

**Amherst Island Wind Energy  
Project,  
Erosion and Sediment Control  
and Stormwater Management  
Plan Report, Phase 4**



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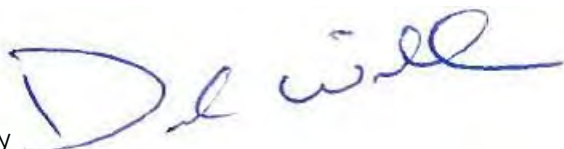
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1609-60595

July 10, 2017

## Sign-off Sheet

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Prepared by  \_\_\_\_\_  
(signature)

**Dave Williams, P.Eng.**  
**Water Resources Engineer**

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## 1.0 INTRODUCTION

to assess the need for and, if necessary, provide a plan detailing erosion and sediment control (ESC) and stormwater management (SWM) measures associated with the proposed development of the Amherst Island Wind Project (herein referred to as the “Project”). This brief is intended to address the requirements for SWM measures as described in Section H of the project’s REA Approval (REA Number 7123-9W9NH2).

This report focuses on the proposed ESC and SWM measures for construction of the Concession Road 2 entrance to the Central Staging Area and Substation. Previous documentation relating to the Central Staging area and Substation Access Roads is included in the *Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report, Phase 1*, Stantec Consulting Ltd. (October 2016), (*Phase 1 SWM Report*). *Previous documentation relating to the Central Staging Area Stormwater Management Controls is included in the Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report, Phase 2*, Stantec Consulting Ltd. (February 2017) (*Phase 2 SWM Report*).

This ESC/SWM Report summarizes the assessment of potential hydrologic impacts associated with the construction phase (i.e., ESC) and operational phase (i.e., SWM) of the Project. Potential hydrologic impacts assessed include changes to the quality and/or quantity discharged to the surface or sub-surface receiving systems. The objective of the report is to demonstrate that the Project design and proposed mitigation measures associated with the construction and operation phases of the Project, as described in the REA Application, detailed engineering design, and herein, are sufficient to minimize any potential impacts to environmental features within the Project area and, further, to provide details on the mitigation measures and control measures that will be implemented.

### 1.1 STUDY APPROACH

The study approach involved the following components:

- A qualitative assessment of existing hydrologic conditions of the area and receiving systems.
- A review of the proposed Project activities as described in the REA Application with an emphasis on assessing potential for impacts associated with changes in hydrology.
- A semi-quantitative analysis of existing, construction, and proposed conditions to determine potential for short-term or long-term effects on receiving systems and mitigative approaches, if necessary.
- Development of an erosion and sediment control (ESC) strategy outlining the anticipated approach to minimize impacts related to construction.

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## 1.2 BACKGROUND INFORMATION

A variety of sources have been referenced during the preparation of this ESC/SWM Report, including project-specific documentation, such as the various reports submitted in support of the REA application, and more general industry-standard design guidance documentation and/or literature references, as follows:

### General Guidance Documentation / Literature

- *Low Impact Development Stormwater Management Planning and Design Guide*, Credit Valley Conservation and Toronto and Region Conservation, 2011
- *Erosion and Sediment Control Guideline for Urban Construction (ESC Guidelines)*, Greater Golden Horseshoe Conservation Authorities (GGHCA), Dec. 2006
- *Stormwater Management Planning and Design Manual (SWMPD Manual)*, Ontario Ministry of the Environment and Climate Change (MOECC), March 2003
- *Guidelines for Evaluating Construction Activities on Water Resources*, Ontario Ministry of the Environment, January 1995

Discussions and conclusions reached herein related to the relevance/significance of impervious coverage and its relative impact on the hydrology of receiving systems are based upon widely available literature, readily obtained in any Internet search for related terms such as “impervious coverage and aquatic systems”. Two excellent examples include:

- *Impacts of Impervious Cover on Aquatic System, Watershed Protection Research Monograph No. 1*, Schueler, T., Center for Watershed Protection, March 2003
- *The Importance of Imperviousness, from Watershed Protection Techniques, Vol.1, No.3 – Fall 1994*, Schueler, T., Centre for Watershed Protection, 1994

### Project-Specific Consultation / Documentation

- *Amherst Island Wind Energy Project - Eves Property Man-made Ditch Realignment Design Brief* Stantec Consulting Ltd. (July 2017)
- *Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report, Phase 3*, Stantec Consulting Ltd. (June 2017)
- *Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report, Phase 2*, Stantec Consulting Ltd. (February 2017)
- *Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report, Phase 1*, Stantec Consulting Ltd. (October 2016)
- *Hydrogeological Investigation – Proposed Amherst Island Wind Farm*, Stantec Consulting Ltd., January 2016
- *Amherst Island Wind Energy Project: Dock Construction Stormwater Management Brief*, Stantec Consulting Ltd., December 2015



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- *Supplementary Geotechnical Investigation – Proposed Amherst Island Wind Farm*, Stantec Consulting Ltd., September 2015
- *Amherst Island Wind Energy Project: Invista Dock – Drainage Assessment*, Stantec Consulting Ltd., August 2015
- *Geophysical Investigation to Map bedrock in Amherst Island, Ontario*, Geophysics GPR International Inc., June 2015
- *Amherst Island Wind Energy Project: Water Assessment and Waterbody Report (WA/WR)*, Stantec Consulting Ltd., April 2013
- *Amherst Island Wind Energy Project: Design and Operations Report (DOR)*, Stantec Consulting Ltd., December 2013
- *Amherst Island Wind Energy Project: Construction Plan Report*, Stantec Consulting Ltd., December 2013

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## **2.0 ASSESSMENT OF POTENTIAL HYDROLOGIC IMPACTS AND MITIGATION – OPERATIONAL PHASE (SWM)**

The proposed works include the installation of an entrance off Concession Road 2, to provide access to the central staging area and substation access roads from the south. The proposed construction also includes a realignment of an existing farm drain underneath the proposed entrance and an associated culvert crossing. The proposed entrance is a critical delivery route for many of the proposed turbine installations.

As described in the *Construction Plan* Report, permanent access roads will be approximately 6 m wide and will not require resizing for the operation phase, with the exception of the entrances off Township or County roads that require wider turning radii, of approximately 50 m, during construction. The access roads will be constructed of engineered compacted fill and/or soil stabilization material. The depth of the roadbed will be approximately 300 mm, subject to geotechnical conditions. Alternatively, soil stabilizer will be utilized with a reduced granular material depth. Details for the access road can be found on Drawing C\_\_\_\_\_.

### **2.1 EXISTING CONDITIONS**

Under existing conditions, the location of the proposed entrance road is cultivated agricultural land, meadow grasses and a grassed line drainage ditch. Runoff drains to the drainage ditch, which conveys flow from east to west, adjacent to Concession Road 2.

### **2.2 PROPOSED CONDITIONS**

The proposed works include the realignment of the existing drainage ditch along Concession Road 2 and the construction of an 80 m entrance off Concession Road 2, providing a connection to the previously approved CSA and Substation access roads (Phase 1 SWM Report). The ditch realignment is documented in the Amherst Island Wind Energy Project – Eves Property Man-made Ditch Realignment (Stantec, July 2017).

### **2.3 SWM ASSESSMENT**

The proposed entrance will result in a minor increase in impervious coverage of the area draining to the drainage ditch adjacent to Concession Road 2. This includes approximately 0.05 ha of permanent access road (80 m long x 6 m wide) and two temporary turning radii off of Concession Road 2 (0.04 ha) to be used during construction. An impervious coverage analysis was completed to determine the effect of impervious coverage to downstream infrastructure. For the purpose of this assessment comparison points were set at the downstream road crossings of a given catchment within which development (i.e., the creation of additional impervious coverage) is proposed (Figures 1 and 2). The analysis then compared existing, during

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construction, and proposed impervious coverages to determine the hydrologic impact of the proposed infrastructure. It is noted that the impervious coverage analysis has accounted for the proposed entrance in addition to all previously approved project infrastructure within the given catchments. The results of the analysis are included in Table 1, below.

