

5.0 PREPARING THE SWPPP

This section is designed to aid the engineer or plan preparer in the development and implementation of an effective stormwater pollution prevention plan (SWPPP).

A SWPPP is a site-specific, written document that:

- Identifies potential sources of pollution at the construction site;
- Describes practices to reduce pollutants
- Describes practices to reduce the quantity of stormwater discharges from the construction site during and after construction
- Identifies procedures the operator will implement to comply with the terms and conditions of a construction general permit.
- Is updated as conditions change on the project.

Operators of construction activities disturbing one or more acre of land, or less than one acre if the site is part of a larger common plan of development, must develop and submit a site-specific comprehensive SWPPP with a NOI for coverage under the CGP along with the associated permit fee to the TDEC field office to gain coverage. The initial, comprehensive SWPPP developed and submitted by the initial permittee (typically owner/developer) should address all construction-related activities from the date construction commences to the date of termination of permit coverage. The SWPPP must be prepared prior to submission of an NOI, and it must be developed, implemented, and updated according to the CGP. SWPPPs should be prepared in accordance with Management Practices in Sections 7, 8 and 9 of this manual, which describe practices to be used to reduce pollutants in stormwater discharges from the construction site. A SWPPP is designed to provide information to planners, developers, engineers, and contractors on the proper selection, installation, and maintenance of Management Practices. It identifies all potential sources of pollution which are likely to affect the quality of stormwater discharges from the construction site. SWPPPs must also be prepared in accordance with good engineering practices. Where a SWPPP includes structural, hydraulic or hydrologic design, it must be prepared by a licensed registered engineer or landscape architect. Individuals with a working knowledge of EPSC, such as Certified Professionals in Erosion and Sediment Control (CPESCs) Level II, can develop the narrative portion.

An example of a SWPPP can be found in Appendix C.

5.1 PRINCIPLES OF A SWPPP

The SWPPP should outline the steps to be taken to comply with the terms and conditions of the CGP. Keeping the following principles in mind in preparing the SWPPP will help address permit requirements and protect water quality. Using the information collected during the site analysis, apply these principles to the overall development plan.

- ***Fit the development to the site***
Follow the natural contours as much as possible. Design the development to work with the natural features on the property, such as floodplain areas, stream buffers, steep slopes, and soils. Consider how these areas will affect your site development costs, stormwater management, and erosion control.
- ***Minimize the area and duration of exposed soils***
Clear only the land that will be under construction in the near future, a practice known as construction phasing. Minimize the duration of soil exposure by stabilizing soils as soon as possible.
- ***Avoid disturbing critical areas***
Areas such as sinkholes, wetlands and stream buffers should be preserved when possible, as these features provide long term stormwater management and water quality benefits to the property. Also, avoid highly erodible soils and steep slopes to the extent feasible. Avoiding these areas greatly reduces the potential for EPSC measure failure.
- ***Minimize impervious surfaces***
Impervious surfaces are hardened surfaces such as concrete or asphalt pavement and rooftops. These surfaces prevent rainfall from infiltrating into the ground and increase the amount (volume) of stormwater runoff. Stormwater runoff is the mechanism by which pollutants are transported to streams. Minimizing the use of impervious surfaces on a development minimizes the potential stormwater impact a development site may have on natural resources. Consider incorporating pervious areas into the overall development plan to facilitate runoff infiltration.
- ***Manage stormwater***
Divert stormwater coming on to the site by conveying it safely around, through, or under the construction site. Avoid allowing run-on to mix with runoff from the disturbed areas of the construction site.
- ***Limit potential for other stormwater pollution***
Eliminate exposure of hazardous materials and chemicals to stormwater and provide proper containers for waste and garbage on site.

5.2 SWPPP CONTENT

A SWPPP is more than just an erosion prevention and sediment control plan. SWPPPs are dynamic site-specific written documents. They should be constantly updated and revised as site conditions change or as new conditions are identified. A SWPPP should contain and address the following:

