

EROSION AND SEDIMENT CONTROL PLAN DESIGN

8.00 DESIGN STANDARDS

8.01 PURPOSE

Erosion and sediment control planning clearly establishes which control measures to use to prevent erosion and off-site sedimentation during construction. The Erosion and Sediment Control Plan (ESCP) shall serve as a guide for the location, installation, and maintenance of practices to control erosion and prevent sediment from leaving the site during construction.

Erosion and sediment control planning determines the measures which must be provided to prevent or minimize erosion and intercept and treat sediment laden runoff which occurs during construction and site stabilization. The ESCP specifies the measures identified during planning to prevent sediment deposition onto adjacent properties and into receiving waters. The ESCP also identifies measures to control volume, velocity, and peak flow rates of concentrated stormwater runoff on site and to meet the regulatory requirements relating to the quality, quantity and velocity of runoff leaving the site during construction. The permanent stormwater management facilities such as curbs, inlets, gutters, etc., incorporated in the project design to control runoff after construction is complete may be used as elements of the ESCP for use during construction.

In order to prevent pollution related to construction projects and meet state and federal requirements, the City of Springfield requires an ESCP for each project. The ESCP is submitted as a part of the Public Improvement Plans and is approved for construction by the City of Springfield. An approved ESCP is the primary document specifying the necessary requirements for minimizing impacts related to erosion and sedimentation and shall be available on the construction site for review.

8.02 ENGINEER RESPONSIBILITIES

An Oregon Registered engineer designs the ESCP based upon information provided from the plans and field conditions to determine which best management practices (BMPs) are appropriate for existing and anticipated conditions. A variety of BMPs shall be included on the ESCP in order to provide the contractor and inspector with adequate tools in the field.

The ESCP shall be designed and established to meet or exceed performance criteria set forth by all permitting agencies that have jurisdiction over the project. At a minimum, the Engineer of Record (Engineer) shall ensure that the ESCP and the activities on the construction site meet or exceed the performance standards within the most current National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit (1200-C permit) applicable to Springfield. It shall be the responsibility of the Engineer to apply for and obtain individual 1200-C coverage with the Oregon Department of Environmental Quality (DEQ) when the grading area of the project exceeds the current allowable area for automatic coverage under the 1200-CN general permit. In the event that multiple performance criteria are defined for one item, the most stringent criteria shall apply to the ESCP and the construction activity.

The Engineer is responsible, directly or through their designated inspector, for ensuring that the ESCP is functioning properly at all times and that the contractor and his/her subcontractors are correctly implementing the approved ESCP. In order to avoid delays and reaction time in the

field, the Engineer shall ensure all erosion prevention and sediment control items and the labor to install and maintain these items are included on the ESCP and in the contract. The approved ESCP is considered a set of minimum requirements and will frequently require adjustments in order to meet the required outcomes throughout the span of a project. It is the responsibility of the Engineer and their designated inspector to direct the contractor when changes to the ESCP are necessary.

8.03 ESCP PREPARATION

The ESCP serves as a blueprint for the location, installation, and maintenance practices to control erosion and prevent sediment from leaving the site during construction.

The following planning issues must be considered in preparing Erosion and Sediment Control Plans:

- Data collection (Section 8.03.1)
- Prevention vs. sediment control (Section 8.03.2)
- Assessing the project site (Section 8.03.3)
- Five basic rules (Section 8.03.4)
- Project scheduling (Section 8.03.5)

The City of Springfield recommends the Oregon Department of Environmental Quality's Erosion and Sediment Control Manual as a resource in developing and implementing an ESCP for site development. The manual can be found online at:

<http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

The Oregon Department of Transportation's (ODOT's) Erosion Control Manuals are also a useful resource. These manuals are based on the requirements of the National Pollutant Discharge Elimination System (NPDES) and may be more suitable in designing an ESCP for linear projects. They can be found online at:

http://www.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/erosion_control_manuals.shtml

8.03.1 Data Collection

An ESCP must contain sufficient information to describe the site development and the system intended to control erosion and prevent off-site impacts from sedimentation. The Engineer responsible for the ESCP shall inspect the site to verify the base map with respect to natural drainage patterns, drainage areas, general soil characteristics, and off-site factors. The base map must reflect such characteristics as:

- A. Soil types.
- B. Natural drainage patterns.
- C. Unstable stream reaches and flood marks.
- D. Watershed areas.
- E. Existing vegetation, noting special vegetative considerations.
- F. Critical areas such as steep slopes, eroding areas, rock outcroppings, and seepage zones.
- G. Critical or highly erodible soils that shall be left undisturbed.

