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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

5520 EIGHTH LINE & 5552 EIGHTH LINE

TOWN OF ERIN
WELLINGTON COUNTY

PROJECT NO. 21-1242

June 2022

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT FOR 5520 EIGHTH LINE & 5552 EIGHTH LINE

TOWN OF ERIN

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**FUNCTIONAL SERVICING
AND
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TOWN OF ERIN

1.0 INTRODUCTION

DSEL has been retained by Mattamy (Erin) Limited and 2779181 Ontario Inc. to prepare a functional servicing and stormwater management report (FSR) for 5520 Eighth Line and 5552 Eighth Line in support of their draft plan submissions. Both properties are covered in this report.

5520 Eighth Line and 5552 Eighth Line consist of approximately 36.02 hectares and 27.14 hectares respectively and are bounded by Eighth Line and existing residential properties to the east, agricultural lands to the west, forest to the south, and Sideroad 17 and existing residential properties to the north, as illustrated in ***Figure 1***.

The subject lands are located within Wellington County in the Town of Erin, and are further located in the Village of Erin.

The subject lands are proposed to be developed for residential and related purposes. The plan includes single family homes, townhouses, medium density residential, a neighbourhood park, Natural Heritage System (NHS), stormwater management facilities, a sewage pumping station, and municipal rights-of-way. The draft plans are included in ***Appendix A.*** To avoid confusion with referencing duplicated street names on the draft plans, the composite plan is used as the basis for the FSR and is illustrated in ***Figure 2***.

The following report will outline the servicing and stormwater management requirements for the project and will confirm that adequate services are available to support the proposed developments in accordance with the standards of the Town of Erin, Wellington County, Credit Valley Conservation, and general industry practice.

2.0 PREVIOUS STUDIES AND REPORTS

The following material has been reviewed in order to identify the constraints, which govern development within the subject site:

- **Urban Centre Wastewater Class EA**
  Ainley & Associates Ltd., October 2019
  (Wastewater Servicing EA)

- **Urban Centre Water Servicing Class EA**
  Triton Engineering Services Ltd., February 2020
  (Water Servicing EA)

- **Water and Wastewater Development Charges Update Study**
  Watson & Associates Economists Ltd., August 2021
  (DC Update Study)

- **Development Charges Background Study**
  Watson & Associates Economists Ltd., May 2019
  (DC Study)

- **Erin and Hillsburgh DC Charge Study Briefing - Water Components**
  Triton Engineering Services Limited, May 2020
  (DC Study Water Memo)

- **Issued for Tender Drawings, Construction of Trunk Sanitary Sewer, Watermain & Related Infrastructure Segment 2 and Segment 4**
  WSP, May 2022
  (Issued for Tender Drawings)

- **Town of Erin Engineering Design Standards Manual**
  Tatham Engineering Limited, May 2022
  (Municipal Design Criteria)

- **Stormwater Management Planning and Design Manual**
  Ministry of Environment, March 2003
  (SWMP Design Manual)

- **Stormwater Management Criteria**
  Credit Valley Conservation, August 2012
  (SWM Criteria)

- **Low Impact Development and Stormwater Management Planning and Design Guide**
  Credit Valley Conservation and Toronto and Region Conservation Authority, 2010
  (LID Guide)

- **Erosion and Sediment Control Guidelines for Urban Construction**
  TRCA et al, December 2006
  (ESC Guidelines)

- **Bridge 11 Replacement Hydraulic Report**
  RJ Burnside, April 2020
  (Bridge 11 Hydraulic Report)

- **Hydrogeological Assessment – Langen Property**
  R.J. Burnside & Associates Limited, June 2022
  (Hydrogeological Assessment)

- **Drinking Water Threats Disclosure Report and Salt Management Plan**
  R.J. Burnside & Associated Limited, June 2022
  (Threats Disclosure Report)

- **Environmental Impact Study 5520 Eighth Line & 5552 Eighth Line**
  R.J. Burnside & Associates Limited, June 2022
  (EIS)

- **Erosion Mitigation Assessment West Credit River (Erin Branch)**
  Geo Morphix Ltd., June 2022
  (Erosion Assessment)

The above documents form the basis for this report.

3.0 WATER SUPPLY SERVICING

3.1 Water Supply Servicing Design Criteria

The water supply servicing the subject lands will be designed according to the ***Municipal Design Criteria***, by taking into consideration watermain sizing, depth, crossings, valves, hydrants, and service connections such that adequate pressures and fire flows can be achieved. Water design flows will be designed with the following criteria shown in ***Table 3-1*** and ***Table 3-2*** below.

Table 3-1: Water Design Criteria

DEMAND TYPE	CRITERIA
Average Daily Demand – Residential (L/c/d)	290
Maximum Daily Demand – Residential (L/c/d)	2.75 x avg. day or per MECP Guidelines
Peak Hour Demand – Residential (L/c/d)	4.13 x avg. day or per MECP Guidelines

Table 3-2: Town of Erin Population Densities

DEVELOPMENT TYPE	EQUIVALENT POPULATION DENSITY (PERSON / UNIT)	EQUIVALENT POPULATION DENSITY (UNIT / HA)
Single Family	2.8	24
Townhouse	2.8	40

3.2 Existing Water Services

Existing watermains are currently available in the vicinity of the subject lands as follows:

Table 3-3: Summary of Existing Watermains

Street	Size	Location
Eighth Line	unconfirmed[1]	Erin Heights Drive to Sideroad 17
Sideroad 17	250 mm	Eighth Line to Wellington County Road 23

[1] Record drawings unavailable from the Town

The existing watermains are illustrated in ***Figure 3.***

3.3 External Water Supply Requirements

As identified in the ***Water Servicing EA***, the Town of Erin is planning future water infrastructure to service existing and future lands throughout Erin and Hillsburgh. This will be achieved through the design and construction of new municipal wells and treatment facilities, pumping facilities, transmission mains, and storage facilities.

Based on correspondence with Ainley Group in October 2021 included in ***Appendix B*** and information provided in the ***DC Study Water Memo***, the following projects are required to support future development within Erin:

Table 3-4: DC Water Projects

Project	Description
W2020-03A	Design and construction of a new municipal well at 5657 Wellington CR23
W2020-03B	Design and construction of 1,500 m of trunk watermain on CR23 from the new municipal well to Sideroad 17
W2020-04	Design and construction of a 2,140 m^3 water tower within Erin

W2020-10A	Design and construction of 950 m of trunk watermain from the intersection of Sideroad 17 & Wellington CR23 to the future municipal water tower
W2020-12	Watermain connection to Development Area 4 (DA4)

The anticipated timing for the above projects is noted in the ***DC Update Study*** as between 2021 and 2031.

In addition to the projects summarized in ***Table 3-4***, watermain improvements on Sideroad 17, Eighth Line, and Dundas Street may also be required.

3.4 Proposed Water Supply

The site will be serviced by connecting to external watermains within Eighth Line at the south end of the proposed development at Street 'E' and by extending the watermain on Sideroad 17 from Eighth Line to Street 'C'.

The water distribution system within the development will be sized to meet the pressures and flows in accordance with the ***Municipal Design Criteria***. The system will be looped internally in order to provide system security.

As the Town of Erin water model is not yet available, a watermain analysis has not been completed. Once the municipal model is available, the analysis will be completed to determine watermain sizing and ensure domestic and fire flows and pressures are met. As part of the analysis, it will be determined if the existing watermains adjacent to the subject lands are sufficient to service the proposed development or if external upgrades on Eighth Line, Sideroad 17, and Dundas Street are required, and the need for any other requirements such as a local booster station.

The proposed watermain network is illustrated in ***Figure 3.***

4.0 WASTEWATER SERVICING

4.1 Wastewater Design Criteria

The wastewater mains will be designed with the following ***Municipal Design Criteria***:

Table 4-1: Wastewater Design Criteria

DEMAND TYPE	CRITERIA
Average Residential Daily Sewage Rate	290 L/capita/day
Inflow and Infiltration	90 L/capita/day
Peaking Factor	Peak Flow Factor – Harmon Formula

Table 4-2: Town of Erin Population Densities

DEVELOPMENT TYPE	EQUIVALENT POPULATION DENSITY (UNITS / HA)	EQUIVALENT POPULATION DENSITY (PERSON / UNIT)
Single Family	24	2.8
Townhouses	40	2.8

4.2 Existing Wastewater Services

No municipal wastewater system exists within the Town of Erin. Private on-site septic systems service the existing properties in the vicinity of the subject lands.

4.3 External Wastewater Supply Requirements

As identified in the ***Wastewater Servicing EA***, a municipal wastewater system for the Town has been recommended, which includes the following: gravity sewers, forcemains, pumping stations, and a wastewater treatment plant (WWTP).

Based on correspondence with Ainley Group in May 2022 included in ***Appendix C*** the following projects will be required to support the proposed development:

- Design and construction of the proposed Wastewater Treatment Plant
- Segment 1 - Erin Sewage Pumping Station (E-SPS-1) in Lions Park and forcemains to the WWTP
- Segment 2 - Micro-Tunnelled Trunk Sanitary Sewer on Main Street from E-SPS-1 to the intersection with the Elora Cataract Trail
- Segment 3 - Trunk Sanitary Gravity Sewer from Hillsburgh to Erin via the Elora Cataract Trail

The WWTP construction contract was awarded to North American Construction (NAC) in March of 2022 and construction is anticipated to commence upon receipt of the Environmental

Compliance Approvals. A request for tenders has been issued for the linear infrastructure related to Segments 1 through 4 and construction is anticipated to commence in the Fall of 2022.

As there is now a gravity sewer instead of a forcemain as proposed in the ***Wastewater Servicing EA*** in the Elora Cataract Trail, it allows the subject lands to discharge to the sewer in the trail at the intersection with Sideroad 17. A gravity system is proposed for the subject lands to convey all flows to the pump station block on Eighth Line just south of the pond block as described in ***Sections 4.3.3*** and ***4.4*** below. From there, two external sanitary options have been reviewed to convey flows to the intersection of the trail and Sideroad 17 which are presented in ***Drawing 1*** and ***Sections 4.3.1*** and ***4.3.2*** below.

4.3.1 *Option 1 – Gravity Sewer*

This external sanitary gravity option includes a gravity sanitary sewer routed north on Eighth Line and east on Sideroad 17. The proposed gravity sanitary sewer on Sideroad 17 will connect with the gravity sanitary sewer proposed by the Town of Erin at the intersection of Sideroad 17 and the Elora Cataract Trail where flows will ultimately be conveyed to the proposed municipal WWTP.

A review of the ***Issued for Tender Drawings*** confirmed that a gravity external sanitary option may be feasible to service the proposed development and the neighbouring Empire development. The drawings show that the difference in obverts between the trail and Main Street sewers within maintenance hole No. H-MH-65 is approximately 2 m which would accommodate some lowering through the trail if needed.

To convey the sanitary flows from the subject lands and the neighboring Empire development lands to the proposed Elora Cataract Trail sanitary sewer, a channel crossing is required on Eighth Line. Considering the proposed sewer invert upstream of the crossing, the elevation of the bottom of the West Credit River at the Eighth Line crossing, and the proposed invert at the connection to the Elora Cataract Trail sanitary sewer, two options are proposed to accommodate the channel crossing:

1. Insulate and strap the sanitary sewer to the bridge
2. Construct a sanitary siphon below the channel to maintain approximately 1.5 m of clearance between the channel bed and the sewer

Continuing a gravity sanitary sewer downstream to the trail, the 450mm diameter sanitary sewer proposed by the Town of Erin on the Elora Cataract Trail would need to be lowered by approximately 1.1 m from Sideroad 17 to Main Street. The drop in the manhole at the intersection of the trail and Main Street accommodates the proposed lowering without necessitating further downstream lowering.

While the drainage area for the existing Erin Heights subdivision has been accounted for in the sizing of this external sewer, the Town is to provide guidance on if and how that area would connect to the Eighth Line sewer. We note that the Eighth Line sewer could be deepened by approximately 8 m at MH 1005A with this option to accommodate Erin Heights. Should a deeper connection be required, localized pumping in Erin Heights should be considered to avoid pumping the entire area tributary to the Eighth Line sewer.

The proposed gravity external sanitary option is depicted in ***Drawing 1.***

4.3.2 *Option 2 – Pumping Station and Forcemain*

The second external sanitary option includes a pump station south of the Pond 2 block on Eighth Line, and a forcemain on Eighth Line and Sideroad 17 from the pumping station on Eighth Line to the intersection of Sideroad 17 and the Elora Cataract Trail. The forcemain will connect to the proposed Town of Erin gravity sanitary sewer on the Elora Cataract Trail, where the sanitary flows will ultimately be conveyed to the proposed municipal WWTP.

The proposed pumping external sanitary option is depicted in ***Drawing 1.***

Option 1 is preferred as it eliminates the need for a pump station. This eliminates the upfront and ongoing maintenance costs of the station, and provides the security of a gravity connection to the lands tributary to this sewer.

4.3.3 *Gravity Sewer on Eighth Line to Pump Station Block*

In both of the options described above, a gravity sanitary sewer is proposed on Eighth Line from Street 'E' to the proposed pumping station block. Three sanitary connections are proposed to the Eighth Line gravity sanitary sewer to service the subject lands and neighboring lands as depicted on ***Drawing 1***.

- One connection to the subject lands will be provided at Street 'E' to convey flows from an area of approximately 6.12 ha with a proposed population of 274.
- A second connection to the subject lands will be provided at the Pond 2 block to convey sanitary flows from an area of approximately 19.94 ha with a proposed population of 1175.
- The final connection to the Eighth Line gravity sewer will be provided on the east side of Eighth Line to convey flows from the Empire development which has an area of approximately 11.57 ha and a proposed population of 810.

In addition to the population serviced via the proposed connections on Eighth Line, the external sanitary sewer has been sized to accommodate potential redevelopment on Eighth Line and the existing residential population within the Erin Heights subdivision.

Sanitary drainage areas are illustrated in ***Drawing 1*** with design sheets included in ***Appendix D***.

4.4 Proposed Wastewater Servicing

4.4.1 *General Overview*

The subject site will be serviced by a network of local gravity sewers designed in accordance with the ***Municipal Design Criteria***.

The conceptual wastewater servicing concept is illustrated in ***Figure 4***. Sanitary drainage from the subject site will be conveyed via local gravity sewers to either "Trunk 1" or "Trunk 2". The sanitary drainage from the site is split by a high point located on Street 'E' near the intersection with Street 'A'. Trunk 1 generally collects sewage from the area north and west of the high point and conveys it north, and Trunk 2 generally collects sewage from the area south and east of the high point and conveys it southeast.

Trunk 1, located on Street ‘A’, conveys sewage north towards Street ‘C’ and then east on Street ‘C’. Trunk 1 is then routed through an easement within the northern Medium Density Block before traversing south across the NHS. Further details regarding the NHS sanitary crossing can be found in ***Section 4.4.2*** below. Following the NHS crossing, Trunk 1 is routed along the outer edge of the Stormwater Management (SWM) Pond 2 block and conveys sanitary drainage towards Eighth Line. As described in ***Section 4.3***, Trunk 1 will either connect to a pumping station south of the pond on Eighth Line or to a gravity trunk sewer on Eighth Line.

Trunk 2, located on Street ‘E’, conveys sewage southeast towards Eighth Line where it connects into the proposed trunk sewer on Eighth Line.

Sanitary drainage areas are illustrated in ***Drawing 2*** with design sheets included in ***Appendix D***.

4.4.2 *Natural Heritage System Crossing*

To connect Trunk 1 to the proposed pumping station at Eighth Line or the Eighth Line trunk gravity sewer, crossing the NHS is required. The sanitary sewer installation is proposed to be completed via open cut construction. The sanitary crossing will generally follow the existing laneway through the NHS to minimize the impact to the area. As noted in the ***EIS,*** the existing laneway bisects two wetlands and provides a crossing alignment that is already heavily disturbed and avoids further fragmenting the adjacent wetlands. The ***EIS*** recommends the following mitigation measures:

- Fuel handling and construction staging to be located, at minimum, outside of the 30 m PSW buffer
- Robust ESC and spills plan to be implemented for the crossing works to prevent sedimentation and contamination of the PSW
- Area to be restored with a planting plan that will include self-sustaining native vegetation

4.4.3 *Sanitary Easements*

As noted above, sanitary easements are required to convey Trunk 1 through the northern medium density block as well as across the NHS through the lands to be retained north of the pond block. A 10 m easement is proposed through the northern medium density block and a 15 m easement is proposed through the retained lands. The proposed easement widths are in excess of the minimum required easement widths for sanitary sewers per the ***Municipal Design Criteria*** and accommodate the construction and maintenance of the sanitary sewer.

5.0 STORM DRAINAGE

5.1 Existing Features and Drainage Patterns

The subject lands are located within the Credit River Watershed and generally drain northeast toward the West Credit River (Erin Branch). The existing site is comprised of plowed fields, forested areas, hedgerows, and wetlands. There is a series of cascading wetlands in the northern half of the site that are part of a provincially significant wetland (PSW) complex. There is no existing storm infrastructure within the subject lands.

The existing drainage areas are illustrated in ***Figure 5***.

5.2 Conveyance of Minor System Flows

The subject lands will be serviced by a conventional storm sewer system designed in accordance with the ***Municipal Design Criteria***. The storm sewers will be sized using a 5-year return frequency and Town of Erin IDF curve. Units with basements will be serviced with gravity storm connections.

Storm flows will generally be directed to one of two stormwater management facilities located within the site where the runoff will be treated for water quality, erosion, and quantity control. As backyard and roof drainage is considered clean, some backyard and roof areas will be directed overland to the NHS or via clean water sewers, to maintain the water balance to wetland features within the NHS. ***Section 10.2*** provides further detail regarding the feature based water balance for the wetlands.

The minor system drainage from the northern medium density block will be conveyed to the NHS to maintain flow to the wetland features and will treated for quality control before discharging. In order to match pre-development flows at Eighth Line, the flow to the NHS will be limited to approximately 135 L/s through a flow splitter, and the remainder of the flow will be conveyed to Pond 1 for treatment. The conceptual storm servicing plan is provided in ***Figure 6***.

Additionally, the minor system drainage from the southern medium density block will be conveyed to an infiltration gallery in the park as part of the 5 mm retention strategy before discharging to Pond 2. To prevent excess sediment build up in the infiltration gallery, pre-treatment is proposed by way of an oil grit separator (OGS) located within the block.

Storm drainage areas are illustrated in ***Drawing 3*** with design sheets included in ***Appendix E***.

5.3 Conveyance of Major Storm Flows

Major system runoff in excess of the minor system and up to the 100-year event will be conveyed within the road allowances via a continuous overland flow route or captured at 100-year intakes and conveyed via storm sewers, ultimately directed to Ponds 1 and 2. The major system flow will not exceed the width of the road allowance, and in no case will the depth of flow exceed 0.15 meters above the crown of the road during a 100-year event, in accordance with the ***Municipal Design Criteria***. Should the major system flow exceed the conveyance capacity of any given road, the storm sewer will be sized to accommodate the flows in excess of the road capacity. Right-of-way conveyance capacities will be confirmed at the detailed design stage based on detailed road grades.

Due to constraints with the site grading which are further discussed in ***Section 11***, several 100-year intakes are proposed to capture and convey major system flows to Pond 2 via gravity storm sewers sized to accommodate the 100-year event:

- Due to the large grade differential between Street 'A' and Pond 2 and to avoid routing a continuous overland flow route through the park, a 100-year intake is proposed on Street 'A' at the north end of the park to capture major system flows within the storm sewer.

- A 100-year intake is proposed on Street 'D' at the intersection with Street 'A' as the Street 'D' flows are to be directed to Pond 2 but the grading on Street 'A' does not allow for the high point to be shifted north of this intersection.

- A 100-year intake is proposed on Street 'H' in order to grade the street to the north following the existing topography of the site which helps to reduce the grade difference to Eighth Line.

- A 100-year intake is proposed on Street 'G' in order to reduce the significant grade difference between Streets 'G' and 'E' and tie into the boundary grades along Eighth Line without the use of retaining walls.

- Finally, a 100-year intake is proposed on Street 'E' at the intersection with Eighth Line to avoid discharging subdivision major system drainage to Eighth Line.

Emergency spill points will be provided in 100-year intake areas to safely convey storm events above the 100-year storm as well as provide an emergency route in the event of blockage.

As noted in ***Section 5.2***, minor system drainage from the northern medium density block will be conveyed to the NHS. Major system flow from the northern medium density block, however, will be conveyed overland to Pond 1.

5.4 Clean Water Collection

Clean water collection sewers are proposed in various locations across the site to convey clean flow to the wetland features within the NHS. The clean water collectors will convey roof and backyard drainage captured in rear yard catch basins as well as NHS drainage captured in ditch inlet catch basins (DICB). The clean water collection system is illustrated in ***Figure 6***.

The clean water collection sewers are included in the design sheets in ***Appendix E***.

5.5 External Drainage

The site conveys flows from approximately 1.74 ha of external lands to the west of the proposed development for treatment in Ponds 1 and 2. Pond 2 also treats external drainage from approximately 1.87 ha of existing residential properties to the east of the subject lands, and 2.02 ha from Eighth Line as illustrated in ***Figure 6***.

External flows from the west of the subject lands will be conveyed to the local storm sewers via cut off swales to DICBs or rear yard swales and rear yard catch basins along the west limit of the development. External drainage from the existing residential properties east of the subject lands will flow overland toward the pump station where flows will be captured in a DICB, toward cut off swales south of Pond 2 where flows will be conveyed to wetlands located within the NHS north of the park, or toward Eighth Line where flows will enter the Eighth Line storm sewer via street catch basins.

5.5.1 *Eighth Line Drainage*

As discussed in ***Section 10.1***, Eighth Line will be urbanized from Dundas Street to the watercourse crossing on Eighth Line. The minor system drainage for Eighth Line between Dundas Street and Pond 2 will be conveyed to Pond 2 via a gravity storm sewer located within the Eighth Line ROW. The minor system for Eighth Line between Pond 2 and the watercourse crossing will be conveyed through a local storm sewer within the Eighth Line ROW and treated for quality control prior to discharging to the West Credit River. Major system drainage from Eighth Line will be conveyed uncontrolled to the West Credit River via the Eighth Line ROW as the low point on Eighth Line is located near the bridge, north of Pond 2.

5.6 Southern Slope Drainage

As depicted in ***Drawing 6,*** cut off swales are proposed along the base of the slope within the deep lots in the southwest portion of the site. Cut off swales are proposed to capture the slope drainage as the drainage areas including the transition sloping will exceed the maximum for a side yard swale per ***Municipal Design Criteria***. The cut off swales will convey the flows to DICBs which will connect to either the storm sewer or a clean water collection pipe as depicted in ***Figure 6***.

5.7 Easements

Several storm sewer and clean water sewer easements are proposed through residential lots to convey drainage to the local storm system and to convey clean water to wetland features. Easements have generally been sized at 3.0 m in accordance with Table 15 of the ***Municipal Design Criteria***, with the exception of the easement for the 450 mm diameter PVC clean water pipe that conveys flows from DICB 2103 to the NHS. The easement for this sewer has been conceptually sized at 3.0 m as the installation, maintenance and replacement of a 450 mm PVC pipe uses the same equipment and methods that are required for a 375 mm PVC pipe at the same depth.

6.0 STORMWATER MANAGEMENT

6.1 Stormwater Management Requirements

In the absence of a high-level stormwater management planning study, the CVC confirmed in an email dated August 2021, included in ***Appendix F***, that stormwater management must be practiced as follows:

Water Quality Control	Enhanced stormwater quality control in accordance with the ***SWMP Design Manual***
Erosion Control	Minimum 5mm on site retention or as determined by detailed geomorphic studies. Detention of the 25mm event for 48 hr if required based on the erosion assessment.
Quantity Control	Control post development peak flows to pre-development for 2 – 100-year events. No regional controls required.

Stormwater treatment will be provided by two end of pipe stormwater management wetland facilities. Pond 1 is located at the north end of the site adjacent to Sideroad 17 and Pond 2 is located centrally in the site adjacent to Eighth Line. The ponds are discussed in **Sections 7** and **8** below.

The pond block locations are proposed in the lowest areas of the site in close proximity to the receiving water body, the West Credit River. In addition to property limits, the pond block limits were established by defining existing constraints in the proposed locations. Pond 1 is defined by a dripline buffer to the east. Pond 2 is defined by wetland buffers to the north and south, and a 100 m well head protection area (WHPA) to the east. Further information regarding the WHPA is provided in ***Section 12***.

As noted in ***Section 5.2***, the minor system flows from the northern and southern medium density blocks with be treated for quality control prior to discharging to the wetlands to meet the feature based water balance and to provide pre-treatment prior to discharging to an infiltration gallery in the park as part of the 5 mm on site retention strategy respectively.

As noted in ***Section 5.5***, the minor system drainage for Eighth Line between Pond 2 and the watercourse crossing is proposed to be conveyed to the West Credit River via a local storm sewer. Quality control will be provided prior to discharging.

Details of the quality control will be confirmed at detailed design.

7.0 POND OPERATING CHARACTERISTICS

The stormwater management ponds have been designed in accordance with the requirements of the ***Municipal Design Criteria*** and ***SWMP Design Manual***, and include the following features:

Sediment Forebay	➢ to improve sediment removal prior to entering the pond and contain turbidity
Permanent Pool	➢ to buffer storm flows and trap pollutants
Extended Detention Storage	➢ to provide water quality and erosion control
Quantity Control Storage	➢ to attenuate post development flows to pre-development

The ponds have been sized to ensure post-development flows do not exceed pre-development conditions. To set the pond release rates a pre-development SWMHYMO model was created based on underlying soil mapping, land use, and topographic data. This model was run for the 2–100-year events to determine the release rates of the site to the West Credit River at three different nodes under pre-development conditions. Node 1 is located just south of Sideroad 17, Node 2 is located west of the bridge crossing on Eighth Line, and Node 3 is located immediately east of the bridge crossing on Eighth Line. The model was then updated to reflect the proposed development plan, and the two proposed SWM ponds were iteratively sized to ensure post-development peak flows do not exceed pre-development conditions. Pond 1 release rates are based on pre-development flows at Node 1 and Pond 2 release rates are based on pre-development peak flows at Node 3. The pond sizing and pond controls are included in ***Appendix G***.

The conceptual design of the stormwater management ponds and typical cross-sections are presented in ***Figure 7*** and ***Figure 8.*** A summary of the pond operating characteristics is presented in ***Table 7-1.***

Table 7-1: Summary of Required Stormwater Management Facility Storage Characteristics

Pond I.D.	Facility Type	Drainage Area (ha)	Imp. Coverage (%)	Permanent Pool Volume [1] (m^3)	Erosion Control Volume [2] (m^3)	25 Year Flood Control Volume [3] (m^3)	100 Year Flood Control Volume [3] (m^3)
1	Wetland	12.48	70	999	1,437	6,534	7,902
2	Wetland	25.23	55.1	1,642	2,751	11,280	13,920

[1] 80 m3/ha and 65 m3/ha for wetlands (SWMP Design Manual, Table 3.2)
[2] Based on volume required to detain the 25 mm event for a minimum of 48 hrs
[3] Based on volume required to attenuate peak flows to pre-development flows

The impervious coverage has been estimated based on the various land uses and their respective sizes in the current plan and are summarized in ***Table 7-2*** below. The runoff coefficients used for the development meet or exceed the minimum runoff coefficients per Table 12 of the ***Municipal Design Criteria***. Please note that the final impervious coverage will up-dated at the detailed design stage based on the characteristics of the actual plan, and the pond sizing adjusted accordingly.

Table 7-2: Summary of Runoff Coefficients

Land Use	Runoff Coefficient
Single Family Residential	0.69
Townhouses	0.75
Medium Density Block	0.90
Open Space & NHS	0.25
Park	0.40

Details of the conceptual pond designs are discussed in ***Section 8***.

8.0 POND COMPONENTS

8.1 Sediment Forebay

The stormwater management constructed wetlands include a sediment forebay in order to improve the pollutant removal by trapping larger particles near the inlet of the pond. The forebay will be designed with a length to width ratio of approximately 2:1 and will not exceed 20% of the permanent pool surface area for wetlands, as required in the ***SWMP Design Manual***. Furthermore, the forebay will have a minimum depth of 1.0 metre to minimize the potential for re-suspension.

8.2 Permanent Pool

The permanent pools are approximately 0.3 metres deep outside of the forebay, which is within the range recommended in the ***SWMP Design Manual***.

The permanent pools have been sized to provide an enhanced level of protection in accordance with the ***SWMP Design Manual***. The required and provided permanent pool volumes are summarized in ***Table 8-1*** below:

Table 8-1: Permanent Pool Storage

Pond I.D.	Pond Type	Drainage Area (ha)	Imp. Coverage (%)	Unit Volume (m^3/ha)[1]	Volume Required (m^3)	Volume Provided (m^3)
1	Wetland	12.48	70.0	80	999	1,558
2	Wetland	25.23	55.1	65	1,642	2,696

[1] Interpolated from SWMP Design Manual, Table 3.2

The slopes in the permanent pools will be graded with side slopes of 5:1, with minor localized variations in accordance with the ***SWMP Design Manual***.

8.3 Extended Detention Storage

The ***Erosion Assessment*** notes the critical discharge rate for the receiving watercourse is 1.41 m^3/s, which equates to a unitary release rate of 0.00043 m^3/s/ha over the watercourse's 3571 Ha drainage area. Based on the uncontrolled flow required for the wetland water balances, controlling the extended detention for each pond to the release rate based on the unitary release rate noted above would result in negative release rates in the ponds. Additionally, based on the pre-development SWMHYMO results, the existing flows exceeds the unitary release rate. As noted in the ***Erosion Assessment***, this threshold is considerably conservative and should only be used as an overall target for the watershed as drainage contributions on a per hectare basis will vary significantly based on individual site characteristics. The assessment notes that extended detention of the 25 mm event as well as working towards onsite retention of the first 5mm of runoff is expected to sufficiently mitigate excess erosion.

The extended detention storage has been sized based on releasing the 25mm storm event over a minimum of 48 hours for erosion control. As per the extended detention tables Table 7B and 11B included in ***Appendix G,*** the 25mm event is expected to drawdown in approximately 3.5 days in Pond 1 and 4.2 days in Pond 2.

The extended detention storage for Ponds 1 and 2 does not exceed 1.0 metre depth for storms less than the 10 year event in accordance with the ***Municipal Design Criteria*** and ***SWMP Design Manual***.

The extended detention component has been provided with side slopes of 5:1 with minor localized variations in accordance with the ***SWMP Design Manual***.

8.4 Extended Detention Outlet

The extended detention volumes within the ponds will outlet through a reverse graded pipe. A 100 mm orifice will be provided at an elevation of 395.50 m to discharge the extended detention volume at a maximum release rate of 14 L/s for Pond 1.

A 135 mm orifice will be provided at an elevation of 403.00 m to discharge the extended detention volume at a maximum release rate of 24 L/s for Pond 2.

Calculations in support of the extended detention outlet are provided in ***Appendix G.***

8.5 Quantity Control Outlet

Quantity control will be provided by a combination of orifices and weirs located in pre-cast box outlet structures. The allowable release rates for the site are based on the pre-development peak flow rates at Nodes 1 and 3 located upstream of the pond outlets. The target flow rates for the nodes based on pre-development conditions are summarized in ***Table 8-2.***

Table 8-2: Summary of Node Target Discharge Rates

Node I.D.	Peak Outflow Rates (m^3/s)	
	25 Year	100 Year
1	0.876	1.257
2	2.483	3.567
3	2.644	3.783

Pond 1

A 500 mm x 200 mm vertical rectangular orifice will be provided at elevation of 396.85 m for quantity control. This orifice in combination with the 100 mm diameter circular orifice at an elevation of 395.50 m for quality control will control the post development 100-year flow from the pond to 0.188 m^3/s. This results in a 100-year flow at Node 1 of 1.206 m^3/s which is less than the pre-development flow of 1.257 m^3/s.

The controlled flows at the outlet structure will be conveyed by a 525 mm diameter concrete pipe (or equivalent) with a 0.30% slope and a capacity of 0.236 m^3/s. The flows from that pipe will be directed to the West Credit River immediately south of Sideroad 17.

The simulated operating levels for Pond 1 are presented in ***Table 8-3***:

Table 8-3: Pond 1 Summary of Pond Operating Characteristics

Design Storm	Lower Elevation (m)	Upper Elevation (m)	Outflow (m^3/s)	Total Volume Used (m^3)
Permanent Pool	394.50[1]	395.50	-	1,560
Extended Detention	395.50	395.70	0.014	3,090
25 Year	395.50	397.05	0.100	8,120
100 Year	395.50	397.30	0.191	9,530

[1] Permanent pool is 1.0 m deep in the forebay only

Calculations in support of the quantity control orifices and weirs are provided in ***Appendix G***.

Pond 2

A 1400 mm x 300 mm vertical rectangular orifice will be provided at elevation 403.70 m for quantity control. This orifice in combination with the 135 mm diameter circular orifice at an elevation of 403.00 m for quality control will control the post development 100-year flow from the pond to 1.145 m^3/s. This results in a 100-year flow at Node 3 of 3.175 m^3/s which is less than the pre-development flow of 3.783 m^3/s.

The controlled flows at the outlet structure will be conveyed by a 750 mm diameter concrete pipe (or equivalent) with a 1.50% slope and a capacity of 1.363 m^3/s. The flows from that pipe will be directed to the West Credit River, immediately east of Eighth Line.

The simulated operating levels for Pond 2 are presented in ***Table 8-4***:

Table 8-4: Pond 2 Summary of Pond Operating Characteristics

Design Storm	Lower Elevation (m)	Upper Elevation (m)	Outflow (m^3/s)	Total Volume Used (m^3)
Permanent Pool	402.00[1]	403.00	-	2,700
Extended Detention	403.00	403.20	0.024	5,770
25 Year	403.00	404.50	0.977	14,290
100 Year	403.00	404.75	1.145	16,620

[1] Permanent pool is 1.0 m deep in the forebay only

Calculations in support of the quantity control orifices and weirs are provided in ***Appendix G***.

8.6 Emergency Overflows

In the event of a blockage or a storm greater than the 100-year design horizon, an emergency overflow weir will be provided in each pond.

Pond 1 is located adjacent to Sideroad 17 and will be provided with an overflow weir to the Sideroad 17 ROW north of the pond and ultimately to the West Credit River. The overflow weir has been conceptually sized at a length of 20.0 m at an elevation of 398.20 m. Pond 2 is located adjacent to Eighth Line and will be provided with an overflow weir to the Eighth Line ROW and ultimately to the West Credit River. The overflow weir has been conceptually sized at a length of 20.0 m at an elevation of 405.20 m.

8.7 Access Road

Five metre wide access roads will be provided in the pond blocks in order to facilitate routine inspection and maintenance activities within the pond. The pond access road will double as a trail to provide pedestrian connection between adjacent streets and naturalized areas. The access roads will be paved and graded with a maximum slope of 5% where the access road doubles as a trail and 10% elsewhere, in accordance with the ***Municipal Design Criteria***.

8.8 Thermal Mitigation

Thermal mitigation measures will be provided at pond locations by the application of the following measures:

- The extended detention discharge will be released through a buried outlet pipe, thereby using the thermal mass of the surrounding soil to attenuate temperatures.
- The facilities have been designed with a high length to width ratio where possible to allow for effective shading with landscape material.
- Increased riparian vegetation will be provided throughout the constructed wetlands.

9.0 WATER BALANCE

9.1 Site Wide Water Balance

A ***Hydrogeology Assessment*** has been completed by RJ Burnside for the proposed development to assess the existing hydrogeologic conditions of the site and determine potential impacts of development on the water balance.

The site-specific water balance assessment concluded that without mitigation, the development lands would experience 32% less infiltration under post-development conditions. This equates to an annual infiltration deficit of approximately 47,400 m^3/year without mitigation.

In order to promote additional infiltration and to reduce runoff volumes under post-development conditions, several low impact development strategies (LIDs) are recommended. The LIDs recommended to achieve pre to post development water balance for the subject lands are outlined below:

- Disconnect roof leaders and discharge to pervious grade
- Increase topsoil depth in the lots, boulevards, and park

Introducing the above noted LIDs will increase the infiltration volume by 43,400 m^3/year when compared to the unmitigated post-development scenario. This results in only a 3% annual infiltration deficit when compared to pre-development conditions. Please refer to the ***Hydrogeological Report*** for post-development water balance calculations.

9.2 LID Measures

In addition to maintaining the pre- to post development annual infiltration for the subject lands, LID measures are proposed on site with best efforts to retain the first 5 mm of runoff from impervious surfaces. Retaining frequent low flow events on site will mitigate erosion within the receiving watercourse. The following LIDs are proposed to retain the 5mm event:

- Divert clean water to wetland features
- Implement rear yard infiltration trenches
- Implement an infiltration gallery in the park

As described in ***Section 9.3***, clean water is proposed to be conveyed from several areas across the development to the NHS to maintain the pre-development runoff to wetland features within the NHS. Diverting clean flow to the NHS rather than conveying it to a stormwater management facility is expected to mitigate erosion in the receiving watercourse by providing an opportunity for infiltration and evapotranspiration prior to reaching the watercourse.

Rear yard infiltration trenches are proposed where feasible. Rear yard trenches are proposed to collect and infiltrate runoff from impervious roof and backyard areas. Runoff will be conveyed through rear yard swales to rear lot catch basins. As depicted in the infiltration trench detail provided on ***Figure 9***, the subdrain invert is lower than the rear yard catch basin lead invert, allowing the infiltration trench to fill and infiltrate runoff before overflowing to the catch basin lead and entering the mainline storm sewer. The rear yard infiltration trenches have been conceptually sized to store up to the 25 mm event.

An infiltration gallery is proposed in the park to store and infiltrate flows from the southern medium density block. An OGS is proposed to pre-treat stormwater from the medium density block prior to conveying the flows to the infiltration gallery. Pre-treatment is recommended to prevent sediment buildup and blockage within the infiltration facility. The proposed infiltration gallery will operate similar to the rear yard infiltration trenches. The gallery will be composed of clearstone and will be equipped with an overflow pipe that will convey flows in excess of the infiltration gallery capacity to the local storm system and ultimately Pond 2. The infiltration gallery has been conceptually sized to store runoff from the medium density block during a 25 mm rainfall event.

Site constraints result in limited infiltration opportunities across the development. In an effort to match the existing topography, walkup and walkout units are proposed throughout the site resulting in limited rear yard catch basins and limited opportunities for rear yard infiltration trenches. Rear yard infiltration trenches have also not been proposed in lots with retaining walls due to the proximity of the infiltration facility relative to the structure. In addition to the grading constraints, the high groundwater table in the northeast of the site limits the possible infiltration locations.

Crediting 5 mm retention to the impervious areas draining to the existing wetlands, the proposed LIDs have a storage capacity of approximately 680 m^3, which equates to approximately 3 mm of runoff from the impervious development area. Although the storage capacity is less than the 5 mm retention target, retaining 3mm across the development can be achieved with the challenging site constraints and is expected to have positive impacts on the downstream watercourse. The storage volume calculations for the proposed LIDs are included in ***Appendix E***.

Site specific infiltration testing and groundwater monitoring should be completed at detailed design to ensure there is sufficient clearance between the base of the LID and the groundwater table as well as confirm the drawdown time of each LID. Filtration will be provided where infiltration is not feasible.

Figure 9 illustrates the proposed LIDs.

9.3 Feature Based Water Balance

A review of the ecological features located within, and in close proximity to, the proposed development was conducted by RJ Burnside in the ***EIS***. It was determined through review of the ecological features that there are eight wetlands and one aquatic feature located within the site that rely on surface flow from the subject lands to maintain the vegetation community. The ***EIS*** recommends that under post-development conditions drainage be maintained to the features and feature based water balance analyses have been completed for these features.

A feature based water balance has also been completed for a pond feature located on the neighboring lands to the northeast of the proposed development. The feature is not part of the PSW complex, and as such, the feature was not assessed through the ***EIS***. The pond's post development drainage area, however, is reduced in the post development condition. Therefore, to ensure the feature receives a similar volume of runoff post-development, a feature based water balance has been completed. It should be confirmed if this is a surface water fed feature.

A feature based water balance analysis was completed by GeoMorphix Ltd. to assess the water balance to the eight wetlands and two pond features. The results of the feature based water balance have been included in ***Appendix H*** and are summarized below.

Figure 10 and ***Figure 11*** depict the pre-development and post-development drainage areas to the features respectively.

9.3.1 *SWDM4-5 & SAS_1-1*

As depicted in ***Figure 10*** the pre-development drainage area to wetland features SWDM4-5 and SAS_1-1 is approximately 3.81 Ha. A portion of the wetlands' pre-development drainage area is proposed to be developed, causing flows to be diverted away from the wetland. To maintain the water balance to the SWDM4-5 and SAS_1-1 features post development, clean water from the southern NHS, roofs, and back yards is proposed to be routed to the wetland via overland flow and clean water collection sewers. Based on modelling results from the feature based water balance analysis, diverting clean water from these areas to SWDM4-5 and SAS_1-1 achieves 95% of the pre-development runoff to the features in the post development condition.

9.3.2 *SWTM2-1 & SWDM2-2*

As depicted in ***Figure 10*** the pre-development drainage area to wetland features SWTM2-1 and SWDM2-2 is approximately 6.99 Ha. A portion of the wetlands' predevelopment drainage area is proposed to be developed, causing flows to be diverted away from the wetland. To maintain the water balance to the SWTM2-1 and SWDM2-2 features post development, clean water from the southern NHS, roofs, and back yards is proposed to be routed to the wetland via overland flow and clean water collection sewers. Based on modelling results from the feature based water balance analysis, diverting clean water from these areas to SWTM2-1 and SWDM2-2 achieves 96% of the pre-development runoff to the features in the post development condition.

9.3.3 *SWDM4-1*

As depicted in ***Figure 10*** the pre-development drainage area to wetland feature SWDM4-1 is approximately 7.08 Ha. A portion of the wetland's pre-development drainage area is proposed to be developed, causing flows to be diverted away from the wetland. To maintain the water balance to the SWDM4-1 feature post development, clean flows from the SWTM2-1 and SWDM2-2 features will be intercepted in a cut-off swale south of Pond 2 and conveyed to SWDM4-1 via clean water collection pipes. Clean water from the park, roofs, and back yards is also proposed to be routed to the wetland via overland flow and clean water collection sewers. Based on modelling results from the feature based water balance analysis, diverting clean water from these areas to SWDM4-1 achieves 99% of the pre-development runoff to the feature in the post development condition.

9.3.4 *MAMM1-3*

As depicted in ***Figure 10*** the pre-development drainage area to wetland feature MAMM1-3 is approximately 14.38 Ha. As illustrated in the figure, drainage from wetland feature SWDM4-1 cascades into wetland feature MAMM1-3. A portion of the wetland's predevelopment drainage area is proposed to be developed, causing flows to be diverted away from the wetland. To maintain the water balance to the MAMM1-3 feature post development, a portion of the minor system drainage from the northern medium density block is proposed to be routed to the wetland. As discussed in ***Section 5.2***, quality control will be provided prior to discharging flows to the wetland. Based on modelling results from the feature based water balance analysis, diverting water from the medium density block to wetland MAMM1-3 achieves 102% of the pre-development runoff to the feature in the post development condition.

9.3.5 *MAMM2-2*

As depicted in ***Figure 10*** the predevelopment drainage area to wetland feature MAMM2-2 is approximately 19.96 Ha. As illustrated in the figure, drainage from wetland features SWDM4-1 and MAMM1-3 cascades into wetland feature MAMM2-2. A portion of the wetland's pre-development drainage area is proposed to be developed, causing flows to be diverted away from the wetland. To maintain the water balance to the MAMM2-2 feature post development, clean flows from the SWTM2-1 and SWDM2-2 features will be intercepted in a cut-off swale south of Pond 2 and conveyed to MAMM2-2 via a clean water collection sewer. Based on modelling results from the feature based water balance analysis, diverting clean water from these wetlands to MAMM2-2 achieves 105% of the pre-development runoff to the feature in the post development condition.

9.3.6 *SWDM4*

As depicted in ***Figure 10*** the pre-development drainage area to wetland feature SWDM4 is approximately 20.77 Ha. As illustrated in the figure, drainage from wetland features SWDM4-1, MAMM1-3 and MAMM2-2 cascades into wetland feature SWDM4. A portion of the upstream wetland's pre-development drainage areas, and therefore the SWMD4 drainage area is proposed to be developed, causing flows to be diverted away from the wetland. Based on modelling results from the feature based water balance analysis, providing clean flow to the upstream wetlands that cascade into SWDM4 achieves 105% of the pre-development runoff to the SWDM4 in the post development condition, without routing any additional flow directly to the feature.

9.3.7 *AQ1*

As depicted in ***Figure 10*** the pre-development drainage area to the AQ1 feature is approximately 1.00 Ha. In the post development condition, the drainage area is reduced due to stormwater management Pond 2. To maintain the water balance to the AQ1 feature post development, clean water from the NHS south of Pond 2 will be collected in a ditch inlet catch basin and conveyed via a clean water pipe in Eighth Line to the AQ1 feature. Based on modelling results from the feature based water balance analysis, diverting clean water from this area to the AQ1 feature achieves 107% of the pre-development runoff to the feature in the post development condition.

9.3.8 *AQ2*

As depicted in ***Figure 10*** and ***Figure 11***, a portion of the 2.32 Ha AQ2 pre-development drainage area is proposed to be developed. To ensure the pond receives similar water volumes in the post development condition a pre to post development water balance analysis was conducted for the AQ2 feature. Based on the results of the analysis, diverting clean water from backyard and roof areas north of Street ‘C’ to the AQ2 feature will maintain 92% of the pre-development runoff to the AQ2 feature post development.

9.3.9 *Environmental Review*

The ***EIS*** notes that the post-development hydroperiods for the features are sufficiently close to the pre-development condition which will protect the wetlands.

10.0 ROADS

Access to the property is available from the north by Sideroad 17 via Street ‘C’ and from the east by Eighth Line via Street ‘E’. Municipal right of way widths proposed in the site are 18 m and 20 m. The typical Town of Erin road sections are included in ***Appendix I***. Modified standard road sections depicting the servicing layout in areas where there is a three pipe system are included in ***Figure 12.***

Local streets will be designed in accordance with the ***Municipal Design Criteria***. Due to the steep topography of the site, road grades up to 5.0% are proposed in areas with lot frontage and up to 7.0% elsewhere, which meets the Town Standards.

Sidewalks will be constructed in accordance with the enclosed municipal cross sections. The sidewalks are generally proposed on the north and west sides of the streets as per Town standards. The sidewalk on Street ‘A’, however, is proposed on the east side of the street to provide pedestrian connectivity to the park. Additionally, to avoid flipping the sidewalk to the other side of the road on continuous streets, sidewalks on looped streets are not consistently maintained on the north or west side. The proposed locations are illustrated on ***Figure 13***.

10.1 Eighth Line Urbanization

Eighth Line is proposed to be widened and urbanized along the frontage of the subject lands. As it will tie into 20 m 2-lane rural cross-sections at both the north and south ends, and as no widening is expected to be provided along the existing Erin Heights Subdivision, a 23 m cross-section is proposed to provide a 2-lane urban section with the widening occurring on the west side of the road.

The 23.0 m ROW is proposed approximately from Dundas Street W to the northern limit of the retained Langen property on Eighth Line. North of the 23.0 m ROW, a 20.0 m urban ROW is proposed to the watercourse crossing. The remaining section of Eighth Line from the watercourse crossing to Sideroad 17 is proposed to remain as a 20.0 m rural road per existing conditions. A sidewalk is proposed on both sides of the 23.0 m ROW from the proposed Street 'E' and Erin Heights Drive intersection to the pond access road on the west side of Eighth Line and to the park in the Empire development lands on the east side of Eighth Line. Typical cross-sections for Eighth Line have been included in ***Figure 14***.

To match boundary elevations at existing driveways, Erin Heights Drive, and the ROW limit, Eighth Line centreline grades have generally been maintained. The proposed profile of Eighth Line is illustrated in ***Drawing 1***. The proposed slopes vary from 0.5% to 8.0%, with the majority of the road at or below 6% and only localized sections which exceed the Town's maximum slope of 6% for collector roads. The steeper sections are proposed to generally match the existing profile and allow for existing grades to be matched along the existing Erin Heights subdivision.

In additional to generally matching the existing profile, a modified cross-section is proposed adjacent to the existing Erin Heights Subdivision in order to tie into existing grades. An asymmetric cross-section is proposed to increase the boulevard width on the east side in order to tie into the existing ditch in an effort to preserve the existing trees along the ROW. The applicable tree preservation zone as well as the feasibility of preserving the trees is to be confirmed by an arborist.

Similarly, a modified cross-section is proposed north of the proposed park within the Empire development to the crossing. Boulevard widths have been narrowed in order to tie into existing grades.

The conceptual grading is illustrated in ***Drawing 4*** with cross-sections in ***Drawing 5***.

10.1.1 *Eighth Line Crossing*

The existing single lane bridge on Eighth Line that traverses the West Credit River will be replaced with a two-lane structure as part of the Eighth Line works. The Eighth Line bridge was identified by the Town of Erin as requiring replacement and the project is included in the ***DC Study***.

As noted in the ***Erosion Assessment*** a crossing span consistent with the Eighth Line crossing north of Sideroad 17 (9.14m) is recommended to maintain the existing channel form. The structure design will be further reviewed through detailed design, including a hydraulic analysis and ecological review to confirm the structure span.

11.0 PRELIMINARY GRADING PLAN

A preliminary grading plan has been prepared for the subject site based on the engineering constraints identified above. The site is generally constrained by the steep existing grades within the subject lands and the boundary elevations at the interface with the NHS, existing residential lots, agricultural lands to the west, Eighth Line and Sideroad 17. There is over 60 vertical metres between the highest elevation at the ridge at the south end the site and the lowest elevation at Sideroad 17. As a result of the challenging existing topography, the proposed streets, ponds, and park have been strategically configured to optimize the grading design.

The spine road for the site is comprised of Street 'E' from Eighth Line to Street 'A', Street 'A' from Street 'E' to Street 'C', and 'Street C' from Street 'A' to Sideroad 17. The high point of the spine road is located on Street 'E' just east of Street 'A' and has been positioned near the existing high point of the site to mimic the existing topography. North of the high point, the spine road falls north generally following the existing topography toward a low point at Sideroad 17. Southeast of the high point, the spine road falls southeast toward a low point at Eighth Line. The spine road is slightly curved to maximize its length and therefore maximize the grade differential that can be accommodated along the road.

The southwest area of the site is near the top of the existing ridge and is especially steep. The local streets off the spine road in this area have been designed to generally run parallel to the existing contours, while the lots are aligned perpendicular to the existing contours. This configuration minimizes the centreline grade of the local streets and takes advantage of the large grade differential that can be accommodated through the walk out and walk up units proposed in this area. Additionally, lots with increased lot depth are proposed in the southwest of the site so the extended lot depth can be used as a grading transition from the ridge to the proposed development.

The proposed grading design limits the use and height of retaining walls by maximizing transitional sloping where possible and by implementing walk-up and walk-out unit types to maximize the grades over the units. The proposed centreline grades of local streets have been limited to 5.0% in areas with lot frontage to minimize the crossfall between lots and reduce the need for driveway retaining walls. All boundary conditions are achieved with the proposed plan as demonstrated on the conceptual grading plan in ***Drawing 6*** and cross-sections in ***Drawing 7.***

11.1 Grading in Natural Heritage System

Grading in the NHS and the associated buffers is minimized but may be required at the following locations:

- Storm outfalls
- Grade transitions within the outer 15 m of the 30 m wetland buffer
- Grade transitions within localized areas of the 10 m dripline buffer

As discussed in ***Section 9.3***, eight wetlands within or adjacent to the subject lands require a surface water balance. As such, storm outfalls are required in proximity to the wetlands to convey clean water to the features. The storm outfalls and associated grading works, therefore, are required in the NHS buffers.

As depicted in ***Drawing 6*** and ***Drawing 7***, there are significant grade differentials between the lots at the south end of the site and the southern NHS as well as between the lots north of the park and the adjacent wetland. To accommodate these grade differentials while minimizing the use of retaining walls, grade transitions have been implemented in the wetland and dripline buffers to match the existing boundary grades.

As noted in the ***EIS***, the grading impacts are temporary and once restored will be an improvement from existing conditions as the land has been historically disturbed due to intensive farming practices and is significantly degraded. No long term net effects are anticipated as a result of grading within the buffers. The restoration of the buffers in these locations represents a net benefit and will be enhanced with a native seed mix and conveyed into public use.

The anticipated grading within the NHS buffers is illustrated on ***Drawing 1***.

11.2 Retaining Walls

As depicted in ***Drawing 6*** and ***Drawing 7*** retaining walls are required in some areas to accommodate grade transitions between lots and to match existing boundary grades. The use of retaining walls has been minimized by implementing walk-out and walk-up units to maximize the grades over the units as well as using extensive sloping where possible.

The retaining wall between Street ‘F’ and Street ‘E’ has been limited to a maximum height of 1.0 m as recommended in the ***Municipal Design Criteria***. The retaining wall between Street ‘E’ and Street ‘G’ ranges in height up to approximately 2.0 m to accommodate the grade difference between Street ‘E’ and Street ‘G’. As discussed in ***Section 5.3***, 100-year intakes are proposed on Street ‘G’ to minimize the grade differential between Street ‘E’ and Street ‘G’ and limit of the height of the retaining wall.

Retaining walls on either side of Street ‘C’ at the north end of the site are required to accommodate the grade transition between the existing residential lot to the west and Pond 1 to the east. Pond 1 elevations have been set based on the existing property line grades to the east and the Sideroad 17 boundary grades to the north. As depicted on ***Drawing 6*** there is up to approximately 6 m of elevation difference between the existing property to the west of Pond 1 and the existing property to the east of Pond 1 as well as approximately 10 m of elevation difference between Sideroad 17 and the rear lot line of the property west of Pond 1. Due to the steepness of the lot west of Street ‘C’, Street ‘C’ is required to be lower than the adjacent existing property to accommodate the tie-in to existing Sideroad 17, provide a low point adjacent to the pond, and adhere to the maximum centreline grade per the ***Municipal Design Criteria.*** Additionally, due to the limited width of the site in this location, the width available for transitional grading within the pond block and west of the Street ‘C’ boulevard is limited and retaining walls are required to make up some of the grade differential.

As noted in ***Section 11.3***, extensive transitional sloping is used to match existing boundary grades where possible, however, retaining walls are required in some constrained areas to tie into existing boundary grades. Boundary retaining walls have generally been limited to 3.0 m in height, with localized exceedances.

The retaining walls within the medium density blocks are shown for illustrative purposes only to note that boundary conditions will be met and will be further reviewed through the site plans for those blocks.

All retaining walls over 1.0 m in height will be designed by a Professional Engineer and will be equipped with a 1.5 m high safety fencing as per ***Municipal Design Criteria***. Any retaining walls between two backyards will be fully contained within one lot so that the wall itself and any backfill, tiebacks, etc. will be within one property.

11.3 Boundary Grading

Boundary grades have generally been met through the use of 3:1 transition sloping, however in localized sections along the southern limit of development where grading is constrained, maximum 2:1 sloping is proposed to accommodate the grade differential between the forested area south of the development and the lots on Street 'E' and Street 'G'. Flat 1.0 m wide shelves are proposed approximately midway up the the slope where slopes exceed 3:1 and 6 vertical metres to mitigate erosion. The use of 2:1 sloping eliminates or minimizes the need for retaining walls in these areas.

A slope stability analysis has been completed by Shad and Associates Ltd. for the transition slopes with the larger cuts and fills in the site including the proposed 2:1 slopes. The analysis confirms that the proposed slopes are stable. The slope stability analysis has been included in ***Appendix J***.

11.4 Park Grading

The park grading is constrained by the need to match existing grades at the PSW to the north and woodlot to the south, and the grade differential between Street A and Pond 2 which varies from approximately 19 to 23 m. As a result, transition sloping up to 3:1 has been proposed to tie into all boundary conditions. While this exceeds the Town's criteria of 5:1, this maximizes the area graded at 2-5% and works with the challenging site topography.

11.5 Floodplain

A review of the existing West Credit River (Erin Branch) flood levels adjacent to the subject lands was completed. Based on the ***Bridge 11 Hydraulic Report*** the existing flood elevation downstream of the Sideroad 17 culvert, east of the proposed SWM Pond 1, is 398.08 m due to overtopping of Sideroad 17. To maintain SWM Pond 1 above the floodplain, the northeast Pond 1 berm has been set at an elevation of 398.40 m. Maintaining the pond berm above the flood level results in localized filling in the floodplain in the northeast corner of the Pond 1 block. The loss of floodplain volume is anticipated to be minor and have little impact on the overall floodplain storage in the system.

The Town will be replacing the existing Sideroad 17 crossing which may lower the floodline at the pond. This will be reviewed as the Town advances their design of the new crossing.

11.6 Wildlife Passage

A review of the wildlife within, and in close proximity to, the proposed development was conducted by RJ Burnside in the ***EIS***. The review determined that connectivity is required between the southern NHS and the wetland features SAS_1-1 and SWDM4-1 to provide passage for amphibians and reptiles. A slotted, at-grade wildlife tunnel equipped with headwalls to direct migrating animals through the tunnel is proposed on Street 'E' to provide the required connectivity. The slotted at grade tunnel is proposed rather than a box culvert as the tunnel minimizes the length of the crossing. As noted in the ***EIS***, the animal passage should ideally be less than 25 m in length. With the use of the at grade, slotted tunnel, the length of the crossing can be minimized to approximately 20 m. ***Drawing 6*** illustrates the wildlife passage with a cross-section through the tunnel provided in ***Drawing 7***. Details of the tunnel are provided in ***Appendix K***.

12.0 WELL HEAD PROTECTION AREA

A municipal well known as Erin Well 8 is located east of the subject lands on Eighth Line. Well head protection areas (WHPA) associated with Erin Well 8 extend into the site, including a highly vulnerable 100 m radius surrounding the well defined as WHPA-A (vulnerability score of 10). RJ Burnside developed a Drinking Water Threats Disclosure Report and Salt Management Plan for the site. Figure 2 included in the ***Threats Disclosure Report*** illustrates the extent of the WHPA within the site.

As noted in the ***Threats Disclosure Report*** the following proposed site activities are among the list of drinking water threats;

1. Establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.

2. The application of road salt.

3. An activity that reduces the recharge of an aquifer.

The ***Threat Disclosure Report*** also notes that the Official Plan requires disclosure of several activities including the following activities which are proposed within the development;

- Sanitary sewage and stormwater management

- Winter maintenance activities including road salt application, road salt storage, and snow storage

12.1 Stormwater Conveyance and Stormwater Management Facilities

The two on site stormwater management facilities are located outside of the highly vulnerable WHPA-A and are located within the WHPA-B with a vulnerability score of 8. The emergency spillway for Pond 2 is located within WHPA-A. The locations of the stormwater management facilities were chosen as they are the lowest areas of the site which facilitates gravity conveyance of stormwater, they are close to the West Credit River where the facilities discharge, and they are located outside of the WHPA-A. As recommended in the ***Threats Disclosure Report,*** Pond 2 will be lined to prevent infiltration and mitigate potential drinking water threats posed by the SWM pond. The report also notes that a thick clay, silt and stone layer is present in the area of the pond. Efforts will be made to preserve as much of the layer as possible to protect the underlying sediments from potential contamination. Lining the emergency spillway may also be implemented to prevent infiltration in the WHPA-A in the unlikely event the emergency spillway is activated.

The stormwater outfall pipe from Pond 2 traverses WHPA-A and the Pond 2 headwall located on the east side of Eighth Line at the West Credit River is located within the WHPA-B which has a vulnerability score of 10. As recommended in the ***Threats Disclosure Report*** enhanced construction techniques will be used for the installing the stormwater outfall sewer through the highly vulnerable WHPA to mitigate the risk of leakage.

A local storm sewer is proposed on Eighth Line from Pond 2 to the watercourse, therefore traversing the WHPA-A. An OGS is also proposed upstream of the stormwater outlet at the West Credit River within the WHPA-B with the vulnerability score of 10.

A clean water collection pipe is proposed to discharge within the WHPA-A. The clean water pipe will convey clean flows from the NHS south of Pond 2 to the ecological feature AQ1 located within the PSW complex west of Eighth Line. The pipe is required to outlet within the WHPA-A as the ecological feature is located within WHPA-A and the feature requires a pre to post development surface water balance as per the ***EIS***.

12.2 Sewage Conveyance and Pumping Station

The external sanitary options presented in ***Section 4.3*** of this report result in either a gravity sanitary sewer or forcemain within the highly vulnerable WHPA-A. In both options, the pipes must traverse the WHPA-A to connect to the proposed municipal trunk sewer on the Elora Cataract Trail.

External sanitary Option 2 would also result in a pumping station within WHPA-B with a vulnerability score of 8. The pumping station is proposed on Eighth Line near the northern edge of the development. This location was chosen as it is outside the WHPA-A and the lands tributary to the pump station can drain to this location via gravity.

12.3 Winter Maintenance

It is assumed road salt will be applied to roads, sidewalks and driveways within subject site, including within the WHPA. The ***Threats Disclosure Report*** discusses the salt management plan for the subject site.

12.4 Water Quantity

As noted in the ***Threats Disclosure Report*** the subject lands are not located within an area where water quality threats under the Clean Water Act may be identified.

The imperviousness of the subject lands post development will be higher than the pre-development condition which may reduce the groundwater recharge should mitigation measures not be provided. ***Section 9.1*** of this report describes the proposed mitigation measures at the subject site to maintain the pre-development water balance.

The subject site will be serviced with municipal water, therefore water will not be taken from the aquifer within the development lands for residential use.

13.0 POND MAINTENANCE

13.1 Inspections

As recommended in the ***SWMP Design Manual***, inspections should be made after every significant storm (say, >10 mm) during the first two years of operation to ensure that the facility is functioning properly. It is anticipated that four inspections will be required per year. After the initial period, and proper operation has been confirmed, an inspection schedule can be established based on the observed operation of the pond. As a minimum requirement, however, the pond should be inspected annually, although four inspections per year are recommended.

13.2 Regular Operation and Maintenance Activities

Grass Cutting

Grass cutting is not recommended for the pond. Allowing grass to grow enhances the water quality and provides other benefits. It is understood though, that grass cutting enhances the aesthetics of the facility for nearby residents and therefore, should be done as infrequently as possible.

Grass should not be cut to the edge of the permanent pool and should be done parallel to the shoreline. Grass clippings should be ejected away from the pond.

Weed Control

If weed control is required in order to remove a specific species, the weeds should be removed by hand.

Plantings

A vegetative community is required in three different locations – upland / flood, shoreline, and aquatic fringes. Planting methods and any replanting should be carried out in accordance with the approved Landscape Design and the recommendations of the ***SWMP Design Manual***, or as modified by the operating authority.

Trash Removal

Trash and debris should be removed by hand, performed as required based on inspections.

Sediment Removal

In accordance with the ***SWMP Design Manual,*** it is recommended that the frequency of sediment removal be determined based on a 5% reduction in the total suspended solids (TSS) removal efficiency. The frequency of pond maintenance will be determined at the detailed design stage. It should be noted that routine cleaning of the sediment forebay should allow for less frequent cleaning of the main cell than indicated in the ***SWMP Design Manual,*** however the extension of service life prior to cleaning cannot be quantified.

Safety

The pond should be provided with appropriate signage which warns the public of the presence of deep water and slopes.

Landscape drawings will be prepared with strategic plantings around the perimeter of the pond in order to discourage direct access to the facility.

All inlets, outlets, structures, and headwalls will be provided with the appropriate grates, covers, and safety features in order to prevent public entry or tampering.

14.0 EROSION AND SEDIMENT CONTROL

An erosion and sediment control strategy should be implemented prior to construction of site services. The following measures are recommended:

- environmental fencing where required;
- stone mud mat at the construction entrance;
- use of the permanent pond as a temporary silt basin during site construction activities
- regular inspection and monitoring of the erosion and sediment control devices;
- removal and disposal of the erosion and sediment control devices after the site has been stabilized.

15.0 CONCLUSIONS

The Functional Servicing and Stormwater Management Report provides an overview of the servicing plan for 5520 Eighth Line and 5552 Eighth Line located within the Town of Erin. This report demonstrates the availability of water, wastewater, and storm services for the proposed subdivision in accordance with Town and CVC criteria, and general industry practice. This report is to demonstrate functional design concepts only and not to be used for construction.

Report Prepared by,
David Schaeffer Engineering Ltd.

Per: Elizabeth Reid, EIT

Report Prepared by,
David Schaeffer Engineering Ltd.

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Per: Alexandra Schaeffer, P.Eng

Figures & Calculations Prepared by,
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LICENSED PROFESSIONAL ENGINEER
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July 5, 2022
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Per: Kaca Mitic, P.Eng

SWM Modeling Prepared by,
J.F. Sabourin and Associates Inc.

LICENSED PROFESSIONAL ENGINEER
J. J. BURNETT
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Per: Jonathon Burnett, P.Eng.

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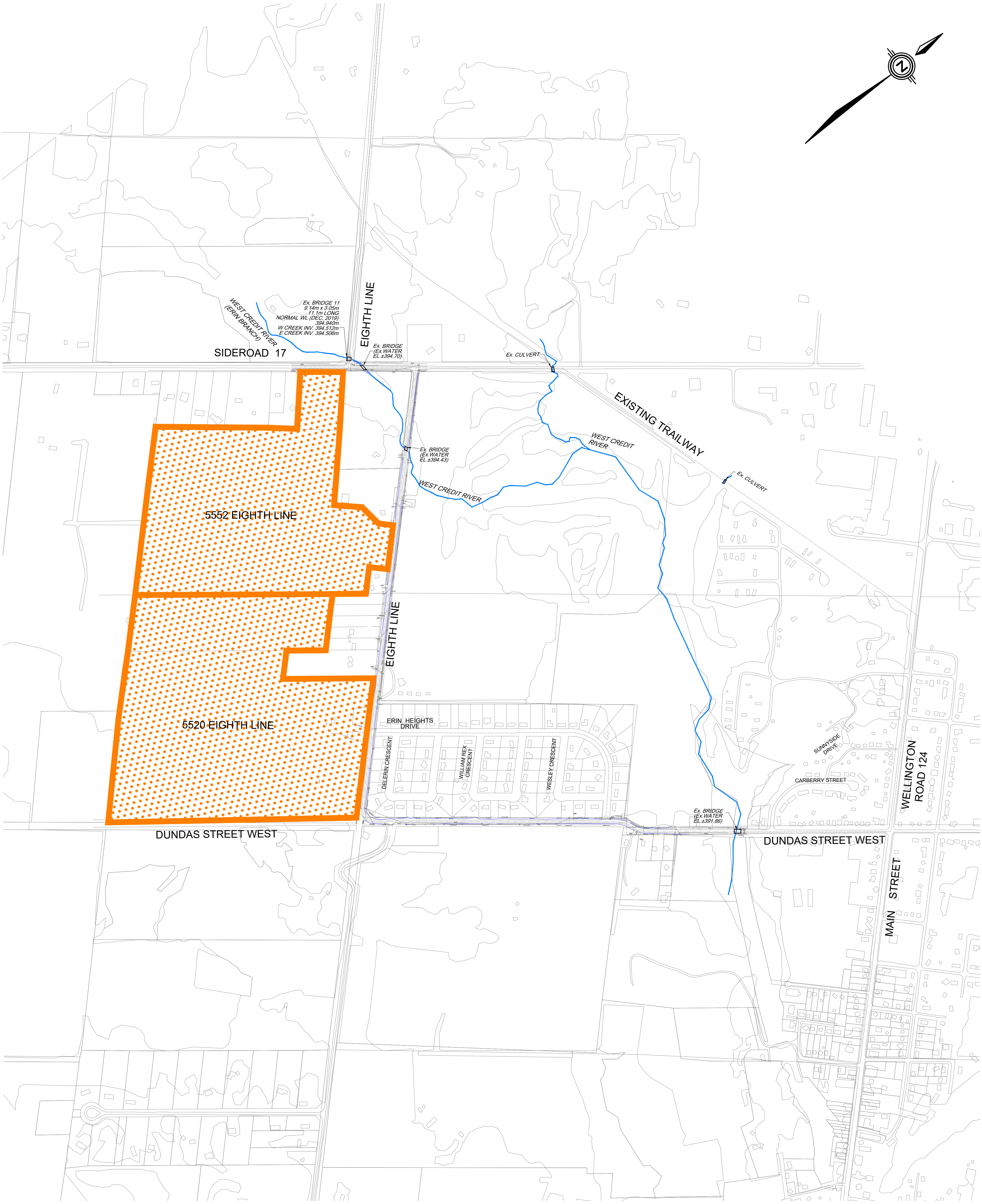
FIGURES & DRAWINGS



LEGEND

SITE BOUNDARY

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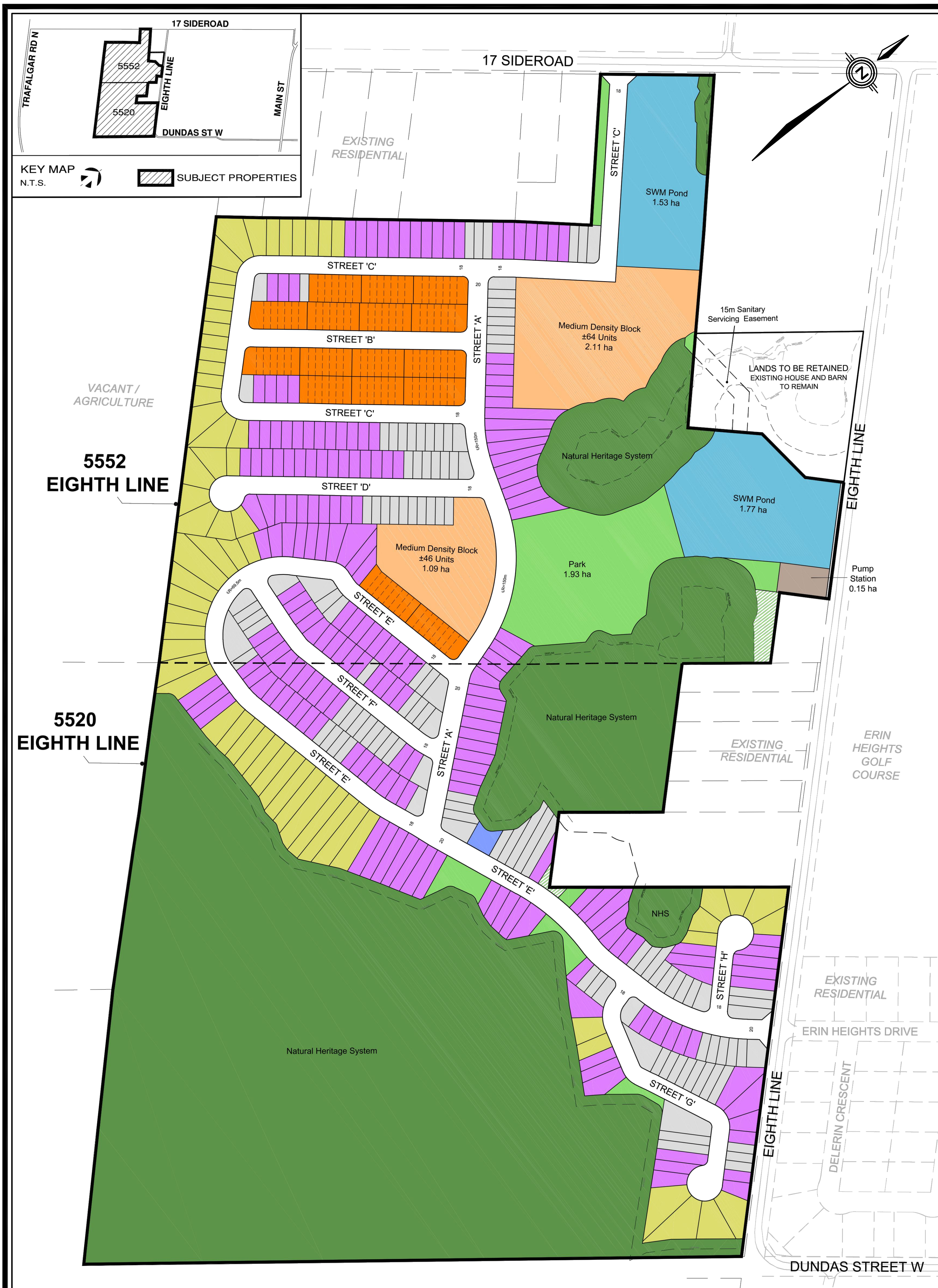
5520 EIGHTH LINE & 5552 EIGHTH LINE

TOWN OF ERIN

SITE LOCATION PLAN

SCALE:	1:10000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	1



ERIN
5552 EIGHTH LINE &
5520 EIGHTH LINE

Preliminary Composite Lotted Plan

Unit Type	Unit Count (±)	%
30' Singles	121	24
36' Singles	204	40
43' Singles	66	13
66' Singles	1	-
23' Townhouses	116	23
Total	508	100

mattamyHOMES

SCALE 1:3500

June 2, 2022

KORSIAK Urban Planning

S:\Korsiak & Company\MATTAMY\Erin\Lotted Plan\2022-06\Erin - Prelim Composite Lotted Plan - Jun 2 22_kc.dwg

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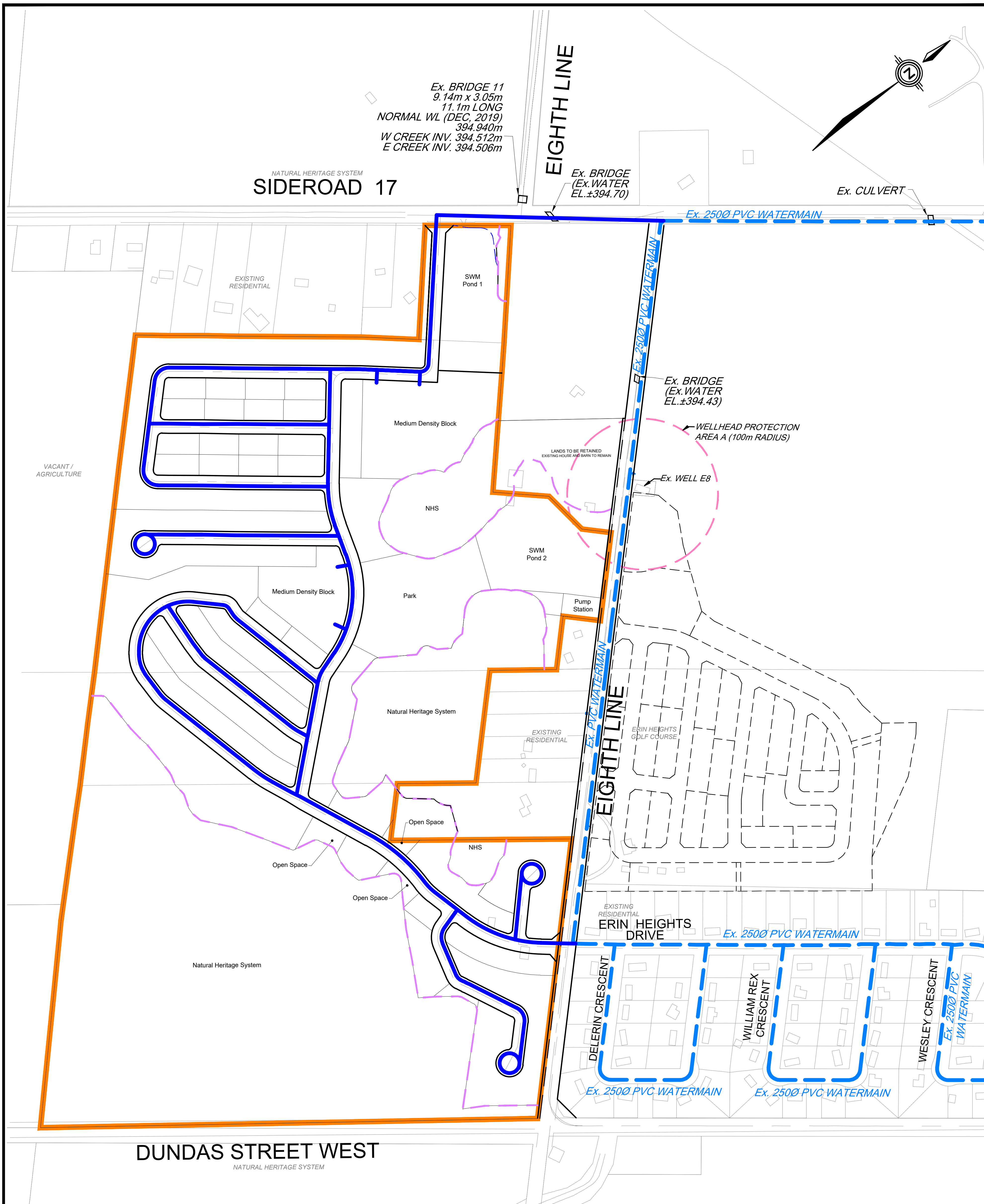
TOWN OF ERIN

COMPOSITE PLAN

SCALE:	AS SHOWN	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	2



LEGEND

SITE BOUNDARY

DEVELOPMENT LIMIT

PROPOSED WATERMAIN

EXISTING WATERMAIN

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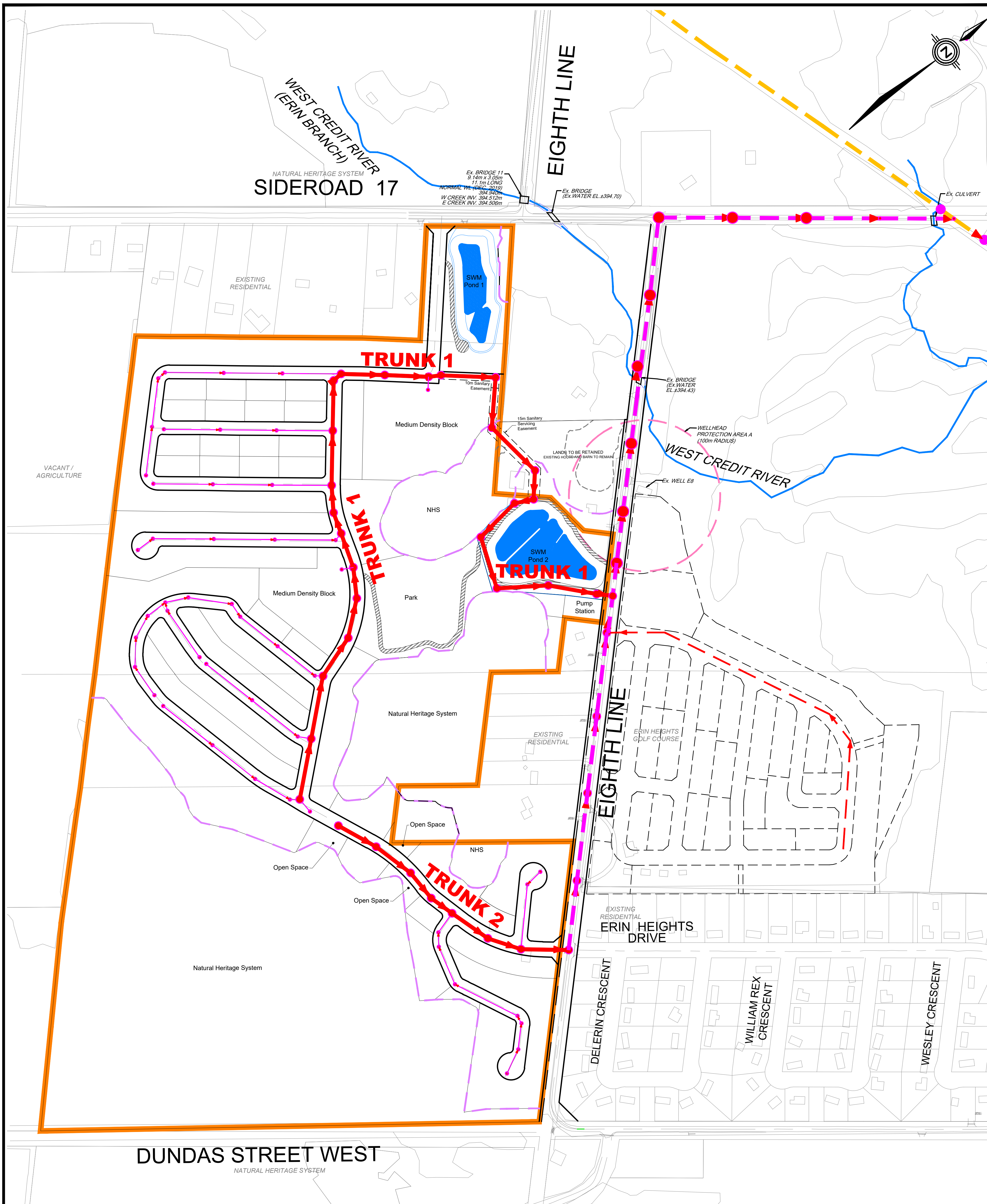
TOWN OF ERIN

CONCEPTUAL WATERMAIN SERVICING PLAN

SCALE:	1:5000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	3



LEGEND

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- PROPOSED EXTERNAL SANITARY TRUNK SEWER (SEE DWG. 1)
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY TRUNK SEWER
- PROPOSED SANITARY SEWER (B.O.)
- PROPOSED SANITARY TRUNK SEWER (B.O.)
- PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY TRUNK MANHOLE
- PROPOSED SANITARY TRUNK MANHOLE (B.O.)