✓ **Site Description and Supporting Information (Narrative)**

- A description of all construction activities at the site (not just grading and street construction): Estimated total area expected to be disturbed by excavation, grading, or other construction activities, including dedicated off-site borrow and fill areas; estimated project start and end dates. Project type or function (for example, low-density residential, shopping mall or highway)
- Sequence of major activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation, etc.);
- Estimated area of the site and the total area that is expected to be disturbed;
- Soil Data: how the soil type will dictate the needed control measures and the expected quality of any discharge from the site;
- Estimated runoff coefficient and curve numbers of the site after construction activities are completed and how the runoff will be handled to prevent erosion at the permanent outfall and receiving stream;
- A description of any discharge associated with industrial activity other than construction stormwater that originates on site and the location of that activity and its permit number;
- Identification of any stream or wetland on or adjacent to the project, a description of any anticipated alteration of these waters and the permit number or the tracking number of the Aquatic Resources Alteration Permit (ARAP) or Section 401 Certification issued for the alteration;
- The name of the receiving water(s), and approximate size and location of affected wetland acreage at the site;
- For projects that will have separate and common stormwater features, such as residential developments or industrial parks, the developer/owner must describe how he/she will prevent erosion and/or control any sediment from portions of the property that will be sold prior to completion of construction; once the property is sold, the new operator must obtain coverage under this CGP, and assume operational control and responsibility of that portion of the site;
- For projects of more than 50 acres, the construction phases must be described; however, phasing of all projects is highly recommended;
- If only a portion of the total acreage of the construction site is to be disturbed, then the protections employed to limit the disturbance must be discussed, i.e., caution fence, stream side buffer zones, etc.
- Pollution prevention measures for non-stormwater discharges
- Documentation of permit eligibility related to Total Maximum Daily Loads, TMDL.

- Summary of supporting calculations for the design of sediment basins, channel linings, inlet protection, outlet protection, etc. While it is not necessary to include every calculation performed, enough information should be included with the SWPPP to show that the proper design criteria were used.
- ✓ **Erosion Prevention and Sediment Control Plan**
 - Site development plan with the proposed construction area clearly outlined;
 - Boundaries of the permitted area;
 - Topographic information for the site and the adjacent properties (to determine run-on and watershed boundaries);
 - Approximate slopes anticipated after major grading activities;
 - Areas of soil disturbance, including an outline of areas which are not to be disturbed;
 - Location of major structural and nonstructural controls identified in the SWPPP;
 - Location of areas where stabilization practices are expected to occur;
 - Location and boundaries of buffer zones, if any, established to protect waters of the state located within the boundaries of the project;
 - Locations of surface waters including wetlands, sinkholes, and careful identification on the map of outfall points for stormwater discharges from the site;
 - Locations of other permit boundaries, such as ARAP, TVA 26A or COE permits, including locations of stream realignments or mitigation areas;
 - Locations of temporary and permanent stormwater management structures;
 - Locations of stockpile and/or borrow areas;
 - Separate sheets for staged plans to show detail. For projects greater than 5 acres, at least 3 staged plan sheets should be provided: the clearing and grubbing phase, initial grading plan with perimeter controls and the final grading plan with final EPSC and stormwater management controls in place;
 - Construction details with dimensions, cross sectional views and/or plan views with enough information for the contractor to understand how to install the practice.

5.2.1 Field Reconnaissance

The development of a site-specific SWPPP requires a great deal of information about a site. Much of the base information can be obtained from existing data sets, such as soil surveys, contours, and known stream locations. However, existing general data sets alone should not be the sole source of site information used to develop the SWPPP. Often times, these data sets are invalid due to recent development and may lead a designer to incorrect assumptions that can negatively affect components of a SWPPP. After collecting the existing base information, the designer should visit the site and perform a full site assessment prior to preparing the SWPPP.

Site Assessment

The best place to start on the preparation of a SWPPP is in the field, at the site. While some pre-site visit information can and should be gathered to give a holistic understanding of the

site, this information coupled with a comprehensive site assessment provides the most complete picture of the site. The approximate locations of salient features should be identified during field reconnaissance and marked on a base map (USGS topographic map works well). Describe the undeveloped site and identify features of the land that can be incorporated into the final plan and natural resources that should be protected. Understanding the hydrologic and other natural features will aid in developing a better SWPPP and, ultimately, to more effectively prevent stormwater pollution. Too many SWPPPs have been prepared and submitted from an aerial photo and topographic map to save time and man hours. While it may appear that a desktop analysis is the most cost effective manner to produce a SWPPP, significantly more money and time may be necessary to revise a plan if a feature, such as a stream or sinkhole, is encountered after the SWPPP has been developed or construction begins.

