UNIT III
EROSION AND SEDIMENT CONTROL (ESC) SITE PLAN

INTRODUCTION

Comprehensive Site Planning

An Erosion and Sediment Control (ESC) site plan is a map(s) or drawing(s) that depicts information contained in the narrative. This plan should contain all of the necessary information for implementing, installing, and maintaining erosion and sediment control measures in the field. The site plan is the ESC "blue print" and should be used as a guide for the developer, contractor, and inspector.

LEARNING OBJECTIVES

1. To understand the development and implementation of an ESC site plan for a construction project.

2. To adequately review an ESC site plan and provide recommendations and comments according to the state Erosion and Sediment Control Law and Regulations (VESCLR) and the *Virginia Sediment and Control Handbook, 1992 Edition* (VESCH).

INSTRUCTION ELEMENTS

III.1 GENERAL GUIDELINES

Practice Standards and Specifications

Chapter 3 of the VESCH contains minimum state standards and specifications for conservation practices. Wherever any of these practices are to be employed on a site, the specific title and number of the practice should be clearly marked on the plan. By referencing the handbook properly, the site planner can reduce the need for lengthy descriptions of the practices in the plan. The plan should contain sketches and notes related to the installation and maintenance of the practices.

Modifications to state standard practices or new innovative conservation practices may also be employed, but such practices must be thoroughly described in detail to the satisfaction of the plan-approving authority. Variances from state standards should also be submitted at the time of plan submission.

Standard Practice Coding System

Site planners are urged to use the standard numbering and coding system for conservation practices contained in the VESCH. Chapter 2 contains a large fold-out chart which lists each practice with its designated number, symbol, and code. This chart can be placed on the wall for fast and easy reference. Use of this coding system will result in increased uniformity of plans and thus increase their readability to plan reviewers, job superintendents, and inspectors statewide.

III.2 EROSION AND SEDIMENT CONTROL SITE PLAN COMPONENTS

1. **Vicinity Map**

   Requirements:
   A small map locating the site in relation to the surrounding area. Include any landmarks which might assist in locating the site.

   Discussion:
   A small map should be included in the site plan. This allows for all people associated with the project to locate the site easily. Reproductions of topographic maps or county road maps are suitable. The route numbers must be clearly shown and that the location of the project must be marked. A north arrow is also important.

   Vicinity maps are helpful in the plan review process in identifying adjacent areas, potential traffic hazards, and environmentally sensitive areas.

2. **Indicate North**

   Requirements:
   The direction of north in relation to the site.

   Discussion:
   The site plan should be used as an inspection tool for ESC inspections, therefore, the plan needs to provide the orientation of site improvements and ESC controls. This facilitates identifying these locations on inspection reports. For example, an inspection report might indicate that "the silt fence on the west side of the project needs maintenance."
   Noting the direction on the site plan is also helpful for planning vegetative practices. Certain slope orientations, such as south facing slopes may be better suited for particular types of vegetation.

3. **Limits of Clearing and Grading**

   Requirements:
   Areas which are to be cleared and graded.

Discussion:
Determining the limits of construction is one of the first steps in determining the areas requiring erosion and sediment control practices. The limits of clearing and grading are essential in verifying compliance with the approved plan in the field. As previously stated, the total area disturbed is vital to nonpoint source pollution determinations. Also, having the limits clearly marked in the field may help to avoid potential complaints and property line dispute and litigation. The developer should physically mark off limits of land-disturbance on the site with tape, signs, or other methods, so that workers can readily identify areas to be protected.

4. **Existing Contours**

Requirements:
The existing contours of the site.

Discussion:
The existing contour lines of the site need to be shown to represent the existing pre-development site conditions. This pre-development topography is essential in determining drainage divides and patterns. It also alerts the reviewer to potential critical erosion areas, such as areas with steep slopes.

