Certified Inspector of Sediment and Erosion Control Training Manual

(2022 Revised Edition V8 – Canada)

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ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

TRAINING MODULES

CISEC, Inc.

Dedicated to Educating and Certifying Sediment and Erosion Control Inspectors

Introduction

Introduction

Introduction

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Introduction

Table of Contents

Introduction

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Introduction

WHAT IS THE CISEC, INC. PROGRAM?

The Certified Inspector of Sediment and Erosion Control (CISEC) Program is a training program administered by the non-profit organization CISEC, Inc., based in Parker, Colorado. The program was introduced in 2005 and recognizes the abilities, skills, experience, and knowledge of inspectors who have demonstrated their proficiency in observing, inspecting, and reporting on the implementation of Storm Water Pollution Prevention Plans (SWPPP), as they are known in the United States, or Erosion and Sediment Control Plans (ESC Plans) as they are referred to here in Canada. The program was introduced to Canada in 2011 and is known as the Canadian CISEC Program (CAN-CISEC).

CAN-CISEC Mission Statement

To provide an inspector certification program for individuals that:

- Demonstrate comprehensive knowledge in the principles and practices of sediment and erosion control and their applicability to the development of erosion and sediment control plans.
- Demonstrate the necessary skills to observe onsite and offsite conditions that impact the quality of storm water discharges from active construction sites.
- Demonstrate the ability to inspect installed best management practices and their ongoing maintenance to determine if the mitigation measures will minimize the discharge of sediment and other pollutants from active construction sites.
- Demonstrate the ability to communicate and report on their inspection of active construction sites as to whether compliance issues may exist with federal, provincial and/or local regulators.

Who Can Become a CAN-CISEC?

CISEC Inc. defines a Certified Inspector of Sediment and Erosion Control as an individual who has demonstrated his or her proficiency in observing, inspecting, and reporting on the implementation of ESC Plans.

In the CISEC, Inc. Program, a candidate wishing to write the CAN-CISEC exam must have the requisite education and work background and be able to provide proof of such in the form of documentation and references. The current background criteria are:

- Two or more years of construction site field experience involving erosion and sediment control and/or stormwater pollution prevention,
- A complete understanding of erosion and sedimentation processes and how they impact the environment,
- A complete understanding of key Canadian federal, provincial and local regulations,
- The ability to read and understand construction site stormwater management and ESC plans; and
- The ability to communicate and write complete and accurate inspection reports.

What is a CAN-CISEC-IT?

If an individual does not have the above qualifications to become a CAN-CISEC, they have the option of becoming a Canadian Certified Inspector of Sediment and Erosion Control In-Training (CAN-CISEC-IT). A CAN-CISEC-IT has four years to obtain the above requirements to become a full CAN-CISEC registrant.

Introduction

CERTIFICATION RENEWAL REQUIREMENTS

CAN-CISEC Registrant:

Once an inspector is certified as a CAN-CISEC, an annual certification fee is payable to CISEC, Inc. on a yearly basis by the end of the month a registrant was certified in. An email notification will be sent out to registrants prior to their due date. Certification, or contract renewal, occurs every year by demonstrating the completion of at least 12 Professional Development Hours (PDHs) within the 1-year period, by adhering to the CAN-CISEC Code of Ethics, and by remaining current with the annual certification fee.

CAN-CISEC-IT Registrant:

Once an inspector is certified as a CAN-CISEC-IT, an annual certification fee is payable to CISEC, Inc. on a yearly basis by the end of the month a registrant was certified in. An email notification will be sent out to registrants prior to their due date. Certification, or contract renewal, occurs every year by adhering to the CAN-CISEC-IT Code of Ethics, and by remaining current with the annual certification fee. Professional Development Hours (PDHs) are optional and if submitted will be counted towards the first year's renewal as a full CAN-CISEC registrant.

Introduction

UNDERSTANDING THE POTENTIAL IMPACTS OF CONSTRUCTION ACTIVITIES

Environmental Impacts

It can be easily forgotten that the construction activity humans perform every day can impact the natural environment in varying degrees. No matter how minimal one impact is, it must be considered and it is the cumulative effect of multiple impacts that can have detrimental consequences for the natural environment.

Here are a few examples of the kinds of environmental impacts that can occur:

- Eroded soil and other construction site pollutants (e.g., concrete wash) degrade water quality, impact fish, fish habitat, invertebrates, and overall stream ecology,
- Channelization and infilling of watercourses can reduce navigation, by both humans and aquatic species,
- Increased hardened surfaces increase runoff to natural features and in turn increase the potential for flooding,
- Scouring, erosion and undercutting of watercourse banks can occur due to additional flows received from hardened surfaces resulting from development and construction activity; and
- Fish and fish habitat can be damaged due to the release of deleterious substances into local receiving watercourses. This can be directly from a spill or breach in ESC measures, or indirectly through storm water management pond release.

These are just some of the potential impacts associated with construction and/or development activities. The source material released from a construction site to a natural feature determines the type of impact that results.

Source materials that can be released from construction sites include eroded soils (coarse and/or fine material), hydrocarbons, paint wash, concrete slurry, garbage, fertilizers, solvents, etc. Remember how many trades work on these sites and what they bring in with them, or what they require to complete their work. It isn't just about grading and excavating activities, but also road, sidewalk, house, and utility construction.

Release of materials from a construction/development site to a local watercourse can have significant, long-term impacts. Once a material is released it will eventually deposit.

