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## 1.0 INTRODUCTION

Morrison Hershfield has been retained by IPC Energy to complete an Environmental Impact Study as part of a Natural Heritage Assessment for the HAF Wind Energy Project located in the Township of West Lincoln, in Niagara Region, Ontario. The Project will consist of five (5) Vestas V-100 1.8 megawatt wind turbines producing a nameplate capacity of 9.0 megawatts.

This report has been prepared to identify and assess any negative effects of the project on natural features and identifies and explains how mitigation measures will ensure that there will be no negative environmental effects in accordance with the requirements of Section 38 of O. Reg. 359/09. Monitoring plans will also be established to evaluate the success of the mitigation measures proposed (See the **Environmental Effects Monitoring Report**).

The Records Review, Site Investigation and Evaluation of Significance Reports within the Natural Heritage Assessment identified all natural features within 120m of the project location and determined whether these features were significant.

In this report, where the project location is within 120m of a significant natural feature, mitigation measures are proposed to address negative environmental effects. This report describes how the **Construction Plan Report** will aid in addressing any negative environmental effects and also identifies the environmental effects monitoring requirements, identified in the **Environmental Effect Monitoring Plan Reports**. These mitigation measures and requirements ensure that there will be no negative effects as a result of the proposed project.

The proposed project area is in the Township of West Lincoln, in the Niagara Region (**Figure 1**). The HAF Wind Energy Project is situated about 11 km (6.8 miles) inland (south of) from the Lake Ontario shoreline. The predominate land use in the study area is agriculture with common crops consisting of soybean/corn rotations and sod. Natural habitats are highly fragmented and few in number, consisting of scattered wooded areas and some small wetlands.

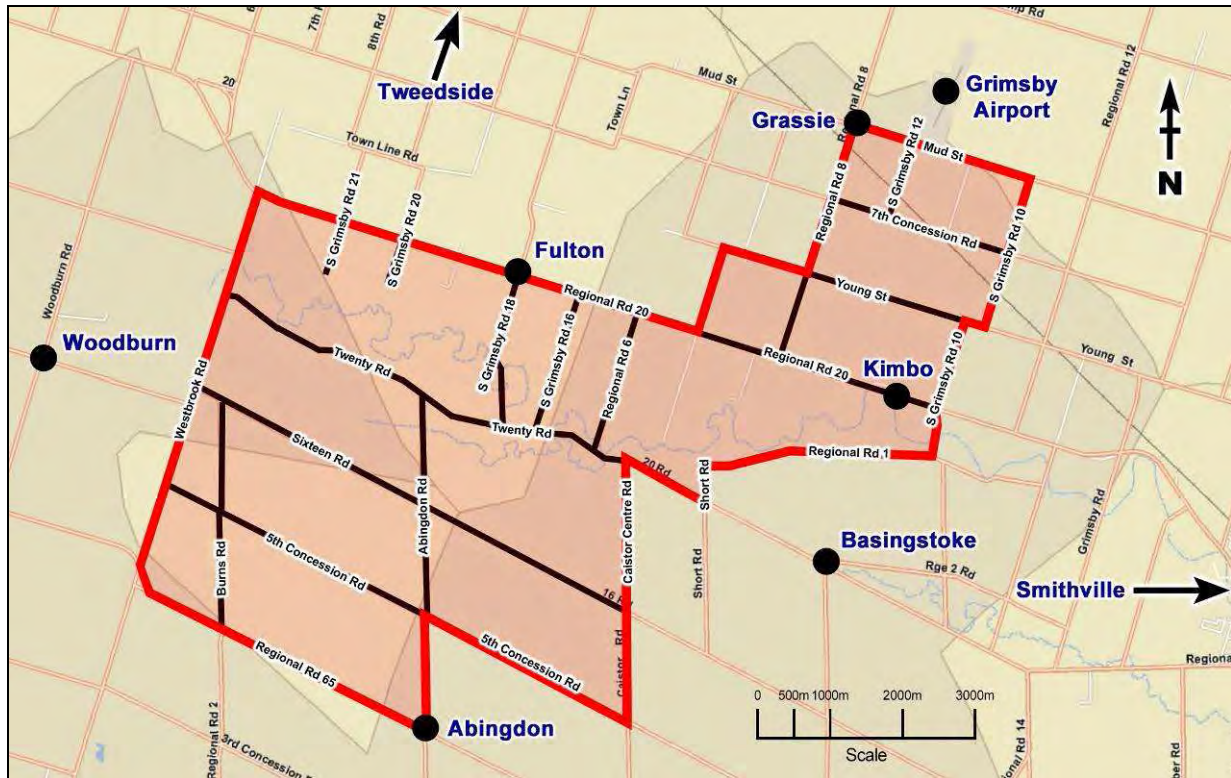


Figure 1: Study Area within the Township of West Lincoln

## 1.1 SIGNIFICANT NATURAL FEATURES

As identified in the Natural Heritage Assessment, there are three significant natural features and two generalized significant wildlife habitat features within 120 metres of the project location. **Table 1** provides an overview of all the natural heritage features determined to be significant in the Evaluation of Significance report. **Appendix A** provides mapping of all of the identified significant natural features. According to Ontario Regulation 359/09 – Renewable Energy Approvals under Part V.0.1. of the Environmental Protection Act, an Environmental Impact Study must be prepared when the project location is proposed within 120 metres of significant natural features. The following report addresses the potential negative environmental effects and proposed mitigation measures for the negative environmental effects for each significant natural feature.

**Table 1: Summary of Significant Features**

Feature Type/ID	Minimum Distance Between Feature and Project Location	Significance Results
Significant Southern Wetland: Twenty Mile Creek Wetland Complex AKA Abingdon Northwest Wetland	3metres from Underground Collector Line and Access Road to Turbine 1 and 2	Provincially significant
Significant Woodland: Mill Creek-Inverary Woods	25.4 metres from Access Road to Turbine 4	Significant as per the Township of Lincoln Official Plan and Region of Niagara Policy Plan
Significant Woodland: Twenty Mile Creek Woodland	7 metres from Underground Collector Line	Significant as per the Township of Lincoln Official Plan and Region of Niagara Policy Plan
Significant Wildlife Habitat: Bat Maternity Colony (Mill Creek-Inverary Woods)	65.4 metres fromTurbine 4 25.4 metres from Turbine 4 Access Road	Treated as significant
Generalized SWH: Woodland Raptor Nesting Habitat (Mill Creek-Inverary Woods + Twenty Mile Creek Woodland)	Mill Creek-Inverary Woods: 25.4 metres from Turbine 4 Access Road Twenty Mile Creek: 7 metres from Underground Collector Line	Treated as significant
Significant Wildlife Habitat: Terrestrial Crayfish Habitat (all MAS communities)	0 metres, Access Road and Underground Collector line will intersect this feature	Treated as significant

## 2.0 PROJECT ACTIVITIES

An introduction to the proposed HAF Wind Energy Project is given in the accompanying **Records Review Report**, **Site Investigations Report**, and **Evaluation of Significance Report**, which comprise the **Natural Heritage Assessment Report**. This report addresses the potential negative environmental effects and proposed mitigation measures for each of the significant natural features identified within 120 metres of the project location.

The construction, operation and decommissioning activities for this project are detailed in **Table 2** below. The **Construction Plan Report**, **Design and Operations Report**, and the **Decommissioning Plan Report** provides a detailed description of the activities in each phase. Impacts were assessed for all three phases of the proposed undertaking and mitigation measures are recommended (see Section 3.0).

**Table 2: Summary of Construction, Operation and Decommissioning Activities**

Phase	Activity	Description of Activity
Construction	Surveying and Geotechnical	Land survey, bore hole sampling and in situ testing prior to construction
	Access Road Construction and Site Preparation	Excavate topsoil and some subsoil; install geotextile and aggregate; build access roads (up to width of 7m) to existing municipal road  Clear land (active agricultural fields) for each turbine location, laydown area, temporary staging areas, substation, construction of access roads and underground collector system.
	Turbine Site and Crane Pad Construction	Clear and level area for turbine laydown areas and crane pad areas required for erection of each turbine; temporary construction laydown areas (50m x 50m) and crane pad areas (20mx40m)
	Equipment Transport	Delivery of turbine components (tower, blades and nacelle) for storage and assembly; delivery of heavy equipment required for turbine assembly
	Foundation Construction	Clear and stockpile soil; excavate area of 3m deep by 20m wide by 20m long for foundation; store subsoil separately from top soil; cure foundation; maintenance of foundation while curing
	Turbine Assembly and Installation	Assemble and erect turbines with large crane on crane pad area
	Electrical Switching Station Construction	Excavate area for substation; install concrete foundation; install substation equipment; connect to outgoing distribution line; fence, lock and secure substation
	Electrical Distribution System	Build trenches for underground collector system; connect to wind turbines and switching station
	Site Clean Up/Restoration	Rehabilitate construction areas (replace topsoil; re-vegetate)
	Turbine Commissioning	Interconnecting testing; physical of technical

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		adjustments as required
	Environmental Effects Monitoring	Install environmental protection measures; adhere to necessary monitoring protocols; maintain and repair environmental protection measures as required
<b>Operation</b>	Turbine operation and electricity production	Operation year round
	Annual and semi-annual maintenance	Preventative maintenance/inspections and maintenance/repairs as required
	Community relations	Respond to inquiries from neighbouring community members
	Environmental Effects Monitoring	Install environmental protection measures; adhere to necessary monitoring protocols; maintain and repair environmental protection measures as required
<b>Decommissioning</b>	Land clearing	Clear land (active agricultural fields) for each turbine laydown area, temporary decommissioning areas, and removal of electrical taplines.
	Road modification/ Removal	Repair access roads and apply aggregate as required for the delivery of heavy equipment and machinery associated with the dismantling of wind turbines
	Removal of Turbines and Ancillary Equipment	Dismantle wind turbines according to manufacturer specifications (in reverse order to construction with a crane); load onto truck and remove from site; demolish concrete foundations and excavate access roads
	Removal of Electrical Taplines;	Dig and remove of all electrical taplines
	Site Restoration and Rehabilitation (replace top soil and re-vegetate)	Rehabilitate construction areas (replace topsoil; re-vegetate); follow-up monitoring
	Environmental Effects Monitoring	Install environmental protection measures; adhere to necessary monitoring protocols; maintain and repair environmental protection measures as required



### 3.0 IMPACT ASSESSMENT

This section describes the anticipated negative environmental effects for construction, operation and decommissioning of each project activity, as well as the mitigation measures and monitoring of each significant natural feature identified. The net effects are those negative environmental effects caused by the project and related activities that will remain after mitigation and impact management measures have been applied. A summary of the potential negative effects and proposed mitigation measures for each significant natural feature is provided in **Table 3**. Detailed monitoring and contingency plans that support the mitigation measures outlined in this report are described in the **Construction Plan Report** and **Environmental Effects Monitoring Reports** where applicable.

Table 3: Summary of Potential Negative effects and Proposed Mitigation Measures for Significant Natural Features

Feature Type/ID	Project Phase & Activity within 120m of the feature	Distance between Feature and all Project Components within 120m of it	Potential Negative Effects to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
Provincially Significant Southern Wetland: Twenty Mile Creek Wetland Complex AKA Abingdon Northwest Wetland	<b>Construction, Operation and Decommissioning:</b> – site preparation, access road construction underground electrical distribution system and turbine operation.	3 metres from Access Road and underground collector system leading to Turbine 1 and 2	<ul style="list-style-type: none"><li>- Temporary disturbance to wildlife due to noise and dust</li><li>- Impacts to wildlife from wildlife entering the construction area.</li><li>-Erosion/ siltation</li><li>- Accidental spills</li><li>- Establishment of invasive and disturbance tolerant non-native species near the natural feature</li></ul>	<ul style="list-style-type: none"><li>- Movement of wildlife through the area, may experience temporary avoidance or displacement effects during construction due to noise, however once the Project is operating, human activity around the facilities will decrease, thus allowing local wildlife movement patterns to quickly re-establish.</li><li>- Where construction is proposed within 30 m of a significant wetland, sediment fencing will be erected along the feature edge acting as a barrier to prevent small animals, amphibians and reptiles from moving into the construction area or onto access roads. Fencing will also be erected around the perimeter of the construction area preventing wildlife from entering the area.</li><li>-Install and maintain sediment and erosion control measures</li><li>- Utilize Horizontal Pressure Directional Drilling where possible for the installation of underground collector lines</li><li>- No equipment storage or refueling areas are located within 30m of the wetland</li></ul>	<ul style="list-style-type: none"><li>-Wetland functions are maintained</li><li>-Prevent offsite transport of sediment; monitor and maintain silt fences</li></ul> <p>See Construction Plan Report for detailed monitoring and contingency plans</p>

Feature Type/ID	Project Phase & Activity within 120m of the feature	Distance between Feature and all Project Components within 120m of it	Potential Negative Effects to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
Significant Woodland: Mill Creek-Inverary Woods	<b>Construction, Operation and Decommissioning:</b> – site preparation, access road construction underground electrical distribution system and turbine operation.	25.4 metres from Underground Collector Line	<ul style="list-style-type: none"><li>- Temporary disturbance to wildlife due to noise and dust</li><li>-Erosion/ siltation</li><li>-Accidental spills</li><li>- Establishment of invasive and disturbance tolerant non-native species near the natural feature</li></ul>	<ul style="list-style-type: none"><li>- Potential disturbance effects to birds would be minimized through avoiding construction activities during sensitive periods (i.e. the breeding season).</li><li>- Should activities be required in this area during the breeding bird season, prior to construction, surveys would be undertaken to identify the presence/absence of nesting birds within the woodland where construction activities are to occur within 30 m of the woodland edge. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed, while the nest is active. The radius of the buffer width ranges from 5 - 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.</li><li>-Install and maintain sediment and erosion control measures</li><li>- Utilize Horizontal Pressure Directional Drilling where possible</li><li>- No equipment storage or refueling areas are located within woodland</li><li>- Excavated soils which must be stored for a period longer than 45 days will be covered or seeded with a cover crop; once they are replaced, they will be re-seeded with a native seed mix</li></ul>	<ul style="list-style-type: none"><li>-Woodland functions are maintained</li><li>-Prevent offsite transport of sediment; monitor and maintain silt fences</li></ul> See Construction Plan Report for detailed monitoring and contingency plans
Significant Woodland: Twenty Mile Creek Woodland	<b>Construction, Operation and Decommissioning:</b> – site preparation, access road construction underground electrical distribution system and turbine operation.	7 metres from Underground Collector Line	<ul style="list-style-type: none"><li>-Temporary disturbance to wildlife due to noise and dust</li><li>-Erosion/ siltation</li><li>-Accidental spills</li><li>- Establishment of invasive and disturbance tolerant non-native species near the</li></ul>	<ul style="list-style-type: none"><li>- Potential disturbance effects to birds would be minimized through avoiding construction activities during sensitive periods (i.e. the breeding season).</li><li>- Should activities be required in this area during the breeding bird season, prior to construction, surveys would be undertaken to identify the presence/absence of nesting birds</li></ul>	<ul style="list-style-type: none"><li>-Woodland functions are maintained</li><li>-Prevent offsite transport of sediment; monitor and maintain silt fences</li></ul> See Construction Plan Report for detailed monitoring and contingency plans

Feature Type/ID	Project Phase & Activity within 120m of the feature	Distance between Feature and all Project Components within 120m of it	Potential Negative Effects to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
			natural feature	<p>within the woodland where construction activities are to occur within 30 m of the woodland edge. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width ranges from 5 - 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.</p> <p>- Install and maintain sediment and erosion control measures</p> <p>- Utilize Horizontal Pressure Directional Drilling where possible</p> <p>- No equipment storage or refueling areas are located within 7m woodland</p> <p>- Excavated soils which must be stored for a period longer than 45 days will be covered or seeded with a cover crop; once they are replaced, they will be re-seeded with a native seed mix</p>	
Significant Wildlife Habitat: Bat Maternity Colony (Mill Creek-Inverary Woods)	<b>Construction, Operation and Decommissioning:</b> – site preparation, access road construction underground electrical distribution system and turbine operation.	65.4 metres from Turbine 4 25.4 metres from Turbine 4 Access Road	<p>- Temporary disturbance to wildlife due to noise and dust</p> <p>-Accidental loss of wildlife</p> <p>-Erosion/ siltation</p> <p>- Accidental spills</p> <p>- Establishment of invasive and disturbance tolerant non-native species near the natural feature</p>	<p>-Potential disturbance effects to bats would be minimized through avoiding construction activities during sensitive periods (i.e. the birthing and rearing season).</p> <p>-Should activities be required in this area during the maternity season, prior to construction, surveys would be undertaken to identify the presence/absence of maternity roosts within the woodland where construction activities are to occur within 120 m of the woodland edge.</p>	<p>Bat maternity colony and its functions are maintained</p> <p>Prevent offsite transport of sediment; monitor and maintain silt fences</p> <p>See Environmental Effects Monitoring Plan (EEMP) for detailed monitoring and contingency plans.</p>
Generalized SWH: Woodland Raptor Nesting Habitat: Mill Creek-Inverary Woods + Twenty Mile Creek Woodland	<b>Construction, Operation and Decommissioning:</b> – site preparation, access road construction underground electrical distribution system and turbine operation.	Mill Creek-Inverary Woods: 25.4 metres from Access Road. 65.4m from Turbine 4 Twenty Mile Creek: 7 metres from Underground Collector Line	<p>-Temporary disturbance to wildlife due to noise and dust</p> <p>-Erosion/ siltation</p>	<p>-Potential disturbance effects to raptors would be minimized through avoiding construction activities during sensitive periods (i.e. the breeding/ nesting season).</p> <p>- Should activities be required in this</p>	<p>-Congregation area is maintained</p> <p>-Prevent offsite transport of sediment; monitor and maintain silt fences</p> <p>See Construction Plan Report for</p>

Feature Type/ID	Project Phase & Activity within 120m of the feature	Distance between Feature and all Project Components within 120m of it	Potential Negative Effects to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
			<ul style="list-style-type: none"><li>-Accidental spills</li><li>-Establishment of invasive and disturbance tolerant non-native species near the natural feature</li></ul>	<p>area during the breeding season, prior to construction commencing, surveys will be undertaken to identify the presence/absence of nesting raptors within the woodland where construction activities are to occur (within 30m of the woodland edge). If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active.. Buffer widths will be based on the species sensitivity.</p> <ul style="list-style-type: none"><li>- Install and maintain sediment and erosion control measures</li><li>-Utilize Horizontal Pressure Directional Drilling where possible</li><li>- No equipment storage or refueling areas are located within 25.4m of the generalized significant wildlife habitat.</li><li>- Excavated soils which must be stored for a period longer than 45 days will be covered or seeded with a cover crop; once they are replaced, they will be re-seeded with a native seed mix</li></ul>	<p>detailed monitoring and contingency plans</p>
Significant Terrestrial Crayfish: all MAS communities	<b>Construction, Operation and Decommissioning:</b> – site preparation, access road construction underground electrical distribution system and turbine operation.	0 metres, access road and underground collector line will intersect this feature	<ul style="list-style-type: none"><li>- Temporary disturbance to wildlife due to noise and dust</li><li>-Accidental loss of wildlife</li><li>-Erosion/ siltation</li><li>-Accidental spills</li><li>- Establishment of invasive and disturbance tolerant non-native species near the natural feature</li></ul>	<ul style="list-style-type: none"><li>-Install and maintain sediment and erosion control measures</li><li>-The Contractor will inspect construction area prior to and after excavation of trench and release any trapped wildlife.</li><li>-Silt fences will be utilized around the designated work area.</li><li>- Utilize Horizontal Pressure Directional Drilling where possible</li><li>- No equipment storage or refueling areas are located within MAS communities</li><li>- Excavated soils which must be stored for a period longer than 45 days will be covered or seeded with a cover crop; once they are replaced, they will be re-seeded with a native seed mix</li></ul>	<ul style="list-style-type: none"><li>- Rare vegetation community and its functions are maintained</li><li>-Prevent offsite transport of sediment</li><li>- Monitor and maintain silt fences</li></ul> <p>See Environmental Effect Monitoring Plan (EEMP) and Construction Plan Report for detailed monitoring and contingency plans</p>

### **3.1 PROVINCIALY SIGNIFICANT WETLAND: LOWER TWENTY MILE CREEK WETLAND COMPLEX AKA ABINGDON (NORTHWEST) WETLAND**

Lower Twenty Mile Creek Wetland Complex (AKA Abingdon (Northwest) Wetland) is a 1907.1-hectare provincially significant wetland complex with 88% swamp and 12% marsh communities. The wetland provides habitat for birds, amphibians and fish. All proposed project components of the HAF Wind Energy Project are located outside of the PSW boundary. The project location, in relation the Lower Twenty Mile Creek Wetland Complex boundaries is shown in mapping provided in Appendix A.

#### **3.1.1 Potential Impacts**

All components of the project location are located outside the boundaries of this PSW, and therefore no direct loss of habitat or function will be experienced. The minimum distance between the feature and the nearest project component is approximately 3 metres (from access road to Turbine 1 and 2).

##### **Temporary Disturbance to Wildlife**

During construction indirect impacts such as the generation of dust or noise are anticipated. Movement of wildlife through the area, may experience temporary avoidance or displacement effects during construction due to noise, however once the Project is operating, human activity around the facilities will decrease, thus allowing local wildlife movement patterns to quickly re-establish.

##### **Accidental Spills**

During borehole excavation, which is to be carried out at each turbine location, equipment may leak, or spills may occur during re-fueling. This is also not expected to have any effect on this feature, however, general mitigations will protect against impacts due to accidental hazardous materials spills. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures.

##### **Establishment of invasive and disturbance tolerant non-native species near the natural feature**

Where taplines are buried or turbine foundations are constructed, excavation may be required to a depth below the frost line. Where temporary storage of the soil will be required, the soil will stored immediately adjacent to the excavation site. Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material. Expected impacts are the potential for disturbance tolerant species to dominate the disturbed soils and displace native beneficial species. Many disturbance tolerant species are non-native and/or aggressively invasive and do not provide quality habitat or food for wildlife.