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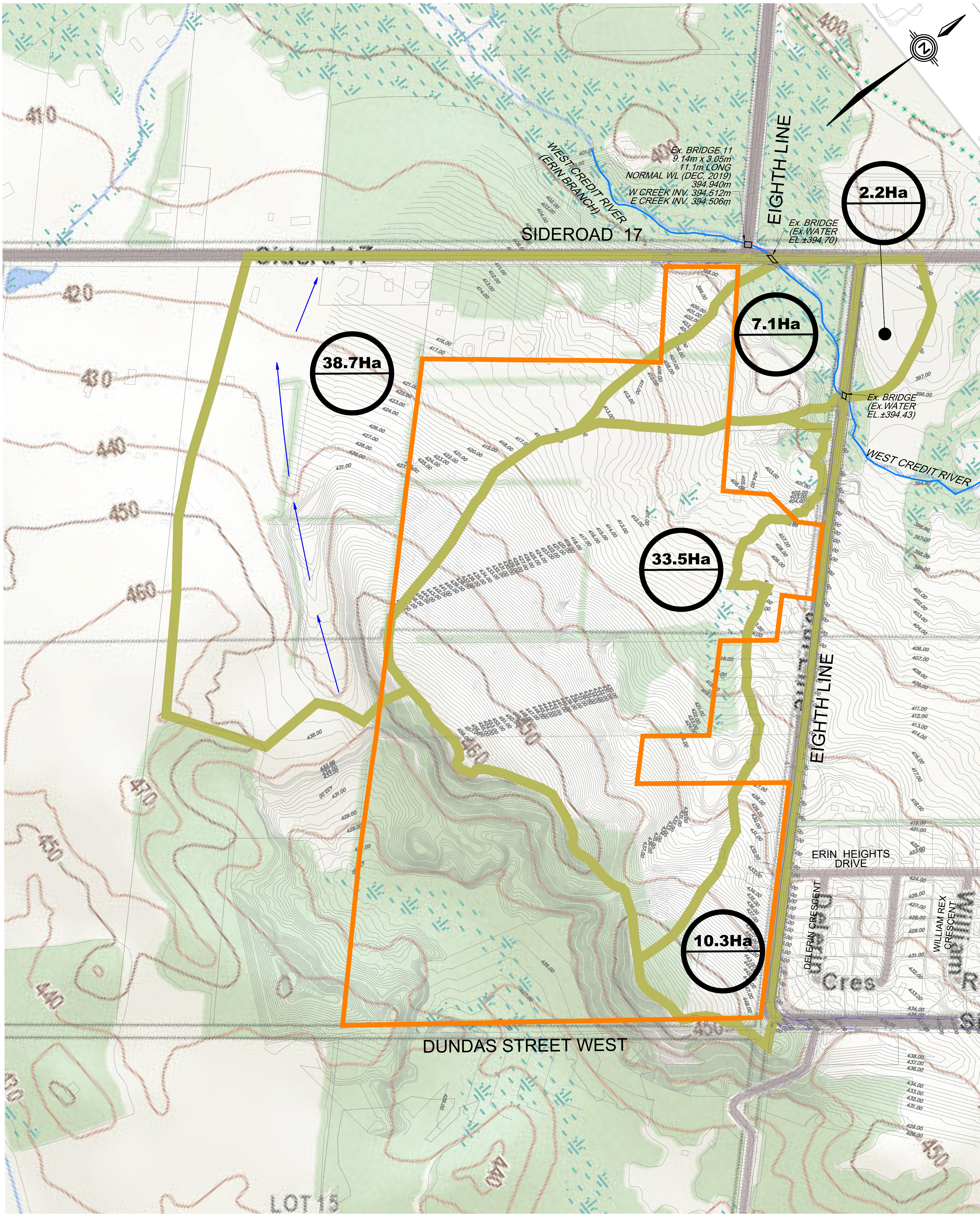
TOWN OF ERIN

CONCEPTUAL SANITARY SERVICING PLAN

SCALE:	1:5000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	4



LEGEND

(orange line)	SITE BOUNDARY
(green line)	PRE-DEVELOPMENT STORM DRAINAGE AREA
33.5Ha	TOTAL PRE-DEVELOPMENT DRAINAGE AREA

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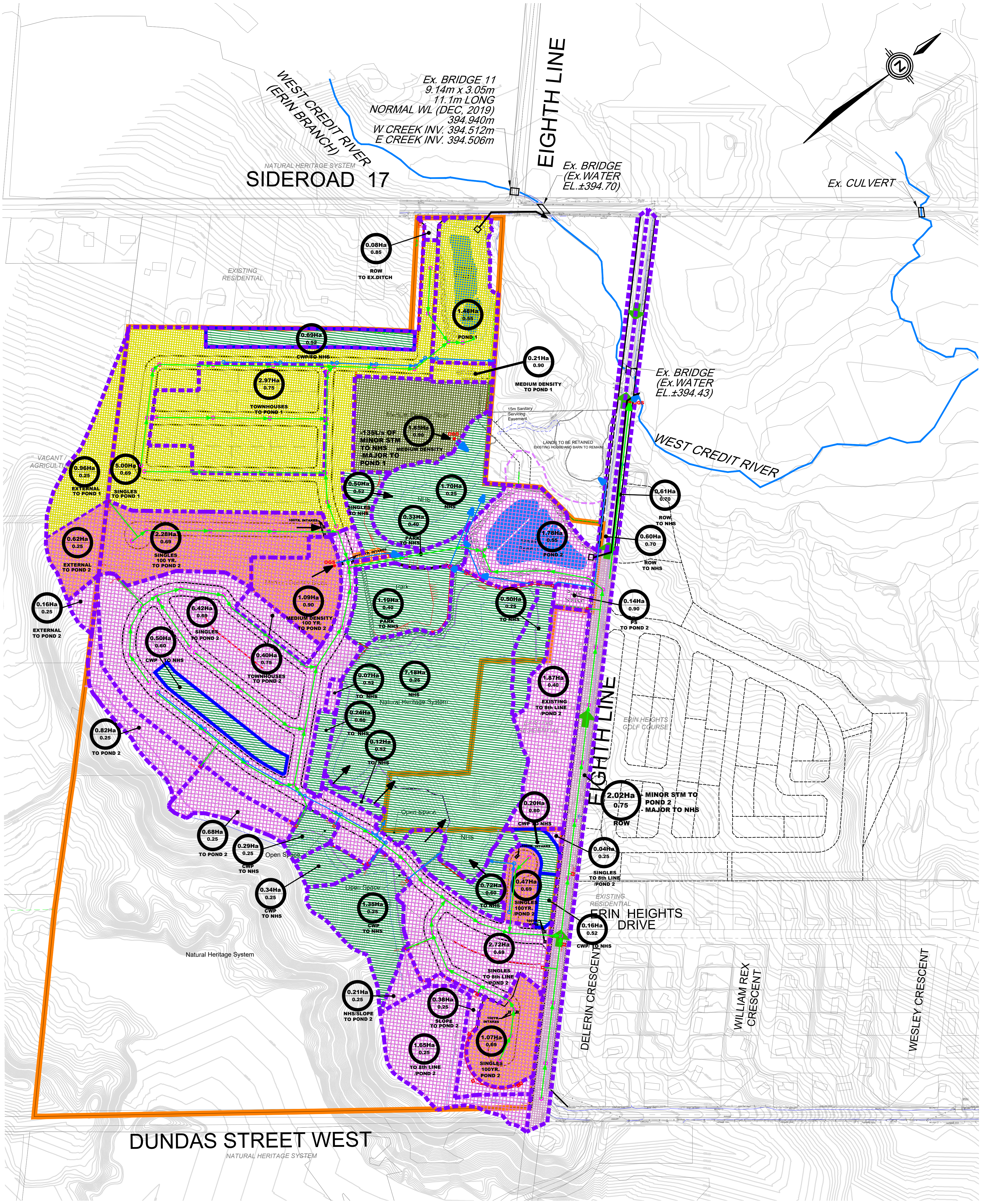
TOWN OF ERIN

PRE-DEVELOPMENT STORM DRAINAGE AREAS

SCALE:	1:6000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	5



LEGEND

SITE BOUNDARY	STORM TRIBUTARY AREA	7.37Ha	TOTAL DRAINAGE AREA		DRAINAGE AREA TO POND 1
DEVELOPMENT LIMIT	CLEAN WATER TRIBUTARY AREA (100 YEAR)	0.25	RUNOFF COEFFICIENT		DRAINAGE AREA TO POND 2
PROPOSED STORM SEWER	INFILTRATION GALLERY	NHS	DRAINAGE DESTINATION		DRAINAGE AREA TO NHS
PROPOSED CLEAN WATER SEWER					MED. DENSITY DRAINAGE AREA TO NHS
					DRAINAGE AREA TO 100 YR. INTAKES

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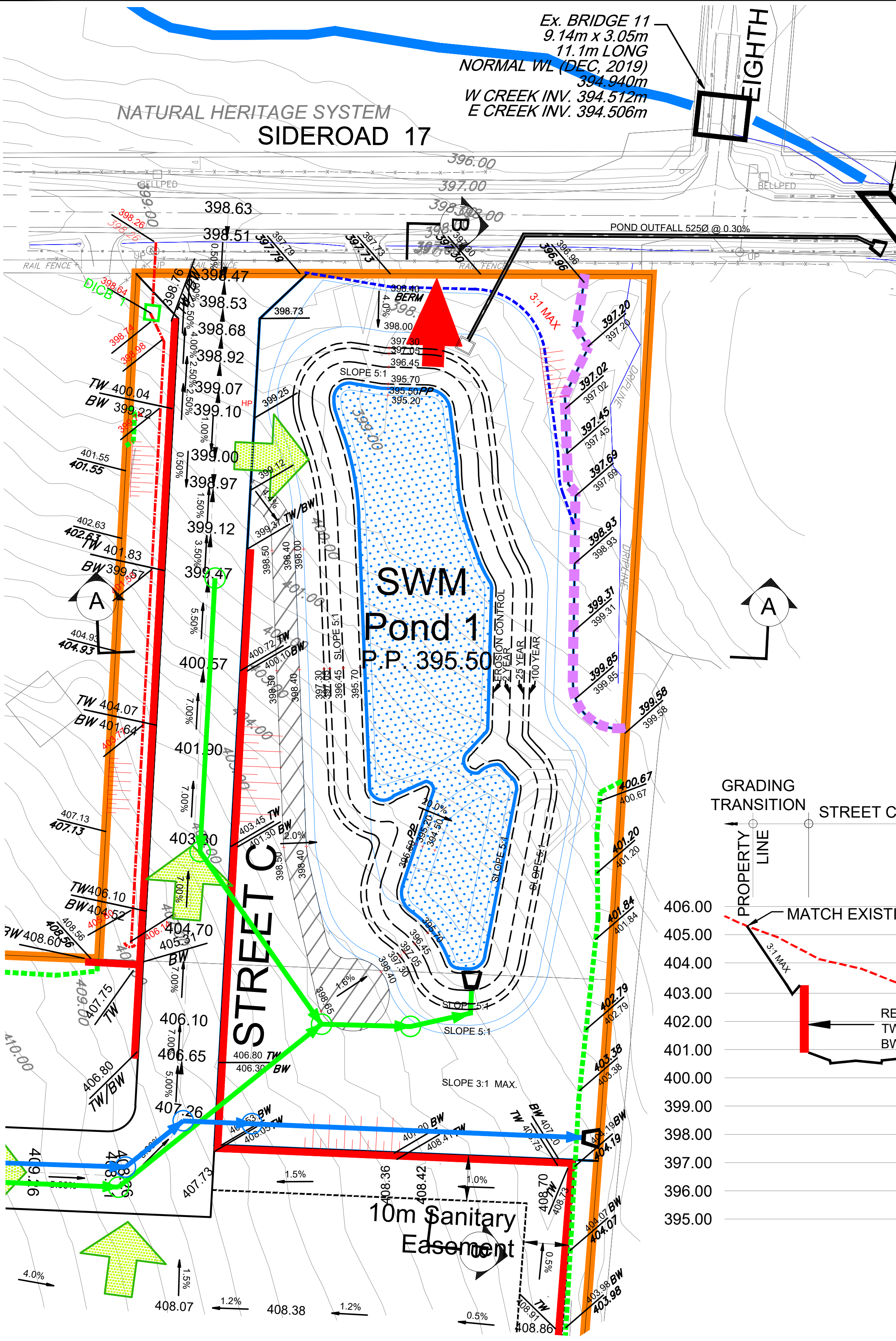
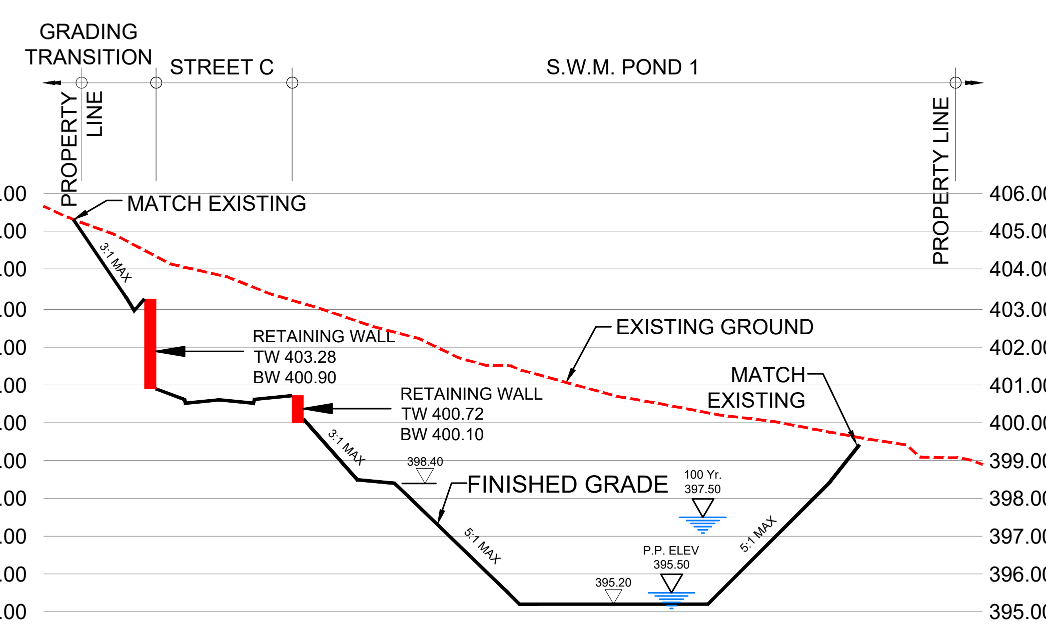
TOWN OF ERIN

CONCEPTUAL STORM SERVICING PLAN

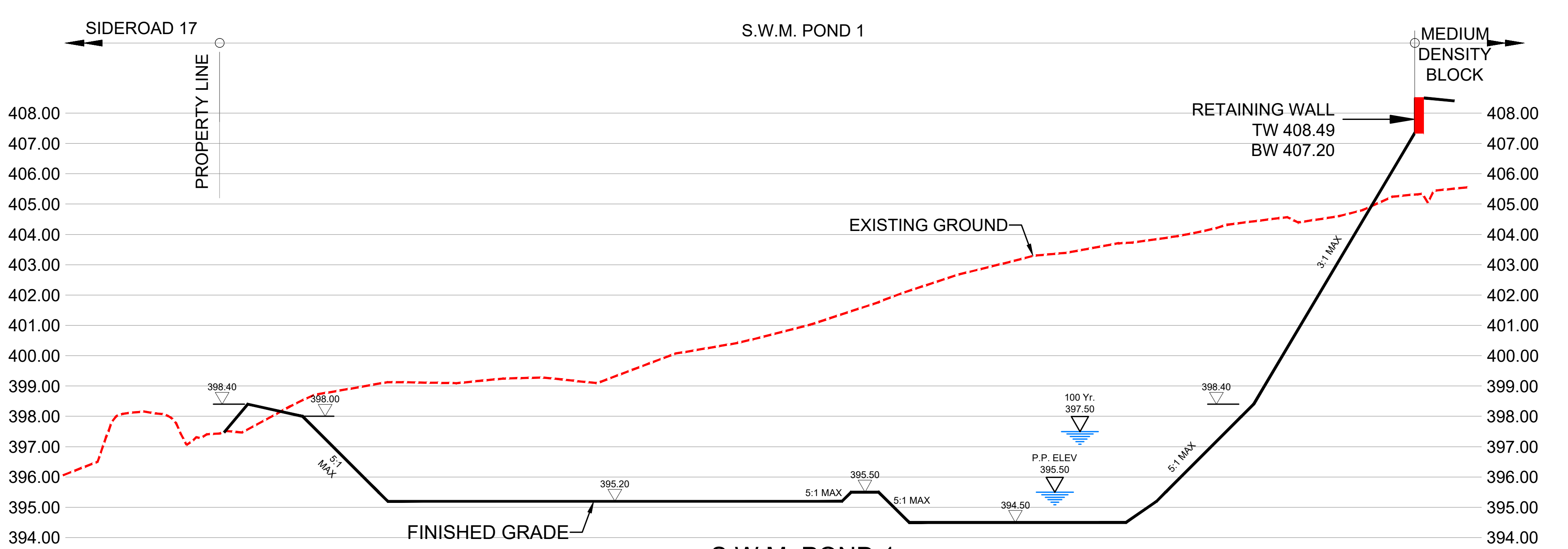
SCALE:	1:5000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	6



	Lower Elevation (m)	Upper Elevation (m)	Volume Required (m3)	Volume Provided (m3)
Permanent Pool	394.50	395.50	1000	1560
Erosion Control	395.50	395.70	1440	1440
2 Year	395.50	396.45	3480	3590
25 Year	395.50	397.05	6530	6560
100 Year	395.50	397.30	7900	7970



S.W.M. POND 1
SECTION A-A
SCALE HOR. 1:1000
VER. 1:200



S.W.M. POND 1
SECTION B-B
SCALE HOR. 1:1000
VER. 1:200

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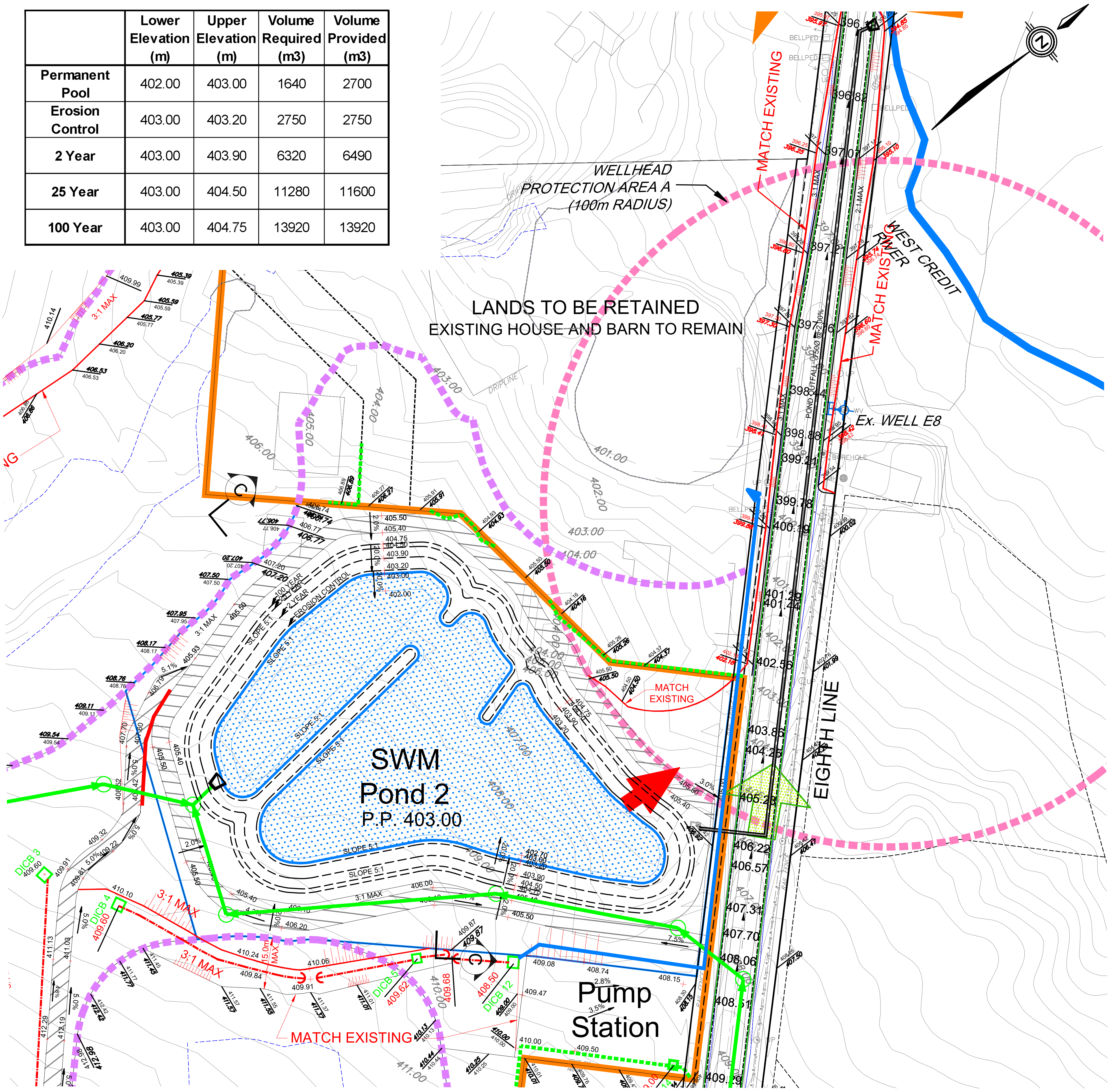
5520 EIGHTH LINE & 5552 EIGHTH LINE

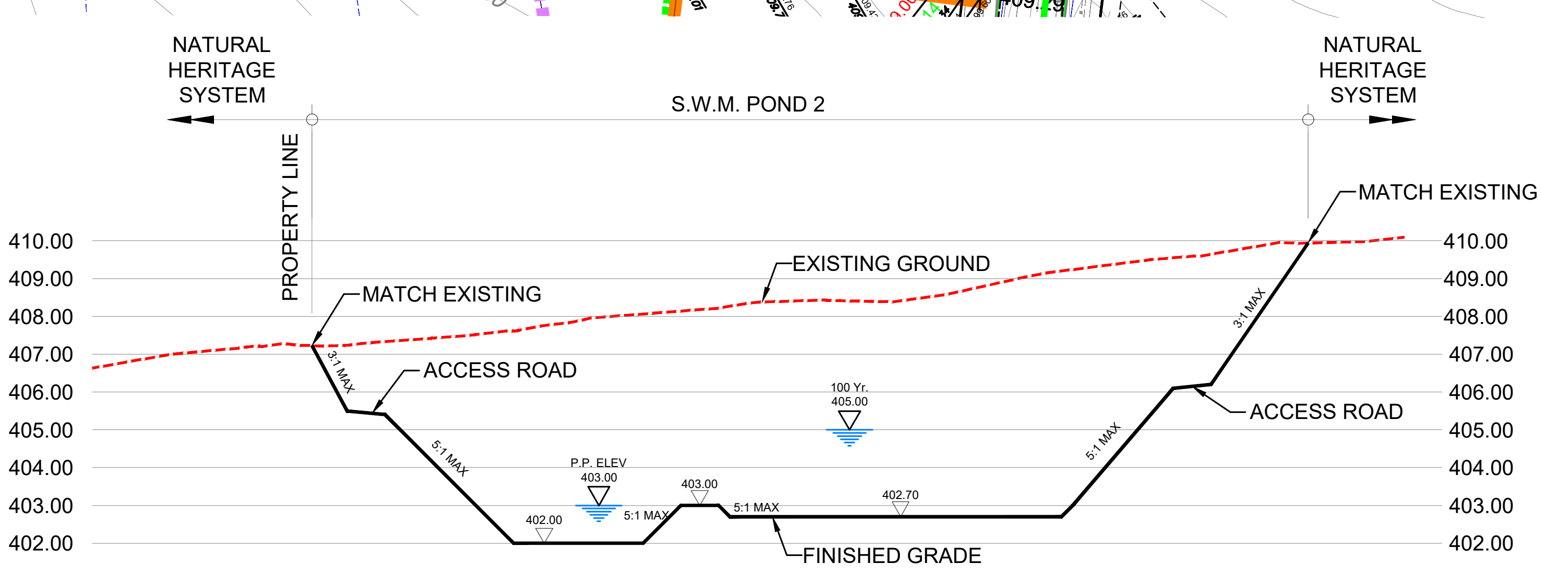
TOWN OF ERIN

SWM POND 1

SCALE:	1:1250	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	7

	Lower Elevation (m)	Upper Elevation (m)	Volume Required (m3)	Volume Provided (m3)
Permanent Pool	402.00	403.00	1640	2700
Erosion Control	403.00	403.20	2750	2750
2 Year	403.00	403.90	6320	6490
25 Year	403.00	404.50	11280	11600
100 Year	403.00	404.75	13920	13920





S.W.M. POND 2
SECTION C-C
SCALE HOR. 1:1000
VER. 1:200

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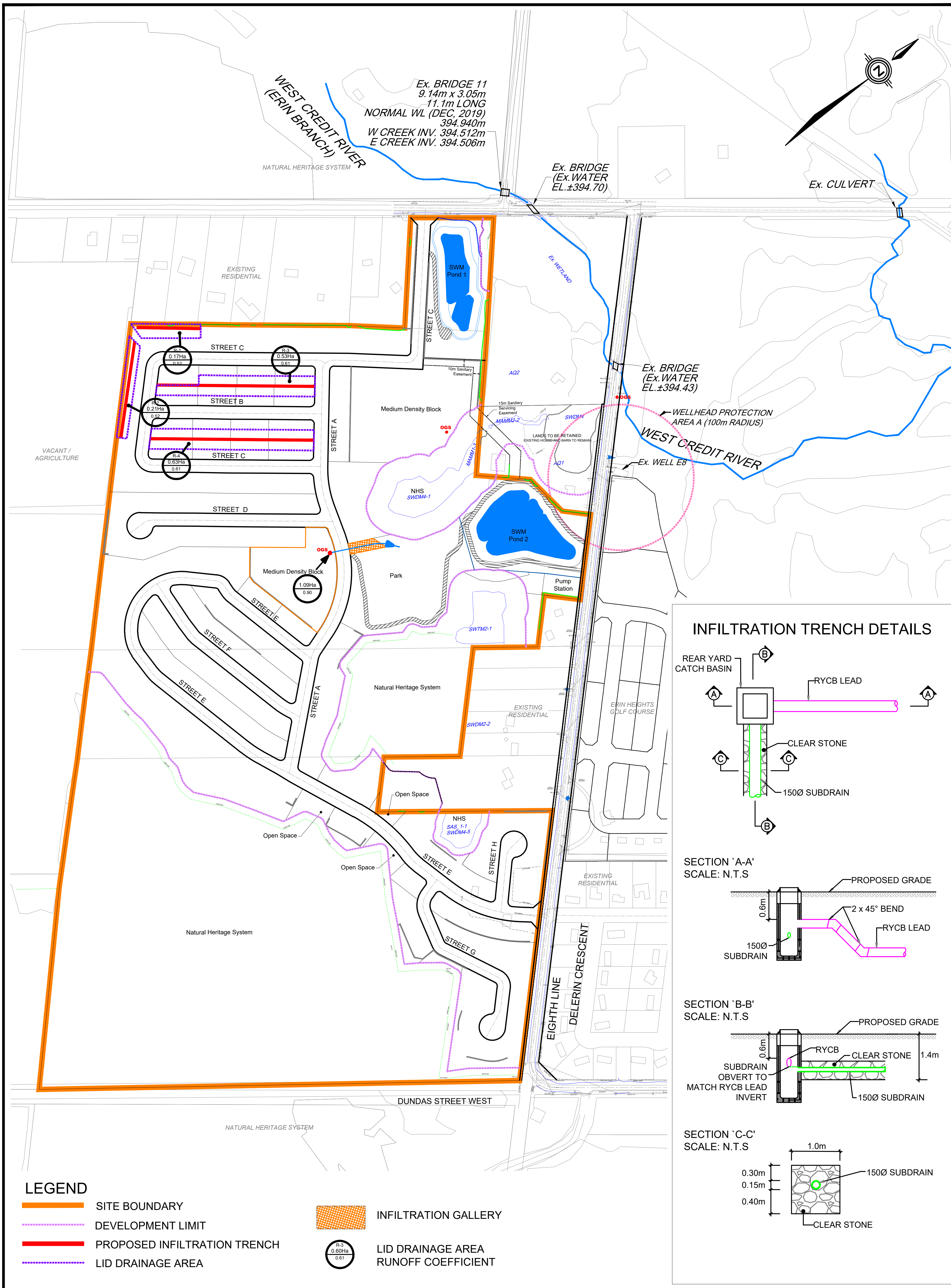
TOWN OF ERIN

SWM POND 2

SCALE:	1:1250	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	8



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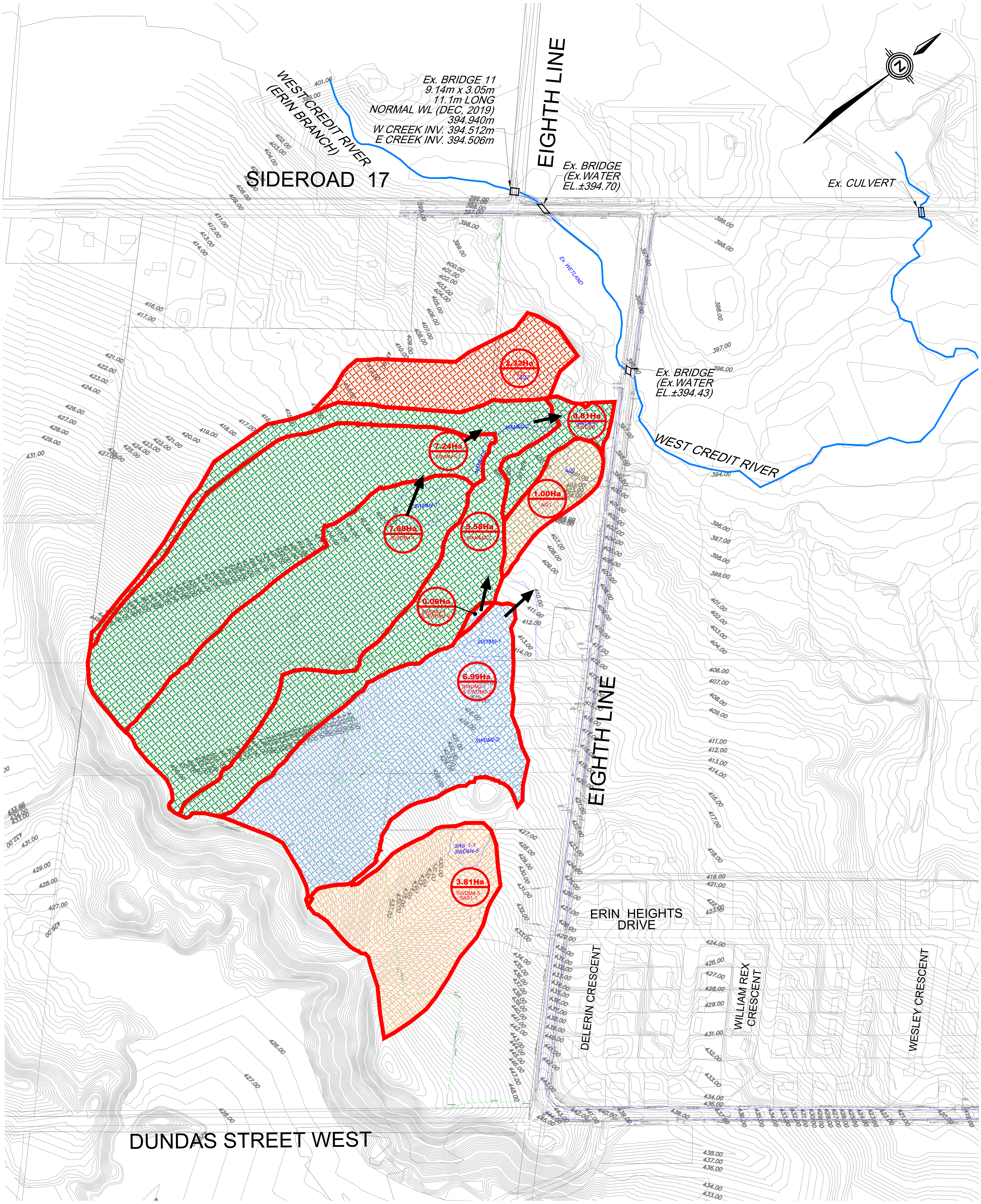
TOWN OF ERIN

POTENTIAL LID OPPORTUNITIES

SCALE:	1:5000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	9



LEGEND

SITE BOUNDARY

PRE-DEVELOPMENT DRAINAGE AREAS TO WETLANDS

5.16Ha PSW — TOTAL DRAINAGE AREA DRAINAGE DESTINATION

DRAINAGE AREA TO MAMM1-3 MAMM2-2 SWDM4-1 SWDM4

DRAINAGE AREA TO SWTM2-1 & SWDM2-2

DRAINAGE AREA TO SWDM4-5 & SAS1-1

DRAINAGE AREA TO AQ1

DRAINAGE AREA TO AQ2

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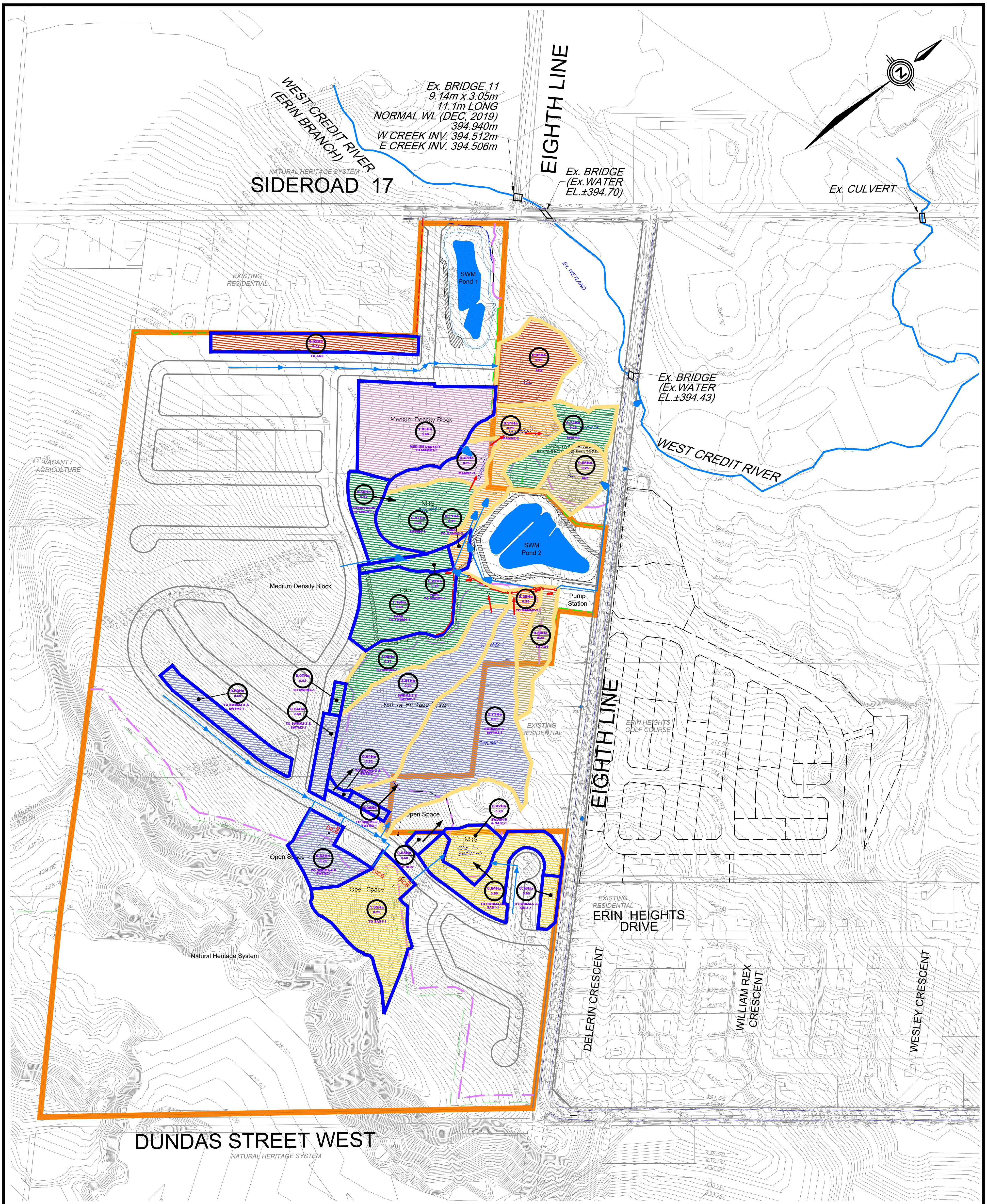
TOWN OF ERIN

PRE-DEVELOPMENT DRAINAGE AREAS TO WETLANDS

SCALE:	1:5000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	10



LEGEND

- SITE BOUNDARY
- POST DEVELOPMENT DRAINAGE AREAS TO WETLANDS
- PRE-DEVELOPMENT DRAINAGE AREAS TO WETLANDS
- PROPOSED CLEANWATER SEWER
- DRAINAGE AREA TO AQ2
- DRAINAGE AREA TO MAMM1-3
- DRAINAGE AREA TO SWDM4-1
- DRAINAGE AREA TO SWDM2-2 & SWTM2-1
- DRAINAGE AREA TO SWDM4-5 & SAS1-1
- DRAINAGE AREA TO MAMM2-2
- TOTAL DRAINAGE AREA RUNOFF COEFFICIENT DRAINAGE DESTINATION
- DRAINAGE AREA TO AQ1

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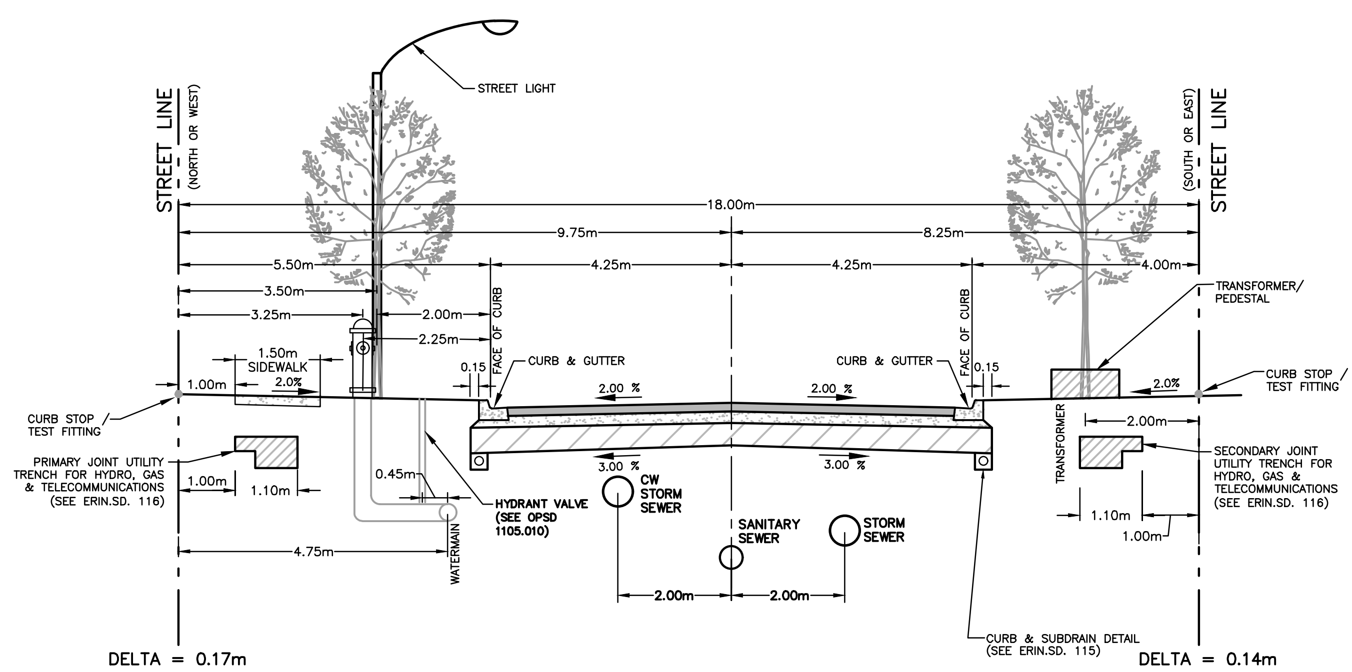
TOWN OF ERIN

POST DEVELOPMENT DRAINAGE AREAS TO WETLANDS

SCALE:	1:5000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	11

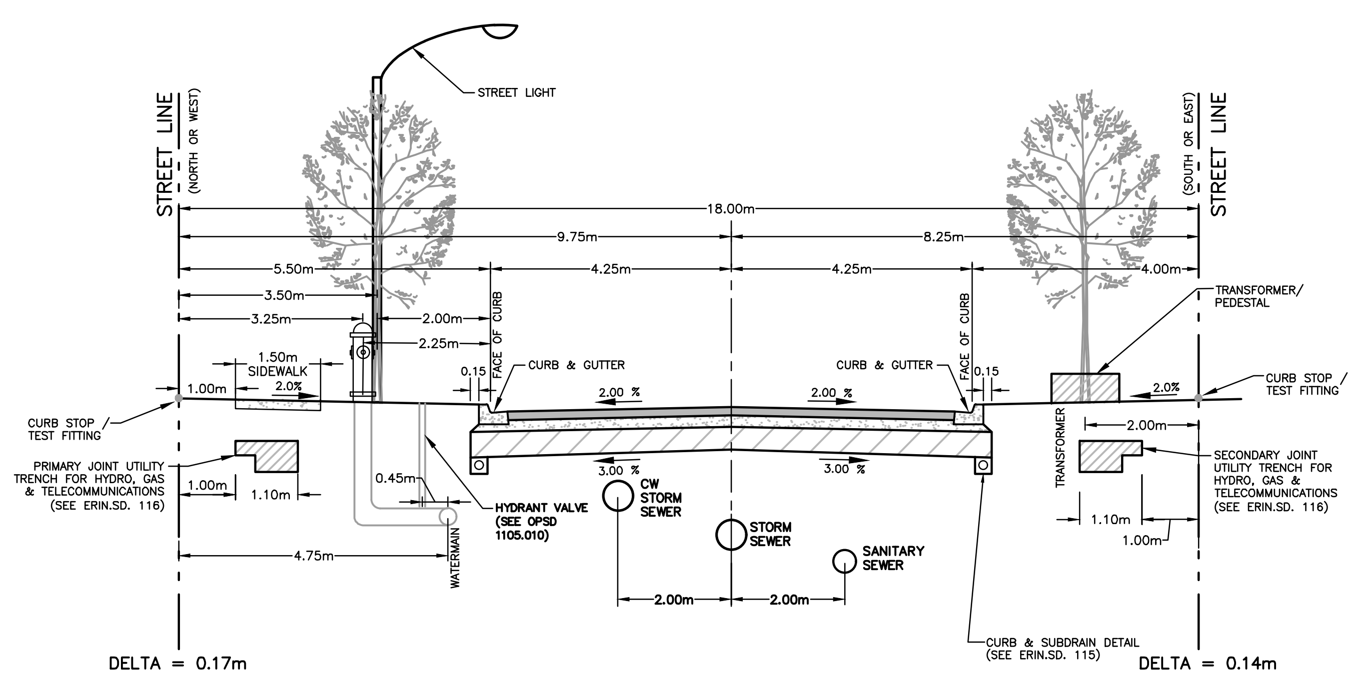


NOTE:

1. 18.0m CORRIDOR ONLY TO BE USED ON SUBDIVISIONS WITH DRAFT PLAN APPROVAL AS OF APRIL 2021.

URBAN MINOR LOCAL (8.5m ROAD ON 18.0m RIGHT-OF-WAY)	NO.	REVISIONS	DATE	APR'D	SCALE: N.T.S. DATE: NOV. 2021 ERIN SD. 101 (MOD.)

STREET C - ROAD CROSS SECTION WITH CLEAN WATER PIPE



NOTE:

1. 18.0m CORRIDOR ONLY TO BE USED ON SUBDIVISIONS WITH DRAFT PLAN APPROVAL AS OF APRIL 2021.

URBAN MINOR LOCAL (8.5m ROAD ON 18.0m RIGHT-OF-WAY)	NO.	REVISIONS	DATE	APR'D	SCALE: N.T.S. DATE: NOV. 2021 ERIN SD. 101 (MOD.)

STREET E - ROAD CROSS SECTION WITH CLEAN WATER PIPE

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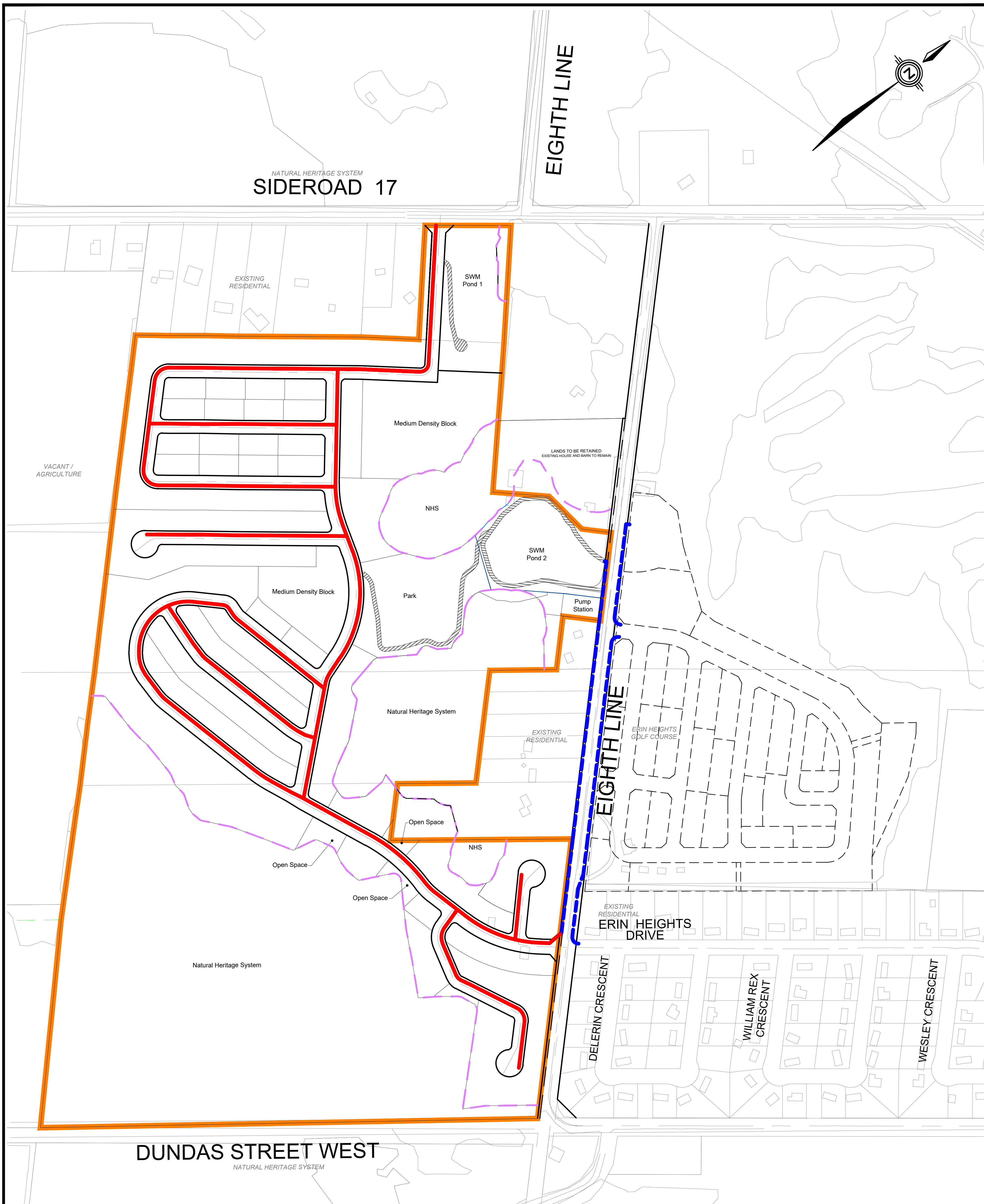
5520 EIGHTH LINE & 5552 EIGHTH LINE

TOWN OF ERIN

MODIFIED TYPICAL ROAD SECTIONS - INTERNAL

SCALE:	AS SHOWN	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	12



LEGEND

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- PROPOSED SIDEWALK LOCATION
- EXTERNAL PROPOSED SIDEWALK LOCATION

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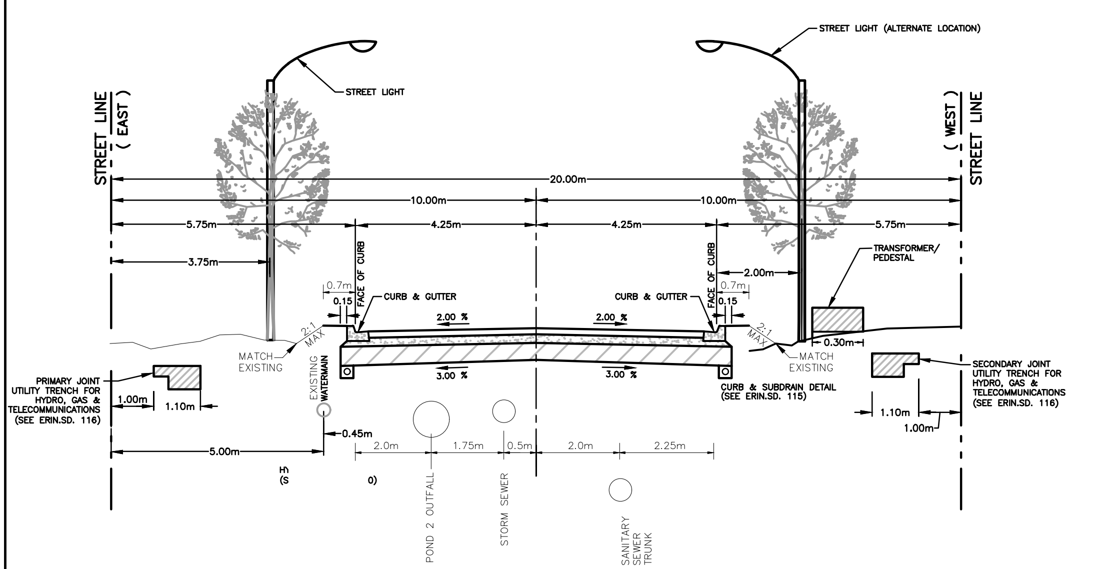
TOWN OF ERIN

SIDEWALK LOCATION PLAN

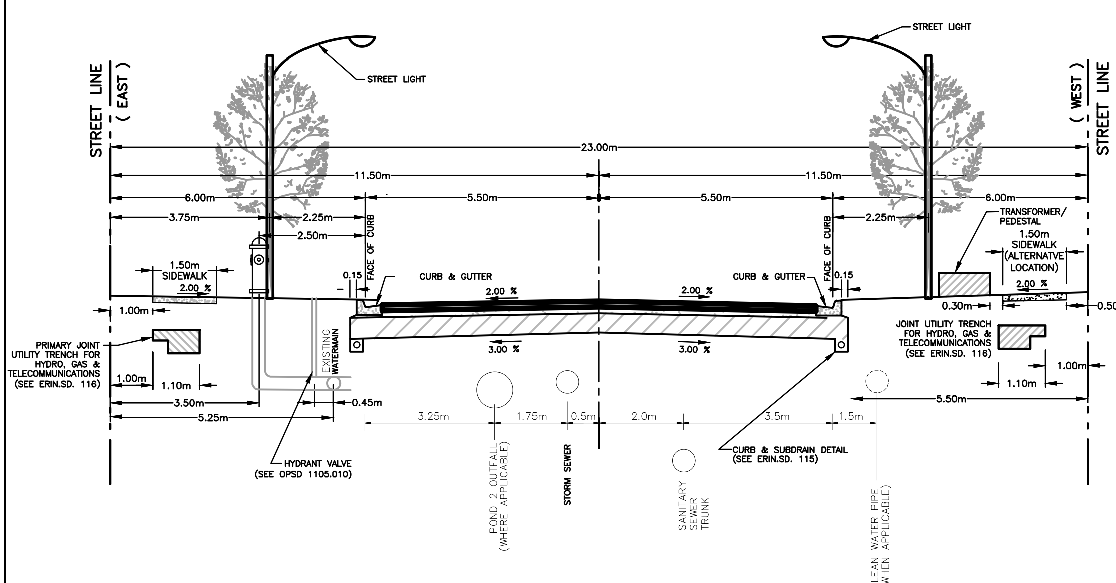
SCALE:	1:5000	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	13



NOTE:
1. WHERE MULTI-USE TRAIL OR BICYCLE LANES ARE REQUIRED THE ROW WIDTH SHALL BE INCREASED TO 26.0m

URBAN/ SUBURBAN ROAD SECTION (8.5m ROAD ON 20.0m RIGHT-OF-WAY)	NO.	REVISIONS	DATE	APR'D	SCALE: N.T.S. DATE: NOV. 2021 ERIN SD. 102 (MOD.)

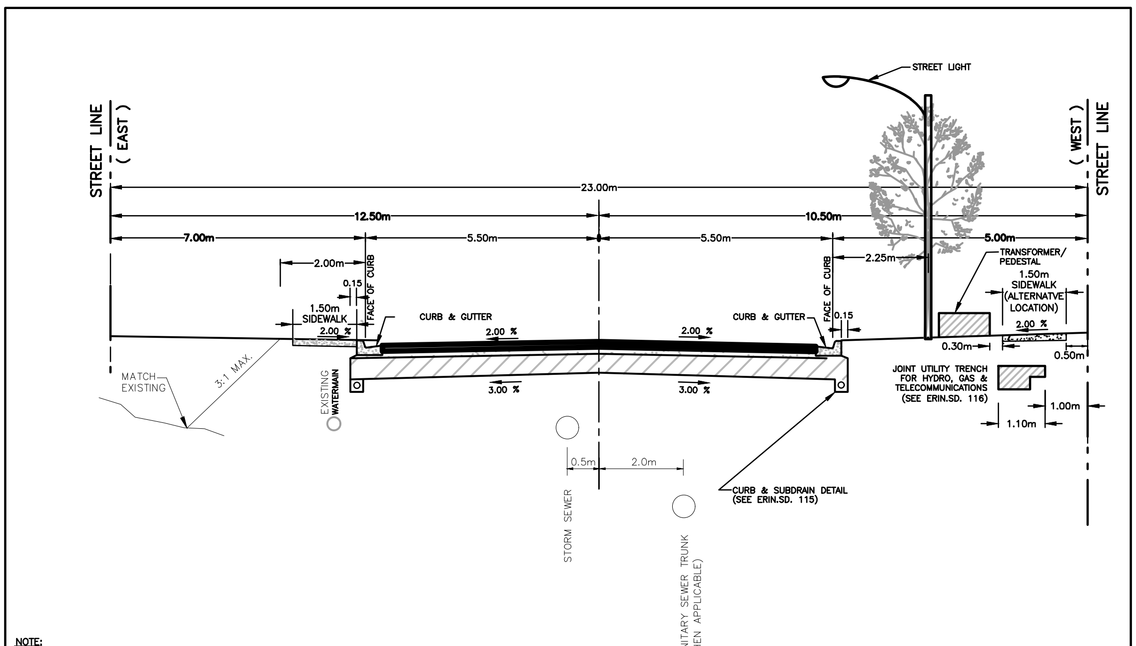
EIGHTH LINE (from ±0+210.0 to 0+271.0)



NOTE:
1. WHERE MULTI-USE TRAIL OR BICYCLE LANES ARE REQUIRED THE ROW WIDTH SHALL BE INCREASED TO 26.0m

MINOR COLLECTOR (10.0m ROAD ON 23.0m RIGHT-OF-WAY)	NO.	REVISIONS	DATE	APR'D	SCALE: N.T.S. DATE: NOV. 2021 ERIN SD. 103 (MOD.)

EIGHTH LINE (from ±0+410.0 to 0+880.0)



NOTE:
1. WHERE MULTI-USE TRAIL OR BICYCLE LANES ARE REQUIRED THE ROW WIDTH SHALL BE INCREASED TO 26.0m

MINOR COLLECTOR (10.0m ROAD ON 23.0m RIGHT-OF-WAY)	NO.	REVISIONS	DATE	APR'D	SCALE: N.T.S. DATE: NOV. 2021 ERIN SD. 103 (MOD.)

EIGHTH LINE (from ±0+900.0 to 0+980.0)

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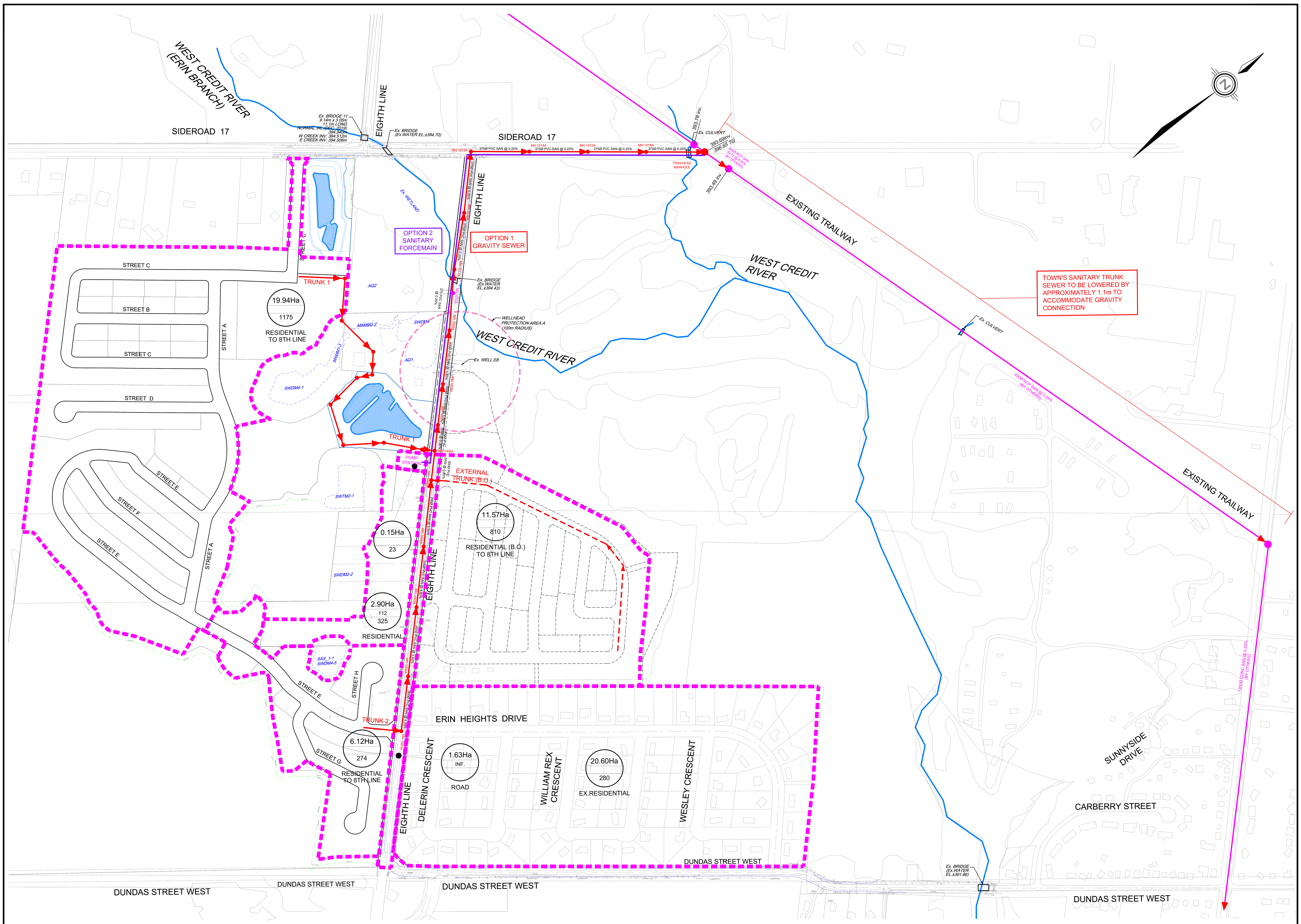
5520 EIGHTH LINE & 5552 EIGHTH LINE

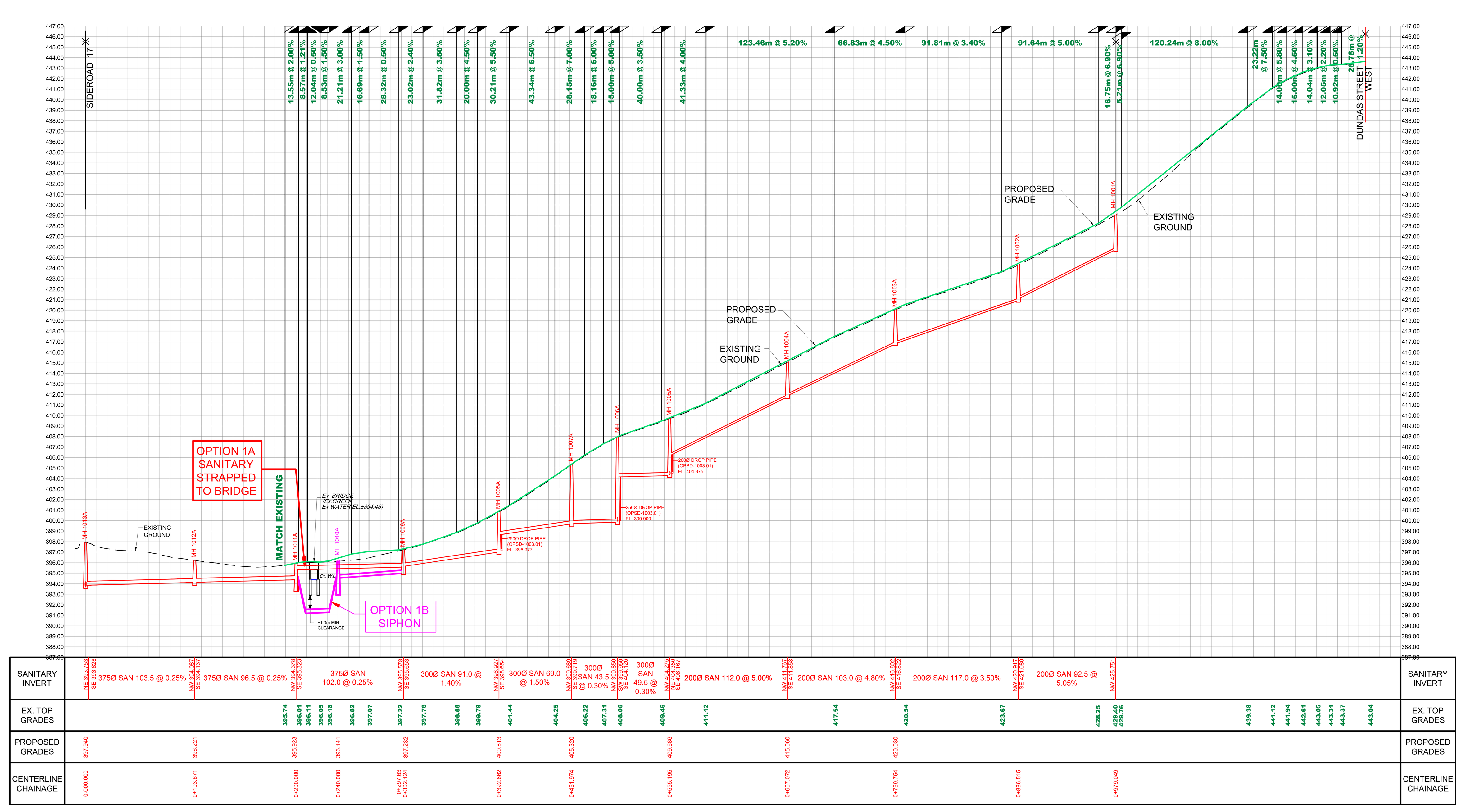
TOWN OF ERIN

MODIFIED TYPICAL ROAD SECTIONS - EIGHTH LINE

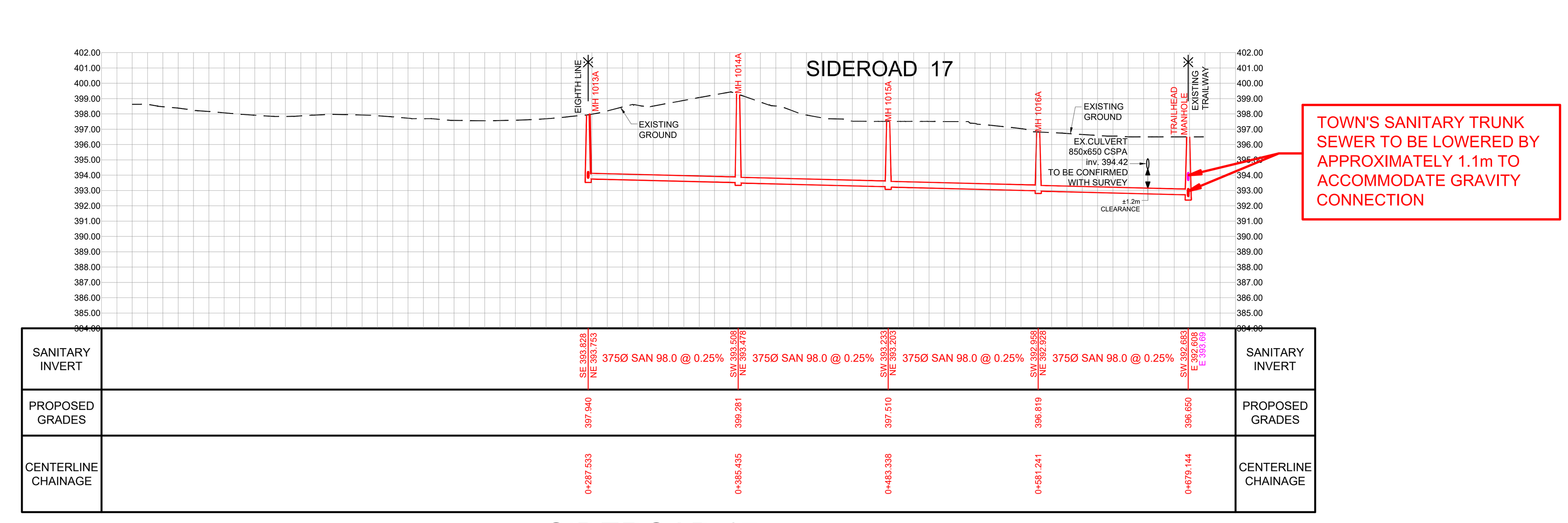
SCALE:	AS SHOWN	PROJECT No.:	21-1242
DATE:	JUNE 2022	FIGURE:	14



GRAVITY SYSTEM



EIGHTH LINE



SIDEROAD 17

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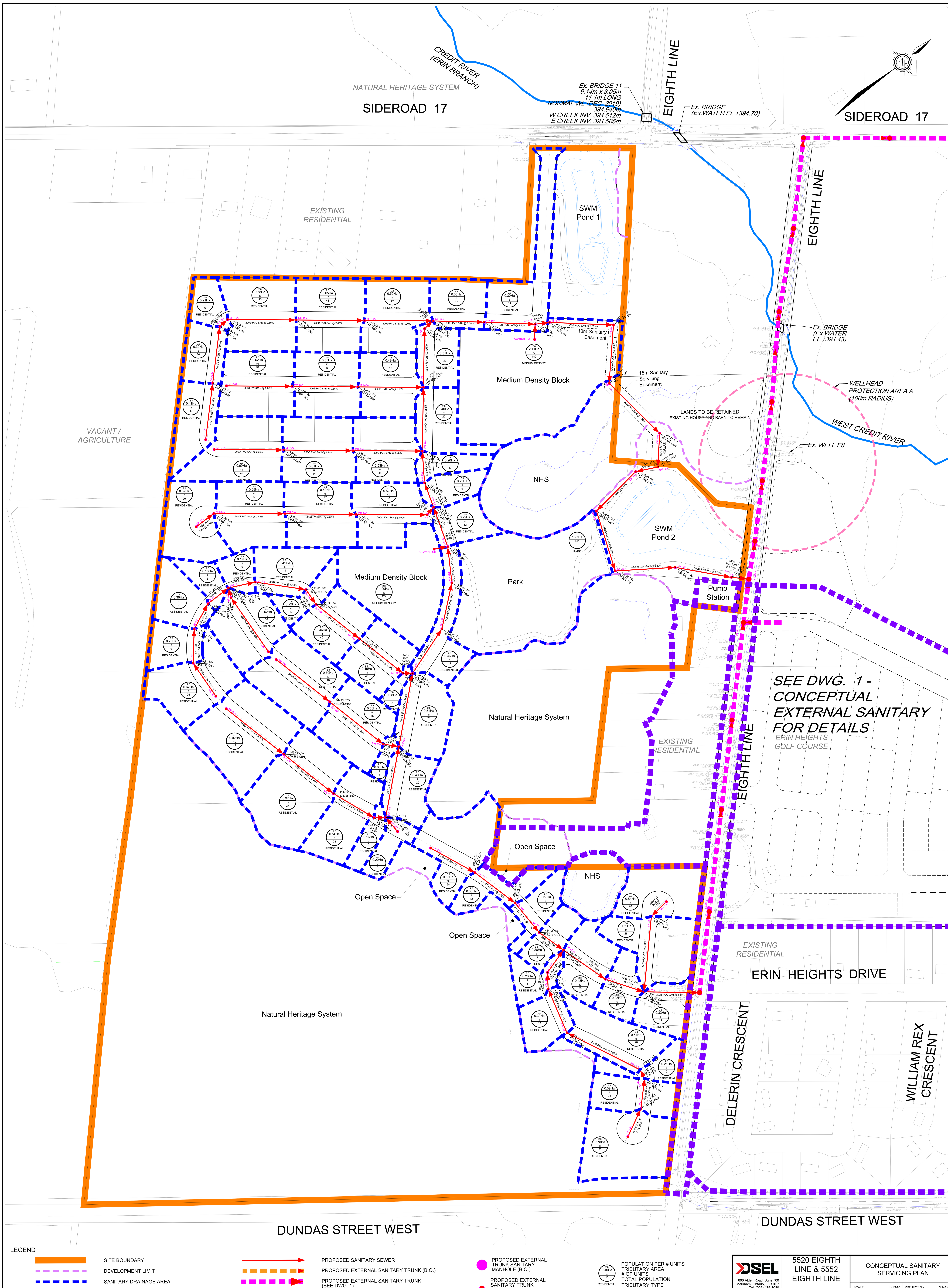
5520 EIGHTH LINE & 5552 EIGHTH LINE

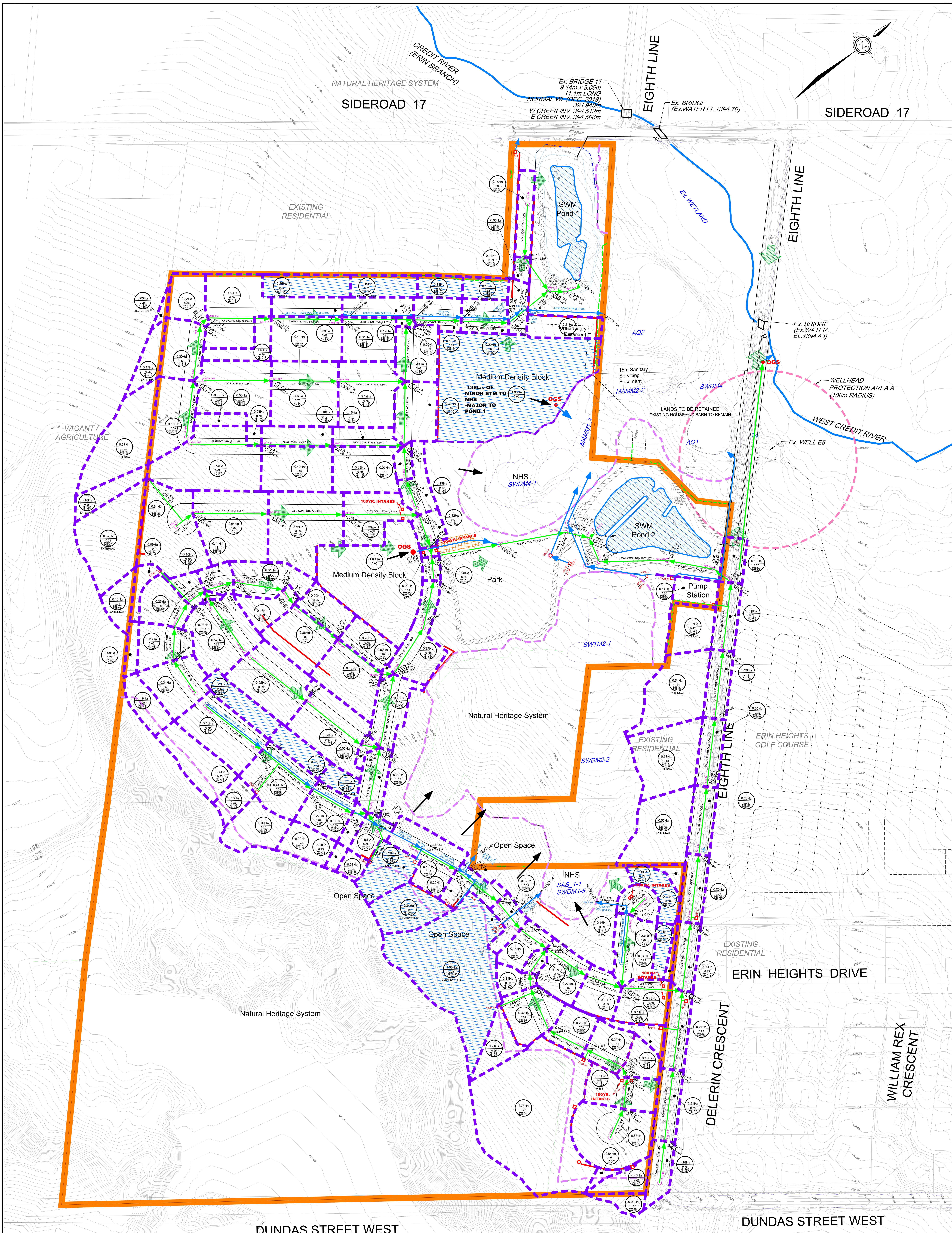
TOWN OF ERIN

CONCEPTUAL EXTERNAL SANITARY

SCALE:	1:2500	PROJECT No.:	21-1242
DATE:	JUNE 2022	DRAWING:	1



SIDEROAD 17
NATURAL HERITAGE SYSTEM
CREDIT RIVER (ERIN BRANCH)
EIGHTH LINE
Ex. BRIDGE 11
9.14m x 3.05m
11.1m LONG
NORMAL WL (DEC. 2019)
394.940m
W CREEK INV. 394.512m
E CREEK INV. 394.506m
Ex. BRIDGE
(Ex.WATER EL.±394.70)
SIDEROAD 17
EXISTING RESIDENTIAL
SWM Pond 1
VACANT / AGRICULTURE
Ex. BRIDGE
(Ex.WATER EL.±394.43)
10m Sanitary Easement
Medium Density Block
15m Sanitary Servicing Easement
WELLHEAD PROTECTION AREA A
(100m RADIUS)
LANDS TO BE RETAINED
EXISTING HOUSE AND BARN TO REMAIN
WEST CREDIT RIVER
Ex. WELL E8
NHS
SWM Pond 2
Medium Density Block
Park
Pump Station
SEE DWG. 1 - CONCEPTUAL EXTERNAL SANITARY FOR DETAILS
ERIN HEIGHTS GOLF COURSE
EXISTING RESIDENTIAL
Natural Heritage System
EIGHTH LINE
Open Space
NHS
Open Space
Open Space
EXISTING RESIDENTIAL
ERIN HEIGHTS DRIVE
Natural Heritage System
DELERIN CRESCENT
WILLIAM REX CRESCENT
DUNDAS STREET WEST
DUNDAS STREET WEST
LEGEND
SITE BOUNDARY
DEVELOPMENT LIMIT
SANITARY DRAINAGE AREA
EXTERNAL SANITARY DRAINAGE AREA
PROPOSED SANITARY SEWER
PROPOSED EXTERNAL SANITARY TRUNK (B.O.)
PROPOSED EXTERNAL SANITARY TRUNK (SEE DWG. 1)
PROPOSED SANITARY MANHOLE
PROPOSED EXTERNAL TRUNK SANITARY MANHOLE (B.O.)
PROPOSED EXTERNAL SANITARY TRUNK MANHOLE (SEE DWG. 1)
POPULATION PER # UNITS
TRIBUTARY AREA
OF UNITS
TOTAL POPULATION
TRIBUTARY TYPE
DSEL
5520 EIGHTH LINE & 5552 EIGHTH LINE
TOWN OF ERIN
CONCEPTUAL SANITARY SERVICING PLAN
SCALE: 1:1250
PROJECT No.: 21-1242
DATE: JUNE 2022
DRAWING: 2



