CONSTRUCTION SPECIFICATION FOR TEMPORARY SEDIMENT CONTROL

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805.01 SCOPE

This specification describes the requirements for the installation, maintenance, and removal of temporary sediment control during construction.

805.02 REFERENCES

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

Ontario Provincial Standard Specifications, Construction

OPSS 206 Grading
OPSS 517 Dewatering
OPSS 803 Vegetative Cover
OPSS 804 Temporary Erosion Control

Ontario Provincial Standard Specifications, Material

OPSS 1860 Geotextiles

805.03 DEFINITIONS

For the purpose of this specification, the definitions in OPSS 182 and the following definitions apply:

Earth means as defined in OPSS 206.

Erosion means as defined in OPSS 804.

Fibre Roll means as defined in OPSS 804.

Significant Rainfall means as defined in OPSS 804.

Sediment means as defined in OPSS 804.

Sediment Barrier means a barrier used to trap sediment in overland flow.

Turbidity Barrier means turbidity curtains or turbidity dams used to isolate the Working Area to prevent the release of sediment and debris from the Working Area into the surrounding waterbody.

Turbidity Curtain means a flexible barrier used to trap sediment in waterbodies.

Turbidity Dam means a non-flexible barrier used to trap sediment in waterbodies.

Temporary Sediment Control means control of sediment produced by erosion some distance away from the sediment source using sediment barriers, bags and traps and turbidity barriers.

805.05 MATERIALS

805.05.02 Geosynthetics

805.05.02.01 Geotextile

Geotextile shall be free of holes, tears, and punctures.

805.05.02.02 Sediment Fence Geotextile

Geotextile for sediment fence shall be according to OPSS 1860, Table 3.

Geotextile for sediment fence may be separate from the stakes used to install it as a sediment barrier.

805.05.02.03 Berm Barrier Geotextile

Geotextile for berm barriers and rock flow check dams shall be a woven, Class II geotextile according to OPSS 1860. The filtration opening size (FOS) shall be no greater than 300 µm.

805.05.02.04 Turbidity Curtain Geosynthetic

Turbidity curtain geosynthetics shall have a grab tensile strength of at least 990 N, according to OPSS 1860 and be one of geotextile or geomembrane.

Geotextile shall be a woven material. The FOS shall be no greater than 300 µm, according to OPSS 1860.

Geomembrane shall be a low-permeability synthetic material or a geotextile impregnated with elastomeric spray.

805.05.02.05 Filter Bags

Geotextile for filter bags shall be non-woven, polypropylene, Class I according to Table 1 of OPSS 1860 or as specified in the Contract Documents.

805.05.03 Plastic Sheeting

Plastic sheeting shall be according to OPSS 804.

805.05.04 Stakes

Stakes shall be of sufficient strength and length to satisfy temporary sediment control installation, performance and maintenance requirements.

805.05.05 Wire Fence

Wire fence used in wire-backed sediment fence barrier shall be 1.63 mm diameter galvanized steel fence with a 5 cm by 10 cm weave and a 0.91 m height.

805.05.05.01 Posts

Posts to support wire-backed sediment fence barriers shall be metal T-posts. Metal ties shall be used to secure the sediment fence to the metal T-posts.

805.05.06 Berm Barriers

Berm barriers shall be constructed using non-erodible earth or organic materials such as, sand, gravel, brush or compost.

805.05.07 Sandbags

Sandbags shall be made from heavy gauge plastic, agricultural burlap, or sediment fence geotextile. Heavy gauge plastic shall contain stabilizers or inhibitors resistant to deterioration by ultraviolet radiation. Sandbags shall be filled with clean sand, 19 mm gravel or 6 mm pea gravel, containing no silt or clay.

805.05.08 Fibre Rolls

Fibre rolls shall be according to OPSS 804.

805.05.09 Turbidity Curtain

Turbidity curtain shall be weighted at the bottom to ensure that sediment does not travel under the curtain. Turbidity curtain shall be supported at the top through a flotation system.

805.05.09 Turbidity Dam

Turbidity dams shall be constructed with materials specified in the Contract Documents.