**Table 1: Impervious Coverage Summary**

Receivers / Catchment	Drainage Area (ha)	Existing Impervious Coverage / Percent Impervious (ha) / (%)	During Construction Impervious Coverage / Percent Impervious (ha) / (%)	Proposed Impervious Coverage / Percent Impervious (ha) / (%)
15	76.53	0.60 / 0.78	18.27 / 23.87	2.48 / 3.24
23	888.36	5.86 / 0.66	29.51 / 3.32	9.03 / 1.02

Industry-standard approaches to assessing the potential for hydrologic impacts related to changes in the amount of urban impervious coverage, as supported by literature (see references in Section 1.2), generally conclude that watersheds typically maintain pre-development hydrology characteristics until they exceed 10-15% impervious coverage. As illustrated in Table 1, the impervious coverage in Catchment 23 below 10% for during construction and proposed conditions in Catchment 23 while Catchment 15 remains below 10% under proposed conditions. Stormwater management controls for catchment 15, to be installed in the during construction phase, are documented in *Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report Phase 2* (Stantec, 2017), which was approved on March 13, 2017 by the MOECC and on April 19, 2017 by the CRCA. It is concluded, therefore, that the development of the Project will have negligible impact on the hydrology of the area and receiving systems.

**2.4 ASSESSMENT OF HYDROLOGIC IMPACTS AND NEED FOR STORMWATER CONTROLS**

Industry-standard approaches to assessing the potential for hydrologic impacts related to changes in the amount of urban impervious coverage, as supported by literature (see references in Section 1.2), generally conclude that watersheds typically maintain pre-development hydrology characteristics until they exceed 10-15% impervious coverage.

As illustrated in Table 1, the impervious coverage in Catchment 23 below 10% for during construction and proposed conditions in Catchment 23 while Catchment 15 remains below 10% under proposed conditions. Stormwater management controls for catchment 15, to be installed in the during construction phase, are documented in *Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report Phase 2* (Stantec, 2017), which was approved on March 13, 2017 by the MOECC and on April 19, 2017 by the



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CRCA. It is concluded, therefore, that the development of the Project will have negligible impact on the hydrology of the area and receiving systems.

Regarding the potential for flow re-direction or obstruction, the REA documents include commitments to minimizing grading and the implementation of drainage infrastructure as necessary to maintain drainage patterns per existing conditions. Care will be taken where construction is proposed in areas of known tile drainage systems to minimize damage to these systems and to repair any inadvertent damage that may occur, maintaining existing conditions drainage characteristics. On-going landowner liaison will occur as any impacts may only become noticeable at a later date.

Given the general maintenance of at-surface drainage conditions (i.e., no substantive grading or re-direction of surface water away from existing features) and vegetative conditions across the majority of the site, and the minimal introduction of impervious coverage, a formal stormwater management system for the Concession Road 2 entrance is not proposed.

## **3.0 ASSESSMENT OF POTENTIAL HYDROLOGIC IMPACTS AND MITIGATION – CONSTRUCTION PHASE (ESC)**

### **3.1 ASSESSMENT OF EROSION POTENTIAL**

An assessment of the erosion potential of the construction area was completed following the methodology outlined in the *ESC Guidelines* (GGHACA, 2006). The erosion potential is based on an assessment of three primary factors, namely slope gradient, slope length and soil texture (erodibility), with the resultant designation of either “low”, “medium”, or “high” erosion potential. The relative level of erosion potential dictates, to some extent, the comprehensiveness of the resultant ESC system design, monitoring, and maintenance program.

Beyond the three-parameter approach described by the Guidelines, it is often also appropriate to account for the relative sensitivity of the receiving systems as it relates to potential sediment transport offsite during construction. While never leading to a *reduction* in assessed erosion potential, such an assessment could result in a conclusion that diligence in excess of that already assessed is warranted. In this particular case, the receiving system is Lake Ontario which, should a spill occur, presents cleanup challenges if any sediment is to migrate into the Lake. It would be incumbent upon the proponent and contractor to elevate the level of attention paid to protecting the Lake against construction related impacts.

The existing and proposed (post-construction) condition gradients on the Project site can be classified as moderate (2 – 10% - Overland flow paths) to steep (>10% - Access road embankments), with predominantly long slopes (greater than 30 m). Site soils are comprised primarily of sand and silt tills, which are considered to represent a high erodibility potential (Table A1, ESC Guidelines). Therefore, based on this classification, the site has a “high” erosion potential.

The setbacks provided between the proposed project infrastructure, the surface water receiving features, the existing agricultural land uses surrounding the proposed infrastructure, and the features are such that the derivation of an ESC strategy in accordance with the “high” erosion potential assessment should satisfactorily address the potential impacts to the water features.

### **3.2 DURING CONSTRUCTION DEWATERING**

As per the Construction Plan Report, it is not expected that the water table will be intercepted by any construction activities, though it is possible. Should dewatering be required, such would be temporary and any potential impact would be limited to the local near-surface water table. Post-construction, the water table would return to pre-construction levels and the relatively small ‘footprint’ of the road base and turbine pads would not affect flow volumes or patterns, or the deep groundwater regime. Pumping rates are not anticipated to exceed 50,000 litres per day or the requirements of an Environmental Activity Sector Registration application approval.

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Any required dewatering operations will be completed such that discharge rates will not cause any flooding and erosion concerns for the downstream natural areas. In order to prevent sediment migration to the downstream areas dewatering discharges may be treated with a variety of measures including but not limited to filter socks, sediment traps, and “frog’s foot” dissipaters at the discretion of the contractor. Dewatering discharges will be directed through the sediment control measures to a gently sloped vegetated area greater than 30 m from any watercourse or wetland feature. If a vegetated area is not available alternative measures such as splash pads or infiltration basins may be considered.

Detailed pumping records will be kept on site to ensure that maximum pumping rates are not exceeded.

### **3.3 EROSION AND SEDIMENTATION CONTROL PLAN**

As described in the *Construction Plan Report*, the various construction activities required to develop the site include topsoil removal, minor grading activities, infrastructure installation, and general construction traffic. If left unmitigated, these activities will result in impacts ranging from disturbance of at-surface soils and exposure of the native sub-soils to potential erosion and sediment transport to offsite locations.

Erosion control will be achieved primarily through the use of rig-mats as temporary vehicle roads, and by limiting the duration of exposure of disturbed sub-soils inherent in the construction process. Further, at any given location, these works will be completed in short order (1-2 days expected), providing little opportunity for sub-soils to be disturbed and entrained in storm runoff.

In addition to limiting the potential for erosion, sediment control measures will be implemented prior to any grading or servicing works commencing as shown on the accompanying Plans (Drawings C111), and include, but not necessarily be limited to, the following items:

- Sediment and erosion control measures should be implemented prior to construction and maintained during the construction phase to prevent entry of sediment into the water:
  - Erect silt fence (per OPSD 219.110) within the constructible limits, along all access roads and turbine pads;
  - Stockpiling of materials for construction will occur at the nearby Central Staging Area. Erosion and Sediment Control and Stormwater Management Details for stockpiling within the Central Staging area are included in the Phase 2 SWM Report which was approved on March 13, 2017 by the MOECC and on April 19, 2017 by the CRCA.
  - If the sediment and erosion control measures are not functioning properly, no further work should occur until the sediment and/or erosion problem is addressed;
  - In the event of inclement weather or unfavourable terrain for construction, construction best practices such as temporary rig-mats may be used to prevent disruption of surface soils and vegetative cover by construction vehicles and equipment. As these measures

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are within the constructible areas of the project, it is not anticipated that offsite flows will increase from proposed conditions.

- o Additional erosion and sediment controls may be required due to unforeseen circumstances, changing site conditions or if the proposed controls do not achieve their anticipated result. In these circumstances, additional controls may be installed consistent with GGHCA ESC Guidelines and MOECC SWMPD Manual. The locations and application of the controls will be approved by a qualified erosion and sediment control inspector prior to their installation.
- When possible, complete work in and around watercourses when the features are at their driest. All in-water work should be completed within MNRD timing windows to protect local fish populations during their spawning and egg incubation periods. A typical construction timing window for warmwater streams in the Peterborough District is July 1<sup>st</sup> to March 31<sup>st</sup>.
- All materials and equipment used for the purpose of site preparation and Project construction should be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water:
  - o Any stockpiled materials should be stored and stabilized away from the water;
  - o Refuelling and maintenance of construction equipment should occur in designated areas, a minimum of 100 m from a water body;
  - o Spills should be reported to the MOE Spills Action Centre;
  - o Any part of equipment entering the water should be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water; and
  - o Only clean material, free of fine particulate matter should be placed in the water.
- Revegetate all disturbed areas where construction is not expected for 30 days with a minimum 50 mm of topsoil and hydro-seeding or other stabilizing vegetation / erosion protection measures (per OPSS 804). If given seasonal restriction or other revegetation limiting factors, the disturbed area should be stabilized against erosion impacts by non-vegetated means such as erosion control blankets or other means approved by a qualified erosion and sediment control inspector.