Introduction

Potential Impacts to Fish and Fish Habitat

Once this material is deposited in a watercourse, the effects on fish and fish habitat can be as follows:

- The material may cover the substrate that is used by particular fish species for spawning beds, leaving that reach of the watercourse now unsuitable for spawning,
- The material can smother and eventually destroy aquatic vegetation, which is relied upon by many species that make up the ecology of the watercourse,
- The material may cover used spawning beds, smothering any eggs that are present, and thus reducing their chances of survival,
- The material, while still in solution, can clog the gills of fish and damage fish membranes; and
- The material, while still in solution, reduces the ability of many fish to hunt, as water quality is impaired and many fish feed by sight (e.g., Redside Dace).

The accumulation of all of the potential effects noted above results in the overall reduction of the diversity and abundance of aquatic organisms and increases physiological stress on all entities of the system. By impacting the overall ecology of the watercourse, many species can be lost as the food for which they depend, disappears, and a chain reaction occurs.

Some fish species are more sensitive to water clarity than others. As mentioned above, Redside Dace is a sight feeder and therefore if the water is turbid, it cannot see prey to eat. This species is protected by Provincial legislation in some provinces (i.e., Endangered Species Act, in Ontario).

Impacts to Wetlands and Woodlots

Impacts are not only seen in watercourses, but in wetlands and woodlots as well. Wetlands are often described as nature's filter and are home to thousands of types of vegetation, bird, aquatic, and mammal species. Not unlike a watercourse, disruption to one portion of the ecosystem has a chain reaction. An example of disruption is the release of sediment from a construction/development site into a wetland, which will smother the vegetation and can fill in water pockets. Wetlands mature and become less saturated over time (a very, very long time) and deposition of soils can accelerate this natural process, resulting in the immediate displacement of species due to loss of habitat.

Woodlots can also experience severe damage resulting from sedimentation. Should the sediment being deposited be foreign in nature, there can be introduction of non-native or invasive species of plants and insects. Additionally, if large volumes of sediment are released, roots can become compressed resulting in tree fatality; or rodents and small mammals that nest and forage in the forest floor will lose the use of these areas as they are destroyed and filled in.

Introduction

Essentially, it is important to remember what sensitive environmental features need protecting from activities on your construction site. You are inspecting sediment and erosion controls, for the purpose of protecting the surrounding natural features and their function.

Economic Impacts

The economic impacts associated with site material release cannot be forgotten. Should any of the environmental or fish-related impacts described above occur, there will be a requirement for restoration or remediation.

Watercourses, wetlands, and woodlots that experience deposition and are impacted, must be restored. In addition to charges and fines that may be issued, additional costs can be incurred as a result of:

- Requirements for sediment removal,
- Requirements for restoration and stabilization,
- Construction delays and stop work orders,
- Charges and fines; and
- Ecosystem habitat reconstruction.

Introduction

INSPECTION EXERCISES

Introduction

Land Development Projects

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.
1.	
2.	
3.	
4.	

Introduction

Big Box Projects

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.
1.	
2.	
3.	
4.	

Introduction

Vertical Development Projects

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.
1.	
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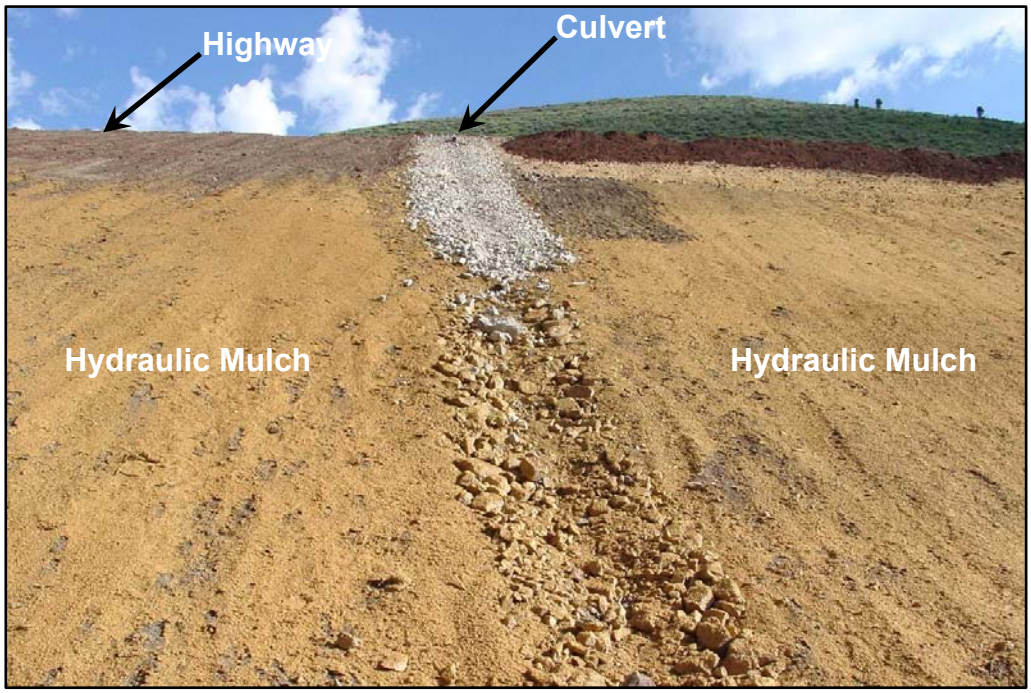
Introduction

Linear Projects



Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.
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Background of an Inspector

Module 1

Background Information for Inspectors

Background of an Inspector

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Background of an Inspector

Table of Contents

Background of an Inspector

Background of an Inspector

OBJECTIVES OF MODULE 1

To review:

- Key definitions
- Types of erosion
- Factors affecting erosion rates
- Topographic maps
- Basic hydrology
- Understanding BMPS
- ESC reports & plans
- Define the roles and responsibilities of an inspector
- Define the purpose of and the components of inspection reports
- Discuss the importance of good documentation and communication
- Review the CISEC, Inc. Code of Ethics

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TYPE OF CONSTRUCTION ACTIVITIES

Large Land Development

- Topsoil stripping
- Phased Construction
- Grading
- Hillsides and steep slopes
- Utilities
- Preparation for additional construction activities

Vertical

- Multi-family and single-family residence construction projects
    - Small sites
- Mass chaos
- Builder responsibility
    - Multiple subcontractors

Big Box

- Commercial/industrial buildings
- Mass Grading
- Mass chaos
- Complete Site Development at one time
- High profile (highly visible)

Linear

- Roadway, utilities, and stream corridors
- Long narrow site
- Mass chaos
- Limited site access control (traffic passing through)
- Active portion of the site is constantly changing (moving)

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ASSESSING YOUR BACKGROUND

Circle the correct answer

1. Sediment is a major pollutant of our national rivers and streams and excessive amounts have a direct impact on aquatic life.	**True or False**
2. Sediment control BMPs (e.g., silt fence barriers) remove all suspended particles found in runoff waters.	**True or False**
3. Inspectors should always tell contractors what type of BMPs to install on a project when noncompliance problems are found.	**True or False**
4. Good sediment control results in good erosion control.	**True or False**
5. Storm drain inlet protection practices remove all sediment in runoff waters and allow clean water to flow into the drainage system.	**True or False**
6. Saltation is a form of wind erosion.	**True or False**
7. The most effective method for sediment control involves containing sediment laden runoff waters for sufficient time to allow heavier suspended particles to settle.	**True or False**
8. It is not cost effective to implement erosion control methods while construction activities are occurring.	**True or False**
9. Inspectors do not need to know much about hydrology.	**True or False**
10. The motto of an inspector is to observe, inspect, and report, but never to mandate.	**True or False**

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DEFINITIONS

The ultimate goal on construction sites is to reduce the amount of pollution leaving a construction site to the maximum extent practicable.

Types of Erosion

The processes by the action of water, wind, or other weather conditions in which soil particles are displaced.

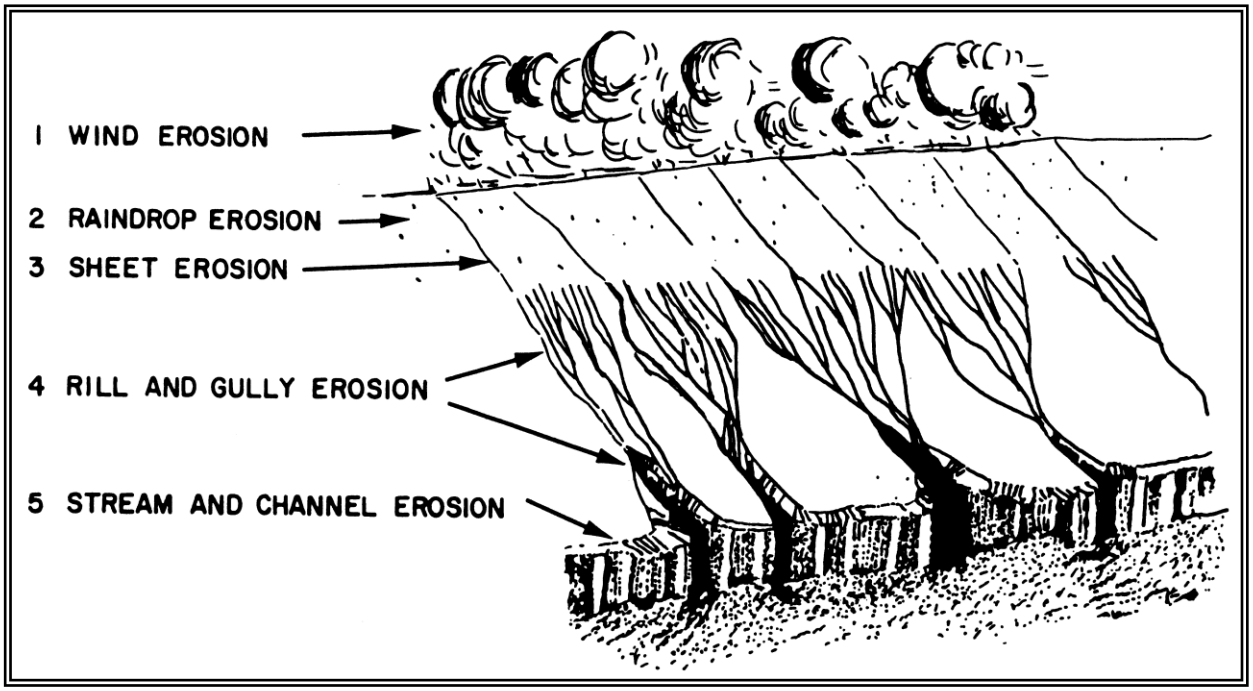

Figure 1 Illustration of types of erosion (from SCS, 1978)

Natural Versus Accelerated Erosion

Soil erosion and deposition are natural geomorphic processes that give shape to landforms and provide new parent material for the development of soil profiles.

Erosion is in fact responsible for the formation of some of the most beautiful and well-known geographical features in the world (e.g., Grand Canyon).

Accelerated Erosion: These processes become soil conservation issues when the rate of erosion greatly exceeds the rate expected in the absence of human land use —a situation referred to as accelerated erosion. Rates of normal soil erosion have been estimated from measurements of sediment transport, accumulation, and mass movement on hill slopes.