805.07 CONSTRUCTION

805.07.01 General

805.07.01.02 Protection of Stockpiled Materials

All stockpiles of erodible construction materials, and excess or surplus materials, shall be protected from sediment transport within 48 hours of being built unless as specified in the Contract Documents.

805.07.01.03 Dewatering

Dewatering shall be according to OPSS 517.

805.07.01.04 Turbidity Curtains and Turbidity Dams

Equipment shall not be operated in a waterbody outside a turbidity curtain or turbidity dam other than hand held equipment or boats, unless specified in the Contract Documents.

805.07.01.05 Construction and Removal of Measures

The timing of construction and removal of temporary sediment control shall be as specified in the Contract Documents.

805.07.02 Light-Duty Sediment Barriers, General

Light-duty sediment barriers are sediment fence barriers, or fibre roll barriers.

Light-duty sediment barriers shall be constructed as specified in the Contract Documents.

Light-duty sediment barriers shall not be installed in or across waterbodies.

When the Light-Duty Sediment Barrier item is specified in the Contract Documents, any light-duty sediment barriers may be used. When a specific light-duty sediment barrier is specified in the Contract Documents, no substitution shall be permitted.

Light- duty sediment barriers shall be installed such that soil scour and erosion is prevented at the low points of the barrier on the downslope side.

805.07.02.02 Sediment Fence Barriers

Sediment fence barriers shall not have plastic or wire mesh backing.

Sediment fence barriers shall be constructed as specified in the Contract Documents and according to the following:

a) Within a trench excavated along the contour of the ground such that the elevation of the above ground portion of the fence is the same along its entire length except at the ends.

b) Without breaks or gaps along their entire length.

c) On flat ground with a minimum offset of 2 m from the toe of the slope being protected. When a longer sediment barrier is required, additional sediment fence barriers shall be installed as specified in the Contract Documents.

d) With the geotextile attached firmly, without sagging, to the upslope side of the stakes and the stakes spaced to ensure the geotextile remains vertical.

e) With the geotextile joined to provide a continuous run, with the ends overlapped a minimum of 500 mm and securely fastened to the stakes using cable ties or soft wire at the top of the geotextile only.

f) With the geotextile angled upslope at the ends of each run in a “J” pattern and so that the ends are at a higher elevation than the bottom of the run.

When geotextile is supplied without stakes attached, the geotextile shall be installed into the trench in the ground first, the stakes shall be driven into the ground behind the geotextile, and the geotextile shall be attached to the upslope side of the stakes using cable ties or soft wire at the top of the geotextile only.

805.07.02.03 Fibre Roll Barriers

Fibre roll barriers shall be sized and constructed as specified in the Contract Documents and according to the following:

a) Along the contour of the ground into trenches that have been excavated into the soil perpendicular to the slope face to a depth of approximately one half the roll diameter across the width of the slope unless otherwise specified by the manufacturer of a commercial product.

b) After any rills and gullies on the slope where fibre roll barriers are to be installed have been filled in.

c) On flat ground with a minimum offset of 2 m from the toe of the slope being protected. When a longer sediment barrier is required, additional fibre roll barriers shall be installed tightly butted against each other as specified in the Contract Documents.

d) With their base in continuous contact with the underlying soil along their entire length without gaps and angled upslope at end of each run in a “J” pattern.

e) With the ends of adjacent fibre roll segments tightly butted against each other without being overlapped vertically or horizontally.

After placement, a metal bar shall be used to make pilot holes perpendicular to the slope face through the centre of the fibre rolls as specified in the Contract Documents. Pilot holes shall also be made at the ends of each fibre roll segment angled towards the next abutting fibre roll to hold adjacent rolls together.

Wooden stakes shall be driven into the pilot holes as specified in the Contract Documents.

Soil excavated from the trenches shall be placed along the upslope side of the fibre rolls and compacted into the front of the trench to minimize possible undermining by runoff.

The soil on the upslope and downslope sides of the fibre rolls shall be seeded as specified in the Contract Documents and according to OPSS 803.

