

## **CHAPTER 6**

### **INSPECTION AND MAINTENANCE**

Erosion and sediment control measures are required for the sole purpose of protecting sensitive areas such as: streams, rivers, lakes, and wetlands. Check with local jurisdiction for specific requirements, permits and inspection. Inspection and Maintenance of ESC measures throughout the life of the project are imperative to ensure their performance. Unless the measures are properly installed and maintained, there is a strong chance of failure during the construction period.

#### **6.1 Permittee Site Inspector**

Larger more complex construction sites such as: subdivisions, commercial, and highway projects require ongoing, very detailed inspection and maintenance for longer periods of time. For that very reason alone, pre-construction meetings are vital and should be scheduled prior to any clearing, grading, or utility activities. Equally important is who should attend. Along with the inspector and engineer, the contractors grading and utility superintendent should be present.

The owner of the site shall designate a competent person as Permittee Site Inspector (PSI), Inspections must be conducted by a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact stormwater quality, is knowledgeable in the correct installation of the erosion and sediment controls, and is able to assess the effectiveness of any sediment and erosion control measures selected to control the quality of stormwater discharges from the construction activity. The PSI shall be responsible for assuring the implementation of the ESCP and have the authority to immediately mobilize necessary personnel and equipment to correct and modify erosion prevention and sediment controls when required.

Duties of the PSI include:

- Provide name and 24-hour contact information of PSI
- Manage and insure proper implementation of the ESCP.
- Accompany the Agency in a field review of the ESCP prior to the beginning of work.
- *Inspection:*
  - Active Period – Daily when stormwater runoff, including runoff from snowmelt, is occurring.
  - Prior to the site becoming inactive or in anticipation of site inaccessibility – Once to ensure that erosion and sediment control measures are in working order. Any necessary maintenance and repair must be made prior to leaving the site.
  - Inactive periods greater than seven (7) consecutive calendar days – Once every two (2) weeks.
  - Periods during which the site is inaccessible due to inclement weather – If practical, inspections must occur daily at a relevant and accessible discharge point or downstream location.
- Mobilize crews to make immediate repairs to the controls or install controls during working and non-working hours.

- Complete erosion control monitoring forms after each inspection.
- Maintain up to date ESCP throughout the life of the project, available for review upon request.
- Prepare a contingency plan in preparation for emergencies and the rainy season.
- Accompany the Agency on inspections and, if requested, on inspection made by other regulating Agencies.

### 6.1.1 Ineffective Controls

The PSI shall record measures to clean up significant amounts of sediment. Should a control measure not function effectively, one or more of the following tasks should be performed.

- Immediately repair the control.
- Replace the control.
- Provide additional controls.

### 6.2 Pre-Construction Meeting

The PSI, contractor and inspector should carefully review the ESCP prior to the pre-construction meeting to understand what is required. Implementing the ESCP and assuring its performance may involve significant expense. The following pre-construction activities should be required.

- Prior to the pre-construction meeting, review and comment of the ESCP.
- During the pre-construction meeting, review all comments and concerns.
- Prohibit clearing and grading operations prior to ESCP approval and implementation.
- Tentatively locate construction accesses.
- Delineate clearing limits, drainage courses, easements, setbacks, wetlands, and other sensitive areas and their buffers.

The pre-construction meeting provides an opportunity for the contractor to discuss the plan with the inspector and learn which elements of the ESCP deserve the most attention. Adjustments to improve performance or make installation easier and maintenance more reliable may also be discussed.

The pre-construction meeting is also an opportunity to discuss the inspection schedule and procedures. Key points to consider in the pre-construction meeting are:

- Pollution Control Plan for contractor operations.
- Qualifications of individuals designated as competent person for ESCP.
- Method to be used to document the up-to-date ESCP.
- Adjacent areas that need special protection from sedimentation, particularly environmentally sensitive areas such as wetlands, stream crossings, channel, and water disposal outlets.
- Discuss drainage aspects of the site (both pre and post construction).
- Location of erosion and sediment control practices and their implementation.
- Sequence of installation with respect to the construction schedule.
- Surface stabilization plans, temporary and permanent seeding.
- Construction schedule and any anticipated shutdown periods.
- Maintenance plans and the contractor's procedure for monitoring performance.

- Location of all borrow and disposal areas.
- Emergency or contingency plans.
- Any special requirements identified in permits.
- Monitoring form used and availability.
- Biological Assessment – this report comes from the consultant and cover special needs and concerns for threatened and endangered species on the project, the contractor should be aware of its contents.

### **6.2.1 Modified ESCP**

All projects will include a prepared ESCP. This plan may require a registered engineer's approval. This plan is only a guide and is unlikely to have addressed all erosion problems for the project adequately. The ESCP included in the plan set should not be followed blindly. It is the owner or PSI responsibility to propose modifications to the plan.