A small-scale topographic map of the site should be prepared to show the existing contour elevations at intervals from 1 to 5 feet depending on the slope of the terrain. Existing topographic maps (e.g., USGS or local government topos) can be a good starting point, however, the information should be verified by a field investigation. In addition, the contour interval on these maps is 20 feet, which does not provide enough detail for smaller, relatively flat sites.

Existing contours need to be shown in order to determine the cut and fill areas. This is important in determining if off-site land-disturbing activities will be involved in the project. It also assists the plan reviewer in determining if the proper ESC measures have been designed for the site.

5. **Final Contours**

Requirements:
Changes to the existing contours, including final drainage patterns.

Discussion:
A post-development, final site plan needs to be provided to determine final drainage patterns. This is critical in determining post-development runoff for Minimum Standard 19. If the drainage patterns have been changed by the development, are downstream properties being adversely affected? Are the channels adequate to covey the increased flows? Have pre-development sheet flows been changed into concentrated flows?

The final contours also provide the plan reviewer with information on cut and fill slope construction. Is Minimum Standard 7 being met? Are steep slopes proposed which will lead to stabilization problems?

6. **Existing Vegetation**

Requirements:

The existing tree lines, grassed areas, or unique vegetation.

Discussion:

It is important to note as many existing features as possible on the site plan. Development should be planned to preserve as much existing green space as possible. Buffer zones should be left in environmentally sensitive areas. It is imperative for the developer and contractor to have a clearly marked site plan in the field that delineates the vegetation or areas which are to remain undisturbed. It is also helpful to utilize the ESC practice of tree protection in these areas. Please refer to Chapter 3 of the VESCH for more information.

7. **Soils**

Requirements:

The boundaries of different soil types.

Discussion:

The soils information provided in the narrative needs to be plotted on the site plan. Soil types, conditions, and typography can vary greatly over a single project site. Crucial soils information, such as depth to bedrock, depth to seasonal water table, permeability, shrink-swell potential, and texture need to be mapped out on the site plan. Highly erodible soils will need additional protection to prevent erosion and

sedimentation. Land development and construction strategies should be based on this important information.

8. **Existing Drainage Patterns**

Requirements:

The dividing lines and the direction of flow for the different drainage areas. Include the size (acreage) of each drainage area.

Discussion:

This is one of the most essential aspects of the ESC plan. Most of the structural controls are designed based on drainage area size. Sediment traps and sediment basins are designed by the total drainage area coming to these structures. Also, the location of controls should be based on the flow path of the drainage area. It is much easier to

control erosion in each individual drainage area, than to control sedimentation project wide.

By identifying the existing drainage patterns, such as overland flow, swales and depressions, and natural watercourses, the developer can avoid those critical areas where water may concentrate. Utilizing the existing drainage to convey runoff is also the most economical means of stormwater management. However, if site development causes an increase in runoff, the existing channels need to be verified for erosive resistance and capacity in accordance with Minimum Standard 19.

9. **Critical Erosion Areas**

Requirements:

Areas with potentially serious erosion problems (see Chapter 6 of the VESCH for criteria).

Discussion:

The site plan needs to be clearly marked to show critical erosion areas in order to prevent degradation to live streams, erosion, sediment loss, and safety hazards. Potentially critical erosion hazards could include: steep slopes, long slope lengths, natural watercourses, springs, adjacent lakes or ponds, and highly erodible soils, as well as others.

A simple asterisk with an explanation will alert the developer in the field to the potential hazard and will help to prevent costly and environmentally damaging sediment loss. When possible, confine construction activities to the least critical areas. Any land disturbance in critically erodible areas will necessitate the installation of more costly control measures.

10. **Site Development**

Requirements:

Show all improvements, such as buildings, parking lots, access roads, utility construction, etc.

Discussion:

The ultimate development of the site must be taken into consideration when planning stormwater management strategies and verifying Minimum Standard 19. Large projects should be staged to avoid large areas of exposed soil.

If possible, careful planning with cluster development will minimize the amount of disturbed area, save money by concentrating utility lines and service connections in one area, and provide more open green space. The cluster concept not only lessens the area exposed to erosion, it also reduces runoff and generally reduces development costs.