LEGEND

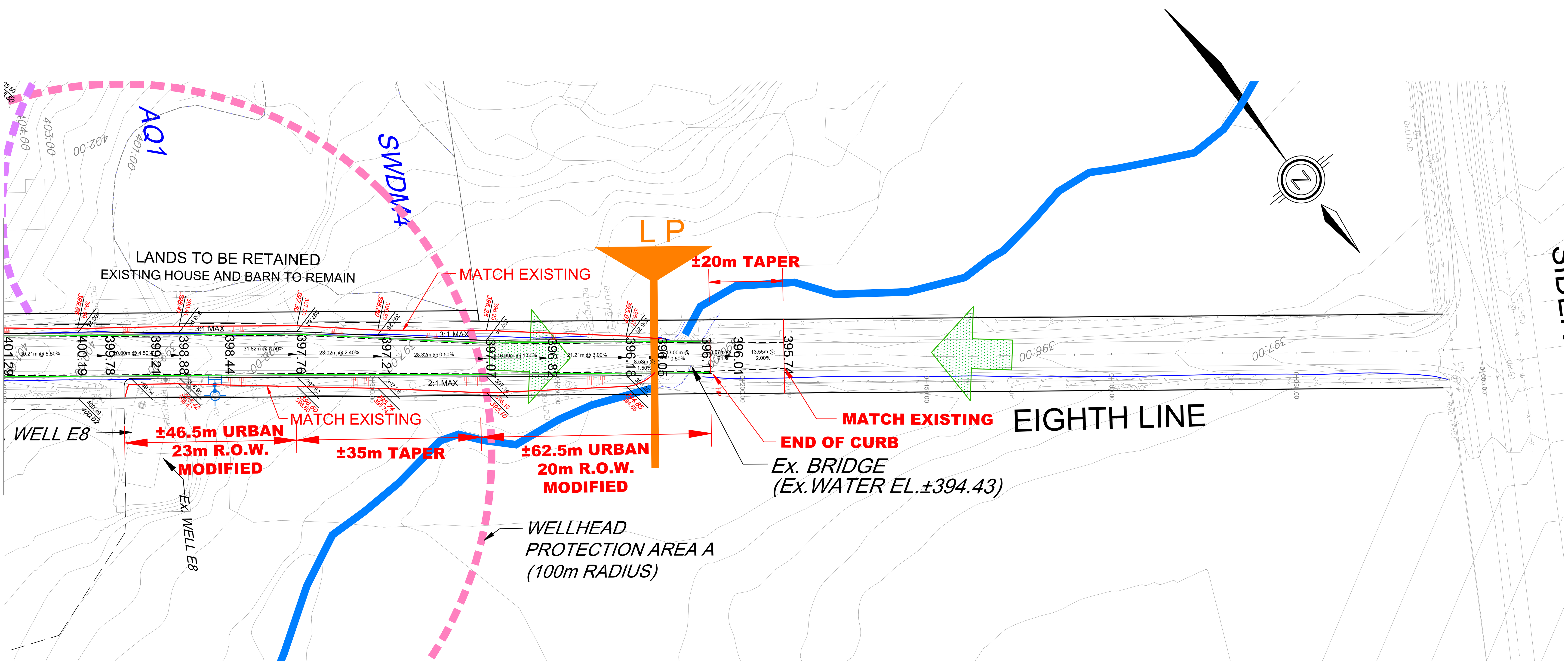
SITE BOUNDARY	PROPOSED STORM SEWER	STORM TRIBUTARY AREA	TOTAL DRAINAGE AREA
DEVELOPMENT LIMIT	PROPOSED CLEANWATER STORM SEWER	EXISTING WATERCOURSE	RUNOFF COEFFICIENT
PROPOSED STORM MANHOLE	STORM OVERLAND FLOW ARROW	CLEANWATER TRIBUTARY AREA (100 YEAR)	UPSTREAM MANHOLE
PROPOSED CLEANWATER STORM MANHOLE	EMERGENCY STORM OVERLAND FLOW ARROW	INFILTRATION GALLERY	DOWNSTREAM MANHOLE

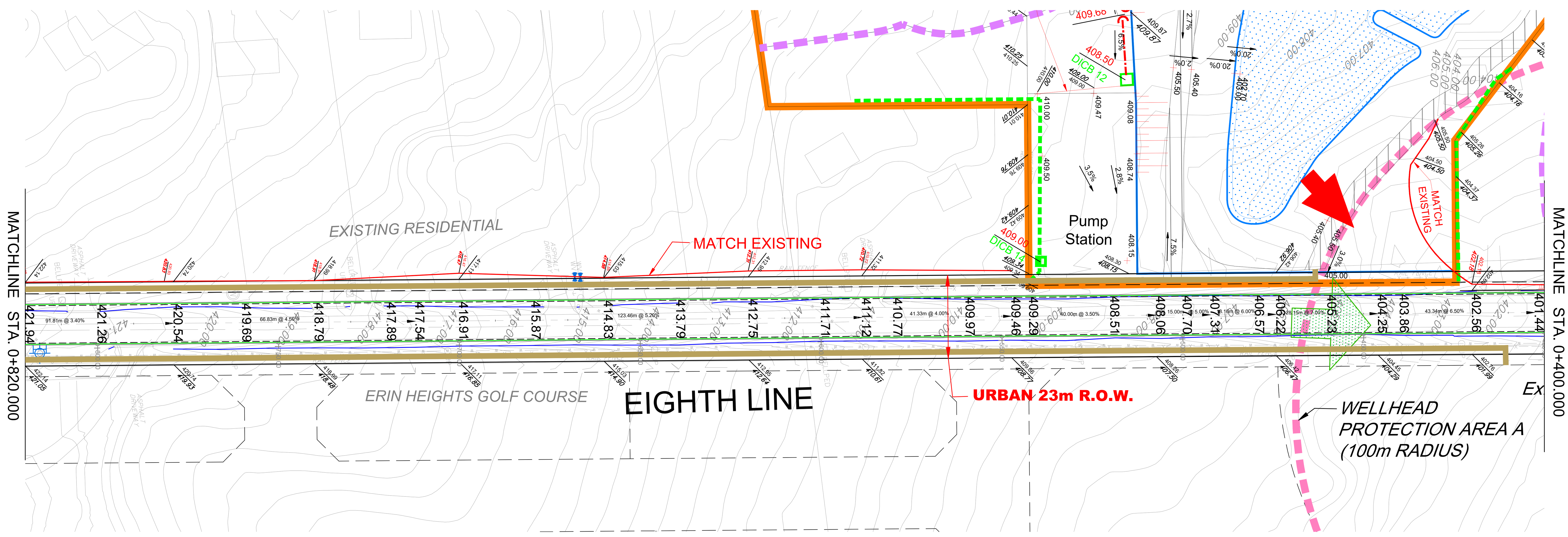
DSEL
600 Alden Road, Suite 700
Markham, Ontario, L3R 0E7
Tel. (905) 475-3080
Fax. (905) 475-3081
www.DSEL.ca

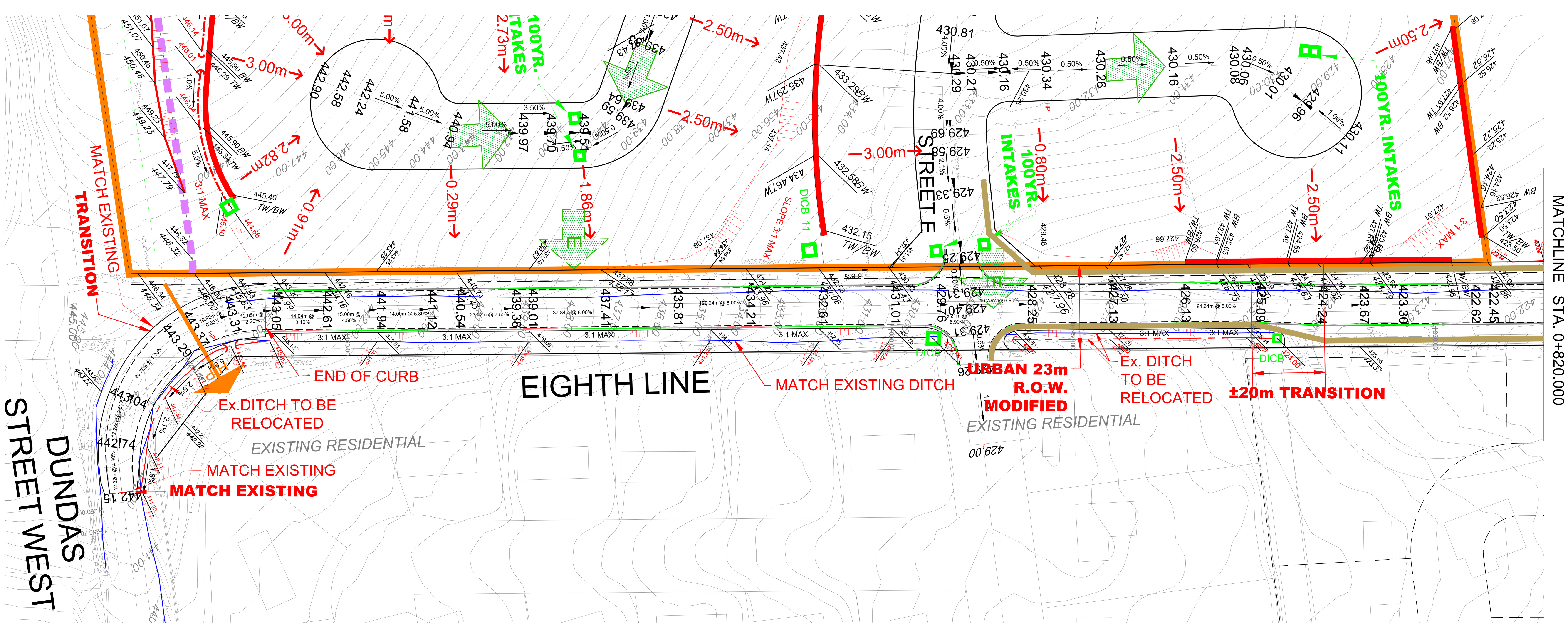
5520 EIGHTH LINE & 5552 EIGHTH LINE
TOWN OF ERIN

CONCEPTUAL STORM SERVICING PLAN

SCALE: 1:1250 | PROJECT No.: 21-1242
DATE: JUNE 2022 | DRAWING: 3







LEGEND

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- WELLHEAD PROTECTION AREA A
- STORM OVERLAND FLOW ARROW
- RETAINING WALL
- EXISTING DITCH
- 427.13 PROPOSED CENTERLINE ELEVATION
- PROPOSED ELEVATION / EXISTING ELEVATION
- EXISTING CONTOUR ELEVATION
- PROPOSED SIDEWALK
- PROPOSED CURB

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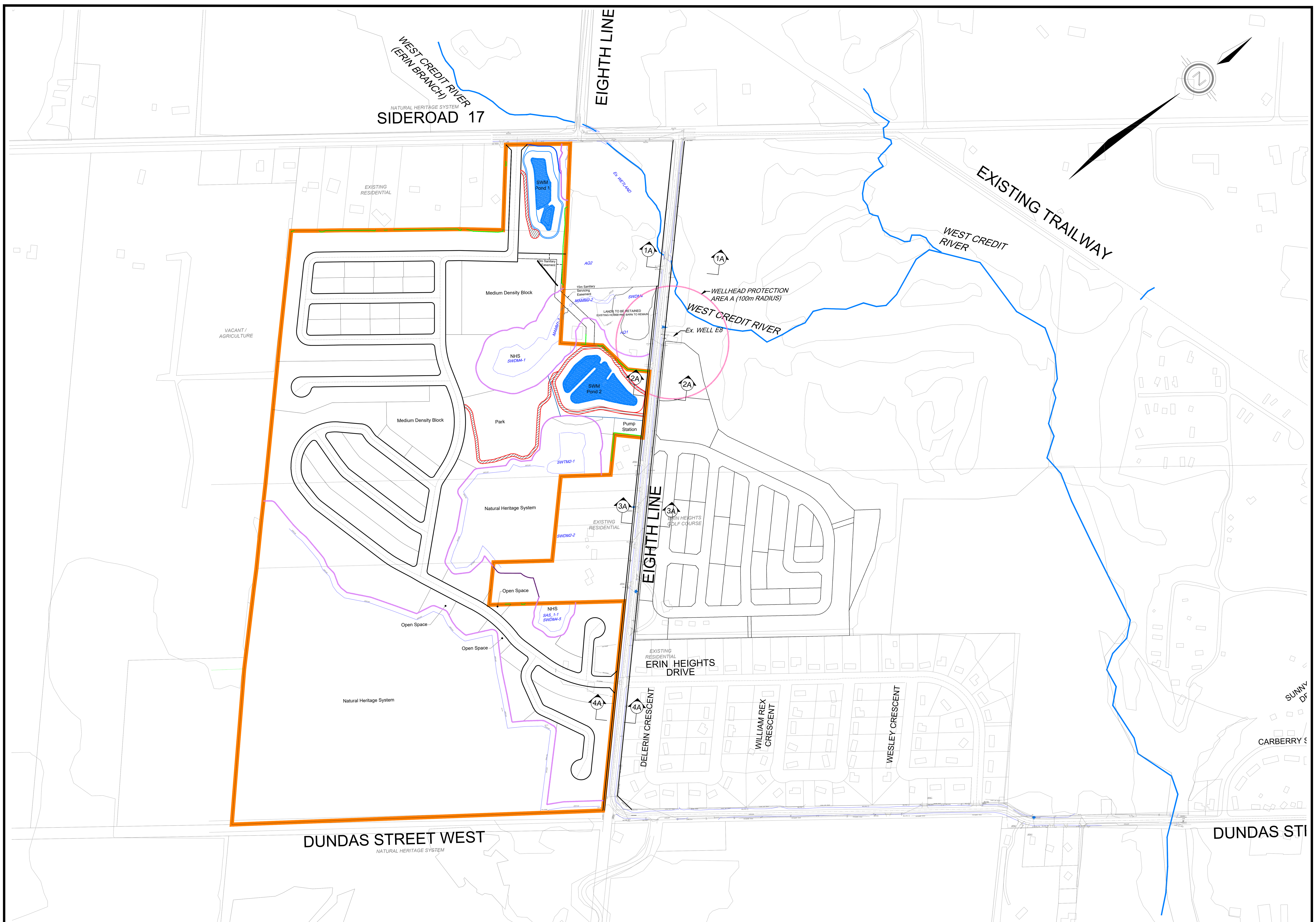
5552 EIGHTH LINE & 5520 EIGHTH LINE

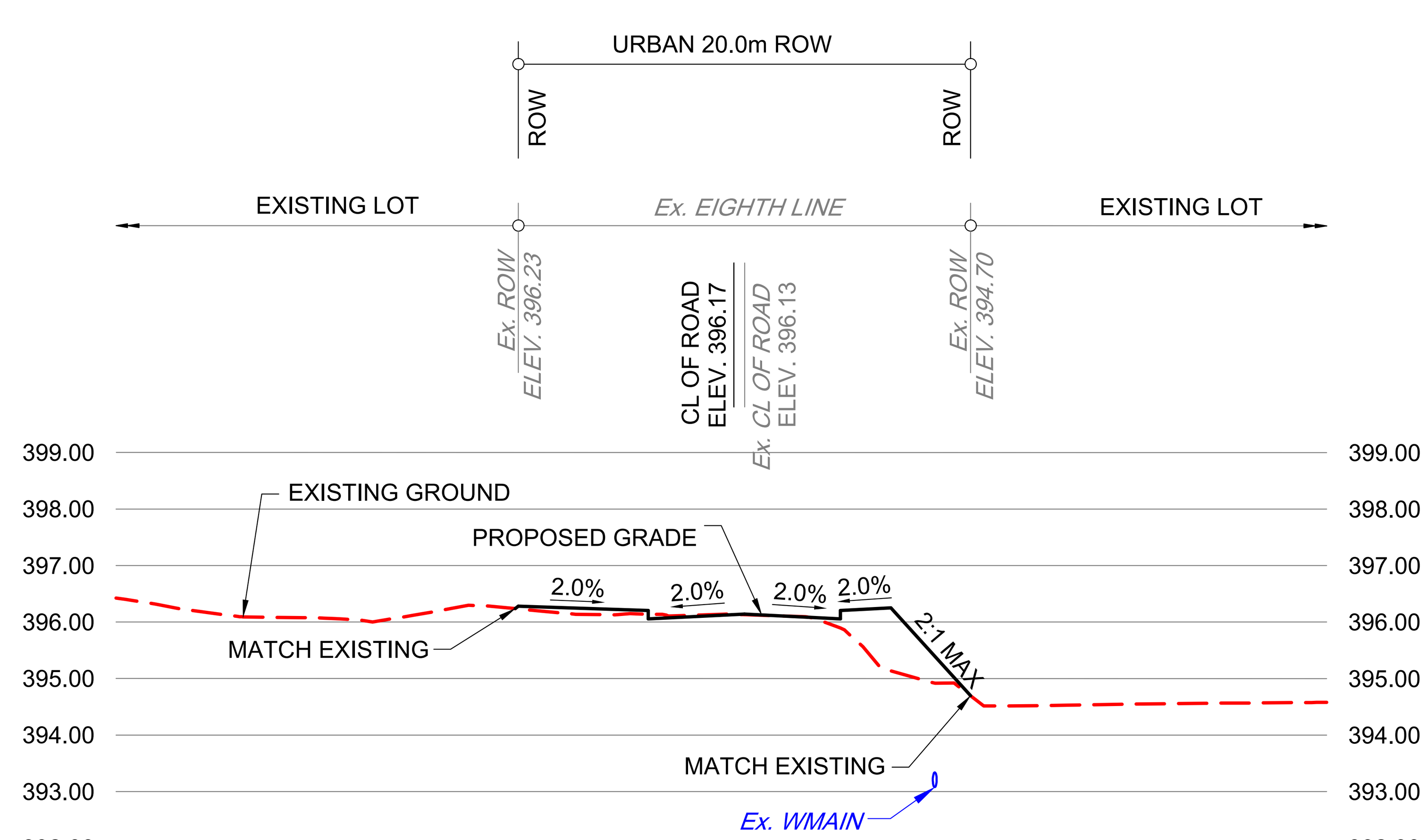
TOWN OF ERIN

EIGHTH LINE - CONCEPTUAL GRADING PLAN

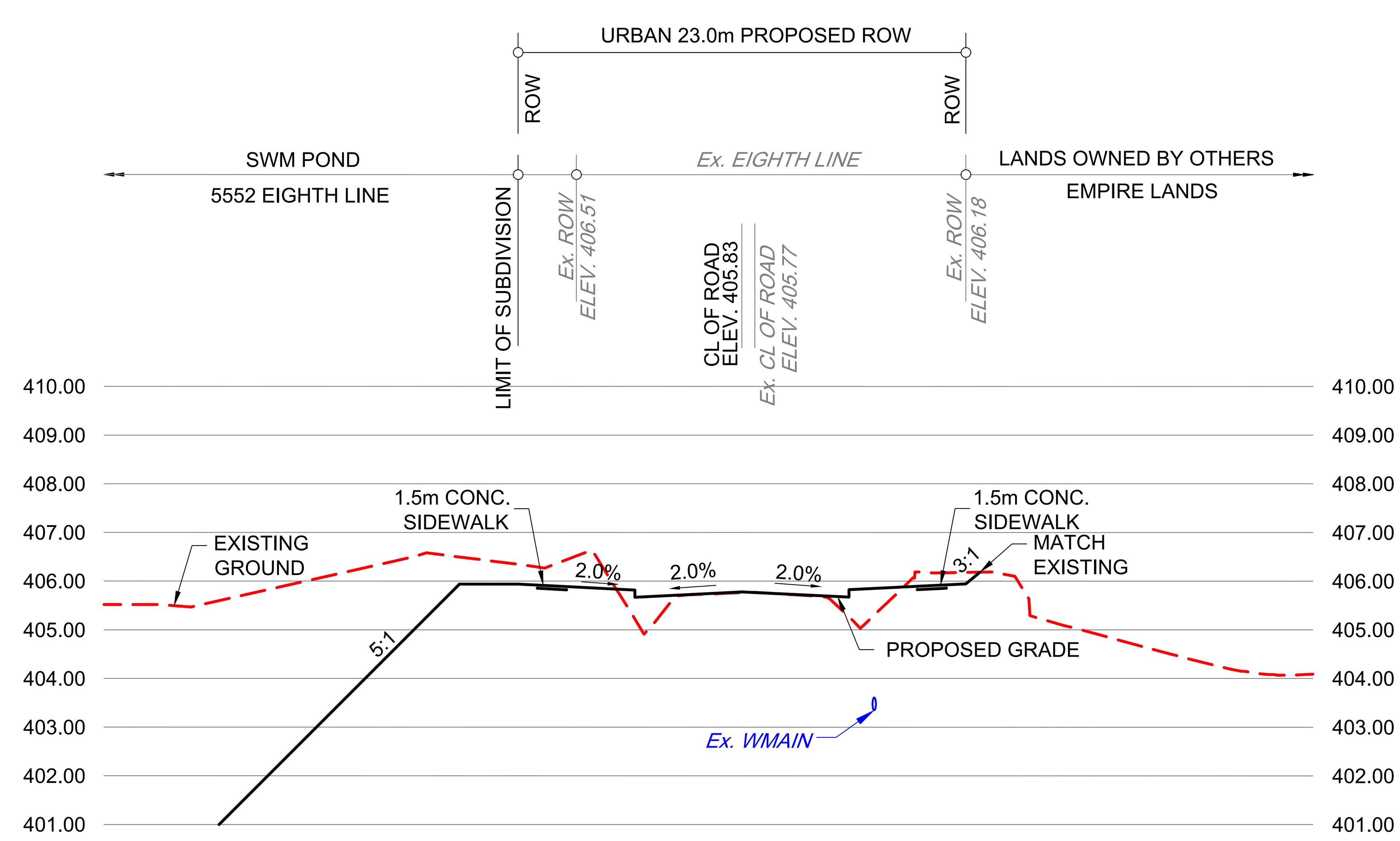
SCALE:	1:750	PROJECT No.:	21-1242
DATE:	JUNE 2022	DRAWING:	4



PLAN VIEW
SCALE: 1:4000



SECTION 1A-1A
SCALE HOR. 1: 250
VER. 1:100



SECTION 2A-2A
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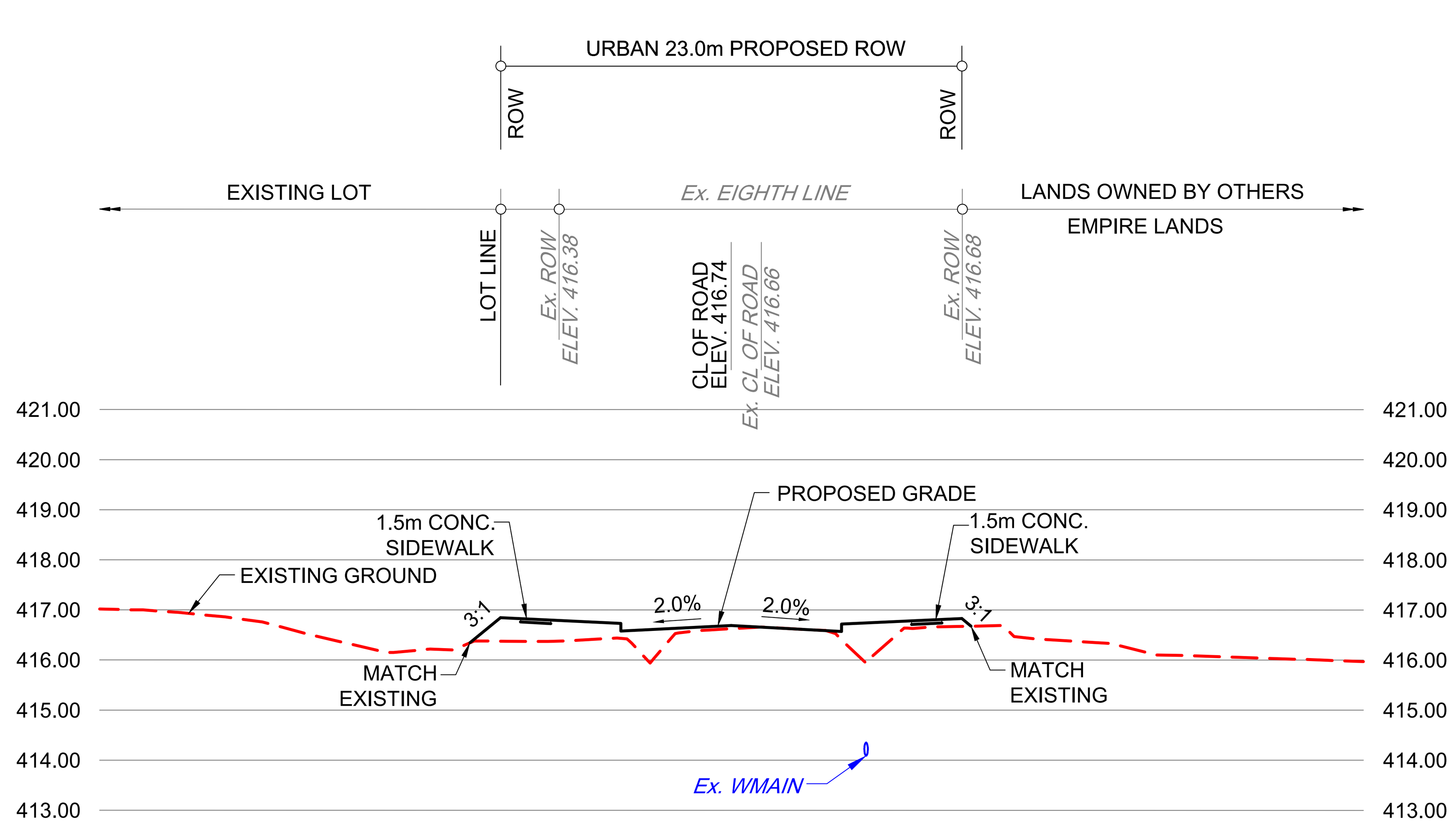
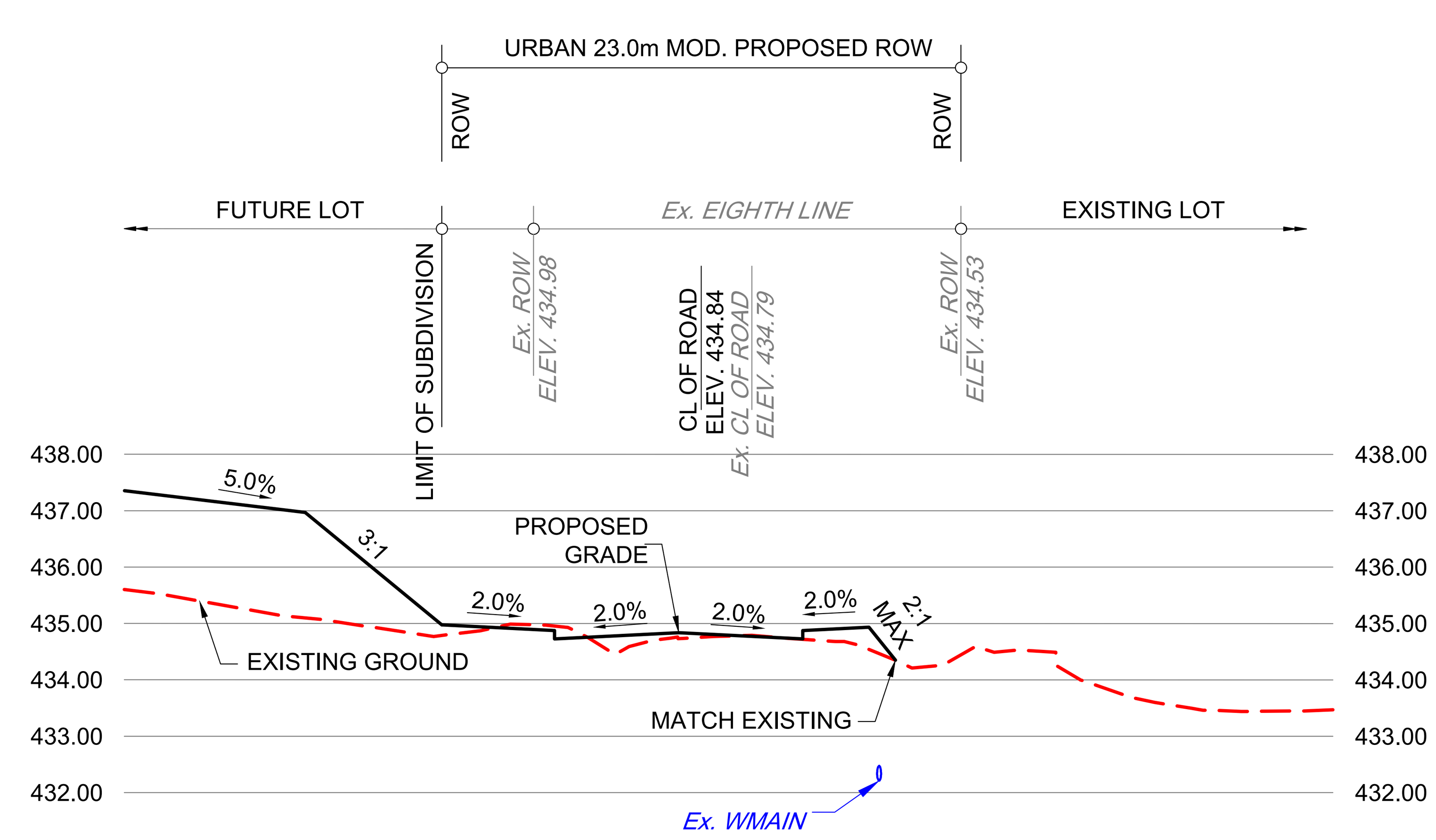
VER. 1:100



SECTION 3A-3A
SCALE HOR. 1: 250
VER. 1: 100



SECTION 4A-4A
SCALE HOR. 1: 250
VER. 1: 100

DSEL
600 Alden Road, Suite 700
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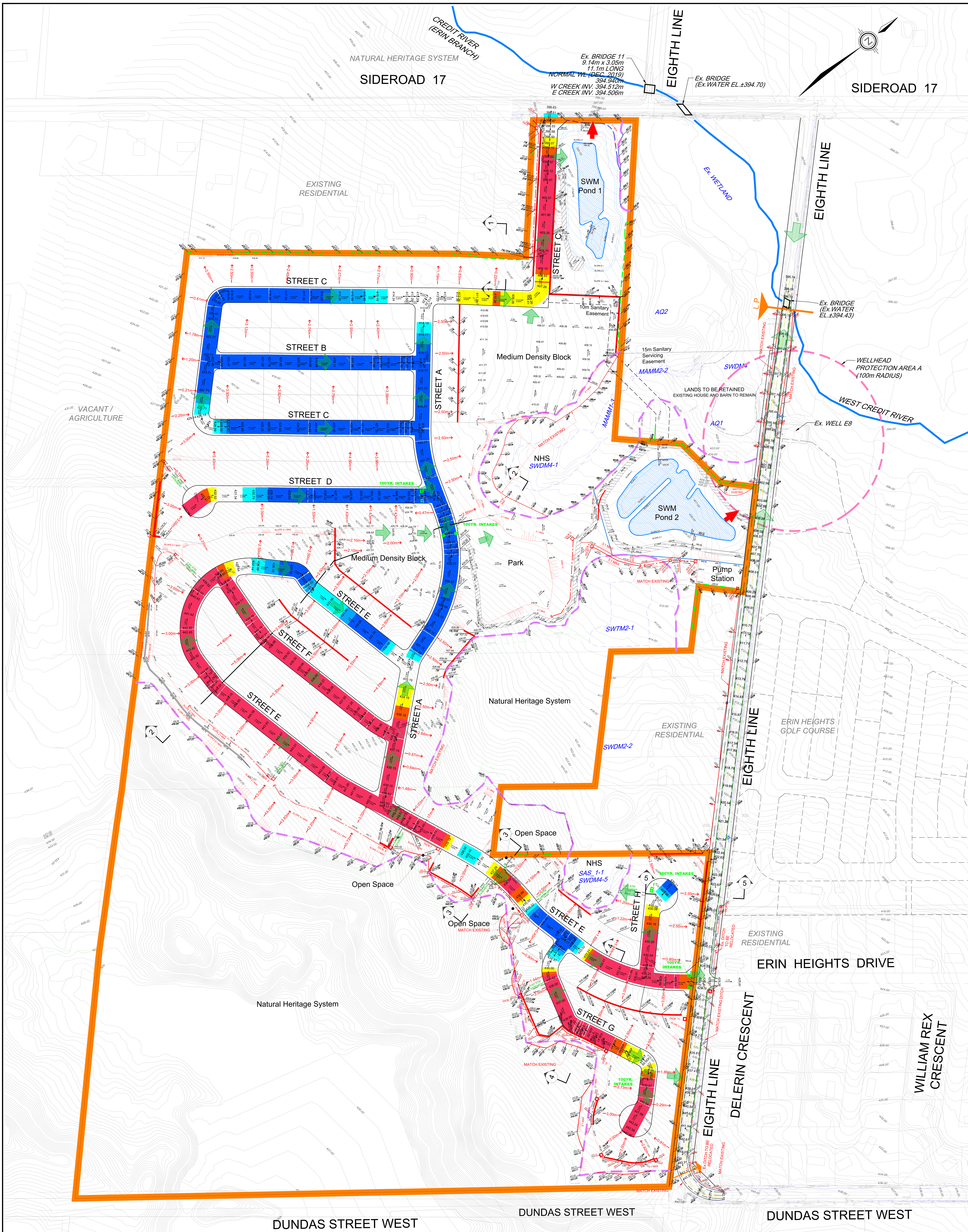
Fax. (905) 475-3081
www.DSEL.ca

5552 EIGHTH LINE & 5520 EIGHTH LINE

TOWN OF ERIN

EIGHTH LINE - CROSS SECTIONS

SCALE:	AS SHOWN	PROJECT No.:	21-1242
DATE:	JUNE 2022	DRAWING:	5



LEGEND:

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- WELLHEAD PROTECTION AREA A
- STORM OVERLAND FLOW ARROW
- EMERGENCY STORM OVERLAND FLOW ARROW
- PROPOSED CENTERLINE ELEVATION
- PROPOSED ELEVATION / EXISTING ELEVATION
- EXISTING CONTOUR ELEVATION
- RETAINING WALL
- TREE PROTECTION FENCE

CUT-FILL DEPTH ALONG CENTERLINE

CUT DEPTH (m)	FILL DEPTH (m)
0.00~1.00:	0.00~1.00:
1.00~2.00:	1.00~2.00:
2.00~3.00:	2.00~3.00:
>3.00	>3.00

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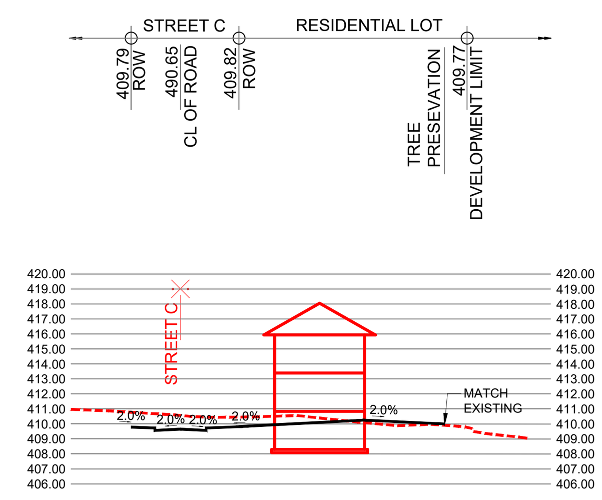
Fax. (905) 475-3081
www.DSEL.ca

5520 EIGHTH LINE & 5552 EIGHTH LINE

TOWN OF ERIN

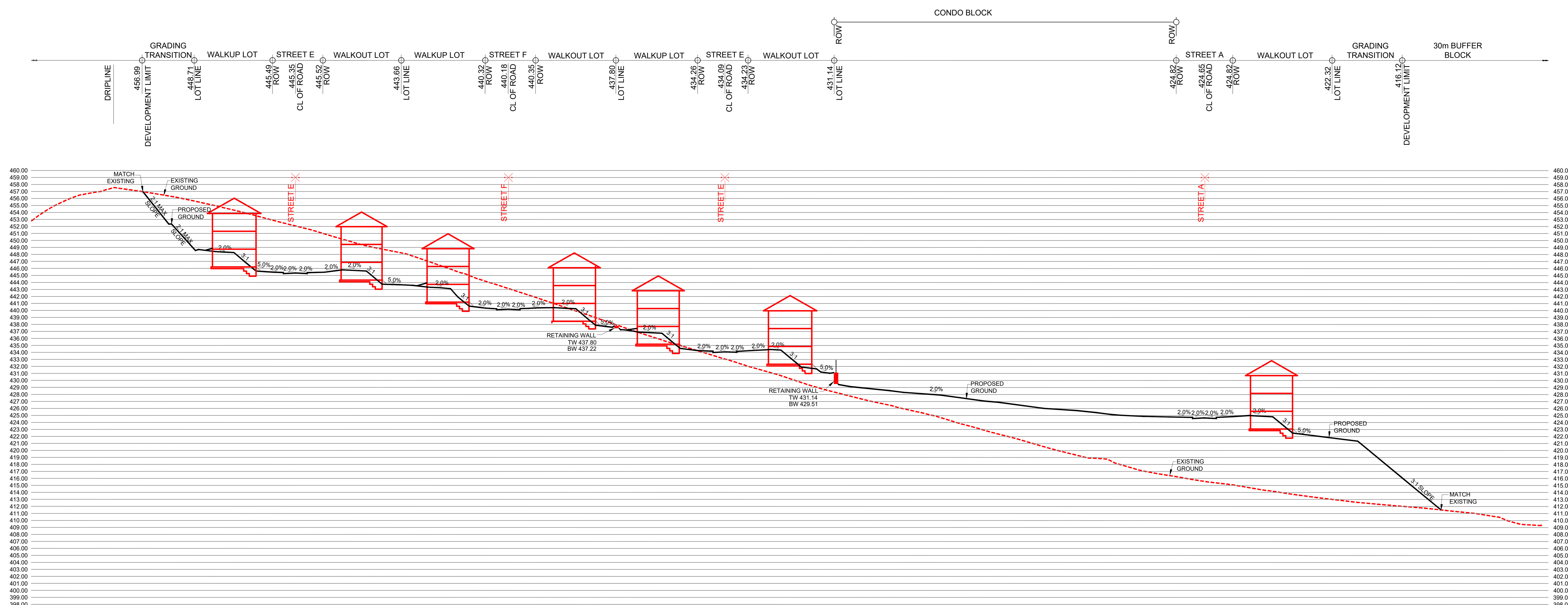
CONCEPTUAL GRADING PLAN

SCALE:	1:1250	PROJECT No.:	21-1242
DATE:	JUNE 2022	DRAWING:	6



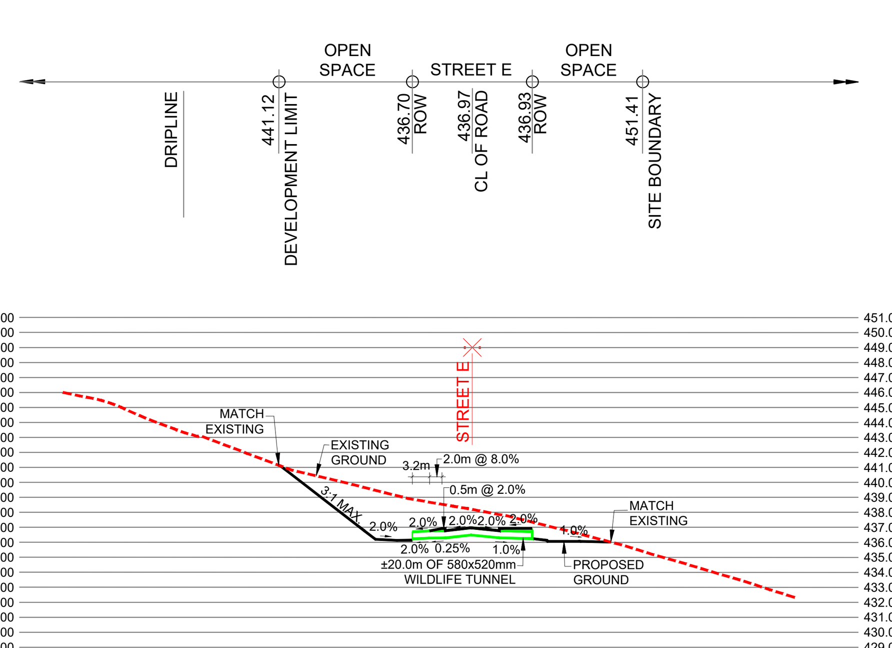
SECTION 1-1

SCALE HOR 1:1000
VER 1:400



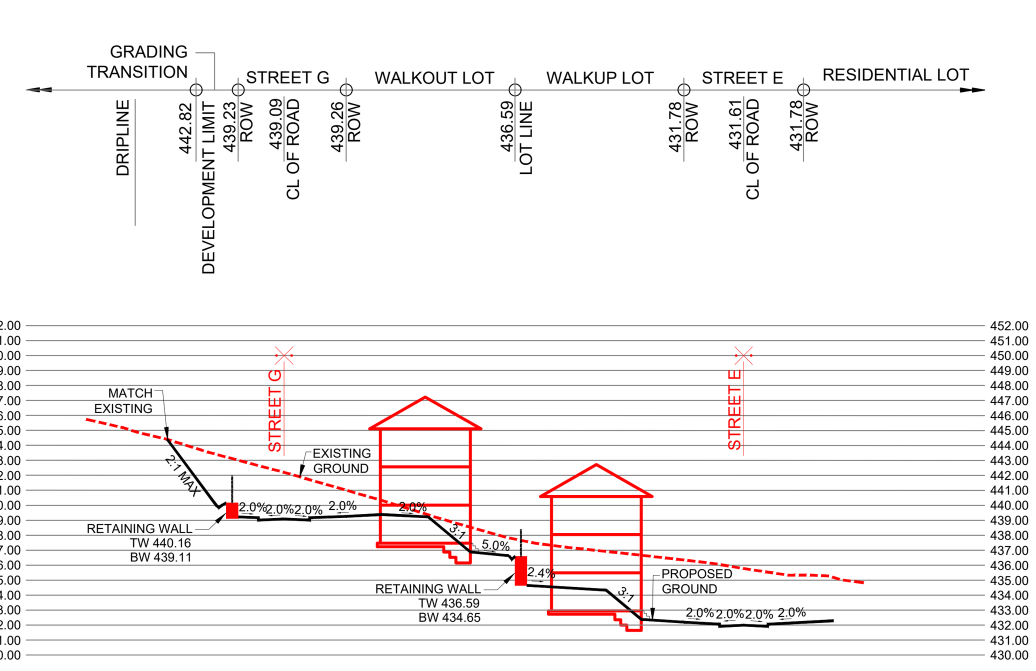
SECTION 2-2

SCALE HOR 1:1000
VER 1:400



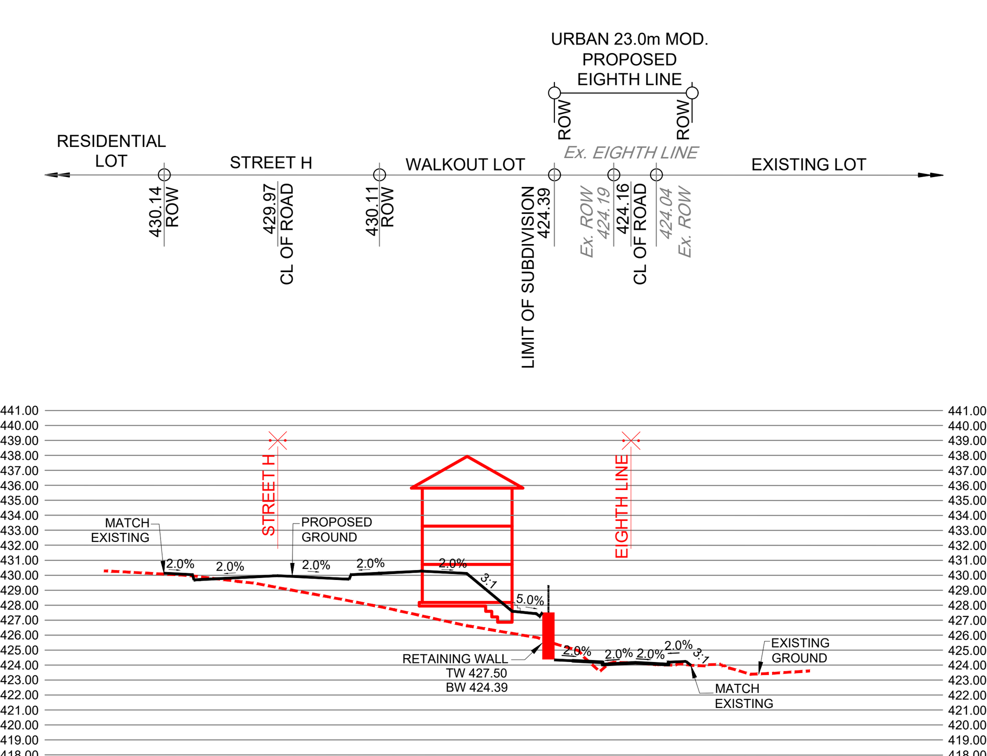
SECTION 3-3

SCALE HOR 1:100
VER 1:40



SECTION 4-4

SCALE HOR 1:1000
VER 1:400



SECTION 5-5

SCALE HOR 1:1000
VER 1:400

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5552 EIGHTH LINE & 5520 EIGHTH LINE

TOWN OF ERIN

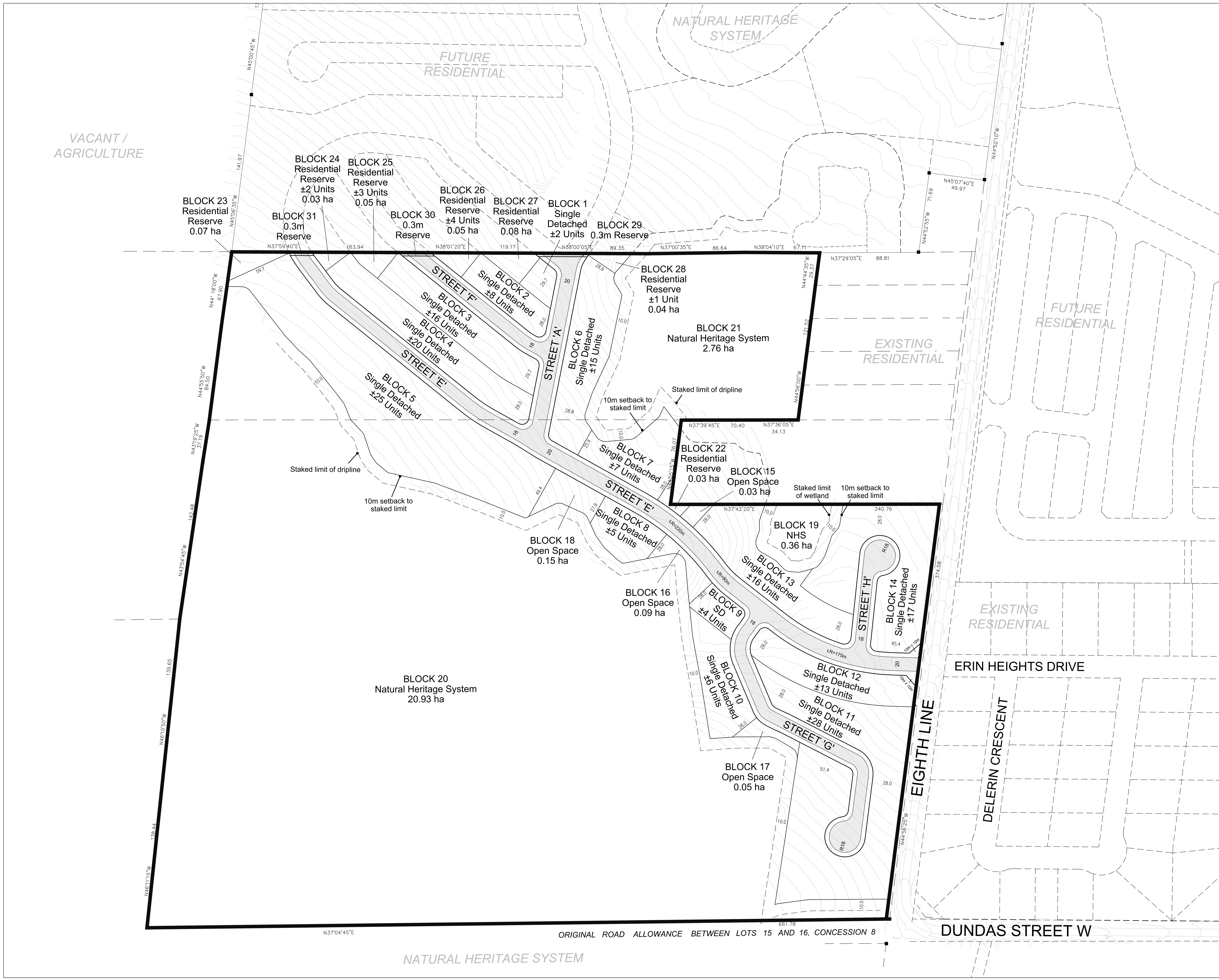
CROSS SECTIONS

SCALE:	AS SHOWN	PROJECT No.:	21-1242
DATE:	JUNE 2022	DRAWING:	7

APPENDIX A

DRAFT PLANS

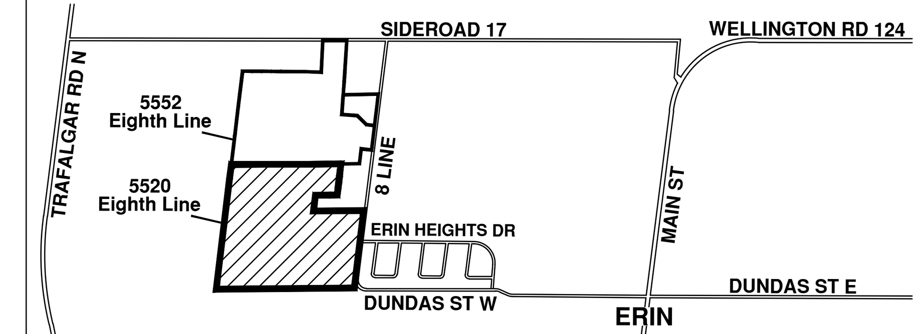
KORSIAK URBAN PLANNING, JUNE 2022



DRAFT PLAN OF SUBDIVISION 23T -

5520 Eighth Line

PART OF LOT 16
CONCESSION 8
(GEOGRAPHIC TOWNSHIP OF ERIN)
TOWN OF ERIN
COUNTY OF WELLINGTON



KEY MAP
N.T.S.

SUBJECT PROPERTY

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE KORSIAK URBAN PLANNING TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO WELLINGTON COUNTY FOR APPROVAL.

SIGNED ____ DATE June 9, 2022
Gary Langen
2779176 Ontario Inc.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED ____ DATE May 10, 2022
R. DenBroeder, Ontario Land Surveyor

R-PE SURVEYING LTD.
ONTARIO LAND SURVEYORS
643 CHRISLEA ROAD, SUITE 7, WOODBRIDGE, ONTARIO L4L 8A3
Tel.(416)635-5000 Fax (416)635-5001

ADDITIONAL INFORMATION (UNDER SECTION 51 (17) OF THE PLANNING ACT)

A) SHOWN ON PLAN
B) SHOWN ON PLAN
C) SHOWN ON PLAN
D) SHOWN ON PLAN
E) SHOWN ON PLAN
F) SHOWN ON PLAN
G) SHOWN ON PLAN
H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
I) CLAY LOAM
J) SHOWN ON PLAN
K) SANITARY AND STORM SEWERS TO BE PROVIDED
L) SHOWN ON PLAN

LAND USE SCHEDULE

Land Use	Lots/Blocks	Block Total	Area (ha)	Units	SDE*
Residential (Single Detached)	1-14	14	8.60	182	182
Open Space	15-18	4	0.32		
Natural Heritage System (NHS)	19-21	3	24.05		
Residential Reserve	22-28	7	0.35	10	10
0.3m Reserve	29-31	3	0.00		
18m ROW (802m)			1.53		
20m ROW (581m)			1.17		
Total	31	31	36.02	192	192

*SDE Factor:
Single Detached - 1.0
Current subscription: 210 SDEs

DATE	REVISION	DWG	BY
June 6, 2022	First Submission	A	KC

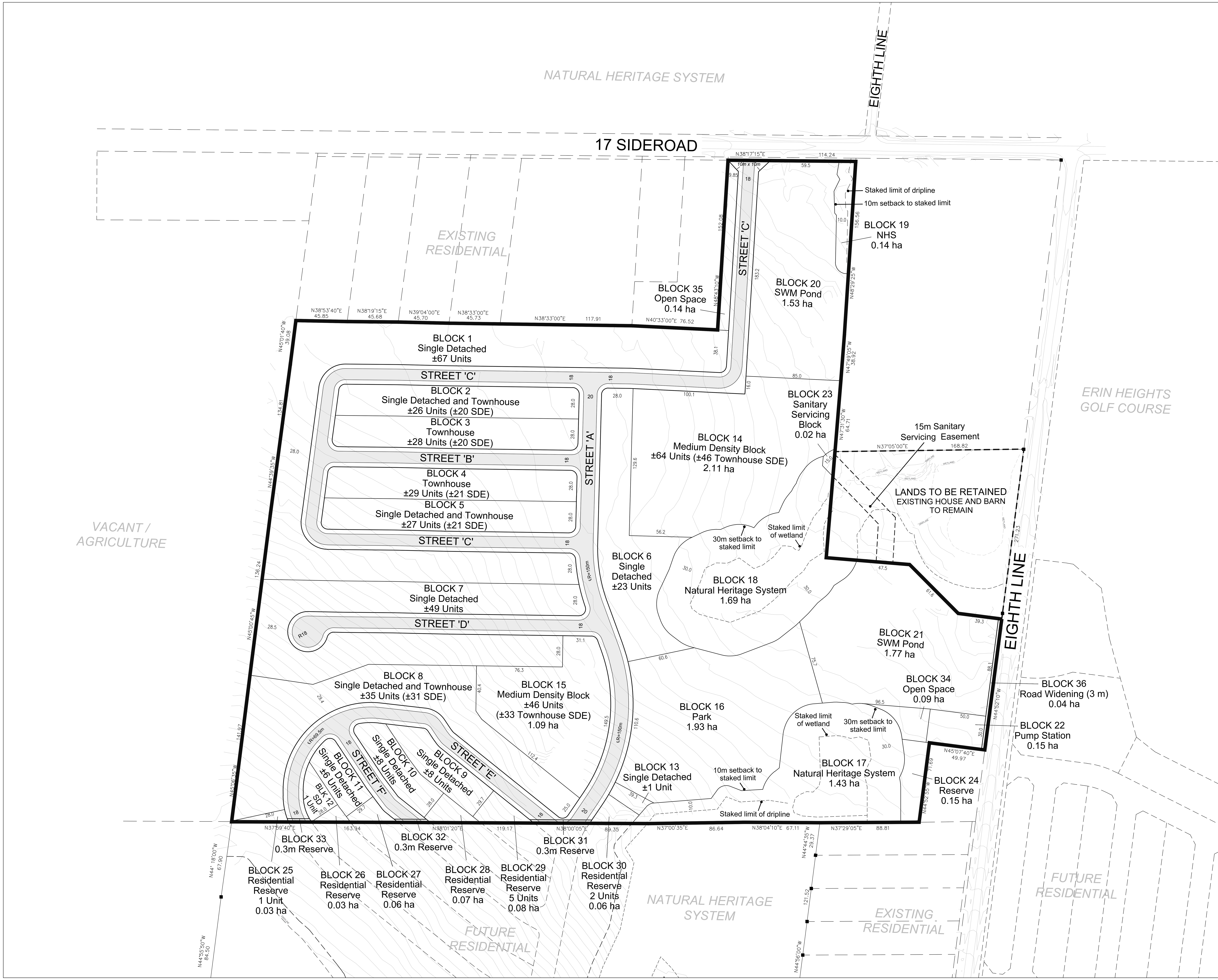
NOTES:
* Local road/Local road corner radii = 6m
* Pavement illustration is diagrammatic

mattamyHOMES

SCALE 1:1500	June 6, 2022		A
DRAWN BY: KC	CHECKED BY: CR		

KORSIAK Urban Planning
206-277 Lakeshore Road East
Oakville, Ontario L6J 1H9
T: 905-257-0227
info@korsiak.com

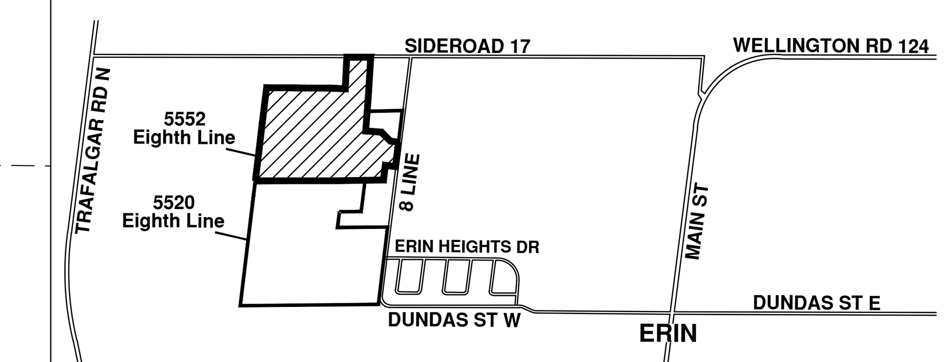
S:\Korsiak & Company\MATTAMY\Erin\Draft Plan\South\2022-06\Erin - 5520 Eighth Line Draft Plan - Jun 06 22_kc.dwg



DRAFT PLAN OF SUBDIVISION
23T -

5552 Eighth Line

PART OF LOT 17
CONCESSION 8
(GEOGRAPHIC TOWNSHIP OF ERIN)
TOWN OF ERIN
COUNTY OF WELLINGTON



KEY MAP
N.T.S.

SUBJECT PROPERTY

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE KORSIAK URBAN PLANNING TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO WELLINGTON COUNTY FOR APPROVAL.

SIGNED ______ Tom Baskerville, 2779181 Ontario Inc. DATE June 7, 2022

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED ______ R. DenBroeder, Ontario Land Surveyor DATE May 10, 2022

R-PE SURVEYING LTD.
ONTARIO LAND SURVEYORS
643 CHRISLEA ROAD, SUITE 7, WOODBRIDGE, ONTARIO L4L 8A3
Tel.(416)635-5000 Fax (416)635-5001

ADDITIONAL INFORMATION (UNDER SECTION 51 (17) OF THE PLANNING ACT)

A) SHOWN ON PLAN
B) SHOWN ON PLAN
C) SHOWN ON PLAN
D) SHOWN ON PLAN
E) SHOWN ON PLAN
F) SHOWN ON PLAN
G) SHOWN ON PLAN
H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
I) CLAY LOAM
J) SHOWN ON PLAN
K) SANITARY AND STORM SEWERS TO BE PROVIDED
L) SHOWN ON PLAN

LAND USE SCHEDULE

Land Use	Lots/Blocks	Block Total	Area (ha)	Units	SDE*
Residential (Single Detached and Townhouse)	1-13	13	10.27	308	276
Medium Density Block	14, 15	2	3.20	110	79
Park	16	1	1.93		
Natural Heritage System (NHS)	17-19	3	3.26		
SWM Pond	20, 21	2	3.30		
Pump Station	22	1	0.15		
Sanitary Servicing Block	23	1	0.02		
Reserve	24	1	0.15		
Residential Reserve	25-30	6	0.33	8	8
0.3m Reserve	31-33	3	0.00		
Open Space	34, 35	2	0.23		
Road Widening	36	1	0.04		
18m ROW (1,856 m)			3.43		
20m ROW (400 m)			0.81		
Total	36	36	27.12	426	363

*SDE Factors:
Single Detached - 1.0
Townhouse - 0.72
Current subscription: 365 SDEs

DATE	REVISION	DWG	BY
June 6, 2022	First Submission	A	KC

NOTES:

* Local road/Local road corner radii = 6m
* Pavement illustration is diagrammatic

COSCORP INC.

SCALE 1:1500	June 6, 2022
DRAWN BY: KC	CHECKED BY: CR

A

KORSIAK Urban Planning
206-277 Lakeshore Road East
Oakville, Ontario L6J 1H9
T: 905-257-0227
info@korsiak.com

S:\Korsiak & Company\MATTAMY\Erin\Draft Plan\North\2022-06\Erin - 5552 Eighth Line Draft Plan - Jun 06 22_kc.dwg

APPENDIX B

CORRESPONDENCE REGARDING WATER SERVICING

Elizabeth Reid

From: Joe Mullan <mullan@ainleygroup.com>
Sent: October 7, 2021 1:05 PM
To: Kenny Sun
Cc: John Tjeerdsma; Nick Colucci
Subject: RE: Mattamy Erin: As-builts & WM Modelling
Attachments: FCV's.dbf; FCV's.shp; FCV's.shx; Fire Flows.dbf; Fire Flows.shp; Fire Flows.shx; Junctions.dbf; Junctions.shp; Junctions.shx; Pipes.dbf; Pipes.shp; Pipes.shx; Pump Status.dbf; Pump Status.shp; Pump Status.shx; Pumps.dbf; Pumps.shp; Pumps.shx; Resiviors.dbf; Resiviors.shp; Resiviors.shx; Tanks.dbf; Tanks.shp; Tanks.shx

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Kenny:

Further to your request please find attached the existing WaterCAD model files/components associated with the Town of Erin Water system that was prepared by Triton Engineering. In utilizing this model please be aware of the following:

- The model was prepared a number of years ago.
- We are unsure if the model was ever field calibrated
- The model is based on historic information and discussions with former in-house water operation staff, however; not necessarily all based on “As-Built” information.
- The exact material, alignment, limits and elevations of the watermain are in some cases approximate and should not be relied upon.
- Well/pump details and operating conditions are based on historic information and pump curve information and discussions with former staff. If pumps have been since been replaced this information will need to be updated.

After you have a chance to review this material, please let us know if you have specific questions and we try to follow up with Triton and or Operations Staff to get answers.

With regard to available Water Capacity in Erin, we do know from recent annual Water Reports that there is “very limited” residual capacity available in the system and that in conjunction with the new developments proposed in Erin the following water related works will have to be completed:

a) The design and construction of a new Municipal Well at #5657 Wellington CR23.
b) The design and construction of a 2,140m^3 Water Tower within Erin.
c) The design and construction of 1,500m of trunk main on CR23 from the new Municipal Well to Sideroad 17.
d) The design and construction of 950m of trunk watermain from the intersection of Sideroad 17 & Wellington CR 23 to the future Water Tower.
e) Possible watermain upgrades on Eight Line, Dundas St West & Sideroad 17.

Note the Town are currently in the process of retaining a consultant to Develop Calibrated a Water Model for the Town water systems that will look at the existing systems and the future infrastructure needs to accommodate the proposed growth. It is anticipated that this new model will be completed in the spring of 2022.

Regards,

J. A. Mullan, P.Eng.
President & CEO

Tel: (705) 445-3451 Ext. 126
Cell: (705) 718-7230

WWW.AINLEYGROUP.COM

From: Kenny Sun <KSun@dsel.ca>
Sent: Thursday, October 7, 2021 9:16 AM
To: Joe Mullan <mullan@ainleygroup.com>; Nick Colucci <nick.colucci@erin.ca>
Cc: John Tjeerdsma <JTjeerdsma@dsel.ca>
Subject: RE: Mattamy Erin: As-builts & WM Modelling
Importance: High

Hi Nick & Joe,

Just following up with you on the file request below.

Could you advise if we can hear back sometime this week with the as-builts / watermain modelling?

Cheers,

Kenny Sun

DSEL
david schaeffer engineering ltd.

600 Alden Road, Suite 700
Markham, ON L3R 0E7

phone: (905) 475-3080 ext.284
fax: (905) 475-3081
email: ksun@DSEL.ca

From: Kenny Sun
Sent: October 1, 2021 9:38 AM
To: 'mullan@ainleygroup.com' <mullan@ainleygroup.com>; 'Nick Colucci' <Nick.Colucci@erin.ca>
Cc: John Tjeerdsma <JTjeerdsma@dsel.ca>
Subject: RE: Mattamy Erin: As-builts & WM Modelling
Importance: High

Good Morning Nick & Joe,

Hope that you're both keeping well!

Just wanted to follow-up on the file request from John and I, per the below & attached correspondence. Can you kindly advise when we can expect to receive the following files?

- As-built drawings:
  - For Sideroad 17, from Trafalgar to Main St.
  - For 8 Line, from Sideroad 17 to Dundas St. W
  - For Dunda St., from 8 Line to Main St.
  - Dundas St. Bridge (Google Maps Link Here); approx. 422m SW of main street.
- Watermain modelling.
- Master Servicing / Capital Works plan that details existing storm infrastructure / existing ROW / road classifications.

We hope to hear back soon – please let us know if there are any questions for us!

Cheers,

Kenny Sun

DSEL
david schaeffer engineering ltd.

600 Alden Road, Suite 700
Markham, ON L3R 0E7

phone: (905) 475-3080 ext.284
fax: (905) 475-3081
email: ksun@DSEL.ca

From: Nick Colucci <Nick.Colucci@erin.ca>
Sent: September 28, 2021 8:23 PM
To: John Tjeerdsma <JTjeerdsma@dsel.ca>
Subject: RE: Mattamy Erin: Water Model

Dear John,

I've requested drawings from our previous Town engineer.

With the growing health concerns, and out of abundance of caution, all municipal facilities, including Town Hall and recreational facilities will remain closed to public access until further notice. Please be advised that staff will continue to conduct business and will be available via email or by phone at 519.855.4407.

Stay informed with the Town's precautionary actions to reduce the spread of COVID-19: https://www.erin.ca/newsroom/news-releases/COVID-19.

Thank you,
Nick

Nick Colucci, P. Eng., BASc, MBA, FEC
Director of Infrastructure Services
Town of Erin
Tel: 519.855.4407 Ext. 227
Email: Nick.Colucci@erin.ca

TOWN OF ERIN

From: John Tjeerdsma [mailto:JTjeerdsma@dsel.ca]
Sent: Tuesday, August 24, 2021 1:25 PM
To: Nick Colucci <Nick.Colucci@erin.ca>
Subject: RE: Mattamy Erin: Water Model

Hi Nick

Just wanted to follow up on my request below and add some more to your to do list…are you able to also provide any drawings of Dundas Street and 8th Line that the Town has?

- Dundas is urbanized from Main Street to the bridge, and also appears to have more recently expanded pavement from the bridge to Erin Heights Drive so wondering if any drawings available for this work
- Dundas Street bridge design drawings
- 8th Line – might be drawings given the watermain within it?

Thanks

John Tjeerdsma, P.Eng.

DSEL
David Schaeffer Engineering Ltd.

600 Alden Road, Suite 700
Markham, ON L3R 0E7

phone: (905) 475-3080 ext. 255
cell: (705) 229-8525
fax: (905) 475-3081
email: jtjeerdsma@DSEL.ca

From: John Tjeerdsma
Sent: August 18, 2021 9:28 AM
To: Nick Colucci <Nick.Colucci@erin.ca>
Subject: Mattamy Erin: Water Model

Hi Nick

We are working on the Mattamy Erin lands and wanting to advance the conceptual water servicing. Does the Town have an overall water model as part of the preferred solution outlined in the 2020 Urban Center Water Servicing report that we can use as a basis to determine internal pipe sizing, etc?

Thanks!

John Tjeerdsma, P.Eng.

DSEL
David Schaeffer Engineering Ltd.

600 Alden Road, Suite 700
Markham, ON L3R 0E7

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email: jtjeerdsma@DSEL.ca

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APPENDIX C

CORRESPONDENCE REGARDING SANITARY SERVICING

Elizabeth Reid

To: Alexandra Schaeffer
Subject: RE: Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

From: Joe Mullan <joe.mullan@ainleygroup.com>
Sent: May 16, 2022 2:54 PM
To: Ryan Oosterhoff <Ryan.Oosterhoff@mattamycorp.com>; Jason Suddergaard <Jason.Suddergaard@mattamycorp.com>; jswartz@empirecommunities.com; Tom Baskerville <tbaskerville@coscorp.ca>
Cc: Nathan Hyde <Nathan.Hyde@erin.ca>; Nick Colucci <nick.colucci@erin.ca>; Quinto Annibale <qannibale@loonix.com>; Claudio Micelli <Claudio.Micelli@wsp.com>; John Tjeerdsma <JTjeerdsma@dsel.ca>; Dragan Zec - Urbantech (dzec@urbantech.com) <dzec@urbantech.com>
Subject: Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

Hi Ryan:

I apologize for delay in this response, but there has been a lot of things happening on this project over the past four weeks, which has caused our delay in getting a response back to you and your team.

Following Solmar advising the Town in mid-Apr that they did not wish to pay the extra monies to have the Trunk Sewer downstream of Dundas St lowered, WSP re-evaluated the overall collection system including the need for a Sewage Pumping Station in Hillsburgh and have recently presented a new Design solution to the Town which includes the following components

Segment 1	Erin Sewage Pumping Station (E-SPS-1) in Lions Park and forcemains to the WWTP (No Change from Class EA)
Segment 2	Micro-Tunnelled Trunk Sanitary Sewer on Main Street from (E-SPS-1) to the intersection with the Eora Cataract Trail. (This has been changed to a larger diameter pipe that will be lower than proposed in the Class EA)
Segment 3	Trunk Sanitary Gravity Sewer from Hillsburgh to Erin via the Eora Cataract Trail. (This has changed from a Sewage Pumping Station (H-SPS-1) in Hillsburgh and forcemain(s) to Erin, via the Eora Cataract Trail, to a trunk gravity sewer from Hillsburgh to Erin).
Segment 4	Trunk Sanitary Sewer on Trafalgar Road in Hillsburgh from Eora Cataract Trail to Queen Street (No Change from Class EA)

In conjunction with latest design solution, it was determined that the Town needs to proceed with the Tendering and award of these Infrastructure Segments ASAP, to comply with the timelines in the executed Front Ending Agreements and to ensure that the Contracts can be awarded by Town Council, before the date when the pending Municipal Election would render Council not able to make a significant financial decision.

As such the following tendering and awards have now been set and WSP is proceeding to comply:

Linear Works contract – Segments 2, 3 & 4

Request for Tender (RFT) issue date	May 19
Bid Closing date	June 16
Council Award date	June 30

Sewage Pumping Station (SPS) contract – Segment 1

RFT issue date	May 26
Bid Closing date	June 23
Council Award date	July 7

While the proposed design solution will not permit Mattamy Homes and Empire Communities to drain the sewage flows from your developments to the trunk sewer via gravity, it still provides significant benefit as it will allow Mattamy Homes and Empire Communities to discharge your sewage flows to the gravity sewer on the Elora Cataract Trailway at the intersection with Sideroad 17, which is significantly closer and less disruptive than having to construct a forcemain along Dundas St West to Main St.

In conjunction with all this, Quinto's office is working with Watson and Associates to develop updated Cost Sharing Tables and we anticipate that follow-up meetings with all Developers will be arranged in early summer to review and discuss the updated financial tables.

Thank you for your patience and please let me know if you have any additional questions.

Regards,

J. A. Mullan, P.Eng.
President & CEO

Ainley GROUP

Tel: (705) 445-3451 Ext. 126
Cell: (705) 718-7230

WWW.AINLEYGROUP.COM

From: Ryan Oosterhoff <Ryan.Oosterhoff@mattamycorp.com>
Sent: Wednesday, May 11, 2022 9:40 AM
To: Joe Mullan <joe.mullan@ainleygroup.com>; Jason Suddergaard <Jason.Suddergaard@mattamycorp.com>; jswartz@empirecommunities.com; Tom Baskerville <tbaskerville@coscorp.ca>
Cc: Nathan Hyde <Nathan.Hyde@erin.ca>; Nick Colucci <nick.colucci@erin.ca>; Quinto Annibale <qannibale@loonix.com>; Claudio Micelli <Claudio.Micelli@wsp.com>; John Tjeerdsma <jtjeerdsma@dsel.ca>; Dragan Zec - Urbantech (dzec@urbantech.com) <dzec@urbantech.com>
Subject: RE: [EXTERNAL] Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

Good morning Joe, hope all is well.
Wondering if there is any update you can provide with respect to the alternative Sanitary sewer design that WSP is working on? We are eager, as is the Town, to ensure the most efficient and cost effective design is implemented and would like to suggest a meeting with our engineers and WSP even if a design alternative has not been completed. Both Urbantech and DSEL, the engineering consultants for Empire and Mattamy respectively, have been analysing this over the past few months and a meeting to share design ideas and collaborate on this matter may prove to be of value.
We can make ourselves available to accommodate the Town and WSP's availability.

Much appreciated,

Ryan Oosterhoff
289.981.9056

From: Ryan Oosterhoff
Sent: May 2, 2022 1:44 PM
To: Joe Mullan <joe.mullan@ainleygroup.com>; Jason Suddergaard <Jason.Suddergaard@mattamycorp.com>; jswartz@empirecommunities.com; Tom Baskerville <tbaskerville@coscorp.ca>
Cc: Nathan Hyde <Nathan.Hyde@erin.ca>; Nick Colucci <nick.colucci@erin.ca>; Quinto Annibale <qannibale@loonix.com>; Claudio Micelli <Claudio.Micelli@wsp.com>; John Tjeerdsma <jtjeerdsma@dsel.ca>; Dragan Zec - Urbantech (dzec@urbantech.com) <dzec@urbantech.com>
Subject: RE: [EXTERNAL] Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

Good afternoon Joe
Following up to see how your meeting with WSP went last week and if there is anything you can update us on.

Thanks,

Ryan Oosterhoff
289.981.9056

From: Joe Mullan <joe.mullan@ainleygroup.com>
Sent: April 25, 2022 10:04 AM
To: Ryan Oosterhoff <Ryan.Oosterhoff@mattamycorp.com>; Jason Suddergaard <Jason.Suddergaard@mattamycorp.com>; jswartz@empirecommunities.com; Tom Baskerville <tbaskerville@coscorp.ca>
Cc: Nathan Hyde <Nathan.Hyde@erin.ca>; Nick Colucci <nick.colucci@erin.ca>; Quinto Annibale <qannibale@loonix.com>; Claudio Micelli <Claudio.Micelli@wsp.com>; John Tjeerdsma <jtjeerdsma@dsel.ca>; Dragan Zec - Urbantech (dzec@urbantech.com) <dzec@urbantech.com>
Subject: [EXTERNAL] Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

Hi Ryan:

I was out of the office on vacation for a week, so I apologize for the delayed response.

We have a mtg with WSP on Wed, to review and discuss the overall Design and we will be discussing the options for the collections system, given Solmar's recent decision not to pay the additional costs for the lowering of the trunk sewer downstream of the Main St & Dundas St intersection. As such, I will follow up with you after Wed's mtg to discus next steps.

Regards,

J. A. Mullan, P.Eng.
President & CEO

Tel: (705) 445-3451 Ext. 126
Cell: (705) 718-7230

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**** Please note that we have transitioned our email addresses to a new format. While my previous address will continue to work, we ask that you please update your address book with my new email address: Joe.Mullan@ainleygroup.com ****

From: Ryan Oosterhoff <Ryan.Oosterhoff@mattamycorp.com>
Sent: Monday, April 25, 2022 9:00 AM
To: Joe Mullan <joe.mullan@ainleygroup.com>; Jason Suddergaard <Jason.Suddergaard@mattamycorp.com>; jswartz@empirecommunities.com; Tom Baskerville <tbaskerville@coscorp.ca>
Cc: Nathan Hyde <Nathan.Hyde@erin.ca>; Nick Colucci <nick.colucci@erin.ca>; Quinto Annibale <qannibale@loonix.com>; Claudio Micelli <Claudio.Micelli@wsp.com>; John Tjeerdsma <jtjeerdsma@dsel.ca>; Dragan Zec - Urbantech (dzec@urbantech.com) <dzec@urbantech.com>
Subject: RE: [EXTERNAL] Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

Good morning Joe, I hope all is well.
Following up on our request, per the email below, and hoping we can meet with WSP to discuss.
I understand from Nick that Solmar declined the most recent proposal and that WSP is looking at an alternative design – perhaps we can arrange a meeting for when they expect to have this completed.

Thanks,

Ryan Oosterhoff
289.981.9056

From: Ryan Oosterhoff
Sent: April 13, 2022 9:42 AM
To: Joe Mullan <joe.mullan@ainleygroup.com>; Jason Suddergaard <Jason.Suddergaard@mattamycorp.com>; jswartz@empirecommunities.com; Tom Baskerville <tbaskerville@coscorp.ca>
Cc: Nathan Hyde <Nathan.Hyde@erin.ca>; Nick Colucci <nick.colucci@erin.ca>; Quinto Annibale <qannibale@loonix.com>; Claudio Micelli <Claudio.Micelli@wsp.com>; John Tjeerdsma <jtjeerdsma@dsel.ca>; Dragan Zec - Urbantech (dzec@urbantech.com) <dzec@urbantech.com>
Subject: RE: [EXTERNAL] Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

Good Morning Joe

Thank you for investigating the lowering of the Trunk Sanitary Sewers in Erin & Hillsburgh to determine if the Mattamy/Corcorp/Empire lands could be accommodated by gravity. We have reviewed the memo provided which was helpful however there remains a number of questions related to the design and the assumptions being made that we and our engineers are unable to reconcile and are hoping we could arrange a meeting with yourself and WSP to review some of these technical matters. We understand time is of the essence for us to confirm our decision on the alternatives presented below and as such would request your availability for next week. As a suggestion, the participants of the allocation program are meeting at the Town's office next week Wednesday, April 20th, at 10:30 a.m., perhaps we could arrange a meeting to discuss the sanitary trunk lowering at 9/9:30 that same day.

Thanks,

Ryan Oosterhoff
289.981.9056

From: Joe Mullan <joe.mullan@ainleygroup.com>
Sent: April 4, 2022 11:10 AM
To: Frank Miceli <fmiceli@westonlaw.ca>; Jason Suddergaard <Jason.Suddergaard@mattamycorp.com>; Ryan Oosterhoff <ryan.oosterhoff@mattamycorp.com>
Cc: Nathan Hyde <Nathan.Hyde@erin.ca>; Nick Colucci <nick.colucci@erin.ca>; Quinto Annibale <qannibale@loonix.com>; Claudio Micelli <Claudio.Micelli@wsp.com>
Subject: [EXTERNAL] Erin Trunk Sewers & SPSs - Mattamy Homes and Derrydale Golf Sanitary Servicing

Hi Everyone:

As you know WSP are proceeding with the design of the Trunk Sanitary Sewers in Erin & Hillsburgh (Segments 1, 2, 3 & 4) to accommodate the servicing of the new developments in Erin & Hillsburgh. During the design, WSP were required to investigate the lowering of the trunk sanitary sewers in Erin, such that the new developments could drain to the trunk sewer, via gravity and avoid the developers having to design and construct sewage pumping stations in conjunction with their developments. Note in accordance with the approved Wastewater Class EA, dated Oct. 2019, Mattamy Homes and Derrydale Golf would be required to design and construct sewage pumping station(s) within your developments along with a forcemain to discharge the flows to the trunk sewer at the intersection of Dundas Street and Main Street in Erin.

WSP have developed a scenario, outlined in the attached Tech Memo, whereby the trunk sewer on Main Street in Erin, could be lowered and extended along Main Street from Dundas St to the Elora Cataract Trail and along the Elora Cataract Trail to Sideroad 17, such that Mattamy Homes & Derrydale Golf could eliminate the proposed sewage pumping station(s) within their developments; however, Mattamy Homes & Derrydale Golf would be solely responsible for the increased cost of $14.0 Million to lower the trunk sewer. Note the feasibility of this alternative is conditional upon Solmar agreeing to pay additional costs for the lowering of the trunk sewer on Main Street between Lions Park Pumping Station and Dundas Street and a similar Tech Memo relating to their additional costs has been sent to Solmar.

