



DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook – 11182024 Erosion Prevention and Sediment Control Handbook

Chapter 1 - Introduction

1.1 Purpose

This *Erosion Prevention and Sediment Control (EPSC) Handbook* has been developed to provide comprehensive and standardized EPSC measures for use on construction sites to limit the export of sediment to surface waters in Tennessee. The Tennessee Construction General Permit [CGP; (TDEC)] is predominantly focused on pollution caused by exposed and destabilized soils; therefore, this handbook is designed to provide information on how to prevent, minimize, and treat sediment laden stormwater discharges during construction and site development. This handbook serves as the primary reference for the design and implementation of all such measures and practices under the CGP. This update of the handbook serves to be a more technical reference than the previous version (2012) by streamlining text and logical flow, expanding the list of EPSC measures, and updating various technical specifications for EPSC measures.

Site-specific stormwater pollution prevention plans (SWPPP) are required in order to receive coverage under the CGP. The SWPPP lays out the steps and techniques the operator will use to reduce pollutants in stormwater runoff leaving their construction site. The EPSC plans are design drawings that show the placement, size, and details of EPSC measures. This handbook is to be used as design guidance for the EPSC measures. More details of what is required in the SWPPP can be found in the permit.

1.2 Erosion and Sediment Impairments to Water Quality

Erosion is the process by which land surfaces are worn away by the impacts of raindrops or by the shear forces of stormwater. Stormwater is runoff generated during rainfall and snowmelt events that flows over land (i.e., does not infiltrate into the ground) or impervious surfaces such as paved streets, parking lots, and building rooftops. Erosion is a natural process which, in undisturbed conditions, occurs at extremely slow rates depending on rainfall, landscape characteristics, soil properties, and vegetation. However, human land-disturbing activities accelerate erosion rates several orders of magnitude from average rates of <1 ton per acre per year in forested or undisturbed settings to 7 tons per acre per year in developed settings and to approximately 200 tons per acre per year on construction sites (Borrelli et al., 2021; Nearing et al., 2017).

Eroded soils can be transported short distances when soil particles are detached by raindrop impact and longer distances when the detached particles are transported by stormwater. Additional soil particles can be detached and transported if the velocity of overland flow is increased due to intense storms, steep slopes, compacted soils, impervious areas, etc. If not



DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook – 11182024

Erosion Prevention and Sediment Control Handbook

managed properly, overland flow will begin to concentrate and erode small channels or rills and will eventually form larger channels or gullies which, in turn, allow for larger shear forces and continued erosion.

Eroded soils travel in overland flow and are eventually discharged to receiving bodies of water. Once these soils enter larger bodies of water and the velocity of water slows, the soils begin to settle, a process known as sedimentation. Larger, coarser particles, such as gravels and sands, will settle much quicker than medium sized particles (silts) and fine particles (clays). Siltation is a condition where the natural bottom of a stream is covered in silts and clays. Sediment laden discharges from construction activities, if not managed properly, lead to adverse water quality, food web alterations, biologic suffocation, stream geomorphic changes, increased flooding, restrictions on navigation, and turbid waters which impact fish feeding and plant photosynthesis. Sediment is one of the top three causes of impairment within the state of Tennessee and United States surface waters. As such, there are 16 billion dollars in environmental damages due to sedimentation annually (Smith, 2018). Communities, construction and development companies, and industries help protect Tennessee’s water resources by using stormwater controls, known as best management practices (BMPs), to limit sediment pollution and other pollutants that preferentially bind to sediments. These BMPs limit stormwater pollution by controlling it at its source.

1.3 Regulations

The National Pollutant Discharge Elimination System [NPDES; (CFR122)] program regulates stormwater discharges from three potential sources: municipal separate storm sewer systems (MS4s), industrial activities, and construction activities. Operators of these sources might be required to obtain coverage under the NPDES permit before they can discharge stormwater. The NPDES permitting mechanism is designed to prevent stormwater runoff from washing toxic or harmful pollutants into surface waters or infiltrating into groundwater sources.

