Appendix G DFO-Enbridge Gas Generic Watercourse Crossing Drawings

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Generic Sediment Control Plan – Horizontal Directional Drill

This Plan is applicable to Enbridge Gas Inc. (EGI) workers and Contractors involved in HDD activities. It establishes best management practices to prevent and/or mitigate an unauthorized death of fish or harmful alteration, disruption or destruction (HADD) of fish and fish habitat or the impairment of water quality from an inadvertent release of drilling fluid or sedimentation in the vicinity of, or beneath, watercourses. **NOTE:** There is a Duty to Notify and Duty to Take Corrective Measures to report death of fish or a HADD of fish habitat to DFO.

Drilling fluid is typically composed of bentonite clay-water mixture, which is considered non-toxic/hazardous, however, if it is released to a watercourse, there is the potential for the drilling fluid to adversely impact fish and invertebrates. EGI recognizes the need to protect downstream water users, as well as aquatic species and their habitat, from sedimentation. As such, extensive planning prior to, and constant vigilance during, construction operations are essential.

Conditions for use

- Work is taking place outside of Critical Habitat including any identified riparian areas
- Work is taking place at least 30m from any watercourse that has aquatic species at risk
- Work is taking place at least 15m from any watercourse

Planning and Pre-Construction

The following precautionary measures should be implemented to minimize the risk of an inadvertent release or sedimentation during HDD activities:

- Select a pipeline route to minimize the number of watercourse crossings;
- If possible, schedule HDD activities during low flow times;
- Ensure watercourse crossing permits and approvals are obtained, reviewed and remain on-site throughout the duration of the project;
- Where necessary, EGI will notify the required regulatory authorities (i.e. Conservation Authority) prior to the watercourse crossing;
- Ensure that all construction personnel are aware of this contingency plan prior to the commencement of drilling activity;
- Conduct a feasibility assessment (i.e. geotechnical assessment) to assess the suitability of subsurface conditions (if required);
- Maximize distance of HDD entry and exit points from the watercourse and ensure they are at least 10 m from a watercourse if aquatic species at risk are not present in 30 m if present; and
- Maximize depth of the drill path beneath the watercourse.

Construction Mitigation Measures

The steps and precautions that follow should be completed when conducting HDD activities beneath, or in the vicinity of, a watercourse:

- Clearly flag the expected drill path prior to commencing any drilling operations, to facilitate monitoring for potential drilling fluid releases.
- Assign personnel to monitor the drill path for inadvertent returns of drilling fluid or sedimentation.
- Fluid volumes, annular pressure and cutting returns will be continuously monitored to ensure potential drilling fluid losses are detected and addressed immediately. Dedicated personnel should be assigned to continuously monitor drilling pressure and fluid volumes.
- Ensure an approved spill kit is on site and readily available, as per the Spill Response Procedure.
- Sediment control measures (i.e. silt fencing, SiltSoxx™, etc.) should be set-up prior to initiating HDD operations to contain potential releases of drilling fluid, sediment-laden groundwater or run-off along the proposed drill path. Sediment control measures shall be installed:
- Around entry and exit pits;
- Around drilling fluid containment pits;
- Surrounding spoil piles;
- Between all HDD operations and watercourse as identified on this drawing;
- Over-excavate the entry and exit pits to create drilling fluid sump pits;
- Drilling fluid must be contained in entry and exit pits (sump pits) and as they are filled, drilling fluids should be promptly removed and/or removed at the completion of HDD operations at an approved location;
- All vehicles, machinery and other equipment shall not enter the water. There must be no fording of any watercourse;
- If possible, refueling of equipment should not occur within a minimum of 30 m from a watercourse, however, if required, secondary containment must be used around the refuelling area to prevent entry into the watercourse; and
- If necessary, ensure dewatering occurs through a 'sediment-bag' and utilizes other erosion and sediment control (ESC) measures, as required, and is released greater than 30 m from the top-of-bank into a vegetated area.

During HDD operations, workers should keep enough spill response material on-site and readily available to contain any inadvertent releases of drilling fluid or release of sediment-laden groundwater, including (but not limited to):

- Sandbags
- Filter cloth (i.e. silt fence)
- T-Posts
- Corrugated culverts
- Numerous 5-gallon pails
- Vacuum trucks
- Straw bales
- Snow fencing
- Sediment control lots (i.e. SiltSoxx™) or equivalent
- Polyethylene sheets
- Shovels

In addition to the above, for larger watercourse crossings, the following materials should also be kept on-site:

- Turbidity curtains
- Floating sediment boom
- Trash pumps complete with sufficient lengths of leak-free hose, suction heads, and fish screens

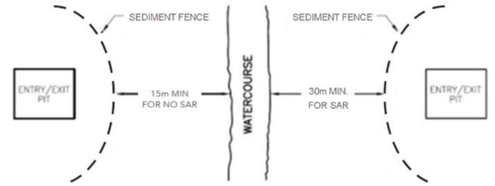
Contingency Plan for Inadvertent Release

Bank and Riparian Zone Areas

The steps that follow should be completed when pipeline installation by HDD is occurring adjacent to a watercourse bank or riparian zone and drilling fluid is identified along the drill path.

- HDD operations should stop immediately and spill containment be established using EGI's approved methods including, but not limited to:
- Straw bales and sediment control fencing;
- Sandbags and polyethylene sheets;
- Containment pits, rings and/or absorbent booms;
- Vacuum trucks; and,
- Site re-grading (berms).
- The EGI Supervisor and Environmental Inspector (if applicable) must be notified of the inadvertent release of drilling fluid or sedimentation.
- The EGI Supervisor must follow the reporting requirements outlined in the Spill Response Procedure and at a minimum, contact, the Environmental Advisor at **1-855-336-2056** to ensure regulatory reporting requirements are met and to ensure clean-up operations are completed.
- If in doubt, report the spill. At a minimum, the following information will be required when reporting to the Environmental Advisor:
  1. Date and time of spill
  2. How the spill occurred
  3. Location of spill
  4. Type of material spilled
  5. Volume of material spilled
  6. Any impacts from the spill
  7. Immediate spill response actions
  8. Photographs
- Contact an approved environmental consultant to support spill cleanup and restoration, if deemed necessary based on the extent and impacts of the release.
- Workers including the EGI Inspector, Environmental Advisor and Contractor and Environmental Inspector (if used) should check for the root cause of release and identify potential solutions including (but not limited to):
- Reducing the pressure of slurry flow (i.e. excavate pressure relief pits);
- Reducing the speed of drill rotation;
- Reducing the speed of drill rod advancement;
- Moving the drill location (laterally, depth, etc.); and,
- Utilizing water to replace the bentonite drilling fluid, if site conditions allow.
- Any substantial deviation (i.e. installation method, crossing location/depth) from approved pipeline construction drawings must be resubmitted to the respective regulatory agencies (i.e. Conservation Authority) prior to resuming work.
- Residual drilling fluid must be removed by shovel or vacuum truck. Clean-up activities must minimize further disruption to the bank and riparian zone area.
- Any damage must be repaired, such as settlement and/or heaving.
- HDD activities may resume when preventative actions have been implemented and all parties are satisfied with the approach (i.e. EGI Supervisor, Environmental Advisor, Environmental Inspector and regulatory authorities [if involved]).