##### **Erosion and Siltation**

The potential for erosion of the work areas during excavations or soil storage and the subsequent sedimentation of the wetland has been considered and will be mitigated with silt fencing around all designated work areas to prevent any offsite transport of sediment.

### 3.1.2 Mitigation Measures

Avoidance was the main strategy used to minimize impacts to the PSW within 120 metres of the project location.

#### **Temporary Disturbance to Wildlife**

Impacts caused by dust and noise during construction are unavoidable but are temporary in nature and are not anticipated to cause any residual effects. Where construction is proposed within 30 m of a significant wetland, sediment fencing will be erected along the feature edge acting as a barrier to prevent small animals, amphibians and reptiles from moving into the construction area or onto access roads. Fencing will also be erected around the perimeter of the construction area preventing wildlife from entering the area.

#### **Accidental Spills**

The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within 30m of this PSW. All toxic products required during construction, operation and decommissioning must be transported, handled, disposed or recycled according to provincial and municipal waste management standards and a spill prevention program must be developed and carried out in accordance with MOE Spill Reporting Guidelines **(See Appendix D)**.

Recommended mitigation measures to minimize the potential of any petroleum, oil and lubricants (POLs) spills on this natural feature include:

Storage of POLs:

- Fuel transport will be conducted in compliance with the *Transportation of Dangerous Goods Act*.
- Mobile fuelling trucks will be used where possible to minimize the requirements for on-site storage of POLs.
- Any on-site POL storage associated with the construction or decommissioning of the facility will be contained within a ventilated, lockable steel container. The container will be equipped with galvanized steel drip trays for the collection of spilled substances.
- Spill decks will be used for transferring products to smaller containers.
- Fire extinguishers will be located near POL storage areas. A spill kit, including absorbent material, will either be stored in the base of the tower or will be brought to the site during construction or maintenance visits.

Equipment Fuelling:

Only equipment that is not easily transported will be refueled on site. All other vehicles and equipment will be refueled at a commercial fuelling station.

- When refueling equipment, operators will:
  - Use designated fuelling locations;
  - Use drips trays;

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- Use leak free containers and reinforced rip and puncture proof hoses and nozzles;
  - Be in attendance for the duration of the procedure; and
  - Seal all storage container outlets except the outlet currently in use.
- Fuelling must be done at least 120 m from a wetland or water body.
- The Contractor will make daily inspections of hydraulic and fuel systems on machinery.
- Servicing of equipment will not be allowed within 120 m of a wetland or water body.
- All necessary precautions will be implemented to prevent the spillage and release of hazardous materials to the environment.
- All leaks or spills will be immediately reported to the MOE, Spills Action Centre at 1-800-268-6060.

The **Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report** provide a more detailed description of Emergency Response Protocols and Contingency Plans.

### **Establishment of invasive and disturbance tolerant non-native species near the natural feature**

To avoid encouraging the establishment of invasive and disturbance tolerant non-native species near the natural feature, excavated soils which must be stored for a period longer than 45 days should be covered or seeded with a cover crop. As well, once they are replaced, they should be re-seeded with a native seed mix suited to the site conditions and complimentary to the adjacent natural feature.

### **Erosion and Siltation**

Erosion control measures must be implemented to ensure that excavated areas and storage piles do not erode and the resulting silt does not enter natural areas. The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within 30m of this PSW.

Horizontal Pressure Directional Drilling (HPDD) is recommended where possible in areas that are within 120 m of this natural feature.

- Drilling sites will be located at a pre-determined set back distance/location from the PSW boundaries (A setback of 3-30m will be implemented).
- All drilling sites will be rehabilitated back to pre-construction site conditions.
- The Construction Contractor will be responsible for preparing a Frac-Out Response Plan and Contingency Plan in accordance with the DFO HPDD Operational Statement.

In order to mitigate the transport of sediment during vegetation removal and soil disturbance, environmental protection measures (such as straw bale flow checks, rock flow



check dams, silt fence barriers, erosion control blankets and seeding) will be incorporated into the final design and installed during construction by the Contractor. Ontario Provincial Standard Specification (OPSS) 804 (**See Appendix B**) provides construction specifications for these measures.

To reduce potential soil compaction, the Contractor will be instructed to:

- Clearly mark all construction areas within 3 m of a significant wetland where equipment may not be operated or stored, or any other materials stored;
- No activities may occur outside of the identified project location including the operation of any equipment or construction vehicles; and
- Plan and stage the construction to ensure that minimal vegetation is removed during construction for equipment access, stockpiling, and equipment operations.

Where excavations are carried out in proximity to the wetland, all heavy equipment will be kept out of the wetland and located outside of the flagged areas and the silt fencing maintaining a minimum separation distance of 3m. Excavated soils must be piled outside of the flagged areas and continuous, over-lapping silt fencing must be installed between the soil piles and the wetland.

### **3.1.3 Residual Impacts**

When mitigations are carried out, no residual impacts are expected.

## **3.2 MILL CREEK-INVERARY WOODS**

Mill Creek-Inverary Woods is a 4.97-hectare significant woodland with a fresh-moist oak maple deciduous forest dominated by pin oak, swamp white oak and trembling aspen in the canopy, swamp white oak and willow in the sub-canopy and moist-fresh silty clay soil. The project location, in relation to Mill Creek-Inverary Woods is shown in mapping provided in Appendix A.

### **3.2.1 Potential Impacts**

All components of the project location are located outside the boundaries of Mill Creek-Inverary Woods, and therefore no direct loss of habitat or function will be experienced. The minimum distance between the feature and the nearest project component is approximately 25.4 metres (Access Road).

#### **Temporary Disturbance to Wildlife**

During construction indirect impacts such as the generation of dust or noise are anticipated.

#### **Accidental Spills**

During borehole excavation, which is to be carried out at each turbine location, equipment may leak, or spills may occur during re-fueling. This is also not expected to have any effect

on this feature, however, general mitigations will protect against impacts due to accidental hazardous materials spills. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures.

**Establishment of invasive and disturbance tolerant non-native species near the natural feature**

Where taplines are buried or turbine foundations are constructed, excavation will be required to a depth below the frost line. Where temporary storage of the soil will be required, the soil will be stored immediately adjacent to the excavation site. Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material. Expected impacts are the potential for disturbance tolerant species to dominate the disturbed soils and displace native beneficial species. Many disturbance tolerant species are non-native and/or aggressively invasive and do not provide quality habitat or food for wildlife.

**Erosion and Siltation**

The potential for erosion of the work areas during excavations or soil storage and the subsequent sedimentation of this feature has been considered and will be mitigated with silt fencing around all designated work areas to prevent any offsite transport of sediment.

**3.2.2 Mitigation Measures**

**Temporary Disturbance to Wildlife**

Impacts caused by dust and noise during construction are unavoidable but are temporary in nature and are not anticipated to cause any residual effects. Potential disturbance effects to birds will be minimized through avoiding construction activities during sensitive periods (i.e. the breeding season). Should activities be required in this area during the breeding bird season, prior to construction, surveys would be undertaken to identify the presence/absence of nesting birds within the woodland where construction activities are to occur within 30 m of the woodland edge. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width ranges from 5 - 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

**Accidental Spills**

The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials outside of the identified project location. A minimum setback distance of 25.4m will be maintained. All toxic products required during construction, operation and decommissioning must be transported, handled, disposed or recycled according to provincial and municipal waste management standards and a spill prevention program must be developed and carried out in accordance with MOE Spill Reporting Guidelines (**See Appendix D**).

Recommended mitigation measures to minimize the potential of any petroleum, oil and lubricants (POLs) spills on this natural feature include:

Storage of POLs:

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- Fuel transport will be conducted in compliance with the *Transportation of Dangerous Goods Act*.
- Mobile fuelling trucks will be used where possible to minimize the requirements for on-site storage of POLs.
- Any on-site POL storage associated with the construction or decommissioning of the facility will be contained within a ventilated, lockable steel container. The container will be equipped with galvanized steel drip trays for the collection of spilled substances.
- Spill decks will be used for transferring products to smaller containers.
- Fire extinguishers will be located near POL storage areas. A spill kit, including absorbent material, will either be stored in the base of the tower or will be brought to the site during construction or maintenance visits.

### Equipment Fuelling:

Only equipment that is not easily transported will be refueled on site. All other vehicles and equipment will be refueled at a commercial fuelling station.

- When refueling equipment, operators will:
  - Use designated fuelling locations;
  - Use drips trays;
  - Use leak free containers and reinforced rip and puncture proof hoses and nozzles;
  - Be in attendance for the duration of the procedure; and
  - Seal all storage container outlets except the outlet currently in use.
- Fuelling must be done at least 120 m from a wetland or water body.
- The Contractor will make daily inspections of hydraulic and fuel systems on machinery.
- Servicing of equipment will not be allowed within 120 m of a wetland or water body.
- All necessary precautions will be implemented to prevent the spillage and release of hazardous materials to the environment.
- All leaks or spills will be immediately reported to the MOE, Spills Action Centre at 1-800-268-6060.

The **Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report** provide a more detailed description of Emergency Response Protocols and Contingency Plans.

**Establishment of invasive and disturbance tolerant non-native species near the natural feature**

To avoid encouraging the establishment of invasive and disturbance tolerant non-native species near the natural feature, excavated soils which must be stored for a period longer than 45 days should be covered or seeded with a cover crop. As well, once they are replaced, they should be re-seeded with a native seed mix suited to the site conditions and complimentary to the adjacent natural feature.

**Erosion and Siltation**

Erosion control measures must be implemented to ensure that excavated areas and storage piles do not erode and the resulting silt does not enter natural areas. The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within 25.4m of Mill Creek-Inverary Woods.

Horizontal Pressure Directional Drilling (HPDD) is recommended where possible in areas that are within 120 m of this natural feature. Although there are impacts related to HPDD due to soil compaction and damage to vegetation. However all equipment will be located to an area beyond the dripline of mature trees (minimum setback of 25.4 meters), this damage is expected to be minimal.

- All drilling sites will be rehabilitated back to pre-construction site conditions.
- The Construction Contractor will be responsible for preparing a Frac-Out Response Plan and Contingency Plan in accordance with the DFO HPDD Operational Statement.

In order to mitigate the transport of sediment during vegetation removal and soil disturbance, environmental protection measures (such as straw bale flow checks, rock flow check dams, silt fence barriers, erosion control blankets and seeding) will be incorporated into the final design and installed during construction by the Contractor. Ontario Provincial Standard Specification (OPSS) 804 (**See Appendix B**) provides construction specifications for these measures.

To reduce potential soil compaction, the Contractor will be instructed to:

- Clearly mark all areas beside natural features where equipment may not be operated or stored, or any other materials stored;
- No activities may occur outside of the identified project location including the operation of operation of any equipment or construction vehicles within 25.4m of the woodland; and
- Plan and stage the construction to ensure that minimal vegetation is removed during construction for equipment access, stockpiling, and equipment operations.

Where excavations are carried out, all heavy equipment will be kept out of the woodland and located outside of the flagged areas and the silt fencing maintaining a minimum separation distance of 25.4m. Excavated soils must be piled outside of the flagged areas and continuous, over-lapping silt fencing must be installed between the soil piles and the woodland.

### **3.2.3 Residual Impacts**

If mitigations are carried out, no residual impacts are expected.

## **3.3 TWENTY MILE CREEK WOODLAND**

This 2.49-hectare significant woodland with a fresh-moist bur oak deciduous forest dominated by white elm, bur oak and red ash in the canopy, blue beech, white ash and red ash in the sub-canopy, sensitive fern and fowl manna grass in the understory and jack in the pulpit in the groundcover. The project location, in relation to Twenty Mile Creek Woodland is shown in mapping provided in Appendix A.

### **3.3.1 Potential Impacts**

All components of the project location are located outside the boundaries of Twenty Mile Creek Woodland, and therefore no direct loss of habitat or function will be experienced. The minimum distance between the feature and the nearest project component is approximately 7 metres (Underground Collector Line).

#### **Temporary Disturbance to Wildlife**

During construction indirect impacts such as the generation of dust or noise are anticipated.

#### **Accidental Spills**

During borehole excavation, which is to be carried out at each turbine location, equipment may leak, or spills may occur during re-fueling. This is also not expected to have any effect on this feature, however, general mitigations will protect against impacts due to accidental hazardous materials spills. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures.

#### **Establishment of invasive and disturbance tolerant non-native species near the natural feature**

Where taplines are buried or turbine foundations are constructed, excavation will be required to a depth below the frost line. Where temporary storage of the soil will be required, the soil will be stored immediately adjacent to the excavation site. Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material. Expected impacts are the potential for disturbance tolerant species to dominate the disturbed soils and displace native beneficial species. Many disturbance tolerant species are non-native and/or aggressively invasive and do not provide quality habitat or food for wildlife.

### **Erosion and Siltation**

The potential for erosion of the work areas during excavations or soil storage and the subsequent sedimentation of the woodland has been considered and will be mitigated with silt fencing around all designated work areas to prevent any offsite transport of sediment.

### **3.3.2 Mitigation Measures**

#### **Temporary Disturbance to Wildlife**

Impacts caused by dust and noise during construction are unavoidable but are temporary in nature and are not anticipated to cause any residual effects. Potential disturbance effects to birds will be minimized through avoiding construction activities during sensitive periods (i.e. the breeding season). Should activities be required in this area during the breeding bird season, prior to construction, surveys would be undertaken to identify the presence/absence of nesting birds within the woodland where construction activities are to occur within 30 m of the woodland edge. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width ranges from 5 - 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

#### **Accidental Spills**

The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials outside of the identified project location. A minimum setback distance of 7m will be maintained. All toxic products required during construction, operation and decommissioning must be transported, handled, disposed or recycled according to provincial and municipal waste management standards and a spill prevention program must be developed and carried out in accordance with MOE Spill Reporting Guidelines **(See Appendix D)**

Recommended mitigation measures to minimize the potential of any petroleum, oil and lubricants (POLs) spills on this natural feature include:

#### **Storage of POLs:**

- Fuel transport will be conducted in compliance with the *Transportation of Dangerous Goods Act*.
- Mobile fuelling trucks will be used where possible to minimize the requirements for on-site storage of POLs.
- Any on-site POL storage associated with the construction or decommissioning of the facility will be contained within a ventilated, lockable steel container. The container will be equipped with galvanized steel drip trays for the collection of spilled substances.
- Spill decks will be used for transferring products to smaller containers.
- Fire extinguishers will be located near POL storage areas. A spill kit, including absorbent material, will either be stored in the base of the tower or will be brought to the site during construction or maintenance visits.

### Equipment Fuelling:

Only equipment that is not easily transported will be refueled on site. All other vehicles and equipment will be refueled at a commercial fuelling station.

- When refueling equipment, operators will:
  - Use designated fuelling locations;
  - Use drips trays;
  - Use leak free containers and reinforced rip and puncture proof hoses and nozzles;
  - Be in attendance for the duration of the procedure; and
  - Seal all storage container outlets except the outlet currently in use.
- Fuelling must be done at least 120 m from a wetland or water body.
- The Contractor will make daily inspections of hydraulic and fuel systems on machinery.
- Servicing of equipment will not be allowed within 120 m of a wetland or water body.
- All necessary precautions will be implemented to prevent the spillage and release of hazardous materials to the environment.
- All leaks or spills will be immediately reported to the MOE, Spills Action Centre at 1-800-268-6060.

The **Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report** provide a more detailed description of Emergency Response Protocols and Contingency Plans.

### **Establishment of invasive and disturbance tolerant non-native species near the natural feature**

To avoid encouraging the establishment of invasive and disturbance tolerant non-native species near the natural feature, excavated soils which must be stored for a period longer than 45 days should be covered or seeded with a cover crop. As well, once they are replaced, they should be re-seeded with a native seed mix suited to the site conditions and complimentary to the adjacent natural feature.

### **Erosion and Siltation**

Erosion control measures must be implemented to ensure that excavated areas and storage piles do not erode and the resulting silt does not enter natural areas. The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within 7m Twenty Mile Creek Woodland.

Horizontal Pressure Directional Drilling (HPDD) is recommended where possible in areas that are within 120 m of this natural feature. Although there are impacts related to HPDD due to soil compaction and damage to vegetation, However as all equipment will be located

to an area beyond the dripline of mature trees (minimum setback of 7 meters), this damage is expected to be minimal..

- All drilling sites will be rehabilitated back to pre-construction site conditions.
- The Construction Contractor will be responsible for preparing a Frac-Out Response Plan and Contingency Plan in accordance with the DFO HPDD Operational Statement.

In order to mitigate the transport of sediment during vegetation removal and soil disturbance, environmental protection measures (such as straw bale flow checks, rock flow check dams, silt fence barriers, erosion control blankets and seeding) will be incorporated into the final design and installed during construction by the Contractor. Ontario Provincial Standard Specification (OPSS) 804 (**See Appendix B**) provides construction specifications for these measures.

To reduce potential soil compaction, the Contractor will be instructed to:

- Clearly mark all areas beside natural features where equipment may not be operated or stored, or any other materials stored;
- No activities may occur outside of the identified project location including the operation of operation of any equipment or construction vehicles within 7m of the woodland; and
- Plan and stage the construction to ensure that minimal vegetation is removed during construction for equipment access, stockpiling, and equipment operations.

Where excavations are carried out, all heavy equipment will be kept out of the woodland and located outside of the flagged areas and the silt fencing maintaining a minimum separation distance of 7m. Excavated soils must be piled outside of the flagged areas and continuous, over-lapping silt fencing must be installed between the soil piles and the woodland.

### **3.3.3 Residual Impacts**

If mitigations are carried out, no residual impacts are expected.

## **3.4 CANDIDATE SIGNIFICANT WILDLIFE HABITAT: BAT MATERNITY COLONY HABITAT (MILL CREEK-INVERARY WOODS)**

### **3.4.1 Preconstruction Monitoring**

As part of the treatment of this habitat as a significant natural feature additional studies are required in order to establish baseline information regarding its significance. These studies will be completed prior to the commencement of any construction activities for Turbine 4. This approach follows the guidance from within Appendix D of the NHAG (MNR, 2011).



#### **3.4.1.1 Candidate Significant Bat Maternity Colony Habitat: Mill Creek-Inverary Woods**

Turbine 4 is 65.4 m from this feature; the spatial relationship between the project location and this feature is shown in mapping provided in Appendix D.

This study will be conducted in June 2012 to facilitate observations of bats exiting the candidate maternity colony roosts.

The study will include monitoring candidate roost trees for evidence of maternity colonies through an exit survey. A minimum of 10 candidate roost trees will be identified for survey in the candidate maternity colony (Mill Creek- Inverary Woods). The trees will be selected based on the following criteria:

- tallest snag/cavity tree
- exhibits cavities or crevices most often originating as cracks, scars, knot holes or woodpecker cavities
- has the largest diameter breast height
- is within the highest density of snags/cavity trees (eg. Clusters of snags)
- has a large amount of loose, peeling bark
- cavity or crevice is high in snag/cavity tree (>10m)
- tree species that provide good cavity habitat (eg. White pine, maple, aspen, ash, oak)
- canopy is more open (to determine canopy cover, determine the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of trees) and
- exhibits early stages of decay (decay class 1-3)

The candidate roost trees will be marked with flagging tape and their locations recorded on a GPS. Each candidate roost tree will be monitored once from 30 minutes before dusk until 60 minutes after dusk on nights without precipitation or high winds (>6m/s). Two observers will conduct a visual survey of the bat activity at the candidate roost tree, in conjunction with a broadband bat detector with a condenser microphone (Wildlife Acoustics SM2, subject to availability), with the acoustic monitoring device ~10m from the candidate roost tree. The number of all bats observed will be recorded and the calls will be analyzed by Erin McLachlan with CallViewer software to determine species. Erin has taken the MNR Bat Monitoring Workshop for Wind Power Projects and is familiar with identification of Ontario bat species.

See Appendix D for the Pre-construction Monitoring Plan: Bat Maternity Colonies.

The following numbers of bats will be considered significant at maternity colonies, as per the Significant Wildlife Habitat Technical Guide (OMNR 2000):

- 30 Big Brown Bats (*Eptesicus fuscus*)
- 100 Little Brown Bats (*Myotis lucifugus*)
- 10 Eastern Pipistrelles (*Pipistrellus subflavus*)

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- 10 Silver-haired Bats (*Lasionycteris noctivagans*)
- 10 Long-eared Bats (*Myotis septentrionalis*)
- 10 Small-footed Bats (*Myotis leibii*)

As per the draft Ecoregion 7E Criteria Schedule (OMNR 2011), candidate bat maternity colonies are deemed significant if studies confirm the use of the feature by:

- >20 Northern Myotis (*Myotis septentrionalis*)
- >10 Big Brown Bats (*Eptesicus fuscus*)
- >20 Little Brown Myotis (*Myotis lucifugus*)
- >5 Adult Female Silver-haired Bats (*Lasionycteris noctivagans*)

Based on the results of this study two scenarios were developed to outline the potential outcomes and address the requirements of O. Reg. 359/09 as appropriate. Once the study is complete the scenarios will be reviewed and the appropriate scenario will be implemented based on the study results.

### **Scenario 1**

Upon the completion of the baseline studies it is concluded that the habitat is not significant, because:

- The following criteria for maternal bat colony habitat – that a maternity roost was found - was not satisfied as a result of studies completed

### **Scenario 2**

Upon the completion of the baseline studies it is concluded that the habitat is significant because:

- The following criteria for maternal bat colony habitat – that a maternity roost was found - was satisfied as a result of studies completed.

### **3.4.2.1 Potential Impacts**

Should the habitat identified be determined to be significant based on the results of the preconstruction survey, the following potential impacts may occur for each scenario:

#### **Scenario 1**

Where sites are determined to be not significant the identification of potential impacts is not required under O.Reg 359/09.

#### **Scenario 2**

Should the habitat identified be determined to be significant based on the results of the preconstruction surveys, the following potential impacts may occur:

### **Temporary Disturbance to Bats**

- During construction indirect impacts such as the generation of dust or noise are anticipated. Maternal colonies are sensitive to disturbance and may temporarily abandon the roosting area during construction.

### **Behavioural Avoidance**

- Operation of wind turbines may result in the avoidance of maternal bats and may reduce the species use of the habitat.

### **Fatalities**

- Collisions with turbines may occur.

