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**EROSION AND SEDIMENT CONTROL****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. NPDES General Permit No. 2
- B. Stormwater Pollution Prevention Plan (SWPPP)
- C. Erosion Control Measures
- D. Velocity and Flow Control Measures
- E. Sediment Control Measures
- F. Application/Installation of Measures
- G. Removal/Replacement of Measures

**1.02 DESCRIPTION OF WORK**

- A. Furnish all materials; install, construct, maintain, and remove specified erosion control devices; at locations specified in the contract documents, or where specified by the Engineer.
- B. Complete the required construction work on this project, while minimizing soil erosion and controlling water pollution. Maintain these features as specified, from initial construction stages to final completion of the project.

**1.03 SUBMITTALS**

Comply with Division 1 - General Provisions and Covenants, as well as the following:

- A. Upon request, provide copies of all records and documentation related to compliance with the Iowa DNR NPDES Permit.
- B. For grid-tied concrete block mat, submit all manufacturer details, recommendations, and installation instructions for approval.
- C. For manufactured track-out devices, submit a copy of shop drawings and installation instructions per the manufacturer.

**1.04 SUBSTITUTIONS**

Comply with Division 1 - General Provisions and Covenants.

**1.05 DELIVERY, STORAGE, AND HANDLING**

Comply with Division 1 - General Provisions and Covenants.

**1.06 SCHEDULING AND CONFLICTS**

Comply with Division 1 - General Provisions and Covenants, as well as the following:

- A. Implement erosion and sediment control measures at the appropriate time(s).
- B. Coordinate construction to minimize damage to erosion and sediment control devices.

## 1.07 SPECIAL REQUIREMENTS

### A. Permit:

1. When applicable, comply with the requirements of the Iowa Department of Natural Resources, *NPDES (National Pollutant Discharge Elimination System) General Permit No. 2 for Stormwater Discharge Associated with Industrial Activity for Construction Activities*, and the Stormwater Pollution Prevention Plan.
2. For projects covered under the Iowa DNR General Permit No. 2, sign on as a co-permittee with the owner and any other contractors or subcontractors.
3. When applicable, comply with the local jurisdiction's permitting requirements.

**B. Protection of Property:** Prevent accumulation of soil, sediment, or debris from project site onto adjoining public or private property. Remove any accumulation of soil or debris immediately, and take remedial actions for prevention.

**C. Permit Compliance:** When applicable, conduct all operations in compliance with the Iowa DNR NPDES General Permit No. 2. Labor, equipment, or materials not included as a bid item, but necessary to prevent stormwater contamination from construction related sources, are considered incidental. Incidental work related to compliance with the permit may include, but is not limited to: hazardous materials protection, fuel containment, waste disposal, and providing employee sanitary facilities.

**D. Project Staging:** Replacing erosion and sediment control practices that are damaged or removed by the contractor in a manner that is inconsistent with the current project staging or SWPPP is the Contractor's responsibility and will be at the Contractor's expense.

## 1.08 MEASUREMENT AND PAYMENT

### A. Stormwater Pollution Prevention Plan (SWPPP):

#### 1. Preparation:

- a. **Measurement:** Lump sum item; no measurement will be made.
- b. **Payment:** Payment will be at the lump sum price for SWPPP preparation.
- c. **Includes:** Lump sum price includes, but is not limited to, development of a SWPPP by the Contractor meeting local and state agency requirements, filing the required public notices, filing a Notice of Intent for coverage of the project under the Iowa DNR NPDES General Permit No. 2, and payment of associated NPDES permit fees.
- d. **Other:** Item will be paid for upon approval of the SWPPP by the Engineer, and after the Notice of Intent has been filed by the Contractor.

#### 2. Management:

- a. **Measurement:** Lump sum item; no measurement will be made.
- b. **Payment:** Payment will be at the lump sum price for SWPPP management.
- c. **Includes:** Lump sum price includes all work required to comply with the administrative provisions of the Iowa DNR NPDES General Permit No. 2; including record keeping, documentation, updating the SWPPP, filing the Notice of Discontinuation, etc. Item also includes weekly inspections required to satisfy the provisions of General Permit No. 2, unless otherwise specified in the contract documents.
- d. **Does Not Include:** Unit price does not include installation or maintenance of erosion and sediment control practices.
- e. **Other:** The Engineer may make partial payments based on estimates of the project completion. Final payment will be made when the site reaches final stabilization and the Notice of Discontinuation is filed.

**1.08 MEASUREMENT AND PAYMENT (Continued)****B. Compost Blankets:**

1. **Measurement:** Measurement will be in square feet for each thickness of compost blanket.
2. **Payment:** Payment will be at the unit price per square foot for each thickness of compost blanket.
3. **Includes:** Unit price includes, but is not limited to, furnishing and spreading compost over the designated area.

**C. Filter Berms:**

1. **Measurement:** Measurement will be in linear feet for each size of filter berm, measured longitudinally along the top of the berm.
2. **Payment:** Payment will be at the unit price per linear foot for each size of berm.
3. **Includes:** Unit price include, but is not limited to, furnishing material and constructing the filter berm, including vegetation if specified.

**D. Filter Socks:**

1. **Installation:**
  - a. **Measurement:** Measurement will be in linear feet for each size of filter sock.
  - b. **Payment:** Payment will be at the unit price per linear foot for each size of filter sock.
  - c. **Includes:** Unit price includes, but is not limited to, anchoring stakes.
2. **Removal:**
  - a. **Measurement:** Measurement will be in linear feet of filter sock removed.
  - b. **Payment:** Payment will be at the unit price per linear foot of filter sock removed.
  - c. **Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of filter socks and accumulated sediment.

**E. Temporary Rolled Erosion Control Products (RECP):**

1. **Measurement:** Measurement will be in square yards, based on the width specified in the contract documents and actual measured length, for each type of temporary RECP.
  - a. Areas of RECP buried in trenches or covered by overlaps along seams will not be measured.
  - b. For each blanket check installed, the Engineer will add 4 feet of length to the measured quantity.
2. **Payment:** Payment will be at the unit price per square yard for each type of temporary RECP.
3. **Includes:** Unit price includes, but is not limited to, excavation, staples, anchoring devices, and material for anchoring slots.

**F. Wattles:**

1. **Installation:**
  - a. **Measurement:** Measurement will be in linear feet for each type and size of wattle.
  - b. **Payment:** Payment will be at the unit price per linear foot for each type and size of wattle.
  - c. **Includes:** Unit price includes, but is not limited to, anchoring stakes.

**1.08 MEASUREMENT AND PAYMENT (Continued)****2. Removal:**

- a. **Measurement:** Measurement will be in linear feet of wattle removed.
- b. **Payment:** Payment will be at the unit price per linear foot of wattle removed.
- c. **Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of wattle and accumulated sediment.

**G. Check Dams:****1. Rock Check Dams:**

- a. **Measurement:** Measurement will be in ton of stone installed.
- b. **Payment:** Payment will be at the unit price per ton of stone installed.
- c. **Includes:** Unit price includes, but is not limited to, engineering fabric.

**2. Manufactured Check Dams:****a. Installation:**

- 1) **Measurement:** Measurement will be in linear feet for each type and size of manufactured check dam.
- 2) **Payment:** Payment will be at the unit price per linear foot for each type and size of manufactured check dam.
- 3) **Includes:** Unit price includes, but is not limited to, anchoring stakes.

**b. Removal:**

- 1) **Measurement:** Measurement will be in linear feet for each type of manufactured check dam removed.
- 2) **Payment:** Payment will be at the unit price per linear foot for each type of manufactured check dam removed.
- 3) **Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of manufactured check dam and accumulated sediment.

3. **Fiber Logs:** Filter sock and wattles utilized for check dams will be measured and paid for according to 9040, 1.08, D and 9040, 1.08 F respectively.

**H. Temporary Earth Diversion Berms:**

1. **Measurement:** Measurement will be in linear feet for each type and size of temporary earth diversion berm.
2. **Payment:** Payment will be at the unit price per linear foot of temporary earth diversion berm.
3. **Includes:** Unit price includes, but is not limited to, removal of the berm upon completion of the project.

**I. Level Spreaders:**

1. **Measurement:** Measurement will be in linear feet of level spreaders.
2. **Payment:** Payment will be at the unit price per linear foot of level spreader.
3. **Includes:** Unit price includes, but is not limited to, maintaining the spreader during the period of construction and removal upon completion of the project, unless otherwise specified in the contract documents.

**1.08 MEASUREMENT AND PAYMENT (Continued)****J. Rip Rap:**

1. **Measurement:** Measurement will be in tons for each type of rip rap.
2. **Payment:** Payment will be at the unit price per ton of rip rap.
3. **Includes:** Unit price includes, but is not limited to, engineering fabric.

**K. Temporary Pipe Slope Drains:**

1. **Measurement:** Measurement will be in linear feet for each type and size of temporary pipe slope drain, measured from end of apron to end of apron.
2. **Payment:** Payment will be at the unit price per linear foot for each type and size of pipe.
3. **Includes:** Unit price includes, but is not limited to, excavation, furnishing and installing pipe and pipe aprons, grading, and removal of the slope drain upon completion of the project.

**L. Temporary Sediment Basin:**

1. **Outlet Structure:**
  - a. **Measurement:** Each size of temporary sediment basin outlet structure will be counted.
  - b. **Payment:** Payment will be at the unit price for each temporary sediment basin outlet structure.
  - c. **Includes:** Unit price includes, but is not limited to, concrete base, dewatering device, anti-vortex device, outlet pipe, and anti-seep collars (if specified).
  - d. **Does Not Include:** Unit price does not include earthwork required for construction of the temporary sediment basin.
2. **Removal of Sediment:**
  - a. **Measurement:** Each occurrence of sediment removal will be counted.
  - b. **Payment:** Payment will be at the unit price for each occurrence of sediment removal.
  - c. **Includes:** Unit price includes, but is not limited to, dewatering and removal and off-site disposal of accumulated sediment.
3. **Removal of Outlet Structure:**
  - a. **Measurement:** Each temporary sediment basin outlet structure removed will be counted.
  - b. **Payment:** Payment will be at the unit price for each temporary sediment basin outlet structure removed.
  - c. **Includes:** Unit price includes, but is not limited to, dewatering and off-site disposal of the outlet structure, concrete base, emergency spillway, and accumulated sediment.
  - d. **Does Not Include:** Unit price does not include earthwork required to remove the temporary sediment basin and restoration of the area to finished grade.

**M. Sediment Trap Outlet:**

1. **Installation:**
  - a. **Measurement:** Measurement will be in tons of crushed stone placed.
  - b. **Payment:** Payment will be at the unit price per ton of crushed stone.
  - c. **Includes:** Unit price includes, but is not limited to, engineering fabric.
  - d. **Does Not Include:** Unit price does not include earthwork required for construction of the sediment trap.

**1.08 MEASUREMENT AND PAYMENT (Continued)****2. Removal of Sediment:**

- a. **Measurement:** Each occurrence of sediment removal will be counted.
- b. **Payment:** Payment will be at the unit price for each occurrence of sediment removal.
- c. **Includes:** Unit price includes, but is not limited to, dewatering and removal and off-site disposal of accumulated sediment.

**3. Removal of Device:**

- a. **Measurement:** Each sediment trap outlet removed will be counted.
- b. **Payment:** Payment will be at the unit price for each sediment trap outlet removed.
- c. **Includes:** Unit price includes, but is not limited to, dewatering and off-site disposal of sediment trap outlet and accumulated sediment.
- d. **Does Not Include:** Unit price does not include earthwork required to remove the sediment trap outlet and restoration of the area to finished grade.

**N. Silt Fence or Silt Fence Ditch Check:****1. Installation:**

- a. **Measurement:** Measurement will be in linear feet of silt fence or silt fence ditch check.
- b. **Payment:** Payment will be at the unit price per linear foot of silt fence or silt fence ditch check.
- c. **Includes:** Unit price includes, but is not limited to, anchoring posts.

**2. Removal of Sediment:**

- a. **Measurement:** Each occurrence of sediment removal will be counted.
- b. **Payment:** Payment will be at the unit price for each occurrence of sediment removal.
- c. **Includes:** Unit price includes, but is not limited to, dewatering and removal and off-site disposal of accumulated sediment.

**3. Removal of Device:**

- a. **Measurement:** Measurement will be in linear feet of silt fence removed.
- b. **Payment:** Payment will be at the unit price per linear foot of silt fence removed.
- c. **Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of fence, posts, and accumulated sediment.

**O. Stabilized Construction Exit:****1. Track-out Control by Square Yard:**

- a. **Measurement:** Measurement will be in square yards of material or manufactured track-out pad placed.
- b. **Payment:** Payment will be at the unit price per square yard of material or manufactured track-out pad placed.
- c. **Includes:** Unit price includes, but is not limited to, subgrade stabilization fabric, removal and disposal of accumulated sediment, and removal and disposal of track-out control stone and manufactured pad.

**2. Track-out Control by Ton:**

- a. **Measurement:** Measurement will be in tons of material placed.
- b. **Payment:** Payment will be at the unit price per ton of material placed.
- c. **Includes:** Unit price includes, but is not limited to, subgrade stabilization fabric.

**1.08 MEASUREMENT AND PAYMENT (Continued)****P. Dust Control:****1. Water for Dust Control:**

- a. Measurement:** Measurement will be by metering of water applied to haul roads and other areas to control dust. If metering is not available, measurement will be by counting the loads from a transporting tank of known volume and gauging the contents of the transporting truck for partial loads.
- b. Payment:** Payment will be at the unit price per 1,000 gallons of water used.
- c. Includes:** Unit price includes, but is not limited to, furnishing, transporting, and distributing water to the haul road.

**2. Dust Control Product:**

- a. Measurement:** Measurement will be in square yards of the treated area.
- b. Payment:** Payment will be at the unit price per square yard of product applied.
- c. Includes:** Unit price include, but is not limited to, furnishing and incorporating the dust control product.

**Q. Erosion Control Mulching:****1. Conventional Mulching:**

- a. Measurement:** Measurement will be in acres of conventional mulch.
- b. Payment:** Payment will be at the unit price per acre of conventional mulch.
- c. Includes:** Unit price includes, but is not limited to, furnishing and incorporating mulch in the area designated in the contract documents.

**2. Hydromulching:**

- a. Measurement:** Measurement will be in acres for each type of hydromulch.
- b. Payment:** Payment will be at the unit price per acre for each type of hydromulch.
- c. Includes:** Unit price includes, but is not limited to, furnishing mulch and tackifier (if applicable), providing equipment specific to hydromulching, and applying the mulch to the specified area.

**R. Turf Reinforcement Mats (TRM):**

- 1. Measurement:** Measurement will be in square yards for each type of turf reinforcement mat.
- 2. Payment:** Payment will be at the unit price per square yard for each type of turf reinforcement mat.
- 3. Includes:** Unit price includes, but is not limited to, excavation, staples, anchoring devices, and material for anchoring slots.

**S. *Intentionally left blank*****T. Inlet Protection Device:****1. Installation:**

- a. Measurement:** Each type of inlet protection device will be counted.
- b. Payment:** Payment will be at the unit price for each inlet protection device.
- c. Includes:** Unit price includes, but is not limited to, removal of the device upon completion of the project.

**1.08 MEASUREMENT AND PAYMENT (Continued)****2. Maintenance:**

- a. **Measurement:** Each inlet protection device maintenance occurrence will be counted.
- b. **Payment:** Payment will be at the unit price for each inlet protection device maintenance occurrence.
- c. **Includes:** Unit price includes, but is not limited to, removal and off-site disposal of accumulated sediment.

**U. Flow Transition Mat:**

1. **Measurement:** Measurement will be in square feet of flow transition mat.
2. **Payment:** Payment will be at the unit price per square foot of flow transition mat.
3. **Includes:** Unit price includes, but is not limited to, anchoring devices.

**V. End of Season Temporary Erosion Control:**

1. **Measurement:** Measurement will be in acres of end of season temporary erosion control applied.
2. **Payment:** Payment will be at the unit price per acre for end of season temporary erosion control.
3. **Includes:** Unit price includes, but is not limited to, furnishing, placing, and maintaining the end of season temporary erosion control throughout the winter season.

**W. Linear Erosion Control:**

When linear erosion control is specified, select an appropriate erosion control practice for use as perimeter control, inlet protection, slope length reduction, or flow diversion. Allowable linear erosion control practices include filter socks, wattles, or silt fence as described in Section 9040.

**1. Installation:**

- a. **Measurement:** Measurement will be in linear feet of linear erosion control installed. No distinction will be made between practices.
- b. **Payment:** Payment will be at the unit price per linear foot for linear erosion control.
- c. **Includes:** Unit price includes, but is not limited to, anchoring posts and anchoring stakes.

**2. Removal:**

- a. **Measurement:** Measurement will be in linear feet of linear erosion control removed. No distinction will be made between practices.
- b. **Payment:** Payment will be at the unit price per linear foot of linear erosion control removed.
- c. **Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of fence, filter socks, wattles, anchoring posts, anchoring stakes, and accumulated sediment.



**1.08 MEASUREMENT AND PAYMENT (Continued)****X. Grid-Tied Concrete Block Mat (GTCBM):****1. Grid Tied Concrete Block Mat:**

- a. Measurement:** Measurement will be the plan quantity in square yards of the finished surface of GTCBM. Areas of GTCBM placed in edge trenches, anchor trenches, or overlapped at mat seams will not be measured.
- b. Payment:** Payment will be at the unit price per square yard of grid-tied concrete block mat installed.
- c. Includes:** Unit price includes, but is not limited to, concrete anchor trenches, underlayments, ground anchors, ties, and splicing.

**2. GTCBM Concrete Anchor Trench:**

- a. Measurement:** Measurement will be in linear feet of GTCBM concrete anchor trench.
- b. Payment:** Payment will be at the unit price per linear foot of GTCBM concrete anchor trench.
- c. Includes:** Unit price includes, but is not limited to, excavation, concrete, and installation.

**PART 2 - PRODUCTS****2.01 COMPOST BLANKETS**

Comply with [Section 9010, 2.07, C](#) for compost material requirements for compost blankets.

**2.02 COMPOST BLANKET TACKIFIER**

- A. Use a biodegradable, organic binding agent or polyacrylamide that can be mixed with, or injected into, compost as it is placed, which is not detrimental to the establishment of vegetation.
- B. Use in compost blankets when specified in the contract documents.
- C. Apply at the rate recommended by the manufacturer.

**2.03 FILTER MATERIAL**

Material for use in filter socks and other areas, as specified in the contract documents.

- A. Use material derived from wood, bark, or other, non-toxic vegetative feedstocks.
- B. Use material with no visible admixture of refuse or other physical contaminants, nor any material toxic to plant growth.
- C. Use material meeting the following particle sizes:

**Table 9040.01: Filter Material Size**

Sieve Size	Percent Passing <sup>1</sup>
2"	100
1"	90-100
3/8"	0-30

<sup>1</sup> The target flow rate of in-place material is 10 gal/min/lf. The Engineer may approve use of alternate materials meeting the target flow rate.

**2.04 SLASH MULCH**

Material for use in filter berms, and other areas as specified in the contract documents, to slow, filter, and divert stormwater runoff.

- A. Raw wood slash from hard or soft timber harvested during clearing and grubbing operations within the project area.
- B. Product of a mechanical chipper, hammermill, or tub grinder.
- C. Maximum length of individual pieces shall not exceed 20 inches.
- D. Maximum width of individual pieces shall not exceed 2 inches.

**2.05 FILTER SOCK**

- A. For slope and sediment control applications, use a continuous, tubular, knitted, mesh netting with 3/8 inch openings, constructed of 5 mil thickness, photodegradable HDPE.
- B. For inlet protection, use a continuous, tubular, knitted, mesh netting with 3/8 inch openings, constructed of 500 denier polypropylene.
- C. Use 1 inch by 2 inch (minimum) hardwood stakes or stakes of equivalent strength.

