SITE SPECIFIC ENVIRONMENTAL MANAGEMENT AND PROTECTION PLAN (SSEMPP)

Site A – Dam at Lock 38

Trent-Severn Waterway Infrastructure
Talbot Dams Rehabilitation – Kirkfield Bundle
Public Works and Government Services Canada

August 2, 2018
Rev. 02

PREPARED FOR:
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DOCUMENT CONTROL TABLE – RECORD OF UPDATES

TOR	TOC	SPEC SECTION	DATE ISSUED	Rev. No	COMMENTS
RS 3.8.2	-	-	31/05/2018	0	SSEMP SUBMITTED FOR REVIEW
RS 3.8.2	-	-	09/07/2018	1	See Amendment Sheet
RS 3.8.2	-	-	02/08/2018	2	See Amendment Sheet

TOR – Terms of Reference number

TOC – Table of Contents reference number

SPEC SECTION – TDKB Project Specification reference

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Amendment Sheet

REVISION	PAGE #	SUBJECT OF THE AMENDMENT	AMENDED BY	DATE
01	Appendix H	Added blue/brown water mass dewatering breakdown based on discussion during the 20180703 Delivery Team Minutes	Jordan Feijoo	09/07/2018
02	All	Changes related to comments from PCA/PWGSC on Rev 01 Inclusion of the Site A Specifications (July 2018)	Jordan Feijoo	02/08/2018

1.0 Vision Statement

At the request of the Departmental Representative, the EllisDon-Chant Joint Venture (herein referred to as EDCJV) has completed and had approved by Public Work Government Services Canada (PWGSC) and Parks Canada Agency (PCA) a Site Specific Environmental Management and Protection Plan (SSEMPP) for the Reconstruction of the Dam at Lock 38. The SSEMPP is premised on PWGSC and PCA's policies, procedures, processes, documents, opportunity selection, work planning, execution and close-out practices, all of which display a high regard and respect for the natural environment and the need for sustainable development.

The vision of the SSEMPP is that it is prescriptive in nature and clearly establishes the basis for:

a) Determination of the processes and procedures required to successfully implement the SSEMPP.

b) Determination of the means and methods needed to ensure that the development, implementation, operation and control of these processes and procedures are effective.

c) Ensuring the availability of knowledge, information and trained resources to support the effectiveness of the processes, procedures, means and methods.

d) Monitoring, measuring, and analyzing related outcomes.

e) The continual improvement of outcomes through the enhancement of the processes and procedures.

The provided SSEMPP reflects all environmental issues identified in the Basic Impact Assessment (BIA) prepared for the Project by PCA and provides a template to ensure the Work is completed in compliance with the mitigation measures that are prescribed in the BIA as a minimum. Consistent with the intent of the Construction Contract, the Contractor's Project Staff will be responsible for implementation and continuous improvement of the provided SSEMPP during the Work. The specific individuals of the Contractor responsible for the effective implementation of the provided SSEMPP are found in Table A below.

Table A - Environmental Plan Management Responsibilities

Role	*Name*
(To be Completed by Contractor)	

The Contractor's environmental protection efforts during construction shall:

- Comply with the commitments and conditions of environmental approvals, permits, exemptions, agreements, reports, clearances and the SSEMPP, all as provided or identified by

the Departmental Representative and PCA as components of the Contract Documents.

- Comply with any other formal environmental approvals (such as the BIA), Parks Canada Historic Canals Rehabilitation Permit, exemptions, agreements, reports and clearances procured by the Departmental Representative (or others) to perform the work and as provided or identified to the Contractor as components of the Contract Documents.
- Be integrated with the environmental and other requirements specified in the Contract Documents.
- Incorporate Ontario Waterways Environmental Standards and Guidelines for project site dewatering, vegetation removal and rehabilitation, environmental practices, mitigation measures stipulated in the BIA and other standards and guidelines provided as components or otherwise identified or reasonably inferred in the Contract Documents.
- Ensure that mitigation or other guidelines provided within environmentally related Best Management Practice documents which are not specifically referred to within the SSEMPP are implemented and adhered to throughout the duration of the Work as required.
- Reflect that the SSEMPP will remain a living document throughout the lifecycle of the project and will be continually revised to reflect site conditions and ensure its effectiveness for the intended purpose.

The key objectives of the SSEMPP are to:

- Clearly establish the positions and names of the persons responsible within the Contractor's hierarchy for ensuring personnel training in, adherence to and compliance with the SSEMPP.
- Establish clear and specific obligations on the part of the Contractor to report, inform, consult and otherwise communicate on environmental matters with the Departmental Representative. The Departmental Representative shall inform, seek the approval of or otherwise engage PCA as required by the understandings between the two parties (some but not all of which are identified in the provided SSEMPP).
- Detail site access (site roads, access embankments and access ramps) and staging area plans.
- Detail the Erosion and Sedimentation Control Plan, including provisions for maintaining the sites during construction and providing erosion control on all exposed earth surfaces and temporary fills.
- Provide drawings which illustrate the scope of the provided SSEMPP's, the means and methods to mitigate identified environmental risks and to detail key features and facilities required to implement the SSEMPP.
- Detail spill control procedures and the Spill Response Plan and Incident Reporting plan.

The approved season of work for this Project is 12 months per year. Working hours will be ten (10) to twelve (12) hour per day (6 AM – 6PM) between five (5) and seven (7) days a week (with some night shift work being performed) as required during the Non-Navigation Season (Mid October 2018 to early May 2019). The working hours during the Non-Navigation season 2019-2020 and the two (2) Navigation

Seasons (Late May – Early October) will be on a ten (10) hour day basis (7 AM – 5PM), five (5) days a week. Should the Contractor intend to work outside of the approved hours during the Navigation Season the Departmental Representative must be informed as early as possible so that extended hours can be communicated to nearby third-party stakeholders.

The following equipment list does not include tools of the trade used as part of general construction processes. Exact quantities of equipment and personnel are at the discretion of the Contractor and will be determined so as to ensure that schedule objectives are attained. The following is a list of equipment to be used for the permanent works, temporary roads and access construction (a complete list of equipment planned for use on site will be provided to the Departmental Representative and PCA by the Contractor, when finalized):

- Hydraulic excavators (various sizes)
- Legal and off-highway haul trucks
- Front End Loader type material handlers, forklifts, zoom booms and access equipment
- Conventional and hydraulic cranes
- Rock Drills (large and small diameter)
- Tree Chipper
- Smooth drum compacting roller
- Various Piping and Hoses
- Vibratory sheet pile installation equipment
- Pneumatic jack hammers
- Wall mounted and wire concrete saws
- Excavators equipped with hydraulic breakers (Hoe Ram)
- Air compressors
- Generators
- Pumps (electric and diesel)
- Hand held cutting equipment

The following is a list of materials to be used. The list is not exhaustive:

- Washed 19mm clear stone
- Well graded Rip Rap washed
- Washed Armor stone
- 300 mm rock with minimal fines
- 2”- crushed stone
- Well graded granular “B”
- Select Subgrade Material (SSM)
- Geotextile
- Geotextile Sediment Fence without mesh – In accordance with Table 3 OPSS 1860, 04/2012
- Grass Seed (Various application techniques)
- Concrete
- Reinforcing steel
- Formwork consumables

- Concrete finishing products

Prior to the start of the Work, the Departmental Representative will conduct a project start up meeting outlining the details of the SSEMPP to the Contractor. PCA will attend and participate directly in this start up meeting. The objective of this meeting is to ensure awareness and understanding of the SSEMPP's requirements. As part of this meeting the Departmental Representative will detail the frequency of monitoring and list high risk construction activities where an environmental professional of the Contractor and/or PCA Environmental Personnel must be on site to witness the identified activities. A partial listing of high risk activities can be found in the Technical Specifications.

2.0 Environmental Protection Measures

2.1. **Soil Movement Mitigation Measures (Erosion and Sediment Control)**

Soil movement mitigation measures will be carried out as indicated in the applicable sections of the SSEMPP and the Erosion and Sediment Control Plan located in Appendix D. The following measures will serve as guidelines in support of the Erosion and Sediment Control Plan and are not all-inclusive:

2.1.1. The Contractor shall provide temporary erosion and sediment control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, and the waterway itself according to the approved Erosion and Sediment Control Plan and requirements of authorities having jurisdiction.

2.1.2. The Contractor shall inspect, repair, and maintain erosion and sediment control measures daily and post rainfall during construction until permanent vegetation has been established. If sediment and erosion control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed.

2.1.3. The Contractor will remove erosion and sedimentation controls as well as restore and stabilize areas disturbed during the removal when work is complete.

2.1.4. The Contractor will confine work, including temporary structures, plant, equipment, materials and operations of employees, to areas defined by the contract documents. Drawings showing the project footprint including the fencing and gate locations can be found in Appendix B. The site plan shown in Appendix B will be revised to show as-built conditions, spoil/stockpile and environmental protection locations.

2.1.5. The Contractor will stockpile fill materials in areas approved by the Departmental Representative in consultation with PCA. To prevent erosion of fill material, stockpiles will be protected if said material is expected to be unused for a long period of time. Geotextile sediment fence without mesh is to be placed around the stockpile as per the Sediment and Erosion Control plan. Any stockpiled materials, or concrete debris shall be stored and stabilized a safe distance away from any watercourse, drainage course or

swales to prevent erosion and subsequent entry into the TSW OR removed from the site in accordance with all federal, municipal and provincial regulations.

2.1.6. All disturbed areas of the work site shall be re-instated immediately following work and re-vegetated as soon as conditions allow. Then the backfill will be placed along with erosion sediment control blankets overtop to stabilize the slope. All exposed areas will be covered with erosion control blankets to keep the soil in place and prevent erosion until vegetated.

2.1.7. Erosion control blankets will be fibre-based and biodegradable.

2.1.8. Sediment and erosion control measures shall be left in place by the Contractor until all areas of the work site have been stabilized.

2.1.9. Water discharge points will be fitted with flow dissipaters to prevent the erosion of materials at the discharge point.

2.1.10. Whenever possible local soil shall be stockpiled and reused as opposed to importing soil from other areas.

2.1.11. Best efforts shall be made to prepare the site for inclement weather including but not limited to: installation of additional SSEMPP infrastructure (sediment fence, ground protection, etc.) and removal of materials and equipment from environmental sensitive areas.

2.1.12. Wet weather work restrictions may be required to prevent or reduce surface run-off from site.

2.1.13. Exposed areas will be protected against rainfall/heavy flow events at the end of each work day.

2.1.14. Work may need to be suspended when there is a strong probability of a high rainfall event.

2.2. **Temporary Access Ramps, Roads and Yards Construction and Maintenance**

Access road and staging areas as required by the Scope of Work will be carried out as outlined in the Access Roads Construction and Maintenance Plan (See Appendix E).

2.2.1. Materials used in the construction of temporary project infrastructure shall not contain sulphides or other deleterious components.

2.2.2. A properly contained staging area set back at the maximum available on-site distance from the water shall be established for the storage of materials, liquid products (in a secure area on impermeable pads) and equipment.