## **3.4.2.2 Mitigation Measures**

Should the habitat identified be determined to be significant based on the results of the preconstruction survey, the following mitigation will be implemented for each scenario.

### **Scenario 1**

Where sites are determined to be not significant the identification of mitigation measures is not required under O.Reg 359/09.

### **Scenario 2**

Where sites are determined to be significant the identification of mitigation measures is required under O.Reg 359/09.

### **Temporary Disturbance to Wildlife**

Potential disturbance effects to bats would be minimized through avoiding construction activities during sensitive periods (i.e. the birthing and rearing season). Should activities be required within 120 m of the woodland edge during the maternity season, prior to construction, surveys would be undertaken to identify the presence/absence of maternity roosts within the woodland. If a roost is located, a designated 30m buffer will be marked off within which no construction activity will be allowed while the roost is active.

### **Behavioural Avoidance**

3 years of follow-up post-construction monitoring and associated mitigation will be carried out if the habitat is deemed significant to document and mitigate any impacts to the habitat used by maternal bats following operation of the wind turbines. Mitigation will include adaptive management techniques, utilize the best available science, and will satisfy the MOE and MNR. See the EEMP for the monitoring plan for this habitat.

### **Fatalities**

The project is also required under Section 23.1 of O. Reg 359/09 to develop an environmental effects monitoring plan (EEMP) with respect to fatalities of birds and bats from the operation of the wind turbines. See the EEMP for the monitoring plan for addressing the mortality monitoring requirements under Section 23 of O. Reg 359/09.

### **3.5 GENERALIZED SIGNIFICANT WILDLIFE HABITAT: WOODLAND RAPTOR NESTING HABITAT (MILL CREEK-INVERARY WOODS + TWENTY MILE CREEK WOODLAND)**

The Mill Creek-Inverary Woods and Twenty Mile Creek Woodland provide potential woodland raptor nesting habitat. The project location, in relation to Woodland Raptor Nesting Habitat is shown in mapping provided in Appendix A.

#### **3.5.1 Potential Impacts**

All components of the project location are located outside the boundaries of the feature, and therefore no direct loss of habitat or function will be experienced. The minimum distance between the feature and the nearest project component is approximately 7 metres from Underground Collector Line for the Twenty Mile Creek Woodland. Mill Creek-Inverary Woods in 25.4m from an underground collector line and 65.4m from Turbine 4.

#### **Temporary Disturbance to Wildlife**

During construction indirect impacts such as the generation of dust or noise are anticipated.

#### **Accidental Spills**

During borehole excavation, which is to be carried out at each turbine location, equipment may leak, or spills may occur during re-fueling. This is also not expected to have any effect on this feature, however, general mitigations will protect against impacts due to accidental hazardous materials spills. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures.

#### **Establishment of invasive and disturbance tolerant non-native species near the natural feature**

Where taplines are buried or turbine foundations are constructed, excavation will be required to a depth below the frost line. Where temporary storage of the soil will be required, the soil will be stored immediately adjacent to the excavation site. Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material. Expected impacts are the potential for disturbance tolerant species to dominate the disturbed soils and displace native beneficial species. Many disturbance tolerant species are non-native and/or aggressively invasive and do not provide quality habitat or food for wildlife.

#### **Erosion and Siltation**

The potential for erosion of the work areas during excavations or soil storage and the subsequent sedimentation of the wetland has been considered and will be mitigated with silt fencing around all designated work areas to prevent any offsite transport of sediment.

### 3.5.2 Mitigation Measures

#### **Temporary Disturbance to Wildlife**

Impacts caused by dust and noise during construction are unavoidable but are temporary in nature and are not anticipated to cause any residual effects. Potential disturbance effects to raptors will be minimized through avoiding construction activities during sensitive periods (i.e. the breeding/ nesting season). In the event that construction activities be required in this area during the breeding season, prior to construction commencing, surveys will be undertaken to identify the presence/absence of nesting raptors within the woodland where construction activities are to occur (within 30m of the woodland edge). If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active.. Buffer widths will be based on the species sensitivity.

#### **Accidental Spills**

The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within 7m of the Twenty Mile Creek Woodland, and 25.4m Mill Creek-Inverary Woods. All toxic products required during construction, operation and decommissioning must be transported, handled, disposed or recycled according to provincial and municipal waste management standards and a spill prevention program must be developed and carried out in accordance with MOE Spill Reporting Guidelines **(See Appendix D)**

Recommended mitigation measures to minimize the potential of any petroleum, oil and lubricants (POLs) spills on this natural feature include:

##### Storage of POLs:

- Fuel transport will be conducted in compliance with the *Transportation of Dangerous Goods Act*.
- Mobile fuelling trucks will be used where possible to minimize the requirements for on-site storage of POLs.
- Any on-site POL storage associated with the construction or decommissioning of the facility will be contained within a ventilated, lockable steel container. The container will be equipped with galvanized steel drip trays for the collection of spilled substances.
- Spill decks will be used for transferring products to smaller containers.
- Fire extinguishers will be located near POL storage areas. A spill kit, including absorbent material, will either be stored in the base of the tower or will be brought to the site during construction or maintenance visits.

##### Equipment Fuelling:

Only equipment that is not easily transported will be refueled on site. All other vehicles and equipment will be refueled at a commercial fuelling station.

- When refueling equipment, operators will:

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- Use designated fuelling locations;
  - Use drips trays;
  - Use leak free containers and reinforced rip and puncture proof hoses and nozzles;
  - Be in attendance for the duration of the procedure; and
  - Seal all storage container outlets except the outlet currently in use.
- Fuelling must be done at least 120 m from a wetland or water body.
- The Contractor will make daily inspections of hydraulic and fuel systems on machinery.
- Servicing of equipment will not be allowed within 120 m of a wetland or water body.
- All necessary precautions will be implemented to prevent the spillage and release of hazardous materials to the environment.
- All leaks or spills will be immediately reported to the MOE, Spills Action Centre at 1-800-268-6060.

The **Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report** provide a more detailed description of Emergency Response Protocols and Contingency Plans.

### **Establishment of invasive and disturbance tolerant non-native species near the natural feature**

To avoid encouraging the establishment of invasive and disturbance tolerant non-native species near the natural feature, excavated soils which must be stored for a period longer than 45 days should be covered or seeded with a cover crop. As well, once they are replaced, they should be re-seeded with a native seed mix suited to the site conditions and complimentary to the adjacent natural feature.

### **Erosion and Siltation**

Erosion control measures must be implemented to ensure that excavated areas and storage piles do not erode and the resulting silt does not enter natural areas. The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within 7m of the Twenty Mile Creek Woodland, and 25.4m Mill Creek-Inverary Woods.

Horizontal Pressure Directional Drilling (HPDD) is recommended where possible in areas that are within 120 m of this natural feature. Although there are impacts related to HPDD due to soil compaction and damage to vegetation, if the equipment is located to an area beyond the dripline of mature trees, this damage is expected to be minimal.

- All drilling sites will be rehabilitated back to pre-construction site conditions.

- The Construction Contractor will be responsible for preparing a Frac-Out Response Plan and Contingency Plan in accordance with the DFO HPDD Operational Statement.

In order to mitigate the transport of sediment during vegetation removal and soil disturbance, environmental protection measures (such as straw bale flow checks, rock flow check dams, silt fence barriers, erosion control blankets and seeding) will be incorporated into the final design and installed during construction by the Contractor. Ontario Provincial Standard Specification (OPSS) 804 (**See Appendix B**) provides construction specifications for these measures.

To reduce potential soil compaction, the Contractor will be instructed to:

- Clearly mark all areas beside natural features where equipment may not be operated or stored, or any other materials stored;
- No activities may occur outside of the identified project location including the operation of operation of any equipment or construction vehicles within 7m of the Twenty Mile Creek Woodland, and 25.4m Mill Creek-Inverary Woods; and
- Plan and stage the construction to ensure that minimal vegetation is removed during construction for equipment access, stockpiling, and equipment operations.

Where excavations are carried out, all heavy equipment will be kept out of the woodland and located outside of the flagged areas and the silt fencing maintaining a minimum separation distance of 7m of the Twenty Mile Creek Woodland, and 25.4m Mill Creek-Inverary Woods. Excavated soils must be piled outside of the flagged areas and continuous, over-lapping silt fencing must be installed between the soil piles and the woodlands.

### **3.5.3 Residual Impacts**

If mitigations are carried out, no residual impacts are expected.

## **3.6 SIGNIFICANT WILDLIFE HABITAT: TERRESTRIAL CRAYFISH HABITAT**

The access road and underground collector line will intersect this feature at 2 locations. The access road is 7m wide at these crossings and the underground collector line will be routed in trenches along the access road.

2 MAS Communities provide potential terrestrial crayfish habitat, the Evaluation of Significance Report treated these features as significant. The project location, in relation to terrestrial crayfish habitat is shown in mapping provided in Appendix A.

### **3.6.1 Preconstruction Monitoring**

As part of the treatment of these habitats as significant natural features additional studies are required for these habitats in order to establish baseline information regarding their significance. These studies will be completed prior to the commencement of any

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construction activities for the access road and collector lines associated with turbines 1 and 2. This approach follows the guidance from within Appendix D of the NHAG (MNR, 2011).

This study will be conducted in April 1– June 30 to include the adult breeding season. Three field visits will be scheduled.

- Site Visit #1: April
- Site Visit #2: May
- Site Visit #3: June

The study will include thoroughly investigating the entire candidate site on foot, looking for evidence of chimneys (burrows). Locations of all chimneys will be recorded with a GPS and notes will be made of any burrow activity observed (i.e. fresh mud pellets at burrow portals). Other observations of species using burrows (such as snakes and small mammals) will also be noted and reported. Two observers will conduct 3 surveys of 1 hour each (6 person hours of effort). Data on habitat and weather conditions (including the conditions and any precipitation events of the preceding week), start and end times of survey will also be recorded.

As per the Significant Wildlife Habitat Technical Guide (OMNR 2000), candidate significant wildlife habitat (species/habitats of conservation concern) areas are analyzed in terms of 10 criteria:

- Degree of rarity of species found at site
- Documented significant decline in a species and/or its critical habitat
- Species whose range is solely or primarily found in Ontario
- Condition of existing habitat at site
- Size of species population at site
- Size and location of habitat
- Potential for long-term protection of the habitat
- Representation of species/habitat within the municipality
- Evidence of use of the habitat
- Species of particular interest to the planning authority

This study will provide information on the abundance and species of crayfish using the habitat to conduct an analysis on this feature.



As per the draft Ecoregion 7E Criteria Schedule (OMNR 2011), candidate terrestrial crayfish habitats are deemed significant if studies confirm the use of the feature by:

- Presence of 1 or more individuals of species listed or their chimneys (burrows):
  - Chimney or Digger Crayfish (*Fallicambarus fodiens*)
  - Devil Crawfish or Meadow Crayfish (*Cambarus Diogenes*)

Based on the results of these studies several scenarios were developed to outline the potential outcomes and address the requirements of O.Reg 359/09 as appropriate. Once the studies are completed the scenarios will be reviewed and the appropriate scenario will be implemented based on the study results.

### **Scenario 1**

Upon the completion of the baseline studies it is concluded that the habitat(s) are not significant, because:

- Chimney or Digger Crayfish; (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish; (*Cambarus Diogenes*) or their chimneys (burrows) were not determined to be present within the habitat when studies were completed

### **Scenario 2 A**

Upon the completion of the baseline studies it is concluded that the habitat(s) are significant, because:

- The presence of 1 or more individuals of Chimney or Digger Crayfish; (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish; (*Cambarus Diogenes*) or their chimneys (burrows) in suitable marsh meadow or terrestrial sites within the identified habitat boundaries.

### **Scenario 2 B**

Upon the completion of the baseline studies it is concluded that the habitat(s) are significant, because:

- The presence of 1 or more individuals of Chimney or Digger Crayfish; (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish; (*Cambarus Diogenes*) or their chimneys (burrows) in suitable marsh meadow or terrestrial sites within the identified habitat boundaries, and surrounding areas.
- The original habitat boundaries are adjusted/ revised to include the additional area(s) where the species listed above or their chimneys (burrows) were found/observed.

### **3.6.2 Potential Impacts**

Should the habitat identified be determined to be significant based on the results of the preconstruction surveys, the following potential impacts may occur for each scenario:

### **Scenario 1**

Where sites are determined to be not significant the identification of potential impacts is not required under O.Reg 359/09.

### **Scenario 2A**

Should the habitat identified be determined to be significant based on the results of the preconstruction surveys, the following potential impacts may occur.

#### **Loss of Habitat**

The access road and underground collector line will intersect the habitat(s) at 2 locations. The access road is 7m wide at these crossings and the underground collector line will be routed in trenches along the access road, the construction of the infrastructure will result in a small portion of this habitat will be lost. The total habitat loss anticipated is approximately 0.055 ha (0.03ha for Turbine 1 and 0.025 ha for Turbine 2).

#### **Temporary Disturbance to Wildlife**

During construction indirect impacts such as the generation of dust or noise are anticipated.

#### **Accidental Loss of Wildlife**

Where taplines are buried, excavation will be required and crayfish could become trapped and buried in the trenches.

#### **Accidental Spills**

During borehole excavation, which is to be carried out at each turbine location, equipment may leak, or spills may occur during re-fueling. This is also not expected to have any effect on this feature, however, general mitigations will protect against impacts due to accidental hazardous materials spills. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures.

#### **Establishment of invasive and disturbance tolerant non-native species near the natural feature**

Where taplines are buried or turbine foundations are constructed, excavation will be required to a depth below the frost line. Where temporary storage of the soil will be required, the soil will stored immediately adjacent to the excavation site. Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material. Expected impacts are the potential for disturbance tolerant species to dominate the disturbed soils and displace native beneficial species. Many disturbance tolerant species are non-native and/or aggressively invasive and do not provide quality habitat or food for wildlife.

#### **Erosion and Siltation**

The potential for erosion of the work areas during excavations or soil storage and the subsequent sedimentation of the wetland has been considered and will be mitigated with silt fencing around all designated work areas to prevent any offsite transport of sediment.

## **Scenario 2B**

Should the habitat identified be determined to be significant based on the results of the preconstruction surveys, and additional habitat beyond the original boundaries be discovered following potential impacts may occur . Please note that the original habitat boundaries will be adjusted/ revised to include the additional area(s) where the species listed above or their chimneys (burrows) were found/observed. Any change to the boundaries, potential impacts and/or mitigation will be presented to MNR prior to implementation.

### **Loss of Habitat**

The access road and underground collector line will intersect the habitat(s) at 2 locations. The access road is 7m wide at these crossings and the underground collector line will be routed in trenches along the access road, the construction of the infrastructure will result in a small portion of this habitat will be lost. The total habitat loss anticipated is approximately 0.055 ha (0.03ha for Turbine 1 and 0.025 ha for Turbine 2). This will be updated should additional portions of habitat be removed/ impacted based on the results of the preconstruction surveys and updated habitat boundaries.

### **Temporary Disturbance to Wildlife**

During construction indirect impacts such as the generation of dust or noise are anticipated.

### **Accidental Loss of Wildlife**

Where taplines are buried, excavation will be required and crayfish could become trapped and buried in the trenches.

### **Accidental Spills**

During borehole excavation, which is to be carried out at each turbine location, equipment may leak, or spills may occur during re-fueling. This is also not expected to have any effect on this feature, however, general mitigations will protect against impacts due to accidental hazardous materials spills. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures.

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Where taplines are buried or turbine foundations are constructed, excavation will be required to a depth below the frost line. Where temporary storage of the soil will be required, the soil will stored immediately adjacent to the excavation site. Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material. Expected impacts are the potential for disturbance tolerant species to dominate the disturbed soils and displace native beneficial species. Many disturbance tolerant species are non-native and/or aggressively invasive and do not provide quality habitat or food for wildlife.

### **Erosion and Siltation**

The potential for erosion of the work areas during excavations or soil storage and the subsequent sedimentation of the wetland has been considered and will be mitigated with silt fencing around all designated work areas to prevent any offsite transport of sediment.

#### **3.6.3 Mitigation Measures**

Should the habitat identified be determined to be significant based on the results of the preconstruction surveys, the following mitigation will be implemented for each scenario.

##### **Scenario 1**

Where sites are determined to be not significant the identification of mitigation measures is not required under O.Reg 359/09.

##### **Scenario 2A**

Should the habitat identified be determined to be significant based on the results of the preconstruction surveys, the following mitigation measures will be implemented to address the potential impacts outlines in scenario 2A above.

##### **Loss of Habitat**

To compensate for the loss of approximately 0.055 ha of habitat, a commitment will be made to monitor the population for 2 years to provide the MNR with more scientific data on the species. This supports protection of the species by providing a better understanding of the population size, and habitat needs and preferences of the species. The access road will be constructed with 2 culverts that will be filled with natural substrate and will maintain an openness ratio of 0.25-0.5 to provide habitat and a migration route for terrestrial crayfish.

##### **Temporary Disturbance to Wildlife**

Impacts caused by dust and noise during construction are unavoidable but are temporary in nature and are not anticipated to cause any residual effects. Culverts will be installed at associated road crossings to maintain the connectivity of the MAS communities.

##### **Accidental Loss of Wildlife**

Where construction is proposed within a significant wildlife habitat – terrestrial crayfish, sediment fencing will be erected along the feature edge acting as a barrier to prevent small animals, amphibians and reptiles from moving into the construction area or onto access roads. Fencing will also be erected around the perimeter of the construction area (including trenches) preventing wildlife from entering the area. The Contractor will inspect construction area prior to and after excavation of trench and release any trapped wildlife. Silt fences will be utilized around a minimized designated work area.

##### **Accidental Spills**

The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within this feature. All toxic products required during construction, operation and decommissioning must be transported, handled, disposed or recycled according to provincial and municipal

waste management standards and a spill prevention program must be developed and carried out in accordance with MOE Spill Reporting Guidelines **(See Appendix D)**.

Recommended mitigation measures to minimize the potential of any petroleum, oil and lubricants (POLs) spills on this natural feature include:

### Storage of POLs:

- Fuel transport will be conducted in compliance with the *Transportation of Dangerous Goods Act*.
- Mobile fuelling trucks will be used where possible to minimize the requirements for on-site storage of POLs.
- Any on-site POL storage associated with the construction or decommissioning of the facility will be contained within a ventilated, lockable steel container. The container will be equipped with galvanized steel drip trays for the collection of spilled substances.
- Spill decks will be used for transferring products to smaller containers.
- Fire extinguishers will be located near POL storage areas. A spill kit, including absorbent material, will either be stored in the base of the tower or will be brought to the site during construction or maintenance visits.

### Equipment Fuelling:

Only equipment that is not easily transported will be refueled on site. All other vehicles and equipment will be refueled at a commercial fuelling station.

- When refueling equipment, operators will:
  - Use designated fuelling locations;
  - Use drips trays;
  - Use leak free containers and reinforced rip and puncture proof hoses and nozzles;
  - Be in attendance for the duration of the procedure; and
  - Seal all storage container outlets except the outlet currently in use.
- Fuelling must be done at least 120 m from a wetland or water body.
- The Contractor will make daily inspections of hydraulic and fuel systems on machinery.
- Servicing of equipment will not be allowed within 120 m of a wetland or water body.
- All necessary precautions will be implemented to prevent the spillage and release of hazardous materials to the environment.
- All leaks or spills will be immediately reported to the MOE, Spills Action Centre at 1-800-268-6060.

The **Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report** provide a more detailed description of Emergency Response Protocols and Contingency Plans.

**Establishment of invasive and disturbance tolerant non-native species near the natural feature**

To avoid encouraging the establishment of invasive and disturbance tolerant non-native species near the natural feature, excavated soils which must be stored for a period longer than 45 days should be covered or seeded with a cover crop. As well, once they are replaced, they should be re-seeded with a native seed mix suited to the site conditions and complimentary to the adjacent natural feature.

**Erosion and Siltation**

Erosion control measures must be implemented to ensure that excavated areas and storage piles do not erode and the resulting silt does not enter natural areas. The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within this feature.

Horizontal Pressure Directional Drilling (HPDD) is recommended where possible in areas that are within 120 m of this natural feature. Although there are impacts related to HPDD due to soil compaction and damage to vegetation the following measures will be implemented to minimize impacts

- All drilling sites will be rehabilitated back to pre-construction site conditions.
- The Construction Contractor will be responsible for preparing a Frac-Out Response Plan and Contingency Plan in accordance with the DFO HPDD Operational Statement.

In order to mitigate the transport of sediment during vegetation removal and soil disturbance, environmental protection measures (such as straw bale flow checks, rock flow check dams, silt fence barriers, erosion control blankets and seeding) will be incorporated into the final design and installed during construction by the Contractor. Ontario Provincial Standard Specification (OPSS) 804 (**See Appendix B**) provides construction specifications for these measures.

To reduce potential soil compaction, the Contractor will be instructed to:

- Clearly mark all areas beside natural features where equipment may not be operated or stored, or any other materials stored;
- Not operate any equipment or construction vehicles within the wildlife habitat; and
- Plan and stage the construction to ensure that minimal vegetation is removed during construction for equipment access, stockpiling, and equipment operations.

If excavations are carried out, all heavy equipment will be kept out of the wildlife habitat and located outside of the flagged areas and the silt fencing. Excavated soils must be piled outside of the flagged areas and continuous, over-lapping silt fencing must be installed between the soil piles and the MAS communities.

### **Scenario 2B**

Should the habitat identified be determined to be significant based on the results of the preconstruction surveys, and additional habitat beyond the original boundaries be discovered the following mitigation measures will be implemented.

### **Loss of Habitat**

To compensate for the loss of habitat, a commitment will be made to monitor the population for 2 years to provide the MNR with more scientific data on the species. This supports protection of the species by providing a better understanding of the population size, and habitat needs and preferences of the species.

The access road will be constructed with 2 culverts that will be filled with natural substrate and will maintain an openness ratio of 0.25-0.5 to provide habitat and a migration route for terrestrial crayfish.

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### **Accidental Spills**

The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within this feature. All toxic products required during construction, operation and decommissioning must be transported, handled, disposed or recycled according to provincial and municipal waste management standards and a spill prevention program must be developed and carried out in accordance with MOE Spill Reporting Guidelines **(See Appendix D)**.