Given that time is of the essence, we would like to get a decision on which alternative to proceed with asap, and the alternatives are:

i. The Town proceed with the design and construction of a deep trunk sewer on Main Street that is lowered and extended along Main Street, from Dundas Street to the Elora Cataract Trail, and along the Elora Cataract Trail to Sideroad 17, with all Developers sharing in the cost of the "shallow" trunk sewer cost, as per the executed Agreements with the Town, and Mattamy Homes & Derrydale Golf paying the additional $14.0 Million to lower and extend the trunk sewer, as per the attached Tech Memo.

   or

ii. The Town proceed with the design and construction of "shallow" trunk sewer on Main Street, as per the approved Wastewater Class EA, with all Developers sharing in the cost in accordance with the executed Agreements with the Town.

After you and your teams have a chance to review this information, we would be happy to arrange a meeting to discuss, if necessary.

Regards,

J. A. Mullan, P.Eng.
President & CEO

Tel: (705) 445-3451 Ext. 126
Cell: (705) 718-7230

WWW.AINLEYGROUP.COM

**** Please note that we have transitioned our email addresses to a new format. While my previous address will continue to work, we ask that you please update your address book with my new email address: Joe.Mullan@ainleygroup.com ****

APPENDIX D

SANITARY DESIGN SHEETS

DAVID SCHAEFFER ENGINEERING LTD.

600 ALDEN ROAD, SUITE 700
MARKHAM, ONTARIO
L3R 0E7
TEL: (905) 475-3080
FAX: (905) 475-3081

TOWN OF ERIN

SANITARY SEWER DESIGN

LOCATION: 5520 EIGHTH LINE & 5552 EIGHTH LINE

Single Family:	2.8	People/Unit
Townhouse:	2.8	People/Unit
Commercial:	100	ppha
School:	60	ppha
Infil.Flow (INF):	0.29	L/s/ha

n (PVC): 0.013
n (Conc): 0.013

PROJECT No.: 21-1242
DATE: Jun 2022
DESIGNED BY: G.Y.
CHECKED BY: P.P.

STREET	MANHOLE		LENGTH	TRIBUTARY AREA HECTARE							POPULATION TRIBUTARY						AVG.	AVG.				MAX	SEWER					PIPE			REMARKS
				INCREMENT						TOTAL	INCREMENT					TOTAL	L/s	L/s	PEAKING	MAX	INF.	FLOW	SIZE	SLOPE	Q	VEL (m/s)					
	FROM	TO	(m)	SINGLE F.	SEMI.	TOWNHOUSE	COMMERCIAL	SCHOOL	INFILT		SINGLE F.	SEMI.	TOWNHOUSE	COMMERCIAL	SCHOOL		INC.	TOTAL	FACTOR	L/s	L/s	EXP.			L/s	FULL	ACT.	TYPE	CLASS	Q/Qf	
STREET F																															
	5A	6A	75.0	0.52						0.52	34					34	0.11	0.11	4.00	0.46	0.15	0.61	200	2.35	50.28	1.60	0.53	PVC	SDR-35	0.01	
	6A	7A	11.5							0.52						34		0.11	4.00	0.46	0.15	0.61	200	0.50	23.19	0.74	0.31	PVC	SDR-35	0.03	
To STREET E, Pipe 7A - 8A										0.52						34															
	13A	14A	77.5	0.70						0.70	48					48	0.16	0.16	4.00	0.64	0.20	0.85	200	2.70	53.89	1.72	0.62	PVC	SDR-35	0.02	
	14A	15A	77.5	0.58						1.28	45					93	0.15	0.31	4.00	1.25	0.37	1.62	200	2.55	52.37	1.67	0.75	PVC	SDR-35	0.03	
	15A	22A	18.0	0.08						1.36	3					96	0.01	0.32	4.00	1.29	0.39	1.68	200	0.50	23.19	0.74	0.43	PVC	SDR-35	0.07	
To STREET A, Pipe 22A - 23A										1.36						96															
STREET D																															
	27A	28A	25.0	0.57						0.57	20					20	0.07	0.07	4.00	0.27	0.17	0.43	200	4.15	66.82	2.13	0.58	PVC	SDR-35	0.01	
	28A	29A	81.0	0.58						1.15	37					57	0.12	0.19	4.00	0.77	0.33	1.10	200	2.85	55.37	1.76	0.68	PVC	SDR-35	0.02	
	29A	30A	81.0	0.59						1.74	42					99	0.14	0.33	4.00	1.33	0.50	1.83	200	4.00	65.60	2.09	0.89	PVC	SDR-35	0.03	
	30A	31A	81.0	0.52						2.26	40					139	0.13	0.47	4.00	1.87	0.66	2.52	200	2.00	46.38	1.48	0.78	PVC	SDR-35	0.05	
	31A	32A	11.5							2.26						139		0.47	4.00	1.87	0.66	2.52	200	0.60	25.41	0.81	0.51	PVC	SDR-35	0.10	
To STREET A, Pipe 32A - 33A										2.26						139															
STREET B																															
	38A	39A	74.5	0.62						0.62	59					59	0.20	0.20	4.00	0.79	0.18	0.97	200	2.85	55.37	1.76	0.66	PVC	SDR-35	0.02	
	39A	40A	74.5	0.55						1.17	56					115	0.19	0.39	4.00	1.54	0.34	1.88	200	2.85	55.37	1.76	0.81	PVC	SDR-35	0.03	
	40A	41A	74.5	0.49						1.66	45					160	0.15	0.54	4.00	2.15	0.48	2.63	200	1.55	40.83	1.30	0.73	PVC	SDR-35	0.06	
To STREET A, Pipe 41A - 42A										1.66						160															
STREET A																															
	20A	21A	21.0	0.20						0.20	6					6	0.02	0.02	4.00	0.08	0.06	0.14	200	1.00	32.80	1.04	0.25	PVC	SDR-35	0.00	
Contribution From STREET E, Pipe 19A - 21A										2.59						108															
	21A	22A	82.0	0.40						3.19	20					134	0.07	0.45	4.00	1.80	0.93	2.72	200	5.30	75.51	2.40	1.11	PVC	SDR-35	0.04	
Contribution From STREET F, Pipe 15A - 22A										1.36						96															
	22A	23A	84.5	0.51						5.06	23					253	0.08	0.85	4.00	3.40	1.47	4.86	200	5.00	73.34	2.33	1.30	PVC	SDR-35	0.07	
Contribution From STREET E, Pipe 12A - 23A										3.75						205															
	23A	24A	61.0	0.46						9.27	12					470	0.04	1.58	3.99	6.29	2.69	8.98	200	5.05	73.71	2.35	1.59	PVC	SDR-35	0.12	
	24A	25A	53.5							9.27						470		1.58	3.99	6.29	2.69	8.98	200	6.00	80.34	2.56	1.69	PVC	SDR-35	0.11	
	25A	26A	41.5							9.27						470		1.58	3.99	6.29	2.69	8.98	200	2.20	48.65	1.55	1.18	PVC	SDR-35	0.18	
	26A	32A	48.0	0.29						9.56	12		129			611	0.04	2.05	3.93	8.06	2.77	10.83	200	1.75	43.39	1.38	1.15	PVC	SDR-35	0.25	
Contribution From STREET D, Pipe 31A - 32A										2.26						139															
	32A	33A	29.5	0.23						12.05	9					759	0.03	2.55	3.87	9.86	3.49	13.35	200	2.60	52.89	1.68	1.40	PVC	SDR-35	0.25	
	33A	37A	36.0	0.20						12.25	6					765	0.02	2.57	3.87	9.94	3.55	13.49	200	2.55	52.37	1.67	1.39	PVC	SDR-35	0.26	
Contribution From STREET C, Pipe 36A - 37A										1.83						141															
	37A	41A	72.5	0.40						14.48	20					926	0.07	3.11	3.82	11.87	4.20	16.07	200	2.70	53.89	1.72	1.49	PVC	SDR-35	0.30	
Contribution From STREET B, Pipe 40A - 41A										1.66						160															
	41A	42A	66.5	0.31						16.45	20					1106	0.07	3.71	3.77	14.00	4.77	18.77	200	1.95	45.80	1.46	1.38	PVC	SDR-35	0.41	
To STREET C, Pipe 42A - 49A										16.45						1106															
STREET C																															
	34A	35A	79.0	0.69						0.69	42					42	0.14	0.14	4.00	0.56	0.20	0.76	200	2.35	50.28	1.60	0.58	PVC	SDR-35	0.02	
	35A	36A	79.0	0.61						1.30	54					96	0.18	0.32	4.00	1.29	0.38	1.67	200	2.85	55.37	1.76	0.77	PVC	SDR-35	0.03	
	36A	37A	79.0	0.53						1.83	45					141	0.15	0.47	4.00	1.89	0.53	2.42	200	1.75	43.39	1.38	0.74	PVC	SDR-35	0.06	
To STREET A, Pipe 37A - 41A										1.83						141															

DAVID SCHAEFFER ENGINEERING LTD.

600 ALDEN ROAD, SUITE 700
MARKHAM, ONTARIO
L3R 0E7
TEL: (905) 475-3080
FAX: (905) 475-3081

TOWN OF ERIN

SANITARY SEWER DESIGN

LOCATION: 5520 EIGHTH LINE & 5552 EIGHTH LINE

Single Family:	2.8	People/Unit	
Townhouse:	2.8	People/Unit	
Commercial:	100	ppha	
School:	60	ppha	n (PVC): 0.013
Infil.Flow (INF):	0.29	L/s/ha	n (Conc): 0.013

PROJECT No.: 21-1242
DATE: Jun 2022
DESIGNED BY: G.Y.
CHECKED BY: P.P.

Note: To be conservative, industrial Kav is considered to be 1

STREET	MANHOLE		LENGTH	TRIBUTARY AREA HECTARE							POPULATION TRIBUTARY						AVG.	AVG.				MAX	SEWER					PIPE			
				INCREMENT						TOTAL	INCREMENT					TOTAL	L/s	L/s	PEAKING	MAX	INF.	FLOW	SIZE	SLOPE	Q	VEL (m/s)					REMARKS
	FROM	TO	(m)	SINGLE F.	SEMI.	TOWNHOUSE	COMMERCIAL	SCHOOL	INFILT		SINGLE F.	SEMI.	TOWNHOUSE	COMMERCIAL	SCHOOL		INC.	TOTAL	FACTOR	L/s	L/s	EXP.			L/s	FULL	ACT.	TYPE	CLASS	Q/Qf	
	43A	44A	65.0	0.41						0.41	17					17	0.06	0.06	4.00	0.23	0.12	0.35	200	5.00	73.34	2.33	0.56	PVC	SDR-35	0.00	
	44A	45A	65.0	0.30						0.71	14					31	0.05	0.10	4.00	0.42	0.21	0.62	200	5.00	73.34	2.33	0.71	PVC	SDR-35	0.01	
	45A	46A	12.0	0.21						0.92	6					37	0.02	0.12	4.00	0.50	0.27	0.76	200	1.00	32.80	1.04	0.43	PVC	SDR-35	0.02	
	46A	47A	78.0	0.68						1.60	40					77	0.13	0.26	4.00	1.03	0.46	1.50	200	2.60	52.89	1.68	0.74	PVC	SDR-35	0.03	
	47A	48A	78.0	0.65						2.25	48					125	0.16	0.42	4.00	1.68	0.65	2.33	200	2.65	53.39	1.70	0.84	PVC	SDR-35	0.04	
	48A	49A	78.0	0.59						2.84	42					167	0.14	0.56	4.00	2.24	0.82	3.07	200	1.90	45.21	1.44	0.82	PVC	SDR-21	0.07	
To STREET C, Pipe 49A - 50A										2.84						167															
Contribution From STREET A, Pipe 41A - 42A										16.45						1106															
	42A	49A	13.0							16.45						1106		3.71	3.77	14.00	4.77	18.77	200	5.95	80.00	2.55	2.06	PVC	SDR-35	0.23	
Contribution From STREET C, Pipe 48A - 49A										2.84						167															
	49A	50A	58.0	0.35						19.64	17					1290	0.06	4.33	3.73	16.15	5.70	21.85	200	3.50	61.36	1.95	1.78	PVC	SDR-35	0.36	
	50A	51A	58.0	0.30						19.94	14					1304	0.05	4.38	3.72	16.28	5.78	22.06	200	2.15	48.09	1.53	1.50	PVC	SDR-35	0.46	
To SERVICING EASEMENT, Pipe 51A - 52A										19.94						1304															
STREET E																															
	16A	17A	83.5	0.92						0.92	42					42	0.14	0.14	4.00	0.56	0.27	0.83	200	2.25	49.20	1.57	0.59	PVC	SDR-35	0.02	
	17A	18A	72.0	0.97						1.89	37					79	0.12	0.27	4.00	1.06	0.55	1.61	200	2.40	50.81	1.62	0.73	PVC	SDR-35	0.03	
	18A	19A	53.5	0.54						2.43	23					102	0.08	0.34	4.00	1.37	0.70	2.07	200	2.25	49.20	1.57	0.78	PVC	SDR-35	0.04	
	19A	21A	13.0	0.16						2.59	6					108	0.02	0.36	4.00	1.45	0.75	2.20	200	1.85	44.61	1.42	0.73	PVC	SDR-35	0.05	
To STREET A, Pipe 21A - 22A										2.59						108															
	1A	2A	45.5	0.62						0.62	26					26	0.09	0.09	4.00	0.35	0.18	0.53	200	4.70	71.11	2.26	0.65	PVC	SDR-35	0.01	
	2A	3A	39.0	0.28						0.90	9					35	0.03	0.12	4.00	0.47	0.26	0.73	200	4.70	71.11	2.26	0.72	PVC	SDR-35	0.01	
	3A	4A	33.0	0.36						1.26	9					44	0.03	0.15	4.00	0.59	0.37	0.96	200	4.85	72.23	2.30	0.80	PVC	SDR-35	0.01	
	4A	7A	29.5	0.18						1.44	6					50	0.02	0.17	4.00	0.67	0.42	1.09	200	5.10	74.07	2.36	0.82	PVC	SDR-35	0.01	
Contribution From STREET F, Pipe 6A - 7A										0.52						34															
	7A	8A	31.0	0.17						2.13	9					93	0.03	0.31	4.00	1.25	0.62	1.87	200	2.75	54.39	1.73	0.80	PVC	SDR-35	0.03	
	8A	9A	58.5	0.41						2.54	17					110	0.06	0.37	4.00	1.48	0.74	2.21	200	4.05	66.01	2.10	0.97	PVC	SDR-35	0.03	
	9A	10A	20.5	0.22						2.76	12					122	0.04	0.41	4.00	1.64	0.80	2.44	200	2.90	55.85	1.78	0.88	PVC	SDR-35	0.04	
	10A	11A	63.0	0.46						3.22	40					162	0.13	0.54	4.00	2.18	0.93	3.11	200	1.50	40.17	1.28	0.75	PVC	SDR-35	0.08	
	11A	12A	63.0	0.45						3.67	40					202	0.13	0.68	4.00	2.71	1.06	3.78	200	1.50	40.17	1.28	0.80	PVC	SDR-35	0.09	
	12A	23A	11.0	0.08						3.75	3					205	0.01	0.69	4.00	2.75	1.09	3.84	200	0.60	25.41	0.81	0.58	PVC	SDR-35	0.15	
To STREET A, Pipe 23A - 24A										3.75						205															
	72A	73A	57.5	0.65						0.65	28					28	0.09	0.09	4.00	0.38	0.19	0.56	200	3.00	56.81	1.81	0.58	PVC	SDR-35	0.01	
	73A	74A	57.5	0.33						0.98	12					40	0.04	0.13	4.00	0.54	0.28	0.82	200	3.40	60.48	1.93	0.67	PVC	SDR-35	0.01	
	74A	75A	43.0	0.27						1.25	12					52	0.04	0.17	4.00	0.70	0.36	1.06	200	2.10	47.53	1.51	0.61	PVC	SDR-35	0.02	
	75A	76A	34.5	0.26						1.51	17					69	0.06	0.23	4.00	0.93	0.44	1.36	200	2.00	46.38	1.48	0.65	PVC	SDR-35	0.03	
Contribution From STREET G, Pipe 71A - 76A										2.42						98															
	76A	77A	58.0	0.43						4.36	28					195	0.09	0.65	4.00	2.62	1.26	3.88	200	3.05	57.28	1.82	1.04	PVC	SDR-35	0.07	
	77A	78A	46.5	0.28						4.64	17					212	0.06	0.71	4.00	2.85	1.35	4.19	200	5.45	76.57	2.44	1.29	PVC	SDR-35	0.05	
Contribution From STREET H, Pipe 64A - 78A										1.16						48															
	78A	1001A	63.0	0.32						6.12	14					274	0.05	0.92	4.00	3.68	1.77	5.45	200	0.90	31.12	0.99	0.74	PVC	SDR-35	0.18	
To EIGHTH LINE, Pipe 1001A - 1002A										6.12						274															

DAVID SCHAEFFER ENGINEERING LTD.
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TOWN OF ERIN

SANITARY SEWER DESIGN

LOCATION: 5520 EIGHTH LINE & 5552 EIGHTH LINE

Single Family:	2.8	People/Unit
Townhouse:	2.8	People/Unit
Commercial:	100	ppha
School:	60	ppha
Infil.Flow (INF):	0.29	L/s/ha

n (PVC): 0.013
n (Conc): 0.013

PROJECT No.: 21-1242
DATE: Jun 2022
DESIGNED BY: G.Y.
CHECKED BY: P.P.

Note: To be conservative, industrial Kav is considered to be 1

STREET	MANHOLE		LENGTH	TRIBUTARY AREA HECTARE							POPULATION TRIBUTARY						AVG.	AVG.	PEAKING	MAX	INF.	MAX	SEWER					PIPE		Q/Qf	REMARKS
				INCREMENT						TOTAL	INCREMENT					TOTAL	L/s	L/s				FLOW	SIZE	SLOPE	Q	VEL (m/s)					
	FROM	TO	(m)	SINGLE F.	SEMI.	TOWNHOUSE	COMMERCIAL	SCHOOL	INFILT		SINGLE F.	SEMI.	TOWNHOUSE	COMMERCIAL	SCHOOL		INC.	TOTAL	FACTOR	L/s	L/s	EXP.			L/s	FULL	ACT.	TYPE	CLASS		
STREET G																															
	65A	66A	35.5	0.75						0.75	23					23	0.08	0.08	4.00	0.31	0.22	0.53	200	5.00	73.34	2.33	0.68	PVC	SDR-35	0.01	
	66A	67A	34.5	0.39						1.14	23					46	0.08	0.15	4.00	0.62	0.33	0.95	200	3.55	61.80	1.97	0.71	PVC	SDR-35	0.02	
	67A	68A	11.0	0.21						1.35	6					52	0.02	0.17	4.00	0.70	0.39	1.09	200	3.80	63.94	2.04	0.76	PVC	SDR-35	0.02	
	68A	69A	93.0	0.54						1.89	28					80	0.09	0.27	4.00	1.07	0.55	1.62	200	1.00	32.80	1.04	0.54	PVC	SDR-35	0.05	
	69A	70A	54.5	0.30						2.19	12					92	0.04	0.31	4.00	1.24	0.64	1.87	200	4.35	68.41	2.18	0.93	PVC	SDR-35	0.03	
	70A	71A	19.0	0.23						2.42	6					98	0.02	0.33	4.00	1.32	0.70	2.02	200	3.30	59.58	1.90	0.88	PVC	SDR-35	0.03	
	71A	76A	31.5							2.42						98		0.33	4.00	1.32	0.70	2.02	200	1.45	39.49	1.26	0.65	PVC	SDR-35	0.05	
To STREET E, Pipe 76A - 77A										2.42						98															
STREET H																															
	63A	64A	24.0	0.54						0.54	20					20	0.07	0.07	4.00	0.27	0.16	0.43	200	1.75	43.39	1.38	0.42	PVC	SDR-35	0.01	
	64A	78A	86.5	0.62						1.16	28					48	0.09	0.16	4.00	0.64	0.34	0.98	200	0.85	30.24	0.96	0.43	PVC	SDR-35	0.03	
To STREET E, Pipe 78A - 1001A										1.16						48															
EIGHTH LINE																															
Contribution From STREET E, Pipe 78A - 1001A										6.12						274															
	1001A	1002A	93.0						0.74	6.86						274		0.92	4.00	3.68	1.99	5.67	200	3.40	60.48	1.93	1.20	PVC	SDR-35	0.09	
	1002A	1003A	117.0				2.90		0.27	10.03				325		599	1.09	2.01	3.93	7.90	2.91	10.81	200	3.50	61.36	1.95	1.46	PVC	SDR-35	0.18	
	1003A	1004A	103.0						0.23	10.26						599		2.01	3.93	7.90	2.98	10.88	200	4.80	71.86	2.29	1.64	PVC	SDR-35	0.15	
	1004A	1005A	112.0						0.25	10.51						599		2.01	3.93	7.90	3.05	10.95	200	5.05	73.71	2.35	1.68	PVC	SDR-35	0.15	
							11.57		0.05	22.13				810		1409															
	1005A	84A	25.5				20.60			42.73				280		1689	0.94	5.67	3.64	20.64	12.39	33.03	200	2.10	47.53	1.51	1.63	PVC	SDR-35	0.69	
To SERVICING EASEMENT, Pipe 84A - 85A										42.73						1689															
SERVICING EASEMENT																															
Contribution From STREET C, Pipe 50A - 51A										19.94						1304															
	51A	52A	16.5							19.94			180			1484		4.98	3.68	18.33	5.78	24.11	250	0.65	47.94	0.98	0.98	PVC	SDR-35	0.50	
	52A	53A	78.0							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.50	68.38	0.97	0.88	PVC	SDR-35	0.35	
	53A	54A	71.0							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.95	94.25	1.33	1.11	PVC	SDR-35	0.26	
	54A	55A	74.0							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-35	0.46	
	55A	56A	38.5							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-35	0.46	
	56A	57A	26.0							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-35	0.46	
	57A	58A	63.0							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-21	0.46	
	58A	59A	71.5							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-21	0.46	
	59A	60A	68.0							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-21	0.46	
	60A	61A	65.0							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-21	0.46	
	61A	62A	21.5							19.94						1484		4.98	3.68	18.33	5.78	24.11	300	0.30	52.97	0.75	0.73	PVC	SDR-21	0.46	
	62A	84A	16.0						0.03	19.97						1484		4.98	3.68	18.33	5.79	24.12	300	0.50	68.38	0.97	0.88	PVC	SDR-21	0.35	
Contribution From EIGHTH LINE, Pipe 1005A - 84A										42.73						1689															
	84A	85A	10.5						0.15	62.85						3173		10.65	3.42	36.42	18.23	54.65	375	0.50	123.98	1.12	1.08	PVC	SDR-21	0.44	

APPENDIX E

STORM DESIGN SHEETS AND LID CALCULATIONS

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
STREET B															10.00					
			0.08	0.69	0.06	0.06														
	106	107	0.53	0.75	0.40	0.45	123.38	155	76.0	2.85	375	296	2.68	0.47	10.47					52%
	107	108	0.56	0.75	0.42	0.87	119.89	291	76.0	2.85	450	481	3.03	0.42	10.89					60%
	108	109	0.49	0.75	0.37	1.24	116.98	403	76.0	1.30	600	700	2.48	0.51	11.40					58%
To STREET A, Pipe 109 - 110						1.24									11.40					
STREET D															10.00					
			0.62	0.25	0.16	0.16														
	227	228	0.64	0.69	0.44	0.60	123.38	204	24.0	4.00	375	351	3.17	0.13	10.13					58%
	228	229	0.64	0.69	0.44	1.04	122.43	353	85.5	2.95	450	490	3.08	0.46	10.59					72%
	229	230	0.66	0.69	0.46	1.49	119.06	494	85.5	4.00	525	860	3.97	0.36	10.95					57%
						100Yr. Intake Flow =		607												
	230	231	0.36	0.69	0.25	1.74	116.60	1171	85.5	1.65	825	1844	3.45	0.41	11.36					64%
To STREET A, Pipe 231 - 270						1.74		607							11.36					
STREET C																				
Contribution From STREET A, Pipe 109 - 110						3.22									12.00					
	110	118	0.02	0.69	0.01	3.23	110.01	989	11.5	1.25	750	1245	2.82	0.07	12.07					79%
Contribution From STREET C, Pipe 116 - 118						2.28									11.77					
	118	119	0.19	0.69	0.13	5.65	109.62	1721	54.0	2.25	825	2153	4.03	0.22	12.29					80%
	119	120	0.20	0.69	0.14	5.79	108.35	1742	54.0	2.25	825	2153	4.03	0.22	12.52					81%
	120	123	0.14	0.69	0.10	5.89	107.11	1751	57.5	2.15	900	2654	4.17	0.23	12.75					66%
To STREET C, Pipe 120 - 123						5.89									12.75					
															10.00					
	121	122	0.18	0.69	0.12	0.12	123.38	43	60.5	0.30	300	53	0.75	1.35	11.35					80%
	122	123	0.05	0.69	0.03	0.16	114.01	50	46.5	0.45	300	65	0.92	0.84	12.19					77%
Contribution From STREET C, Pipe 120 - 123						5.89									12.75					

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient
I = Intensity (mm/hr)
A = Area (hectares)
n = 0.013 (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

DESIGNED BY: G.Y.
CHECKED BY: P.P.
DATE: Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
	123	124	0.21	0.90	0.19	6.23	105.87	1833	19.5	2.15	900	2654	4.17	0.08	12.83					69%
	124	HW1			0.00	6.23	105.46	1826	20.5	2.15	900	2654	4.17	0.08	12.91					69%
															10.00					
			0.04	0.70	0.03	0.03														
			0.18	0.25	0.05	0.07														
	100	101	0.74	0.69	0.51	0.58	123.38	200	80.5	2.25	375	263	2.38	0.56	10.56					76%
			0.18	0.70	0.13	0.71														
	101	102	0.42	0.69	0.29	1.00	119.24	331	80.5	2.90	450	486	3.05	0.44	11.00					68%
			0.16	0.70	0.11	1.11														
	102	105	0.38	0.69	0.26	1.37	116.23	443	80.5	1.60	600	777	2.75	0.49	11.49					57%
To STREET A, Pipe 105 - 109						1.37									11.49					
															10.00					
			0.38	0.69	0.26	0.26														
	111	112	0.58	0.25	0.15	0.41	123.38	140	64.5	4.95	300	215	3.04	0.35	10.35					65%
			0.17	0.25	0.04	0.45														
	112	113	0.30	0.69	0.21	0.66	120.75	220	64.5	5.00	375	392	3.55	0.30	10.66					56%
			0.03	0.25	0.01	0.66														
	113	114	0.22	0.69	0.15	0.82	118.59	269	11.5	1.85	450	388	2.44	0.08	10.73					69%
			0.18	0.75	0.14	0.95														
	114	115	0.78	0.69	0.54	1.49	118.05	488	71.5	2.50	525	680	3.14	0.38	11.11					72%
			0.18	0.69	0.12	1.61														
	115	116	0.41	0.75	0.31	1.92	115.50	616	80.5	2.50	600	971	3.43	0.39	11.50					63%
			0.19	0.69	0.13	2.05														
	116	118	0.31	0.75	0.23	2.28	113.01	717	81.0	4.00	750	2227	5.04	0.27	11.77					32%
To STREET C, Pipe 118 - 119						2.28									11.77					

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient
I = Intensity (mm/hr)
A = Area (hectares)
n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.
CHECKED BY: P.P.

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

DATE: Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

SHEET 2 OF 10

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
STREET A															10.00					
	103	104	0.19	0.69	0.13	0.13	123.38	45	35.0	5.00	300	216	3.06	0.19	10.19					21%
	104	105	0.07	0.69	0.05	0.18	121.94	61	38.5	4.90	300	214	3.03	0.21	10.40					28%
Contribution From STREET C, Pipe 102 - 105						1.37									11.49					
	105	109	0.32	0.69	0.22	1.77	113.10	557	72.5	4.45	600	1295	4.58	0.26	11.76					43%
Contribution From STREET B, Pipe 108 - 109						1.24									11.40					
	109	110	0.30	0.69	0.21	3.22	111.48	997	62.5	3.20	675	1504	4.20	0.25	12.00					66%
To STREET C, Pipe 110 - 118						3.22									12.00					
Contribution From STREET D, Pipe 230 - 231						1.74		607							11.36					
	231	270	0.12	0.69	0.08	1.82	113.92	1184	38.5	0.45	975	1503	2.01	0.32	11.68					79%
						100Yr. Intake Flow =		1864												
	270	258	0.02	0.69	0.01	1.84	111.94	3043	11.0	0.95	1200	3800	3.36	0.05	11.73					80%
To SERVICING EASEMENT, Pipe 258 - 259						1.84		2471							11.73					
Contribution From STREET E, Pipe 247 - 253						0.12									10.17					
Contribution From STREET E, Pipe 252 - 253						1.12									11.53					
	253	254	0.21	0.69	0.14	1.39	112.88	437	75.5	4.40	600	1288	4.56	0.28	11.80					34%
Contribution From STREET F, Pipe 246 - 254						0.77									11.36					
	254	255	0.28	0.69	0.19	2.35	111.20	726	85.5	3.90	600	1213	4.29	0.33	12.13					60%
Contribution From STREET E, Pipe 243 - 255						2.41									12.15					
	255	256	0.37	0.69	0.26	5.02	109.19	1522	62.0	2.40	825	2224	4.16	0.25	12.39					68%
	256	257	1.09	0.90	0.98	6.00	107.79	1796	54.5	2.15	900	2654	4.17	0.22	12.61					68%
	257	258	0.05	0.69	0.03	6.03	106.59	1786	27.0	2.15	900	2654	4.17	0.11	12.72					67%
To SERVICING EASEMENT, Pipe 258 - 259						6.03									12.72					

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient
I = Intensity (mm/hr)
A = Area (hectares)
n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.
CHECKED BY: P.P.
DATE: Jun 2022

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

TOWN OF ERIN

STORM SEWER DESIGN

SHEET 3 OF 10

1242_STM_FSR1.xlsx

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
STREET F															10.00					
	232	233	0.52	0.69	0.36	0.36	123.38	123	71.0	2.25	375	263	2.38	0.50	10.50					47%
	233	238	0.02	0.69	0.01	0.37	119.71	124	10.5	0.30	450	156	0.98	0.18	10.68					79%
To STREET E, Pipe 238 - 239						0.37									10.68					
															10.00					
	244	245	0.52	0.69	0.36	0.36	123.38	123	79.5	2.30	300	147	2.07	0.64	10.64					84%
	245	246	0.54	0.69	0.37	0.73	118.71	241	79.5	2.60	450	460	2.89	0.46	11.10					52%
	246	254	0.05	0.69	0.03	0.77	115.61	246	22.0	0.50	525	304	1.40	0.26	11.36					81%
To STREET A, Pipe 254 - 255						0.77									11.36					
STREET G															10.00					
			0.04	0.25	0.01	0.01														
			0.16	0.25	0.04	0.05														
	200	201	0.57	0.69	0.39	0.44	123.38	152	36.0	4.90	300	214	3.03	0.20	10.20					71%
						100Yr. Intake Flow =		481												
	201	202	0.31	0.69	0.21	0.66	121.89	704	36.0	3.45	600	1140	4.03	0.15	10.35					62%
	202	203	0.15	0.69	0.10	0.76	120.79	736	13.0	1.20	675	921	2.57	0.08	10.43					80%
			0.22	0.69	0.15	0.91														
	203	204	1.73	0.25	0.43	1.35	120.18	930	46.5	0.45	900	1214	1.91	0.41	10.84					77%
	204	205	0.20	0.69	0.14	1.48	117.35	964	46.5	1.60	900	2290	3.60	0.22	11.05					42%
			0.21	0.25	0.05	1.54														
	205	206	0.32	0.69	0.22	1.76	115.91	1046	52.5	3.10	900	3187	5.01	0.17	11.23					33%
	206	207	0.11	0.69	0.08	1.83	114.77	1065	17.5	3.05	900	3162	4.97	0.06	11.29					34%
	207	212	0.05	0.69	0.03	1.87	114.39	1074	33.5	1.50	900	2217	3.49	0.16	11.45					48%
To STREET E, Pipe 212 - 213						1.87		481							11.45					

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient
I = Intensity (mm/hr)
A = Area (hectares)
n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.
CHECKED BY: P.P.
DATE: Jun 2022

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

TOWN OF ERIN

STORM SEWER DESIGN

SHEET 4 OF 10

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIEN T "C"	SECTION AxC	ACCUMULA TED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTR ATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
STREET H															10.00					
						100Yr. Intake Flow =		122												
	214	215	0.16	0.69	0.11	0.11	123.38	160	25.0	0.50	450	202	1.27	0.33	10.33					79%
	215	216	0.33	0.69	0.23	0.23	120.93	198	84.0	0.30	600	336	1.19	1.18	11.51					59%
To STREET E, Pipe 216 - 217						0.23		122							11.51					
STREET E			0.35	0.25	0.09	0.09									10.00					
	248	249	0.48	0.69	0.33	0.42	123.38	143	81.5	2.20	375	260	2.35	0.58	10.58					55%
			0.13	0.25	0.03	0.45														
			0.30	0.25	0.08	0.53														
	249	250	0.44	0.69	0.30	0.83	119.15	275	72.5	2.25	450	428	2.69	0.45	11.03					64%
			0.20	0.25	0.05	0.88														
	250	252	0.27	0.69	0.19	1.07	116.08	344	53.0	2.40	450	442	2.78	0.32	11.34					78%
To STREET E, Pipe 252 - 253						1.07									11.34					
															10.00					
			0.19	0.25	0.05	0.05														
	234	235	0.34	0.69	0.23	0.28	123.38	97	45.0	4.75	300	211	2.98	0.25	10.25					46%
			0.08	0.25	0.02	0.30														
	235	236	0.26	0.69	0.18	0.48	121.49	162	37.5	4.90	300	214	3.03	0.21	10.46					76%
			0.16	0.25	0.04	0.52														
	236	237	0.25	0.69	0.17	0.69	119.99	231	31.5	5.10	375	396	3.59	0.15	10.60					58%
			0.09	0.25	0.02	0.72														
	237	238	0.10	0.69	0.07	0.79	118.95	260	24.0	3.75	375	340	3.07	0.13	10.73					76%
Contribution From STREET F, Pipe 233 - 238						0.37									10.68					
	238	239	0.11	0.69	0.08	1.23	118.05	405	33.5	3.25	450	514	3.23	0.17	10.91					79%
	239	240	0.31	0.69	0.21	1.45	116.87	470	57.5	4.15	450	581	3.65	0.26	11.17					81%
	240	241	0.18	0.69	0.12	1.57	115.14	503	20.5	2.95	525	739	3.41	0.10	11.27					68%
			0.20	0.75	0.15	1.72														
	241	242	0.36	0.69	0.25	1.97	114.49	627	63.5	1.60	600	777	2.75	0.39	11.66					81%

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient

I = Intensity (mm/hr)

A = Area (hectares)

n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.

CHECKED BY: P.P.

CONSULTANT DAVID SCHAEFFER ENGINEERING LTD.

DATE: Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
			0.20	0.75	0.15	2.12														
	242	243	0.40	0.69	0.28	2.40	112.09	746	63.5	1.40	675	995	2.78	0.38	12.04					75%
	243	255	0.02	0.69	0.01	2.41	109.82	735	14.0	0.70	750	931	2.11	0.11	12.15					79%
To STREET A, Pipe 255 - 256						2.41									12.15					
															10.00					
			0.08	0.25	0.02	0.02														
	247	253	0.15	0.69	0.10	0.12	123.38	42	22.5	2.70	300	159	2.25	0.17	10.17					27%
To STREET A, Pipe 253 - 254						0.12									10.17					
Contribution From STREET E, Pipe 250 - 252						1.07									11.34					
			0.04	0.25	0.01	1.08														
	252	253	0.07	0.69	0.05	1.12	114.02	356	17.5	0.55	600	455	1.61	0.18	11.53					78%
To STREET A, Pipe 253 - 254						1.12									11.53					
															10.00					
	208	209	0.40	0.69	0.28	0.28	123.38	95	59.0	3.00	300	167	2.37	0.41	10.41					56%
	209	210	0.20	0.69	0.14	0.41	120.30	138	59.0	3.40	300	178	2.52	0.39	10.80					78%
	210	211	0.14	0.69	0.10	0.51	117.57	167	40.5	2.10	375	254	2.30	0.29	11.10					66%
	211	212	0.18	0.69	0.12	0.63	115.61	204	37.0	2.10	375	254	2.30	0.27	11.37					80%
Contribution From STREET G, Pipe 207 - 212						1.87		481							11.45					
	212	213	0.27	0.69	0.19	2.69	113.38	1328	54.5	2.60	900	2919	4.59	0.20	11.64					45%
	213	216	0.22	0.69	0.15	2.84	112.16	1366	42.5	2.55	900	2891	4.54	0.16	11.80					47%
Contribution From STREET H, Pipe 215 - 216						0.23		122							11.51					
						100Yr. Intake Flow =		526												
	216	217	0.28	0.69	0.19	3.26	111.21	2136	69.0	1.40	1050	3231	3.73	0.31	12.11					66%
To EIGHTH LINE, Pipe 217 - 218						3.26		1129							12.11					

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient

I = Intensity (mm/hr)

A = Area (hectares)

n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.

CHECKED BY: P.P.

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

DATE: Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
EIGHTH LINE															10.00					
			0.09	0.25	0.02	0.02														
	263	262	0.18	0.75	0.14	0.16	123.38	54	47.5	2.50	300	153	2.16	0.37	10.37					35%
	262	251	0.21	0.75	0.16	0.32	120.65	106	81.5	6.00	300	237	3.35	0.41	10.77					45%
			0.11	0.25	0.03	0.34														
	251	217	0.24	0.75	0.18	0.52	117.80	171	90.0	6.00	300	237	3.35	0.45	11.22					72%
Contribution From STREET E, Pipe 216 - 217						3.26		1129							12.11					
			0.04	0.25	0.01	3.79														
	217	218	0.20	0.75	0.15	3.94	109.41	2327	77.5	1.80	1050	3664	4.23	0.31	12.41					64%
			0.06	0.25	0.02	3.96														
	218	219	0.20	0.75	0.15	4.11	107.68	2358	77.5	1.75	1050	3612	4.17	0.31	12.72					65%
			0.20	0.75	0.15	4.26														
	219	220	0.52	0.40	0.21	4.47	106.00	2444	77.5	1.75	1050	3612	4.17	0.31	13.03					68%
			0.20	0.75	0.15	4.62														
	220	221	0.53	0.40	0.21	4.83	104.38	2529	77.5	1.70	1050	3560	4.11	0.31	13.35					71%
			0.20	0.75	0.15	4.98														
	221	222	0.54	0.40	0.22	5.19	102.79	2612	77.5	1.65	1050	3508	4.05	0.32	13.67					74%
			0.20	0.75	0.15	5.34														
	222	223	0.27	0.40	0.11	5.45	101.24	2662	77.5	1.65	1050	3508	4.05	0.32	13.98					76%
To SERVICING EASEMENT, Pipe 223 - 224						5.45		1129							13.98					

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient
I = Intensity (mm/hr)
A = Area (hectares)
n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT:	5520 EIGHTH LINE & 5552 EIGHTH LINE		
PROJECT NO:	21-1242	DESIGNED BY:	G.Y.
		CHECKED BY:	P.P.
CONSULTANT	DAVID SCHAEFFER ENGINEERING LTD.	DATE:	Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

SHEET 7 OF 10

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
SERVICING EASEMENT																				
Contribution From STREET A, Pipe 257 - 258						6.03									12.72					
Contribution From STREET A, Pipe 270 - 258						1.84		2471							11.73					
	258	259			0.00	7.87	106.01	4789	77.0	1.10	1350	5598	3.91	0.33	13.05					86%
	259	260			0.00	7.87	104.30	4751	77.0	1.10	1350	5598	3.91	0.33	13.38					85%
	260	261			0.00	7.87	102.64	4715	27.0	1.10	1350	5598	3.91	0.12	13.49					84%
Contribution From SERVICING EASEMENT, Pipe 226 - 261						5.68		1129							15.29					
	261	HW2			0.00	13.55	94.13	7142	11.5	0.65	1800	9267	3.64	0.05	15.34					77%
Contribution From EIGHTH LINE, Pipe 222 - 223						5.45		1129							13.98					
			0.13	0.75	0.10	5.55														
	223	224	0.14	0.90	0.13	5.68	99.74	2701	24.5	0.80	1200	3487	3.08	0.13	14.12					77%
	224	225			0.00	5.68	99.13	2692	54.0	0.45	1350	3580	2.50	0.36	14.48					75%
	225	226			0.00	5.68	97.53	2667	77.0	0.30	1500	3872	2.19	0.59	15.06					69%
	226	261			0.00	5.68	95.04	2627	29.5	0.30	1500	3872	2.19	0.22	15.29					68%
To SERVICING EASEMENT, Pipe 261 - HW2						5.68		1129							15.29					

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient
I = Intensity (mm/hr)
A = Area (hectares)
n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.
CHECKED BY: P.P.
DATE: Jun 2022

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

TOWN OF ERIN

STORM SEWER DESIGN

SHEET 8 OF 10

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	100 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
Run-off coeficient adjustment for 100yr flow:				**1.250**																
CLEANWATER PIPE															10.00					
	1000	1001	0.25	0.52	0.16	0.16	206.07	93	75.5	2.60	300	156	2.21	0.57	10.57					60%
	1001	1002	0.19	0.52	0.12	0.29	119.19	95	75.5	0.75	450	247	1.55	0.81	11.38					38%
	1002	1003	0.13	0.52	0.08	0.37	113.79	117	52.5	4.15	450	581	3.65	0.24	11.62					20%
	1003	1004	0.13	0.52	0.08	0.46	112.30	142	52.5	5.00	450	638	4.01	0.22	11.84					22%
	1004	1005			0.00	0.46	110.98	140	16.5	0.30	525	236	1.09	0.25	12.09					60%
	1005	1006			0.00	0.46	109.50	138	15.5	1.90	525	593	2.74	0.09	12.19					23%
	1006	1007			0.00	0.46	108.96	138	77.0	0.30	525	236	1.09	1.18	13.37					58%
															10.00					
	2000	2001	0.22	0.60	0.17	0.17	123.38	57	80.0	2.15	300	142	2.01	0.66	10.66					40%
	2001	2002	0.17	0.60	0.13	0.29	118.53	96	72.0	2.30	375	266	2.41	0.50	11.16					36%
	2002	2003	0.11	0.60	0.08	0.38	115.18	120	89.0	0.85	450	263	1.65	0.90	12.06					46%
	2003	2004	0.29	0.25	0.09	0.47	109.68	142	54.0	0.30	525	236	1.09	0.83	12.89					60%
	2004	2006			0.00	0.47	105.13	136	55.5	2.80	525	720	3.32	0.28	13.17					19%
To CLEANWATER PIPE, Pipe 2006 - 2007						0.47									13.17					
															10.00					
	2005	2006	0.34	0.25	0.11	0.11	123.38	36	15.5	0.40	300	61	0.87	0.30	10.30					60%
Contribution From STREET E, Pipe 2004 - 2006						0.47									13.17					
	2006	HW2007			0.00	0.46	103.17	131	29.5	0.40	525	272	1.26	0.39	13.56					48%
															10.00					
	2100	2101	0.11	0.52	0.07	0.07	123.38	25	65.0	0.45	300	65	0.92	1.18	11.18					38%
	2101	HW2102	0.19	0.60	0.14	0.14	115.07	46	38.0	0.30	375	96	0.87	0.73	11.91					47%
															10.00					
	DICB2103	HW2104	1.35	0.25	0.42	0.42	123.38	145	71.0	0.30	450	156	0.98	1.21	11.21					93%

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient

I = Intensity (mm/hr)

A = Area (hectares)

n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.

CHECKED BY: P.P.

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

DATE: Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)

STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	100 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
Run-off coeficient adjustment for 100yr flow:				**1.250**																
EASEMENT SIZING															10.00					
	DICB2	227-228	0.62	0.25	0.19	0.19	206.07	111	58.5	0.50	375	124	1.12	0.87	10.87					89%
			0.16	0.25	0.05	0.05									10.00					
	DICB13	237	0.09	0.25	0.03	0.08	123.38	27	47.0	0.50	300	68	0.97	0.81	10.81					39%
			0.35	0.25	0.11	0.11									10.00					
	DICB5	249-250	0.13	0.25	0.04	0.15	123.38	51	39.5	0.50	300	68	0.97	0.68	10.68					75%
			0.30	0.25	0.09	0.09									10.00					
			0.20	0.25	0.06	0.16														
			0.04	0.25	0.01	0.17														
	DICB6	247	0.08	0.25	0.03	0.19	123.38	66	39.5	0.50	300	68	0.97	0.68	10.68					97%
															10.00					
	DICB7	2004	0.29	0.25	0.09	0.09	123.38	31	16.0	0.50	300	68	0.97	0.28	10.28					45%
															10.00					
	DICB8	2006	0.34	0.25	0.11	0.11	123.38	36	37.0	0.50	300	68	0.97	0.64	10.64					53%
															10.00					
	DICB2103	HW2104	1.35	0.25	0.42	0.42	123.3804	145	71	0.3	450	156	0.98	1.21	11.21					93%
															10.00					
	DICB 9	205-206	0.21	0.25	0.07	0.07	123.38	22	40.0	0.50	300	68	0.97	0.69	10.69					33%
															10.00					
	DICB10	204	1.73	0.25	0.54	0.54	123.38	185	10.0	0.50	450	202	1.27	0.13	10.13					92%
															10.00					
	DICB11	216-217	0.11	0.25	0.03	0.03	123.38	12	17.5	0.50	300	68	0.97	0.30	10.30					17%

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient
I = Intensity (mm/hr)
A = Area (hectares)
n = (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT:	5520 EIGHTH LINE & 5552 EIGHTH LINE		
PROJECT NO:	21-1242	DESIGNED BY:	G.Y.
		CHECKED BY:	P.P.
CONSULTANT	DAVID SCHAEFFER ENGINEERING LTD.	DATE:	Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

SHEET 10 OF 10

LOCATION			CONTRIBUTING AREA				FLOW		SEWER DESIGN											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
STREET	FROM MANHOLE	TO MANHOLE	AREA "A" (ha)	STORM COEFFICIENT "C"	SECTION AxC	ACCUMULATED AxC	5 YR RATIONAL INTENSITY "I" (mm/hr)	FLOW Q (L/s)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCENTRATION (min)	FALL IN PIPE SECTION (m)	MANHOLE INLET INVERT (m)	MANHOLE LOSSES (m)	MANHOLE OUTLET INVERT (m)	PIPE % CAPACITY
POND 1 Outfall																				
						Target 100yr Flow:		188	76.0	0.30	525	236	1.09	1.16	11.16					80%
POND 2 Outfall																				
						Target 100yr Flow:		1145	76.0	1.50	750	1363	3.09	0.41	10.41					84%

NOTES:

Initial time of concentration = 10 min.

C = Runoff Co-efficient

I = Intensity (mm/hr)

A = Area (hectares)

n = 0.013 (conc.) for sewers =>525mm

$$I5 = \frac{744}{(td + 1.76)^{0.729}}$$

PROJECT: 5520 EIGHTH LINE & 5552 EIGHTH LINE

PROJECT NO: 21-1242

DESIGNED BY: G.Y.

CHECKED BY: P.P.

CONSULTANT: DAVID SCHAEFFER ENGINEERING LTD.

DATE: Jun 2022

TOWN OF ERIN

STORM SEWER DESIGN

SHEET 1 OF 1

Project Name: 5520 EIGHTH LINE & 5552 EIGHTH LINE
Project No.: 21-1242
Date: June 2022

LID ID	Location	Type	LID Storage Volume						Rainfall Volume			
			LID Storage Length (m)	LID Storage Width (m)	LID Storage Depth (m)	Porosity [1]	Drawdown Time [2] (hr)	Provided Storage Volume (m^3)	Contributing Drainage Area (Ha)	Imperviousness (%)	Rainfall Event Storage (mm)	Provided Rainfall Volume (to LID) (m^3)
Total Required Rainfall Volume to Infiltrate:									36.57	62%	5.0	**1133.6**
1	Table Land - Rear Yard	Trench	88	1.2	0.60	0.4		25.3	0.17	46%	25.0	19.4
2	Table Land - Rear Yard	Trench	134	1.2	0.60	0.4		38.6	0.21	46%	25.0	24.0
3	Table Land - Rear Yard	Trench	217	1.5	0.60	0.4		78.1	0.53	59%	25.0	77.5
4	Table Land - Rear Yard	Trench	225	1.5	0.70	0.4		94.5	0.63	59%	25.0	92.3
5	Park	Infiltration Gallery	41	15.0	1.10	0.4		270.6	1.09	100%	24.5	267.1
	Wetland	Wetlands ***							6.79	59%	5.0	198.9
Total Provided Rainfall Volume to Infiltrate:												**679.0**

Notes:
1. Porosity assumed to be 0.40 for 50mm clear stone, as per CVC LID Design Manual (v2010), pg 4-57
2. Recommended drawdown time of 48hrs, as per CVC LID Design Manual (v2010), pg 4-57
3. Groundwater elevation to be confirmed by Hydrogeological Assessment.

*Percolation rate to be determined through on site infiltration testing
**Drawdown time to be confirmed with percolation rates
***Cleanwater conveyed to wetlands to maintain predevelopment flow to wetlands

APPENDIX F

STORMWATER MANAGEMENT DESIGN CRITERIA

CVC, 2021

Elizabeth Reid

To: Alexandra Schaeffer
Subject: RE: DR 21/041 - CVC review of EIS TOR for Mattamy, 8th Line Erin (PD 20/199)

From: Hosale, Lisa <Lisa.Hosale@cvc.ca>
Sent: August 24, 2021 2:53 PM
To: Paudel, Elizabeth <Elizabeth.Paudel@cvc.ca>; John Tjeerdsma <JTjeerdsma@dsel.ca>; Kenny Sun <KSun@dsel.ca>
Subject: RE: DR 21/041 - CVC review of EIS TOR for Mattamy, 8th Line Erin (PD 20/199)

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

Hi John,
Good afternoon- my apologies for the delay in getting back to you. In terms of water quantity, quality, and erosion controls, we would like to see the following criteria met which differs a bit from the approach that you outlined. Please do let me know if you have any questions I can set up a quick discussion with Rizwan if needed.

Stormwater management criteria is defined in detail in CVC's stormwater management Criteria document: https://cvc.ca/wp-content/uploads//2021/06/cvc-swm-criteria-appendices-Aug12-D-july14.pdf

Generally, following SWM criteria is recommended in the absence of local studies high level studies (i.e. subwatershed studies, EIS, etc.):
Quality Control: Enhance stormwater quality control i.e. 80% sediment removal in CVC watershed.
Erosion Control: minimum 5mm infiltration or as determined by detail geomorphic studies.
For sites with SWM ponds, 25mm-48hr detention may also be required, depending on the results of the erosion assessment.
Quantity Control: post to pre for 2-100 year event, no Regional control. Safe conveyance of Regional flows through the SWM Pond.

And in terms of your other question regarding whether CVC has additional reporting in support of the model and associated hydrology so that you can reference the original source for the flow information, we are still looking into that for you. But hope to have an answer soon.

We do hope that this helps-
Best wishes,
Lisa

I'm working remotely. The best way to reach me is by email, mobile phone or Microsoft Teams.

Lisa Hosale | M.A., M.Sc., AICP | she/her/hers
Planner, Planning and Development Services | Credit Valley Conservation
905-670-1615 ext 268 | M: 437-881-1737
lisa.hosale@cvc.ca | cvc.ca

Credit Valley Conservation inspired by nature | 2021 Canada's Greenest Employers | Greater Toronto's Top 2021 Employers

View our privacy statement

From: John Tjeerdsma
Sent: August 18, 2021 2:50 PM
To: 'Paudel, Elizabeth' <Elizabeth.Paudel@cvc.ca>
Cc: Kenny Sun <KSun@dsel.ca>
Subject: RE: DR 21/041 - CVC review of EIS TOR for Mattamy, 8th Line Erin (PD 20/199)

Hi Elizabeth

I hope all is well. Thank you for the hydraulic model that was included in Data Sharing Agreement below. Included in the model are flows for various storm events, and we are wondering if there is additional reporting in support of the model and associated hydrology so that we can reference the original source for the flow information. We will be using this as the basis for our post to pre modeling for the SWM pond quantity control. We are moving forward on the following basis:

Quality Control: MOE criteria
Erosion Control: proceeding with 25mm even detained for 48 hrs, subject to additional input from the ongoing assessment of the downstream watercourse by the fluvial consultant.
Quantity Control: post to pre for 2-100 year event, no Regional control.

Trusting the above is acceptable but let me know if you have any comments, and if the CVC can provide additional information on the hydrology.

Thanks!

John Tjeerdsma, P.Eng.

DSEL
David Schaeffer Engineering Ltd.

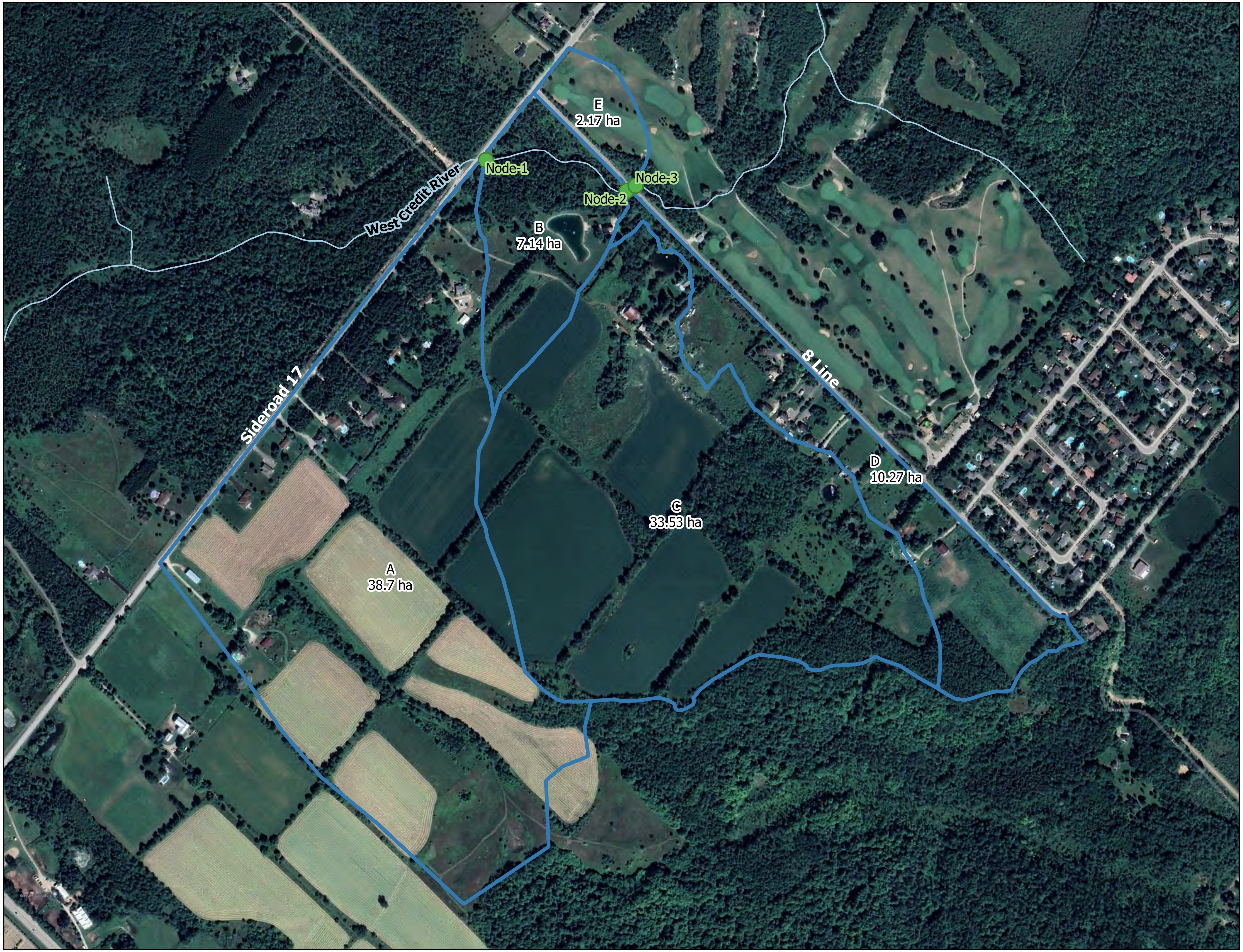
600 Alden Road, Suite 700
Markham, ON L3R 0E7

phone: (905) 475-3080 ext. 255
cell: (705) 229-8525
fax: (905) 475-3081
email: jtjeerdsma@DSEL.ca

APPENDIX G

PRELIMINARY POND SIZING AND POND CONTROLS

J.F. SABOURIN & ASSOCIATES, INC., JUNE 2022



N

Legend

Drainage Area: [Name] [Area]

Model Nodes

Watercourses

SCALE: 1:6000

0 100 200 m

J.F. Sabourin and Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
52 Springbrook Drive, Ottawa, ON, K2S 1B9
(613) 836-3884
www.jfsa.com

DSEL
david schaeffer engineering ltd

Mattamy Erin

Figure 1: Pre Development Area

PROJECT	2147-21
DRAWN	JB
DATE	June 2022

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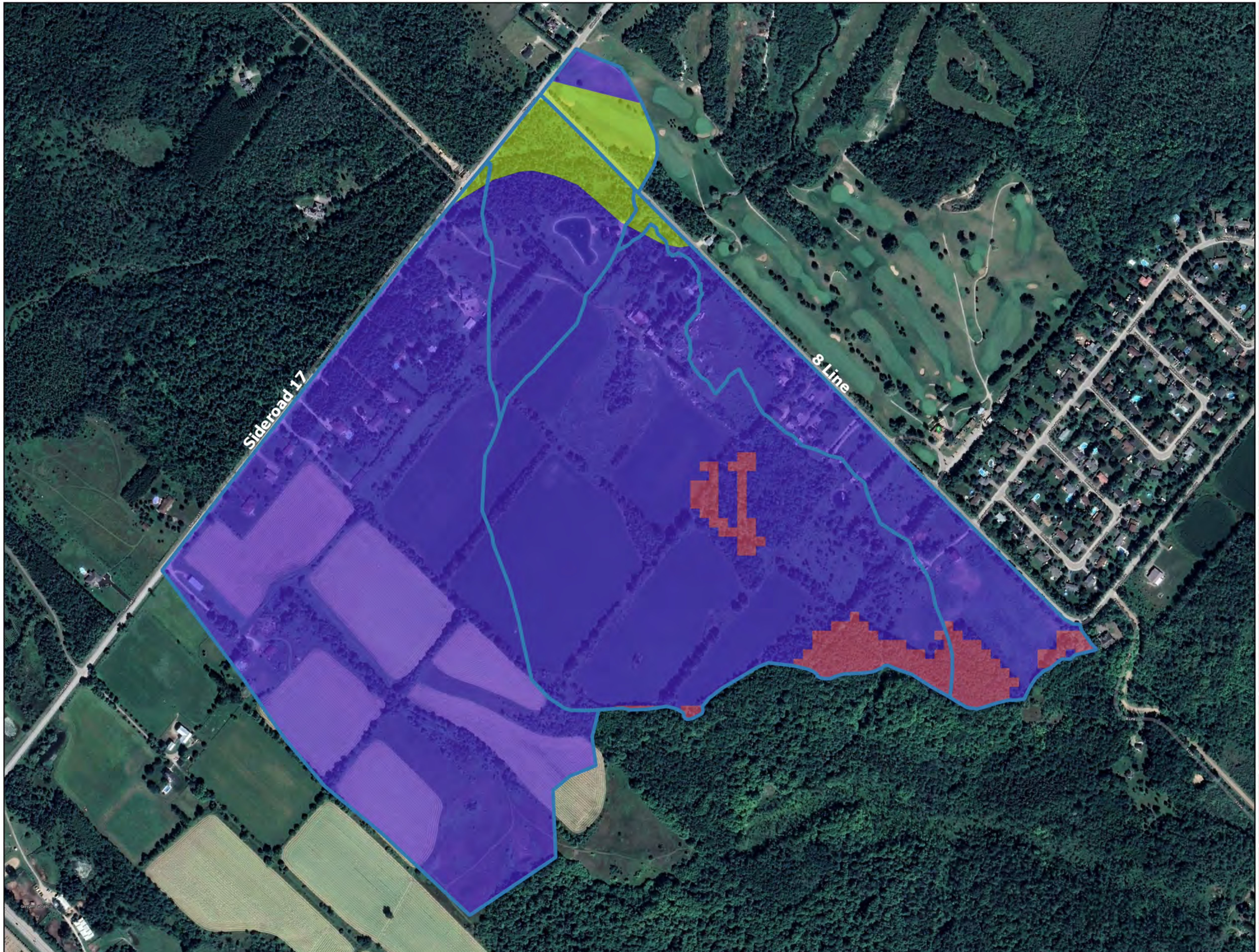

N

Legend

Soils:

- DONNYBROOK SANDY LOAM (A)
- HILLSBURGH FINE SANDY LOAM (A)
- MUCK (D)
- Drainage Area

SCALE: 1:6000

0 100 200 m

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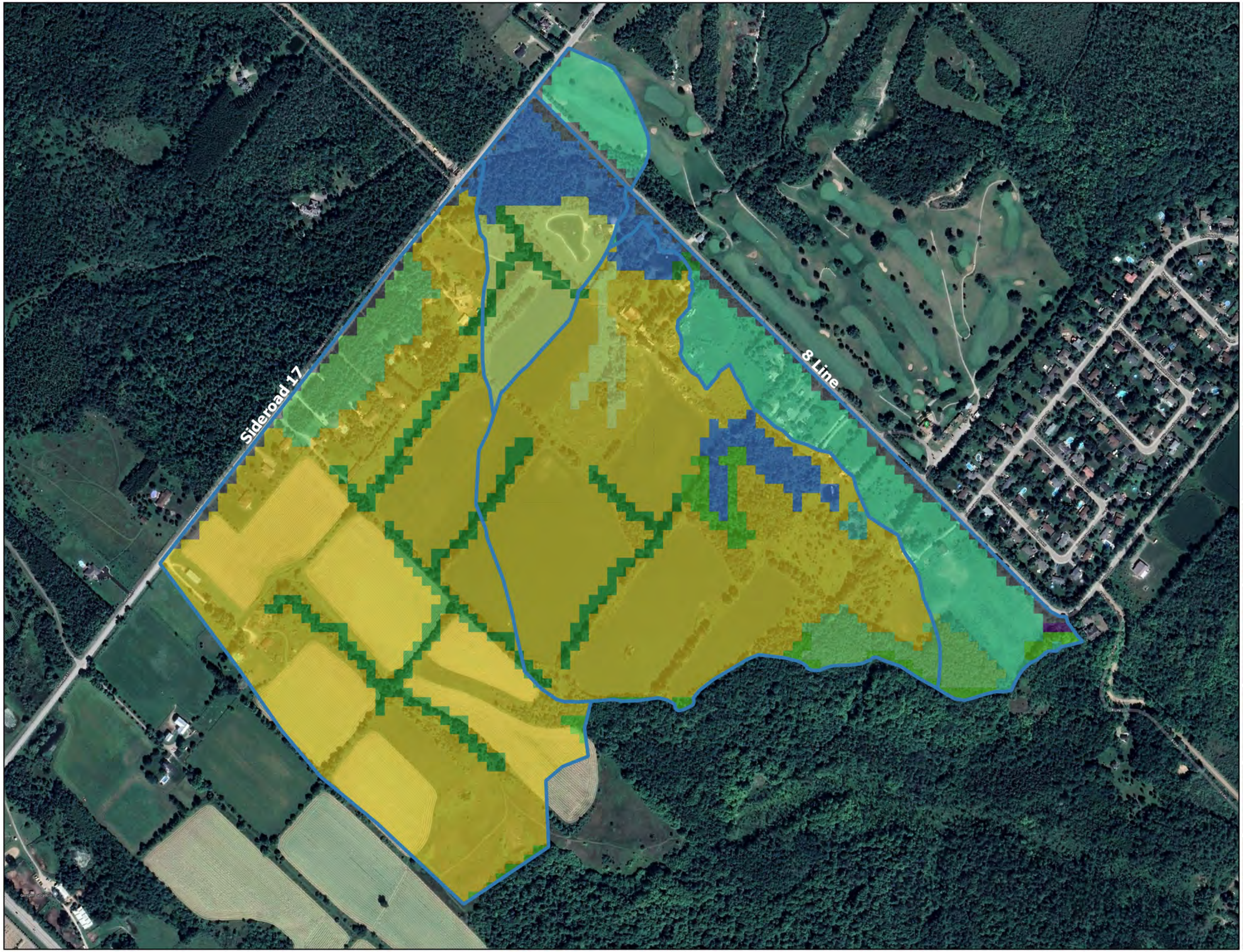
Figure 2: Soils Mapping

PROJECT	2147-21
DRAWN	JB
DATE	June 2022



Legend

Land Use:

- Built Up Area - Impervious
- Built Up Area - Pervious
- Coniferous Forest
- Deciduous Forest
- Hedge Rows
- Marsh
- Plantation
- Thicket Swamp
- Tilled
- Transportation
- Treed Swamp
- Drainage Area

SCALE: 1:6000

0 100 200 m

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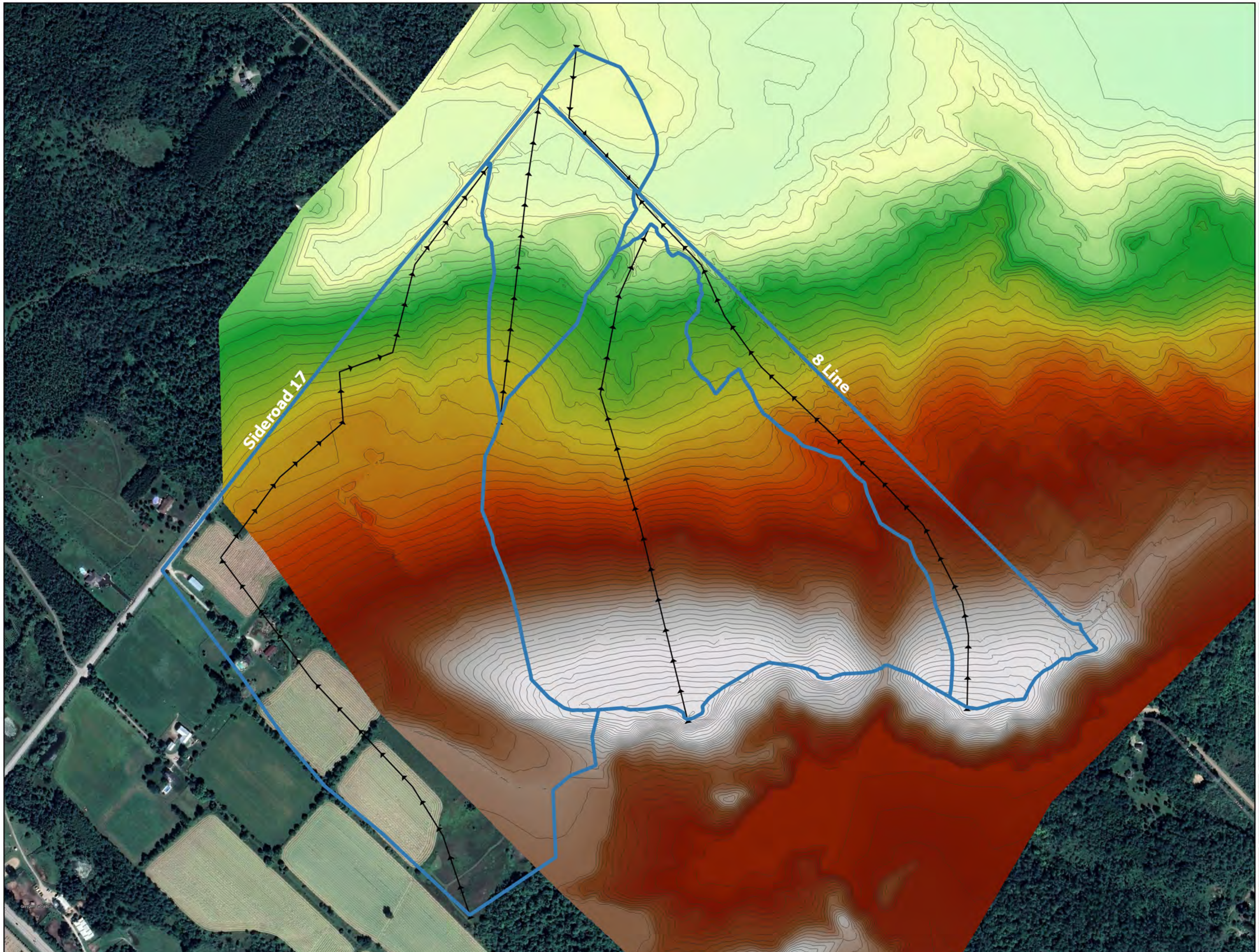
Figure 3: Land Use

PROJECT	2147-21
DRAWN	JB
DATE	June 2022



N

Legend

- Drainage Area
- Flow Lengths

Terrain (m)

- 390
- 397.5
- 405
- 412.5
- 420
- 427.5
- 435
- 442.5
- 450

SCALE: 1:6000

0 100 200 m

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Figure 4: Topography

PROJECT	2147-21
DRAWN	JB
DATE	June 2022

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N

Legend

Drainage Areas:
[Name]
[Area]

Development Plan

SCALE: 1:6000

0 100 200 m

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Figure 5: Post Development Areas

PROJECT	2147-21
DRAWN	JB
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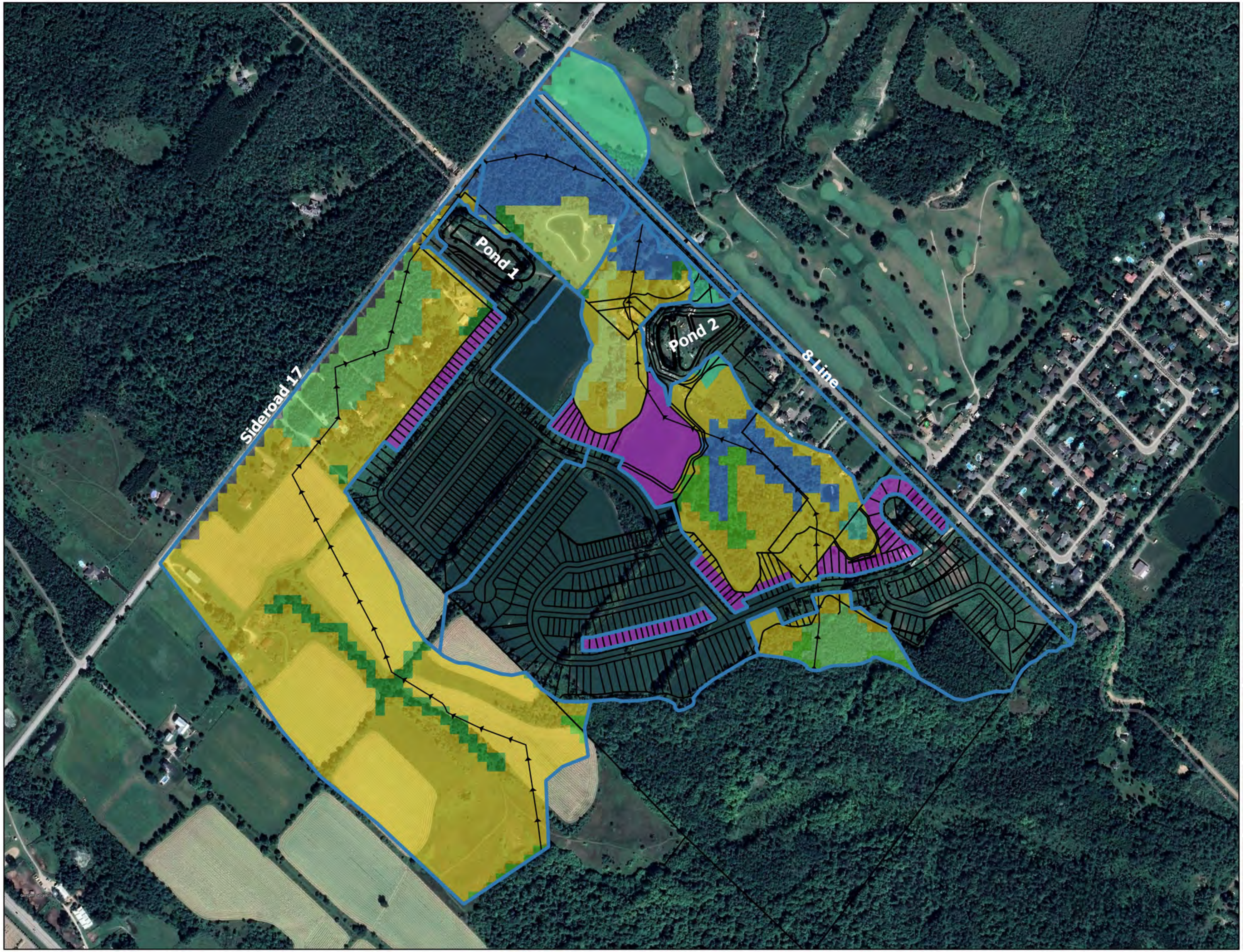

Legend

- Drainage Areas
- Flow Lengths
- Development Plan

Land Use

- Built Up Area - Impervious
- Built Up Area - Pervious
- Coniferous Forest
- Deciduous Forest
- Hedge Rows
- Marsh
- Plantation
- Thicket Swamp
- Tilled
- Transportation
- Treed Swamp
- Rear Yards

N

SCALE: 1:6000

0 100 200 m

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Figure 6: Post Development Land Use

PROJECT	2147-21
DRAWN	JB
DATE	June 2022

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Table 1: Pre Development - Calculation of SCS Curve Number (CN)

A (38.696 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
3.251	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	8.4%	2.9
2.724	Plantation	HILLSBURGH FINE SANDY LOAM	A	Fair	36	7.0%	2.5
2.701	Tilled	HILLSBURGH FINE SANDY LOAM	A	Fair	49	7.0%	3.4
0.054	Transportation	MUCK	D	Fair	98	0.1%	0.1
0.661	Transportation	HILLSBURGH FINE SANDY LOAM	A	Fair	98	1.7%	1.7
0.011	Treed Swamp	MUCK	D	Fair	50	0.0%	0.0
28.989	Tilled	HILLSBURGH FINE SANDY LOAM	A	Fair	49	74.9%	36.7
0.034	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	0.1%	0.0
0.048	Treed Swamp	MUCK	D	Fair	50	0.1%	0.1
0.221	Deciduous Forest	HILLSBURGH FINE SANDY LOAM	A	Fair	36	0.6%	0.2
						CN	45

B (7.193 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
0.293	Transportation	MUCK	D	Fair	98	4.1%	4.0
0.002	Built Up Area - Pervious	MUCK	D	Fair	84	0.0%	0.0
0.887	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	12.3%	6.2
1.638	Treed Swamp	MUCK	D	Fair	50	22.8%	11.4
0.001	Treed Swamp	MUCK	D	Fair	50	0.0%	0.0
3.733	Marsh	HILLSBURGH FINE SANDY LOAM	A	Fair	50	51.9%	25.9
0.601	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	8.4%	2.9
						CN	50

C (33.534 ha)							
Area	Land Type	Soil Name	Soil	Soil Group	CN	% of	Weighted
1.244	Plantation	DONNYBROOK SANDY LOAM	A	Fair	36	3.7%	1.3
2.116	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	6.3%	3.2
22.676	Tilled	HILLSBURGH FINE SANDY LOAM	A	Fair	49	67.6%	33.1
3.530	Tilled	HILLSBURGH FINE SANDY LOAM	A	Fair	49	10.5%	5.2
0.988	Marsh	HILLSBURGH FINE SANDY LOAM	A	Fair	50	2.9%	1.5
0.180	Thicket Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	0.5%	0.3
1.243	Deciduous Forest	DONNYBROOK SANDY LOAM	A	Fair	36	3.7%	1.3
1.508	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	4.5%	1.6
0.048	Treed Swamp	MUCK	D	Fair	50	0.1%	0.1
						CN	48

D (10.272 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
0.359	Transportation	MUCK	D	Fair	98	3.5%	3.4
0.947	Transportation	HILLSBURGH FINE SANDY LOAM	A	Fair	98	9.2%	9.0
0.000	Coniferous Forest	DONNYBROOK SANDY LOAM	A	Fair	36	0.0%	0.0
7.668	Built Up Area - Pervious	HILLSBURGH FINE SANDY LOAM	A	Fair	49	74.6%	36.6
0.050	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	0.5%	0.2
0.069	Built Up Area - Impervious	DONNYBROOK SANDY LOAM	A	Fair	98	0.7%	0.7
0.001	Built Up Area - Pervious	HILLSBURGH FINE SANDY LOAM	A	Fair	49	0.0%	0.0
0.340	Deciduous Forest	DONNYBROOK SANDY LOAM	A	Fair	36	3.3%	1.2
0.213	Treed Swamp	MUCK	D	Fair	50	2.1%	1.0
0.105	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	1.0%	0.5
0.774	Plantation	DONNYBROOK SANDY LOAM	A	Fair	36	7.5%	2.7
						CN	55

E (2.174 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
0.036	Thicket Swamp	MUCK	D	Fair	50	1.7%	0.8
0.572	Built Up Area - Pervious	HILLSBURGH FINE SANDY LOAM	A	Fair	49	26.3%	12.9
1.282	Built Up Area - Pervious	MUCK	D	Fair	84	59.0%	49.5
0.030	Transportation	HILLSBURGH FINE SANDY LOAM	A	Fair	98	1.4%	1.4
0.254	Transportation	MUCK	D	Fair	98	11.7%	11.4
						CN	76

Table 2: Time to Peak Calculations

Parameter	Units	A	B	C	D	E
Area	ha	38.70	7.14	33.53	10.27	2.17
CN	-	45	50	48	55	76
Ptotal to calc C from CN, use 2 yr 3 hr Chicago stom	P(mm)	33.2	33.2	33.2	33.2	34.2
	Ia(mm)	4.67	4.67	4.67	4.67	4.67
	RV(mm)	2.4	2.9	2.6	3.5	8.0
Ptotal to calc C from CN, use 2 yr 24 hr SCS stom	P(mm)	52.77	52.77	52.77	52.77	53.77
	RV(mm)	6.4	7.8	7.0	9.1	18.7
C (From Chicago storm)	-	0.07	0.09	0.08	0.10	0.23
C (From SCS storm)	-	0.12	0.15	0.13	0.17	0.35
Length of Channel	m	1515	525	823	1021	272
	ft	4971	1721	2701	3349	893
Elevation of Head Water	m	467.06	414.14	460.38	449.11	399.46
	ft	1532	1359	1510	1473	1311
Elevation of Outlet	m	395.21	398.36	397.29	395.38	395.21
	ft	1297	1307	1303	1297	1297
Average Slope	m/m	4.74%	3.01%	7.66%	5.26%	1.56%
	ft/ft	4.74%	3.01%	7.66%	5.26%	1.56%
Kirpich						
Time of Concentration	mins	18	9	9	13	7
Time to Peak	min	12	6	6	8	5
Time to Peak	Hours	0.20	0.10	0.10	0.14	0.08
FAA (From Chicago storm)						
Time of Concentration	mins	78	52	48	60	40
Time to Peak	mins	52	35	32	40	27
Time to Peak	Hours	0.86	0.58	0.54	0.66	0.45
FAA (From SCS storm)						
Time of Concentration	mins	74	49	46	55	35
Time to Peak	mins	49	33	31	37	23
Time to Peak	Hours	0.82	0.55	0.51	0.62	0.39
Barnsby Williams						
Time of Concentration	mins	44	20	22	33	13
Time to Peak	mins	30	13	15	22	9
Time to Peak	Hours	0.49	0.22	0.25	0.37	0.15
SCS						
Time of Concentration	mins	134	62	60	71	26
Time to Peak	mins	89	42	40	47	17
Time to Peak	Hours	1.49	0.69	0.67	0.79	0.29
Selected Method						
FAA (From Chicago storm)						
Time to Peak	min	49	33	31	37	23
Time to Peak	Hours	0.82	0.55	0.51	0.62	0.39

Note:

All methods calculated as per Appendix A of the SWMHYMO manual

Time to Peak calculated as 2/3 Time of concentration

Table 3: Post Development Calculation of SCS Curve Number (CN)

A (30.564 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
0.658	Transportation	HILLSBURGH FINE SANDY LOAM	A	Fair	98	2.2%	2.1
0.059	Treed Swamp	MUCK	D	Fair	50	0.2%	0.1
0.221	Deciduous Forest	HILLSBURGH FINE SANDY LOAM	A	Fair	36	0.7%	0.3
0.667	Rear Yard	HILLSBURGH FINE SANDY LOAM	A	Fair	68	2.2%	1.5
24.628	Tilled	HILLSBURGH FINE SANDY LOAM	A	Fair	49	80.6%	39.5
1.508	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	4.9%	1.7
0.054	Transportation	MUCK	D	Fair	98	0.2%	0.2
2.724	Plantation	HILLSBURGH FINE SANDY LOAM	A	Fair	36	8.9%	3.2
0.034	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	0.1%	0.1
0.012	Marsh	HILLSBURGH FINE SANDY LOAM	A	Fair	50	0.0%	0.0
						CN	49

B (4.256 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
0.885	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	20.8%	10.4
1.535	Marsh	HILLSBURGH FINE SANDY LOAM	A	Fair	50	36.1%	18.0
0.090	Transportation	MUCK	D	Fair	98	2.1%	2.1
1.563	Treed Swamp	MUCK	D	Fair	50	36.7%	18.4
0.183	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	4.3%	1.5
						CN	50

C (16.898 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
2.437	Rear Yard	HILLSBURGH FINE SANDY LOAM	A	Fair	68	14.4%	9.8
0.180	Thicket Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	1.1%	0.5
2.115	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	12.5%	6.3
1.095	Deciduous Forest	DONNYBROOK SANDY LOAM	A	Fair	36	6.5%	2.3
7.345	Tilled	HILLSBURGH FINE SANDY LOAM	A	Fair	49	43.5%	21.3
0.933	Plantation	DONNYBROOK SANDY LOAM	A	Fair	36	5.5%	2.0
0.048	Treed Swamp	MUCK	D	Fair	50	0.3%	0.1
0.123	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	0.7%	0.3
0.167	Built Up Area - Pervious	HILLSBURGH FINE SANDY LOAM	A	Fair	49	1.0%	0.5
						CN	43

D (0.517 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
0.023	Hedge Rows	HILLSBURGH FINE SANDY LOAM	A	Fair	35	4.4%	1.6
0.009	Transportation	MUCK	D	Fair	98	1.7%	1.7
0.093	Treed Swamp	HILLSBURGH FINE SANDY LOAM	A	Fair	50	18.0%	9.0
0.158	Treed Swamp	MUCK	D	Fair	50	30.6%	15.3
0.207	Built Up Area - Pervious	HILLSBURGH FINE SANDY LOAM	A	Fair	49	40.0%	19.6
0.026	Transportation	HILLSBURGH FINE SANDY LOAM	A	Fair	98	5.0%	4.9
						CN	52

E (1.9 ha)							
Area (ha)	Land Type	Soil Name	Soil Condition	Soil Group	CN	% of Catchment	Weighted CN
1.212	Built Up Area - Pervious	MUCK	D	Fair	84	63.8%	53.6
0.572	Built Up Area - Pervious	HILLSBURGH FINE SANDY LOAM	A	Fair	49	30.1%	14.8
0.030	Transportation	HILLSBURGH FINE SANDY LOAM	A	Fair	98	1.6%	1.5
0.034	Thicket Swamp	MUCK	D	Fair	50	1.8%	0.9
0.051	Transportation	MUCK	D	Fair	98	2.7%	2.6
						CN	73

Table 4: Post Development - Time to Peak Calculations

Parameter	Units	A	B	C	D	E
Area	ha	30.56	4.26	16.89	0.52	2.19
CN	-	49	50	43	52	73
Ptotal to calc C from CN, use 2 yr 3 hr Chicago stom	P(mm)	33.2	33.2	33.2	33.2	34.2
	Ia(mm)	4.67	4.67	4.67	4.67	4.67
	RV(mm)	2.7	2.9	2.2	3.1	7.2
Ptotal to calc C from CN, use 2 yr 24 hr SCS stom	P(mm)	52.77	52.77	52.77	52.77	53.77
	RV(mm)	7.3	7.8	6.0	8.2	17.1
C (From Chicago storm)	-	0.08	0.09	0.07	0.09	0.21
C (From SCS storm)	-	0.14	0.15	0.11	0.16	0.32
Length of Channel	m	1410	223	875	244	272
	ft	4626	732	2871	800	893
Elevation of Head Water	m	437.57	394.78	454.00	404.24	399.46
	ft	1436	1295	1490	1326	1311
Elevation of Outlet	m	397.75	394.66	396.60	396.07	395.21
	ft	1305	1295	1301	1299	1297
Average Slope	m/m	2.82%	0.05%	6.56%	3.35%	1.56%
	ft/ft	2.82%	0.05%	6.56%	3.35%	1.56%
Kirpich						
Time of Concentration	mins	20	23	10	5	7
Time to Peak	min	14	15	7	3	5
Time to Peak	Hours	0.23	0.26	0.11	0.06	0.08
FAA (From Chicago storm)						
Time of Concentration	mins	88	132	53	34	41
Time to Peak	mins	59	88	35	23	28
Time to Peak	Hours	0.98	1.47	0.59	0.38	0.46
FAA (From SCS storm)						
Time of Concentration	mins	83	125	51	32	36
Time to Peak	mins	56	83	34	21	24
Time to Peak	Hours	0.93	1.39	0.56	0.36	0.40
Barnsby Williams						
Time of Concentration	mins	47	20	26	12	13
Time to Peak	mins	31	13	17	8	9
Time to Peak	Hours	0.52	0.22	0.29	0.13	0.15
SCS						
Time of Concentration	mins	149	241	77	31	28
Time to Peak	mins	99	160	51	20	19
Time to Peak	Hours	1.65	2.67	0.85	0.34	0.31
Selected Method						
FAA (From Chicago storm)						
Time to Peak	min	56	83	34	21	24
Time to Peak	Hours	0.93	1.39	0.56	0.36	0.40

Note:

All methods calculated as per Appendix A of the SWMHYMO manual

Time to Peak calculated as 2/3 Time of concentration

Table 5B: Pond 1 Stage Storage Curve

Elevation (m)	Notes	Volume (m^3)	Area (m^2)
394.5	**Pond Bottom**	**0**	**621**
394.55		32	641
394.6		64	662
394.65		98	685
394.7		133	708
394.75		169	733
394.8		206	757
394.85		244	783
394.9		284	809
394.95		325	836
395		368	864
395.05		412	892
395.1		457	921
395.15		504	951
395.2		592	2586
395.25		723	2657
395.3		858	2730
395.35		996	2803
395.4		1138	2876
395.45		1284	2950
395.5	**Perm Pool**	**1433**	**3026**
395.55		1588	3164
395.6		1748	3235
395.65		1912	3305
395.7	**Quality Control**	**2079**	**3377**
395.75		2249	3448
395.8		2423	3520
395.85		2601	3592
395.9		2783	3665
395.95		2968	3738
396		3156	3811
396.05		3349	3885
396.1		3545	3959
396.15		3745	4033
396.2		3948	4108
396.25		4156	4183
396.3		4367	4259
396.35		4581	4335
396.4		4800	4411
396.45		5023	4487
396.5		5249	4564
396.55		5479	4642
396.6		5713	4719
396.65		5951	4797
396.7		6193	4876
396.75		6438	4954
396.8		6688	5034
396.85		6942	5113
396.9		7199	5193
396.95		7461	5274
397		7727	5354
397.05		7997	5435
397.1		8270	5516
397.15		8548	5598
397.2		8830	5680
397.25		9116	5763
397.3	**100 Year**	**9406**	**5846**
397.35		9701	5929
397.4		9999	6012
397.45		10302	6096
397.5		10609	6181
397.55		10920	6265
397.6		11236	6350
397.65		11555	6436
397.7		11879	6522
397.75		12207	6608
397.8		12540	6695
397.85		12877	6781
397.9		13218	6869
397.95		13564	6956
398		13914	7055
398.05		14269	7142
398.1		14628	7231
398.15		14992	7320
398.2		15360	7409
398.25		15733	7499
398.3		16110	7588
398.35		16492	7679
398.4	**Top Of Pond**	**16878**	**7771**

Table 6A: Pond 1- Criteria for Required Storage Volumes

Pond	Area [1] (ha)	Imperviousness (%)	Storage Volume for Impervious Level [2] (m^3/ha)
N/A	N/A	55	105
SWM Pond 1	12.48	70.0	120
N/A	N/A	70	120

[1] Refer to Appendix C for drainage areas to the SWM facility.