**2.06 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP)**

Use temporary rolled erosion control products that are classified and have material properties according to the Erosion Control Technology Council's (ECTC) guidelines as follows:

**A. Material Classification:**

1. **RECP Type 1 (Ultra Short-term):** Functional longevity of 3 months and classified as follows:
  - a. **RECP Type 1.A:** Mulch control netting or open weave textile consisting of a photodegradable synthetic mesh or woven biodegradable natural fiber netting.
  - b. **RECP Type 1.B:** Netless rolled erosion control blankets, consisting of natural and/or polymer fibers, mechanically interlocked and/or chemically adhered together to form a RECP.
  - c. **RECP Type 1.C:** Single-net erosion control blankets consisting of processed degradable natural and/or polymer fibers, mechanically bound together by a single rapidly-degrading, synthetic or natural fiber netting.
  - d. **RECP Type 1.D:** Double-net erosion control blankets, consisting of processed degradable natural and/or polymer fibers, mechanically bound together between two rapidly-degrading, synthetic or natural fiber nettings.
2. **RECP Type 2 (Short-term):** Functional longevity of 12 months and classified as follows:
  - a. **RECP Type 2.A:** Netting or open weave textile consisting of a photodegradable synthetic mesh or woven biodegradable natural fiber netting.
  - b. **RECP Type 2.B:** Netless rolled erosion control blankets, consisting of natural and/or polymer fibers, mechanically interlocked and/or chemically adhered together to form a RECP.
  - c. **RECP Type 2.C:** Single-net erosion control blankets and open weave textiles, consisting of an erosion control blanket composed of processed degradable natural or polymer fibers, mechanically bound together by a single degradable synthetic or natural fiber netting.
  - d. **RECP Type 2.D:** Double-net erosion control blanket, consisting of processed degradable natural and/or polymer fibers, mechanically bound together between two degradable synthetic or natural fiber nettings.
3. **RECP Type 3 (Extended Term):** Functional longevity of 24 months and classified as follows:
  - a. **RECP Type 3.A:** Open weave textiles consisting of a slow-degrading synthetic mesh or woven natural fiber netting.
  - b. **RECP Type 3.B:** Erosion control blankets consisting of processed slow-degrading natural or polymer fibers, mechanically bound together between two slow-degrading synthetic or natural fiber nettings to form a continuous matrix.

**2.06 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) (Continued)**

- 4. RECP Type 4 (Long Term):** Functional longevity of 36 months and classified as follows:
- RECP Type 4.A:** Open weave textiles consisting of processed slow-degrading natural or polymer yarns or twines woven into a continuous matrix.
  - RECP Type 4.B:** Erosion control blankets consisting of processed slow degrading natural or polymer fibers mechanically bound together between 2 slow degrading synthetic or natural fiber nettings to form a continuous matrix.

**B. Properties and Performance:**

- Testing performed according to the ECTC's Testing Procedures for Rolled Erosion Control Products. Verify manufacturer's test results by independent testing.
- Material properties meeting the ECTC Standard Specifications for Rolled Erosion Control Products are summarized as follows:

**Table 9040.02: Rolled Erosion Control Products**

Type	Shear Stress <sup>2</sup> (lbs/ft <sup>2</sup> )	Max. Slope <sup>3</sup> (H:V)	Material Thickness (in)	C Factor <sup>4</sup>	Tensile Strength	
					MD <sup>5</sup> (lbs/ft)	TD <sup>5</sup> (lbs/ft)
1.A <sup>1</sup>	≥ 1.0	5:1	≥ 0.03	≤ 0.10	≥ 125	≥ 10
1.B	≥ 1.0	3:1	≥ 0.30	≤ 0.10	≥ 125	≥ 10
1.C	≥ 1.5	3:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 60	≥ 20
1.D	≥ 1.75	2:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 75	≥ 40
2.A <sup>a</sup>	≥ 1.0	5:1	≥ 0.03	≤ 0.10	≥ 125	≥ 10
2.B	≥ 1.0	3:1	≥ 0.30	≤ 0.10	≥ 125	≥ 10
2.C	≥ 1.5	3:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 60	≥ 20
2.D	≥ 1.75	2:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 75	≥ 40
3.A	≥ 2.0	2:1	≥ 0.20 - ≤ 0.40	≤ 0.05	≥ 100	≥ 40
3.B	≥ 2.0	1.5:1	≥ 0.25 - ≤ 0.50	≤ 0.05	≥ 100	≥ 40
4.A	≥ 2.25	1:1	≥ 0.20 - ≤ 0.40	≤ 0.05	≥ 100	≥ 40
4.B	≥ 2.25	1:1	≥ 0.25 - ≤ 0.50	≤ 0.05	≥ 100	≥ 40

<sup>1</sup> C Factor and permissible shear stress for Types 1.A and 2.A mulch control netting must be obtained with netting used in conjunction with pre-applied mulch material.

<sup>2</sup> Required minimum shear stress RECP (unvegetated) can sustain without physical damage or excess erosion (≥ 0.5 in soil loss) during a 30 minute flow event in large-scale performance testing, ASTM D 6460 or equivalent test acceptable to the Engineer.

<sup>3</sup> This value represents the maximum gradient on which the product should be utilized for rainfall/slope application.

<sup>4</sup> Maximum C Factor from standardized large-scale rainfall performance testing, ASTM D 6459 or equivalent test acceptable to the Engineer.

<sup>5</sup> Machine direction and transverse direction (cross-machine direction).

- C. RECP Anchors:** Stakes or staples as recommended by manufacturer, with a minimum length of 6 inches.

**2.07 WATTLES**

- Netting:** Open weave, degradable netting. Nominal diameter of 9 inches, or as specified.
- Fill Material:** Straw, wood excelsior, coir, or other natural materials approved by the Engineer.
- Stakes:** 1 inch by 1 inch (minimum) wooden stakes, or stakes of equivalent strength.

**2.08 CHECK DAMS (DITCH CHECK)****A. Synthetic Permeable Check Dam (HDPE):**

- 1. Ditch Berm:**
  - a. Installed height of 9 to 10 inches.
  - b. Manufactured check dam constructed from sheets of perforated, UV-stabilized HDPE.
  - c. Perforations of 30 to 40% open area.
- 2. RECP for Permeable Check Dam (when specified):** RECP Type 4, 4 feet wide.
- 3. Anchors:** As recommended by the manufacturer.

**B. Triangular Foam Check Dam:** Triangular-shaped device with a height of 8 to 10 inches and a base of 16 to 20 inches.

- 1. Inner Support Material:** Urethane foam.
- 2. Outer Cover:** Woven geotextile material shaped to fit around the inner support material, extending 2 to 3 feet beyond the bottom edge of the triangular-shaped inner support.
- 3. RECP for Triangular Foam Check Dam:** RECP Type 4, 4 feet wide.

**C. Rock Check Dam:**

- 1. Aggregate:** Erosion stone complying with [Iowa DOT Article 4130.04](#).
- 2. Engineering Fabric:** Comply with Section 9040, 2.22.

**D. Fiber Log:** Provide filter sock complying with 9040, 2.05 or wattle complying with 9040, 2.07.**E. RECP Blanket Pillow Check:** Utilize standard RECP specified for ditch or swale lining to form RECP blanket pillow check.**F. Rock/Sand Bags:**

- 1. Bags:**
  - a. Woven polypropylene fabric sewn together with double stitching.
  - b. Overall size of at least 14 inches by 26 inches.
  - c. Minimum grab strength of 90 pounds per ASTM D 4632.
  - d. UV stability of 70% per ASTM D4355
- 2. Aggregate:** Clean 1 inch nominal crushed stone or gravel.

**2.09 LEVEL SPREADERS**

- A.** Provide 2 inch by 8 inch (minimum) pressure-treated timber of the length specified.
- B.** Use timbers that are relatively straight and have a minimum length of 5 feet each.

**2.10 RIP RAP**

- A. **Class A Revetment:** Comply with [Iowa DOT Section 4130](#).
- B. **Class B Revetment:** Comply with [Iowa DOT Section 4130](#).
- C. **Class D and E Revetment:** Comply with [Iowa DOT Section 4130](#).
- D. **Erosion Stone:** Comply with [Iowa DOT Section 4130](#).

**2.11 TEMPORARY PIPE SLOPE DRAINS**

- A. PVC, HDPE, and metal pipes as specified in [Section 4020, 2.01](#).
- B. HDPE, Type C (corrugated interior).
- C. All pipes listed are allowed for use within the right-of-way.

**2.12 TEMPORARY SEDIMENT BASIN OUTLET STRUCTURES**

- A. **Base:** Class C concrete unless otherwise specified in the contract documents.
- B. **Riser:** CMP complying with [Section 4020](#); diameter as specified in the contract documents.
- C. **Dewatering Device:**
  - 1. Drill holes in the riser of the number, diameter, and at the elevation specified in the contract documents.
  - 2. 1/4 inch by 1/4 inch or 1/2 inch by 1/2 inch wire mesh for hardware cloth.
- D. **Barrel:** CMP complying with [Section 4020](#); diameter as specified in the contract documents.
- E. **Anti-Vortex Device:** CMP complying with [Section 4020](#); diameter according to [Figure 9040.116](#) and riser diameter as specified in the contract documents.
- F. **Anti-Seep Collar:**
  - 1. Manufactured anti-seep collar constructed of Corrugated metal, HDPE, or gum rubber.
  - 2. Size according to manufacturer's recommendations. Ensure overall collar width and height is at least 3 feet larger than outlet pipe's nominal diameter.
- G. **Sediment Baffle:** Provide silt fence complying with Section 9040, 2.14.

**2.13 SEDIMENT TRAPS**

- A. **Erosion Stone:** Comply with Section 9040, 2.10.
- B. **Engineering Fabric:** Comply with Section 9040, 2.22.

**2.14 SILT FENCE**

- A. Fabric:** Comply with [Iowa DOT Article 4196.01](#).
- B. Posts:** 4 foot minimum steel (T-section) weighing at least 1.25 pounds per foot, exclusive of anchor plate. Painted posts are not required.
- C. Fastener:** Wire or plastic ties with a minimum tensile strength of 50 pounds.

**2.15 STABILIZED CONSTRUCTION EXIT**

- A. Stone Exit:** Comply with [Iowa DOT Section 4122](#), Gradation 13, Macadam crushed stone.
- B. Subgrade Stabilization Material:** Use woven, UV-stabilized geotextile with a minimum tensile strength of 135 lb/ft.
- C. Manufactured Track-out Pad:**
  - 1. Must be approved by the Engineer.
  - 2. Provide a manufactured device intended to reduce track-out of sediment by flexing and vibrating tires as vehicles pass across the surface.
  - 3. Capable of supporting anticipated construction vehicle and equipment loads per manufacturer's recommendations.

**2.16 DUST CONTROL**

- A. Water:** Use potable water or water from a source approved by the engineer.
- B. Calcium Chloride:** Comply with [Iowa DOT Article 4194.01](#).
- C. Lignosulfonate (Tree Sap):** Use a commercially-available product with known lignin content.
- D. Soapstock (Soybean Oil):**
  - 1. Use a commercially-available, undiluted, soybean oil soapstock emulsion.
  - 2. Comply with manufacturer's recommendations for storage, transportation, temperature, and application equipment requirements.

**2.17 EROSION CONTROL MULCH**

- A. Conventional Mulch:**
  - 1. Use dry cereal straw (oats, wheat, barley, or rye) or native grass straw.
  - 2. Use material that is free of noxious weeds, seed-bearing stalks, or roots, and will be inspected and approved by the Engineer prior to use.
  - 3. Other materials, subject to the approval of the Engineer, may be used.

**2.17 EROSION CONTROL MULCH (Continued)****B. Hydromulch:**

1. **Wood Cellulose Mulch:** Comply with [Section 9010, 2.07](#).
2. **Bonded Fiber Matrix (BFM):** Comply with [Section 9010, 2.07](#).
3. **Mechanically Bonded Fiber Matrix (MBFM):** See [Section 9010, 2.07](#).

**2.18 TURF REINFORCEMENT MATS (TRM)****A. Material Classification:**

1. **Type 5.A, 5.B, 5.C, 5.D, and 5.E Turf Reinforcement Mat:** Composed of UV-stabilized non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements processed into a permanent, three dimensional matrix that may be supplemented with degradable components.
2. **Type 5.F High Performance Turf Reinforcement Mat:** A product composed of UV-stabilized, non-degradable, synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a permanent, three dimensional matrix.

- B. Properties and Performance:** Meet the minimum material and performance requirements contained in the following table:

**Table 9040.03: Turf Reinforcement Mats**

Property		Test Method	Type					
			5.A	5.B	5.C	5.D	5.E	5.F
Material	Tensile Strength (MD)	ASTM D 6818	≥ 150 lbs/ft <sup>2</sup>	≥ 175 lbs/ft <sup>2</sup>	≥ 200 lbs/ft <sup>2</sup>	≥ 325 lbs/ft <sup>2</sup>	≥ 1,500 lbs/ft <sup>2</sup>	≥ 3,000 lbs/ft <sup>2</sup>
	Tensile Strength (TD)	ASTM D 6818	≥ 150 lbs/ft <sup>2</sup>	≥ 175 lbs/ft <sup>2</sup>	≥ 200 lbs/ft <sup>2</sup>	≥ 225 lbs/ft <sup>2</sup>	≥ 1,500 lbs/ft <sup>2</sup>	≥ 3,000 lbs/ft <sup>2</sup>
	Material Mass / Unit Area	ASTM D 6566	≥ 8.0 oz./yd <sup>2</sup>	≥ 8.0 oz./yd <sup>2</sup>	≥ 8.0 oz./yd <sup>2</sup>	≥ 8.0 oz./yd <sup>2</sup>	≥ 8.0 oz./yd <sup>2</sup>	≥ 8.0 oz./yd <sup>2</sup>
	Thickness	ASTM D 6525	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in
	UV Stability	ASTM D 4355	80% @ 500 hrs	80% @ 500 hrs	80% @ 1,000 hrs	80% @ 1,000 hrs	90% @ 1,000 hrs	80% @ 3,000 hrs
Performance	Slope Application Max. Gradient (H:V)	N/A	1:1	1:1	0.5:1	0.5:1	0.5:1	0.5:1
	Unvegetated Shear Stress <sup>4</sup>	ASTM D 6460	≥ 2.0 lb/ft <sup>2</sup>	≥ 2.0 lb/ft <sup>2</sup>	≥ 2.0 lb/ft <sup>2</sup>	≥ 2.0 lb/ft <sup>2</sup>	≥ 2.0 lb/ft <sup>2</sup>	≥ 2.0 lb/ft <sup>2</sup>
	Vegetated Shear Stress	ASTM D 6460	≥ 6.0 lb/ft <sup>2</sup>	≥ 8.0 lb/ft <sup>2</sup>	≥ 10.0 lb/ft <sup>2</sup>	≥ 12.0 lb/ft <sup>2</sup>	≥ 12.0 lb/ft <sup>2</sup>	≥ 14.0 lb/ft <sup>2</sup>
	Seedling Emergence	ASTM D 7322	≥ 250%	≥ 250%	≥ 250%	≥ 250%	≥ 250%	≥ 250%

Refer to the ECTC Specifications for details of testing requirements and assumptions.



**2.19 INLET PROTECTION****A. Drop-in Intake Protection:**

1. Use a manufactured device that is inserted into the intake and is capable of trapping or filtering sediment from runoff prior to entering the storm sewer.
2. All components must be contained entirely below the surface of the intake grate.
3. Incorporate means of emergency outflow to prevent flooding if plugged with sediment.

**B. Surface-applied Intake Protection:**

1. Use devices or filter socks, placed around or over the intake, that are capable of trapping or filtering sediment from runoff prior to entering the storm sewer.
2. Do not allow the device to completely block or plug the intake, preventing inflow.

**2.20 FLOW TRANSITION MATS**

Comply with the following and [Iowa DOT Materials I.M. 469.10](#).

- A. Mat:** Constructed of 85% minimum UV resistant material with a maximum ground cover of 80%. Meet the requirements of Table 9040.04.

**Table 9040.04: Flow Transition Mats**

Property	Test Method	Value
Mass/Unit Area (max.)	ASTM D 6566	3 lbs/SF
Minimum Thickness	ASTM D 6525	0.4 inch
Maximum Thickness	ASTM D 6525	1 inch
Wide Width Tensile Strength	ASTM D 6818	2,500 lbs/ft
Minimum Percent Open Area	ASTM D 6567 Calculated	20%
UV Stability	ASTM D 4355	85%
Manning's n	Calculated	0.039

**B. Anchoring Devices:**

1. Furnish bullet tip style anchors made of a metal alloy attached to a wire rope.
2. Anchors capable of withstanding a minimum 300 pounds (136 kg) of pull out resistance in cohesive soils.
3. Wire rope a minimum of 30 inches (762 mm) in length with a minimum breaking strength of at least 300 pounds (136 kg).
4. The top washer a minimum of 3 inches (76 mm) in diameter and constructed of a UV resistant plastic.
5. Each anchor equipped to allow the retightening of the anchor when deemed necessary by the Engineer.

**2.21 Grid Tied Concrete Block Mat**

Grid tied concrete block mat is manufactured from individual concrete blocks that are cast integrally with a geogrid to form an erosion control mat. The resulting mat is supplied and transported in a rolled form.

**A. Blocks:**

1. Manufacture blocks with concrete complying with the cement requirements of ASTM C 150 and the aggregate requirements of ASTM C 33.
2. Minimum compressive strength of 5,000 psi at 28 days.
3. Furnish blocks that have a minimum weight of 3 pounds per block. Do not allow completed mat weight to exceed 10 pounds per square foot.
4. Ensure blocks have a flat-top pyramid shape with a nominal base of 6.5 inches by 6.5 inches and a height between 2.25 and 2.5 inches.
5. Place blocks no further than 1.5 inches apart.
6. Ensure missing concrete due to chipping or cracking does not exceed 15% of the average concrete unit weight.

**B. Grid:**

1. Open-knitted fabric composed of high tenacity, multifilament polypropylene yarns knitted and coated tension to form a stable grid structure. Comply with the material requirements of Table 9040.05.
2. Embed the grid within the base of each of the concrete blocks.
3. When mats will be installed adjacent to each other:
  - a. Extend the geogrid 12 inches beyond one long edge of the mat to allow for overlap with the adjacent mat.
  - b. Extend the geogrid 12 inches beyond one end of the roll to allow for overlap with an abutting mat.

**Table 9040.05: Grid Tied Concrete Block Mat Grid Properties**

Property <sup>1</sup>	Test Method	Value
Aperture Size	Measured Length	1.4 to 1.9 inches
Ultimate Tensile Strength	ASTM D 6637	2,055 lb/ft
Elongation at Break	ASTM D 6637	6% (max.)
Tensile Strength @ 2%	ASTM D 6637	822 lb/ft (min.)
Tensile Strength @ 5%	ASTM D 6637	1,640 lb/ft (min.)
Tensile Modulus @ 2%	ASTM D 6637	41,000 lb/ft (min.)
Tensile Modulus @5%	ASTM D 6637	32,800 lb/ft (min.)

<sup>1</sup> All values apply to both the machine direction and cross machine direction.

**2.21 Grid Tied Concrete Block Mat (Continued)****C. Underlayment Materials:**

1. Use a Type 2D or 3B RECP base layer composed of curled wood excelsior.
2. If required by the manufacturer, provide five-pick leno weave polypropylene netting top layer to add strength and support to the underlying RECP.
3. Depending on the site conditions, additional or alternative underlayment materials may be specified in the contract documents.
4. The underlayments may be attached to the GTCBM during manufacture.
5. When GTCBM will be installed adjacent to each other:
  - a. Extend the RECP underlayment 6 inches beyond one long edge of the mat to allow for overlap with the adjacent mat.
  - b. Extend the RECP underlayment 6 inches beyond one end of the roll to allow for overlap with an abutting mat.