The Engineer shall evaluate the data collected and identify:

1. Buffer zones.
2. Suitable stream crossing areas.
3. Access routes for construction and maintenance of erosion and sediment control devices.
4. Borrow and waste disposal areas.
5. The most practical sites for BMPs.

8.03.1.A Soil Types

The base map for the ESCP is prepared from a detailed topographic map. Obtaining a soils map from the local office of the USDA Natural Resource Conservation Service is encouraged, as transferring soil survey information to the topographic map is helpful for site evaluation.

The Lane County Soil Survey contains information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Great differences in soil properties can occur even within short distances. Soils may be seasonally wet, subject to landslides or flooding, or they may be shallow to bedrock.

These and many other soil properties that affect land use are described in the soil survey. Broad areas of soils are shown on a general soil map. The location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses.

8.03.1.B Precipitation Data

The occurrence and amounts of rainfall are important for the Engineer when deciding to what extent the erosion control measures must be used. Precipitation data may be found by contacting the National Weather Service West Coast Weather Observation at:

<http://www.wrh.noaa.gov/pqr/>

This web site provides historical weather data such as temperature, wind direction, relative humidity, and precipitation at various times of the year as well as detailed 7-day spot forecasts for all of western Oregon. Weather patterns must be considered when developing a construction schedule and selecting appropriate BMPs for the site.

8.03.2 Prevention vs. Sediment Control

The driving consideration in creating and implementing an effective ESCP is providing erosion prevention measures rather than sediment control. Although every ESCP will have elements of both, it is often far more cost effective and practical to emphasize erosion prevention. Erosion prevention measures are designed to prevent exposed soil particles from becoming dislodged by rain and wind, as well as construction activity and traffic. Such measures include stabilized construction roads, temporary ground covers (mulch, temporary grasses, straw mulch, tackifier, etc.), matting, plastic sheeting, and numerous other products designed to provide mechanical or physical protection to exposed soil. Sediment control involves techniques to remove transported sediment from runoff, where common control measures include sediment basins, sediment traps, sediment fences, check dams, bio-filter berms, catch basin filters, etc.

The benefit of erosion prevention is that it seeks to prevent the problem before it starts. It is also often impractical to recover large amounts of sediment after it becomes dislodged and suspended in runoff. On projects where the predominant soil particle size is very small (fine silts and

clays), the amount of time required to allow for settling the particles can reach days or even weeks. It is also generally true that erosion prevention measures are more reliable, whereas sediment control measures require continual and costly maintenance.

Because successful erosion control requires minimizing disturbed areas, the ESCP must emphasize scheduling and phasing. Project scheduling and phasing is often driven by factors other than erosion control, however, so contingency planning is essential. Most importantly, the ESCP must be designed and implemented as a living, dynamic plan that can be adapted to address changes in the project as work progresses.

8.03.3 Assessing the Project Site

The ESCP must seek to protect the soil surface from erosion; control the quantity, quality, and velocity of runoff; and capture all sediment on-site during each phase of the construction project. When assessing erosion control needs for the project, the Engineer shall note any of the following regulatory requirements, existing conditions, or construction conditions:

A. Regulatory Requirements

1. All requirements and conditions outlined in the current 1200-C General Permit issued by the Department of Environmental Quality shall be the minimum criteria used to evaluate the design and functionality of the ESCP developed by the Engineer for the specific site.
2. Requirements of other involved agencies such as ODOT or Lane County.
3. Special requirements by other permitting agencies such as the Oregon Department of Fish & Wildlife, Department of Environmental Quality, Department of State Lands, or the Army Corps of Engineers. Any permits required from other regulatory agencies for a project shall be obtained prior to the submittal of the ESCP. Copies of applications and permits shall be submitted with the ESCP.