Minimum Horizontal Directional Drill Setback and Depth



PLAN

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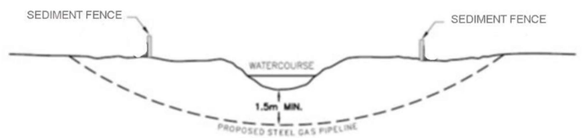
- SEDIMENT FENCE TO BE SET UP A MINIMUM OF 15m FROM A NO SPECIES AT RISK WATERCOURSE AND 30m FOR A SPECIES AT RISK WATERCOURSE.
- HORIZONTAL DIRECTIONAL DRILL TO BE SET UP BEHIND SEDIMENT FENCE.
- MINIMUM OF 1.5m COVER FROM TOP OF PIPE TO BED OF WATERCOURSE.
- ALL DISTURBED AREAS TO BE RESTORED TO PRE-CONSTRUCTION CONDITIONS OR AS CLOSE AS POSSIBLE.



PROFILE

Watercourses

In addition to the above steps and precautions for bank and riparian zone areas, the following should be completed when pipeline installation by HDD is occurring beneath a watercourse and drilling fluid is identified or suspected in the watercourse itself:

- Where leakage of drilling fluids is suspected in a watercourse (i.e. sediment plume) operations should stop immediately and a visual inspection be conducted to verify the presence and extent. All necessary steps should be taken to minimize the impacts.
- Containment and clean-up activities must be initiated as soon as possible, where appropriate.
- Where the release is small with no visible sediment plume it should be allowed to dissipate naturally. Clean-up efforts within the watercourse may potentially be disruptive and cause further suspension of sediment in the water column than if the release were left to dissipate.
- Where the release is large with a visible sediment plume extending beyond the drilling site, the Environmental Advisor must be contacted to retain an environmental consultant to monitor the turbidity levels of the plume and associated potential impacts. In addition, the location of the inadvertent release should be isolated from the watercourse by installing a cofferdam or other containment system by utilizing the following materials:
  - Sandbags and polyethylene sheets;
  - Siltsoxx™, filter cloth (silt fence), straw bales;
  - Corrugated culverts; and/or,
  - Turbidity curtains.
  - The following materials can be used to control and clean up the release:
  - Shovels and 5-gallon pails (if conditions are dry)
  - Trash pumps with hose, suction head and fish screens; and/or
  - Vacuum trucks.
- If subsequent drilling attempts result in additional inadvertent returns of drilling fluid, the crossing should be halted, the Supervisor contact the Environment Department at **1-855-336-2056** and refer to the Contingency Plan for Installation Alternatives below.

Contingency Plan for Installation Alternatives

If EGI is unable to use HDD methodology to install the pipeline even with the mitigation implemented above, construction activities must be suspended, and the Environmental and/or Permit Advisor must be contacted to discuss alternate crossing methods. Any changes to the permitted crossing method may require permit amendments or government agency approval.

EGI should consider the following (from most to least preferred):

- Further geotechnical investigations to revise the pipeline alignment or depth
- Implement another crossing method as outlined in the Enbridge Gas Inc. and Department of Fisheries and Oceans Agreement Related to Watercourse Crossings for Pipeline Construction and Maintenance in Ontario (EGI DFO Agreement)
- Implement another crossing method such as a Non-Isolated Trench/Wet Open Cut method (work area is not isolated from flowing water)

Once the crossing method is reviewed by all internal parties and has been revised, the revised crossing method must be resubmitted for review and approval to the respective regulatory agencies (i.e. Conservation Authority, DFO [if required]) prior to resuming work.

Death of Fish or Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD)

- If death of fish or HADD has occurred due to failure of this plan, a restoration plan should be developed and implemented by the company in consultation with and upon receipt of approval from the respected Conservation Authority and the DFO.

If a HADD occurs, notification are required as per the Contingency Plan for Inadvertent Release section above. **NOTE:** There is a Duty to Notify and Duty to Take Corrective Measures to report death of fish or a HADD to DFO.

Restoration

The following conditions should be considered when restoring any areas impacted by an inadvertent release of drilling fluid:

- Ensure the drilling exit and entry pits are cleaned of drilling fluid and the fluids are disposed of at an approved location.
- Any disturbed areas adjacent to the watercourse should be seeded, covered with erosion control matting (or equivalent) and restored as close as possible to pre-construction condition.
- All seeding and vegetation replacement will be with native species and as directed by the landowner or regulator (as required).
- If post-construction monitoring reveals erosion, remedial work will be taken as quickly as possible.
- If there is insufficient time in the growing season, the site should be stabilized (i.e. cover exposed soils with erosion control matting) and seeded the following spring.
- Maintain effective erosion and sediment controls until revegetation of disturbed areas is achieved, then remove the control measures.
- All debris and garbage shall be removed from the construction site to an approved location.

NOTES

ENBRIDGE

LOCATION

ALL HORIZONTAL DIRECTIONAL DRILL CROSSINGS IN ONTARIO

DRAWING TITLE

GENERIC SEDIMENT CONTROL PLAN HORIZONTAL DIRECTIONAL DRILL

SCALE	DATE
NTS	DECEMBER 2021
FILE No.	PROJECT No.