**D. Anchors and Ties:**

1. **U-Anchors:** Provide No. 3 deformed bars shaped in a "U" with 18 inch long legs.
2. **Ties:** Provide 20 inch long, type 304 stainless steel zip ties with a minimum tensile strength of 250 pounds.

- E. Performance:** Comply with the minimum requirements of Table 9040.07 when tested with a backing material on a non-vegetated surface. Verify performance with full-scale laboratory testing performed by an independent third-party testing facility.

**Table 9040.07: Grid Tied Concrete Block Mat Performance**

Property	Test Method	Bed Slope	Value
Shear Stress	ASTM D 6460	10% & 20%	18 lb/ft <sup>2</sup>
Velocity	ASTM D 6460	10% & 20%	30 ft/sec

**2.22 ENGINEERING FABRIC**

Comply with [Iowa DOT Article 4196.01, B, 3.](#)

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**PART 3 - EXECUTION****3.01 SWPPP PREPARATION**

- A. Prepare a SWPPP according to the requirements of the Iowa DNR NPDES General Permit No. 2.
- B. Ensure that controls utilized in the SWPPP conform to the type and quantity of erosion and sediment controls specified in the contract documents.
- C. Submit the completed SWPPP to the Engineer for review and approval prior to filing the Notice of Intent.
- D. Upon approval of the Engineer, file public notices, as required by the NPDES General Permit No. 2.
- E. File the Notice of Intent and fee, as required by the NPDES General Permit No. 2.

**3.02 SWPPP MANAGEMENT**

Coordinate and carry out all requirements of Iowa DNR NPDES General Permit No. 2 and any local ordinance requirements, including:

- A. Update the SWPPP according to the requirements of the NPDES General Permit No. 2.
- B. Revise the SWPPP and implement changes, as necessary, to prevent sediment or hazardous materials from being transported off the site.
- C. Submit all SWPPP revisions to the Engineer for review and approval.
- D. Perform and maintain records of weekly erosion and sediment control site inspections, unless otherwise specified in the contract documents.
- E. Maintain records of transfer of responsibility under the NPDES General Permit No. 2.
- F. Retain all records on-site, or as required by the NPDES General Permit No. 2.
- G. After final stabilization, file a Notice of Discontinuation, according to the NPDES General Permit No. 2.
- H. Provide all records and documentation to the Engineer upon completion of the project. Retain a copy of all records for the period required under the Permit.
- I. Continue to perform the work required under this item throughout the duration of the project, and until final stabilization is achieved and a Notice of Discontinuation is filed.

**3.03 EROSION AND SEDIMENT CONTROL INSPECTION**

- A. Perform inspections according to and at frequency required by the Iowa DNR NPDES General Permit No. 2.
- B. Schedule necessary maintenance or improvements for items included in the contract documents.
- C. Notify the Engineer immediately of situations requiring attention beyond that provided for in the contract documents.
- D. Provide copies of the inspection reports to the Engineer.

**3.04 EQUIPMENT**

Comply with [Iowa DOT Article 2601.03](#).

**3.05 COMPOST BLANKETS** ([Figure 9040.101](#))

- A. Loosen the ground surface to a minimum depth of 1 inch.
- B. Evenly spread compost, as specified in the contract documents, or as directed by the Engineer.
- C. Divert concentrated flows away from the slope.
- D. Do not operate heavy equipment over the compost blanket after placement, or throughout the required period of protection.
- E. Inspect the ground under the blanket at regular intervals for signs of erosion.

**3.06 FILTER BERMS** ([Figure 9040.102](#))

- A. Install filter berm along the contour of the slope and perpendicular to sheet flow as specified in the contract documents, or as directed by the Engineer.
- B. Turn the beginning and ends of the filter berm installation uphill to create a “J” shape at each end to prevent runoff from flowing around the end of the berm.
- C. For slopes that receive runoff from above, place a filter berm at the top of the slope to control the velocity and spread flow.
- D. Ditch Checks:
  - 1. When filter berms are allowed for ditch checks, extend the berm up the side slopes of the ditch to prevent flow from bypassing around the edges of the berm.
  - 2. Ensure the bottom of the berm on the slope is higher in elevation than the top of the berm in the middle of the ditch.
  - 3. Construct standard filter berm with a base of 5 to 7 feet and minimum height of 24 inches.
  - 4. Construct compact filter berm with a base of 3 to 5 feet and minimum height of 18 inches.
- E. Replace the berm when sediment accumulation reaches one-half of the height of the berm.

**3.07 FILTER SOCKS** ([Figure 9040.102](#))**A. Installation:**

- 1. Fill mesh filter sock with filler material to the size and length specified in the contract documents.
- 2. Place the filter sock along the contour as specified in the contract documents, or as directed by the Engineer.
- 3. Construct a “J-hook” at each end of a continuous run of filter sock, by turning the end of the sock uphill, as necessary to prevent runoff from flowing around the ends when water behind the sock ponds up to a level even with the top of the sock.

**3.07 FILTER SOCKS (Continued)**

4. Drive stakes into the ground at a maximum spacing of 10 feet, and as required to secure the sock and prevent movement.
5. Repair or replace non-functioning filter socks that allow water to flow under the sock, are torn, or are otherwise damaged, due to inadequate installation.
6. Remove filter material from damaged socks that are located along streambanks, around intakes, in ditches, or in other locations where the material may be carried to surface waters.

**B. Removal:** When specified in the contract documents, or as directed by the Engineer; remove the filter sock upon completion of the project, and after final stabilization is achieved; or as indicated in the SWPPP, if applicable.

1. Upon completion of the project, completely remove socks and filter material that are located along streambanks, around intakes, in ditches, or in other locations where the filter material may be carried to surface waters if the sock degrades and/or tears.
2. Slice the sock longitudinally. Remove and dispose of the filter sock material and stakes.
3. Spread the filter material and accumulated sediment to match finished grade and to ensure proper drainage.
4. If the site has been brought to finished grade and prepared for permanent seeding, spread and incorporate the filter material into the surface by tilling, or as required to break up any large particles and provide a finished surface suitable for permanent seeding.

**C. Replacement:**

1. When accumulated sediment reaches a level one-half the height of the sock, or when the sock becomes clogged with sediment and no longer allows runoff to flow through, remove the sock as described above, and replace according to the installation instructions above.
2. At the Engineer's option, the existing filter sock and accumulated sediment may be left in place, and a new filter sock installed up-slope from the existing filter sock.

**3.08 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) ([Figures 9040.103](#) and [9040.104](#))**

Install temporary RECPs according to the manufacturer's published installation recommendations, subject to the following minimum requirements:

**A. Anchor Trenches, Seams, and Terminal Ends:**

**1. Upslope Anchor Trenches:**

- a. Excavate a 6 inch by 6 inch trench along the top of the slope.
- b. Extend the upslope terminal end of the RECP 3 feet past the anchor trench.
- c. Use staples at 1 foot centers to fasten the RECP to the bottom of the trench.
- d. Backfill and compact the trench.
- e. Apply seed and fertilizer to the trench surface if seeding is specified.
- f. Fold top end of RECP over compacted trench and secure upslope terminal end with a single row of staples on 1 foot centers.

**2. Adjacent Seams:**

- a. Overlap edges of adjacent RECPs by 2 to 4 inches.
- b. Install a sufficient number of staples to prevent seam or abutted rolls from separating.

**3.08 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) (Continued)****3. Consecutive Rolls (End Lap):**

- a. Shingle and overlap consecutive rolls 2 to 6 inches in the direction of flow.
- b. Secure staples through seam at 1 foot intervals.

**4. Intermediate Anchor Trench:**

- a. Excavate a 6 inch by 6 inch trench.
- b. Use staples at 1 foot centers to fasten the RECP to the bottom of the trench.
- c. Fold the RECP over upslope material and backfill and compact the trench.
- d. Apply seed and fertilizer to the trench surface if seeding is specified.
- f. Continue rolling material downslope over the trench.

**5. Staple Check:** Install two rows of staggered stakes or staples 4 inches on center and 4 inches apart.**6. RECP Blanket Check:**

- a. For use in conjunction with an RECP blanket lined channel.
- b. During RECP blanket installation, gather a 4 foot section of the blanket.
- c. Fold the blanket back upon itself, with the overlap pointing in the downhill direction, shingle style, to form a shallow, 2 foot long, check dam.
- d. Secure blanket check with long staples or wood stakes spaced at 12 inch intervals.

**7. Terminal End Anchor Trench:**

- a. Excavate a 6-inch by 6-inch trench.
- b. Extend the terminal end of the RECP 3 feet past the anchor trench.
- c. Use staples at 1-foot centers to fasten the RECP to the bottom of the trench.
- d. Backfill and compact the trench.
- e. Apply seed and fertilizer to the trench surface if seeding is specified.
- f. Fold the remaining end of the RECP over the compacted trench and secure the terminal end of the RECP with staples on 1 foot centers.

**B. Slope Application:**

1. Grade and smooth surface. Remove all rocks, clods, vegetation, or other obstructions that will prevent direct contact between the RECP and the soil surface.
2. When specified, prepare seedbed and place seed and fertilizer according to [Section 9010](#) prior to placing RECP.
3. Install anchor trench at top of slope.
4. Unroll the RECP down or horizontally across the slope.
5. Securely fasten RECP to the soil with staples according to the density and pattern recommended by the manufacturer with a minimum rate of 1.3 staples per square yard within the body of the blanket.
6. Place consecutive blankets down the slope end-over-end, shingle style.
7. Overlap ends of consecutive rolls and secure with staples.
8. Overlap edges of adjacent rolls and secure with staples.
9. Anchor the terminal end of the RECP with an anchor trench or staple check slot.

**3.08 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) (Continued)****C. Channel/Ditch Application:**

1. When specified, prepare seedbed and place seed and fertilizer according to [Section 9010](#), prior to placing RECP.
2. Construct an anchor trench at the beginning of the channel across its entire width.
3. Position adjacent rolls in the anchor slot and overlap.
4. Unroll RECP downstream.
5. Follow the manufacturer's recommendations for the installation of intermediate anchor trenches or staple checks at intervals along the channel.
6. Construct consecutive roll lap at end of roll and beginning of new roll.
7. Terminate installation at downstream end with an anchor trench or staple check.
8. Install anchors in a regular pattern over entire area covered according to manufacturer's published recommendations (minimum 1.7 anchors per square yard). Significantly higher anchor rates and longer staples may be necessary in sandy, loose, or wet soils and in severe applications.

**3.09 WATTLES ([Figure 9040.105](#))****A. Installation:**

1. Construct a shallow trench, 2 to 4 inches deep, matching the width and contour of the wattle.
2. Install wattle along contour of slope.
3. Turn ends of wattle uphill to prevent water from flowing around ends.
4. Place and compact excavated soil against the wattle, on the uphill side.
5. Drive stakes through the center of the wattle, into the ground at a maximum spacing of 4 feet along the length of the wattle, and as needed to secure the wattle and prevent movement.
6. Abut ends of adjacent wattles tightly. Wrap joint with a 36 inch wide section of silt fence and secure with stakes.

**B. Removal:** When specified in the contract documents, or as directed by the Engineer, remove the wattle upon completion of the project, and after final stabilization is achieved; or as indicated in the SWPPP, if applicable.

1. Completely remove the wattle netting, filler material, and stakes.
2. Spread the accumulated sediment to match finished grade and to ensure proper drainage.
3. When allowed by the Engineer, the wattle netting may be sliced open and the filler material spread out over the ground. Removal of netting and stakes and spreading of sediment is still required.



**3.09 WATTLES (Continued)****C. Replacement:**

1. When accumulated sediment reaches a level one-half the height of the wattle, or when the wattle becomes clogged with sediment and no longer allows runoff to flow through, remove the wattle as described above, and replace according to the installation instructions above.
2. At the Engineer's option, the existing wattle and accumulated sediment may be left in place, and a new wattle installed up-slope from the existing wattle.

**3.10 CHECK DAMS ([Figure 9040.106](#))****A. Synthetic Permeable Check Dam (HDPE):**

1. Install according to the manufacturer's recommendations.
2. When specified in the contract documents, provide an RECP under the check dam, installed according to the manufacturer's recommendations.

**B. Triangular Foam Check Dam:**

1. Install according to the manufacturer's recommendations.
2. When specified in the contract documents, provide an RECP under the check dam, installed according to the manufacturer's recommendations.

**C. Rock Check Dam:** Construct according to [Figure 9040.107](#).**D. Fiber Log:**

1. When specified in the contract documents, install fiber log check dam over RECP blanket.
2. Install fiber log across ditch or swale perpendicular to flow in a crescent shape with the ends facing upstream.
3. Install fiber log so the center section is one log diameter lower than the ends.
4. Space stakes at 1 foot intervals. Place two stakes at a 45 degree angle to the surface in a crisscross pattern with the fiber log in-between.

**F. Rock/Sand Bag:**

1. Fill bags only three-fourths full of rock to reduce gaps in the check dam.
2. Stack bags forming a check dam with a height of 1.5 to 2 feet and side slopes 2:1.
3. Tightly abut and overlap rock bags to prevent flow between bag joints.
4. Extend bags up the side slopes of the ditch to prevent flow from bypassing around the edges of the check dam.

**3.10 CHECK DAMS (Continued)**

**G. Removal:** When specified in the contract documents, or as directed by the Engineer, remove check dams upon completion of the project, and after final stabilization is achieved; or as indicated in the SWPPP, if applicable.

1. Remove the check dam and dispose of materials, or salvage to the contractor.
2. Remove the accumulated sediment or spread to match finished grade; ensure proper drainage.
3. Stabilize the area disturbed by removal operations.

**3.11 TEMPORARY EARTH DIVERSION BERMS ([Figure 9040.108](#))**

- A. Ensure positive drainage along the diversion toward the outlet area.
- B. Adequately compact fill to prevent failures or seepage.
- C. Outlet the diversion to undisturbed and/or stabilized areas only.
- D. Stabilize the surface of the earth diversion with temporary erosion control seeding, as specified in [Section 9010](#).

**3.12 LEVEL SPREADERS ([Figure 9040.109](#))**

- A. Butt multiple timbers together, as necessary to provide the required length.
- B. Ensure the spreader is installed level in all directions. Adjust as necessary during construction to maintain spreader in a level condition.
- C. Excavate a depression behind the spreader to the depth specified in the contract documents. The depression may be over-excavated up to 1 foot to provide an area for sediment accumulation.
- D. Grade as required to prevent flow around the ends of spreader.
- E. Remove the accumulated sediment from the depression when the depth is reduced below that specified in the contract documents.

**3.13 RIP RAP ([Figures 9040.110](#) and [9040.111](#))**

Install rip rap (revetment stone or erosion stone) as shown on [Figures 9040.110](#) and [9040.111](#).

**3.14 TEMPORARY PIPE SLOPE DRAINS ([Figure 9040.112](#))**

- A. Place slope drain on undisturbed soil or well compacted fill.
- B. Carefully compact cohesive soils around inlet ends of the drain in 6 inch lifts.
- C. Discharge slope drain to a stable outlet or to a sediment retention device.

**3.15 TEMPORARY SEDIMENT BASIN** ([Figures 9040.113](#) and [9040.114](#))**A. Basin Construction:**

1. Construct the storage area to the size and elevations specified in the contract documents.
2. Stabilize the side slopes and internal surfaces of the temporary sediment basin.
3. When specified in the contract documents, install internal baffles to enhance sediment capture. Refer to [Figure 9040.117](#).

**B. Outlet Structure:**

1. **Concrete Base:** Construct the concrete base and anchor riser section, as shown on [Figure 9040.115](#).
2. **Dewatering Device:**
  - a. Drill holes in the riser section. The number, diameter, and configuration will be specified in the contract documents.
  - b. Wrap the perforated section of the riser pipe with metal hardware cloth.
3. **Anti-vortex Device:** If required by the contract documents, firmly attach the cylinder to the top of the riser by welding or other means. Comply with [Figure 9040.116](#).

**C. Anti-Seep Collar:**

1. Provide anti-seep collars at locations shown in the contract documents.
2. Install according to the collar manufacturer's recommendations.
3. Place backfill material and compact over-excavation areas to a minimum of 95% Standard Proctor Density per [Section 3010](#).

**3.16 SEDIMENT TRAPS** ([Figure 9040.118](#))

- A. Construct the storage area to the size and elevations specified in the contract documents.
- B. Stabilize the side slopes and internal surfaces of the sediment trap.
- C. When specified in the contract documents, install internal baffles to enhance sediment capture. Refer to [Figure 9040.117](#).

**3.17 SILT FENCES** ([Figure 9040.119](#))**A. Installation:**

1. Install material along the contour of the ground, as specified in the contract documents, or as directed by the Engineer.
2. Install silt fence with a mechanical soil slicing machine that creates a slit in the ground while simultaneously installing the fabric. The trenching method may be used when situations will not allow soil slicing, as determined by the Engineer.
3. Construct a "J-hook" at each end of a continuous run of silt fence, by turning the end of the silt fence uphill, as necessary to prevent runoff from flowing around ends when water behind the fence ponds to a level even with the top of the fence.

**3.17 SILT FENCES (Continued)**

4. Insert 12 inches of fabric to a minimum depth of 6 inches (fabric may be folded below the ground line).
5. Compact installation by driving along each side of the silt fence, or by other means, as necessary to adequately secure the fabric in the ground, to prevent pullout and water flow under the fence.
6. Drive steel posts into the ground alongside the silt fence, to a minimum depth of 20 inches, unless otherwise specified by the Engineer. Space posts as shown on [Figure 9040.119](#) or as required to adequately support silt fence.

**B. Maintenance:** Repair or replace non-functioning silt fence that allows water to flow under the fence, is torn, or is otherwise damaged, due to inadequate installation, at no additional cost to the Contracting Authority.

**C. Removal:**

1. Remove the silt fence upon final stabilization of the project area, or according to the staging indicated in the SWPPP.
2. Remove and dispose of silt fence and posts.
3. Remove sediment or spread to match finished grade; ensure proper drainage.
4. Stabilize the area disturbed by removal operations.

**D. Replacement:**

1. When accumulated sediment reaches a level one-half the height of the fence, remove the silt fence as described above, and replace according to the installation instructions above.
2. At the Engineer's option, the existing silt fence and accumulated sediment may be left in place, and a new silt fence installed up-slope from the existing silt fence.
3. When allowed by the Engineer, the existing silt fence may be left in place and the accumulated sediment removed to the original ground line and within 6 inches of the silt fence. Carefully inspect the existing silt fence for structural integrity and signs of undermining. Make any necessary repairs.

**3.18 STABILIZED CONSTRUCTION EXIT ([Figure 9040.120](#))**

- A. Install a stabilized construction exit at all locations where construction traffic leaving the site presents the potential for sediment track-out.
- B. Remove vegetation and excavate soft soils from entrance area. Thoroughly compact subgrade prior to placing stone or manufactured pad.
- C. Install culvert under entrance if necessary to maintain drainage.
- D. Grade entrance to prevent runoff from flowing onto street. Direct all runoff from entrance to a sediment retention device.
- E. When specified, install subgrade stabilization fabric prior to placing crushed stone or manufactured track-out pad.

**3.18 STABILIZED CONSTRUCTION EXIT (Continued)**

- F. For stone track-out control, install a layer of crushed stone to the thickness (6 inches minimum) and dimensions specified in the contract documents.
- G. For manufactured track-out pad, install according to manufacturer's recommendations and [Figure 9040.120](#). If soil conditions are poor, provide aggregate base, geotextile, or geogrid as recommended by the manufacturer.
- H. Remove the accumulated sediment and install new stone or clean manufactured device, as required to prevent track-out.

