US Army Corps of Engineers ®
Fort Worth District

# Public Notice

INFORMATIONAL PUBLIC NOTICE

Date: March 4, 2021

**PUBLIC NOTICE ANNOUNCING REGIONAL CONDITIONS AND SECTION 401 WATER QUALITY CERTIFICATION REGARDING THE REISSUANCE OF 12 NATIONWIDE PERMITS AND THE ISSUANCE OF 4 NEW NATIONWIDE PERMITS**

Purpose of Public Notice:

This public notice is to announce and convey the 2021-A Nationwide Permits (NWPs), Regional Conditions and Clean Water Act (CWA) Section 401 Water Quality Certifications. These documents and certifications will go into effect for the subject 16 NWPs on March 15, 2021 and are attached to this public notice. The Corps is not seeking comments at this time.

On January 13, 2021, the U.S. Army Corps of Engineers (Corps) published a final rule in the Federal Register (86 FR 2744) announcing the reissuance of 12 existing NWPs and four new NWPs, as well as the reissuance of NWP general conditions and definitions with some modifications. These 16 NWPs will go into effect on March 15, 2021, and will expire on March 14, 2026:

- NWP 12 – Oil or Natural Gas Pipeline Activities
- NWP 21 – Surface Coal Mining Activities
- NWP 29 – Residential Developments
- NWP 39 – Commercial and Institutional Developments
- NWP 40 – Agricultural Activities
- NWP 42 – Recreational Facilities
- NWP 43 – Stormwater Management Facilities
- NWP 44 – Mining Activities
- NWP 48 – Commercial Shellfish Mariculture Activities
- NWP 50 – Underground Coal Mining Activities
- NWP 51 – Land-Based Renewable Energy Generation Facilities
- NWP 52 – Water-Based Renewable Energy Generation Pilot Projects
- NWP 55 – Seaweed Mariculture Activities
- NWP 56 – Finfish Mariculture Activities
- NWP 57 – Electric Utility Line and Telecommunications Activities

- NWP 58 – Utility Line Activities for Water and Other Substances

Regional Conditions:

Regional conditions are intended to provide additional protection of the aquatic environment by ensuring that the NWPs authorize only those activities with minimal adverse effects on the aquatic environment. Regional conditions help ensure protection of high value waters within the districts. The final NWP regional conditions for Texas and Louisiana and a map of the Corps district boundaries are attached to this public notice (Encl 1, 2 and 3).

CWA Section 401 Water Quality Certifications:

With the exception of NWP 55 (fka A) and NWP 56 (fka B) for which no water quality certification was requested, the Environmental Protection Agency (EPA) Region 6, by letter dated December 14, 2020, on behalf of Ysleta del Sur Pueblo, Alabama-Coushatta Tribe of Texas, and Kickapoo Traditional Tribe of Texas, granted CWA Section 401 certification, with no conditions, for these 16 NWPs. EPA Region 6 has determined that any discharge that could be authorized under these 14 NWPs would comply with water quality requirements, as defined at 40 CFR 121.1(n).

The Texas Commission on Environmental Quality (TCEQ), by letter dated December 18, 2020, conditionally certified these 16 NWPs, with the exception of NWP 48, NWP 55, and NWP 56 which were certified with no conditions (Encl 4). TCEQ has determined that any discharge that could be authorized under these 16 NWPs would comply with water quality requirements, as required by CWA Section 401 certification and pursuant to Title 30 Texas Administrative Code (TAC) Chapter 279. Conditions for each NWP were defined in the TCEQ's water quality certification letter.

The Texas Railroad Commission (TxRRC), by letter dated December 18, 2020, conditionally certified NWP 12, NWP 43, and NWP 58 (fka D) and determined that they should not result in a violation of Texas Surface Water Quality Standards as required by CWA Section 401 and pursuant to 16 TAC §3.93 (Encl 5). Conditions for each NWP were defined in TxRRC's water quality certification letter. Under Texas Natural Resource Code, Title 3, and the Texas Water Code, Chapter 26, the TxRRC has the responsibility for the prevention of pollution that might result from activities associated with the exploration, development, and production of oil, gas, or geothermal resources of the State.

The Louisiana Department of Environmental Quality (LDEQ), by letter dated December 15, 2020, denied certification for NWP 29 and NWP 39 citing potential to violate state water quality standards (LAC 33:IX.Chapter 11). LDEQ conditionally certified NWP 12, NWP 43 and NWP 44 and determined they should not violate state water quality standards (Encl 2). Conditions for each NWP were defined in LDEQ's letter.

Existing NWPs Not Subject to this Effort:

There are 40 existing NWPs that were not reissued or modified by the January 13, 2021 final rule. Those 40 NWPs were published in the January 6, 2017, issue of the Federal Register (82 FR 1860) and those NWPs remain in effect until the Corps issues a final rule reissuing those NWPs or March 18, 2022, whichever comes first. The 40 2017 NWPs that remain in effect are:

- NWP 1 – Aids to Navigation
- NWP 2 – Structures in Artificial Canals
- NWP 3 – Maintenance
- NWP 4 – Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
- NWP 5 – Scientific Measurement Devices
- NWP 6 – Survey Activities
- NWP 7 – Outfall Structures and Associated Intake Structures
- NWP 8 – Oil and Gas Structures on the Outer Continental Shelf
- NWP 9 – Structures in Fleeting and Anchorage Areas
- NWP 10 – Mooring Buoys
- NWP 11 – Temporary Recreational Structures
- NWP 13 – Bank Stabilization
- NWP 14 – Linear Transportation Projects
- NWP 15 – U.S. Coast Guard Approved Bridges
- NWP 16 – Return Water From Upland Contained Disposal Areas
- NWP 17 – Hydropower Projects
- NWP 18 – Minor Discharges
- NWP 19 – Minor Dredging
- NWP 20 – Response Operations for Oil or Hazardous Substances
- NWP 22 – Removal of Vessels
- NWP 23 – Approved Categorical Exclusions
- NWP 24 – Indian Tribe or State Administered Section 404 Programs
- NWP 25 – Structural Discharges
- NWP 27 – Aquatic Habitat Restoration, Establishment, and Enhancement Activities
- NWP 28 – Modifications of Existing Marinas
- NWP 30 – Moist Soil Management for Wildlife
- NWP 31 – Maintenance of Existing Flood Control Facilities
- NWP 32 – Completed Enforcement Actions
- NWP 33 – Temporary Construction, Access, and Dewatering
- NWP 34 – Cranberry Production Activities
- NWP 35 – Maintenance Dredging of Existing Basins
- NWP 36 – Boat Ramps
- NWP 37 – Emergency Watershed Protection and Rehabilitation
- NWP 38 – Cleanup of Hazardous and Toxic Waste
- NWP 41 – Reshaping Existing Drainage Ditches
- NWP 45 – Repair of Uplands Damaged by Discrete Events

- NWP 46 – Discharges in Ditches
- NWP 49 – Coal Remining Activities
- NWP 53 – Removal of Low-Head Dams
- NWP 54 – Living Shorelines

The regional conditions for these 40 NWPs that were approved by division engineers in 2017 remain in effect while these 2017 NWPs remain in effect.

Brandon W. Mobley
Chief, Regulatory Division

Enclosures

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# 2021-A NATIONWIDE PERMIT (NWP) REGIONAL CONDITIONS FOR THE STATE OF TEXAS

**The following regional conditions only apply within the Albuquerque District.**

1. Dredge and Fill Activities in Intermittent and Perennial Streams, and Special Aquatic Sites: For all activities subject to regulation under the Clean Water Act Section 404 in intermittent and perennial streams, and special aquatic sites (including wetlands, riffle and pool complexes, and sanctuaries and refuges), Pre-Construction Notification (PCN) to the Albuquerque District Engineer is required in accordance with Nationwide Permit General Condition 32.

2. Suitable Fill. Use of broken concrete as fill or bank stabilization material is prohibited unless the applicant demonstrates that its use is the only practicable material (with respect to cost, existing technology, and logistics). Any applicant who wishes to use broken concrete as bank stabilization must provide notification to the Albuquerque District Engineer in accordance with Nationwide Permit General Condition 32 - PCN along with justification for such use. Use of broken concrete with rebar or used tires (loose or formed into bales) is prohibited in all waters of the United States.

**The following regional conditions apply within the Fort Worth District and Galveston District Boundaries:**

3. Notification to the appropriate District Engineer in accordance with Nationwide Permit General Condition 32 - Pre-Construction Notification (PCN) is required for all activities proposed for authorization by any NWP into the below listed ecologically unique and sensitive areas located within waters of the United States. The Corps will coordinate with the resource agencies as specified in NWP General Condition 32(d)(3).
    a. Pitcher plant bogs ((*Sarracenia* spp.) and/or sundews (*Drosera* spp.) and/or Bald Cypress/Tupelo swamps ((*Taxodium distichum*) and/or water tupelo (*Nyssa aquatica*)).
    b. Karst Zones 1 and 2 located in Bexar, Travis and Williamson Counties (see https://www.fws.gov/southwest/es/AustinTexas/Maps_Data.html ).
    c. Caddo Lake and associated areas that are designated as “Wetland of International Importance” under the Ramsar Convention (see http://caddolakedata.us/media/145/1996caddolakeramsar.pdf or http://caddolakedata.us/media/144/1996caddolakeramsar.jpg ).
    d. Reaches of rivers (and their adjacent wetlands) that are included in the Nationwide Rivers Inventory (see https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm ).

4. For all activities proposed for authorization under any NWP at sites approved as compensatory mitigation sites (either permittee-responsible, mitigation bank and/or in-lieu fee) under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899, the applicant shall notify the appropriate District Engineer in accordance with the Nationwide Permit General Condition 32 - PCN prior to commencing the activity.

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# 2021-A NATIONWIDE PERMIT (NWP) REGIONAL CONDITIONS FOR THE STATE OF TEXAS

**The following regional conditions apply only within the Galveston District.**

5. No NWP, except NWP 3, shall be used to authorize discharges into the habitat types or specific areas located within waters of the United States, listed in paragraphs a through c, below. The applicant shall notify the Galveston District Engineer in accordance with the NWP General Condition 32 - Pre-Construction Notification (PCN) prior to commencing the activity under NWP 3.

   a. Mangrove Marshes. For the purpose of this regional condition, Mangrove marshes are those waters of the United States that are dominated by mangroves (*Avicennia* spp., *Laguncuaria* spp., *Conocarpus* spp., and *Rhizophora* spp.).
   b. Coastal Dune Swales. For the purpose of this regional condition, coastal dune swales are wetlands and/or other waters of the United States located within the backshore and dune areas in the coastal zone of Texas. They are formed as depressions within and among multiple beach ridge barriers, dune complexes, or dune areas adjacent to beaches fronting tidal waters of the United States.
   c. Columbia Bottomlands. For the purpose of this regional condition, Columbia bottomlands must meet all of the following criteria: 1) wetlands and/or other waters of the United States, 2) currently dominated by bottomland hardwoods (Quercus spp.), and 3) located in the Lower Brazos and San Bernard River basins identified in the 1997 Memorandum of Agreement between the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Natural Resource Conservation Service, and Texas Parks and Wildlife Department for bottomland hardwoods in Brazoria County. (For further information, see http://www.swg.usace.army.mil/Business-With-Us/Regulatory/Permits/Nationwide-General-Permits/)

6. Nationwide Permit 12, 57, and 58 shall not be used to authorize all discharges within 500 feet of vegetated shallows and coral reefs; as defined by 40 CFR 230.43 and 230.44 respectively. Examples include, but are not limited to: seagrass beds, oyster reefs, and coral reefs.

7. For all activities proposed for authorization under Nationwide Permit 12, 57, or 58 that involve underground placement below a non-navigable tributary there shall a minimum cover of 48 inches of soil below the river and/or perennial stream thalweg.

8. No NWPs, except NWPs 3, 16, 20, 22, 37, shall be used to authorize discharges, structures, and/or fill within the standard setback and high hazard zones of the Sabine-Neches Waterway as defined in the Standard Operating Procedure - Permit Setbacks along the Sabine-Neches Waterway. The applicant shall notify the Galveston District Engineer in accordance with NWP General Condition 32 - PCN for all discharge, structures and/or work in medium hazard zones and all NWP 3 applications within the standard setback and high hazard zones of the Sabine-Neches Waterway.

9. No NWP, except 20, 22, and 37, shall be used to authorize discharges, structures, and/or fill within the standard setback exemptions of the Gulf Intracoastal Waterway as defined in the Standard Operating Procedure- Department of the Army Permit Evaluation Setbacks along the Gulf Intracoastal Waterway. The applicant shall notify the Galveston District Engineer in accordance with NWP General Condition 32 – PCN for all discharges, structures and/or work within the standard setback, shoreward of the standard setback, and/or standard setback exemption zones.

10. All work in the San Jacinto Waste Pit (SWJP) Area of Concern (AOC), authorized under an NWP, requires a waiver from the Galveston District Engineer (DE). The applicant shall notify the DE in accordance with the NWP General Condition 32 - PCN. The PCN shall be used to review the project to determine if it will result in more than minimal effects to the region and does not lessen the restriction provided by any General Condition of the NWPs. The applicant must receive written approval, including a waiver, from the DE prior to starting work in jurisdictional areas. (For further information, see http://www.swg.usace.army.mil/Business-With-Us/Regulatory/Permits/Nationwide-General-Permits/)

JOHN BEL EDWARDS
GOVERNOR

CHUCK CARR BROWN, PH.D.
SECRETARY

# State of Louisiana

## DEPARTMENT OF ENVIRONMENTAL QUALITY
## ENVIRONMENTAL SERVICES

DEC 15 2020

Mr. Martin S. Mayer
Chief, Regulatory Branch
US Army Corps of Engineers, New Orleans District
Attn: Brenda Archer
CEMVN-ODR
7400 Leake Avenue
New Orleans, Louisiana 70118

AI No.: 149056
Activity No.: CER20200001

RE: Water Quality Certification WQC 200929-01
Proposal to Reissue and Modify Nationwide Permits
State of Louisiana

Dear Mr. Mayer:

The Louisiana Department of Environmental Quality, Office of Environmental Services (LDEQ), provides with this correspondence water quality certification approval and reissuance of the U.S. Army Corps of Engineers (Corps) Nationwide Permits (NWPs), general conditions, and definitions with some modification as proposed in the *Federal Register* (Vol. 85 No. 179) as published September 15, 2020. The request for the pre-filling meeting was received September 14, 2020. On October 27, 2020, the New Orleans District of the Corps requested water quality certification under Section 401 of the Clean Water Act for the issuance of those NWPs that may result in a discharge in water of the United States in the State of Louisiana.

LDEQ has reviewed the Corps' Proposal to Reissuance and Modify the Nationwide Permits, as published in the referenced *Federal Register* and hereby issues WQC 200929-01 with the attached Nationwide Permit (NWP) Regional Conditions for the following NWPs:

| | | | |
|---|---|---|---|
| NWP 3 | NWP 18 | NWP 33 | NWP 46 |
| NWP 4 | NWP 19 | NWP 34 | NWP 48 |
| NWP 5 | NWP 20 | NWP 36 | NWP 49 |
| NWP 6 | NWP 21 | NWP 37 | NWP 50 |
| NWP 7 | NWP 22 | NWP 38 | NWP 51 |
| NWP 12 | NWP 23 | NWP 40 | NWP 52 |
| NWP 13 | NWP 25 | NWP 41 | NWP 53 |
| NWP 14 | NWP 27 | NWP 42 | NWP 54 |
| NWP 15 | NWP 30 | NWP 43 | NWP C |
| NWP 16 | NWP 31 | NWP 44 | NWP D |
| NWP 17 | NWP 32 | NWP 45 | NWP E |

LDEQ denies 401 Water Quality Certification to the reissuance of NWP 29 except those associated with construction or expansion of a single residence pursuant to the attached State of Louisiana Nationwide Permit Regional Conditions.

Louisiana Revised Statutes, RS 30:2074 provides the Secretary of the Louisiana Department of Environmental Quality (LDEQ) authority to process all applications for certifications for federal or state licenses or permits and to establish such standards, guidelines, or criteria as he deems necessary or appropriate to prohibit, control, or abate water pollution. With that authority, the State of Louisiana's Surface Water Quality Standards are set forth in LAC 33:IX, Chapter 11.

In accordance with LAC 33:IX.1109.A.1, the state of Louisiana's Antidegradation Policy requires that all waters of the state, including interstate, intrastate, and coastal waters, and any portions thereof, whose existing water quality standards exceeds the specifications of the approved water quality standards or otherwise supports an unusual abundance and diversity of fish and wildlife sources, will be maintained at their existing high quality. Furthermore, LAC: IX.1109.A.2 states "The administrative authority shall not approve any wastewater discharge or certify any activity for a federal permit that would impair water quality or use of state waters, including waters in the Natural or and Scenic Rivers System that are waters of the state."

Louisiana's water quality standards include both numeric and general criteria. General criteria shall apply at all times to the surface waters of the state, including wetlands, whether they are identified in the standards or not. (LAC 33:IX.1113.B.) LAC 33:IX.1113.B.1.d reiterates this by stating, "All waters shall be free from such concentrations of substances attributable to wastewater or other discharges sufficient to:

Additionally, LAC 33:IX.1113.B.5 states "No substances shall be present in the waters of the state or the sediments underlying said waters in quantities that alone or in combination will be toxic to human, plant, or animal life or significantly increase health risks due to exposure to the substances or consumption of contaminated fish or other aquatic life."

Based on the information provided in the notice, it is the opinion of LDEQ that the Nationwide Permit NWP 29 could have potential adverse effects on water quality or fail to comply with State water quality standards as provided for un LAC 33:IX. Chapter 11, and should be considered for certification on a case-by-case basis. Therefore, certification for NWP 29 is denied..

LDEQ has denied 401 Water Quality Certification to the reissuance of NWP 39.

Based on the information provided in the notice, it is the opinion of LDEQ that the Nationwide Permit NWP 39 could have potential adverse effects on water quality or fail to comply with State water quality standards as provided for un LAC 33:IX. Chapter 11, and should be considered for certification on a case-by-case basis. Therefore, certification for this NWP is denied.

Should you have any questions concerning any part of this certification, please contact Elizabeth Hill at (225) 219-3225 or by email at elizabeth.hill@la.gov Please reference Agency Interest (AI) number 149056 and Water Quality Certification 200929-01 on all future correspondence to this Department to ensure all correspondence regarding this subject is properly filed into the Department's Electronic Document Management System.

Sincerely,

Elliott B. Vega
Assistant Secretary

Attachment

c: IO-W

ec: Brenda.A.Archer@usace.army.mil

# 1. STATE OF LOUISIANA
# 2. NATIONWIDE PERMIT (NWP) REGIONAL CONDITIONS

## Proposed 2020 NWP Louisiana Regional Conditions

***PART I - REGIONAL CONDITIONS FOR ALL NWPS:***

**Regional Condition 1.** No regulated activity may cause the permanent loss or the conversion of greater than ½ acre of cypress swamp and/or cypress-tupelo swamp.