The U.S. Environmental Protection Agency (EPA) has authorized the Tennessee Department of Environment and Conservation, Division of Water Resources (TDEC-DWR) to implement the NPDES program for the state of Tennessee, thereby regulating point and non-point sources of pollution. Construction stormwater is regulated under Tennessee’s *General NPDES Permit for Discharges of Stormwater Associated with Construction Activities*, commonly known as the CGP (TDEC), and in some situations, under an individual permit.

CGP coverage is required when construction activities will disturb one or more acres of soil or disturb less than one acre of soil but are part of a larger common plan of development or sale that comprises at least one acre of cumulative land disturbance. CGP coverage is also required for projects of less than one acre of total land disturbance if TDEC has determined



DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook – 11182024

Erosion Prevention and Sediment Control Handbook

that the stormwater discharge from a site is causing, contributing to, or is likely to contribute to a violation of a state water quality standard or has determined that the stormwater discharge is, or is likely to be a significant contributor of pollutants to waters of the state. The CGP requires: (1) EPSC measures to be used during construction; (2) setbacks from waterbodies (water quality riparian buffer zones); (3) a site specific SWPPP; (4) self-monitoring site inspections; and (5) final stabilization before permit termination. Refer to the CGP for the requirements for obtaining coverage and where and how to submit the CGP Notice of Intent, SWPPP, and fee. More information can be found at TDEC’s Construction Stormwater website: <https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/npdes-stormwater-construction-permit.html>

In the early 1990’s and then again in 2003, EPA finalized regulations requiring MS4 operators meet specific criteria to obtain coverage under an NPDES permit for their MS4’s stormwater discharges. Check with the local jurisdiction early in the planning process to understand their construction stormwater requirements and how they may affect the site-specific SWPPP and EPSC plans. Both local and state requirements must be met. A list of Tennessee’s designated MS4 programs can be found on TDEC’s website: <https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/npdes-municipal-separate-storm-sewer-system--ms4--program.html>

The CGP requires a higher standard for design of EPSC measures, water quality riparian buffer zones (setbacks), and BMPs for construction stormwater discharges to Exceptional Tennessee Waters (ETWs) and waterbodies that have unavailable parameters for siltation. ETWs are surface waters designated by the TDEC-DWR as having the characteristics set forth at Tennessee Rules, Chapter 0400-40-03-.06(4). Waters with unavailable parameters means any segment of surface waters that has been identified by TDEC-DWR as failing to support one or more classified uses. The term unavailable parameters is not the same as unassessed. For example, if a stream has unavailable parameters, the stream has been assessed and cannot receive any more of the specified pollutant. This terminology has replaced what used to be termed an impaired stream. Therefore, the impairments would be the unavailable parameters of that stream. For the purpose of the CGP, the pollutant of concern is siltation. Thus, if there was a stream that had unavailable parameters for siltation, this would mean the stream is unable to take in anymore sediment; it is already impaired by sediment to the maximum degree possible, so the stream must have more conservative measures in place to ensure no further sediment pollution to the stream. Waters with unavailable parameters which are impaired for reasons other than sedimentation/siltation (such as nutrients, PCBs, Escherichia coli, etc.) are not required to meet the higher design standards unless sedimentation/siltation is also listed as a cause of impairment. To determine the



DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook – 11182024

Erosion Prevention and Sediment Control Handbook

classification of receiving water bodies, utilize the TDEC-DWR construction stormwater permitting map viewer found at <https://tdeconline.tn.gov/dwrcgp/> and the list of known ETWs can be found at <https://dataviewers.tdec.tn.gov/dataviewers/f?p=2005:34304:312383363635:>.

Some MS4 programs may require a more conservative design for waterbodies that have unavailable parameters for other contaminants even if siltation is not listed. The more stringent requirements between the CGP and local ordinances must be followed.

Total maximum daily load (TMDL) means the sum of the individual wasteload allocations for point sources and load allocations for nonpoint sources and natural background (40 CFR 130.2(l)). TMDL is a study that quantifies the amount of a pollutant in a stream, identifies the sources of the pollutant and recommends regulatory or other actions that may be needed in order for the stream to recover from pollution. Coverage under the CGP can only be obtained if the SWPPP incorporates measures or controls consistent with the assumptions and requirements of the TMDL (if the TMDL is for sediment or urban runoff).