**3.19 DUST CONTROL**

- A. Water:** Apply frequent light watering to ground surface, as required to control dust.
- B. Calcium Chloride:** Apply according to [Iowa DOT Section 2314](#).
- C. Lignosulfonate (Tree Sap):**
  - 1. Loosen the top 1 to 2 inches of the roadway surface.
  - 2. Apply solution with a 50% residual concentration, at a rate of 0.50 gal/yd<sup>2</sup>, to deliver a 25% residual. For diluted solutions, increase the application rate, as required, to deliver an equivalent 25% residual.
  - 3. Allow product to penetrate through the loosened material.
  - 4. Tight-blade road surface.
- D. Soapstock (Soybean Oil):**
  - 1. Loosen the top 1 to 2 inches of the roadway surface.
  - 2. Apply undiluted soapstock at a rate of 0.70 gal/yd<sup>2</sup>.
  - 3. Allow product to penetrate through the loosened material.
  - 4. Tight-blade road surface.

**3.20 EROSION CONTROL MULCHING**

- A. Conventional Mulching:**
  - 1. Use conventional mulching when the surface cannot be stabilized by seeding, due to season or ground conditions.
  - 2. Uniformly distribute mulch over the required areas, at a rate of 2 tons/acre for dry cereal straw, or 2.5 tons/acre for prairie hay.
  - 3. Work the mulch into the soil with a mulch tucker, designed to anchor the mulch into the soil, by means of dull blades or disks.

**3.20 EROSION CONTROL MULCHING (Continued)****B. Hydromulching:**

1. Place mulch and tackifier (if applicable) in equipment specifically manufactured for hydraulic mulching.
2. Mix materials with fresh, potable water using a combination of re-circulation through the equipment's pump and mechanical agitation to form a homogeneous slurry.
3. If necessary, dampen any dry, dusty soil as required to prevent balling of the material during application.
4. Apply hydromulch in multiple layers from opposing directions, where possible.
5. Apply the slurry evenly over all specified areas, at the minimum component material rates specified:
  - a. Wood Cellulose Mulch:
    - 1) Mulch: Minimum 3,000 lb/acre dry weight.
    - 2) Tackifier: Minimum 50 lb/acre.
  - b. Bonded Fiber Matrix: Minimum 3,000 lb/acre dry weight.
  - c. Mechanically Bonded Fiber Matrix: Minimum 3,000 lb/acre dry weight.
6. Retain and count empty bags of mulch to ensure final application rate.

**3.21 TURF REINFORCEMENT MATS**

Install according to the manufacturer's published installation literature for the product specified and application (slope or channel).

**3.22 INLET PROTECTION**

- A. Install inlet protection devices according to the manufacturer's recommendations.
- B. Remove the accumulated sediment, as required to maintain the inlet protection device in working order. Remove any accumulated sediment from streets open to traffic if it encroaches into the traveled roadway.

**3.23 FLOW TRANSITION MATS**

Install according to the manufacturer's published recommendations.

**3.24 GRID TIED CONCRETE BLOCK MAT**

Install according to the GTCBM supplier's recommendations, details, and the following:

**A. Installation Practices:**

1. **Standard Anchor Trench:** Excavate an 18 inch deep vertical trench. Bury 18 inches, or three blocks, of the mat in the trench, backfill, and compact.
2. **Edge Trench:** Excavate a 12 inch trench at a 45 degree angle to the surface. Bury 12 inches, or two blocks, of the mat in the trench, backfill, and compact.

**3.24 GRID TIED CONCRETE BLOCK MAT (Continued)****3. Leading and Ending Anchor Trench:**

- a. Excavate an 18 inch deep vertical trench. Bury 18 inches, or three blocks, of the mat in the trench, backfill, and compact.
- b. Install U-anchors at 2 foot increments perpendicular to flow directly behind the first exposed block.

**4. Seams:** Supply GTCBM in lengths and widths that minimize seams to the extent possible. Where required, construct seams as follows:

- a. **Standard Seams:** Seams in channels parallel with the direction of flow and all seams on slopes that are not exposed to concentrated flow:
  - 1) Extend geogrid 12 inches and RECP 6 inches under the adjacent mat.
  - 2) Secure seam with U-anchors at 2 foot increments directly behind the first row of blocks on the adjacent mat. Alternatively, secure adjacent mats with zip ties at 1 foot intervals. Encompass at least 3 cords of each mat with zip ties.
- b. **Overlap Seams:** Where seams are perpendicular to flow in a channel:
  - 1) Install upstream mat and flip trailing edge back 24 inches.
  - 2) Excavate 2.25 inches of soil 18 inches from the trailing end of the upstream mat.
  - 3) Place the leading edge of the downstream mat into the shallow trench. Backfill and tamp soil into the mat filling voids between blocks. Place seed over the soil.
  - 4) Flip the end of the upstream mat over the soil-covered and seeded area.
  - 5) Secure overlap with U-anchors at 2 foot increments directly behind the first block of the up-channel mat. Alternatively, secure overlap with zip ties at 1 foot intervals. Encompass at least 3 cords of each mat with zip ties.

**5. Concrete GTCBM Trench:** Where GTCBM is installed at a culvert or storm pipe outlet, construct a concrete GTCBM trench to secure the end of the mat and prevent undermining of the outlet.

- a. Excavate an 18 inch wide by 18 inch deep trench at the end of the pipe apron.
- b. Install 36 inches of GTCBM in trench with 18 inches flat along the bottom of the trench and 18 inches extending vertically up the wall of the trench to the top of the surface of the channel.
- c. Backfill channel with Class C concrete.
- d. If a concrete footing is specified for the apron, and a cast-in-place footing is provided, the concrete GTCBM trench may be combined with the footing by extending 36 inches of GTCBM into the footing in lieu of constructing a separate trench.

**B. General Site Preparation:**

1. Complete final grading and restore topsoil if previously stripped.
2. Ensure ground surface is smooth and free of rocks, clods, roots, or debris.
3. Perform seedbed preparation and apply seed according to [Section 9010](#) prior to placement of the GTCBM.

**C. Slopes:**

1. Construct an anchor trench at the top and bottom of the slope.
2. Begin the installation at the top of the slope.
3. Unroll GTCBM down the slope to the bottom anchor trench.

**3.24 GRID TIED CONCRETE BLOCK MAT (Continued)**

4. If slope length exceeds the allowable length of GTCBM roll, install subsequent mats end to end with a standard seam.
5. Install adjacent rolls and splice with a standard seam.

**D. Channels:****1. GTCBM Perpendicular to Flow:**

- a. Place mats continuously across the width of the channel, including side slopes, without any seams parallel to the direction of flow.
- b. Begin installation downstream and move up the channel.
- c. Place the first mat across the channel.
- d. Install an ending anchor trench at the terminal end of the downstream mat.
- e. Install subsequent mats upstream, splicing each abutting mat with a standard seam.
- f. Construct a leading anchor trench at the upstream end of the installation or a concrete GTCBM trench if specified.

**2. GTCBM Parallel to Flow:**

- a. Begin at the upstream end of the installation, utilizing multiple mats as necessary to achieve the width specified in the contract documents.
- b. Construct a leading anchor trench at the upstream end of the installation or a concrete GTCBM trench if specified.
- c. Unroll mats downstream, securing parallel edges with standard seams.
- d. If installation length requires multiple rolls of GTCBM, join ends of subsequent mats together with an overlap seam.
- e. Install an ending anchor trench at the terminal end of the downstream mat.

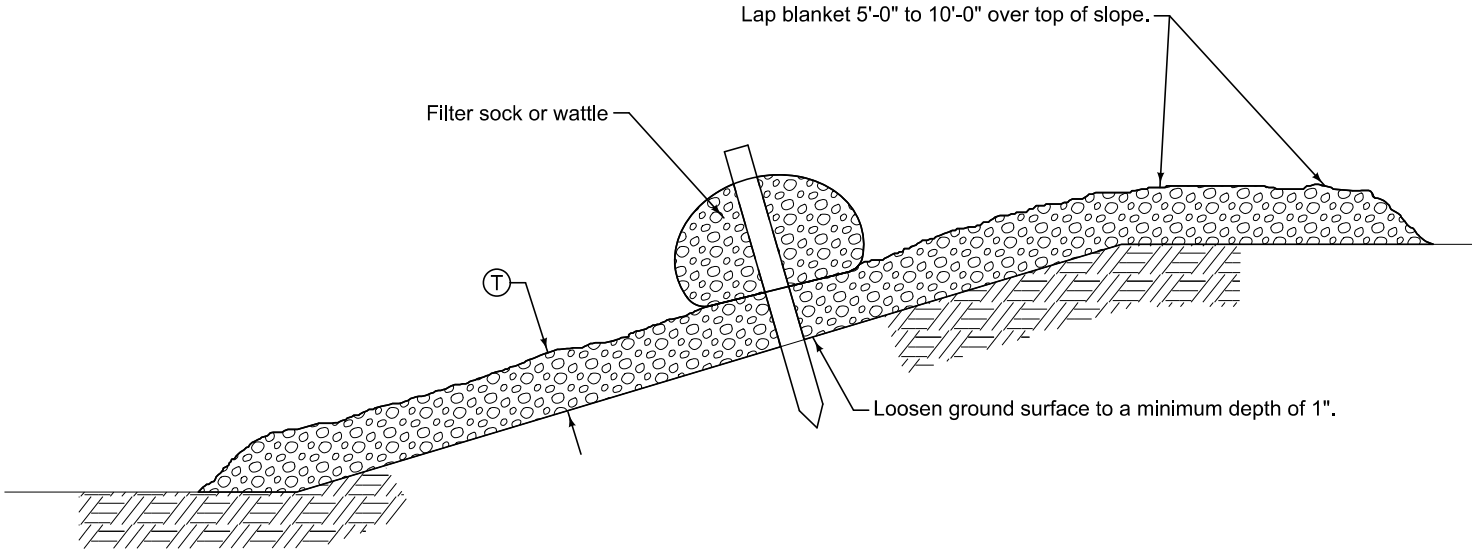
**3.25 TEMPORARY EROSION CONTROL SEEDING**

Comply with [Section 9010](#).

END OF SECTION



Compost blanket may be vegetated or unvegetated as specified in the contract documents.



COMPOST BLANKET DETAIL

MINIMUM COMPOST BLANKET THICKNESS

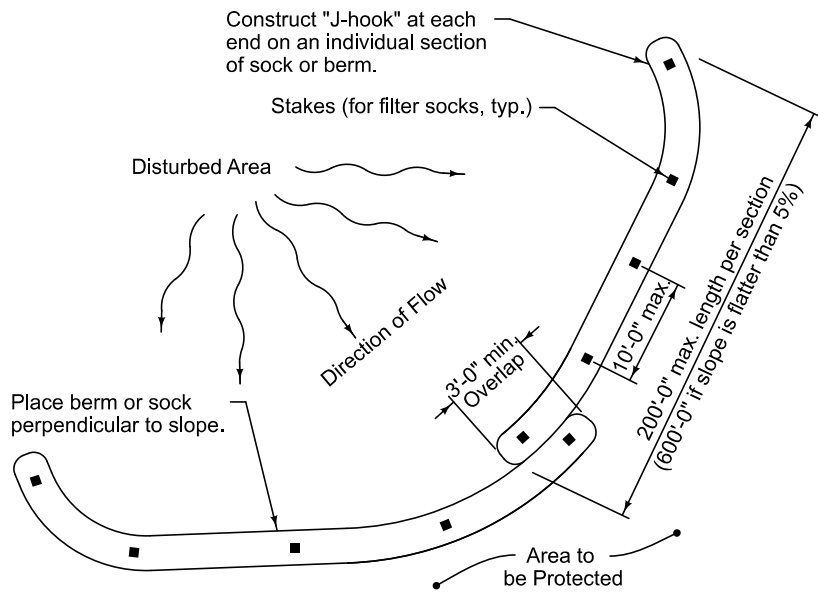
SLOPE	BLANKET THICKNESS Ⓧ
3:1	3"
≤ 4:1	2"

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	<b>9040.101</b>
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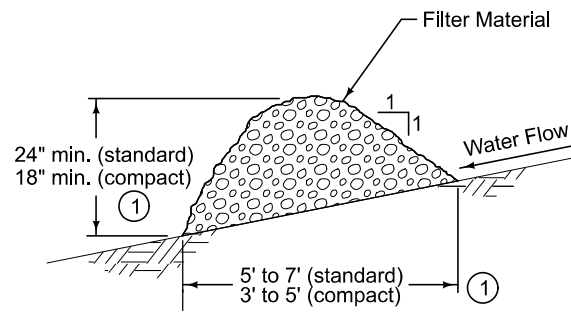
SUDAS Standard Specifications

**COMPOST BLANKET**

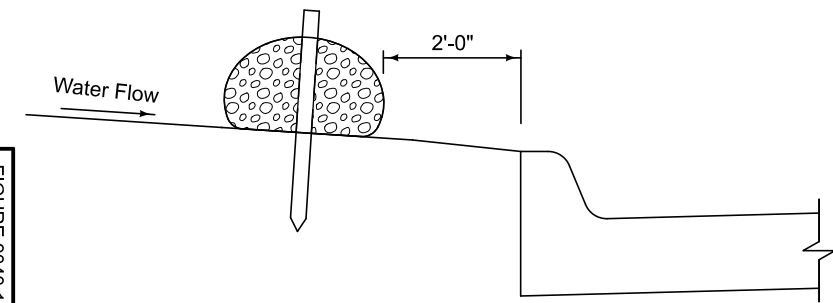




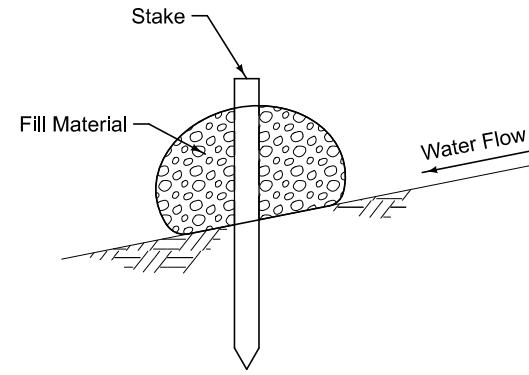
PLAN VIEW OF SLOPE  
(for sediment and slope control)



FILTER BERM



SECTION VIEW AT STREET  
(for perimeter control along street)



FILTER SOCK

Berm shown is typical for slopes flatter than 3:1. For steeper slopes, increase berm size as directed by the Engineer.

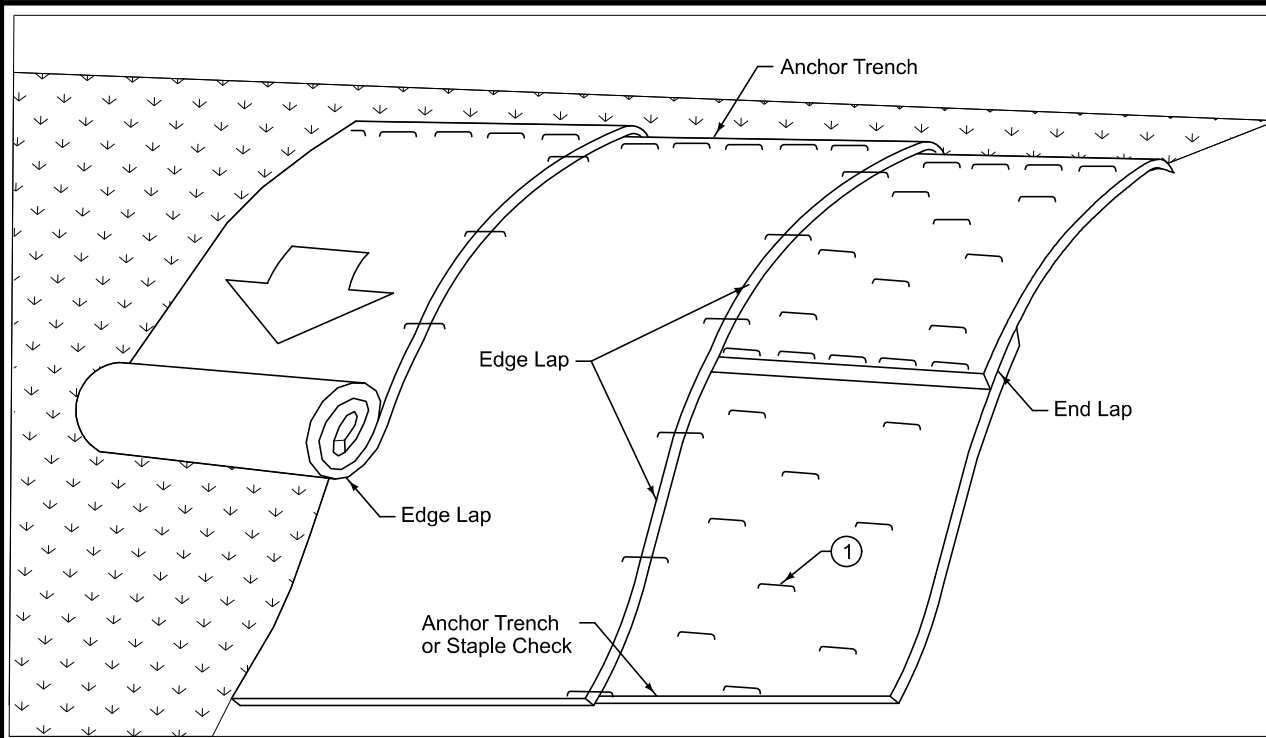
Place berm in uncompacted windrow perpendicular to the slope at locations specified in the contract documents.

Filter sock diameter as specified in the contract documents.

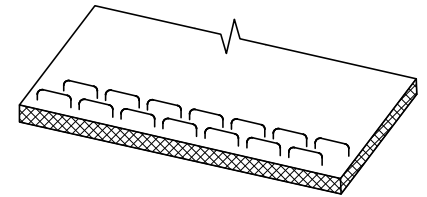
① Filter berm size (standard or compact) as specified in the contract documents.

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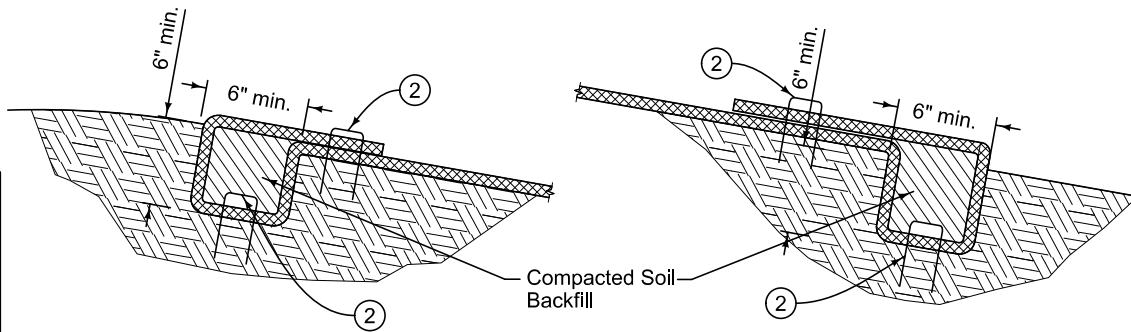




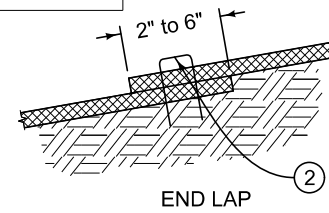
- ① Secure blanket to ground according to manufacturer's recommended anchoring pattern and anchor density (minimum 1.3 anchors per square yard).
- ② Install staples at 1 foot on center.