**Regional Condition 2.** No regulated activity may cause the permanent loss or the conversion of greater than ½ acre of coastal prairie, pine savanna, and/or pitcher plant bogs.

**Regional Condition 3.** No regulated activity is authorized under any NWP permit which has been determined to have an adverse impact upon a federal or state designated rookery and/or bird sanctuary.

**Regional Condition 4.** Dredged and/or fill material placed within wetlands and other waters must be free of contaminants, to the best of the applicant's knowledge.

**Regional Condition 5.** For work within the Louisiana Coastal Zone and/or the Outer Continental Shelf off Louisiana;

a. The New Orleans District's Programmatic General Permit (PGP) generally supersedes the Nationwide Permit authorization for regulated activities located within the Louisiana Coastal Zone as incorporated within the New Orleans Corps District boundaries. Projects typically will not qualify for a Nationwide Permit if they qualify for the Programmatic General Permit.

b. A joint permit application for work must first be submitted to the Louisiana Department of Natural Resources, Office of Coastal Management (OCM). OCM will then forward the request to the Corps of Engineers-New Orleans District.

c. NWP requests that have not received a Coastal Use Permit or other consistency determination from the OCM would be processed by the Corps. However any granted authorization may be conditioned to require the applicant to obtain appropriate authorization from OCM before the NWP is valid.

**Regional Condition 6.** A pre-construction notification, as defined under nationwide general condition 32, will be provided for all regulated activities, excluding Nationwide 20, that

a. Adversely affects greater than 1/10 acre of wetlands, and/or;

b. Adversely impacts a Louisiana designated Natural and Scenic River or a state or federal wetland/wildlife management area and/or refuge.

**Regional Condition 7, Supplement to General Condition 2 – Aquatic Life Movement**. To support compliance with General Condition 2 of the NWPs, culverts must be sufficiently sized to maintain expected high water flows and be installed at a sufficient depth to maintain low flows to sustain the movement of aquatic species.

## PART II - REGIONAL CONDITIONS FOR SPECIFIC NWPS

**NWP 1**. *Aids to Navigation*:
No regional conditions are proposed.

**NWP 2**. *Structures in Artificial Canals*:
No regional conditions are proposed.

**NWP 3**. *Maintenance*:
No regional conditions are proposed.

**NWP 4**. *Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities*:
No regional conditions are proposed.

**NWP 5**. *Scientific Measurement Devices*:
Pre-construction notification, as defined under nationwide general condition 32, is required for all weirs and flumes in any water of the United States.

**NWP 6**. *Survey Activities*:
No regional conditions are proposed.

**NWP 7**. *Outfall Structures and Associated Intake Structures*:
Activities that include the construction of intake structures must include adequate fish exclusion screening devices.

**NWP 8**. *Oil and Gas Structures on the Outer Continental Shelf*:
No regional conditions are proposed.

**NWP 9.** *Structures in Fleeting and Anchorage Areas*:
No regional conditions are proposed.

**NWP 10.** *Mooring Buoys*:
No regional conditions are proposed.

**NWP 11.** *Temporary Recreational Structures*:
No regional conditions are proposed.

**NWP 12.** *Oil or Natural Gas Pipeline Activities*:
Pre-Construction Notification, as defined under nationwide general condition 32, is required for regulated **pipeline activities within tidal waters** regardless of impact acreage. The U.S. Environmental Protection Agency and National Marine Fisheries Service will be forwarded a copy of the Pre-Construction Notification..

A 50-foot gap shall be required for every 500 linear feet of sidecast material resulting from trench excavation activities associated with pipeline construction. Under certain circumstances the gap intervals may be modified. Additionally, no fill shall be placed in a manner which would impede natural watercourses.

**NWP 13.** *Bank Stabilization*:
Rip-rap material shall be free of protruding reinforcement material (i.e., rebar). Such material may pose a hazard to navigation and recreational uses.

**NWP 14.** *Linear Transportation Projects*:
Pre-Construction Notification, as defined under nationwide general condition 32, is required for all regulated **linear transportation crossings within tidal waters** regardless of impact acreage. The U.S. Environmental Protection Agency and National Marine Fisheries Service will be forwarded a copy of the Pre-Construction Notification.

**NWP 15.** *U.S. Coast Guard Approved Bridges*:
No regional conditions are proposed.

**NWP 16.** *Return Water from Upland Contained Disposal Areas*:
No regional conditions are proposed.

**NWP 17.** *Hydropower Projects*:
No regional conditions are in proposed.

**NWP 18.** *Minor Discharges*:
No regional conditions are proposed.

**NWP 19.** *Minor Dredging*:
No regional conditions are proposed.

**NWP 20.** *Response Operations for Oil and Hazardous Substances*:
No regional conditions are proposed.

**NWP 21.** *Surface Coal Mining Activities*:
No regional conditions are proposed.

**NWP 22.** *Removal of Vessels*:
No regional conditions are proposed.

**NWP 23.** *Approved Categorical Exclusions*:
No regional conditions are proposed.

**NWP 24.** *Indian Tribe or State Administered Section 404 Programs*:
Not applicable in the State of Louisiana.

**NWP 25.** *Structural Discharges*:
No regional conditions are proposed.

**NWP 26.** (Reserved)

**NWP 27.** *Aquatic Habitat Restoration, Establishment, and Enhancement Activities*:
No regulated activities shall be authorized that would convert tidal wetlands to another aquatic habitat type.

**NWP 28.** *Modifications of Existing Marinas*:
No regional conditions are proposed.

**NWP 29.** *Residential Developments*:
No regional conditions are proposed.

**NWP 30.** *Moist Soil Management for Wildlife*:
No regional conditions are proposed.

**NWP 31.** *Maintenance of Existing Flood Control Facilities*:
No regional conditions are proposed.

**NWP 32.** *Completed Enforcement Actions*:
No regional conditions are proposed.

**NWP 33.** *Temporary Construction, Access and Dewatering*:
No regional conditions are proposed.

**NWP 34.** *Cranberry Production Activities*:
Not applicable within the State of Louisiana.

**NWP 35.** *Maintenance Dredging of Existing Basins*:
No regional conditions are proposed.

**NWP 36.** *Boat Ramps*:
No regional conditions are proposed.

**NWP 37.** *Emergency Watershed Protection and Rehabilitation*:
No regional conditions are proposed.

**NWP 38.** *Cleanup of Hazardous and Toxic Waste*:
No regional conditions are proposed.

**NWP 39.** *Commercial and Institutional Developments*:
No regional conditions are proposed.

**NWP 40.** *Agricultural Activities*:
No regional conditions are proposed.

**NWP 41.** *Reshaping Existing Drainage Ditches*:
No regional conditions are proposed.

**NWP 42.** *Recreational Facilities*:
No regional conditions are proposed.

**NWP 43.** *Stormwater Management Facilities*:
Regulated activities which would result in the resuspension of dredged material shall be prohibited in Bayou d'Inde, the Inner Navigation Harbor Canal, Calcasieu River at the mouth of Bayou d'Inde, Harvey Canal, California Canal, and Bayous Trepagnier, Rigaud, Olsen and Verdine, Capitol Lake, Coon Island Loop, Devil's Swamp, and Tensas River (areas within and upstream of Tensas National Wildlife Refuge), Ouachita River (areas within and upstream of the Upper Ouachita National Wildlife Refuge), Wham Brake drainage (Staulkinghead Creek, Little Bayou Boeuf, Bayou Lafourche and Lake Irwin).

**NWP 44.** *Mining Activities*:
Regulated activities which would result in the resuspension of dredged material shall be prohibited in Bayou d'Inde, the Inner Harbor Canal, Calcasieu River at the mouth of Bayou d'Inde, Harvey Canal, California Canal, and Bayous Trepagnier, Rigaud, Olsen and Verdine, Capitol Lake, Coon Island Loop, Devil's Swamp, and Tensas River (areas within and upstream of Tensas National Wildlife Refuge), Ouachita River (areas within and upstream of the Upper Ouachita National Wildlife Refuge), Wham Brake drainage (Staulkinghead Creek, Little Bayou Boeuf, Bayou Lafourche and Lake Irwin).

**NWP 45.** ***Repair of Uplands Damaged by Discrete Events*:**
No regional conditions are proposed.

**NWP 46.** ***Discharges in Ditches*:**
No regional conditions are proposed.

**NWP 47.** *[Reserved]*

**NWP 48.** ***Existing Commercial Shellfish Aquaculture Activities*:**
No regional conditions are proposed.

**NWP 49.** ***Coal Remining Activities*:**
No regional conditions are proposed.

**NWP 50.** ***Underground Coal Mining Activities*:**
No regional conditions are proposed.

**NWP 51. Land-Based Renewable Energy Generation Facilities:**
No regional conditions are proposed.

**NWP 52. Water-Based Renewable Energy Generation Pilot Projects:**
No regional conditions are proposed.

***NWP-53. Removal of Low-Head Dams***
No regional conditions are proposed.

***NWP-54. Living Shorelines***
No regional conditions are proposed.

**New NWP A. Seaweed Mariculture Activities**
No regional conditions are proposed.

**New NWP B. Finfish Mariculture Activities**
No regional conditions are proposed.

**New NWP C. Electric Utility Line and Telecommunication Activities**
No regional conditions are proposed.

**New NWP D. Utility Line Activities for Water and Other Substances**
No regional conditions are proposed.

**New NWP E. Water Reclamation and Reuse Facilities**
No regional conditions are proposed.

## *PART III - WATER QUALITY REGIONAL NWPS CONDITIONS FOR "INDIAN COUNTRY" LANDS*

The Environmental Protection Agency (EPA) is the agency required to address water quality certification of the 2020 nationwide permits (NWPs) in Indian country[1] where a tribe has not received treatment in the same manner as a state for the Clean Water Act (CWA) Section 401 program. Tribes which have received treatment in the same manner as a state (TAS) for the water quality standards and §401 certification programs and which have EPA-approved water quality standards will be contacted by the Corps of Engineers for the water quality certification process. EPA is the agency required to address water quality certification for tribes that have not received TAS for the water quality standards and 401 certification programs. At this time, no Indian tribes in Louisiana have CWA Section 401 authority.

1. The permittee shall conduct all work in such a manner to comply with all U.S. Army Corps of Engineers §404 permit conditions.

2. The permittee shall keep a copy of this certification with conditions at the project site during all phases of construction. All contractors or subcontractors involved in the project must be provided a copy of this certification prior to commencement of activities.

3. All heavy equipment used in the project areas shall be steam cleaned before the start of the project and inspected daily for leaks. Leaking equipment must not be used in or near surface water or in a wetland area. Equipment shall be parked outside the waterbody when not in use.

4. All fuels, oil, hydraulic fluid, or other substances of this nature must not be stored, temporarily or otherwise, within the normal floodplain or the wetland. A secondary containment system for these items shall be used in the event the primary containment system leaks. Refueling or servicing of equipment must not take place within 100 feet of any watercourse or within the wetland area.

5. The construction area shall be protected such that a runoff event will not move soil or contaminants to surface water or away from the construction site. These measures shall be in place prior to the commencement of activities and inspected daily.

6. Temporary mats must be placed on stream banks, riparian areas, and wetlands, to minimize impacts to soil and vegetation from heavy equipment. Temporary access roads must be restored to pre-project conditions.

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[1] "Indian Country", as defined in 18 U.S.C. 1151, means: (1) all land within the limits of any Indian reservation under the jurisdiction of the United States government, not withstanding the issuance of any patent, and including rights-of-way running through the reservation; (2) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a State; and (3) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

7. All asphalt, concrete, and other construction materials must be properly handled and contained to prevent releases to the stream channels. All concrete that is to be poured must be fully contained in mortar-tight forms to prevent accidental releases to surface water or ground water. No discharge of any concrete to surface water or ground water may occur. Dumping of waste materials near watercourses is strictly prohibited.

8. Work in a stream channel should be limited to periods of no flow when practicable, and must be limited to periods of low flow. Avoid working within the channel during spring runoff or summer thunderstorm season.

9. When working in a stream channel, flowing water must be temporarily diverted around the work area to minimize sedimentation and turbidity problems. Acceptable diversion structures are non-erosive and include (but are not limited to) sand bags, water bladders, concrete barriers lined with plastic, and flumes.

10. The permittee shall restore all areas disturbed by construction activities to pre-project conditions. This shall include restoration of surface contours, stabilization of the soil, and restoration of appropriate native vegetation to establish permanent cover.

# US Army Corps Of Engineers
# Regulatory Boundaries

## Little Rock District

Regulatory Branch, CESWL-RO
P.O. Box 867
Little Rock, Arkansas 72203-0867
(501) 324-5295

## Vicksburg District

Regulatory Branch, CEMVK-OD-F
4155 Clay Street
Vicksburg, Mississippi 39183-3435
(607) 637-7071

## Tulsa District

Regulatory Branch, CESWT-PE-R
1645 South 101st East Avenue
Tulsa, Oklahoma 74128-4609
(918) 669-7400

## Fort Worth District

Regulatory Branch, CESWF-PER-R
819 Taylor Street, Room 3A37
P.O.Box 17300
Fort Worth, Texas 76102-0300
(817) 886-1731

## New Orleans District

Regulatory Branch, CEMVN-OD-S
P.O. Box 60267
New Orleans, Louisiana 70160-0267
(504) 862-2257

## Galveston District

Regulatory Branch, CESWG-PE-R
2000 Fort Point Road
P.O. Box 1229
Galveston, Texas 77553-1229
(409) 766-3930

## Albuquerque District

Las Cruces Regulatory Office, CESPA-RD
505 S. Main St. Suite 142
Las Cruces, New Mexico 88001
(575) 556-9939

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Created By: Elisha Bradshaw
Date: 23Aug2011

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

December 18, 2020

Colonel Timothy R. Vail
Galveston District
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Re: 2020 USACE Nationwide Permits Reissuance

Dear Colonel Vail:

This letter is in response to your October 19, 2020, letter requesting Clean Water Act Section 401 certification of the United States Army Corps of Engineers (Corps) Nationwide Permits (NWPs). The Proposal to Reissue and Modify Nationwide Permits was published in the Federal Register (Vol. 85, No. 179, pages 57298-57395) on September 15, 2020. Regional conditions for NWPs in Texas were proposed in public notices on September 30, 2020 (Corps Galveston District) and October 1, 2020 (Corps Fort Worth District).

The Texas Commission on Environmental Quality (TCEQ) has reviewed the Proposal to Reissue and Modify Nationwide Permits and the proposed regional conditions. On behalf of the Executive Director and based on our evaluation of the information contained in these documents, the TCEQ certifies that any discharge associated with the activities authorized by NWPs 1, 2, 4, 5, 8, 9, 10, 11, 20, 23, 24, 28, 34, 35, 48, A, and B will comply with water quality requirements as required by Section 401 of the Federal Clean Water Act and pursuant to Title 30, Texas Administrative Code (TAC), Chapter 279.

The TCEQ conditionally certifies that any discharge associated with the activities authorized by NWPs 3, 6, 7, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 25, 27, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 49, 50, 51, 52, 53, 54, C, D, and E will comply with water quality requirements as required by Section 401 of the Federal Clean Water Act and pursuant to Title 30, Texas Administrative Code, Chapter 279. Conditions for each NWP are defined in Attachment 1 and more detail on specific conditions is given below, including information explaining why the condition is necessary for compliance with water quality requirements as well as the supporting regulatory authorizations.

The TCEQ understands that a prohibition against the use of NWPs (except for NWP 3) in coastal dune swales, mangrove marshes, and Columbia Bottomlands in the Galveston District is included in the Draft 2020 Nationwide Permit (NWP) Regional Conditions for the State of Texas (Regional Conditions). A prohibition of using NWPs (except for NWP 3) in coastal dune swales, mangrove marshes, and Columbia bottomlands in the Galveston District is a condition of this TCEQ 401 certification. This condition is necessary to ensure compliance with water quality requirements because impacts to rare and ecologically significant aquatic resources such as coastal dune swales, mangrove marshes, and Columbia bottomlands would not be considered minimal but significant, and therefore would not meet the purpose of a nationwide permit to authorize activities that will result in no more than minimal adverse environmental effects. Furthermore, activities that would result in impacts to these unique resources are more appropriately authorized under an individual permit to ensure that unavoidable impacts are adequately minimized (30 TAC §279.11(c)(2)) and mitigated (30 TAC §279.11(c)(3) and 30 TAC §307.4(i)).

The TCEQ wants to clarify the application of NWP 16 in Texas. NWP 16 should be limited to the return water from upland contained dredged material disposal areas. It is important to emphasize the intent for dredged material disposal. The TCEQ understands dredged material to be associated with navigational dredging activities, not commercial mining activities. To avoid confusion, the TCEQ requests that a regional condition be added or that the Corps commits to prohibiting the use of NWP 16 for activities that would be regulated under Standard Industrial Classification (SIC) codes 1442 and 1446 (industrial and construction sand and gravel mining).

Consistent with previous NWPs certification decisions, the TCEQ is conditionally certifying NWP 16 for the return water from confined upland disposal not to exceed a 300 mg/L total suspended solids (TSS) concentration. This condition is necessary to ensure that return water discharges will comply with water quality requirements in accordance with Texas Water Code §26.003 and antidegradation policy in 30 TAC §307.5, and not result in violations of general water quality criteria in 30 TAC 307.4(b)(2)-(5). The TCEQ encourages the Corps to consider that TSS limits are promulgated as effluent limits under Title 40 of the Code of Federal Regulations, and that the TCEQ effectively imposes TSS effluent limits in thousands of wastewater discharge permits issued in Texas under Section 402 of the federal Clean Water Act.

The TCEQ recognizes the usefulness of having an instantaneous method to determine compliance with the 300 mg/L TSS limit. However, existing literature and analysis of paired samples of turbidity and TSS from the Texas Surface Water Quality Information System indicate this relationship must be a site-specific characterization of the actual sediments to be dredged. To address this approach, we have continued language in the NWP 16 conditional certification that allows flexibility to use an instantaneous method in implementing the TSS limit when a site-specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus TSS has been approved by TCEQ. The TCEQ remains interested in working with the Corps in the development of these curves and in working together to find the best methods to implement this limit.

Regional Condition 17 applies to NWP authorizations in the Area of Concern (AOC) of the San Jacinto River Waste Pits Superfund Site. The TCEQ conditionally certifies Regional Condition 17 provided that the Permit Evaluation Requirement Process (Process), effective November 1, 2009, is adhered to for all proposed and existing permits within the AOC. The Process requires that all permit applicants and existing permittees within the AOC perform sampling to ensure that any activities conducted, especially activities involving dredging or disposal of dredged materials, do not impact site investigation and remediation and that existing water quality is maintained and protected in accordance with the Texas Water Code §26.003 and TCEQ antidegradation policy in 30 TAC §307.5.