The following items should be considered during the field reconnaissance:

Site Suitability

Developers and builders can minimize erosion, sedimentation, and other construction problems by selecting areas appropriate for the intended use. Tracts of land vary in suitability for development. Knowing the soil type, topography, natural landscape values, drainage patterns, flooding potential, and other pertinent data helps identify both beneficial features and potential problems of a site.

Areas to protect.

Sinkholes, streams, wetlands, critical habitat, steep slopes, and cemeteries are example features that should be avoided and protected on a project. Identifying these early in the project development process prevents costly changes to development plans. If streams or wetlands are to be impacted by the development, additional permits may be required, meaning additional permitting time should be added to your overall project development schedule.

Drainage patterns.

Understand the watersheds and subwatersheds around your project. Know if your site is located at the bottom of a watershed or at the top. Identify areas where run-on from adjacent properties could affect your project design. Identify springs, wet weather conveyances and streams early in your project to avoid potential problems as the project goes into construction.

5.2.2 Local Requirements

Local municipalities (cities and counties) may have their own requirements for construction sites that are more stringent than state requirements (e.g., local permits for grading or sediment and erosion control, utilities, etc.). Compliance with both state and local requirements is necessary. Check with your local jurisdiction early in the SWPPP preparation process to understand their requirements.

5.2.3 Staged Drawings

For all but the simplest sites, grades on a development will change substantially from the initial grading to the final grade. To address EPSC and stormwater management during each stage of construction, staged drawings should be provided. Staging is an important tool in managing EPSC on a project, and it is important that EPSC measures follow the flow of work through construction staging and phasing. For the purposes of this manual *staging* refers to the different construction stages, such as clearing and grubbing, initial or rough grading, and final grading. *Phasing*, on the other hand, references the day-to-day site management that balances disturbed, undisturbed and stabilized areas. Phasing on larger projects may be necessary to limit the overall disturbed area at any one time to less than 50 acres, as required by the CGP.

Design plans should also contain basic information such as a scale, north arrow, topographic information at a level of detail to understand flow patterns and slopes, limits of disturbance, drawing revision dates, and a location map. Construction details for each management practice should also be included.

Often times, one EPSC plan is developed based upon final grades, making the initial installation of measures infeasible and the ongoing construction site management difficult. The number and level of detail of EPSC plan drawings will vary dependent on the complexity of the design. However, at least 3 staged drawings will be needed:

1. The clearing and grubbing plan,
2. Interim grading plan and
3. The final grading plan.

The **initial clearing and grubbing plan** should show site contours with enough grading to install initial and perimeter measures. These measures may include a construction entrance, silt fence, sediment basins, diversions, etc. This plan simplifies the installation of the initial measures and steps the site operators through EPSC management on the site in a sequential manner.

For more complex sites with a substantial amount of earthwork, an **interim grading plan** may also be needed. Interim grading plans are necessary when contours on the site change between the clearing and grubbing stage and final grading stage to the extent that the proposed practices for those stages don't fit for an interim grading stage. Often, the interim grading plan and EPSC controls are modified as construction progresses. Note that anytime measures are changed, deleted, or added on an EPSC plan, the field plan (a component of the SWPPP document) should be updated. Each staged drawing should clearly show the area to be disturbed,

areas to be protected from construction activities, existing and proposed contours, and measures to be installed in that stage.

The **final grading plan** should show the final, finished contours and any permanent erosion and stormwater management controls. Permanent controls include permanent stream buffers, energy dissipaters, permanent stormwater detention basins, rip rap lined channels, etc.

5.2.4 Construction Schedule

Construction sequencing requires creating and following a construction schedule that balances the timing of land disturbance activities and the installation of measures to control erosion and sedimentation, in order to reduce on-site erosion and off-site sedimentation. One of the primary focuses of the construction schedule should be to minimize the amount of disturbed area at the site at any one time. Limiting the area of disturbance and stabilizing areas as quickly as possible can be the most effective management practices and most cost-effective way of controlling erosion during construction.

Construction drawings should clearly state the designer's intentions, and an appropriate sequence of construction should be shown on the plans. This sequence should be discussed at the pre-construction meeting and then enforced by an appropriate inspection program throughout the construction period. While the pre-construction conference isn't required by the CGP, it is strongly encouraged and should include the on-site responsible construction personnel.

Appropriate parts of the SWPPP must be implemented before clearing, grubbing, grading, and excavating activities begins. After construction activities begin, the SWPPP should describe when additional erosion prevention and sediment controls will be installed (generally after initial clearing and grubbing activities are complete).

Each construction site should have a site specific construction schedule included with the SWPPP. However, initial activities in a construction sequence are often very similar. Table 5-1 contains some schedule considerations for typical construction activities. Note that when a construction site has other permits besides just the CGP, such as an ARAP, the construction sequence should include those activities and specific scheduling requirements as well.

Table 5.2-1 Example Construction Schedule

| Construction Activity | Schedule Consideration |
|--|---|
| Installation of erosion prevention and sediment control, EPSC, measures | a) Perform selective vegetation removal for silt fence installation b) Install stabilized construction entrance c) Install silt fence and diversions d) Install high visibility fencing around areas not to be disturbed |
| Construction access, entrance to site, construction routes, areas designated for equipment parking | This is the first land-disturbing activity. As soon as construction begins, stabilize any bare areas with gravel and temporary vegetation. |

| | |
|---|---|
| Sediment traps and barriers, sediment basin, silt fences, outlet protection | After construction site is accessed, sediment basins should be installed, with the addition of more traps and barriers as needed during grading. |
| Roadbed and haul road stabilization and slope stabilization | To prevent overloading other measures, construction haul roads, roadbeds, and slopes should be stabilized either temporarily or permanently. Storm drain pipes associated with roadways should also be stabilized. |
| Runoff control, diversions, perimeter dikes, water bars, outlet protection | Key practices should be installed after the installation of sediment basins and traps and before land grading. Additional runoff control measures may be installed during grading. |
| Runoff conveyance system, stabilize stream banks, storm drains, channels, inlet and outlet protection, slope drains | If necessary, stabilize stream banks as soon as possible, and install principal runoff conveyance system with runoff control measures. The remainder of the systems may be installed after grading. |
| Land clearing and grading, site preparation (cutting, filling, and grading, sediment traps, barriers, diversions, drains, surface roughening) | Implement major clearing and grading after installation of principal sediment and key runoff-control measures, and install additional control measures as grading continues. Clear borrow and disposal areas as needed, and mark trees and buffer areas for preservation. Stockpile topsoil for use in final stabilization later. |
| Surface stabilization, temporary and permanent seeding, mulching, sodding, riprap | Temporary or permanent stabilizing measures should be applied immediately to any disturbed areas where work has been either completed or delayed. Temporarily stabilize topsoil stockpiles (seed stockpile and silt fence around toe of slope) |
| Building construction, buildings, utilities, paving | During construction, install any erosion and sediment control measures that are needed. |
| Landscaping and final stabilization, topsoiling, trees and shrubs, permanent seeding, mulching, sodding, riprap | This is the last construction phase. Stabilize all open areas, including borrow and spoil areas, and remove all temporary control measures. Stabilize disturbed areas associated with temporary measure removal. |

5.2.5 Construction Details

The SWPPP must also include typical construction details with enough information to convey construction information to the site inspector and, more importantly, the contractor. Construction details can be cross sectional or plan views of the measure but need to show elevations, installation and type of materials for a measure. The details can be located on a separate detail sheet of the EPSC drawings or on sheets where each measure will be installed, depending on the site detail.

The details can be generic for some measures, such as silt fence or wattles but must show the correct sizes and installation. However, it is likely that a construction detail will be necessary for each complex measure, such as a sediment basin on a project to show the basin-specific materials and sizes. For example, each basin on a project may have different permanent pool elevations, riser pipe diameters and outlet geometry.

Note in Figure 5.2-1 below that two different typical construction details are given for EPSC measures used throughout the project. The silt fence detail gives enough information for a contractor to correctly install the measure, and the detail applies to silt fence installations specified throughout the project. The diversion berm detail, however, does not provide enough detail. Note the “maximum” and “minimum” notes on the cross sectional view. These values should be inserted specifically, as should the top width, height and stabilization method so the contractor can install the correctly dimensioned measures in the field.

Appendix F contains standard drawing details that can be incorporated into the design plans and customized for each site.

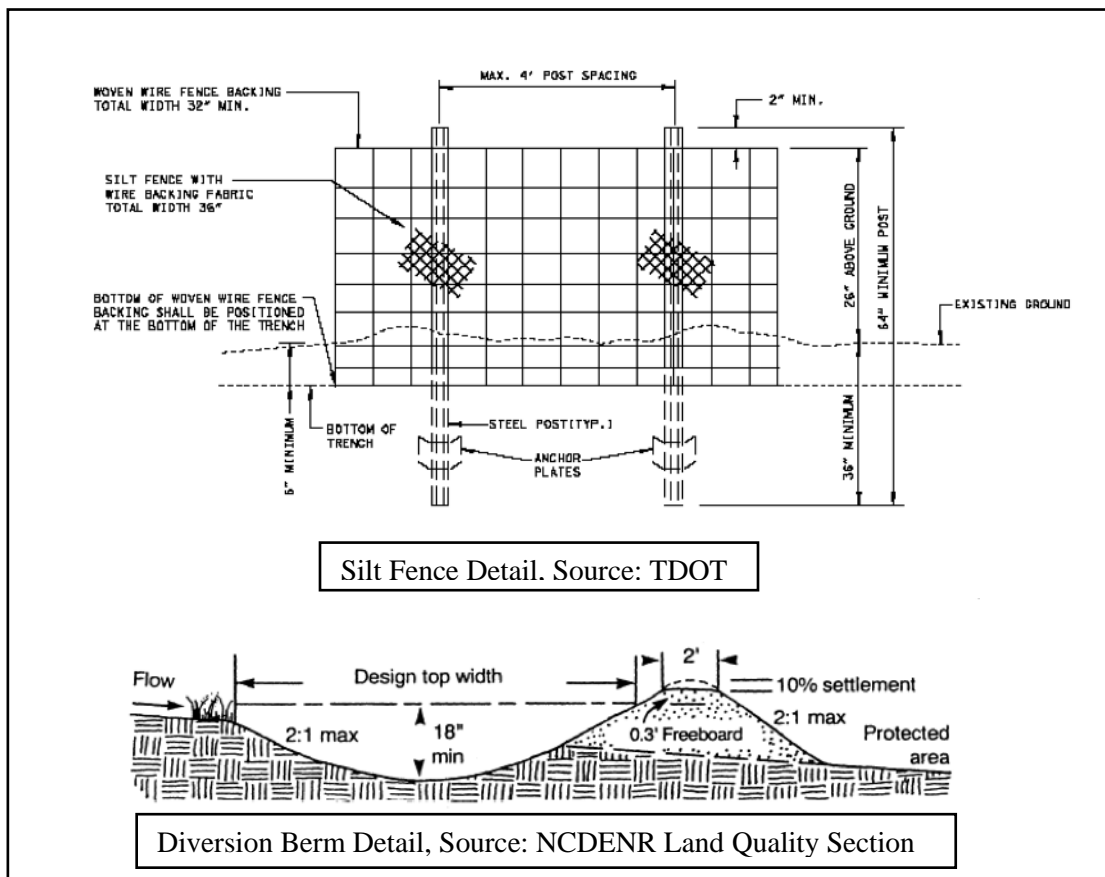


Figure 5.2-1 Typical Construction Detail

5.2.6 Other Considerations

Impaired or Exceptional TN Waters

The CGP contains additional design related requirements for construction sites that discharge into streams that are either designated by TDEC as Exceptional Tennessee Waters or as impaired due to siltation (sediment). Erosion prevention and sediment control measures must be designed to control runoff generated by the 5-yr, 24-hr storm event. Also, sediment basins (or equivalent measures) are required for outfalls that have a total drainage area of 5 acres or more. The basin must be designed to provide treatment for the volume of runoff from a 5-yr, 24-hr storm event from each acre drained.

Buffer Zones for Impaired or Exceptional TN Waters NOTE:

For sites that contain and/or are adjacent to a receiving stream designated as impaired or Exceptional Tennessee waters a 60-foot natural riparian buffer zone adjacent to the receiving stream shall be preserved, to the maximum extent practicable, during construction activities at the site. The natural buffer zone should be established between the top of stream bank and the disturbed construction area. The 60-foot criterion for the width of the buffer zone can be established on an average width basis at a project, as long as the minimum width of the buffer zone is more than 30 feet at any measured location.

A 30-foot natural riparian buffer zone adjacent to all streams at the construction site shall be preserved, to the maximum extent practicable, during construction activities at the site. The riparian buffer zone should be preserved between the top of stream bank and the disturbed construction area. The 30-foot criterion for the width of the buffer zone can be established on an average width basis at a project, as long as the minimum width of the buffer zone is more than 15 feet at any measured location.

Total Maximum Daily Loads (TMDL)

The SWPPP must include documentation addressing an approved TMDL for a pollutant of concern, including:

- a) identification of whether the discharge is identified in an approved TMDL and any associated allocations, requirements, and assumptions identified for the discharge;
- b) summaries of consultation with the TDEC-WPC on consistency of SWPPP conditions with the approved TMDL, and
- c) measures taken to ensure that the discharge of pollutants from the site is consistent with the approved TMDL, including any specific waste load allocation that has been established that would apply to the discharge.

Pollution Prevention Principles for Good Housekeeping

Besides sediment, the SWPPP must address other potential stormwater pollutants on the construction site. It must include a description of construction and waste materials expected to be stored on-site and include a description of controls used to reduce pollutants from those materials, including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response.

The principles described below are designed to aid in identifying pollution prevention practices that should be described in the SWPPP and implemented on site.

1. Provide for waste management.

Practices such as trash disposal, recycling, proper material handling, and cleanup measures can reduce the potential for construction site waste materials from becoming stormwater pollutants. Keep dumpsters covered to prevent trash from being blown out and into the stormwater system. For larger, solid construction debris, an open containment system (as simple as a wire fenced in area) can provide enough protection from materials moving around the construction site and into the storm drain system.

2. Establish proper construction materials staging area(s).

The SWPPP should include comprehensive handling and management procedures for construction related materials, especially those that are hazardous or toxic. Paints, solvents, pesticides, fuels and oils, other hazardous materials or any building materials that have the potential to contaminate stormwater should be stored inside the construction trailer, in a storage building, or under cover whenever possible. If such a scenario isn't feasible on the construction site, secondary containment should be provided. Secondary containment systems provide a means to capture spills and prevent them from moving offsite in stormwater runoff. More information on secondary containment systems can be found in Section 7.19. Training employees and subcontractors on materials storage and spill prevention is essential to the success of this pollution prevention principle.

3. Designate concrete washout areas.

Designate specific on-site washout areas and design facilities to handle the anticipated volume of concrete washout. The washout area should be clearly marked, and operators and contractors made aware of its location. Once the concrete washout slurry sets up, the material can be broken up and removed or used where allowed as suitable fill material. In slurry form, concrete washout can impact a receiving stream or watercourse in numerous ways, including covering habitat, clogging fish gills, and altering the pH of the water .

4. Establish proper equipment/vehicle fueling and maintenance practices

Performing equipment/vehicle fueling and maintenance at an off-site facility is preferred over performing these activities on the site. However, on some projects, onsite vehicle maintenance may be necessary. The goal of this pollution prevention principle is to keep fuel, oils and greases from coming into contact with stormwater. Create an on-site fueling and maintenance area that is clean and dry, equipped with a spill kit, and staff should be trained in how to properly use it. Maintenance and refueling stations should be established well away from streams, wetlands and storm drain systems. Drip pans should be installed under any leaky equipment. Any material in the drip pans should be collected and taken offsite for proper disposal. Lubricants, solvents and fuels should be stored under cover or have secondary containment systems installed to prevent spills or leaks from mixing with stormwater.

5. Develop a spill prevention and response plan

A comprehensive spill prevention and response plan is needed where any fluids are stored on a construction project. The plan should clearly identify the site contact for spills; identify ways to reduce the chance of spills; identify methods to stop the source of spills; describe

how to contain and clean up spills; identify the location of the closest stormwater system component, stream or wetland; describe the disposal method for materials contaminated by spills; and provide a mechanism to train personnel responsible for spill prevention and response. Chapter 7 contains additional information on spill prevention and response.

Endangered or Threatened Species

A determination should be made if listed endangered or threatened species or their critical habitats are located on or near the construction activities. A description of measures taken to avoid disturbance should be listed. Contact local offices of the U.S. Fish and Wildlife Service (FWS) and TDEC Division of Natural Areas for listings of protected species and habitats.

Permanent Stormwater Management

While the CGP's primary focus is on construction related stormwater management activities, construction is typically the initial step towards a built-out environment, where permanent stormwater management controls are included and incorporated into the overall development plan. These permanent controls are designed to reduce stormwater discharges to a non-erosive velocity, reduce runoff volumes to prevent degradation of receiving stream channels, and reduce pollutants in stormwater runoff quality to prevent degradation of receiving streams. Integrating these permanent controls into the development plans in the SWPPP manages the site and its resources more comprehensively.

The CGP includes a general requirement to manage stormwater runoff after development. The SWPPP must include a description of measures that will be installed during the construction process to control pollutants in stormwater discharges that will occur **during and after** construction operations have been completed such as practices that control pollutants and any increase in the quantity of stormwater discharges that will occur after construction operations have been completed. The planning and citing of permanent stormwater controls can affect decisions concerning site design, location of buildings and other structures, grading, and preserving natural features.

Low impact development techniques (see Chapter 6) that emphasize reducing the generation of stormwater runoff, preserving natural drainage patterns, and preserving natural vegetation offer the best opportunities to protect a site's natural resources as well as nearby streams, rivers, lakes, and wetlands. Incorporating these ideas and concepts into the design and planning for a project before it is built can also translate to reduced capital infrastructure and long-term maintenance costs.

In addition to the requirements contained in the CGP, local jurisdictions may also have permanent stormwater management requirements. Prior to preparing the SWPPP, the designer should contact the local jurisdiction for guidance on their stormwater program requirements. Understanding their requirements early in the planning and design process can avoid costly redesigns and schedule adjustments. Note that both the state and local stormwater management requirements must be met.

Special Site Conditions

Many difficult site conditions can occur at a construction site. Some of the more common and problematic conditions are highlighted below.

- 1. Steep slope areas.** Development in mountainous areas requires specific attention to stormwater runoff management, both during and after construction. During the SWPPP development, techniques to reduce flow length and velocities must be incorporated into the SWPPP, such as ditch turnouts with outlet protection, frequent diversions, check dams, and slope drains. Roadway layout should strive for longer roadways with flatter grades and many ditch turnouts. Fill slopes should be 3:1 or flatter and incorporate slope breaks. Stabilization of diversions and channels should be a priority.
- 2. Sensitive streams.** Development near streams must incorporate stream buffers. However, additional consideration should be given to these sites for short-term and long-term stormwater management, including buffer enhancement where the existing buffer does not have adequate woody vegetation; a site layout that incorporates limited stream crossings; wider buffers where adjacent slopes are steep; and the incorporation of level spreaders to convert concentrated flow to sheet flow prior to discharging into the stream buffer.
- 3. Difficult soils.** When developing the SWPPP, the soils on the project should be determined.
 - If the potential exists for your site to have difficult soils, additional measures may be necessary to ensure successful implementation of the SWPPP at the site. For clayey soils, include provisions in the SWPPP for passive or active treatment for turbidity. While clay soils are less erosive, once eroded and in the stormwater column, settling is very difficult. Flocculants may be necessary to reduce the turbidity of the discharge.
 - If the potential exists at your site for highly acidic soils such as pyritic soil formations, include provisions for managing acid runoff. These provisions can include capping onsite, treatment onsite or disposing the soils properly offsite.
 - If your site has non-cohesive soils, refined stabilization techniques should be incorporated into the SWPPP. Non-cohesive soils may require very flat slopes and low velocities. RECPs that are pinned in place may require specialty pins or anchors that go deeper than regular pins. For steep fill slopes, a geotechnical engineer may be required for the design.
- 4. Active and passive treatment systems.** To meet effluent limitations, construction sites may be required to include either passive or active treatment systems to manage turbidity in their discharge. The designer must include design components such as the treatment type, soil type and discharge polishing. Many of these treatment components require a settling area, a treatment delivery mechanism, and a method to repair or maintain each component.
- 5. Rock outcrops.** Many areas in Tennessee have bedrock either exposed or very close to the surface. Shallow bedrock can cause difficulties on a construction project, as it deters infiltration and impacts the measures that can be installed to manage runoff. However, soil erosion is typically minimized where the majority of the site surface is rock. Particular attention should be given to sediment control. Many common BMPs cannot be constructed. For example, silt fence cannot be trenched in at the toe. Wattles and other controls that need minimal site preparation should be included in the SWPPP for sites with shallow bedrock. Stabilization techniques, such as bonded fiber matrix, may also be necessary to get vegetation established on rocky slopes.

- 6. Sinkholes.** Where sinkholes are known or suspected, the SWPPP should identify them and protect them from sediment laden runoff. Where the throat of the sinkhole is open, mulch should not be used in the sinkhole basin, as clogging of the sinkhole and flooding may occur. Stormwater runoff should be treated before discharging into the sinkhole. A Class-V Injection Well permit may be needed when the sinkhole drainage is improved.

5.3 MANAGING THE SWPPP

The SWPPP is a dynamic document that manages EPSC and stormwater runoff throughout the life of the construction activity. Typically, field conditions change once construction starts due to unforeseen site conditions such as the location of utilities, soils, and/or other materials encountered on the project. While a thorough site analysis during SWPPP development and preparation limits the level of unforeseen conditions that may affect construction, it is likely that construction schedules and stormwater management needs will change as the project progresses. For this reason, the SWPPP must be updated to reflect site conditions. This section provides background on how a site operator should manage his SWPPP.

5.3.1 Multiple operators, new operators, termination of operators

Multiple operators may operate under the same SWPPP, but responsibilities must be clearly described. There is always a primary permit holder for each permit, while there can be several secondary permit holders, depending on how work is being completed on the project. However, depending on the type of development, there may be several permits with primary holders. Preparation and implementation of the SWPPP may be a cooperative effort between more than one operator at a site. Other primary permittees at the site may develop a SWPPP addressing only their portion of the project, as long as the management practices are compatible with the comprehensive SWPPP and comply with conditions of the general permit. New operators with design and operational control over their portion of the construction site are not precluded from developing and implementing their own SWPPP, but are encouraged to adopt, modify, update, and implement a comprehensive SWPPP. Separate SWPPPs cannot cause a conflict with a comprehensive SWPPP in the same development.

When new operators are added to a SWPPP, a supplemental NOI should be completed and submitted to the TDEC field office at least 2 days prior to the new operator taking operational control over any portion of the site. When a contractor (a secondary permittee) is no longer a contractor on a site covered by the CGP, he can request termination of his coverage through the NOT.

Permits can be reassigned if the original operator is no longer involved with the development and the new operator agrees to accept the responsibility of the permit.

5.3.2 Onsite records management

A copy of the SWPPP must be maintained on the site at all times; a copy of the NOC must be posted on site in a location visible to the public. (Note: if this is not possible, contact your local TDEC field office and discuss alternatives). If a construction trailer is onsite, keep the SWPPP documents in the trailer in a designated location. If there is no construction trailer, a SWPPP box should be constructed for the SWPPP document to be stored. The location of the SWPPP should be clearly identified in the original SWPPP submitted for coverage under the CGP. If the site is

inactive or does not have an onsite location adequate to store the SWPPP, the location of it, along with a contact phone number, shall be posted on the project. If the SWPPP is located offsite, reasonable local access to the plan, during normal working hours, must be provided. Updated plans and inspection reports must be available upon request by inspectors, local agency approving EPSC plans, grading plans, or stormwater management plans, or the operator of the local MS4.

Besides the original SWPPP documents submitted for coverage under the CGP, additional information is needed to manage the construction site and SWPPP.

Inspection reports. Routine inspections are required by the CGP. Copies of the written reports must be kept with the SWPPP and provide enough information that a regulator is given a full picture of the management techniques employed onsite, including problems, maintenance needs, and corrective actions taken. The inspection report becomes a document of a site's compliance with the CGP. These reports need to clearly note the dates that problems or maintenance needs were identified and the dates that these activities were addressed, as well as dates when major grading activities occurred, the dates when construction activities temporarily or permanently ceased on a portion of the site, and the dates when stabilization measures were initiated. An inspection report form can be found in Appendix B.

Rainfall data. A rainfall gauge is required on the construction site and should be read at least once a day at approximately the same time to get a 24 hour rainfall depth total. In addition, when a rain event occurs, the approximate beginning and ending time should be documented to provide the rain event duration. The rainfall depth and duration together can be used to determine the storm frequency and related back to the permit and design requirements. Rainfall data should be kept with the field SWPPP.

EPSC plan revisions. The original EPSC plans submitted for coverage under the CGP will likely need to be updated and/or revised at various times throughout the life of the project. A set of EPSC plans should be designated as the "field plans" and used to show modifications and updates, which can be hand-written on the sheets. For major revisions or updates requiring engineering (such as hydrologic or hydraulic design modification or substantial site grade changes), an engineer may need to reissue a set of drawings. In any event, modifications should be noted to keep the SWPPP current and the date that the modification was implemented in the field should also be noted. These field plans should be available for state and local regulators to view and should reflect current site conditions.

Rainfall records. The CGP requires at least one rain gauge for monitoring rainfall on a project. For consistency, it is recommended that the rain gauge is read at the same time each day. Rainfall should be recorded in a rainfall log, and rainfall log kept with the onsite SWPPP. These records document the amount of rain a project has received (whether the rain was above or below the design standard for a measure).