11. **Location of Practices**

Requirements:

The locations of erosion and sediment controls and stormwater management practices used on the site. Use the standard symbols and abbreviations in Chapter 3 of the VESCH.

Discussion:

The proper installation of controls is necessary to ensure control of erosion and sedimentation. These controls must be designed based on a variety of conditions, including topography and drainage. The developer must have a clear and precise plan to follow in the field. The ESC inspector also relies on the practices outlined in the plan when inspecting the site to ensure that the proper measures are installed to prevent erosion and sedimentation.

12. **Off-Site Areas**

Requirements:

Identify any off-site land-disturbing activities (e.g., borrow sites, waste areas, etc.). Show location of erosion controls. (Is there sufficient information to ensure adequate protection and stabilization?)

Discussion:

An ESC site plan is required for any off-site disturbance which will result from the land-disturbing activity. This may be submitted for review in the initial stages of plan review, or when the need for such a disturbance is realized. Perimeter controls, such as construction entrances, sediment traps, diversions, sediment basins, or silt fence should be verified. Also, temporary and permanent stabilization measures are important in preventing erosion and sedimentation.

13. **Detail Drawings**

Requirements:

Any structural practices used that are not referenced to the VESCH or local handbooks, should be explained and illustrated with detail drawings.

Discussion:

Proper construction and installation of structural practices is critical to the success or failure of that control. To avoid misunderstandings and confusion, a detail drawing should be provided on the site plan sheet. In many instances the job superintendent or foreman may not have access to a VESCH on the site. A comprehensive ESC site plan will have all the information necessary to comply with the VESCLR. These detail drawings are available on an AutoCAD™ program from the Division of Soil and Water Conservation.

14. **Maintenance**

Requirements:

A schedule of regular inspections and repair of erosion and sediment control structures should be set forth.

Discussion:

The site plan should show specific maintenance requirements as they relate to the ESC controls outlined in Chapter 3 of the VESCH. The detail sheet of the site plan may be an appropriate place to illustrate these specifications. If sediment traps and/or sediment basins are employed, clean-out elevations should be clearly shown on the site plan.

III.3 EROSION AND SEDIMENT CONTROL MANAGEMENT

Good construction management is as important as structural and vegetative practices for erosion and sediment control, and there is generally little or no cost involved. Refer to Chapter 6 of the VESCH for more information on ESC planning.

Checklist (continued)

SITE PLAN

_____ Vicinity map - A small map locating the site in relation to the surrounding area. Include any landmarks which might assist in locating the site.

_____ Indicate north - The direction of north in relation to the site.

_____ Limits of clearing and grading - Areas which are to be cleared and graded.

_____ Existing contours - The existing contours of the site.

_____ Final contours - Changes to the existing contours, including final drainage patterns.

_____ Existing vegetation - The existing tree lines, grassed areas, or unique vegetation.

_____ Soils - The boundaries of different soil types.

_____ Existing drainage patterns - The dividing lines and the direction of flow for the different drainage areas. Include the size (acreage) of each drainage area.

_____ Critical erosion areas - Areas with potentially serious erosion problems. (See Chapter 6 of VESCH for criteria.)

_____ Site Development - Show all improvements such as buildings, parking lots, access roads, utility construction, etc.

_____ Location of practices - The locations of erosion and sediment controls and stormwater management practices used on the site. Use the standard symbols and abbreviations in Chapter 3 of this handbook.

_____ Off-site areas - Identify any off-site land-disturbing activities (e.g., borrow sites, waste areas, etc.). Show location of erosion controls. (Is there sufficient information to assure adequate protection and stabilization?)

_____ Detail drawings - Any structural practices used, that are not referenced to the ESC handbook or local handbooks, should be explained and illustrated with detail drawings.

_____ Maintenance - A schedule of regular inspections and repair of erosion and sediment control structures should be set forth.