B. Existing Conditions

1. Type and condition of existing vegetation.
2. Soil types expected.
3. Runoff flowing onto the construction site.
4. Swales or streams that run through the site.
5. Runoff that concentrates in swales or ditches.
6. Streams that could rise during high water flow.
7. Stormwater systems with inlets, which might receive sediment-laden water.
8. Outlets at culverts and other stormwater conveyances.
9. Permanent landscaping.

C. Construction Conditions

1. Construction traffic routes throughout the work site.
2. Runoff flowing onto the construction site.
3. Runoff that will flow onto disturbed areas having slopes 4H:1V or steeper.
4. Cut or fill slopes 3H:1V or steeper and higher than six feet.
5. Runoff leaving the disturbed areas as sheet flow.
6. Runoff leaving disturbed areas as concentrated flow
7. Exposed soils within 100 feet of a waterway or wetland
8. Disturbed areas of more than five acres that drain to a common location.
9. Disturbed areas of less than five acres that drain to a common location.

10. Stormwater systems with inlets that might receive sediment-laden water.
11. Outlets at culverts and other stormwater conveyances.
12. Permanent landscaping.

8.03.4 Five Basic Rules

Attention to the following five basic rules at the planning stage will develop a successful program:

- A. Timing - Schedule work to minimize overall impacts.
- B. Stage Work - Identify and process critical areas first, look at new drainage patterns created through phases of work.
- C. Minimize Disturbance - Create buffers and reduce mass grading.
- D. Pre-construction Planning - Identify construction sequences and lay out erosion control measures.
- E. Documentation - Photograph/video/record existing conditions prior to and throughout construction.

8.03.5 Project Scheduling

Following a specified work schedule that coordinates the timing of land disturbing activities and the installation of control measures is perhaps the most cost-effective way of controlling erosion during construction. The removal of ground cover leaves a site vulnerable to accelerated erosion. Construction procedures that limit land clearing, provide the timely installation of erosion and sedimentation controls, and restore protective cover quickly can significantly reduce the erosion potential of a site. The ESCP must indicate in each phase of the scheduled work how the proposed erosion/sediment control measures will divert flows, store flows, limit runoff from exposed areas, stabilize exposed soil, and filter sediment.

8.04 ESCP - DETERMINE APPLICABLE DESIGN ELEMENTS

The ESCP shall be developed according to the following general principles of erosion and sedimentation:

- A. Fit grading to the surrounding terrain.
- B. Time grading operations to minimize soil disturbance.
- C. Emphasize erosion control measures to stabilize disturbed areas.
- D. Retain existing vegetation wherever possible.
- E. Direct runoff away from disturbed areas.
- F. Minimize the length and steepness of slopes.
- G. Use energy dissipation devices to reduce runoff velocities.
- H. Install permanent stormwater facilities as soon as possible.
- I. Manage clean water to prevent it from coming into contact with exposed soil.
- J. Provide stabilized construction roads for all internal traffic.
- K. Clearly mark all restricted areas and natural features to be protected.

Keeping these design principals in mind, the following ten elements should be evaluated for every project. Erosion control measures must be chosen based on the elements that apply to the project.

Clearing Limits (Section 8.04.1)

Sensitive Area Restrictions (Section 8.04.2)

Surface Water Control (Section 8.04.3)
Perimeter Protection (Section 8.04.4)
Sediment Retention (Section 8.04.5)
Cover Measures (Section 8.04.6)
Inlet Protection (Section 8.04.7)
Traffic Area Stabilization (Section 8.04.8)
Dust Control (Section 8.04.9)
Permanent Ground Cover (Section 8.04.10)

8.04.1 Clearing Limits

Limiting site disturbance is the single most effective method for reducing erosion. Clearing limits prevent disturbance of areas not designated for clearing or grading, protect the natural environment, provide a buffer between disturbed areas and sensitive areas, and reduce the need for other erosion control measures. Clearing limits shown on the ESCP shall be clearly marked in the field.

Since clearing limits must be marked before ground disturbance occurs, the Engineer shall show the sensitive areas as "no work" areas on the ESCP, even when the "no work" areas are shown elsewhere in the plans. Sensitive areas and their buffers may require more substantial protection such as plastic or metal safety fences or stake and wire fences. High visibility construction fence (manufactured in orange instead of black) may serve the dual-purpose of both sediment control and delineation.