Tennessee's water quality is regulated through the Water Quality Control Act, T.C.A., §69-3-101, et seq., and Chapters 0400-40-03 (General Water Quality Criteria) and Chapter 0400-40-04 (Use Classifications for Surface Water) of Rules of the TDEC-DWR. These regulations outline designated uses for streams as well as the quality of all types of discharges. According to the state's antidegradation policy (Chapter 0400-40-06 of Rule of the TDEC-DWR), new discharges must not alter or degrade the quality of the receiving waterbody. If the quality of water can support either the propagation of fish, shellfish, and wildlife or recreational activities, then the water quality must be maintained and protected unless TDEC-DWR finds that the degradation of the water quality is necessary to accommodate important economic or social development in the area. The CGP contains specific discharge quality criteria for such activities. First, the construction activity shall be carried out in such a manner that will prevent violations of water quality criteria as stated in the TDEC Rules. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, deposits, or turbidity impairs the usefulness of waters of the state for any of the uses designated for that water body. Second, there shall be no distinctly visible floating scum, oil, or other matter contained in the stormwater discharge. Third, the stormwater discharge must not cause an objectionable color contrast in the receiving stream. Lastly, the stormwater discharge must result in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.



DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook – 11182024

Erosion Prevention and Sediment Control Handbook

1.3.1 Water Resources Inventory

An inventory of all water resources (streams, rivers, lakes, wetlands, etc.) must be completed and clearly shown on the EPSC plans. A formal process for determining jurisdictional streams and wet weather conveyances in Tennessee is called hydrologic determination (Rule 0400-4-03 as provided for in Public Chapter 464 of 2009). A hydrological determination must be completed by a certified TN-Qualified Hydrologic Professional (QHP) and submitted to TDEC-DWR for concurrence of the findings on site. Wetlands must be identified and delineated by wetland professionals. Wetland delineation must be submitted to the TDEC-DWR for concurrence, and the confirmed delineation must be included in the water resources inventory. This documentation and process prevents water resources from being destroyed/alterd without permitting or mitigation. The water resource inventory on the EPSC plans also indicate what water resources are on the site, where the riparian buffer zones will be placed/conserved, what may be impacted due to construction, and if any additional permits may be required.

1.3.2 Other Permits and Regulations

A person who wishes to make an alteration to a stream, river, lake, or wetland must first obtain a water quality permit. Physical alterations to properties of waters or the state require an Aquatic Resource Alteration Permit (ARAP; Chapter 0400-40-04 Aquatic Resource Alteration). Depending on the extent of the impact on the water resource, these permitted activities fall into two categories: those that can be authorized under a general permit and those that require an individual ARAP. Many, if not most, of the activities requiring an ARAP also require coverage under the CGP. The majority of alterations that require an ARAP will also require a U.S. Army Corps of Engineers (USACE) Section 404 permit and possibly a Section 10 permit for projects that include the discharge of dredged or fill material into waters of the U.S. including wetlands. USACE should be contacted directly to determine if acquiring these permits are required for the proposed site. When a 404 certification is required from USACE, a 401 certification must first be obtained from the TDEC. General ARAPs provide a streamlined means for the TDEC-DWR to approve activities considered to result in minor impacts. Some General ARAPs require prior TDEC notification or approval before beginning the activity; others only require that the activity be conducted in accordance with the conditions of the General ARAP. Individual Permits are required when an activity does not qualify for coverage under a General Permit. Only projects that demonstrate the least impactful practicable alternative to the proposed activity will be eligible for coverage by an Individual Permit. More information on each permit type can be found at TDEC's ARAP website: <https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap.html>.



DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook – 11182024

Erosion Prevention and Sediment Control Handbook

Underground injection control (UIC) applications must be submitted to TDEC-DWR, Drinking Water Unit when emplacing any fluids into the subsurface via a discrete point of injection (e.g., sinkhole, rock crevice/crack, dug hole, drilled shaft, etc.). Wells are divided into six classifications depending on their use and risk for groundwater contamination, wherein construction of a well used for stormwater management would be considered a Class V injection well. More information regarding UIC and well classification can be found at TDEC's UIC website: <https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/underground-injection-control--uic-.html>.

