

**White Pines Wind Project
Erosion and Sediment Control
and Stormwater Management
Plan Report**



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Sign-off Sheet

This document entitled White Pines Wind Project Erosion and Sediment Control and Stormwater Management Plan Report was prepared by Stantec Consulting Ltd. for the account of wpd Canada Corporation. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation.



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**WHITE PINES WIND PROJECT
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Introduction
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1.0 Introduction

Stantec Consulting Ltd. (Stantec) was retained by wpd Canada Corporation (wpd Canada) 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 White Pines Wind Project (herein referred to as the "Project"). This report is intended to address the requirements for SWM/ESC measures as described in Section G of the project's REA Approval (#2344-9R6RWR) and to supplement the information included as part of the application for a Renewable Energy Approval (the REA Application).

The Project was originally proposed as a maximum 59.45 MW Class 4 Wind Energy Generation Facility consisting of 29 Senvion (previously Repower) MM92 wind turbines of 2.05 MW each, on privately-owned agricultural lands within Prince Edward County near the town of Milford, within the former Townships of South Marysburgh and Athol, ON. . Within the REA Approval, two turbines (T07 and T11) were removed from the Project. Although T07 and T11 will not be built, these two turbines continue to be shown in figures, and are accounted for in the current analysis and report to remain consistent with earlier documentation and for the sake of completeness.

The turbine locations have been sited within the area bounded by Brummel Road/Bond Road to the North, Lighthall Road to the West, Gravelly Bay Road to the East and Lake Ontario to the South. Two transformer substations are required for the project: one located within the main turbine area adjacent the access road to the previously proposed Turbine T07, southeast of Royal Road and Dainard Road. An interconnection line will connect the substation near T07 to a substation to be built near the Picton Transformer Station (TS) on County Road 5, approximately 14 km north of the main turbine area. An overview of the project location is illustrated in Figure 1.

This ESC/SWM Report summarizes the assessment of potential hydrologic impacts associated with the construction (i.e., ESC) and operational phases (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.

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- A semi-quantitative analysis of existing and proposed conditions, focused on changes in impervious coverage associated with the Project development, 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 of impacts related to construction.

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

- *Erosion and Sediment Control Guideline for Urban Construction (ESC Guidelines)*, Greater Golden Horseshoe Conservation Authorities, Dec. 2006
- *Stormwater Management Planning and Design Manual (SWMPD Manual)*, Ontario Ministry of the Environment, March 2003

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

- *White Pines Wind Project: Construction Plan Report (CPR)*, Stantec Consulting Ltd., September 2012.
- *White Pines Wind Project: Design and Operations Report (DOR)*, Stantec Consulting Ltd., September 2012.
- *White Pines Wind Project: Water Assessment and Water Body Report*, Stantec Consulting Ltd., October 2014.
- *White Pines Wind Project: Interconnection Line Water Assessment and Water Body Report*, Stantec Consulting Ltd., October 2014.
- *White Pines Wind Project: Project Description Report (PDR)*, Stantec Consulting Ltd., September 2012.

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Assessment of Potential Hydrologic Impacts and Mitigation - Operational Phase (SWM)
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2.0 Assessment of Potential Hydrologic Impacts and Mitigation - Operational Phase (SWM)

2.1 EXISTING CONDITIONS

As illustrated in the attached Figures 2.1 – 2.4, and summarized in Table 1, the proposed Project is situated on predominantly agricultural lands with very low existing impervious coverage. Runoff drains overland to local drainage draws, small watercourses, and/or wetland features, ultimately discharging to Lake Ontario. Drainage patterns are to be maintained through the use of limited grading, maintenance of surrounding land uses (e.g., agricultural operations, and the provision of conveyance infrastructure (e.g., culverts). As such, impervious coverage represents the primary parameter of potential impact to the hydrology of the Project area.

A series of 28 catchment areas were delineated so as to encompass all proposed infrastructure and, therefore, any hydrologic impacts associated with proposed impervious coverage increases, allowing for a comparison between existing and proposed conditions. Owing to the dispersed characteristic of the proposed wind farm, with infrastructure distributed at very low density across a large area, deriving a reasonable comparison point at which to compare pre- and post-development conditions is somewhat subjective. For the purposes of the analysis described herein, comparison points have been set at the closest downstream road crossing of a given catchment within which development (i.e., the creation of new impervious surfaces) is proposed. These locations have been selected since, should a hydrologic impact occur as a result of development, this is the location at which it would be most noticeable and of most concern to the public. A summary of catchment IDs and areas and existing conditions impervious coverage statistics is provided in Table 1.

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Table 1: Existing Conditions Impervious Coverage

Catchment ID	Catchment Area (ha)	Impervious Area (ha)	% Impervious
0	31.9	1.00	3.2%
2	43.2	0.00	0.0%
3	82.7	0.96	1.2%
4	40.4	0.73	1.8%
5	61.1	0.79	1.3%
6	83.8	0.55	0.7%
7	72.5	0.87	1.2%
8	125.4	1.44	1.1%
9	510.5	5.14	1.0%
10	28.5	0.12	0.4%
11	188.5	1.37	0.7%
12	31.3	0.11	0.3%
15	39.5	0.17	0.4%
18	25.2	0.97	3.9%
19	10.8	0.00	0.0%
21	10.4	0.00	0.0%
22	27.1	0.00	0.0%
24	24.8	0.08	0.3%
25	756.6	7.91	1.0%
26	67.3	0.00	0.0%
27	79.7	0.39	0.5%
13-1	242.9	3.80	1.6%
13-2	376.6	2.02	0.5%
14-1	214.5	2.07	1.0%
14-2	251.6	2.48	1.0%
20-1	294.5	5.20	1.8%
20-2	33.6	0.21	0.6%
30	51.7	0.67	1.3%

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2.2 PROPOSED CONDITIONS

As described previously, the Project includes the construction of 29 wind turbines and associated infrastructure including access roads and 2 substations, all of which represent changes in the impervious coverage of the general catchment area.

As described in the *Construction Plan Report*, the majority of long-term (i.e., for the Project lifespan) impervious coverage for the proposed Project is to be comprised of approximately 16.7 km of 5 m wide granular access roads (representing 83,500 m² or 8.35 ha), with construction kept to the minimum required for site access. During construction, there will also be some temporary road widening required at access road entrances and bends to accommodate the wider turning radii of the turbine blade transport vehicles. Typical construction details for the access road can be found appended Figures 3 and 4.

The construction of roads will include the excavation and removal of topsoil, placing of geotextile fabrics where necessary, placement of aggregate and gravel materials as a road base, and further grading and compaction as necessary. From a hydrologic impact perspective, the access roads are considered generally equivalent to a typical farm access (i.e., driveway), though they have been conservatively considered as 100% impervious herein, as have all areas proposed for granular surface treatment. Photographs of a typical wind project access road construction have been appended for reference.

Additional long-term impervious coverage will be created through the development of a 0.49 ha (70 m x 70 m) transformer substation to be located on the access road to Turbine T07 (Dwg. 2.3), and a 0.30 ha (50 m x 60 m) granular equipment/material storage area to be located on the east side of County Road 10, just south of Murphy Road and north of proposed Turbine T06 (Dwg. 2.4). The second transformer substation, located near the Picton Transformer Station (TS) on County Road 5, approximately 14 km north of the main turbine area, represents an additional 0.67 ha (76 m x 76 m substation and 10 m x 95 m access road) of impervious area, as illustrated on Figure 5.

Impervious coverage is at a 'worst-case' condition in the short-term during construction, when granular laydown areas are required to facilitate turbine construction. Turbine components will be delivered directly to a gravel-surfaced laydown area located at each individual turbine location, running adjacent to the access roads and connecting to the crane pads. As shown on Figure 3, each of the proposed laydown areas is 5,000 m² (50 m x 100 m), and encompasses each respective associated crane pad (1,350 m²) and turbine foundation area (18 m diam. = 250 m²); these project elements will remain post-construction. The removal of much of the granular laydown areas following construction will reduce the impervious impact to 4.64 ha ((1,350 m² + 250 m²) x 29 turbines) for the remainder of the project's lifespan.

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Finally, the erection of wind turbines will require the use of a lattice boom crane, the assembling of which requires the stripping of a 720 m² area followed by the potential application of a gravel and stone base, and covered by sheet metal to maintain a flat, obstacle-free area. Following construction, the sheet metal will be removed and the assembly area will be restored to pre-development conditions. Crane assembly areas for each of the proposed turbines represent an approximate temporary impervious coverage of 0.36 ha (6 m x 120 m).