Wind Erosion

The movement of soil particles physically dislodged by wind or after disturbance by other particles.

1. Surface creep is the rolling and sliding movement of particles across a surface.
   a) These particles generally have a diameter in excess of 1,000 μm (0.04 in.)

b) Represents about 5% to 25% of the total soil loss by wind.

2. Saltation is the hopping and bouncing movement of particles.
   a) Particles are lifted into the atmosphere but return to the ground and dislodge other particles.
   b) These particles typically have diameters ranging from 80 μm to 1,000 μm (0.003 to 0.04 in.) and are lifted by the wind. However, their larger mass results in their returning to the ground, which causes additional dislodging of particles.
   c) Represents about 50% to 80% of the total soil loss by wind.

3. Suspension occurs when particles smaller than 80 μm (0.003-in.) in diameter are carried great distances by the wind.
   a) These particles can remain suspended for long durations and can travel great distances. Represents less than 10% of total soil loss by wind.

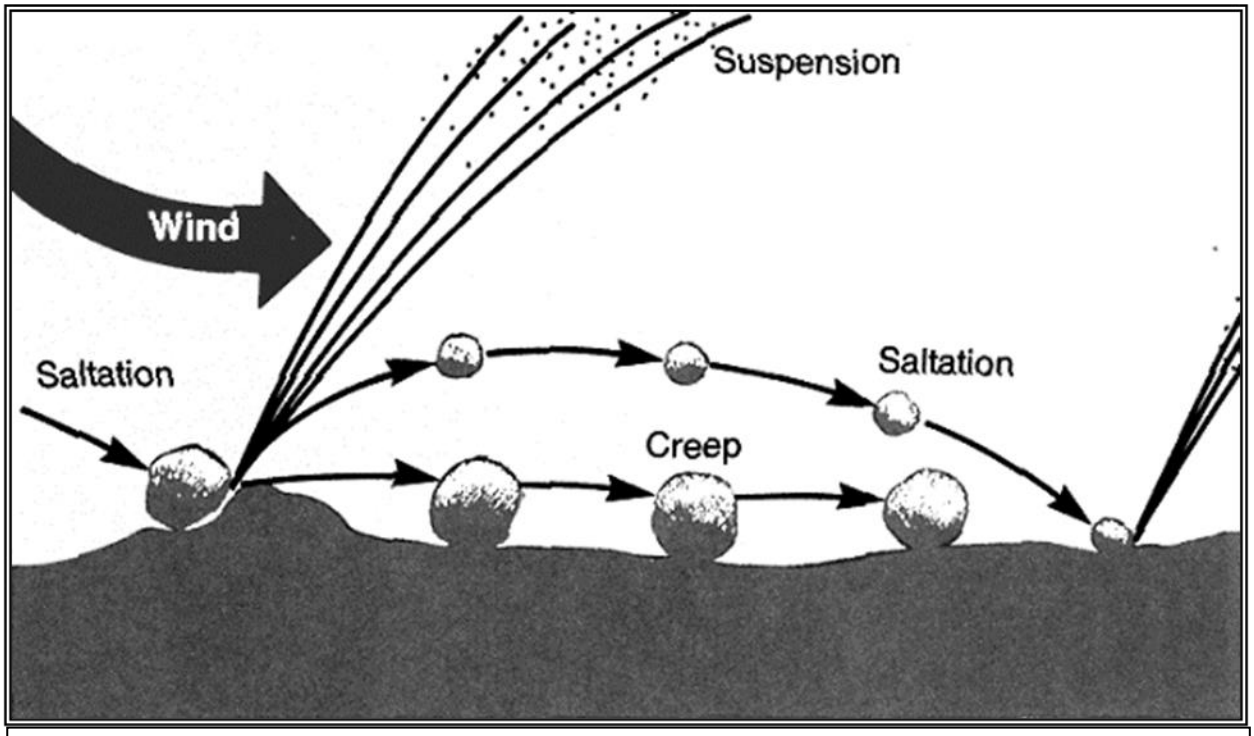

Figure 2 Mechanisms of erosion and sediment transport by wind (from SCS, 1989)