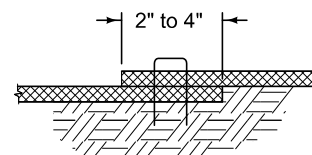
**STAPLE CHECK**  
(Two rows of staples at 4" on center and staggered 4" apart)



**UPSLOPE AND TERMINAL END ANCHOR TRENCH**



**END LAP**



**EDGE LAP**  
(4'-0" min. anchor spacing)

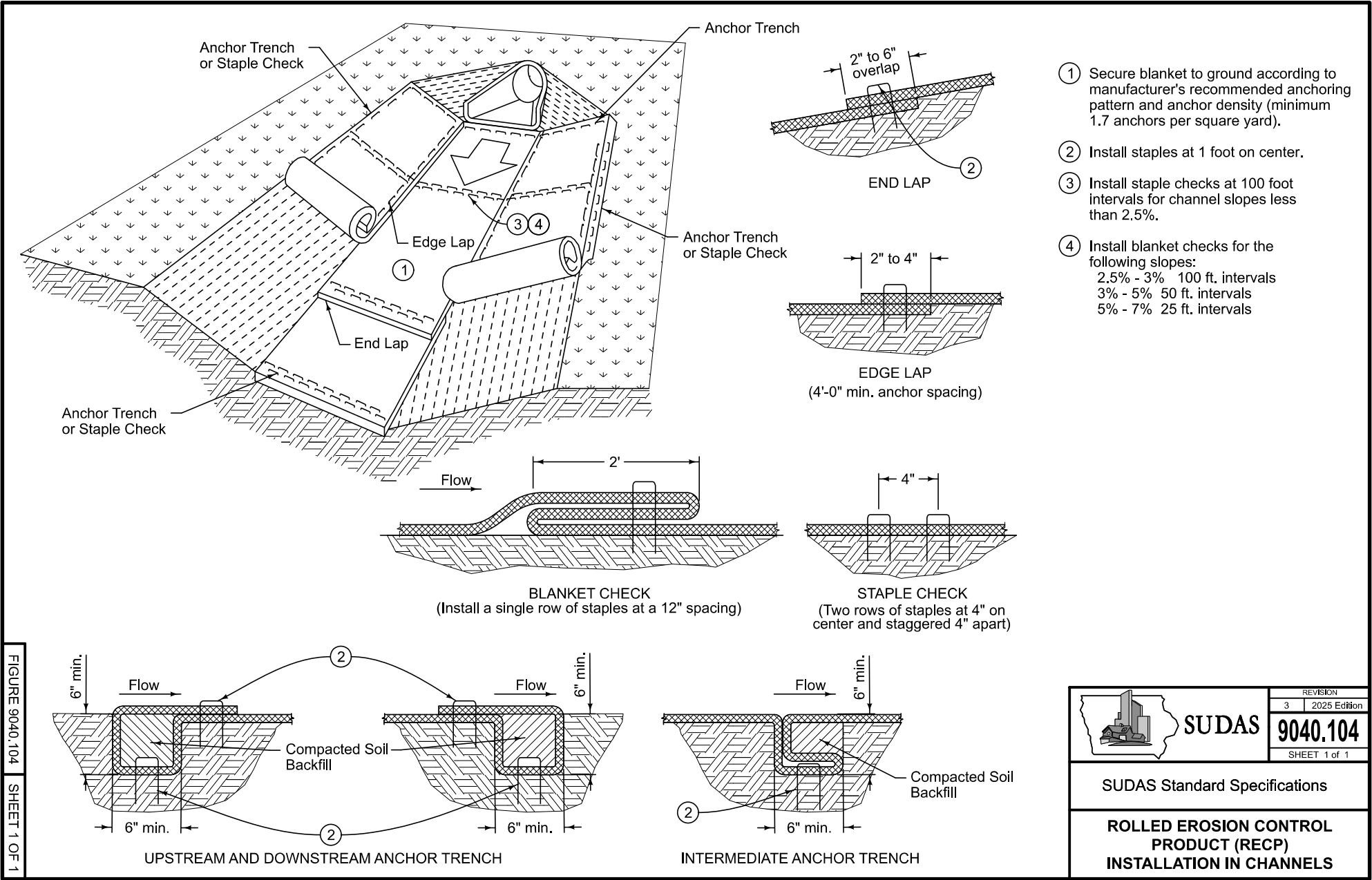
FIGURE 9040.103 SHEET 1 OF 1

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SUDAS Standard Specifications

**ROLLED EROSION CONTROL  
PRODUCT (RECP)  
INSTALLATION ON SLOPES**





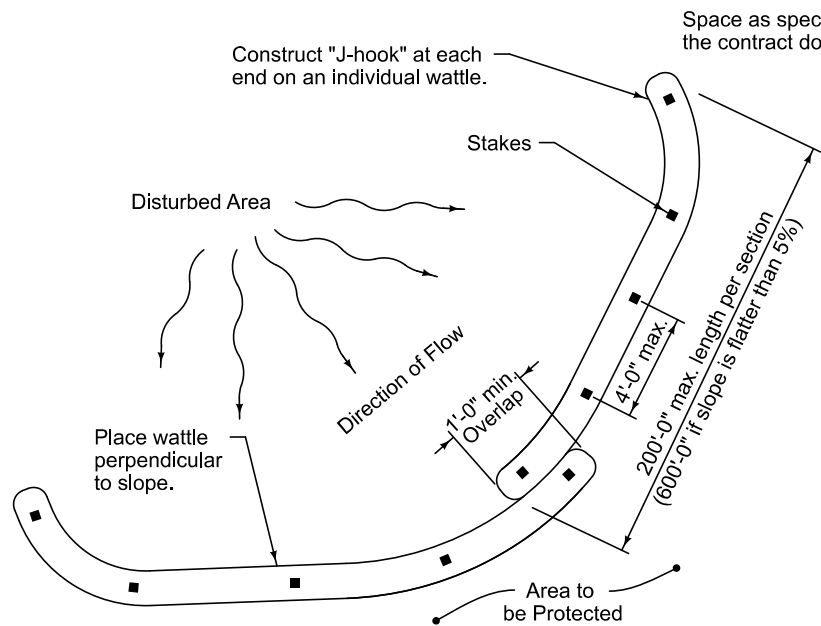
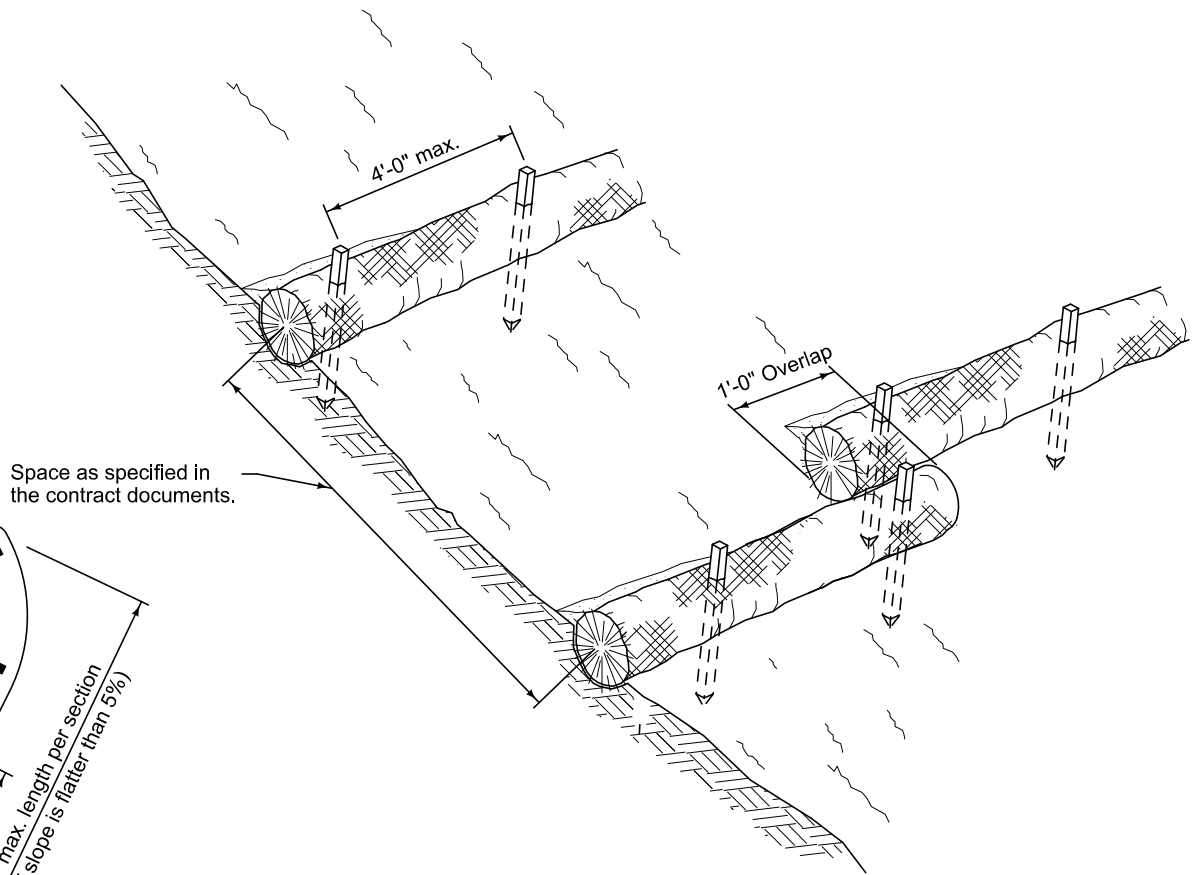
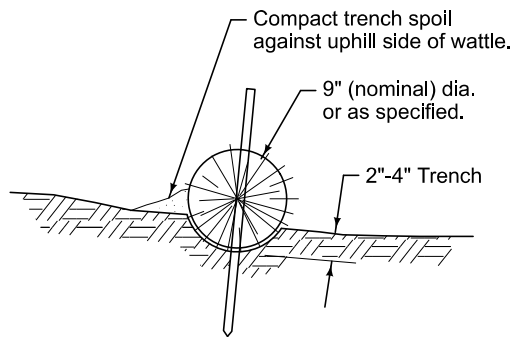
- ① Secure blanket to ground according to manufacturer's recommended anchoring pattern and anchor density (minimum 1.7 anchors per square yard).
- ② Install staples at 1 foot on center.
- ③ Install staple checks at 100 foot intervals for channel slopes less than 2.5%.
- ④ Install blanket checks for the following slopes:  
 2.5% - 3% 100 ft. intervals  
 3% - 5% 50 ft. intervals  
 5% - 7% 25 ft. intervals

FIGURE 9040.104 SHEET 1 OF 1

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	SUDAS 9040.104
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SUDAS Standard Specifications	
ROLLED EROSION CONTROL PRODUCT (RECP) INSTALLATION IN CHANNELS	




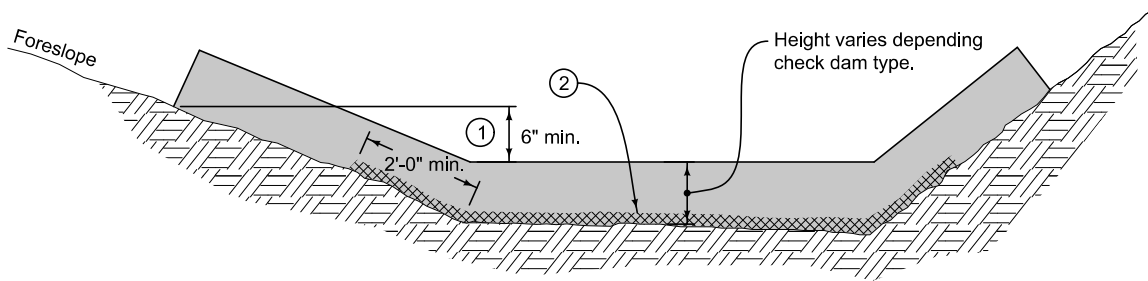




PLAN VIEW OF SLOPE  
(for sediment and slope control)

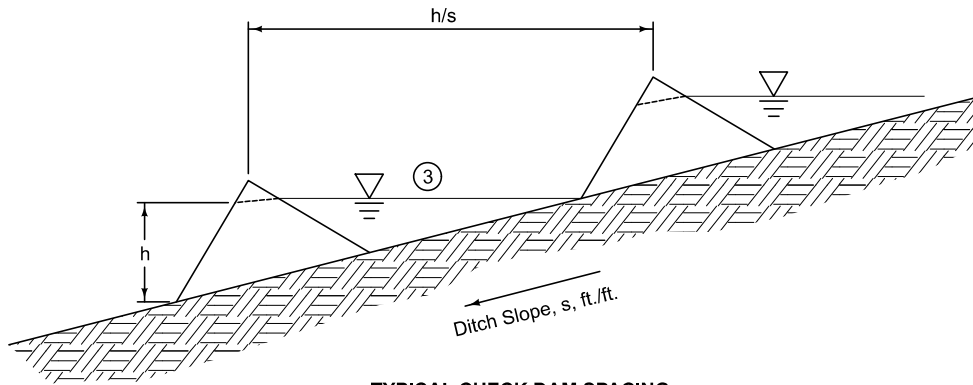
FIGURE 9040.105 SHEET 1 OF 1

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	<b>SUDAS</b> <b>9040.105</b> SHEET 1 of 1
SUDAS Standard Specifications	
<b>WATTLE</b>	




**TYPICAL CHECK DAM SECTION**  
 (Applies to silt fence, fiber log, and manufactured check dam devices)

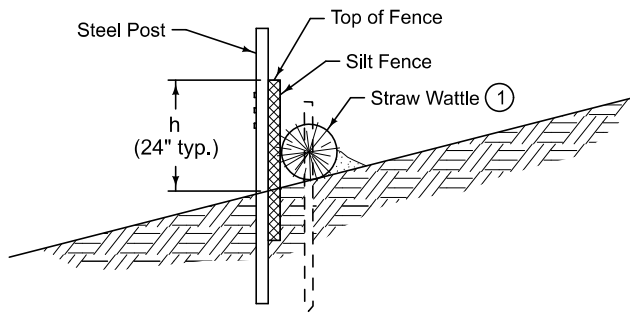
- ① Extend check dam up sides of slope so the bottom of the check dam is at least 6 inches higher than the check dam crest.
- ② When specified, install an 8 foot wide strip of RECP under the check dam. Extend RECP up the slopes a minimum of 2 feet from the toe of the channel.
- ③ Space check dams so crest of downstream check dam is level with the base of the upstream check dam.



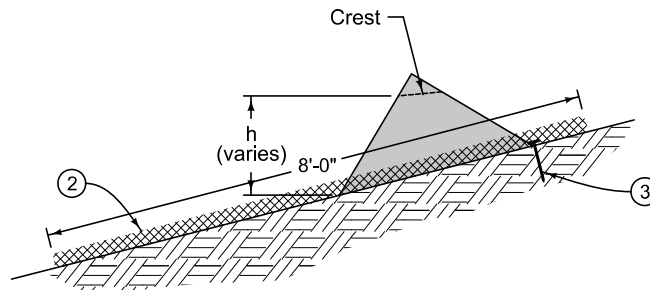
**TYPICAL CHECK DAM SPACING**

FIGURE 9040.106 SHEET 1 OF 2

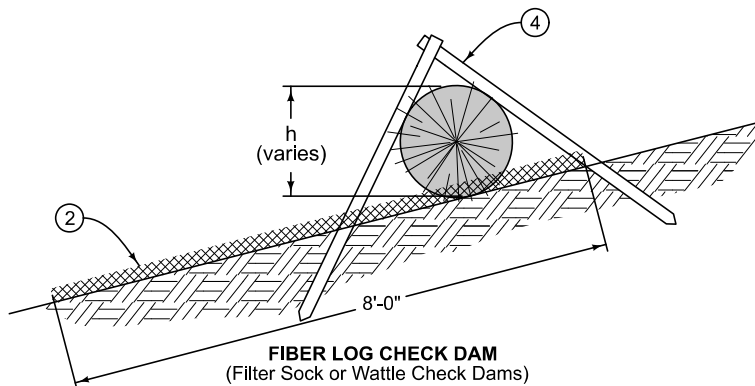
	REVISION 3   2025 Edition	
	<b>SUDAS</b> <b>9040.106</b> SHEET 1 of 2	
SUDAS Standard Specifications		
<b>CHECK DAMS</b>		



**SILT FENCE CHECK DAM**  
 (See Figure 9040.119 for installation  
 of Silt Fence Check Dams)




**MANUFACTURED CHECK DAM**  
 (Synthetic Permeable and  
 Triangular Foam Check Dams)

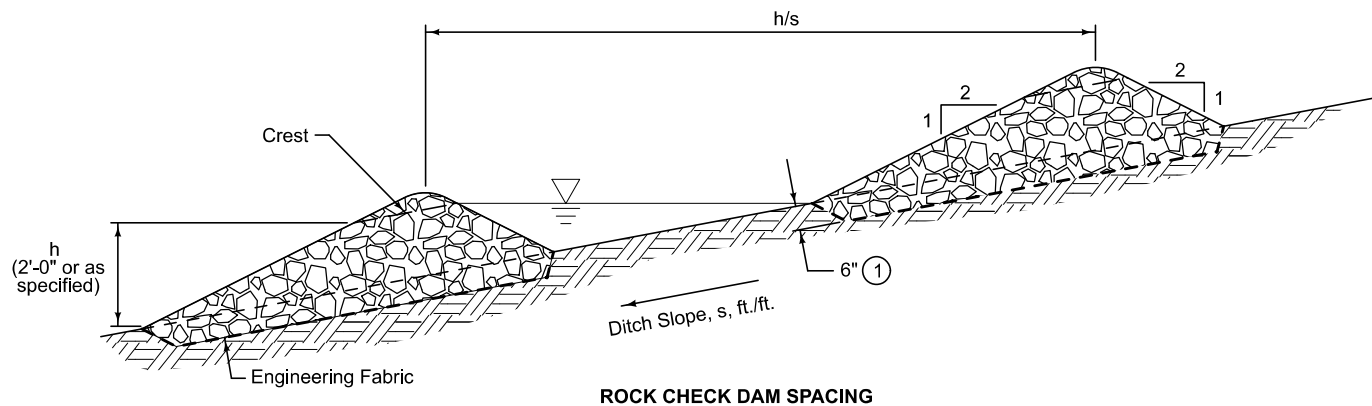


**FIBER LOG CHECK DAM**  
 (Filter Sock or Wattle Check Dams)

- ① When specified, place a straw wattle against the upstream face of silt fence check dams. Secure wattle in place with wood stakes.
- ② When specified, install an 8 foot wide strip of RECP under the check dam. Extend RECP up the slopes a minimum of 2 feet from the toe of the channel.
- ③ Anchor manufactured check dam according to the manufacturer's recommendations.
- ④ Install two stakes at a 45 degree angle to the surface. Space stakes at 1 foot intervals.

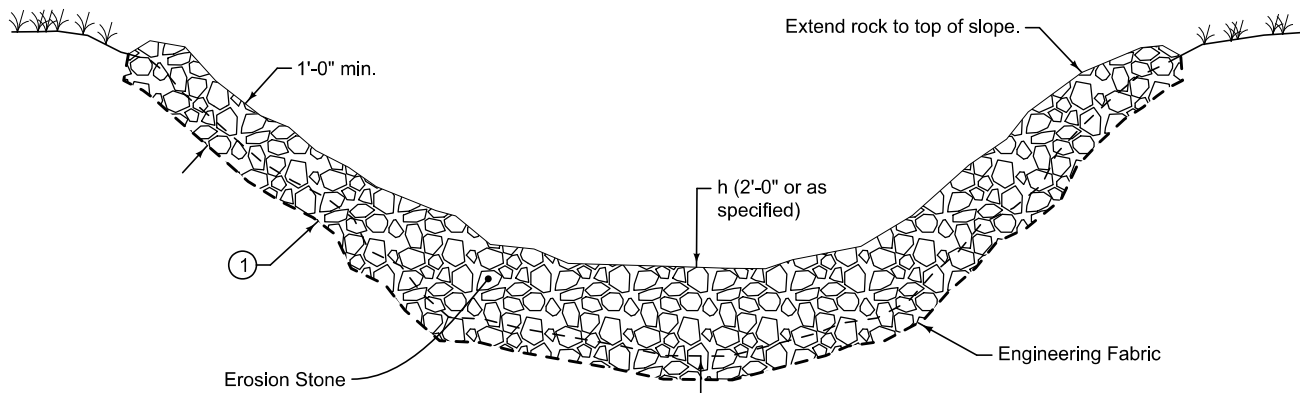
	<b>SUDAS</b>	<small>REVISION</small> 3   2025 Edition
	<b>9040.106</b>	<small>SHEET 2 of 2</small>
	SUDAS Standard Specifications	
<b>CHECK DAMS</b>		





**ROCK CHECK DAM SPACING**

① Key rock check dam into bottom and sides of the channel a minimum of 6 inches.