Table 2: Proposed Conditions (During Construction) Impervious Coverage

Catchment ID	Catchment Area (ha)	Additional Proposed Impervious Area (ha)	Total Impervious Area (ha)	% Impervious
0	31.9	0.22	1.23	3.8%
2	43.2	0.76	0.76	1.8%
3	82.7	0.08	1.04	1.3%
4	40.4	0.12	0.84	2.1%
5	61.1	0.63	1.43	2.3%
6	83.8	1.06	1.61	1.9%
7	72.5	0.36	1.24	1.7%
8	125.4	0.65	2.09	1.7%
9	510.5	1.53	6.67	1.3%
10	28.5	0.78	0.90	3.2%
11	188.5	0.00	1.37	0.7%
12	31.3	0.47	0.57	1.8%
15	39.5	0.37	0.53	1.4%
18	25.2	0.70	1.67	6.6%
19	10.8	0.12	0.12	1.1%
21	10.4	0.56	0.56	5.3%
22	27.1	0.24	0.24	0.9%
24	24.8	0.52	0.59	2.4%
25	756.6	7.26	15.17	2.0%
26	67.3	0.59	0.59	0.9%
27	79.7	1.03	1.41	1.8%
13-1	242.9	1.13	4.94	2.0%
13-2	376.6	1.41	3.43	0.9%
14-1	214.5	1.69	3.76	1.8%
14-2	251.6	0.88	3.36	1.3%
20-1	294.5	1.54	6.75	2.3%
20-2	33.6	0.33	0.54	1.6%
30	51.7	0.67	1.34	2.6%

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2.3 ASSESSMENT OF HYDROLOGIC IMPACTS AND NEED FOR SWM 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 2, the impervious coverage in all catchments identified as part of this study remains below 7% even under the 'worst-case' during construction scenario. With the removal of much of the turbine laydown areas following construction activities, it is to be expected that impervious coverage will be below 5% in all catchments over the life of the Project. 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 (e.g., culverts or overland flow routes) 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, to repair any inadvertent damage that may occur, and maintain existing drainage conditions and 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), the vegetative conditions across the majority of the site, and the minimal introduction of impervious coverage, a formal stormwater management system is not proposed.

Though not strictly related to stormwater management in a hydrologic sense, consideration of the potential for spills, and the associated provision of protected measures, is related to the protection of receiving surface and/or groundwater systems. Turbine components requiring lubrication and cooling fluids are contained within the nacelle of each turbine. The nacelle and turbine foundation provide ample containment volume should any possible leaks occur. Routine inspection will be the primary preventative mitigation measure against possible leaks, and a response plan for use in the unlikely event of an accidental spill will be developed.

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3.0 Assessment of Potential Hydrologic Impacts and Mitigation - During-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 the assessed erosion potential, such an assessment could result in a conclusion that diligence in excess of that already assessed is warranted. If we assume, for example, that the receiving system included a Provincially Significant Wetland, a coldwater fishery, or perhaps an area where body-contact exposure to surface waters might be expected (e.g., a beach), it would be incumbent upon the proponent and contractor to elevate the level of attention paid to protecting the receiver against construction-related impacts.

The existing and proposed (post-construction) condition gradients on the Project site can be classified as gentle (< 2%), with predominantly long slopes (greater than 30 m). Site soils are comprised primarily of sandy loam, clay loam, and clays, which are considered to represent a medium-to-high erodibility potential (Table A1, *ESC Guidelines*). Therefore, based on this classification, the site has a "moderate-to-high" erosion potential.

The setbacks provided between the proposed project infrastructure and the surface water receiving features and 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 affect the local near-surface water table only for the period for construction (until concrete is hardened). Post-construction, the water table would return to pre-construction levels and the relatively small 'footprint' of the turbine base would not affect flow volumes or patterns, or the deep groundwater regime. Pumping rates are not anticipated to exceed 50,000 litres per day.

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Although culvert installation works are proposed to be completed in the dry season or during dry conditions, culvert installation may require minor dewatering during construction. The construction of watercourse crossings are understood to require approximately 1-3 days per crossing including the installation of minor water diversion infrastructure (if necessary), site excavation/preparation, culvert installation, backfilling, and removal of diversion measures. It is anticipated that the headwater features will be crossed using standard passive diversion or "dam and pump" dry crossing techniques. Prior to commencing crossing construction, weather forecasts will be reviewed to assess the potential for significant precipitation. In-stream activities will be delayed if foul weather is forecast and/or flows are elevated beyond available pump capacity, or 50,000 litres per day.

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.

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, creation of granular access roads and crane pads, and general construction traffic. If left unmitigated, these activities could result in impacts ranging from disturbance of at-surface soils, exposure of the native sub-soils to potential erosion, and sediment transport to offsite locations.

Erosion control will be achieved primarily through the excavation-and-backfill methods of construction and by limiting the duration of exposure of disturbed sub-soils inherent in the construction process. For example, access road and crane pad construction includes the removal of topsoil and sub-soils as necessary to achieve a competent base, followed by the placement of granular material back to existing grade elevations (or marginally above); hence, the work areas are generally "self-contained" and protected from erosion and sediment transport by definition. 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.

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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, and include, but are not necessarily 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) on the downstream sides of disturbed areas within 30 m of the buffers to environmental features and around entirety of temporarily stockpiled soils;
 - Install temporary straw bale check dams (per OPSD 219.180) within 15 m downstream of new culvert construction
 - No equipment should be permitted to enter any natural areas beyond the silt fencing during construction;
 - Topsoil stockpiles should be sufficiently distant from watercourses to preclude sediment inputs due to erosion of stored soil materials;
 - 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;
- Complete work in and around watercourses when the features are at their driest, i.e., during the summer. All in-water work should be completed within MNR 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 Jul 1 - March 15.
- 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:
 - Any stockpiled materials should be stored and stabilized away from the water;
 - Refuelling and maintenance of construction equipment should occur a minimum of 100 m from a water body;
 - As appropriate, spills should be reported to the MOE Spills Action Centre;
 - 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
 - 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.

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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, replacements or modifications to the installed item shall be noted in logbooks to be kept on-site.

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 after each significant rainfall event (25 mm) or weekly, whichever is more frequent, and immediate repair of any deficiencies. 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 process should be undertaken to determine appropriate mitigative measures:

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.
2. Convene a meeting with the appropriate review agencies to discuss the problem.
3. Develop a consensus on a proposed plan of action to resolve the problem in consultation with agency staff.
4. Implement additional mitigation measures and monitor the results.

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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 is not anticipated.

One year after construction a survey will be undertaken to ensure that long-term erosion control measures have been effective. This will include an inspection of drainage facilities associated with the Project construction (e.g., culverts) for structural integrity and any excessive amount of silt collection. Seeded or replanted areas will be inspected to 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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Conclusions
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4.0 Conclusions

It is concluded that both the relative lack of change in impervious coverage associated with the proposed development and the resultant total impervious coverage within the local drainage catchments 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 and, 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 conditions 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

Figure 1 – Project Location

Figures 2.1 – 2.4 - Drainage Catchment Areas

Figure 3 – Typical Turbine Layout

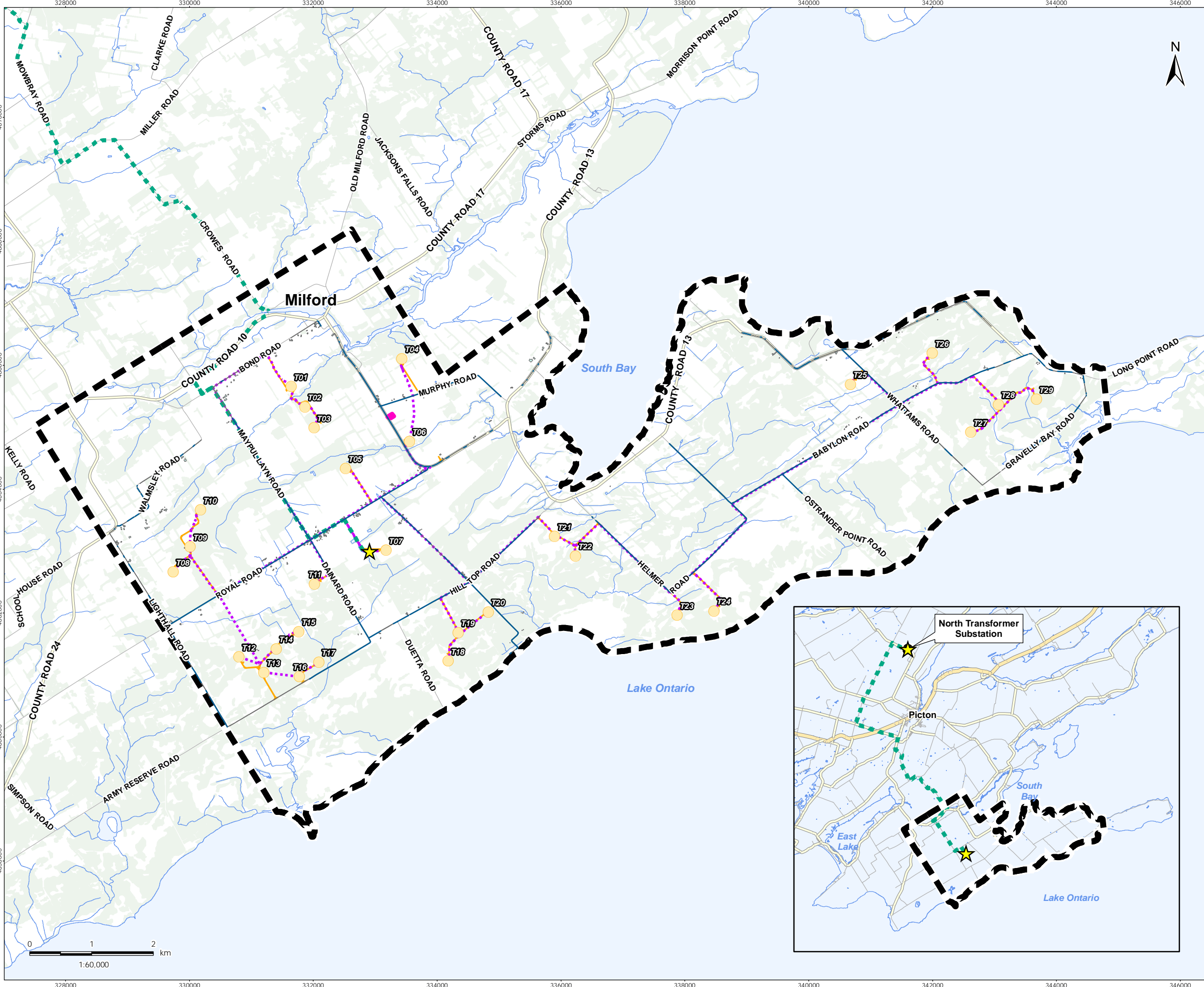
Figure 4 – Typical Watercourse Crossing Layout