Background of an Inspector

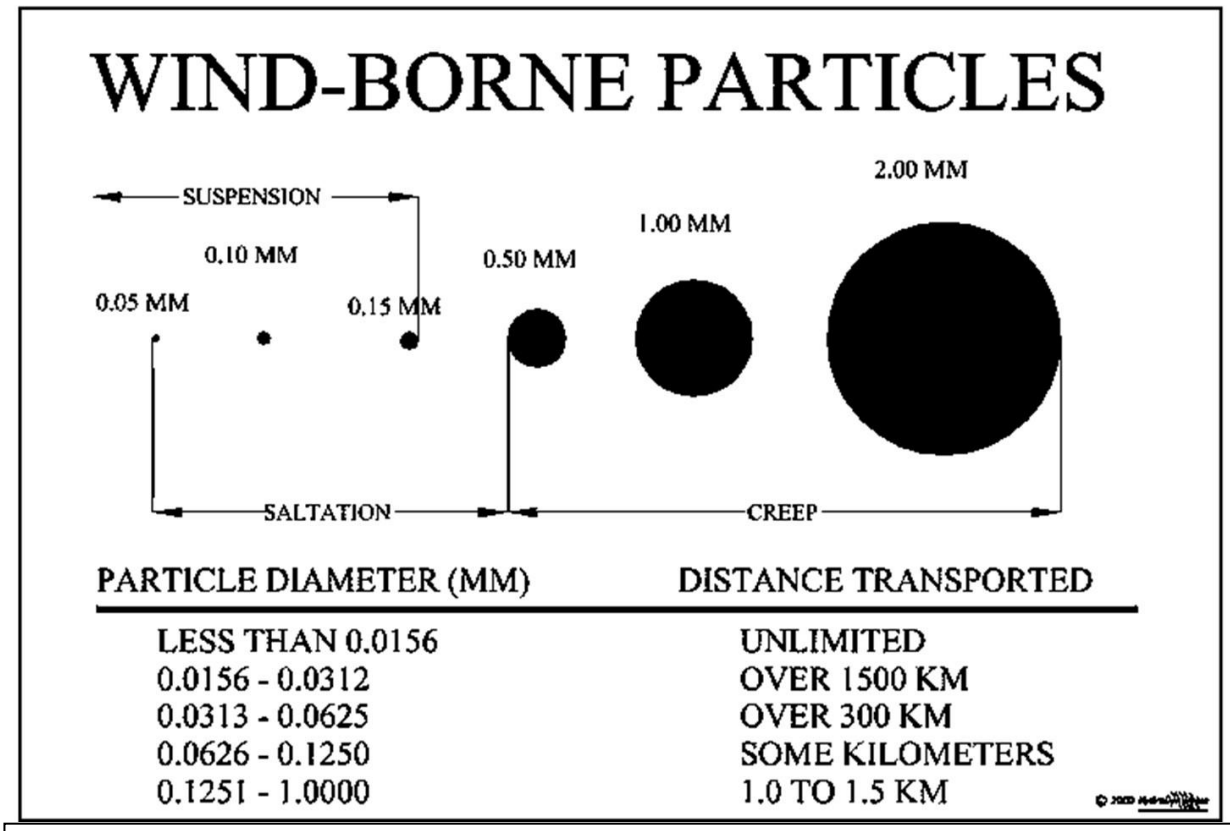

Figure 3 **Relative size distribution of wind borne particles (from Fifield, 2004)**

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Raindrop or Splash Erosion

Dislodging of soil particles due to the impact of raindrops.

Figure 4 Illustration of splash erosion (from National Geographic Creative)

Sheet Erosion:

Stripping of soil that occurs due to sheet flows of runoff.

Figure 5 Illustration of how sheet flows result in erosion

Rill Erosion:

Small rivets that can be up to 76 mm (3-in.) deep that form due to the concentration of sheet flow waters.

Figure 6 Illustration on the formation of rills (from Wikimedia Commons, the free media repository)

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Gully Erosion:

Large and deep channels that occur when concentrated flows of water scouring along flow routes cause sharp-sided entrenched channels.

Figure 7 Illustration of a gully on a construction site

Figure 8 Illustration of streambank and channel erosion

Streambank and Channel Erosion:

The removal of soil and other embankment materials due to concentrated channel flows.

Other Forms of Erosion

Shoreline

Background of an Inspector

Mass Wasting/Landslides (see page 10 for additional information)

Debris flows

Geological

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Mass Wasting and Landslides

Landslides are one type of "mass wasting," which denotes any down-slope movement of soil and rock under the direct influence of gravity. Other types are slides, falls, slumps and creep.

Factors That Impact Water Erosion

1. Climate
2. Soil erodibility (based upon percent of silt & very fine sand, percent of 0.10 – 2.0 mm sand, percent organic matter, soil structure, and permeability)

Possible Hierarchy of Soil Erodibility (from RUSLE2)

Soil Type	Erodibility Classification
Silt	Most Erodible (K ≈ 0.75)
Silt Loam	↓
Loam	↓
Sandy Loam	↓
Silty Clay Loam	↓
Clay Loam	↓
Loamy Sand	↓
Silty Clay	↓
Sandy Clay Loam	↓
Sand	↓
Sandy Clay	↓
Clay	Least Erodible (K ≈ 0.013)

3. Length of flow
4. Slope of the land
5. Erosion control BMPs
6. Sediment control BMPs

Sediment

Eroded material suspended in water or in air

- Sediment loading can be 10 to 20 times greater from bare ground construction sites than soil particles lost from lands where vegetation exists.
- Sediment loading causes reservoirs, streams, and harbors to clog with soil material.
- Sediment loading causes loss of recreational areas and wildlife habitat.
- Sediment loading reduces the beneficial uses of water from humans and can harm plants, animals, and fish that live in the water.
- Sediment loading from construction areas may increase the amount of nutrients in water.

Sedimentation

The deposition of eroded material

- Dependent upon particle size
- Dependent upon flow velocity
- Basis for how sediment containment systems function

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TEST YOUR UNDERSTANDING

1. **Which of the following represents the definition of sediment?**
    a. **The deposition of soil particles suspended in water or air.**
    b. **Eroded material suspended in water or air.**
    c. **Soil particles displaced by the action of wind or water.**

2. **Which one of the following does not represent rainfall or runoff erosion?**
    a. **Splash**
    b. **Sheet flow**
    c. **Creep**
    d. **Rill and gully**

3. **Clay is more erodible than silt.**
    a. **True**
    b. **False**

4. **Saltation creates more wind-borne particles than suspension.**
    a. **True**
    b. **False**