2.2.3. Vehicle and equipment (e.g. pumps, chainsaws, etc.) re-fuelling and/or maintenance

shall be conducted off of slopes and away from the water on impermeable pads to allow for full containment of spills at a recommended minimum distance of 20 m from water. All stationary equipment and/or small power tools containing deleterious liquids shall be kept in a watertight containment that will have the bottom lined with absorbent pads. The containment unit shall be capable of holding 125% of the total volume of liquid of the equipment housed in it.

2.2.4. The Contractor will inspect and maintain temporary access roads and staging areas for safe travel within the project area and ensure that mud and dirt are not tracked onto local roads or onto waterway bed areas where practical. The Contractor will monitor and take necessary cleaning measures (i.e. water sweeping truck) when mud and/or dirt are tracked onto local roads.

2.2.5. The Contractor will de-compact/scarify soils as required to restore existing surface conditions and grades to the satisfaction of both the Departmental Representative and PCA. Grassed areas to be re-vegetated for surface restoration shall be planted by sodding as indicated on the drawings and as required by the Technical Specifications.

2.2.6. Staging areas and access roads shall not encroach on municipal roads right-of-way, except at existing entrances. Municipal approval shall be obtained for temporary entrances for site access roads.

2.2.7. Clearing of isolated trees and grubbing of isolated tree stumps outside prescribed clearing limits may be permitted to establish staging areas and temporary access with prior approval from the Departmental Representative in consultation with PCA. Soil stabilization of such hilly grubbed areas may be required if there is insufficient growing time remaining in the growing season, as per the BMP for Vegetation Removal.

2.2.8. When practical main access routes and staging areas will be restricted to roads and parking lots. If this is not possible, the use of protective covering such as wood chip/mulch lifts with geotextile mats or granular A. The protections shall be removed as part of the reclamation process.

2.3. **Clearing, Grubbing and Vegetation Protection**

Clearing and grubbing operations will be carried out as indicated in the Scope of Work and the SSEMPP. Vegetation removal will be phased such that areas will not be exposed beyond what can be protected by erosion and sediment controls.

2.3.1. Prior to the clearing & grubbing operations, the Contractor will meet with PCA and the Departmental Representative to identify and approve the areas of work. The Contractor will notify utility authorities before starting clearing and grubbing and utility locates will be conducted.

2.3.2. Grubbing will only be conducted inside the area marked out by PCA at the Ball Ave

Lot to protect the trees owned by the nearby stakeholders; trees selected for removal outside of this area will be cut and their stumps ground flush as per SSEMPP Section 2.3.16.

2.3.3. As part of the clearing to take place at the Ball Ave Lot the Contractor will arrange to have the butternut trees relocated to a place chosen by PCA. The relocation process shall be witnessed by the Departmental Representative.

2.3.4. Replantation/revegetation shall be completed as detailed in the Landscaping Plan provided by the Departmental Representative in consultation with PCA.

2.3.5. Prior to clearing & grubbing operations, the Contractor will install erosion and sediment control barriers as per OPSD 219.110 and as indicated in Appendix F. Additional sediment fencing may be required as directed by the Departmental Representative.

2.3.6. The Contractor will remove cleared and grubbed materials off site for disposal in accordance with the SSEMPP Section 2.12 below. Removal of diseased trees identified by the Departmental Representative and shall be disposed of in a manner approved by the Departmental Representative.

2.3.7. The Contractor will clear vegetation from unstable or erodible banks by hand, where possible, avoiding the use of heavy machinery.

2.3.8. Should any vegetation require chipping/mulching, the after product will be used onsite for the duration of the project to supplement erosion and sediment control methods where appropriate. Should chippings/mulch not be immediately required at site they will be transported to an approved landfill.

2.3.9. The Contractor will minimize clearing as much as practical to maintain riparian vegetation cover, tree screens and windbreaks. Where possible, the Contractor will maintain vegetated buffer at shorelines and minimize clearing near water bodies. If buffers cannot be maintained, grubbing of vegetation root mass in close proximity to shorelines and stream banks is to be avoided.

2.3.10. When practical, alteration of riparian vegetation in the right-of-way will be performed by hand. If machinery must be used, the Contractor will operate machinery on land and in a manner that minimizes disturbance to the banks of any water body.

2.3.11. The Contractor will make every effort to retain as much of the natural vegetation as reasonably possible to help ensure bank stability, control erosion and expedite re-colonization of vegetative cover.

2.3.12. All disturbed surfaces and shorelines shall be stabilized and revegetated as soon as possible after completion of the work in the immediate area. If there is insufficient (less than four (4) weeks) time remaining in the growing season, the site should be stabilized (e.g. cover exposed areas, where machinery will not be operating, with erosion control blankets to keep soil in place and prevent erosion) and vegetate in the following spring.

2.3.13. Where disturbance occurs outside approved clearing limits the Contractor will restore these areas to original conditions or as directed by the Departmental Representative.

2.3.14. Only equipment designed for vegetation removal will be used during clearing and grubbing activities.

2.3.15. When practical, large trees will be pruned rather than removed. Pruned limbs will be cut close to the trunk. Pruning will consist of a shallow undercut followed by a full top cut. This method will prevent bark from being peeled from the tree when the limb falls. Axes will not be used for pruning.

2.3.16. Trees that would require pruning on more than 50% of the limbs will be removed.

2.3.17. When removing trees, the stumps will be cut to ground level and chipped such that no pointed stumps remain.

2.3.18. Trees to remain on site during the work will be flagged as such. The roots of said trees will be protected via protective fencing. In the event that such fencing is not practical, other soil compaction prevention measures will be installed to the satisfaction of the Departmental Representative in consultation with PCA.

2.3.19. If practical, clearing should commence before or after the nesting period (April 1st to August 31st). If this is not practical the area must be inspected by a biologist to check for the presence of nests.

2.3.20. For trees damaged by the Contractor during the work:

- Where practical, the branches of the large trees should be trimmed back as the first option rather than cutting the entire tree

- Broken branches 25 mm or greater in diameter: cut back cleanly at break, or to within 10 mm of their base, if substantial portion of branch is damaged Departmental Representative will direct the remedial actions to be taken.

- Exposed roots 25 mm or larger: cut back cleanly to soil surface within five (5) calendar days of exposure.

- Damaged bark: neatly trim back to uninjured bark without causing further injury to the tree within five (5) calendar days of the damage occurring.

2.4. **Wildlife Protection**

All construction equipment and vehicles shall give right of way to wildlife, allowing wildlife to pass and proceed at a safe distance prior to construction equipment/vehicles commencing construction activities. In the event wildlife is injured during construction activities, the Contractor will notify the Departmental Representative immediately and provide details of the incident, PCA will be informed by the Departmental Representative immediately.

2.4.1. Areas of non-disturbance ("no-go zones") as identified by a PCA approved person will be avoided by all Contractor employees, vehicles and machinery.

2.4.2. Pre-stressing activities may be performed by PCA approved person prior to the start of work at site in order to encourage wildlife to relocate. The requirement of this procedure will be dependent on-site conditions.

2.4.3. As part of daily site inspection, a visual sweep of the work site will be completed to ensure no wildlife is present. This includes the discovery of tracks or trails within the work site.

2.4.4. Evidence of wildlife activity or encounters with wildlife within site limits will be reported to the Departmental Representative who will inform PCA as required.

- Wildlife encounters on site will be recorded including: Location, date and time of encounter, wildlife species (if possible), any photographs taken of the species, and condition of the animal. These records will be supplied to the Departmental Representative within 24 hours of the encounter.
- Injured or dead wildlife found on site will be immediately reported to the Departmental Representative who will inform PCA.
- Tracks or trails found within the site area will be reported to the Departmental Representative.

2.4.5. Objects and material that could entangle (wire, tubing, plastic, etc.) or be consumed by wildlife will be properly stored or disposed of as appropriate.

2.4.6. Feeding of wildlife is prohibited.

2.4.7. A site speed limit of 20 km/h will be enforced to promote safe driving and reduce the risk of hitting local wildlife.

2.4.8. The Contractor will carry out construction operations to minimize impact on fish habitat from both disturbed sediments and fill materials.

2.4.9. The Contractor will abide by the mitigation measures and best management practices outlined within DFO's online guidance materials: *Measures to Avoid Causing Harm to Fish and Fish Habitat*

2.4.10. Captured invasive species will be removed from site and disposed of as directed by the Departmental Representative in consultation with PCA.

2.4.11. Fish shall be relocated safely during dewatering operations:

- Contractor employees must be on hand with appropriate equipment to remove any stranded fish in the dewatered area. As water levels drop in the work area the Contractor shall monitor the deeper pool areas where fish are congregating. If safe to do so, Seine nets or Dip nets can be operated by Contractor employees to remove the fish. A qualified consultant may be required to remove fish with specialized equipment where conditions dictate.

- Fish shall be immediately transported to the closest open water source (fish from upstream are returned upstream and fish from downstream are returned downstream) and released. The length of time fish are out of the water shall be minimized.

- Any invasive species (such as the Round Goby) will be euthanized in ethanol and disposed of as per SSEMPP Section 2.11.

- Contact the Departmental Representative should there be any issues with fish removal.

- The Contractor shall keep a record of the quantity and species (if possible) of fish removed from the dewatered areas.

2.5. **Nesting and Migratory Bird Protection**

The Contractor shall not destroy nests of protected migratory birds. When these are encountered, the Departmental Representative will be notified. The Contractor shall take all necessary measures to seal all structural work platforms and closures against entry of birds protected under the provision of the Migratory Birds Convention Act in order to prevent their nesting within the work area.

2.6. **Protection of Species at Risk**

The Contractor shall comply with the Species at Risk Act, 2002, which provides for the protection of Species at Risk in Canada, if any Species at Risk is encountered during the Work.

2.6.1. Parks Canada has identified critical habitat for Blanding's Turtle and Eastern Musk

Turtle. In addition, two (2) Butternut Trees have been identified.

2.6.2. Sediment fencing will not contain or be attached to meshing to prevent reptiles and other small animals from becoming trapped or tangled.

2.6.3. No vegetation shall be removed without the consent of the Departmental Representative to protect nesting birds.

2.6.4. Should conditions at the work site indicate that there are unforeseen negative effects on any wildlife or their habitat all work shall cease until the Departmental Representative has been notified and the problem has been corrected to the satisfaction of the Departmental Representative. Should work-related activities have potential to negatively impact Species at Risk, the Departmental Representative will consult with the PCA Project Leader for guidelines on how to proceed.

2.6.5. If a turtle/other SAR is found within the limits of the project, it should be left alone to leave the area if possible, or the animal should be gently placed outside the construction site. Typically, animals should not be released more than 250 m from the capture site. Release sites should be near water with vegetative cover for shelter. Turtle/reptile exclusion fencing will be implemented for works extending into May as per the BIA to prevent reptiles/turtles from nesting in stockpiles or exposed earth.

2.6.6. If any other Species at Risk are observed on or near the worksite, the species must not be harmed or harassed. If the species does not leave, or cannot leave the site, the Contractor must immediately stop the works and contact the Departmental Representative who will contact the Canadian Wildlife Service and PCA.