Figure 5 – North Transformer Substation

Photographs of Typical Road Construction at Wind Projects

Legend

- Wind Project Location
- Proposed Project Components
 - Wind Turbine
 - Proposed Substation
 - Access Road
 - Collector Line
 - Interconnection Line
 - Storage Area
- Existing Features
 - Highway
 - Major Road
 - Local Road
 - Railway
 - Watercourse
 - Waterbody
 - Woodland



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, 2013.

December 2015
160960594

Client/Project

WPD Canada Corp.
White Pines Wind Project

Figure No.

1

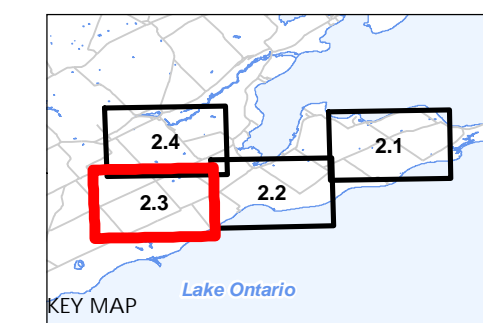
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Project Location

W:\active\60960594\drawing\GIS\MXD\WaterResources\sedimentAndErosionControl\60960594_Fig_1_ProjectLocation_20151208.mxd
 Revised: 2015-12-08 By: dhanvey

- Legend
- Proposed Project Components
- Wind Turbine (Blade Sweep)
 - Access Road
 - Collector Line
 - Interconnection Line
 - Construction Area
 - Turbine Laydown Area
 - Crane Laydown Area
 - Storage Area
 - Substation
- Existing Features
- Flood Plain Limit (Quinte Conservation)
 - Direction of Surface Water Flow

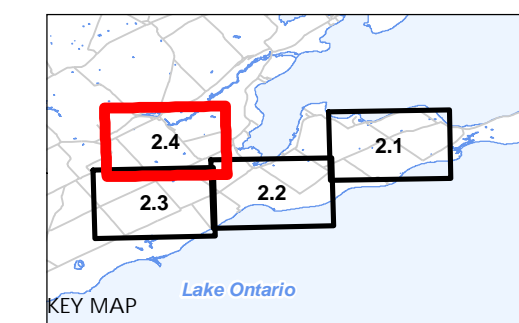
- Contour Line 5m Intervals
 - Road
 - Railway
 - Property Boundary
 - Watercourse
 - Waterbody
 - Surveyed Wetland Delineation (Stantec)
 - Catchment Area
 - Waterbody
- Sediment and Erosion Control Features
- Equalization Culvert
 - Staw Bale Flow Check Dam
 - Silt Fencing



- Notes
- Coordinate System: NAD 1983 UTM Zone 18N
 - Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
 - Image Source: Image Source: © First Base Solutions, 2011 - Imagery Date: 2008.

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 Printed: 2015-12-28 10:28:10 AM By: zhenyuan

- Legend**
- Proposed Project Components**
- Wind Turbine (Blade Sweep)
 - Access Road
 - Collector Line
 - Interconnection Line
 - Construction Area
 - Turbine Laydown Area
 - Crane Laydown Area
 - Storage Area
 - Substation
- Existing Features**
- Flood Plain Limit (Quinte Conservation)
 - Direction of Surface Water Flow
 - Contour Line 5m Intervals
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- Equalization Culvert
 - Straw Bale Flow Check Dam
 - Silt Fencing



- NOTES**
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Consultants

Legend

- Collector Line
- Turbine Foundation
- Fill: 75m³ (assumed)
- Top Soil: 150m³ (assumed)
- Access Roads
- Crane Pad
- Laydown Area
- Crane Laydown Area
- ~ Ground Surface Contour (metres AMSL)
- Silt Fencing
- ↑ Direction of Surface Water Flow

5. SURFACES ARE TO BE SMOOTH AND FREE OF STONES AND DEBRIS OR OTHER WEED CLUMPS PRIOR TO RECP PRODUCTS BEING INSTALLED.
6. CONTRACTOR TO ENSURE THAT BILLING/GULLING IS RECTIFIED PRIOR TO RECP OR MULCHMAX ULTRA INSTALLATION. CONTRACTOR TO MONITOR RUNOFF UNDER THE RECP FOLLOWING INSTALLATION.
7. CONTRACTOR TO ENSURE THAT RECP IS SECURED AT THE TOP OF THE SLOPE IN A TRENCH AND OVERLAP (SIDE TO SIDE AND BOTTOM TO TOP)
8. CONTRACTOR TO INSPECT THE SITE WEEKLY OR AFTER EVERY RAINFALL EVENT AND IDENTIFY AREAS OF EROSION OR POTENTIAL EROSION. BEST MANAGEMENT PRACTICES ARE TO BE USED TO CONTROL THE EROSION. METHODS OF CONTROL MAY INCLUDE THE USE OF EROSION CONTROL BLANKETS C/W SEEDING, HYDRAULIC MULCH OR STRAW MULCH, OR SOIL BINDER. SOILS ARE TO BE STABILIZED AS SOON AS AREAS ARE IDENTIFIED TO PREVENT FURTHER EROSION.

SILT FENCE NOTES (SEE DETAIL OPSD 219.110)

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

HYDRAULIC MULCH NOTES

1. COORDINATE/CONSULT WITH OWNER PRIOR TO UTILIZING ANY HYDRAULIC MULCH. TIMELINES AND SEEDING METHODS NEED TO BE CAREFULLY CONSIDERED PRIOR TO IMPLEMENTATION.
2. ENSURE THAT A TACKIFIER IS USED TO KEEP PRODUCT IN PLACE
3. APPLY SEED MIX PRIOR TO MULCH WITH TACKIFIER
4. HYDRAULIC MULCH IS TO BE APPLIED AS SOON AS GRADING AND SEEDING WORK IS COMPLETE TO ENSURE STABILIZATION OF SOILS.
5. RE-APPLY HYDRAULIC MULCH IF THE SUBJECT AREA IS DAMAGED OR ERODED BY WIND OR WATER

GENERAL

1. EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM THE WATER IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATER. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30 M OF A WATERCOURSE OR WITHIN THE HIGH VULNERABILITY AQUIFER ZONE AS DESIGNATED BY KAWARTHA CONSERVATION AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE.

NOTES:

EROSION AND SEDIMENT CONTROL NOTES (SEE DETAILS THIS SHEET)

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR 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.
2. EROSION AND SEDIMENT CONTROL WORKS SHALL BE INSTALLED AND IN WORKING CONDITION PRIOR TO COMMENCEMENT OF CONSTRUCTION RELATED ACTIVITIES.
3. 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.
4. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED AND IMPROVED UPON AS NECESSARY TO KEEP THEM EFFECTIVE AND MINIMIZE THE POTENTIAL FOR EROSION AND MIGRATION OF SEDIMENT TO THE DOWNSTREAM NATURAL ENVIRONMENT.
5. AT THE DISCRETION OF THE OWNER OR OWNER'S CONSULTANT, ADDITIONAL SILT CONTROL DEVICES SHALL BE INSTALLED AT DESIGNATED LOCATIONS.
6. 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.
7. STOCKPILED MATERIAL IS TO BE STORED AWAY FROM POTENTIAL RECEIVERS (E.G. WATERCOURSES), AND BE SURROUNDED BY EROSION CONTROL MEASURES WHERE MATERIAL IS TO BE LEFT IN PLACE IN EXCESS OF 10 DAYS OR PRIOR TO A RAIN EVENT, WHICHEVER OCCURS SOONER.
8. REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%.
9. 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.
10. IN ADDITION TO BEING RESPONSIBLE FOR ENSURING THAT THE PRESCRIBED MEASURES ARE INSTITUTED AND FUNCTIONING AS INTENDED THE CONTRACTOR IS ALSO RESPONSIBLE FOR IMPLEMENTING ANY INTERIM OR EMERGENCY MEASURES AS NECESSARY, TO ENSURE THAT NO SEDIMENT IS DISCHARGED TO THE NATURAL ENVIRONMENT. THE FOLLOWING EXTRA EQUIPMENT/MATERIALS ARE TO BE KEPT ON SITE AS A CONTINGENCY, IN CASE THE PROPOSED CONTROL MEASURES ARE BREACHED.
 - SILT FENCE
 - FILTER CLOTH
 - PUMPS
 - CLEAN RIP-RAP (FREE OF FINES) FOR ROCK CHECK DAMS
 - SAND BAGS AND CLEAN (FREE OF FINES) GRAVEL