[2] Protection Level for Weland: Enhanced 80% long-term S.S. removal.
SWM Planning & Design Manual, Table 3.2, p.3-10 (March 2003).

Table 6B: Pond 1 -Required Storage Volumes for SWM Facility

Pond Component	Required Volume (m^3)	Provided Volume [4] (m^3)	Volume Ratio	Pond Elevation (m)
Permanent Pool (PP) [1]	999	1558	1.56	396
Quality Control [2]	499	645	1.29	395.7
Forebay (20% PP)	200	N/A	N/A	-
PP - Forebay	799	N/A	N/A	-

[1] Required PP volume based on Table B-1.

[2] Required quality control volume based on 40 m^3/ha.

[4] Provided volume based on stage-storage curve and extended detention (refer to Tables B-3 and B-4).

[5] Based on grading plan provided by DSEL (refer to Figure 2).

[6] As per MOE, Maximum Forebay Area: 33% of Total Permanent Pool.

Table 7A: Pond 1 Extended Detention Parameters for SWM Facility

Permanent Pool Parameters			Quality Orifice Parameters		
Area (C3)	3026.00	m^2	Width	0.100	m
Volume	1433	m^3			
PP Elev	395.500	m	Area	0.008	m^2
QC Elev	396.700	m	Invert	64.800	m
			C_o	0.62	

Notes:
- C3 is the intercept from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- h is the maximum water elevation above the orifice (m).

Table 7B: Pond 1 Extended Detention Drawdown Time for SWM Facility

Elev. (m)	Active Storage V (m^3)	A (m^2)	depth (m)	C2 (m^2/m)	Drawdown Time (h)	Drawdown Time (days)	Flow (m^3/s)	Demarkation Point
395.50	**0**	**3026**	**0.00**		**0.00**		**0.00**	**PP Elev**
395.55	155	3164	0.05	2769.38	35.65	1.49	0.00	
395.60	315	3235	0.10	2088.31	47.94	2.00	0.00	
395.65	478	3305	0.15	1863.31	55.74	2.32	0.01	
395.70	**645**	**3377**	**0.20**	**1753.61**	**61.86**	**2.58**	**0.01**	**Quality Control**
395.75	816	3448	0.25	1689.82	67.12	2.80	0.01	
395.80	990	3520	0.30	1647.08	71.86	2.99	0.01	
395.85	1168	3592	0.35	1617.60	76.23	3.18	0.01	
395.90	1349	3665	0.40	1596.59	80.33	3.35	0.01	
395.95	1534	3738	0.45	1581.97	84.23	3.51	0.01	**Extended Detention**
396.00	1723	3811	0.50	1569.98	87.96	3.66	0.01	
396.05	1916	3885	0.55	1561.06	91.55	3.81	0.02	
396.10	2112	3959	0.60	1554.92	95.04	3.96	0.02	
396.15	2311	4033	0.65	1549.76	98.43	4.10	0.02	
396.20	2515	4108	0.70	1545.74	101.75	4.24	0.02	
396.25	2722	4183	0.75	1543.24	105.00	4.37	0.02	
396.30	2933	4259	0.80	1541.05	108.19	4.51	0.02	
396.35	3148	4335	0.85	1539.44	111.34	4.64	0.02	
396.40	3367	4411	0.90	1538.54	114.44	4.77	0.02	
396.45	3589	4487	0.95	1538.14	117.50	4.90	0.02	
396.50	3816	4564	1.00	1538.32	120.53	5.02	0.02	
396.55	4046	4642	1.05	1538.57	123.53	5.15	0.02	
396.60	4280	4719	1.10	1539.20	126.51	5.27	0.02	
396.65	4518	4797	1.15	1540.05	129.46	5.39	0.02	
396.70	4759	4876	1.20	1541.43	132.40	5.52	0.02	
396.75	5005	4954	1.25	1542.79	135.32	5.64	0.02	
396.80	5255	5034	1.30	1544.54	138.23	5.76	0.02	
396.85	5509	5113	1.35	1546.27	141.12	5.88	0.02	
396.90	5766	5193	1.40	1548.17	143.52	5.98	0.03	
396.95	6028	5274	1.45	1550.09	145.18	6.05	0.05	
397.00	6294	5354	1.50	1552.08	146.33	6.10	0.08	
397.05	6563	5435	1.55	1554.18	147.19	6.13	0.10	
397.10	6837	5516	1.60	1556.47	147.84	6.16	0.13	
397.15	7115	5598	1.65	1558.79	148.38	6.18	0.15	
397.20	7397	5680	1.70	1561.37	148.88	6.20	0.17	
397.25	7683	5763	1.75	1563.98	149.34	6.22	0.18	
397.30	**7973**	**5846**	**1.80**	**1566.57**	**149.78**	**6.24**	**0.19**	**100 Year**

Notes:
- C2 is the slope coefficient from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext Det indicates the elevation of extended detention.

Table 8: Pond 1 - Stage-Storage-Outflow Curve for SWM Facility (Free Outfall Conditions)

			Quality Control 1		Quantity Control 1		Emergency Overflow			
			Vertical Orifice		Vertical Rect. Orifice		Broad Crested Weir			
			Dia (m)	0.100	Width (m)	0.500	L (m)	20.000		
					Height (m)	0.200				
			Area (m^2)	0.008	Area (m^2)	0.100				
			Invert (m)	395.50	Invert (m)	396.85	C_w	1.580		
			C_o	0.62	C_o	0.62	Invert (m)	398.20		
			Q @ D	0.005	C_w	1.800	n contr.	2		
Elevation (m)	Active Sto. (m^3)	Demarkation Points	Depth (m)	Outflow (m^3/s)	Depth (m)	Outflow (m^3/s)	Depth (m)	Outflow (m^3/s)	Outflow (m^3/s)	Storage (ha·m)
395.50	**0**	**PP Elev**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
395.55	155		0.050	0.002	0.000	0.000	0.000	0.000	0.002	0.015
395.60	315		0.100	0.005	0.000	0.000	0.000	0.000	0.005	0.031
395.65	478		0.150	0.007	0.000	0.000	0.000	0.000	0.007	0.048
395.70	**645**	**Quality Control**	**0.200**	**0.008**	**0.000**	**0.000**	**0.000**	**0.000**	**0.008**	**0.065**
395.75	816		0.250	0.010	0.000	0.000	0.000	0.000	0.010	0.082
395.80	990		0.300	0.011	0.000	0.000	0.000	0.000	0.011	0.099
395.85	1168		0.350	0.012	0.000	0.000	0.000	0.000	0.012	0.117
395.90	1349		0.400	0.013	0.000	0.000	0.000	0.000	0.013	0.135
395.95	1534	**Extended Detention**	0.450	0.014	0.000	0.000	0.000	0.000	0.014	0.153
396.00	1723		0.500	0.014	0.000	0.000	0.000	0.000	0.014	0.172
396.05	1916		0.550	0.015	0.000	0.000	0.000	0.000	0.015	0.192
396.10	2112		0.600	0.016	0.000	0.000	0.000	0.000	0.016	0.211
396.15	2311		0.650	0.017	0.000	0.000	0.000	0.000	0.017	0.231
396.20	2515		0.700	0.017	0.000	0.000	0.000	0.000	0.017	0.251
396.25	2722		0.750	0.018	0.000	0.000	0.000	0.000	0.018	0.272
396.30	2933		0.800	0.019	0.000	0.000	0.000	0.000	0.019	0.293
396.35	3148		0.850	0.019	0.000	0.000	0.000	0.000	0.019	0.315
396.40	3367		0.900	0.020	0.000	0.000	0.000	0.000	0.020	0.337
396.45	3589		0.950	0.020	0.000	0.000	0.000	0.000	0.020	0.359
396.50	3816		1.000	0.021	0.000	0.000	0.000	0.000	0.021	0.382
396.55	4046		1.050	0.022	0.000	0.000	0.000	0.000	0.022	0.405
396.60	4280		1.100	0.022	0.000	0.000	0.000	0.000	0.022	0.428
396.65	4518		1.150	0.023	0.000	0.000	0.000	0.000	0.023	0.452
396.70	4759		1.200	0.023	0.000	0.000	0.000	0.000	0.023	0.476
396.75	5005		1.250	0.024	0.000	0.000	0.000	0.000	0.024	0.501
396.80	5255		1.300	0.024	0.000	0.000	0.000	0.000	0.024	0.525
396.85	5509		1.350	0.025	0.000	0.000	0.000	0.000	0.025	0.551
396.90	5766		1.400	0.025	0.050	0.010	0.000	0.000	0.035	0.577
396.95	6028		1.450	0.026	0.100	0.027	0.000	0.000	0.053	0.603
397.00	6294		1.500	0.026	0.150	0.049	0.000	0.000	0.075	0.629
397.05	6563		1.550	0.026	0.200	0.074	0.000	0.000	0.100	0.656
397.10	6837		1.600	0.027	0.250	0.106	0.000	0.000	0.133	0.684
397.15	7115		1.650	0.027	0.300	0.123	0.000	0.000	0.150	0.711
397.20	7397		1.700	0.028	0.350	0.137	0.000	0.000	0.165	0.740
397.25	7683		1.750	0.028	0.400	0.150	0.000	0.000	0.179	0.768
397.30	**7973**	**100 Year**	**1.800**	**0.029**	**0.450**	**0.162**	**0.000**	**0.000**	**0.191**	**0.797**
397.35	8268		1.850	0.029	0.500	0.174	0.000	0.000	0.203	0.827
397.40	8566		1.900	0.029	0.550	0.184	0.000	0.000	0.214	0.857
397.45	8869		1.950	0.030	0.600	0.194	0.000	0.000	0.224	0.887
397.50	9176		2.000	0.030	0.650	0.204	0.000	0.000	0.234	0.918
397.55	9487		2.050	0.031	0.700	0.213	0.000	0.000	0.243	0.949
397.60	9802		2.100	0.031	0.750	0.221	0.000	0.000	0.252	0.980
397.65	10122		2.150	0.031	0.800	0.230	0.000	0.000	0.261	1.012
397.70	10446		2.200	0.032	0.850	0.238	0.000	0.000	0.269	1.045
397.75	10774		2.250	0.032	0.900	0.246	0.000	0.000	0.278	1.077
397.80	11107		2.300	0.032	0.950	0.253	0.000	0.000	0.286	1.111
397.85	11444		2.350	0.033	1.000	0.261	0.000	0.000	0.293	1.144
397.90	11785		2.400	0.033	1.050	0.268	0.000	0.000	0.301	1.178
397.95	12131		2.450	0.033	1.100	0.275	0.000	0.000	0.308	1.213
398.00	12481		2.500	0.034	1.150	0.281	0.000	0.000	0.315	1.248
398.05	12836		2.550	0.034	1.200	0.288	0.000	0.000	0.322	1.284
398.10	13195		2.600	0.034	1.250	0.295	0.000	0.000	0.329	1.320
398.15	13559		2.650	0.035	1.300	0.301	0.000	0.000	0.336	1.356
398.20	**13927**	**Emerg Over**	**2.700**	**0.035**	**1.350**	**0.307**	**0.000**	**0.000**	**0.342**	**1.393**
398.25	14300		2.750	0.035	1.400	0.313	0.050	0.353	0.702	1.430
398.30	14677		2.800	0.036	1.450	0.319	0.100	0.998	1.353	1.468
398.35	15059		2.850	0.036	1.500	0.325	0.150	1.833	2.194	1.506
398.40	**15445**	**Top of Berm**	**2.900**	**0.036**	**1.550**	**0.331**	**0.200**	**2.821**	**3.188**	**1.544**

Notes :
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext Det indicates the elevation of extended detention provided.
- Emerg Over indicates the elevation of the overflow provided above the 100-year water level.
- Top of Berm indicates the elevation at the top of the berm.

Table 9 B: Pond 2 Stage Storage Curve

Elevation (m)	Notes	Volume (m^3)	Area (m^2)
402	**Pond Bottom**	**0**	**1083**
402.05		55	1111
402.1		111	1140
402.15		169	1170
402.2		228	1200
402.25		289	1231
402.3		351	1261
402.35		415	1292
402.4		480	1324
402.45		547	1355
402.5		616	1387
402.55		686	1419
402.6		758	1451
402.65		831	1484
402.7		1000	5285
402.75		1268	5405
402.8		1541	5527
402.85		1820	5650
402.9		2106	5772
402.95		2398	5895
403	**Perm Pool**	**2696**	**6020**
403.05		3010	6554
403.1		3340	6635
403.15		3673	6717
403.2	**Quality Control**	**4011**	**6798**
403.25		4353	6881
403.3		4699	6963
403.35		5050	7047
403.4		5404	7130
403.45		5763	7214
403.5		6125	7298
403.55		6492	7383
403.6		6864	7468
403.65		7239	7553
403.7		7619	7639
403.75		8003	7725
403.8		8392	7811
403.85		8784	7898
403.9		9181	7986
403.95		9583	8074
404		9989	8162
404.05		10399	8250
404.1		10814	8339
404.15		11233	8428
404.2		11657	8518
404.25		12085	8608
404.3		12517	8699
404.35		12955	8790
404.4		13396	8881
404.45		13843	8973
404.5		14294	9065
404.55		14749	9157
404.6		15209	9250
404.65		15674	9344
404.7		16144	9437
404.75	**100 Year**	**16618**	**9531**
404.8		17097	9625
404.85		17581	9720
404.9		18069	9815
404.95		18562	9911
405		19060	10007
405.05		19563	10103
405.1		20070	10200
405.15		20583	10298
405.2		21100	10395
405.25		21622	10493
405.3		22150	10591
405.35		22682	10690
405.4	**Top of Pond**	**23219**	**10803**

Table 10A: Pond 2 - Criteria for Required Storage Volumes

Pond	Area [1] (ha)	Imperviousness (%)	Storage Volume for Impervious Level [2] (m^3/ha)
N/A	N/A	55	105
SWM Pond 1	25.23	55.1	105
N/A	N/A	70	120

[1] Refer to Appendix C for drainage areas to the SWM facility.

[2] Protection Level for Wetland: Enhanced 80% long-term S.S. removal.
SWM Planning & Design Manual, Table 3.2, p.3-10 (March 2003).

Table 10B: Pond 2 -Required Storage Volumes for SWM Facility

Pond Component	Required Volume (m^3)	Provided Volume [4] (m^3)	Volume Ratio	Pond Elevation (m)
Permanent Pool (PP) [1]	1642	2696	1.64	403
Quality Control [2]	1009	1316	1.30	403.2
Forebay (20% PP)	328	N/A	N/A	-
PP - Forebay	1314	N/A	N/A	-

[1] Required PP volume based on Table B-1.

[2] Required quality control volume based on 40 m^3/ha.

[4] Provided volume based on stage-storage curve and extended detention (refer to Tables B-3 and B-4).

[5] Based on grading plan provided by DSEL (refer to Figure 2).

[6] As per MOE, Maximum Forebay Area: 33% of Total Permanent Pool.

Table 11A: Pond 2 - Extended Detention Parameters for SWM Facility

Permanent Pool Parameters			Quality Orifice Parameters		
Area (C3)	6019.96	m^2	Width	1.400	m
Volume	2696	m^3	Height	0.300	
PP Elev	403.000	m	Area	0.420	m^2
QC Elev	404.200	m	Invert	64.800	m
			C_o	0.62	

Notes:
- C3 is the intercept from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- h is the maximum water elevation above the orifice (m).

Table 11B: Pond 2- Extended Detention Drawdown Time for SWM Facility

Elev. (m)	Active Storage V (m^3)	A (m^2)	depth (m)	C2 (m^2/m)	Drawdown Time (h)	Drawdown Time (days)	Flow (m^3/s)	Demarkation Point
403.00	**0**	**6020**	**0.00**		**0.00**		**0.00**	**PP Elev**
403.05	314	6554	0.05	10678.93	46.17	1.92	0.00	
403.10	644	6635	0.10	6152.30	62.31	2.60	0.01	
403.15	978	6717	0.15	4645.15	72.15	3.01	0.01	
403.20	**1316**	**6798**	**0.20**	**3892.19**	**79.48**	**3.31**	**0.01**	**Quality Control**
403.25	1658	6881	0.25	3442.95	85.59	3.57	0.02	
403.30	2004	6963	0.30	3144.67	90.97	3.79	0.02	
403.35	2354	7047	0.35	2933.36	95.85	3.99	0.02	
403.40	2708	7130	0.40	2775.26	100.37	4.18	0.02	
403.45	3067	7214	0.45	2652.95	104.61	4.36	0.02	**Extended Detention**
403.50	3430	7298	0.50	2555.97	108.63	4.53	0.03	
403.55	3797	7383	0.55	2477.74	112.46	4.69	0.03	
403.60	4168	7468	0.60	2412.76	116.15	4.84	0.03	
403.65	4544	7553	0.65	2358.32	119.70	4.99	0.03	
403.70	4923	7639	0.70	2312.60	123.15	5.13	0.03	
403.75	5308	7725	0.75	2273.21	125.47	5.23	0.06	
403.80	5696	7811	0.80	2239.34	126.72	5.28	0.11	
403.85	6089	7898	0.85	2210.00	127.47	5.31	0.18	
403.90	6486	7986	0.90	2184.31	127.98	5.33	0.25	
403.95	6887	8074	0.95	2161.67	128.36	5.35	0.34	
404.00	7293	8162	1.00	2141.94	128.63	5.36	0.48	
404.05	7703	8250	1.05	2124.24	128.85	5.37	0.55	
404.10	8118	8339	1.10	2108.29	129.05	5.38	0.62	
404.15	8537	8428	1.15	2094.38	129.23	5.38	0.67	
404.20	8961	8518	1.20	2081.80	129.40	5.39	0.72	
404.25	9389	8608	1.25	2070.70	129.56	5.40	0.77	
404.30	9822	8699	1.30	2060.64	129.71	5.40	0.82	
404.35	10259	8790	1.35	2051.61	129.85	5.41	0.86	
404.40	10701	8881	1.40	2043.56	129.99	5.42	0.90	
404.45	11147	8973	1.45	2036.38	130.13	5.42	0.94	
404.50	11598	9065	1.50	2029.84	130.26	5.43	0.98	
404.55	12054	9157	1.55	2024.03	130.38	5.43	1.01	
404.60	12514	9250	1.60	2018.76	130.51	5.44	1.05	
404.65	12979	9344	1.65	2014.29	130.63	5.44	1.08	
404.70	13448	9437	1.70	2010.03	130.75	5.45	1.11	
404.75	**13922**	**9531**	**1.75**	**2006.22**	**130.87**	**5.45**	**1.15**	**100 Year**

Notes:
- C2 is the slope coefficient from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext Det indicates the elevation of extended detention.

Table 12: Pond 2 Stage-Storage-Outflow Curve for SWM Facility (Free Outfall Conditions)

			Quantity Control 1		Quality Control 1		Emergency Overflow			
			Vertical Orifice		Vertical Rect. Orifice		Broad Crested Weir			
			Dia (m)	0.135	Width (m)	1.400	L (m)	20.000		
					Height (m)	0.300				
			Area (m^2)	0.014	Area (m^2)	0.420				
			Invert (m)	403.00	Invert (m)	403.70	C_w	1.580		
			C_o	0.62	C_o	0.62	Invert (m)	405.20		
			Q @ D	0.010	C_w	1.800	n contr.	2		
Elevation (m)	**Active Sto. (m^3)**	**Demarkation Points**	**Depth (m)**	**Outflow (m^3/s)**	**Depth (m)**	**Outflow (m^3/s)**	**Depth (m)**	**Outflow (m^3/s)**	**Outflow (m^3/s)**	**Storage (ha·m)**
403.00	0	PP Elev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
403.05	314		0.050	0.004	0.000	0.000	0.000	0.000	0.004	0.031
403.10	644		0.100	0.008	0.000	0.000	0.000	0.000	0.008	0.064
403.15	978		0.150	0.011	0.000	0.000	0.000	0.000	0.011	0.098
403.20	1316	Quality Control	0.200	0.014	0.000	0.000	0.000	0.000	0.014	0.132
403.25	1658		0.250	0.017	0.000	0.000	0.000	0.000	0.017	0.166
403.30	2004		0.300	0.019	0.000	0.000	0.000	0.000	0.019	0.200
403.35	2354		0.350	0.021	0.000	0.000	0.000	0.000	0.021	0.235
403.40	2708		0.400	0.023	0.000	0.000	0.000	0.000	0.023	0.271
403.45	3067	Extended Detention	0.450	0.024	0.000	0.000	0.000	0.000	0.024	0.307
403.50	3430		0.500	0.026	0.000	0.000	0.000	0.000	0.026	0.343
403.55	3797		0.550	0.027	0.000	0.000	0.000	0.000	0.027	0.380
403.60	4168		0.600	0.029	0.000	0.000	0.000	0.000	0.029	0.417
403.65	4544		0.650	0.030	0.000	0.000	0.000	0.000	0.030	0.454
403.70	4923		0.700	0.031	0.000	0.000	0.000	0.000	0.031	0.492
403.75	5308		0.750	0.032	0.050	0.028	0.000	0.000	0.060	0.531
403.80	5696		0.800	0.034	0.100	0.079	0.000	0.000	0.112	0.570
403.85	6089		0.850	0.035	0.150	0.143	0.000	0.000	0.178	0.609
403.90	6486		0.900	0.036	0.200	0.219	0.000	0.000	0.255	0.649
403.95	6887		0.950	0.037	0.250	0.304	0.000	0.000	0.341	0.689
404.00	7293		1.000	0.038	0.300	0.447	0.000	0.000	0.485	0.729
404.05	7703		1.050	0.039	0.350	0.516	0.000	0.000	0.555	0.770
404.10	8118		1.100	0.040	0.400	0.577	0.000	0.000	0.617	0.812
404.15	8537		1.150	0.041	0.450	0.632	0.000	0.000	0.673	0.854
404.20	8961		1.200	0.042	0.500	0.682	0.000	0.000	0.724	0.896
404.25	9389		1.250	0.043	0.550	0.729	0.000	0.000	0.772	0.939
404.30	9822		1.300	0.044	0.600	0.774	0.000	0.000	0.817	0.982
404.35	10259		1.350	0.045	0.650	0.816	0.000	0.000	0.860	1.026
404.40	10701		1.400	0.045	0.700	0.855	0.000	0.000	0.901	1.070
404.45	11147		1.450	0.046	0.750	0.893	0.000	0.000	0.940	1.115
404.50	11598		1.500	0.047	0.800	0.930	0.000	0.000	0.977	1.160
404.55	12054		1.550	0.048	0.850	0.965	0.000	0.000	1.013	1.205
404.60	12514		1.600	0.049	0.900	0.999	0.000	0.000	1.048	1.251
404.65	12979		1.650	0.049	0.950	1.032	0.000	0.000	1.081	1.298
404.70	13448		1.700	0.050	1.000	1.063	0.000	0.000	1.114	1.345
404.75	**13922**	**100 Year**	**1.750**	**0.051**	**1.050**	**1.094**	**0.000**	**0.000**	**1.145**	**1.392**
404.80	14401		1.800	0.052	1.100	1.124	0.000	0.000	1.176	1.440
404.85	14885		1.850	0.052	1.150	1.153	0.000	0.000	1.206	1.489
404.90	15373		1.900	0.053	1.200	1.182	0.000	0.000	1.235	1.537
404.95	15867		1.950	0.054	1.250	1.210	0.000	0.000	1.264	1.587
405.00	16365		2.000	0.055	1.300	1.237	0.000	0.000	1.292	1.636
405.05	16867		2.050	0.055	1.350	1.264	0.000	0.000	1.319	1.687
405.10	17375		2.100	0.056	1.400	1.290	0.000	0.000	1.346	1.737
405.15	17887		2.150	0.057	1.450	1.315	0.000	0.000	1.372	1.789
405.20	**18405**	**Emerg Over**	**2.200**	**0.057**	**1.500**	**1.340**	**0.000**	**0.000**	**1.398**	**1.840**
405.25	18927		2.250	0.058	1.550	1.365	0.050	0.353	1.776	1.893
405.30	19454		2.300	0.059	1.600	1.389	0.100	0.998	2.446	1.945
405.35	19986		2.350	0.059	1.650	1.413	0.150	1.833	3.305	1.999
405.40	**20523**	**Top of Berm**	**2.400**	**0.060**	**1.700**	**1.436**	**0.200**	**2.821**	**4.317**	**2.052**

Notes :
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext Det indicates the elevation of extended detention provided.
- Emerg Over indicates the elevation of the overflow provided above the 100-year water level.
- Top of Berm indicates the elevation at the top of the berm.

Table 13: Summary of SWM Pond Operating Characteristics

Pond Components	Pond 1 Release Rate (m^3/s)	Pond 1 Volume (m^3)	Node 1 - Target Flow[1] (m^3/s)	Node 1 - Post Dev[1] (m^3/s)	Node 2 - Target Flow[2] (m^3/s)	Node 2 - Post Dev[2] (m^3/s)	Pond 2 Release Rate (m^3/s)	Pond 2 Volume (m^3)	Node 3 - Target Flow[2] (m^3/s)	Node 3 - Post Dev[2] (m^3/s)
2-Year CHI 4Hr	0.017	2,274	0.112	0.112	0.294	0.220	0.030	4,418	0.317	0.317
5-Year CHI 4Hr	0.020	3,252	0.206	0.194	0.550	0.374	0.125	5,773	0.592	0.516
10-Year CHI 4Hr	0.021	3,927	0.283	0.259	0.762	0.483	0.252	6,469	0.818	0.718
25-Year CHI 4Hr	0.023	4,849	0.393	0.353	1.070	0.624	0.517	7,480	1.145	1.137
50-Year CHI 4Hr	0.025	5,522	0.483	0.429	1.323	0.741	0.646	8,338	1.414	1.402
100-Year CHI 4Hr	0.059	6,105	0.584	0.524	1.603	0.848	0.753	9,222	1.710	1.663
2-Year SCS 24 Hr	0.020	3,481	0.278	0.250	0.772	0.393	0.222	6,317	0.832	0.662
5-Year SCS 24 Hr	0.023	4,947	0.485	0.422	1.361	0.676	0.626	8,190	1.459	1.364
10-Year SCS 24 Hr	0.036	5,786	0.645	0.555	1.823	0.893	0.787	9,534	1.948	1.760
25-Year SCS 24 Hr	0.098	6,534	0.876	0.811	2.483	1.272	0.951	11,280	2.644	2.319
50-Year SCS 24 Hr	0.154	7,185	1.062	1.017	3.014	1.584	1.054	12,600	3.203	2.762
100-Year SCS 24 Hr	0.188	7,902	1.257	1.206	3.567	1.880	1.145	13,920	3.783	3.175

(1) Node1 - Target flows based on peak pre development flows at Downstream side of Side Road 17

(2) Node 2 -Target flows based on peak pre development flows upstream of 8th Line Crossing