2.6.7. Fish stranded behind turbidity curtains shall be captured and released in safe area. Fish trapped in areas to be dewatered must be captured alive and relocated outside areas to be dewatered before commencement of pumping.

2.6.8. Geotextile sediment fence without mesh surrounding stockpiles will be implemented in accordance with *Species at Risk Branch Best Practice Technical Note: Reptile and Amphibian Exclusion Fencing* as included in Appendix G.

2.6.9. The Contractor will review the Species at Risk section of the BIA with their employees and workers to ensure that Species at Risk can be identified and properly protected should an individual of said species be present at site.

2.6.10. Bat boxes shall be installed to offset the potential loss of roosts for SAR bats. These shall be installed under direction of the Departmental Representative. The quantity and locations to be determined based on-site conditions.

2.7. **Habitat Protection (Aquatic and Terrestrial)**

The Contractor shall make every effort to protect the aquatic/fish habitat adjacent to and contained within the work area. These efforts include but are not limited to:

2.7.1. Should conditions at the work site indicate that there are unforeseen negative impacts to fish or their habitat, all work shall cease until the problem has been corrected and/or the Departmental Representative and PCA consulted.

2.7.2. Prior to commencement of work, access points and work areas are to be inspected for any nests or dens and the Contractor is to avoid disturbing any that may be found.

2.7.3. The Contractor will conduct an orientation session with the workers and subcontractors to advise of invasive species potentially present within the work site areas including, but not limited to the following:

- Purple Loosestrife: http://www.invadingspecies.com/purple-loosestrife/
- Round Goby: http://www.invadingspecies.com/round-goby/
- Rusty Crayfish: http://www.invadingspecies.com/rusty-crayfish/
- Tatarian Honeysuckle: http://www.invadingspecies.com/invasive-honeysuckles/
- Water Soldier: http://www.invadingspecies.com/water-soldier/
- Wild Parsnip: http://www.invadingspecies.com/wild-parsnip/
- Yellow Iris: http://www.invadingspecies.com/yellow-iris/
- Zebra Muscle: http://www.invadingspecies.com/zebra-quagga-mussels/

2.7.4. The Contractor will conduct a site assessment for invasive species plant infestations prior to carrying out field activities to prevent transport of invasive species, particularly if barges are present on site.

2.7.5. Any equipment or vehicles which are to be used in water should be thoroughly cleaned, before and after use, of any visible mud, vegetation, mussels, etc. Should an invasive species be encountered (or at least suspected), a photo and report of the specimen should be sent to the Departmental Representative who will contact PCA and the Invading Species Hotline at 1-800-563- 7711 or online at EDDMapS Ontario, https://www.eddmaps.org/ontario/

2.7.6. Equipment entering or leaving the waterway will be drained of standing water, cleaned at minimum 20 m away from the waterway with hot (>50°C), high pressure (>250 psi) water whenever possible.

2.7.7. The Contractor will follow *Ontario Clean Equipment Protocol for Industry – Inspecting and Cleaning Equipment for the Purposes of Invasive Species Prevention* when dealing with invasive species as included in Appendix G. Ontario Best Management Practices for the species identified in Section 2.8.3 will be available as required.

2.7.8. The Contractor will use weed-free material (i.e. sand, gravel, etc.) for erosion control and stabilization. Use weed free seed and confirm that seed mix to be used for re-vegetation purposes does not (potentially) contain invasive plants. Native grasses, shrubs, etc., should be planted to match existing species on site.

2.7.9. The Contractor will move only weed/contaminant-free materials into non-infested areas. Moving materials from one infested location to another within a particular zone may not cause contamination but moving materials from infested to non-infested areas could lead to the introduction and spread of invasive plants.

2.7.10. The Contractor will line ditch slopes using seeds from species native to the area and similar to pre-existing vegetation.

2.7.11. Mud/dirt and vegetation shall be cleaned off of clothing/footwear prior to arriving at site and when leaving site to prevent the transportation of invasive species.

2.7.12. Parking Areas will be restricted to the sections shown in Appendix B to prevent additional disturbance of the areas surrounding the Work and mobilization of existing invasive species.

2.8. **Prevention of Wildlife Harassment**

The Contractor shall not harass or otherwise harm any wildlife encountered during construction. The Contractor shall not block or prohibit wildlife access or other points of natural access and egress without the approval of the Departmental Representative.

2.9. **Winter Protection**

No snow will be stockpiled on temporary access roads. No chemical de-icing agents shall be used. Screened sand or road surface scarification will be used to provide traction as required.

2.9.1. Snow/ice removal shall be coordinated in such a manner as to prevent impact to nearby private properties.

2.10. **Areas of Archaeological Concerns and Archaeological Finds/Heritage Resources**

If previously undocumented archaeological and cultural resources are encountered, the Contractor shall stop all construction activities in the area (within 10 m) and inform the Departmental Representative requesting direction.

2.10.1. Technical Specifications Section 01 35 46 – Archeological and Cultural Procedures provides additional information on the nature and discovery response protocols for archaeological and cultural resources.

2.11. **Waste Management and Disposal**

Waste Management and disposal will be carried in accordance with the Contractor's Waste Reduction Workplan (Technical Specifications Section 01 74 21). The workplan will include but not be limited to the following;

2.11.1. Waste and Recycling Facilities to be utilized: Contractor to provide detailed listing of these facilities.

2.11.2. Waste and recycle material generated by the project will be disposed of as per all applicable federal, provincial and municipal regulations and guidelines.

2.11.3. Do not bury rubbish and waste materials on site.

2.11.4. Do not dispose of waste or volatile materials, such as mineral spirits, oil or thinner, into waterways, sewers or drains.

2.11.5. All waste materials should be disposed of in a legal manner at a site approved by Local Authorities.

2.11.6. Do not allow deleterious substance to enter the waterway.

2.11.7. Remove from site and dispose of all packaging materials at appropriate recycling facilities.

2.11.8. Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with the Waste Management Plan.

2.11.9. Divert unused metal materials from landfill to metal recycling facilities as approved by the Departmental Representative.

2.11.10. Fold up metal banding, flatten and place in designated area for recycling.

2.11.11. Divert unused concrete materials from landfill to a local quarry approved by the Departmental Representative.

2.11.12. Divert unused admixtures and additive materials from landfill to official hazardous material collections site as approved by the Departmental Representative.

2.11.13. Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose a health or environmental hazard.

2.11.14. Prevent admixtures and additive materials from entering drinking water supplies or

streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

2.11.15. Remove recycling containers to appropriate facilities.

2.11.16. Provide appropriate areas on the site where concrete trucks can be safely washed.

2.11.17. Store and Dispose of hazardous materials and designated substances in accordance with Ontario Regulation 347/90.

2.12. **Surface and Ground Water**

The primary objective of the dewatering and water management effort is for the Contractor to isolate all work from the waterbodies and effectively manage any water that enters or reenters the watercourse. All water released or reintroduced to a waterbody during the work shall be monitored and controlled and released water shall meet the standards included in the Erosion and Sediment Control Plan (Appendix D).

2.12.1. The Contractor will grade or otherwise prepare the Ball Ave Lot so that any surface run off present will be intercepted or otherwise prevented from entering nearby private properties.

2.12.2. The work shall be planned such that the water levels upstream and downstream of the project remain seasonally unchanged.

2.12.3. Only clean material free of fine particulate matter and non-acid bearing or metal leaching rock shall be placed directly in water. Use of limestone aggregate is to be avoided if practical.

2.12.4. Dirty water will be filtered by means of an appropriately designed water management facility that will be constantly monitored for its effectiveness. Discharge of pumped water shall be performed in a manner that does not cause additional erosion at the point of discharge. Sediment settling devices shall be adequately designed to compensate for variable flows arising from initial dewatering, maintenance dewatering, weather events and/or spring snow melts.

2.12.5. Turbidity curtains will be deployed as close as possible to the work area and will be weighted on the bottom to form a continuous seal on the water course or lake bed with adequate floatation at the water surface to prevent overspills of turbid water.

2.12.6. The Contractor will ensure edges of turbidity curtains are tight to the shorelines to reduce the risk of turbid water and sediment escaping. Turbidity curtains shall be installed beginning at the shoreline or cofferdam and moved into the desired location in such a manner as to ensure fish are not trapped behind the curtain. The Contractor will also monitor and

maintain the turbidity curtain both during and outside normal working shifts daily and identify if any fishes are trapped behind the curtain. The coordination of the removal of any fish so trapped is the responsibility of the Contractor.

2.12.7. Areas contained by turbidity curtains will not be used as receiving or settling areas for Brown Water originating from dewatering activities.

2.12.8. During freezing conditions, an excavator shall be used to break ice in and around the turbidity curtain area if required.

2.12.9. Submersible pumps (2" - 6") utilizing a fish screen meeting *DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines* (http://www.dfo-mpo.gc.ca/Library/223669.pdf) on each piece of pumping equipment will be used for maintenance dewatering. Sumps shall be placed at the low point of a given work site or area and installed above the invert of the waterway or sump with the use of sand bags. If there is high turbidity, pre-filtering of inflow water may involve a perforated drum or culvert with clear stone around the outside of the pump (or other similarly effective approach) to restrict the volume of sediment being pumped.

2.12.10. The Contractor shall carry out its construction operations so as to minimize impact on fish habitat and fish from both dewatering activities, fill placements and sedimentation. The Contractor will abide by mitigation measures and best management practices outlined within DFO's online guidance materials entitled *Measures to Avoid Causing Harm to Fish and Fish Habitat*. Fish endangered by dewatering activities shall be relocated safely as described in the SSEMPP.

2.12.11. As water levels drop in the work area the contractor shall monitor the deeper pool areas where fish are congregating and advise the Departmental Representative and PCA. The Contractor shall contact the Departmental Representative should there be any issues with fish or if fish removal is required. The Departmental Representative is to contact and inform PCA, but the Contractor shall coordinate any and all fish rescue activities.

2.12.12. All in-water work must be completed between July 15 to March 15 to protect fish populations during their spawning and nursery periods. Should emergency work be required beyond this date, additional mitigation measures may be required based on site specific characteristics. In water work will not proceed beyond March 15 unless approval from the Departmental Representative and PCA has been received well in advance of March 15.

2.12.13. Upon completion of work and prior to watering up dewatered areas, all debris shall be completely removed, and the dewatered area restored to the satisfaction of the Departmental Representative.

2.12.14. Watering up of the worksite will follow the Departmental Representative's prepared checklist of activities which will reflect the following considerations, among others:

- All construction material/debris is removed from area to be watered up.
- Any excess sediment deposits have been removed and capped with clean washed rock if appropriate.
- Fish timing windows for in-water work still apply.
- Sediment control measures and exclusion fencing has been removed and in a manner that has prevented the escape or re-suspension of sediments.

2.13. **Cofferdam Installation, Maintenance and Removal:**

The cofferdams used to isolate the dam during the works will be installed with the goal of minimal environmental impact. It is required that sediment and other by-products of the works in the area are not allowed to enter the watercourse. The preferred location for these structures will be detailed in Appendix B once the design is completed.