In addition, effective erosion control is closely tied to a contractor's staging, operation methods and construction timing. When the ESCP is developed the contractor's staging and operation methods are unknown. Therefore, it is expected that changes to the ESCP be updated throughout the life of the project. As modifications to the ESCP take place, it is extremely important to secure the interest of all parties. Communications between the contractor, designated person and inspector is vital.

Depending upon the level of modification, the design engineer is responsible for submitting those changes to the local jurisdiction. Regardless of the magnitude, a contingency plan must be implemented immediately. Minor modifications to the ESCP such as installing small sections of sediment control barriers, can be field adjusted and hand written on the plans. On 1200-C permitted projects, an Action Plan or approved equivalent is required for any change to the approved ESCP. Check with DEQ or DEQ's Local Agent for specific requirements.

### **6.2.2 Construction Schedule Review**

The implementation of the construction schedule should include the following.

- Timing of activities to limit seasonal and weather impacts.
- Timing of wet season work and temporary work shut down.
- Time of activities to meet "in-water" work restrictions.
- Erosion prevention and sediment controls shown on the plans should be installed before ground-disturbing activities begin.
- Permanent facilities, such as sediment traps and basins, which will be used during construction as temporary measures should be installed.
- Retention of temporary perimeter controls until all upstream areas are finally stabilized.
- Timing of soil stabilization such as seeding, planting, etc.

### **6.2.3 Monitoring Form**

On all development sites inspections are to be recorded and readily available. The effectiveness of each BMP at every location on site should be documented on the form, and general observations on site conditions should also be recorded. Information provided on the form is

useful for tracking repairs and demonstrating permit compliance. It is noteworthy that in the event of permit violations or subsequent enforcement actions, the information recorded on the form, along with photographs and videos, may be used to evaluate the responsibility of involved parties.

### 6.3 Materials (Qualified Products List)

The purpose of this manual is to provide cost effective, environmentally sensitive management of erosion through a qualified products list (QPL). This manual illustrates materials that have been approved based on geographical controls such as, climate and soil type. In addition, approvals of all materials listed on a QPL were field tested through demonstration projects and reviewed for their performance. New materials not listed in this manual will be approved based on equal to or greater than criteria.

### 6.4 Installation

It must be understood that installation is equally important to the value and success of the materials. If installed incorrectly, even the best materials will fail causing more damage and additional expense to the project. For this reason alone, installation procedures should be followed very closely.

Installation of all base measures shall be inspected by Permittee Site Inspector and any deficiencies corrected prior to the start of land disturbing activities. Subsequent inspections of any additional installations should also be made throughout the life of the project as needed. Base measures may also be required to be inspected by the local jurisdiction with erosion control authority.

The inspector, contractor or PSI should be familiar with installations details for each BMP used on the project. Details for the installation of all specified BMP's should be provided in the ESCP. Installation details for BMP's are also provided in Chapter 4 of this manual.

### 6.5 Inspection Requirements

The owner or designated person (PSI) shall be required to provide ongoing inspection of erosion and sediment control measures throughout the life of the project. Inspections shall be recorded on an approved monitoring form.

Minimum inspection requirements shall be as follows:

- **Active Period** – Daily when stormwater runoff, including runoff from snowmelt, is occurring.
- **Prior to the site becoming inactive or in anticipation of site inaccessibility** – Once to ensure that erosion and sediment control measures are in working order. Any necessary maintenance and repair must be made prior to leaving the site.
- **Inactive periods greater than seven (7) consecutive calendar days** – Once every two (2) weeks.

- **Periods during which the site is inaccessible due to inclement weather** – If practical, inspections must occur daily at a relevant and accessible discharge point or downstream location.

### 6.5.1 Inspection of Work Restriction Areas

All construction projects are required to restrict certain types of work, which may contribute to sediment-laden water leaving the project boundaries or entering waterways. The following work restrictions need to be inspected prior to the start of work and throughout the life of the project.

- 1) **Flag Clearing Limits:** Construction site clearing limits will be clearly flagged in accordance with the approved plans. No ground disturbance is permitted beyond the flagged boundary. Flagging should be maintained for the duration of construction.
- 2) **Perimeter Controls before Grubbing:** all appropriate perimeter controls should be installed prior to any major site grubbing operation. Perimeter controls include interceptor ditches, berms infill areas, and sediment fences along the banks of existing streams and toes of slopes.
- 3) **Wet Season Plan and Schedule:** Prior to wet season construction work and before temporary work suspension for winter, the contractor, or designated person should meet with the Agency to review and update the ESCP and to develop a schedule to assure that appropriate controls are implemented and maintained during the wet season work and suspended periods.
- 4) **Limit Disturbed Areas:** If soil erosion and sediment resulting from construction activities is not effectively controlled, the Agency will limit the amount of disturbed areas that can be effectively controlled.
- 5) **Install BMP's Early:** Erosion and sediment control features should be incorporated into the projects at the earliest practicable time. All erosion and sediment control measures should be installed according to the approved implementation schedule and with these specifications.
- 6) **Stop Work:** Failure to control erosion and or pollution shall be cause for the Agency to stop all construction work until measures have been taken to bring all construction into compliance with these specifications.