DRAWN	CHECKED	DRAWING	REV
GTH			0

APPROVED

Generic Sediment Control Plan - Temporary Vehicle Crossings

This plan sets out the measures that will be taken by Enbridge Gas Inc. (EGI) and its contractors to control downstream sediment to the lowest level practically achievable during the construction, use and removal of temporary vehicle water crossing at any watercourse (e.g., streams, rivers and ponds). The conditions and techniques set out on this plan are to be followed unless approved otherwise by the Department of Fisheries and Oceans (DFO).

General Measures

EGI must use materials, construction practices, mitigation techniques and monitoring of operations at every water crossing in order to prevent the unauthorized harmful alteration, disruption or destruction of fish habitat or the impairment of water quality. General measures are available at https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html. Vehicle crossings typically include temporary bridges (e.g., Bailey bridges, log stringer bridges) and winter crossings such as ice bridges and snow fills. The following requirements apply to any watercourse and areas adjacent to it:

- Temporary vehicle crossings to be in place no longer than a single restricted activity timing window.
- Use existing vehicle access across watercourses wherever possible.
- Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum needed for construction and delay grubbing to immediately prior to grading operations.
- Prior to commencing the installation of temporary vehicle crossings, local weather stations will be monitored to determine whether any precipitation is forecasted. If practical work will be delayed until weather conditions are favourable. If necessary, to proceed with work under unfavourable conditions, EGI will exercise due diligent.
- Vehicle crossing structures capable of handling anticipated high water flows during the construction period will be used. See guidelines below on sizing of water opening.
- Coarse cobbles, sandbags, geotextile liners and/or curb stringers will be used to protect culvert and ramp approach fills from erosion and to prevent sediment from entering a watercourse.
- On the approaches to vehicle crossing structures, road ditches constructed for drainage control will incorporate the necessary erosion and sedimentation control measures (e.g., silt fence, check dams) to prevent sediment from entering a watercourse.
- Except during construction of the crossing, EGI will not obstruct any watercourse so as to impede the free movement of water and fish.
- All exposed mineral soil must be graded to a stable slope and treated as quickly as possible to prevent erosion and sediment from entering a watercourse.
- All temporary vehicle crossing structures will be removed upon completion of construction. Banks and approaches will be restored and stabilized immediately upon removal of a vehicle crossing structure.
- The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be taken with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly from sediment control mitigations.
- Equipment fording will only be allowed if the Code of Practice can be met. It is available at https://www.dfo-mpo.gc.ca/pnw-ppe/codes/temporary-crossings-traversees-temporaires-eng.html.
- The Company will be held responsible for implementation of this plan. Any questions regarding the implementation of this plan should be directed towards the Environmental Advisor assigned to the project.

Sizing of Water Opening

It is important that the size of the water opening be selected so the structure can safely pass flood flows that can reasonably be expected to occur during the life of the crossing. **These structures must also allow for fish passage at all times except during the pipeline installation.** Any one of the following methods can be followed:

- Install a bridge that clear spans the watercourse from top of bank to top of bank where banks are defined (i.e. ordinary high water mark), and ensure adequate freeboard to allow for anticipated increase in stream discharge and passage of debris. In cases where banks are undefined: use cribbing or other footing material to hold the bridge and ensure adequate freeboard to allow for anticipated increase in steam discharge and passage of debris.
- Maximum culvert length will be 12.2 m (40 ft).
- Conduct a hydrology and hydraulics analysis to determine theoretical opening size. The design flow will be the two year flood (Q2), unless the culvert is to be left in place through the spring freshet, in which case the theoretical opening size will be based on the five year flood (Q5).
- Culvert sizes may also be selected to be the same as nearby culverts that have been in place for many years and have performed satisfactorily.
- If culverts are used, the approved size or equivalent multiple culverts must be installed. If multiple culverts are used a low-flow channel through one culvert must be established.

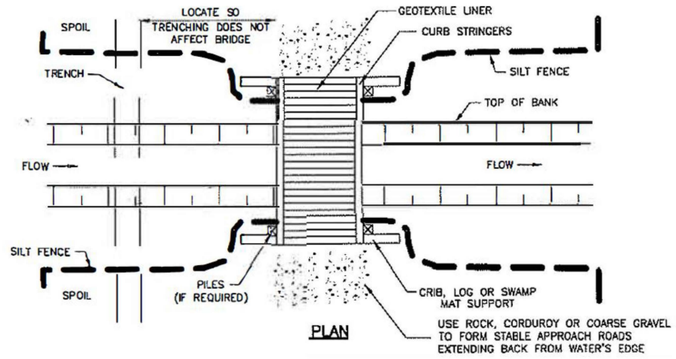
Detailed Construction Sequence - Temporary Bridges

In general terms, the following sequence of construction and mitigation measures will be followed at all temporary bridges.

Conditions for use

- The temporary bridge is no greater than one lane wide.
- The crib, log or swamp mat support is above the ordinary high water mark.

1. Generally, there are no restrictions on timing for the construction of clear-span structures as they do not involve in-water work. However, if there are any activities with the potential to disrupt fish or fish habitat (e.g., in-water crossing of watercourse by machinery), these should be undertaken outside of the restricted activity timing windows.
2. Install the bridge in a manner that will minimize sediment entering the watercourse. Stringers must be engineered to support the loads expected on the bridge. Curbs at least 150 mm high must be installed along the edge of the deck and if necessary, the deck lined with geotextile to contain mud on the bridge. Fasteners connecting components must be strong enough to hold them in position during the life of the bridge.
3. Road approaches leading to the bridges must be raised and stable, so equipment loads are supported a sufficient distance back from the watercourse to reduce sediment entering the watercourse from equipment. This may require using materials such as gravel, rock or corduroy. If cuts are needed to obtain a satisfactory grade, they are to be dug with side ditches and stable slopes. Erosion and sediment control measures are to be installed to keep sediment from entering the watercourse (e.g., check dams, filler cloth, rip rap, seed and mulch, sediment traps, etc.)
4. While the bridge is in use, any buildup of sediment on the bridge deck or approaches that has the potential to enter the watercourse is to be scraped off and disposed of in an approved location.
5. Temporary crossings will be removed as quickly as possible when no longer required. Surplus gravel and bridge materials are to be removed from the crossing area and stabilized above the floodplain in an approved location. The watercourse bed and banks are to be restored to a stable angle and protected with erosion resistant material compatible with flow velocity (e.g., coarse gravel or rip rap). Measures such as berms or logs may be needed to prevent sediment laden water from entering the watercourse.
6. Vegetate any disturbed areas by planting and seeding native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.