2.13.1. The window for the installation of the downstream cofferdam will be July 15th to March 15th.

2.13.2. Installation of the cofferdam shall be executed such that all drilling water and rock cuttings from installation operations can be effectively captured and removed from the watercourse.

2.13.3. The drilling system used for the works will be self-contained such that water containing cuttings will be transferred directly from the drilled hole during drilling to a staging/storage container before being sent to the Water Treatment Facility to be treated as Brown Water before returning this water to the watercourse.

2.13.4. During installation of the cofferdam or trestle the drill used for installation shall be configured in such a way that prevents the “blow-out” or discharge of cuttings into the waterway. All cuttings shall be captured and contained in a manner that satisfies SSEMPP Sections 2.14.2 and 2.14.3.

2.13.5. The areas inside the cofferdams bins walls and under the trestles shall be restored to the satisfaction of the Departmental Representative. If required, these areas will be capped with clean rock to mitigate turbidity.

2.13.6. Cofferdams will be designed by a professional engineer licensed in the Province of Ontario who is experienced in cofferdam design and construction means, methods and sequencing. The cofferdam shall be constructed in strict accordance with the design.

2.13.7. The downstream cofferdam will be installed with special attention to the identified downstream fish spawning area. Care shall be taken to ensure no sediment or debris are introduced to this area.

2.13.8. Once flows through the existing dam have been reduced to a single sluice, a turbidity curtain will be installed downstream of the dam prior to cofferdam installation.

2.13.9. All portions of the cofferdams will be removed from the water course when works are completed with special attention taken to ensure no debris is left or enters the waterway.

2.13.10. Once the cofferdams are in place they will be consistently monitored for leaks and damage.

2.13.11. Any proposed changes to the planned/accepted footprint or design of the cofferdam will be submitted to the Departmental Representative and PCA for review.

2.13.12. Changes to the accepted design of the cofferdam dewatering system or dewatering procedures due to unforeseen conditions or developments will be immediately communicated to the Departmental Representative and PCA.

2.14. **Concrete Placement and Curing:**

Concrete is alkaline and highly toxic to aquatic life. The Contractor will take all measures necessary, including but not limited to the stipulations below and the applicable other sections of the SSEMPP to prevent the introduction of concrete/ concrete leachate or wash water to the water way.

2.14.1. Newly poured concrete shall be completely isolated from fish bearing water for a minimum of 48 hours or until sufficiently cured to allow the pH to reach acceptable levels as described in Appendix D.

2.14.2. Additional mitigations will be in effect during any tremie pours

- Tremie placement techniques shall only be considered when such a methodology is the only practical means to the desired outcome.
- Isolate the area with an impenetrable material specifically designed for concrete containment.
- Any forms used during the pour will be evaluated to ensure a tight seal prior to the initiation of the pour.
- A CO^2 bubbler system will used to control the pH of any water that has contact with concrete and will be in place and functional at the Water Treatment Facility prior to any and all concrete pours. The CO^2 system will be primed to function immediately

when required and Contractor employees on site will be trained on the usage of the system.

- Ensure a static head is present in the area of the proposed tremie pour to prevent washout of green concrete.

3.0 Equipment Refueling, Maintenance and Washing

All equipment will be cleaned of any excess surface oil, grease and dirt prior to their arrival on site. Equipment will be kept in good working order and whenever possible use biodegradable oil/hydraulic fluids. Equipment with any leaks will stop work until they are repaired. Each piece of equipment will have its own emergency spill kit. In addition, a spill kit capable of containing large spills (minimum 45 gallons) will be located at the work area access point(s) on the shore in a secure and visible location. The spill kit shall be replenished as required. If items in the spill kit have been used, the "incident" requiring their use shall be reported to the Departmental Representative regardless if it is reportable to the Spill Action Line under the Spill Response Plan and Incident Reporting protocols (Appendix C).

The Contractor will provide a list of equipment and fuel storage devices to be used on site. The Departmental Representative will access and confirm that the Contractor's quantity and capability of spill kits on site is satisfactory.

Designated areas will be established to allow concrete trucks to wash out after unloading and discharge their contents no closer than 20 meters from watercourse or wetland areas. The concrete sediments will also be collected and disposed of at an approved waste handling facility.

Refueling of mobile equipment and trucks will be done no closer than 20 meters from a watercourse or wetland area within a designated, flat area and optimally one of low environmental sensitivity. The operator of the equipment must be present and able to witness that the tank is not overfilled. Third party fuel trucks are to have emergency spill kits on board.

Designated refueling stations will be constructed with impermeable containment using berms, booms and liners to capture and contain any spills or drippings from fuel nozzles. Refueling stations will be supplemented with drip trays to be used during refueling activities to provide an additional barrier between spills and the environment. Drip trays will be monitored for snow/ice/water accumulation and emptied accordingly to ensure the tray has capacity to function if required.

Designated refueling stations will have containment appropriate to capture a volume equal to 125% of the fuel source container. Monitoring for snow/ice/water accumulation will be required to retain the 125% capacity.

Immobile equipment and equipment in proximity to water will be refueled using small volume fuel cubes whenever possible.

Fuel trucks shall not be permitted on the cofferdam or within de-watered areas.

No hazardous or deleterious substances shall be deposited in any watercourse or wetland area.

4.0 Environmental Spill Response

See Appendix C for the Spill Response Plan and Incident Reporting.

5.0 Fire Protection Contingency

There will be no burning of materials on the site. Construction debris will be picked up and placed in designated, well maintained and appearing well maintained garbage bins.

In the event of a fire, the Contractor will notify the local fire department immediately. The Contractor will have fire extinguishers on site and will attempt to put out any fires that may break out as best possible. Fire extinguishers will be located in site pickup trucks, tool cribs, on equipment and in all office trailers. These fire extinguishers are to be of type ABC 20-P5 or equivalent.

6.0 Education and Training

Prior to engaging in any work activities at the site, each Contractor will be asked by the Departmental Representative to acknowledge and agree in writing that they understand and will adhere to the contents of the SSEMPP

During the initial weekly project meeting the Departmental Representative will review the SSEMPP with the site staff of the Contractor. This meeting will be held prior to the commencement of construction in the work site. All field staff joining the project once underway will review this plan as part of their site orientation.

Prior to the start of their employment on the project, each worker will review the SSEMPP with an informed member of the the Contractor's site staff. During this review employees will be informed of their obligations with respect to Species at Risk on site, spills and the Spill Response Plan and Incident Reporting as well as site specific environmental objectives and work impacts. Any required training of employees in these matters shall be provided by the Contractor.

Continuous training will be carried out during the work as required. The Contractor is responsible for coordinating this environmental training and ensuring all employees are aware of their obligations under the SSEMPP.

A hard copy of the most recent revision of the SSEMPP must be available in the Contractor's site construction trailer and all other locations where workers gather.

7.0 Inspection and Monitoring

As part of the SSEMPP, the Contractor will assign qualified personnel (Site Superintendent, Foremen and/or Lead Hands) to the daily inspection of environment related risk items and protection/mitigation infrastructure.

The Contractor will encourage all employees to carefully monitor their own adherence and that of crew members to the SSEMPP and advise the Contractor's management if any worker is working outside of the explicit or implicit intent of the SSEMPP in a manner that may cause damage to the environment in any way.

The Departmental Representative will be reviewing on a continuing basis the Contractor's conformance with the SSEMPP. Additional reviews as required will be undertaken by the Departmental Representative prior to and after storm events to assess the suitability of the erosion control measures and to make adjustments to improve the effectiveness of the SSEMPP means, methods and infrastructure as installed.

APPENDICIES

APPENDIX A NOISE AND AIR QUALITY MANAGAMENT PLAN

APPENDIX B SITE DRAWINGS

APPENDIX C SPILL RESPONSE PLAN AND INCIDENT REPORTING

APPENDIX D EROSION AND SEDIMENT CONTROL PLAN

APPENDIX E ACCESS ROADS CONSTRUCTION AND MAINTENANCE

APPENDIX F TYPICAL DRAWINGS

APPENDIX G BEST MANAGEMENT PRACTICES FOR INVASIVE SPECIES AND SPECIES AT RISK

APPENDIX H DEWATERING PLAN

APPENDIX A
NOISE AND AIR QUALITY MANAGEMENT PLAN

Noise and Air Quality Management Plan

All public complaints regarding noise and air quality shall be referred by the Contractor to the Departmental Representative. The Contractor is expected to monitor and mitigate any public complaints in consultation with the Departmental Representative/PCA. The Contractor will require that all employees and subcontractors adhere to the following air quality principles:

- All equipment using internal combustion engines shall be maintained in such as manner as to minimize exhaust fumes (visible emission).
- Idling of equipment and vehicles is to be avoided.
- Dust material being transported is to be contained in covered haulage vehicles.
- Release of dust generated by work being completed shall be minimized via vacuum equipment or wetting, any run-off caused by wetting will be captured by sediment control ditches and treated as stated in the Erosion and Sediment Control Plan.
- Dust generated by travel on site roads shall be minimized using water or alternate approved means.
- The disposal of combustible waste materials by burning is not permitted.
- All on-site vehicles required by regulation are expected to have a Drive Clean Emissions Report in compliance with O. Reg. 361/98: Motor Vehicles under the Environmental Protection Act, R.S.O. 1990, c. E.19.

The Contractor will also ensure that all equipment and vehicles adhere to the following noise pollution reduction principles:

- All equipment must be in good operating condition, well maintained and look well maintained. Equipment shall meet the Departmental Representative's high expectations with respect to serviceability, fluid tightness and exhaust emissions.
- Exhaust systems shall function in a manner to control noise to within acceptable levels.
- Avoid causing operating loud equipment when not required (compressors and related equipment, batch plants, etc.).
- Use equipment with sound shielding or dampening when possible.
- Deploy or install sound barriers if required.