Recommended mitigation measures to minimize the potential of any petroleum, oil and lubricants (POLs) spills on this natural feature include:

Storage of POLs:

## Environmental Impact Study Report

- Fuel transport will be conducted in compliance with the *Transportation of Dangerous Goods Act*.
- Mobile fuelling trucks will be used where possible to minimize the requirements for on-site storage of POLs.
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- The Contractor will make daily inspections of hydraulic and fuel systems on machinery.
- Servicing of equipment will not be allowed within 120 m of a wetland or water body.
- All necessary precautions will be implemented to prevent the spillage and release of hazardous materials to the environment.
- All leaks or spills will be immediately reported to the MOE, Spills Action Centre at 1-800-268-6060

The **Construction Plan Report**, **Design and Operations Report**, and **Decommissioning Plan Report** provide a more detailed description of Emergency Response Protocols and Contingency Plans.



**Establishment of invasive and disturbance tolerant non-native species near the natural feature**

To avoid encouraging the establishment of invasive and disturbance tolerant non-native species near the natural feature, excavated soils which must be stored for a period longer than 45 days should be covered or seeded with a cover crop. As well, once they are replaced, they should be re-seeded with a native seed mix suited to the site conditions and complimentary to the adjacent natural feature.

**Erosion and Siltation**

Erosion control measures must be implemented to ensure that excavated areas and storage piles do not erode and the resulting silt does not enter natural areas. The Contractor will not be permitted to park construction equipment or vehicles, to repair or refuel vehicles, store construction materials, or stockpile earth materials within this feature.

Horizontal Pressure Directional Drilling (HPDD) is recommended where possible in areas that are within 120 m of this natural feature. Although there are impacts related to HPDD due to soil compaction and damage to vegetation the following measures will be implemented to minimize impacts

- All drilling sites will be rehabilitated back to pre-construction site conditions.
- The Construction Contractor will be responsible for preparing a Frac-Out Response Plan and Contingency Plan in accordance with the DFO HPDD Operational Statement.

In order to mitigate the transport of sediment during vegetation removal and soil disturbance, environmental protection measures (such as straw bale flow checks, rock flow check dams, silt fence barriers, erosion control blankets and seeding) will be incorporated into the final design and installed during construction by the Contractor. Ontario Provincial Standard Specification (OPSS) 804 (**See Appendix B**) provides construction specifications for these measures.

To reduce potential soil compaction, the Contractor will be instructed to:

- Clearly mark all areas beside natural features where equipment may not be operated or stored, or any other materials stored;
- Not operate any equipment or construction vehicles within the wildlife habitat; and
- Plan and stage the construction to ensure that minimal vegetation is removed during construction for equipment access, stockpiling, and equipment operations.

If excavations are carried out, all heavy equipment will be kept out of the wildlife habitat and located outside of the flagged areas and the silt fencing. Excavated soils must be piled outside of the flagged areas and continuous, over-lapping silt fencing must be installed between the soil piles and the MAS communities.

#### **3.6.4 Residual Impacts**

If mitigations are carried out, no residual impacts are expected.

## 4.0 CONCLUSION

The mitigation measures and recommendations described in this report are expected to reduce the impacts of the proposed project on the functions and/or integrity of natural features on the site during construction, operation, and decommissioning process. The environmental monitoring recommendations in the associated **Construction Plan Report** and **Environmental Effects Monitoring Plan** will be followed through during and after construction to ensure the continued or delayed effects of the project are minimized. As well, all recommendations for protection of significant habitat according to the Ministry of Natural Resources Significant Wildlife Habitat Technical Guide have been adhered to.

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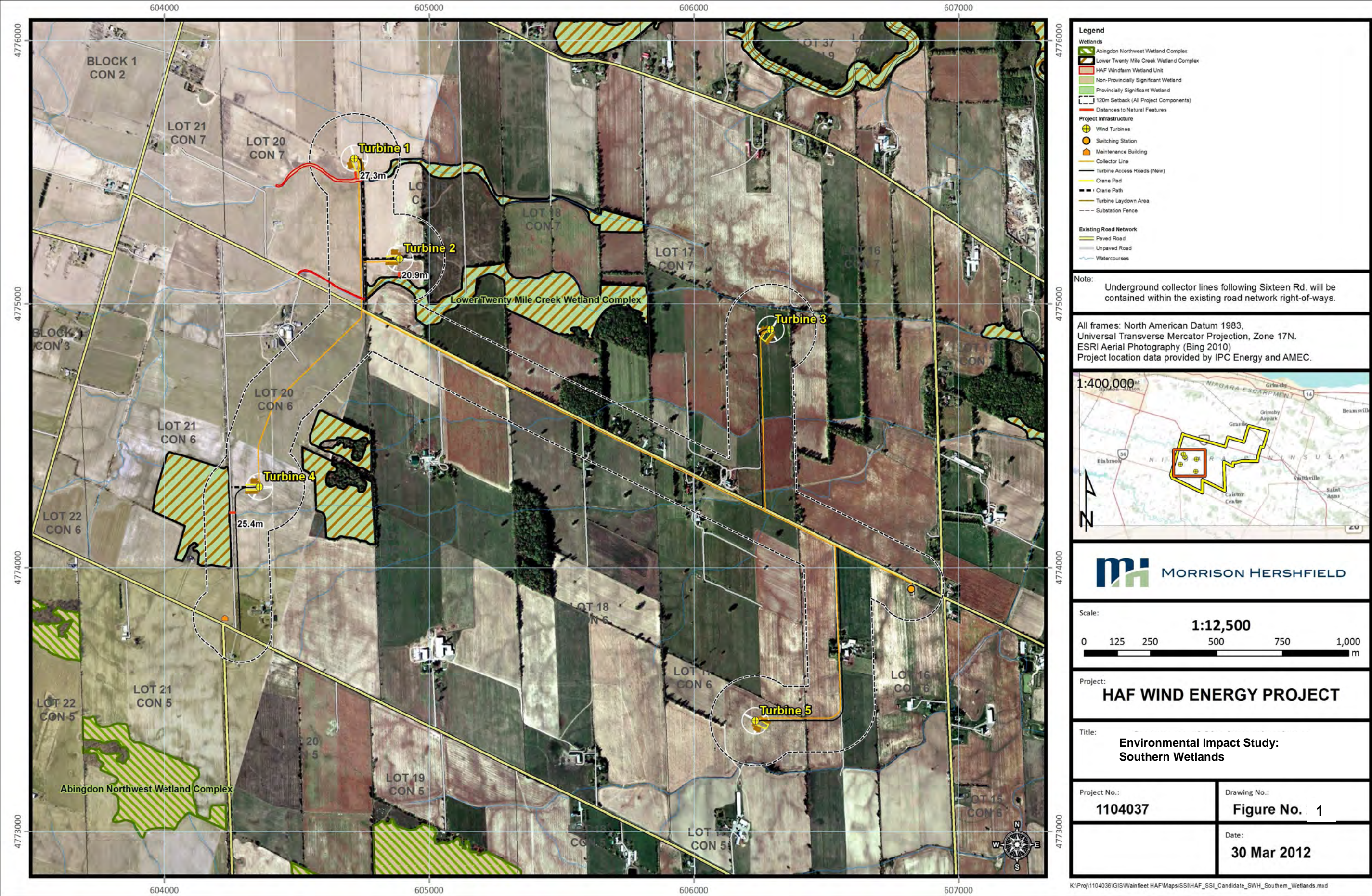
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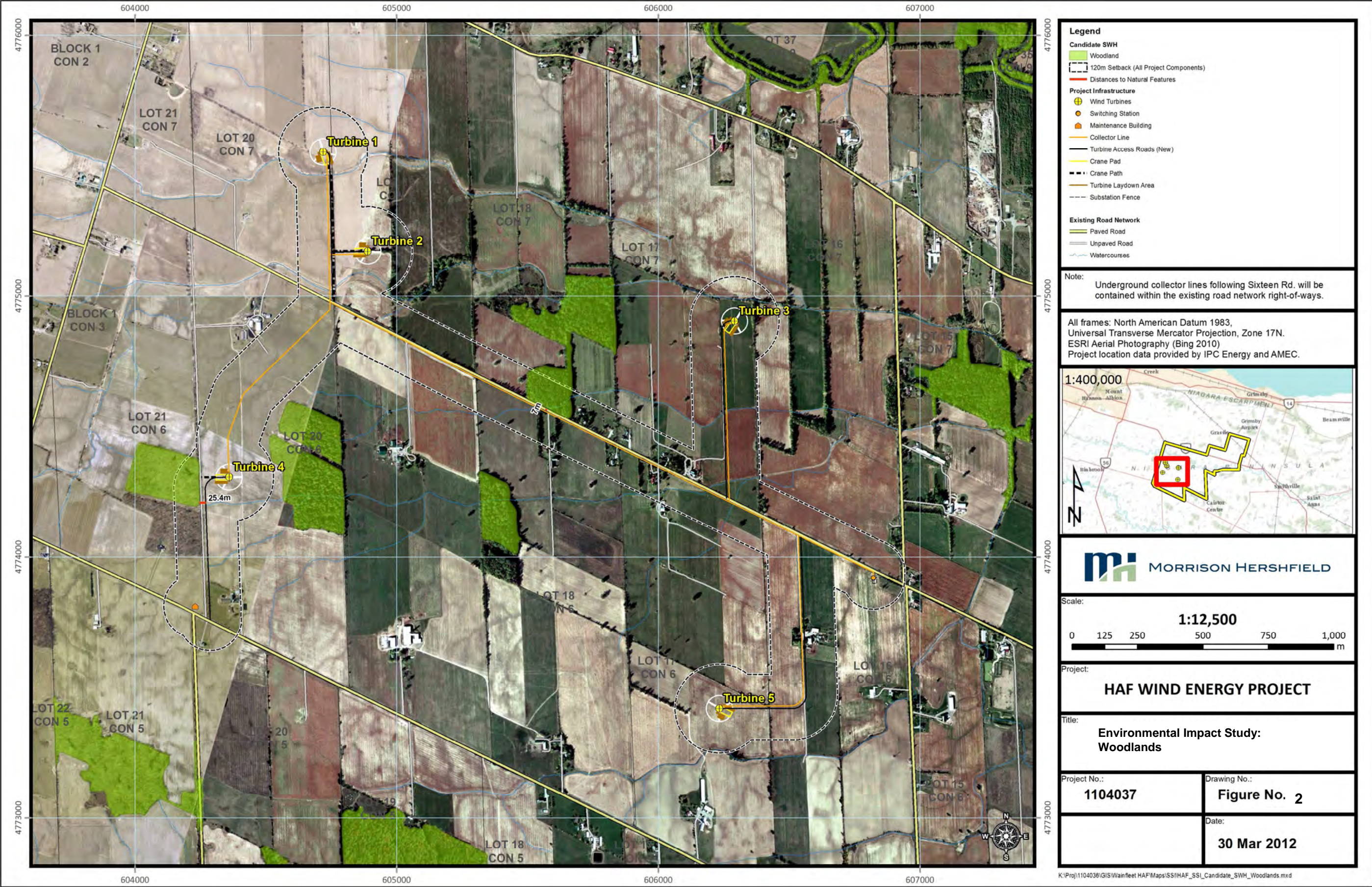
## **APPENDIX A**

### **Significant Natural Features Maps**

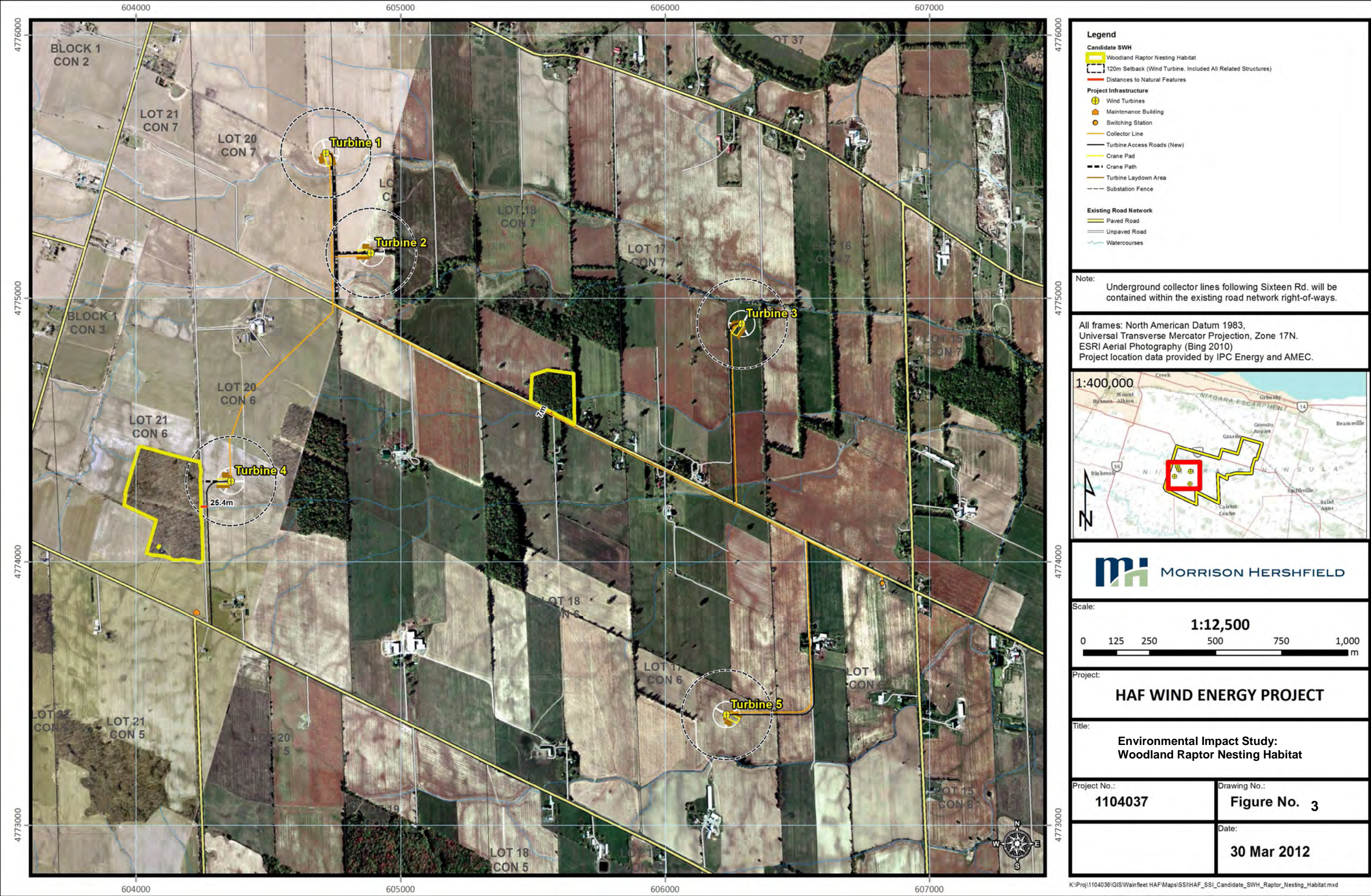




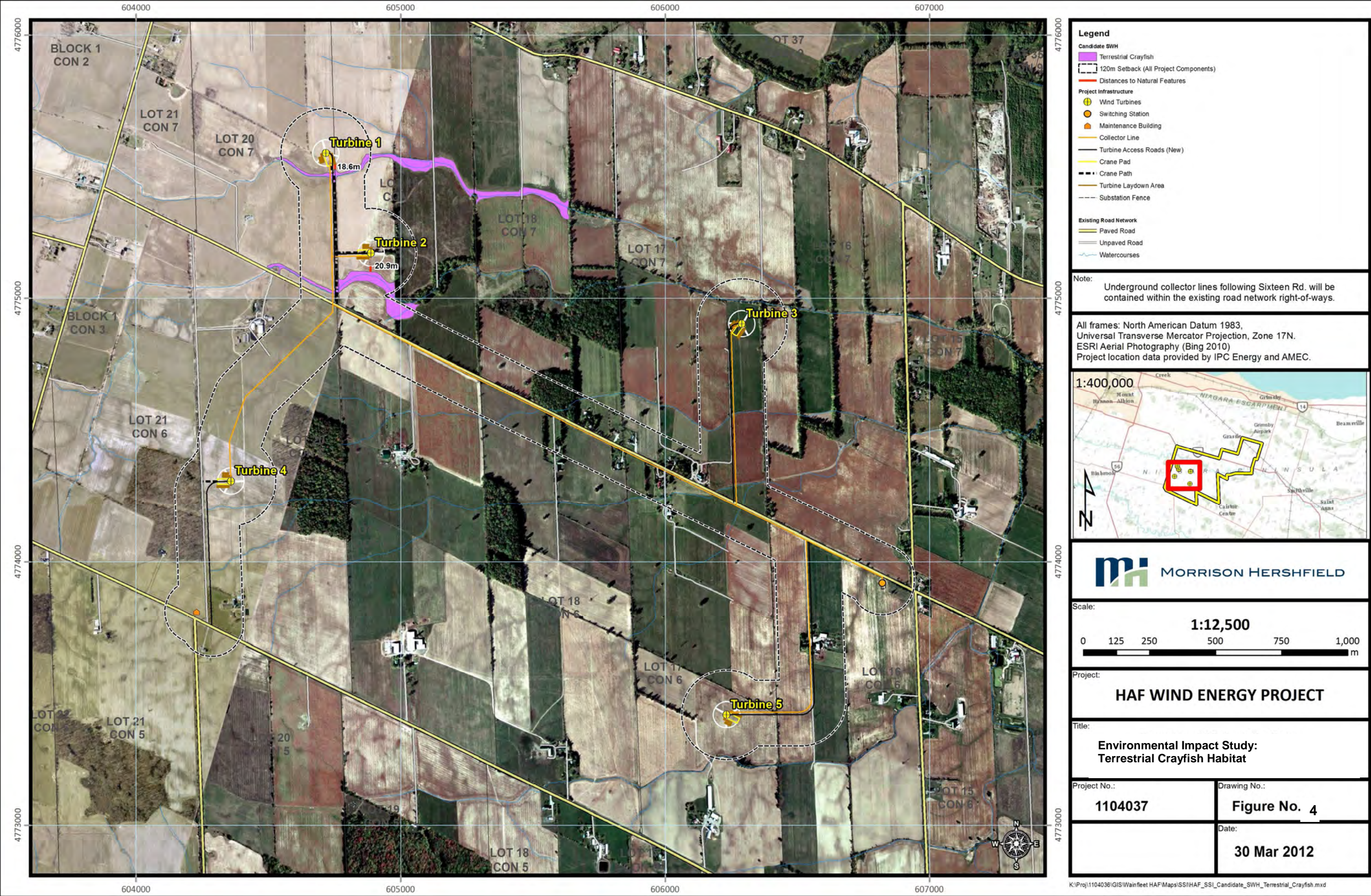














## **APPENDIX B**

### **OPSS 804**



**ONTARIO  
PROVINCIAL  
STANDARD  
SPECIFICATION**

**METRIC  
OPSS 804  
NOVEMBER 2010**  
(Formerly OPSS 572, November 2003)

**CONSTRUCTION SPECIFICATION FOR  
SEED AND COVER**

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<b>804.01</b>	<b>SCOPE</b>
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This specification covers the requirements for seeding with either hydraulic or straw mulching, Bonded Fibre Matrix, or erosion control blanket application.

**804.01.01 Specification Significance and Use**

This specification has been developed for use in provincial- and municipal-oriented Contracts. The administration, testing, and payment policies, procedures, and practices reflected in this specification correspond to those used by many municipalities and the Ontario Ministry of Transportation.

Use of this specification or any other specification shall be according to the Contract Documents.

## **804.01.02**

### **Appendices Significance and Use**

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

## **804.02**

### **REFERENCES**

When the Contract Documents indicate that provincial-oriented specifications are to be used and there is a provincial-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.PROV, unless use of a municipal-oriented specification is specified in the Contract Documents. When there is not a corresponding provincial-oriented specification, the references below shall be considered to be to the OPSS listed, unless use of a municipal-oriented specification is specified in the Contract Documents.

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

#### **Ontario Provincial Standard Specifications, Materials**

OPSS 1103      Emulsified Asphalt

#### **Ontario Ministry of Transportation Publication**

Seeding and Cover Quality Assurance Visual Inspection Field Guide

#### **Others**

Canada Fertilizers Act (R.S., 1985, c. F-10)

Canada Seeds Act (R.S., 1985, c. S-8)

## **804.03 DEFINITIONS**

For the purpose of this specification, the following definitions apply:

**Cover** means any approved or specified material such as straw mulch, hydraulic mulch, erosion control blanket, or Bonded Fibre Matrix applied at the time of seeding to provide temporary erosion control and protection of the germinating seed.

**Cultivate** means to prepare and work the soil with agricultural implements to provide a specified depth of loose, friable soil as a suitable medium to germinate seed.

**Seeded Earth Area** means the prepared earth area that has received the applied seed and fertilizer.

**Uniform, Cohesive Mat** means an application of cover that is unvarying in consistency and where all of the cover material particles are consolidated and adhere together to produce a solid layer that protects the seeded earth area from heat and adverse environmental conditions, yet allows moisture to percolate into the underlying soil.

**Waterbody** means any lake, pond, watercourse, or fish habitat.

## **804.04 DESIGN AND SUBMISSION REQUIREMENTS**

A legible, valid Certificate of Seed Analysis from a seed testing laboratory approved by the Canadian Food Inspection Agency for all single seed species and all seed mixtures to be used on the Contract shall be provided to the Contract Administrator 24 hours prior to any seeding operations.

## **804.05 MATERIALS**

### **804.05.01 Seed**

#### **804.05.01.01 Grade Standards**

All seed supplied, either as single seed species, or as a seed mix shall comply with the provisions of the Canada Seeds Act and Regulations and the grade standards for that particular seed kind.

Birdsfoot Trefoil Mix shall contain only certified Blue Tag Leo Birdsfoot Trefoil.

#### **804.05.01.02 Certificate of Seed Analysis**

The Certificate of Seed Analysis shall stipulate the seed supplier's lot designation numbers.