(3) Node 3 -Target flows based on peak pre development flows downstream of 8th Line Crossing

```
20      Metric units
*#*********************************************************************************
*#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
*#  Date         : 2022-04
*#  Modeller     : B T - J B
*#  Company      : JFSA
*#  License #    :  2582634
*#*********************************************************************************
*#*********************************************************************************
START                   TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                        25mmCHI4HR.stm
READ STORM              STORM_FILENAME=["storm.001"]
*==================================================================================
CALIB NASHYD              NHYD=["A"], DT=[1]min, AREA=[38.7](ha)
                          DWF=[0.0](cms),  CN=[45], IA=[4.67](mm), N=[3.0]
                          Tp=[0.82]hrs, END=-1
*%-----------------|----------------------------------------------------------------|
CALIB NASHYD              NHYD=["B"], DT=[1]min, AREA=[7.14](ha)
                          DWF=[0.0](cms),  CN=[50], IA=[4.67](mm), N=[3.0]
                          Tp=[0.55]hrs, END=-1
*%-----------------|----------------------------------------------------------------|
CALIB NASHYD              NHYD=["C"], DT=[1]min, AREA=[33.53](ha)
                          DWF=[0.0](cms),  CN=[48], IA=[4.67](mm), N=[3.0]
                          Tp=[0.51]hrs, END=-1
*%-----------------|----------------------------------------------------------------|
CALIB NASHYD              NHYD=["D"], DT=[1]min, AREA=[10.27](ha)
                          DWF=[0.0](cms),  CN=[55], IA=[4.67](mm), N=[3.0]
                          Tp=[0.62]hrs, END=-1
*%-----------------|----------------------------------------------------------------|
CALIB NASHYD              NHYD=["E"], DT=[1]min, AREA=[2.17](ha)
                          DWF=[0.0](cms),  CN=[76], IA=[4.67](mm), N=[3.0]
                          Tp=[0.39]hrs, END=-1
*%-----------------|----------------------------------------------------------------|
ROUTE CHANNEL           NHYDout=["Node-1"], NHYDin=["A"],  RDT=[1](min),
                        CHLGTH=[240](m),  CHSLOPE=[0.1](%), FPSLOPE=[0.1](%),
                        SECNUM=[1],       NSEG=[3]
                        ( SEGROUGH, SEGDIST (m))=[0.08,12.4,-0.035,23.77,0.08, 25.84] NSEG times
                        ( DISTANCE (m), ELEVATION (m))=[8.27,395.91]
                                                        [9.30,395.89]
                                                        [10.34,395.82]
                                                        [11.37,395.64]
                                                        [12.40,395.40]
                                                        [13.44,395.16]
                                                        [14.47,394.82]
                                                        [15.51,394.80]
                                                        [16.54,394.83]
                                                        [17.57,394.86]
                                                        [18.61,394.89]
                                                        [19.64,394.93]
                                                        [20.67,394.96]
                                                        [21.71,394.99]
                                                        [22.74,395.09]
                                                        [23.77,395.30]
                                                        [24.81,395.52]
                                                        [25.84,395.73]
*%-----------------|----------------------------------------------------------------|
ADD HYD                 NHYDsum=["Node-2"], NHYDs to add=["Node-1"+"B"+"C"+"D"]
*%-----------------|----------------------------------------------------------------|
ADD HYD                 NHYDsum=["Node-3"], NHYDs to add=["Node-2"+"E"]
*%-----------------|----------------------------------------------------------------|
*%-----------------|----------------------------------------------------------------|
*% STORMS
*%-----------------|----------------------------------------------------------------|
*START                   TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*                        002YRCHI1HR.stm
```

```
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*                    005YRCHI1HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[10]
*                    010YRCHI1HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[25]
*                    025YRCHI1HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[50]
*                    050YRCHI1HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[99]
*                    100YRCHI1HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[102]
                    002YRCHI4HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[105]
                    005YRCHI4HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[110]
                    010YRCHI4HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[125]
                    025YRCHI4HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[150]
                    050YRCHI4HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[199]
                    100YRCHI4HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[202]
*                    002YRSCS12HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[205]
*                    005YRSCS12HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[210]
*                    010YRSCS12HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[225]
*                    025YRSCS12HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[250]
*                    050YRSCS12HR.stm
*%-----------------|------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[299]
*                    100YRSCS12HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[302]
                    002YRSCS24HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[305]
                    005YRSCS24HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[310]
                    010YRSCS24HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[325]
                    025YRSCS24HR.stm
*%-----------------|------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[350]
                    050YRSCS24HR.stm
```

```
*%------------------|-------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[399]
                    100YRSCS24HR.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[402]
*                    002YCHI1H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[405]
*                    005YCHI1H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[410]
*                    010YCHI1H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[425]
*                    025YCHI1H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[450]
*                    050YCHI1H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[499]
*                    100YCHI1H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[502]
*                    002YCHI4H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[505]
*                    005YCHI4H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[510]
*                    010YCHI4H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[525]
*                    025YCHI4H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[550]
*                    050YCHI4H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[599]
*                    100YCHI4H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[602]
*                    002YSCS12H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[605]
*                    005YSCS12H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[610]
*                    010YSCS12H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[625]
*                    025YSCS12H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[650]
*                    050YSCS12H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[699]
*                    100YSCS12H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[702]
*                    002YSCS24H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[705]
*                    005YSCS24H-72.stm
*%------------------|-------------------------------------------------------------|
*START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[710]
*                    010YSCS24H-72.stm
```

```
*%-----------------|-----------------------------------------------------------|
*START                  TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[725]
*                       025YSCS24H-72.stm
*%-----------------|-----------------------------------------------------------|
*START                  TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[750]
*                       050YSCS24H-72.stm
*%-----------------|-----------------------------------------------------------|
*START                  TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[799]
*                       100YSCS24H-72.stm
*%-----------------|-----------------------------------------------------------|
*% Hurricane Hazel (Regional Event)
*START                  TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[999]
*%                      STORM_FILENAME=["hazel-10.stm"]
*%-----------------|-----------------------------------------------------------|
FINISH
```

```
 ==========================================================================================

 SSSSS   W   W   M   M   H   H   Y   Y   M   M    OOO         222     000    11   5555   =========
 S       W W W   MM MM   H   H    Y Y    MM MM   O   O          2    0   0   11   5
 SSSSS   W W W   M M M   HHHHH     Y     M M M   O   O          2    0   0   11   5      Ver 5.500
     S    W W    M   M   H   H     Y     M   M   O   O        222    0   0   11   555    FEB  2015
 SSSSS    W W    M   M   H   H     Y     M   M    OOO         2      0   0   11     5    =========
                                                              2      0   0   11     5    # 2549237
       StormWater Management HYdrologic Model                  222     000    11   555    =========

 ******************************************************************************************
 ************************************  SWMHYMO Ver 5.500  ********************************
 ******************  A single event and continuous hydrologic simulation model  *************
 ******************     based on the principles of HYMO and its successors     *************
 ******************                 OTTHYMO-83 and OTTHYMO-89.                 *************
 ******************************************************************************************
 ****************** Distributed by:  J.F. Sabourin and Associates Inc.         *************
 ******************                  Ottawa,  Ontario: (613) 836-3884          *************
 ******************                  Gatineau, Quebec: (819) 243-6858          *************
 ******************                  E-Mail: swmhymo@jfsa.Com                  *************
 ******************************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 ++++++++++++++++++ Licensed user: JFSAinc.                                    +++++++++++++
 ++++++++++++++++++               Ottawa                SERIAL#:2549237        +++++++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ******************************************************************************************
 ******************             ++++++ PROGRAM ARRAY DIMENSIONS ++++++         *************
 ******************             Maximum value for ID numbers  :     11         *************
 ******************             Max. number of rainfall points: 105408         *************
 ******************             Max. number of flow points    : 105408         *************
 ******************************************************************************************


 ********************************   S U M M A R Y   O U T P U T   ************************
 ******************************************************************************************
 *                  RUN DATE: 2022-04-28     TIME: 15:16:28     RUN COUNTER: 008532        *
 ******************************************************************************************
 * Input   file: C:\Temp\2147\20220427 Pre\Pre-v03.DAT                                     *
 * Output  file: C:\Temp\2147\20220427 Pre\Pre-v03.out                                     *
 * Summary file: C:\Temp\2147\20220427 Pre\Pre-v03.sum                                     *
 * User comments:                                                                          *
 * 1:______________________________________________________________________________________*
 * 2:______________________________________________________________________________________*
 * 3:______________________________________________________________________________________*
 ******************************************************************************************


#********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#********************************************************************************
#********************************************************************************
 RUN#:COMMAND#
R0001:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0001 ]
R0001:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = 25mm Chicago design storm, based on 2 Year 4 Hr Chicago a = 538.296
      [SDT=10.00:SDUR=   4.17:PTOT=  25.00]
R0001:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             38.70     .051 No_date    2:44    1.25 .050      .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0001:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              7.14     .014 No_date    2:17    1.51 .060      .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0001:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             33.53     .065 No_date    2:13    1.40 .056      .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0001:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D             10.27     .023 No_date    2:24    1.81 .072      .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0001:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.17     .015 No_date    2:00    4.11 .164      .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0001:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A             38.70     .051 No_date    2:44    1.25  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1        38.70     .046 No_date    3:13    1.25  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .143:Dmax=  .111}
R0001:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1        38.70     .046 No_date    3:13    1.25  n/a      .000
                    +     1.0 02:B              7.14     .014 No_date    2:17    1.51  n/a      .000
                    +     1.0 02:C             33.53     .065 No_date    2:13    1.40  n/a      .000
                    +     1.0 02:D             10.27     .023 No_date    2:24    1.81  n/a      .000
                 SUM=     1.0 01:Node-2        89.64     .130 No_date    2:30    1.39  n/a      .000
R0001:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        89.64     .130 No_date    2:30    1.39  n/a      .000
                    +     1.0 02:E              2.17     .015 No_date    2:00    4.11  n/a      .000
                 SUM=     1.0 01:Node-3        91.81     .142 No_date    2:26    1.45  n/a      .000
  ** END OF RUN :  101

***************************************************************************************************





 RUN#:COMMAND#
R0102:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0102 ]
#********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#********************************************************************************
#********************************************************************************
R0102:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = Chicago design storm, a = 538.296378867179, b = 0.18, c = 0.702, Du
      [SDT=10.00:SDUR=   4.17:PTOT=  34.76]
R0102:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             38.70     .112 No_date    2:40    2.66 .077      .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0102:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              7.14     .032 No_date    2:14    3.19 .092      .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0102:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             33.53     .144 No_date    2:10    2.97 .085      .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0102:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D             10.27     .051 No_date    2:21    3.81 .110      .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0102:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.17     .032 No_date    1:58    8.21 .236      .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0102:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A             38.70     .112 No_date    2:40    2.66  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1        38.70     .103 No_date    3:03    2.66  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .181:Dmax=  .158}
R0102:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1        38.70     .103 No_date    3:03    2.66  n/a      .000
                    +     1.0 02:B              7.14     .032 No_date    2:14    3.19  n/a      .000
                    +     1.0 02:C             33.53     .144 No_date    2:10    2.97  n/a      .000
                    +     1.0 02:D             10.27     .051 No_date    2:21    3.81  n/a      .000
                 SUM=     1.0 01:Node-2        89.64     .294 No_date    2:26    2.95  n/a      .000
R0102:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        89.64     .294 No_date    2:26    2.95  n/a      .000
                    +     1.0 02:E              2.17     .032 No_date    1:58    8.21  n/a      .000
                 SUM=     1.0 01:Node-3        91.81     .317 No_date    2:24    3.07  n/a      .000
  ** END OF RUN :  104

***************************************************************************************************





 RUN#:COMMAND#
R0105:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0105 ]
#********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#********************************************************************************
#********************************************************************************
R0105:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = Chicago design storm, a = 538.384937760781, b = 0.18, c = 0.702, Du
      [SDT=10.00:SDUR=   4.17:PTOT=  45.92]
R0105:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             38.70     .206 No_date    2:38    4.84 .105      .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0105:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              7.14     .058 No_date    2:13    5.76 .126      .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0105:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             33.53     .268 No_date    2:09    5.38 .117      .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0105:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D             10.27     .093 No_date    2:19    6.83 .149      .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0105:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.17     .057 No_date    1:57   14.01 .305      .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0105:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A             38.70     .206 No_date    2:38    4.84  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1        38.70     .193 No_date    2:56    4.84  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .215:Dmax=  .204}
R0105:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1        38.70     .193 No_date    2:56    4.84  n/a      .000
                    +     1.0 02:B              7.14     .058 No_date    2:13    5.76  n/a      .000
                    +     1.0 02:C             33.53     .268 No_date    2:09    5.38  n/a      .000
                    +     1.0 02:D             10.27     .093 No_date    2:19    6.83  n/a      .000
                 SUM=     1.0 01:Node-2        89.64     .550 No_date    2:24    5.34  n/a      .000
R0105:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        89.64     .550 No_date    2:24    5.34  n/a      .000
                    +     1.0 02:E              2.17     .057 No_date    1:57   14.01  n/a      .000
                 SUM=     1.0 01:Node-3        91.81     .592 No_date    2:21    5.55  n/a      .000
  ** END OF RUN :  109

***************************************************************************************************





 RUN#:COMMAND#
R0110:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0110 ]
#********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#********************************************************************************
#********************************************************************************
R0110:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = Chicago design storm, a = 624.216217439326, b = 0.18, c = 0.702, Du
      [SDT=10.00:SDUR=   4.17:PTOT=  53.24]
R0110:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             38.70     .283 No_date    2:37    6.57 .123      .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0110:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              7.14     .080 No_date    2:12    7.80 .146      .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0110:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             33.53     .367 No_date    2:09    7.29 .137      .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0110:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D             10.27     .127 No_date    2:18    9.20 .173      .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0110:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.17     .076 No_date    1:57   18.32 .344      .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0110:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A             38.70     .283 No_date    2:37    6.57  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1        38.70     .268 No_date    2:53    6.57  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .242:Dmax=  .232}
R0110:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1        38.70     .268 No_date    2:53    6.57  n/a      .000
                    +     1.0 02:B              7.14     .080 No_date    2:12    7.80  n/a      .000
                    +     1.0 02:C             33.53     .367 No_date    2:09    7.29  n/a      .000
                    +     1.0 02:D             10.27     .127 No_date    2:18    9.20  n/a      .000
                 SUM=     1.0 01:Node-2        89.64     .762 No_date    2:22    7.24  n/a      .000
R0110:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        89.64     .762 No_date    2:22    7.24  n/a      .000
                    +     1.0 02:E              2.17     .076 No_date    1:57   18.32  n/a      .000
                 SUM=     1.0 01:Node-3        91.81     .818 No_date    2:20    7.50  n/a      .000
  ** END OF RUN :  124

***************************************************************************************************





 RUN#:COMMAND#
R0125:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0125 ]
#********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#********************************************************************************
#********************************************************************************
R0125:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = Chicago design storm, a = 732.346626526722, b = 0.18, c = 0.702, Du
      [SDT=10.00:SDUR=   4.17:PTOT=  62.47]
R0125:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             38.70     .393 No_date    2:36    9.07 .145      .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0125:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              7.14     .111 No_date    2:11   10.71 .172      .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0125:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             33.53     .512 No_date    2:08   10.03 .161      .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0125:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D             10.27     .175 No_date    2:17   12.58 .201      .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0125:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.17     .102 No_date    1:56   24.20 .387      .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0125:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A             38.70     .393 No_date    2:36    9.07  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1        38.70     .374 No_date    2:49    9.07  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .270:Dmax=  .265}
R0125:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1        38.70     .374 No_date    2:49    9.07  n/a      .000
                    +     1.0 02:B              7.14     .111 No_date    2:11   10.71  n/a      .000
                    +     1.0 02:C             33.53     .512 No_date    2:08   10.03  n/a      .000
                    +     1.0 02:D             10.27     .175 No_date    2:17   12.58  n/a      .000
                 SUM=     1.0 01:Node-2        89.64    1.070 No_date    2:21    9.96  n/a      .000
R0125:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        89.64    1.070 No_date    2:21    9.96  n/a      .000
                    +     1.0 02:E              2.17     .102 No_date    1:56   24.20  n/a      .000
                 SUM=     1.0 01:Node-3        91.81    1.145 No_date    2:19   10.30  n/a      .000
  ** END OF RUN :  149

***************************************************************************************************





 RUN#:COMMAND#
R0150:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0150 ]
#********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#********************************************************************************
#********************************************************************************
R0150:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = Chicago design storm, a = 819.333705013031, b = 0.18, c = 0.704, Du
      [SDT=10.00:SDUR=   4.17:PTOT=  69.12]
R0150:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
```

```
    CALIB NASHYD          1.0 01:A              38.70     .483 No_date    2:35   11.08 .160     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0150:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B               7.14     .137 No_date    2:11   13.04 .189     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0150:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C              33.53     .631 No_date    2:08   12.23 .177     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0150:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              10.27     .215 No_date    2:17   15.26 .221     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0150:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E               2.17     .123 No_date    1:56   28.72 .415     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0150:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A              38.70     .483 No_date    2:35   11.08  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1         38.70     .463 No_date    2:48   11.08  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .289:Dmax=  .288}
R0150:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1         38.70     .463 No_date    2:48   11.08  n/a     .000
                  +       1.0 02:B               7.14     .137 No_date    2:11   13.04  n/a     .000
                  +       1.0 02:C              33.53     .631 No_date    2:08   12.23  n/a     .000
                  +       1.0 02:D              10.27     .215 No_date    2:17   15.26  n/a     .000
               SUM=       1.0 01:Node-2         89.64    1.323 No_date    2:21   12.15  n/a     .000
R0150:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2         89.64    1.323 No_date    2:21   12.15  n/a     .000
                  +       1.0 02:E               2.17     .123 No_date    1:56   28.72  n/a     .000
               SUM=       1.0 01:Node-3         91.81    1.414 No_date    2:18   12.54  n/a     .000
 ** END OF RUN :  198

*****************************************************************************************************

 RUN#:COMMAND#
R0199:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0199 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0199:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = Chicago design storm, a = 896.407191239013, b = 0.24, c = 0.703, Du
      [SDT=10.00:SDUR=   4.17:PTOT=  76.03]
R0199:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A              38.70     .584 No_date    2:35   13.34 .175     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0199:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B               7.14     .165 No_date    2:11   15.65 .206     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0199:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C              33.53     .761 No_date    2:07   14.69 .193     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0199:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              10.27     .258 No_date    2:17   18.24 .240     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0199:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E               2.17     .145 No_date    1:55   33.60 .442     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0199:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A              38.70     .584 No_date    2:35   13.34  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1         38.70     .561 No_date    2:46   13.34  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .310:Dmax=  .313}
R0199:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1         38.70     .561 No_date    2:46   13.34  n/a     .000
                  +       1.0 02:B               7.14     .165 No_date    2:11   15.65  n/a     .000
                  +       1.0 02:C              33.53     .761 No_date    2:07   14.69  n/a     .000
                  +       1.0 02:D              10.27     .258 No_date    2:17   18.24  n/a     .000
               SUM=       1.0 01:Node-2         89.64    1.603 No_date    2:20   14.59  n/a     .000
R0199:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2         89.64    1.603 No_date    2:20   14.59  n/a     .000
                  +       1.0 02:E               2.17     .145 No_date    1:55   33.60  n/a     .000
               SUM=       1.0 01:Node-3         91.81    1.710 No_date    2:18   15.04  n/a     .000
 ** END OF RUN :  301

*****************************************************************************************************

 RUN#:COMMAND#
R0302:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0302 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0302:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_59.6mm design storm, total rainfall = 59.6 mm, rain int
      [SDT= 6.00:SDUR=  24.00:PTOT=  59.60]
R0302:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A              38.70     .278 No_date   12:49    8.26 .139     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0302:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B               7.14     .082 No_date   12:30    9.77 .164     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0302:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C              33.53     .380 No_date   12:27    9.14 .153     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0302:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              10.27     .128 No_date   12:34   11.48 .193     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0302:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E               2.17     .077 No_date   12:18   22.33 .375     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0302:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A              38.70     .278 No_date   12:49    8.26  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1         38.70     .258 No_date   13:02    8.26  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .241:Dmax=  .230}
R0302:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1         38.70     .258 No_date   13:02    8.26  n/a     .000
                  +       1.0 02:B               7.14     .082 No_date   12:30    9.77  n/a     .000
                  +       1.0 02:C              33.53     .380 No_date   12:27    9.14  n/a     .000
                  +       1.0 02:D              10.27     .128 No_date   12:34   11.48  n/a     .000
               SUM=       1.0 01:Node-2         89.64     .772 No_date   12:37    9.08  n/a     .000
R0302:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2         89.64     .772 No_date   12:37    9.08  n/a     .000
                  +       1.0 02:E               2.17     .077 No_date   12:18   22.33  n/a     .000
               SUM=       1.0 01:Node-3         91.81     .832 No_date   12:34    9.39  n/a     .000
 ** END OF RUN :  304

*****************************************************************************************************

 RUN#:COMMAND#
R0305:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0305 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0305:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_78.6mm design storm, total rainfall = 78.6 mm, rain int
      [SDT= 6.00:SDUR=  24.00:PTOT=  78.60]
R0305:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A              38.70     .485 No_date   12:48   14.22 .181     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0305:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B               7.14     .142 No_date   12:29   16.67 .212     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0305:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C              33.53     .659 No_date   12:26   15.66 .199     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0305:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              10.27     .220 No_date   12:34   19.40 .247     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0305:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E               2.17     .125 No_date   12:17   35.46 .451     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0305:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A              38.70     .485 No_date   12:48   14.22  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1         38.70     .457 No_date   13:00   14.22  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .289:Dmax=  .289}
R0305:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1         38.70     .457 No_date   13:00   14.22  n/a     .000
                  +       1.0 02:B               7.14     .142 No_date   12:29   16.67  n/a     .000
                  +       1.0 02:C              33.53     .659 No_date   12:26   15.66  n/a     .000
                  +       1.0 02:D              10.27     .220 No_date   12:34   19.40  n/a     .000
               SUM=       1.0 01:Node-2         89.64    1.361 No_date   12:36   15.55  n/a     .000
R0305:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2         89.64    1.361 No_date   12:36   15.55  n/a     .000
                  +       1.0 02:E               2.17     .125 No_date   12:17   35.46  n/a     .000
               SUM=       1.0 01:Node-3         91.81    1.459 No_date   12:33   16.02  n/a     .000
 ** END OF RUN :  309

*****************************************************************************************************

 RUN#:COMMAND#
R0310:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0310 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0310:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_91.1mm design storm, total rainfall = 91.1 mm, rain int
      [SDT= 6.00:SDUR=  24.00:PTOT=  91.10]
R0310:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A              38.70     .645 No_date   12:48   18.82 .207     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0310:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B               7.14     .188 No_date   12:29   21.94 .241     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0310:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C              33.53     .875 No_date   12:26   20.66 .227     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0310:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              10.27     .289 No_date   12:34   25.39 .279     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0310:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E               2.17     .159 No_date   12:17   44.83 .492     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0310:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A              38.70     .645 No_date   12:48   18.82  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1         38.70     .615 No_date   12:57   18.82  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .321:Dmax=  .326}
R0310:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1         38.70     .615 No_date   12:57   18.82  n/a     .000
                  +       1.0 02:B               7.14     .188 No_date   12:29   21.94  n/a     .000
                  +       1.0 02:C              33.53     .875 No_date   12:26   20.66  n/a     .000
                  +       1.0 02:D              10.27     .289 No_date   12:34   25.39  n/a     .000
               SUM=       1.0 01:Node-2         89.64    1.823 No_date   12:35   20.51  n/a     .000
R0310:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2         89.64    1.823 No_date   12:35   20.51  n/a     .000
                  +       1.0 02:E               2.17     .159 No_date   12:17   44.83  n/a     .000
               SUM=       1.0 01:Node-3         91.81    1.948 No_date   12:33   21.08  n/a     .000
 ** END OF RUN :  324

*****************************************************************************************************

 RUN#:COMMAND#
R0325:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0325 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0325:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_107mm design storm, total rainfall = 107 mm, rain inter
      [SDT= 6.00:SDUR=  24.00:PTOT= 107.00]
R0325:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A              38.70     .876 No_date   12:48   25.37 .237     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0325:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B               7.14     .254 No_date   12:29   29.39 .275     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0325:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C              33.53    1.184 No_date   12:26   27.74 .259     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0325:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              10.27     .388 No_date   12:33   33.76 .316     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0325:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E               2.17     .204 No_date   12:17   57.36 .536     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0325:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:A              38.70     .876 No_date   12:48   25.37  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1         38.70     .841 No_date   12:57   25.37  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .357:Dmax=  .373}
R0325:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1         38.70     .841 No_date   12:57   25.37  n/a     .000
                  +       1.0 02:B               7.14     .254 No_date   12:29   29.39  n/a     .000
                  +       1.0 02:C              33.53    1.184 No_date   12:26   27.74  n/a     .000
                  +       1.0 02:D              10.27     .388 No_date   12:33   33.76  n/a     .000
               SUM=       1.0 01:Node-2         89.64    2.483 No_date   12:35   27.54  n/a     .000
R0325:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2         89.64    2.483 No_date   12:35   27.54  n/a     .000
                  +       1.0 02:E               2.17     .204 No_date   12:17   57.36  n/a     .000
               SUM=       1.0 01:Node-3         91.81    2.644 No_date   12:33   28.24  n/a     .000
 ** END OF RUN :  349

*****************************************************************************************************

 RUN#:COMMAND#
R0350:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0350 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0350:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_118.7mm design storm, total rainfall = 118.7 mm, rain i
      [SDT= 6.00:SDUR=  24.00:PTOT= 118.70]
R0350:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A              38.70    1.062 No_date   12:47   30.63 .258     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0350:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B               7.14     .307 No_date   12:29   35.33 .298     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0350:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C              33.53    1.433 No_date   12:26   33.41 .281     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0350:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              10.27     .467 No_date   12:33   40.40 .340     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0350:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
```

```
    CALIB NASHYD         1.0 01:E             2.17     .239 No_date   12:17   66.94 .564     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0350:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->   1.0 02:A            38.70    1.062 No_date   12:47   30.63  n/a     .000
     [RDT= 1.00] out<-   1.0 01:Node-1       38.70    1.023 No_date   12:56   30.63  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .381:Dmax=  .407}
R0350:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD              1.0 02:Node-1       38.70    1.023 No_date   12:56   30.63  n/a     .000
                    +    1.0 02:B             7.14     .307 No_date   12:29   35.33  n/a     .000
                    +    1.0 02:C            33.53    1.433 No_date   12:26   33.41  n/a     .000
                    +    1.0 02:D            10.27     .467 No_date   12:33   40.40  n/a     .000
                 SUM=    1.0 01:Node-2       89.64    3.014 No_date   12:34   33.16  n/a     .000
R0350:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD              1.0 02:Node-2       89.64    3.014 No_date   12:34   33.16  n/a     .000
                    +    1.0 02:E             2.17     .239 No_date   12:17   66.94  n/a     .000
                 SUM=    1.0 01:Node-3       91.81    3.203 No_date   12:33   33.96  n/a     .000
  ** END OF RUN :  398
***************************************************************************************************
 RUN#:COMMAND#
R0399:C00001---------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0399 ]
#******************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2022-04
#  Modeller     : B T - J B
#  Company      : JFSA
#  License #    :  2582634
#******************************************************************************
#******************************************************************************
R0399:C00002---------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_130.1mm design storm, total rainfall = 130.1 mm, rain i
      [SDT= 6.00:SDUR=  24.00:PTOT= 130.10]
R0399:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD         1.0 01:A            38.70    1.257 No_date   12:47   36.09 .277     .000
      [CN= 45.0: N= 3.00: Tp=  .82]
R0399:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD         1.0 01:B             7.14     .361 No_date   12:28   41.46 .319     .000
      [CN= 50.0: N= 3.00: Tp=  .55]
R0399:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD         1.0 01:C            33.53    1.692 No_date   12:26   39.27 .302     .000
      [CN= 48.0: N= 3.00: Tp=  .51]
R0399:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD         1.0 01:D            10.27     .548 No_date   12:33   47.21 .363     .000
      [CN= 55.0: N= 3.00: Tp=  .62]
R0399:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD         1.0 01:E             2.17     .274 No_date   12:17   76.51 .588     .000
      [CN= 76.0: N= 3.00: Tp=  .39]
R0399:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->   1.0 02:A            38.70    1.257 No_date   12:47   36.09  n/a     .000
     [RDT= 1.00] out<-   1.0 01:Node-1       38.70    1.213 No_date   12:55   36.09  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .402:Dmax=  .439}
R0399:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD              1.0 02:Node-1       38.70    1.213 No_date   12:55   36.09  n/a     .000
                    +    1.0 02:B             7.14     .361 No_date   12:28   41.46  n/a     .000
                    +    1.0 02:C            33.53    1.692 No_date   12:26   39.27  n/a     .000
                    +    1.0 02:D            10.27     .548 No_date   12:33   47.21  n/a     .000
                 SUM=    1.0 01:Node-2       89.64    3.567 No_date   12:34   38.98  n/a     .000
R0399:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD              1.0 02:Node-2       89.64    3.567 No_date   12:34   38.98  n/a     .000
                    +    1.0 02:E             2.17     .274 No_date   12:17   76.51  n/a     .000
                 SUM=    1.0 01:Node-3       91.81    3.783 No_date   12:32   39.87  n/a     .000
R0399:C00002---------------------------------------------------------------------------------------
    FINISH
---------------------------------------------------------------------------------------------------
***************************************************************************************************
     WARNINGS / ERRORS / NOTES
     ------------------------
   Simulation ended on 2022-04-28     at 15:16:29
===================================================================================================
```

```
20     Metric units
*#*****************************************************************************
*#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
*#  Date         : 2021-11
*#  Modeller     : M M
*#  Company      : JFSA
*#  License #    :  2582634
*#*****************************************************************************
* Model updated to use CN instead of CN* for natural areas, 100 year pond release
* rates updated based on new Pre dev model using CN instead of CN*,
* very rough cut to see what the increased release rate does to pond volumes
*#*****************************************************************************
START                   TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                        25mmCHI4HR.stm
READ STORM              STORM_FILENAME=["storm.001"]
*==============================================================================
*# Pond 1
*==============================================================================
*Lumped development Area to Pond 1
CALIB STANDHYD          NHYD=["DEV-1A"], DT=[1](min), AREA=[10.628](ha), XIMP=[0.55],
TIMP=[0.65], DWF=[0.0](cms),
                        LOSS=[1] Horton Equ: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                        DCAY=[4.14](/hr), F=[0.00](mm),
                        Pervious   areas: IAper=[4.67](mm), SLPP=[4.0](%), LGP=[40](m),
                        MNP=[0.25], SCP=[0](min),
                        Impervious areas: IAimp=[1.57](mm), SLPI=[2.0](%), LGI=[266](m),
                        MNI=[0.013], SCI=[0](min),
                        RAINFALL=[ ,  ,  -1]
*%-----------------|-----------------------------------------------------------|
CALIB STANDHYD          NHYD=["DEV-1B"], DT=[1](min), AREA=[1.85](ha), XIMP=[0.89],
TIMP=[0.99], DWF=[0.0](cms),
                        LOSS=[1] Horton Equ: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                        DCAY=[4.14](/hr), F=[0.00](mm),
                        Pervious   areas: IAper=[4.67](mm), SLPP=[4.0](%), LGP=[40](m),
                        MNP=[0.25], SCP=[0](min),
                        Impervious areas: IAimp=[1.57](mm), SLPI=[2.0](%), LGI=[111](m),
                        MNI=[0.013], SCI=[0](min),
                        RAINFALL=[ ,  ,  -1]
*%-----------------|-----------------------------------------------------------|
*5-Year Capture to NHS, major system to Pond 1
COMPUTE DUALHYD         NHYDin=["DEV-1B"], CINLET=[0.135](cms), NINLET=[1],
                        MajNHYD=["DEV-1B-MJ"]
                        MinNHYD=["DEV-1B-MN"]
                        TMJSTO=[0](cu-m)
*%-----------------|-----------------------------------------------------------|
ADD HYD                 NHYDsum=["P1-In"], NHYDs to add=["DEV-1A"+"DEV-1B-MJ"]
*%-----------------|-----------------------------------------------------------|
*# Pond 1 set to match pre-development peak flows from EXT-A
ROUTE RESERVOIR         NHYDout=["P1-Out"] ,NHYDin=["P1-In"] ,
                        RDT=[1](min),
                              TABLE of ( OUTFLOW-STORAGE ) values
                                          (cms) - (ha-m)
                                          [ 0 , 0 ]
                                        [ 0 , 0 ]
                                        [ 0.0024 , 0.0155 ]
                                        [ 0.0048 , 0.0315 ]
                                        [ 0.0068 , 0.0478 ]
                                        [ 0.0084 , 0.0645 ]
                                        [ 0.0096 , 0.0816 ]
                                        [ 0.0108 , 0.099 ]
                                        [ 0.0118 , 0.1168 ]
                                        [ 0.0128 , 0.1349 ]
                                        [ 0.0136 , 0.1534 ]
                                        [ 0.0145 , 0.1723 ]
                                        [ 0.0153 , 0.1916 ]
                                        [ 0.016 , 0.2112 ]
```

```
                                          [ 0.0167 , 0.2311 ]
                                          [ 0.0174 , 0.2515 ]
                                          [ 0.018 , 0.2722 ]
                                          [ 0.0187 , 0.2933 ]
                                          [ 0.0193 , 0.3148 ]
                                          [ 0.0199 , 0.3367 ]
                                          [ 0.0205 , 0.3589 ]
                                          [ 0.021 , 0.3816 ]
                                          [ 0.0216 , 0.4046 ]
                                          [ 0.0221 , 0.428 ]
                                          [ 0.0226 , 0.4518 ]
                                          [ 0.0231 , 0.4759 ]
                                          [ 0.0236 , 0.5005 ]
                                          [ 0.0241 , 0.5255 ]
                                          [ 0.0246 , 0.5509 ]
                                          [ 0.0349 , 0.5766 ]
                                          [ 0.0528 , 0.6028 ]
                                          [ 0.0751 , 0.6294 ]
                                          [ 0.1005 , 0.6563 ]
                                          [ 0.1332 , 0.6837 ]
                                          [ 0.1501 , 0.7115 ]
                                          [ 0.165 , 0.7397 ]
                                          [ 0.1785 , 0.7683 ]
                                          [ 0.191 , 0.7973 ]
                                          [ 0.2026 , 0.8268 ]
                                          [ 0.2136 , 0.8566 ]
                                          [ 0.2239 , 0.8869 ]
                                          [ 0.2338 , 0.9176 ]
                                          [  -1    ,   -1    ]
                               NHYDovf=["P1ovf"] ,
*%-------------------|-------------------------------------------------------------|
*Uncontrolled portion of Development Area to Pond 1
CALIB STANDHYD       NHYD=["EX-DITCH"], DT=[1](min), AREA=[0.069](ha), XIMP=[0.83],
TIMP=[0.93], DWF=[0.0](cms),
                     LOSS=[1] Horton Equ: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                     DCAY=[4.14](/hr), F=[0.00](mm),
                     Pervious   areas: IAper=[4.67](mm), SLPP=[2.0](%), LGP=[30](m),
                     MNP=[0.25], SCP=[0](min),
                     Impervious areas: IAimp=[1.57](mm), SLPI=[2.0](%), LGI=[30](m),
                     MNI=[0.013], SCI=[0](min),
                     RAINFALL=[ ,  ,  -1]
*%-------------------|-------------------------------------------------------------|
*#Reduced external Area A
CALIB NASHYD           NHYD=["A"], DT=[1]min, AREA=[30.564](ha)
                       DWF=[0.0](cms),  CN=[49], IA=[4.67](mm), N=[3.0]
                       Tp=[0.93]hrs, END=-1
*%-------------------|-------------------------------------------------------------|
ADD HYD              NHYDsum=["NATURAL1"], NHYDs to add=["EX-DITCH"+"A"]
*%-------------------|-------------------------------------------------------------|
ADD HYD              NHYDsum=["Node-1"], NHYDs to add=["P1-out"+"P1ovf"+"NATURAL1"]
*%-------------------|-------------------------------------------------------------|
ROUTE CHANNEL        NHYDout=["Node-1R"], NHYDin=["Node-1"],  RDT=[1](min),
                     CHLGTH=[240](m),  CHSLOPE=[0.1](%), FPSLOPE=[0.1](%),
                     SECNUM=[1],       NSEG=[3]
                     ( SEGROUGH, SEGDIST (m))=[0.08,12.4,-0.035,23.77,0.08, 25.84] NSEG
                     times
                     ( DISTANCE (m), ELEVATION (m))=[8.27,395.91]
                                                    [9.30,395.89]
                                                    [10.34,395.82]
                                                    [11.37,395.64]
                                                    [12.40,395.40]
                                                    [13.44,395.16]
                                                    [14.47,394.82]
                                                    [15.51,394.80]
                                                    [16.54,394.83]
                                                    [17.57,394.86]
```

```
                                                      [18.61,394.89]
                                                      [19.64,394.93]
                                                      [20.67,394.96]
                                                      [21.71,394.99]
                                                      [22.74,395.09]
                                                      [23.77,395.30]
                                                      [24.81,395.52]
                                                      [25.84,395.73]
*================================================================================
*# Pond 2
*================================================================================
*Lumped development Area to Pond 2
CALIB STANDHYD      NHYD=["DEV-2A"], DT=[1](min), AREA=[23.212](ha), XIMP=[0.43],
TIMP=[0.53], DWF=[0.0](cms),
                    LOSS=[1] Horton Equ: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4.14](/hr), F=[0.00](mm),
                    Pervious   areas: IAper=[4.67](mm), SLPP=[4.0](%), LGP=[40](m),
                    MNP=[0.25], SCP=[0](min),
                    Impervious areas: IAimp=[1.57](mm), SLPI=[2.0](%), LGI=[393](m),
                    MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  -1]
*%-----------------|-------------------------------------------------------------|
*Urbanized Road to Pond 2 (2-Year Capture)
CALIB STANDHYD      NHYD=["ROAD"], DT=[1](min), AREA=[2.019](ha), XIMP=[0.69],
TIMP=[0.79], DWF=[0.0](cms),
                    LOSS=[1] Horton Equ: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4.14](/hr), F=[0.00](mm),
                    Pervious   areas: IAper=[4.67](mm), SLPP=[4.0](%), LGP=[40](m),
                    MNP=[0.25], SCP=[0](min),
                    Impervious areas: IAimp=[1.57](mm), SLPI=[2.0](%), LGI=[774](m),
                    MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  -1]
*%-----------------|-------------------------------------------------------------|
*2-Year Capture to Pond 2, major system uncontrolled to watercourse
COMPUTE DUALHYD     NHYDin=["ROAD"], CINLET=[0.233](cms), NINLET=[1],
                    MajNHYD=["ROAD-MJ"]
                    MinNHYD=["ROAD-MN"]
                    TMJSTO=[0](cu-m)
*%-----------------|-------------------------------------------------------------|
ADD HYD             NHYDsum=["P2-In"], NHYDs to add=["ROAD-MN"+"DEV-2A"]
*%-----------------|-------------------------------------------------------------|
*# Estimated Pond Volumes for SWM Facility
ROUTE RESERVOIR     NHYDout=["P2-out"] ,NHYDin=["P2-In"] ,
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    [ 0 , 0 ]
                                    [ 0 , 0 ]
                                    [ 0.0038 , 0.0314 ]
                                    [ 0.0076 , 0.0644 ]
                                    [ 0.0113 , 0.0978 ]
                                    [ 0.0143 , 0.1316 ]
                                    [ 0.0168 , 0.1658 ]
                                    [ 0.019 , 0.2004 ]
                                    [ 0.0209 , 0.2354 ]
                                    [ 0.0227 , 0.2708 ]
                                    [ 0.0243 , 0.3067 ]
                                    [ 0.0259 , 0.343 ]
                                    [ 0.0273 , 0.3797 ]
                                    [ 0.0287 , 0.4168 ]
                                    [ 0.03 , 0.4544 ]
                                    [ 0.0313 , 0.4923 ]
                                    [ 0.0604 , 0.5308 ]
                                    [ 0.1122 , 0.5696 ]
                                    [ 0.178 , 0.6089 ]
                                    [ 0.2548 , 0.6486 ]
                                    [ 0.3407 , 0.6887 ]
```

```
                                          [ 0.4847 , 0.7293 ]
                                          [ 0.5548 , 0.7703 ]
                                          [ 0.6167 , 0.8118 ]
                                          [ 0.6727 , 0.8537 ]
                                          [ 0.7242 , 0.8961 ]
                                          [ 0.7722 , 0.9389 ]
                                          [ 0.8174 , 0.9822 ]
                                          [ 0.8601 , 1.0259 ]
                                          [ 0.9008 , 1.0701 ]
                                          [ 0.9397 , 1.1147 ]
                                          [ 0.977 , 1.1598 ]
                                          [ 1.0129 , 1.2054 ]
                                          [ 1.0476 , 1.2514 ]
                                          [ 1.0811 , 1.2979 ]
                                          [ 1.1136 , 1.3448 ]
                                          [ 1.1452 , 1.3922 ]
                                          [ 1.176 , 1.4401 ]
                                          [ 1.2059 , 1.4885 ]
                                          [ 1.2351 , 1.5373 ]
                                          [ 1.2637 , 1.5867 ]
                                          [ 1.2916 , 1.6365 ]
                                          [  -1    ,  -1    ]
                              NHYDovf=["P2ovf"] ,
*%-----------------|------------------------------------------------------------|
ADD HYD             NHYDsum=["Pond2-Out"], NHYDs to add=["P2-out"+"P2ovf"]
*================================================================================
*# Uncontrolled Natural Lands
*================================================================================
*Uncontrolled Urbanized Road to watercourse / NHS
CALIB STANDHYD      NHYD=["ROW-NHS1"], DT=[1](min), AREA=[0.578](ha), XIMP=[0.61], TIMP=[0.71], DWF=[0.0](cms),
                    LOSS=[1] Horton Equ: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr), DCAY=[4.14](/hr), F=[0.00](mm),
                    Pervious   areas: IAper=[4.67](mm), SLPP=[4.0](%), LGP=[40](m), MNP=[0.25], SCP=[0](min),
                    Impervious areas: IAimp=[1.57](mm), SLPI=[2.0](%), LGI=[461](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  -1]
*%-----------------|------------------------------------------------------------|
CALIB NASHYD          NHYD=["B"], DT=[1]min, AREA=[4.256](ha)
                      DWF=[0.0](cms),  CN=[50], IA=[4.67](mm), N=[3.0]
                      Tp=[1.39]hrs, END=-1
*%-----------------|------------------------------------------------------------|
CALIB NASHYD          NHYD=["C"], DT=[1]min, AREA=[16.891](ha)
                      DWF=[0.0](cms),  CN=[43], IA=[4.67](mm), N=[3.0]
                      Tp=[0.56]hrs, END=-1
*%-----------------|------------------------------------------------------------|
CALIB NASHYD          NHYD=["D"], DT=[1]min, AREA=[0.517](ha)
                      DWF=[0.0](cms),  CN=[52], IA=[4.67](mm), N=[3.0]
                      Tp=[0.36]hrs, END=-1
*%-----------------|------------------------------------------------------------|
ADD HYD             NHYDsum=["NATURAL2"], NHYDs to add=["B"+"C"+"D"]
ADD HYD             NHYDsum=["Node-2"], NHYDs to add=["Node-1R"+"NATURAL2"+"ROW-NHS1"+"ROAD-MJ"+"DEV-1B-MN"]
*%-----------------|------------------------------------------------------------|
*Uncontrolled Urbanized Road to watercourse / NHS
CALIB STANDHYD      NHYD=["ROW-NHS2"], DT=[1](min), AREA=[0.608](ha), XIMP=[0.61], TIMP=[0.71], DWF=[0.0](cms),
                    LOSS=[1] Horton Equ: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr), DCAY=[4.14](/hr), F=[0.00](mm),
                    Pervious   areas: IAper=[4.67](mm), SLPP=[4.0](%), LGP=[40](m), MNP=[0.25], SCP=[0](min),
                    Impervious areas: IAimp=[1.57](mm), SLPI=[2.0](%), LGI=[461](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  -1]
*%-----------------|------------------------------------------------------------|
```

```
CALIB NASHYD          NHYD=["E"], DT=[1]min, AREA=[2.19](ha)
                      DWF=[0.0](cms),  CN=[73], IA=[4.67](mm), N=[3.0]
                      Tp=[0.40]hrs, END=-1
*%-------------------|-----------------------------------------------------|
ADD HYD              NHYDsum=["Node-3"], NHYDs to
add=["Node-2"+"E"+"ROW-NHS2"+"Pond2-Out"]
*%-------------------|-----------------------------------------------------|
*SAVE HYD             NHYD=["P1-out"],  # OF PCYCLES=[-1],  ICASEsh=[1]
*                     HYD_COMMENT=["P1-out"]
*%-------------------|-----------------------------------------------------|
*SAVE HYD             NHYD=["P2-out"],  # OF PCYCLES=[-1],  ICASEsh=[1]
*                     HYD_COMMENT=["P2-out"]
*%-------------------|-----------------------------------------------------|
*% STORMS
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*                     002YRCHI1HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*                     005YRCHI1HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[10]
*                     010YRCHI1HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[25]
*                     025YRCHI1HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[50]
*                     050YRCHI1HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[99]
*                     100YRCHI1HR.stm
*%-------------------|-----------------------------------------------------|
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[102]
                     002YRCHI4HR.stm
*%-------------------|-----------------------------------------------------|
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[105]
                     005YRCHI4HR.stm
*%-------------------|-----------------------------------------------------|
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[110]
                     010YRCHI4HR.stm
*%-------------------|-----------------------------------------------------|
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[125]
                     025YRCHI4HR.stm
*%-------------------|-----------------------------------------------------|
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[150]
                     050YRCHI4HR.stm
*%-------------------|-----------------------------------------------------|
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[199]
                     100YRCHI4HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[202]
*                     002YRSCS12HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[205]
*                     005YRSCS12HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[210]
*                     010YRSCS12HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[225]
*                     025YRSCS12HR.stm
*%-------------------|-----------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[250]
*                     050YRSCS12HR.stm
*%-------------------|-----------------------------------------------------|
```

```
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[299]
*                      100YRSCS12HR.stm
*%-------------------|------------------------------------------------------------|
START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[302]
                      002YRSCS24HR.stm
*%-------------------|------------------------------------------------------------|
START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[305]
                      005YRSCS24HR.stm
*%-------------------|------------------------------------------------------------|
START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[310]
                      010YRSCS24HR.stm
*%-------------------|------------------------------------------------------------|
START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[325]
                      025YRSCS24HR.stm
*%-------------------|------------------------------------------------------------|
START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[350]
                      050YRSCS24HR.stm
*%-------------------|------------------------------------------------------------|
START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[399]
                      100YRSCS24HR.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[402]
*                      002YCHI1H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[405]
*                      005YCHI1H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[410]
*                      010YCHI1H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[425]
*                      025YCHI1H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[450]
*                      050YCHI1H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[499]
*                      100YCHI1H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[502]
*                      002YCHI4H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[505]
*                      005YCHI4H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[510]
*                      010YCHI4H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[525]
*                      025YCHI4H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[550]
*                      050YCHI4H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[599]
*                      100YCHI4H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[602]
*                      002YSCS12H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[605]
*                      005YSCS12H-72.stm
*%-------------------|------------------------------------------------------------|
*START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[610]
*                      010YSCS12H-72.stm
*%-------------------|------------------------------------------------------------|
```

```
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[625]
*                     025YSCS12H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[650]
*                     050YSCS12H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[699]
*                     100YSCS12H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[702]
*                     002YSCS24H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[705]
*                     005YSCS24H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[710]
*                     010YSCS24H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[725]
*                     025YSCS24H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[750]
*                     050YSCS24H-72.stm
*%-----------------|------------------------------------------------------------|
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[799]
*                     100YSCS24H-72.stm
*%-----------------|------------------------------------------------------------|
*% Hurricane Hazel (Regional Event)
*START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[999]
*%                    STORM_FILENAME=["hazel-10.stm"]
*%-----------------|------------------------------------------------------------|
FINISH
```

```
=====================================================================================================

SSSSS   W   W   M   M   H   H   Y   Y   M   M    OOO         222     000    11   5555   =========
S        W W W   MM MM   H   H    Y Y    MM MM   O   O          2    0   0   11   5
SSSSS    W W W   M M M   HHHHH     Y     M M M   O   O          2    0   0   11   5      Ver 5.500
    S     W W    M   M   H   H     Y     M   M   O   O        222    0   0   11   555    FEB  2015
SSSSS     W W    M   M   H   H     Y     M   M    OOO         2      0   0   11      5   =========
                                                              2      0   0   11      5   # 2549237
      StormWater Management HYdrologic Model                    222     000    11   555    =========

*****************************************************************************************************
***************************************  SWMHYMO Ver 5.500  ****************************************
******************  A single event and continuous hydrologic simulation model  *******************
******************     based on the principles of HYMO and its successors      *******************
******************                 OTTHYMO-83 and OTTHYMO-89.                  *******************
*****************************************************************************************************
****************** Distributed by:  J.F. Sabourin and Associates Inc.          *******************
******************                  Ottawa,  Ontario: (613) 836-3884           *******************
******************                  Gatineau, Quebec: (819) 243-6858           *******************
******************                  E-Mail: swmhymo@jfsa.Com                   *******************
*****************************************************************************************************

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++++++++++ Licensed user: JFSAinc.                                    +++++++++++++++++++
++++++++++++++++++                 Ottawa               SERIAL#:2549237        +++++++++++++++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*****************************************************************************************************
******************             ++++++ PROGRAM ARRAY DIMENSIONS ++++++          *******************
******************             Maximum value for ID numbers  :     11          *******************
******************             Max. number of rainfall points: 105408          *******************
******************             Max. number of flow points    : 105408          *******************
*****************************************************************************************************


*********************************   S U M M A R Y   O U T P U T   **********************************
*****************************************************************************************************
*                 RUN DATE: 2022-05-27     TIME: 16:47:07     RUN COUNTER: 008697                  *
*****************************************************************************************************
* Input   file: C:\Temp\20220511-Post33\Post33-v04.DAT                                              *
* Output  file: C:\Temp\20220511-Post33\Post33-v04.out                                              *
* Summary file: C:\Temp\20220511-Post33\Post33-v04.sum                                              *
* User comments:                                                                                    *
* 1:_______________________________________________________________________________________________*
* 2:_______________________________________________________________________________________________*
* 3:_______________________________________________________________________________________________*
*****************************************************************************************************


#**********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#**********************************************************************************
#**********************************************************************************
 RUN#:COMMAND#
R0001:C00001----------------------------------------------------------------------------------------
      START
       [TZERO =    .00 hrs on        0]
       [METOUT=   2    (1=imperial, 2=metric output)]
       [NSTORM=   1 ]
       [NRUN  = 0001 ]
R0001:C00002----------------------------------------------------------------------------------------
      READ STORM
       Filename = storm.001
       Comment  = 25mm Chicago design storm, based on 2 Year 4 Hr Chicago a = 538.296
       [SDT=10.00:SDUR=   4.17:PTOT=  25.00]
# Pond 1
R0001:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63     .808 No_date    1:31   14.05 .562     .000
       [XIMP=.55:TIMP=.65]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0001:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .278 No_date    1:30   22.93 .917     .000
       [XIMP=.89:TIMP=.99]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0001:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .278 No_date    1:30   22.93  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ       .29     .143 No_date    1:30   22.93  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN      1.56     .135 No_date    1:23   22.93  n/a     .000
R0001:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63     .808 No_date    1:31   14.05  n/a     .000
                    +     1.0 02:DEV-1B-MJ       .29     .143 No_date    1:30   22.93  n/a     .000
                 SUM=     1.0 01:P1-In         10.91     .938 No_date    1:31   14.28  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0001:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         10.91     .938 No_date    1:31   14.28  n/a     .000
                out <=    1.0 01:P1-Out        10.91     .013 No_date    4:07   14.28  n/a     .000
           overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.1437E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0001:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .010 No_date    1:30   20.67 .827     .000
       [XIMP=.83:TIMP=.93]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0001:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56     .044 No_date    2:55    1.45 .058     .000
       [CN= 49.0: N= 3.00: Tp=  .93]
R0001:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .010 No_date    1:30   20.67  n/a     .000
                    +     1.0 02:A             30.56     .044 No_date    2:55    1.45  n/a     .000
                 SUM=     1.0 01:NATURAL1      30.63     .044 No_date    2:55    1.50  n/a     .000
R0001:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        10.91     .013 No_date    4:07   14.28  n/a     .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:NATURAL1      30.63     .044 No_date    2:55    1.50  n/a     .000
                 SUM=     1.0 01:Node-1        41.55     .057 No_date    2:56    4.85  n/a     .000
R0001:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.55     .057 No_date    2:56    4.85  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.55     .053 No_date    3:23    4.85  n/a     .000
       [L/S/n=  240./ .100/.035]
       {Vmax=  .148:Dmax=  .117}
# Pond 2
R0001:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    1.263 No_date    1:32   11.25 .450     .000
       [XIMP=.43:TIMP=.53]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0001:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .146 No_date    1:35   17.35 .694     .000
       [XIMP=.69:TIMP=.79]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0001:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .146 No_date    1:35   17.35  n/a     .000
     Major System   /     1.0 02:ROAD-MJ         .00     .000 No_date    0:00     .00  n/a     .000
     Minor System   \     1.0 03:ROAD-MN        2.02     .146 No_date    1:35   17.35  n/a     .000
R0001:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        2.02     .146 No_date    1:35   17.35  n/a     .000
                    +     1.0 02:DEV-2A        23.21    1.263 No_date    1:32   11.25  n/a     .000
                 SUM=     1.0 01:P2-In         25.23    1.401 No_date    1:32   11.74  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0001:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         25.23    1.401 No_date    1:32   11.74  n/a     .000
                out <=    1.0 01:P2-out        25.23     .023 No_date    4:09   11.74  n/a     .000
           overflow <=    1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.2751E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0001:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        25.23     .023 No_date    4:09   11.74  n/a     .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
                 SUM=     1.0 01:Pond2-Out     25.23     .023 No_date    4:09   11.74  n/a     .000
# Uncontrolled Natural Lands
R0001:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .043 No_date    1:32   15.45 .618     .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0001:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .005 No_date    3:41    1.51 .060     .000
       [CN= 50.0: N= 3.00: Tp= 1.39]
R0001:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .026 No_date    2:18    1.16 .046     .000
       [CN= 43.0: N= 3.00: Tp=  .56]
R0001:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .001 No_date    1:58    1.62 .065     .000
       [CN= 52.0: N= 3.00: Tp=  .36]
R0001:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .005 No_date    3:41    1.51  n/a     .000
                    +     1.0 02:C             16.89     .026 No_date    2:18    1.16  n/a     .000
                    +     1.0 02:D               .52     .001 No_date    1:58    1.62  n/a     .000
                 SUM=     1.0 01:NATURAL2      21.66     .029 No_date    2:21    1.24  n/a     .000
R0001:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.55     .053 No_date    3:23    4.85  n/a     .000
                    +     1.0 02:NATURAL2      21.66     .029 No_date    2:21    1.24  n/a     .000
                    +     1.0 02:ROW-NHS1        .58     .043 No_date    1:32   15.45  n/a     .000
                    +     1.0 02:ROAD-MJ         .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:DEV-1B-MN      1.56     .135 No_date    1:23   22.93  n/a     .000
                 SUM=     1.0 01:Node-2        65.35     .186 No_date    1:33    4.18  n/a     .000
R0001:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .046 No_date    1:32   15.45 .618     .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0001:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .013 No_date    2:01    3.62 .145     .000
       [CN= 73.0: N= 3.00: Tp=  .40]
R0001:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.35     .186 No_date    1:33    4.18  n/a     .000
                    +     1.0 02:E              2.19     .013 No_date    2:01    3.62  n/a     .000
                    +     1.0 02:ROW-NHS2        .61     .046 No_date    1:32   15.45  n/a     .000
                    +     1.0 02:Pond2-Out     25.23     .023 No_date    4:09   11.74  n/a     .000
                 SUM=     1.0 01:Node-3        93.38     .245 No_date    1:33    6.28  n/a     .000
  ** END OF RUN :  101

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 RUN#:COMMAND#
R0102:C00001----------------------------------------------------------------------------------------
      START
       [TZERO =    .00 hrs on        0]
       [METOUT=   2    (1=imperial, 2=metric output)]
       [NSTORM=   1 ]
       [NRUN  = 0102 ]
#**********************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#**********************************************************************************
#**********************************************************************************
R0102:C00002----------------------------------------------------------------------------------------
      READ STORM
       Filename = storm.001
       Comment  = Chicago design storm, a = 538.296378867179, b = 0.18, c = 0.702, Du
       [SDT=10.00:SDUR=   4.17:PTOT=  34.76]
# Pond 1
R0102:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63    1.314 No_date    1:31   21.56 .620     .000
       [XIMP=.55:TIMP=.65]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0102:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .397 No_date    1:30   32.68 .940     .000
       [XIMP=.89:TIMP=.99]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0102:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .397 No_date    1:30   32.68  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ       .43     .262 No_date    1:30   32.68  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN      1.42     .135 No_date    1:22   32.68  n/a     .000
R0102:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63    1.314 No_date    1:31   21.56  n/a     .000
                    +     1.0 02:DEV-1B-MJ       .43     .262 No_date    1:30   32.68  n/a     .000
                 SUM=     1.0 01:P1-In         11.06    1.558 No_date    1:30   21.99  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0102:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         11.06    1.558 No_date    1:30   21.99  n/a     .000
                out <=    1.0 01:P1-Out        11.06     .017 No_date    4:06   21.99  n/a     .000
           overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.2274E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0102:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .014 No_date    1:30   29.91 .860     .000
       [XIMP=.83:TIMP=.93]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0102:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56     .095 No_date    2:50    3.08 .088     .000
       [CN= 49.0: N= 3.00: Tp=  .93]
R0102:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .014 No_date    1:30   29.91  n/a     .000
                    +     1.0 02:A             30.56     .095 No_date    2:50    3.08  n/a     .000
                 SUM=     1.0 01:NATURAL1      30.63     .096 No_date    2:50    3.14  n/a     .000
R0102:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.06     .017 No_date    4:06   21.99  n/a     .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:NATURAL1      30.63     .096 No_date    2:50    3.14  n/a     .000
                 SUM=     1.0 01:Node-1        41.69     .112 No_date    2:50    8.14  n/a     .000
R0102:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.69     .112 No_date    2:50    8.14  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.69     .105 No_date    3:13    8.14  n/a     .000
       [L/S/n=  240./ .100/.035]
       {Vmax=  .181:Dmax=  .158}
# Pond 2
R0102:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    2.144 No_date    1:32   18.02 .518     .000
       [XIMP=.43:TIMP=.53]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0102:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .233 No_date    1:34   25.50 .733     .000
       [XIMP=.69:TIMP=.79]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0102:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .233 No_date    1:34   25.50  n/a     .000
     Major System   /     1.0 02:ROAD-MJ         .00     .000 No_date    0:00     .00  n/a     .000
     Minor System   \     1.0 03:ROAD-MN        2.02     .233 No_date    1:34   25.50  n/a     .000
R0102:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        2.02     .233 No_date    1:34   25.50  n/a     .000
                    +     1.0 02:DEV-2A        23.21    2.144 No_date    1:32   18.02  n/a     .000
                 SUM=     1.0 01:P2-In         25.23    2.368 No_date    1:32   18.62  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0102:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         25.23    2.368 No_date    1:32   18.62  n/a     .000
                out <=    1.0 01:P2-out        25.23     .030 No_date    4:08   18.62  n/a     .000
           overflow <=    1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.4418E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0102:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        25.23     .030 No_date    4:08   18.62  n/a     .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
                 SUM=     1.0 01:Pond2-Out     25.23     .030 No_date    4:08   18.62  n/a     .000
# Uncontrolled Natural Lands
R0102:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .069 No_date    1:32   23.23 .668     .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0102:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .011 No_date    3:35    3.19 .092     .000
       [CN= 50.0: N= 3.00: Tp= 1.39]
R0102:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .057 No_date    2:15    2.47 .071     .000
       [CN= 43.0: N= 3.00: Tp=  .56]
R0102:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .003 No_date    1:56    3.42 .098     .000
       [CN= 52.0: N= 3.00: Tp=  .36]
R0102:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .011 No_date    3:35    3.19  n/a     .000
                    +     1.0 02:C             16.89     .057 No_date    2:15    2.47  n/a     .000
                    +     1.0 02:D               .52     .003 No_date    1:56    3.42  n/a     .000
                 SUM=     1.0 01:NATURAL2      21.66     .065 No_date    2:18    2.63  n/a     .000
R0102:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.69     .105 No_date    3:13    8.14  n/a     .000
                    +     1.0 02:NATURAL2      21.66     .065 No_date    2:18    2.63  n/a     .000
                    +     1.0 02:ROW-NHS1        .58     .069 No_date    1:32   23.23  n/a     .000
                    +     1.0 02:ROAD-MJ         .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:DEV-1B-MN      1.42     .135 No_date    1:22   32.68  n/a     .000
                 SUM=     1.0 01:Node-2        65.35     .220 No_date    1:34    6.98  n/a     .000
R0102:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .072 No_date    1:32   23.23 .668     .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0102:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .028 No_date    1:59    7.30 .210     .000
       [CN= 73.0: N= 3.00: Tp=  .40]
R0102:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.35     .220 No_date    1:34    6.98  n/a     .000
                    +     1.0 02:E              2.19     .028 No_date    1:59    7.30  n/a     .000
                    +     1.0 02:ROW-NHS2        .61     .072 No_date    1:32   23.23  n/a     .000
                    +     1.0 02:Pond2-Out     25.23     .030 No_date    4:08   18.62  n/a     .000
                 SUM=     1.0 01:Node-3        93.38     .317 No_date    1:34   10.24  n/a     .000
  ** END OF RUN :  104

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 RUN#:COMMAND#
R0105:C00001----------------------------------------------------------------------------------------
      START
       [TZERO =    .00 hrs on        0]
       [METOUT=   2    (1=imperial, 2=metric output)]
```

```
       [NSTORM=   1 ]
       [NRUN  = 0105 ]
#**************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date        : 2021-11
#  Modeller    : M M
#  Company     : JFSA
#  License #   :  2582634
#**************************************************************************
#**************************************************************************
R0105:C00002--------------------------------------------------------------------------------------
      READ STORM
       Filename = storm.001
       Comment  = Chicago design storm, a = 538.384937760781, b = 0.18, c = 0.702, Du
       [SDT=10.00:SDUR=   4.17:PTOT=  45.92]
# Pond 1
R0105:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-1A        10.63    2.000 No_date    1:31   30.22 .658      .000
       [XIMP=.55:TIMP=.65]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0105:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-1B         1.85     .529 No_date    1:30   43.82 .954      .000
       [XIMP=.89:TIMP=.99]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0105:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .529 No_date    1:30   43.82  n/a      .000
      Major System   /     1.0 02:DEV-1B-MJ       .52     .394 No_date    1:30   43.82  n/a      .000
      Minor System   \     1.0 03:DEV-1B-MN      1.33     .135 No_date    1:21   43.82  n/a      .000
R0105:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:DEV-1A        10.63    2.000 No_date    1:31   30.22  n/a      .000
                     +     1.0 02:DEV-1B-MJ       .52     .394 No_date    1:30   43.82  n/a      .000
                  SUM=     1.0 01:P1-In         11.15    2.363 No_date    1:30   30.86  n/a      .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0105:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ROUTE RESERVOIR ->    1.0 02:P1-In         11.15    2.363 No_date    1:30   30.86  n/a      .000
                 out <=    1.0 01:P1-Out        11.15     .020 No_date    4:06   30.86  n/a      .000
            overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
      {MxStoUsed=.3252E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0105:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:EX-DITCH        .07     .019 No_date    1:30   40.65 .885      .000
       [XIMP=.83:TIMP=.93]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0105:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:A             30.56     .174 No_date    2:48    5.57 .121      .000
       [CN= 49.0: N= 3.00: Tp=  .93]
R0105:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:EX-DITCH        .07     .019 No_date    1:30   40.65  n/a      .000
                     +     1.0 02:A             30.56     .174 No_date    2:48    5.57  n/a      .000
                  SUM=     1.0 01:NATURAL1      30.63     .175 No_date    2:48    5.65  n/a      .000
R0105:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:P1-out        11.15     .020 No_date    4:06   30.86  n/a      .000
                     +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
                     +     1.0 02:NATURAL1      30.63     .175 No_date    2:48    5.65  n/a      .000
                  SUM=     1.0 01:Node-1        41.78     .194 No_date    2:48   12.37  n/a      .000
R0105:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ROUTE CHANNEL   ->    1.0 02:Node-1        41.78     .194 No_date    2:48   12.37  n/a      .000
      [RDT= 1.00] out<-    1.0 01:Node-1R       41.78     .185 No_date    3:07   12.37  n/a      .000
       [L/S/n=  240./ .100/.035]
      {Vmax=  .211:Dmax=  .199}
# Pond 2
R0105:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-2A        23.21    3.437 No_date    1:32   25.83 .562      .000
       [XIMP=.43:TIMP=.53]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0105:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:ROAD           2.02     .339 No_date    1:33   35.16 .766      .000
       [XIMP=.69:TIMP=.79]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0105:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     COMPUTE DUALHYD       1.0 01:ROAD           2.02     .339 No_date    1:33   35.16  n/a      .000
      Major System   /     1.0 02:ROAD-MJ         .14     .106 No_date    1:33   35.16  n/a      .000
      Minor System   \     1.0 03:ROAD-MN        1.88     .233 No_date    1:28   35.16  n/a      .000
R0105:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:ROAD-MN        1.88     .233 No_date    1:28   35.16  n/a      .000
                     +     1.0 02:DEV-2A        23.21    3.437 No_date    1:32   25.83  n/a      .000
                  SUM=     1.0 01:P2-In         25.09    3.670 No_date    1:32   26.52  n/a      .000
# Estimated Pond Volumes for SWM Facility
R0105:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ROUTE RESERVOIR ->    1.0 02:P2-In         25.09    3.670 No_date    1:32   26.52  n/a      .000
                 out <=    1.0 01:P2-out        25.09     .125 No_date    3:38   26.52  n/a      .000
            overflow <=    1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
      {MxStoUsed=.5773E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0105:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:P2-out        25.09     .125 No_date    3:38   26.52  n/a      .000
                     +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
                  SUM=     1.0 01:Pond2-Out     25.09     .125 No_date    3:38   26.52  n/a      .000
# Uncontrolled Natural Lands
R0105:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .103 No_date    1:32   32.33 .704      .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0105:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:B              4.26     .020 No_date    3:31    5.76 .126      .000
       [CN= 50.0: N= 3.00: Tp= 1.39]
R0105:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:C             16.89     .106 No_date    2:14    4.50 .098      .000
       [CN= 43.0: N= 3.00: Tp=  .56]
R0105:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:D               .52     .006 No_date    1:56    6.17 .134      .000
       [CN= 52.0: N= 3.00: Tp=  .36]
R0105:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:B              4.26     .020 No_date    3:31    5.76  n/a      .000
                     +     1.0 02:C             16.89     .106 No_date    2:14    4.50  n/a      .000
                     +     1.0 02:D               .52     .006 No_date    1:56    6.17  n/a      .000
                  SUM=     1.0 01:NATURAL2      21.66     .121 No_date    2:16    4.79  n/a      .000
R0105:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:Node-1R       41.78     .185 No_date    3:07   12.37  n/a      .000
                     +     1.0 02:NATURAL2      21.66     .121 No_date    2:16    4.79  n/a      .000
                     +     1.0 02:ROW-NHS1        .58     .103 No_date    1:32   32.33  n/a      .000
                     +     1.0 02:ROAD-MJ         .14     .106 No_date    1:33   35.16  n/a      .000
                     +     1.0 02:DEV-1B-MN      1.33     .135 No_date    1:21   43.82  n/a      .000
                  SUM=     1.0 01:Node-2        65.50     .374 No_date    1:33   10.73  n/a      .000
R0105:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .108 No_date    1:32   32.33 .704      .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0105:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:E              2.19     .050 No_date    1:58   12.59 .274      .000
       [CN= 73.0: N= 3.00: Tp=  .40]
R0105:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:Node-2        65.50     .374 No_date    1:33   10.73  n/a      .000
                     +     1.0 02:E              2.19     .050 No_date    1:58   12.59  n/a      .000
                     +     1.0 02:ROW-NHS2        .61     .108 No_date    1:32   32.33  n/a      .000
                     +     1.0 02:Pond2-Out     25.09     .125 No_date    3:38   26.52  n/a      .000
                  SUM=     1.0 01:Node-3        93.38     .516 No_date    1:33   15.16  n/a      .000
  ** END OF RUN :  109

*********************************************************************************************

 RUN#:COMMAND#
R0110:C00001--------------------------------------------------------------------------------------
      START
       [TZERO =    .00 hrs on        0]
       [METOUT=   2    (1=imperial, 2=metric output)]
       [NSTORM=   1 ]
       [NRUN  = 0110 ]
#**************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date        : 2021-11
#  Modeller    : M M
#  Company     : JFSA
#  License #   :  2582634
#**************************************************************************
#**************************************************************************
R0110:C00002--------------------------------------------------------------------------------------
      READ STORM
       Filename = storm.001
       Comment  = Chicago design storm, a = 624.216217439326, b = 0.18, c = 0.702, Du
       [SDT=10.00:SDUR=   4.17:PTOT=  53.24]
# Pond 1
R0110:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-1A        10.63    2.402 No_date    1:30   36.15 .679      .000
       [XIMP=.55:TIMP=.65]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0110:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-1B         1.85     .616 No_date    1:30   51.14 .960      .000
       [XIMP=.89:TIMP=.99]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0110:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .616 No_date    1:30   51.14  n/a      .000
      Major System   /     1.0 02:DEV-1B-MJ       .57     .481 No_date    1:30   51.14  n/a      .000
      Minor System   \     1.0 03:DEV-1B-MN      1.28     .135 No_date    1:21   51.14  n/a      .000
R0110:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:DEV-1A        10.63    2.402 No_date    1:30   36.15  n/a      .000
                     +     1.0 02:DEV-1B-MJ       .57     .481 No_date    1:30   51.14  n/a      .000
                  SUM=     1.0 01:P1-In         11.20    2.883 No_date    1:30   36.92  n/a      .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0110:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ROUTE RESERVOIR ->    1.0 02:P1-In         11.20    2.883 No_date    1:30   36.92  n/a      .000
                 out <=    1.0 01:P1-Out        11.20     .021 No_date    4:05   36.92  n/a      .000
            overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
      {MxStoUsed=.3927E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0110:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:EX-DITCH        .07     .022 No_date    1:30   47.80 .898      .000
       [XIMP=.83:TIMP=.93]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0110:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:A             30.56     .237 No_date    2:47    7.54 .142      .000
       [CN= 49.0: N= 3.00: Tp=  .93]
R0110:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:EX-DITCH        .07     .022 No_date    1:30   47.80  n/a      .000
                     +     1.0 02:A             30.56     .237 No_date    2:47    7.54  n/a      .000
                  SUM=     1.0 01:NATURAL1      30.63     .238 No_date    2:47    7.63  n/a      .000
R0110:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:P1-out        11.20     .021 No_date    4:05   36.92  n/a      .000
                     +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
                     +     1.0 02:NATURAL1      30.63     .238 No_date    2:47    7.63  n/a      .000
                  SUM=     1.0 01:Node-1        41.83     .259 No_date    2:47   15.47  n/a      .000
R0110:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ROUTE CHANNEL   ->    1.0 02:Node-1        41.83     .259 No_date    2:47   15.47  n/a      .000
      [RDT= 1.00] out<-    1.0 01:Node-1R       41.83     .248 No_date    3:01   15.47  n/a      .000
       [L/S/n=  240./ .100/.035]
      {Vmax=  .235:Dmax=  .224}
# Pond 2
R0110:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-2A        23.21    4.352 No_date    1:32   31.53 .592      .000
       [XIMP=.43:TIMP=.53]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0110:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:ROAD           2.02     .414 No_date    1:33   41.85 .786      .000
       [XIMP=.69:TIMP=.79]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0110:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     COMPUTE DUALHYD       1.0 01:ROAD           2.02     .414 No_date    1:33   41.85  n/a      .000
      Major System   /     1.0 02:ROAD-MJ         .25     .181 No_date    1:33   41.85  n/a      .000
      Minor System   \     1.0 03:ROAD-MN        1.77     .233 No_date    1:27   41.85  n/a      .000
R0110:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:ROAD-MN        1.77     .233 No_date    1:27   41.85  n/a      .000
                     +     1.0 02:DEV-2A        23.21    4.352 No_date    1:32   31.53  n/a      .000
                  SUM=     1.0 01:P2-In         24.98    4.585 No_date    1:32   32.26  n/a      .000
# Estimated Pond Volumes for SWM Facility
R0110:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ROUTE RESERVOIR ->    1.0 02:P2-In         24.98    4.585 No_date    1:32   32.26  n/a      .000
                 out <=    1.0 01:P2-out        24.98     .252 No_date    2:33   32.26  n/a      .000
            overflow <=    1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
      {MxStoUsed=.6469E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0110:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:P2-out        24.98     .252 No_date    2:33   32.26  n/a      .000
                     +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
                  SUM=     1.0 01:Pond2-Out     24.98     .252 No_date    2:33   32.26  n/a      .000
# Uncontrolled Natural Lands
R0110:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .126 No_date    1:32   38.55 .724      .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0110:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:B              4.26     .027 No_date    3:30    7.80 .146      .000
       [CN= 50.0: N= 3.00: Tp= 1.39]
R0110:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:C             16.89     .146 No_date    2:13    6.12 .115      .000
       [CN= 43.0: N= 3.00: Tp=  .56]
R0110:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:D               .52     .008 No_date    1:55    8.33 .157      .000
       [CN= 52.0: N= 3.00: Tp=  .36]
R0110:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:B              4.26     .027 No_date    3:30    7.80  n/a      .000
                     +     1.0 02:C             16.89     .146 No_date    2:13    6.12  n/a      .000
                     +     1.0 02:D               .52     .008 No_date    1:55    8.33  n/a      .000
                  SUM=     1.0 01:NATURAL2      21.66     .166 No_date    2:16    6.51  n/a      .000
R0110:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:Node-1R       41.83     .248 No_date    3:01   15.47  n/a      .000
                     +     1.0 02:NATURAL2      21.66     .166 No_date    2:16    6.51  n/a      .000
                     +     1.0 02:ROW-NHS1        .58     .126 No_date    1:32   38.55  n/a      .000
                     +     1.0 02:ROAD-MJ         .25     .181 No_date    1:33   41.85  n/a      .000
                     +     1.0 02:DEV-1B-MN      1.28     .135 No_date    1:21   51.14  n/a      .000
                  SUM=     1.0 01:Node-2        65.60     .483 No_date    1:33   13.51  n/a      .000
R0110:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .133 No_date    1:32   38.55 .724      .000
       [XIMP=.61:TIMP=.71]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0110:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:E              2.19     .067 No_date    1:58   16.55 .311      .000
       [CN= 73.0: N= 3.00: Tp=  .40]
R0110:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:Node-2        65.60     .483 No_date    1:33   13.51  n/a      .000
                     +     1.0 02:E              2.19     .067 No_date    1:58   16.55  n/a      .000
                     +     1.0 02:ROW-NHS2        .61     .133 No_date    1:32   38.55  n/a      .000
                     +     1.0 02:Pond2-Out     24.98     .252 No_date    2:33   32.26  n/a      .000
                  SUM=     1.0 01:Node-3        93.38     .718 No_date    2:31   18.76  n/a      .000
  ** END OF RUN :  124

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 RUN#:COMMAND#
R0125:C00001--------------------------------------------------------------------------------------
      START
       [TZERO =    .00 hrs on        0]
       [METOUT=   2    (1=imperial, 2=metric output)]
       [NSTORM=   1 ]
       [NRUN  = 0125 ]
#**************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date        : 2021-11
#  Modeller    : M M
#  Company     : JFSA
#  License #   :  2582634
#**************************************************************************
#**************************************************************************
R0125:C00002--------------------------------------------------------------------------------------
      READ STORM
       Filename = storm.001
       Comment  = Chicago design storm, a = 732.346626526722, b = 0.18, c = 0.702, Du
       [SDT=10.00:SDUR=   4.17:PTOT=  62.47]
# Pond 1
R0125:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-1A        10.63    3.010 No_date    1:30   44.27 .709      .000
       [XIMP=.55:TIMP=.65]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0125:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:DEV-1B         1.85     .725 No_date    1:30   60.35 .966      .000
       [XIMP=.89:TIMP=.99]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0125:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .725 No_date    1:30   60.35  n/a      .000
      Major System   /     1.0 02:DEV-1B-MJ       .62     .590 No_date    1:30   60.35  n/a      .000
      Minor System   \     1.0 03:DEV-1B-MN      1.23     .135 No_date    1:21   60.35  n/a      .000
R0125:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:DEV-1A        10.63    3.010 No_date    1:30   44.27  n/a      .000
                     +     1.0 02:DEV-1B-MJ       .62     .590 No_date    1:30   60.35  n/a      .000
                  SUM=     1.0 01:P1-In         11.25    3.600 No_date    1:30   45.15  n/a      .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0125:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ROUTE RESERVOIR ->    1.0 02:P1-In         11.25    3.600 No_date    1:30   45.15  n/a      .000
                 out <=    1.0 01:P1-Out        11.25     .023 No_date    4:05   45.15  n/a      .000
            overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
      {MxStoUsed=.4849E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0125:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB STANDHYD        1.0 01:EX-DITCH        .07     .027 No_date    1:30   56.84 .910      .000
       [XIMP=.83:TIMP=.93]
       [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
       [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
       [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0125:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     CALIB NASHYD          1.0 01:A             30.56     .329 No_date    2:46   10.37 .166      .000
       [CN= 49.0: N= 3.00: Tp=  .93]
R0125:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
     ADD HYD               1.0 02:EX-DITCH        .07     .027 No_date    1:30   56.84  n/a      .000
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                    +     1.0 02:A             30.56     .329 No_date    2:46   10.37  n/a      .000
                  SUM=    1.0 01:NATURAL1      30.63     .330 No_date    2:46   10.47  n/a      .000
R0125:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.25     .023 No_date    4:05   45.15  n/a      .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
                    +     1.0 02:NATURAL1      30.63     .330 No_date    2:46   10.47  n/a      .000
                  SUM=    1.0 01:Node-1        41.88     .353 No_date    2:46   19.78  n/a      .000
R0125:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.88     .353 No_date    2:46   19.78  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.88     .340 No_date    3:00   19.78  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .259:Dmax=  .253}
# Pond 2
R0125:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    5.563 No_date    1:31   39.06 .625      .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0125:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .513 No_date    1:33   50.29 .805      .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0125:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .513 No_date    1:33   50.29  n/a      .000
     Major System   /     1.0 02:ROAD-MJ         .36     .280 No_date    1:33   50.29  n/a      .000
     Minor System   \     1.0 03:ROAD-MN        1.65     .233 No_date    1:26   50.29  n/a      .000
R0125:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        1.65     .233 No_date    1:26   50.29  n/a      .000
                    +     1.0 02:DEV-2A        23.21    5.563 No_date    1:31   39.06  n/a      .000
                  SUM=    1.0 01:P2-In         24.87    5.796 No_date    1:31   39.81  n/a      .000
# Estimated Pond Volumes for SWM Facility
R0125:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         24.87    5.796 No_date    1:31   39.81  n/a      .000
                 out <=   1.0 01:P2-out        24.87     .517 No_date    2:11   39.81  n/a      .000
            overflow <=   1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
     {MxStoUsed=.7480E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0125:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        24.87     .517 No_date    2:11   39.81  n/a      .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
                  SUM=    1.0 01:Pond2-Out     24.87     .517 No_date    2:11   39.81  n/a      .000
# Uncontrolled Natural Lands
R0125:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .158 No_date    1:31   46.83 .750      .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0125:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .037 No_date    3:28   10.71 .172      .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0125:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .204 No_date    2:13    8.47 .136      .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0125:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .011 No_date    1:55   11.43 .183      .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0125:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .037 No_date    3:28   10.71  n/a      .000
                    +     1.0 02:C             16.89     .204 No_date    2:13    8.47  n/a      .000
                    +     1.0 02:D               .52     .011 No_date    1:55   11.43  n/a      .000
                  SUM=    1.0 01:NATURAL2      21.66     .232 No_date    2:15    8.98  n/a      .000
R0125:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.88     .340 No_date    3:00   19.78  n/a      .000
                    +     1.0 02:NATURAL2      21.66     .232 No_date    2:15    8.98  n/a      .000
                    +     1.0 02:ROW-NHS1        .58     .158 No_date    1:31   46.83  n/a      .000
                    +     1.0 02:ROAD-MJ         .36     .280 No_date    1:33   50.29  n/a      .000
                    +     1.0 02:DEV-1B-MN      1.23     .135 No_date    1:21   60.35  n/a      .000
                  SUM=    1.0 01:Node-2        65.72     .624 No_date    1:33   17.39  n/a      .000
R0125:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .166 No_date    1:31   46.83 .750      .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0125:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .091 No_date    1:57   22.01 .352      .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0125:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.72     .624 No_date    1:33   17.39  n/a      .000
                    +     1.0 02:E              2.19     .091 No_date    1:57   22.01  n/a      .000
                    +     1.0 02:ROW-NHS2        .61     .166 No_date    1:31   46.83  n/a      .000
                    +     1.0 02:Pond2-Out     24.87     .517 No_date    2:11   39.81  n/a      .000
                  SUM=    1.0 01:Node-3        93.38    1.137 No_date    2:21   23.66  n/a      .000
  ** END OF RUN :  149

****************************************************************************************************

 RUN#:COMMAND#
R0150:C00001----------------------------------------------------------------------------------------
      START
       [TZERO =    .00 hrs on        0]
       [METOUT=   2    (1=imperial, 2=metric output)]
       [NSTORM=   1 ]
       [NRUN  = 0150 ]
#*******************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#*******************************************************************************
#*******************************************************************************
R0150:C00002----------------------------------------------------------------------------------------
      READ STORM
       Filename = storm.001
       Comment  = Chicago design storm, a = 819.333705013031, b = 0.18, c = 0.704, Du
       [SDT=10.00:SDUR=   4.17:PTOT=  69.12]
# Pond 1
R0150:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63    3.433 No_date    1:30   50.14 .725      .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0150:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .809 No_date    1:30   67.01 .969      .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0150:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .809 No_date    1:30   67.01  n/a      .000
     Major System   /     1.0 02:DEV-1B-MJ       .65     .674 No_date    1:30   67.01  n/a      .000
     Minor System   \     1.0 03:DEV-1B-MN      1.20     .135 No_date    1:19   67.01  n/a      .000
R0150:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63    3.433 No_date    1:30   50.14  n/a      .000
                    +     1.0 02:DEV-1B-MJ       .65     .674 No_date    1:30   67.01  n/a      .000
                  SUM=    1.0 01:P1-In         11.28    4.108 No_date    1:30   51.11  n/a      .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0150:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         11.28    4.108 No_date    1:30   51.11  n/a      .000
                 out <=   1.0 01:P1-Out        11.28     .025 No_date    4:05   51.11  n/a      .000
            overflow <=   1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
     {MxStoUsed=.5522E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0150:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .030 No_date    1:30   63.41 .917      .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0150:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56     .403 No_date    2:45   12.63 .183      .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0150:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .030 No_date    1:30   63.41  n/a      .000
                    +     1.0 02:A             30.56     .403 No_date    2:45   12.63  n/a      .000
                  SUM=    1.0 01:NATURAL1      30.63     .405 No_date    2:45   12.75  n/a      .000
R0150:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.28     .025 No_date    4:05   51.11  n/a      .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
                    +     1.0 02:NATURAL1      30.63     .405 No_date    2:45   12.75  n/a      .000
                  SUM=    1.0 01:Node-1        41.91     .429 No_date    2:45   23.07  n/a      .000
R0150:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.91     .429 No_date    2:45   23.07  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.91     .415 No_date    2:57   23.07  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .279:Dmax=  .275}
# Pond 2
R0150:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    6.417 No_date    1:31   44.75 .647      .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0150:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .595 No_date    1:32   56.59 .819      .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0150:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .595 No_date    1:32   56.59  n/a      .000
     Major System   /     1.0 02:ROAD-MJ         .44     .362 No_date    1:32   56.59  n/a      .000
     Minor System   \     1.0 03:ROAD-MN        1.58     .233 No_date    1:25   56.59  n/a      .000
R0150:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        1.58     .233 No_date    1:25   56.59  n/a      .000
                    +     1.0 02:DEV-2A        23.21    6.417 No_date    1:31   44.75  n/a      .000
                  SUM=    1.0 01:P2-In         24.79    6.650 No_date    1:31   45.51  n/a      .000
# Estimated Pond Volumes for SWM Facility
R0150:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         24.79    6.650 No_date    1:31   45.51  n/a      .000
                 out <=   1.0 01:P2-out        24.79     .646 No_date    2:10   45.50  n/a      .000
            overflow <=   1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
     {MxStoUsed=.8338E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0150:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        24.79     .646 No_date    2:10   45.50  n/a      .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
                  SUM=    1.0 01:Pond2-Out     24.79     .646 No_date    2:10   45.50  n/a      .000
# Uncontrolled Natural Lands
R0150:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .180 No_date    1:31   52.83 .764      .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0150:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .045 No_date    3:27   13.04 .189      .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0150:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .251 No_date    2:12   10.36 .150      .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0150:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .014 No_date    1:54   13.90 .201      .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0150:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .045 No_date    3:27   13.04  n/a      .000
                    +     1.0 02:C             16.89     .251 No_date    2:12   10.36  n/a      .000
                    +     1.0 02:D               .52     .014 No_date    1:54   13.90  n/a      .000
                  SUM=    1.0 01:NATURAL2      21.66     .287 No_date    2:14   10.97  n/a      .000
R0150:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.91     .415 No_date    2:57   23.07  n/a      .000
                    +     1.0 02:NATURAL2      21.66     .287 No_date    2:14   10.97  n/a      .000
                    +     1.0 02:ROW-NHS1        .58     .180 No_date    1:31   52.83  n/a      .000
                    +     1.0 02:ROAD-MJ         .44     .362 No_date    1:32   56.59  n/a      .000
                    +     1.0 02:DEV-1B-MN      1.20     .135 No_date    1:19   67.01  n/a      .000
                  SUM=    1.0 01:Node-2        65.80     .741 No_date    1:32   20.38  n/a      .000
R0150:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .189 No_date    1:31   52.83 .764      .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0150:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .110 No_date    1:57   26.23 .379      .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0150:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.80     .741 No_date    1:32   20.38  n/a      .000
                    +     1.0 02:E              2.19     .110 No_date    1:57   26.23  n/a      .000
                    +     1.0 02:ROW-NHS2        .61     .189 No_date    1:31   52.83  n/a      .000
                    +     1.0 02:Pond2-Out     24.79     .646 No_date    2:10   45.50  n/a      .000
                  SUM=    1.0 01:Node-3        93.38    1.402 No_date    2:21   27.39  n/a      .000
  ** END OF RUN :  198

****************************************************************************************************

 RUN#:COMMAND#
R0199:C00001----------------------------------------------------------------------------------------
      START
       [TZERO =    .00 hrs on        0]
       [METOUT=   2    (1=imperial, 2=metric output)]
       [NSTORM=   1 ]
       [NRUN  = 0199 ]
#*******************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#*******************************************************************************
#*******************************************************************************
R0199:C00002----------------------------------------------------------------------------------------
      READ STORM
       Filename = storm.001
       Comment  = Chicago design storm, a = 896.407191239013, b = 0.24, c = 0.703, Du
       [SDT=10.00:SDUR=   4.17:PTOT=  76.03]
# Pond 1
R0199:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63    3.917 No_date    1:30   56.34 .741      .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0199:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .885 No_date    1:30   73.91 .972      .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0199:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .885 No_date    1:30   73.91  n/a      .000
     Major System   /     1.0 02:DEV-1B-MJ       .68     .750 No_date    1:30   73.91  n/a      .000
     Minor System   \     1.0 03:DEV-1B-MN      1.17     .135 No_date    1:14   73.91  n/a      .000
R0199:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63    3.917 No_date    1:30   56.34  n/a      .000
                    +     1.0 02:DEV-1B-MJ       .68     .750 No_date    1:30   73.91  n/a      .000
                  SUM=    1.0 01:P1-In         11.30    4.668 No_date    1:30   57.39  n/a      .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0199:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         11.30    4.668 No_date    1:30   57.39  n/a      .000
                 out <=   1.0 01:P1-Out        11.30     .059 No_date    4:03   57.39  n/a      .000
            overflow <=   1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
     {MxStoUsed=.6105E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0199:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .033 No_date    1:30   70.26 .924      .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0199:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56     .485 No_date    2:44   15.17 .199      .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0199:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .033 No_date    1:30   70.26  n/a      .000
                    +     1.0 02:A             30.56     .485 No_date    2:44   15.17  n/a      .000
                  SUM=    1.0 01:NATURAL1      30.63     .487 No_date    2:44   15.29  n/a      .000
R0199:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.30     .059 No_date    4:03   57.39  n/a      .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a      .000
                    +     1.0 02:NATURAL1      30.63     .487 No_date    2:44   15.29  n/a      .000
                  SUM=    1.0 01:Node-1        41.94     .524 No_date    2:48   26.64  n/a      .000
R0199:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.94     .524 No_date    2:48   26.64  n/a      .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.94     .510 No_date    3:00   26.64  n/a      .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .297:Dmax=  .298}
# Pond 2
R0199:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    7.407 No_date    1:31   50.53 .665      .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0199:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .663 No_date    1:32   63.05 .829      .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0199:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .663 No_date    1:32   63.05  n/a      .000
     Major System   /     1.0 02:ROAD-MJ         .50     .430 No_date    1:32   63.05  n/a      .000
     Minor System   \     1.0 03:ROAD-MN        1.52     .233 No_date    1:24   63.05  n/a      .000
R0199:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        1.52     .233 No_date    1:24   63.05  n/a      .000
                    +     1.0 02:DEV-2A        23.21    7.407 No_date    1:31   50.53  n/a      .000
                  SUM=    1.0 01:P2-In         24.73    7.640 No_date    1:31   51.30  n/a      .000
# Estimated Pond Volumes for SWM Facility
R0199:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         24.73    7.640 No_date    1:31   51.30  n/a      .000
                 out <=   1.0 01:P2-out        24.73     .753 No_date    2:09   51.30  n/a      .000
            overflow <=   1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
     {MxStoUsed=.9222E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0199:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        24.73     .753 No_date    2:09   51.30  n/a      .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a      .000
                  SUM=    1.0 01:Pond2-Out     24.73     .753 No_date    2:09   51.30  n/a      .000
# Uncontrolled Natural Lands
R0199:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .204 No_date    1:31   59.23 .779      .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0199:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .054 No_date    3:26   15.65 .206      .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0199:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
```

```
    CALIB NASHYD          1.0 01:C            16.89     .304 No_date    2:12   12.48 .164     .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0199:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              .52     .017 No_date    1:54   16.65 .219     .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0199:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B             4.26     .054 No_date    3:26   15.65  n/a     .000
                   +      1.0 02:C            16.89     .304 No_date    2:12   12.48  n/a     .000
                   +      1.0 02:D              .52     .017 No_date    1:54   16.65  n/a     .000
                SUM=      1.0 01:NATURAL2     21.66     .346 No_date    2:14   13.20  n/a     .000
R0199:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R      41.94     .510 No_date    3:00   26.64  n/a     .000
                   +      1.0 02:NATURAL2     21.66     .346 No_date    2:14   13.20  n/a     .000
                   +      1.0 02:ROW-NHS1       .58     .204 No_date    1:31   59.23  n/a     .000
                   +      1.0 02:ROAD-MJ        .50     .430 No_date    1:32   63.05  n/a     .000
                   +      1.0 02:DEV-1B-MN     1.17     .135 No_date    1:14   73.91  n/a     .000
                SUM=      1.0 01:Node-2       65.85     .848 No_date    1:32   23.62  n/a     .000
R0199:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2       .61     .215 No_date    1:31   59.23 .779     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0199:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E             2.19     .130 No_date    1:56   30.80 .405     .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0199:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2       65.85     .848 No_date    1:32   23.62  n/a     .000
                   +      1.0 02:E             2.19     .130 No_date    1:56   30.80  n/a     .000
                   +      1.0 02:ROW-NHS2       .61     .215 No_date    1:31   59.23  n/a     .000
                   +      1.0 02:Pond2-Out    24.73     .753 No_date    2:09   51.30  n/a     .000
                SUM=      1.0 01:Node-3       93.38    1.663 No_date    2:21   31.35  n/a     .000
  ** END OF RUN :  301

*****************************************************************************************************

 RUN#:COMMAND#
R0302:C00001-----------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0302 ]
#*****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#*****************************************************************************
#*****************************************************************************
R0302:C00002-----------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_59.6mm design storm, total rainfall = 59.6 mm, rain int
      [SDT= 6.00:SDUR=  24.00:PTOT=  59.60]
# Pond 1
R0302:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A       10.63    1.528 No_date   11:57   39.04 .655     .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0302:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B        1.85     .389 No_date   11:54   55.59 .933     .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0302:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B        1.85     .389 No_date   11:54   55.59  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ      .32     .254 No_date   11:54   55.59  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN     1.53     .135 No_date   11:43   55.59  n/a     .000
R0302:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A       10.63    1.528 No_date   11:57   39.04  n/a     .000
                   +      1.0 02:DEV-1B-MJ      .32     .254 No_date   11:54   55.59  n/a     .000
                SUM=      1.0 01:P1-In        10.95    1.727 No_date   11:56   39.53  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0302:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In        10.95    1.727 No_date   11:56   39.53  n/a     .000
                 out <=   1.0 01:P1-Out       10.95     .020 No_date   16:57   39.52  n/a     .000
            overflow <=   1.0 03:P1ovf          .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.3481E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0302:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH       .07     .015 No_date   11:54   51.84 .870     .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0302:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A            30.56     .230 No_date   12:57    9.45 .159     .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0302:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH       .07     .015 No_date   11:54   51.84  n/a     .000
                   +      1.0 02:A            30.56     .230 No_date   12:57    9.45  n/a     .000
                SUM=      1.0 01:NATURAL1     30.63     .230 No_date   12:57    9.55  n/a     .000
R0302:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out       10.95     .020 No_date   16:57   39.52  n/a     .000
                   +      1.0 02:P1ovf          .00     .000 No_date    0:00     .00  n/a     .000
                   +      1.0 02:NATURAL1     30.63     .230 No_date   12:57    9.55  n/a     .000
                SUM=      1.0 01:Node-1       41.58     .250 No_date   12:57   17.44  n/a     .000
R0302:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1       41.58     .250 No_date   12:57   17.44  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1R      41.58     .236 No_date   13:11   17.44  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .231:Dmax=  .221}
# Pond 2
R0302:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A       23.21    2.902 No_date   12:01   33.66 .565     .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0302:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD          2.02     .278 No_date   12:01   45.43 .762     .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0302:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD          2.02     .278 No_date   12:01   45.43  n/a     .000
     Major System   /     1.0 02:ROAD-MJ        .04     .045 No_date   12:01   45.43  n/a     .000
     Minor System   \     1.0 03:ROAD-MN       1.98     .233 No_date   11:57   45.43  n/a     .000
R0302:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN       1.98     .233 No_date   11:57   45.43  n/a     .000
                   +      1.0 02:DEV-2A       23.21    2.902 No_date   12:01   33.66  n/a     .000
                SUM=      1.0 01:P2-In        25.19    3.135 No_date   12:01   34.58  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0302:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In        25.19    3.135 No_date   12:01   34.58  n/a     .000
                 out <=   1.0 01:P2-out       25.19     .222 No_date   12:45   34.58  n/a     .000
            overflow <=   1.0 03:P2ovf          .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.6317E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0302:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out       25.19     .222 No_date   12:45   34.58  n/a     .000
                   +      1.0 02:P2ovf          .00     .000 No_date    0:00     .00  n/a     .000
                SUM=      1.0 01:Pond2-Out    25.19     .222 No_date   12:45   34.58  n/a     .000
# Uncontrolled Natural Lands
R0302:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1       .58     .082 No_date   12:00   41.79 .701     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0302:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B             4.26     .025 No_date   13:31    9.77 .164     .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0302:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C            16.89     .150 No_date   12:30    7.70 .129     .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0302:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              .52     .009 No_date   12:16   10.43 .175     .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0302:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B             4.26     .025 No_date   13:31    9.77  n/a     .000
                   +      1.0 02:C            16.89     .150 No_date   12:30    7.70  n/a     .000
                   +      1.0 02:D              .52     .009 No_date   12:16   10.43  n/a     .000
                SUM=      1.0 01:NATURAL2     21.66     .171 No_date   12:32    8.17  n/a     .000
R0302:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R      41.58     .236 No_date   13:11   17.44  n/a     .000
                   +      1.0 02:NATURAL2     21.66     .171 No_date   12:32    8.17  n/a     .000
                   +      1.0 02:ROW-NHS1       .58     .082 No_date   12:00   41.79  n/a     .000
                   +      1.0 02:ROAD-MJ        .04     .045 No_date   12:01   45.43  n/a     .000
                   +      1.0 02:DEV-1B-MN     1.53     .135 No_date   11:43   55.59  n/a     .000
                SUM=      1.0 01:Node-2       65.39     .393 No_date   12:52   15.49  n/a     .000
R0302:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2       .61     .087 No_date   12:00   41.79 .701     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0302:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E             2.19     .069 No_date   12:18   20.27 .340     .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0302:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2       65.39     .393 No_date   12:52   15.49  n/a     .000
                   +      1.0 02:E             2.19     .069 No_date   12:18   20.27  n/a     .000
                   +      1.0 02:ROW-NHS2       .61     .087 No_date   12:00   41.79  n/a     .000
                   +      1.0 02:Pond2-Out    25.19     .222 No_date   12:45   34.58  n/a     .000
                SUM=      1.0 01:Node-3       93.38     .662 No_date   12:43   20.93  n/a     .000
  ** END OF RUN :  304

*****************************************************************************************************

 RUN#:COMMAND#
R0305:C00001-----------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0305 ]
#*****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#*****************************************************************************
#*****************************************************************************
R0305:C00002-----------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_78.6mm design storm, total rainfall = 78.6 mm, rain int
      [SDT= 6.00:SDUR=  24.00:PTOT=  78.60]
# Pond 1
R0305:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A       10.63    2.198 No_date   11:57   53.64 .682     .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0305:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B        1.85     .523 No_date   11:54   74.27 .945     .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0305:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B        1.85     .523 No_date   11:54   74.27  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ      .41     .388 No_date   11:54   74.27  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN     1.44     .135 No_date   11:39   74.27  n/a     .000
R0305:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A       10.63    2.198 No_date   11:57   53.64  n/a     .000
                   +      1.0 02:DEV-1B-MJ      .41     .388 No_date   11:54   74.27  n/a     .000
                SUM=      1.0 01:P1-In        11.03    2.507 No_date   11:56   54.40  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0305:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In        11.03    2.507 No_date   11:56   54.40  n/a     .000
                 out <=   1.0 01:P1-Out       11.03     .023 No_date   17:56   54.39  n/a     .000
            overflow <=   1.0 03:P1ovf          .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.4947E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0305:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH       .07     .020 No_date   11:54   69.25 .881     .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0305:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A            30.56     .398 No_date   12:56   16.16 .206     .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0305:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH       .07     .020 No_date   11:54   69.25  n/a     .000
                   +      1.0 02:A            30.56     .398 No_date   12:56   16.16  n/a     .000
                SUM=      1.0 01:NATURAL1     30.63     .399 No_date   12:56   16.28  n/a     .000
R0305:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out       11.03     .023 No_date   17:56   54.39  n/a     .000
                   +      1.0 02:P1ovf          .00     .000 No_date    0:00     .00  n/a     .000
                   +      1.0 02:NATURAL1     30.63     .399 No_date   12:56   16.28  n/a     .000
                SUM=      1.0 01:Node-1       41.67     .422 No_date   12:56   26.37  n/a     .000
R0305:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1       41.67     .422 No_date   12:56   26.37  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1R      41.67     .403 No_date   13:07   26.37  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .278:Dmax=  .273}
# Pond 2
R0305:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A       23.21    4.351 No_date   12:00   46.97 .598     .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0305:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD          2.02     .395 No_date   12:00   61.37 .781     .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0305:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD          2.02     .395 No_date   12:00   61.37  n/a     .000
     Major System   /     1.0 02:ROAD-MJ        .18     .162 No_date   12:00   61.37  n/a     .000
     Minor System   \     1.0 03:ROAD-MN       1.84     .233 No_date   11:52   61.37  n/a     .000
R0305:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN       1.84     .233 No_date   11:52   61.37  n/a     .000
                   +      1.0 02:DEV-2A       23.21    4.351 No_date   12:00   46.97  n/a     .000
                SUM=      1.0 01:P2-In        25.05    4.584 No_date   12:00   48.03  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0305:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In        25.05    4.584 No_date   12:00   48.03  n/a     .000
                 out <=   1.0 01:P2-out       25.05     .626 No_date   12:28   48.03  n/a     .000
            overflow <=   1.0 03:P2ovf          .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.8190E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0305:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out       25.05     .626 No_date   12:28   48.03  n/a     .000
                   +      1.0 02:P2ovf          .00     .000 No_date    0:00     .00  n/a     .000
                SUM=      1.0 01:Pond2-Out    25.05     .626 No_date   12:28   48.03  n/a     .000
# Uncontrolled Natural Lands
R0305:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1       .58     .115 No_date   12:00   56.95 .725     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0305:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B             4.26     .042 No_date   13:29   16.67 .212     .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0305:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C            16.89     .262 No_date   12:30   13.31 .169     .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0305:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D              .52     .015 No_date   12:16   17.72 .225     .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0305:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B             4.26     .042 No_date   13:29   16.67  n/a     .000
                   +      1.0 02:C            16.89     .262 No_date   12:30   13.31  n/a     .000
                   +      1.0 02:D              .52     .015 No_date   12:16   17.72  n/a     .000
                SUM=      1.0 01:NATURAL2     21.66     .299 No_date   12:31   14.08  n/a     .000
R0305:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R      41.67     .403 No_date   13:07   26.37  n/a     .000
                   +      1.0 02:NATURAL2     21.66     .299 No_date   12:31   14.08  n/a     .000
                   +      1.0 02:ROW-NHS1       .58     .115 No_date   12:00   56.95  n/a     .000
                   +      1.0 02:ROAD-MJ        .18     .162 No_date   12:00   61.37  n/a     .000
                   +      1.0 02:DEV-1B-MN     1.44     .135 No_date   11:39   74.27  n/a     .000
                SUM=      1.0 01:Node-2       65.53     .676 No_date   12:49   23.73  n/a     .000
R0305:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2       .61     .121 No_date   12:00   56.95 .725     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0305:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E             2.19     .113 No_date   12:18   32.56 .414     .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0305:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2       65.53     .676 No_date   12:49   23.73  n/a     .000
                   +      1.0 02:E             2.19     .113 No_date   12:18   32.56  n/a     .000
                   +      1.0 02:ROW-NHS2       .61     .121 No_date   12:00   56.95  n/a     .000
                   +      1.0 02:Pond2-Out    25.05     .626 No_date   12:28   48.03  n/a     .000
                SUM=      1.0 01:Node-3       93.38    1.364 No_date   12:36   30.67  n/a     .000
  ** END OF RUN :  309

*****************************************************************************************************

 RUN#:COMMAND#
R0310:C00001-----------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0310 ]
#*****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#*****************************************************************************
```

```
#****************************************************************************
R0310:C00002------------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_91.1mm design storm, total rainfall = 91.1 mm, rain int
      [SDT= 6.00:SDUR=  24.00:PTOT=  91.10]
# Pond 1
R0310:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63    2.580 No_date   11:56   63.11 .693     .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0310:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .610 No_date   11:54   86.63 .951     .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0310:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .610 No_date   11:54   86.63  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ       .45     .475 No_date   11:54   86.63  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN      1.40     .135 No_date   11:38   86.63  n/a     .000
R0310:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63    2.580 No_date   11:56   63.11  n/a     .000
                    +     1.0 02:DEV-1B-MJ       .45     .475 No_date   11:54   86.63  n/a     .000
                 SUM=     1.0 01:P1-In         11.07    3.010 No_date   11:55   64.06  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0310:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         11.07    3.010 No_date   11:55   64.06  n/a     .000
                out <=    1.0 01:P1-Out        11.07     .036 No_date   15:51   64.05  n/a     .000
           overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.5786E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0310:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .023 No_date   11:54   80.79 .887     .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0310:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56     .528 No_date   12:56   21.29 .234     .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0310:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .023 No_date   11:54   80.79  n/a     .000
                    +     1.0 02:A             30.56     .528 No_date   12:56   21.29  n/a     .000
                 SUM=     1.0 01:NATURAL1      30.63     .529 No_date   12:56   21.43  n/a     .000
R0310:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.07     .036 No_date   15:51   64.05  n/a     .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:NATURAL1      30.63     .529 No_date   12:56   21.43  n/a     .000
                 SUM=     1.0 01:Node-1        41.71     .555 No_date   12:56   32.75  n/a     .000
R0310:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.71     .555 No_date   12:56   32.75  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.71     .534 No_date   13:07   32.75  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .303:Dmax=  .306}
# Pond 2
R0310:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    5.169 No_date   12:00   55.69 .611     .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0310:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .468 No_date   12:00   71.80 .788     .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0310:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .468 No_date   12:00   71.80  n/a     .000
     Major System   /     1.0 02:ROAD-MJ         .26     .235 No_date   12:00   71.80  n/a     .000
     Minor System   \     1.0 03:ROAD-MN        1.76     .233 No_date   11:50   71.80  n/a     .000
R0310:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        1.76     .233 No_date   11:50   71.80  n/a     .000
                    +     1.0 02:DEV-2A        23.21    5.169 No_date   12:00   55.69  n/a     .000
                 SUM=     1.0 01:P2-In         24.97    5.402 No_date   12:00   56.83  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0310:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         24.97    5.402 No_date   12:00   56.83  n/a     .000
                out <=    1.0 01:P2-out        24.97     .787 No_date   12:27   56.82  n/a     .000
           overflow <=    1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.9534E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0310:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        24.97     .787 No_date   12:27   56.82  n/a     .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
                 SUM=     1.0 01:Pond2-Out     24.97     .787 No_date   12:27   56.82  n/a     .000
# Uncontrolled Natural Lands
R0310:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .139 No_date   11:58   66.82 .733     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0310:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .056 No_date   13:29   21.94 .241     .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0310:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .349 No_date   12:30   17.65 .194     .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0310:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .020 No_date   12:16   23.28 .256     .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0310:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .056 No_date   13:29   21.94  n/a     .000
                    +     1.0 02:C             16.89     .349 No_date   12:30   17.65  n/a     .000
                    +     1.0 02:D               .52     .020 No_date   12:16   23.28  n/a     .000
                 SUM=     1.0 01:NATURAL2      21.66     .398 No_date   12:31   18.63  n/a     .000
R0310:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.71     .534 No_date   13:07   32.75  n/a     .000
                    +     1.0 02:NATURAL2      21.66     .398 No_date   12:31   18.63  n/a     .000
                    +     1.0 02:ROW-NHS1        .58     .139 No_date   11:58   66.82  n/a     .000
                    +     1.0 02:ROAD-MJ         .26     .235 No_date   12:00   71.80  n/a     .000
                    +     1.0 02:DEV-1B-MN      1.40     .135 No_date   11:38   86.63  n/a     .000
                 SUM=     1.0 01:Node-2        65.61     .893 No_date   12:49   29.69  n/a     .000
R0310:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .146 No_date   11:58   66.82 .733     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0310:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .144 No_date   12:18   41.41 .455     .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0310:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.61     .893 No_date   12:49   29.69  n/a     .000
                    +     1.0 02:E              2.19     .144 No_date   12:18   41.41  n/a     .000
                    +     1.0 02:ROW-NHS2        .61     .146 No_date   11:58   66.82  n/a     .000
                    +     1.0 02:Pond2-Out     24.97     .787 No_date   12:27   56.82  n/a     .000
                 SUM=     1.0 01:Node-3        93.38    1.760 No_date   12:36   37.46  n/a     .000
  ** END OF RUN :  324
*******************************************************************************************************
 RUN#:COMMAND#
R0325:C00001------------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0325 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0325:C00002------------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_107mm design storm, total rainfall = 107 mm, rain inter
      [SDT= 6.00:SDUR=  24.00:PTOT= 107.00]
# Pond 1
R0325:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63    3.165 No_date   11:56   75.22 .703     .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0325:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .721 No_date   11:54  102.43 .957     .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0325:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .721 No_date   11:54  102.43  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ       .48     .586 No_date   11:54  102.43  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN      1.37     .135 No_date   11:37  102.43  n/a     .000
R0325:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63    3.165 No_date   11:56   75.22  n/a     .000
                    +     1.0 02:DEV-1B-MJ       .48     .586 No_date   11:54  102.43  n/a     .000
                 SUM=     1.0 01:P1-In         11.11    3.695 No_date   11:55   76.41  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0325:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         11.11    3.695 No_date   11:55   76.41  n/a     .000
                out <=    1.0 01:P1-Out        11.11     .098 No_date   13:15   76.40  n/a     .000
           overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.6534E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0325:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .027 No_date   11:54   95.55 .893     .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0325:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56     .713 No_date   12:55   28.56 .267     .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0325:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .027 No_date   11:54   95.55  n/a     .000
                    +     1.0 02:A             30.56     .713 No_date   12:55   28.56  n/a     .000
                 SUM=     1.0 01:NATURAL1      30.63     .715 No_date   12:55   28.71  n/a     .000
R0325:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.11     .098 No_date   13:15   76.40  n/a     .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:NATURAL1      30.63     .715 No_date   12:55   28.71  n/a     .000
                 SUM=     1.0 01:Node-1        41.75     .811 No_date   12:56   41.40  n/a     .000
R0325:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.75     .811 No_date   12:56   41.40  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.75     .785 No_date   13:05   41.40  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .348:Dmax=  .360}
# Pond 2
R0325:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    6.326 No_date   12:00   66.71 .624     .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0325:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .566 No_date   12:00   85.18 .796     .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0325:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .566 No_date   12:00   85.18  n/a     .000
     Major System   /     1.0 02:ROAD-MJ         .34     .333 No_date   12:00   85.18  n/a     .000
     Minor System   \     1.0 03:ROAD-MN        1.68     .233 No_date   11:47   85.18  n/a     .000
R0325:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        1.68     .233 No_date   11:47   85.18  n/a     .000
                    +     1.0 02:DEV-2A        23.21    6.326 No_date   12:00   66.71  n/a     .000
                 SUM=     1.0 01:P2-In         24.89    6.559 No_date   12:00   67.96  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0325:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         24.89    6.559 No_date   12:00   67.96  n/a     .000
                out <=    1.0 01:P2-out        24.89     .951 No_date   12:26   67.96  n/a     .000
           overflow <=    1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.1128E+01  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0325:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        24.89     .951 No_date   12:26   67.96  n/a     .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
                 SUM=     1.0 01:Pond2-Out     24.89     .951 No_date   12:26   67.96  n/a     .000
# Uncontrolled Natural Lands
R0325:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .168 No_date   11:57   79.48 .743     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0325:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .076 No_date   13:28   29.39 .275     .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0325:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .475 No_date   12:30   23.85 .223     .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0325:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .026 No_date   12:16   31.09 .291     .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0325:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .076 No_date   13:28   29.39  n/a     .000
                    +     1.0 02:C             16.89     .475 No_date   12:30   23.85  n/a     .000
                    +     1.0 02:D               .52     .026 No_date   12:16   31.09  n/a     .000
                 SUM=     1.0 01:NATURAL2      21.66     .542 No_date   12:31   25.11  n/a     .000
R0325:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.75     .785 No_date   13:05   41.40  n/a     .000
                    +     1.0 02:NATURAL2      21.66     .542 No_date   12:31   25.11  n/a     .000
                    +     1.0 02:ROW-NHS1        .58     .168 No_date   11:57   79.48  n/a     .000
                    +     1.0 02:ROAD-MJ         .34     .333 No_date   12:00   85.18  n/a     .000
                    +     1.0 02:DEV-1B-MN      1.37     .135 No_date   11:37  102.43  n/a     .000
                 SUM=     1.0 01:Node-2        65.69    1.272 No_date   12:49   37.86  n/a     .000
R0325:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .176 No_date   11:57   79.48 .743     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0325:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .187 No_date   12:18   53.35 .499     .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0325:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.69    1.272 No_date   12:49   37.86  n/a     .000
                    +     1.0 02:E              2.19     .187 No_date   12:18   53.35  n/a     .000
                    +     1.0 02:ROW-NHS2        .61     .176 No_date   11:57   79.48  n/a     .000
                    +     1.0 02:Pond2-Out     24.89     .951 No_date   12:26   67.96  n/a     .000
                 SUM=     1.0 01:Node-3        93.38    2.319 No_date   12:38   46.52  n/a     .000
  ** END OF RUN :  349
*******************************************************************************************************
 RUN#:COMMAND#
R0350:C00001------------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0350 ]
#****************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#****************************************************************************
#****************************************************************************
R0350:C00002------------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_118.7mm design storm, total rainfall = 118.7 mm, rain i
      [SDT= 6.00:SDUR=  24.00:PTOT= 118.70]
# Pond 1
R0350:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63    3.558 No_date   11:56   84.23 .710     .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0350:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .803 No_date   11:54  114.10 .961     .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0350:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .803 No_date   11:54  114.10  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ       .51     .668 No_date   11:54  114.10  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN      1.34     .135 No_date   11:35  114.10  n/a     .000
R0350:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63    3.558 No_date   11:56   84.23  n/a     .000
                    +     1.0 02:DEV-1B-MJ       .51     .668 No_date   11:54  114.10  n/a     .000
                 SUM=     1.0 01:P1-In         11.13    4.166 No_date   11:55   85.59  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0350:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         11.13    4.166 No_date   11:55   85.59  n/a     .000
                out <=    1.0 01:P1-Out        11.13     .154 No_date   12:49   85.58  n/a     .000
           overflow <=    1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.7185E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0350:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .030 No_date   11:54  106.46 .897     .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0350:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56     .863 No_date   12:55   34.36 .289     .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0350:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .030 No_date   11:54  106.46  n/a     .000
                    +     1.0 02:A             30.56     .863 No_date   12:55   34.36  n/a     .000
                 SUM=     1.0 01:NATURAL1      30.63     .864 No_date   12:55   34.53  n/a     .000
R0350:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.13     .154 No_date   12:49   85.58  n/a     .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:NATURAL1      30.63     .864 No_date   12:55   34.53  n/a     .000
                 SUM=     1.0 01:Node-1        41.77    1.017 No_date   12:55   48.14  n/a     .000
R0350:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.77    1.017 No_date   12:55   48.14  n/a     .000
```

```
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.77     .989 No_date   13:04   48.14  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .375:Dmax=  .399}
# Pond 2
R0350:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    7.126 No_date   12:00   74.96 .632     .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0350:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .643 No_date   11:59   95.10 .801     .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0350:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .643 No_date   11:59   95.10  n/a     .000
     Major System   /     1.0 02:ROAD-MJ         .39     .410 No_date   11:59   95.10  n/a     .000
     Minor System   \     1.0 03:ROAD-MN        1.63     .233 No_date   11:46   95.10  n/a     .000
R0350:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        1.63     .233 No_date   11:46   95.10  n/a     .000
                    +     1.0 02:DEV-2A        23.21    7.126 No_date   12:00   74.96  n/a     .000
                 SUM=     1.0 01:P2-In         24.84    7.359 No_date   12:00   76.28  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0350:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         24.84    7.359 No_date   12:00   76.28  n/a     .000
                 out <=   1.0 01:P2-out        24.84    1.054 No_date   12:26   76.28  n/a     .000
            overflow <=   1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.1260E+01  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0350:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        24.84    1.054 No_date   12:26   76.28  n/a     .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
                 SUM=     1.0 01:Pond2-Out     24.84    1.054 No_date   12:26   76.28  n/a     .000
# Uncontrolled Natural Lands
R0350:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .188 No_date   11:57   88.87 .749     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0350:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .091 No_date   13:28   35.33 .298     .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0350:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .577 No_date   12:29   28.85 .243     .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0350:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .032 No_date   12:16   37.31 .314     .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0350:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .091 No_date   13:28   35.33  n/a     .000
                    +     1.0 02:C             16.89     .577 No_date   12:29   28.85  n/a     .000
                    +     1.0 02:D               .52     .032 No_date   12:16   37.31  n/a     .000
                 SUM=     1.0 01:NATURAL2      21.66     .658 No_date   12:31   30.32  n/a     .000
R0350:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.77     .989 No_date   13:04   48.14  n/a     .000
                    +     1.0 02:NATURAL2      21.66     .658 No_date   12:31   30.32  n/a     .000
                    +     1.0 02:ROW-NHS1        .58     .188 No_date   11:57   88.87  n/a     .000
                    +     1.0 02:ROAD-MJ         .39     .410 No_date   11:59   95.10  n/a     .000
                    +     1.0 02:DEV-1B-MN      1.34     .135 No_date   11:35  114.10  n/a     .000
                 SUM=     1.0 01:Node-2        65.74    1.584 No_date   12:48   44.25  n/a     .000
R0350:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .198 No_date   11:57   88.87 .749     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0350:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .220 No_date   12:17   62.52 .527     .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0350:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.74    1.584 No_date   12:48   44.25  n/a     .000
                    +     1.0 02:E              2.19     .220 No_date   12:17   62.52  n/a     .000
                    +     1.0 02:ROW-NHS2        .61     .198 No_date   11:57   88.87  n/a     .000
                    +     1.0 02:Pond2-Out     24.84    1.054 No_date   12:26   76.28  n/a     .000
                 SUM=     1.0 01:Node-3        93.38    2.762 No_date   12:38   53.49  n/a     .000
  ** END OF RUN :  398

****************************************************************************************************





 RUN#:COMMAND#
R0399:C00001----------------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on       0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  = 0399 ]
#******************************************************************************
#  Project Name: [P2147-LP Mattamy Erin - Town of Erin]    Project Number: [2147]
#  Date         : 2021-11
#  Modeller     : M M
#  Company      : JFSA
#  License #    :  2582634
#******************************************************************************
#******************************************************************************
R0399:C00002----------------------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = SCS_Type_II_130.1mm design storm, total rainfall = 130.1 mm, rain i
      [SDT= 6.00:SDUR=  24.00:PTOT= 130.10]
# Pond 1
R0399:C00003------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1A        10.63    4.015 No_date   11:56   93.07 .715     .000
      [XIMP=.55:TIMP=.65]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 266.:MNI=.013:SCI=   .0]
R0399:C00004------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-1B         1.85     .883 No_date   11:54  125.48 .965     .000
      [XIMP=.89:TIMP=.99]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 111.:MNI=.013:SCI=   .0]
R0399:C00005------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:DEV-1B         1.85     .883 No_date   11:54  125.48  n/a     .000
     Major System   /     1.0 02:DEV-1B-MJ       .53     .748 No_date   11:54  125.48  n/a     .000
     Minor System   \     1.0 03:DEV-1B-MN      1.32     .135 No_date   11:34  125.48  n/a     .000
R0399:C00006------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:DEV-1A        10.63    4.015 No_date   11:56   93.07  n/a     .000
                    +     1.0 02:DEV-1B-MJ       .53     .748 No_date   11:54  125.48  n/a     .000
                 SUM=     1.0 01:P1-In         11.15    4.713 No_date   11:55   94.60  n/a     .000
# Pond 1 set to match pre-development peak flows from EXT-A
R0399:C00007------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P1-In         11.15    4.713 No_date   11:55   94.60  n/a     .000
                 out <=   1.0 01:P1-Out        11.15     .188 No_date   12:44   94.59  n/a     .000
            overflow <=   1.0 03:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.7902E+00  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0399:C00008------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:EX-DITCH        .07     .033 No_date   11:54  117.13 .900     .000
      [XIMP=.83:TIMP=.93]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  30.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI=  30.:MNI=.013:SCI=   .0]
#Reduced external Area A
R0399:C00009------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:A             30.56    1.017 No_date   12:55   40.36 .310     .000
      [CN= 49.0: N= 3.00: Tp=  .93]
R0399:C00010------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:EX-DITCH        .07     .033 No_date   11:54  117.13  n/a     .000
                    +     1.0 02:A             30.56    1.017 No_date   12:55   40.36  n/a     .000
                 SUM=     1.0 01:NATURAL1      30.63    1.019 No_date   12:55   40.53  n/a     .000
R0399:C00011------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P1-out        11.15     .188 No_date   12:44   94.59  n/a     .000
                    +     1.0 02:P1ovf           .00     .000 No_date    0:00     .00  n/a     .000
                    +     1.0 02:NATURAL1      30.63    1.019 No_date   12:55   40.53  n/a     .000
                 SUM=     1.0 01:Node-1        41.79    1.206 No_date   12:54   54.96  n/a     .000
R0399:C00012------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE CHANNEL   ->    1.0 02:Node-1        41.79    1.206 No_date   12:54   54.96  n/a     .000
     [RDT= 1.00] out<-    1.0 01:Node-1R       41.79    1.175 No_date   13:03   54.96  n/a     .000
      [L/S/n=  240./ .100/.035]
      {Vmax=  .396:Dmax=  .431}
# Pond 2
R0399:C00013------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:DEV-2A        23.21    8.038 No_date   11:57   83.06 .638     .000
      [XIMP=.43:TIMP=.53]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 393.:MNI=.013:SCI=   .0]
R0399:C00014------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROAD           2.02     .713 No_date   11:59  104.82 .806     .000
      [XIMP=.69:TIMP=.79]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 774.:MNI=.013:SCI=   .0]
R0399:C00015------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    COMPUTE DUALHYD       1.0 01:ROAD           2.02     .713 No_date   11:59  104.82  n/a     .000
     Major System   /     1.0 02:ROAD-MJ         .43     .480 No_date   11:59  104.82  n/a     .000
     Minor System   \     1.0 03:ROAD-MN        1.59     .233 No_date   11:45  104.82  n/a     .000
R0399:C00016------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:ROAD-MN        1.59     .233 No_date   11:45  104.82  n/a     .000
                    +     1.0 02:DEV-2A        23.21    8.038 No_date   11:57   83.06  n/a     .000
                 SUM=     1.0 01:P2-In         24.80    8.271 No_date   11:57   84.45  n/a     .000
# Estimated Pond Volumes for SWM Facility
R0399:C00017------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ROUTE RESERVOIR ->    1.0 02:P2-In         24.80    8.271 No_date   11:57   84.45  n/a     .000
                 out <=   1.0 01:P2-out        24.80    1.145 No_date   12:26   84.45  n/a     .000
            overflow <=   1.0 03:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
     {MxStoUsed=.1392E+01  m3, TotOvfVol=.0000E+00  m3, N-Ovf=    0, TotDurOvf=    0.hrs}
R0399:C00018------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:P2-out        24.80    1.145 No_date   12:26   84.45  n/a     .000
                    +     1.0 02:P2ovf           .00     .000 No_date    0:00     .00  n/a     .000
                 SUM=     1.0 01:Pond2-Out     24.80    1.145 No_date   12:26   84.45  n/a     .000
# Uncontrolled Natural Lands
R0399:C00019------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS1        .58     .212 No_date   11:57   98.08 .754     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0399:C00020------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:B              4.26     .108 No_date   13:27   41.46 .319     .000
      [CN= 50.0: N= 3.00: Tp= 1.39]
R0399:C00021------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:C             16.89     .684 No_date   12:29   34.04 .262     .000
      [CN= 43.0: N= 3.00: Tp=  .56]
R0399:C00022------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:D               .52     .038 No_date   12:15   43.71 .336     .000
      [CN= 52.0: N= 3.00: Tp=  .36]
R0399:C00023------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:B              4.26     .108 No_date   13:27   41.46  n/a     .000
                    +     1.0 02:C             16.89     .684 No_date   12:29   34.04  n/a     .000
                    +     1.0 02:D               .52     .038 No_date   12:15   43.71  n/a     .000
                 SUM=     1.0 01:NATURAL2      21.66     .779 No_date   12:30   35.73  n/a     .000
R0399:C00024------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-1R       41.79    1.175 No_date   13:03   54.96  n/a     .000
                    +     1.0 02:NATURAL2      21.66     .779 No_date   12:30   35.73  n/a     .000
                    +     1.0 02:ROW-NHS1        .58     .212 No_date   11:57   98.08  n/a     .000
                    +     1.0 02:ROAD-MJ         .43     .480 No_date   11:59  104.82  n/a     .000
                    +     1.0 02:DEV-1B-MN      1.32     .135 No_date   11:34  125.48  n/a     .000
                 SUM=     1.0 01:Node-2        65.79    1.880 No_date   12:47   50.76  n/a     .000
R0399:C00025------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB STANDHYD        1.0 01:ROW-NHS2        .61     .223 No_date   11:57   98.08 .754     .000
      [XIMP=.61:TIMP=.71]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=4.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=2.00:LGI= 461.:MNI=.013:SCI=   .0]
R0399:C00026------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    CALIB NASHYD          1.0 01:E              2.19     .253 No_date   12:17   71.72 .551     .000
      [CN= 73.0: N= 3.00: Tp=  .40]
R0399:C00027------------DTmin-ID:NHYD---------AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C.---DWFcms
    ADD HYD               1.0 02:Node-2        65.79    1.880 No_date   12:47   50.76  n/a     .000
                    +     1.0 02:E              2.19     .253 No_date   12:17   71.72  n/a     .000
                    +     1.0 02:ROW-NHS2        .61     .223 No_date   11:57   98.08  n/a     .000
                    +     1.0 02:Pond2-Out     24.80    1.145 No_date   12:26   84.45  n/a     .000
                 SUM=     1.0 01:Node-3        93.38    3.175 No_date   12:38   60.50  n/a     .000
R0399:C00002----------------------------------------------------------------------------------------
    FINISH
----------------------------------------------------------------------------------------------------
****************************************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
  Simulation ended on 2022-05-27     at 16:47:19
====================================================================================================

```

APPENDIX H

FEATURE BASED WATER BALANCE ASSESSMENT

GEOMORPHIX LTD., JUNE 2022

June 22[th], 2022

Mattamy (Erin) Limited and 2779181 Ontario Inc.
c/o David Schaeffer Engineering Limited
600 Alden Road, Suite 700
Markham, Ontario
L3R 0E7

Attention: **Alexandra Schaeffer**

Re: **Feature Based Water Balance Assessment**
Proposed Residential Development
5520 & 5552 8th Line, Erin, Ontario
GEO Morphix Project No. 22026

GEO Morphix Ltd. was retained by Mattamy (Erin) Limited and 2779181 Ontario Inc. to conduct a feature-based water balance assessment of the wetland and aquatic features situated on the properties located at 5520 & 5552 Eighth Line in the Town of Erin, Ontario. Feature-based water balance assessments are undertaken to predict how changes in hydrological processes resulting from planned development will impact the water balance of surface water features such as wetlands and ponds. In most physiographic regions of Southern Ontario, development activities typically tend to increase the percentage of a property's impervious cover which depending on the details of the planned development may alter runoff rates to subject features. Therefore, a water balance assessment provides a means of understanding how land use changes may alter the hydrologic regime of these features.