The ESC measures shall be maintained in good repair during the entire construction period, and removed as contributing drainage areas are restored and stabilized. ESC measures shall not be removed until a qualified inspector determines that the measures are no longer required and the risk of surface water and environmental impacts from construction activities are negligible. In addition, the condition of erosion control works, their overall performance, and any repairs, replacement, or modifications to the installed item shall be noted in logbooks to be kept on-site.

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### **3.4 EROSION AND SEDIMENTATION CONTROL MONITORING PLAN**

In order to ensure the effectiveness of the various erosion and sediment control measures, a routine program should be implemented which includes the inspection of the erosion and sediment controls daily and after each significant rainfall event (10 mm), and immediate repair of any deficiencies resulting in sediment discharges to the downstream environment.

Non-urgent repairs (i.e., no immediate risk of sediment discharges to the downstream environment) will be completed within 48 hours of identifying the deficiency, or prior to the next anticipated rainfall event, whichever is less. This program will consist of the following activities:

- Visual inspection of the ESC measures to ensure discharged flows are generally free of sediment and turbidity
- Inspection of vegetation protection and silt fencing to ensure that they are maintained in good repair
- Removal of construction debris that may accumulate
- Implementation of remedial measures including erosion stabilization, repair of damaged fencing and any other remediation, where required.

If the monitoring program outlined above indicates a persistent problem then the following steps should be undertaken to determine appropriate mitigative measures (if step 1 does not resolve the issue, proceed to step 2):

1) Analysis of the monitoring information and field visits as required, determine the cause of the problem, and develop a mitigation plan to address the issue in consultation with a certified ESC inspector.

a) Implement additional mitigation measures and monitor the results.

2) Convene a meeting *with* the appropriate review agencies to discuss the problem.

a) Develop a consensus on a proposed plan of action to resolve the problem in consultation with agency staff.

b) Implement additional mitigation measures and monitor the results

### **3.5 LONG TERM EROSION AND SEDIMENT CONTROL**

Per the *Construction Plan Report*, upon the completion of backfilling and the subsequent disposition of excess soil elsewhere within the properties by the property owners, replanting with native vegetation will be undertaken in areas where active agricultural use is not anticipated.

Approximately one year after construction a survey will be undertaken to ensure that long-term erosion control measures have been effective. Seeded or replanted areas will be inspected to

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ensure that revegetation measures were successful and reseeding or replanting will occur where necessary.

If erosion control measures are found to be less than fully effective during this survey, reseeding or replanting of problem areas will take place. Should there be residual effects noted during post-construction monitoring, advice on contingency measures will be sought out and applied.

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## **4.0 CONCLUSIONS**

It is concluded that both the relative lack of change in impervious coverage associated with the under construction and proposed development conditions are sufficiently limited as to not impact the pre-development hydrologic characteristics of the area during construction or long-term operation of the facility. There should be negligible change/impact on the quality and/or quantity of surface water runoff and/or groundwater recharge as a result of the construction of the proposed Concession Road 2 Entrance, therefore, no requirement for the implementation of formal stormwater quality or quantity controls.

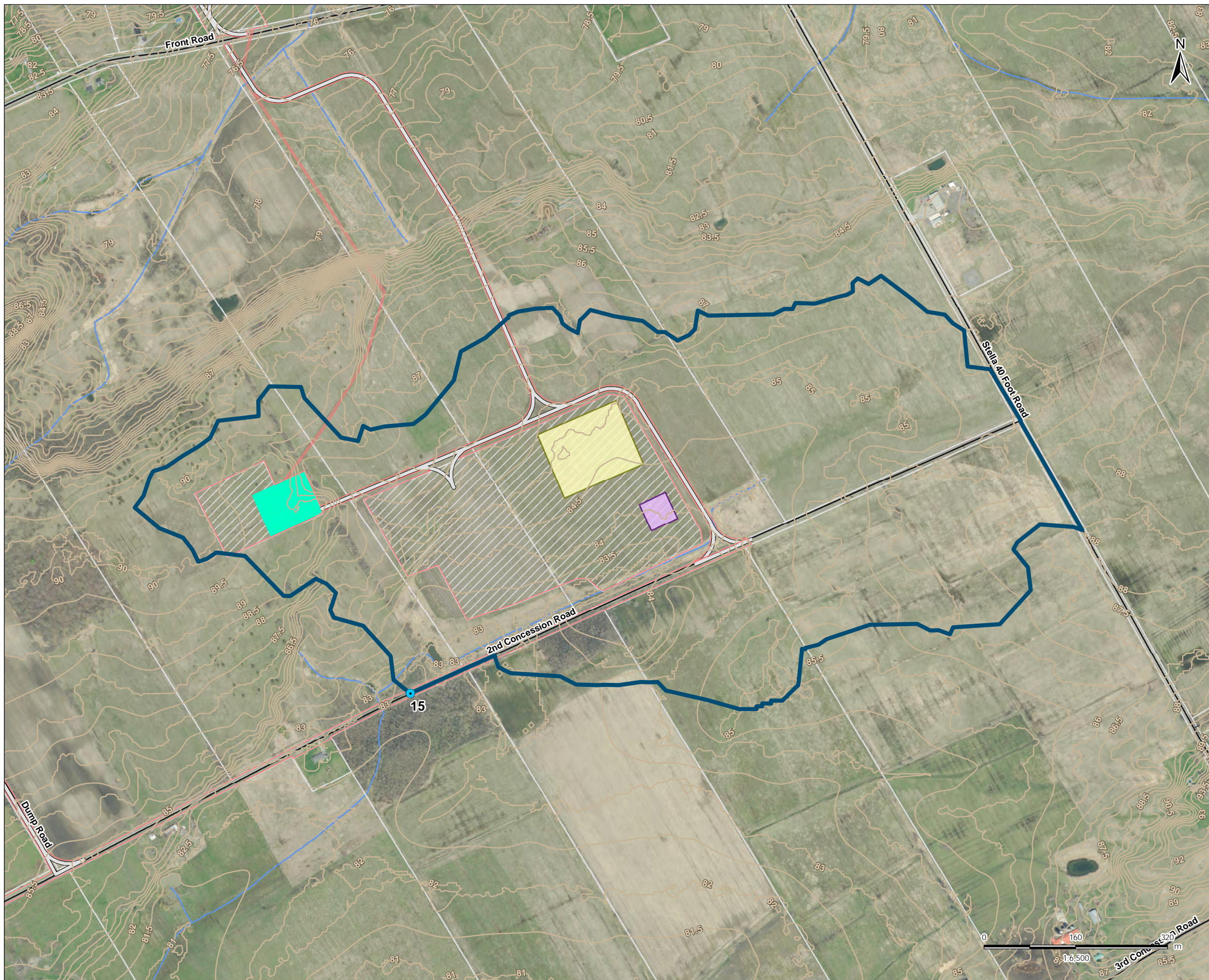
While the site assessment yields a "high" erosion potential classification, a number of factors combine to limit the potential for impact on the receiving systems. Specifically the relatively small area proposed to be disturbed, the short-term nature of the disturbance prior to stabilization whether through granular placement or re-vegetation, and the existing land use of the surrounding area as agricultural operations all combine to create a condition where a "standard" approach to erosion and sediment control will suffice to minimize potential for off-site impacts. The proposed erosion and sediment control plan accompanied by a monitoring and maintenance program will be implemented to prevent migration of sediment to downstream features during the construction phase of the Project.

# ATTACHMENTS



Legend

- Point of Interest
  - Surface Water Catchment Area
  - Access Road
  - Constructible Area
  - Batch Plant
  - Site Office
  - Central Staging Area
  - Substation
- Existing Features
- Road
  - Unopened Road Allowance
  - Topographic Contour (metres AMSL)
  - Watercourse
  - Property Line



Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.
3. Orthoimagery © Cataraqui Region Conservation Authority, 2017. Imagery taken in 2014.