Test results from the Certificate of Seed Analysis shall specify germination and purity for each seed species of the mix as well as the seed mix composition expressed as a percentage of each seed species by mass for each seed mix specified in the Contract Documents. Test results shall comply with the values specified in Table 1 for the various seed mixes.

#### **804.05.01.03 Seed Packaging, Labelling, and Storage**

All seed and seed mixes shall be in the original factory sealed package with the original legible label securely attached.

Labelling shall be according to the requirements of the Canada Seeds Act and Regulations. Each package shall be labelled to show:

- a) The name and address of the seed supplier.
- b) The name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass of each.
- c) The grade of the seed or seed mix.
- d) The supplier's lot designation number corresponding to the Certificate of Seed Analysis.
- e) Mass in kilograms of the seed mix.
- f) The inoculant type, strain, and expiry date.

All seed and inoculant shall be stored in cool, dry locations until use. Inoculant is only required for seed mixes containing Crown Vetch or Birdsfoot Trefoil.

#### **804.05.01.04                      Permanent Seed Mixes**

Permanent seed mixes shall be as specified in the Contract Documents and Table 1.

#### **804.05.02                              Annual Nurse Crop Seed**

Nurse crop seed shall be either Fall Rye Grain or Winter Wheat Grain, unless otherwise approved by the Contract Administrator.

#### **804.05.03                              Fertilizer**

Fertilizer shall comply with the provisions of the Canada Fertilizers Act and Regulations. Fertilizer shall be supplied in original factory sealed bags bearing the manufacturer's original label indicating mass and analysis. All fertilizer shall be in granular form: dry, free flowing, and free from lumps, and with an analysis as specified in Table 2.

#### **804.05.04                              Cover**

##### **804.05.04.01                      Straw Mulch**

Straw mulch shall be oat or wheat straw. Straw shall be supplied in bales, dry, and free of weeds and other foreign materials.

##### **804.05.04.02                      Hydraulic Mulch**

Hydraulic mulch shall be capable of dispersing rapidly in water to form a homogeneous slurry and remain in such a state when agitated or mixed with other specified materials. When applied, hydraulic mulch shall be capable of forming a uniform, cohesive mat. Hydraulic mulch shall not inhibit growth or germination of the seed mix. Hydraulic mulch shall be dry, free of weeds and other foreign materials, and shall be supplied in factory sealed packages bearing the manufacturer's label indicating product name and mass.

##### **804.05.04.03                      Bonded Fibre Matrix**

Bonded Fibre Matrix (BFM) shall be a hydraulically applied, 100% biodegradable product, which after application is capable of adhering to the soil. In a dry state, BFM shall be comprised of not less than 70% by

weight of long stranded wood fibres held together by organic or mineral bonding agents or both. The hydrated BFM shall form a viscous material that creates a high strength, porous, and erosion-resistant uniform, cohesive mat, when applied and dried. The bonding agent shall not dissolve or disperse upon re-wetting. BFM shall not inhibit the germination or growth of plant material.

#### **804.05.04.04                      Erosion Control Blanket**

Erosion control blanket (ECB) shall be of a consistent thickness with a 100% biodegradable even fibre distribution. The ECB shall be covered on top with a biodegradable and photodegradable plastic mesh. ECB may also be sewn together with cotton thread. ECB shall be supplied in a dry, rolled mat protected with an outer waterproof wrap bearing the manufacturer's original label indicating product name and application instructions.

#### **804.05.05                      Erosion Control Blanket Staples**

Staples shall be U-shaped, constructed of wire with a diameter of at least 2.5 mm with legs at least 150 mm long and 25 mm apart.

#### **804.05.06                      Straw Mulch Adhesives**

Straw mulch adhesive shall be emulsified asphalt adhesive according to OPSS 1103.

#### **804.05.07                      Water**

Water shall be free of any contaminants or impurities that would adversely affect the germination and growth of vegetation.

### **804.06                      EQUIPMENT**

#### **804.06.01                      Hydraulic Seeder and Mulcher**

The hydraulic seeder and mulcher shall be capable of mixing the materials into a homogeneous slurry and maintaining the slurry in a homogeneous state until it is applied. The discharge pumps and gun nozzles shall be capable of applying the materials uniformly over the specified area. A hose extension for the hydraulic seeder and mulcher shall be on site and available for use for areas outside of the range of the gun nozzle.

#### **804.06.02                      Straw Mulch Blower**

The straw mulch blower shall be capable of separating straw from the bales without chopping it into short lengths and applying the straw mulch in a uniform, cohesive mat.

When emulsified asphalt is used, the straw mulch blower shall be capable of applying straw mulch and emulsified asphalt simultaneously. The straw mulch blower shall be equipped with a minimum of two nozzles located inside the end of the blower pipe to coat the straw with emulsified asphalt.

#### **804.06.03                      Cyclone Spreader**

The cyclone spreader shall be capable of distributing seed and fertilizer uniformly in a dry state.



## **804.07 CONSTRUCTION**

### **804.07.01 Operational Constraints**

The seeding operation shall not commence until the Contract Administrator is in receipt of the Certificate of Seed Analysis for the seed being applied.

The seeding operation shall not commence until the Contract Administrator has approved the surface preparation, layout of permanent seed mix locations, and different cover types.

Seed and cover application or re-application shall not be carried out under adverse weather conditions such as high wind or heavy rain or when field conditions are not conducive to seed germination such as frozen soil or soil covered with snow, ice, or standing water.

The Contractor shall maintain the site and control erosion until final acceptance of the seed and cover.

The surface to be seeded shall be prepared not more than 7 Days before the seeding operation.

No seed or cover shall come in contact with the foliage of any trees, shrubs, or other vegetation, except as specified in the Seeding subsection. No seed or cover shall come in contact with waterbodies.

Emulsified asphalt shall not be applied when rainfall is expected, during rainfall or immediately after rainfall.

Bonded Fibre Matrix (BFM) shall be installed by a Contractor certified and trained by the manufacturer in the proper mixing and installation of the product. To ensure a suitable drying and curing period, BFM shall not be applied when rainfall is expected, during rainfall, or immediately after rainfall.

### **804.07.02 Surface Preparation for Seeding**

At the time of seeding, all surface areas designated for seeding shall have a fine-graded, uniform surface and shall exhibit no evidence of erosion. The surface shall be uniformly cultivated to a minimum depth of 50 mm and shall not have surface stones greater than 25 mm in diameter, foreign material, and weeds or other unwanted vegetation.

### **804.07.03 Layout**

The locations and limits of the different permanent seed mixes and different cover types as specified in the Contract Documents shall be staked out on the ground surface.

### **804.07.04 Seeding**

#### **804.07.04.01 Application Rates for Seed, Fertilizer, and Water**

Application rates for primary seed, nurse crop seed, and fertilizer shall be as specified in Table 2.

#### **804.07.04.02 Seed and Fertilizer Application**

Seed and fertilizer shall be applied prior to the application of cover.

Seed, fertilizer, and water shall be thoroughly mixed in the hydraulic seeder and mulcher into a homogeneous water slurry. When thoroughly mixed, the water slurry shall be applied to the prepared earth areas by the nozzle sprayer or extension hose.

The Contractor shall ensure that the seeding equipment is calibrated to provide the coverage as specified in Table 2. The Contractor shall ensure there is a uniform dispersal of the mixed material over the entire area designated for seeding and that the spray does not dislodge soil or cause erosion.

Seed and fertilizer may also be applied separately by a cyclone spreader.

Seeding shall overlap the adjoining ground cover by 300 mm.

#### **804.07.05 Cover Applications**

All cover materials shall be applied as a separate operation immediately following the application of seed and fertilizer.

The Contractor shall ensure that the hydraulic seeder and mulcher is properly calibrated to provide the coverage as specified for each of the hydraulically applied cover materials.

##### **804.07.05.01 Straw Mulch Application**

Straw mulch shall be applied to form a uniform, cohesive mat over 100% of the seeded earth area. The straw mulch shall be applied to a minimum depth of 25 mm and a maximum depth of 50 mm measured at the time of application.

When emulsified asphalt adhesive is used, it shall be applied at the rate of 1,100 litres per 10,000 m<sup>2</sup>.

##### **804.07.05.02 Hydraulic Mulch Application**

Hydraulic mulch shall be applied at the rate of 2,000 kilograms of dry product per 10,000 m<sup>2</sup>. Hydraulic mulch shall be thoroughly mixed with water into a homogenous slurry.

When thoroughly mixed, the hydraulic mulch slurry shall be applied to the seeded earth areas by nozzle sprayer or extension hose. The mixed material shall be evenly dispersed over the entire seeded earth area to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

##### **804.07.05.03 Bonded Fibre Matrix Application**

Bonded Fibre Matrix shall be applied at a minimum rate of 3,700 kg of dry product per 10,000 m<sup>2</sup>. BFM shall be mixed with water in a hydraulic seeder and mulcher at a rate of 20-30 kg of dry product to 500-600 litres of water to form a homogeneous slurry.

When thoroughly mixed, the BFM slurry shall be applied to the seeded earth areas by nozzle sprayer or extension hose. The BFM slurry shall be evenly dispersed in successive applications from different directions over the seeded earth area to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

##### **804.07.05.04 Erosion Control Blanket Application**

Erosion control blanket shall be placed and stapled into position as per the manufacturer's installation instructions over the entire designated surface area. Blankets shall be installed in direct contact with the ground surface to form a uniform, cohesive mat over the seeded earth area. The Contractor shall ensure that the ECB is anchored to the soil and that tenting of the ECB does not occur.

On slopes, the uppermost edge of the ECB shall be anchored in a 150 mm wide by 150 mm deep trench when the ECB cannot be extended and anchored over the crest of the slope. The trench shall be backfilled with earth and compacted.

#### **804.07.06                      Clean up**

When seed and cover materials are applied to the foliage of trees, shrubs, other susceptible plant material, or waterbodies, the Contractor shall immediately remove the seed and cover materials from the areas and wash the areas with clean water.

When seed and cover materials are applied to areas or objects other than those designated, the Contractor shall remove the seed and cover materials.

#### **804.07.07                      Management of Excess Material**

Management of excess material shall be according to the Contract Documents.

### **804.08                              QUALITY ASSURANCE**

#### **804.08.01                      Performance Measure**

The Certificate of Seed Analysis shall be reviewed by the Contract Administrator to ensure compliance with the values specified in Table 1.

All seeded areas will be inspected by the Contract Administrator using the Seeding and Cover Quality Assurance Visual Inspection Field Guide to ensure compliance with this specification at 30, 60, and 90-Day periods following the seeding and Cover operation.

At the 30-Day inspection within the seeded area:

- a) The applied cover shall be visually intact and shall form a uniform, cohesive mat.
- b) Germination of the nurse crop shall be visually evident.

At the 60-Day inspection within the seeded area:

- a) The nurse crop shall be evident at mature height in an evenly dispersed, uniform cover.
- b) Germination of the specified permanent seed species shall be visually evident in an evenly dispersed uniform cover.
- c) There shall not be any significant bare areas, both in terms of quantity and size.
- d) Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.

At the 90-Day inspection within the seeded area:

- a) The specified permanent seed species shall be at an average height of 50 mm in an evenly dispersed, uniform cover.
- b) There shall not be any significant bare areas, both in terms of quantity and size.
- c) Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.

No inspections will be made during the winter dormant period or when site conditions prohibit a visual field inspection. The timing intervals between inspections will be suspended during the winter dormant period shown in Table 3.

**804.08.02****Failure to Meet Performance Measure**

If the values in the Certificate of Seed Analysis for the seeds supplied do not meet the values for seed germination, seed purity, and weed seed content as specified in Table 1, the seed lot will not be approved for use on the Contract and the Contractor shall supply a new seed lot and a new Certificate of Seed Analysis for approval prior to seeding.

If the values in the Certificate of Seed Analysis for the seeds supplied do not meet the values for seed species composition as specified in Table 1, the Contractor shall supply a legible, valid copy of the Seed Mixing Sheet from the seed supplier for approval by the Contract Administrator prior to seeding.

If the completed work does not meet the performance measures of the 30-Day inspection, the Contract Administrator shall document the failed areas, notify the Contractor of those areas, and re-inspect at the 60-Day inspection.

If the completed work does not meet the performance measures of the 60-Day inspection, the Contract Administrator shall notify the Contractor in writing of the failed areas. The Contractor shall re-apply the specified material according to this specification within 14 Days of receiving the notification. The Contract Administrator will re-inspect the seeded area at the 90-Day inspection.

If the completed work does not meet the performance measures of the 90-Day inspection, the Contract Administrator shall notify the Contractor in writing of the failed areas. The Contractor shall re-apply the specified material according to this specification within 14 Days of receiving the notification. The Contract Administrator will re-inspect the seeded area 30 Days after re-application of material.

Inspections and re-application of material shall continue, as outlined in the 90-Day inspection clause above, until the seeded area has been accepted.

All replaced seed and cover shall be subject to the Quality Assurance section of this specification.

**804.08.03****Dispute Resolution**

Dispute resolution only applies to the germination and growth of the permanent seed mix species.

Disputes arising from the performance measure evaluation shall be settled through referee testing using an actual live seedling count of the specified permanent seed mix species within the seeded earth area.

An independent consultant with experience in herbaceous plant identification shall perform the referee testing. Both parties shall agree on the selection of the independent consultant and both parties shall be bound by the consultant's evaluation.

The actual count shall be based on minimum germination requirements and minimum levels of acceptability to meet industry standards and federal legislation governing the testing, inspection, quality, and sale of seed.

To determine the number of seeds per unit of weight, published standard industry lists shall be referenced. Where these lists show a range in the number of seeds per unit of weight, the mid-range number shall be used. Where there is a difference in the estimated number of seeds by weight from one industry standard list to another, the lower figure shall be used.

To determine the germination rate for each seed species, the number of seeds per unit of weight is factored by the minimum germination rate of 70% in accordance with the Canada Seeds Act. A further 25% reduction is allowed to account for variation in seeding application, seedbed quality, seedbed preparation, and area cover.

The Contractor and the Owner may agree to use a simplified analysis, where instead of counting each seedling of each individual seeded perennial species of the mix, only the total number of seedlings of the mix are counted. If the parties cannot agree to the simplified analysis, the default method is a seedling count of each seeded perennial species.

The field inspection to determine the number of live plant seedlings should only be performed after the 90-Day inspection and when the seedlings reach an identifiable and measurable size.

The sampling procedure should be randomized over an area that both parties agree is representative of the seeded contract. The selection and evaluation process is as follows:

- a) Select a representative area from the average seeded areas, eliminating the thinnest and thickest growth areas from the analysis.
- b) Measure its length and width. Use a random numbers table to generate five sets of X and Y axis coordinates from the area.
- c) Each axis coordinate is a sampling point. A sampling plot, or quadrat, is set out in a 200 x 1000 mm plot with the axis coordinate becoming the lower right-hand corner of each quadrat.
- d) Each quadrat is divided into 20 sub-sampling units, each being 100 x 100 mm.
- e) The sub-sampling units are numbered from 1 to 20.
- f) Using a random numbers table, two of the twenty sub-sampling units are randomly selected.
- g) Live seedlings of each individual seeded perennial species of the mix are counted in the selected sub-sampling units to determine actual plant densities.
- h) An average seedling density per seeded perennial species, expressed as the number of seedlings per square metre is generated for each sampling plot or quadrat, based on the data from the two selected sub-sampling units.
- i) The procedure is repeated for the four other sampling points.
- j) The average number of seedlings per square metre for each of the seeded perennial species generated from the five sampling points is evaluated against the minimum industry standard benchmark for the seeded mix.

If the results of the referee testing prove that the seed and cover is unacceptable in meeting the minimum industry standard for germination, then the Contractor shall re-apply seed and Cover in accordance with this specification to all areas under dispute. In addition, the Contractor shall pay all costs associated with the dispute resolution process.

If the results of the referee testing prove that the seed and cover is acceptable in meeting the minimum industry standard for germination then the Owner shall pay all costs associated with the dispute resolution process.

**804.09 MEASUREMENT FOR PAYMENT**

**804.09.01 Actual Measurement**

**804.09.01.01 Seed and Mulch**

Seeding and mulch measurement shall be in square metres following the contours of the ground with no allowance for overlap.

**804.09.01.02 Seed and Erosion Control Blanket**

Seeding and erosion control blanket measurement shall be in square metres following the contours of the ground with no allowance for overlap.

**804.09.01.03 Seed and Bonded Fibre Matrix**

Seeding and Bonded Fibre Matrix measurement shall be in square metres following the contours of the ground with no allowance for overlap.

**804.09.02 Plan Quantity Measurement**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

**804.10 BASIS OF PAYMENT**

**804.10.01 Seed and Mulch - Item  
Seed and Erosion Control Blanket - Item  
Seed and Bonded Fibre Matrix - Item**

Payment at the Contract price for the above tender items shall be full compensation for all the labour, Equipment, and Material to do the work.

**TABLE 1 - PERMANENT SEED MIXES AND SEED CERTIFICATE ANALYSIS VALUES**

Permanent Seed Mix	Seed Mix %	Seed Species Composition %	Grade Name	Minimum Seed Germination %	Minimum Seed Purity %	Maximum Weed Seed %
<b>Standard Roadside Mix</b>			Canada #1 Lawn Grass Seed Mixture	70	85	0.5
Creeping Red Fescue: <i>Festuca rubra</i>	55%	50% to 60%				
Kentucky Bluegrass: <i>Poa pratensis</i>	27%	25% to 30%				
Perennial Ryegrass: <i>Lolium perenne</i>	15%	12% to 18%				
White Clover: <i>Trifolium repens</i>	3%	2% to 4%				
<b>Crown Vetch Mix</b>			Common #1 Forage Mixture	75	N/A	3.0
Creeping Red Fescue: <i>Festuca rubra</i>	66%	62% to 70%				
Crown Vetch: <i>Coronilla varia</i> inoculated seed	34%	30% to 38%				
<b>Birdsfoot Trefoil Mix</b>			Common #1 Forage Mixture	75	N/A	3.0
Creeping Red Fescue: <i>Festuca rubra</i>	66%	62% to 70%				
Birdsfoot Trefoil 'Leo': <i>Lotus corniculatus</i> 'Leo' inoculated seed	34%	30% to 38%				
<b>Salt Tolerant Mix</b>			Canada #1 Ground Cover Mixture	70	85	3.0
Tall Fescue: <i>Festuca arundinacea</i>	25%	20% to 30%				
Weeping Alkali Grass: <i>Puccinellia distans</i>	20%	15% to 25%				
Creeping Red Fescue: <i>Festuca rubra</i>	20%	15% to 25%				
Perennial Ryegrass: <i>Lolium perenne</i>	20%	15% to 25%				
Kentucky Bluegrass: <i>Poe pratensis</i>	15%	10% to 15%				
<b>Lowland Mix</b>			Common #1 Forage Mixture	75	N/A	3.0
Creeping Red Fescue: <i>Festuca rubra</i>	45%	40% to 50%				
Brome Grass: <i>Bromus нерres</i>	25%	20% to 30%				
Kentucky Bluegrass: <i>Poa pratensis</i>	15%	10% to 20%				
Birdsfoot Trefoil 'Leo': <i>Lotus corniculatus</i> 'Leo' inoculated seed	5%	3% to 7%				
White Clover: <i>Trifolium repens</i>	5%	3% to 7%				
Perennial Ryegrass: <i>Lolium perenne</i>	5%	3% to 7%				
<b>Acidic Soil Mix</b>			Common #1 Forage Mixture	75	N/A	3.0
Birdsfoot Trefoil 'Leo', <i>Lotus corniculatus</i> 'Leo' inoculated seed	35%	30% to 40%				
Kentucky Bluegrass: <i>Poa pratensis</i>	25%	20% to 30%				
Tall Fescue: <i>Festuca arundinacea</i>	20%	15% to 20%				
Creeping Red Fescue: <i>Festuca rubra</i>	10%	7% to 12%				
Hard Fescue: <i>Festuca trachyphylla</i>	5%	3% to 7%				
Alsike Clover: <i>Trifolium hybridum</i>	5%	3% to 7%				
<b>Old Field Mix</b>			Common #1 Forage Mixture	75	N/A	3.0
Flat-topped Aster: <i>Aster umbellatus</i>	37%	35% to 40%				
New England Aster: <i>Aster novae-angliae</i>	15%	10% to 20%				
Purple-stemmed Aster: <i>Aster punicens</i>	15%	10% to 20%				
Canada Goldenrod: <i>Solidago Canadensis</i>	12%	10% to 15%				
Panicled Aster: <i>Aster simplex/lanceolatus</i>	8%	6% to 10%				
Heath Aster: <i>Aster ericoides</i> or Frost Aster: <i>Aster pilosus</i>	5%	3% to 7%				
Grey-stemmed Goldenrod: <i>Solidago graminifolia</i>	5%	3% to 7%				
Grass-leaved Goldenrod: <i>Solidago memorialis</i>	3%	1% to 5%				

**TABLE 2 - APPLICATION RATES FOR SEED AND FERTILIZER**

Permanent Seed Mixes	Permanent Seed Mix Rate kg/10,000 m <sup>2</sup>	Fertilizer Rate minimum kg/10,000 m <sup>2</sup>			Nurse Crop Rate kg/10,000 m <sup>2</sup>
		8-32-16	0-46-0	0-0-60	
Standard Roadside Mix	100	350			60
Crown Vetch Mix	75	350	250		60
Birdsfoot Trefoil Mix	75	350	250		60
Salt Tolerant Mix	100	350			60
Lowland Mix	100	350			60
Acidic Soil Mix	100	350	200	200	60
Old Field Mix	100	350			60

**TABLE 3 - WINTER DORMANT PERIOD**

<b>SOUTHWESTERN ONTARIO</b>	<b>SOUTHERN ONTARIO</b>	<b>NORTHERN ONTARIO</b>
That area of Ontario south of a line joining Grand Bend and Clarkson.	That area of Ontario between the northern and southern boundaries of Southwestern Ontario and Northern Ontario respectively	That area of Ontario north of a line joining Waubesa, Severn Bridge, Bancroft, and Ottawa
November 15 to April 15 inclusive	November 1 to April 30 inclusive	October 15 to May 15 inclusive



## **Appendix 804-A, Commentary for OPSS 804, November 2010**

**Note:** This appendix does not form part of the standard specification. It is intended to provide information to the designer on the use of this specification in a Contract.