For this assessment the following tasks were completed:

- Characterization of the study area by review of available background reports pertaining to the site's physiography, hydrology, and geology.
- Determine the hydrological characteristics for the distinct land uses for both the existing and proposed conditions using the methodology detailed in the Ontario Ministry of Environment's Stormwater Management Planning and Design Manual (MOE 2003).
- Complete pre- and post-development water balance assessment of eight (8) wetlands and two (2) aquatic features using a monthly water-balance approach (Thornthwaite and Mather 1957)
- Iteration of the model to account for changes to the proposed development plan for the site.
- Analysis of the results obtained from the final water balance model for each of the wetlands and aquatic features located on the subject property.

Study Area Location and Description

The subject property is located on a 65-ha site situated southwest of the intersection of Sideroad 17 and 8th Line in the town of Erin, Ontario. Existing land use at the site is a mix of crops, pasture, forested areas, meadows and swampland. The defining feature of the site is its relatively steep topography; the site is situated on a north facing slope with an average surface gradient of ~ 8%. Surface runoff drains to one of ten (10) distinct surface water features, six (6) of which are located on the property and four (4) of which are located immediately adjacent to the property, and which likely receive runoff from the subject property. Note that for modeling purposes features SAS1-1 and SWDM4-5 were considered a single feature (i.e., Wetland A), and features SWTM2-1 and SWDM2-2 were also considered a single feature (i.e., Wetland B).

For reference, a site location map showing the wetlands and ponds is provided in **Appendix A**.

Climatic Conditions

Climate data used for the water-balance assessment was obtained from the Fergus Shand Dam Climate Normals (Station ID: 6142400; Environment Canada, 2022). This weather station is located approximately 27 km west of the study area at an elevation of ~418 m above sea level and is the closest meteorological station with a climate record relevant for a water-balance assessment. Climate Normals (1981-2010) from the aforementioned weather station, indicate that the study area receives an average of 946 mm of annual precipitation (i.e., rain and snowfall). Total precipitation is highest in August (97 mm) and lowest in February (56 mm). Average monthly temperatures range from a minimum of -7.4°C in January to a maximum of 20.0°C in July. The months of December, January, February, and March have monthly average temperatures below 0°C.

Surface Water Hydrology and Drainage

The subject site is situated immediately south of the Erin Branch of the Credit River which flows through the West Credit River Wetland Complex located along the northern border of the property. Runoff from the site ultimately discharges to the Credit River via the Credit River Wetland Complex. There are eight (8) wetland features and two (2) aquatic feature (i.e., ponds) which are the subject of this assessment. The wetlands are classified as either swamps or marshes with swamps defined as wooded wetlands with 25% or more tree or tall shrub cover; marshes are defined as wetlands with periodically or permanently inundated standing or slowly moving open water and which have limited woody vegetation cover (i.e., less than 25%; MNRF 2014). The relatively steep topography at the site indicates that runoff generation via the wetlands is likely dominated by rapid fill-and-spill processes with limited surface water retention or surface water storage within these features; with the exception of Wetland A which contains an open water feature (i.e., water storage). Based on our desktop analysis Wetland A does not appear to be directly connected to downstream wetlands via a surface water connection. Details about each of surface water features including the two off-site ponds are summarized in the table below which provides: (i) identification codes shown on the site's Ecological Land Classification Map dated June 9, 2022 (Burnside 2022); and (ii) the existing catchment areas as defined on the pre-development drainage area drawings provided by DSEL. For reference, a map showing the pre-development drainage areas for each of the features is provided in **Appendix A**.

With the exception of the wetlands and ponds there are no other surface water features shown on the Environmental Constraints map (Burnside 2022) and therefore on-site drainage to these features was assumed to be as overland flow along the topographic gradients and within the boundaries of the pre-development catchment areas that were provided.

Drainage to Wetland A, Pond 2, and Pond 3 were assumed to be contained within the feature (i.e., no surface water outlets), whereas Wetlands C, D, E, and F were assumed to be connected, with the outlet from the upstream wetland contributing inflows to the immediately downstream wetland. In the existing (pre-development) condition a corner of Wetland B is situated on a drainage divide with the catchment of Wetland E. Therefore, a small portion of the runoff from Wetland B was assumed to drain to Wetland E with the remaining outflow from Wetland B draining offsite via overland flow to a drainage ditch along 8th line.

Land cover classes were defined using the provided Environmental Constraints Map (Burnside) and were simplified to conform to the water balance methodology detailed in the Ontario Ministry of Environment's Stormwater Management Planning and Design Manual (MOE 2003). As such, existing land cover classes were defined as: forest; agriculture (moderately rooted crops; pasture and shrubs); and lawn. Land cover classes were used to define water balance component values for the feature-based water balance models. Post-development land cover classes were provided by DSEL along with their drainage areas and percent imperviousness. Hydrological routing between post-development features was also provided. For reference, maps showing the pre- and post-development land cover classes and drainage areas are provided in **Appendix A**.

Feature	ELC Code	Description	Surface Area (m^2)	Existing Catchment Area (m^2)
Wetland A	SAS1-1 & SWDM4-5	Pondweed submerged shallow aquatic, Poplar Mineral Deciduous Swamp	2440	35744
Wetland B	SWTM2-1 & SWDM2-2	Red-osier Dogwood Mineral Deciuous Thicket Swamp, Green Ash Minderal Deciduous Swamp	13506	56439
Wetland C	SMDM4-1	Willow Mineral Deciduous Swamp	4072	66800
Wetland D	MAMM1-3	Reed-canary Grass Gramiroid Mineral Meadow Marsh	865	577454
Wetland E (off-site)	MAMM2-2	Panicled Aster Mineral Meadow Marsh	466	55358
Wetland F (off-site)	SWDM4	Mineral Deciduous Swamp	3157	5411
Pond 2 (off-site)	AQ1	Aquatic System	1859	8143
Pond 3 (off-site)	AQ2	Aquatic System	3109	20043

Surficial Geology and Hydrogeological Conditions

The subject property is located in the eastern portion of the Guelph Drumlin Field, a physiographic region characterized by an expansive drumlin field furrowed by cross cutting glacial spillways that formed as a result of the advance and retreat of the continental ice sheets that covered the area until approximately 10,000 years ago (Chapman and Putman, 1987). The higher elevation portions of the site are located on a drumlinized till plain. The lower elevation portions of the site where the surface water features are situated is located on a post-glacial spillway (Chapman and Putman, 2007). Soils at the site are sandy loams with the upper portions of the site mapped as Donnybrook Sandy Loam and the lower portions of the site as Hillsburgh Fine Sandy Loam (OMAFRA, 2022).

Geotechnical Investigations were completed by Shad & Associates Inc. on behalf of the Mattamy Development Corporation in November of 2020, and January and March of 2021 (Shad 2020; Shad 2021a; Shad 2021b). One of the objectives of these investigations was to characterize subsurface conditions at the site; the relevant findings are summarized in the following paragraphs.

The November 2020 investigation involved the excavation and sampling of 11 test pits ranging in depth from 4.7 to 5.3 m below ground surface (bgs) distributed over the upper (higher elevation) half of the subject property. A detailed description of the stratigraphy of the project site is provided in the investigation report (Shad 2020). In general terms the site stratigraphy over this portion of the site can be summarized as follows: (i) a layer of topsoil (0-0.8m bgs); (ii) overlaying a layer of silty sand till with cobbles and boulders that was encountered to the maximum depth in each of the excavations. These results are consistent with the regional scale mapping of the area showing that this portion of the study site is a drumlinized till plain. The investigation report also notes that the glacial till is particularly compact at depths below 2.5m bgs, and that there was no observable groundwater seepage into any of the 11 test pits. Additionally, in March 2021 two boreholes were drilled to depths of 19.8 and 18.3 m below ground surface (bgs) with three borehole attempts aborted due to auger refusal on possible cobbles and/or boulders at depths of approximately 5-7 m bgs (Shad 2021b). The stratigraphy of the two boreholes is consistent with the results of the test pitting program over this portion of the site; topsoil over compact and very dense silty sand (till) and sandy silt (till) but with silty sand fill or fine sand fill extending to depths of approximately 1-2 m bgs. Both boreholes were dry upon completion as was the monitoring well installed in one of the wells at subsequent monitoring events on March 5 and 12, 2021. The report noted the potential for perched groundwater tables due to the presence of the dense and less-permeable deposits underlaying the more permeable topsoils and fill and possible fill at these locations.

The January 2021 investigation involved the excavation and sampling of 12 test pits ranging in depth from 4.1 to 5.0 m bgs distributed over the bottom (lower elevation) half of the subject property. A detailed description of the stratigraphy of the project site is provided in the investigation report (Shad 2021a). In general terms the site stratigraphy over this portion of the site can be summarized as follows: (i) a layer of topsoil (0-0.4 m bgs); (ii) overlaying organic stained silty sand (0.4-0.8 m bgs); (ii) overlaying a layer of silty sand till. However, in three test pits a silty sand layer extended to depths of 1.5 – 2.0 m bgs before till was encountered. Nine of the 12 test pits remained dry several hours after completion. The remaining three test pits accumulated water; at these three test pit locations a seam of water-yielding sand and gravel was observed at depths ranging from 2.0 to 3.5 m bgs. In all three locations these sand and gravel layers were between layers of glacial till. These results are consistent with the regional scale mapping of the site showing that the surficial geology over the northern portion of the site as either Port Stanley Till deposits (i.e., glacial diamicton) or glaciofluvial outwash deposits (i.e., gravel/sand under sand/silt).

Water Balance Methodology

Water balance calculations were completed using a monthly soil-moisture water balance approach (Thornthwaite and Mather, 1957). This is a relatively straightforward approach to estimate a monthly water balance from commonly available meteorological data (i.e., temperature and precipitation), and information about the site's topography, soils, and landcover. The approach uses the following relation where the variable quantities are expressed either as volumes or depths (volumes per unit area):

$$P = ET + R + I \quad \text{[Eq. 1]}$$

Where:

P = Precipitation (mm)
ET = Evapotranspiration (mm)
R = Surface Water Runoff (mm)
I = Infiltration (mm)

Precipitation (P) data were retrieved from the Fergus Shand Dam Climate Normals 1981 to 2010 Canadian Climate Normals (Environment Canada, 2010), which report an average of 946 mm of annual total precipitation (i.e., rain and snow). Evapotranspiration (ET) rates are governed by meteorological conditions and influenced by water availability which is accounted for in the model. Potential evapotranspiration (PET) rates were calculated using a temperature-based method (Hamon, 1963).

Surface Water Runoff (R) and Infiltration (I) are largely dependent on soil type, topography and the proportion of impervious surface at the site. The values for these parameters for each of the various land cover classes within the wetland and pond catchment areas was determined using the methodology detailed in Table 3.1 of the MOE's Stormwater Planning and Design Manual (MOE, 2003). Using the land cover details shown on the provided Environmental Constraints Map land cover classes were delineated based on the vegetation cover types specified in the aforementioned MOE manual. Land cover classes are used to inform the infiltration factors and soil moisture storage capacities used in the water balance analysis. The infiltration factors are calculated as follows:

$$I.F = T + S + C \quad \text{[Eq. 2]}$$

Where:

$I.F$ = Infiltration factor
T = Topography Factor
S = Soil Type
C = Cover Type

This infiltration factor is then multiplied by the calculated monthly water surplus to estimate the monthly infiltration rate, with the remainder of the water surplus attributed to monthly surface runoff. Notably, infiltration is assumed not to occur during months in which the average temperature is below zero (December – March) as the available water is considered to be frozen. Note that the model does not directly account for the storage and flow of groundwater although some of the infiltrating water can assumed to discharge back to the stream as baseflow. The infiltration factors, soil types, soil moisture storage capacity and total area for each land use type are provided in the table below.

Land cover class	Water Holding Capacity (mm)	Topography (*T*)	Soils (*S*)	Cover (*C*)	Infiltration Factor
Forest	300	Very Hilly 0.05	Fine Sandy Loam 0.25	Woodland 0.2	0.50
Forest	300	Hilly 0.1	Fine Sandy Loam 0.25	Woodland 0.2	0.55
Pasture & Crops	150	Hilly 0.1	Fine Sandy Loam 0.25	Cultivated 0.1	0.45
Greenspace / NHS	150	Hilly 0.1	Fine Sandy Loam 0.25	Cultivated 0.1	0.45
Parkland / Lawn	75	Hilly 0.1	Fine Sandy Loam 0.25	Non-Cultivated 0.0	0.35

Results

For all wetlands, on-site and off-site, the water-balance model results indicate that post-development annual runoff volumes will be maintained within +/- 5% (i.e., 95-105% of pre-development annual runoff). The two off-site ponds are predicted to have post-development annual runoff volumes within +/- 10% of pre-development annual runoff volumes.

The post-development water balances to the features are achieved by: maintaining natural heritage features (i.e., forests), the conversion of portions of the sites existing agricultural and pastoral lands to parks and green space and the routing of runoff from these areas to wetlands and ponds via overland flow and clean water collection systems; the routing of rooftop drainage via backyard lawns to wetlands and ponds via overland flow and clean water collection systems; and the interception of a portion of the runoff from Wetland B (i.e., SWDM2-2;SWTM2-1) which currently drains to a roadside ditch along 8th line approximately 150m downslope from the wetland. In the proposed development a portion of the intercepted runoff from Wetland B will be directed into Wetland C (SWDM4-1) with the remainder directed to Wetland E (MAMM2-2) via a cut off swale located immediately downslope of Wetland B. To maintain the water balance for Wetland D (MAMM1-3) 135 L/s of minor system drainage from a medium density development block (see Dh on the "Post Development Drainage Areas and Land Cover Classes" Map) is proposed to be routed to the wetland via an oil and grit separator (OGS).

Seasonally, the water balance model shows that there is no surface runoff during the months of December-March owning to the model assumption that precipitation inputs during months with sub-zero temperatures (i.e., December-March) are as snow which is stored and released as melt water in April when average monthly temperatures rise above freezing (i.e., 5.7ºC). Under pre-development conditions approximately 83% of the annual runoff occurs in the spring (i.e., months of April-May), whereas in the post-development condition spring runoff volumes for the surface water features ranged from 64-83% of annual runoff.

Under existing conditions, the model also shows that during the months of June and July there is no surface runoff to any of the surface water features as evaporation rates exceed monthly precipitation rates during this period. Under post-development conditions the model shows that surface water features (with the exception of Pond 2) receive some runoff during the months of June and July; monthly runoffs in the range of 1-4% of annual runoff. The source of this runoff is the backyard lawns where rooftop drainage maintains a water surplus (i.e., precipitation inputs exceed rates of evapotranspiration) and therefore the generation of some runoff from these areas during June and July. The increased post-development runoff to the features during the summer months (May-September) offset the decreased runoff to the features during the months of April and November such that annual runoff volumes to the wetlands remain balanced to within +/- 5% of their pre-development volumes.

Feature	Pre-development Total Runoff (m^3/year)	Post-development Total Runoff (m^3/year)	Deficit/Surplus (m^3)	% of Pre-development Runoff
Wetland A	7902	7527	-375	95%
Wetland B	12056	11621	-435	96%
Wetland C	15245	15055	-190	99%
Wetland D	33417	34035	618	102%
Wetland E (off-site)	46540	49014	2473	105%
Wetland F (off-site)	47677	50114	2436	105%
Pond 2 (off-site)	1865	1992	127	107%
Pond 3 (off-site)	4859	4446	-413	92%

Summary

This memo summarizes the results of a feature-based water-balance assessment to determine the influence of the proposed development on average monthly and average annual surface runoff volumes to the six (6) wetlands located on the subject property and the two (2) wetlands and two (2) ponds located immediately adjacent to the subject property. A monthly soil-moisture water balance approach (Thornthwaite and Mather, 1957) was used to predict the seasonal changes in evapotranspiration, runoff, and infiltration within the study area for pre- and post-development conditions. Water-balance model estimates indicate that the post-development annual runoff volumes are maintained within +/- 5% (i.e., 95-105% of pre-development annual runoff) for all eight (8) of the wetland features, both on and off-site. The water-balance model indicates that post-development annual runoff volumes for both pond features (2) are maintained within +/- 10% of the pre-development volumes.

The water-balance models provide estimates of runoff to the site’s surface water features. These models do not directly account for groundwater discharge to/from these features. There is a potential that groundwater fluxes may contribute to the seasonal and annual water balances for these surface water features; particularly for those features situated on the north end (lower elevation) portion of the subject property. However, 20 of the 23 (i.e., 87%) exploratory test pits dug at the site showed no evidence of groundwater seepage. At the three (3) test pits where groundwater seepage was observed, the water-yielding sand and gravel seams were situated under a 1.2 m to 2.0 m thick layer of silty sand glacial till (Shad 2021b). More detailed measurements within the wetlands would be required to determine whether net groundwater contributions are significant (i.e., > 5% of total annual inflows) to the annual water balances of the site’s wetlands and pond.

The results of the feature-based water-balance models provide a relative assessment of the ability of the proposed post-development land use to match the annual pre-development water balances at this site and thereby to mitigate changes to hydrological conditions associated with the proposed development.

We trust the memo meets your current requirements. Should you have any questions, please contact the undersigned.

Respectfully submitted,

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Director, Principal Geomorphologist

Jan Franssen, Ph.D.
Senior Watershed Scientist

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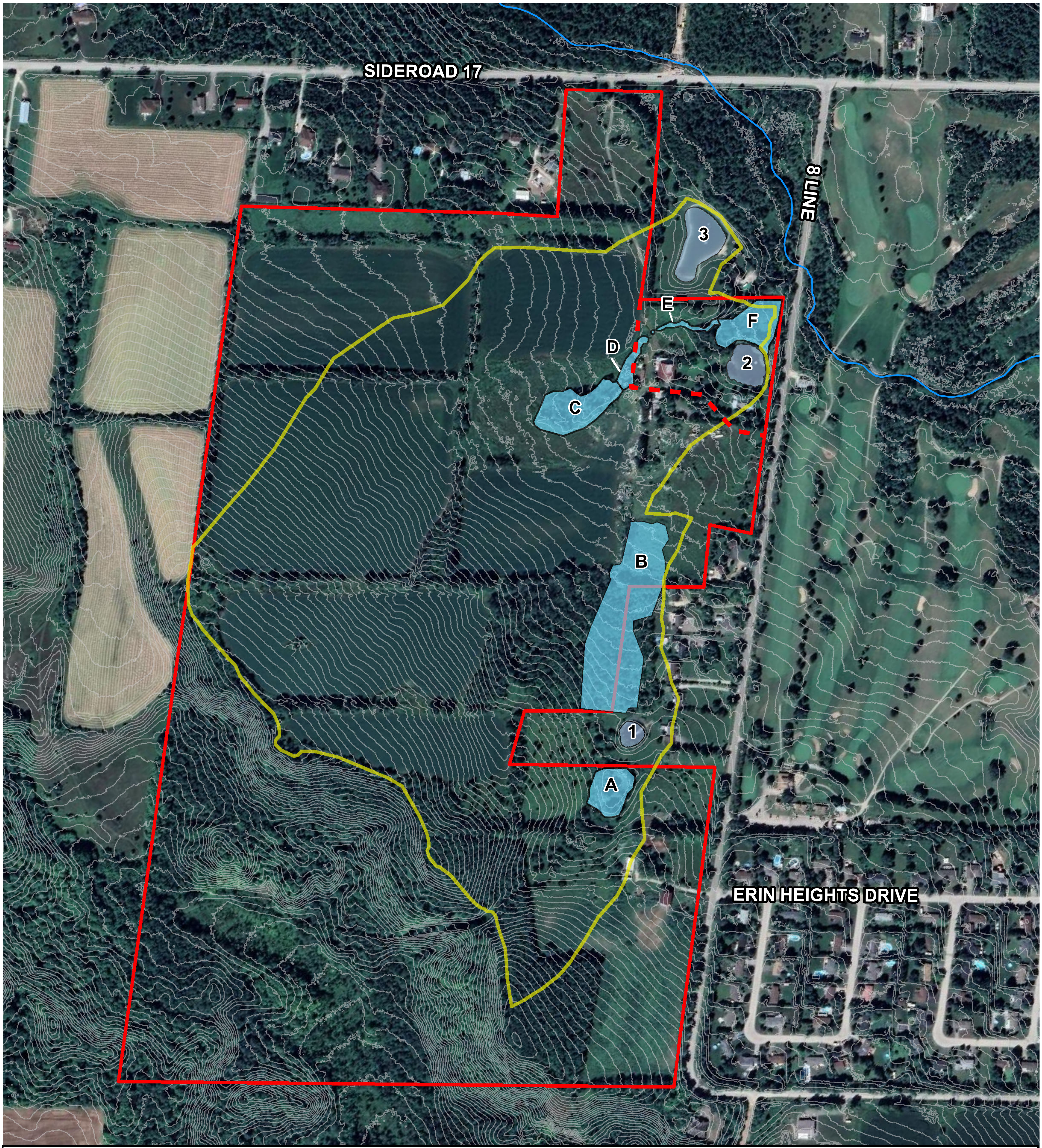
Appendix A
Figures



Legend

- Watercourse
- 1 m Contour
- Pond
- Wetland
- Catchment Area
- Study Boundary
- Retained Lands

Feature Based Water Balance Assessment

Study Site

5520 and 5552 Eighth Line, Town of Erin, Ontario

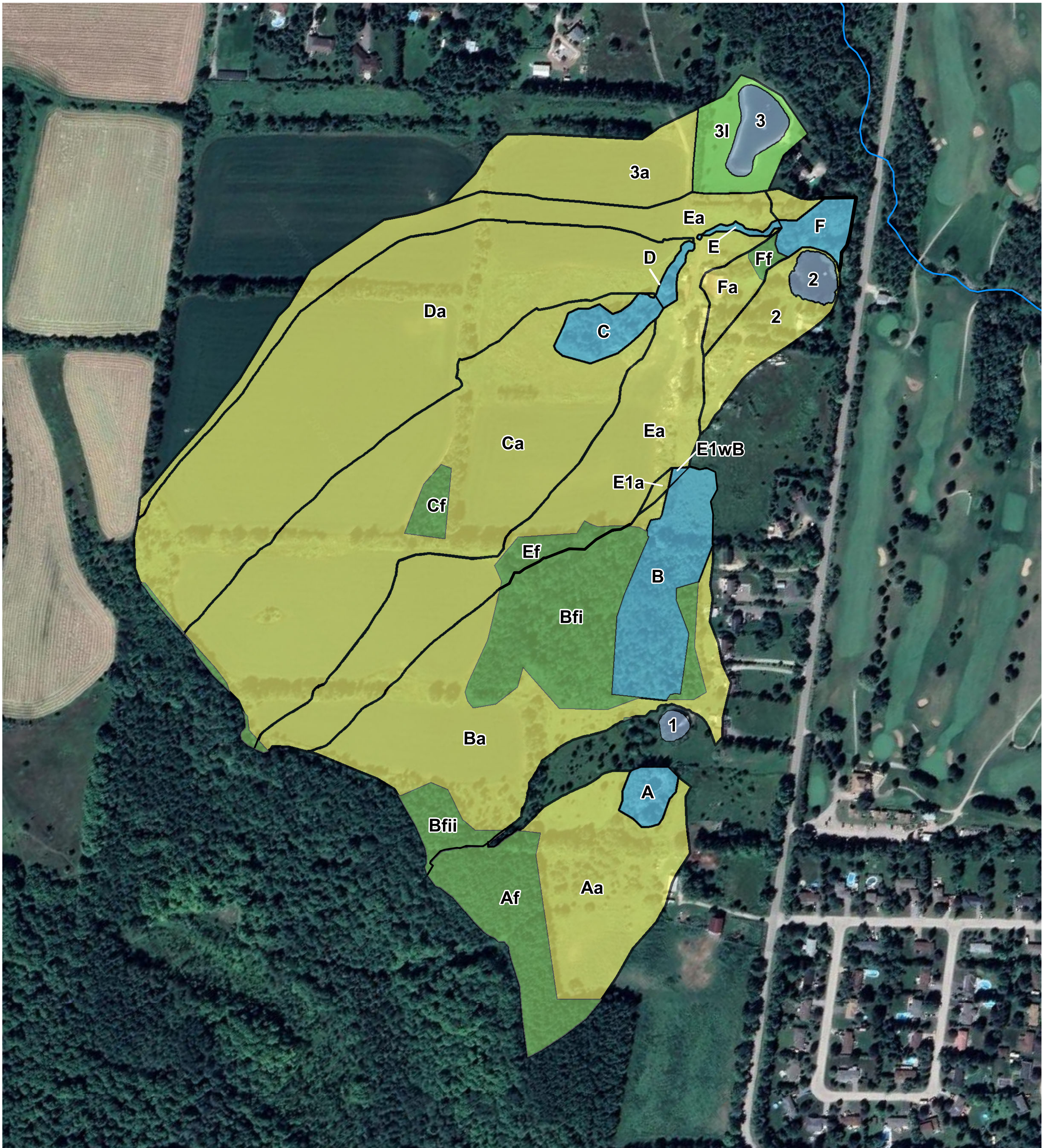
GEO MORPHIX™

N

0 75 150

Metres

Imagery: Google Earth, 2018.
Watercourse: MNRF, 2021. 1 m Contour: MNRF, 2018.
Pond and Wetland: DSEL, 2022.
Catchment: GEO Morphix Ltd., 2022.
Print Date: June 2022. PN22026. Drawn By: J.F., M.O.



Legend

- Watercourse
- Pond
- Wetland
- Forest
- Agriculture
- Lawn
- Drainage Area

GEO MORPHIX™

Feature Based Water Balance Assessment

Existing Drainage Areas and Land Cover Classes

5520 and 5552 Eighth Line, Town of Erin, Ontario

N

0 75 150
Metres

Imagery: Google Earth, 2018.
Watercourse: MNRF, 2021.
Landuse Classification: GEO Morphix Ltd., 2022.
Pond and Wetland: DSEL, 2022.
Print Date: June 2022. PN22026. Drawn By: J.F., M.O.

Legend

- Watercourse
- Pond
- Wetland
- Forest
- Lawn
- Park Land
- Development

GEO MORPHIX™

Feature Based Water Balance Assessment

Post Development Drainage Areas and Land Cover Classes

5520 and 5552 Eighth Line, Town of Erin, Ontario

N

0 75 150

Metres

Imagery: Google Earth, 2018.
Watercourse: MNRF, 2021.
Landuse Classification: GEO Morphix Ltd., 2022.
Pond and Wetland: DSEL, 2022.
Print Date: June 2022. PN22026. Drawn By: J.F., M.O.

Appendix B
Tables

SUBCATCHMENTS / LAND COVER CLASSES	5520 & 5552 8th Line, Erin, Ontario [PN22026]

	Area (m^2)	Water Holding Capacity (mm)	Infiltration Factor	Runoff Factor
(A) SMDM4-5; SAS1-1 Existing Conditions				
Mature Forests (Af; steeply sloping)	13182	300.0	0.50	0.50
Pasture and Crops (Aa)	22562	150.0	0.45	0.55
Total	**35744**			
(A) SMDM4-5; SAS1-1 Post-development				
Forest (Af)	10856	300.0	0.50	0.50
Single Family Home - Impervious to lawns (Ah)	5700	0.0	--	0.90
Single Family Home - Lawns (Ah)	4300	75.0	0.35	0.65
Greenspace (An)	2661	150.0	0.45	0.55
Wetland Buffer (Ab)	1685	300.0	0.55	0.45
Total	**25202**			
(B) SWTM2-1 & SWDM2-2 Existing Conditions (top units drain to B that drains offsite; bottom unit drains to E1wB that drains to E)				
Forests (Bfi)	21215	300.0	0.55	0.45
Forests (Bfii)	3563	300.0	0.50	0.50
Pasture and Crops (Ba)	31661	150.0	0.45	0.55
Pasture and Crops (E1a)	455	150.0	0.45	0.55
Total	**56439**			
(B) SWTM2-1 & SWDM2-2 Post-development (top units drain to B that drains to E; bottom units drain to C1wB that drains to C)				
Forest (Bfi)	7034	300.0	0.55	0.45
Greenspace (Bni)	8272	150.0	0.45	0.55
Forest (Bfii)	3081	300.0	0.50	0.50
Greenspace (Bnii)	3226	150.0	0.45	0.55
Single Family Home - Impervious to lawns (Bhi)	368	0.0	--	0.90
Single Family Home - Lawns (Bhi)	432	75.0	0.35	0.65
Single Family Home - Impervious to lawns (Bhii)	2576	0.0	--	0.90
Single Family Home - Lawns (Bhii)	1944	75.0	0.35	0.65
NHS (C1ni)	1062	150.0	0.45	0.55
Forest (C1f)	14190	300.0	0.55	0.45
NHS (C1nii)	3187	150.0	0.45	0.55
Single Family Homes - Impervious to lawns (Chiii)	1368	0.0	--	0.90
Single Family Homes - Lawns (Chiii)	1032	75.0	0.35	0.65
Single Family Homes - Impervious to lawns (Chiv)	184	0.0	--	0.90
Single Family Homes - Lawns (Chiv)	216	300.0	0.55	0.45
Total	**22413**			
(C) SMDM4-1 Existing Conditions				
Forests (Cf)	2519	300.0	0.50	0.50
Pasture and Crops (Ca)	64281	150.0	0.45	0.55
Total	**66800**			
(C) SMDM4-1 Post-development				
Forest (pre Ef; Cf)	2487	300.0	0.50	0.50
NHS (Cn)	7654	150.0	0.45	0.55
Parkland (Cp)	14100	75.0	0.35	0.65
Single Family Home - Impervious to lawn (Chi)	2300	0.0	--	0.90
Single Family Home - Lawns (Chi)	2700	75.0	0.35	0.65
Single Family Home - Impervious to lawn (Chii)	322	0.0	--	0.90
Single Family Home - Lawns (Chii)	378	75.0	0.35	0.65
Wetland Buffer (Cb)	5716	300.0	0.50	0.50

Wetland SWTM2-1 & SWDM2-2 (C1wB)	1727	300.0	0.55	0.45
Total	**35657**			
(D) MAMM1-3 Existing Conditions				
Forests (Df)	172	300.0	0.55	0.45
Pasture and Crops (Da)	71301	150.0	0.45	0.55
Wetland SWDM4-1 (C)	4072	300.0	0.55	0.45
Total	**75545**			
(D) MAMM1-3 Post-development				
Medium Density - Impervious to NHS (Dh)	18500	0.0	--	0.90
Wetland Catchment and Buffer (Db)	3730	300.0	0.50	0.50
Wetland SWDM4-1 (C)	4072	300.0	0.55	0.45
Total	**26302**			
(E) MAMM2-2 Existing Conditions				
Forests (Ef)	2564	300.0	0.55	0.45
Pasture and Crops (Ea)	52794	150.0	0.45	0.55
Wetland SWTM2-1 & SWDM2-2 (E1wB)	145	300.0	0.55	0.45
Wetland MAMM1-3 (D)	865	300.0	0.55	0.45
Total	**55358**			
(E) MAMM2-2 Post-development				
Rural and meadow (E)	8611	150.0	0.45	0.55
Parkland (Ep)	1100	75.0	0.35	0.65
Greenspace (Eg)	1909	150.0	0.45	0.55
Wetland MAMM1-3 (D)	865	300.0	0.55	0.45
Wetland SWTM2-1 & SWDM2-2 (B)	13650	300.0	0.55	0.45
Total	**12485**			
(F) SWDM4 Existing Conditions				
Forest (Ff)	814	300.0	0.55	0.45
Rural (Fa)	4131	150.0	0.45	0.55
Wetland MAMM2-2 (E)	466	300.0	0.50	0.50
Total	**5411**			
(F) SWDM4 Post-development				
Forest (Ff)	814	300.0	0.55	0.45
Rural (F)	3297	150.0	0.45	0.55
Wetland MAMM2-2 (E)	466	300.0	0.50	0.50
Total	**4577**			
(2) AQ1 Existing Conditions				
Rural (2)	8143	150.0	0.45	0.55
Total	**8143**			
(2) AQ1 Post-development				
Rural (2ni)	3698	150.0	0.45	0.55
Greenspace (2nii)	5000	150.0	0.45	0.55
Total	**8698**			
(3) AQ2 Existing Conditions				
Pasture and Crops (3a)	13843	150.0	0.45	0.55
Lawn (3l)	6200	75.0	0.35	0.65
Total	**20043**			
(3) AQ2 Post-development				
Single Family Home (3h; Impervious to lawn)	3174	0.0	--	0.90
Single Family Home (3h; Lawns)	3726	75.0	0.35	0.65
Lawn (3l)	6200	75.0	0.35	0.65
Total	**13100**			

WATER BALANCE SUMMARY TABLES

5520 & 5552 8th Line, Erin, Ontario [PN22026]

WETLANDS

(A) SMDM4-5; SAS1-1

Total Runoff to Wetland (m^3)	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Pre-development	0	0	0	5921	657	0	0	0	2	717	604	0	7902
Post-development	0	0	0	4424	700	251	239	324	429	649	511	0	7527
Deficit/Surplus	0	0	0	-1497	43	251	239	324	427	-69	-93	0	-375

(B) SWTM2-1 & SWDM2-2

Total Runoff to Wetland (m^3)	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Pre-development	0	0	0	9035	1003	0	0	0	3	1093	921	0	12056
Post-development	0	0	0	7787	1027	194	183	252	308	1029	841	0	11621
Deficit/Surplus	0	0	0	-1248	24	194	183	252	305	-64	-81	0	-435

(C) SMDM4-1 post recieves runoff from portion of Wetland B (C1wB)

Total Runoff to Wetland (m^3)	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Pre-development	0	0	0	11411	1267	0	0	0	6	1397	1164	0	15245
Post-development	0	0	0	10410	1307	156	120	235	377	1345	1105	0	15055
Deficit/Surplus	0	0	0	-1000	40	156	120	235	370	-52	-59	0	-190

(D) MAMM1-3 recieves runoff from Wetland C

Total Runoff to Wetland (m^3)	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Pre-development	0	0	0	24925	2767	0	0	2	127	3054	2542	0	33417
Post-development	0	0	0	18680	3269	1510	1520	1845	2040	2924	2247	0	34035
Deficit/Surplus	0	0	0	-6245	502	1510	1520	1843	1913	-130	-295	0	618

(E) MAMM2-2 recieves runoff from Wetland D; recieves portion of runoff from Wetland B (E1wB pre; C1wB post)

Total Runoff to Wetland (m^3)	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Pre-development	0	0	0	34727	3855	0	0	3	160	4254	3541	0	46540
Post-development	0	0	0	29214	4547	1508	1502	2019	2604	4268	3352	0	49014
Deficit/Surplus	0	0	0	-5513	691	1508	1502	2016	2444	14	-189	0	2473

(F) SWDM4	recieves runoff from Wetland E												
Total Runoff to Wetland (m^3)	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
Pre-development	0	0	0	35571	3949	0	0	3	169	4357	3627	0	47677
Post-development	0	0	0	30039	4638	1503	1492	2019	2617	4369	3436	0	50114
Deficit/Surplus	0	0	0	-5533	689	1503	1492	2016	2448	12	-191	0	2436

PONDS

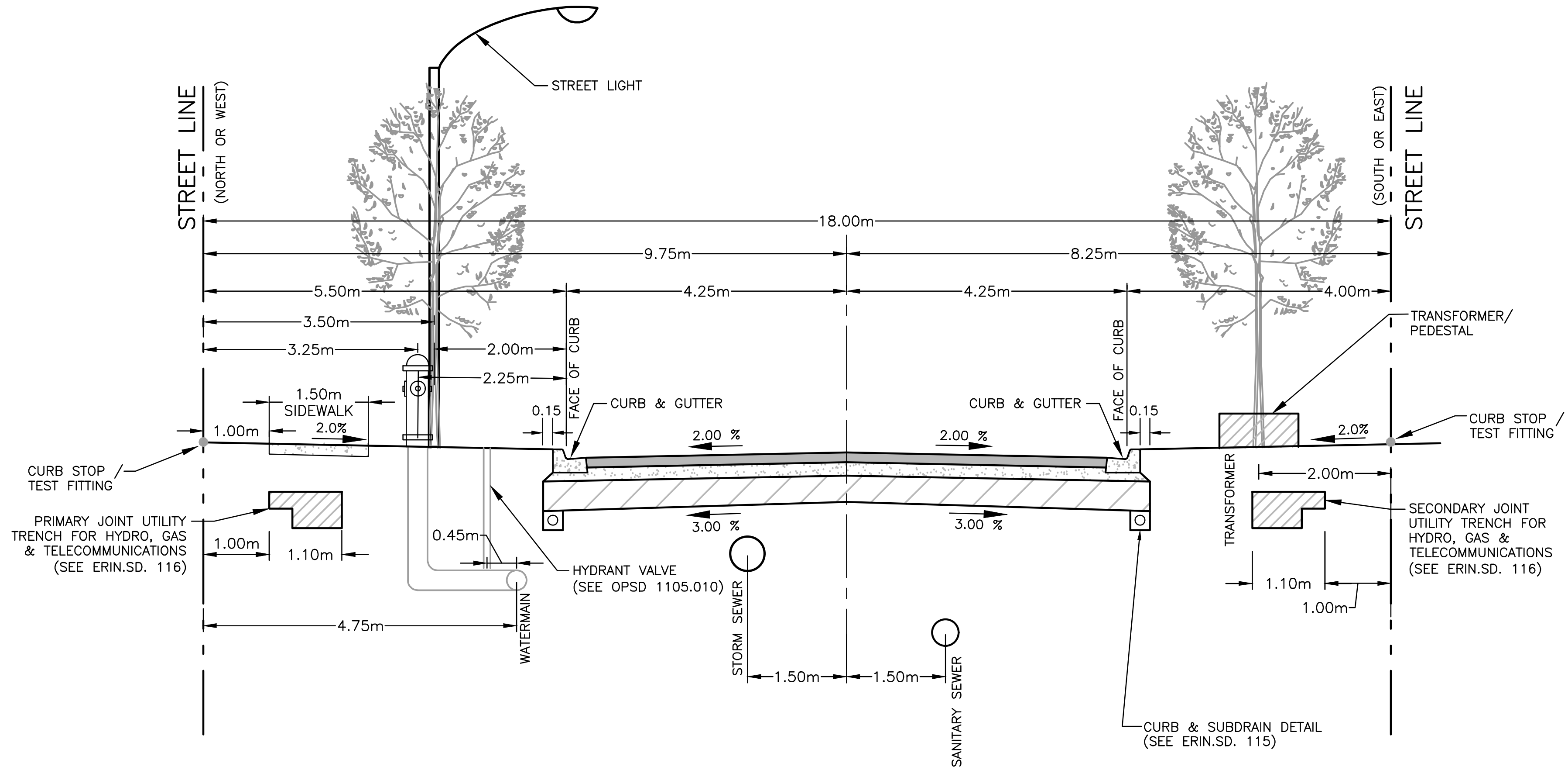
(2) AQ1													
Total Runoff to Wetland (m^3)	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
Pre-development	0	0	0	1396	155	0	0	0	1	171	142	0	1865
Post-development	0	0	0	1491	166	0	0	0	1	183	152	0	1992
Deficit/Surplus	0	0	0	95	11	0	0	0	0	12	10	0	127

(3) AQ2													
Total Runoff to Wetland (m^3)	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
Pre-development	0	0	0	3629	403	0	0	0	13	445	370	0	4859
Post-development	0	0	0	2662	412	131	115	181	252	390	305	0	4446
Deficit/Surplus	0	0	0	-967	9	131	115	181	239	-55	-65	0	-413

APPENDIX I

STANDARD RIGHT OF WAY CROSS SECTIONS

TOWN OF ERIN, NOVEMBER 2021



NOTE:

1. 18.0m CORRIDOR ONLY TO BE USED ON SUBDIVISIONS WITH DRAFT PLAN APPROVAL AS OF APRIL 2021.

TOWN OF ERIN

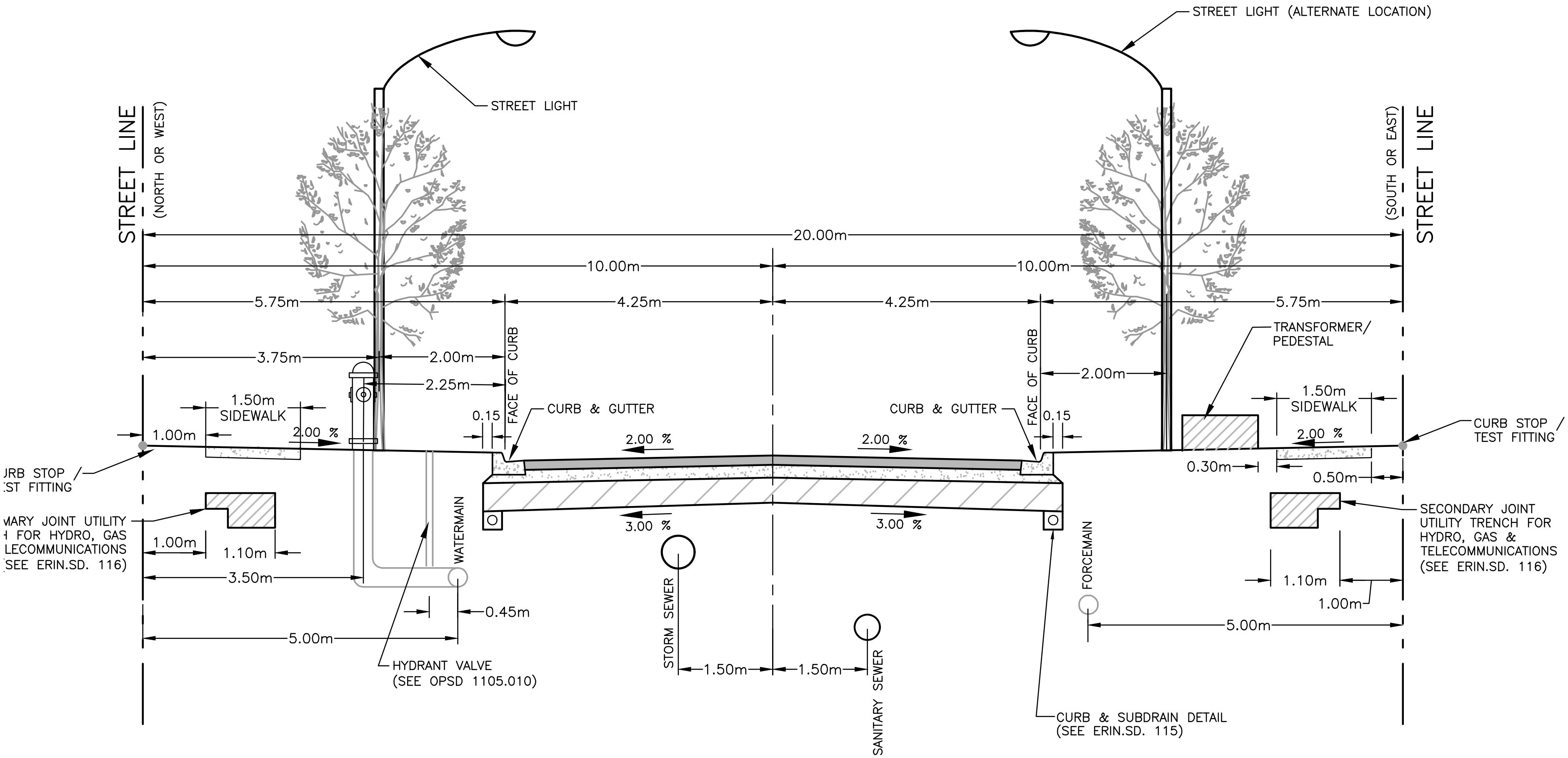
URBAN MINOR LOCAL
(8.5m ROAD ON 18.0m RIGHT-OF-WAY)

NO.	REVISIONS	DATE	APR'D

SCALE: N.T.S.

DATE: NOV. 2021

ERIN SD. 101



NOTE:

1. WHERE MULTI–USE TRAIL OR BICYCLE LANES ARE REQUIRED THE ROW WIDTH SHALL BE INCREASED TO 26.0m

TOWN OF ERIN

URBAN/ SUBURBAN ROAD SECTION (8.5m ROAD ON 20.0m RIGHT–OF–WAY)

NO.	REVISIONS	DATE	APR'D

SCALE: N.T.S.

DATE: NOV. 2021

ERIN SD. 102

APPENDIX J

PRELIMINARY GEOTECHNICAL SLOPE STABILITY ANALYSIS

SHAD AND ASSOCIATES INC., JUNE 2022

June 1, 2022
Ref. No.: T20828

Mattamy (Erin) Limited
c/o David Schaeffer Engineering Limited
600 Alden Road, Suite 700
Markham, Ontario
L3R 0E7

Attention: **Mr. Alexandra Schaeffer, P.Eng.**

RE: **PRELIMINARY GEOTECHNICAL SLOPE STABILITY ANALYSIS**
SITE GRADING
ERIN PROPERTY
8TH LINE 7 & DUNDAS STREET WEST
ERIN, ONTARIO

As requested, we have carried out some preliminary slope stability analysis for the proposed site slopes at the above captioned site and this report is prepared to summarize our findings and recommendations. For this review and assessment, the following information were referenced:

1) Conceptual Grading Plan prepared by David Schaeffer Engineering Limited ('DSEL' plan dated May 2022);
2) Geotechnical Test Pit Investigation Report (South Parcel); Report prepared by Shad & Associates Inc. ('Shad' Report No. T20828 dated November 9, 2020);
3) Geotechnical Test Pit Investigation Report (North Parcel); Shad Report No. T20828-1 dated January 18, 2021; and
4) Geotechnical Borehole Information; Shad Report T21837 dated March 13, 2021.

It should be noted that this report is prepared as an addendum to the above-mentioned geotechnical reports and they should be referenced for additional details and recommendations.

1.0 Subsurface Conditions

Based on the subsurface conditions encountered at the preliminary test pits and a couple of boreholes drilled at the property, generally below some surficial topsoil and/or fill and some compact silty sand to sandy silt till extending down to a depth of about 1 to 2 m below existing ground surface, the site was predominantly underlain by dense to very dense silty sand to sandy silt till extending down to the investigated depths. Furthermore, the boreholes drilled on the site were both dry on completion as well as during the groundwater monitoring through the installation of a standpipe piezometer in one of the boreholes.

2.0 Slope Stability Analysis

Considering the above subsurface information, some preliminary slope stability analysis were carried out for the proposed relatively larger cuts and fills by assuming six representative cross sections passing through the most critical parts of the site. The assumed sections are shown in Figure 1.

The assumed sections were analysed by assuming conservative soil parameters based on the preliminary subsurface information, the field and laboratory tests performed, our experience with similar site conditions as well as published geotechnical data. These are summarized in Table 1.

Table 1: Assumed Conservative Geotechnical Parameters

Soil Type	Bulk Unit Weight (kN/m^3)	Shear Strength Parameters			
		C' (kPa)	Φ' (degree)	C_u (kPa)	Φ_u (degree)
Existing Topsoil, Silty Sand/Sandy Silt Fill	17.0	0	17	0	16
Compact Silty Sand/Sandy Silt Till, Engineered Silty Sand/Sandy Silt Fill	19.0	0	30	0	29
Dense to Very Dense Silty Sand to Sandy Silt Till	22.0	0	34	0	33

For slope stability analysis, computer program Slope/W 2012 and the Bishop's Simplified method for the calculation of the factor of safety for slip surface were used. For a slope to be assessed as being stable under static loading, a minimum Factor of Safety ('FOS') of 1.5 is normally required. Furthermore, the pond walls were also analysed under seismic loading conditions. The site-specific seismic hazards as per National Building Code of Canada (2015) were obtained from Earthquakes Canada website (www.EarthquakesCanada.ca) and are provided in Appendix A. The peak ground acceleration (PGA) for 2 percent probability in 50 years (0.000404 per annum or return period of 2,475 years) for the site is 0.081g corresponding to Site Class C. For this study, although a geophysical assessment was not completed in assessing the applicable seismic site classification, considering the subsurface conditions encountered at the boreholes drilled at the site, for a conservative analysis, a site Class D is assigned for seismic design purposes. Therefore, the peak ground acceleration corresponding to Site Class D at the site will be PGA=1.3×0.081g=0.1053g. According to industry standards, the acceleration used in pseudostatic analysis is equal to 0.5 × PGA. Based on these values and in accordance with the Canadian Foundation Manual (4th Edition), the following parameters were used for seismic stability evaluations:

Horizontal Seismic Coefficient	=	0.5 X 0.1053g=0.0527g
Vertical Seismic Coefficient	=	0

For a stable slope under seismic loading using pseudostatic analysis, a minimum FOS of 1.1 is normally recommended.

Considering the subsurface soil and groundwater information as well as the assumed geotechnical parameters, the assumed cross-sections were analyzed under the following conditions:

-During and Immediately after the End of Construction (Undrained Analysis);
-Long-term (Drained Analysis); and
-Seismic Loading (Undrained Analysis).

Where applicable, surface loads of 30 kPa and 12 kPa were assumed across the proposed roads in order to include the effects of construction and traffic loads in the slope stability analysis. Furthermore, any existing topsoil and/or fill located within the study area were assumed to be removed and replaced with properly placed and compacted engineered fill.

Considering the above details, the stability of the assumed six cross-sections was analysed and some of the results are shown in Enclosures 1 to 18. The results indicate stable conditions with calculated FOS being more than the minimum recommended value of 1.5 for static conditions and 1.1 under seismic loading.

3.0 Discussions and Recommendations

Based on the subsurface conditions encountered at the test pits excavated at the site as well as the two relatively boreholes drilled within the property, the proposed side slopes were assessed to be stable under static and seismic loading conditions. However, we would recommend that before final design, the assumed subsurface conditions to be confirmed by drilling representative number of the boreholes as well as carrying out supplementary detailed slope stability modelling and analysis.

Furthermore, in an attempt to minimize the potential for surface erosion and formation of gulleys and localized slope instability, we would recommend the proposed side slopes to be covered with topsoil and vegetated.

4.0 Closure

We wish to mention that this report is prepared as addendum to Shad Geotechnical Investigation Reports T20828, T20828-1 and T21837. These reports should be referenced for more details.

Sincerely,
Shad & Associates Inc.

LICENSED PROFESSIONAL ENGINEER
H. SHAD
PROVINCE OF ONTARIO

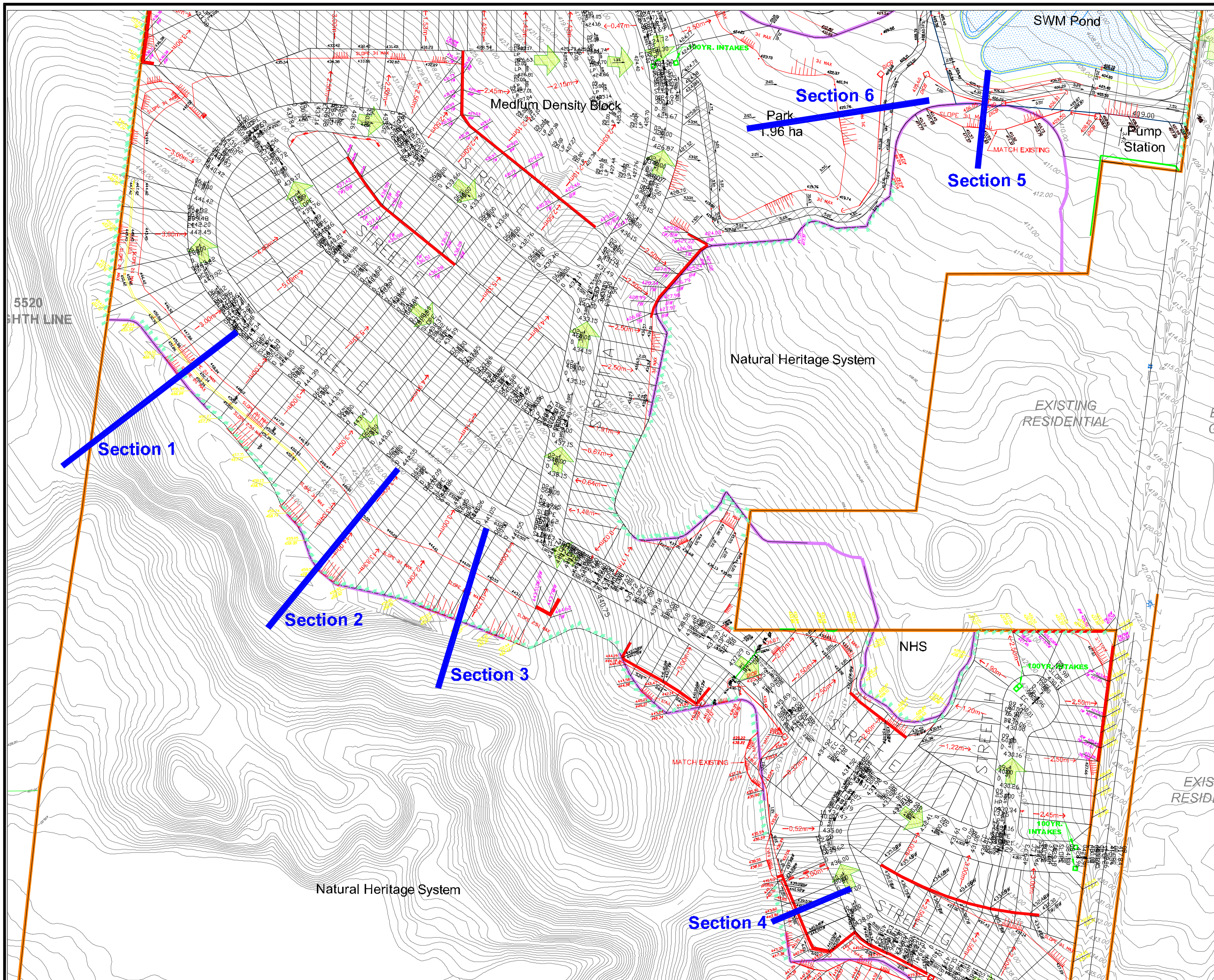
Stephen Chong, P.Eng.
Senior Engineer

Houshang Shad, Ph.D., P. Eng.
Principal

cc. Mr. Ryan Oosterhoff, Mattamy (Erin) Limited

FIGURES

FIGURE 1: ASSUMED CROSS-SECTIONS FOR SLOPE STABILITY ANALYSIS



LEGEND:

Sections

NOTES:

1. Cross-Section locations are approximate.
2. Drawing was provided by DSEL.
3. The drawing should be read in conjunction with the associated report by Shad & Associates Inc. T20828.

CLIENT: **Mattamy (Erin) Limited**	Drawn By: R.H.	TITLE: **ASSUMED CROSS-SECTIONS FOR SLOPE STABILITY ANALYSIS**	Date: June, 2022
	Checked By: H.S.		Project No.: **T20828**
SHAD & ASSOCIATES INC. GEOTECHNICAL, ENVIRONMENTAL AND MATERIALS ENGINEERS, 83 Citation Drive, Unit 9, Vaughan, Ontaruio, L4K 2Z6, Tel: (905) 760-5566, Fax: (905) 760-5567	Datum: -	PROJECT: **Proposed Residential Subdivision** **Erin Property** 5520 8th Line, Erin, Ontario	Figure No.: **1**
	Projection: -		
	Scale: -		

APPENDICES

APPENDIX A: SITE SPECIFIC SEISMIC HAZARDS AS PER NBC 2015

2015 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Site: 43.736N 80.044W **User File Reference:** Erin Subdivision 2022-05-30 18:58 UT

Requested by: Razi Husnain, Shad & Associates Inc.

Probability of exceedance per annum	0.000404	0.001	0.0021	0.01
Probability of exceedance in 50 years	2 %	5 %	10 %	40 %
Sa (0.05)	0.112	0.065	0.038	0.010
Sa (0.1)	0.146	0.088	0.054	0.016
Sa (0.2)	0.132	0.081	0.052	0.018
Sa (0.3)	0.107	0.067	0.044	0.016
Sa (0.5)	0.082	0.053	0.035	0.012
Sa (1.0)	0.047	0.031	0.020	0.006
Sa (2.0)	0.024	0.015	0.010	0.003
Sa (5.0)	0.006	0.004	0.002	0.001
Sa (10.0)	0.003	0.002	0.001	0.000
PGA (g)	0.081	0.048	0.030	0.009
PGV (m/s)	0.066	0.040	0.026	0.007

Notes: Spectral (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are given in units of g (9.81 m/s^2). Peak ground velocity is given in m/s. Values are for "firm ground" (NBCC2015 Site Class C, average shear wave velocity 450 m/s). NBCC2015 and CSAS6-14 values are highlighted in yellow. Three additional periods are provided - their use is discussed in the NBCC2015 Commentary. Only 2 significant figures are to be used. **These values have been interpolated from a 10-km-spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the directly calculated values.**

References

National Building Code of Canada 2015 NRCC no. 56190; Appendix C: Table C-3, Seismic Design Data for Selected Locations in Canada

Structural Commentaries (User's Guide - NBC 2015: Part 4 of Division B)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File 7893 Fifth Generation Seismic Hazard Model for Canada: Grid values of mean hazard to be used with the 2015 National Building Code of Canada

See the websites www.EarthquakesCanada.ca and www.nationalcodes.ca for more information

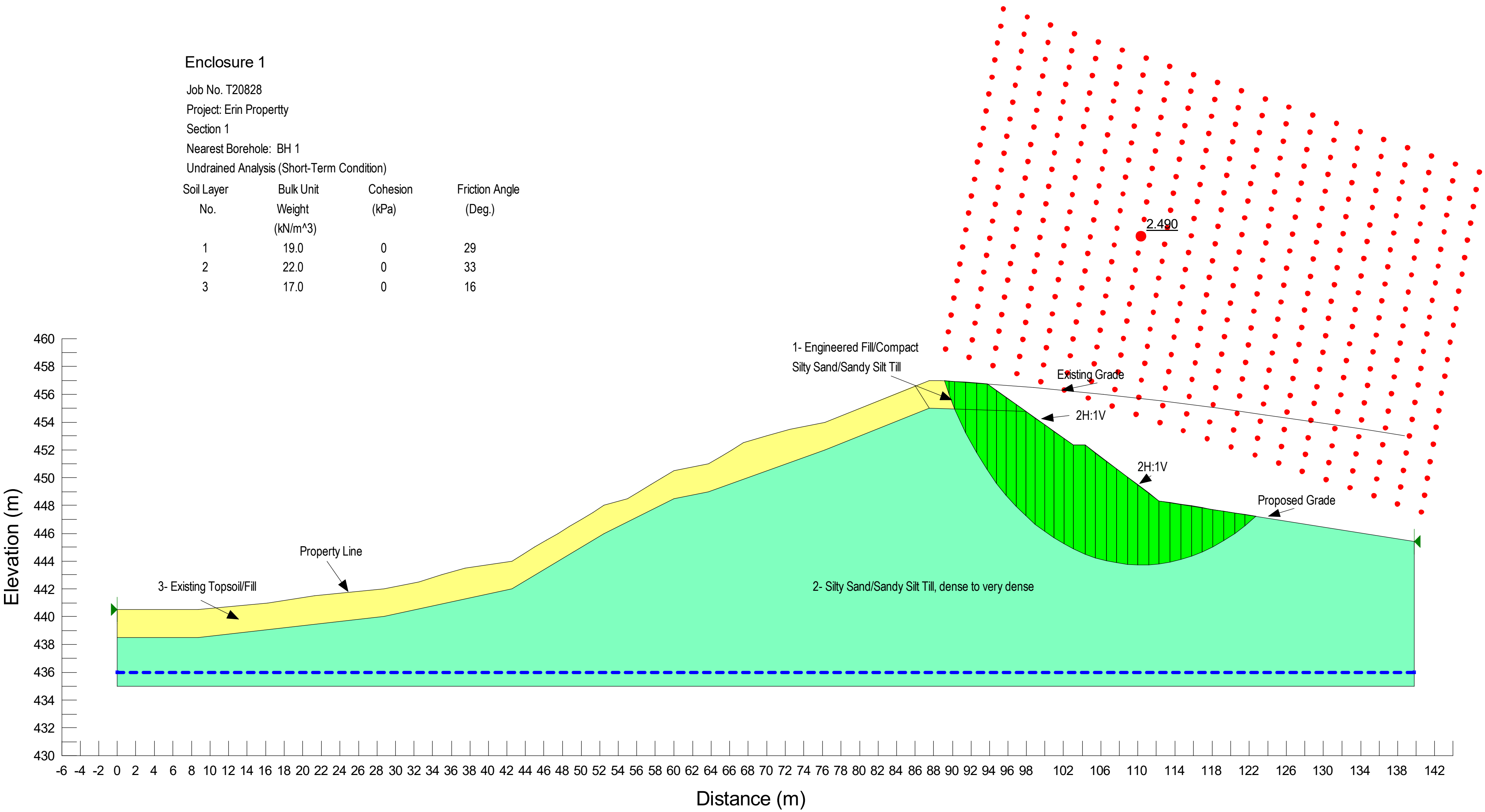
ENCLOSURES

SLOPE STABILITY ANALYSIS RESULTS

Enclosure 1

Job No. T20828
Project: Erin Propertty
Section 1
Nearest Borehole: BH 1
Undrained Analysis (Short-Term Condition)

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



Enclosure 2

Job No. T20828

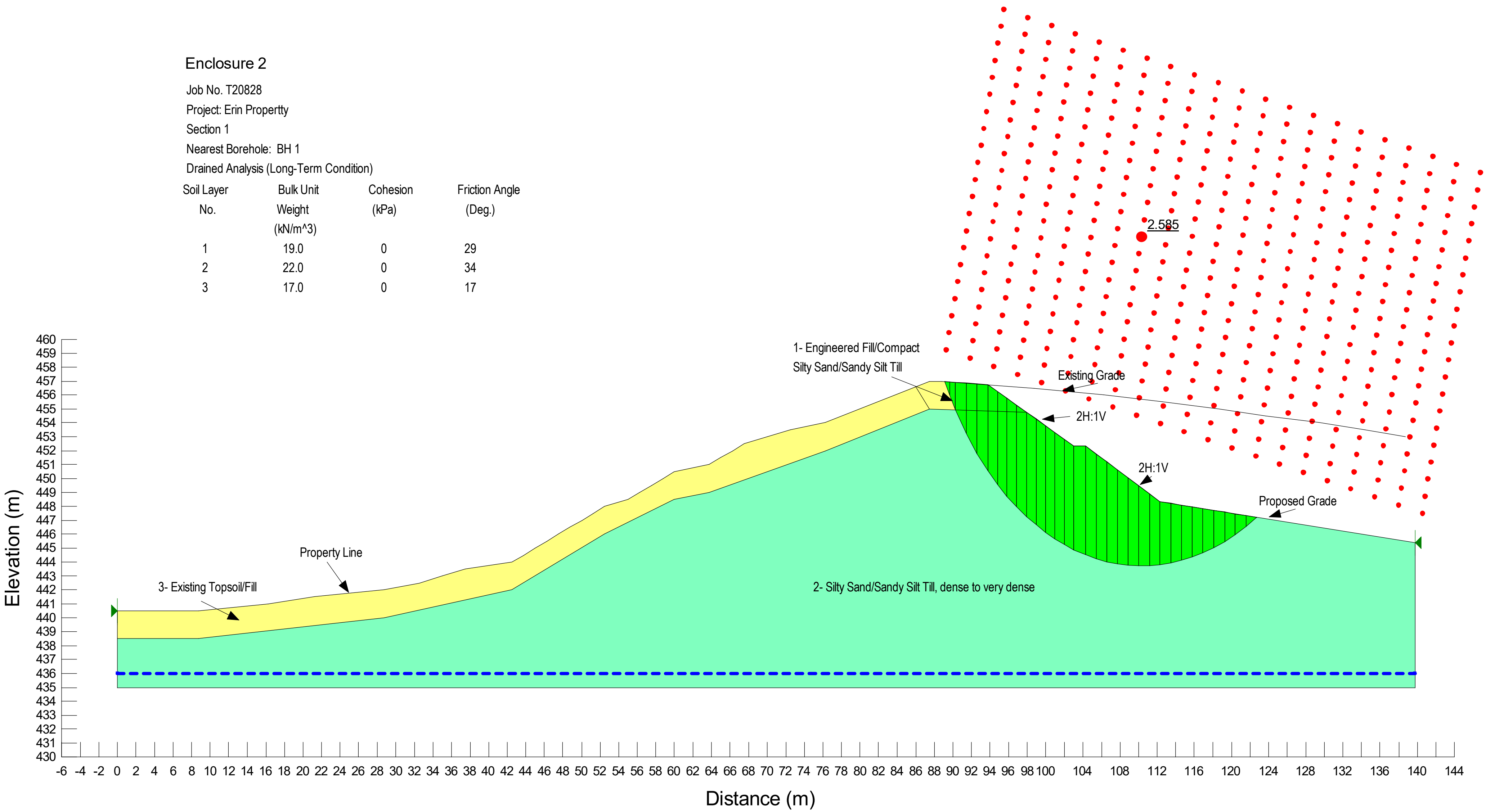
Project: Erin Propertty

Section 1

Nearest Borehole: BH 1

Drained Analysis (Long-Term Condition)

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	34
3	17.0	0	17



Enclosure 3

Job No. T20828

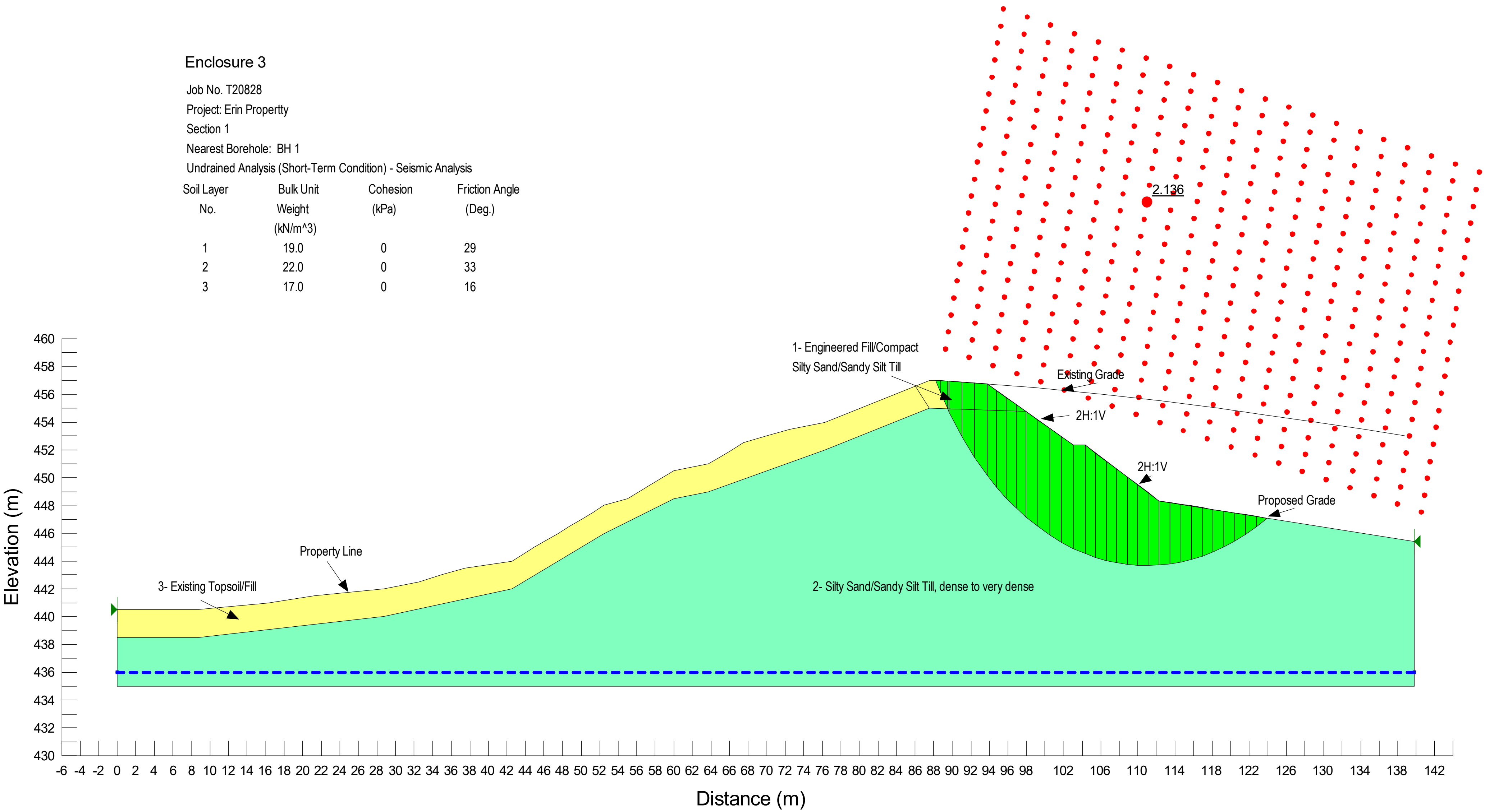
Project: Erin Propertty

Section 1

Nearest Borehole: BH 1

Undrained Analysis (Short-Term Condition) - Seismic Analysis

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



Enclosure 4

Job No. T20828

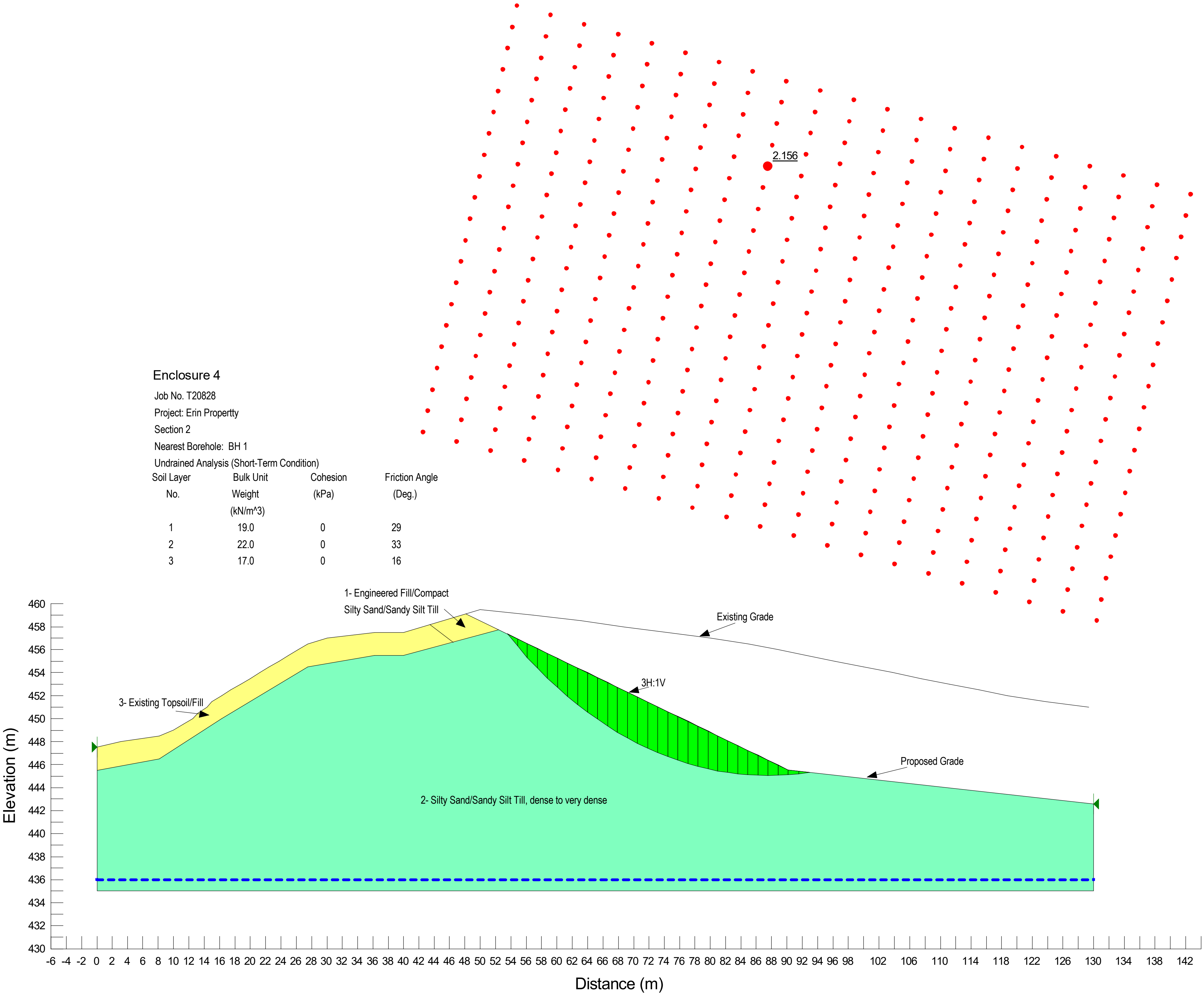
Project: Erin Propertty

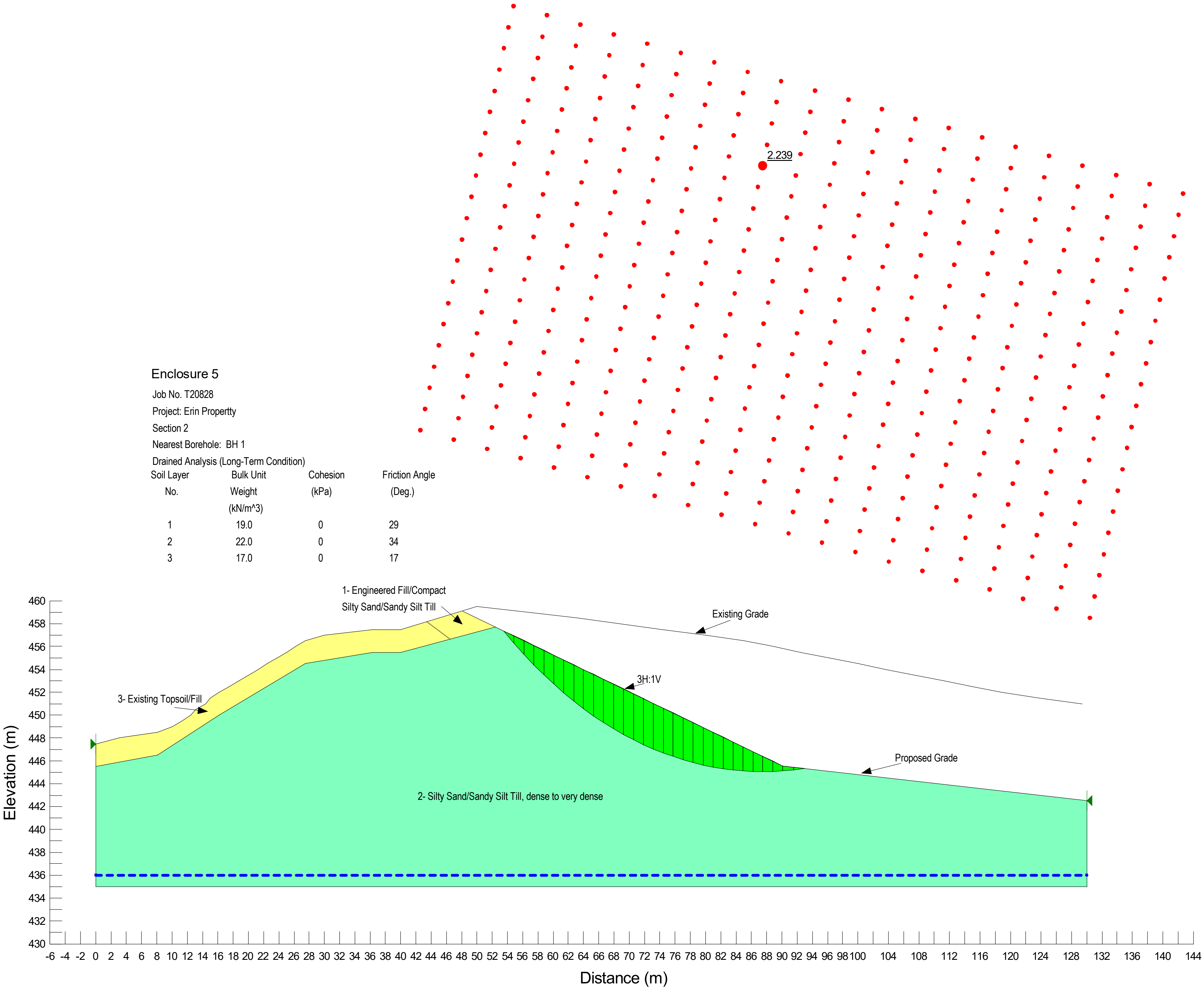
Section 2

Nearest Borehole: BH 1

Undrained Analysis (Short-Term Condition)