8.04.2 Sensitive Area Restrictions

Any project, regardless of size, that disturbs areas near or within a stream or associated buffer, a wetland or its associated buffer, or within 100 feet of a lake has the potential to cause serious damage to water resources. Projects along or near waterways may have special requirements that must be incorporated into the ESCP. Contact the City of Springfield or other applicable permitting agency for specific requirements.

Any permits required from other regulatory agencies for a project shall be obtained prior to the submittal of the ESCP. Copies of applications and permits shall be submitted with the ESCP.

When dealing with sensitive areas, the following recommendations shall be incorporated into the ESCP where appropriate:

- A. Prior to the wet season, a sediment control measure shall be constructed at an appropriate location in order to isolate the construction zone from the protected area.
- B. Runoff generated by decanting shall be directed through a sediment trap and/or the water released uniformly over a well-vegetated, relatively flat area. A well-vegetated area with dense grass or similar vegetation is a filter for the runoff to pass through. Since pumps are used for decanting, it may be possible to pump the sediment-laden water away from the surface water so that vegetation can be more effectively used for filtration.

The following items shall be considered and applicable items shall be included on the ESCP:

1. Specify the type, locations, and details of any measures necessary to comply with requirements to protect surface waters.
2. Specify the type, locations, and details of any measures necessary to comply with any

additional protection required for steep slopes.

8.04.3 Surface Water Control

Surface water controls collect and convey surface water to minimize erosion and may:

- A. Intercept runoff on and above disturbed slopes.
- B. Divert offsite runoff around project.
- C. Convey the runoff to a sediment trap, basin or stabilized outlet.
- D. Release the runoff downslope of any disturbed areas.

Surface water control measures include dikes, swales, ditches, pipe slope drains, and level spreaders. Interceptor dikes/swales intercept runoff and convey it away from disturbed ground. Ditches and pipe slope drains convey runoff through a site. Riprap or level spreaders dissipate the velocity of runoff and release it in a non-erosive manner. Vegetation lined channels are preferable to pipe slope drains whenever the channel gradient does not exceed five percent, vegetation can be adequately established, and the channel is accessible for maintenance.

Surface water controls should be constructed during the initial grading to prevent storm runoff from causing erosion. If the soils and topography are such that no offsite discharge of surface water is anticipated based on the ten-year six-hour storm, surface water controls may not be needed. When using vegetation-lined channels, they should be established early in the project. Irrigation may be required to establish a thick, dense stand of vegetation. Grass may require mowing and removal of the dead plant material to optimize its effectiveness. If vegetation cannot be adequately established, the channel should be protected with temporary measures such as matting or rock.

The following items shall be considered and applicable items shall be included on the ESCP:

- 1. Locate all pipes, ditches, and interceptor ditches and swales that will be used to convey stormwater.
- 2. Provide details sufficient to install and maintain all conveyance systems.
- 3. Indicate locations of outlet protection and provide detail of protection measures.
- 4. Indicate locations and outlets of any possible de-watering systems.
- 5. Indicate the location of any level spreaders, and provide details sufficient to install and maintain.
- 6. Provide all temporary pipe inverts.
- 7. Provide location and specifications for the interception of runoff from disturbed areas and the conveyance of the runoff to a non-erosive discharge point.
- 8. Provide front and side sections of typical rock check dams.

8.04.4 Perimeter Protection

Perimeter protection measures are so named because they are installed at the perimeter of disturbed areas. These measures either reduce runoff velocity, retain sediment while allowing water to pass, or collect runoff and direct it to a sediment trap or basin for treatment.

Perimeter protection can be used as the primary means of sediment removal when the catchment area is very small. It may be a secondary means of sediment removal, for instance, following a sediment trap or basin. Perimeter protection measures include sediment fences, sediment barriers, interceptor dikes and swales, and sediment traps and basins. Perimeter protection may

be used as the primary treatment when the flow path meets the criteria listed below. Otherwise, perimeter protection shall be used in combination with other measures.