### **Designer Action/Considerations**

The designer may select the appropriate seed mix and cover type application from the Permanent Seeding Mix Types and Seeding Cover Application Types tables attached to this commentary.

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

### **Related Ontario Provincial Standard Drawings**

No information provided here.

**PERMANENT SEEDING MIX TYPES**

<b>Permanent Seed Mixes</b>	<b>Seed Mix Attributes</b>	<b>Selection Criteria</b>
Standard Roadside Mix	A tested mix of hardy roadside perennial grasses that have performed well in highway situations.	This mix should be the default seed mix for most roadside seeding work.
Crown Vetch Mix	A blend of a hardy legume and a hardy turfgrass. The turfgrass provides control and top growth until the Crown Vetch plants grow and develop after several seasons. Crown Vetch produces a mass of purple flowers in season and is a vigorous ground cover.	This mix is primarily used to re-vegetate slope areas where erosion and soil fertility may be a problem. There have been some concerns over its ability to spread and crowd out indigenous growth and its non-native status.
Birdsfoot Trefoil Mix	A blend of another hardy legume and a hardy turfgrass. Very similar growth characteristics to the Crown Vetch mix, except a little slower growing, less vigorous and Trefoil has masses of yellow flowers in season.	As with Crown Vetch, this mix is primarily used to re-vegetate slope areas where erosion and soil fertility may be a problem. It is hardier in the north than Crown Vetch and is not as aggressive in growth and habit.
Salt Tolerant Mix	The salt tolerant mix is a blend mixture of several turfgrass species with a proven resistance to salt.	The salt tolerance mix should be specified in areas such as medians, shoulder strips, and shoulder ditches where salt is thought to be in heavier concentrations.
Lowland Mix	The lowland mix was developed with several species of turfgrasses that grow well in low-lying wet areas.	The lowland mix should be specified along waterbody edges in low-lying areas where light seasonal flooding is a possibility.
Acidic Soil Mix	The acidic soil mix was developed to provide adequate vegetative cover on areas of low fertility and high acidity.	The acidic soil mix should be used in areas of low fertility, medium to high acidity and in the northern areas of the province.
Old Field Mix	The old field mix, where species of aster and goldenrod comprise the majority of the mix, provides an accelerated successional cover to a mature field condition.	Old field should be selected where there will be fallow areas left alone with little or no maintenance, no mowing and the area will be required to be self-sustaining. More suitable in rural areas than urban or suburban.

**SEEDING COVER APPLICATION TYPES**

<b>Cover Application Types</b>	<b>Cover Type Attributes</b>	<b>Selection Criteria</b>
Straw	Chopped straw is applied to the seeded area via a straw mulch blower and is coated with a tackifier to hold it together. A time-tested method of providing cover and protection for germinating seedlings as well as short-term erosion control.	One of the default cover types. Straw has the advantage of being relatively cheap and providing good coverage. Straw cover application requires another piece of equipment and a labour intensive second application to properly apply the cover material.
Hydraulic Mulch	Hydraulic mulch is a processed fibre of wood, straw, cotton, cellulose pulp, or any combination of these materials. Hydraulic mulches provide a uniform absorptive mat that allows moisture to penetrate into the underlying soil, while providing cover for the germinating seed.	Hydraulic mulch is the other default mulch. It has the advantage of being easy to apply, using the same equipment when applying seed and fertilizer. It is low-cost and low-labour. Hydraulic mulch does not give the same degree of protection to the germinating grass as does straw. During extremes of temperature and moisture it will not perform as well as straw or other higher levels of erosion control.
Erosion Control Blanket (ECB)	ECBs are a family of products that are supplied in rolls. They are unrolled over the seeded earth area and stapled in place. ECBs provide a higher level of erosion control and protection for germinating seedlings. ECBs are machine woven mats with a variety of materials sandwiched between the two woven layers. Materials can be wood, coco or cotton fibre, straw, or any combination depending upon manufacturer.	ECBs should be specified in the contract preparation stage and not during construction. ECBs are specified on a project where erosion of soil slopes or soil ditches is expected to be a problem. ECBs have an advantage over hydraulic mulch in that the blanket is firmly attached to the underlying soil by staples, it is longer lasting and provides a superior growth medium for seedlings. It is more expensive and improper installation can result in poor end results leading to surface erosion.
Bonded Fibre Matrix (BFM)	BFM is a hydraulically applied product made of wood, cotton or cellulose pulp fibres. The fibres are bonded together by various means including mineral bonding agents or organic tackifiers. When applied, the BFM forms a viscous material, that upon drying creates a high strength, porous and erosion resistant mat.	BFMs are applied like hydraulic mulches and have a great similarity to hydraulic mulches, except BFM's have greater erosion resistance and create a thicker, firmer mat. BFM's should be specified where erosion of soil slopes or soil ditches is expected to be a problem and where hydraulic seeders can get access. BFM's are specified in the design stage and have also been substituted for ECBs during construction, although usually at the Contractor's request.

## **APPENDIX C**

### **MOE Spill Reporting Guidelines**

**Spills Reporting -  
A Guide to Reporting Spills and Discharges**

**As required by the**

**(Ontario) Environmental Protection Act  
(s.92 and s.15)**

**and**

**Ontario Regulation 675/98  
Classification and Exemption of Spills and Reporting  
of Discharges**

**May, 2007**



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Discharges**

**May, 2007**

Spills Action Centre

Ontario Ministry of the Environment

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## **SPILLS AND DISCHARGES REPORTING**

As required by the  
**(Ontario) Environmental Protection Act**  
(s.92 and s.15)

and

**Ontario Regulation 675/98**

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#### **OTHER RELEVANT MINISTRY OF THE ENVIRONMENT DOCUMENTS:**

- PLANNING FOR SPILL CONTINGENCIES - suggestions for industry and municipalities
- MOE's EMERGENCY RESPONSE PLAN
- ONTARIO REGULATION 224/07 – SPILL PREVENTION AND CONTINGENCY PLANS
- GUIDELINE FOR IMPLEMENTING SPILL PREVENTION AND CONTINGENCY PLANS



**IN ONTARIO**

**REPORT**

**SPILLS (S.92 EPA) AND DISCHARGES (S.15 EPA)**

**TO THE**

**MINISTRY OF THE ENVIRONMENT'S**

**SPILLS ACTION CENTRE**

**1 - 800 - 268 - 6060**  
(TOLL-FREE, PROVINCE-WIDE, 24/7)

**416 - 325 - 3000**  
(TORONTO AREA)

**SPILLS MUST ALSO BE REPORTED TO THE**

**MUNICIPALITY IN WHICH A SPILL OCCURS**

## Spills and Discharges Reporting

### 1. INTRODUCTION

The Ministry of the Environment (“Ministry”) is responsible for achieving and maintaining environmental quality that will protect human health and the ecosystem, and will contribute to the well-being of the people of Ontario.

When a spill or a discharge of contaminants into the natural environment occurs, Canadian federal and provincial agencies that administer safety, transportation and environmental legislation and related programs generally hold the discharger responsible for dealing with problems created by the discharge. In Ontario, specific notification, cleanup and liability provisions for spills of pollutants are addressed in Part X of the (Ontario) *Environmental Protection Act*, R.S.O. 1990, Chapter E.19 (“EPA”).

Ontario Regulation 675/98 Classification and Exemption of Spills and Reporting of Discharges was amended to prescribe specific reporting details for both Part X spills and discharges that must be reported under s.15(1) of the EPA. Examples of such discharges would be pollutants seeping from a river bank caused by historical contamination or discharges such as sewage treatment plant bypasses occurring during storm events which may cause adverse effects.

The primary purpose of this Guide is to offer practical guidance of the reporting provisions for spills that must be reported under s. 92 of the EPA, discharges that must be reported under s.15(1) of the EPA and O. Reg. 675/98. Chapters 4 through 10 of this Guide discuss the various discharge reporting requirements and spill classification and exemptions for Part X spills.

### 2. THE ENVIRONMENTAL PROTECTION ACT, PART X, SPILLS

Part X was added to the EPA during the 1970s after the costs for the cleanup of a series of significant spills were left to the taxpayer. Subsequent litigation was based, in large part, on common law principles, because then-available environmental legislation did not definitively address duties and responsibilities for spills. The current Act devotes an entire segment to spills, Part X, and assigns clear reporting and cleanup duties. Part X also addresses other related topics including the rights of municipalities to respond, and rights of other parties affected by spills. The cornerstone of Part X is the definition of a spill and the reporting and cleanup duties of involved parties.

Part X of the EPA establishes three basic elements: the duty to report a spill, the duty to clean up, and accountability.

More specifically, s. 92 of the EPA requires the discharger to **report** a spill to the Ministry, to the municipality, where the discharger is not the owner, to the owner of the spilled pollutant, and under some circumstances to others. O. Reg. 675/98 further requires that the discharge telephone the Spills Action Centre (“SAC”) and provide information to the person who answers the call. In general terms, s. 92 of the EPA sets out that those who spill, those who cause or

permit a spill, and those who had control of the pollutant that spills, are made responsible for reporting the event to SAC as quickly as possible. Similarly, s. 92 of the EPA states that spills must also be reported as quickly as possible to the municipality in which the spill occurred.

Furthermore, under s. 93 of the EPA, there is a duty to contain and **clean up** the pollutant, and to restore the spill site to essentially pre-spill conditions where this can reasonably be expected. Those who had control of the spilled pollutant, and the owner of the pollutant, are both given responsibility for containment and cleanup where the spill causes or is likely to cause the adverse effects (as defined in s.1 of the EPA), regardless of contributing circumstances.

Section 99 addresses **accountability** by extending rights to third parties for the recovery of costs and expenses, as well as loss and damages, from the person who had control of the spilled pollutant and the owner of the pollutant spilled without having to prove fault or negligence. Another aspect of accountability, is that municipalities, under ss.100 and 100.1 of the EPA, are given the authority to respond to spills, the right to enter property for the purpose of response, and the right and a mechanism, the Municipality's Order, to recover costs from those the Act holds accountable for the spill. Finally, there is a mechanism (see ss. 94 and 97 of the EPA) that allows the Crown to intervene or pre-empt inadequate response efforts at the expense of those held accountable.

Other sections of Part X enhance, or rely on, the three basic elements: reporting, cleanup, and accountability.

### **3. DEFINITIONS**

Several terms are defined specifically for the purpose of Part X. This Chapter will set out some of the most commonly used defined terms. Other Part X terms, as well as terms defined elsewhere in the EPA on which Part X relies, are reproduced in Annex I of this Guide. Terms that apply to other discharges reportable under s. 15(1) of the EPA are also included in Annex I.

A “spill” is defined in Part X to be a specific subset of discharges. A “spill” is a discharge into the natural environment, from or out of a structure, vehicle or other container, that is abnormal in quality or quantity in light of all the circumstances of the discharge. In more general terms, a spill is essentially any accidental, abnormal or inadvertent release of a pollutant discharged into the natural environment from or out of a man-made container. It is important to note that the definition of a spill itself does not include small quantity exemptions. Rather, these exemptions are found in O. Reg. 675/98.

Part X defines a “pollutant” to be a subset of the term “contaminant”. A “pollutant” is a contaminant other than heat, sound, vibration or radiation. A contaminant is defined in s. 1 of the EPA as any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from human activities that causes or may cause an adverse effect. Note that “adverse effect” is also defined in s.1 of the EPA (see Annex I for this and other relevant definitions).

#### **4. SPILLS AND EPA SUBSECTION 15(1) DISCHARGES THAT MUST BE REPORTED**

Part 2 of O. Reg. 675/98 is entitled Reporting of Discharges and prescribes the notification requirements for both ss. 15 and 92 of the EPA.

Section 92 of the EPA was amended by the *Environmental Enforcement Statute Law Amendment Act, 2005* (commonly referred to as Bill 133). Prior to the amendment, the obligation to report spills under s. 92 only applied to a spill of a pollutant that causes or is likely to cause an adverse effect. The amendment broadened the application of s. 92 by removing the reference to causes or is likely to cause an adverse effect. The section now applies to every spill of a pollutant. However, O. Reg. 675/98, discussed in Chapters 9 and 10 of this Guide, provides a number of exemptions to section 92. An important exemption provided in Ontario Regulation 675/98 permits a person, through the development of a spill prevention and contingency plan, to identify those spills that are not subject to 92 because they satisfy the regulation's requirements for "non-reportable" spills. The purpose of the exemption in combination with the amendment to section 92 is to encourage persons to develop spill prevention and contingency plans.

In the case of s.15 (1) of the EPA, a discharge must be reported if it is out of the normal course of events and it causes or is likely to cause an adverse effect (and the person is not otherwise required to notify the Ministry under s. 92 of the EPA). The discharger must determine whether the potential risks that arise from events such as storm related sewage bypasses (e.g. potential health impacts to downstream water users) meet the criteria in s.15(1) and need to be reported.

Cleanup requirements established under Part X arise for spills of pollutants that cause or are likely to cause adverse effects as defined by the EPA. Therefore, awareness of the potential adverse effects for substances that spill is important with respect to response. For instance, spills of oils into a creek may impact wildlife, vegetation and limit potential uses by the public.

#### **5. WHO MUST REPORT SPILLS (s.92) AND DISCHARGES (s.15(1))**

The reporting provisions of Part X of the EPA are found in Section 92 of the EPA. Section 92 imposes reporting duties on:

- a) the person that spills or who causes or permits the spill,
- b) the person who had control of the pollutant immediately prior to the spill, and
- c) police officers and employees of a municipality or other public authorities who may have been informed of or who are investigating a spill unless they have reasonable grounds for believing that such notice to the Ministry has been made (s. 92(4)).

The reporting provisions for s. 15(1) of the EPA place the reporting duties on the person who discharges or causes or permits the discharge of a contaminant. This person and persons described in a) and b) above are collectively referred to as the discharger in this Guide. The reporting details required of the discharger are found in Chapter 8 of this Guide.

Persons addressed in c) above are collectively referred to as persons in the public service in this Guide. Section 13 of O. Reg. 675/98 requires that these persons provide their name and telephone number and should attempt to provide the name and telephone number of the discharger. The only other details required of persons in the public service are the date and time of the spill or discovery of the spill and its location although it would be helpful if these persons also provided their best assessment of the consequences of the spill.

Chapter 6 of this Guide outlines in more detail who must report to whom, and uses examples to illustrate the circumstances under which these notification requirements apply.

## **6. WHO MUST BE NOTIFIED**

### **Notification to the Ministry (ss. 15(1) and 92(1)(a) of the EPA),**

Subsection 13(2) of O. Reg. 675/98 requires that reports must be made to the Ministry by speaking with a person at the Ministry's SAC. SAC operates 24 hours per day, every day of the year and is responsible for:

- receiving reports of spills and other events that require immediate reporting to the Ministry,
- determining the adequacy of reported spills response activities,
- facilitating or triggering a response where it appears the response is inadequate, and
- activating an Ministry field response (on-site assessment), as required.

A Province-wide, toll-free telephone number is available to industry and the public for the reporting of spills and other events that require the Ministry to be notified immediately, and for reporting other urgent environmental matters. The Centre's province-wide telephone number **800-268-6060** is widely advertised, as is its Toronto number **416-325-3000**.

### **Notification to the municipality (s. 92(1)(b) of the EPA)**

In addition to notifying the Ministry, Part X of the EPA also requires every spill to be reported to the municipality in which the spill occurs. Larger municipalities advertise a telephone number for such reporting duties in local telephone directories. Smaller municipalities may direct such calls to their respective works or engineering department, while some municipalities may not have formalized a mechanism for receiving such reports. The responsibility for locating an appropriate municipal contact point in the event of a spill rests with the parties given notification responsibilities under Part X, namely, the person who spills or causes or permits the spill, and the person who had control of the pollutant immediately prior to the spill.

### **Notification to the owner (s. 92(1)(c) of the EPA)**

Part X of the EPA requires that the person report the spill to the owner of the spilled pollutant if the person required to report is not the owner of the pollutant spilled. This reporting requirement would apply to the person who spills or who causes or permits the spill, and the person who had control of the pollutant immediately prior to the spill. Similar to other reporting provisions of Part X, the owner must be notified "forthwith". The reason for this notification requirement (notifying the owner) is that s. 93 of the EPA (the section that establishes response

and cleanup duties) holds both the owner and the person who had control of the pollutant immediately prior to the spill jointly responsible for cleanup.

An example of where the person in control of the pollutant that was spilled may be a different party to the owner is readily found in the transportation industry. By way of illustration, Part X holds both the transport operator involved in an accident in which something is spilled and the owner of the pollutant spilled as a result of that accident responsible for an appropriate and timely response and cleanup. In transportation accidents, the owner of any spilled cargo is most probably located far away from the spill site, while the transport operator involved is on-site. In this example, the requirement imposed on the transporter to notify the owner of the spilled pollutant ensures that the owner is given fair opportunity to become involved in response decisions as the owner of the spilled pollutant may be required to share the costs associated with any spill response.

### **Notification to the person in control (s. 92(1)(d) of the EPA)**

For spills where the person who is required to report is not the person who had control of the pollutant immediately prior to the spill, Part X requires the person who spills, or causes or permits the spill, to notify the person who has control of the pollutant if he knows or is able to ascertain readily the identity of the person having control of the pollutant. This requirement is intended to ensure that the response required to be undertaken under Part X can be triggered by the parties given that responsibility, namely the person in control and the owner of the pollutant spilled.

For instance, if a subcontractor's equipment ruptures a tank or cracks a pipe at a facility, such as a bulk terminal, which then discharges a pollutant, Part X requires the equipment operator to notify forthwith the person in charge of the facility.

The above example also highlights that Part X addresses "persons". The reader should note that Part X addresses individuals, as well as municipalities, corporations and other organizations, and holds every person involved in a spill accountable for their actions.

## **7. WHEN TO REPORT SPILLS AND DISCHARGES**

Both ss.15 (1) and 92 of the EPA, requires that notification be made "forthwith". Courts have interpreted this term to mean as quickly as possible under the circumstances.

In the case of Part X spills, the duties for the persons required to notify SAC and others come into force "immediately when the person knows or ought to know that the pollutant is spilled" (s. 92(2) of the EPA) but this does not mean that the spill needs to be reported immediately. Forthwith should be taken to mean without undue delay, that is, as soon as possible. Reasonable delay may include setting in motion mitigative measures such as initial efforts to stop or contain the spill, the notification of first responders and potentially affected parties, and the gathering, without pause, of information critical to the Ministry's understanding and assessment of the event.

It should be noted that there have been successful convictions for the failure to report spills “forthwith” where notifications were made a couple of hours after the spill. As such, it is generally recommended that notification be made as soon as possible, and in most cases, no later than a couple of hours after the duty to notify becomes effective.

It is strongly suggested that a first call to the Ministry, made as quickly as possible under the circumstances, is appropriate and satisfies the intent of Part X reporting requirements, even if only preliminary or sketchy details are initially available. Section 13(4) of O. Reg. 675/98 requires that the information listed in that section be provided “to the best of the person’s knowledge”. Additional information about the spill then must be reported as more details of the event become available (see ss. 13(5) and 13(6) of O. Reg. 675/98).

## **8. REPORTING**

Part 2 of O. Reg. 675/98 sets out the information that must be provided when notifying the Ministry under ss 15(1) and 92 of the EPA. All information listed in s. 13(3) of the regulation must be provided to the Ministry. The information in s. 13(4) also must be provided, unless it qualifies under s. 13(6) as not being relevant under the circumstances of the discharge. Note that the onus is on the person reporting to demonstrate that information is not relevant.

The person notifying SAC should exercise judgement in determining the amount of information sufficient to make the first call to SAC. Note that not all of the information listed in ss. 13(3) and (4) of O. Reg. 675/98 need be provided at the time of the initial call. Subsection 13(5) allows for further information to be provided at a later time in order to satisfy the requirements of the regulation. The initial notification is intended to provide the Ministry and others with information to assess the Ministry’s role and the necessity of a response to the discharge; the information requirements are not intended to delay notification by the person reporting or to take away from the response to a discharge.

In the case of a spill, circumstances may dictate that additional information is required by the Ministry beyond what is provided for in the regulation. Section 92(3) of the EPA allows the Ministry to require this information to be provided at any time. The request for additional information may deal with more specific information regarding the pollutants or the circumstances of the spill beyond what is required by the regulation.

Persons who report spills under s.92 of the EPA and discharges under s. 15(1) of the EPA must fulfill the prescribed reporting requirements stipulated in Part 2 of O. Reg. 675/98, described in detail below. If the reporting party becomes aware of missing information that is required under O. Reg. 675/98 then the information must be provided forthwith (s.13(5) of O. Reg. 675/98). If initial information provided to SAC changes significantly then updated information must be reported forthwith upon this new information becoming known to the discharger (s.13(7) of O. Reg. 675/98). For example if a spill is initially reported as contained on-site but later information becomes available that some pollutants have escaped containment and entered a water course then this new information must be reported to SAC or as directed forthwith.

## **Mandatory Reporting Details**

- The caller's name and telephone number and position within corporation or municipality if applicable.
- The location of the discharge.
- The date and time the discharge was discovered and, if known, occurred.
- The name, telephone number and role of each person contacted and/or responsible for coordinating a response to the discharge. (Not intended to include every crew member).
- The duration of the discharge and whether the discharge is continuing.
- The identity and quantity of the pollutants discharged and any known hazards of the pollutant or its constituents. Hazards may typically be found on the Material Safety Data Sheet (MSDS) for the pollutant.
- If the person required to notify is a "regulated person" under the EPA (i.e. is subject to O. Reg. 222/07 - Environmental Penalties), the person must identify whether the pollutant spilled is a "toxic substance" under that regulation.
- The location of the source of the pollutant and the best available information regarding the cause of the discharge. It is understood that information regarding cause may change and any significant revision should be reported as per s.13 (7) of O. Reg. 675/98. If the cause is not known when the spill is reported, then a description of the steps that are being taken or will be taken to determine the cause.
- A description of any adverse effects that occurred or may occur. These effects may include but not be limited to any personal or public safety or health threats, potential impacts to well or water intakes, impacts to private property offsite from the spill location, impacts to fish and wildlife habitat or flood plain areas, other environmental impacts, or any other of the adverse effects described in the EPA.