ANY ADDITIONAL MATERIAL DEEMED NECESSARY TO REPAIR/REMEDiate PROPOSED MEASURES, OR TO ADEQUATELY DEAL WITH UNEXPECTED HIGH FLOWS

AREA GRADING NOTES

PRIOR TO SITE WORKS

1. INSTALL ALL SILT FENCE AND PROTECTIVE FENCING AS SHOWN ON THE PLANS AND MAINTAIN DURING CONSTRUCTION.
2. MONTHLY EROSION AND SEDIMENT CONTROL REPORTS (QUARTERLY DURING PERIODS OF INACTIVITY) ARE TO BE SUBMITTED TO THE AUTHORITY UNTIL THE SITE HAS BEEN BUILT OUT (90%-100%) AND STABILIZED. REPORTS TO BE BASED ON FREQUENT INSPECTIONS PARTICULARLY AFTER RAINFALL>5mm.

DURING AREA GRADING

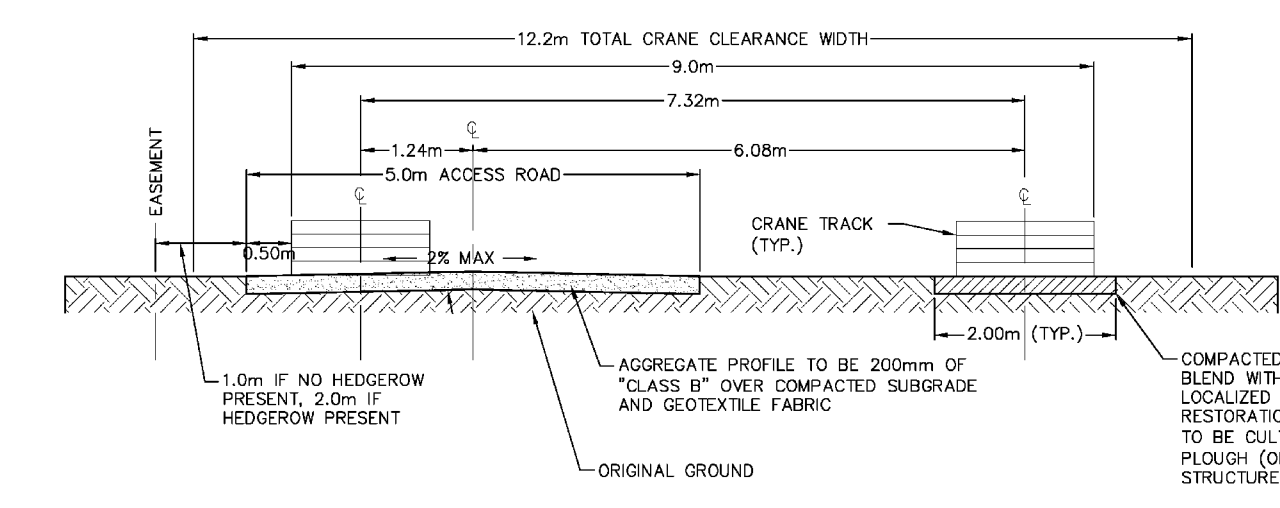
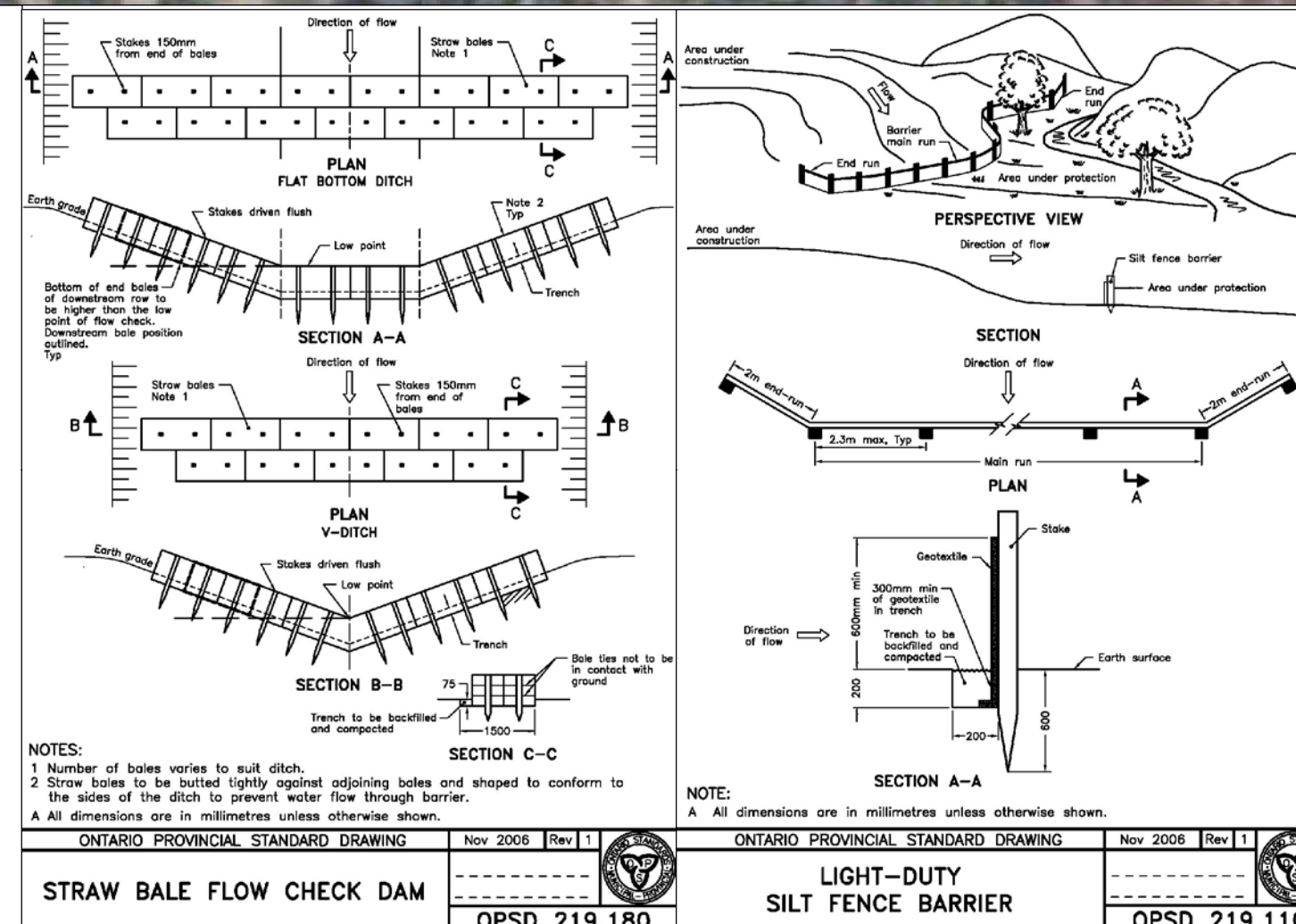
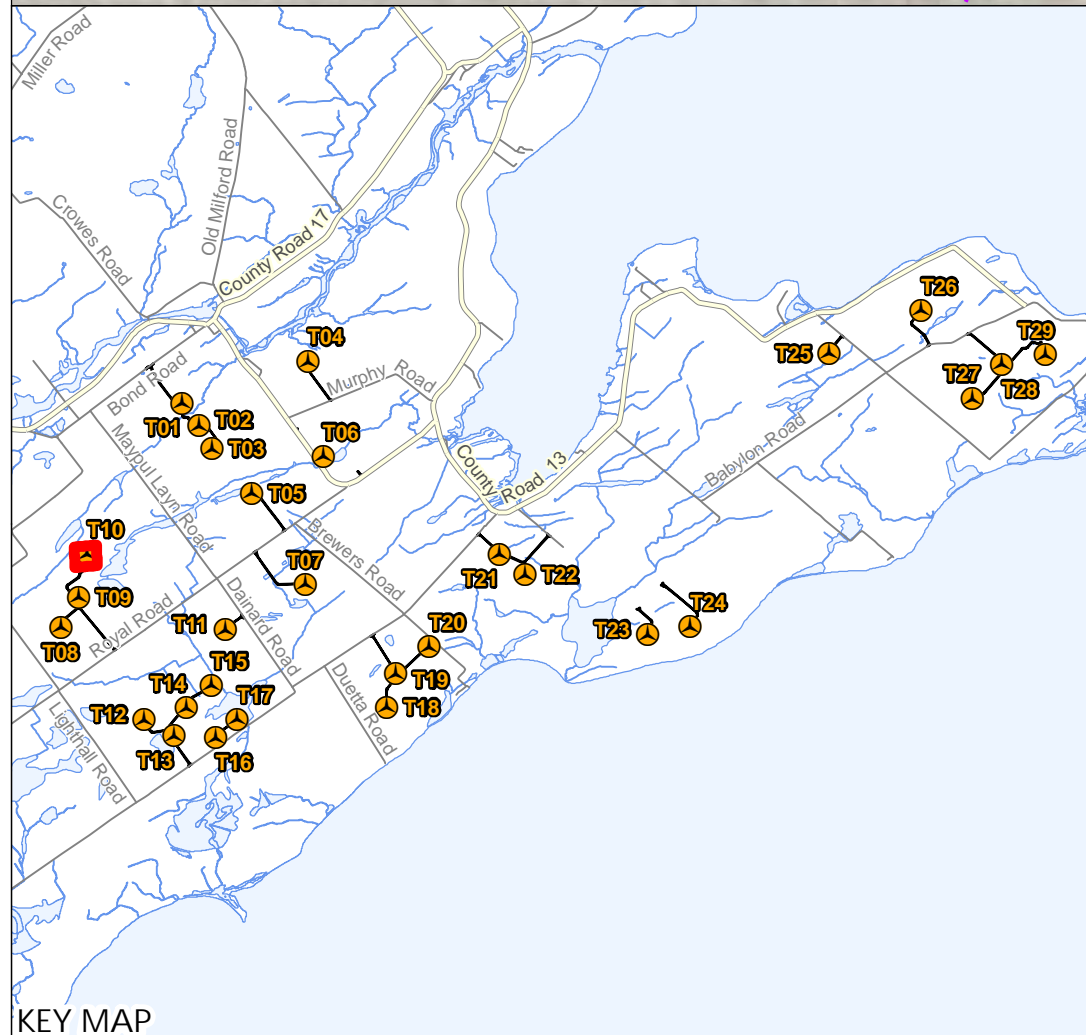
1. TOPSOIL IS TO BE STRIPPED ONLY IN AREAS REQUIRING EARTHWORKS AND PLACED IN STOCK PILES AT THE LOCATIONS SHOWN ON THE PLANS OR AS APPROVED BY THE QUALIFIED ENVIRONMENTAL SITE INSPECTOR.
2. TEMPORARY TOPSOIL STOCKPILES ARE TO HAVE CONTINUOUS SILT FENCE PLACED IMMEDIATELY AROUND THE ENTIRE PERIMETER.
3. ROADWAYS AND LAY DOWN YARDS ARE TO BE PLACED ON NATIVE GROUND AFTER TOPSOIL HAS BEEN STRIPPED.
4. ALL TOPSOIL IS TO BE RE-SPREAD ON CONSTRUCTION IMPACTED AREAS AFTER FINAL GRADING IS COMPLETE TO A MINIMUM DEPTH OF 150MM (INCREASE IF ADDITIONAL TOPSOIL IS AVAILABLE).
5. SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED WEEKLY AND AFTER EACH RAINFALL>5mm 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.

