

Section [_____] Storm Water Treatment Device

PART 1 – GENERAL

01.01.00 Purpose

The purpose of this specification is to establish generally acceptable criteria for Storm Water Treatment Devices for treating storm water runoff including dry weather flows and other contaminated water sources. It is intended to serve as a guide to promote understanding regarding materials, manufacture and installation; and to identify devices complying with this specification.

01.02.00 Description

Storm Water Treatment Devices (SWTD) are used for filtration of stormwater runoff including dry weather flows. The SWTD is an inline pre-engineered hydrodynamic separation system composed of multiple sediment chambers, a screening system designed to capture and store solid debris such as foliage and litter in a dry state, and a oil skimmer to remove free floating hydrocarbons.

01.03.00 Manufacturer

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems developed for the treatment of stormwater runoff for at least (10) years, and which have a history of successful production, acceptable to the engineer of work. In accordance with the drawings, the SWTD(s) shall be a device manufactured by Bio Clean Environmental Services, Inc., or assigned distributors or licensees. Bio Clean Environmental Services, Inc. can be reached at:

Corporate Headquarters:
398 Via El Centro
Oceanside, CA 92058
Phone: (760) 433-7640
Fax: (760) 433-3176
www.biocleanenvironmental.com

01.04.00 Submittals

- 01.04.01 Submittal drawings are to be provided with each order to the contractor and consulting engineer.
- 01.04.02 Submittal drawings are to detail the SWTD and all components required and the sequence for installation, including:
- System configuration with primary dimensions
 - Interior components
 - Any accessory equipment called out on submittal drawings
- 01.04.03 Inspection and maintenance documentation submitted upon request.

01.05.00 Work Included

- 01.05.01 Specification requirements for installation of SWTD.
- 01.05.02 Manufacturer to supply components of the SWTD(s):
- Concrete structure
 - Internal components
 - Risers, hatches, and manholes optional

01.06.00 Reference Standards

ASTM A 615	Standard Specifications for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 706	Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
ASTM F 716.07	Standard Test Methods for Sorbent Performance of Absorbents
ASTM D 3787	Standard Test Method for Bursting Strength of Textiles-Constant-Rate-of- Traverse (CRT) Ball Burst Test

PART 2 – COMPONENTS

The Storm Water Treatment Device (SWTD) and all of its components shall be self-contained within a concrete structure constructed with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A 615 or ASTM A 706, Grade 60, and supports a minimum H-20 loading as indicated by AASHTO. All seams and connection points shall be sealed water tight with non-shrink grout in accordance with manufactures recommendations and project specifications.

02.01.00 Screening System

- 02.01.01 Screen Frame shall be constructed of 100% stainless steel. All joints and seams are to be welded or fastened together with stainless steel hardware. All sides of screen frame shall be fixed. The top section of the screen frame shall have one of the following, open top, hinged top section, or a track guided sliding top section per drawings. The bottom section of the basket frame shall be a minimum of 3" above static.
- 02.01.02 Screens shall be manufactured of 100% louver expanded stainless steel grade 304. The screen shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 4.7 mm regardless of specific gravity for flows up to the device's rated treatment capacity. Screens shall have openings that face opposite the flow of passing stormwater to provide continuous shielding and prevent clogging.

02.02.00 Oil Skimmer

The Oil Skimmer shall be mounted to the skimmer wall and located between the end of the screening system and the outlet pipe. Skimmer wall shall be constructed of concrete with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A 615 or ASTM A 706, Grade 60.

- 02.02.01 Oil Skimmer Cage shall be constructed of stainless steel frame with flattened expanded stainless steel. Housing shall have a hinged top section. Oil Skimmer Cage shall be secured to the skimmer wall with aluminum or stainless steel hardware.
- 02.02.02 Media Filtration Boom shall be made up of granulated oil absorbing polymers that have been tested in accordance with section 11.2 of ASTM F 716.07 and held within a netting.
- Oil absorbing polymers must be proven to absorb 180% of its weight within a 300 second contact time, and at this absorption percentage the physical increase in the size of the granules is not more than 50%.

- Netting shall be 100% polyester with a number 16 sieve size, and strength tested per ASTM D 3787.
- Filter netting shall be 100% polyester with a number 16 sieve size, and strength tested per ASTM D 3787.

02.03.00 Sediment Chambers

- 02.03.01 Baffle Walls shall be constructed of concrete with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A 615 or ASTM A 706, Grade 60.
- 02.03.02 Turbulence Deflectors shall be manufactured of 100% marine grade polyester resin and fiberglass strands or stainless steel and be mounted to the concrete baffles with stainless steel hardware. The turbulence deflectors should be sized to effectively eliminate scouring and re-suspension of previously captured sediments in the sediment removal chambers and creates a flow pattern that encourages suspended solids in influent flows to settle out and accumulate at the bottom of the SWTD.
- The all fiberglass deflectors must be coated with a polyester gel coating with ultra violet inhibitors incorporated into the coating for maximum ultra violet protection.
 - Fiberglass must have a minimum thickness of 3/16".