The TCEQ is conditionally certifying NWP General Condition 12 *Soil Erosion and Sediment Controls*, and General Condition 25 *Water Quality*. The conditions address three broad categories of water quality management with specific recommendations for Best Management Practices (BMPs) for each category. These BMP conditions are necessary to enhance the water quality protection of these General Conditions by requiring the use of specific BMPs to control erosion, sedimentation, and/or post-construction TSS in permitted activities and therefore prevent violation of state general water quality criteria (30 TAC §307.4) and antidegradation policy (30 TAC §307.5). Runoff from bridge decks has been exempted from the requirement for post-construction TSS controls under General Condition 25. A list of TCEQ-recommended BMPs is included as Attachment 2. Attachment 3 is provided as a quick reference table identifying the BMP categories that are required for each NWP. A detailed description of the BMPs is provided in Attachment 4.

The Corps is proposing to remove the 300 linear foot (LF) limit for NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52, in part, to simplify the quantification of aquatic resource types (i.e., streams, wetlands, etc.) by using acreage as the preferred unit of measure. Removing the stream bed loss limit would mean that stream losses associated with activities covered by these 10 NWPs would only be limited by the existing ½-acre limit on overall impacts to waters of the U.S. This could significantly affect state stream resources by allowing upwards of several thousand linear feet of stream impacts under these permits, depending on the dimensions of the streams being impacted. The TCEQ has traditionally relied on and used linear feet as the preferred unit of measure of stream impacts and stream mitigation in our Section 401 water quality certification program. Therefore, the TCEQ does not support the proposed removal of the 300 LF stream bed loss limit in these NWPs and conditionally certifies NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 with a limit of 1,500 linear feet of stream bed loss. The condition is based on the amount of stream impacts considered minimal by the TCEQ, where certification is waived for projects impacting 1,500 LF of streams or less in accordance with the Memorandum of Agreement (August 2000) between the Corps and TCEQ. Any proposed impacts greater than 1,500 linear feet of impacts in stream length will need to undergo an individual TCEQ 401 certification review, preferably in the context of a Section 404 individual permit. This condition is necessary to ensure that the discharge associated with projects permitted using these 10 NWPs will comply with water quality requirements for aquatic life uses and habitat (30 TAC 307.4(i)), antidegradation implementation procedures (30 TAC

307.5(c)(1)(B), and minimization and mitigation requirements in 30 TAC 279.11(c)(2) and (3), as well as be consistent with the NWP goal of authorizing only minimal adverse environmental impacts.

This certification decision is limited to those activities under the jurisdiction of the TCEQ. For activities related to the production and exploration of oil and gas, a Railroad Commission of Texas certification is required as provided in the Texas Water Code §26.131.

The TCEQ has reviewed the Notice of Reissuance of Nationwide Permits for consistency with the Texas Coastal Management Program (CMP) goals and policies in accordance with the CMP regulations {Title 31, Texas Administrative Code (TAC), Chapter (§)505.30} and has determined that the action is consistent with the applicable CMP goals and policies.

This certification was reviewed for consistency with the CMP's development in critical areas policy {31 TAC §501.23} and dredging and dredged material disposal and placement policy {31 TAC §501.25}. This certification complies with the CMP goals {31 TAC §501.12(1, 2, 3, 5)} applicable to these policies.

The TCEQ reserves the right to modify this certification if additional information identifies specific areas where significant impacts, including cumulative or secondary impacts, are occurring, and the use of these NWPs would be inappropriate.

No review of property rights, location of property lines, nor the distinction between public and private ownership has been made, and this certification may not be used in any way with regard to questions of ownership.

If you require further assistance, please contact Ms. Lili Murphy, Water Quality Assessment Section, Water Quality Division (MC-150), at (512) 239-4595 or by email at lili.murphy@tceq.texas.gov.

Sincerely,

David W Galindo

David W. Galindo, Deputy Director
Water Quality Division
Texas Commission on Environmental Quality

DWG/LM/

Attachments

ccs: Mr. Joseph McMahan, U.S. Army Corps of Engineers Galveston District via e-mail at joseph.a.mcmahan@usace.army.mil
Ms. Kristi McMillan U.S. Army Corps of Engineers Galveston District via e-mail at Kristi.N.McMillan@usace.army.mil
Mr. Stephen Brooks, Branch Chief, U.S. Army Corp of Engineers Fort Worth District via e-mail at Stephen.Brooks@usace.army.mil
Ms. Allison Buchtien,and Mr. Jesse Solis, Texas General Land Office via e-mail at Federal.Consistency@glo.texas.gov
Ms. Leslie Savage, Texas Railroad Commission via e-mail at Leslie.Savage@RRC.texas.gov
Branch Chief, U.S. Army Corps of Engineers, Albuquerque District, 4101 Jefferson Plaza NE, Room 313, Albuquerque, New Mexico 87109-3435
Regulatory Branch Chief, U.S. Army Corps of Engineers, Regulatory Branch CESWT-PE-R, 1645 South 101st East Avenue, Tulsa, Oklahoma, 74128
Regulatory Branch Chief, U.S. Army Corps of Engineers, El Paso Regulatory Office, CESPA-OD-R-EP, P.O. Box 6096, Fort Bliss, Texas 79906-6096

# Attachment 1
## Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions

General Condition 12 (Soil Erosion and Sediment Controls)
Erosion control and sediment control best management practices (BMPs) are required with the use of this general condition. Attachment 2 describes the BMPs and the Nationwide Permits (NWPs) to which they apply. If the applicant does not choose one of the BMPs listed in Attachment 2, an individual 401 certification is required.

General Condition 25 (Water Quality)
Post-construction total suspended solids (TSS) BMPs are required with the use of this general condition. Attachment 2 describes the BMPs and the NWPs to which they apply. If the applicant does not choose one of the BMP's listed in Attachment 2, an individual 401 certification is required. Bridge deck runoff is exempt from this requirement.

Regional Condition 17 condition
The Permit Evaluation Requirement Process, effective November 1, 2009, is required for all proposed and existing permits within San Jacinto River Waste Pits Superfund Site Area of Concern.

All NWPs except for NWP 3
These NWPs are not authorized for use in coastal dune swales, mangrove marshes, and Columbia bottomlands in the Galveston District, Texas.

NWP 3 (Maintenance)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 6 (Survey Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 7 (Outfall Structures and Associated Intake Structures)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 12 (Oil or Natural Gas Pipeline Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 13 (Bank Stabilization)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 14 (Linear Transportation Projects)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 15 (U.S. Coast Guard Approved Bridges)
Soil Erosion and Sediment Controls under General Condition 12 are required.

## Attachment 1
## Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions

NWP 16 (Return Water From Upland Contained Disposal Areas)
Activities that would be regulated under Standard Industrial Classification (SIC) codes 1442 and 1446 (industrial and construction sand and gravel mining) are not eligible for this NWP. Effluent from an upland contained disposal area shall not exceed a TSS concentration of 300 mg/L unless a site-specific TSS limit, or a site-specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus TSS has been approved by TCEQ.

NWP 17 (Hydropower Projects)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 18 (Minor Discharges)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 19 (Minor Dredging)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 21 (Surface Coal Mining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 22 (Removal of Vessels)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 25 (Structural Discharges)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 29 (Residential Developments)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 30 (Moist Soil Management for Wildlife)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 31 (Maintenance of Existing Flood Control Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

**Attachment 1**
**Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions**

NWP 32 (Completed Enforcement Actions)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 33 (Temporary Construction, Access and Dewatering)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 36 (Boat Ramps)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 37 (Emergency Watershed Protection and Rehabilitation)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 38 (Cleanup of Hazardous and Toxic Waste)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 39 (Commercial and Institutional Developments)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 40 (Agricultural Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 41 (Reshaping Existing Drainage Ditches and Irrigation Ditches)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 42 (Recreational Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 43 (Stormwater Management Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 44 (Mining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

**Attachment 1**
**Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions**

NWP 45 (Repair of Uplands Damaged by Discrete Events)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 46 (Discharges in Ditches)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 49 (Coal Remining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 50 (Underground Coal Mining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 51 (Land-Based Renewal Energy Generation Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 52 (Water-Based Renewal Energy Generation Pilot Projects)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 53 (Removal of Low-Head Dams)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 54 (Living Shorelines)
Sediment Controls under General Condition 12 are required.

NWP C (Electric Utility Line and Telecommunications Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP D (Utility Line Activities for Water and Other Substances)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP E (Water Reclamation and Reuse Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

**Attachment 2**
**401 Water Quality Certification Best Management Practices (BMPs) for Nationwide Permits**

## I. Erosion Control

Disturbed areas must be stabilized to prevent the introduction of sediment to adjacent wetlands or water bodies during wet weather conditions (erosion). *At least one* of the following best management practices (BMPs) must be maintained and remain in place until the area has been stabilized for NWPs 3, 6, 7, 12, 13, 14, 15, 17, 18, 19, 21, 22, 25, 27, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 49, 50, 51, 52, 53, C, D, and E. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required. BMPs for NWP 52 apply only to land-based impacts from attendant features.

- ◇ Temporary Vegetation
- ◇ Blankets/Matting
- ◇ Mulch
- ◇ Sod
- ◇ Interceptor Swale
- ◇ Diversion Dike
- ◇ Erosion Control Compost
- ◇ Mulch Filter Socks
- ◇ Compost Filter Socks

## II. Sedimentation Control

Prior to project initiation, the project area must be isolated from adjacent wetlands and water bodies by the use of BMPs to confine sediment. Dredged material shall be placed in such a manner that prevents sediment runoff into water in the state, including wetlands. Water bodies can be isolated by the use of one or more of the required BMPs identified for sedimentation control. These BMP's must be maintained and remain in place until the dredged material is stabilized. *At least one* of the following BMPs must be maintained and remain in place until the area has been stabilized for NWPs 3, 6, 7, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 25, 27, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 49, 50, 51, 52, 53, 54, C, D, and E. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required. BMPs for NWP 52 apply only to land-based impacts from attendant features.

- ◇ Sand Bag Berm
- ◇ Rock Berm
- ◇ Silt Fence
- ◇ Hay Bale Dike
- ◇ Triangular Filter Dike
- ◇ Brush Berms
- ◇ Stone Outlet Sediment Traps
- ◇ Sediment Basins
- ◇ Erosion Control Compost
- ◇ Mulch Filter Socks
- ◇ Compost Filter Socks

**Attachment 2**
**401 Water Quality Certification Best Management Practices (BMPs) for Nationwide Permits**

## III. Post-Construction TSS Control

After construction has been completed and the site is stabilized, total suspended solids (TSS) loadings shall be controlled by *at least one* of the following BMPs for NWPs 12, 14, 17, 18, 21, 29, 31, 36, 39, 40, 41, 42, 44, 45, 49, 50, 51, 52, C, D, and E. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required. BMPs for NWP 52 apply only to land-based impacts from attendant features. Runoff from bridge decks has been exempted from the requirement for post construction TSS controls.

- ◇ Retention/Irrigation Systems
- ◇ Extended Detention Basin
- ◇ Vegetative Filter Strips
- ◇ Grassy Swales
- ◇ Erosion Control Compost
- ◇ Compost Filter Socks
- ◇ Constructed Wetlands
- ◇ Wet Basins
- ◇ Vegetation lined drainage ditches
- ◇ Sand Filter Systems
- ◇ Mulch Filter Socks
- ◇ Sedimentation Chambers*

* Only to be used when there is no space available for other approved BMPs.

## Attachment 3
## Reference to Nationwide Permits Best Management Practices Requirements

| NWP | Permit Description | Erosion Control | Sediment Control | Post-Construction TSS |
|---|---|---|---|---|
| 1 | Aid to Navigation | | | |
| 2 | Structures in Artificial Canals | | | |
| 3 | Maintenance | X | X | |
| 4 | Fish and Wildlife Harvesting, Enhancement and Attraction Devices and Activities | | | |
| 5 | Scientific Measurement Devices | | | |
| 6 | Survey Activities *Trenching | X | X | |
| 7 | Outfall Structures and Associated Intake Structures | X | X | |
| 8 | Oil and Gas Structures on the Outer Continental Shelf | | | |
| 9 | Structures in Fleeting and Anchorage Areas | | | |
| 10 | Mooring Buoys | | | |
| 11 | Temporary Recreational Structures | | | |
| 12 | Oil or Natural Gas Pipeline Activities | X | X | X |
| 13 | Bank Stabilization | X | X | |
| 14 | Linear Transportation Projects | X | X | X |
| 15 | U.S. Coast Guard Approved Bridges | X | X | |
| 16 | Return Water From Upland Contained Disposal Areas | | | |
| 17 | Hydropower Projects | X | X | X |
| 18 | Minor Discharges | X | X | X |
| 19 | Minor Dredging | X | X | |
| 20 | Response Operations for Oil or Hazardous Substances | | | |
| 21 | Surface Coal Mining Activities | X | X | X |
| 22 | Removal of Vessels | X | X | |

## Attachment 3
## Reference to Nationwide Permits Best Management Practices Requirements

| NWP | Permit Description | Erosion Control | Sediment Control | Post-Construction TSS |
|---|---|---|---|---|
| 23 | Approved Categorical Exclusions | | | |
| 24 | Indian Tribe or State Administered Section 404 Programs | | | |
| 25 | Structural Discharges | X | X | |
| 26 | [Reserved] | | | |
| 27 | Aquatic Habitat Restoration, Establishment, and Enhancement Activities | X | X | |
| 28 | Modifications of Existing Marinas | | | |
| 29 | Residential Developments | X | X | X |
| 30 | Moist Soil Management for Wildlife | X | X | |
| 31 | Maintenance of Existing Flood Control Facilities | X | X | X |
| 32 | Completed Enforcement Actions | X | X | |
| 33 | Temporary Construction, Access and Dewatering | X | X | |
| 34 | Cranberry Production Activities | | | |
| 35 | Maintenance Dredging of Existing Basins | | | |
| 36 | Boat Ramps | X | X | X |
| 37 | Emergency Watershed Protection and Rehabilitation | X | X | |
| 38 | Cleanup of Hazardous and Toxic Waste | X | X | |
| 39 | Commercial and Institutional Developments | X | X | X |
| 40 | Agricultural Activities | X | X | X |
| 41 | Reshaping Existing Drainage Ditches and Irrigation Ditches | X | X | X |
| 42 | Recreational Facilities | X | X | X |
| 43 | Stormwater Management Facilities | X | X | |

## Attachment 3
## Reference to Nationwide Permits Best Management Practices Requirements

| NWP | Permit Description | Erosion Control | Sediment Control | Post-Construction TSS |
|---|---|---|---|---|
| 44 | Mining Activities | X | X | X |
| 45 | Repair of Uplands Damaged by Discrete Events | X | X | X |
| 46 | Discharges in Ditches | X | X | |
| 47 | [Reserved] | | | |
| 48 | Existing Commercial Shellfish Aquaculture Activities | | | |
| 49 | Coal Remining Activities | X | X | X |
| 50 | Underground Coal Mining Activities | X | X | X |
| 51 | Land-Based Renewable Energy Generation Facilities | X | X | X |
| 52 | Water-Based Renewable Energy Generation Pilot Projects | X | X | X |
| 53 | Removal of Low-Head Dams | X | X | |
| 54 | Living Shorelines | | X | |
| C | Electric Utility Line and Telecommunications Activities | X | X | X |
| D | Utility Line Activities for Water and Other Substances | X | X | X |
| E | Water Reclamation and Reuse Facilities | X | X | X |

# Attachment 4
## Description of Best Management Practices (BMPs)

## EROSION CONTROL BMPs

### Temporary Vegetation

**Description:** Vegetation can be used as a temporary or permanent stabilization technique for areas disturbed by construction. Vegetation effectively reduces erosion in swales, stockpiles, berms, mild to medium slopes, and along roadways. Other techniques such as matting, mulches, and grading may be required to assist in the establishment of vegetation.

**Materials:**

- The type of temporary vegetation used on a site is a function of the season and the availability of water for irrigation.
- Temporary vegetation should be selected appropriately for the area.
- County agricultural extension agents are a good source for suggestions for temporary vegetation.
- All seed should be high quality, U.S. Dept. of Agriculture certified seed.

**Installation:**

- Grading must be completed prior to seeding.
- Slopes should be minimized.
- Erosion control structures should be installed.
- Seedbeds should be well pulverized, loose, and uniform.
- Fertilizers should be applied at appropriate rates.
- Seeding rates should be applied as recommended by the county agricultural extension agent.
- The seed should be applied uniformly.
- Steep slopes should be covered with appropriate soil stabilization matting.

### Blankets and Matting

**Description:** Blankets and matting material can be used as an aid to control erosion

on critical sites during the establishment period of protective vegetation. The most common uses are in channels, interceptor swales, diversion dikes, short, steep slopes, and on tidal or stream banks.

**Materials:**

New types of blankets and matting materials are continuously being developed. The Texas Department of Transportation (TxDOT) has defined the critical performance factors for these types of products and has established minimum performance standards which must be met for any product seeking to be approved for use within any of TxDOT's construction or maintenance activities. The products that have been approved by TxDOT are also appropriate for general construction site stabilization. TxDOT maintains a web site at https://www.txdot.gov/inside-txdot/division/maintenance/erosion-control.html which is updated as new products are evaluated.

**Installation:**

- Install in accordance with the manufacturer's recommendations.
- Proper anchoring of the material.
- Prepare a friable seed bed relatively free from clods and rocks and any foreign material.
- Fertilize and seed in accordance with seeding or other type of planting plan.
- Erosion stops should extend beyond the channel liner to full design cross-section of the channel.
- A uniform trench perpendicular to line of flow may be dug with a spade or a mechanical trencher.
- Erosion stops should be deep enough to penetrate solid material or below level of ruling in sandy soils.
- Erosion stop mats should be wide enough to allow turnover at bottom of trench for stapling, while maintaining the top edge flush with channel surface.

**Mulch**

**Description:** Mulching is the process of applying a material to the exposed soil surface to protect it from erosive forces and to conserve soil moisture until plants can become

established. When seeding critical sites, sites with adverse soil conditions or seeding on other than optimum seeding dates, mulch material should be applied immediately after seeding. Seeding during optimum seeding dates and with favorable soils and site conditions will not need to be mulched.

**Materials:**

- Mulch may be small grain straw which should be applied uniformly.
- On slopes 15 percent or greater, a binding chemical must be applied to the surface.
- Wood-fiber or paper-fiber mulch may be applied by hydroseeding.
- Mulch nettings may be used.
- Wood chips may be used where appropriate.

**Installation:**

Mulch anchoring should be accomplished immediately after mulch placement. This may be done by one of the following methods: peg and twine, mulch netting, mulch anchoring tool, or liquid mulch binders.

## Sod

**Description:** Sod is appropriate for disturbed areas which require immediate vegetative covers, or where sodding is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are waterways carrying intermittent flow, areas around drop inlets or in grassed swales, and residential or commercial lawns where quick use or aesthetics are factors. Sod is composed of living plants and those plants must receive adequate care in order to provide vegetative stabilization on a disturbed area.

**Materials:**

- Sod should be machine cut at a uniform soil thickness.
- Pieces of sod should be cut to the supplier's standard width and length.
- Torn or uneven pads are not acceptable.
- Sections of sod should be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp.

- Sod should be harvested, delivered, and installed within a period of 36 hours.