AFTER AREA GRADING

1. ALL AREAS WHERE ACTIVE CONSTRUCTION IS NOT EXPECTED FOR 2 WEEKS SHALL BE RE-SEED WITH NATIVE PLANT SPECIES.
2. REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%.

SLOPE PROTECTION NOTES

1. EITHER ROLLED EROSION CONTROL PRODUCTS (RECP) OR MULCHMAX ULTRA AT 500 KG/HA ARE TO BE USED ON 3:1 SLOPES OR GREATER.
2. RECP PRODUCTS ARE TO BE BIODEGRADABLE. STRAW, COIR, WOOD EXCELSIOR ARE SAMPLE MATERIALS THAT CAN BE USED.
3. RECP PRODUCTS ARE TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS. INSTALLATION TO BE INSPECTED AND REPAIRED AS NEEDED.
4. RECP ARE TO BE APPLIED AS SOON AS POSSIBLE FOLLOWING GRADING AND SEEDING OF SUBJECT AREAS.



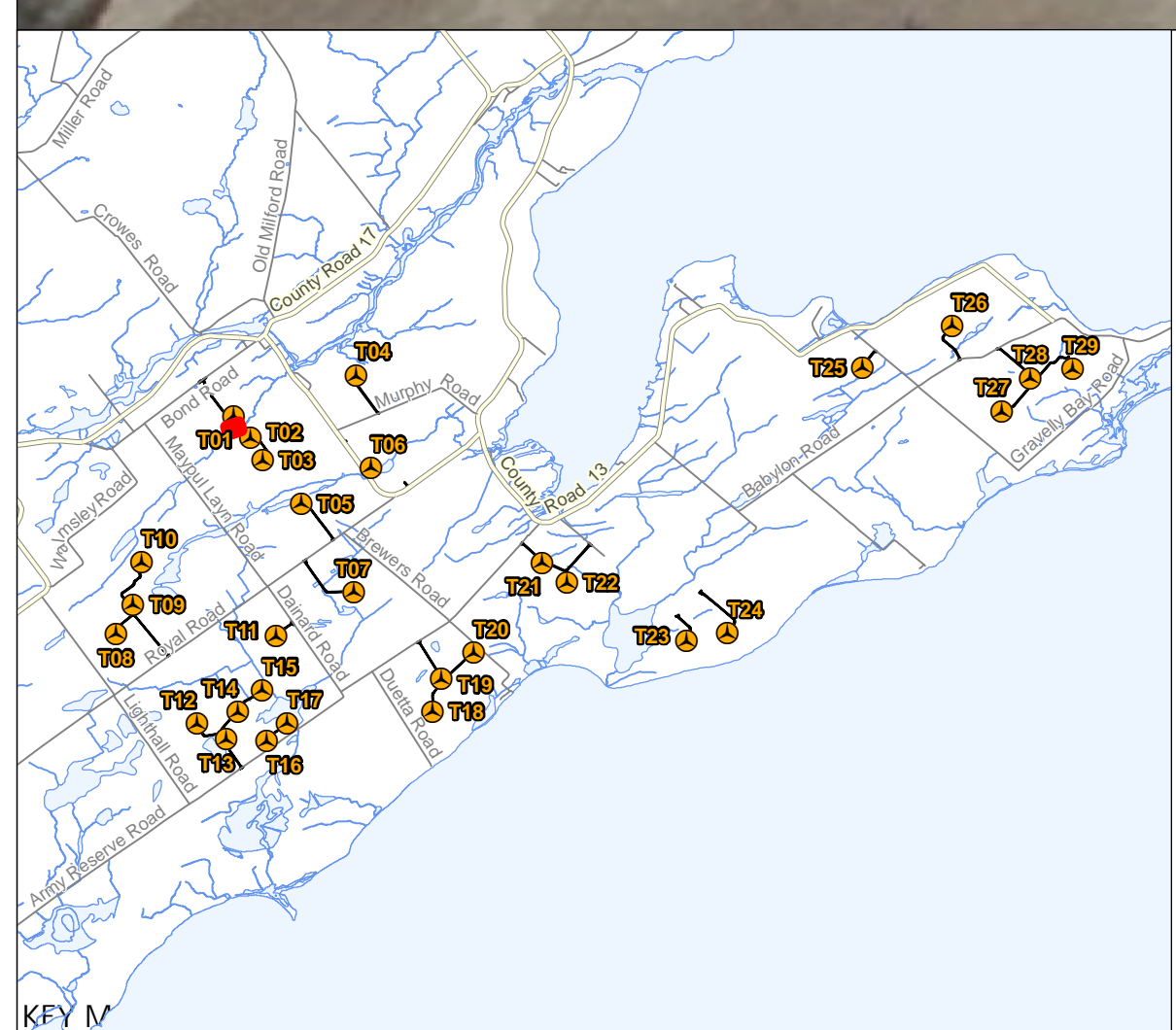
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Consultants

Legend

- Silty Fence
- Collector Line
- Access Roads
- Ground Surface Contour (metres AMSL)
- Watercourse
- Silty Fencing
- Equalization Culvert
- Straw Bale Flow Check Dam
- Direction of Surface Water Flow



NOTES:

CULVERT INSTALLATION

THESE WORKS SHALL INCLUDE, WITHOUT LIMITATION, THE DEWATERING, DIVERSION, AND/OR PUMPING OF DISCHARGE OF BOTH GROUND AND SURFACE WATER DURING INSTALLATION OF THE CULVERT CROSSING AND FINE GRADING. IT IS RECOMMENDED THAT ALL WORKS BE COMPLETED DURING DRY WEATHER CONDITIONS; IF AT ALL POSSIBLE.

THE TEMPORARY BYPASS REQUIRED TO INSTALL THE NEW CULVERT SHOULD ENSURE THAT WATER FLOW IS MAINTAINED DOWNSTREAM AT ALL TIMES FOR THOSE SYSTEMS THAT WOULD OTHERWISE BE FLOWING. IT IS THE CONTRACTOR'S DECISION TO UTILIZE A DAM AND PUMP METHODOLOGY OR CONSTRUCT A TEMPORARY BYPASS CHANNEL. PROPOSED METHODOLOGIES ARE SUBJECT TO THE APPROVAL OF THE CONSERVATION AUTHORITY.