APPENDIX B
SITE DRAWINGS

EDCJV
Building things that matter

No.	Description	By	Date
3	Issued for Comments	JF	15/08/18
2	Issued for Comments	JF	26/07/18
1	Issued for Comments	JF	17/07/18
0	Issued for Comments	JF	08/06/18

Project:

Trent Severn Waterway:
Kirkfeild Bundle

Drawing:

Site A - Dam at
Lock 38 Site Plan

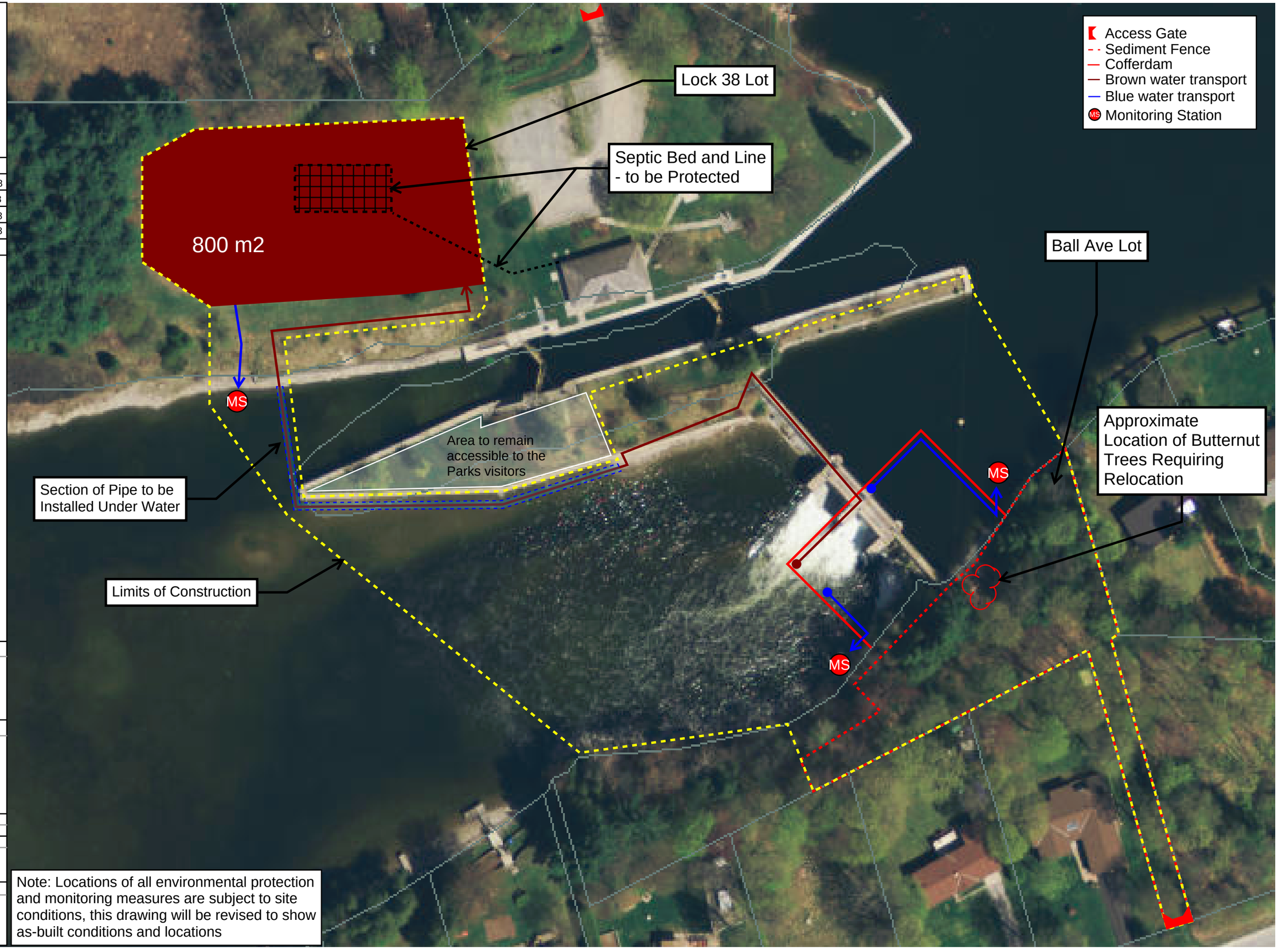
Scale:

Drawn By:

Jordan Feijoo

Project Number:

Chant: 161001
EllisDon: ED70236
PWSGC: EQ754-162678/001/PWL



Note: Locations of all environmental protection and monitoring measures are subject to site conditions, this drawing will be revised to show as-built conditions and locations

APPENDIX C
SPILL RESPONSE PLAN AND INCIDENT REPORTING

SPILL RESPONSE PLAN AND INCIDENT REPORTING

Spill response kits will be kept and maintained on site. The Contractor will ensure that all personnel on-site will be trained in the use of the spill control and response procedures, including spill source and receptor recognition, spill prevention techniques and spill reporting protocols. Spill response will be specifically identified in the Emergency Response Plan which will be posted in the Contractor site office and all temporary offices. The Contractor will ensure that adequate additional response resources (labor, equipment and materials) are available in case of a spill. Spill cleanup will be completed to federal standards and to the satisfaction of the Departmental Representative.

The Ontario Ministry of Environment and Climate Change Spills Action Center, (1-800-268-6060) shall be immediately notified of any spills occurring on site >1 L. All environmental incidents shall be reported as soon as reasonably possible to the Departmental Representative and PCA and in any event within 24 hours. A spill for the purposes of this plan includes; chemical releases, concrete spills, pH spikes over 9 and sediment plumes as indicated by high turbidity.

Spill kits will be located at the site tool storage container for each individual site in addition to the spill kits on site equipment. All workers will be made aware of the location of the spill kits. Spill kits will be immediately replenished when required by the Contractor. In the event any of the contents of a spill kit are required to be used, the incident will be immediately reported to the Departmental Representative. Any and all incidents or spill "close calls" must also be reported to the Departmental Representative. It is the responsibility of the Departmental Representative to immediately report any such incidents to PCA.

The following is the procedure and steps to be taken by any the Contractor in the event of a spill of a regulated substance on the Project:

- Use absorbent material to soak up the spill as quickly as possible.
- Place containment material in an approved containment device or structure.
- Contact the Spill Action Centre (for spills greater than 1 L at 1-800-268-6060) and notify the Departmental Representative of any spill. The Departmental Representative will contact PCA.
- Try to contain the spill from spreading by banking with earth, sand or other such materials. Avoid excavating surrounding materials for this purpose.
- Plug or stop the cause of the spill if this can be done safely.
- If the spill cannot be stopped contact the Departmental Representative directly. Employees may also contact the Spill Action Centre directly. Be prepared to tell the location, the amount and type of material spilled.
- Again, spills of any size shall be reported to the Departmental Representative who will inform PCA.

Information on regulated or hazardous materials in use on the Project including all MSDS shall be kept in hard copy in the Contractor's site office trailer. If any new regulated or hazardous substances are introduced to the Work during the Project their data sheet(s) shall be added to the MSDS Binder.

Spills and environmental incidents will be reported using Form H&S-F.11 (included below). The report is to be appended with any sample analysis taken in conjunction with the incident (ex. water or soil samples), site photos of the incident and records of communication between the Contractor(s) involved, the Departmental Representative and PCA pertaining to the incident.

Please provide as much detail as possible:

DISCOVERY OF AN ENVIRONMENTAL INCIDENT

Location:		**Time:**	**AM PM**
By Whom:		**Date:** (YY/MM/DD)	
Reported To:			
Material Spilled or Released:			
Estimated Quantity:			
Duration of Incident:			
Complete Description of Incident:			

Please provide as much detail as possible:

Immediate Cause:				
Weather Conditions:				
Time Normal Conditions Restored:	**Time:**	**AM PM**	**Date:** (YY/MM/DD)	
Additional Equipment or Agency Deployed:				
Immediate Action Taken:				
Reported to: (***i.e.*** **M.N.R., M.O.E.)**				
Time Reported:	**Time:**	**AM PM**	**Date:** (YY/MM/DD)	
By Whom:				

Name: _____

(please print)

Signature: _____

Please provide as much detail as possible:

CORRECTIVE AND PREVENTATIVE ACTIONS

Additional Corrective Actions Required: (Including responsibility for said action)	
Corrective Actions Required by:	**Date:** (YY/MM/DD)
Preventative Actions Required: (Including responsibility for said action)	
Preventative Actions Required By:	**Date:** (YY/MM/DD)

Name: _____

(please print)

Signature: _____

APPENDIX D
EROSION AND SEDIMENT CONTROL PLAN

Erosion and Sediment Control Plan

The Contractor will manage the existing stream flows and other water inflows within the construction zone and control all construction work activities to ensure there is no release of sediment or other deleterious material into waterbodies. Onsite existing drainage patterns will be maintained during construction whenever possible and only altered when absolutely required (such as in the Ball Ave Lot). The primary focus of the Contractor's environmental protection measures will be erosion control with secondary focus on sediment control; preventing the mobilization of sediment is much more effective than attempting to contain it.

The primary method of accomplishing the Project's erosion and sediment control objectives is to reduce the volume of water entering both the work site and the cofferdams. Prior to the commencement of work all planned erosion and sediment control measures will be installed and commissioned. See Appendix B for the locations of planned erosion and sediment control features.

Erosion and sediment measures will be inspected and maintained by the Contractor on a daily basis and immediately after rainfall, snow fall and other significant weather events to ensure they are functioning properly. Should erosion and sediment control measures not be functioning adequately work shall cease until the identified problem(s) is addressed to the satisfaction of the Departmental Representative. Any breaches or other failures of the erosion and sediment control features will be repaired immediately. An extra supply of sediment barrier will be kept on site for use in emergency situations.

Turbidity and pH shall be monitored and tested daily at each of the identified (see Appendix B) Monitoring Stations (Station location and quantity are subject to change depending on site conditions). Daily Readings will be recorded by the Contractor and provided to the Departmental Representative on a next day basis. Departmental Representative Staff will conduct additional monitoring as a performance check and log the results of these tests.

Control facilities shall be designed and implemented in adequate numbers and size as required to ensure that **released water quality at the point of discharge** is consistent with the following:

- Turbidity at the downstream location should not exceed the turbidity at the upstream location by more than 8 NTUs, when turbidity is below 80 NTUs at the upstream location or,

- Turbidity at the downstream location should not exceed the turbidity at the upstream location by more than 10%, when turbidity is equal to or above 80 NTUs at the upstream location.

- pH levels shall be between 6.5 and 9.0 pH units. pH adjustment measures shall be taken if pH levels change more than 1.0 pH unit measured to an accuracy of 0.2 pH units from the background level or is recorded to be below 6.0 or above 9.0 pH units. Water of pH 12.5 or higher will be treated as a hazardous waste and disposed of as such.

If elevated turbidity is observed, the Departmental Representative and PCA shall be consulted as to the requirement for additional flushing in the affected area. If no flushing is required additional mitigation measures may be instituted instead.

The location, quantity and frequency of monitoring may be altered based on final water management configurations.

A Daily Diary dedicated to erosion and sediment control facilities and readings will be maintained by the Contractor during the construction project and will be submitted daily for review by the Departmental Representative. The results of the Daily Diary will be included in in the Contractor's Daily Progress Reports. PCA will have access to monitoring records anytime upon request.

All disturbed areas of the work site shall be stabilized immediately following work and revegetated as soon as conditions allow. Exposed areas should be covered with erosion control blankets (jute mat) or other protective measures (wood chips/chippings/mulch, etc.) to keep the soil in place and prevent erosion until successfully vegetated. Erosion and sediment control features shall not be removed until after vegetation (or other permanent erosion and sediment control features or devices) has been established to the satisfaction of the Departmental Representative.

Wood chippings/mulch will be locally generated and applied evenly in a 50 mm – 75 mm layer (equivalent to 13,500 kg/ha). The effectiveness of the chipping/mulch layer shall be monitored.

Staging areas and access roads shall be kept in good condition with positive drainage to prevent the pooling of water and the development of mudded areas.

Turbidity Curtains will be installed as required (to be determined in the field based on conditions and final constructability means and methods). The functionality of the turbidity curtain will be monitored daily, and should they become dislodged or submerged they will be repaired by the Contractor accordingly and in a timely manner.