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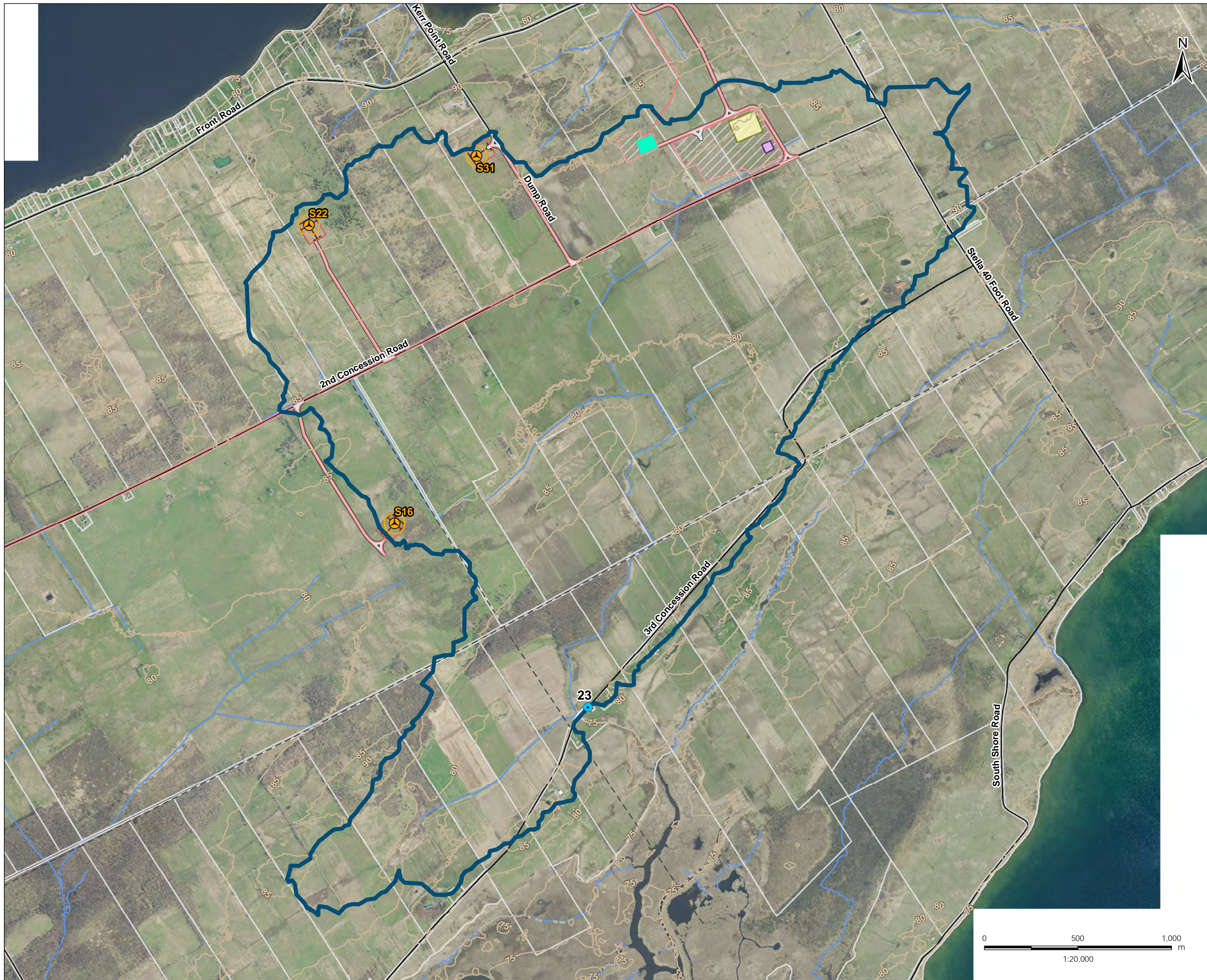
Figure No.

**1**

Title

**SWM Drainage Catchments -  
Drainage Area #15**





- Legend**
- Point of Interest
  - Surface Water Catchment Area
  - Project Components**
  - ⊙ Turbine
  - Access Road
  - Laydown Area and Crane Pad
  - Constructible Area
  - Turbine Blade Tip
  - Batch Plant
  - Site Office
  - Central Staging Area
  - Substation
  - Existing Features**
  - Road
  - Unopened Road Allowance
  - Watercourse
  - Property Line

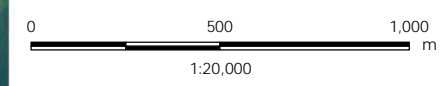
- Notes**
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  3. Orthoimagery © Cataraqui Region Conservation Authority, 2017. Imagery taken in 2014.

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Figure No.  
**2**

Title  
SWM Drainage Catchments -  
Drainage Area #23

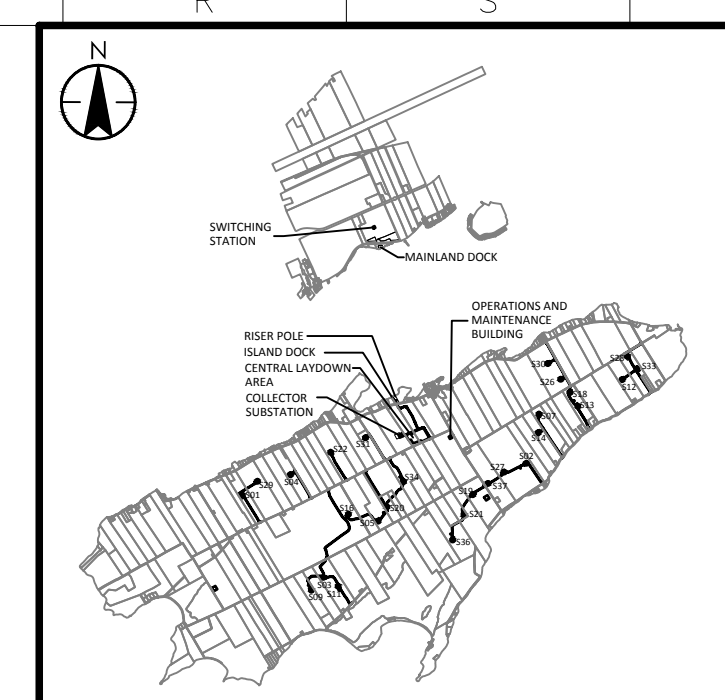


\\C01220-102\01609\active\60960595\Surface\_Water\Ph3\_SWM\160960595\_Ph3\_Fig02\_SWM\_Drainage\_Catchments\_mapbook.mxd  
 Revised: 2017-06-09 By: pworsell



Notes

1. TOPOGRAPHIC SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS DATED 2015 (UTM ZONE 18 NAD83 (GRS1997Z)). GEOTECHNICAL INFORMATION PROVIDED BY STANTEC MEMO, DATED JUNE 2015.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
3. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
4. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS (LATEST EDITION).
5. ENCROACHMENT ON NON-PARTICIPATING PROPERTIES IS STRICTLY PROHIBITED. THE CONTRACTOR AND/OR THEIR REPRESENTATIVES ARE TO BE AWARE OF ALL PARTICIPATING LAND OWNERS ON THE PROJECT AND THE PROJECTS CONSTRUCTIBLE LIMITS. ALL CONSTRUCTION ACTIVITY BEYOND THE CONSTRUCTIBLE LIMITS IS STRICTLY PROHIBITED.
6. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO THE CURRENT MUNICIPAL STANDARDS AND SHALL CONFORM TO ROAD USE AGREEMENT.
7. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE TIME GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED.
8. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
9. ALL DISTURBED AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED AS PER REA. MIX AND APPLICATION RATE/METHOD TO BE APPROVED PRIOR TO IMPLEMENTATION.
10. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 805.
11. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206.
12. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
13. ALL CULVERTS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421 AND AS PER OPSS 802.010.



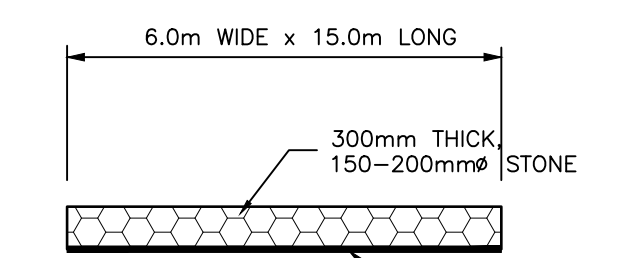
KEY PLAN

N.T.S.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING C303 FOR ADDITIONAL DETAILS AND NOTES

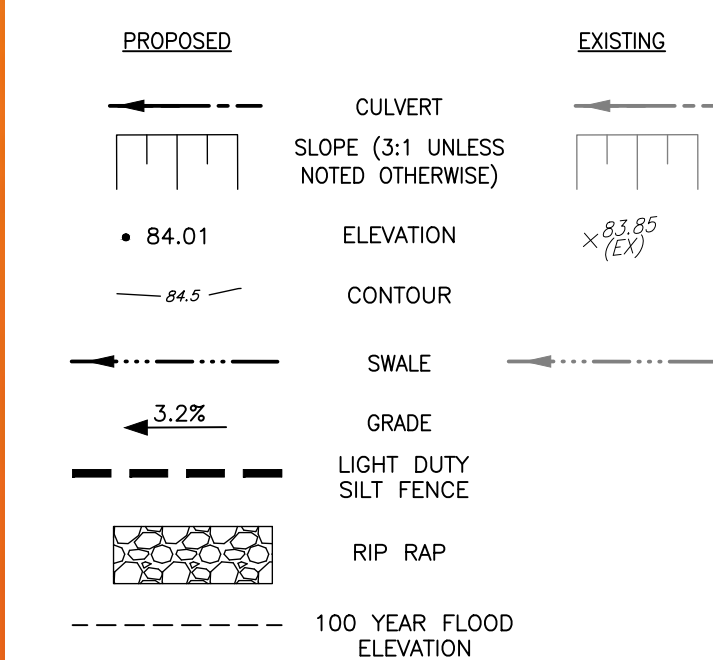
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING C201B FOR ACCESS ROAD DESIGN AND C400 FOR RA21 GRADING PLAN

DESIGNED ACCESS FOR ALL CONSTRUCTION TRAFFIC. INSTALL 'MUD MAT', AS PER DETAIL BELOW, PRIOR TO ANY OTHER CONSTRUCTION. MAT TO BE MAINTAINED IN GOOD WORKING ORDER (STONE VISIBLE AND SEDIMENTATION MINIMAL) UNTIL GRADING WORKS ARE COMPLETED AND GRANULAR 'A' & 'B' HAVE BEEN PLACED.