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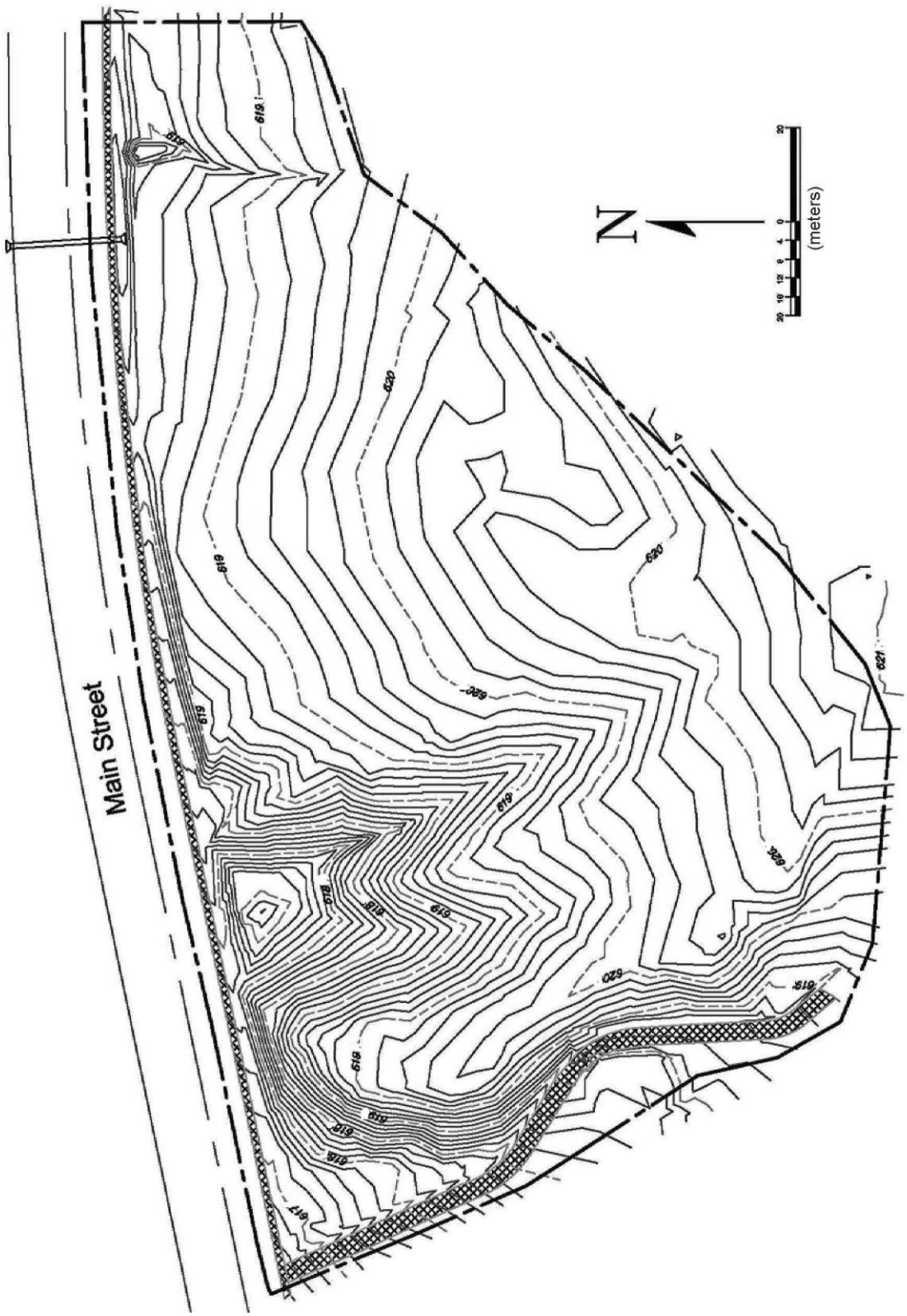
TOPOGRAPHIC ASSESSMENTS



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HYDROLOGY

The study of the waters of the earth: their occurrence, circulation, and distribution; their chemical and physical properties; and their reaction with the environment, including their relation to living things.

Components

Precipitation

1. Rain
    a) Intensity often characterized regionally
        i. Pounding – usually high intensity, short duration
        ii. Light drizzle – usually long duration, low intensity
2. Snow
3. Hail
4. Sleet