Table 8-1: Criteria for Perimeter Protection as Primary Treatment

Average Slope	Flow Path Length
1.5H:1V or flatter	100 feet or shorter
2H:1V or flatter	115 feet or shorter
4H:1V or flatter	150 feet or shorter
6H:1V or flatter	200 feet or shorter

Conveyance of runoff from a construction site can more safely be achieved by:

- A. Utilizing and supplementing existing stable watercourses.
- B. Installing storm drains with stable outlets.
- C. Designing and constructing stable open channels.

The ESCP must indicate locations for these design facilities. Outlets for channels, diversions, slope drains, or other structures shall be completed and stabilized before installing perimeter protection measures. Impacts to existing facilities, if they are to be used for erosion control during construction, shall be evaluated.

The following items shall be considered and applicable items shall be included on the ESCP:

- 1. Specify the location and type of perimeter protection to be used.
- 2. Provide typical details sufficient for installation and maintenance of perimeter protection.
- 3. If a sediment fence is to be used, specify the type of fabric.

8.04.5 Sediment Retention

Sediment retention measures remove sediment from runoff by holding a volume of water for a length of time, allowing particles 0.02 mm and larger to settle out. Sediment retention shall be used as a last line of defense when included in an ESCP. Other design elements shall also be included in the ESCP to assure sediment from erosion is under control

When sediment retention is used by itself, the potential for catastrophic failures is high. Sediment traps are a common facility used for sediment retention. When a sediment trap is required, it shall be shown on the ESCP and the dimensions of each trap described on the sediment trap detail or plan sheets.

8.04.6 Cover Measures

Temporary and permanent cover measures protect disturbed areas. Covering exposed soils prevents erosion, thus reducing reliance on less effective sediment removal and is the only practical method of reducing turbidity. In ideal conditions, all disturbed ground not being worked shall be covered to prevent wind and water erosion.

Temporary cover protects disturbed areas not at finished grade or areas that will be re-disturbed later. Temporary cover methods include mulch, erosion control matting, plastic sheeting,

seeding, and sodding. Mulch and plastic sheeting protect disturbed areas from days to a few months. Plastic sheeting is most applicable to short-term stockpile protection and on slopes steeper than 1.5H:1V. Seeding and sodding protect unworked areas for months. Soil stockpiles should always be protected with plastic sheeting, tarpaulins, sediment fence, diversion dikes, or combinations thereof.

Permanent cover methods include seeding and mulching, erosion control matting with seed on steep slopes, riprap, gravel, bark mulch with tree and shrub planting, and sodding.

The following items shall be considered and applicable items shall be included on the ESCP:

- A. Specify the type and location of temporary cover measures to be used on site.
- B. If more than one type of cover is to be used on site, indicate the areas where each different measure shall be used, including steep cut and fill slopes.
- C. If the type of cover measures to be used will vary depending on the time of year, soil type, gradient, or other factors, specify the conditions that control the use of the different measures.
- D. Specify the nature and location of permanent cover measures. If a landscaping plan is prepared, this may not be necessary.
- E. Correctly quantify the required amount of the selected soil coverage BMPs by calculating the surface area of exposed soil.
- F. If erosion netting or blankets are specified, provide typical details sufficient for installation and maintenance.
- G. Specify the seed mixes, fertilizers, and soil amendments to be used, as well as the application rate for each item.

8.04.7 Inlet Protection

Inlet protection must prevent sediment from entering the stormwater systems by filtering runoff and retaining sediment before it reaches an inlet or stormwater system.

The following items shall be considered and applicable items shall be included on the ESCP:

- A. Indicate catch basins that are to be protected.
- B. Provide details of the catch basin protection sufficient to install and maintain.
- C. Consider potential traffic hazards when selecting applicable basin protection method.

8.04.8 Traffic Area Stabilization

Construction road and parking area stabilization reduces safety hazards caused by sediment on public right-of-way. It also reduces the amount of sediment that may enter the stormwater system by minimizing the amount of sediment transported off site. Stabilization is also an excellent form of dust control in the summer months. Construction entrances are needed to protect sediment from being tracked off site or onto paved surfaces.