CONSTRUCTION ENTRANCE DETAIL

Legend



B.	RE-ISSUED FOR PERMIT	DMS	DW	17.07.10
A.	ISSUED FOR PERMIT	BR	DW	17.07.05
Revision		By	Appd.	YY.MM.DD

File Name:	13356100C-SUBSTATION_ACCESS_ROAD@DESC-PLAN.dwg	DS	17.07.04		
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit/Seal

NOT FOR CONSTRUCTION

Client/Project

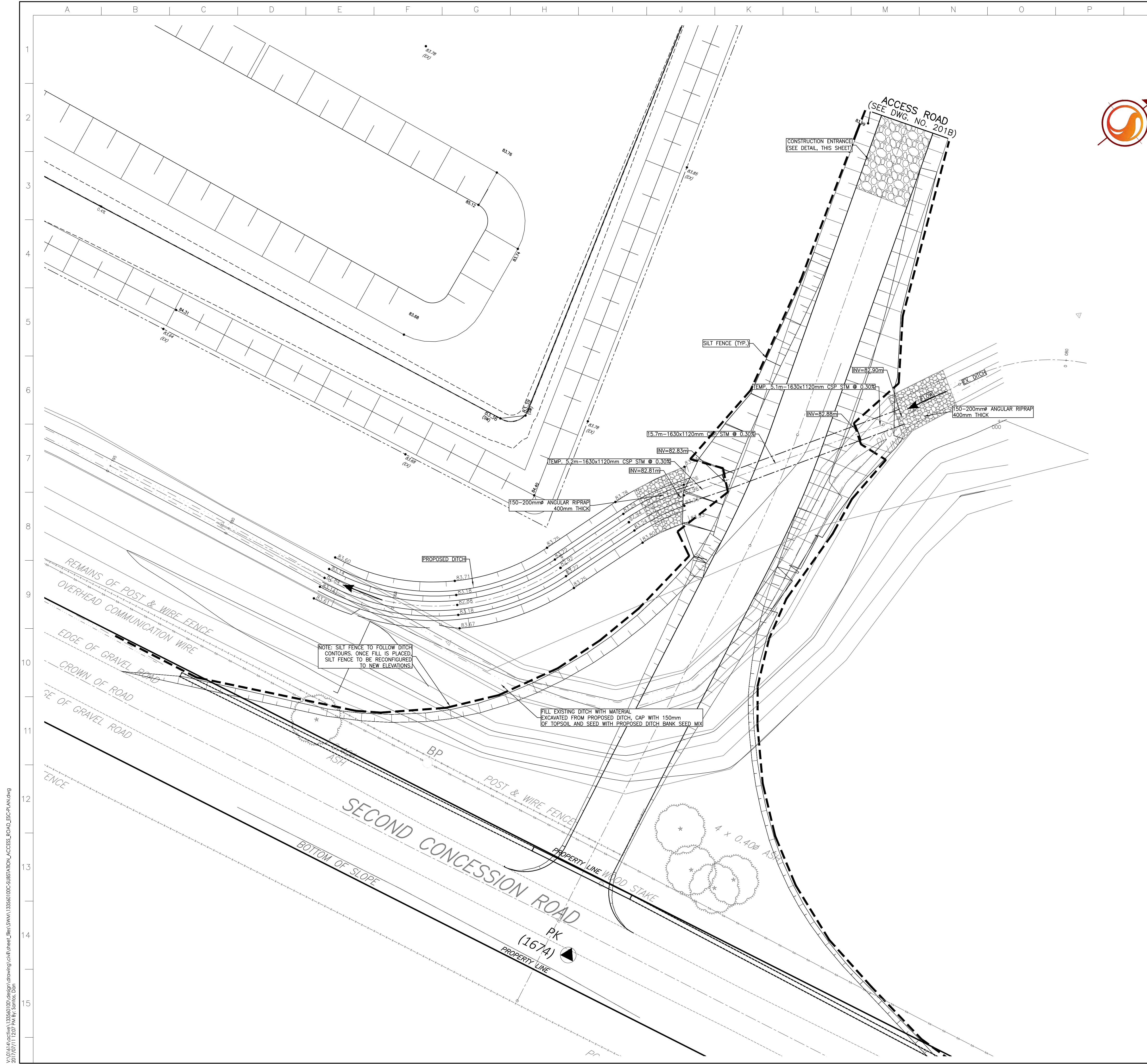


AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

SUBSTATION ACCESS ROAD  
EROSION AND SEDIMENTATION  
CONTROL PLAN

Project No.	Scale	0	2	6	10m
13356100	1:200				
Drawing No.	Sheet	Revision			



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 2017/07/11 11:20 PM By: Stanec, Don



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Notes

- TOPOGRAPHIC SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS DATED 2015 (UTM ZONE 18 NAD83 (EPSG:18973)). GEOTECHNICAL INFORMATION PROVIDED BY STANTEC MEMO, DATED JUNE 2015.
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- GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206.
- GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
- ALL CULVERTS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421 AND AS PER OPSS 802.010.