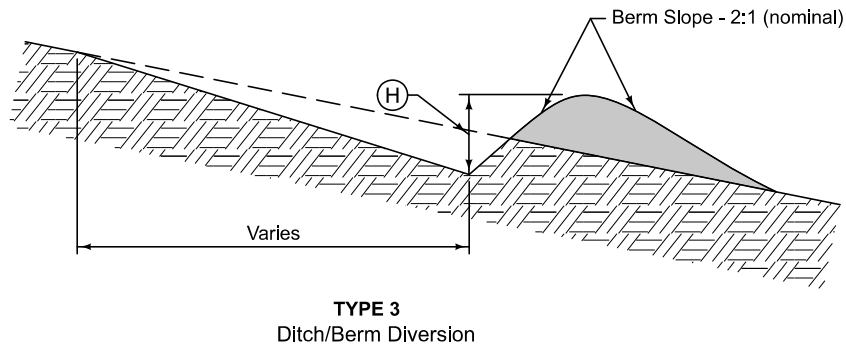
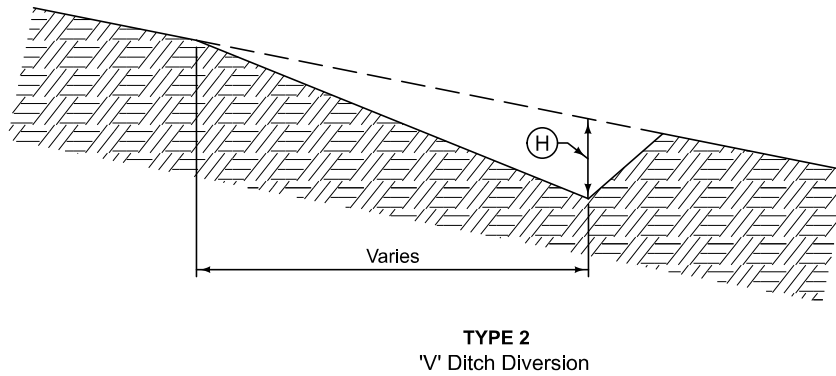
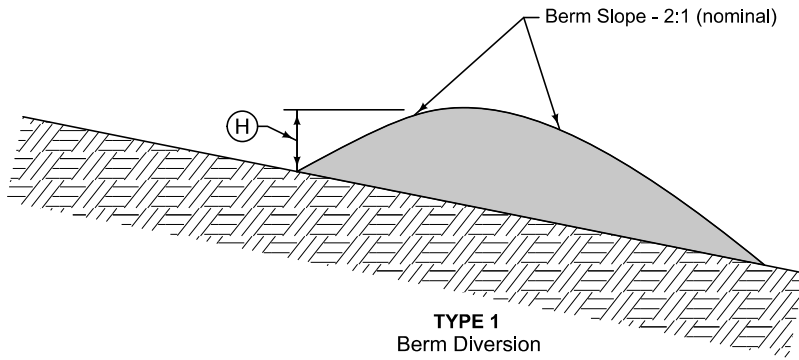
**ROCK CHECK DAM SECTION**

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SHEET 1 of 1	

SUDAS Standard Specifications

**ROCK CHECK DAM**






Diversion Types 1, 2, and 3 may be used interchangeably unless otherwise specified in the contract documents.

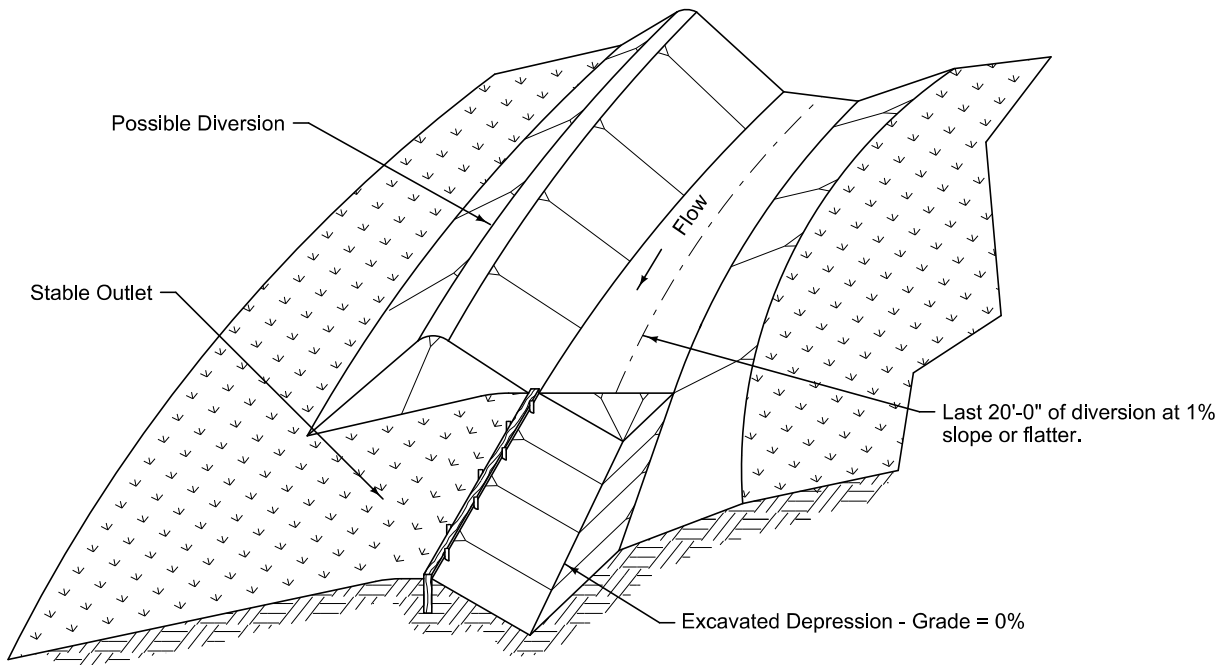
Alternate configurations may be used upon approval from the Engineer.

(H) Total height of diversion (swale and berm): 18 inch minimum or as specified.

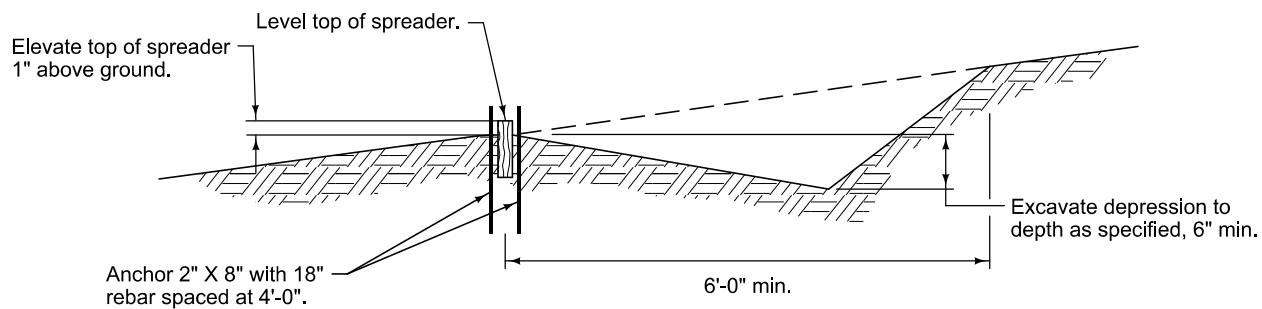
	REVISION 2   2025 Edition
	<b>9040.108</b>
	SHEET 1 of 1
SUDAS Standard Specifications	
<b>TEMPORARY EARTH DIVERSION BERMS</b>	








PERSPECTIVE VIEW

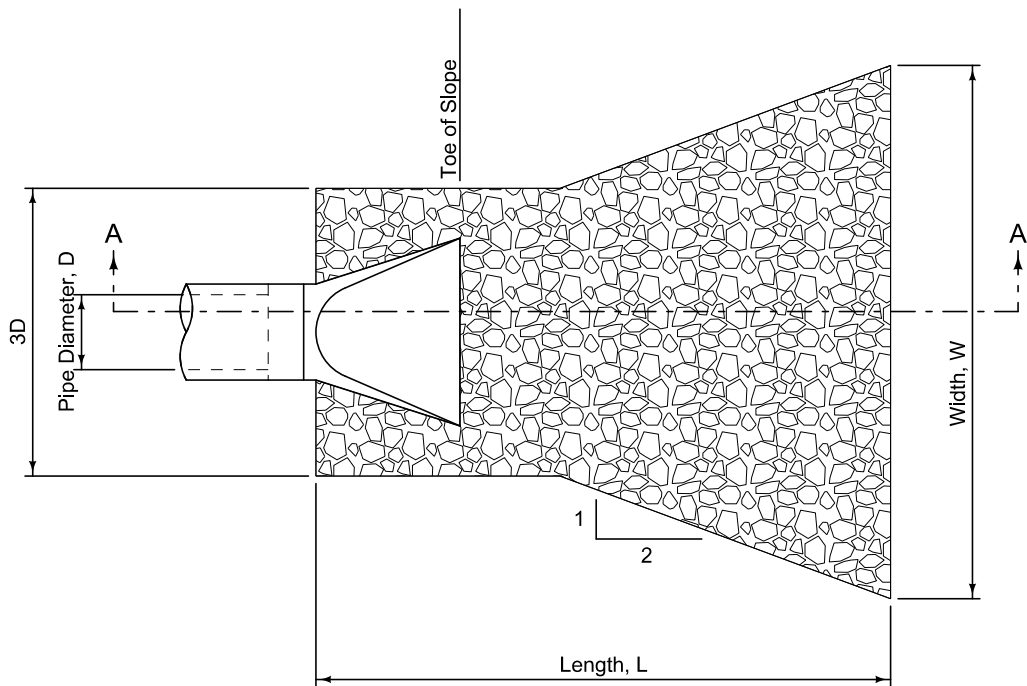


CROSS-SECTION

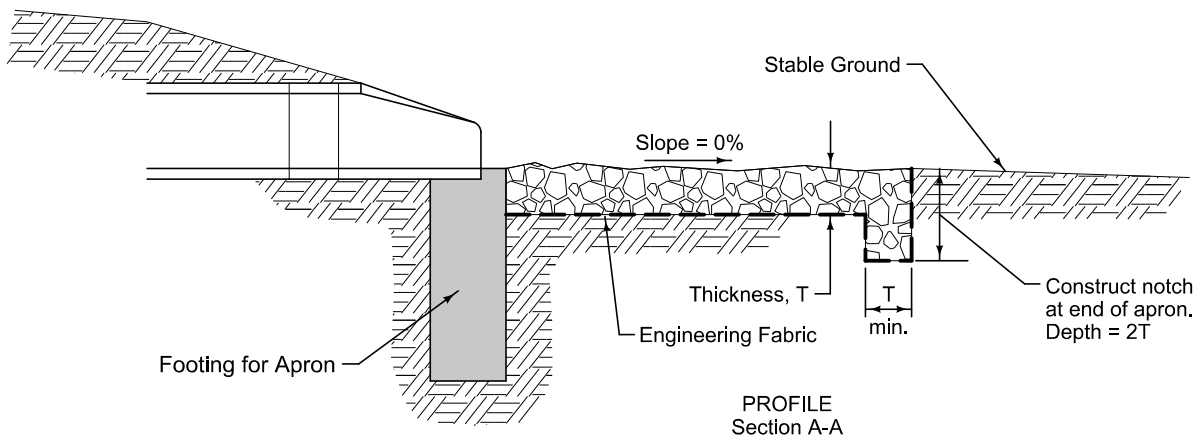
FIGURE 9040.109 SHEET 1 OF 1


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	<b>SUDAS</b> <b>9040.109</b>
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SUDAS Standard Specifications	
LEVEL SPREADER	



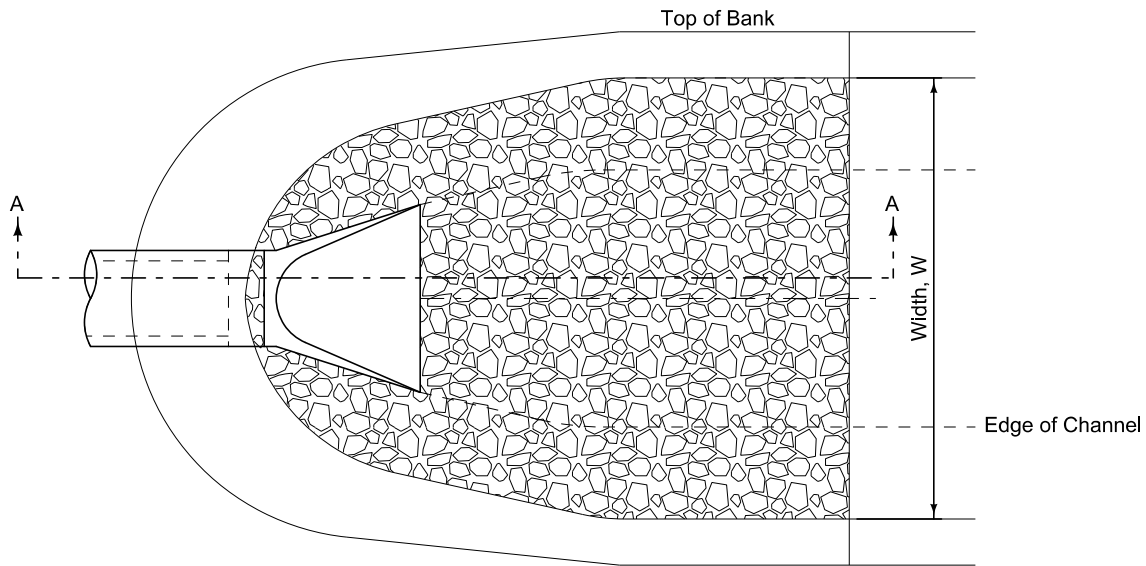


PLAN

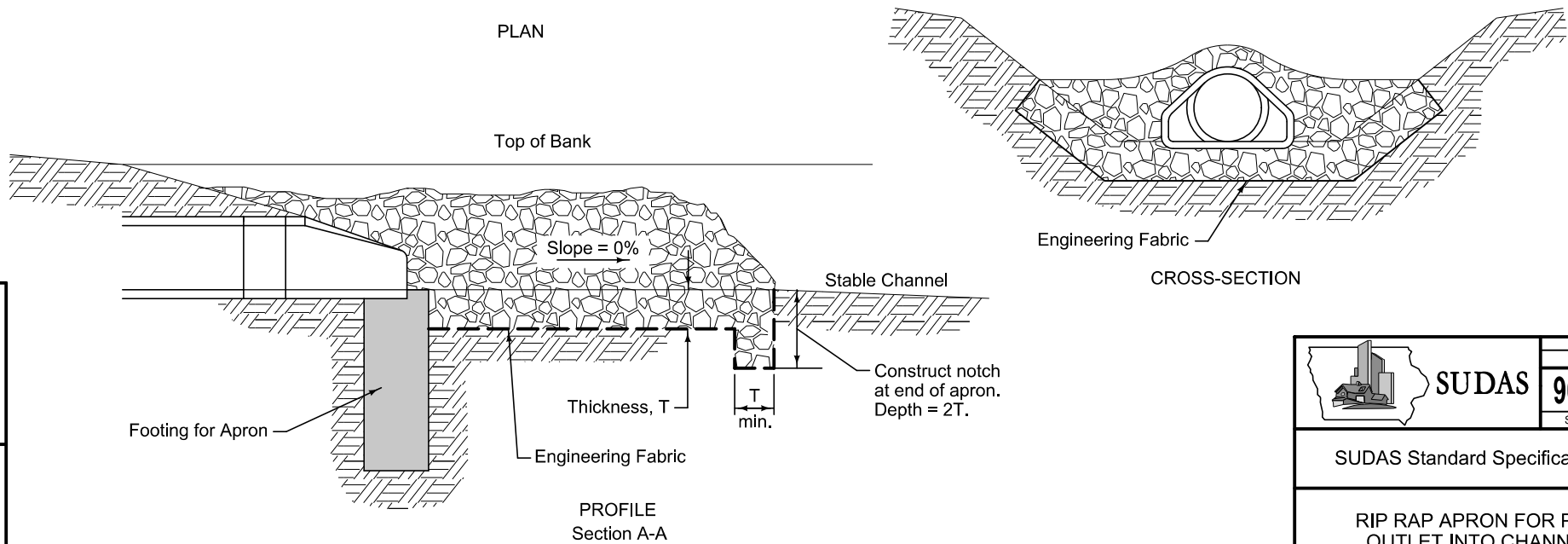


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SUDAS Standard Specifications			
RIP RAP FOR PIPE OUTLET ONTO FLAT GROUND			






PLAN



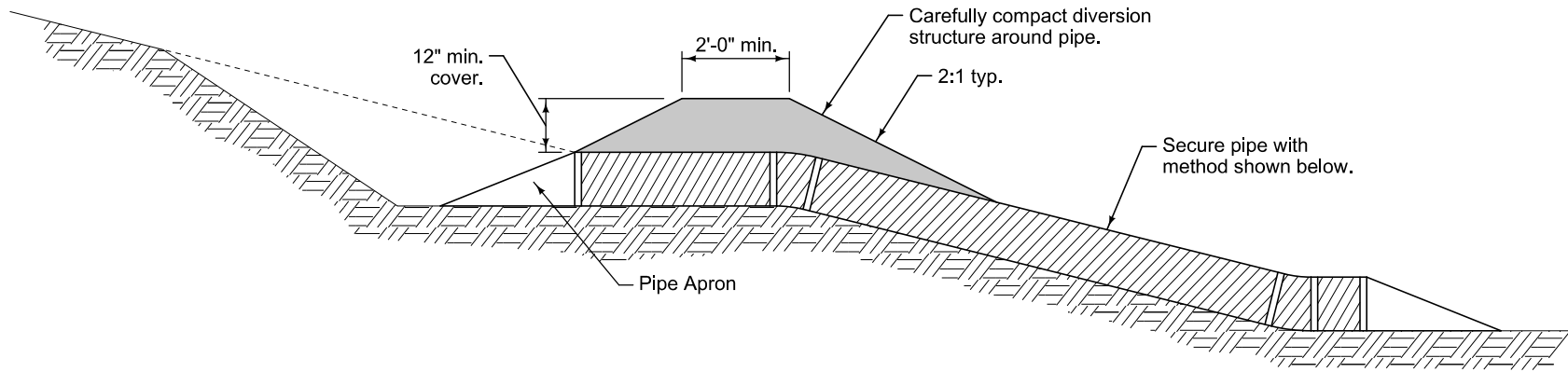
PROFILE  
Section A-A

CROSS-SECTION

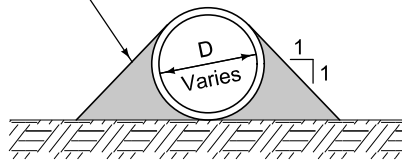
FIGURE 9040.111 SHEET 1 OF 1

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	<b>SUDAS 9040.111</b>		SHEET 1 of 1
	SUDAS Standard Specifications		
<b>RIP RAP APRON FOR PIPE OUTLET INTO CHANNEL</b>			

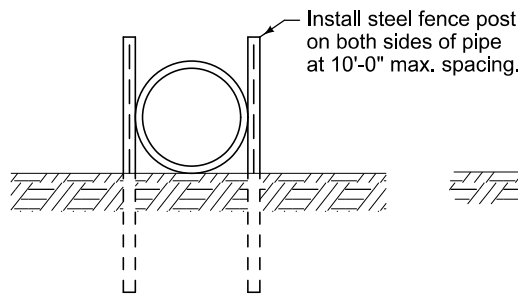




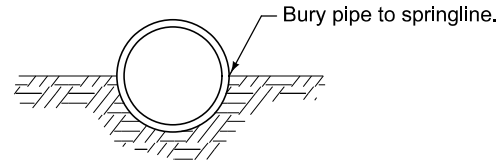
Place and compact fill along sides of pipe.