**Installation:**

- Areas to be sodded should be brought to final grade.
- The surface should be cleared of all trash and debris.
- Fertilize according to soil tests.
- Fertilizer should be worked into the soil.
- Sod should not be cut or laid in excessively wet or dry weather.
- Sod should not be laid on soil surfaces that are frozen.
- During periods of high temperature, the soil should be lightly irrigated.
- The first row of sod should be laid in a straight line with subsequent rows placed parallel to and butting tightly against each other.
- Lateral joints should be staggered to promote more uniform growth and strength.
- Wherever erosion may be a problem, sod should be laid with staggered joints and secured.
- Sod should be installed with the length perpendicular to the slope (on the contour).
- Sod should be rolled or tamped.
- Sod should be irrigated to a sufficient depth.
- Watering should be performed as often as necessary to maintain soil moisture.
- The first mowing should not be attempted until the sod is firmly rooted.
- Not more than one third of the grass leaf should be removed at any one cutting.

## Attachment 4
## Description of Best Management Practices (BMPs)

### Interceptor Swale

Interceptor swales are used to shorten the length of exposed slope by intercepting runoff, prevent off-site runoff from entering the disturbed area, and prevent sediment-laden runoff from leaving a disturbed site. They may have a v-shape or be trapezoidal with a flat bottom and side slopes of 3:1 or flatter. The outflow from a swale should be directed to a stabilized outlet or sediment trapping device. The swales should remain in place until the disturbed area is permanently stabilized.

**Materials**:

- Stabilization should consist of a layer of crushed stone three inches thick, riprap or high velocity erosion control mats.
- Stone stabilization should be used when grades exceed 2% or velocities exceed 6 feet per second.
- Stabilization should extend across the bottom of the swale and up both sides of the channel to a minimum height of three inches above the design water surface elevation based on a 2-year, 24-hour storm.

**Installation**:

- An interceptor swale should be installed across exposed slopes during construction and should intercept no more than 5 acres of runoff.
- All earth removed and not needed in construction should be disposed of in an approved spoils site so that it will not interfere with the functioning of the swale or contribute to siltation in other areas of the site.
- All trees, brush, stumps, obstructions and other material should be removed and disposed of so as not to interfere with the proper functioning of the swale.
- Swales should have a maximum depth of 1.5 feet with side slopes of 3:1 or flatter.
- Swales should have positive drainage for the entire length to an outlet.
- When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. Stabilization should be crushed stone placed in a layer of at least 3 inches thick or may be high velocity erosion control matting. Check dams are also recommended to reduce velocities in the swales possibly reducing the amount of stabilization necessary.

- Minimum compaction for the swale should be 90% standard proctor density.

## Diversion Dikes

A temporary diversion dike is a barrier created by the placement of an earthen embankment to reroute the flow of runoff to an erosion control device or away from an open, easily erodible area. A diversion dike intercepts runoff from small upland areas and diverts it away from exposed slopes to a stabilized outlet, such as a rock berm, sandbag berm, or stone outlet structure. These controls can be used on the perimeter of the site to prevent runoff from entering the construction area. Dikes are generally used for the duration of construction to intercept and reroute runoff from disturbed areas to prevent excessive erosion until permanent drainage features are installed and/or slopes are stabilized.

### Materials:

- Stone stabilization (required for velocities in excess of 6 fps) should consist of riprap placed in a layer at least 3 inches thick and should extend a minimum height of 3 inches above the design water surface up the existing slope and the upstream face of the dike.

- Geotextile fabric should be a non-woven polypropylene fabric designed specifically for use as a soil filtration media with an approximate weight of 6 oz./yd$^2$, a Mullen burst rating of 140 psi, and having an equivalent opening size (EOS) greater than a #50 sieve.

### Installation:

- Diversion dikes should be installed prior to and maintained for the duration of construction and should intercept no more than 10 acres of runoff.

- Dikes should have a minimum top width of 2 feet and a minimum height of compacted fill of 18 inches measured form the top of the existing ground at the upslope toe to top of the dike and have side slopes of 3:1 or flatter.

- The soil for the dike should be placed in lifts of 8 inches or less and be compacted to 95 % standard proctor density.

- The channel, which is formed by the dike, must have positive drainage for its entire l length to an outlet.

- When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. In situations where velocities do not exceed 6 feet per second, vegetation may be used to control erosion.

## Attachment 4
## Description of Best Management Practices (BMPs)

### Erosion Control Compost

**Description**: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

**Materials:**

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at https://www.txdot.gov/inside-txdot/division/support/recycling/speclist.html that provides information on compost specification data.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332.

Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols

or test methods listed in TMECC. TMECC information can be found at https://www.compostingcouncil.org/page/tmecc.
The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at https://www.compostingcouncil.org/page/SealofTestingAssuranceSTA.

**Installation**:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2-inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

## Mulch and Compost Filter Socks

**Description**: Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

**Materials:**

New types of mulch and compost filter socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch and compost filter socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 5049. TxDOT maintains a website at https://www.txdot.gov/inside-txdot/division/support/recycling/speclist.html that provides information on compost specification data.

Mulch and compost filter socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification

data. To ensure the quality of compost used for mulch and compost filter socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch and compost filter socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at https://www.compostingcouncil.org/page/tmecc. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at https://www.compostingcouncil.org/page/SealofTestingAssuranceSTA.

**Installation**:

- Install in accordance with TxDOT Special Specification 5049.
- Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
- Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
- Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

## Attachment 4
## Description of Best Management Practices (BMPs)

## SEDIMENT CONTROL BMPS

### Sandbag Berm

**Description:** The purpose of a sandbag berm is to detain sediment carried in runoff from disturbed areas. This objective is accomplished by intercepting runoff and causing it to pool behind the sandbag berm. Sediment carried in the runoff is deposited on the upstream side of the sandbag berm due to the reduced flow velocity. Excess runoff volumes are allowed to flow over the top of the sandbag berm. Sandbag berms are used only during construction activities in streambeds when the contributing drainage area is between 5 and 10 acres and the slope is less than 15%, i.e., utility construction in channels, temporary channel crossing for construction equipment, etc. Plastic facing should be installed on the upstream side and the berm should be anchored to the streambed by drilling into the rock and driving in T-posts or rebar (#5 or #6) spaced appropriately.

**Materials:**

- The sandbag material should be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight 4 oz/yd 2, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70 percent.

- The bag length should be 24 to 30 inches, width should be 16 to 18 inches and thickness should be 6 to 8 inches.

- Sandbags should be filled with coarse grade sand and free from deleterious material. All sand should pass through a No. 10 sieve. The filled bag should have an approximate weight of 40 pounds.

- Outlet pipe should be schedule 40 or stronger polyvinyl chloride (PVC) having a nominal internal diameter of 4 inches.

**Installation:**

- The berm should be a minimum height of 18 inches, measured from the top of the existing ground at the upslope toe to the top of the berm.

- The berm should be sized as shown in the plans but should have a minimum width of 48 inches measured at the bottom of the berm and 16 inches measured at the top of the berm.

- Runoff water should flow over the tops of the sandbags or through 4-inch diameter PVC pipes embedded below the top layer of bags.

- When a sandbag is filled with material, the open end of the sandbag should be stapled or tied with nylon or poly cord.

- Sandbags should be stacked in at least three rows abutting each other, and in staggered arrangement.

- The base of the berm should have at least 3 sandbags. These can be reduced to 2 and 1 bag in the second and third rows respectively.

- For each additional 6 inches of height, an additional sandbag must be added to each row width.

- A bypass pump-around system, or similar alternative, should be used on conjunction with the berm for effective dewatering of the work area.

## Silt Fence

**Description:** A silt fence is a barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. When properly used, silt fences can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. If not properly installed, silt fences are not likely to be effective. The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas of a limited extent. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence should remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way. If concentrated flow occurs after installation, corrective action must be taken such as placing a rock berm in the areas of concentrated flow. Silt fencing within the site may be temporarily moved during the day to allow construction activity provided it is replaced and properly anchored to the ground at the end of the day. Silt fences on the perimeter of the site or around drainage ways should not be moved at any time.

**Materials:**

- Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

- Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Y-bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft 2, and Brindell hardness exceeding 140.

- Woven wire backing to support the fabric should be galvanized 2-inch x 4-inch welded wire, 12 gauge minimum.

**Installation:**

- Steel posts, which support the silt fence, should be installed on a slight angle toward the anticipated runoff source. Post must be embedded a minimum of 1 foot deep and spaced not more than 8 feet on center. Where water concentrates, the maximum spacing should be 6 feet.

- Lay out fencing down-slope of disturbed area, following the contour as closely as possible. The fence should be sited so that the maximum drainage area is 3 acre/100 feet of fence.

- The toe of the silt fence should be trenched in with a spade or mechanical trencher, so that the down-slope face of the trench is flat and perpendicular to the line of flow. Where fence cannot be trenched in (e.g., pavement or rock outcrop), weight fabric flap with 3 inches of pea gravel on uphill side to prevent flow from seeping under fence.

- The trench must be a minimum of 6 inches deep and 6 inches wide to allow for the silt fence fabric to be laid in the ground and backfilled with compacted material.

- Silt fence should be securely fastened to each steel support post or to woven wire, which is in turn attached to the steel fence post. There should be a 3-foot overlap, securely fastened where ends of fabric meet.

## Triangular Filter Dike

**Description:** The purpose of a triangular sediment filter dike is to intercept and detain water-borne sediment from unprotected areas of limited extent. The triangular sediment filter dike is used where there is no concentration of water in a channel or other drainage way above the barrier and the contributing drainage area is less than one acre. If the uphill slope above the dike exceeds 10%, the length of the slope above the dike should be less than 50 feet. If concentrated flow occurs after installation, corrective action should be taken such as placing rock berm in the areas of concentrated flow. This measure is effective on paved areas where installation of silt fence is not possible or where vehicle access must be maintained. The advantage of these controls is the ease with which they can be moved to allow vehicle traffic and then reinstalled to maintain sediment.


## Attachment 4
## Description of Best Management Practices (BMPs)

**Materials:**

- Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2 , ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

- The dike structure should be 6 gauge 6-ing x 6-inch wire mesh folded into triangular form being eighteen (18) inches on each side.

**Installation:**

- The frame of the triangular sediment filter dike should be constructed of 6-inch x 6-inch, 6-gauge welded wire mesh, 18 inches per side, and wrapped with geotextile fabric the same composition as that used for silt fences.

- Filter material should lap over ends six (6) inches to cover dike to dike junction; each junction should be secured by shoat rings.

- Position dike parallel to the contours, with the end of each section closely abutting the adjacent sections.

- There are several options for fastening the filter dike to the ground. The fabric skirt may be toed-in with 6 inches of compacted material, or 12 inches of the fabric skirt should extend uphill and be secured with a minimum of 3 inches of open graded rock, or with staples or nails. If these two options are not feasible the dike structure may be trenched in 4 inches.

- Triangular sediment filter dikes should be installed across exposed slopes during construction with ends of the dike tied into existing grades to prevent failure and should intercept no more than one acre of runoff.

- When moved to allow vehicular access, the dikes should be reinstalled as soon as possible, but always at the end of the workday.

**Rock Berm**

**Description:** The purpose of a rock berm is to serve as a check dam in areas of concentrated flow, to intercept sediment-laden runoff, detain the sediment and release the water in sheet flow. The rock berm should be used when the contributing drainage area is less than 5 acres. Rock berms are used in areas where the volume of runoff is too great for a silt fence to contain. They are less effective for sediment removal than silt fences, particularly for fine particles, but are able to withstand higher flows than a

silt fence. As such, rock berms are often used in areas of channel flows (ditches, gullies, etc.). Rock berms are most effective at reducing bed load in channels and should not be substituted for other erosion and sediment control measures further up the watershed.

**Materials:**

- The berm structure should be secured with a woven wire sheathing having opening of one inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.

- Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used.

**Installation:**

- Lay out the woven wire sheathing perpendicular to the flow line. The sheathing should be 20-gauge woven wire mesh with 1 inch openings.

- Berm should have a top width of 2 feet minimum with side slopes being 2:1 (H:V) or flatter.

- Place the rock along the sheathing to a height not less than 18 inches.

- Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon.

- Berm should be built along the contour at zero percent grade or as near as possible.

- The ends of the berm should be tied into existing upslope grade and the berm should be buried in a trench approximately 3 to 4 inches deep to prevent failure of the control.

## Hay Bale Dike

**Description:** The purpose of a hay or straw bale dike is to intercept and detain small amounts of sediment-laden runoff from relatively small unprotected areas. Straw bales are to be used when it is not feasible to install other, more effective measures or when the construction phase is expected to last less than 3 months. Straw bales should not be used on areas where rock or other hard surfaces prevent the full and uniform anchoring of the barrier.

## Attachment 4
## Description of Best Management Practices (BMPs)

**Materials:**

**Straw:** The best quality straw mulch comes from wheat, oats or barley and should be free of weed and grass seed which may not be desired vegetation for the area to be protected. Straw mulch is light and therefore must be properly anchored to the ground.

**Hay:** This is very similar to straw with the exception that it is made of grasses and weeds and not grain stems. This form of mulch is very inexpensive and is widely available but does introduce weed and grass seed to the area. Like straw, hay is light and must be anchored.

- Straw bales should weigh a minimum of 50 pounds and should be at least 30 inches long.
- Bales should be composed entirely of vegetable matter and be free of seeds.
- Binding should be either wire or nylon string, jute or cotton binding is unacceptable. Bales should be used for not more than two months before being replaced.

**Installation:**

- Bales should be embedded a minimum of 4 inches and securely anchored using 2-inch x 2-inch wood stakes or 3/8-inch diameter rebar driven through the bales into the ground a minimum of 6 inches.
- Bales are to be placed directly adjacent to one another leaving no gap between them.
- All bales should be placed on the contour.
- The first stake in each bale should be angled toward the previously laid bale to force the bales together.

**Brush Berms**

Organic litter and spoil material from site clearing operations is usually burned or hauled away to be dumped elsewhere. Much of this material can be used effectively on the construction site itself. The key to constructing an efficient brush berm is in the method used to obtain and place the brush. It will not be acceptable to simply take a bulldozer and push whole trees into a pile. This method does not assure continuous ground contact with the berm and will allow uncontrolled flows under the berm.

Brush berms may be used where there is little or no concentration of water in a channel or other drainage way above the berm. The size of the drainage area should be no greater than one-fourth of an acre per 100 feet of barrier length; the maximum slope length behind the barrier should not exceed 100 feet; and the maximum slope gradient behind the barrier should be less than 50 percent (2:1).

**Materials:**

- The brush should consist of woody brush and branches, preferably less than 2 inches in diameter.
- The filter fabric should conform to the specifications for filter fence fabric.
- The rope should be 1/4-inch polypropylene or nylon rope.
- The anchors should be 3/8-inch diameter rebar stakes that are 18-inches long.

**Installation:**

- Lay out the brush berm following the contour as closely as possible.
- The juniper limbs should be cut and hand placed with the vegetated part of the limb in close contact with the ground. Each subsequent branch should overlap the previous branch providing a shingle effect.
- The brush berm should be constructed in lifts with each layer extending the entire length of the berm before the next layer is started.
- A trench should be excavated 6-inches wide and 4-inches deep along the length of the barrier and immediately uphill from the barrier.
- The filter fabric should be cut into lengths sufficient to lay across the barrier from its up-slope base to just beyond its peak. The lengths of filter fabric should be draped across the width of the barrier with the uphill edge placed in the trench and the edges of adjacent pieces overlapping each other. Where joints are necessary, the fabric should be spliced together with a minimum 6-inch overlap and securely sealed.
- The trench should be backfilled, and the soil compacted over the filter fabric.
- Set stakes into the ground along the downhill edge of the brush barrier and anchor the fabric by tying rope from the fabric to the stakes. Drive the rope anchors into the ground at approximately a 45-degree angle to the ground on 6-

foot centers.

- Fasten the rope to the anchors and tighten berm securely to the ground with a minimum tension of 50 pounds.

- The height of the brush berm should be a minimum of 24 inches after the securing ropes have been tightened.

## Stone Outlet Sediment Traps

A stone outlet sediment trap is an impoundment created by the placement of an earthen and stone embankment to prevent soil and sediment loss from a site. The purpose of a sediment trap is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment trap from sedimentation. A sediment trap is usually installed at points of discharge from disturbed areas. The drainage area for a sediment trap is recommended to be less than 5 acres.

Larger areas should be treated using a sediment basin. A sediment trap differs from a sediment basin mainly in the type of discharge structure. The trap should be located to obtain the maximum storage benefit from the terrain, for ease of clean out and disposal of the trapped sediment and to minimize interference with construction activities. The volume of the trap should be at least 3600 cubic feet per acre of drainage area.

### Materials:

- All aggregate should be at least 3 inches in diameter and should not exceed a volume of 0.5 cubic foot.

- The geotextile fabric specification should be woven polypropylene, polyethylene or polyamide geotextile, minimum unit weight of 4.5 oz/yd 2, mullen burst strength at least 250 lb/in 2, ultraviolet stability exceeding 70%, and equivalent opening size exceeding 40.

### Installation:

- Earth Embankment: Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment are to be 3:1. The minimum width of the embankment should be 3 feet.

- A gap is to be left in the embankment in the location where the natural confluence of runoff crosses the embankment line. The gap is to have a width in feet equal to 6 times the drainage area in acres.

- Geotextile Covered Rock Core: A core of filter stone having a minimum height of 1.5 feet and a minimum width at the base of 3 feet should be placed across the opening of the earth embankment and should be covered by geotextile fabric which should extend a minimum distance of 2 feet in either direction from the base of the filter stone core.

- Filter Stone Embankment: Filter stone should be placed over the geotextile and is to have a side slope which matches that of the earth embankment of 3:1 and should cover the geotextile/rock core a minimum of 6 inches when installation is complete. The crest of the outlet should be at least 1 foot below the top of the embankment.

## Sediment Basins

The purpose of a sediment basin is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment basin from sedimentation. A sediment basin is usually installed at points of discharge from disturbed areas. The drainage area for a sediment basin is recommended to be less than 100 acres.

Sediment basins are effective for capturing and slowly releasing the runoff from larger disturbed areas thereby allowing sedimentation to take place. A sediment basin can be created where a permanent pond BMP is being constructed. Guidelines for construction of the permanent BMP should be followed, but revegetation, placement of underdrain piping, and installation of sand or other filter media should not be carried out until the site construction phase is complete.

### Materials:

- Riser should be corrugated metal or reinforced concrete pipe or box and should have watertight fittings or end to end connections of sections.

- An outlet pipe of corrugated metal or reinforced concrete should be attached to the riser and should have positive flow to a stabilized outlet on the downstream side of the embankment.

- An anti-vortex device and rubbish screen should be attached to the top of the riser and should be made of polyvinyl chloride or corrugated metal.

## Attachment 4
## Description of Best Management Practices (BMPs)

**Basin Design and Construction:**

- For common drainage locations that serve an area with ten or more acres disturbed at one time, a sediment basin should provide storage for a volume of runoff from a two-year, 24-hour storm from each disturbed acre drained.

- The basin length to width ratio should be at least 2:1 to improve trapping efficiency. The shape may be attained by excavation or the use of baffles. The lengths should be measured at the elevation of the riser de-watering hole.

- Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment should be 3:1 (H:V).

- An emergency spillway should be installed adjacent to the embankment on undisturbed soil and should be sized to carry the full amount of flow generated by a 10-year, 3-hour storm with 1 foot of freeboard less the amount which can be carried by the principal outlet control device.

- The emergency spillway should be lined with riprap as should the swale leading from the spillway to the normal watercourse at the base of the embankment.

- The principal outlet control device should consist of a rigid vertically oriented pipe or box of corrugated metal or reinforced concrete. Attached to this structure should be a horizontal pipe, which should extend through the embankment to the toe of fill to provide a de-watering outlet for the basin.

- An anti-vortex device should be attached to the inlet portion of the principal outlet control device to serve as a rubbish screen.

- A concrete base should be used to anchor the principal outlet control device and should be sized to provide a safety factor of 1.5 (downward forces = 1.5 buoyant forces).

- The basin should include a permanent stake to indicate the sediment level in the pool and marked to indicate when the sediment occupies 50% of the basin volume (not the top of the stake).

- The top of the riser pipe should remain open and be guarded with a trash rack and anti-vortex device. The top of the riser should be 12 inches below the elevation of the emergency spillway. The riser should be sized to convey the runoff from the 2-year, 3-hour storm when the water surface is at the

emergency spillway elevation. For basins with no spillway the riser must be sized to convey the runoff from the 10-yr, 3-hour storm.

- Anti-seep collars should be included when soil conditions or length of service make piping through the backfill a possibility.

- The 48-hour drawdown time will be achieved by using a riser pipe perforated at the point measured from the bottom of the riser pipe equal to 1/2 the volume of the basin. This is the maximum sediment storage elevation. The size of the perforation may be calculated as follows:

$$Ao = \frac{As \times \sqrt{2h}}{Cd \times 980{,}000}$$

Where:
$A_o$ = Area of the de-watering hole, ft 2
$A_s$ = Surface area of the basin, ft 2
$C_d$ = Coefficient of contraction, approximately 0.6
$h$ = head of water above the hole, ft
Perforating the riser with multiple holes with a combined surface area equal to $A_o$ is acceptable.

## Erosion Control Compost

**Description**: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

**Materials:**

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at https://www.txdot.gov/inside-txdot/division/support/recycling/speclist.html that provides information on compost specification data.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection

Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at https://www.compostingcouncil.org/page/tmecc. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at https://www.compostingcouncil.org/page/SealofTestingAssuranceSTA.

**Installation**:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2-inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

## Mulch and Compost Filter Socks

**Description**: Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the

perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

**Materials:**

New types of mulch and compost filter socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch and compost filter socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 5049. TxDOT maintains a website at https://www.txdot.gov/inside-txdot/division/support/recycling/speclist.html that provides information on compost specification data.

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TMECC information can be found at https://www.compostingcouncil.org/page/tmecc. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at https://www.compostingcouncil.org/page/SealofTestingAssuranceSTA.

**Installation**:

Install in accordance with TxDOT Special Specification 5049.

- Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
- Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
- Inspect and maintain the socks in good condition (including staking, anchoring, etc.).
- Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

## Attachment 4
## Description of Best Management Practices (BMPs)

## POST-CONSTRUCTION TSS CONTROLS

### Retention/Irrigation Systems

**Description:** Retention/irrigation systems refer to the capture of runoff in a holding pond, then use of the captured water for irrigation of appropriate landscape areas. Retention/irrigation systems are characterized by the capture and disposal of runoff without direct release of captured flow to receiving streams. Retention systems exhibit excellent pollutant removal but can require regular, proper maintenance. Collection of roof runoff for subsequent use (rainwater harvesting) also qualifies as a retention/irrigation practice but should be operated and sized to provide adequate volume. This technology, which emphasizes beneficial use of stormwater runoff, is particularly appropriate for arid regions because of increasing demands on water supplies for agricultural irrigation and urban water supply.

**Design Considerations:** Retention/irrigation practices achieve 100% removal efficiency of total suspended solids contained within the volume of water captured. Design elements of retention/irrigation systems include runoff storage facility configuration and sizing, pump and wet well system components, basin lining, basin detention time, and physical and operational components of the irrigation system. Retention/irrigation systems are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

**Maintenance Requirements:** Maintenance requirements for retention/irrigation systems include routine inspections, sediment removal, mowing, debris and litter removal, erosion control, and nuisance control.

### Extended Detention Basin

**Description:** Extended detention facilities are basins that temporarily store a portion of stormwater runoff following a storm event. Extended detention basins are normally used to remove particulate pollutants and to reduce maximum runoff rates associated with development to their pre-development levels. The water quality benefits are the removal of sediment and buoyant materials. Furthermore, nutrients, heavy metals, toxic materials, and oxygen-demanding materials associated with the particles also are removed. The control of the maximum runoff rates serves to protect drainage channels below the device from erosion and to reduce downstream flooding. Although detention facilities designed for flood control have different design requirements than those used for water quality enhancement, it is possible to achieve these two objectives in a single facility.

**Design Considerations:** Extended detention basins can remove approximately 75% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of extended detention basins include basin sizing, basin

configuration, basin side slopes, basin lining, inlet/outlet structures, and erosion controls. Extended detention basins are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

**Maintenance Requirements:** Maintenance requirements for extended detention basins include routine inspections, mowing, debris and litter removal, erosion control, structural repairs, nuisance control, and sediment removal.

## Vegetative Filter Strips

**Description:** Filter strips, also known as vegetated buffer strips, are vegetated sections of land similar to grassy swales except they are essentially flat with low slopes and are designed only to accept runoff as overland sheet flow. They may appear in any vegetated form from grassland to forest, and are designed to intercept upstream flow, lower flow velocity, and spread water out as sheet flow. The dense vegetative cover facilitates conventional pollutant removal through detention, filtration by vegetation, and infiltration.

Filter strips cannot treat high velocity flows, and do not provide enough storage or infiltration to effectively reduce peak discharges to predevelopment levels for design storms. This lack of quantity control favors use in rural or low-density development; however, they can provide water quality benefits even where the impervious cover is as high as 50%. The primary highway application for vegetative filter strips is along rural roadways where runoff that would otherwise discharge directly to a receiving water passes through the filter strip before entering a conveyance system. Properly designed roadway medians and shoulders make effective buffer strips. These devices also can be used on other types of development where land is available and hydraulic conditions are appropriate.

Flat slopes and low to fair permeability of natural subsoil are required for effective performance of filter strips. Although an inexpensive control measure, they are most useful in contributing watershed areas where peak runoff velocities are low as they are unable to treat the high flow velocities typically associated with high impervious cover.

Successful performance of filter strips relies heavily on maintaining shallow unconcentrated flow. To avoid flow channelization and maintain performance, a filter strip should:

- Be equipped with a level spreading device for even distribution of runoff
- Contain dense vegetation with a mix of erosion resistant, soil binding species
- Be graded to a uniform, even and relatively low slope

- Laterally traverse the contributing runoff area

Filter strips can be used upgradient from watercourses, wetlands, or other water bodies along toes and tops of slopes and at outlets of other stormwater management structures. They should be incorporated into street drainage and master drainage planning. The most important criteria for selection and use of this BMP are soils, space, and slope.

**Design Considerations:** Vegetative filter strips can remove approximately 85% of the total suspended solids contained within the volume of runoff captured. Design elements of vegetative filter strips include uniform, shallow overland flow across the entire filter strip area, hydraulic loading rate, inlet structures, slope, and vegetative cover. The area should be free of gullies or rills which can concentrate flow. Vegetative filter strips are appropriate for small drainage areas with moderate slopes. Other design elements include the following:

- Soils and moisture are adequate to grow relatively dense vegetative stands
- Sufficient space is available
- Slope is less than 12%
- Comparable performance to more expensive structural controls

**Maintenance Requirements:** Maintenance requirements for vegetative filter strips include pest management, seasonal mowing and lawn care, routine inspections, debris and litter removal, sediment removal, and grass reseeding and mulching.

## Constructed Wetlands

**Description:** Constructed wetlands provide physical, chemical, and biological water quality treatment of stormwater runoff. Physical treatment occurs as a result of decreasing flow velocities in the wetland, and is present in the form of evaporation, sedimentation, adsorption, and/or filtration. Chemical processes include chelation, precipitation, and chemical adsorption. Biological processes include decomposition, plant uptake and removal of nutrients, plus biological transformation and degradation. Hydrology is one of the most influential factors in pollutant removal due to its effects on sedimentation, aeration, biological transformation, and adsorption onto bottom sediments.

The wetland should be designed such that a minimum amount of maintenance is required. The natural surroundings, including such things as the potential energy of a stream or flooding river, should be utilized as much as possible. The wetland should approximate a natural situation and unnatural attributes, such as rectangular shape or

rigid channel, should be avoided.

Site considerations should include the water table depth, soil/substrate, and space requirements. Because the wetland must have a source of flow, it is desirable that the water table is at or near the surface. If runoff is the only source of inflow for the wetland, the water level often fluctuates, and establishment of vegetation may be difficult. The soil or substrate of an artificial wetland should be loose loam to clay. A perennial baseflow must be present to sustain the artificial wetland. The presence of organic material is often helpful in increasing pollutant removal and retention. A greater amount of space is required for a wetland system than is required for a detention facility treating the same amount of area.

**Design Considerations:** Constructed wetlands can remove over 90% of the total suspended solids contained within the volume of runoff captured in the wetland. Design elements of constructed wetlands include wetland sizing, wetland configuration, sediment forebay, vegetation, outflow structure, depth of inundation during storm events, depth of micro pools, and aeration. Constructed wetlands are appropriate for large drainage areas with low to moderate slopes.

**Maintenance Requirements:** Maintenance requirements for constructed wetlands include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, harvesting, and maintenance of water levels.

## Wet Basins

**Description:** Wet basins are runoff control facilities that maintain a permanent wet pool and a standing crop of emergent littoral vegetation. These facilities may vary in appearance from natural ponds to enlarged, bermed (manmade) sections of drainage systems and may function as online or offline facilities, although offline configuration is preferable. Offline designs can prevent scour and other damage to the wet pond and minimize costly outflow structure elements needed to accommodate extreme runoff events.

During storm events, runoff inflows displace part or all of the existing basin volume and are retained and treated in the facility until the next storm event. The pollutant removal mechanisms are settling of solids, wetland plant uptake, and microbial degradation. When the wet basin is adequately sized, pollutant removal performance can be excellent, especially for the dissolved fraction. Wet basins also help provide erosion protection for the receiving channel by limiting peak flows during larger storm events. Wet basins are often perceived as a positive aesthetic element in a community and offer significant opportunity for creative pond configuration and landscape design. Participation of an experienced wetland designer is suggested. A significant potential drawback for wet ponds in arid climates is that the contributing watershed for these facilities is often incapable of providing an adequate water supply to

maintain the permanent pool, especially during the summer months. Makeup water (i.e., well water or municipal drinking water) is sometimes used to supplement the rainfall/runoff process, especially for wet basin facilities treating watersheds that generate insufficient runoff.

**Design Considerations:** Wet basins can remove over 90% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of wet basins include basin sizing, basin configuration, basin side slopes, sediment forebay, inflow and outflow structures, vegetation, depth of permanent pool, aeration, and erosion control. Wet basins are appropriate for large drainage areas with low to moderate slopes.

**Maintenance Requirements:** Maintenance requirements for wet basins include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, and harvesting.

## Grassy Swales

**Descripton:** Grassy swales are vegetated channels that convey stormwater and remove pollutants by filtration through grass and infiltration through soil. They require shallow slopes and soils that drain well. Pollutant removal capability is related to channel dimensions, longitudinal slope, and type of vegetation. Optimum design of these components will increase contact time of runoff through the swale and improve pollutant removal rates.

Grassy swales are primarily stormwater conveyance systems. They can provide sufficient control under light to moderate runoff conditions, but their ability to control large storms is limited. Therefore, they are most applicable in low to moderate sloped areas or along highway medians as an alternative to ditches and curb and gutter drainage. Their performance diminishes sharply in highly urbanized settings, and they are generally not effective enough to receive construction stage runoff where high sediment loads can overwhelm the system. Grassy swales can be used as a pretreatment measure for other downstream BMPs, such as extended detention basins. Enhanced grassy swales utilize check dams and wide depressions to increase runoff storage and promote greater settling of pollutants.

Grassy swales can be more aesthetically pleasing than concrete or rock-lined drainage systems and are generally less expensive to construct and maintain. Swales can slightly reduce impervious area and reduce the pollutant accumulation and delivery associated with curbs and gutters. The disadvantages of this technique include the possibility of erosion and channelization over time, and the need for more right-of-way as compared to a storm drain system. When properly constructed, inspected, and maintained, the life expectancy of a swale is estimated to be 20 years.

**Design Considerations:**

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system. In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. The seasonal high water table should be at least 4 feet below the surface. Use of natural topographic lows is encouraged, and natural drainage courses should be regarded as significant local resources to be kept in use.

**Maintenance Requirements:**

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods but may be necessary only to prevent the vegetation from dying.

**Vegetation Lined Drainage Ditches**

**Description:** Vegetation lined drainage ditches are similar to grassy swales. These drainage ditches are vegetated channels that convey storm water and remove pollutants by filtration through grass and infiltration through soil. They require soils that drain well. Pollutant removal capability is related to channel dimensions, longitudinal slope, and type of vegetation. Optimum design of these components will increase contact time of runoff through the ditch and improve pollutant removal rates. Vegetation lined drainage ditches are primarily storm water conveyance systems. They have vegetation lined in the low flow channel and may include vegetated shelves.

Vegetation in drainage ditches reduces erosion and removes pollutants by lowering water velocity over the soil surface, binding soil particles with roots, and by filtration through grass and infiltration through soil. Vegetation lined drainage ditches can be used where:

- A vegetative lining can provide sufficient stability for the channel grade by increasing maximum permissible velocity
- Slopes are generally less than 5%, with protection from sheer stress as needed through the use of BMPs, such as erosion control blankets

- Site conditions required to establish vegetation, i.e. climate, soils, topography, are present

**Design Criteria:** The suitability of a vegetation lined drainage ditch at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the ditch system. The hydraulic capacity of the drainage ditch and other elements such as erosion, siltation, and pollutant removal capability, must be taken into consideration. Use of natural topographic lows is encouraged, and natural drainage courses should be regarded as significant local resources to be kept in use. Other items to consider include the following:

- Capacity, cross-section shape, side slopes, and grade
- Select appropriate native vegetation
- Construct in stable, low areas to conform with the natural drainage system. To reduce erosion potential, design the channel to avoid sharp bends and steep grades.
- Design and build drainage ditches with appropriate scour and erosion protection. Surface water should be able to enter over the vegetated banks without erosion occurring.
- BMPs, such as erosion control blankets, may need to be installed at the time of seeding to provide stability until the vegetation is fully established. It may also be necessary to divert water from the channel until vegetation is established or to line the channel with sod.
- Vegetated ditches must not be subject to sedimentation from disturbed areas.
- Sediment traps may be needed at channel inlets to prevent entry of muddy runoff and channel sedimentation.
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

**Maintenance:**

During establishment, vegetation lined drainage ditches should be inspected, repaired, and vegetation reestablished if necessary. After the vegetation has become established, the ditch should be checked periodically to determine if the channel is

withstanding flow velocities without damage. Check the ditch for debris, scour, or erosion and immediately make repairs if needed. Check the channel outlet and all road crossings for bank stability and evidence of piping or scour holes and make repairs immediately. Remove all significant sediment accumulations to maintain the designed carrying capacity. Keep the vegetation in a healthy condition at all times, since it is the primary erosion protection for the channel. Vegetation lined drainage ditches should be seasonally maintained by mowing or irrigating, depending on the vegetation selected. The long-term management of ditches as stable, vegetated, "natural" drainage systems with native vegetation buffers is highly recommended due to the inherent stability offered by grasses, shrubs, trees, and other vegetation.

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods but may be necessary only to prevent the vegetation from dying.

## Sand Filter Systems

**Description:** The objective of sand filters is to remove sediment and the pollutants from the first flush of pavement and impervious area runoff. The filtration of nutrients, organics, and coliform bacteria is enhanced by a mat of bacterial slime that develops during normal operations. One of the main advantages of sand filters is their adaptability; they can be used on areas with thin soils, high evaporation rates, low-soil infiltration rates, in limited-space areas, and where groundwater is to be protected.

Since their original inception in Austin, Texas, hundreds of intermittent sand filters have been implemented to treat stormwater runoff. There have been numerous alterations or variations in the original design as engineers in other jurisdictions have improved and adapted the technology to meet their specific requirements. Major types include the Austin Sand Filter, the District of Columbia Underground Sand Filter, the Alexandria Dry Vault Sand Filter, the Delaware Sand Filter, and peat-sand filters which are adapted to provide a sorption layer and vegetative cover to various sand filter designs.

**Design Considerations:**

- Appropriate for space-limited areas
- Applicable in arid climates where wet basins and constructed wetlands are not appropriate
- High TSS removal efficiency

**Cost Considerations**:

Filtration Systems may require less land than some other BMPs, reducing the land acquisition cost; however the structure itself is one of the more expensive BMPs. In addition, maintenance cost can be substantial.

## Erosion Control Compost

**Description**: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

**Materials:**

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT=s construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at https://www.txdot.gov/inside-txdot/division/support/recycling/speclist.html that provides information on compost specification data.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections '332.71 Sampling and Analysis Requirements for Final Products and '332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

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to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at https://www.compostingcouncil.org/page/tmecc. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at https://www.compostingcouncil.org/page/SealofTestingAssuranceSTA.

**Installation**:

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- Use on slopes 3:1 or flatter.
- Apply a 2-inch uniform layer unless otherwise shown on the plans or as directed.
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**Materials:**

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**Installation**:

- Install in accordance with TxDOT Special Specification 5049.
- Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
- Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.

- Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

**Sedimentation Chambers (only to be used when there is no space available for other approved BMP's)**

**Description:** Sedimentation chambers are stormwater treatment structures that can be used when space is limited such as urban settings. These structures are often tied into stormwater drainage systems for treatment of stormwater prior to entering state waters. The water quality benefits are the removal of sediment and buoyant materials. These structures are not designed as a catch basin or detention basin and not typically used for floodwater attenuation.

**Design Considerations**: Average rainfall and surface area should be considered when following manufacturer's recommendations for chamber sizing and/or number of units needed to achieve effective TSS removal. If properly sized, 50-80% removal of TSS can be expected.

**Maintenance Requirements:** Maintenance requirements include routine inspections, sediment, debris and litter removal, erosion control and nuisance control.

# RAILROAD COMMISSION OF TEXAS
## OIL AND GAS DIVISION

December 18, 2020

Colonel Timothy R. Vail
Galveston District
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Re: 2020 USACE Nationwide Permits Reissuance
NPWs 2, 3, 6, 7, 8, 12, 14, 16, 18, 19, 20, 25, 38, 43, 46, D and E

Dear Colonel Vail:

This letter is in response to your letter dated October 19, 2020, requesting Clean Water Act Section 401 certification of the United States Army Corps of Engineers (USACE) Nationwide Permits (NWPs), notification of which was published in the September 15, 2020, issue of the Federal Register (85 FR 57298). Regional conditions for NWPs in Texas were proposed in public notices on September 30, 2020 and October 1, 2020.