PART 3 – PERFORMANCE

03.01.00 General

- 03.01.01 Function - The SWTD is a pre-engineered inline hydrodynamic separation system composed of multiple sediment removal chambers, a screening system designed to capture and store solid debris such as foliage and litter in a dry state above the static water line, and an oil skimmer to capture oils, grease, and other hydrocarbons.
- 03.01.02 Removal Efficiencies - The SWTD must be capable of capturing and retaining 100% of all trash or debris equal to or greater than 4.7 mm. The SWTD shall not release material during flow events greater than the design flow rate. All removal efficiencies shall be tested in accordance with section 03.02.00.
- 03.01.03 Hydraulic Capacity - The SWTD shall provide a rated hydraulic capacity, which is consistent with governing water treatment regulations. The hydraulic capacity must be supported by independent third-party lab testing of the screen material. The lab testing must be done over a range of 5 flows and the water height and head loss recorded to create a curve. Sizing of the screens treatment flow capacity must be based upon the orifice coefficient related to the independent lab testing.
- 03.01.04 Storage Capacity - The SWTD must have multiple sediment removal chambers for storage of sediments and other non-floatable pollutants. The volume of each sediment removal chamber shall be called out on the submittal drawings. The SWTD must have an oil skimmer to capture hydrocarbons. The skimmer shall be equipped with storm booms per section 02.02.02. The storm boom must be capable of capturing up to 180% of its weight in oils & grease along with other emulsified and free floating hydrocarbons.
- 03.01.05 Pollution Separation - The SWTD must be equipped with a screening system capable of capturing and storing solid debris such as foliage and litter in a dry state above the static water line. The debris captured by the screening system

must be stored a minimum of 3.5" above the static water line. The screening system must be located directly under the systems access hatch(s) to allow easy maintenance and removal of captured debris.

PART 4 - EXECUTION

04.01.00 General

The installation of the SWTD shall conform to all applicable national, state, state highway, municipal and local specifications.

04.02.00 Installation

The Contractor shall furnish all labor, equipment, materials and incidentals required to install the (SWTD) device(s) and appurtenances in accordance with the drawings and these specifications.

- 04.02.01 Grading and Excavation site shall be properly surveyed by a registered professional surveyor, and clearly marked with excavation limits and elevations. After site is marked it is the responsibility of the contractor to contact local utility companies and/or DigAlert to check for underground utilities. All grading permits shall be approved by governing agencies before commencement of grading and excavation. Soil conditions shall be tested in accordance with the governing agencies requirements. All earth removed shall be transported, disposed, stored, and handled per governing agencies standards. It is the responsibility of the contractor to install and maintain proper erosion control measures during grading and excavation operations.
- 04.02.02 Compaction – All soil shall be compacted per registered professional soils engineer's recommendations and per governing agencies standards, prior to installation of SWTD.
- 04.02.03 Backfill shall be placed according to a registered professional soils engineer's recommendations and per governing agencies standards, and with a minimum of 6" of gravel under all concrete structures.
- 04.02.04 Concrete Structures – After backfill has been inspected by the governing agency and approved the concrete structures shall be lifted and placed in proper position per plans.

04.03.00 Shipping, Storage and Handling

- 04.03.01 Shipping – SWTD shall be shipped to the contractor's address or job site, and is the responsibility of the contractor to offload the unit(s) and place in the exact site of installation.
- 04.03.02 Storage and Handling– The contractor shall exercise care in the storage and handling of the SWTD and all components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be born by the contractor. The SWTD(s) and all components shall always be stored indoors and transported inside the original shipping container until the unit(s) are ready to be installed. The SWTD shall always be handled with care and lifted according to OSHA and NIOSA lifting recommendations and/or contractor's workplace safety professional recommendations.

04.04.00 Maintenance and Inspection

- 04.04.01 Inspection – After installation, the contractor shall demonstrate that the SWTD has been properly installed at the correct location(s), elevations, and with appropriate components. All components associated with the SWTD and its installation shall be subject to inspection by the engineer at the place of installation. In addition, the contractor shall demonstrate that the SWTD has been installed per the manufacturer’s specifications and recommendations. All components shall be inspected by a qualified person once a year and results of inspection shall be kept in an inspection log.
- 04.04.02 Maintenance – The manufacturer recommends cleaning and debris removal and replacement of the storm booms as needed. The maintenance shall be preformed by someone qualified. A Maintenance Manual is available upon request from the manufacturer. The manual has detailed information regarding the maintenance of the SWTD. A Maintenance/Inspection record shall be kept by the maintenance operator. The record shall include any maintenance activities preformed, amount and description of debris collected, and the condition of the storm booms.
- 04.04.03 Material Disposal - All debris, trash, organics, and sediments captured by the SWTD shall be transported and disposed of at an approved facility for disposal in accordance with local and state requirements. Please refer to state and local regulations for the proper disposal of toxic and non-toxic material.

PART 5 – QUALITY ASSURANCE

05.01.00 Warranty

The Manufacturer shall guarantee the SWTD against all manufacturing defects in materials and workmanship for a period of (1) year from the date of delivery to the customer. The manufacturer shall be notified of repair or replacement issues in writing within the warranty period. The SWTD is limited to recommended application for which it was designed.

[End of This Section]