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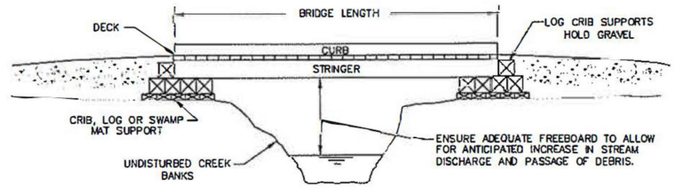
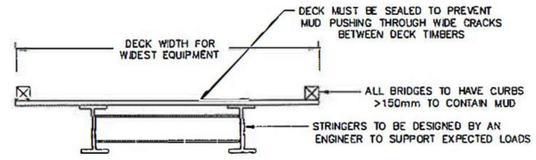


BRIDGE PROFILE



TYPICAL STEEL BRIDGE SECTION

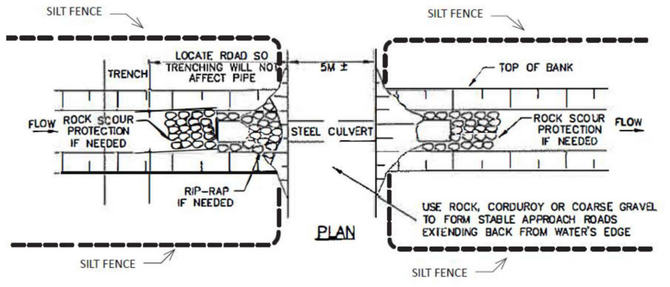
Detailed Construction Sequence - Temporary Culverts

Conditions for use

- The use of explosives is not required to complete the works, undertakings and activities
- Fish passage is maintained during the works, undertakings and activities
- No sensitive habitat exists at the crossing location
- The temporary culvert does not result in the draining of upland ponded or wetland features
- The culverts have a maximum length of no longer than 12.2m (40ft)
- The installation and removal of culverts must occur within a single allowable activity timing window

In general terms, the following sequence of construction and mitigation measures will be followed at all temporary culverts. Pre-, during-, and post-construction photographs showing the culvert location will be taken.

1. Install culvert pipe of diameter and length as per the Sizing of Water Opening requirements to ensure for stable fill slopes and safe vehicle/equipment passage. Culvert invert is to be set to allow a minimum of 10cm water depth for fish passage. Culvert installation can be done in flowing water as long as the installation occurs outside the restricted activity timing window. Culvert backfill and fill for the road is to be course granular or rock fill material. Erosion protection may be needed on the upstream road fill slope and if scour is possible, rip rap is to be placed in the watercourse upstream and downstream of the culvert outlet.
2. Road approaches leading to the culvert crossing must be raised and stable, so equipment loads are supported a sufficient distance back from the watercourse to reduce sediment entering the watercourse from equipment. This may require using materials such as gravel, rock, or corduroy. If cuts are needed to obtain a satisfactory grade, they are to be dug with side ditches and stable slopes. Erosion and sediment control measures are to be installed to keep sediment from entering the watercourse (e.g., check dams, filter cloth, rip rap, seed and mulch, sediment traps, etc.).
3. While the culvert is in use, any build-up of sediment on the road surface or approaches that has the potential to enter the watercourse is to be scraped off and disposed of in an approved location.
4. Temporary crossings will be removed as quickly as possible when no longer required. Removal must occur outside the restricted activity timing window. Surplus gravel and culvert materials are to be removed from the crossing area and stabilized above the floodplain in an approved location. The watercourse bed and banks are to be restored to a stable angle and protected with erosion resistant material compatible with flow velocity (e.g., coarse gravel or rip rap). Measures such as berms or logs may be needed to prevent sediment laden water from entering the watercourse.
5. Vegetate any disturbed areas by planting and seeding native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.



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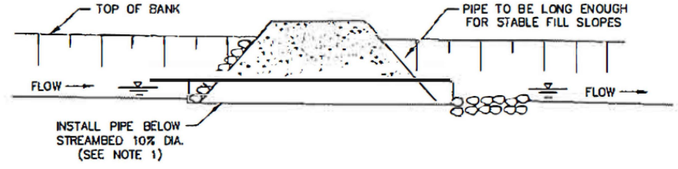

STREAM PROFILE

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ENBRIDGE

LOCATION

ALL TEMPORARY VEHICLE CROSSINGS (BRIDGES & CULVERTS) IN ONTARIO

DRAWING TITLE

GENERIC SEDIMENT CONTROL PLAN TEMPORARY VEHICLE CROSSINGS

SCALE		DATE
NTS		DECEMBER 2021
FILE No.		PROJECT No.
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APPROVED

Generic Sediment Control Plan Dam and Pump Water Crossings

This plan sets out the measures that will be taken by Enbridge Gas Inc. (EGI) and its contractors to control downstream sediment to the lowest level practically achievable during the construction, use and removal of dam and pump type crossings. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the Department of Fisheries and Oceans (DFO). This includes the current DFO Code of Practice for temporary cofferdams and diversion channels available at https://www.dfo-mpo.gc.ca/pnw-ppe/codes/cofferdams-batardeaux-eng.html

Conditions for using the Standard

- The crossing can be completed in 7 calendar days or less avoiding the restricted activity timing window
- The watercourse is 15 m or less wide (current water level) AND flow conditions are 1.5m^3/sec or less
- The in-water work site disturbs a maximum of 50 linear m or less of the watercourse

Note: fish passage in a dam and pump crossing is not required

General Measures

EGI must use materials, construction practices, mitigation techniques and monitoring of operations at every water crossing in order to prevent the death of fish, unauthorized harmful alteration, disruption or destruction of fish habitat or the impairment of water quality. General measures are available at https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html. The following requirements apply to any permanent or intermittent watercourse (stream, river, pond) and areas adjacent to it.