Texas Natural Resources Code, §91.101, and Texas Water Code, §26.131, grant the RRC jurisdiction for water quality certifications for federal permits covering activities associated with the exploration, development, and production, including pipeline transportation, of oil, gas or geothermal resources that may result in discharges to waters of the United States. No person may conduct any activity subject to RRC jurisdiction pursuant to a USACE permit if that activity may result in a discharge into to waters of the United States within the boundaries of the State of Texas, unless the RRC has first issued a certification or waiver of certification under 16 Texas Administrative Code §3.93 (Rule 93). Although the RRC is responsible for water quality certification of activities under the jurisdiction of the RRC, the Texas Commission on Environmental Quality (TCEQ) establishes the Texas Water Quality Standards. This certification is limited to those activities under the jurisdiction of the RRC. For all other activities, the TCEQ will issue the certification as provided in Texas Water Code §26.131.

This office has reviewed the following proposed NWPs: 2 (Structures in Artificial Canals), 3 (Maintenance), 6 (Survey Activities), 7 (Outfall Structures and Associated Intake Structures), 8 (Oil and Gas Structures on the Outer Continental Shelf), 12 (Utility Line Activities), 14 (Linear Transportation Projects), 16 (Return Water From Upland Contained Disposal Areas), 18 (Minor Discharges), 19 (Minor Dredging), 20 (Oil Spill Cleanup), 25 (Structural Discharges), 38 (Cleanup of Hazardous and Toxic Waste), 43 (Stormwater Management Facilities), 46

(Discharges in Ditches), D (Utility Line Activities for Water and Other Substances), and E (Water Reclamation and Reuse Facilities).

Based on our evaluation of the information contained in these documents, the RRC certifies that the activities authorized by NWPs 2, 8, 20, and E should not result in a violation of Texas Surface Water Quality Standards as required by Section 401 of the Federal Clean Water Act and pursuant to 16 Texas Administrative Code (TAC) §3.93.

The RRC conditionally certifies that the activities authorized by NWPs 3, 6, 7, 12, 14, 16, 18, 19, 25, 38, 43, 46, and D should not result in a violation of Texas Surface Water Quality Standards as required by Section 401 of the Federal Clean Water Act and pursuant to 16 TAC §3.93. Conditions for each NWP are defined in Attachment 1, in accordance with Texas Water Code, §26.003 and 30 TAC §307.5(a), which establish the antidegradation policy. The antidegradation policy and implementation procedures apply to actions regulated under state and federal authority that would increase pollution of the water in the state, including federal permits relating to the discharge of fill or dredged material under Federal Clean Water Act, §404.

Conditions for NWPs 6, 7, 12, 14, 16, 18, 19, 25, 38, 43, 46, and D: Certification of these NWPs is conditioned on inclusion of a prohibition on the use of these NWPs in coastal dune swales, mangrove marshes, and Columbia bottomlands in the Galveston District. Impacts to rare and ecologically significant coastal dune swales, mangrove marshes, and Columbia bottomlands, would not be considered minimal. Wetland water quality functions as defined in the Texas Surface Water Quality Standards (30 TAC §307) are attributes of wetlands that protect and maintain the quality of water in the state, which include stormwater storage and retention and the moderation of extreme water level fluctuations; shoreline protection against erosion through the dissipation of wave energy and water velocity, and anchoring of sediments; habitat for aquatic life; and removal, transformation, and retention of nutrients and toxic substances. No discharge can be certified if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other more significant adverse environmental consequences.

Condition for NWP 12 and NWP D: Certification on NWP 12 and NWP D is conditioned on a prohibition on mechanized land clearing in forested wetlands. Wetland water quality functions as defined in the Texas Surface Water Quality Standards (30 TAC §307) are attributes of wetlands that protect and maintain the quality of water in the state, which include stormwater storage and retention and the moderation of extreme water level fluctuations; shoreline protection against erosion through the dissipation of wave energy and water velocity, and anchoring of sediments; habitat for aquatic life; and removal, transformation, and retention of nutrients and toxic substances. No discharge can be certified if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other more significant adverse environmental consequences.

Condition for NWP 16: Certification of NWP 16 is conditioned on inclusion of a limit of 300 mg/L total suspended solids (TSS) concentration on the return water from upland contained dredged material disposal areas. This limit is promulgated as an effluent limit under Title 40 of

the Code of Federal Regulations. The requirement has also been included in individual 404 permits.

The RRC is conditionally certifying NWP General Condition #12 *Soil Erosion and Sediment Controls*, and General Condition #25 *Water Quality*. The conditions address three categories of water quality management with specific recommendations for Best Management Practices (BMPs) for each category intended to enhance the water quality protection. A list of recommended BMPs is included as Attachment 2. The BMPs identified in Attachment 2 are in accordance with the Texas Water Code, §26.003 and the antidegradation policy and implementation procedures in 30 TAC §307.5(a), which apply to actions regulated under state and federal authority that would increase pollution of the water in the state, including federal permits relating to the discharge of fill or dredged material under Federal Clean Water Act, §404.

Attachment 3 is provided as a reference for all NWPs. A detailed description of the BMPs is provided in Attachment 4. These BMPs should be included for the protection of waters in the state specific to each NWP as part of the regional conditions for Texas. The conditions identified in Attachment 3 and 4 are in accordance with the Texas Water Code, §26.003 and the antidegradation policy and implementation procedures in 30 TAC §307.5(a), which apply to actions regulated under state and federal authority that would increase pollution of the water in the state, including federal permits relating to the discharge of fill or dredged material under Federal Clean Water Act, §404.

USACE is proposing to remove the 300 linear foot limit for NWP 43 and quantify impacts to streams using a ½-acre limit. Removal of the 300 linear foot limit would also remove the waiver requirement for proposed impacts to streams greater than 300 linear feet. The RRC is concerned about the potential adverse impact to state aquatic resources of the proposed removal of the 300 linear foot limit on stream bed losses. Removing the stream loss limit would mean that stream losses associated with activities covered by this NWP would only be limited by the existing 1/2 - acre limit on overall impacts to waters of the U.S., which could significantly affect state stream resources by allowing upwards of several thousand linear feet of stream impacts under these permits, depending on the dimensions of the streams being impacted. The RRC conditionally certifies this NWP with a cap of 1,500 linear feet on the stream length impacted based on the amount of stream impacts considered minimal by the state. The greater than minimal loss of stream length would result in significant loss of aquatic habitat and degradation of water quality per the state's Antidegradation Policy (30 TAC §307.4(i)) for aquatic life uses and habitat, where vegetative and physical components of the aquatic environment must be maintained or mitigated to protect aquatic life uses.

Certification of General Condition 23 *Mitigation* is conditioned to require USACE to copy RRC on any written notification of a mitigation waiver so that RRC may fulfill its responsibility to ensure water of the state is appropriately protected by understanding the impact of waivers being granted in Texas.

By letter dated November 14, 2020, the Texas Parks and Wildlife Department (TPWC) provided substantive recommendations. TPWD commented that the proposal to replace the 300 linear

foot limit with a half-acre limit would greatly increase the amount of stream subject to impact without PCN and the length of stream allowed to be impacted under a NWP. TPWD recommended that Regional Condition 10 be revised to include resource agency coordination for any proposed discharges into mangrove forests or coastal dune swales.

TPWD recommended new Regional Conditions for NWP 3, 6, and 12 include PCN for activities that include general conditions for aquatic life movement, shellfish beds, adverse effects from impoundments, endangered species, designated critical resource waters and notice of fish, shellfish, and other aquatic resource mortality events as it related to the general conditions. The General Conditions cover many of these concerns.

In addition, a new regional condition should prohibit use of NWP 12 for discharges into Critical Resource Water (CRW) (GEMS, State Coastal Preserves, Sanctuaries, state Scientific areas, and Ecologically Significant Stream Segments, and Texas protected Mussel Sanctuaries; as well as state designated areas for known mussel habitat and known occurrences of state-and/or federally-listed freshwater mussels species) and their adjacent wetlands. Discharges of dredged or fill material into waters of the U.S. are not authorized by NWP 12 for any activity within, or directly affecting, Designated Critical Resource Waters, including wetlands adjacent to such waters (General Condition 22). PCN is required for NWPs 3 for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after she or he determines that the impacts to the critical resource waters will be no more than minimal (General Condition 22). N addition, USACE advised by letter dated December 11, 2020, that USACE may designate, after notice and opportunity for public comment, additional waters having particular environmental or ecological significance. Although the process for designating the requested areas as CRWs was initiated, it has not been completed.

The RRC reserves the right to modify this certification should it be determined that significant cumulative or secondary impacts are occurring as a result of the activities authorized by the USACE under these NPWs.

The RRC has reviewed this proposed action for consistency with the Texas Coastal Management Plan (TCMP) goals and policies, in accordance with the regulations of the TCMP, and has found that the proposed action will have direct and significant adverse effect on any coastal natural resource area identified in the applicable policies, but has determined that the proposed action is consistent with the applicable goals and policies of the TCMP. This consistency determination is conditioned on inclusion in the NWPs of the conditions discussed above, as well as the following conditions:

Under General Condition 18 (Endangered Species), no activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. However, the General Condition does not include such a prohibition on activity that could jeopardize the continued existence of a threatened or

endangered species or a species proposed for such designation, as identified by the State of Texas. USACE should coordinated with Texas Parks and Wildlife for all discharges, work, dredging activities, or dewatering activities proposed in non-tidal waters in which state and/or federal listed freshwater mussel species are known to occur and/or are within one of the 18 listed Texas protected mussel sanctuaries.

If you require further assistance, please contact me at 512-463-7308 or by email at Leslie.savage@rrc.texas.gov.

Regards,

Leslie Savage

Leslie Savage, Chief Geologist
Oil and Gas Division
Railroad Commission of Texas

Ccs: (Via Electronic mail)
Mr. Stephen Brooks, Branch Chief, U.S. Army Corp of Engineers, Regulatory Branch, Fort Worth
Branch Chief, U.S. Army Corps of Engineers, Albuquerque District
Regulatory Branch Chief, U.S. Army Corps of Engineers, Regulatory Branch, Tulsa
Regulatory Branch Chief, U.S. Army Corps of Engineers, El Paso Regulatory Office
Ms. Leslie Koza, Texas Parks and Wildlife
Ms. Allison Buchtien, Texas General Land Office via e-mail

**Attachment 1**
**Conditions of Section 401 Certification for Nationwide Permits and General Conditions**

General Condition 12 (Soil Erosion and Sediment Controls)
Erosion control and sediment control BMPs described in Attachment 2 are required with the use of this general condition. If the applicant does not choose one of the BMPs listed in Attachment 2, an individual 401 certification is required.

General Condition 25 (Water Quality)
Post-construction total suspended solids (TSS) BMPs described in Attachment 2 are required with the use of this general condition. If the applicant does not choose one of the BMP's listed in Attachment 2, an individual 401 certification is required.

General Condition 23 (Mitigation)
The USACE will copy the RRC on all mitigation waivers sent to applicants.

*NWP* 43
The USACE will copy the RRC on all written approvals of waivers for impacts to ephemeral, intermittent or perennial streams.

*NWPs 2, 3, 6, 7, 8, 12, 14, 16, 18, 19, 20, 25, 38, 43, and 46*
These *NWPs* are not authorized for use in coastal dune swales, mangrove marshes, and Columbia bottomlands in the Galveston District, Texas.

NWP 3 (Maintenance)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 6 (Survey Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 7 (Outfall Structures and Associated Intake Structures)
Soil Erosion and Sediment Controls under General Condition 12 are required.

*NWP* 12 (Utility Line Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Postconstruction TSS controls under General Condition 25 are required.

NWP 14 (Linear Transportation Projects)
Soil Erosion and Sediment Controls under General Condition 12 are required. Postconstruction TSS controls under General Condition 2 5 are required.

NWP 16 (Return Water From Upland Contained Disposal Areas)
Effluent from an upland contained disposal area shall not exceed a TSS concentration of 300 mg/L unless a site-specific TSS limit, or a site specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus TSS has been approved by TCEQ.

NWP 18 (Minor Discharges)
Soil Erosion and Sediment Controls under General Condition 12 are required. Postconstruction TSS controls under General Condition 2 5 are required.

NWP 19 (Minor Dredging)
Soil Erosion: and Sediment Controls under General Condition 12 are required.

NWP 25 (Structural Discharges)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 38 (Cleanup of Hazardous and Toxic Waste)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 43 (Stormwater Management Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 46 (Discharges in Ditches)
Soil Erosion and Sediment Controls under General Condition 12 are required.

**Attachment** 2

**401 Water Quality Certification Best Management Practices (BMPs) for Nationwide Permits**

I. **Erosion Control**

Disturbed areas must be stabilized to prevent the introduction of sediment to adjacent wetlands or water bodies during wet weather conditions (erosion). *At least one* of the following BMPs must be maintained and remain in place until the area has been stabilized for NWPs 3, 6, 7, 12, 14, 18, 19, 25, 38, 43, and 46. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required.

o Temporary Vegetation
o Mulch
o Interceptor Swale
o Erosion Control Compost
o Compost Filter Socks

II. **Sedimentation Control**

o Blankets/Matting
o Sod
o Diversion Dike
o Mulch Filter Socks

Prior to project initiation, the project area must be isolated from adjacent wetlands and water bodies by the use of BMPs to confine sediment. Dredged material shall be placed in such a manner that prevents sediment runoff into water in the state, including wetlands. Water bodies can be isolated by the use of one or more of the required BMPs identified for sedimentation control. These BMP's must be maintained and remain in place until the dredged material is stabilized. *At least one* of the following BMPs must be maintained and remain in place until the area has been stabilized for NWPs 3, 6, 7, 12, 14, 18, 19, 25, 38, 43, and 46. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required.

o Sand Bag Berm
o Rock Berm
o Silt Fence
o Triangular Filter Dike
o Stone Outlet Sediment Traps
o Erosion Control Compost
o Compost Filter Socks

III. **Post-Construction TSS Control**

o Hay Bale Dike
o Brush Berms
o Sediment Basins
o Mulch Filter Socks

After construction has been completed and the site is stabilized, total suspended solids (TSS) loadings shall be controlled by *at least one* of the following BMPs for NWPs 12, 14, and 18. If the applicant does not choose one of the BMPs listed, an individual 401 certification is required.
o Retention/Irrigation Systems
o Constructed Wetlands
o Extended Detention Basin
o Wet Basins
o Vegetative Filter Strips
o Vegetation lined drainage ditches
o Grassy Swales
o Sand Filter Systems
o Erosion Control Compost
o Mulch Filter Socks
o Compost Filter Socks
o Sedimentation Chambers*
* Only to be used when there is no space available for other approved BMPs.

**IV. NWP 16: Return Water from Upland Contained Disposal Areas**
Effluent from an upland contained disposal area shall not exceed a TSS concentration of 300 mg/L unless a site-specific TSS limit, or a site specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus TSS has been approved by TCEQ.

**V. All NWPs except NWP 3**
These NWPs are not authorized for use in coastal dune swales, mangrove marshes, and Columbia bottomlands in the Galveston District, Texas.

**Attachment 3**
**Reference to Nationwide Permits Best Management Practices Requirements**

| NWP | Permit Description | Erosion Control | Sediment Control | Post Construction TSS |
|---|---|---|---|---|
| 2 | Structures in Artificial Canals | | | |
| 3 | Maintenance | X | X | |
| 6 | Survey Activities Trenching | X | X | |
| 7 | Outfall Structures and Associated Intake Structures | X | X | |
| 8 | Oil and Gas Structures on the Outer Continental Shelf | X | X | |
| 12 | Utility Line Activities | X | X | X |
| 14 | Liner Transportation Projects | X | X | X |
| 16 | Return Water From Upland Contained Disposal Areas | | | |
| 18 | Minor Discharges | X | X | X |
| 19 | Minor Dredging | X | X | |
| 20 | Response Operations for Oil and Hazardous Substances | | | |
| 25 | Structural Discharges | X | X | |
| 38 | Cleanup o Hazardous and Toxic Waste | X | X | |
| 43 | Stormwater Management Facilities | X | X | |
| 46 | Discharges in Ditches | X | X | |

**Attachment 4**
**EROSION CONTROL BMPs**

## Temporary Vegetation

**Description:** Vegetation can be used as a temporary or permanent stabilization technique for areas disturbed by construction. Vegetation effectively reduces erosion in swales, stockpiles, berms, mild to medium slopes, and along roadways. Other techniques such as matting, mulches, and grading may be required to assist in the establishment of vegetation.

**Materials:**
• The type of temporary vegetation used on a site is a function of the season and the availability of water for irrigation.
• Temporary vegetation should be selected appropriately for the area.
• County agricultural extension agents are a good source for suggestions for temporary vegetation.
• All seed should be high quality, U.S. Dept. of Agriculture certified seed.

**Installation:**
• Grading must be completed prior to seeding.
• Slopes should be minimized.
• Erosion control structures should be installed.
• Seedbeds should be well pulverized, loose, and uniform.
• Fertilizers should be applied at appropriate rates.
• Seeding rates should be applied as recommended by the county agricultural extension agent.
• The seed should be applied uniformly.
• Steep slopes should be covered with appropriate soil stabilization matting.

## Blankets and Matting

**Description:** Blankets and matting material can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are in channels, interceptor swales, diversion dikes, short, steep slopes, and on tidal or stream banks.

**Materials:**
The Texas Department of Transportation (TxDOT) has defined the critical performance factors for these types of products and has established minimum performance standards which must be met for any product seeking to be approved for use within any of TxDOT's construction or maintenance activities. The products that have been approved by TxDOT are also appropriate for general construction site stabilization. TxDOT maintains a web site at http://www.txdot.gov/business/doing_business/product_evaluation/erosion_control.htm, which is updated as new products are evaluated.

**Installation:**
• Install in accordance with the manufacturer's recommendations.
• Proper anchoring of the material.
• Prepare a friable seed bed relatively free from clods, rocks and any foreign material.
• Fertilize and seed in accordance with seeding or other type of planting plan.

• Erosion stops should extend beyond the channel liner to full design cross-section of the channel.
• A uniform trench perpendicular to line of flow may be dug with a spade or a mechanical trencher.
• Erosion stops should be deep enough to penetrate solid material or below level of ruling in sandy soils.
• Erosion stop mats should be wide enough to allow turnover at bottom of trench for stapling, while maintaining the top edge flush with channel surface.

**Mulch**

**Description:** Mulching is the process of applying a material to the exposed soil surface to protect it from erosive forces and to conserve soil moisture until plants can become established. When seeding critical sites, sites with adverse soil conditions or seeding on other than optimum seeding dates, mulch material should be applied immediately after seeding. Seeding during optimum seeding dates and with favorable soils and site conditions will not need to be mulched.