OPTION A




OPTION B



OPTION C  
(May also be combined with options A or B)

**SLOPE DRAIN ANCHORING OPTIONS**  
(Options A, B, and C are interchangeable unless otherwise specified in the contract documents)

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	SHEET 1 of 1
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TEMPORARY PIPE SLOPE DRAIN	





- ① Barrel length and diameter as specified in the contract documents.
- ② Riser pipe and base/dewatering device: See Figure 9040.115.
- ③ Anti-vortex device: See Figure 9040.116.

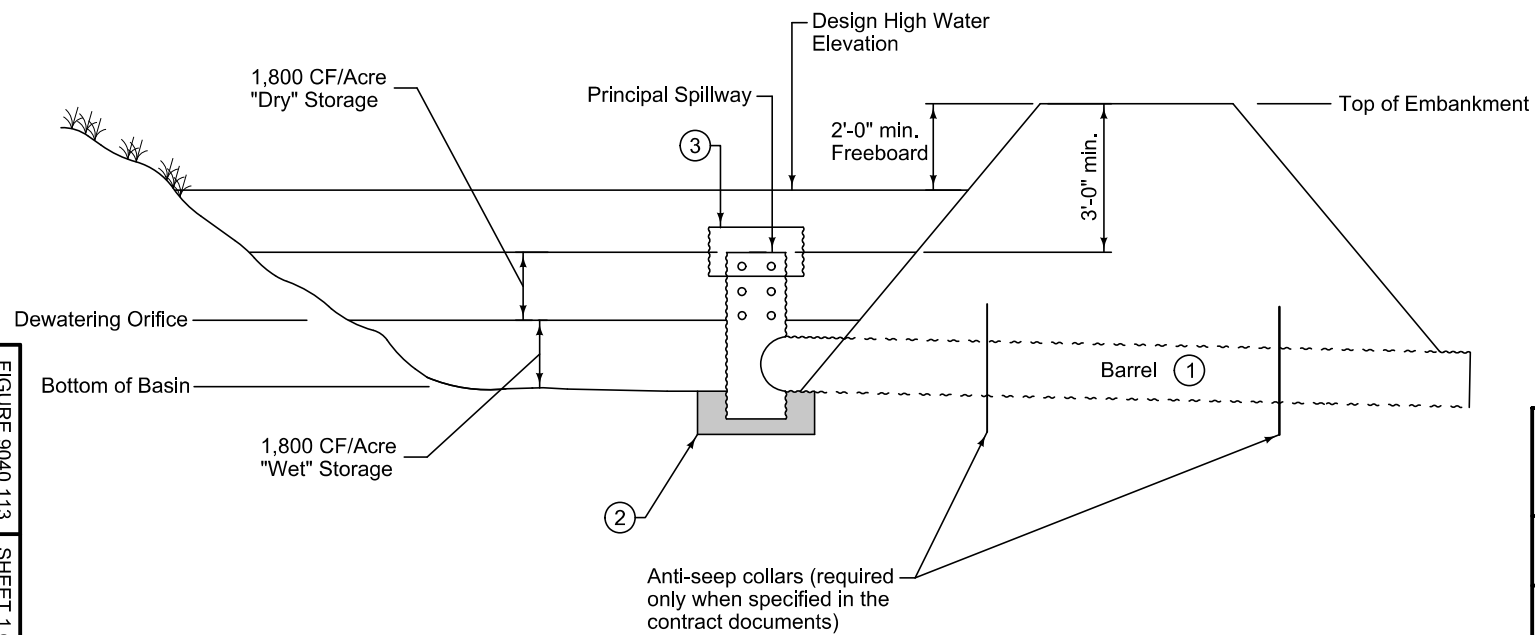



FIGURE 9040.113 SHEET 1 OF 1

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	2   10-21-14
	<b>9040.113</b>
SHEET 1 of 1	
SUDAS Standard Specifications	
SEDIMENT BASIN WITHOUT EMERGENCY SPILLWAY	



- ① Barrel length and diameter as specified in the contract documents.
- ② Riser pipe and base/dewatering device: See Figure 9040.115.
- ③ Anti-vortex device: See Figure 9040.116.

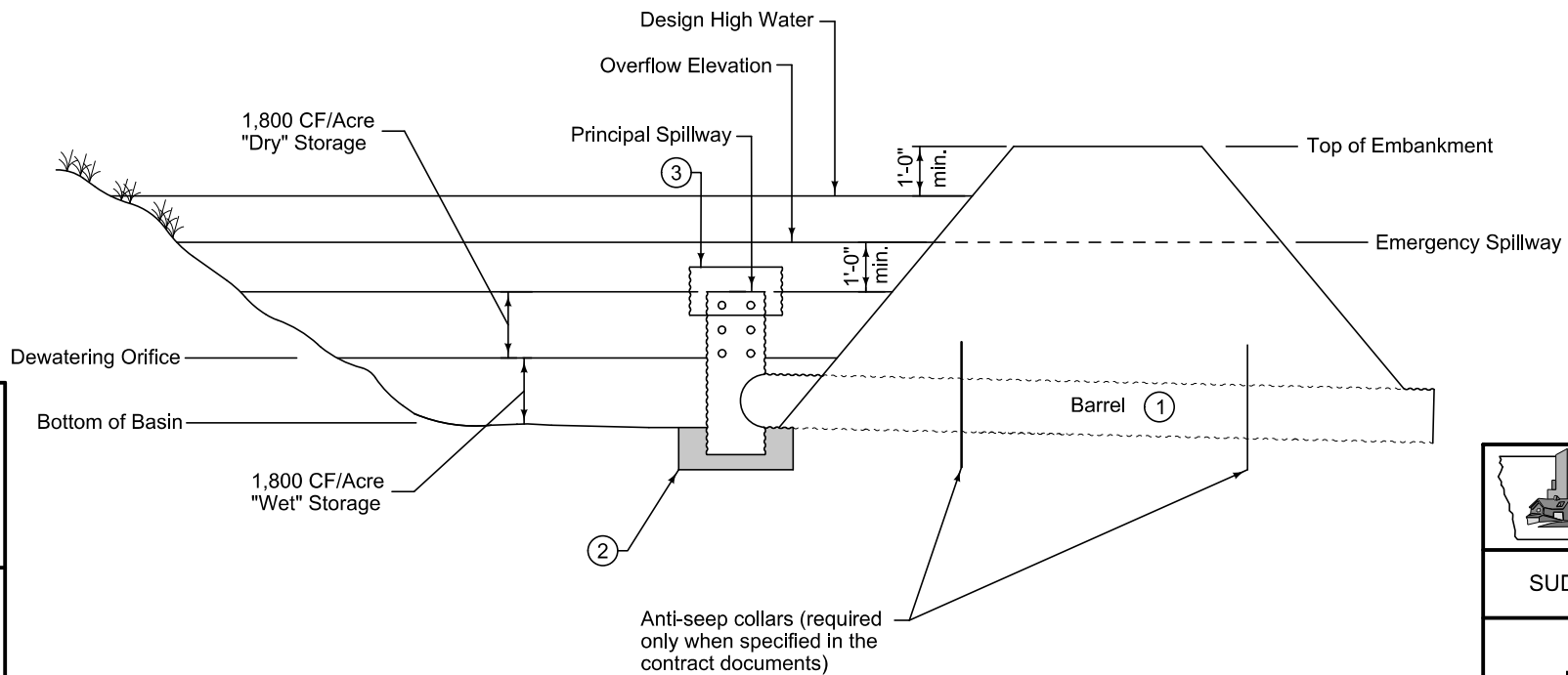

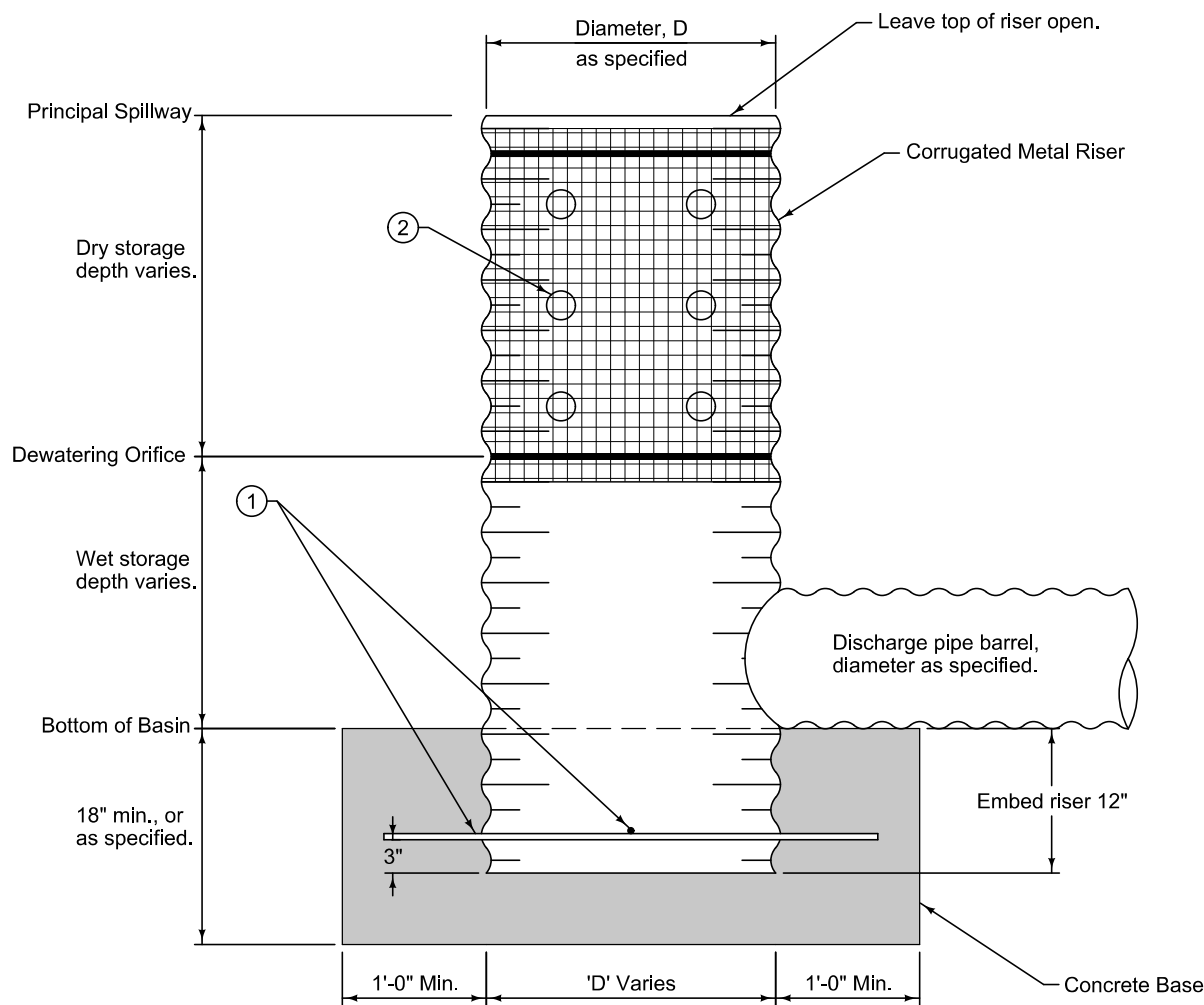


FIGURE 9040.114 SHEET 1 OF 1


	REVISION	2	10-21-14
	<b>SUDAS 9040.114</b>		
	SHEET 1 of 1		
SUDAS Standard Specifications			
SEDIMENT BASIN WITH EMERGENCY SPILLWAY			



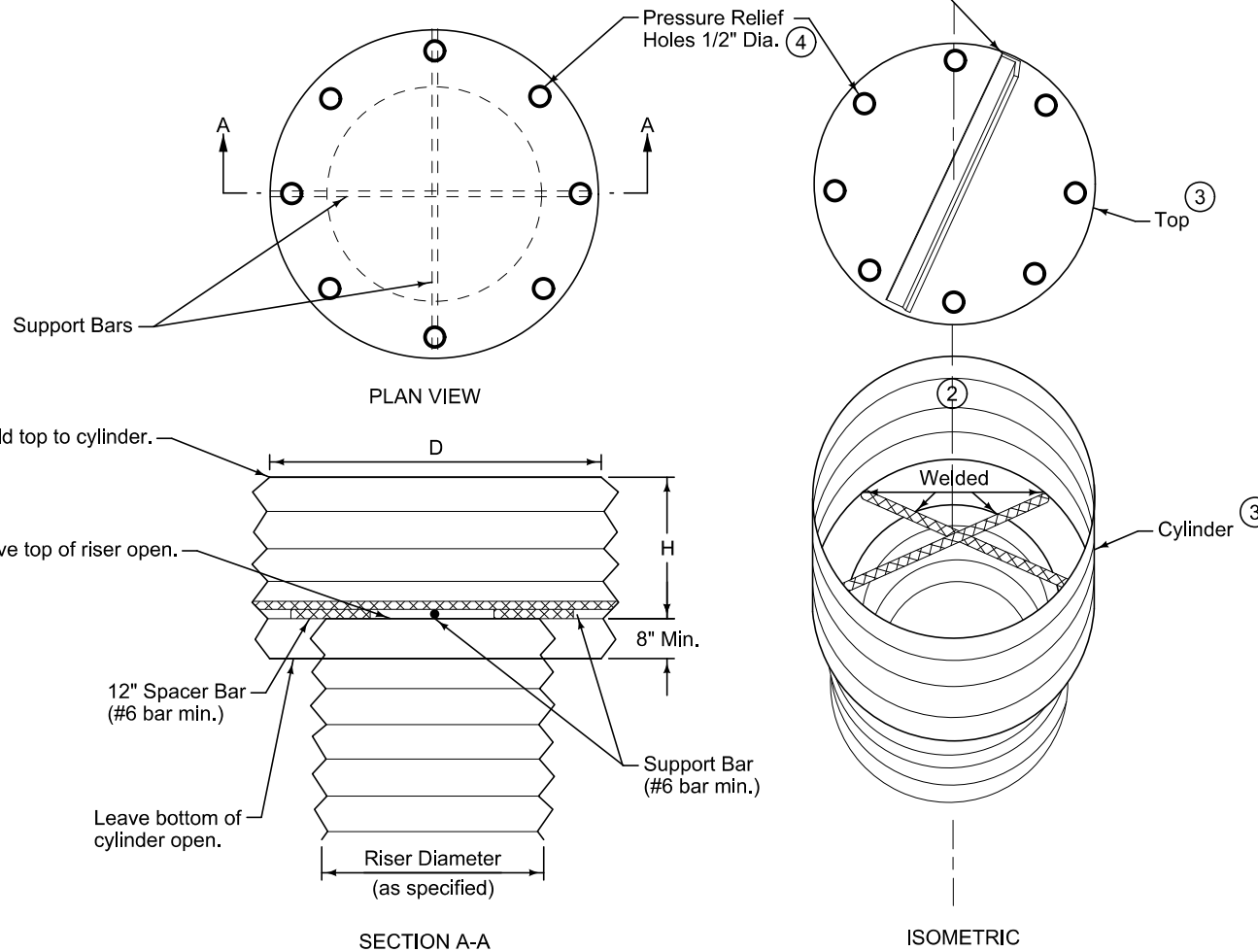


Elevations and dimensions not given are as specified in the contract documents.

- ① Drill four, 5/8 inch diameter holes, 3 inches from bottom of riser pipe and insert two, #4 bars in an "X" configuration. Length of bars = D+16 inches
- ② Provide perforation configuration as specified in the contract documents.


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SEDIMENT BASIN DEWATERING DEVICE (PERFORATED RISER)		

Orient top stiffener (if required) perpendicular to corrugations and weld to top. ①



Alternate anti-vortex device configurations may be utilized upon approval of the Engineer.


- ① See sheet 2 for dimensions of cylinder support bars, top plate, and top stiffener.
- ② Firmly attach the anti-vortex cylinder to the top of the riser by welding or other means.
- ③ Corrugated metal or 1/8 inch steel plate cylinder and top.
- ④ Pressure relief holes may be omitted if ends of corrugations are left fully open when the top is attached.

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RISER	CYLINDER				MINIMUM TOP	
Diameter (in.)	Diameter (in.)	Thickness (gage)	Height (H) (in.)	Minimum Size Support Bar	Thickness	Stiffener
12	18	16	6	#6 rebar or 1 1/2" X 3/16" angle	16 ga F & C	----
15	21	16	7	#6 rebar or 1 1/2" X 3/16" angle	16 ga F & C	----
18	27	16	8	#6 rebar or 1 1/2" X 3/16" angle	16 ga F & C	----
21	30	16	11	#6 rebar or 1 1/2" X 3/16" angle	16 ga (C), 14 ga (F)	----
24	36	16	13	#6 rebar or 1 1/2" X 3/16" angle	16 ga (C), 14 ga (F)	----
27	42	16	15	#6 rebar or 1 1/2" X 3/16" angle	16 ga (C), 14 ga (F)	----
36	54	16	17	#8 rebar	14 ga (C), 12 ga (F)	----
42	60	16	19	#8 rebar	14 ga (C), 12 ga (F)	----
48	72	16	21	1 1/4" pipe or 1 1/4" X 1 1/4" X 1/4" angle	14 ga (C), 10 ga (F)	----
54	78	16	25	1 1/4" pipe or 1 1/4" X 1 1/4" X 1/4" angle	14 ga (C), 10 ga (F)	----
60	90	14	29	1 1/2" pipe or 1 1/2" X 1 1/2" X 1/4" angle	12 ga (C), 8 ga (F)	----
66	96	14	33	2" pipe or 2" X 2" X 1/4" angle	12 ga (C), 8 ga (F)	2" X 2" X 1/4" angle
72	102	14	36	2" pipe or 2" X 2" X 1/4" angle	12 ga (C), 8 ga (F)	2 1/2" X 2 1/2" X 1/4" angle
78	114	14	39	2 1/2" pipe or 2" X 2" X 1/4" angle	12 ga (C), 8 ga (F)	2 1/2" X 2 1/2" X 1/4" angle
84	120	12	42	2 1/2" pipe or 2" X 2" X 1/4" angle	12 ga (C), 8 ga (F)	2 1/2" X 2 1/2" X 5/16" angle

Notes:

- The criterion for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.
- C - Corrugated F - Flat.