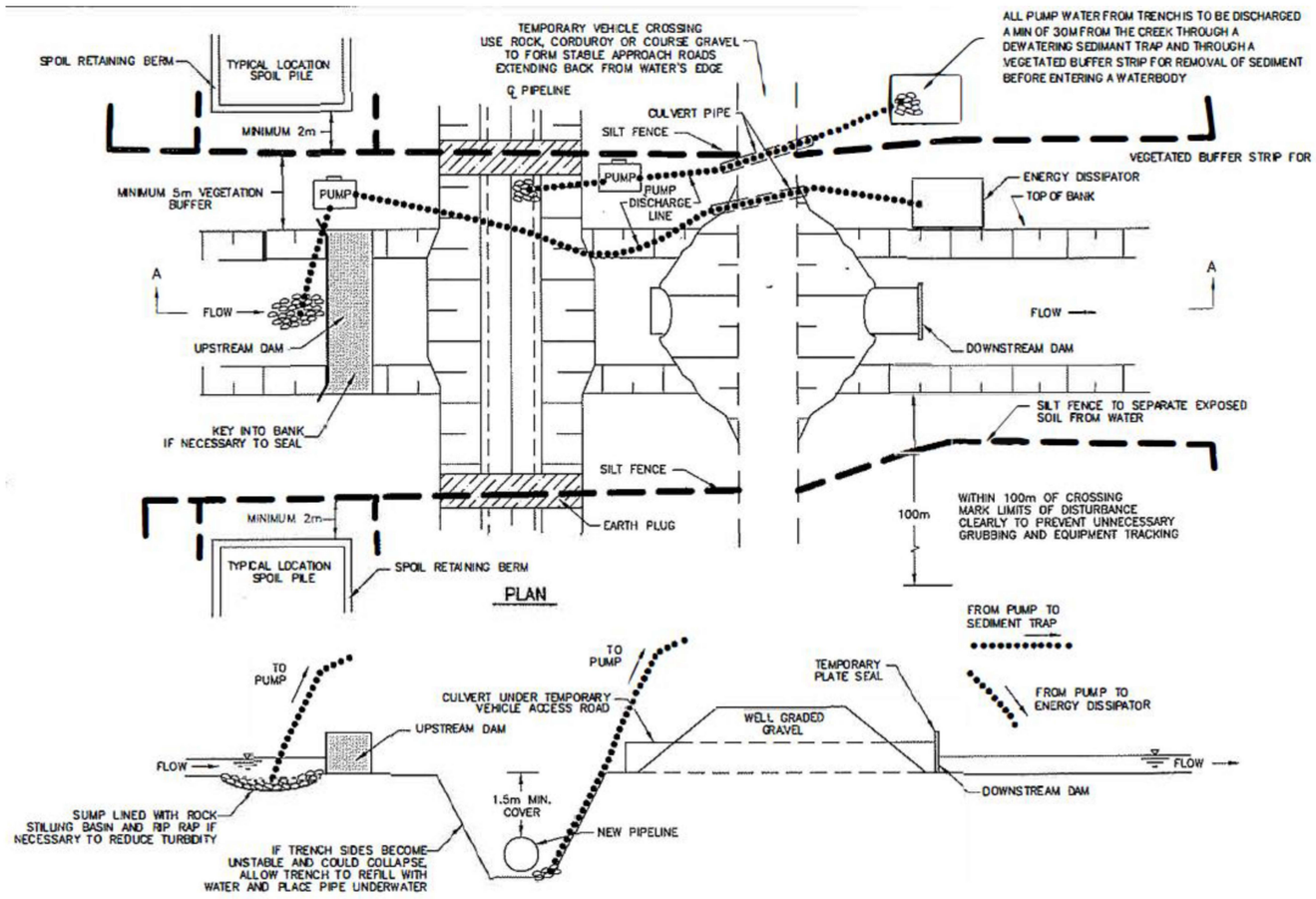
- EGI will adhere to all permits and approvals of federal and provincial agencies related to watercourse crossings.
- EGI will notify the appropriate federal or provincial agencies prior to commencement of a watercourse crossing in accordance with regulatory permit conditions.
- In-stream work will occur during the appropriate time windows for the geographic region and for the fish species present unless otherwise permitted by the appropriate agencies.
- Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum needed for construction and delay grubbing to immediately prior to grading operations.
- All watercourses will require a minimal disturbance zone (MDZ) to be clearly marked with flagging prior to the commencement of clearing activities or any construction activity near the watercourse. This flagging will be set back a minimum of 5m from the watercourse and will be based on site specific conditions. Extra work area required at watercourse crossing will be situated away from the watercourse outside of the MDZ.
- Materials removed or stockpiled during construction (e.g., excavated soil, backfill material) must be deposited in a manner to ensure sediment does not enter a watercourse. Appropriate erosion and sediment controls (e.g. revegetation, vegetated buffer strips, drainage control, sediment settling devices, and sediment fence or other appropriate mitigation measures) will be installed around spoil or stockpiles, to prevent sediment from stockpile runoff from entering a watercourse.
- All vehicles, machinery and other construction equipment shall not enter the water. There must be no fording of any stream.
- Except during construction of the crossing, EGI will not obstruct any watercourse so as to impede the free movement of fish.
- Flow will be maintained at all times downstream of the watercrossing.
- All exposed soil must be stabilized (e.g. graded to a stable slope and erosion control measures implemented) as quickly as possible to prevent erosion.
- EGI is to adhere to the Generic Sediment Control Plan For Temporary Vehicle Crossings.
- All required materials (e.g., silt fencing, filter cloth, polyethylene liners, granular material, rip rap, dam materials) and installation equipment (e.g., pipe, flumes, pumps, pump hoses, generators, spores, energy dissipaters) will be on-site and in good working order prior to construction.
- Prior to commencing watercourse crossings, local weather stations will be monitored to determine whether any precipitation is forecasted. In-stream activity will be delayed if flows are in flood stage and until weather conditions are favourable. If practical work will be delayed until weather conditions are favourable. If necessary, to proceed with work under unfavourable conditions, EGI will exercise due diligence.
- If there is any flow in the watercourse, EGI is to install pumps to maintain streamflow around the blocked off section of channel. An energy dissipater is to be built to accept pump discharge and prevent watercourse erosion.
- Adequate pump capacity will be on site to handle anticipated water flows and any potential increases in flow during the construction period. Backup pumps with adequate capacity to handle 100% of the downstream flow must be on site and ready for immediate replacement, should the primary operating pump(s) fail.
- Water intakes used in fish bearing waters will be screened in accordance with current DFO Code of Practice for end-of-pipe fish protection screens for small water intakes in freshwater https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html.
- Fish recovery and transfer will be conducted prior to and during the isolation of flow and in accordance with permit regulations. See detailed construction sequence for timing of fish recovery operations.
- Instream activities in all watercourses (e.g., trenching, pipe installation, backfilling) will be completed in as short a time as possible to minimize disturbance to water quality, fish and fish habitat.
- In situations where the crossing can be completed in one day, in-stream excavation will begin in the early morning to allow for same day installation.
- Refueling and lubrication of equipment will be conducted in areas that will allow any accidental spill of deleterious substance to be disposed of in an approved location before it reaches any watercourse. Appropriate spill prevention kits will be readily available on site.
- The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be taken with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly.
- Revegetation must be completed as quickly as possible. Revegetate any disturbed areas by planting and seeding native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
- All use of silt fence, rock check dams and dewatering traps shall be constructed/installed in accordance to the most up to date EGI specifications and drawings. Where these mitigation measures are not sufficient to prevent sediment from entering the watercourse, additional mitigation measures will be implemented to prevent sediment from entering the watercourse.
- EGI will be held responsible for implementation of this plan. Any questions regarding the implementation of this plan should be directed towards the Environmental Advisor assigned to the project.