Sites will have a designated stockpiling area for native and/or imported fills, permanent or waste materials. Once these areas have been determined Appendix B shall be revised to show said locations. The onsite stockpiling locations have been assigned to areas furthest from waterbody to prevent the possibility of stockpile runoff entering the waterbody.

Geotextile sediment fence without mesh will be installed around any stockpiled materials. The locations of proposed stockpiling and staging areas in Appendix B are approximate.

A water treatment facility (WTF) shall be installed on the north bank of Lock 38 by the Contractor. The requirement for additional expansion and alterations of the WTF will be assessed based on the performance of the initial facility configuration. See Appendix H for the minimum prescriptive requirements for the water treatment facility.

APPENDIX E
ACCESS ROADS CONSTRUCTION AND MAINTENANCE PLAN

Access Roads Construction and Maintenance Plan

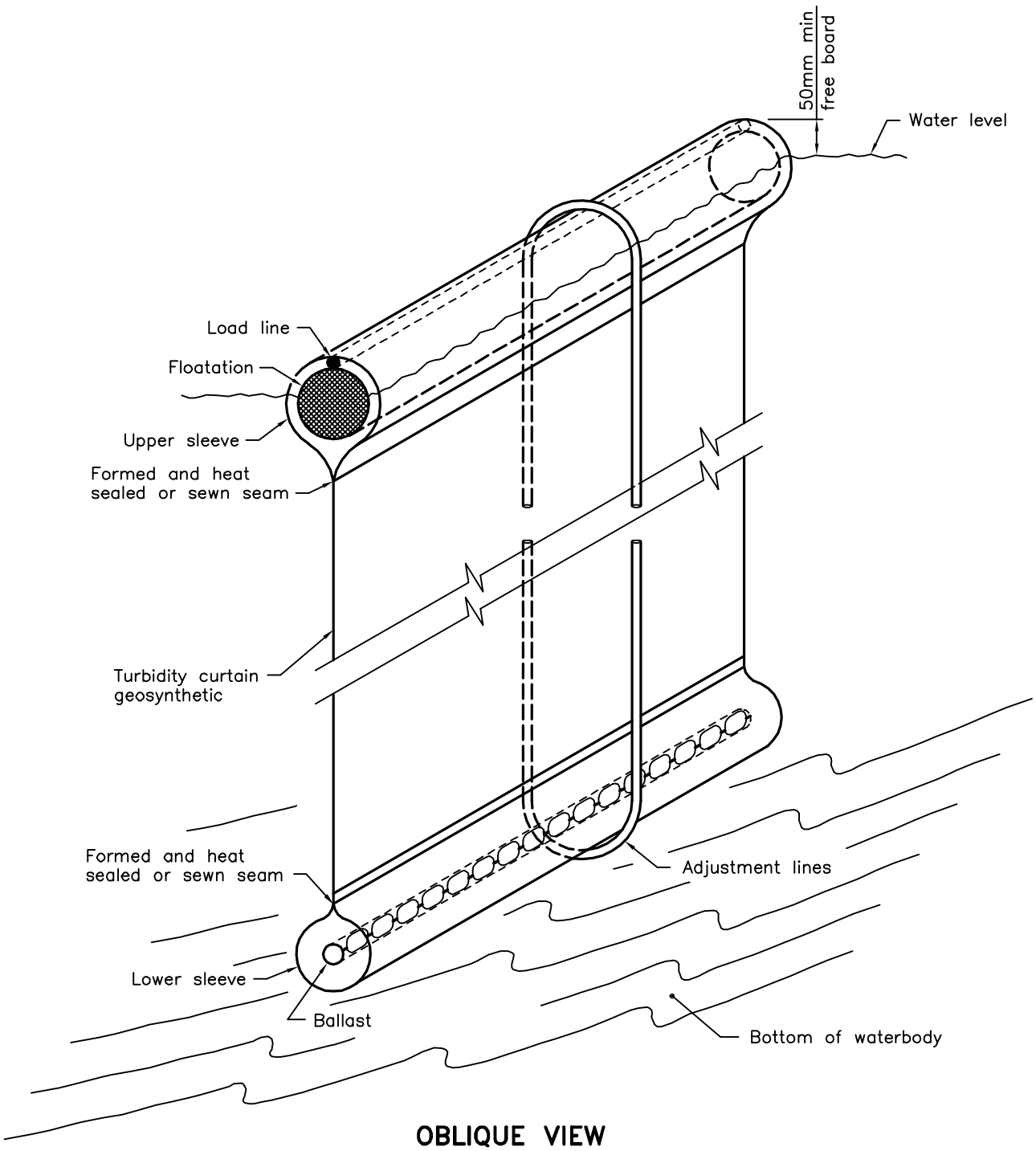
Points of access will be shown in Appendix B once the locations have been finalized. Upon completion of the Work and the removal of any temporary surface protection required for site access, areas damaged by construction processes will be repaired to an equal to or better than as-found condition through comparison to the precondition survey with topsoil and sod by the Contractor as per the Technical Specfications. Damaged hard surfaces shall be repaired to a similar equal to or better standard.

During winter time operations snow accumulation will be managed onsite by Contractor personnel. Local Roads will be monitored by Contractor personnel and cleaned of any mud tracked onto the running surfaces to the satisfaction of the Departmental Representative.

De-icing salts will not be used on the project site and instead sand will be spread, or the road surface scarified on all access roads and work areas as required. Snow containing salt or sand shall never be dumped in or allowed to melt and run off into a waterbody. Water containing sands will be captured and treated as stated in the Erosion and Sediment Control Plan.

For completeness, certain areas may be hoarded with the use of insulated tarps over timber or steel framed structures and/or rental equipment and will be heated with diesel powered frost-fighter heaters or equivalent. Non-hoarded work areas will be kept free from snow accumulation by use of equipment or by hand.

APPENDIX F
TYPICAL DRAWINGS



OBLIQUE VIEW

NOTES:

A All dimensions are in millimeters.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
TURBIDITY CURTAIN SEAM DETAIL			
	OPSD 219.261		

terrafix®
geosynthetics inc.

Product Description Sheet
Terrafix 360R
NONWOVEN ENVIROBAG

Terrafix 360R ENVIROBAGS are composed of a needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability. Terrafix 360R ENVIROBAGS resists ultraviolet deterioration, rotting, biological degradation, naturally encountered basics and acids. Polypropylene is stable within a pH range of 2 to 13. Terrafix 360
R) ENVIROBAGS conforms to the physical property values listed below:

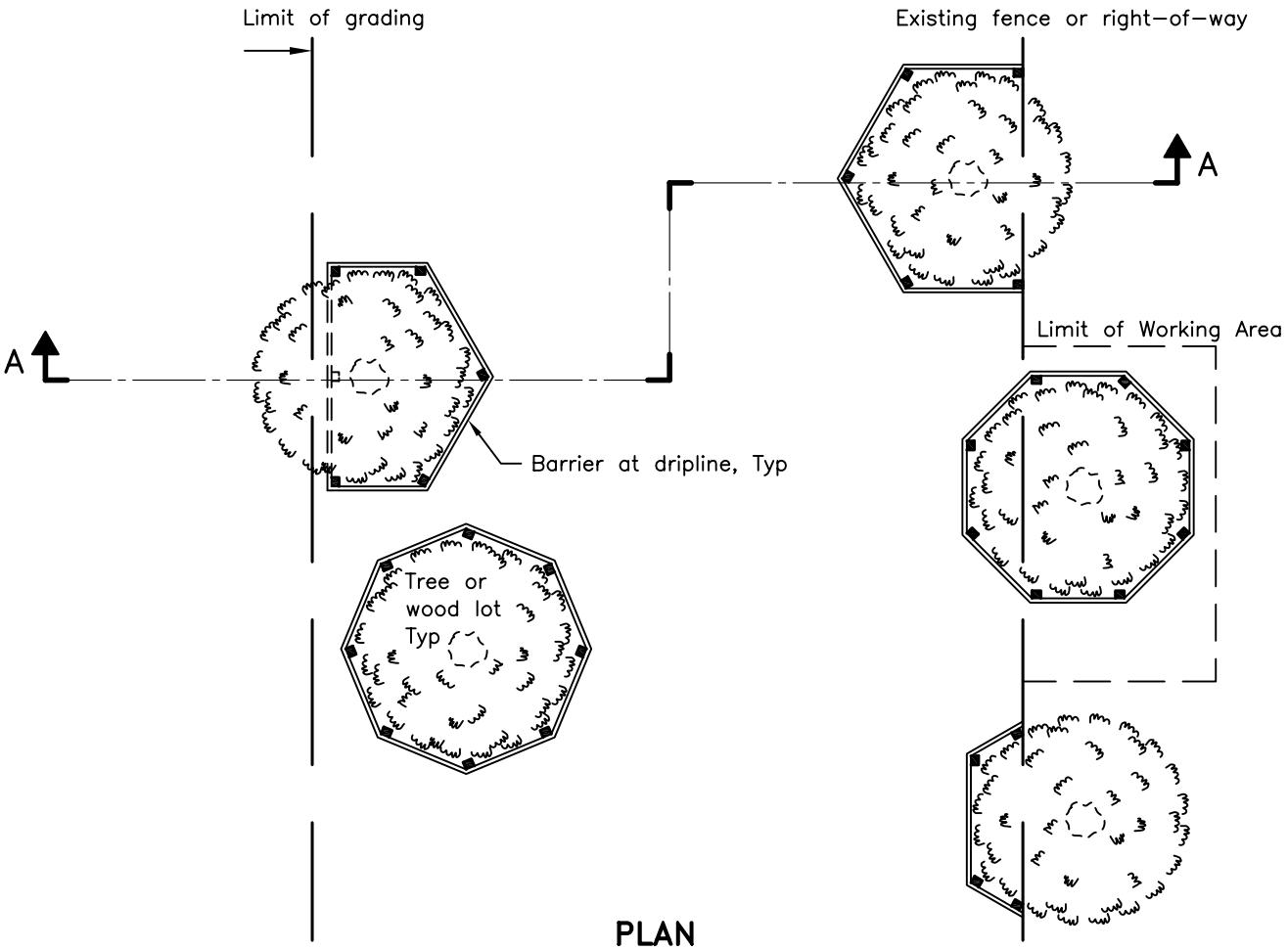
PROPERTY	TEST METHOD	UNIT	M.A.R.V. (Minimum Average Roll Value)
Weight (Typical)	ASTM D 5261	oz./yd.^{2} (g/m^2)	6.0 (203)
Grab Tensile	ASTM D 4632	lbs. (kN)	160 (0.711)
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs. (kN)	60 (0.267)
CBR Puncture Resistance	ASTM D 6241	lbs. (kN)	410 (1.82)
Permittivity*	ASTM D 4491	sec^{-1}	1.5
Water Flow*	ASTM D 4491	gpm/ft.^{2} (l/min/m^2)	110 (4480)
AOS*	ASTM D 4751	US Sieve (mm)	70 (0.212)
U.V. Resistance	ASTM D 4355	%/hrs.	70/500

* At the time of manufacturing. Handling may change these properties.