805.07.03 Heavy-Duty Sediment Barriers, General

Heavy-duty sediment barriers are wire-backed sediment fence barriers, berm barriers, or sandbag barriers.

Heavy-duty sediment barriers shall be constructed as specified in the Contract Documents, without gaps and without undermining to prevent sediment passage through, under, or around the barrier.

When the Heavy-Duty Sediment Barrier item is specified in the Contract Documents, the option is available to select any of the heavy-duty sediment barriers or any combination of them. When a specific heavy-duty sediment barrier is specified in the Contract Documents, no substitution shall be permitted.

Heavy-duty sediment barriers shall be installed such that soil scour and erosion is prevented at the low points of the barrier on the downslope side.

805.07.03.01 Wire-Backed Sediment Fence Barriers

Wire-backed sediment fence barriers shall not be used for perimeter control or property line delineation unless specified in the Contract Documents.

Wire-backed sediment fence barriers shall be constructed as specified in the Contract Documents and according to the following:

a) Within a trench excavated along the contour of the ground such that the elevation of the bottom of the fence is the same along its entire length except at the ends.

b) Without breaks or gaps along their entire length.

c) On flat ground with a minimum offset of 2 m from the toe of the slope being protected. When a longer sediment barrier is required, additional wire-backed sediment fence barriers shall be installed as specified in the Contract Documents.

d) With the wire fence installed into the trench first, the geotextile installed next on the upslope side of the wire fence and T-posts installed into the ground behind the geotextile and wire fence and spaced to ensure the geotextile and wire fence remain vertical.

e) With the geotextile and the wire fence attached securely to the T-posts using wire ties at the top of the geotextile and wire fence only.

f) With the geotextile and the wire fence joined to provide a continuous run, with their ends overlapped a minimum of 500 mm, and securely fastened to T-posts using wire ties at the top of the geotextile or wire fence only.

g) With the wire-backed sediment fence angled upslope at the ends of each run in a “J” pattern and so that the ends are at a higher elevation than the bottom of the run.

805.07.03.02 Berm Barriers

Berm barriers shall be constructed and wrapped in geotextile or plastic sheeting as specified in the Contract Documents unless they are constructed using compost. The geotextile or plastic sheeting shall be secured to the ground.

805.07.03.03 Sandbag Barriers

Sandbags shall be securely tied at the top.

Sandbag barriers shall be constructed as specified in the Contract Documents.

Sandbags within each row shall be placed with the sides of the bags butted tightly against one another without gaps. The ends of sandbags in adjacent rows shall be butted tightly against one another without gaps.

When sandbag barriers are constructed on earth surfaces, they shall be placed into an excavated trench, backfilled with excavated material to existing grade and compacted.

When sandbag barriers are to be constructed on sod, erosion control blanket, existing turf, or bedrock, they shall be placed so there are no gaps between the sandbags and the underlying surface.

Sandbag barriers shall be maintained with undamaged bags that are firmly seated.

805.07.04 Sediment Trap in Ditch

Sediment traps in a ditch shall be constructed as specified in the Contract Documents to prevent sediment transport from the upstream to the downstream side of the trap and so that the majority of the sediment is collected in the excavated basin.

Sediment traps shall be constructed as a single control measure consisting of an excavated basin and a rock flow check dam according to OPSS 804.

805.07.05 Sediment Traps for Dewatering

Sediment traps for dewatering shall be according to OPSS 517 and as specified in the Contract Documents.

A sediment barrier shall be constructed as specified in the Contract Documents and according to this specification to completely surround the sediment trap for dewatering with its ends overlapping a minimum of 500 mm where they meet. The rock flow check dam shall be constructed according to OPSS 804 and be located at the low point of the sediment barrier.

A temporary construction fence shall be erected around the sediment trap to restrict public access.

805.07.06 Filter Bags

Filter bags, hoses and pumps shall be sized appropriately to the volume of water to be filtered as specified in the Contract Documents. Bags shall have a FOS as specified in the Contract Documents.