## **Reportable Details if Relevant**

- A description of any conditions that aggravated or mitigated the adverse effects, or that may do so, including weather, surface water and groundwater conditions. Windspeed and direction may be particularly relevant to spills to air and precipitation may aggravate spills to land.
- If the discharge of the pollutant is to other properties, whether the owners or occupants of the properties affected by the discharge will provide access to a person who is required under the EPA or by an order to take steps to prevent, eliminate or ameliorate any adverse effects that are caused or may be caused by the discharge. For example If a spill of a liquid pollutant flows offsite from Company A to Company B property then Company A, the discharger, should be allowed access to Company B property to carry out their s. 93 EPA cleanup responsibility.
- Any other pollutants that were or may be discharged into the natural environment as a result of the circumstances that gave rise to the notification and any adverse effects that resulted or may result from the discharge of such pollutants. Examples would be a chemical reaction between a spilled pollutant and other stored materials or creating an unsafe environment for workers who are in care and control of hazardous materials or processes.
- Any actions that were taken or will be taken to prevent, eliminate or ameliorate any adverse effects, and if the discharge is a spill, any actions taken to satisfy the person's



duty under section 93 of the EPA and the name and telephone number of every person responsible for carrying out these actions. Where one person is coordinating the action of others only the name of the coordinator is required. As well, any circumstances, including weather or traffic conditions that may interfere with these actions.

## **9. CLASSIFICATION OF SPILLS O. Reg. 675/98**

O. Reg. 675/98 classifies eleven types of spills, circumstances, industry type or activities, and exempts these, under specified conditions, from all or part of Part X duties and responsibilities.

Of the eleven classes of spills, three are exempted from Part X entirely, including reporting and cleanup requirements. Two additional classes of spills are exempted from all reporting requirements of Part X while other Part X duties and responsibilities remain for these two classes. The remaining six classes of spills are exempted from most Part X reporting requirements, and retain other Part X duties and responsibilities.

All eleven classes of spills created by O. Reg. 675/98 remove the requirement for police officers and all other public service or public sector employees to notify the Ministry.

All but two classes of spills created by the O. Reg. 675/98 carry a variety of conditions that must be met for the applicable exemption to apply.

O. Reg. 675/98 also encourages those who manage substances that may spill to evaluate potential risks within their operations and to develop appropriate spill contingency plans. A “Class X Spill” under O. Reg. 675/98 is one addressed in a spill contingency plan that meets certain standards for relatively small and manageable spills. The requirement for immediate reporting is waived for such spills. This encourages the development of acceptable spill contingency plans that establish reportable threshold quantities for some substances that might spill under certain conditions and where the impact of such a spill is minimized, for instance, by backup containment or secondary containment and other restraint mechanisms. Such contingency plans should facilitate decision-making processes for employees and others when spills occur. The development of these plans also offers those who may experience spills the opportunity to review the risks of their activities, to organize an effective response structure, and to train staff. All of this has the overall beneficial effect of facilitating spill prevention.

As of September 1, 2008, all Class X exemptions must comply with the requirement prescribed in the Spill Prevention and Contingency Plan regulation (“O. Reg. 224/07”). Prior to September 1, 2008, as part of the transition to O. Reg. 224/07, facilities have the option of seeking a Class X exemption using either the Canadian Standards Association standard CAN/CSA-Z731-03 (Emergency Planning for Industry), an equivalent standard approved by a Director as appropriate for the industry or by adhering to all the elements of O. Reg. 224/07, including s. 6(2).

A Part X reporting requirement summary, and a summary of the classification and exemption of spills introduced by O. Reg. 675/98, is offered in Annex II of this Guide.

## **10. REGULATION 675/98 CLASSIFICATION AND EXEMPTIONS**

### **Class I: Approved Discharges**

A Class I spill is a discharge of a pollutant that is approved by any Ministry approvals instrument, such as a certificate of approval, license or permit. Approved discharges are exempt from all of Part X of the EPA if all requirements in conjunction with the applicable approvals instrument are met, and the discharge does not contravene any other part of the EPA, other provincial or federal legislation, or municipal by-laws.

Assuming that no other regulatory mechanisms are contravened, Class I spills include such discharges as treated wastewaters in accordance with applicable approvals instruments, and the normal application of approved pesticides in an approved manner.

### **Class II: Discharge of Water**

A Class II spill is a discharge of water caused by natural events from a man-made reservoir, or potable water released from municipal water mains. Discharges of water are exempt from all of Part X. This exemption removes all duties and liabilities associated with Part X for events such as the accidental release of water from reservoirs that might fail, and for accidental failures of municipal water mains.

The exemption from Part X of the EPA for a discharge of water from a reservoir applies to events where the resultant is an increase in the quantity of water downstream of the release, but the exemption does not apply to things or pollutants, such as silt, that may be carried by the released water. The release of water from municipal water mains is limited to potable water. Super-chlorinated water from water mains that may be released in disinfection efforts, and other maintenance, repair or testing practices that result in the release of water other than drinkable water, would not qualify for this exemption.

### **Class III: Household Fires**

A Class III spill is a discharge of combustion products from fires of household materials. Class III spills apply to pollutants from fires where materials involved in the fire are of a quantity and quality that would normally be found in 10 or fewer households. Class III spills are exempt from all of Part X. This exemption is intended to remove the duties and responsibilities of Part X from events such as house fires and other relatively small fires, while maintaining these duties for fires (and really large fires) at industrial or chemical facilities, including fires that may occur in accidents within the transportation sector.

### **Class IV: Planned Spills**

A Class IV spill is a discharge of a pollutant that has been pre-approved by the Ministry for one of two possible purposes. One type of pre-approved spill involves the unavoidable result of planned and essential maintenance of water systems as well as wastewater systems or pollution

## **REGULATION 675/98 CLASSIFICATION AND EXEMPTIONS** (Continued)

abatement equipment. The other type of planned spill is a pre-authorized discharge for research or for training purposes.

Once the Ministry's consent has been obtained in advance of the planned release, these types of spills are exempt from all immediate reporting requirements under Part X of the EPA. All other Part X duties and responsibilities remain unaltered by the exemption.

An example of planned spill for water systems may involve routine and systematic cleaning of water mains. This is achieved by flushing and/or swabbing selected sections of water mains; a process that releases accumulated sediments and (normally) directs these to nearby storm drains. Of course, if the swabbing efforts result in the release of significant quantities of silt that threaten the receiving watercourse, the notification exemption would not apply. Examples of the second type of Class IV spill may involve the planned release of controlled and relatively small quantities of materials for research purposes, and where small quantities of substances such as coloured vegetable oils may be used in spill response training efforts or for periodic spill response exercises.

### **Class V: Refrigerants**

A Class V spill involves refrigerants that are already regulated by the Ministry under O. Reg. 189/94. A Class V spill of less than 100 kilograms of a substance to which O. Reg. 189/94 applies is exempt from the reporting provisions of Part X of the EPA if there are no side effects at the site where the discharge takes place. Records of Class V spills must be maintained which, in combination with other regulated inventory controls, allows the Ministry to monitor these refrigerants.

### **Class VI: Motor Vehicles**

Fluids under 100 litres, other than fluids transported as cargo, that may be released from the operating systems of motor vehicles, such as fuels or radiator fluids in motor vehicle accidents, are defined as Class VI spills. Since existing response systems to motor vehicle accidents take care to minimize the potential effect of such spills, it is not necessary for the Ministry to track these spills as well. Subject to three conditions, Class VI spills, therefore, are not required to be reported to the Ministry by the persons who own the vehicles involved nor by the police officers or other public servants who may investigate the event. The three conditions that must be met for the reporting exemption to apply are:

- the spill of operating system fluids does not enter and is not likely to enter directly or indirectly water or a watercourse, as defined by the *Ontario Water Resources Act*,
- the spill does not cause and is not likely to cause adverse effects other than those that are readily remediated through cleanup and restoration of surfaces prepared for vehicular traffic or adjacent paved, gravelled and sodded areas, and
- arrangements for remediation are made immediately.

## **REGULATION 675/98 CLASSIFICATION AND EXEMPTIONS** (Continued)

The duty to notify the municipality, the owner and the person in control remain, as these requirements may apply to the circumstances of a Class VI spill. However, the municipality is

probably already notified if the spill is the result of a traffic accident. The requirement to notify the owner and person in control remains for events where the person who spills or caused the spill is a party other than the owner or person in control. All other Part X duties and responsibilities remain unaltered as well by the exemption.

### **Class VII: Electrical Utilities**

A spill of mineral oil, other than a PCB liquid, of less than 100 litres from electrical transformers or capacitors owned by a municipal or provincial utility is classified as a Class VII spill. Subject to four conditions, Class VII spills need not be reported to the Ministry. Police officers or other public servants who may investigate or are otherwise aware of the spill also do not have to notify the Ministry. The four conditions that must be met for the reporting exemption to apply are:

- the spill of mineral oil does not enter and is not likely to enter directly or indirectly water or a watercourse, as defined by the *Ontario Water Resources Act*,
- the spill does not cause adverse effects other than those that are readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces,
- arrangements for remediation are made immediately, and
- records of the spill are maintained.

All other Part X duties and responsibilities remain unaltered by the exemption, including the duty to notify the municipality, the owner and the person in control as these requirements may apply to the circumstances of a Class VII spill.

### **Class VIII: Petroleum Sector**

The spill of gasoline or an associated product of not more than 100 litres in areas restricted to the public, or not more than 25 litres in areas with public access, at a location defined as a bulk plant, marina, private outlet or retail outlet in O. Reg. 217/01 Liquid Fuels under the Technical Standards and Safety Act 2000, is classified as a Class VIII spill. Subject to four conditions, Class VIII spills need not be reported to the Ministry or to the municipality. Police officers or other public servants who may investigate or are aware of the spill also do not have to notify the Ministry. The four conditions that must be met for the reporting exemption to apply are:

- the spill of the gasoline or an associated product does not enter and is not likely to enter directly or indirectly water or a watercourse, as defined by the *Ontario Water Resources Act*,
- the spill does not cause adverse effects other than those that are readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces,
- arrangements for remediation are made immediately, and
- records of the spill are maintained.

## **REGULATION 675/98 CLASSIFICATION AND EXEMPTIONS** (Continued)

All other Part X duties and responsibilities remain unaltered by the exemption, including the duty to notify the owner and the person in control as these requirements may apply to the circumstances of a Class VIII spill.

### **Class IX: Transportation of dangerous Goods**

Spills of goods and materials regulated as “dangerous goods” by the federal *Transportation of Dangerous Goods Act* and parallel provincial legislation, where the spill is below the minimum quantity for immediate reporting according to applicable transportation rules, are classified as Class IX spills. Subject to four conditions, Class IX spills are exempted from the Part X reporting requirements as these duties apply to notifying the Ministry and the municipality. Police officers or other public servants who may investigate a Class IX spill also do not have to notify the Ministry. The four conditions that must be met for the Part X reporting exemptions to apply are:

- the spill of dangerous goods does not enter and is not likely to enter directly or indirectly water or a watercourse, as defined by the *Ontario Water Resources Act*,
- the spill does not cause adverse effects other than those that are readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces,
- arrangements for remediation are made immediately, and
- records of the spill are maintained.

All other Part X duties and responsibilities remain unaltered by the exemption, including the duty to notify the owner and the person in control as these requirements may apply to the circumstances of a Class IX spill.

### **Class X: Contingency Plans**

A Class X spill is an accidental spill described as “non reportable” in an acceptable spill contingency plan. For Class X spills, spill contingency plans are currently acceptable if they adhere to the Canadian Standards Association standard CAN/CSA-Z731, Emergency Planning for Industry, an equivalent standard approved by a Director as appropriate for the industry or by adhering to all the elements of O. Reg. 224/07, including s. 6(2). As of September 1, 2008 Class X Contingency Plans must meet the requirements of the Ministry’s Spill Prevention Spill Contingency Regulation O. Reg. 224/07. Subject to several conditions, Class X spills need not be reported to the Ministry or to the municipality, and police officers or other public servants who may investigate the spill also do not have to notify the Ministry.

The conditions that must be met for the reporting exemption to apply are:

- the contingency plan is in effect before the spill,
- the spill is of a pollutant, and its associated quantity less than the reportable quantity, specified in the plan,
- the spill is not entering or likely to enter any waters (surface or groundwater)

## **REGULATION 675/98 CLASSIFICATION AND EXEMPTIONS** (Continued)

- the plan describes the spill as not likely to cause adverse effects, based on experience, other than adverse effects that can be readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces,
- the spill was not deliberate on the part of the owner or person in control,
- any concerns of the Ministry regarding the plan have been withdrawn by the Ministry before the spill,
- the plan will result in preventing adverse effects, other than those readily remedied through cleanup and restoration of paved, gravelled or sodded surfaces,
- arrangements for remediation are made and carried out immediately, and
- records of the spill are maintained for five years (commencing September 1, 2008).

All other Part X duties and responsibilities remain unaltered by the exemption, including the duty to notify the owner and the person in control as these requirements may apply to the circumstances of a Class X spill.

If adverse effects result and planned remediation is not effective or is not arranged and carried out forthwith as stipulated in the spill contingency plan, the reporting exemptions for Class X spills do not apply, and spills that would otherwise “not be reportable” must be then reported in accordance with s. 92 of the EPA requirements. In such eventualities, the Ministry must also be notified in writing within 30 days of the spill of corrective measures taken or the revisions made to the spill contingency plan to prevent the failure of the plan from recurring.

### **Class XI: One-Window Reporting**

A Class XI spill is one that is reportable to more than one provincial or federal agency. Subject to three conditions, Class XI spills need not be reported to the Ministry, and police officers or other public servants who are aware of or may investigate the spill also do not have to notify the Ministry. The conditions that must be met for the reporting exemption to apply are:

- a memorandum of understanding exists between the Ministry and the other agency with respect to resolving duplicate reporting,
- the spill meets all conditions specified in the memorandum of understanding, and
- records of the spilled pollutant are maintained.

All other Part X EPA duties and responsibilities remain unaltered by the exemption, including the duty to notify the owner and the person in control, as well as the duty to notify the municipality, as these requirements may apply to the circumstances of the spill.

As of the date of this document, SAC serves as the contractual reporting desk for Environment Canada for events reportable to Environment Canada under the *Fisheries Act* and for matters subject to immediate reporting requirements under the *Canadian Environmental Protection Act*. The primary purpose of the arrangements between the Ministry and Environment Canada is to minimize duplicate reporting for similar types of events addressed by provincial as well as federal statutes. Thus, the notification of a spill, as defined in the EPA, made forthwith to SAC that is also an event within the reporting requirements of the *Fisheries Act* satisfies the reporting requirements of both statutes. SAC also takes reports on behalf of Environment Canada for

## **REGULATION 675/98 CLASSIFICATION AND EXEMPTIONS** (Continued)

matters reportable within Ontario under the *Canadian Environmental Protection Act*, thus notifications made to SAC effectively satisfies the reporting requirements applicable to all three statutes (within Ontario).

SAC also serves as the contractual reporting desk for Ontario's Technical Standards and Safety Authority ("TSSA") for a variety of events and mishaps reportable to TSSA. This includes spills that may occur at bulk terminals, service stations, etc., and that might otherwise be reportable to both agencies. The arrangements between SAC and TSSA effectively means that an event reportable to TSSA that is also a spill reportable to the Ministry would have been reported to both agencies with a single report made forthwith to SAC.

## Annex I

### Definitions of terms related to the EPA - Part X, Spills

Several words and terms are defined specifically for the purpose of Part X of the EPA. The following definitions are reproduced as presented in Part X, s, 91(1) of the EPA:

Section 91(1):

**"municipality"** means an upper-tier municipality, a lower-tier municipality or a single-tier municipality;

**"owner of the pollutant"** means the owner of the pollutant immediately before the first discharge of the pollutant, whether into the, natural environment or not, in a quantity or with a quality abnormal at the location where the discharge occurs, and "owner of a pollutant" has a corresponding meaning;

**"person having control of a pollutant"** means the person and the person's employee or agent, if any, having the charge, management or control of a pollutant immediately before the first discharge of the pollutant, whether into the natural environment or not, in a quantity or with a quality abnormal at the location where the discharge occurs, and "person having control of the pollutant" has a corresponding meaning;

**"pollutant"** means a contaminant other than heat, sound, vibration or radiation, and includes any substance from which a pollutant is derived ["contaminant" is defined in s. 1(1) of the EPA, see also page 15 of this Guide);

**"practicable"** means capable of being effected or accomplished;

**"regional municipality"** means the corporation of a metropolitan area, regional area or district area;

**"restore the natural environment"**, when used with reference to a spill of a pollutant, means restore all forms of life, physical conditions, the natural environment and things existing immediately before the spill of the pollutant that are affected or that may reasonably be expected to be affected by the pollutant, and "restoration of the natural environment", when used with reference to a spill of a pollutant, has a corresponding meaning;



"**spill**", when used with reference to a pollutant, means a discharge,

into the natural environment,

from or out of a structure, vehicle or other container, and

that is abnormal in quality or quantity in light of all the circumstances of the discharge, and where used as a verb has a corresponding meaning;

"**substance**" means any solid, liquid or gas, or any combination of any of them.

Section 91(3):

"**Practicable**" In determining what is practicable for the purposes of this Part [Part X of the EPA], regard shall be had to the technical, physical and financial resources that are or can reasonably be made available.

---

Part X of the EPA also relies on several other words and terms which are defined in the general provisions of the EPA, namely in s. 1, and which apply to the entire EPA. Some of these words and terms are of particular importance to the spills component of the Act and are highlighted here for the benefit of the reader.

Section 1:

(1) In this Act,

"**adverse effect**" means one or more of,

- a) impairment of the quality of the natural environment for any use that can be made of it,
- b) injury or damage to property or to plant or animal life,
- c) harm or material discomfort to any person,
- d) an adverse effect on the health of any person,
- e) impairment of the safety of any person,
- f) rendering any property or plant or animal life unfit for use by man,
- g) loss of enjoyment of normal use of property, and
- h) interference with the normal conduct of business.

"**contaminant**" means any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from human activities that causes or may cause an adverse effect;

"**discharge**", when used as a verb, includes add, deposit, leak or emit and, when used as a noun, includes addition, deposit, emission or leak;

**"inspection"** includes an audit, examination, survey, test and inquiry;

**"local municipality"** means a city, town, village or township;

**"Minister"** means the Minister of the Environment;

**"Ministry"** means the Ministry of the Environment;

**"municipality"** means the corporation of a county, metropolitan area, regional area, district area, city, town, village, township or improved district and includes a local board thereof and a board, commission or other local authority exercising any power with respect to municipal affairs or purposes, including school purposes, in an unorganized township or unsurveyed territory;

**"natural environment"** means the air, land and water, or any combination or part thereof, of the Province of Ontario;

**"person"** includes a municipality as defined in this subsection;

## Section 2

### **"Secondary discharge within building"**

A contaminant that is discharged into the air within a building or structure as a result of the discharge of the same or another contaminant in another building or structure shall be deemed to be discharged into the natural environment by the owner or the person who has the charge, management or control of the contaminant discharged in the other building or structure.