Legend

Revision	By	Appd.	Y/M/AM/DD
1	DMS	DKS	14.04.13
0	JBM	DKS	17.01.20

File Name	DS	DKS	DS	16.12.12
13356100C-01.dwg	Dwn.	Chkd.	Dgn.	YY.MM.DD

Permit Seal



Client/Project



AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

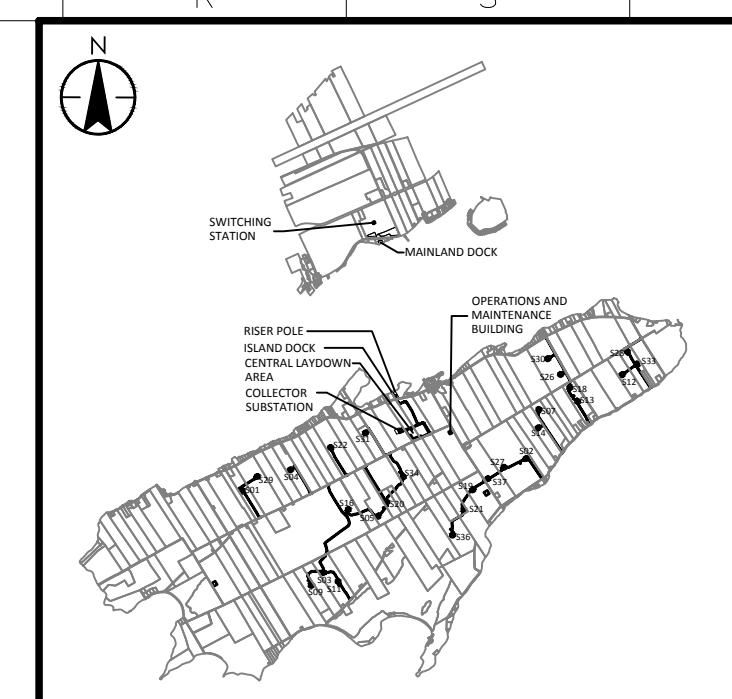
SITE DETAIL SHEET

Project No.	Scale	