Filter bags shall be situated in a vegetated area or placed on a permeable surface on a slight slope with the opening of the bag facing upslope a minimum of 30 m away from waterbodies and sensitive environmental receptors or as far as practicable from the top of the bank of any waterbody.

All filter bags shall be completely surrounded at their perimeter by a sediment barrier constructed according to this specification with its ends overlapping a minimum of 500 mm where they meet.

The opening of the filter bag shall be securely attached with mechanical connections to the discharge hose using commercially available hose couplers and placed in the retention facility to be dewatered.

Discharge of water from filter bags shall be according to OPSS 517.

A filter bag shall be replaced when trapped sediment has accumulated to 50% of the bag capacity or in accordance with the manufacturer's recommendations.

805.07.07 Turbidity Barriers

Turbidity barriers shall be constructed as specified in the Contract Documents, without gaps and without undermining to prevent turbid water from passing through, under, or around the barriers.

805.07.07.01 Turbidity Curtains

Turbidity curtains shall be constructed as specified in the Contract Documents.

Turbidity curtains shall not be used across flowing watercourses.

Turbidity curtains shall be free of tears and gaps. The bottom edge of the curtain shall be in continuous and secured contact with the waterbody bed to prevent sediment passage from the enclosed area.

Turbidity curtains shall be constructed according to the following:

a) Turbidity curtains shall be oriented parallel to the direction of flow to the greatest extent possible.

b) Turbidity curtains shall be firmly anchored in place. The alignment of the curtain shall be set as close to the Working Area as possible but not so close as to be disturbed by construction equipment.

c) The height of turbidity curtains shall be 20% greater than the depth of the water where they are to be installed to allow for water level fluctuations.

d) The area that turbidity curtains protect shall not contain large culverts or drainage areas that if flows occur behind the curtain it would cause a breach or lost contact with the waterbody bed at the bottom surface of the curtain.

e) When water depths at the design alignment are minimal, the toe of the curtain may be anchored in place by staking. Supplemental anchors of the toe of the curtain shall be used, as needed, depending on water surface disturbances such as from boats and wave action.

f) Shallow installations may be made by securing the top of the curtain using staking rather than a flotation system.

805.07.07.02 Turbidity Dam

Turbidity dams shall be constructed as specified in the Contract Documents.

805.07.08 Monitoring and Documentation

All temporary sediment control shall be monitored to ensure it is effective. Monitoring shall be completed for the following conditions:

a) A minimum of every seven Days.

b) The 24 hours prior to a forecasted significant rainfall event.

c) Within 24 hours after significant rainfall events.

Monitoring shall include the following:

a) Visual inspection of the condition and effectiveness of all installed temporary sediment controls; and

b) Visual inspection for sediment leaving the Working Area and for entering waterbodies and sensitive environmental receptors.

Observations shall be documented and any concerns such as observed breaches of temporary sediment control, or sediment transport to a waterbody, sensitive receptor or private property shall be reported immediately to the Contract Administrator. Monitoring documentation shall be provided to the Contract Administrator upon request within 24 hours.

805.07.09 Maintenance

All temporary sediment control constructed under this specification shall be maintained in an effective, functioning, stable condition.

When temporary sediment control is found to be ineffective at any location, a different material, product or method more suitable for the site conditions shall be selected, installed and maintained within 48 hours.

805.07.09.01 Sediment Removal

Sediment contained by temporary sediment control shall be removed and managed as specified in the Contract Documents in a manner that avoids escape of the sediment to the downstream side and avoids damage to the temporary erosion control materials or products. Sediment shall be removed to the level of the grade existing at the time the temporary sediment control was constructed and be according to the following:

a) For light-duty sediment barriers, accumulated sediment shall be removed once it reaches the lesser of the following:

   i. A depth of one-half the effective height of the sediment barrier.
   ii. A depth of 300 mm immediately upstream of the sediment barrier.

b) For heavy-duty sediment barriers, sediment traps in ditches, and sediment traps for dewatering, accumulated sediment shall be removed once it reaches one-half the effective height or depth of the sediment barrier or trap.

c) For sediment traps for dewatering, sediment shall be removed when sediment diminishes the storage volume by 50%.

d) For all temporary sediment control, accumulated sediment shall be removed as necessary to perform maintenance repairs.

e) Accumulated sediment shall be removed immediately prior to the final removal of the temporary sediment control.