**Materials:**
• Mulch may be small grain straw which should be applied uniformly.
• On slopes 15 percent or greater, a binding chemical must be applied to the surface.
• Wood-fiber or paper-fiber mulch may be applied by hydroseeding.
• Mulch nettings may be used.
• Wood chips may be used where appropriate.

**Installation:**
Mulch anchoring should be accomplished immediately after mulch placement. This may be done by one of the following methods: peg and twine, mulch netting, mulch anchoring tool, or liquid mulch binders.

**Description:** Sod is appropriate for disturbed areas which require immediate vegetative covers, or where sodding is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are waterways carrying intermittent flow, areas around drop inlets or in grassed swales, and residential or commercial lawns where quick use or aesthetics are factors. Sod is composed of living plants and those plants must receive adequate care to provide vegetative stabilization on a disturbed area.

**Materials:**
• Sod should be machine cut at a uniform soil thickness.
• Pieces of sod should be cut to the supplier's standard width and length.
• Torn or uneven pads are not acceptable.
• Sections of sod should be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp.
• Sod should be harvested, delivered, and installed within a period of 36 hours.

**Installation:**
• Areas to be sodded should be brought to final grade.
• The surface should be cleared of all trash and debris.

• Fertilize according to soil tests.
• Fertilizer should be worked into the soil.
• Sod should not be cut or laid in excessively wet or dry weather.
• Sod should not be laid on soil surfaces that are frozen.
• During periods of high temperature, the soil should be lightly irrigated.
• The first row of sod should be laid in a straight line with subsequent rows placed parallel to and butting tightly against each other.
• Lateral joints should be staggered to promote more uniform growth and strength.
• Wherever erosion may be a problem, sod should be laid with staggered joints and secured.
• Sod should be installed with the length perpendicular to the slope (on the contour).
• Sod should be rolled or tamped.
• Sod should be irrigated to a sufficient depth.
• Watering should be performed as often as necessary to maintain soil moisture.
• The first mowing should not be attempted until the sod is firmly rooted.
• Not more than one third of the grass leaf should be removed at any one cutting.

**Interceptor Swale**

Interceptor swales are used to shorten the length of exposed slope by intercepting runoff, prevent off-site runoff from entering the disturbed area, and prevent sediment-laden runoff from leaving a disturbed site. They may have a v-shape or be trapezoidal with a flat bottom and side slopes of 3:1 or flatter. The outflow from a swale should be directed to a stabilized outlet or sediment trapping device. The swales should remain in place until the disturbed area is permanently stabilized.

**Materials:**

• Stabilization should consist of a layer of crushed stone three inches thick, riprap or high velocity erosion control mats.
• Stone stabilization should be used when grades exceed 2% or velocities exceed 6 feet per second.
• Stabilization should extend across the bottom of the swale and up both sides of the channel to a minimum height of three inches above the design water surface elevation based on a 2-year, 24-hour storm.

**Installation:**

• An interceptor swale should be installed across exposed slopes during construction and should intercept no more than 5 acres of runoff.
• All earth removed and not needed in construction should be disposed of in an approved spoils site so that it will not interfere with the functioning of the swale or contribute to siltation in other areas of the site.
• All trees, brush, stumps, obstructions and other material should be removed and disposed of so as not to interfere with the proper functioning of the swale.
• Swales should have a maximum depth of 1.5 feet with side slopes of 3:1 or flatter. Swales should have positive drainage for the entire length to an outlet.
• When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. Stabilization should be crushed stone placed in a layer of at least 3 inches thick or may be high velocity erosion control matting. Check dams are also

recommended to reduce velocities in the swales possibly reducing the amount of stabilization necessary.
• Minimum compaction for the swale should be 90% standard proctor density.

## Diversion Dikes

A temporary diversion dike is a barrier created by the placement of an earthen embankment to reroute the flow of runoff to an erosion control device or away from an open, easily erodible area. A diversion dike intercepts runoff from small upland areas and diverts it away from exposed slopes to a stabilized outlet, such as a rock berm, sandbag berm, or stone outlet structure. These controls can be used on the perimeter of the site to prevent runoff from entering the construction area. Dikes are generally used for the duration of construction to intercept and reroute runoff from disturbed areas to prevent excessive erosion until permanent drainage features are installed and/or slopes are stabilized.

**Materials:**
• Stone stabilization (required for velocities in excess of 6 fps) should consist of riprap placed in a layer at least 3 inches thick and should extend a minimum height of 3 inches above the design water surface up the existing slope and the upstream face of the dike.
• Geotextile fabric should be a non-woven polypropylene fabric designed specifically for use as a soil filtration media with an approximate weight of 6 oz./yd2, a Mullen burst rating of 140 psi, and having an equivalent opening size (EOS) greater than a #50 sieve.

**Installation:**
• Diversion dikes should be installed prior to, and maintained for the duration of, construction and should intercept no more than 10 acres of runoff.
• Dikes should have a minimum top width of 2 feet and a minimum height of compacted fill of 18 inches measured form the top of the existing ground at the upslope toe to top of the dike and have side slopes of 3:1 or flatter.
• The soil for the dike should be placed in lifts of 8 inches or less and be compacted to 95 % standard proctor density .
• The channel, which is formed by the dike, must have positive drainage for its entire length to an outlet.
• When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. In situations where velocities do not exceed 6 feet per second, vegetation may be used to control erosion.

## Erosion Control Compost

**Description:** Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

**Materials:**
ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal

Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and TCEQ Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. TCEQ testing requirements are defined in TAC Chapter 332, including Sections §332.71 (Sampling and Analysis Requirements for Final Products) and §332.72 (Final Product Grades). Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

**Installation:**
- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2-inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

**Mulch and Compost Filter Socks**

**Description:** Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

**Materials:**

Mulch and compost filter socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch and compost filter socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and TCEQ Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. TCEQ testing requirements are defined in TAC Chapter

332, including Sections §332.71 (Sampling and Analysis Requirements for Final Products) and §332.72 (Final Product Grades). Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch and compost filter socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (ST A) program contains information regarding compost ST A certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

**Installation:**
• Install in accordance with TxDOT Special Specification 5049.
• Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
• Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
• Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

## SEDIMENT CONTROL BMPS

### Sand Bag Berm

**Description:** The purpose of a sandbag berm is to detain sediment carried in runoff from disturbed areas by intercepting runoff and causing it to pool behind the sand bag berm. Sediment carried in the runoff is deposited on the upstream side of the sand bag berm due to the reduced flow velocity. Excess runoff volumes are allowed to flow over the top of the sand bag berm. Sand bag berms are used only during construction activities in streambeds when the contributing drainage area is between 5 and 10 acres and the slope is less than 15%, i.e., pipeline construction in channels, temporary channel crossing for construction equipment, etc. Plastic facing should be installed on the upstream side and the berm should be anchored to the streambed by drilling into the rock and driving in T-posts or rebar (#5 or #6) spaced appropriately.

**Materials:**
• The sand bag material should be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight 4 oz/yd 2, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70%.
• The bag length should be 24 to 30 inches, width should be 16 to 18 inches and thickness should be 6 to 8 inches.

• Sandbags should be filled with coarse grade sand and free from deleterious material. All sand should pass through a No. 10 sieve. The filled bag should have an approximate weight of 40 pounds.
• Outlet pipe should be schedule 40 or stronger polyvinyl chloride (PVC) having a nominal internal diameter of 4 inches.

**Installation:**
• The berm should be a minimum height of 18 inches, measured from the top of the existing ground at the upslope toe to the top of the berm.
• The berm should be sized as shown in the plans but should have a minimum width of 48 inches measured at the bottom of the berm and 16 inches measured at the top of the berm.
• Runoff water should flow over the tops of the sandbags or through 4-inch diameter PVC pipes embedded below the top layer of bags.
• When a sandbag is filled with material, the open end of the sandbag should be stapled or tied with nylon or poly cord.
• Sandbags should be stacked in at least three rows abutting each other, and in staggered arrangement.
• The base of the berm should have at least 3 sandbags. These can be reduced to 2 and 1 bag in the second and third_ rows respectively.
• For each additional 6 inches of height, an additional sandbag must be added to each row width.
• A bypass pump-around system, or similar alternative, should be used on conjunction with the berm for effective dewatering of the work area.

**Silt Fence**
**Description:** A silt fence is a barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. Silt fences can be highly effective at controlling sediment from disturbed areas by causing runoff to pond, allowing heavier solids to settle. The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas of a limited extent. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence should remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way. If concentrated flow occurs after installation, corrective action must be taken such as placing a rock berm in the areas of concentrated flow. Silt fencing within the site may be temporarily moved during the day to allow construction activity provided it is replaced and properly anchored to the ground at the end of the day. Silt fences on the perimeter of the site or around drainage ways should not be moved at any time.

**Materials:**
• Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.
• Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Y-bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft 2, and Brindell hardness exceeding 140.

• Woven wire backing to support the fabric should be galvanized 2-inch x 4-inch welded wire, 12 gauge minimum.

**Installation:**
• Steel posts, which support the silt fence, should be installed on a slight angle toward the anticipated runoff source. Post must be embedded a minimum of 1 foot deep and spaced not more than 8 feet on center. Where water concentrates, the maximum spacing should be 6 feet.
• Lay out fencing down-slope of disturbed area, following the contour as closely as possible. The fence should be sited so that the maximum drainage area is * acre/100 feet of fence.
• The toe of the silt fence should be trenched in with a spade or mechanical trencher so that the down-slope face of the trench is flat and perpendicular to the line of flow. Where fence cannot be trenched in, weight fabric flap with 3 inches of pea gravel on uphill side to prevent flow from seeping under fence.
• The trench must be a minimum of 6 inches deep and 6 inches wide to allow for the silt fence fabric to be laid in the ground and backfilled with compacted material.
• Silt fence should be securely fastened to each steel support post or to woven wire attached to the steel fence post. There should be a 3-foot overlap, securely fastened where ends of fabric meet.

**Triangular Sediment Filter Dike**
**Description:** The purpose of a triangular sediment filter dike is to intercept and detain water-borne sediment from unprotected areas of limited extent. The triangular sediment filter dike is used where there is no concentration of water in a channel or other drainage way above the barrier and the contributing drainage area is less than one acre. If the uphill slope above the dike exceeds 10%, the length of the slope above the dike should be less than 50 feet. If concentrated flow occurs after installation, corrective action should be taken such as placing rock berm in the areas of concentrated flow. This measure is effective on paved areas where installation of silt fence is not possible or where vehicle access must be maintained. The advantage of these controls is the ease with which they can be moved to allow vehicle traffic and then reinstalled to maintain sediment.

**Materials:**
• Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2 , ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.
• The dike structure should be 6 gauge 6-ing x 6-inch wire mesh folded into triangular form being eighteen (18) inches on each side.

**Installation:**
• The frame of the triangular sediment filter dike should be constructed of 6-inch x 6-inch, 6 gauge welded wire mesh, 18 inches per side, and wrapped with geotextile fabric the same composition as that used for silt fences.
• Filter material should lap over ends 6 inches to cover dike to dike junction; each junction should be secured by shoat rings.

• Position dike parallel to the contours, with the end of each section closely abutting the adjacent sections.
• There are several options for fastening the filter dike to the ground. The fabric skirt may be toed-in with 6 inches of compacted material, or 12 inches of the fabric skirt should extend uphill and be secured with a minimum of 3 inches of open graded rock, or with staples or nails. If these two options are not feasible the dike structure may be trenched in 4 inches.
• Triangular sediment filter dikes should be installed across exposed slopes during construction with ends of the dike tied into existing grades to prevent failure and should intercept no more than one acre of runoff.
• When moved to allow vehicular access, the dikes should be reinstalled as soon as possible, but always at the end of the workday.

**Rock Berm**

**Description:** The purpose of a rock berm is to serve as a check dam in areas of concentrated flow, to intercept sediment-laden runoff, detain the sediment and release the water in sheet flow. The rock berm should be used when the contributing drainage area is less than 5 acres. Rock berms are used in areas where the volume of runoff is too great for a silt fence to contain. They are less effective for sediment removal than silt fences, particularly for fine particles, but can withstand higher flows than a silt fence. As such, rock berms are often used in areas of channel flows. Rock berms are most effective at reducing bed load in channels and should not be substituted for other erosion and sediment control measures further up the watershed.

**Materials:**

• The berm structure should be secured with a woven wire sheathing having maximum opening of one inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.
• Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used.

**Installation:**

• Lay out the woven wire sheathing perpendicular to the flow line. The sheathing should be 20 gauge woven wire mesh with 1 inch openings.
• Berm should have a top width of 2 feet minimum with side slopes being 2:1 (H:V) or flatter.
• Place the rock along the sheathing to a height not less than 18 inches.
• Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon.
• Berm should be built along the contour at zero percent grade or as near as possible.
• The ends of the berm should be tied into existing upslope grade and the berm should be buried in a trench approximately 3 to 4 inches deep to prevent failure of the control.

**Hay Bale Dike**

**Description:** The purpose of a hay or straw bale dike is to intercept and detain small amounts of sediment-laden runoff from relatively small unprotected areas. Straw bales are to be used when it is not feasible to install other, more effective measures or when the construction phase is expected to last less than 3 months. Straw bales should not be used on areas where rock or other hard surfaces prevent the full and uniform anchoring of the barrier.

**Materials:**
**Straw:** The best quality straw mulch comes from wheat, oats or barley and should be free of weed and grass seed which may not be desired vegetation for the area to be protected. Straw mulch is light and therefore must be properly anchored to the ground.
**Hay:** This is very similar to straw with the exception that it is made of grasses and weeds and not grain stems. This form of mulch is very inexpensive and is widely available but does introduce weed and grass seed to the area. Like straw, hay is light and must be anchored.
• Straw bales should weigh a minimum of 50 pounds and should be at least 30 inches long.
• Bales should be composed entirely of vegetable matter and be free of seeds.
• Binding should be either wire or nylon string, jute or cotton binding is unacceptable.
Bales should be used for not more than two months before being replaced.

**Installation:**
• Bales should be embedded a minimum of 4 inches and securely anchored using 2-inch x 2-inch wood stakes or 3/8-inch diameter rebar driven through the bales into the ground a minimum of 6 inches.
• Bales are to be placed directly adjacent to one another leaving no gap between them.
• All bales should be placed on the contour.
• The first stake in each bale should be angled toward the previously laid bale to force the bales together.

## Brush Berms

Organic litter and spoil material from site clearing operations is usually burned or hauled away to be dumped elsewhere. Much of this material can be used effectively on the construction site. The key to constructing an efficient brush berm is in the method used to obtain and place the brush. It will not be acceptable to simply take a bulldozer and push whole trees into a pile as this does not assure continuous ground contact with the berm and will allow uncontrolled flows under the berm. Brush berms may be used where there is little or no concentration of water in a channel or other drainage way above the berm. The size of the drainage area should be no greater than one-fourth of an acre per 100 feet of barrier length; the maximum slope length behind the barrier should not exceed 100 feet; and the maximum slope gradient behind the barrier should be less than 50% (2:1).

**Materials:**
• The brush should consist of woody brush and branches, preferably less than 2 inches in diameter.
• The filter fabric should conform to the specifications for filter fence fabric.
• The rope should be 1/4 - inch polypropylene or nylon rope.
• The anchors should be 3/8-inch diameter rebar stakes that are 18-inches long.

**Installation:**
• Lay out the brush berm following the contour as closely as possible.

• The juniper limbs should be cut and hand placed with the vegetated part of the limb in close contact with the ground. Each subsequent branch should overlap the previous branch providing a shingle effect.
• The brush berm should be constructed in lifts with each layer extending the entire length of the berm before the next layer is started.
• A trench should be excavated 6-inches wide and 4-inches deep along the length of the barrier and immediately uphill from the barrier.
• The filter fabric should be cut into lengths sufficient to lay across the barrier from its up-slope base to just beyond its peak. The lengths of filter fabric should be draped across the width of the barrier with the uphill edge placed in the trench and the edges of adjacent pieces overlapping each other. Where joints are necessary, the fabric should be spliced together with a minimum 6-inch overlap and securely sealed.
• The trench should be backfilled and the soil compacted over the filter fabric.
• Set stakes into the ground along the downhill edge of the brush barrier, and anchor the fabric by tying rope from the fabric to the stakes. Drive the rope anchors into the ground at approximately a 45-degree angle to the ground on 6-foot centers.
• Fasten the rope to the anchors and tighten berm securely to the ground with a minimum tension of 50 pounds.
• The height of the brush berm should be a minimum of 24 inches after the securing ropes have been tightened.

**Stone Outlet Sediment Traps**

A stone outlet sediment trap is an impoundment created by the placement of an earthen and stone embankment to prevent soil and sediment loss from a site. The purpose of a sediment trap is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment trap from sedimentation. A sediment trap is usually installed at points of discharge from disturbed areas. The drainage area for a sediment trap is recommended to be less than 5 acres.

Larger areas should be treated using a sediment basin. A sediment trap differs from a sediment basin mainly in the type of discharge structure. The trap should be located to obtain the maximum storage benefit from the terrain, for ease of clean out and disposal of the trapped sediment and to minimize interference with construction activities. The volume of the trap should be at least 3600 cubic feet per acre of drainage area.

**Materials:**

• All aggregate should be at least 3 inches in diameter and should not exceed a volume of 0. 5 cubic foot.
• The geotextile fabric specification should be woven polypropylene, polyethylene or polyamide geotextile, minimum unit weight of 4.5 oz/yd 2, mullen burst strength at least 2 50 lb/in 2, ultraviolet stability exceeding 70%, and equivalent opening size exceeding 40.

**Installation:**

• Earth Embankment: Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95% standard proctor density. Do not place material on

surfaces that are muddy or frozen. Side slopes for the embankment are to be 3: 1. The minimum width of the embankment should be 3 feet.
• A gap is to be left in the embankment in the location where the natural confluence of runoff crosses the embankment line. The gap is to have a width in feet equal to 6 times the drainage area in acres.
• Geotextile Covered Rock Core: A core of filter stone having a minimum height of 1.5 feet and a minimum width at the base of 3 feet should be placed across the opening of the earth embankment and should be covered by geotextile fabric which should extend a minimum distance of 2 feet in either direction from the base of the filter stone core.
• Filter Stone Embankment: Filter stone should be placed over the geotextile and is to have a side slope which matches that of the earth embankment of 3:1 and should cover the geotextile/rock core a minimum of 6 inches when installation is complete. The crest of the outlet should be at least 1 foot below the top of the embankment.

**Sediment Basins:**
The purpose of a sediment basin is to intercept sediment-laden runoff and trap the sediment to protect drainage ways, properties and rights of way below the sediment basin from sedimentation. A sediment basin is usually installed at points of discharge from disturbed areas. The drainage area for a sediment basin is recommended to be less than 100 acres.