The following items shall be considered and applicable items shall be included on the ESCP:

- A. Locate the construction entrance(s).
- B. Provide typical details sufficient for installation and maintenance of the construction entrance.
- C. Locate the construction roads and parking areas.
- D. Specify the measure(s) that will be used to create stabilized construction roads and

parking areas. Provide sufficient detail to install and maintain.

8.04.9 Dust Control

Dust control measures minimize the transport of soil by wind and traffic, thereby reducing traffic hazards and sediment deposition in water resources and on adjacent properties. Watering is the most common dust control used. Other methods include mulching, seeding, gravel, or spraying exposed areas with an approved dust palliative. Dust control shall be considered on the ESCP.

8.04.10 Permanent Ground Cover

Seeding is a part of work required on all construction projects with disturbed soil anticipated at the end of the construction season or conclusion of a project. Seeding activities may also include fertilizing, mulching, and soil testing operations that are necessary for vegetation establishment. Selecting the appropriate seed mixtures and rate of application is an essential part of the ESCP. Each project may have unique soil, climatic, or other environmental conditions, so it is recommended that an agronomist, horticulturist, erosion control specialist, or an Oregon Registered Landscape Architect provide recommendations.

8.05 ESCP DESIGN

The base map shall be plotted at the same scale as the rest of the roadway plans so important features such as swales and topography can be easily distinguished. The ESCP must be a separate section in a Public Improvement Project plan set as applicable. ESCP sheets shall be included in the sheet numbering sequence so that the total number of pages includes all ESCP sheets.

BMPs shall be designed to function under the conditions of a ten-year, six-hour storm event. For BMPs requiring design such as sediment ponds or traps, sizing calculations shall be submitted with the ESCP.

In the event that the ESCP is not too complicated and the plans can accommodate additional items without appearing confusing, the erosion control items can be incorporated into similar sections of the construction plans. (For example, the ESCP Notes may be included with the Standard Construction Notes.)

8.05.1 Base Map

The base map must include the following information:

- A. Alignment(s) showing stationing on control line.
- B. Names of roads and waterways.
- C. Rights-of-way and easements.
- D. Existing and proposed permanent stormwater facilities (culverts, pipes, etc.).
- E. Boundaries of natural drainage features and sensitive areas (lakes, swales, rivers, streams, wetlands, etc.).
- F. Cut and fill lines on major slopes (greater than 3H:1V).
- G. Existing and proposed ground contour lines (labeled).
- H. Roadway grades.
- I. Extent of surrounding development.
- J. Existing structures.
- K. Existing vegetation, shrubs, trees, etc. identified to remain or to be removed.
- L. Arrows indicating drainage patterns and flow directions in concentrated flow areas.

8.05.2 Erosion and Sediment Control Design using BMPs

To fully develop the ESCP, applicable design elements outlined in Section 8.04 should be added to the base map. A combination of BMPs shall be incorporated into the ESCP. A list of recommended BMPs can be found in the Oregon Department of Environmental Quality manual entitled *Best Management Practices for Storm Water Discharges Associated with Construction Activities* as well as in Appendices E and F of the DEQ Erosion and Sediment Control Manual. These resources provide information about each BMP, such as: basic design and construction, design considerations, efficiency, and maintenance. Each can be found online via the following links:

Best Management Practices for Storm Water Discharges Associated with Construction Activities: <http://www.deq.state.or.us/wq/stormwater/docs/nwr/constrbmps.pdf>

Appendix E: <http://www.deq.state.or.us/wq/stormwater/docs/escmanual/appxe.pdf>

Appendix F: <http://www.deq.state.or.us/wq/stormwater/docs/escmanual/appxf.pdf>

8.05.3 Complete ESCP

Following is a list of items that shall be included on each ESCP Plan Sheet.

- A. Sheet title.
- B. Sheet number (in the format Sheet X of Y).
- C. Signature block including name, address, and telephone number.
- D. Engineer's stamp & signature.
- E. North Arrow.
- F. Initials of engineer and drafter.