Contingency Plan

If unforeseen events (e.g., bedrock in trench, dam washout) cause the strategies set out in this plan to be insufficient or inappropriate to meet the objective, EGI is expected to respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any effects on fish or fish habitat that may result. DFO is to be notified as soon as practical. **NOTE:** There is a Duty to Notify and Duty to Take Corrective Measures to report death of fish or a HADD of fish habitat to DFO.

Spill reporting procedures established by EGI shall be used to report any unexpected discharge of silt or sediment or other deleterious substance at the water crossing. At a minimum contact the Environmental Advisor at **1-855-336-2056.**

If DFO determines that long term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by EGI, in consultation with and approval from DFO for implementation by EGI.



Detailed Construction Sequence - Dam and Pump Crossings

In general terms, the following sequence of construction and mitigation measures will be followed at all "dam and pump" type water crossings.

1. Mark out and maintain limits of authorized work areas with fencing or flagging tape to avoid unnecessary disturbance of vegetation. Ensure equipment operators working on the crossing have been briefed about this plan and the measures needed to protect water quality. Install pre-work sediment control measures, including silt fences and measures to contain excavated spoil and backfill. All necessary equipment and materials to build the dams and to pump water must be on site or readily available prior to commencing in-water construction. Pipe shall be strung, welded and coated ready for installation prior to watercourse trenching.
2. If possible, install pumps in a natural pool upstream of the excavation. Excavate temporary sump within right-of-way if no natural pool exists. Check pump operation to equalize flow and ensure water intakes used in fish bearing waters are screened in accordance with DFO Code of Practice. Rip rap, stilling wells, filter cloth, gravel filters or other mitigation measures will be used at the upstream inlet of the pump to prevent suspension of sediment from pumping when necessary. Rip rap and rock check dams will be used when necessary to prevent scouring and erosion at the pump outlet. Pump discharge lines shall be installed to keep pumped water from coming into contact with soil on the construction site.
3. Dams are to be made of steel plate, inflatable rubber dam (aquadam), pea stone bags, or metre bags and constructed so that sediment is not introduced to the watercourse. An impervious membrane is to be incorporated into the dam if necessary, to control seepage flow. Dams may need keying into the banks and streambed. Install downstream dam only if needed to keep the trench area dry. Dewater the area between dams and for fish bearing streams, conduct fish recovery operations. All pump water is to be discharged well away (minimum 30 m) from the creek and through a sediment trap to prevent reentry of sediment into the watercourse.
4. Excavate trench through plugs and streambed as quickly as possible, re-positioning discharge hose as necessary. Lower the pipe in the trench and backfill immediately. During pumping activities, monitor flow upstream and downstream to ensure normal flow levels. The top 300 mm of trench backfill is to be clean rock, cobble material or native streambed material. EGI is to use granular backfill if the native material is not suitable. Any excess material is to be disposed of above the high-water mark in an approved location and stabilized to prevent reentry into the watercourse. Work is to be completed as quickly as possible.
5. Restore, stabilize and reclaim bed and banks of watercourse to preconstruction profiles and protected with erosion resistant material compatible with flow velocity (e.g., coarse gravel or rip rap) to the maximum extent possible between dams. Do not use erosion control matting in the bankfull channel. All construction material (e.g. dams, rip rap, pea stone bags) will be removed from the site to an approved location. Removal of all materials will be done in a manner to prevent entry of sediment to the watercourse. The downstream dam will be removed first. Keep pump running until normal flow is resumed. Complete bank trimming and erosion protection. If pea stone bags are used for the dams, place and remove by hand to avoid equipment breaking bags.
6. Site stabilization, which includes control of stormwater drainage using a combination of methods such as silt fences, erosion blankets, diversion berms and check dams etc. is to be completed immediately upon trench backfilling or as directed by the Environmental Advisor. If stabilization is delayed, short term erosion control measures will be used to prevent sediment entering the watercourse. Material accumulated at silt fences is to be removed or stabilized in place. Silt fences are to be removed when the site is permanently stabilized.
7. Vegetate any disturbed areas by planting and seeding native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
8. If post-construction monitoring reveals erosion problems, remedial work is to be undertaken as quickly as possible.

NOTES

ENBRIDGE

LOCATION

All DAM AND PUMP WATER CROSSINGS IN ONTARIO

DRAWING TITLE

GENERIC SEDIMENT CONTROL PLAN DAM AND PUMP WATER CROSSINGS

SCALE	DATE
NTS	DECEMBER 2021

FILE No.	PROJECT No.

DRAWN	CHECKED	DRAWING	REV
GTH			0

APPROVED

Generic Sediment Control Plan - Dry Flume Water Crossings

This plan sets out the measures that will be taken by Enbridge Gas Inc. (EGI) and its contractors to control downstream sediment to the lowest level practically achievable during the construction, use and removal of dry flume type crossings. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the Department of Fisheries and Oceans (DFO).