13356100		
Drawing No.	Sheet	Revision

C303

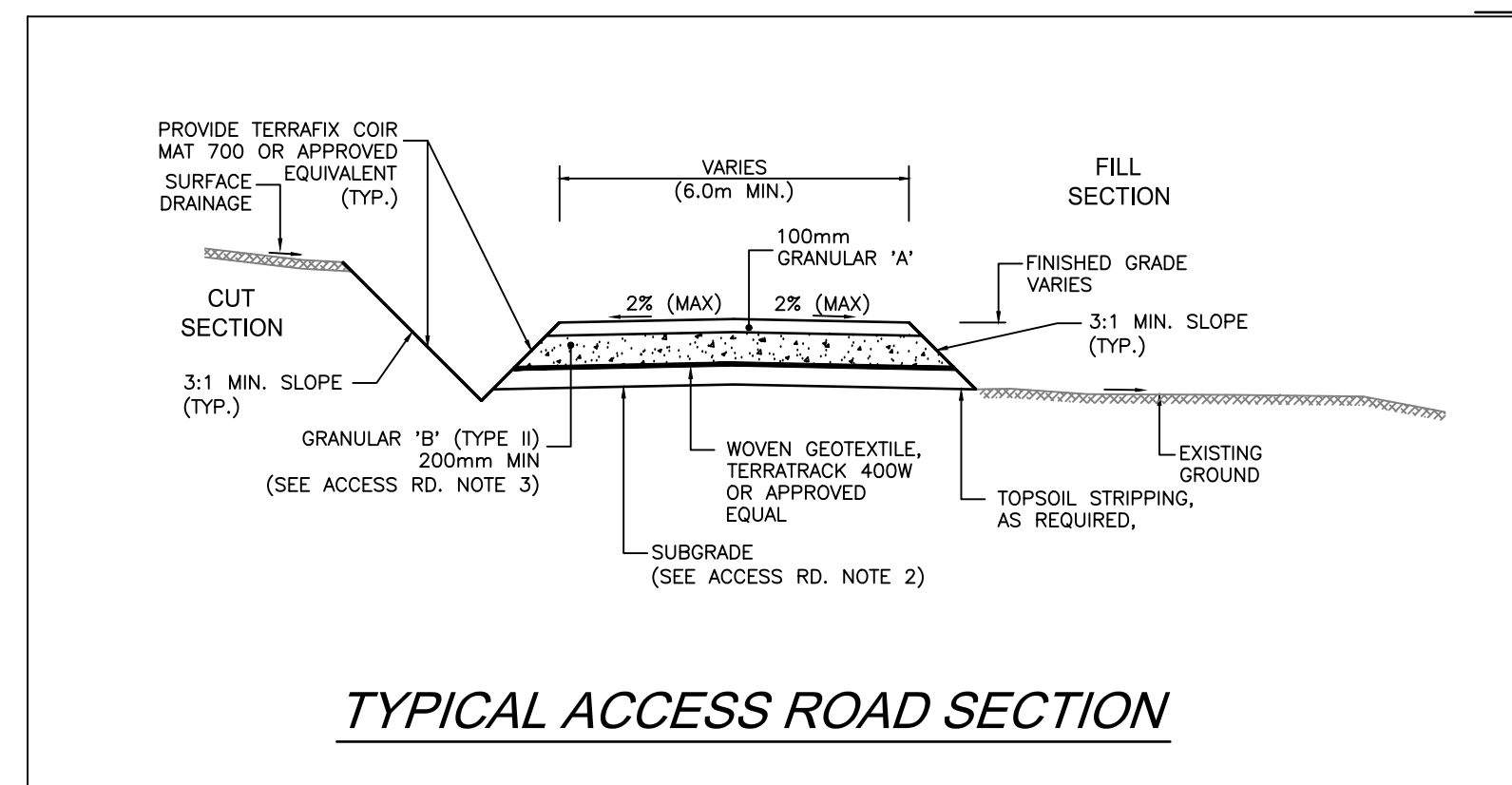
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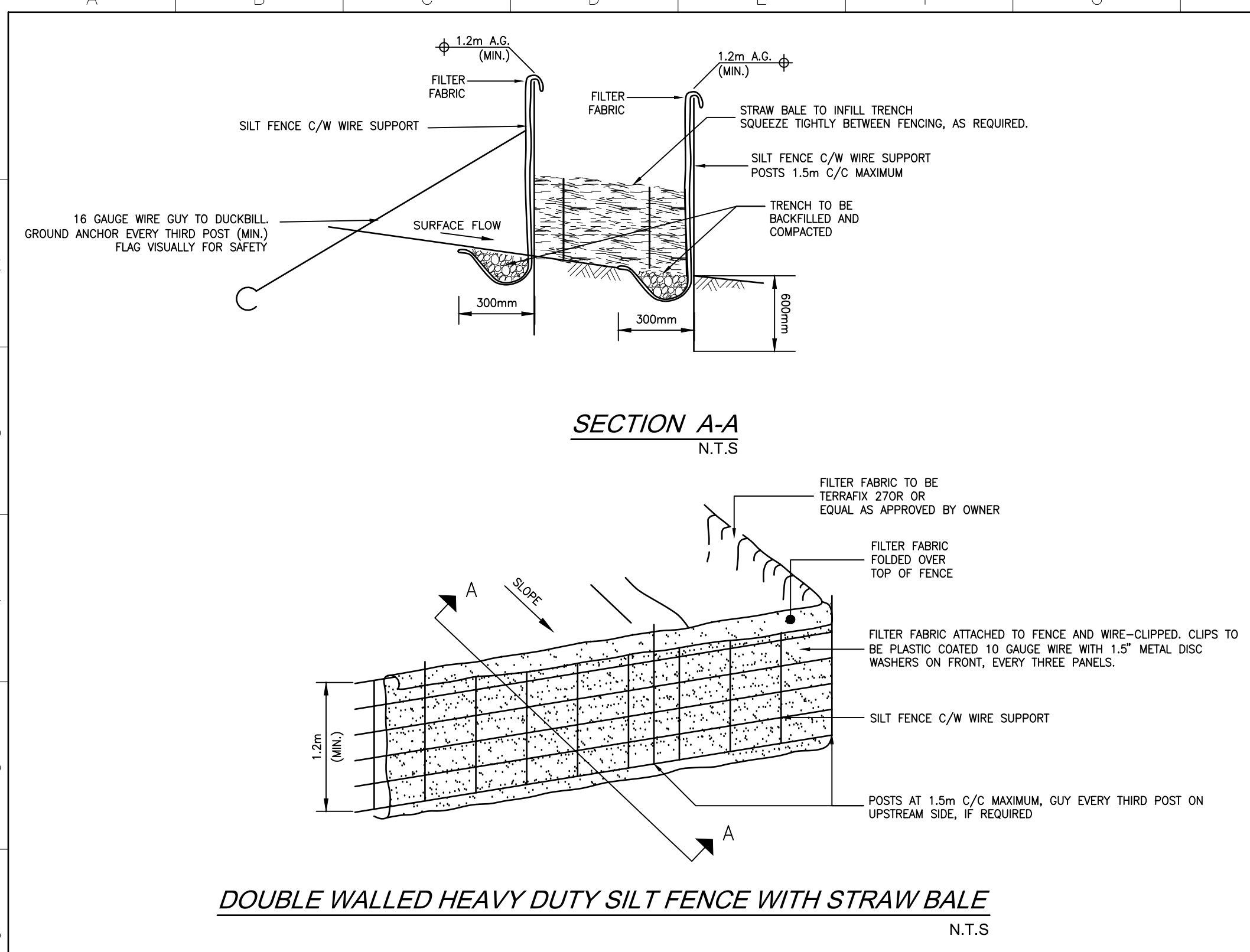
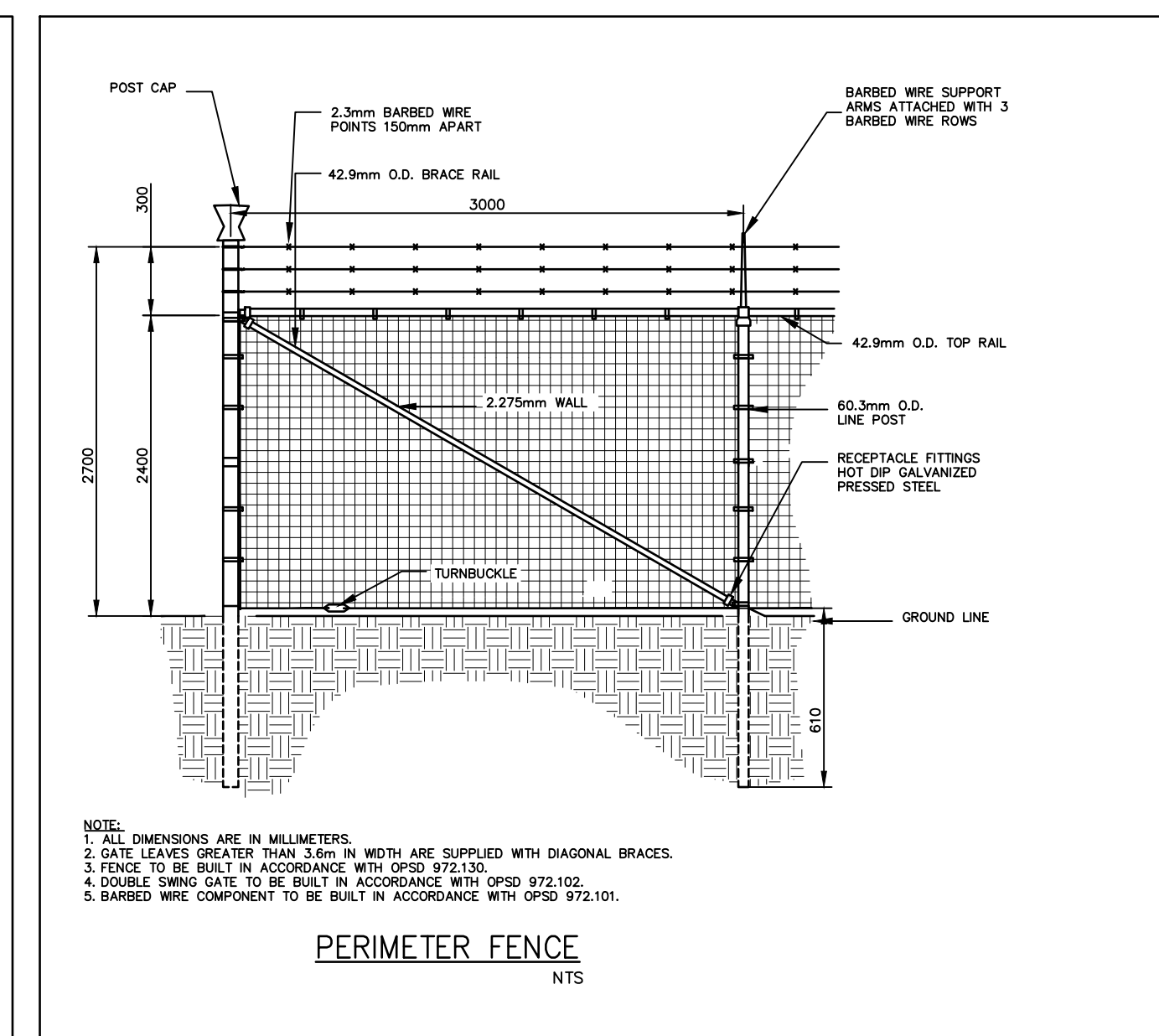
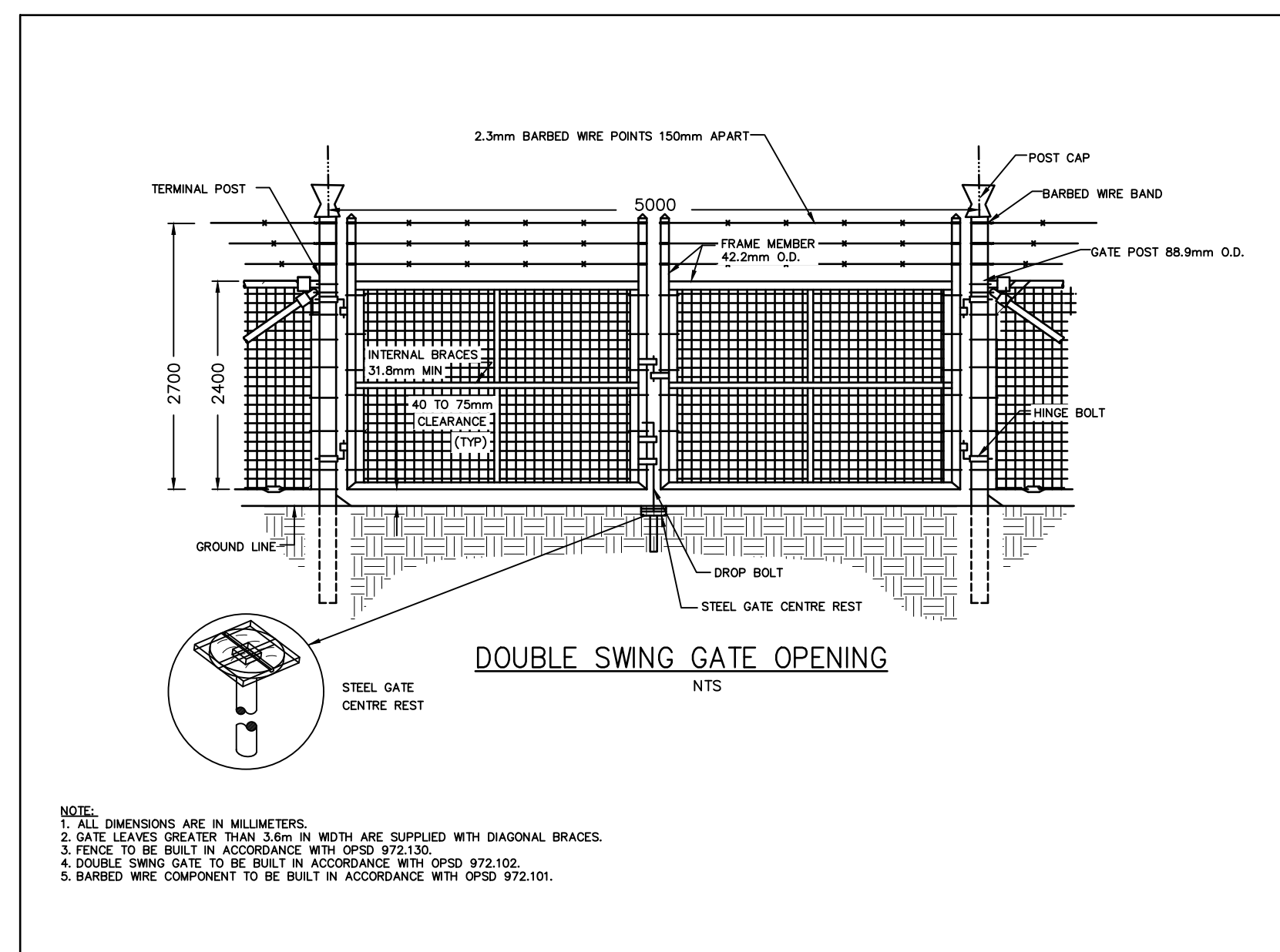
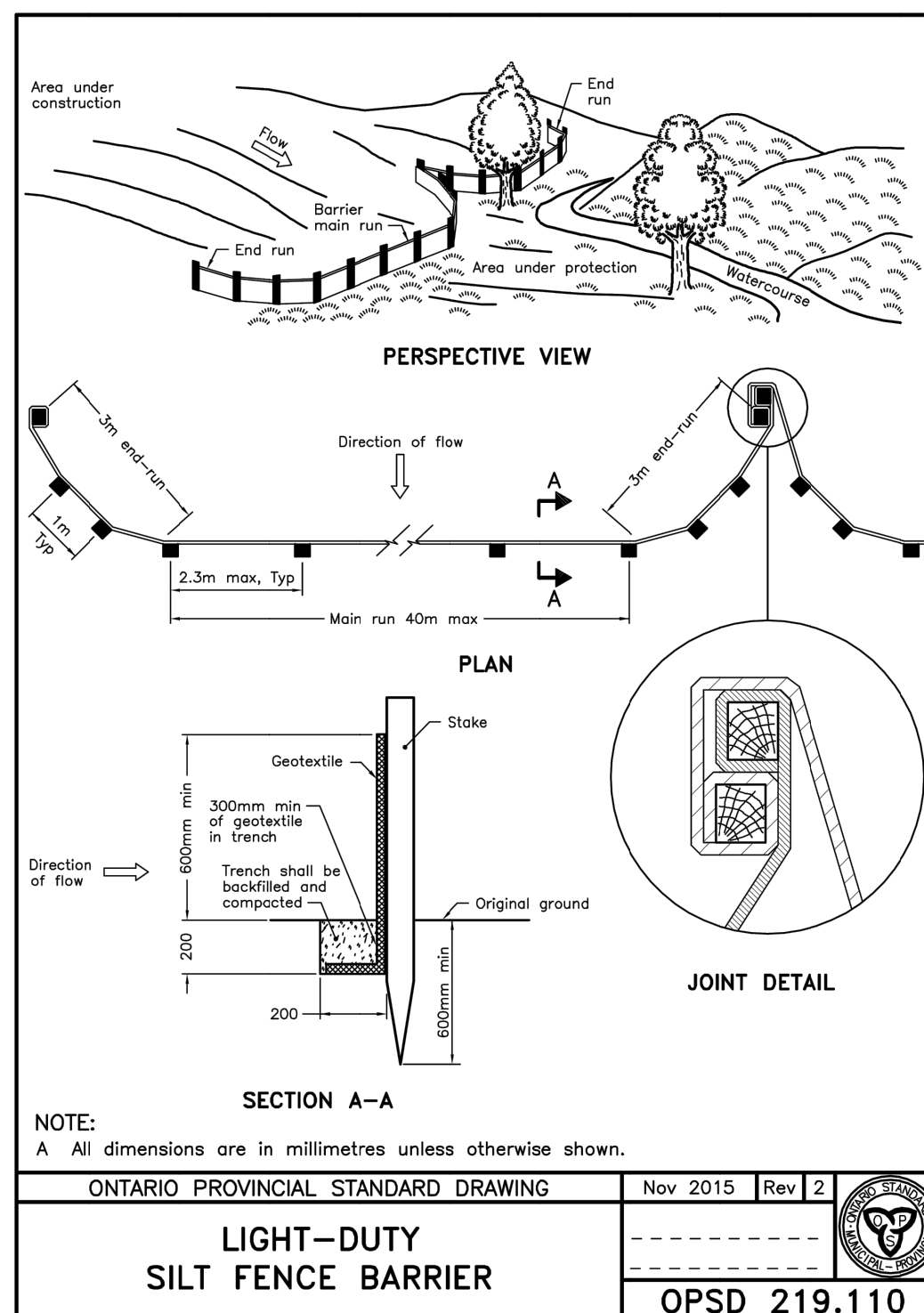