All ESCPs must contain the following sheets in the following order:

Cover Sheet (Section 8.05.3.A)

Detail Sheet(s) (Section 8.05.3.B)

Plan View Sheet(s) (Section 8.05.3.C)

8.05.3.A ESCP Cover Sheet

The following items shall be included on the first ESCP Sheet:

- 1. Vicinity Map
- 2. Standard ESCP notes (as stated in Section 8.06).
- 3. Special ESCP notes specific to site (if necessary).
- 4. Jurisdictional Requirements (ACOE, DSL, etc.).
- 5. General Construction Plan included staging of Erosion Control Measures.
- 6. Contingency Plan for critical area(s).
- 7. Total Project Areas.
- 8. Total Disturbed Area.
- 9. Soil Types including erodibility (Soil Conservation Service K value).
- 10. Symbol Legend.

8.05.3.B ESCP Plan View Sheet(s)

The following items shall be included on ESCP plan view sheets:

1. Base map as described in section 8.05.1.
2. Location of BMPs.
3. Erosion control construction notes and numbered reference bubbles.
4. References to standard or detailed drawings.

8.05.3.C ESCP Detail Sheet(s)

The following items shall be included on ESCP detail sheets:

1. Drawings and text detailing complete installation and maintenance instructions for BMPs used on project.

8.06 EROSION CONTROL CONSTRUCTION NOTES

The standard ESCP construction notes shall be included on the cover sheet of all ESCPs and shall not be altered. The Engineer may add additional notes and conditions specific to the ESCP.

Following are the standard ESCP construction notes:

- A. Approval of this ESCP does not constitute an approval of permanent road or stormwater system design (e.g., size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).
- B. The implementation of this ESCP and the construction, maintenance, replacement, and upgrading of these erosion and sediment control (ESC) facilities is the responsibility of the contractor until all construction is approved and the project is accepted by the City.
- C. In the event the ESC facilities identified on the ESCP are not functioning properly, the contractor shall be responsible for immediately implementing changes to the ESCP as directed by the Engineer or his/her inspector. The Engineer, the inspector or the City may stop all construction activity on site until the erosion problem is corrected and all ESC facilities are functioning properly. If the contractor does not immediately implement changes to the ESCP identified by the Engineer or his/her inspector, the City may implement the necessary changes and require payment from the contractor prior to project acceptance by the City.
- D. The boundaries of the clearing limits shown on this ESCP shall be clearly flagged by a continuous length of survey tape (or fencing, if required) prior to construction. During the construction period, no disturbance beyond the clearing limits shall be permitted. The contractor shall maintain the clearing limits for the duration of the construction.
- E. The ESC facilities shown on the ESCP shall be constructed prior to or in conjunction with all clearing and grading so as to ensure that the transport of sediment to surface waters, stormwater systems, and adjacent properties is minimized.
- F. The ESC facilities shown on this ESCP are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events and modified to account for changing site conditions (e.g., additional sump pumps, relocation of ditches and silt fences, etc.). All changes to the ESCP shall be noted on the contractors and inspector's approved ESCP plan set. One updated ESCP plan set shall be kept on site at all times.
- G. The ESC facilities shall be inspected daily by the contractor and maintained to ensure continued proper functioning. Written records shall be kept of weekly reviews of the ESC facilities during the wet season (October 1 to April 30) and of monthly reviews

- during the dry season (May 1 to September 30).
- H. Any areas of exposed soils, including roadway embankments, that will not be disturbed for two days during the wet season (October 1 to April 30) or seven days during the dry season (May 1 to September 30) shall be immediately stabilized with the approved ESC methods (e.g., seeding, mulching, plastic covering, etc.).
 - I. The ESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within twenty-four hours following a storm event.
 - J. At no time shall more than one foot of sediment be allowed to accumulate within a catch basin. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment-laden water into the downstream system.
 - K. Stabilized construction entrances and roads shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures, such as wash pads, may be required to ensure that all paved areas are kept clean for the duration of the project.
 - L. Any permanent flow control facilities used as a temporary settling basin shall be modified with the necessary erosion control measures and shall provide adequate storage capacity.
 - M. Where straw mulch for temporary erosion control is required, it shall be applied at a minimum thickness of two to three inches.
 - N. In preparation for the wet season, all disturbed areas shall be reviewed to identify which ones can be seeded in preparation for the winter rains. A sketch map of those areas to be seeded and those areas to remain uncovered shall be submitted to the City by September 15. The City can require seeding of additional areas in order to protect surface waters, adjacent properties, or stormwater facilities. Disturbed areas identified for seeding shall be seeded prior to the beginning of the wet season (October 1).