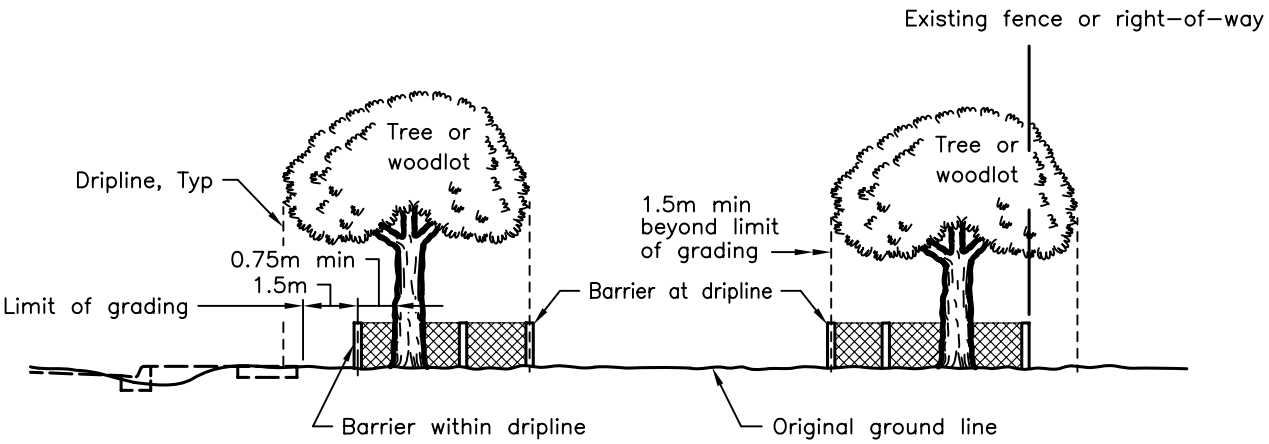
This information is provided for reference purposes only and is not intended as a warranty or guarantee. Terrafix assumes no liability in connection with the use of this information.

Terrafix Geosynthetics Inc
455 Horner Avenue
Toronto, ON
M8w 4W9,

www.terrafixgeo.com

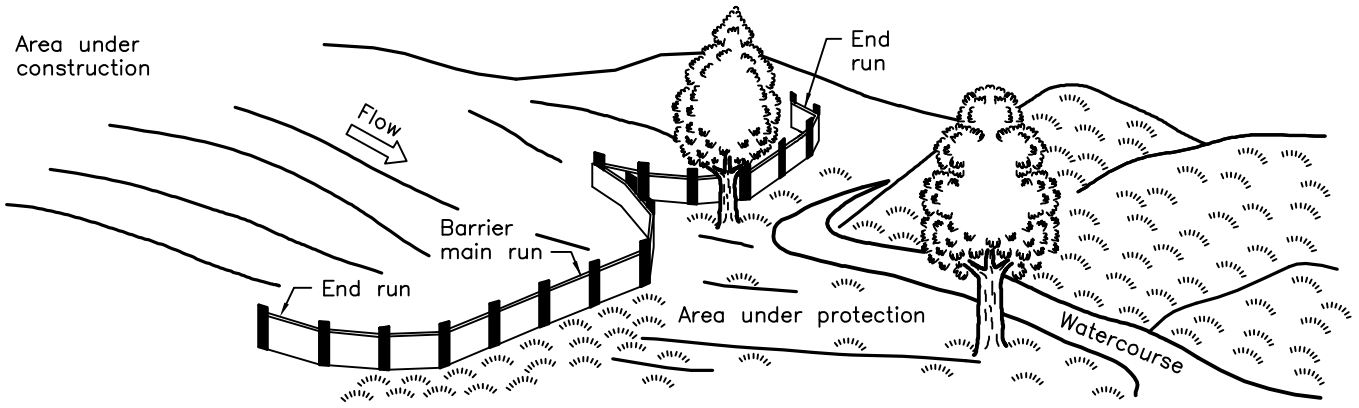


PLAN

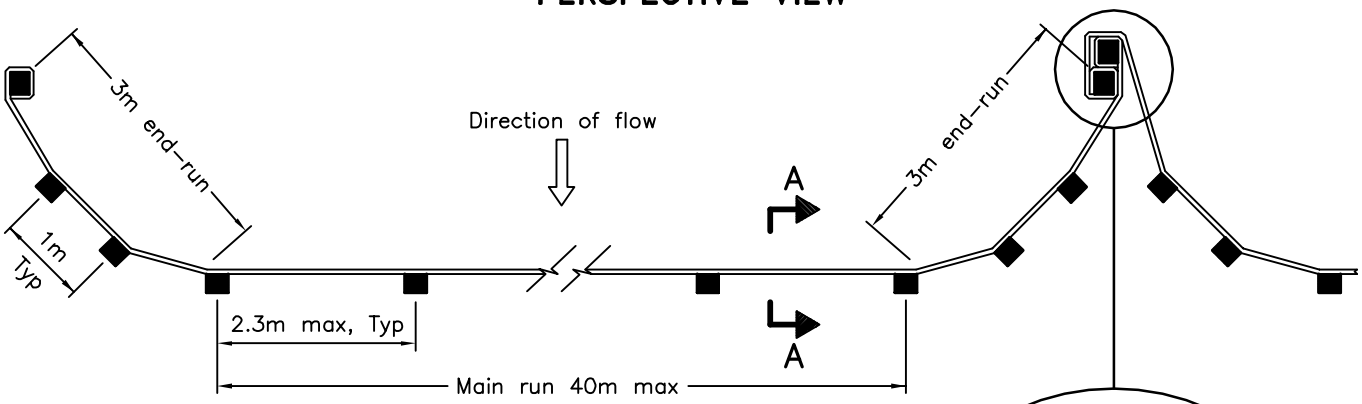


SECTION A–A

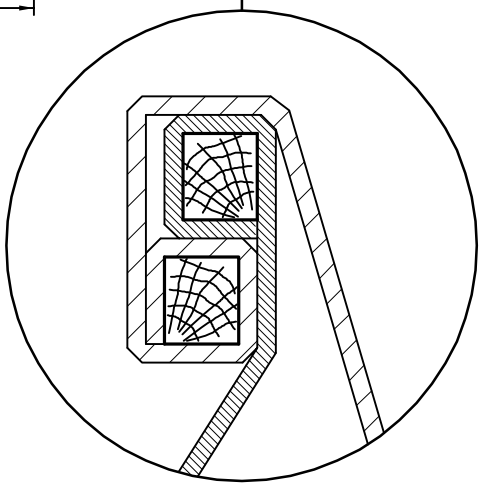
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2007	Rev	0
BARRIER FOR TREE PROTECTION			
	OPSD 220.010		



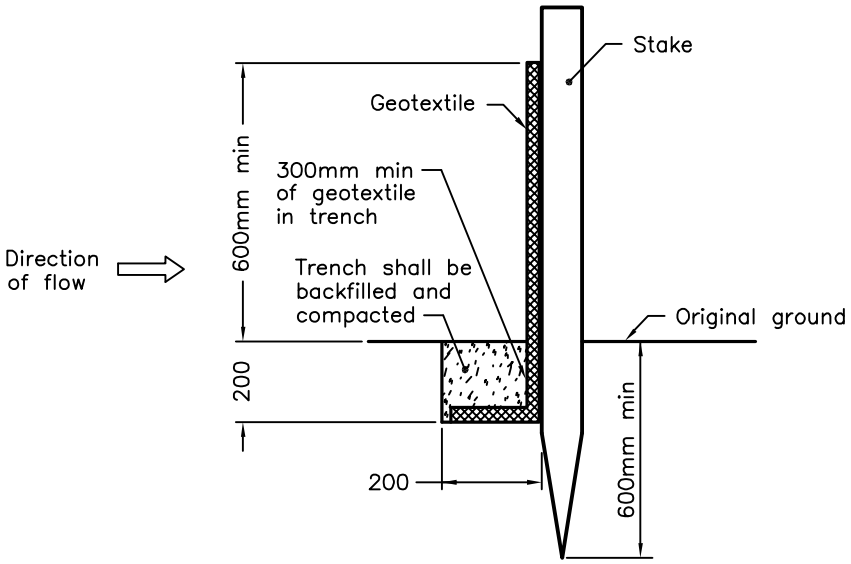
PERSPECTIVE VIEW



PLAN



JOINT DETAIL



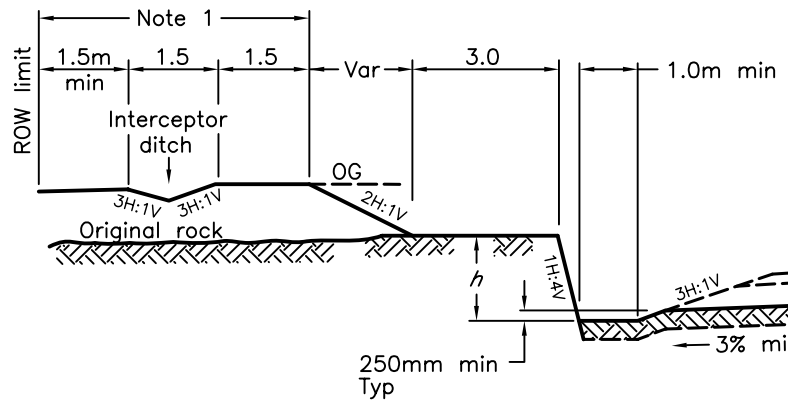
SECTION A–A

NOTE:

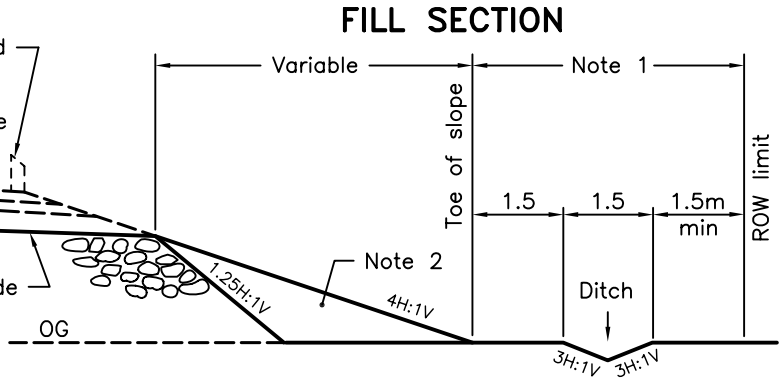
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
LIGHT-DUTY SEDIMENT FENCE BARRIER			
	OPSD 219.110		