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16




2.239
Enclosure 5
Job No. T20828
Project: Erin Propertty
Section 2
Nearest Borehole: BH 1
Drained Analysis (Long-Term Condition)
Soil Layer No. | Bulk Unit Weight (kN/m^3) | Cohesion (kPa) | Friction Angle (Deg.)
1 | 19.0 | 0 | 29
2 | 22.0 | 0 | 34
3 | 17.0 | 0 | 17
1- Engineered Fill/Compact
Silty Sand/Sandy Silt Till
Existing Grade
3H:1V
3- Existing Topsoil/Fill
Proposed Grade
2- Silty Sand/Sandy Silt Till, dense to very dense
Elevation (m)
Distance (m)
460
458
456
454
452
450
448
446
444
442
440
438
436
434
432
430
-6 -4 -2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 104 108 112 116 120 124 128 132 136 140 144

Enclosure 6

Job No. T20828

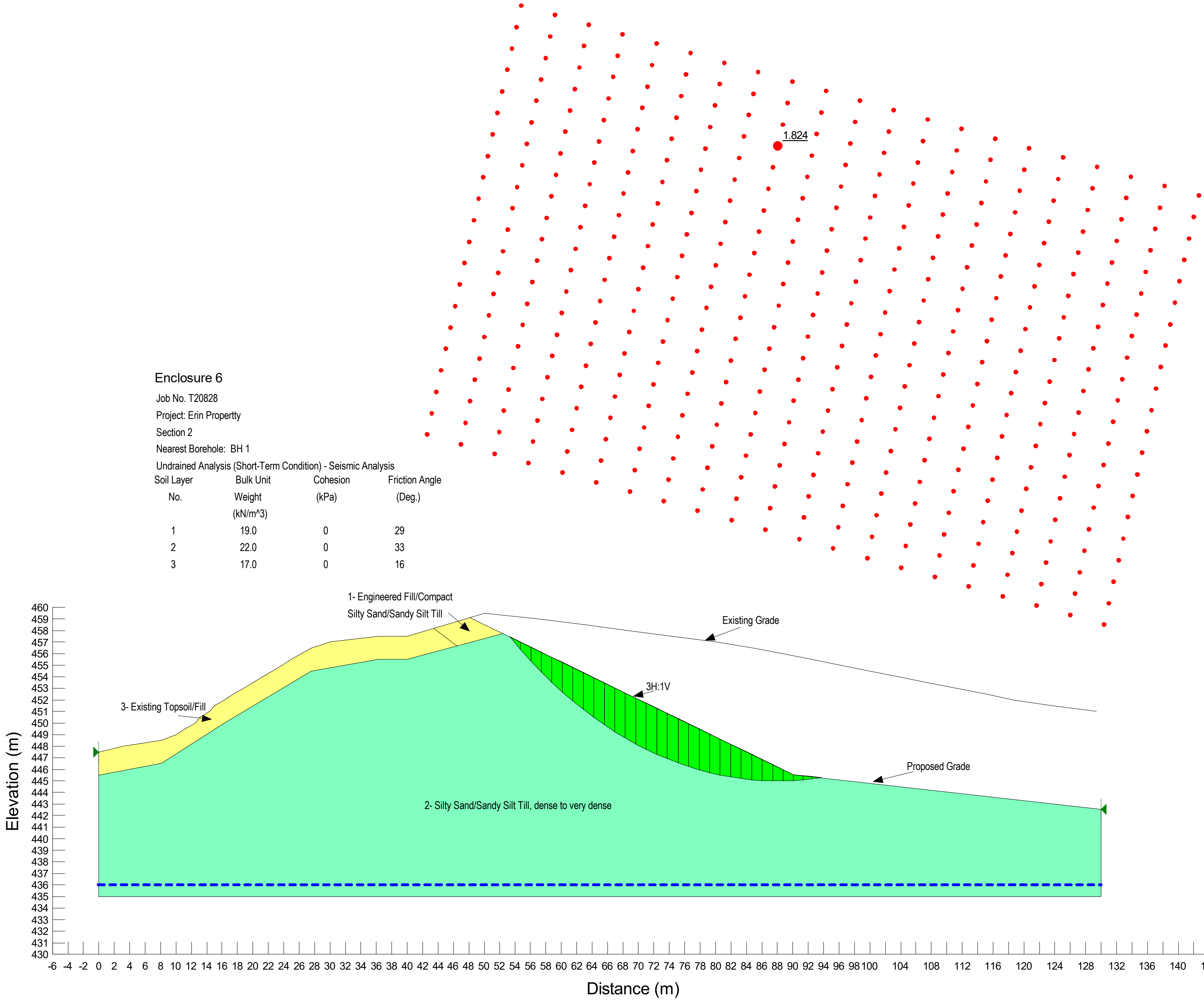
Project: Erin Propertty

Section 2

Nearest Borehole: BH 1

Undrained Analysis (Short-Term Condition) - Seismic Analysis

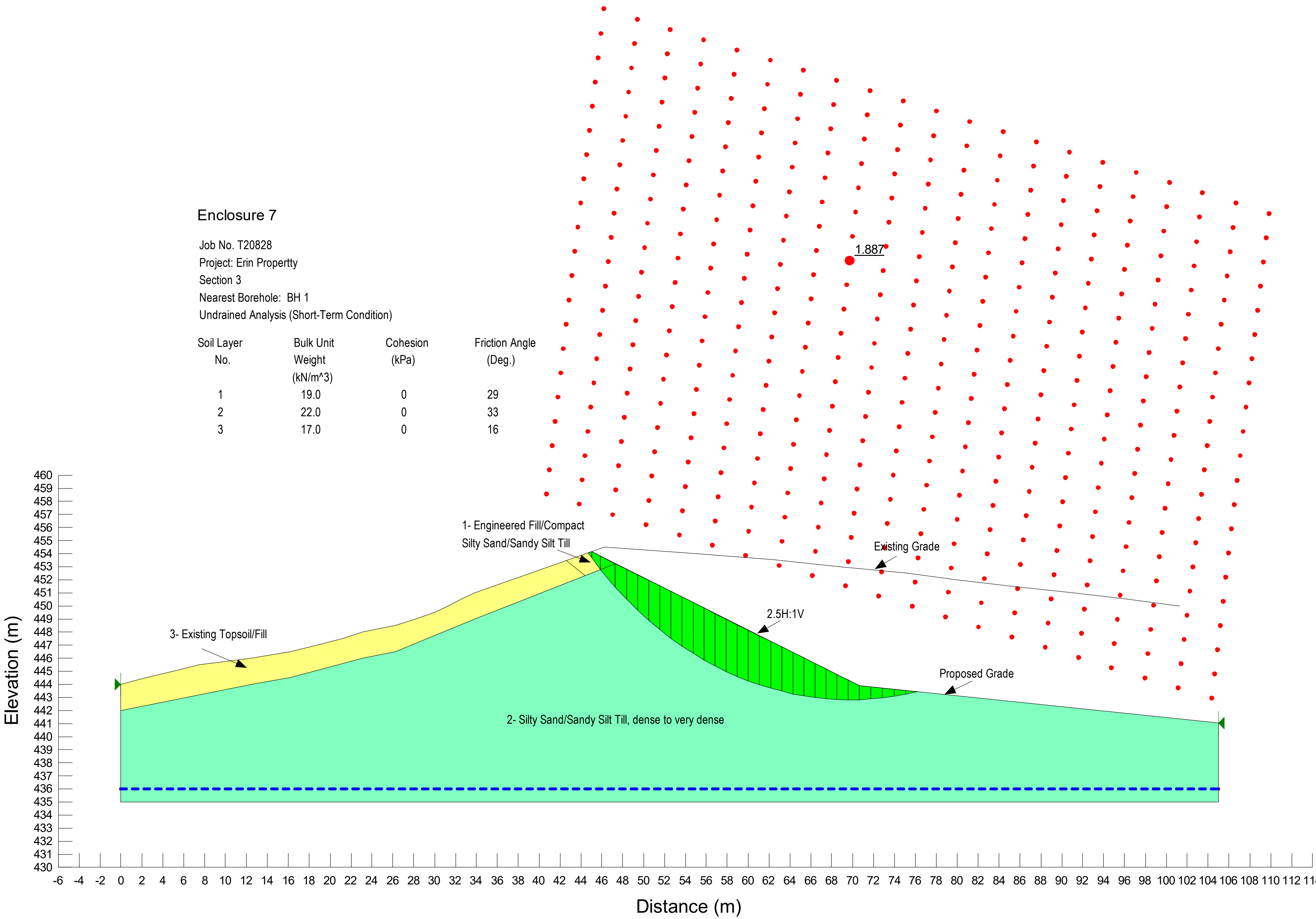
Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16

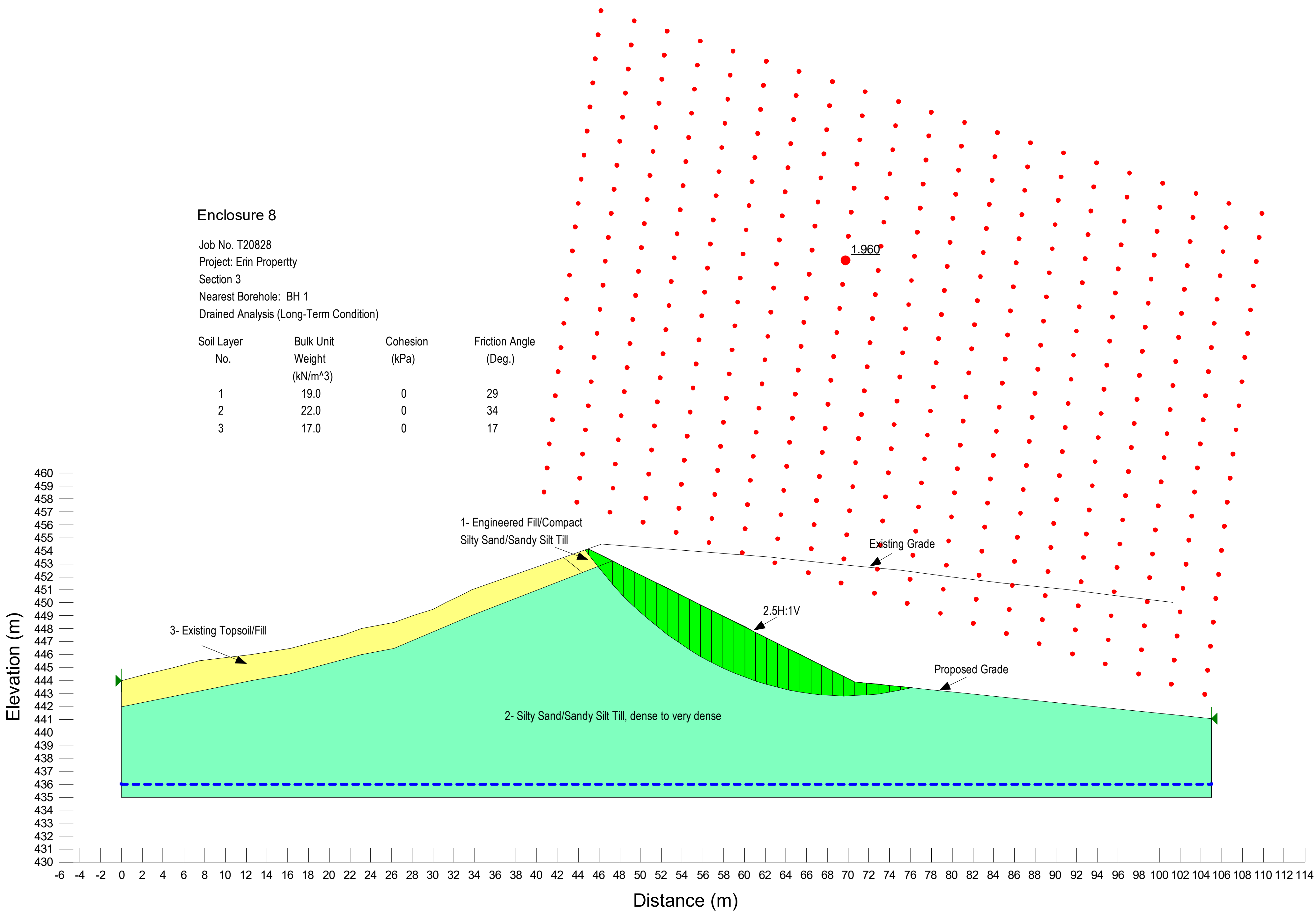


Enclosure 7

Job No. T20828
Project: Erin Propertty
Section 3
Nearest Borehole: BH 1
Undrained Analysis (Short-Term Condition)

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



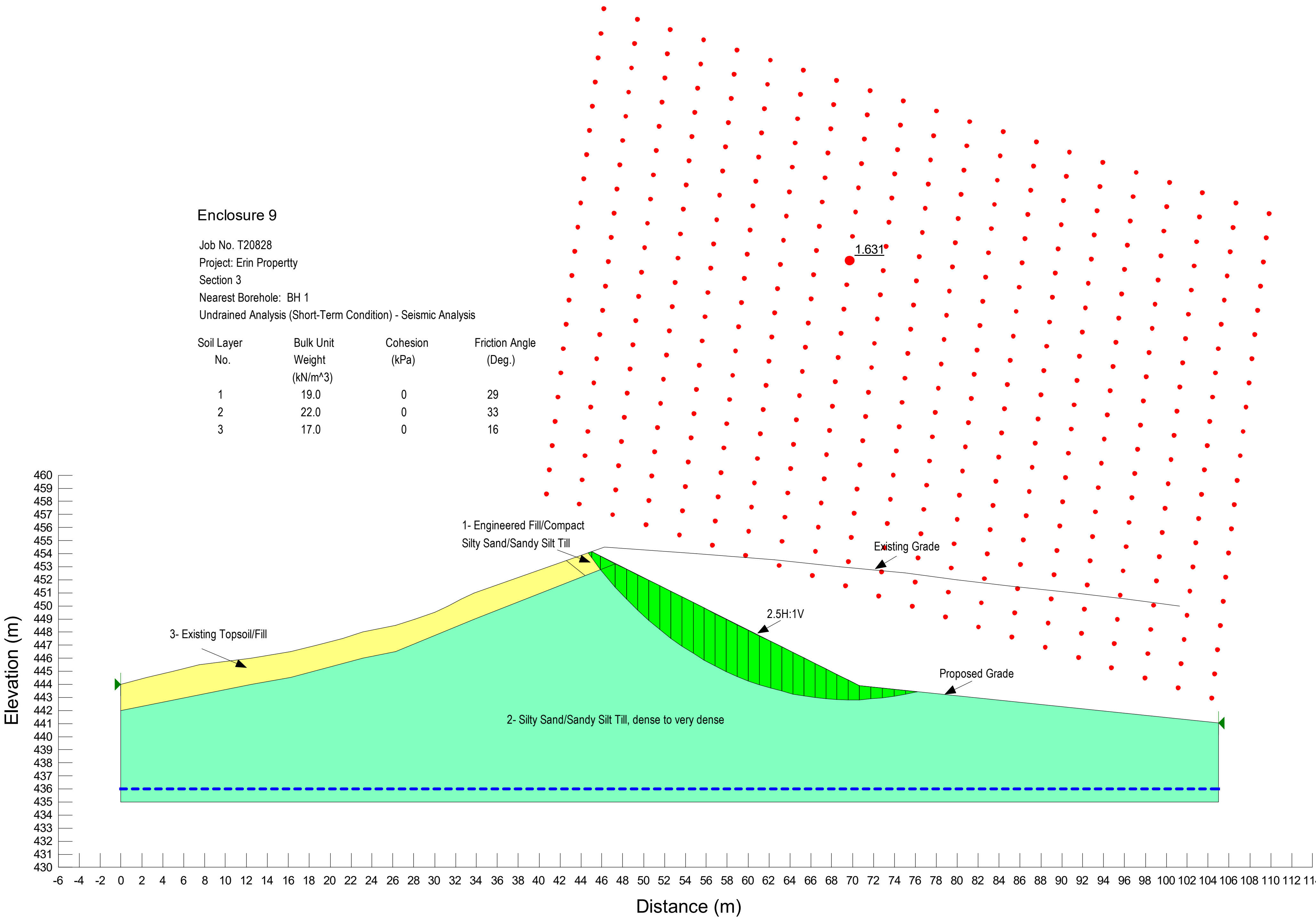


Enclosure 8
Job No. T20828
Project: Erin Propertty
Section 3
Nearest Borehole: BH 1
Drained Analysis (Long-Term Condition)
Soil Layer No. | Bulk Unit Weight (kN/m^3) | Cohesion (kPa) | Friction Angle (Deg.)
1 | 19.0 | 0 | 29
2 | 22.0 | 0 | 34
3 | 17.0 | 0 | 17
1.960
1- Engineered Fill/Compact Silty Sand/Sandy Silt Till
Existing Grade
2.5H:1V
3- Existing Topsoil/Fill
Proposed Grade
2- Silty Sand/Sandy Silt Till, dense to very dense
Elevation (m)
Distance (m)

Enclosure 9

Job No. T20828
Project: Erin Propertty
Section 3
Nearest Borehole: BH 1
Undrained Analysis (Short-Term Condition) - Seismic Analysis

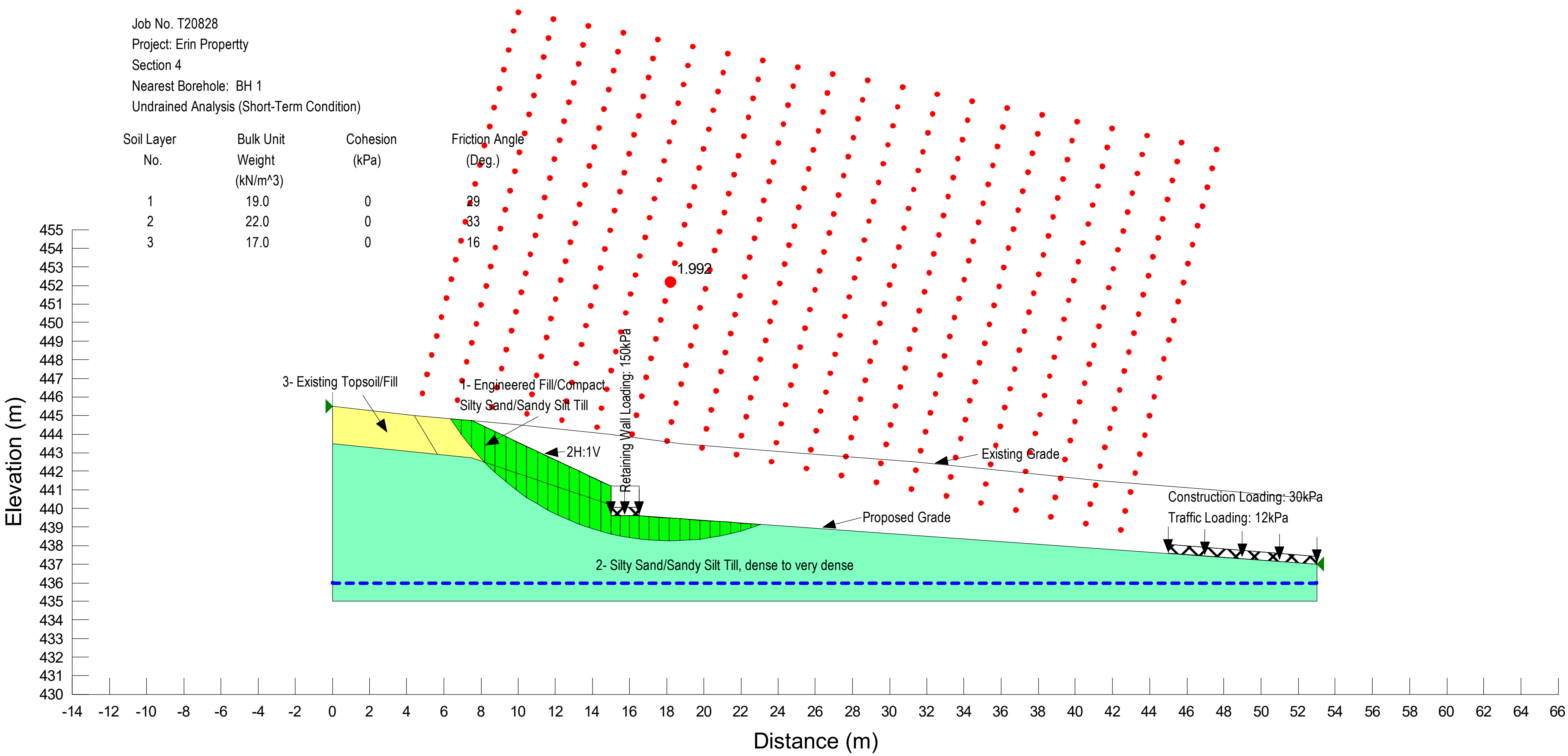
Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



Enclosure 10

Job No. T20828
Project: Erin Propertty
Section 4
Nearest Borehole: BH 1
Undrained Analysis (Short-Term Condition)

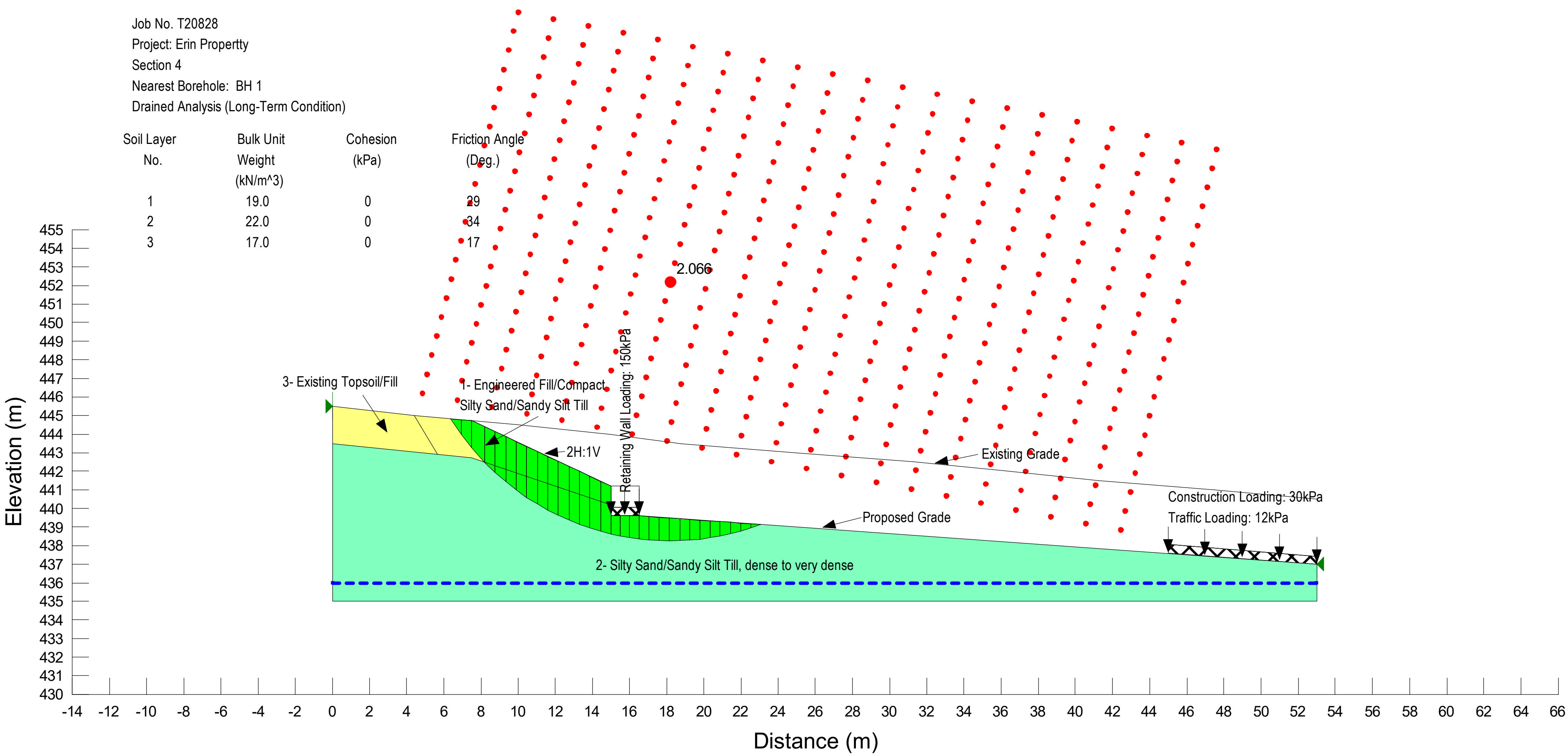
Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



Enclosure 11

Job No. T20828
Project: Erin Propertty
Section 4
Nearest Borehole: BH 1
Drained Analysis (Long-Term Condition)

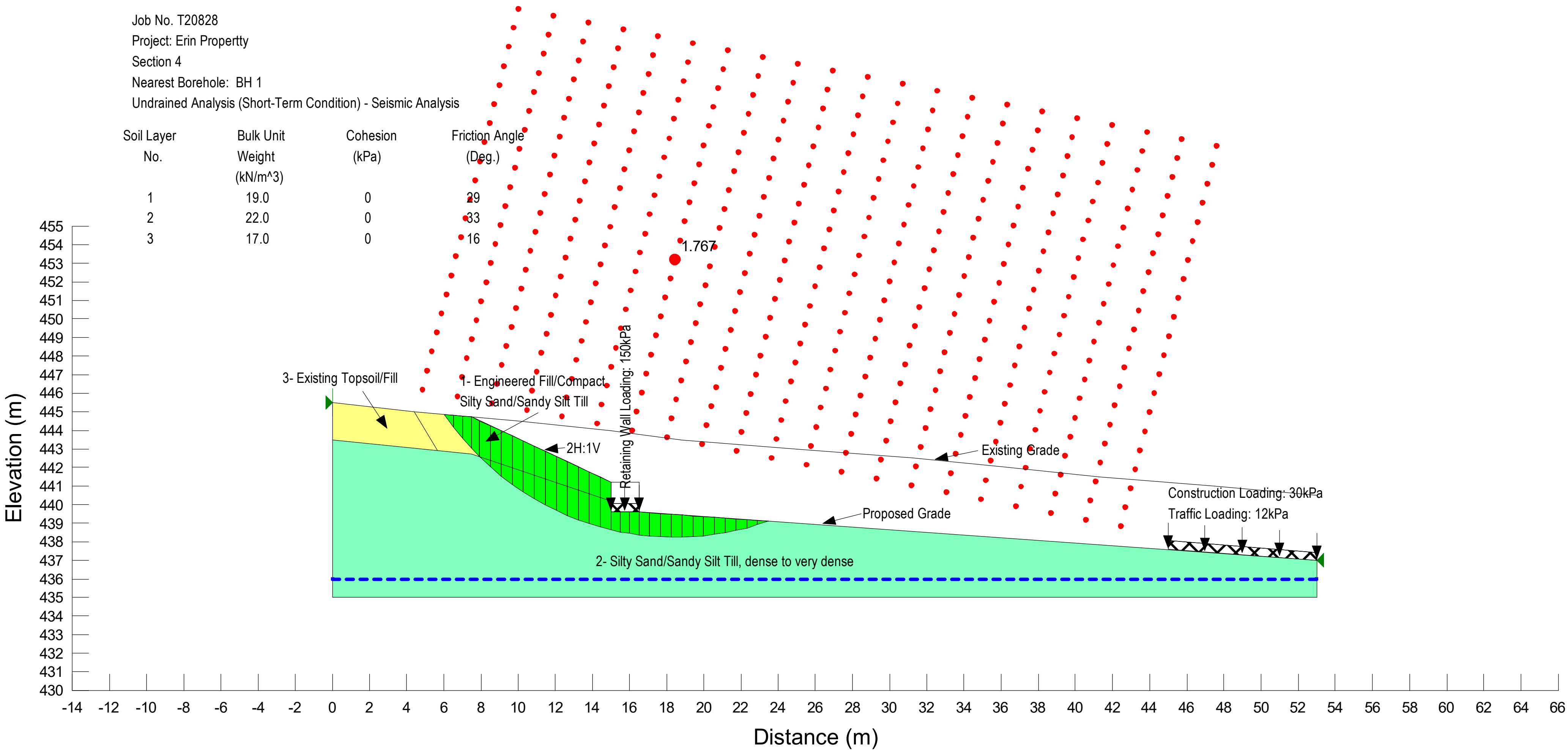
Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	34
3	17.0	0	17



Enclosure 12

Job No. T20828
Project: Erin Propertty
Section 4
Nearest Borehole: BH 1
Undrained Analysis (Short-Term Condition) - Seismic Analysis

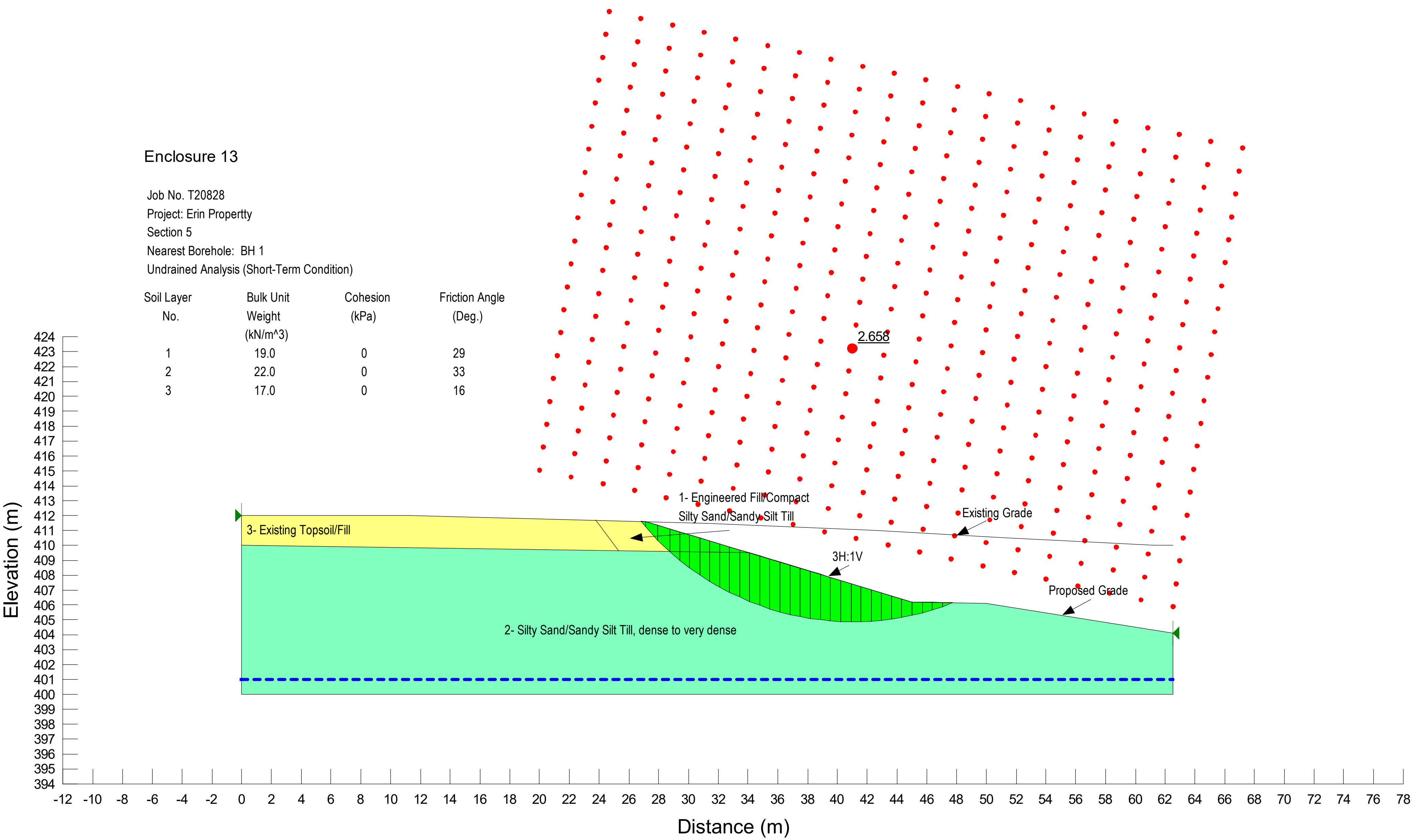
Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



Enclosure 13

Job No. T20828
Project: Erin Propertty
Section 5
Nearest Borehole: BH 1
Undrained Analysis (Short-Term Condition)

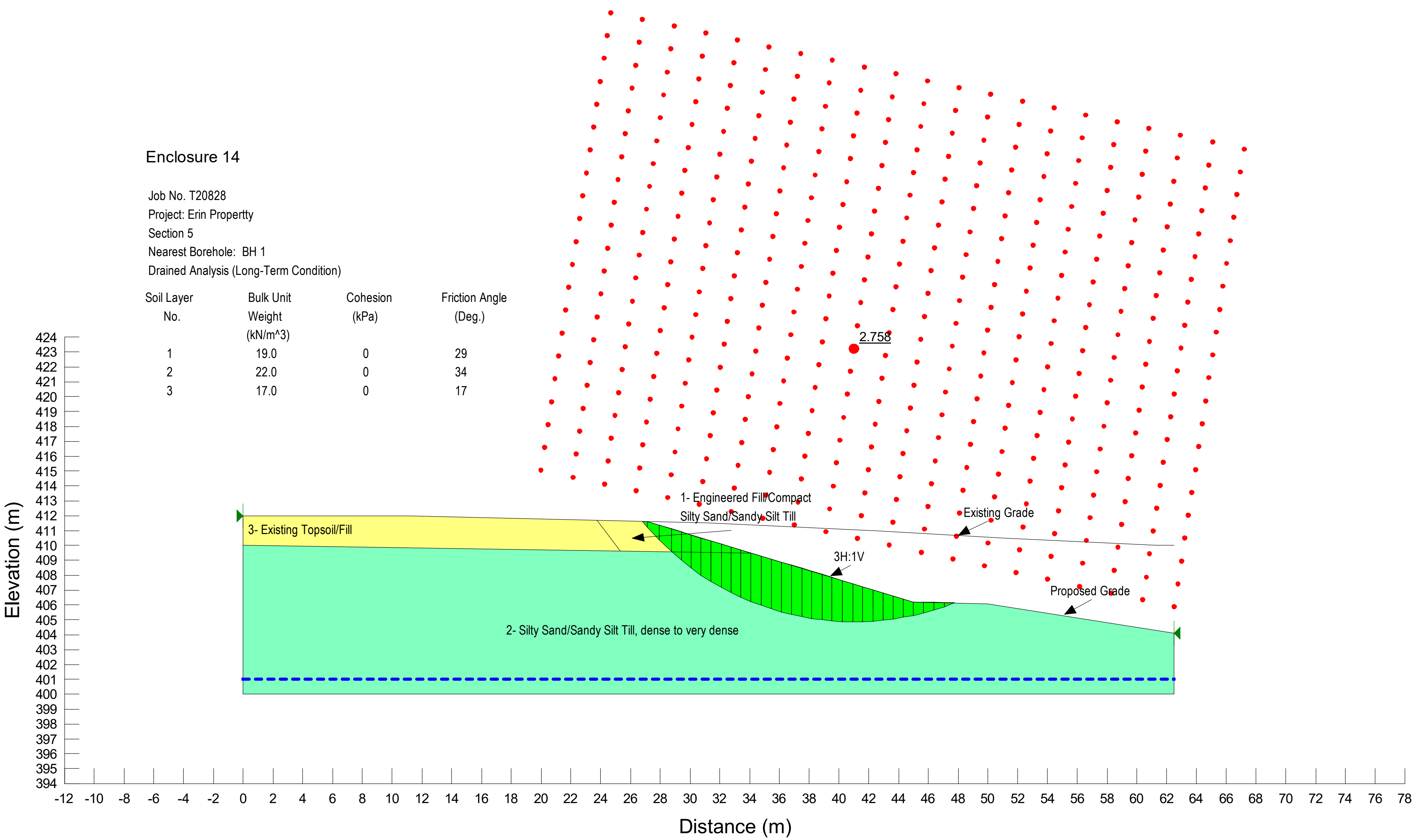
Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



Enclosure 14

Job No. T20828
Project: Erin Propertty
Section 5
Nearest Borehole: BH 1
Drained Analysis (Long-Term Condition)

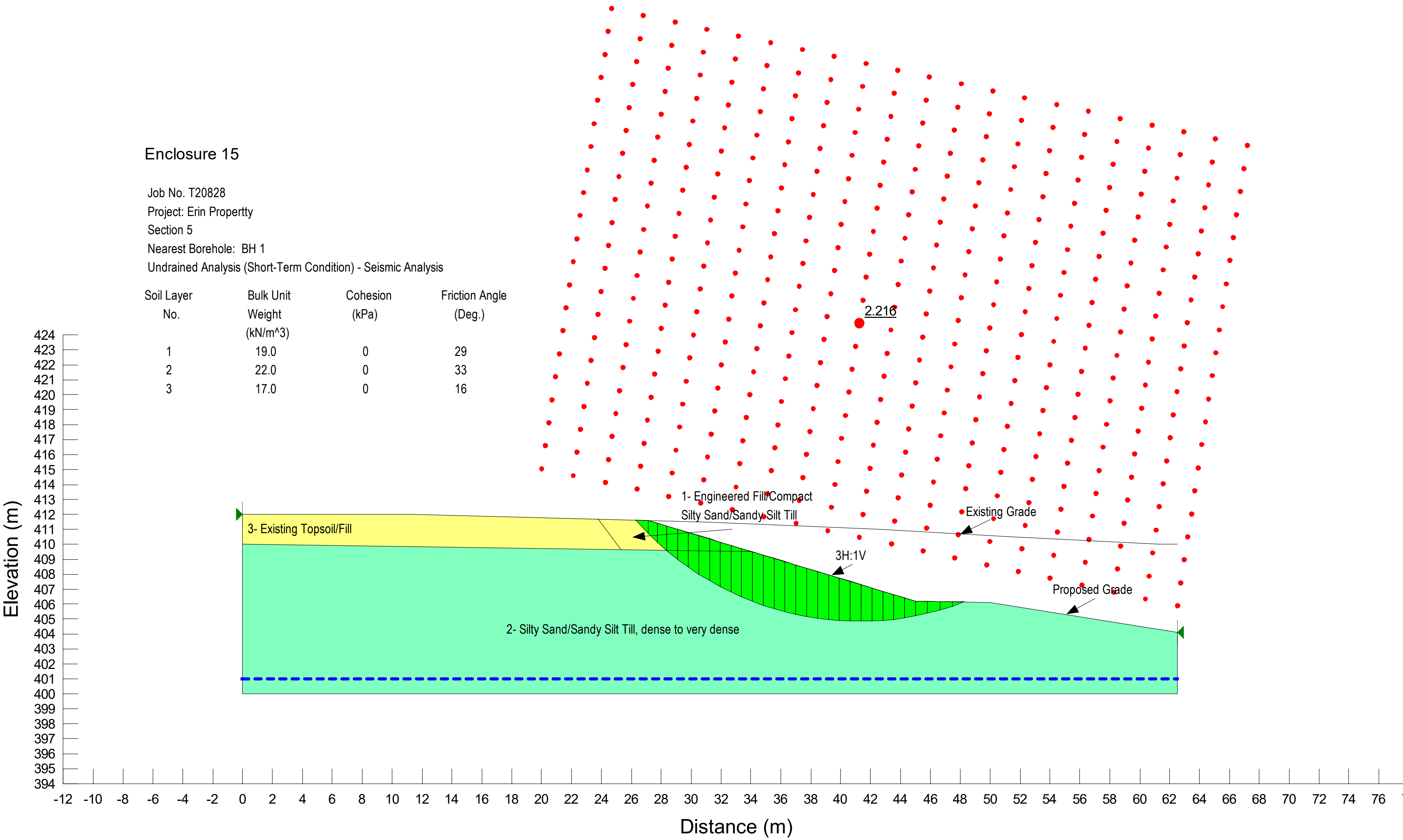
Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	34
3	17.0	0	17



Enclosure 15

Job No. T20828
Project: Erin Propertty
Section 5
Nearest Borehole: BH 1
Undrained Analysis (Short-Term Condition) - Seismic Analysis

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	22.0	0	33
3	17.0	0	16



Enclosure 16

Job No. T20828

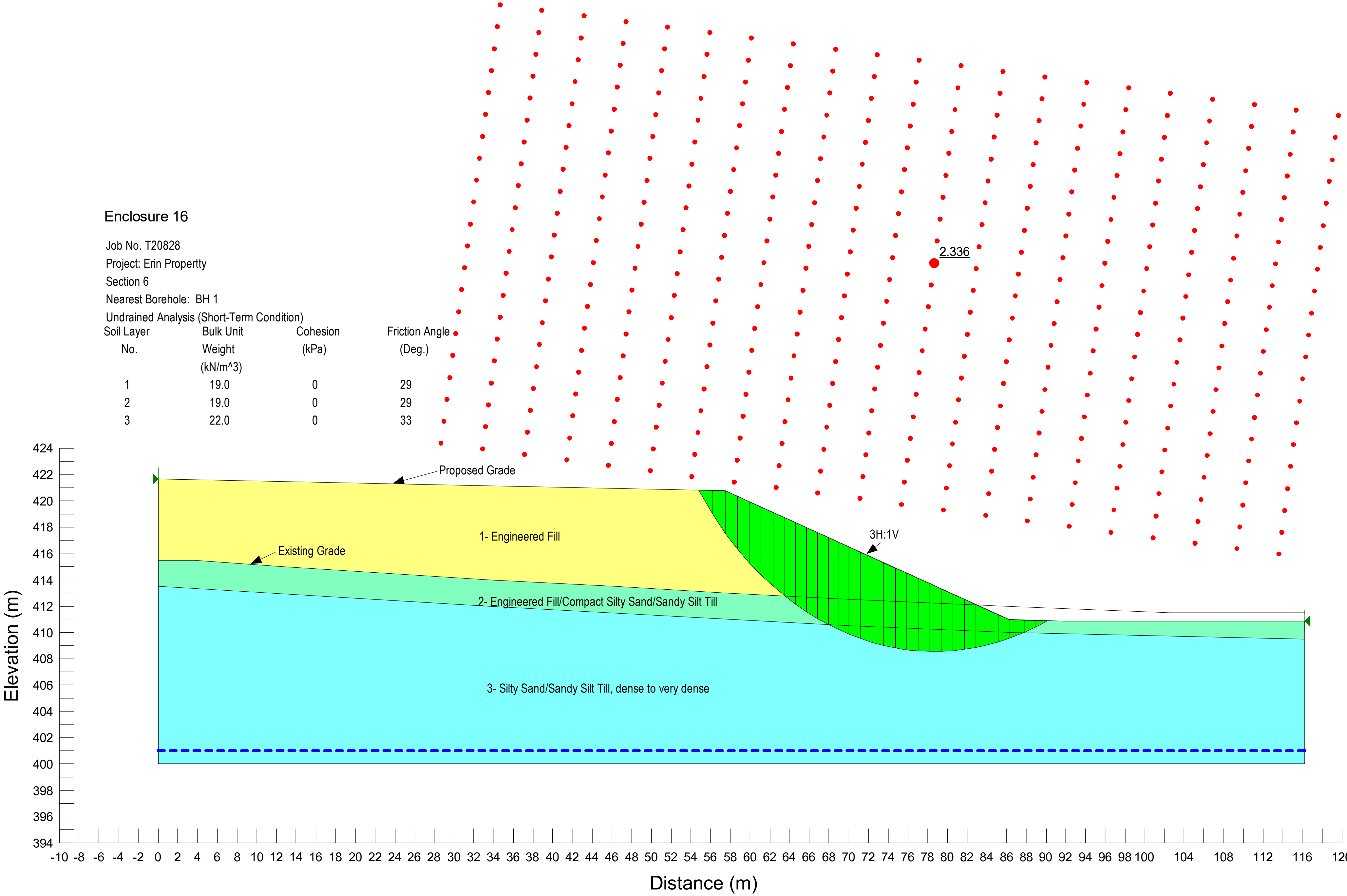
Project: Erin Propertty

Section 6

Nearest Borehole: BH 1

Undrained Analysis (Short-Term Condition)

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	19.0	0	29
3	22.0	0	33



Enclosure 17

Job No. T20828

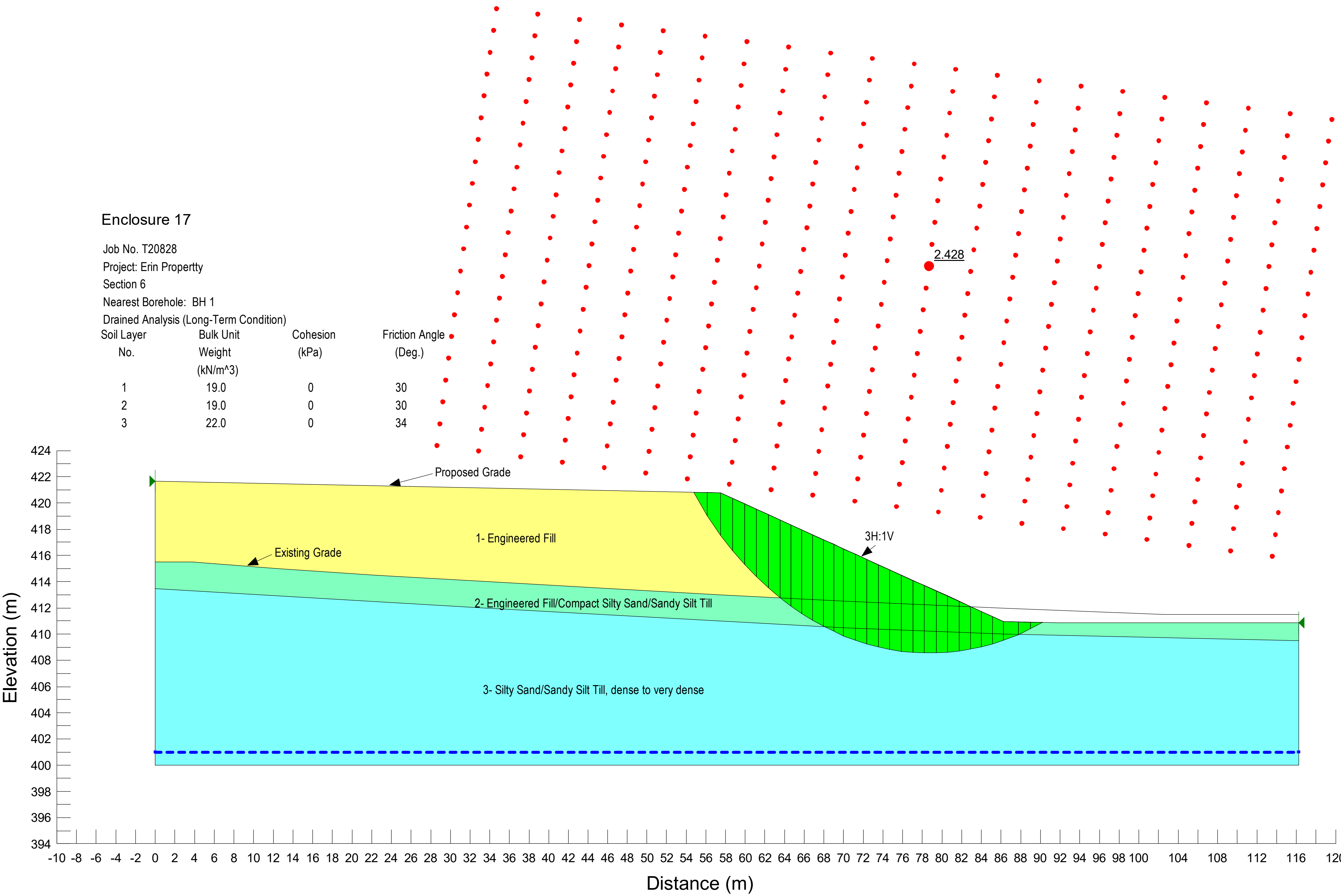
Project: Erin Propertty

Section 6

Nearest Borehole: BH 1

Drained Analysis (Long-Term Condition)

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	30
2	19.0	0	30
3	22.0	0	34



Enclosure 18

Job No. T20828

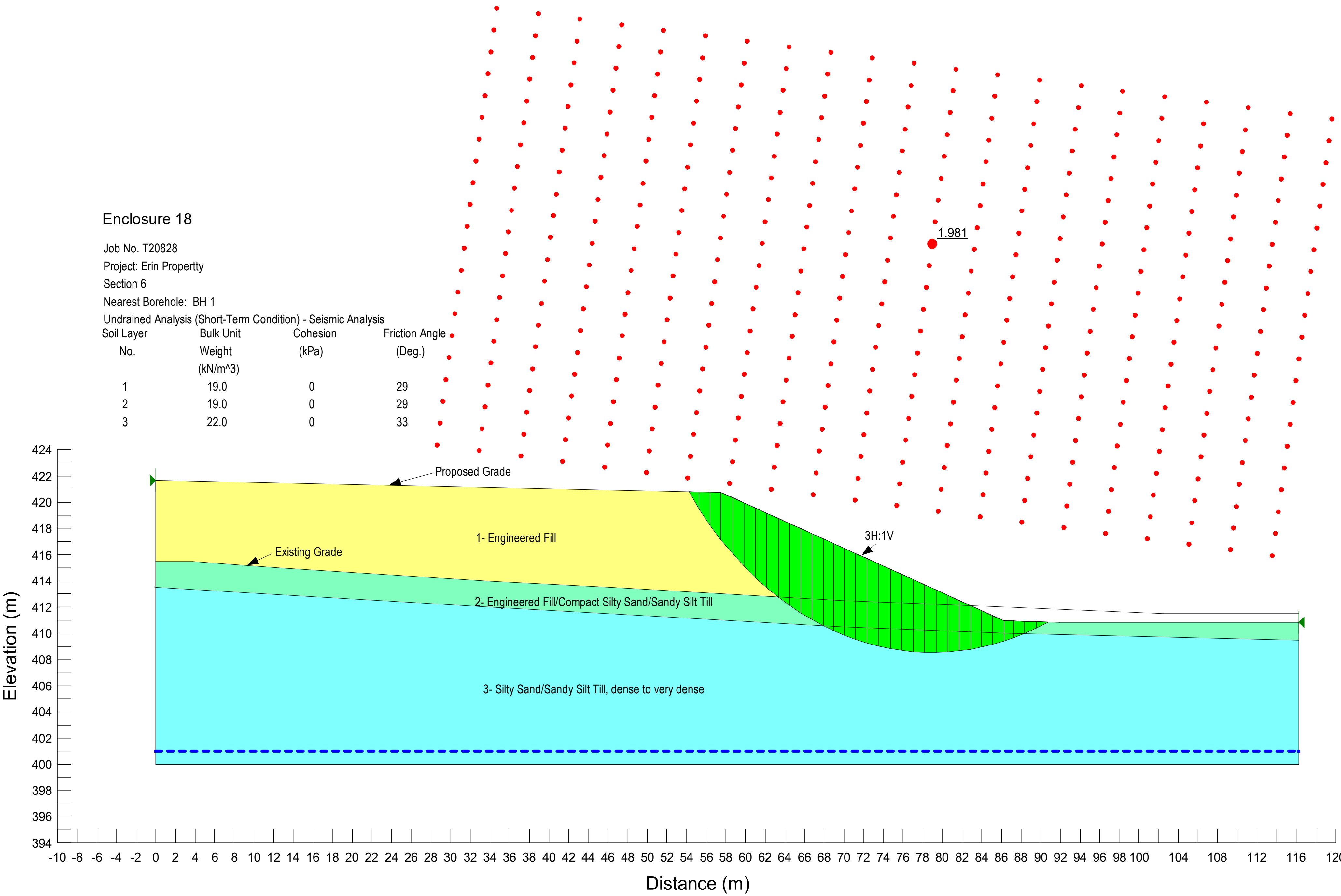
Project: Erin Propertty

Section 6

Nearest Borehole: BH 1

Undrained Analysis (Short-Term Condition) - Seismic Analysis

Soil Layer No.	Bulk Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Deg.)
1	19.0	0	29
2	19.0	0	29
3	22.0	0	33



APPENDIX K

WILDLIFE TUNNEL DETAILS, ACO

Product description

ACO Climate Tunnel (Slotted) KT 500 (11120 & 11121)

For use in crossings installed flush with the surface

The ACO KT 500 Climate Tunnel with slotted upper surface is installed within the road structure, flush with the road surface. The advantages of this system are particularly apparent in difficult terrain conditions, such as where there are ditches on one or both sides of the road or if there are high groundwater levels. The benefits for amphibians and small animals are easily explained: installation flush with the road surface permits minimum crossing distances, uncomplicated entrance areas at road verge level, optimum climatic conditions due to the ingress of water and air and, at the same time, optimum adaptation of tunnel temperature to ambient conditions.

Technical data

System components and dimensions

Installed length = 1000 (11120) and 500mm (11121)

Installed width = 580 mm

Standard installed depth = 520mm

Weights

The standard 1000mm component weighs approx. 260 kg and can be transported and positioned using light construction equipment.

Material

Polymer concrete, characterised by

- high compressive strength and flexural strength
- high chemical resistance
- water penetration depth = 0 mm
- no reinforcement

Stability of shape

The components are inherently stable in shape. Minimal coefficients of expansion permit precise installation without expansion joints.

Load-bearing capacity

The units are certified to BS EN 1433 Load Class D 400.

The properties of polymer concrete guarantee a long service life.

The practical advantages

Ground water

Minimal installation depth ensures that the efficiency of ACO KT 500 Climate Tunnels is not affected by high levels of ground water. Extreme conditions, such as a temporarily flooded tunnel or water flowing through the tunnel from time to time, will not damage the superior polymer concrete material of the tunnel components.

Ditch locations

The ACO Climate Tunnel has a minimal installed depth of just 520mm so it can be installed even where there are ditches, without extensive construction works at the entrances.

Minimum crossing distances

In comparison with all other forms of tunnel crossing system, the ACO Climate Tunnel achieves the shortest possible crossing distance. The tunnel surface is aligned with the surface of the roadway or verges as appropriate to the gradients of the road. The floor of the tunnel exit is 480mm below the upper edge of the verge/roadway. Installation of the KT 500 system can be shown to reduce crossing distances in comparison to other forms of tunnel.

Example 1: Tunnel diameter Ø 1.00m, 1.00m cover, gradient 1:1.5 = 4.50m reduction in distance using the KT 500 system.

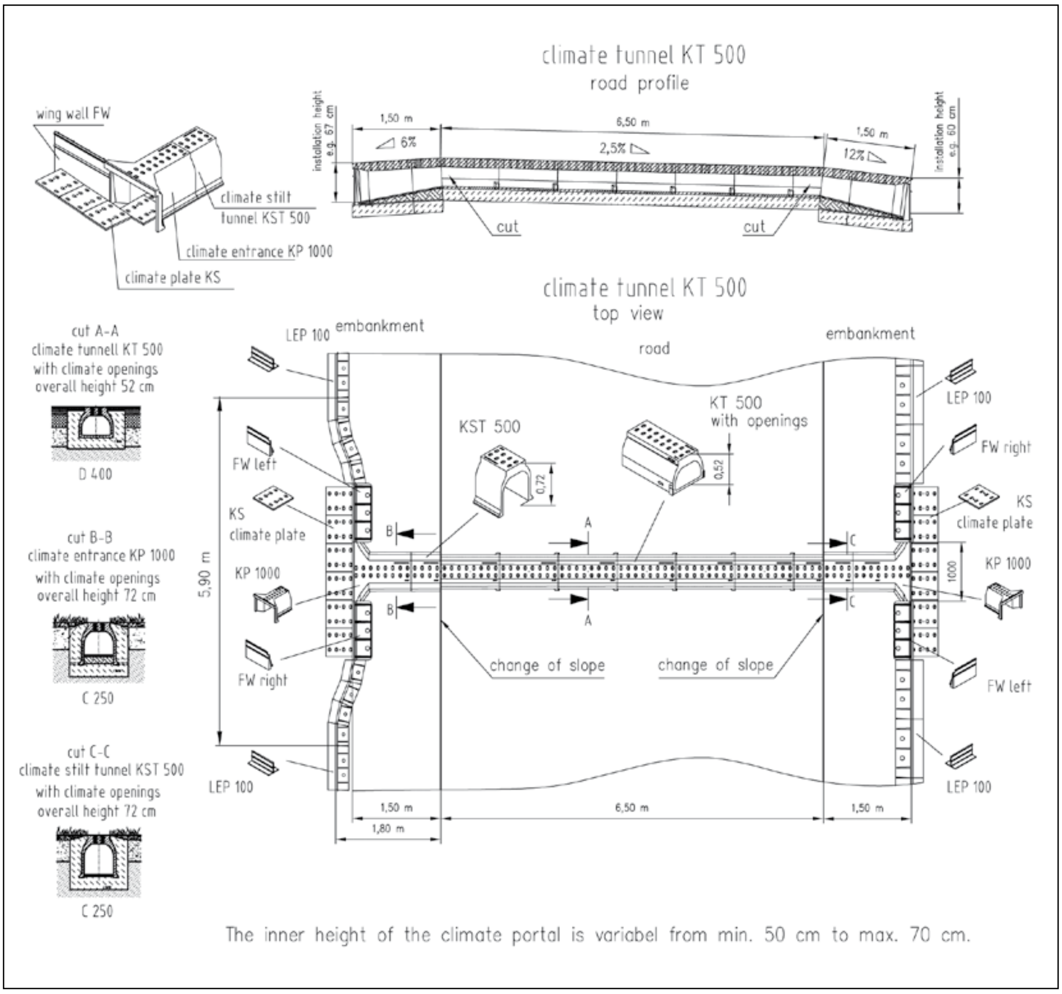
Example 2: Tunnel diameter Ø 1.50m at foot of gradient, 5m embankment height, gradient 1:1.5 = 13.50m reduction in crossing distance using the KT 500 system.

Protection of amphibians

Smooth, non-absorbent surfaces with minimal thermal conductivity form an ideal contact area for amphibians. ACO KT 500 Climate Tunnels are manufactured without using metal reinforcement, eliminating the possibility of disorientation to animals arising from distortion of magnetic fields. Optimally designed slotted openings at surface level permit the ingress of rainwater, thus not only serving the moisture needs particularly of younger amphibians, but also creating a thermal effect, helping the crossing temperature to approximate closely to ambient temperatures. The airflow in crossings often presents problems in closed systems due to “central dryness” inside the tunnel. The slots in the ACO Climate Tunnel form numerous air-inlet openings so that airflow is minimised and vital moisture is retained. Surveys have shown that this system is effective in use.

Installation

ACO Climate Tunnel (Slotted) KT 500 (11120 & 11121)



The slotted ACO Climate Tunnel is installed flush with the carriageway, cycle path or verges and adjusted to suit any relevant gradients The system can be installed in existing roadways by closing one lane at a time. The installation trench has a maximum width of 1000mm and depth of 700mm. The KT 500 system is bedded in concrete in accordance with good practice and the adjacent road surfaces are then repaired.

For detailed information please refer to the installation recommendations for the slotted ACO Climate Tunnel below.

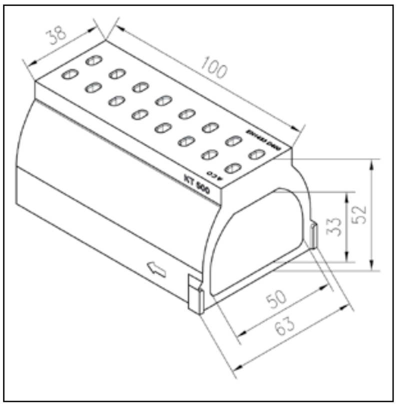
Maintenance

The ACO Climate Tunnel is made from polymer concrete, a homogenous material resistant to various chemicals and salts. The product is manufactured without reinforcement. Even cut surfaces retain all their original material properties. Cover gratings are not necessary. When properly installed, maintenance is limited to flushing the contact surfaces at intervals of several years. In heavily forested areas such flushing is found to be necessary at 3 to 5 year intervals; under favourable conditions the amphibian contact surfaces are flushed naturally by the effects of rainwater. Regular checks should be made to ensure that the system continues to function efficiently. At minimum this should include a visual inspection prior to spring migration periods. A maintenance plan should be developed to keep the system free of accumulations of vegetation and leaves.

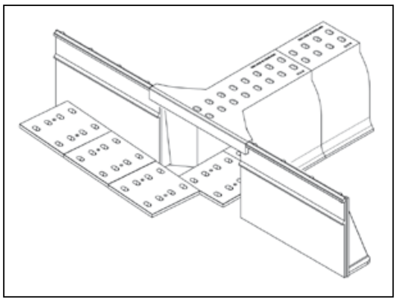
Recommendations/notes on installation

ACO Climate Tunnel (Slotted) KT 500 (11120 & 11121)

Installation: flush with surface



KT 500 climate tunnel



KP 1000-700 climate tunnel entrance with entrance wings and climate plates

General notes

These are general guidelines on the installation of ACO KT 500 Climate Tunnels in carriageway surfaces.

Specific details of an installation should always be determined by the designers, taking into account all local conditions.

The ACO KT 500 Climate Tunnel should fulfil two purposes:

a) amphibians and small animals should be able to cross the road without danger,

b) static and dynamic loads from traffic must be accommodated.

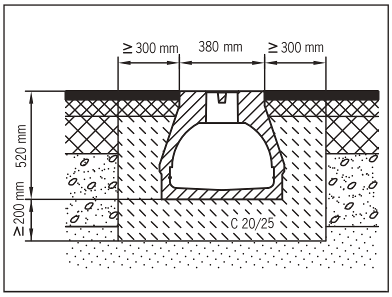
When installing ACO Climate Tunnels the latest versions of the following technical standards should be observed insofar as they apply to the specific installation:

- compliance with the applicable load-bearing class in accordance with BS EN 1433 “Drainage channels for vehicular and pedestrian areas”,
- compliance with the requirements of the Highways Agency “Specification for Highway Works” Section 517 – Linear Drainage Channel Systems.

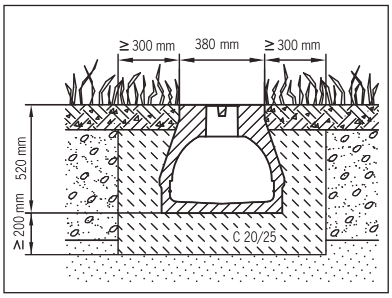
Recommendations for laying out/installation

ACO Climate Tunnel (Slotted) KT 500 (11120 & 11121)

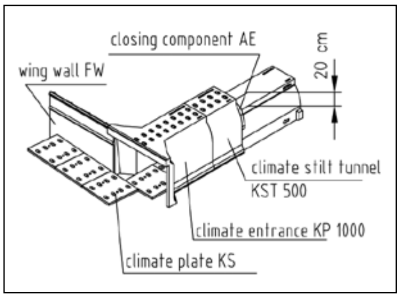
Installation: flush with surface



Installation detail – roadway



Installation detail – verge



ACO KT 500/KP1000-700 P (typical)

Tips on laying tunnels

ACO Climate Tunnels are available with or without ventilation slots. This description of installation flush with the surface is for tunnels with ventilation slots. The upper surface of the tunnel sits flush with the upper surface of the carriageway. Bevelled cutting of tunnel elements (by the customer or on site) is required to suit changes in gradient within the length of the tunnel.

Climate tunnels are laid so that they extend outside the road surface into the verge areas. ACO KP 1000 Tunnel Elements are installed flush with the tunnel and at the same level at both ends. These are installed in the course of concreting work.

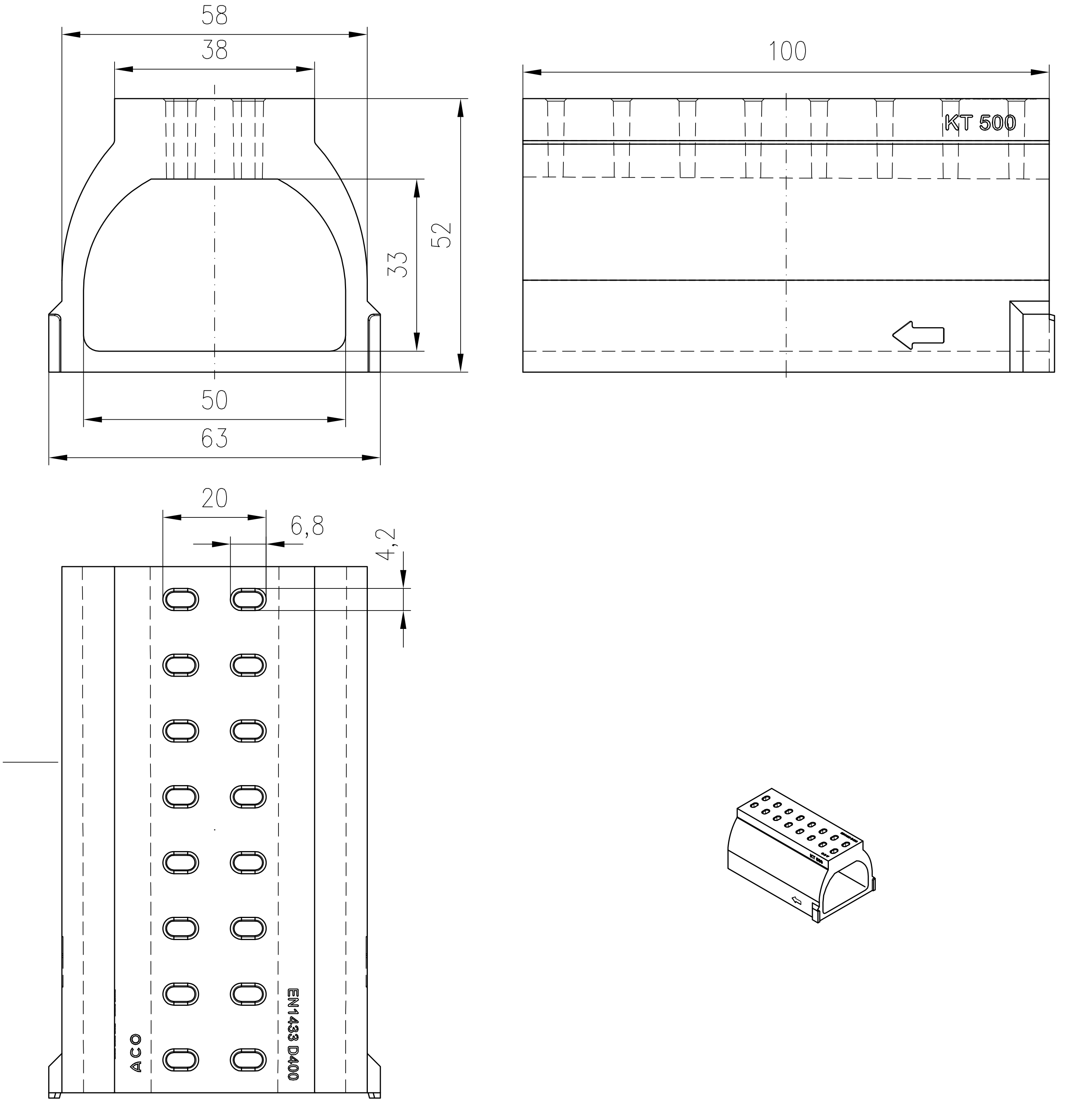
The KT 500 and KP 1000 combined length should extend through the width of the road safety verges (normally 1.50m from the edge of the roadway).

The following should also be taken into account:

- siting of the guide wall.
- the use of closed elements where specially required. Please refer to the details of our Blind Climate Tunnel or to our Design Services Department for further details.

Installation:

1) When carriageway asphalting is completed, cut the road surface out to a width of 1000mm or to suit the width of the digger bucket or other special requirements.
2) For installation flush with the road surface, excavate the trench for the foundation to a depth of approx. 700mm.
3) Lay a C 20/25 concrete footing of approx. 200mm thickness and compact onto a load-bearing foundation.
4) Position the tunnel and entrance elements on this concrete footing to the correct line and level.
5) Lay the individual elements so that they butt tight up against each other.
6) Fill the voids on each side of the tunnel with C 20/25 concrete and compact evenly in layers on both sides. The final top level of the concrete will depend on such factors as the thickness of the asphalt binding and top courses. The top of the concrete should be approx. 100mm below the upper surface of the tunnel.
7) Next, repair the roadway surface either side of the tunnel, preferably by pouring asphalt. If rolled asphalt is used, do not roll over the line of the channel. Take care to ensure that the space is not overfilled or underfilled. The KT 500 system can also be installed before the top course is laid. Care should be taken to ensure an even height at the join between the surface of the tunnel and the top course and that there are also expansion joints at the edge of the concrete surround.
8) Lay a gravel bed in the verge areas before and after the tunnel.
9) Clean any residual concrete and/or asphalt from the floor of the climate tunnel.



Index	Datum	Benennung	Name

Werkstoff: Polymerbeton

Gewicht:

zul. Abweich.:

Oberfläche

ACO Severin Ahlmann
GmbH & Co. KG
24755 Rendsburg • Postfach 320
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Fax 04331 354-130
www.aco-pro.de

	Datum	Name
Gezeichnet:	26.01.2011	wreimers
Geprüft		
Update:	11.02.2011	

Massstab: 1:10

Masseinheit: cm

Projektion: ISO-E

ACO PRO Klimatunnel KT 500
1m lang Bauhöhe 52cm mit Öffnung

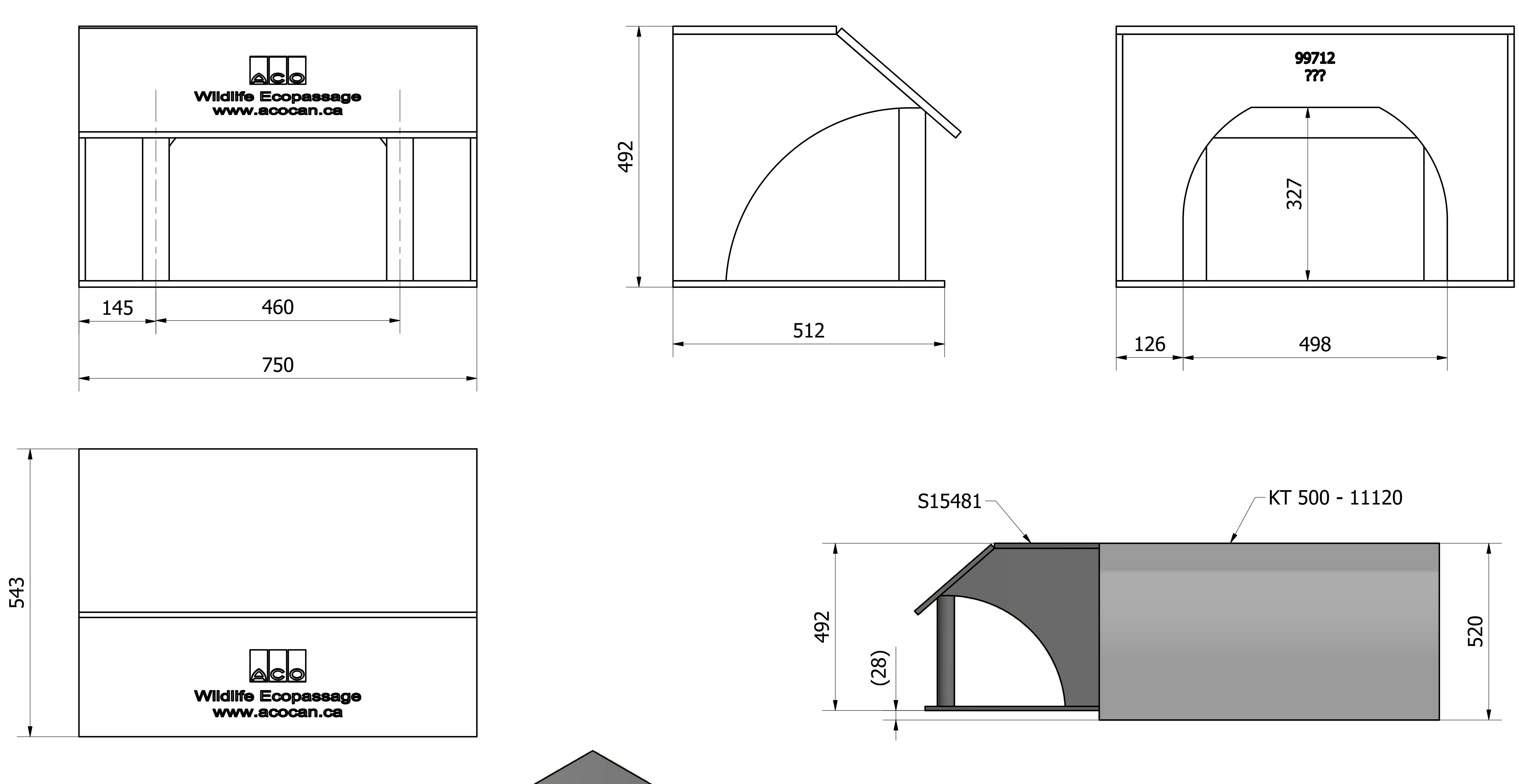
Art.-Nr. 11120

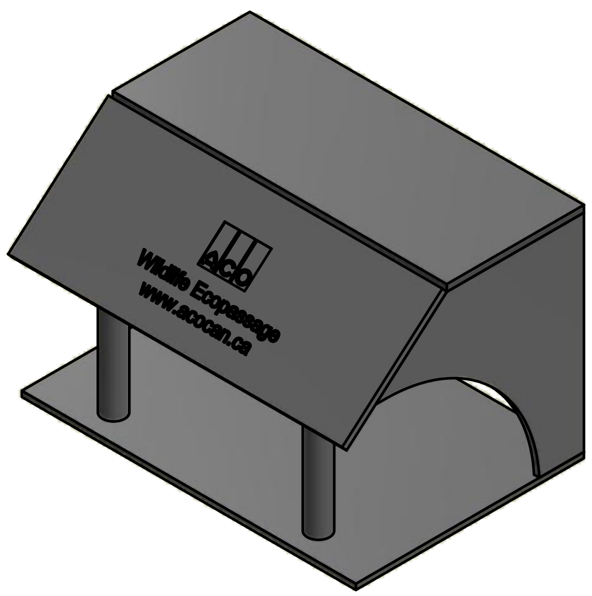
Zeichnung Nr.: G1-K32-0135-00-00

Index 000

Ersatz für:

Ersetzt durch:





Material	Mass N/A	ACO Industries Tábor s.r.o.
Tolerance TKV_06	Tolerance for welding	Průmyslová 1158, 391 02 Sezimovo Ústí, www.aco-industries.cz, Tel.: 381474600, Fax: 381632550

	Date	Name
Created by	9.5.2019	jdivis
Reviewed by		
Update		

Scale

Projection: ISO-E

KT 500 Wildlife

Entrance tunnel

S15481

Drawing NO. N321-2180-00-00

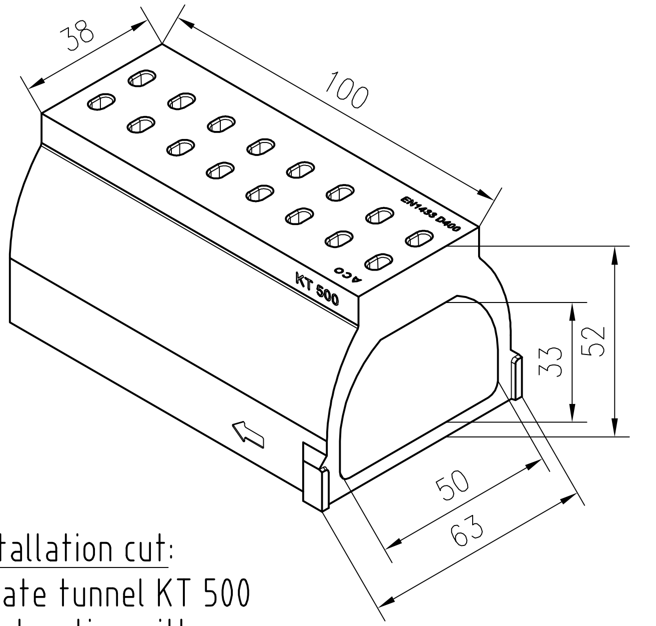
Index

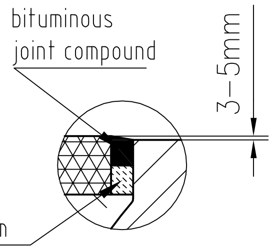
List:1 /1

A3

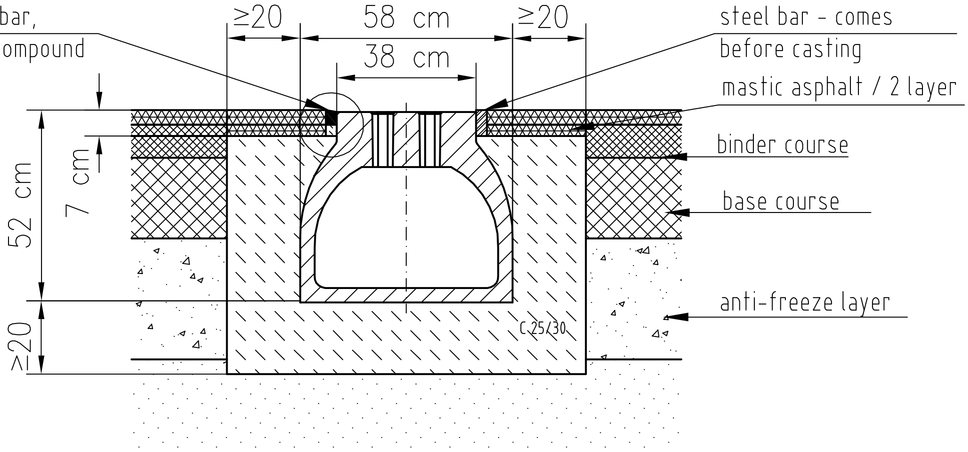
perspective:

climate tunnel KT 500
Art.-Nr. 11120





installation cut:
climate tunnel KT 500
construction with
climate openings
road area D 400



Index	Datum	Benennung	Name

Werkstoff:	Gewicht:
zul. Abweich.:	Oberfläche

ACO Wildlife

ACO Funki GmbH
Postfach 320, 24755 Rendsburg
Telefon: 04331 354-900
Telefax: 04331 354-910
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	Datum	Name
Gezeichnet:	07.03.2011	wreimers
Geprüft		
Update:	11.02.2011	

Massstab: 1:20

Masseinheit: cm

Projektion: ISO-E

climate stilt tunnel KT 500
1m long with openings

Art.-Nr. 11120 / flush mounted D400

Zeichnung Nr.: G1-E32-0135-00-02-W

Index: 000

Ersatz für:

Ersetzt durch: