

2.0 Storm Water Pollution Prevention Plans (SW3Ps)

The purpose of a Storm Water Pollution Prevention Plan (SW3P) prepared for a construction project is to:

- Provide for the design and planning of environmental protection control measures during highway construction projects
- Ensure minimal impact on the environment from highway projects by:
 - Preventing sediment-laden runoff from discharging from a construction site
 - Minimizing construction activity pollutants from entering waters of the US

Earlier practices of specifying that the contractor be responsible for erosion and sediment control are no longer satisfactory. Now, the designer must provide adequate information, control measures, and guidance within the plans and specifications to ensure a practical, economical, and effective plan for the control of erosion and sedimentation.

2.1 Contents of an SW3P

A storm water pollution prevention plan should be developed for any project where soil disturbing activities will occur. Any project which will disturb more than 5 acres of land will also be required to meet the requirements of the EPA NPDES General Permit (see Section 10.0). Any SW3P should describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water associated with the construction site.

At a minimum any SW3P developed for a construction activity should include the following information:

- A description of the nature of the construction activity and the intended sequence of major soil disturbing activities.
- A site map indicating:
 - Drainage patterns
 - Areas not to be disturbed
 - Locations of major controls measures
 - Locations of areas that will be stabilized
 - Surface waters (including wetlands)
 - Locations where storm water is discharged to a surface water
- Limits of construction and disturbed areas
- Erosion control BMPs
- Sediment control BMPs

- Other controls, such as for waste disposal, hazardous and sanitary wastes and offsite vehicle tracking of sediments
- A description of the procedures to ensure the timely maintenance and inspection of erosion and sediment control measures and other protective measures identified in the SW3P

2.2 Development of a SW3P

The major considerations in the development of an effective and economical SW3P are:

- Project sequencing and phasing
- Grade management
- Drainage features
- Limiting disturbed areas
- Stabilization practices
- Storm water management
- Basic principles of the erosion and sedimentation process

2.3 Project Sequencing and Phasing

Proper sequencing and phasing of a project are important considerations in controlling the erosion and sedimentation problems associated with a construction project. The following is a list of some items to consider when planning the sequence and phasing of highway construction operations:

- Sustain a manageable area of construction activities. For example, limit the area of erodible soil exposed at any given time.
- Complete and employ permanent structures, controls, and stabilized areas as soon as practical for use as erosion and sediment control measures for the remaining construction operations. For example, grade and revegetate ditch early on in the project so they can assist in reducing the effects of later construction operations.
- Maintain the maximum amount of existing vegetation to assist in the control of and to minimize the exposed erodible area. For example, do not clear or grub an area until work is necessary.
- Limit the types of construction operations, including access and hauling, allowed in certain areas of the project that may be more susceptible to erosion. For example, do

not allow unlimited vehicle crossing of streams: provide a temporary crossing at a single location and only when access is necessary.

- Plan and designate areas that are not to be disturbed at all, or at which phase in the project the area is to be disturbed. This can include limiting the type of access or operation in a given area. For example, consider only hand clearing operations in areas susceptible erosion and fencing off areas that are not to be disturbed.

2.4 Grade Management Considerations

Proper planning and management of highway construction grading operations can significantly lower the erosion problems associated with these activities. No operation in highway construction increases the potential for erosion as much as excavation and embankment activities. The erosion potential of an area is increased as erodible areas are exposed and slopes are steepened and lengthened. The following is a list of items to consider when managing grading operations:

- Excavation and embankments should be completed to final grade and stabilized in a continuous operation; piles of loose material should be minimized at all times
- Offsite flow should be prevented from crossing into excavated areas by intercepting and/or diverting flows into and through undisturbed or controlled areas (see Figure 2.1)
- Perimeter controls should be installed at the toe of the slope in embankment sections to prevent sediment-laden runoff from leaving the site (see Figure 2.2)
- Small berms or dikes should be placed at the end of each days grading operations in cut and fill sections to divert or intercept runoff to controlled areas
- Prompt grading and stabilization of ditches will greatly reduce the potential sediment load

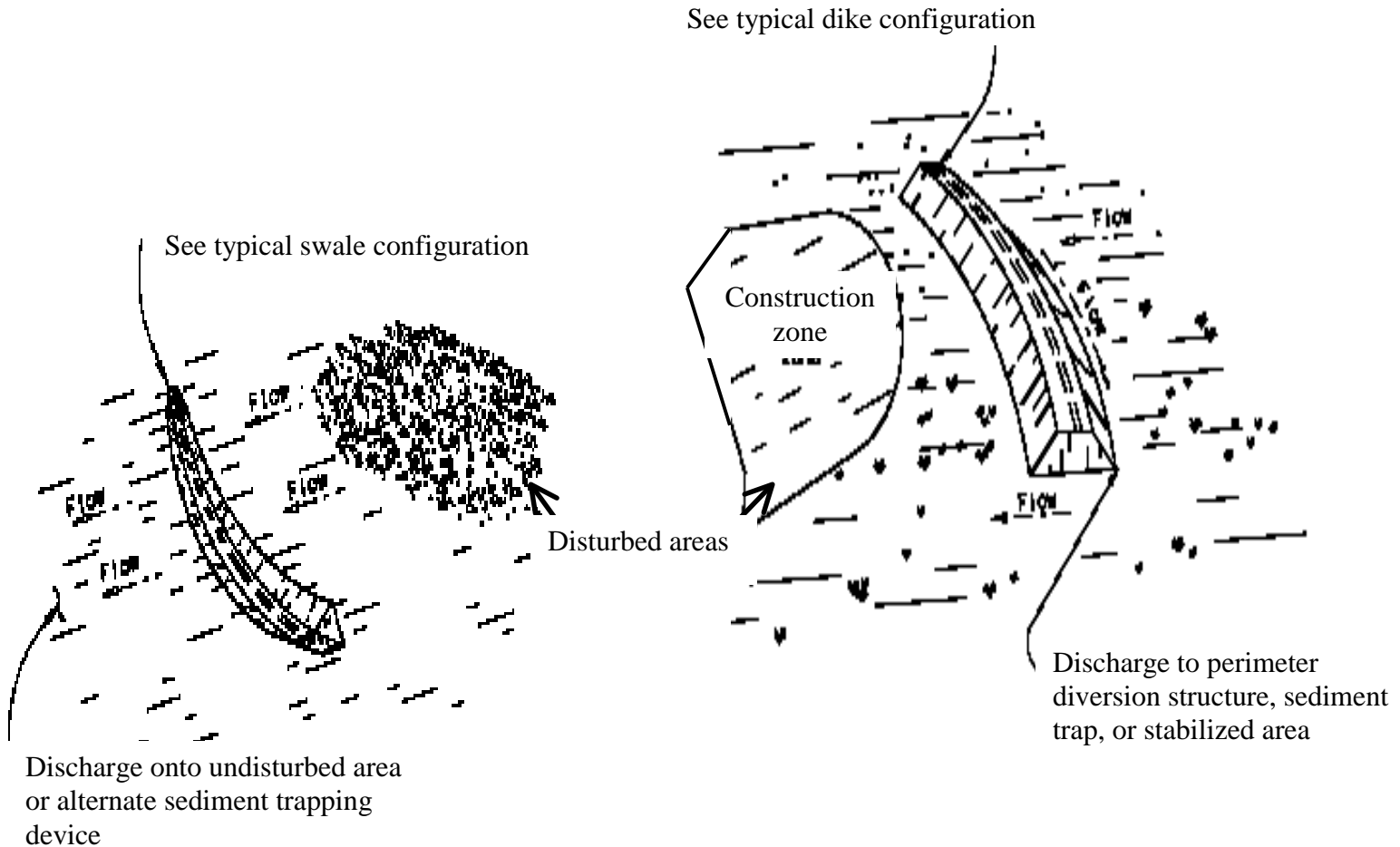


Figure 2.1 - Typical plan for limiting disturbed area by diverting/intercepting runoff to controlled outlets or stabilized areas.

2.5 Drainage Feature Considerations

Construction operations within existing drainageways and the construction of drainage structures (e.g. culverts, channels, and enclosed storm drain systems) increase the potential for erosion from a construction site. The major factors affecting erosion potential are the increasing velocities and concentrating of flows associated with construction of drainage structures and the exposure of erodible soil to frequent concentrated flow. The following list of items should be considered when constructing drainage features and operating within drainageways:

- Minimize the disturbance of and access to existing waterways. Provide planned and protected stream crossings during construction activities.
- When constructing cross drainage structures in existing waterways, provide a controlled diversion through the disturbed area as opposed to allowing uncontrolled flow through the construction area. This could be done by temporarily diverting the

existing stream through a channel made from sandbag berms or even just protected with plastic sheathing. Divert the stream until the permanent structure is completed or partially completed (e.g. completing one barrel or a multi-barrel culvert installation and allowing the flow to cross through the partially completed portion.)

- Appropriate coordination should be conducted in accordance with Section 404 of the Clean Water Act regarding the placement of fill material in the Waters of the U.S. (including wetlands).
- Maximize the storage volume afforded in ditches, etc. for use as temporary sediment traps or ponds to contain sediment-laden runoff on the site.
- Prevent sediment-laden runoff from entering the drainage system by installing controls at each storm drain inlet and culvert entrance.

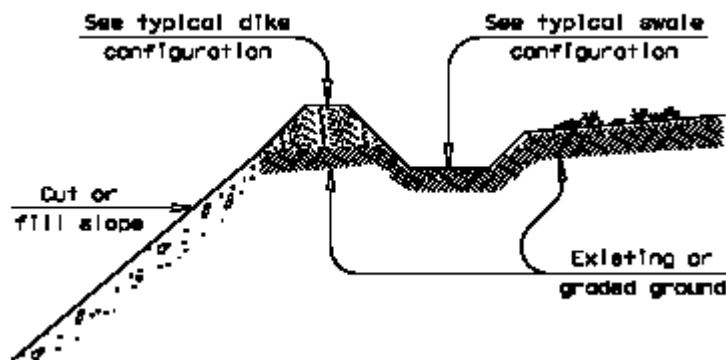


Figure 2.2 - Typical cut section depicting dike and/or swale intercepting runoff at the top of slope.

2.6 Limiting Disturbed Areas

The benefits in limiting disturbed areas during construction are fourfold:

- Maintaining existing vegetation preserves natural habitats that reduce the potential impact of the existing highway
- Areas left undisturbed may not warrant any pollution prevention practices since their erosion potential may not increase
- Existing vegetation can be utilized as an erosion control device acting as a vegetative buffer filtering and settling out sediment

- Smaller disturbed areas are more manageable when trying to control runoff and erosion (see Figure 2.3)



Figure 2.3 - Example of limiting disturbed area. Note the extent of vegetation left in place.

2.7 Erosion Control

Stabilizing areas disturbed during construction in an expeditious manner is one of the best erosion control measures available (discussed in detail in Section 4.0). Establishing a ground cover protects the soil surface from the erosive force of raindrops, promotes infiltration, and provides a barrier to protect against sediment removal due to sheet runoff. The items to consider when determining stabilization practices are:

- Give priority to completing and stabilizing slopes and ditches to reduce erosion potential
- Stabilize areas where grading is complete or work has ceased (or is expected to cease) for 21 days within 14 days of stoppage. In regions receiving less than 20 inches of rain annually, stabilization is to be initiated as soon as possible, but not necessarily within 14 days
- Stabilization can be enhanced by mulching, soil retention blankets, soil tackifiers, geotextile fabrics, grass sodding, and/or any combination of these measures (see Figure 2.4)

- Effects to stabilize disturbed areas should be initiated as soon as possible sequencing permits. This promotes timely completion of the project since a project is not actually complete until the disturbed areas are stabilized. This will assist in obtaining 70% vegetative cover required by the EPA in order to terminate the NPDES permit. An additional benefit is that contractors can be released in a timely fashion, and State Force maintenance work at the end of the project will be minimized



Figure 2.4 - Example of temporary erosion control (matting) and temporary sediment control (silt fence) installed between phases of construction.

2.8 Sediment Control

Temporary sediment controls and post-construction total suspended solid (TSS) controls (discussed in detail in Section 5.0) are the last means of defense to prevent sediment problems associated with construction activities. Consideration should first be given to minimizing the erosion potential. Then, sediment controls should be planned and implemented according to the specific project needs. The devices used in the control of sedimentation are rather simple; it is the planning, design, installation, and maintenance that presents the biggest challenge. The planning, selection, and design of sediment controls is not an exact science but rather an acquired talent with which experience and good judgement lead to successful results.

The types and implementation of devices should not be limited to those discussed herein. Innovative designs and solutions are encouraged because no single device can solve all design situations. Bearing in mind the principles of erosion and sediment control, the purpose of different devices, and the intent of the SW3P, solutions to storm water management problems may be found that are not included in this or any other technical reference.

2.9 Storm Water Management

The SW3P should include a description of “storm water management” measures. For the General Permit, this refers to controls that will reduce the discharge of pollutants in storm water from sites after completion of construction activities. The permit addresses only the installation and maintenance of controls during construction activities.

The purpose of storm water management is to minimize any increase in storm water discharge volumes and peak velocities as well as reduce the amount of pollutants discharged after construction operations have been completed. The prevention of increased streambed scour and bank erosion and maintenance of physical and biological characteristics of receiving waters is an expected result of good management practices. Such practices can include:

- Flow attenuation features such as open vegetated swales, natural depressions, and detention/retention structures
- Outfall velocity dissipation devices
- Constructed wetlands
- Extended detention structures for water quality improvement

The SW3P should provide a description of the permanent storm water management practices utilized on the project.

2.10 Modifications to the SW3P

The SW3P is a working document and should not be considered a fixed plan within the contract documents. The most important aspect of the SW3P is that it functions properly, satisfies the intent of an SW3P, and conforms to applicable regulations. It is unlikely that an SW3P will remain unchanged during a construction project because:

- It is difficult to plan effective structural controls in the office
- It is difficult to foresee differing construction sequences and phases
- Plans and specifications cannot always account for different field conditions encountered

Therefore, it is imperative that the plan be continually evaluated and modified in the field if controls or practices are considered ineffective.

For projects under the EPA regulations, the SW3P need not be submitted with the NOI; however, the EPA may request submittal of the specific plan or plans. The EPA may

notify TxDOT that a plan does not meet one or more of the minimum requirements. If so, within seven days of notification, suitable modifications should be made to the plan and a written certification of the modification should be submitted to the EPA. Additionally, any procedures that have been undertaken but found ineffective or insufficient should be addressed by modifying the SW3P.