Sediment basins are effective for capturing and slowly releasing the runoff from larger disturbed areas thereby allowing sedimentation to take place. A sediment basin can be created where a permanent pond BMP is being constructed. Guidelines for construction of the permanent BMP should be followed, but revegetation, placement of underdrain piping, and installation of sand or other filter media should not be carried out until the site construction phase is complete.
**Materials:**
• Riser should be corrugated metal or reinforced concrete pipe or box and should have watertight fittings or end to end connections of sections.
• An outlet pipe of corrugated metal or reinforced concrete should be attached to the riser and should have positive flow to a stabilized outlet on the downstream side of the embankment.
• An anti-vortex device and rubbish screen should be attached to the top of the riser and should be made of polyvinyl chloride or corrugated metal.

**Basin Design and Construction:**
• For common drainage locations that serve an area with ten or more acres disturbed at one time, a sediment basin should provide storage for a volume of runoff from a two-year, 24-hour storm from each disturbed acre drained.
• The basin length to width ratio should be at least 2:1 to improve trapping efficiency. The shape may be attained by excavation or the use of baffles. The lengths should be measured at the elevation of the riser de-watering hole.
• Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95% standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment should be 3:1 (H:V).

• An emergency spillway should be installed adjacent to the embankment on undisturbed soil and should be sized to carry the full amount of flow generated by a 10-year, 3-hour storm with 1 foot of freeboard less the amount which can be carried by the principal outlet control device.
• The emergency spillway should be lined with riprap as should the swale leading from the spillway to the normal watercourse at the base of the embankment.
• The principal outlet control device should consist of a rigid vertically oriented pipe or box of corrugated metal or reinforced concrete. Attached to this structure should be a horizontal pipe, which should extend through the embankment to the toe of fill to provide a de-watering outlet for the basin.
• An anti-vortex device should be attached to the inlet portion of the principal outlet control device to serve as a rubbish screen.
• A concrete base should be used to anchor the principal outlet control device and should be sized to provide a safety factor of 1.5 (downward forces= 1.5 buoyant forces).
• The basin should include a permanent stake to indicate the sediment level in the pool and marked to indicate when the sediment occupies 50% of the basin volume (not the top of the stake).
• The top of the riser pipe should remain open and be guarded with a trash rack and anti-vortex device. The top of the riser should be 12 inches below the elevation of the emergency spillway. The riser should be sized to convey the runoff from the 2-year, 3-hour storm when the water surface is at the emergency spillway elevation. For basins with no spillway the riser must be sized to convey the runoff from the 10-yr, 3-hour storm.
• Anti-seep collars should be included when soil conditions or length of service make piping through the backfill a possibility.
• The 48-hour drawdown time will be achieved by using a riser pipe perforated at the point measured from the bottom of the riser pipe equal to 1/2 the volume of the basin. This is the maximum sediment storage elevation. The size of the perforation may be calculated as follows:

$$Ao = \frac{As \times \sqrt{2h}}{Cd \times 980{,}000}$$

Where:
*$A_s$ = Area of the de-watering hole, ft 2*
*$A_o$ = Surface area of the basin, ft 2*
*Cd = Coefficient of contraction, approximately 0.6*
*h = head of water above the hole, ft*
*Perforating the riser with nultiple holes in a combined surface area equal to $A_o$ is acceptable.*

## Erosion Control Compost

**Description:** Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

**Materials:**

ECC used for projects not related to TxDOT should be of quality materials by meeting performance standards and compost specification data. Products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and TCEQ Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. TCEQ testing requirements are defined in TAC Chapter 332, including Sections §332.71 (Sampling and Analysis Requirements for Final Products) and §332.72 (Final Product Grades). Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

**Installation:**

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2-inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

## Mulch and Compost Filter Socks

**Description:** Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end nf the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

**Materials:**
Mulch and compost filter socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch and compost filter socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and TCEQ Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. TCEQ testing requirements are defined in TAC Chapter 332, including Sections §332.71 (Sampling and Analysis Requirements for Final Products) and §332.72 (Final Product Grades). Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch and compost filter socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (ST A) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

**Installation:**
• Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
• Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
• Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

## POST-CONSTRUCTION TSS CONTROLS

### Retention/Irrigation Systems

**Description:** Retention/irrigation systems refer to the capture of runoff in a holding pond, then use of the captured water for irrigation of appropriate landscape areas. Retention/irrigation systems are characterized by the capture and disposal of runoff without direct release of captured flow to receiving streams. Retention systems exhibit excellent pollutant removal but require regular, proper maintenance.

**Design Considerations:** Retention/irrigation practices achieve 100% removal efficiency of total suspended solids contained within the volume of water captured. Design elements of

retention/irrigation systems include runoff storage facility configuration and sizing, pump and wet well system components, basin lining, basin detention time, and physical and operational components of the irrigation system. Retention/irrigation systems are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

**Maintenance Requirements:** Maintenance requirements for retention/irrigation systems include routine inspections, sediment removal, mowing, debris and litter removal, erosion control, and nuisance control.

**Extended Detention Basin**

**Description:** Extended detention facilities are basins that temporarily store a portion of stormwater runoff following a storm event. Extended detention basins are normally used to remove particulate pollutants and to reduce maximum runoff rates associated with development to their pre-development levels. The water quality benefits are the removal of sediment and buoyant materials. Furthermore, nutrients, heavy metals, toxic materials, and oxygen-demanding materials associated with the particles also are removed. The control of the maximum runoff rates serves to protect drainage channels below the device from erosion and to reduce downstream flooding.

**Design Considerations:** Extended detention basins can remove approximately 75% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of extended detention basins include basin sizing, basin configuration, basin side slopes, basin lining, inlet/outlet structures, and erosion controls. Extended detention basins are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

**Maintenance Requirements:** Maintenance requirements for extended detention basins include routine inspections, mowing, debris and litter removal, erosion control, structural repairs, nuisance control, and sediment removal.

**Vegetative Filter Strips**

**Description:** Filter strips, also known as vegetated buffer strips, are vegetated sections of land similar to grassy swales except they are essentially flat with low slopes, and are designed only to accept runoff as overland sheet flow. They may appear in any vegetated form from grassland to forest, and are designed to intercept upstream flow, lower flow velocity, and spread water out as sheet flow. The dense vegetative cover facilitates conventional pollutant removal through detention, filtration by vegetation, and infiltration. Filter strips cannot treat high velocity flows, and do not provide enough storage or infiltration to effectively reduce peak discharges to predevelopment levels for design storms. This lack of quantity control favors use in rural or low-density development; however, they can provide water quality benefits even where the impervious cover is as high as 50%.

Flat slopes and low to fair permeability of natural subsoil are required for effective performance of filter strips. Although an inexpensive control measure, they are most useful in contributing watershed areas where peak runoff velocities are low as they are unable to treat the high flow

velocities typically associated with high impervious cover. Successful performance of filter strips relies heavily on maintaining shallow unconcentrated flow. To avoid flow channelization and maintain performance, a filter strip should:
• Be equipped with a level spreading device for even distribution of runoff
• Contain dense vegetation with a mix of erosion resistant, soil binding species
• Be graded to a uniform, even and relatively low slope
• Laterally traverse the contributing runoff area

Filter strips can be used upgradient from watercourses, wetlands, or other water bodies along toes and tops of slopes and at outlets of other stormwater management structures. They should be incorporated into street drainage and master drainage planning. The most important criteria for selection and use of this BMP are soils, space, and slope.

**Design Considerations:** Vegetative filter strips can remove approximately 85% of the total suspended solids contained within the volume of runoff captured. Design elements of vegetative filter strips include uniform, shallow overland flow across the entire filter strip area, hydraulic loading rate, inlet structures, slope, and vegetative cover. The area should be free of gullies or rills which can concentrate flow. Vegetative filter strips are appropriate for small drainage areas with moderate slopes. Other design elements include the following:
• Soils and moisture are adequate to grow relatively dense vegetative stands
• Sufficient space is available
• Slope is less than 12%
• Comparable performance to more expensive structural controls

**Maintenance Requirements:** Maintenance requirements for vegetative filter strips include pest management, seasonal mowing and lawn care, routine inspections, debris and litter removal, sediment removal, and grass reseeding and mulching.

**Constructed Wetlands**

**Description:** Constructed wetlands provide physical, chemical, and biological water quality treatment of stormwater runoff. Physical treatment occurs as a result of decreasing flow velocities in the wetland, and is present in the form of evaporation, sedimentation, adsorption, and/or filtration. Chemical processes include chelation, precipitation, and chemical adsorption. Biological processes include decomposition, plant uptake and removal of nutrients, plus biological transformation and degradation. Hydrology is one of the most influential factors in pollutant removal due to its effects on sedimentation, aeration, biological transformation, and adsorption onto bottom sediments. The wetland should be designed such that a minimum amount of maintenance is required. The natural surroundings, including such things as the potential energy of a stream or flooding river, should be utilized as much as possible. The wetland should approximate a natural situation and unnatural attributes, such as rectangular shape or rigid channel, should be avoided.

Site considerations should include the water table depth, soil/substrate, and space requirements. Because the wetland must have a source of flow, it is desirable that the water table is at or near the surface. If runoff is the only source of inflow for the wetland, the water level often fluctuates and establishment of vegetation may be difficult. The soil or substrate of an artificial wetland

should be loose loam to clay. A perennial baseflow must be present to sustain the artificial wetland. The presence of organic material is often helpful in increasing pollutant removal and retention. A greater amount of space is required for a wetland system than is required for a detention facility treating the same amount of area.

**Design Considerations:** Constructed wetlands can remove over 90% of the total suspended solids contained within the volume of runoff captured in the wetland. Design elements of constructed wetlands include wetland sizing, wetland configuration, sediment forebay, vegetation, outflow structure, depth of inundation during storm events, depth of micropools, and aeration. Constructed wetlands are appropriate for large drainage areas with low to moderate slopes.

**Maintenance Requirements:** Maintenance requirements for constructed wetlands include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, harvesting, and maintenance of water levels.

**Wet Basins**

**Description:** Wet basins are runoff control facilities that maintain a permanent wet pool and a standing crop of emergent littoral vegetation. These facilities may vary in appearance from natural ponds to enlarged, bermed (manmade) sections of drainage systems and may function as online or offline facilities, although offline configuration is preferable. Offline designs can prevent scour and other damage to the wet pond and minimize costly outflow structure elements needed to accommodate extreme runoff events. During storm events, runoff inflows displace part or all of the existing basin volume and are retained and treated in the facility until the next storm event. The pollutant removal mechanisms are settling of solids, wetland plant uptake, and microbial degradation. When the wet basin is adequately sized, pollutant removal performance can be excellent, especially for the dissolved fraction. Wet basins also help provide erosion protection for the receiving channel by limiting peak flows during larger storm events. Wet basins are often perceived as a positive aesthetic element in a community and off er significant opportunity for creative pond configuration and landscape design. Participation of an experienced wetland designer is suggested. A significant potential drawback for wet ponds in arid climates is that the contributing watershed for these facilities is often incapable of providing an adequate water supply to maintain the permanent pool, especially during the summer months. Makeup water (i.e., well water or municipal drinking water) is sometimes used to supplement the rainfall/runoff process, especially for wet basin facilities treating watersheds that generate insufficient runoff.

**Design Considerations:** Wet basins can remove over 90% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of wet basins include basin sizing, basin configuration, basin side slopes, sediment forebay, inflow and outflow structures, vegetation, depth of permanent pool, aeration, and erosion control. Wet basins are appropriate for large drainage areas with low to moderate slopes.

**Maintenance Requirements:** Maintenance requirements for wet basins include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, and harvesting.

## Grassy Swales

Grassy swales are vegetated channels that convey stormwater and remove pollutants by filtration through grass and infiltration through soil. They require shallow slopes and soils that drain well. Pollutant removal capability is related to channel dimensions, longitudinal slope, and type of vegetation. Optimum design of these components will increase contact time of runoff through the swale and improve pollutant removal rates. Grassy swales are primarily stormwater conveyance systems. They can provide sufficient control under light to moderate runoff conditions, but their ability to control large storms is limited. Therefore, they are most applicable in low to moderate sloped areas or along highway medians as an alternative to ditches and curb and gutter drainage. Their performance diminishes sharply in highly urbanized settings, and they are generally not effective enough to receive construction stage runoff where high sediment loads can overwhelm the system. Grassy swales can be used as a pretreatment measure for other downstream BMPs, such as extended detention basins. Enhanced grassy swales use check dams and wide depressions to increase runoff storage and promote greater settling of pollutants. Grassy swales can be more aesthetically pleasing than concrete or rock-lined drainage systems and are generally less expensive to construct and maintain. Swales can slightly reduce impervious area and reduce the pollutant accumulation and delivery associated with curbs and gutters. The disadvantages of this technique include the possibility of erosion and channelization over time, and the need for more right-of-way as compared to a storm drain system. When properly constructed, inspected, and maintained, the life expectancy of a swale is estimated to be 20 years.

**Design Considerations:**

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system. In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. The seasonal high water table should be at least 4 feet below the surface. Use of natural topographic lows is encouraged, and natural drainage courses should be regarded as significant local resources to be kept in use.

**Maintenance Requirements:**

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

## Vegetation Lined Drainage Ditches

Vegetation lined drainage ditches are similar to grassy swales. These drainage ditches are vegetated channels that convey storm water and remove pollutants by filtration through grass and infiltration through soil. They require soils that drain well. Pollutant removal capability is related to channel dimensions, longitudinal slope, and type of vegetation. Optimum design of these components will increase contact time of runoff through the ditch and improve pollutant

removal rates. Vegetation lined drainage ditches are primarily storm water conveyance systems. They have vegetation lined in the low flow channel and may include vegetated shelves. Vegetation in drainage ditches reduces erosion and removes pollutants by lowering water velocity over the soil surface, binding soil particles with roots, and by filtration through grass and infiltration through soil. Vegetation lined drainage ditches can be used where:
• A vegetative lining can provide sufficient stability for the channel grade by increasing maximum permissible velocity
• Slopes are generally less than 5%, with protection from sheer stress as needed through the use of BMPs, such as erosion control blankets
• Site conditions required to establish vegetation, i.e. climate, soils, topography, are present

**Design Criteria:** The suitability of a vegetation lined drainage ditch at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the ditch system. The hydraulic capacity of the drainage ditch and other elements such as erosion, siltation, and pollutant removal capability, must be taken into consideration. Use of natural topographic lows is encouraged, and natural drainage courses should be regarded as significant local resources to be kept in use. Other items to consider include the following:
• Capacity, cross-section shape, side slopes, and grade
• Select appropriate native vegetation
• Construct in stable, low areas to conform with the natural drainage system. To reduce erosion potential, design the channel to avoid sharp bends and steep grades.
• Design and build drainage ditches with appropriate scour and erosion protection. Surface water should be able to enter over the vegetated banks without erosion occurring.
• BMPs, such as erosion control blankets, may need to be installed at the time of seeding to provide stability until the vegetation is fully established. It may also be necessary to divert water from the channel until vegetation is established or to line the channel with sod.
• Vegetated ditches must not be subject to sedimentation from disturbed areas.
• Sediment traps may be needed at channel inlets to prevent entry of muddy runoff and channel sedimentation.
• Availability of water during dry periods to maintain vegetation
• Sufficient available land area

**Maintenance:**
During establishment, vegetation lined drainage ditches should be inspected, repaired, and vegetation reestablished if necessary. After the vegetation has become established, the ditch should be checked periodically to determine if the channel is withstanding flow velocities without damage. Check the ditch for debris, scour, or erosion and immediately make repairs if needed. Check the channel outlet and all road crossings for bank stability and evidence of piping or scour holes and make repairs immediately. Remove all significant sediment accumulations to maintain the designed carrying capacity. Keep the vegetation in a healthy condition at all times, since it is the primary erosion protection for the channel. Vegetation lined drainage ditches should be seasonally maintained by mowing or irrigating, depending on the vegetation selected. The long-term management of ditches as stable, vegetated, "natural" drainage systems with native vegetation buffers is highly recommended due to the inherent stability offered by grasses, shrubs, trees, and other vegetation.

## Sand Filter Systems

The objective of sand filters is to remove sediment and the pollutants from the first flush of pavement and impervious area runoff. The filtration of nutrients, organics, and coliform bacteria is enhanced by a mat of bacterial slime that develops during normal operations. One of the main advantages of sand filters is their adaptability; they can be used on areas with thin soils, high evaporation rates, low-soil infiltration rates, in limited-space areas, and where groundwater is to be protected. There have been numerous alterations or variations in the original design as engineers in other jurisdictions have improved and adapted the technology to meet their specific requirements. Major types include the Austin Sand Filter, the District of Columbia Underground Sand Filter, the Alexandria Dry Vault Sand Filter, the Delaware Sand Filter, and peat-sand filters which are adapted to provide a sorption layer and vegetative cover to various sand filter designs.

**Design Considerations:**

- Appropriate for space-limited areas
- Applicable in arid climates where wet basins and constructed wetlands are not appropriate
- High TSS removal efficiency

**Cost Considerations:**

Filtration Systems may require less land than some other BMPs, reducing the land acquisition cost; however the structure itself is one of the more expensive BMPs. In addition, maintenance cost can be substantial.

## Erosion Control Compost

**Description:** Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

**Materials:**

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and TCEQ Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. TCEQ testing requirements are defined in TAC Chapter 332, including Sections §332.71 (Sampling and Analysis Requirements for Final Products) and §332.72 (Final Product Grades). Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health,

safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost ST A certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

**Installation:**
• Install in accordance with current TxDOT specification.
• Use on slopes 3:1 or flatter.
• Apply a 2-inch uniform layer unless otherwise shown on the plans or as directed.
• When rolling is specified, use a light corrugated drum roller.

**Mulch and Compost Filter Socks**
**Description:** Mulch and compost filter socks (erosion control logs) are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch and compost filter socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch and compost filter socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The sock should remain in place until the area is permanently stabilized. Mulch and compost filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch and compost filter socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

**Materials:**
Mulch and compost filter socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch and compost filter socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and TCEQ Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. TCEQ testing requirements are defined in TAC Chapter 332, including §332.71 (Sampling and Analysis Requirements for Final Products) and §332.72 (Final Product Grades). Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product.es specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch and compost filter socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program

contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

**Installation:**
• Install in accordance with TxDOT Special Specification 5049.
• Install socks (erosion control logs) near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
• Secure socks in a method adequate to prevent displacement as a result of normal rain events such that flow is not allowed under the socks.
• Inspect and maintain the socks in good condition (including staking, anchoring, etc.). Maintain the integrity of the control, including keeping the socks free of accumulated silt, debris, etc., until the disturbed area has been adequately stabilized.

**Sedimentation Chambers (only to be used when there is no space available for other approved BMP's)**
**Description:** Sedimentation chambers are stormwater treatment structures that can be used when space is limited such as urban settings. These structures are often tied into stormwater drainage systems for treatment of stormwater prior to entering state waters. The water quality benefits are the removal of sediment and buoyant materials. These structures are not designed as a catch basin or detention basin and not typically used for floodwater attenuation.

**Design Considerations:** Average rainfall and surface area should be considered when following manufacturer's recommendations for chamber sizing and/or number of units needed to achieve effective TSS removal. If properly sized, 50-80% removal of TSS can be expected.

**Maintenance Requirements:** Maintenance requirements include routine inspections, sediment, debris and litter removal, erosion control and nuisance control.