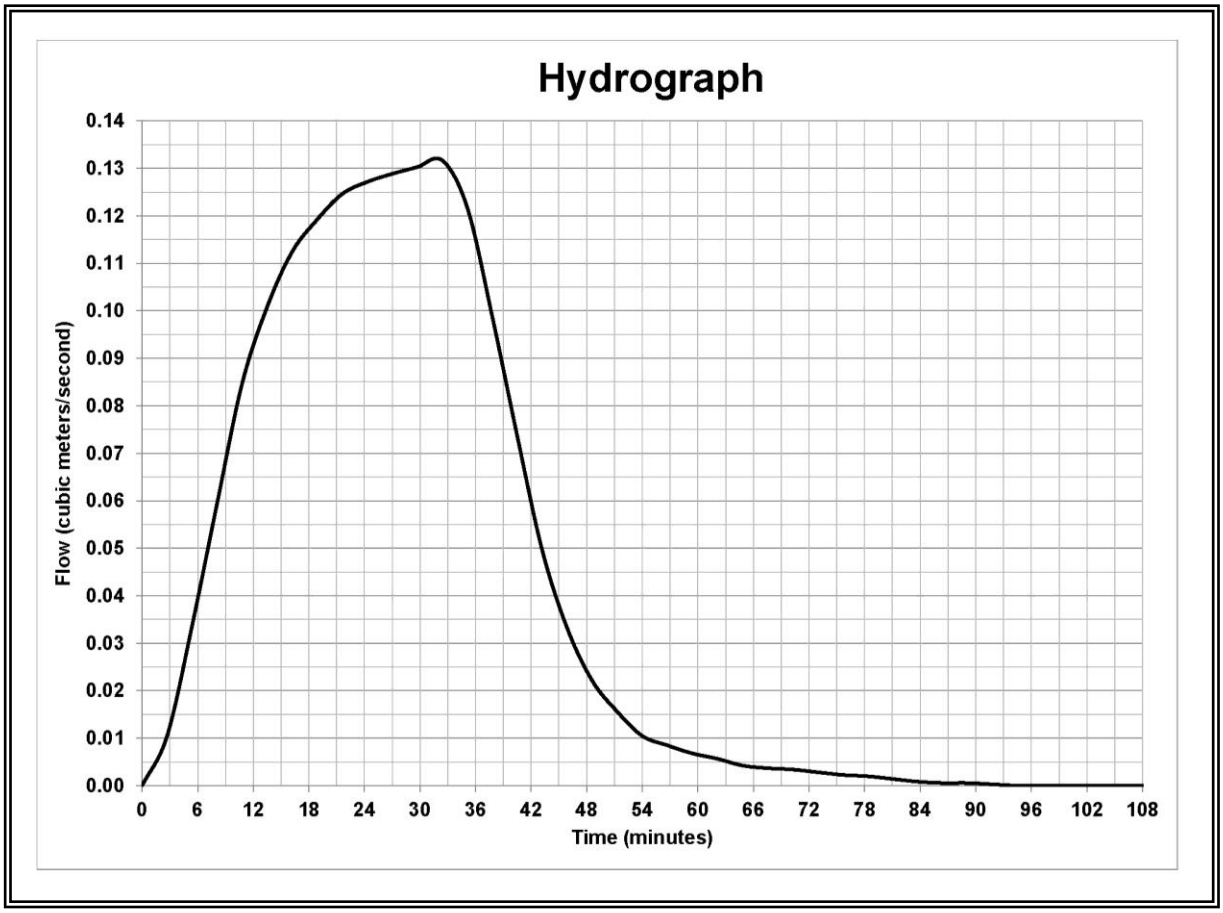
Factors Affecting Runoff and Rate of Flow

1. Soil types and roughness
2. Storm intensity
3. Contributing area
4. Steepness of the terrain
5. Length of slope
6. Vegetative cover
7. Storm duration

Represented by a Hydrograph

Background of an Inspector

Hydrograph



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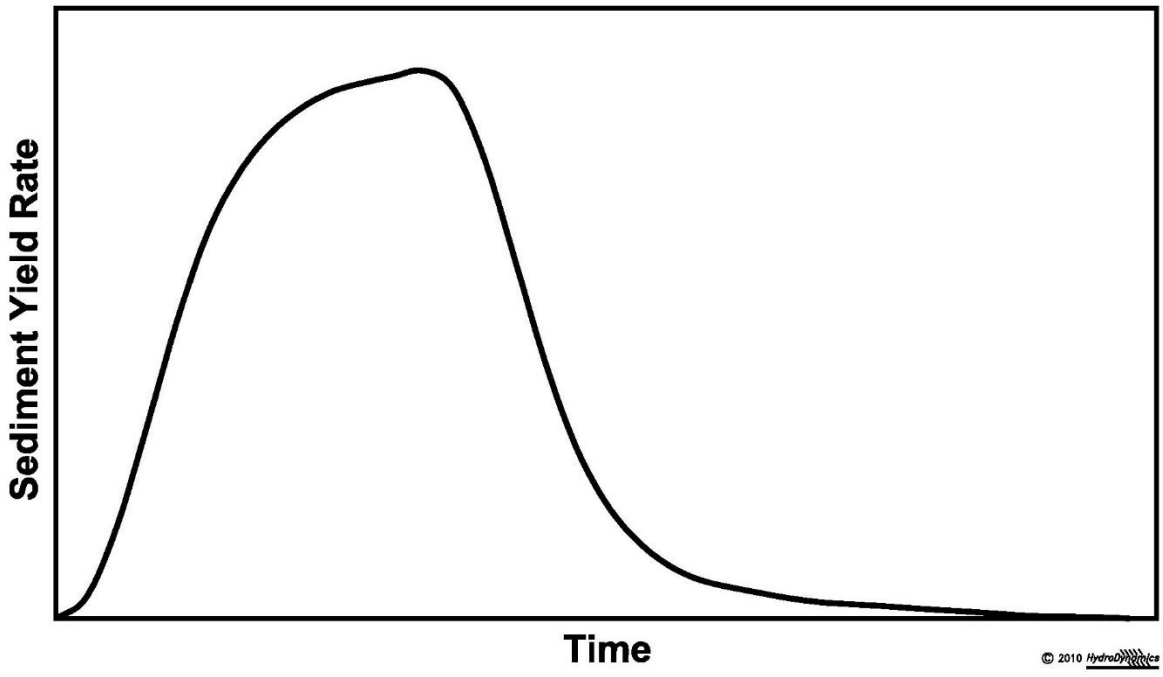