8.07 CONSTRUCTION SEQUENCE

A detailed construction sequence is needed to ensure that erosion and sediment control measures are applied at the appropriate times. Prior to scheduling the pre-construction conference, the Engineer shall identify approximate dates of proposed activities and submit it to the City for review and approval.

A recommended construction sequence is provided below:

- A. Conduct a pre-construction meeting.
- B. Flag or fence clearing limits.
- C. Install catch basin protection, if required.
- D. Grade and install construction entrance(s).
- E. Install perimeter protection (silt fence, brush barrier, etc.).
- F. Construct sediment ponds and traps.
- G. Grade and stabilize construction roads.
- H. Construct surface water controls (interceptor dikes, pipe slope drains, etc.) simultaneously with clearing and grading for project development.
- I. Maintain erosion prevention and sediment control measures in accordance with City of Springfield standards and manufacturer's recommendations.
- J. Update erosion and sediment control measures to handle major change in site conditions.
- K. Cover all areas that will remain undisturbed for more than seven days during the dry season or two days during the wet season with straw, wood fiber mulch, compost, plastic sheeting, or equivalent.

- L. Stabilize all areas within seven days of reaching final grade.
- M. Seed or sod any areas to remain undisturbed for more than 30 days.
- N. Upon completion of the project, stabilize all disturbed areas and remove BMPs if appropriate.

8.08 NARRATIVE

A narrative must accompany the ESCP for inclusion in the project file, and must explain the ESCP in detail. The narrative must be brief, clear, and concise while stating pertinent information. The narrative must include: the approximate construction schedule; ESCP staging; design dates; expected rainfall; expected runoff velocities; expected peak flows; soil types; total project area; and total disturbed area. It must discuss any particular concerns related to the project ESCP special areas including special environmental and jurisdictional requirements, steep slopes, highly erodible soils, etc., and how the concerns were addressed. The narrative must also address contingency plans to protect those special areas in case of failure of the ESCP.

The following items shall be considered when preparing a narrative:

- A. Estimated total project area (acres).
- B. Estimated total area disturbed (acres).
- C. Surficial soil types and erodibility (Soil Conservation Service K value).
- D. Runoff coefficients for disturbed areas.
- E. Estimated peak flows for the design storm runoff.
- F. Receiving waters.
- G. Jurisdictions within the project limits.
- H. State and local requirements incorporated into the ESCP.
- I. Special environmental considerations related to stormwater runoff.
- J. Anticipated concerns or possible problems.
- K. Information sources and/or contacts.
- L. Discuss special design features used for runoff control with average grades exceeding, three percent.
- M. Contingency Plan(s) for crucial areas.
- N. Sediment Basins (volume, infiltration rate, discharge rate, and time of retention).

8.09 ESCP REVIEW AND APPROVAL

The following items shall be submitted as a part of the public improvement plan sets for City review and approval:

- A. ESCP cover sheet as identified in Section 8.05.3.A.
- B. ESCP plan view sheet(s) as identified in Section 8.05.3.B.
- C. ESCP detail sheet(s) as identified in Section 8.05.3.C.

ESCP sheets shall be included in the sheet numbering sequence so the total number of sheets includes the ESCP sheets. The Engineer may include the letters “EC” before the page number to distinguish the erosion control plan sheets from the other plan sheets within in the Public Improvement Project (i.e. if the ESCP sheets start on page 11, the sheet may be numbered “EC11”).

The following items shall be submitted concurrently with the Public Improvement Project plan sets:

1. A narrative as described in Section 8.08.
2. Sizing calculations for and applicable BMPs proposed on the ESCP.
3. Copies of permits and applications made to permitting agencies with jurisdiction over the project (i.e. Army Corps of Engineers/Division of State Lands permits for a site with wetlands).

Since the ESCP is included in the Public Improvement Project plan set, the City will review and approve all required ESCP material concurrently with the improvements. Comments and required modifications will be addressed at the same time and in the same fashion as the other portions of the construction drawings.

The Construction Sequence with approximate dates as detailed in Section 8.07 shall be submitted prior to scheduling a pre-construction meeting.