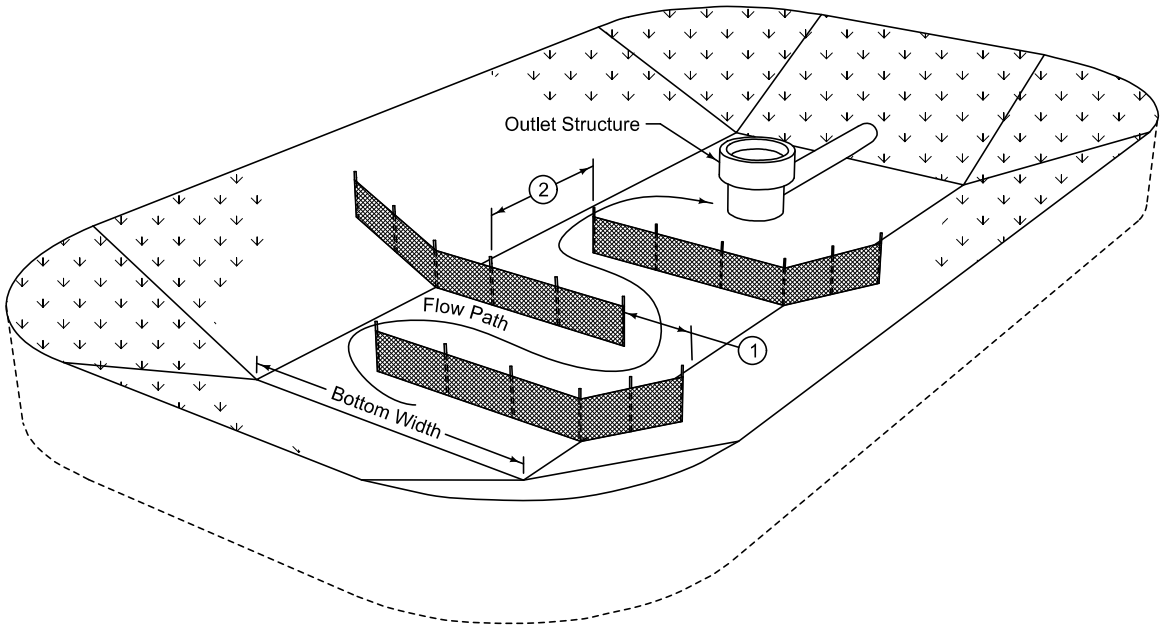
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ANTI-VORTEX DEVICE		





Sediment baffles improve sediment capture by increasing the length that flow must travel through a sediment basin or sediment trap.

- ① Construct sediment baffle by installing rows of silt fence across the bottom of the sediment basin or sediment trap leaving an opening equal to 25% of the bottom width on alternating sides.
- ② Install the number of baffles specified in the contract documents. Space baffles evenly between the inlet and outlet of the basin or trap.



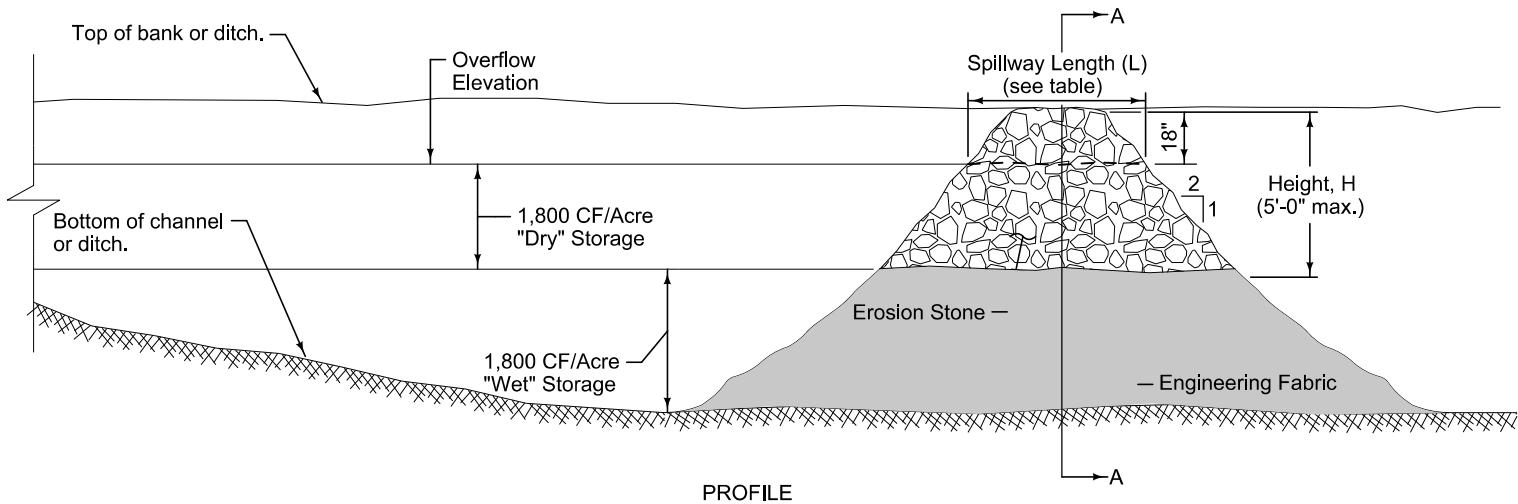
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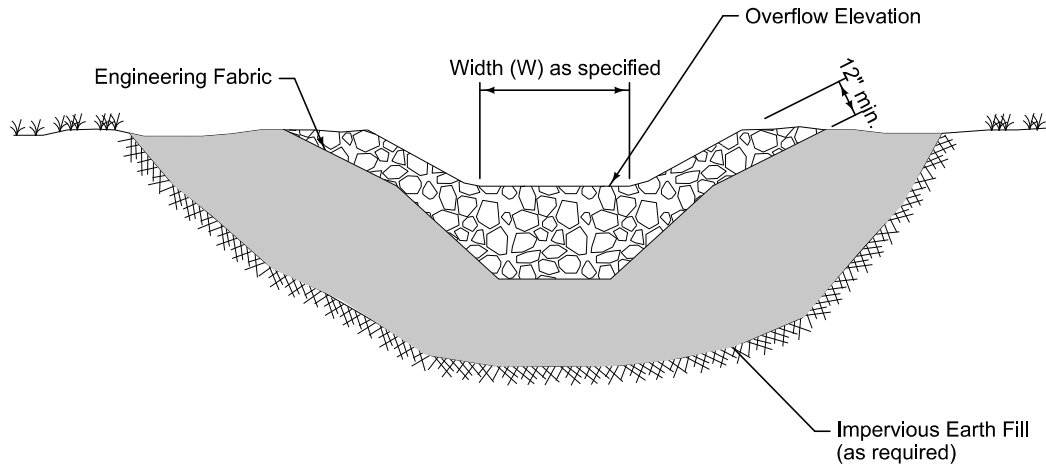
**SEDIMENT BAFFLE**



Remove accumulated sediment when level reaches one-half the height of the wet storage.




PROFILE

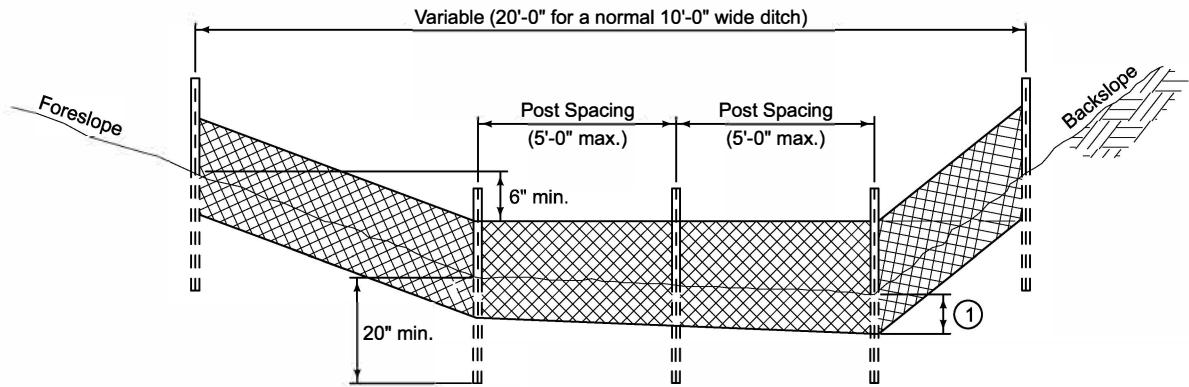


SECTION A-A

Spillway Length

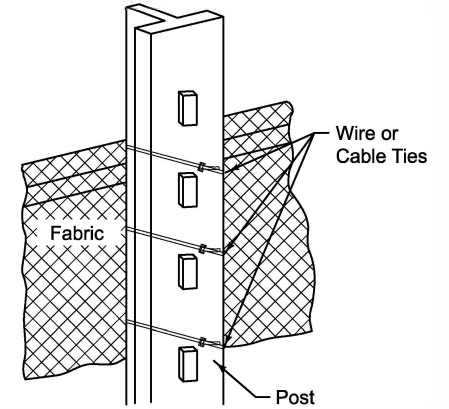
H (ft.)	L (ft.)
1.5	2.0
2.0	2.0
2.5	2.5
3.0	2.5
3.5	3.0
4.0	3.0
4.5	4.0
5.0	4.5

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SEDIMENT TRAP	

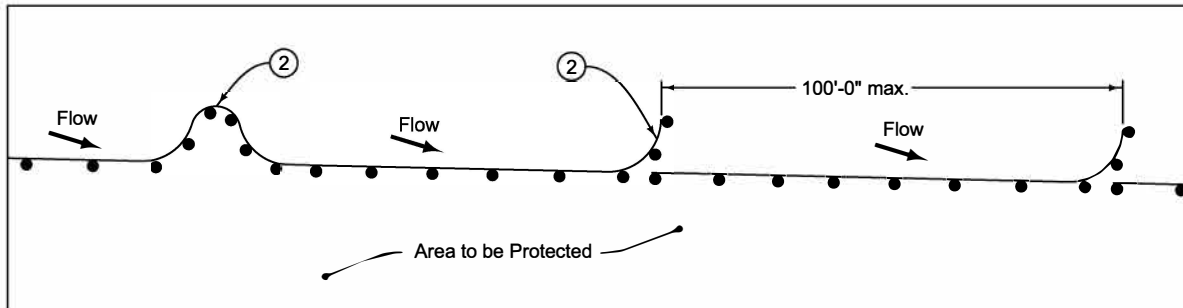


**TYPICAL SILT FENCE DITCH CHECK**

- ① Insert 12 inches of fabric a minimum of 6 inches deep (fabric may be folded below the ground line).
- ② Install silt fence for perimeter control with a maximum run length of 100 feet. At the downstream end of each run, turn the silt fence up the slope for 20 feet as shown to construct a 'J-Hook' to contain runoff. At the contractor's option, the silt fence may terminate and restart at the J-hook or may be installed continuously through the J-hook.




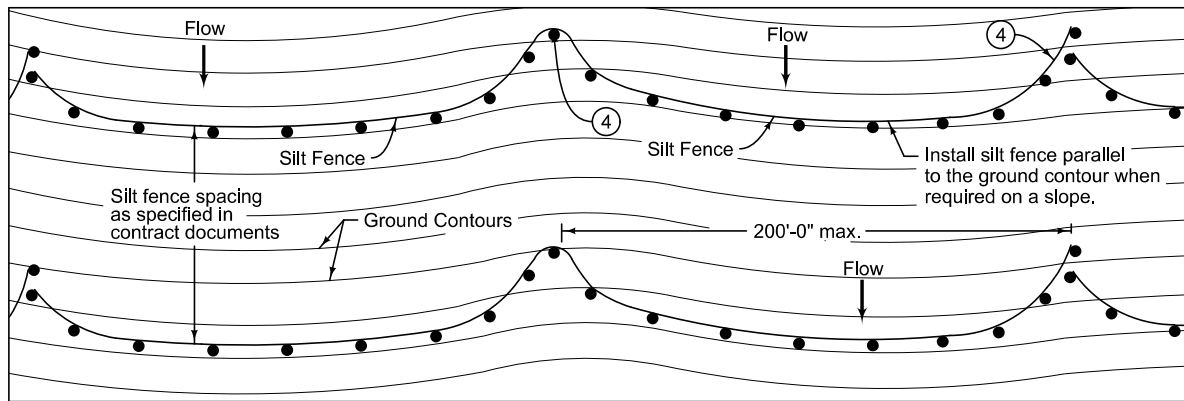
**ATTACHMENT TO POST**



**TYPICAL SILT FENCE INSTALLATION FOR PERIMETER CONTROL**

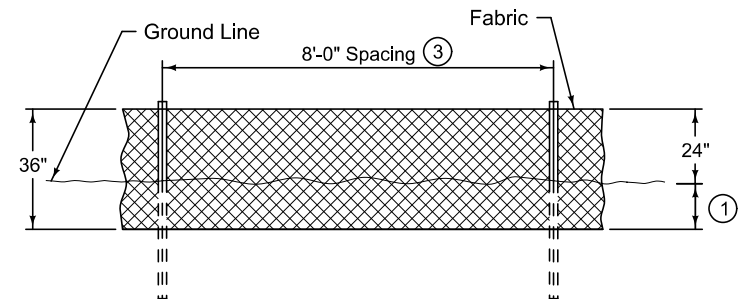
FIGURE 9040.119 SHEET 1 OF 2

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SUDAS Standard Specifications		
<b>SILT FENCE</b>		

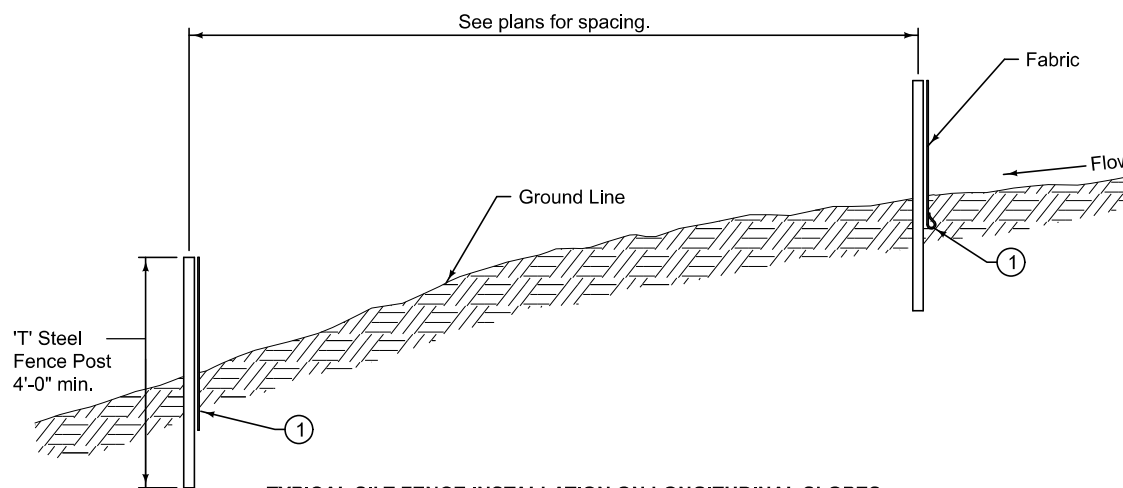


TYPICAL SILT FENCE INSTALLATION ON LONGITUDINAL SLOPES  
(Plan View)


- ① Insert 12 inches of fabric a minimum of 6 inches deep (fabric may be folded below the ground line).
- ③ Reduce post spacing to 5 feet at water concentration areas, or as required to adequately support fence.
- ④ Place silt fence continuously along a constant elevation for a maximum run of 200 feet. At the end of each run, construct a 'J-Hook' to contain runoff by turning the silt fence up the slope for a length of 20 feet as shown. At the contractor's option, the silt fence may terminate and restart at the J-hook or may be installed continuously through the J-hook.



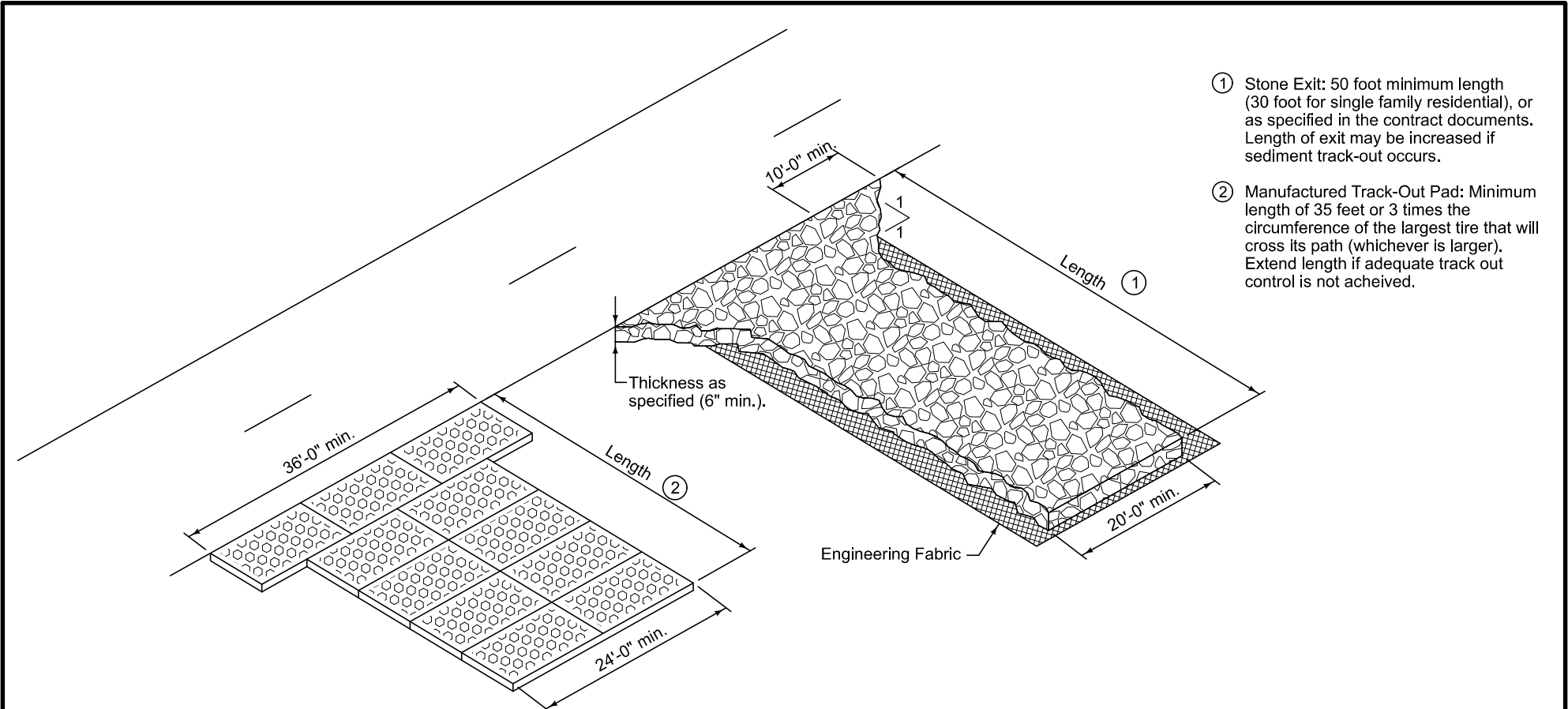
DETAILS OF SILT FENCE ON LONGITUDINAL SLOPES



TYPICAL SILT FENCE INSTALLATION ON LONGITUDINAL SLOPES  
(Profile View)


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SUDAS Standard Specifications	
<b>SILT FENCE</b>	





- ① Stone Exit: 50 foot minimum length (30 foot for single family residential), or as specified in the contract documents. Length of exit may be increased if sediment track-out occurs.
- ② Manufactured Track-Out Pad: Minimum length of 35 feet or 3 times the circumference of the largest tire that will cross its path (whichever is larger). Extend length if adequate track out control is not achieved.

FIGURE 9040.120 SHEET 1 OF 1

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<b>STABILIZED CONSTRUCTION EXIT</b>	