IF A DAM AND PUMP METHODOLOGY IS ADOPTED, THE PUMP MUST BE OF SUFFICIENT SIZE TO CARRY THE TYPICAL FLOW OF THE FEATURE, AS WELL AS ELEVATED FLOWS DURING AND POST RAIN EVENTS. THIS MAY INCLUDE THE USE OF MULTIPLE PUMPS AS REQUIRED. THE DAM SHOULD BE STABLE AND OF SUFFICIENT HEIGHT TO IMPEDE STREAM FLOW WITHOUT OVERTOPPING. THE DISCHARGE LOCATION OF THE DAM AND PUMP DIVERSION SHOULD ALLOW FOR CONTROLLED RELEASE OF WATER BACK INTO THE MUNICIPAL DRAIN AND BE MAINTAINED WITHOUT CAUSING SCOUR OR EROSION TO THE CHANNEL OR BANKS. AN MOE-ISSUED PERMIT TO TAKE WATER WOULD BE REQUIRED FOR DAM AND PUMP DIVERSIONS INVOLVING DAILY VOLUMES OF GREATER THAN 50,000 LITRES.

FISH STRANDED WITHIN THE WORK AREA MUST BE REMOVED AND TRANSFERRED DOWNSTREAM OR UPSTREAM OF THE WORK AREA.

PUMPS MUST OPERATE CONTINUOUSLY FOR THE DURATION OF THE CULVERT INSTALLATION AND THEREFORE FREQUENT AND NIGHTLY INSPECTIONS WILL BE REQUIRED.

WATER WITHIN THE WORK AREA IS TO BE PUMPED AND DISCHARGED WELL AWAY FROM THE DRAIN AND THROUGH A SEDIMENT TRAP OR SUFFICIENT VEGETATION TO ALLOW FOR ADEQUATE FILTRATION OF FINE PARTICULATE MATTER.

EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM THE WATER IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATER. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN THE VICINITY OF THE WATERCOURSE AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE.

THE AREA OF WATERCOURSE AND RIPARIAN ZONE THAT IS DISTURBED SHALL BE MINIMIZED TO THE EXTENT POSSIBLE.

EXISTING DITCH AND CULVERT DIMENSIONS AND DETAILS TO BE FIELD VERIFIED.

SEDIMENT AND EROSION CONTROL MEASURES SHALL BE IMPLEMENTED PRIOR TO WORK AND MAINTAINED DURING THE WORK PHASE AND UNTIL THE SITE HAS BEEN STABILIZED. ALL WORK WILL BE DONE IN ACCORDANCE WITH THE "EROSION AND SEDIMENT CONTROL GUIDELINE FOR URBAN CONSTRUCTION (2006)".

CULVERT CONSTRUCTION WILL OCCUR OUTSIDE OF ANY APPLICABLE FISHERIES TIMING RESTRICTION WINDOWS.

FOLLOWING INSTALLATION OF THE NEW CULVERT, THE CROSSING LOCATION WILL BE STABILIZED AND RESTORED TO ITS ORIGINAL CONDITIONS AND RESEEDED WITH SPECIES NATIVE TO ECOREGION 7E OR THE LOCAL AREA.

EROSION AND SEDIMENT CONTROL NOTES (SEE DETAILS THIS SHEET)

1. 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.
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5. AT THE DISCRETION OF THE OWNER OR OWNER'S CONSULTANT, ADDITIONAL SILT CONTROL DEVICES SHALL BE INSTALLED AT DESIGNATED LOCATIONS.
6. 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.
7. STOCKPILED MATERIAL IS TO BE STORED AWAY FROM POTENTIAL RECEIVERS (E.G. WATERCOURSES), AND BE SURROUNDED BY EROSION CONTROL MEASURES WHERE MATERIAL IS TO BE LEFT IN PLACE IN EXCESS OF 10 DAYS OR PRIOR TO A RAIN EVENT, WHICHEVER OCCURS SOONER.
8. REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%.
9. 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.
10. IN ADDITION TO BEING RESPONSIBLE FOR ENSURING THAT THE PRESCRIBED MEASURES ARE INSTITUTED AND FUNCTIONING AS INTENDED THE CONTRACTOR IS ALSO RESPONSIBLE FOR IMPLEMENTING ANY INTERIM OR EMERGENCY MEASURES AS NECESSARY, TO ENSURE THAT NO SEDIMENT IS DISCHARGED TO THE NATURAL ENVIRONMENT. THE FOLLOWING EXTRA EQUIPMENT/MATERIALS ARE TO BE KEPT ON SITE AS A CONTINGENCY, IN CASE THE PROPOSED CONTROL MEASURES ARE BREACHED.
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AREA GRADING NOTES

PRIOR TO SITE WORKS

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DURING AREA GRADING

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SILT FENCE NOTES (SEE DETAIL OPSD 219.110)

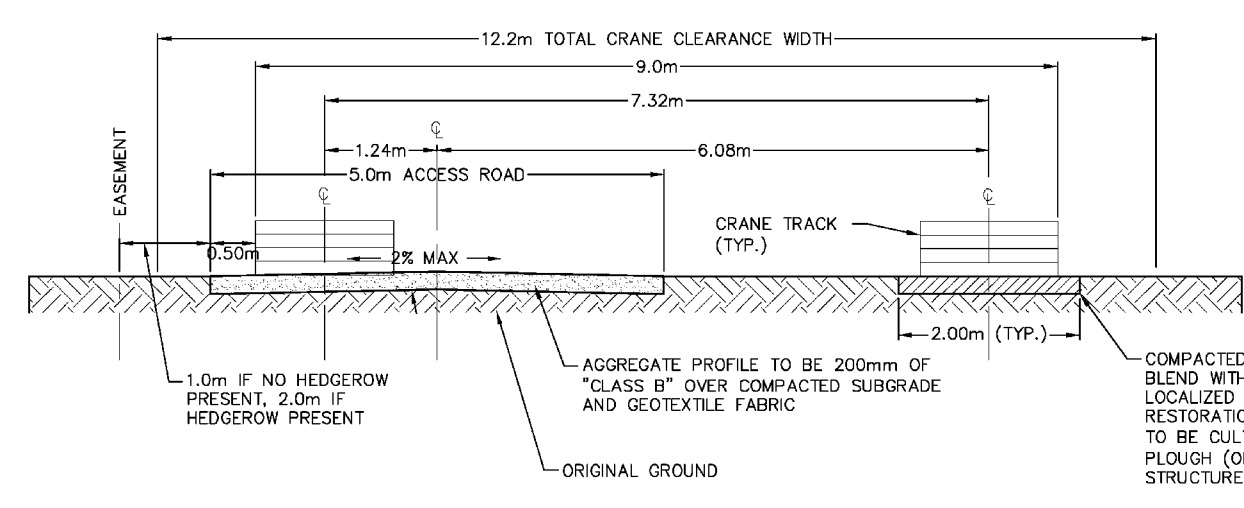
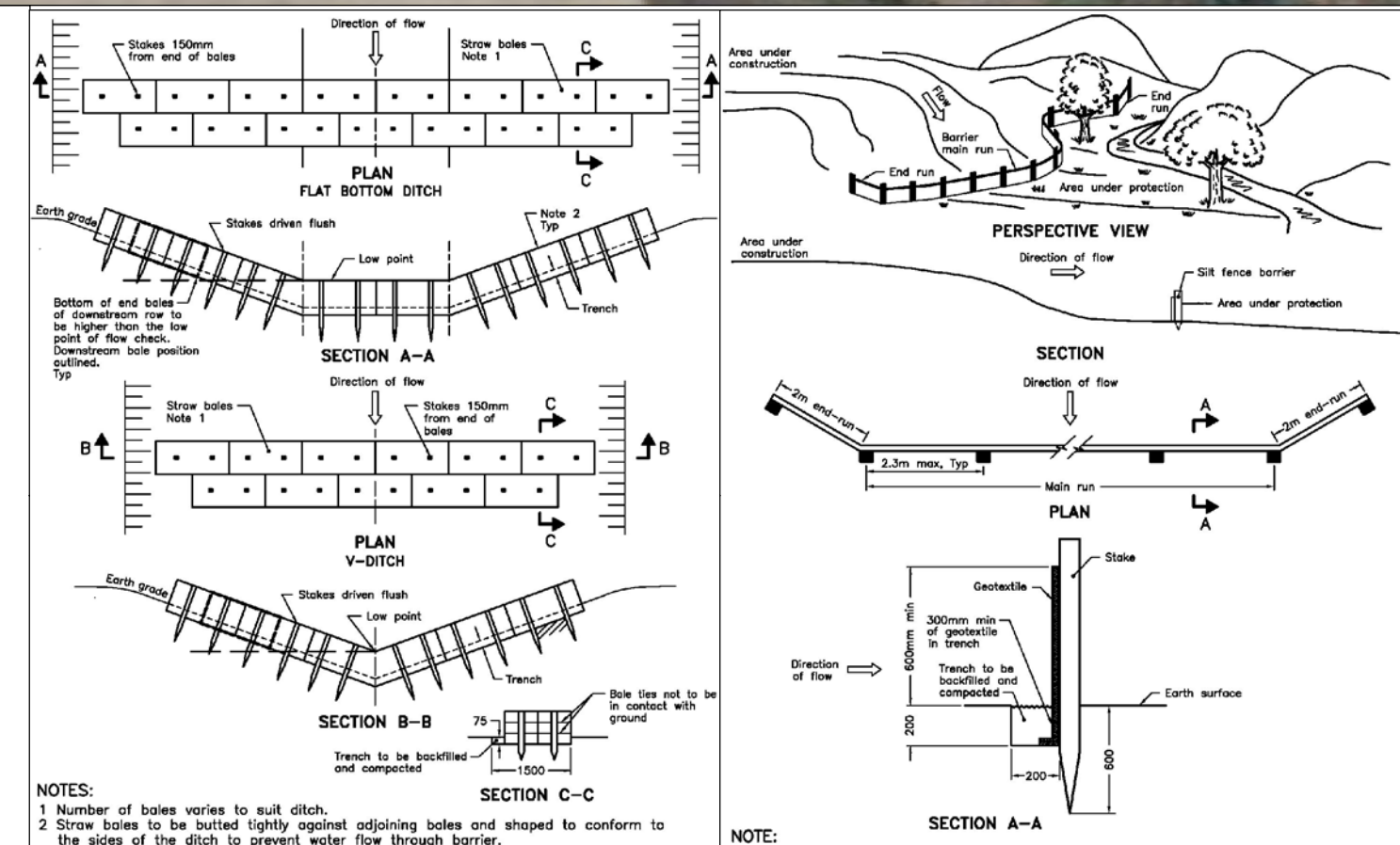
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GENERAL