TDEC-DWR Safe Dams Program is responsible for conducting inspections, maintaining an inventory of dams within the state, reviewing plans, and issuing certifications of operation, alteration, and construction of dam projects. With regards to this document, a EPSC measure would be considered a dam, and therefore must be regulated, if the structure can impound at least 30 acre-feet of water or is, at minimum, 20 feet in height (measured from the downstream toe elevation to the low point of the dam crest). Under rule 0400-45-02, "any such barrier which is or will be less than six (6) feet in height, regardless of storage capacity, or which has or will have a maximum storage capacity not in excess of fifteen (15) acre-feet, regardless of height, shall not be considered a dam." All non-federal dams are required to have a certificate of approval from the Commissioner to construct, alter, or operate an impoundment. Non-federal dams may also require other environmental permits, such as an ARAP or a USACE 404 Permit, even though the dam may not be subject to the Safe Dams Act. More information can be found at TDEC's safe dams website: <https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/safe-dams-program.html>.

The Tennessee Valley Authority (TVA) is a federal agency serving several purposes: to improve navigability and provide for flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; and to provide for the agricultural and industrial development of the valley. The TVA Act, Section 26A, requires that TVA approval be obtained before carrying out any construction activities that affect navigation, flood control, or public lands along the shoreline of TVA reservoirs, in the Tennessee River, or in the Tennessee River's tributaries. TVA 26A is designed to ensure that construction along the shoreline does not have a negative effect on the agency's management of the river system. Permit approvals for construction under Section 26A are considered federal actions and are, therefore, subject to the National Environmental Policy Act and other federal laws. Typical structures and projects that require TVA Section 26A approval include boat docks, piers, boat ramps, bridges, culverts, commercial marinas, barge terminals and mooring cells, water intake and sewage outfalls, and fill or construction within



DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook – 11182024

Erosion Prevention and Sediment Control Handbook

the floodplain. For more information on TVA 26A permits, refer to their website: <https://www.tva.com/environment/shoreline-construction-permits>.

1The NPDES program regulates stormwater discharges from certain *industrial* activities. Operators of these sources might be required to obtain coverage under a NPDES permit before they can discharge stormwater. Industrial stormwater discharges are primarily regulated under the *NPDES Tennessee Stormwater Multi-Sector General Permit for Industrial Activities* (TMSP) and in some situations under an NPDES individual permit. Requirements of the TMSP are separated by standard industrial classification or SIC code. For more information refer to TDEC's website: <https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/npdes-industrial-stormwater-general-permit.html>

The Endangered Species Act, U.S. Fish and Wildlife Service, and National Invasive Species Council all impose contingencies for construction if the construction would disrupt an ecosystem that contains threatened and endangered species of fish, wildlife, and plants; does not comply with the Migratory Bird Treaty Act, Marine Mammal Protection, or harms a species on the list of federally endangered or threatened species; and if construction has the potential to cause or promote the introduction of invasive species, respectively. These three acts impose contingencies for performance of construction; however, they do not impact the process of obtaining a CGP. Refer to the National Heritage Inventory Program's website for full compliance with the Endangered Species Act (<https://www.tn.gov/environment-program-areas/na-natural-areas/na-natural-heritage-inventory-program.html>); the Fish and Wildlife Service's website for full compliance with their stipulations (www.fws.gov/); and the National Invasive Species Council's website to prevent the introduction of new species (<https://www.usda.gov/topics/invasive-species>).

References:

- Borrelli, P., Alewell, C., Alvarez, P., Anache, J. A. A., Baartman, J., Ballabio, C., Bezak, N., Biddoccu, M., Cerdà, A., & Chalise, D. (2021). Soil erosion modelling: A global review and statistical analysis. *Science of The Total Environment*, 780, 146494.
- CFR122. *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System*.
- Nearing, M. A., Xie, Y., Liu, B., & Ye, Y. (2017). Natural and anthropogenic rates of soil erosion. *International Soil and Water Conservation Research*, 5(2), 77-84.
- Smith, P. M. (2018). Monitoring and Assessment of Sediment Basins at Highway Construction Sites.



**DWR – NPDES-SOP – G – 16 –Erosion Prevention and Sediment Control Handbook –
11182024
Erosion Prevention and Sediment Control Handbook**

TDEC. *Tennessee Construction General Permit*. <https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/npdes-stormwater-construction-permit.html>