**ONTARIO MINISTRY OF THE ENVIRONMENT**

**SPILLS ACTION CENTRE**

**1 - 800 - 268 - 6060**  
(TOLL-FREE, PROVINCE-WIDE, 24/7)

**416 - 325 - 3000**  
(TORONTO AREA)

## Annex II

### Ontario Regulation 675/98 - Classification and Exemption of Spills - Summary

Class of spill	Nature or type of discharge, and circumstances or activity where Part X-related exemptions apply	Exemptions	Conditions that must be met for exemption to apply
I	<u>Approved discharge</u> ; authorized by and in accordance with a C of A, a provisional C of A., order, license, etc.	Exempted from all of Part X of the EPA** including reporting and cleanup.	⇒ must have been in compliance with all orders or other requirements made under Ministry legislation; and ⇒ the spill does not contravene any other part of the EPA and other legislation including municipal by-laws.
II	<u>Discharge of water</u> ; water from reservoirs formed by dams where the discharge is caused by natural events, and potable water from water mains.	Exempted from all of Part X of the EPA** including reporting and cleanup.	⇒ none
III	<u>Household fires</u> ; combustion products from a fire of materials in quantity not greater than normally found in residential properties of 10 or fewer households.	Exempted from all of Part X of the EPA** including reporting and cleanup.	⇒ none
IV	<u>Planned spills</u> ; pre-authorized and unavoidable discharges involving planned maintenance procedures to water or waste systems, or pre-authorized discharges for research or training purposes.	Exempted from all reporting requirements of Part X of the EPA**.	⇒ application for Ministry consent is made at least 15 days prior to the release or spill, and ⇒ adverse effects must be monitored and a report must be filed with the Ministry within 5 days of the spill.  • With regard to obtaining prior Ministry consent: ◇ Ministry is required to give consent if potential risks and adverse effects are deemed acceptable, and ◇ Ministry may stipulate additional conditions.
V	Refrigerants; a spill of less than 100 Kg of a substance to which O. Reg. 189/94 applies.	Exempted from all reporting requirements of Part X of the EPA**.	⇒ no adverse effect to take place at location of discharge, ⇒ keep records. ***

<b>Class of spill</b>	<b>Nature or type of discharge, and circumstances or activity where Part X-related exemptions apply</b>	<b>Exemptions</b>	<b>Conditions that must be met for exemption to apply</b>
<b>VI</b>	<u>Motor Vehicles</u> ; spills of 100 litres or less of fluid, other than fluids transported as cargo, from fuel or other operating systems of motor vehicles.	Exempted from the requirement to notify the Ministry and from having to provide additional information to the Ministry. Police and other public servants need not notify the Ministry. The duty to notify the municipality in which the spill occurs as well as the owner and the person in control of the pollutant spilled remains.	⇒ the spill does not enter and is not likely to enter directly or indirectly water or a watercourse, ⇒ the spill does not cause and is not likely to cause any adverse effects other than those that are readily remediated through cleanup and restoration of surfaces prepared for vehicular traffic or adjacent paved, gravelled or sodded areas, and ⇒ arrangements for remediation are made immediately.
<b>VII</b>	<u>Electrical utilities</u> ; spills of 100 litres or less of mineral oil, excluding PCB liquid, from transformers or capacitors owned by municipal or provincial utilities.	Exempted from the requirement to notify the Ministry. Also exempted from having to provide additional information to the Ministry. Police and other public servants need not notify the Ministry. The duty to notify the municipality, the owner and the person in control of the pollutant spilled, as applicable, remains.	⇒ the spill does not enter and is not likely to enter directly or indirectly water or a watercourse, ⇒ the spill does not cause and is not likely to cause any adverse effects other than those that are readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces, ⇒ arrangements for remediation are made immediately, and ⇒ keep records. ***
<b>VIII</b>	<u>Petroleum sector</u> ; gasoline or associated product spills at a bulk plant, marina, and private or retail outlet of 100 litres or less in areas restricted from public access, and 25 litres or less in areas with public access.	Exempted from the requirement to notify the Ministry and the municipality in which the spill occurs. Also exempted from having to provide additional information to the Ministry. Police and other public servants need not notify the Ministry. The duty to notify the owner and the person in control of the pollutant spilled, as applicable, remains.	⇒ the spill does not enter and is not likely to enter directly or indirectly water or a watercourse, ⇒ the spill does not cause and is not likely to cause any adverse effects other than those that are readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces, ⇒ arrangements for remediation are made immediately, and ⇒ keep records. ***
<b>IX</b>	<u>Transportation of dangerous goods</u> ; spilled goods or materials, otherwise regulated by the federal TDG Act and Regulations and the parallel provincial act and regulations, at a quantity below the minimum reportable as stipulated by the federal transportation rules.	Exempted from the requirement to notify the Ministry and the municipality in which the spill occurs. Also exempted from having to provide additional information to the Ministry. Police and other public servants need not notify the Ministry. The duty to notify the owner and the person in control of the pollutant spilled, as applicable, remains.	⇒ the spill does not enter and is not likely to enter directly or indirectly water or a watercourse, ⇒ the spill does not cause and is not likely to cause any adverse effects other than those that are readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces, ⇒ arrangements for remediation are made immediately, and ⇒ keep records. ***

Class of spill	Nature or type of discharge, and circumstances or activity where Part X-related exemptions apply	Exemptions	Conditions that must be met for exemption to apply
X	<u>Contingency plans</u> ; accidental spills of materials below reportable quantities as specified in a contingency plan that meets CSA or other acceptable standards. (As of September 1, 2008 all Contingency plans must meet the requirements of the Ministry's Spill Prevention Spill Contingency Regulation).	Exempted from the requirement to notify the Ministry and the municipality in which the spill occurs. Also exempted from having to provide additional information to the Ministry. Police and other public servants need not notify the Ministry. The duty to notify the owner and the person in control of the pollutant spilled, as applicable, remains.	⇒ the contingency plan is in effect before the spill, ⇒ the spill involves a material, and its associated quantity less than the reportable quantity, specified in the plan, ⇒ the spill is not entering or likely to enter any waters (surface or groundwater) ⇒ the plan describes the spill as not likely to cause any adverse effects based on experience, ⇒ the spill was not deliberate on the part of the owner or person in control, ⇒ any concerns of the Ministry regarding the plan have been withdrawn by the Ministry before the spill, ⇒ the plan will result in preventing adverse effects other than those that are readily remediated through cleanup and restoration of paved, gravelled or sodded surfaces, ⇒ arrangements for remediation are made immediately, and ⇒ keep records. ***
XI	<u>One-window reporting</u> ; spills reportable to more than one provincial or federal agency.	Exempted from the requirement to notify the Ministry immediately, but the Ministry retains the right to request information. Police and other public servants need not notify the Ministry. The duty to notify the municipality in which the spill occurs as well as the owner and the person in control of the pollutant spilled remains.	⇒ the spill meets all conditions of the memorandum of understanding that exists between the Ministry and another agency with respect to resolving duplicate reporting of spills, and ⇒ keep records. ***

**Note:** \* The summary cannot reflect all details of O. Reg. 675/98. The reader is urged to review O. Reg. 675/98 in detail

\*\* The term EPA in this summary refers to the *Environmental Protection Act*, R.S.O. 1990, c. E. 19.

\*\*\* Details of records to be prepared and kept for two years (5 years in the case of Class X spills as of September, 2008) as specified in s. 12 of O. Reg. 675/98 and include: date, time, location and duration of the release; identity and quantity of the pollutant; circumstances of the spill; containment and clean-up efforts utilized; disposal and re-use method used within compliance of s. 96 of the EP; and specifics of any adverse effect observed. Records for Class 5 spills, refrigerants, need only include: date, time, location and duration of the release; identity and quantity of the pollutant; and the circumstances of the spill. Spills not captured by O. Reg. 675/98 must be reported to the Ministry, to the municipality in which it occurred, and to others (s. 92 of the EPA).

**APPENDIX D**  
**Post-Construction Monitoring Plan: Bat Maternity Colonies**





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**Project Number:** 1104037.00

**Project Title:** HAF WIND ENERGY PROJECT

**Report:** 007-R02-1104037

**Title:** **PRE-CONSTRUCTION MONITORING WORK PLAN:  
CANDIDATE BAT MATERNITY COLONIES**

**Client:** IPC Energy  
2550 Argentia Road Suite 105  
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**Date:** February 2012

Morrison Hershfield Limited

Erin McLachlan  
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Figure 1. Candidate Bat Maternity Colonies

## 1.0 Introduction

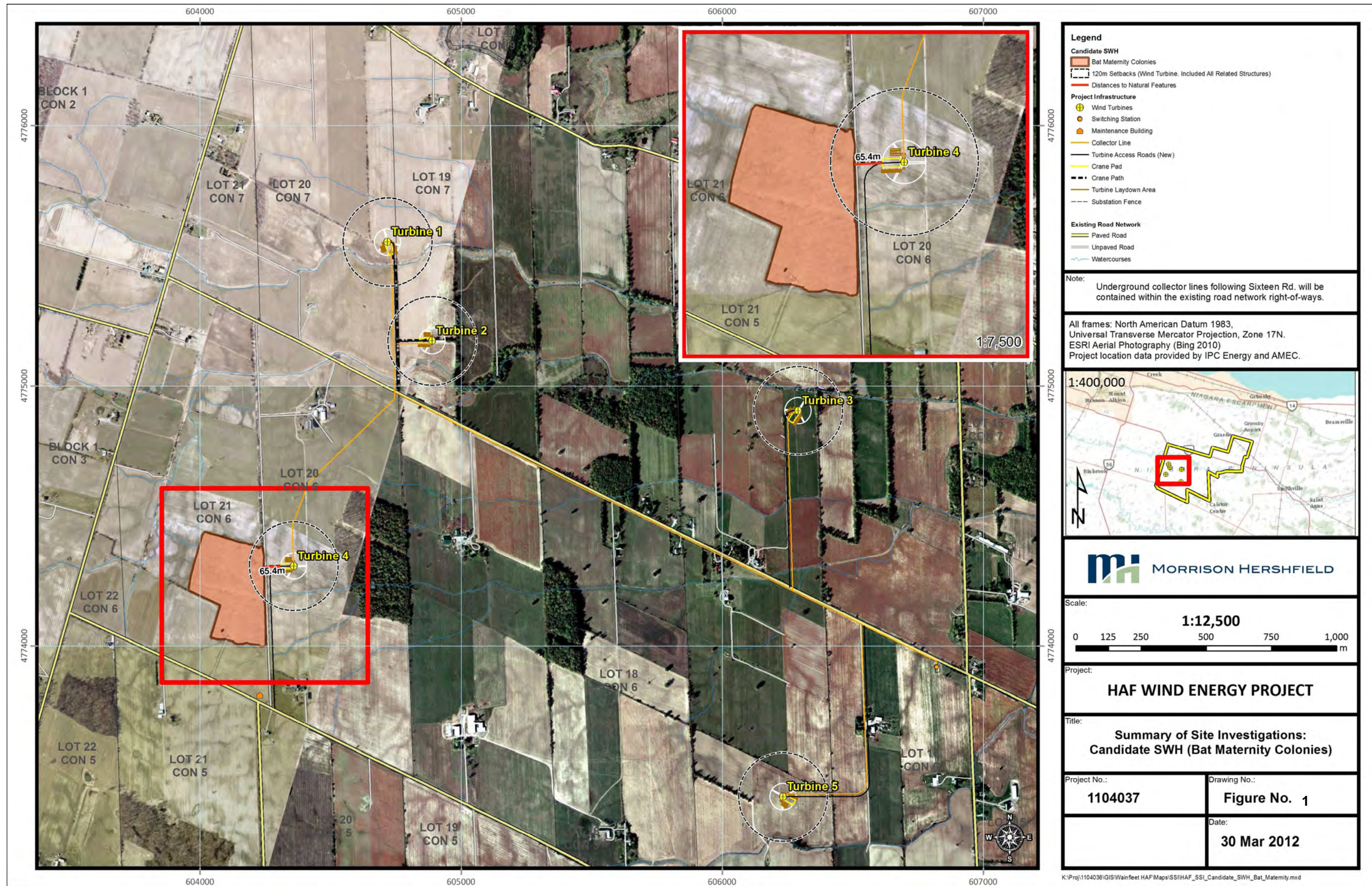
According to the Bat and Bat Habitats: Guidelines for Wind Power Projects candidate bat maternity colonies are found in mixed or deciduous forest with  $\geq 10$  snags/cavity trees per hectare of trees  $\geq 25\text{cm}$  dbh. The forests within 120 metres of the project location were surveyed for an abundance of snags and cavity trees and 1 candidate site was identified (Mill Creek-Inverary Woods). **See Figure 1.** It will be treated as significant and carried forward to the EIS. Pre-construction monitoring will be outlined in the EIS.

### **Candidate Bat Maternity Colony (Mill Creek-Inverary Woods)**

This 4.97-hectare deciduous forest has abundant snags and cavity trees that make it suitable for a bat maternity colony site. The candidate site was investigated for bat activity (i.e. bat droppings below a hole, smell of ammonia near a hole, grease marks, urine stains or actual bats) during the day and at dusk (9:00pm) and bat activity was observed.

Feature Type/ID	Size	Significance (if known)	Attributes	Composition	Functions	Minimum distance between feature & project location	Carried forward to EOS (y/n)
Candidate Bat Maternity Colony (Mill Creek-Inverary Woods)	10 ha	Unknown	-dominated by deciduous trees with Mill Creek flowing through woodland	FOD9-2 -fresh-moist oak maple deciduous forest	-large forest for protection - abundance of snag and cavity trees suitable for bat maternity colony sites	65.4 metres from Turbine 4	No – assumed significant and carried forward to EIS (Pre-construction monitoring will be outlined in the EIS.)







## **2.0 Objectives of Study**

This study seeks to confirm the use of the candidate bat maternity colonies. If use is confirmed, we will gather information on the abundance and species of bats using the maternity colonies.

## **3.0 Timing of Study**

This study will be conducted in June 2012 to facilitate observations of bats exiting the candidate maternity colony roost.

## **4.0 Study Methods**

The study will include monitoring candidate roost trees for evidence of a maternity colony through an exit survey. A minimum of 10 candidate roost trees will be identified for survey in the candidate maternity colony (Mill Creek- Inverary Woods). The trees will be selected based on the following criteria:

- tallest snag/cavity tree
- exhibits cavities or crevices most often originating as cracks, scars, knot holes or woodpecker cavities
- has the largest diameter breast height
- is within the highest density of snags/cavity trees (eg. Clusters of snags)
- has a large amount of loose, peeling bark
- cavity or crevice is high in snag/cavity tree (>10m)
- tree species that provide good cavity habitat (eg. White pine, maple, aspen, ash, oak)
- canopy is more open (to determine canopy cover, determine the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of trees) and
- exhibits early stages of decay (decay class 1-3)

The candidate roost trees will be marked with flagging tape and their locations recorded on a GPS. Each candidate roost tree will be monitored once from 30 minutes before dusk until 60 minutes after dusk on nights without precipitation or high winds (>6m/s). Two observers will conduct a visual survey of the bat activity at the candidate roost tree, in conjunction with a broadband bat detector with a condenser microphone (Wildlife Acoustics SM2), with the acoustic monitoring device ~10m from the candidate roost tree. The number of all bats observed will be recorded and the calls will be analyzed by Erin McLachlan with CallViewer software to determine species. Erin has taken the MNR Bat Monitoring Workshop for Wind Power Projects and is familiar with identification of Ontario bat species.

## **5.0 Analysis of Results**

The Environmental Impact Study will include a discussion of different result outcome scenarios of the study. The analysis of results will be submitted to MNR for review immediately after study completion, and prior to construction.

### **5.1 Significant Wildlife Habitat Technical Guide**

The following numbers of bats will be considered significant at maternity colonies, as per the Significant Wildlife Habitat Technical Guide (OMNR 2000):

- 30 Big Brown Bats (*Eptesicus fuscus*)
- 100 Little Brown Bats (*Myotis lucifugus*)
- 10 Eastern Pipistrelles (*Pipistrellus subflavus*)
- 10 Silver-haired Bats (*Lasionycteris noctivagans*)
- 10 Long-eared Bats (*Myotis septentrionalis*)
- 10 Small-footed Bats (*Myotis leibii*)

### **5.2 Ecoregion 7E Criteria Schedule**

As per the draft Ecoregion 7E Criteria Schedule (OMNR 2011), candidate bat maternity colonies are deemed significant if studies confirm the use of the feature by:

- >20 Northern Myotis (*Myotis septentrionalis*)
- >10 Big Brown Bats (*Eptesicus fuscus*)
- >20 Little Brown Myotis (*Myotis lucifugus*)
- >5 Adult Female Silver-haired Bats (*Lasionycteris noctivagans*)

If the analysis of results deems the site not significant, no further studies or mitigation are required.

If the analysis of results deems the site significant, a discussion of potential impacts to the feature will be included in the Environmental Impact Study and mitigation measures will be provided and incorporated into the Environmental Effects Monitoring Plan (EEMP) to minimize impacts.

**APPENDIX E**  
**Post-Construction Monitoring Plan: Terrestrial Crayfish**





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**Project Number:** 1104036.00

**Project Title:** HAF WIND ENERGY PROJECT

**Report:** 007-R02-1104036

**Title:** **PRE-CONSTRUCTION MONITORING WORK PLAN:  
CANDIDATE TERRESTRIAL CRAYFISH HABITAT**

**Client:** IPC Energy  
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**Date:** March 2012

Morrison Hershfield Limited

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Figure 1. Candidate Terrestrial Crayfish Habitat

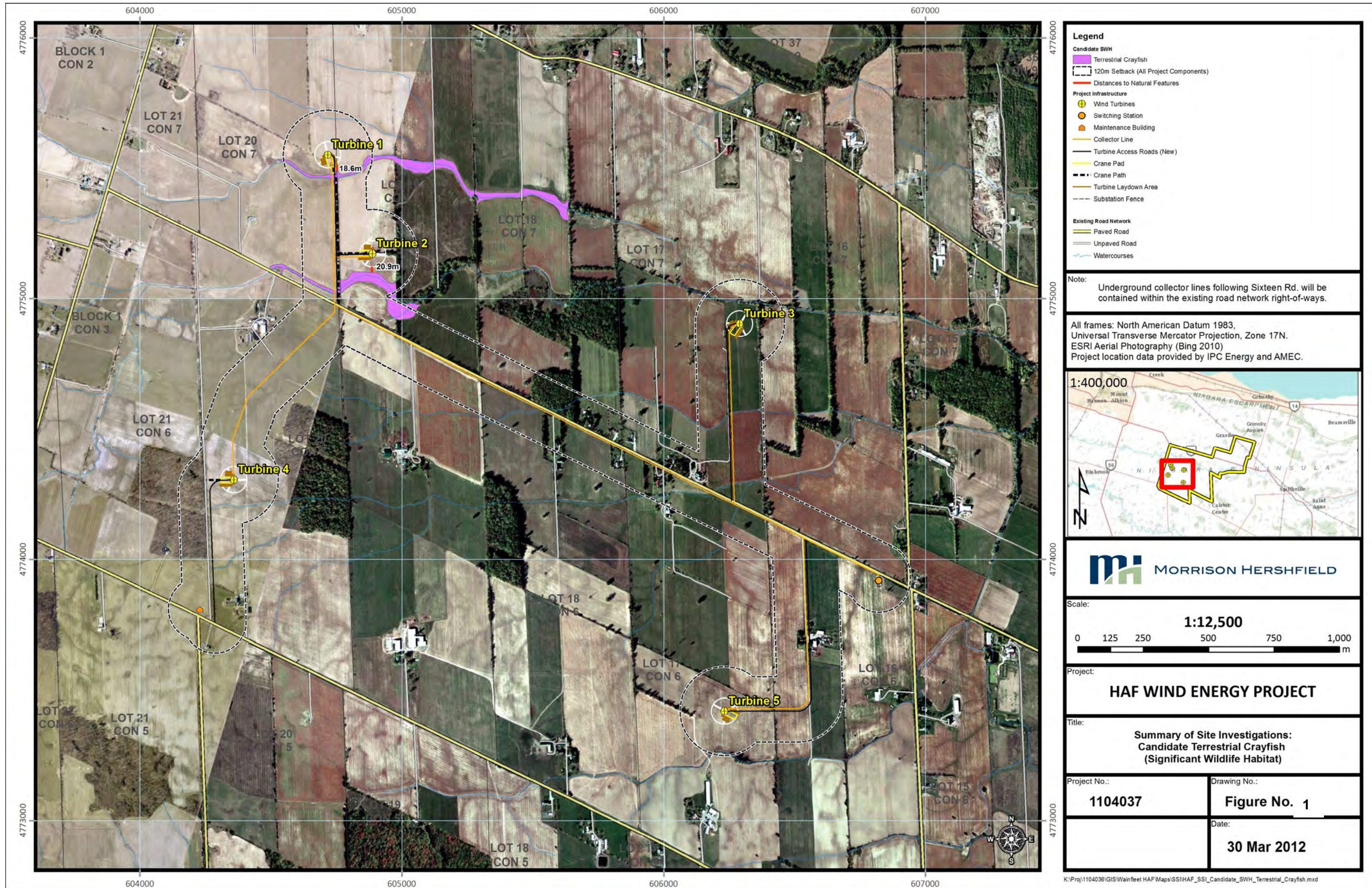
## 1.0 Introduction

Within Canada, terrestrial crayfish are only found within Southwestern Ontario and their habitats are very rare. They burrow in shallow mares, meadow marshes and mudflats near water.

During Site Investigations, 2 candidate sites (MAS2) were identified within 120 metres of the project location. See Figure 1.

<b>Feature Type/ID</b>	<b>Size</b>	<b>Significance (if known)</b>	<b>Attributes</b>	<b>Composition</b>	<b>Functions</b>	<b>Minimum distance between feature &amp; project location</b>	<b>Carried forward to EOS (y/n)</b>
Candidate Terrestrial Crayfish Habitat	4.76 ha	Unknown	-wetland dominated by marsh species	MAS2 -mineral shallow marsh -dominated by reed canary grass	- suitable conditions for terrestrial crayfish habitat	0 meters Access road and underground collector line will intersect this feature	No – assumed significant and carried forward to EIS (Pre-construction monitoring will be outlined in the EIS.).







## **2.0 Objectives of Study**

This study seeks to confirm the use of the candidate terrestrial crayfish habitat. If use is confirmed, we will gather information on the abundance and species of crayfish using the habitat.

## **3.0 Timing of Study**

This study will be conducted in April 1– June 30 to include the adult breeding season. Three field visits will be scheduled.

- Site Visit #1: April
- Site Visit #2: May
- Site Visit #3: June

## **4.0 Study Methods**

The study will include thoroughly investigating the entire candidate site on foot, looking for evidence of chimneys (burrows). Locations of all chimneys will be recorded with a GPS and notes will be made of any burrow activity observed (i.e. fresh mud pellets at burrow portals). Other observations of species using burrows (such as snakes and small mammals) will also be noted and reported. Two observers will conduct 3 surveys of 1 hour each (6 person hours of effort). Data on habitat and weather conditions (including the conditions and any precipitation events of the preceding week), start and end times of survey will also be recorded.

## **5.0 Analysis of Results**

The Environmental Impact Study will include a discussion of different result outcome scenarios of the study. The analysis of results will be submitted to MOE and MNR immediately after study completion, and prior to construction. This analysis will include conclusions about which outcome scenarios are to be implemented from the Environmental Impact Study.

### ***5.1 Significant Wildlife Habitat Technical Guide***

As per the Significant Wildlife Habitat Technical Guide (OMNR 2000), candidate significant wildlife habitat (species/habitats of conservation concern) areas are analyzed in terms of 10 criteria:

- Degree of rarity of species found at site
- Documented significant decline in a species and/or its critical habitat
- Species whose range is solely or primarily found in Ontario
- Condition of existing habitat at site

- Size of species population at site
- Size and location of habitat
- Potential for long-term protection of the habitat
- Representation of species/habitat within the municipality
- Evidence of use of the habitat
- Species of particular interest to the planning authority

This study will provide information on the abundance and species of crayfish using the habitat to conduct an analysis on this feature.

### ***5.2 Ecoregion 7E Criteria Schedule***

As per the draft Ecoregion 7E Criteria Schedule (OMNR 2011), candidate terrestrial crayfish habitats are deemed significant if studies confirm the use of the feature by:

- Presence of 1 or more individuals of species listed or their chimneys (burrows):
  - Chimney or Digger Crayfish (*Fallicambarus fodiens*)
  - Devil Crawfish or Meadow Crayfish (*Cambarus Diogenes*)

If the analysis of results deems the site not significant, no further studies or mitigation are required.

If the analysis of results deems the site significant, a discussion of potential impacts to the feature will be included in the Environmental Impact Study and mitigation measures will be provided and incorporated into the Environmental Effects Monitoring Plan (EEMP) to minimize impacts.