Conditions for using the Standard

- The crossing can be completed in 7 calendar days or less avoiding the restricted activity timing window
- The watercourse is 15 m or less wide (current water level) AND flow conditions are 1.5m^3/sec or less
- The in-water work site disturbs a maximum of 50 linear m or less of the watercourse

Note: fish passage in a dry flume is not required

General Measures

EGI must use materials, construction practices, mitigation techniques and monitoring of operations at every water crossing in order to prevent the death of fish, unauthorized harmful alteration, disruption or destruction of fish habitat or the impairment of water quality. General measures are available at https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html. The following requirements apply to any permanent or intermittent watercourse (stream, river, pond) and areas adjacent to it.

- EGI will adhere to all permits and approvals of federal and provincial agencies related to watercourse crossings.
- EGI will notify the appropriate federal or provincial agencies prior to commencement of a watercourse crossing in accordance with regulatory permit conditions.
- In-stream work will occur outside of the restricted activity timing windows for the geographic region and for the fish species present unless otherwise permitted by the appropriate agencies.
- Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum needed for construction and delay grubbing to immediately prior to grading operations.
- All watercourses will require a minimal disturbance zone (MDZ) to be clearly marked with flagging prior to the commencement of clearing activities or any construction activity near the watercourse. This flagging will be set back a minimum of 5m from the watercourse and will be based on site specific conditions. Extra work area required at watercourse crossings will be situated away from the watercourse outside of the MDZ.
- Materials removed or stockpiled during construction (e.g., excavated soil, backfill material) must be deposited in a manner to ensure sediment does not enter a watercourse. Appropriate erosion and sediment controls (e.g. revegetation, vegetated buffer strips, drainage control, sediment settling devices, and sediment fence or other appropriate mitigation measures) will be installed around spoil or stockpiles to prevent sediment from stockpile runoff from entering a watercourse.
- All vehicles, machinery and other construction equipment should not enter the water. There should be no fording of any stream.
- Except during construction of the crossing, EGI will not obstruct any watercourse so as to impede the free movement of fish.
- Flow will be maintained at all times downstream of the water crossing.
- All exposed soil must be stabilized (e.g. graded to a stable slope and erosion control measures implemented) as quickly as possible to prevent erosion.
- EGI is to adhere to the Generic Sediment Control Plan For Temporary Vehicle Crossings.
- All required materials (e.g., silt fencing, filter cloth, polyethylene liners, granular material, rip rap, dam materials) and installation equipment (e.g., pipe, flumes, pumps, pump hoses, generators, spores, energy dissipaters) will be on-site and in good working order prior to construction.
- Prior to commencing watercourse crossings, local weather stations will be monitored to determine whether any precipitation is forecasted. In-stream activity will be delayed if flows are in flood stage and until weather conditions are favourable. If practical work will be delayed until weather conditions are favourable. If necessary, to proceed with work under unfavourable conditions, EGI will exercise due diligence
- Water intakes used in fish bearing waters will be screened in accordance with current DFO Code of Practice for end-of-pipe fish protection screens for small water intakes in freshwater https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html.
- Fish recovery and transfer will be conducted prior to and during the isolation of flow and in accordance with permit regulations. See detailed construction sequence for timing of fish recovery operations.
- In-stream activities in all watercourses (e.g., trenching, pipe installation, backfilling) will be completed in as short a time as possible to minimize disturbance to water quality, fish and fish habitat.
- In situations where the crossing can be completed in one day, in-stream excavation will begin in the early morning to allow for same day installation.
- Refueling and lubrication of equipment will be conducted in areas that will allow any accidental spill of deleterious substance to be disposed of in an approved location before it reaches any watercourse. Appropriate spill prevention kits will be readily available on site.
- The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be token with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly.
- Revegetation must be completed as quickly as possible. Revegetate any disturbed areas by planting and seeding native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
- All use of silt fence, rock check dams and dewatering traps shall be constructed/installed in accordance to the most up to date Company specifications and drawings. Where these mitigation measures are not sufficient to prevent sediment from entering the watercourse, additional mitigation measures will be implemented to prevent sediment from entering the watercourse.
- EGI will be held responsible for implementation of this plan. Any questions regarding the implementation of this plan should be directed towards the Environmental Advisor assigned to the project.