### 6.6 Stabilization Requirements

All soils that are exposed and disturbed by construction-related activities should be stabilized according to the following time frames.

- All seeding applications must be completed and established prior to wet weather season
- Wet weather season – October 1<sup>st</sup> through May 31<sup>st</sup>
- Soils exposed during wet weather season as a result of construction must be covered at the end of each day

### 6.7 Erosion Control Contingency Items

It is a requirement that all construction sites have materials on hand as a contingency in the event of a failure or when required to shore up BMP's installed as part of the ESCP.

The contingency items may also be used at the discretion of the project inspector to strengthen the erosion control measures as needed during construction.

The following are examples of materials to be kept on the project site for use in emergencies.

- 100 ft of sediment fence
- 260 sq. ft. of plastic sheeting
- 1,000 ft of rope
- 50 empty sand bags (to be filled as needed)
- 10 bales of straw (used for ground cover)
- 10 bio-filter bags with stakes

### **6.8 Maintenance**

Erosion and sediment controls must be maintained in good working order at all times in order to function as intended. These controls must be maintained in place until the Agency issues notification of acceptance of permanent stabilization.

Typical maintenance activities, guidelines and failure modes for BMP's are discussed in Chapter 4 of this manual. The inspector should be familiar with maintenance requirements for each BMP used on the project. It is noteworthy that maintenance activities and frequencies vary among the different BMP's and will depend largely on weather and other site conditions. In general, the more effective erosion prevention measures are, the less maintenance will be required for sediment controls.

#### **6.8.1 Sediment Removal**

Sediment shall be removed and the controls upgraded or repaired as outlined in Chapter 4 BMP maintenance, or as directed. In the event of continuous rainfall over a 24-hour period, or other circumstances that preclude equipment operation in that area, additional sediment control shall be hand-carried and installed in accordance with best management practices and as approved by the Agency. Sediment shall be removed from controls such as sediment fences, sediment barriers, check dams, inlet protection, and sediment traps when the sediment buildup has reached 1/3 the exposed height of the control or storage depth. Rock filters and filter berm material shall be replaced with new rock material when sediment reduces the filtering capacity by 50 percent. Rock or other material specified shall be added or removed as needed to maintain proper function of the entrance areas. All paved areas shall be kept clean (by mechanical means) for the duration of the project.

#### **6.8.2 Sediment Disposal**

Removed sediment shall be placed in a non-erodible area within the construction site, or removed and disposed of off site in accordance with all federal, state, and local laws and ordinances. Sediment-laden water shall not be flushed into the storm water system.

### 6.9 Inspection Checklist

The sample Inspection Checklist included in Appendix B may be used by Agency representatives when inspecting erosion and sediment controls on a project site. The checklist is intended to summarize the key elements of a successful erosion and sediment control program. Topics on the checklist include:

- Schedule Review
- Erosion and Sediment Control Plan
- Erosion and Pollution Control Manager
- Sensitive Areas
- Contingency Plans
- Materials On-Hand
- Maintenance
- Monitoring Forms
- Slope Protection and Stabilization
- Plan Revisions and Modifications
- BMP Evaluation
- Additional Items

#### 6.9.1 Winterization

The wet weather period is October 1 through May 31. Prior to wet weather period work and before consideration of work suspension for winter, the contractor should meet with the Agency to review and update the ESCP and to develop a schedule to assure that appropriate controls are implemented and maintained during wet season and during any possible work suspension periods. Winter preparations should begin several weeks prior to wet weather season. Refer to Chapter Four for information on common best management practices.

#### 6.9.2 Designer/Inspector Tool Box

Several worksheets are provided in Appendix C to aid designers and inspectors in determining and verifying the quality and quantity of various erosion control items. These are especially useful when verifying the application rates of various mulch and hydraulically applied products. Appendix C includes the following.

- Slope Inclination Conversions
- Metric Conversions Table
- Straw Mulch Application Worksheet
- Hydraulic Application Equations
- Wood Fiber Mulch Hydraulic Application Worksheet
- Seed / Fertilizer Hydraulic Application Worksheet
- Hydraulic Application Example Problems

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