KEY PLAN

N.T.S.



TYPICAL ACCESS ROAD SECTION



EROSION AND SEDIMENT CONTROL NOTES:  
(SEE DETAILS THIS SHEET)

- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE PROTECTION OF THE AREA DRAINAGE SYSTEM DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT AND DURATION OF EXPOSED SOIL AND INSTALLING SILT FENCES AND OTHER SEDIMENT TRAPS/FILTERS SIMILAR TO THOSE ILLUSTRATED HEREIN.
- EROSION AND SEDIMENT CONTROL WORKS SHALL BE INSTALLED AND IN WORKING CONDITION PRIOR TO COMMENCEMENT OF CONSTRUCTION RELATED ACTIVITIES.
- SEDIMENT CONTROL MEASURES ADJACENT TO CONSTRUCTION AREAS MAY REQUIRE REMOVAL / RELOCATION IN ORDER TO COMPLETE SPECIFIC CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL ENSURE THAT ADEQUATE SEDIMENT CONTROL MEASURES ARE IN PLACE AT ALL TIMES.
- EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED AND IMPROVED AS NECESSARY TO KEEP THEM EFFECTIVE AND MINIMIZE THE POTENTIAL FOR EROSION AND MIGRATION OF SEDIMENT TO THE DOWNSTREAM NATURAL ENVIRONMENT.
- AT THE DISCRETION OF THE OWNER OR OWNER'S CONSULTANT, ADDITIONAL SILT CONTROL DEVICES SHALL BE INSTALLED AT DESIGNATED LOCATIONS.
- SEDIMENT THAT IS ACCUMULATED BY THE TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED IN A MANNER THAT AVOIDS ESCAPE OF THE SEDIMENT TO THE DOWNSTREAM SIDE OF THE CONTROL MEASURE AND AVOIDS DAMAGE TO THE CONTROL MEASURE. ALL SEDIMENT SHALL BE REMOVED AND TOPSOIL WITH SEED TO BE ADDED IF NECESSARY.  
A) ACCUMULATED SEDIMENT IS TO BE REMOVED AND DISPOSED OF AS PER OPSS 180, PRIOR TO THE REMOVAL OF ANY CONTROL MEASURE.
- SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED DAILY AND AFTER EACH RAINFALL > 10mm FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES ONE THIRD OF THE WAY TO THE TOP OF THE BARRIER.
- ALL AREAS WHERE ACTIVE CONSTRUCTION IS NOT EXPECTED FOR 2 WEEKS SHALL BE STABILIZED THROUGH SEEDING WITH NATIVE PLANT SPECIES AND APPLICATION OF HYDRAULIC MULCH.
- STOCKPILED MATERIAL IS TO BE STORED AWAY FROM POTENTIAL RECEIVERS (E.G. WATERCOURSES), AND LOCATED AT LEAST 6m FROM THE BOUNDARY OF THE LAYDOWN AREA. WHERE STOCKPILED EXCAVATED NATIVE MATERIALS AND IMPORTED MATERIALS WITH A D50 LESS THAN 4.75mm ARE TO BE LEFT IN PLACE UNDISTURBED IN EXCESS OF 10 DAYS, STOCKPILES ARE TO BE COVERED WITH A ROLLED EROSION CONTROL PRODUCT (RECP) SUCH AS A TARP, SINGLE NET STRAW MAT OR DOUBLE NET STRAW MAT. IMPORTED MATERIALS WITH A D50 OF 4.75mm OR GREATER CAN REMAIN UNCOVERED. GRANULAR A AND B (TYPE II) GRADATION REQUIREMENTS ALLOW UP TO 55% PERCENT PASSING A 4.75mm SIEVE (#4 SEVE), AND MAY BE STOCKPILED WITHOUT COVERING WITH AN RECP.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN AND BOLSTER EROSION AND SEDIMENT CONTROL MEASURES AS NECESSARY TO KEEP THEM EFFECTIVE AND MINIMIZE THE POTENTIAL FOR EROSION.  
SILT FENCE  
FILTER CLOTH  
PUMPS  
CLEAN RIP-RAP (FREE OF FINES) FOR ROCK CHECK DAMS  
SAND BAGS  
ANY ADDITIONAL MATERIAL DEEMED NECESSARY TO REPAIR/ CONSTRUCT PROPOSED MEASURES OR TO ADEQUATELY DEAL WITH UNEXPECTED HIGH FLOWS

CULVERT NOTES:

- CULVERT SLOPE TO MATCH EXISTING DITCH GRADE UNLESS OTHERWISE NOTED.
- CULVERT TO BE EMBEDDED 10% OF PIPE DIAMETER BELOW DITCH INVERT.
- CULVERTS TO BE CORRUGATED STEEL PIPE (CSP). PIPE MATERIAL TO BE GALVANIZED STEEL AND HAVE A 68mm x 13mm CORRUGATION WITH 1.6mm METAL THICKNESS.
- PIPE TO BE INSTALLED IN ACCORDANCE WITH OPSS 802.010.
- CULVERT ELEVATIONS ARE APPROXIMATE AND ARE TO BE FINALIZED IN THE FIELD.

SILT FENCE NOTES (AS PER OPSS 219.110):

- STAKES ARE TO BE INSTALLED ON THE DOWNSTREAM SIDE OF THE BARRIER.
- CONTRACTOR TO MONITOR SILT FENCE FOR UV DEGRADATION.
- SILT FENCE IS TO BE CLEANED OUT ONCE SEDIMENT REACHES MAXIMUM 1/3 OF THE FENCE HEIGHT.

HYDRAULIC MULCH NOTES:

- COORDINATE/CONSULT WITH OWNER PRIOR TO UTILIZING ANY HYDRAULIC MULCH. TIMELINES AND SEEDING METHODS NEED TO BE CAREFULLY CONSIDERED PRIOR TO IMPLEMENTATION.
- ENSURE THAT A TACKIFIER IS USED TO KEEP PRODUCT IN PLACE.
- APPLY SEED MIX PRIOR TO MULCH WITH TACKIFIER.
- HYDRAULIC MULCH IS TO BE APPLIED AS SOON AS GRADING AND SEEDING WORK IS COMPLETE TO ENSURE STABILIZATION OF SOILS.
- RE-APPLY HYDRAULIC MULCH IF THE SUBJECT AREA IS DAMAGED OR ERODED BY WIND OR WATER. SURFACE COVERAGE MUST BE AT LEAST 80% AT ALL TIMES.

ROLLED EROSION CONTROL PRODUCT (RECP) NOTES:

- RECP SHALL CONSIST OF STRAW, STRAW-COCOONUT, OR COCONUT FIBER WHICH ARE HELD IN PLACE BY NETTING SEWN ON BOTH SIDES OF THE MATERIAL.
- RECP MUST BE SECURED ON STOCK PILE BY STAPLING AT THE BOTTOM OF THE SLOPE AND UPRIIL TRENCHES ON THE STOCKPILE/SLOPED SURFACE.