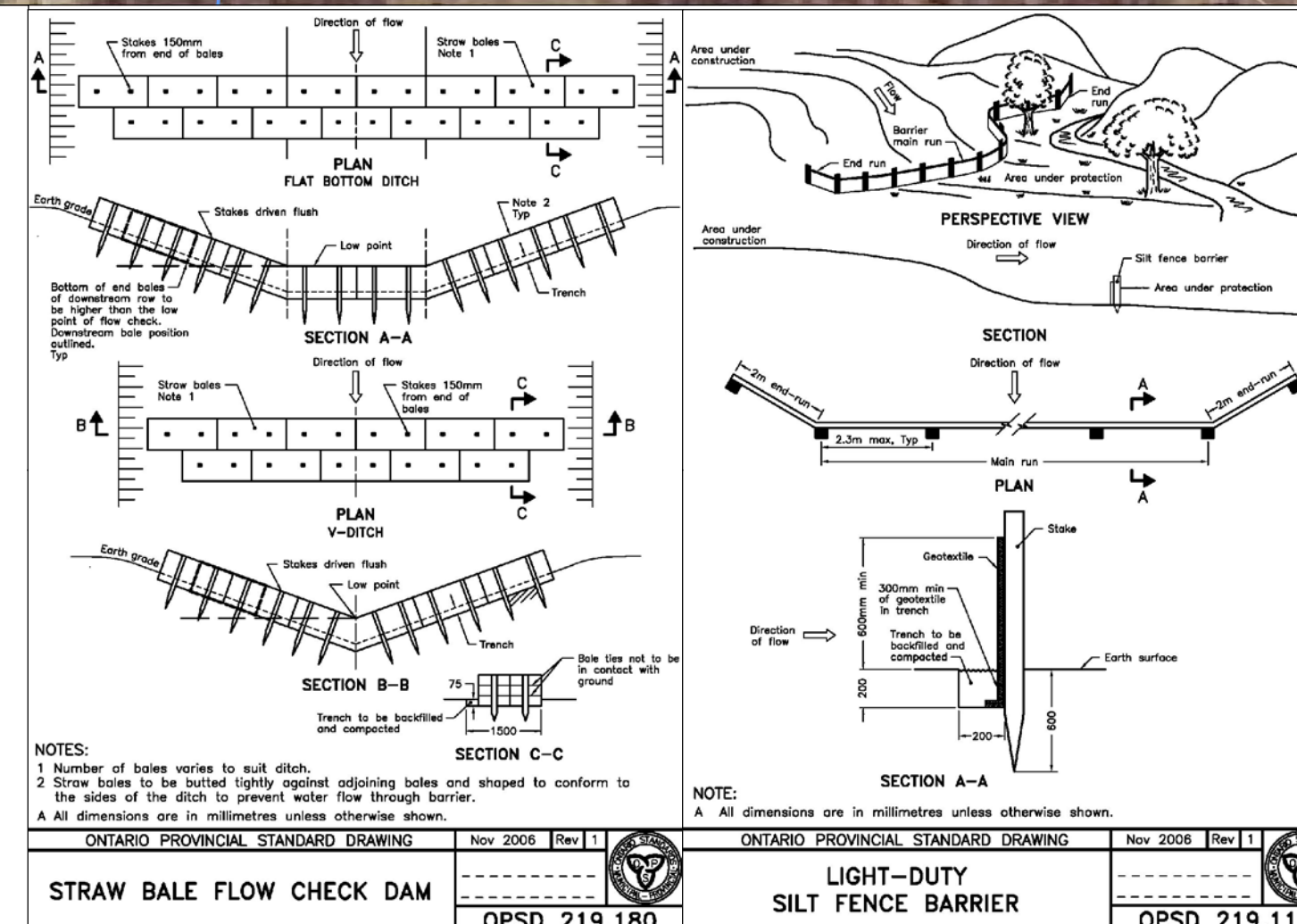
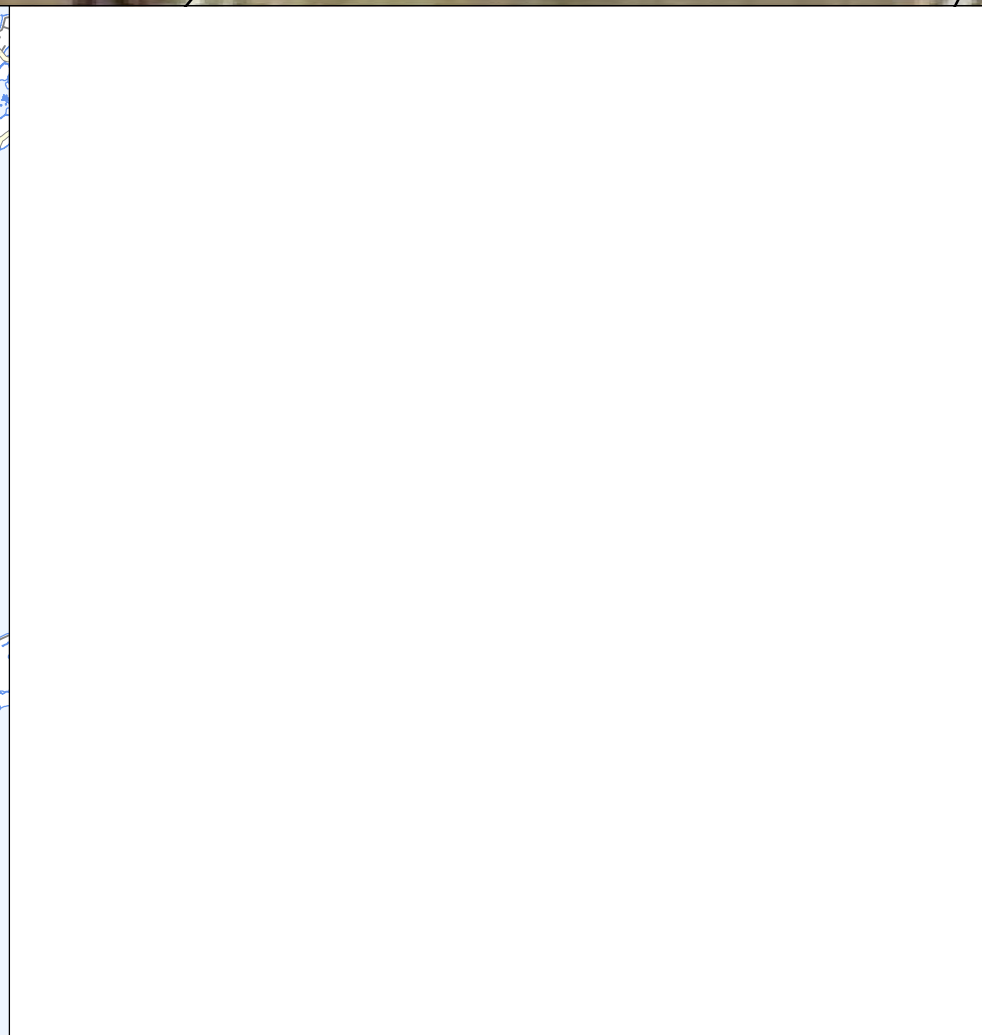
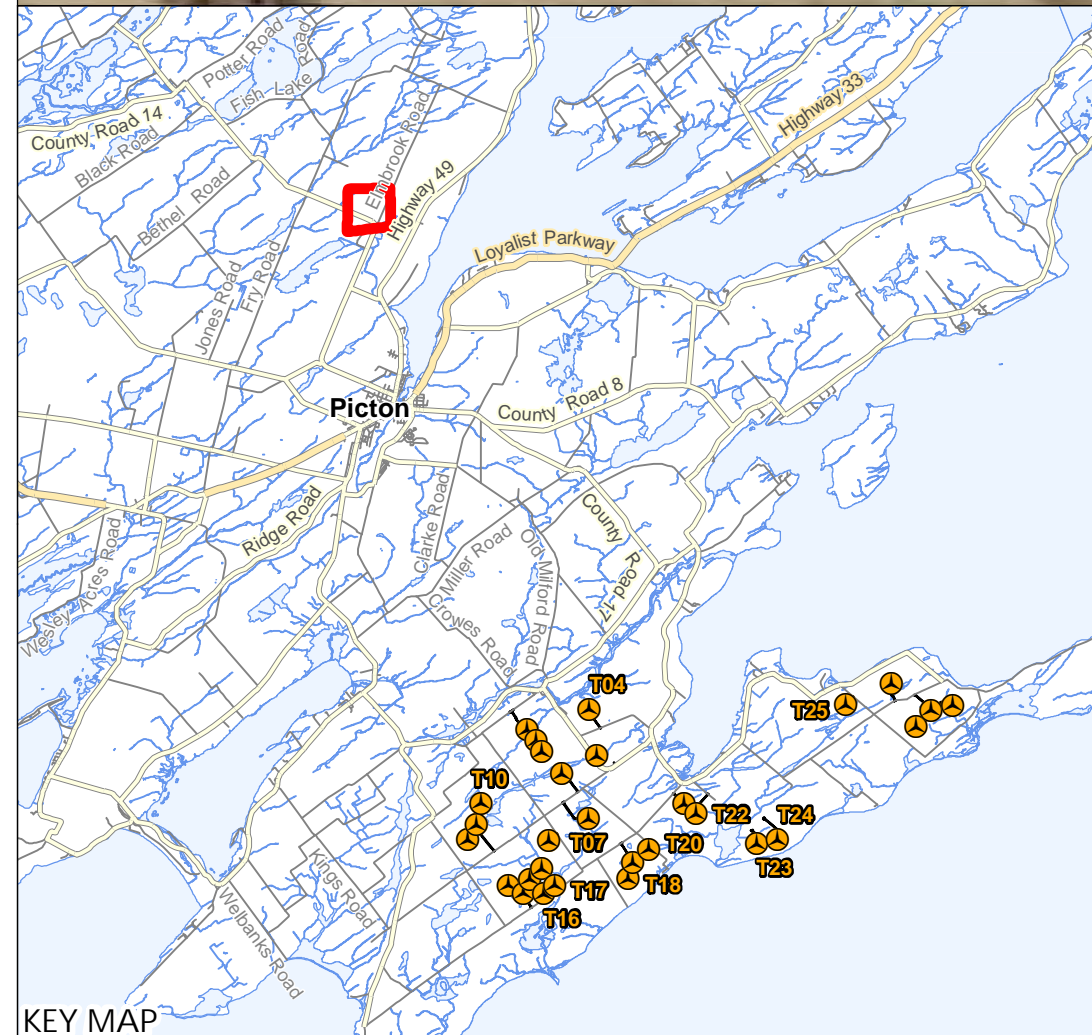
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ONTARIO PROVINCIAL STANDARD DRAWING Nov 2008 (Rev. 11)	ONTARIO PROVINCIAL STANDARD DRAWING Nov 2008 (Rev. 11)
STRAW BALE FLOW CHECK DAM OPSD 219.180	LIGHT-DUTY SILT FENCE BARRIER OPSD 219.110

- Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
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Client/Project
WPD CANADA CORP.
WHITE PINES WIND PROJECT
Figure No.
4
Title



NOTES:

EROSION AND SEDIMENT CONTROL NOTES (SEE DETAILS THIS SHEET)

- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR 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 UPON 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.
 - ACCUMULATED SEDIMENT IS TO BE REMOVED AND DISPOSED OF AS PER OPSS 180, PRIOR TO THE REMOVAL OF ANY CONTROL MEASURE.
- STOCKPILED MATERIAL IS TO BE STORED AWAY FROM POTENTIAL RECEIVERS (E.G. WATERCOURSES), AND BE SURROUNDED BY EROSION CONTROL MEASURES WHERE MATERIAL IS TO BE LEFT IN PLACE IN EXCESS OF 10 DAYS OR PRIOR TO A RAIN EVENT, WHICHEVER OCCURS SOONER.
- REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%.
- 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.
- IN ADDITION TO BEING RESPONSIBLE FOR ENSURING THAT THE PRESCRIBED MEASURES ARE INSTITUTED AND FUNCTIONING AS INTENDED THE CONTRACTOR IS ALSO RESPONSIBLE FOR IMPLEMENTING ANY INTERIM OR EMERGENCY MEASURES AS NECESSARY, TO ENSURE THAT NO SEDIMENT IS DISCHARGED TO THE NATURAL ENVIRONMENT. THE FOLLOWING EXTRA EQUIPMENT/MATERIALS ARE TO BE KEPT ON SITE AS A CONTINGENCY, IN CASE THE PROPOSED CONTROL MEASURES ARE BREACHED.
 - SILT FENCE
 - FILTER CLOTH
 - PUMPS
 - CLEAN RIP-RAP (FREE OF FINES) FOR ROCK CHECK DAMS
 - SAND BAGS AND CLEAN (FREE OF FINES) GRAVEL

ANY ADDITIONAL MATERIAL DEEMED NECESSARY TO REPAIR/REMEDiate PROPOSED MEASURES, OR TO ADEQUATELY DEAL WITH UNEXPECTED HIGH FLOWS

AREA GRADING NOTES

PRIOR TO SITE WORKS

- INSTALL ALL SILT FENCE AND PROTECTIVE FENCING AS SHOWN ON THE PLANS AND MAINTAIN DURING CONSTRUCTION.
- MONTHLY EROSION AND SEDIMENT CONTROL REPORTS (QUARTERLY DURING PERIODS OF INACTIVITY) ARE TO BE SUBMITTED TO THE AUTHORITY UNTIL THE SITE HAS BEEN BUILT OUT (90%-100%) AND STABILIZED. REPORTS TO BE BASED ON FREQUENT INSPECTIONS PARTICULARLY AFTER RAINFALL > 5mm.

DURING AREA GRADING

- TOPSOIL IS TO BE STRIPPED ONLY IN AREAS REQUIRING EARTHWORKS AND PLACED IN STOCK PILES AT THE LOCATIONS SHOWN ON THE PLANS OR AS APPROVED BY THE QUALIFIED ENVIRONMENTAL SITE INSPECTOR.
- TEMPORARY TOPSOIL STOCKPILES ARE TO HAVE CONTINUOUS SILT FENCE PLACED IMMEDIATELY AROUND THE ENTIRE PERIMETER.
- ROADWAYS AND LAY DOWN YARDS ARE TO BE PLACED ON NATIVE GROUND AFTER TOPSOIL HAS BEEN STRIPPED.
- ALL TOPSOIL IS TO BE RE-SPREAD ON CONSTRUCTION IMPACTED AREAS AFTER FINAL GRADING IS COMPLETE TO A MINIMUM DEPTH OF 150MM (INCREASE IF ADDITIONAL TOPSOIL IS AVAILABLE).
- SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED WEEKLY AND AFTER EACH RAINFALL > 5mm 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.

AFTER AREA GRADING

- ALL AREAS WHERE ACTIVE CONSTRUCTION IS NOT EXPECTED FOR 2 WEEKS SHALL BE RE-SEED WITH NATIVE PLANT SPECIES.
- REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%.

SLOPE PROTECTION NOTES

- EITHER ROLLED EROSION CONTROL PRODUCTS (RECP) OR MULCHMAX ULTRA AT 500 KG/HA ARE TO BE USED ON 3:1 SLOPES OR GREATER.
- RECP PRODUCTS ARE TO BE BIODEGRADABLE. STRAW, COIR, WOOD EXCELSIOR ARE SAMPLE MATERIALS THAT CAN BE USED.
- RECP PRODUCTS ARE TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS. INSTALLATION TO BE INSPECTED AND REPAIRED AS NEEDED.
- RECP ARE TO BE APPLIED AS SOON AS POSSIBLE FOLLOWING GRADING AND SEEDING OF SUBJECT AREAS.

SILT FENCE NOTES (SEE DETAIL OPSD 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

GENERAL

- EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM THE WATER IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATER. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30 M OF A WATERCOURSE OR WITHIN THE HIGH VULNERABILITY AQUIFER ZONE AS DESIGNATED BY KAWARTHA CONSERVATION AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE.

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Consultants

Legend

- Ground Surface Contour (metres AMSL)
- Watercourse
- Silt Fencing
- Direction of Surface Water Flow
- Substation
- Catchment Area



Photo 1 Typical access road construction at a wind project



Photo 2 Typical access road construction at a wind project



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Photo 3 Typical access road construction at a wind project



Photo 4 Typical access road construction at a wind project



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Photo 5 Typical access road construction at a wind project



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