805.07.10 Removal

Temporary sediment control shall be removed, and associated excavations backfilled and compacted when the area being protected has been completely stabilized by final cover placement. When the final cover is vegetated and placement could not be advanced to allow establishment and stabilization of the site prior to Contract Completion, temporary sediment control shall be left in place.

Temporary sediment control shall also be removed without entry of equipment to any waterbody other than hand-held equipment or boats as may be required, and in a manner that minimizes release of sediment and debris to any waterbody, sensitive receptor or private property.

Prior to removal of in-water turbidity barriers, any sediment laden water shall be allowed to settle out or be pumped out of the area enclosed by the turbidity barrier.

Any existing, seed, sod, temporary erosion control, or final design cover disturbed by removal or backfilling of temporary sediment control and removal of accumulated sediment, shall be brought to final grade and restored as specified in the Contract Documents.

Filter bags that have reached capacity or are no longer in use, and any captured sediment within the filter bag or its light-duty sediment barrier enclosure shall be managed as excess material as specified in the Contract Documents.

805.07.11 Protection of Waterbodies and Sensitive Environmental Receptors

Protection of waterbodies, waterbody banks and sensitive environmental receptors shall be as specified in the Contract Documents.

805.07.12 Management of Excess Material

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

805.08 QUALITY ASSURANCE

805.08.01 Acceptance of Temporary Sediment Control

The acceptance of temporary sediment control shall be according to the requirements of this specification and, as specified in the Contract Documents. Acceptance for each type of temporary sediment control shall be determined through visual inspection by the Contract Administrator and random quality assurance checks by the Owner.

The Owner may conduct random quality assurance checks on temporary sediment control that has been installed or removed to verify they are in accordance with the requirements of this specification, and as specified in the Contract Documents.

Temporary sediment control that is identified by the Owner as deficient shall be removed and replaced or reapplied with measures that meet the requirements of this specification and, as specified in the Contract Documents. Removal and replacement or reapplication shall be carried out at no additional cost to the Owner within 48 hours of the Owner providing notice to the Contractor, unless otherwise agreed to in writing.

805.09 MEASUREMENT FOR PAYMENT

805.09.01 Actual Measurement

805.09.01.01 Light-Duty Sediment Barriers
Sediment Fence Barriers
Fibre Roll Barriers
Heavy-Duty Sediment Barriers
Wire-Backed Sediment Fence Barriers
Berm Barriers
Sandbag Barriers

Measurement shall be the length in linear metres from end to end of the barrier, following the contours of the ground.

805.09.01.02 Sediment Traps in Ditch
Sediment Traps for Dewatering
Filter Bags

For measurement purposes, a count shall be made of the number of sediment traps in a ditch, sediment traps for dewatering and filter bags constructed or installed. Component parts shall not be counted separately for payment.

805.09.01.03 Turbidity Curtains

Measurement of turbidity curtain shall be made in linear metres along its length from end to end between tie-downs for each turbidity curtain installed.

805.09.01.04 Turbidity Dams

For measurement purposes, a count shall be made of the number of turbidity dams constructed.

805.09.02 Plan Quantity Measurement

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

805.10 BASIS OF PAYMENT

805.10.01

Light-Duty Sediment Barriers - Item
Sediment Fence Barriers - Item
Fibre Roll Barriers - Item
Heavy-Duty Sediment Barriers - Item
Wire-Backed Sediment Fence Barriers - Item
Berm Barriers - Item
Sandbag Barriers - Item
Sediment Traps in Ditch - Item
Sediment Traps for Dewatering - Item
Filter Bags - Item
Turbidity Curtains - Item
Turbidity Dams - Item

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

Progress payments for the sediment control measures shall be made as follows:

a) 30% for initial construction.

b) 50% for maintenance.

c) 20% for removal.