Contingency Plan

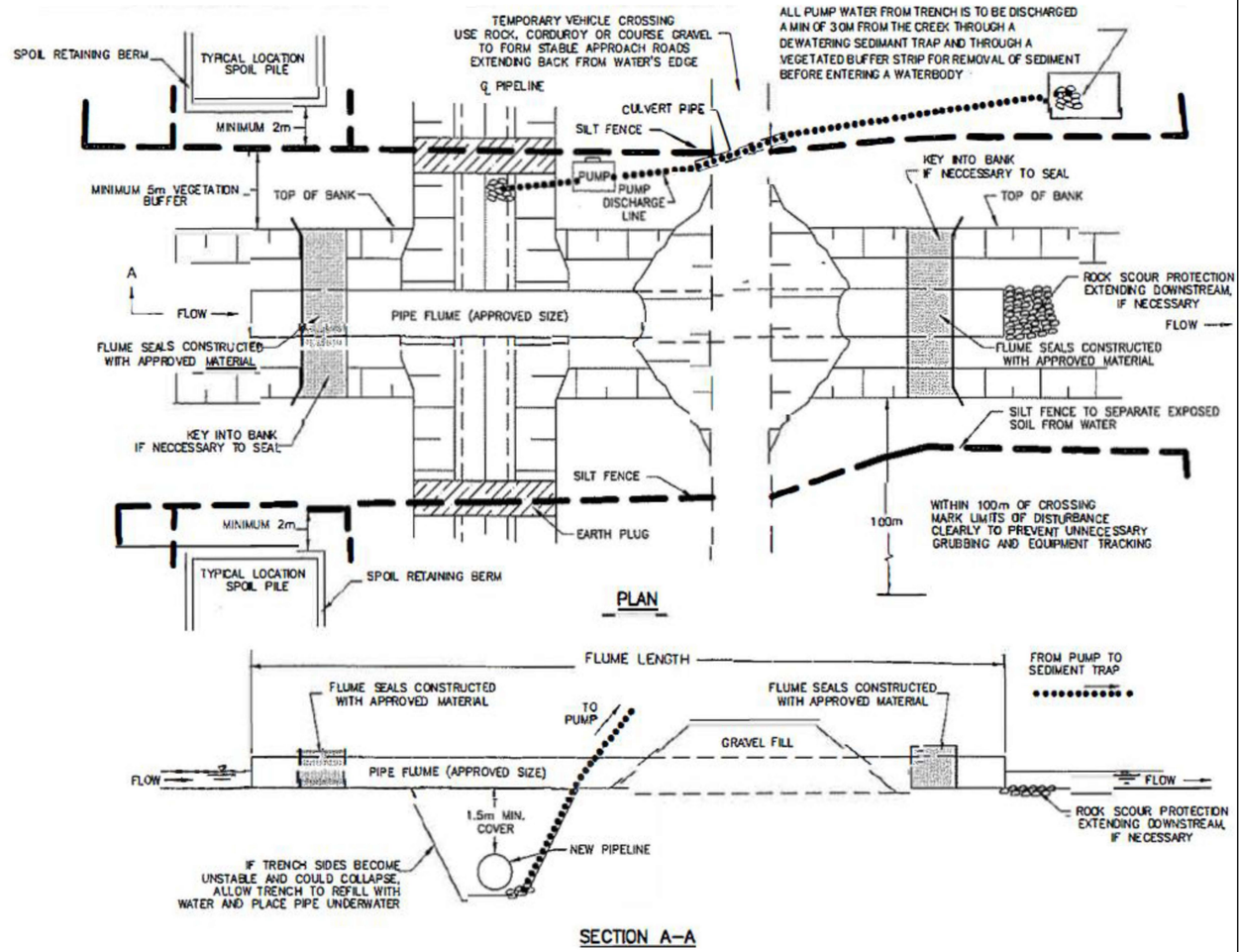
If unforeseen events (e.g. bedrock in trench, flume washout) cause the strategies set out in this pion to be insufficient or inappropriate to meet the objective, EGI is expected to respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any effects on fish or fish habitat that may result. DFO is to be notified as soon as practical. **NOTE:** There is a Duty to Notify and Duty to Take Corrective Measures to report death of fish or a HADD of fish habitat to DFO.

Spill reporting procedures established by EGI will be used to report any unexpected discharge of silt or sediment or other deleterious substance of the water crossing. At a minimum contact the Environmental Advisor at **1-855-336-2056.**

If DFO determines that tong term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by EGI, in consultation with and approval from DFO for implementation by EGI.

Flume Sizing

- Flumes will be sized initially based on hydrology and hydraulic analysis to determine theoretical opening size. The capacity of the flumes will be sized to handle 150% of the anticipated flow.
- The approved size or equivalent multiple flumes must be installed.
- Flume sizes may also be selected to be the same as existing nearby culverts that have been in place for many years and have performed satisfactorily.



Detailed Construction Sequence - Dry Flume Crossings

In general terms, the following sequence of construction and mitigation measures will be followed at all "dry flume" type water crossings.

1. Mark out and maintain limits of authorized work areas with fencing or flagging tape to avoid unnecessary disturbance of vegetation. Ensure equipment operators working on the crossing have been briefed about this plan and the measures needed to protect water quality. Install pre-work sediment control measures, including silt fences and measures to contain excavated spoil and backfill. All necessary equipment and materials to build the flume must be on site or readily available prior to commencing in-water construction. Pipe shall be strung, welded and coated ready for installation prior to watercourse trenching.
2. Install flumes equal to or larger than the diameter determined by the methods described above. Place impervious dams at each end of the flume, upstream first then downstream. Alternative dam materials include coarse gravel with rip rap protection, pea stone bags, steel plate and metre bags. During placement, install an impervious membrane, if necessary, to prevent leakage. Dams may need keying into the bank and streambed. Once the area is isolated, conduct fish recovery and transfer operations and dewater the area between the dams. All pump water is to be discharged well away (minimum 30 m) from the watercourse and through a sediment trap to prevent reentry of sediment into the watercourse. Pump discharge lines will be installed to keep pumped water from coming into contact with soil on the construction site.
3. Excavate trench through plugs and under flume, then dewater. Work area dewatering will be filtered to remove suspended solids. Lower in pipe by passing under flume and backfill immediately. The top 300 mm of trench backfill is to be clean rock, cobble material or native streambed material. EGI is to use granular backfill if the native material is not suitable. Any excess material is to be disposed of in an approved location and stabilized to prevent reentry into the watercourse. Work is to be completed as quickly as possible.
4. Once the pipe installation is complete and the flume(s) are no longer necessary, they will be removed as quickly as possible and in the following manner: remove the downstream dam; remove the upstream dam; remove flume(s).
5. Restore, stabilize and reclaim bed and banks of watercourse to preconstruction profiles and protected with erosion resistant material compatible with flow velocity (e.g., do not use erosion control matting in the bankfull channel coarse gravel or rip rap) to the maximum extent possible between dams. All construction material (e.g. dams, rip rap) not required to return the watercourse to preconstruction condition will be removed from the site and stabilized above the high-water mark in an approved location. Removal of all materials will be done in a manner that will not introduce sediment to the watercourse.
6. Site stabilization, which includes control of stormwater drainage using a combination of methods such as silt fences, erosion blankets, diversion berms and check dams etc., is to be completed immediately upon removal of the flume or as directed by the Environmental Advisor. If stabilization is delayed, short term erosion control measures will be used to prevent sediment entering the watercourse. Material accumulated at silt fences is to be removed or stabilized in place. Silt fences are to be removed when the site is permanently stabilized.
7. Vegetate any disturbed areas by planting and seeding native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
8. If post-construction monitoring reveals erosion problems, remedial work is to be undertaken as quickly as possible.

NOTES

ENBRIDGE

LOCATION: ALL DRY FLUME WATER CROSSINGS IN ONTARIO			
DRAWING TITLE: GENERIC SEDIMENT CONTROL PLAN DRY FLUME WATER CROSSINGS			
SCALE: NTS		DATE: DECEMBER 2021	
FILE No.		PROJECT No.	
DRAWN: GTH	CHECKED	DRAWING	REV: 0
APPROVED			