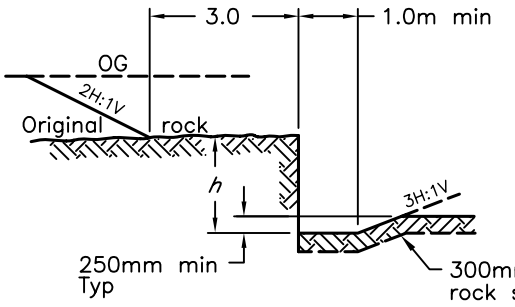
CUT SECTION



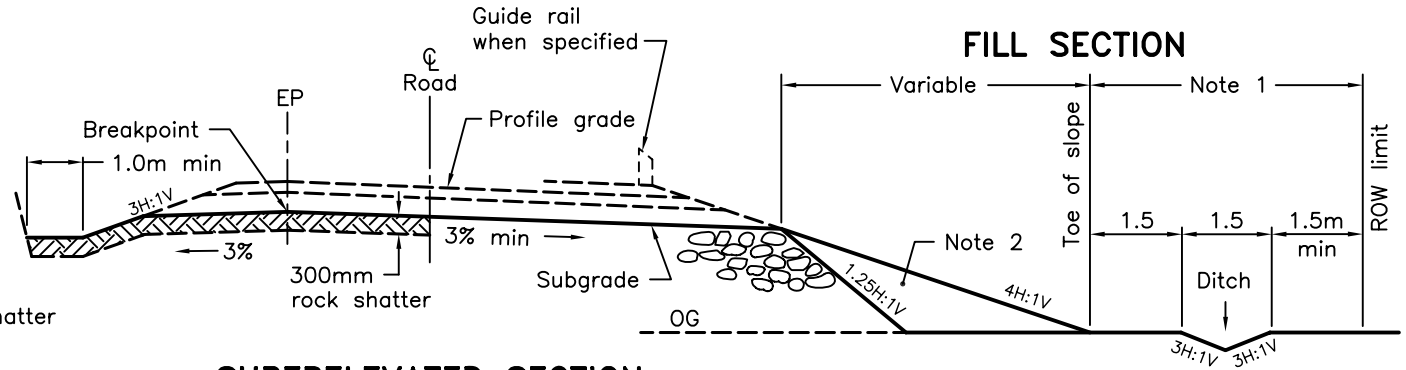
FILL SECTION



TANGENT SECTION



SUPERELEVATED SECTION



ALTERNATIVE DETAIL
WHERE SPECIFIED

NOTES:

1 Distance shall be 1.5m minimum when ditch is not required.

2 Where top of rock fill embankment is less than 2.0m above original ground, flatten slope with surplus excavated material.

A Shale shall be treated according to earth grading standards.

B This OPSD to be read in conjunction with OPSD 202.010 and OPSD 202.020.

C All dimensions are in metres unless otherwise shown.

LEGEND:

h – Height of rock face

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ROCK GRADING

UNDIVIDED RURAL

ONTARIO STANDARD MUNICIPAL – PROVINCIAL

OPSD 201.010

APPENDIX G
BEST MANAGEMENT PRACTICES FOR INVASIVE SPECIES AND SPECIES AT RISK

OMITTED DUE TO FILE SIZE RESTRICTIONS

Contains:

Clean Equipment Protocol for Industry: Inspecting and Cleaning Equipment for the Purposes of Invasive Species Prevention

Species at Risk Branch Best Practices Technical Note: Reptile and Amphibian Exclusion Fencing

Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species in Ontario

APPENDIX H
DEWATERING PLAN

Dewatering Plan

The reconstruction of the dam at Lock 38 requires a three (3) phase staged water management (diversion) and dewatering program. The Contractor shall install a dewatering system, adequate in terms of its treatment capabilities, technology and capacity to meet the requirements of the reconstruction objective and the diversion program dewatering as described in the Contract Documents.

The Contractor's amended Dewatering Plan shall describe in detail the operating philosophy of the proposed facilities and the exact nature of the dewatering infrastructure to be provided. The Plan shall include but not be limited to the supply, installation, maintenance and demobilization of the following:

- Primary and secondary power sources complete with auto transfer capabilities
- Primary and standby sumps/pumps
- Inflow response devices, triggers and alarms
- Means and methods statements for flow management and separation of Blue and Brown water under a variety of anticipated cofferdam performance and inflow scenarios
- Inflow response devices and operational philosophy
- Piping and valves to support the operational intent and flexibility of the dewatering systems
- Four season operational capability
- Systems to address the need for Surge Capacity and to treat Filter Backwash Water

Once the Upstream and Downstream bin walls, trestles and cofferdams have been installed, the contained work areas (Stage I, Stage II and Stage III as appropriate) shall be quickly drawn down to a dewatered condition using high capacity pumps. Once initially dewatered, the area shall be assessed by the Contractor as to the manageability of the steady state inflows of both Blue and Brown Water (as defined in the Technical Specifications Section 01 35 43 *Environmental Procedures*) and the appropriate adjustments made to the Dewatering Plan. Should the existing inflows be deemed manageable by the Contractor no additional cofferdam sealing effort shall be required. Should inflows be considered excessive or unmanageable additional cofferdam sealing efforts shall be immediately undertaken by the Contractor to bring the inflows to a manageable level. The Departmental Representative shall be informed as to the level of inflows being experienced, the degree to which the Contractor considers the inflows manageable and the details of the Contractors planned additional cofferdam sealing efforts, if any. Contractors are cautioned that sealing work on the exterior of the cofferdam is restricted to the in-water work windows and the use of tremie concrete at any time when not contained is not permitted.

Foundation grouting may be required. Grouting will be completed with equivalent hydrostatic head on both sides of the cofferdam meaning that the site may be of necessity be watered up prior to grouting and require additional dewatering post grouting. The Departmental Representative and PCA shall be kept informed of all dewatering activities being undertaken by the Contractor.

The Contractor's dewatering installations shall be separate for each of Blue and Brown Water. The Blue Water system is intended to discharge Blue water upstream of the Upstream Cofferdam and Downstream of the Downstream Cofferdam:

- A trench or channel will be cut or otherwise created (sandbags) within the dewatered work area immediately adjacent and parallel to the interior cofferdam toe to collect and channel Blue Water inflows entering through and/or under the toe of the cofferdam structures.

- Water so entering the dewatered area in this manner, if turbidity levels permit, will be captured in this trench or localized sumps and pumped over the cofferdams to the TSW without treatment (Blue Water).

A Brown Water collection system will be implemented to collect and manage Brown Water within the dewatered areas and transport it to the Site's Water Treatment Facility (WTF):

- A low point shall be identified near the Downstream Cofferdam outside of the Blue Water channel/trench. Brown water best collected within the area downstream of the Dam centerline will be captured and pumped across the Bin Wall/Trestle Cofferdam structure and lock to the WTF.

- A low point shall be identified near the Upstream Cofferdam outside of the Blue Water channel/trench. Brown water best collected within the area upstream of the Dam centerline will be captured and pumped across the Bin Wall/Trestle Cofferdam structure and lock to the WTF.

The Dewatering Systems to be supplied and installed by the Contractor must be designed for expected Blue and Brown Water inflows plus an additional 20% contingent capacity for Blue Water and an additional 30% for Brown Water. Both Brown and Blue Dewatering Systems will be kept maintained and appearing well maintained during active construction periods as well as during periods when the Contractor may be off-site.

All environmental best management practices and guidelines shall be followed by the Contractor during dewatering activities.

Based on experience from the Talbot Dam (Site B) dewatering process the Departmental Representative has determined that during initial mass dewatering, if properly managed by the Contractor, that stranded water may be treated as up to 75% Blue Water. During subsequent mass dewatering efforts, if any, the mass stranded water can be treated as approximately 40% Blue Water. All of these observations are based on Contractor turbidity readings. All other water quantities removed required processing through a Water Treatment Plant. It was also observed that the bottom 10% of stranded water during initial or mass dewatering can be considered as very turbid (~800 NTU) and will require significant additional measures to reduce the turbidity to release levels. The values presented herein are empirical and provided only to relate the Departmental Representative's recent experience at Site B.

The Brown Water Dewatering System described above will be connected to a Contractor designed, supplied, installed, maintained and demobilized four (4) season Water Treatment Facility (WTF). The objective of the WTF is to reduce turbidity levels and balance the pH of managed (pumped) Brown Waters to within the limits set out in Appendix D prior to release into waterbodies. To assist in the design of the WTF, the Contractor shall complete a particle size analysis on the sediment in the

dewatered areas by sampling the turbid water generated or bottom sediments recovered during cofferdam installation. A sediment analysis from the Site B works downstream of Lock 38 is shown below. This analysis may vary from the results of analysis to be completed by the Contractor for the Dam at Lock 38.

Particle Size in microns	Percentage Distribution
<0.45	51.88
0.45 - 2	30.16
2 - 5	10.40
5 -15	5.18
15 - 25	1.68
25 - 100	0.52
>100	0.17

The Water Treatment Facility shall consist of two (2) principle components: A WTP and Backwash Water and Surge Management Facility. The final orientation, size and location of these two principle features of the WTF and related dewatering system components will be ultimately determined by field conditions and will be reflected in additional information to be added to this Appendix by the Contractor once the anticipated site conditions and final design of the WTF have been confirmed.

The WTF shall include the following:

1. A Water Treatment Plant (WTP) located in the field area immediately adjacent the existing Lock Master's Station at Lock 38. The plant shall provide enough treatment capacity to address a minimum of 1200 USGPM of Brown Water with moderate turbidity (200 +/- NTU) using sand/bag filters and flocculent/coagulant. The capability of adding CO^2 as a means of compensating for pH levels shall be included. Four (4) season operation is required. The WTP shall have its own primary and backup power supply for the flocculent/coagulant, CO^2, winter air bubbler systems, lighting and to power backwashing and miscellaneous small circulation/mixing pumps as required.

   The WTP shall be fully enclosed and heated for efficient operation during the winter months.

   The associated piping system will be capable of having some or all (adjustable flow splitting rates) of the Brown Water bypass the plant itself (capable of sending some flow to the Surge Management facility – see below).

   The major components of WTP shall include but are not limited to:

   a. Sand/Bag Filters capable of filtering the smallest size of particle or at a minimum 80% of the total particles found by the particle size analysis
   b. A flocculent/coagulant injection system
   c. Flowmeter(s) to allow for accurate calculation of the volumes of water entering/leaving the plant

d. Storage tanks for adequate volumes of water to allow for the slow mixing of previously injected flocculant/coagulant and settling time for the amalgamated floc
e. Accessible locations for water quality sampling
f. Pumps/piping and all other miscellaneous accessories.

2. An 800 m^2 (1,000 m3 +/-) Backwash Water and Surge Facility (BWSF) located in the field to the West of the proposed WTP. The installation of this facility will require the decommissioning and removal of the existing building septic bed and pressure main shown in Appendix B. These items are to be reinstated (new) to the satisfaction of the Departmental Representative upon decommissioning and restoration of the area to be occupied by the BWSF.

   The BWSF facility will serve to:

   a. Receive, retain and make available for recirculation through the plant (after time) the Filter Backwash Water (one appropriately sized containment cell with baffles), and

   b. Stage high flows with the large volumes of turbid water associated with the initial dewatering of Stage II and Stage III Diversion (a minimum of three (3) larger cells). Ultimately, turbid water will be drawn from the Surge Facility and treated through the WTP at manageable flow rates and as time permits.