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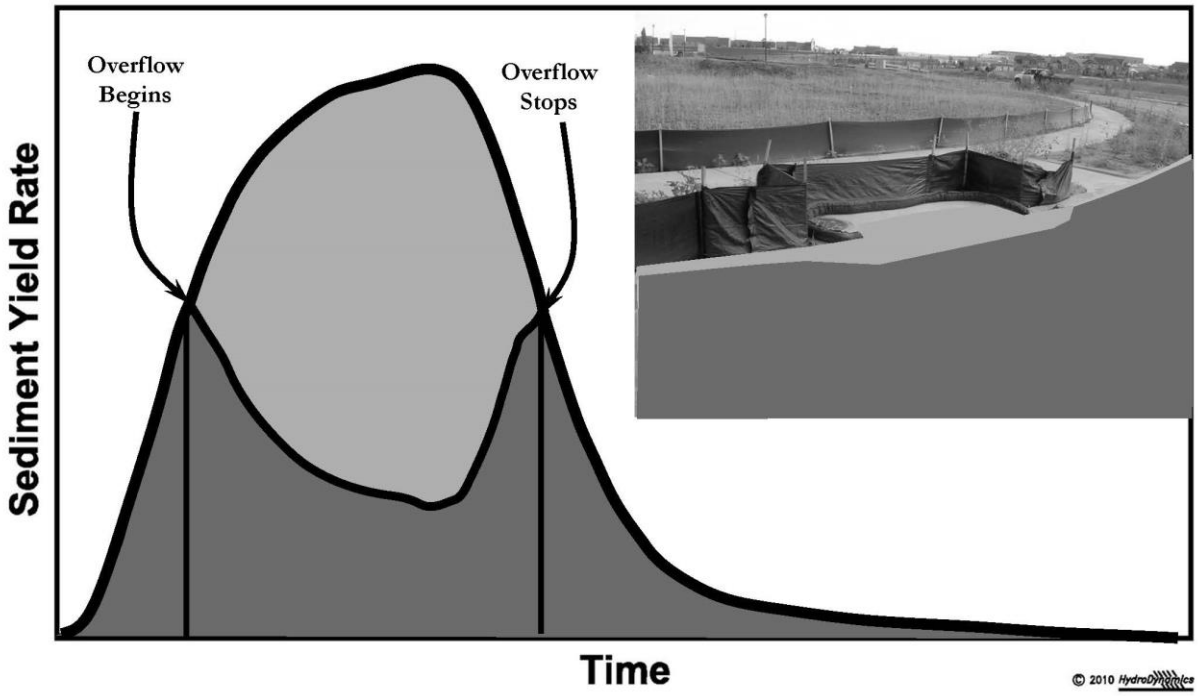
Assessing Sedimentation in Front of a Curb Inlet



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WATER QUALITY SAMPLING

Water quality sampling should be conducted during every inspection.

Sampling should occur:

- Upstream
- Site Outlets
- Downstream

What to Sample:

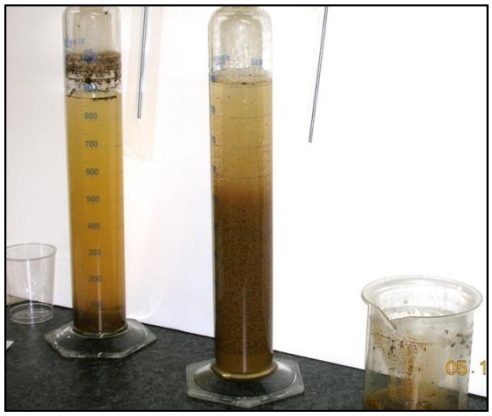
- Nephelometric Turbidity Units (NTU)
  - √ Instantaneous results using portable equipment
- Totals Suspended Solids (TSS)
  - √ Must be analyzed in a lab

Background of an Inspector

FLOCCULANTS

Flocculants consist of anionic, nonionic and cationic polymers that can cause individual particles within a suspension to form aggregates. The process is known as flocculation.

When flocculants are added to sediment laden runoff waters, increased sedimentation occurs. Rapid flocculation settling rates is essential to capture of treated particulates by a downstream system.



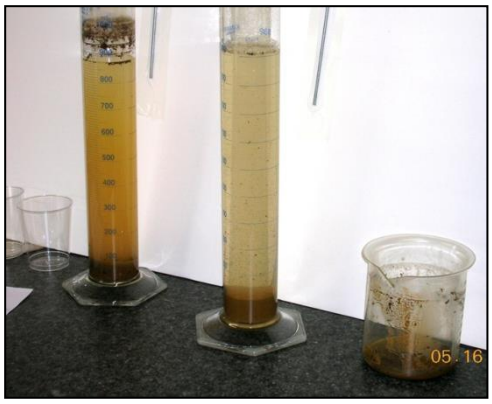
Types of Flocculants

Flocculants used on construction sites are usually classified as containing anionic (i.e., negative) or cationic (i.e., positive) polymers.

- Cationic flocculants attract negatively charged soil particles and may be detrimental to aquatic life.
- Anionic (negative) flocculants may not be as detrimental to aquatic life as are cationic flocculants. .

Inspector's Responsibility for Flocculants

- Observe and report
- Compile monitoring report



Background of an Inspector

BEST MANAGEMENT PRACTICES

What is a Best Management Practice (BMP)?

Any measure, practice, or device used to minimize erosion or the release of sediment from a construction site.

Some Items to Consider About BMPs

1. Always consider local site needs when selecting BMPs
2. Know limitations
3. Unlimited types and numbers
4. Drainage areas
5. Soil type and sediment size
6. Availability
7. Ability to maintain
8. Room to install
9. Cost
10. Interference – BMP must be compatible with objectives of development
11. Type of expected storms and the resulting flows
12. Duration of the project
13. Season of construction
14. Environmentally Sensitive Areas
15. Maintenance – A BMP that is not maintained often causes more damage than if it had never been installed
16. Target Pollutants

Background of an Inspector

ROLES AND RESPONSIBILITIES OF AN INSPECTOR

Ultimate Goal

Work with the contractor and permittee to minimize pollutants leaving a job site to the maximum extent practical.
In addition, prevent prohibited discharges from leaving a site, which can include:

- Wastewater from washout of concrete, stucco, paint, form release oils, curing compounds, and other construction materials,
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance,
- Soaps, solvents, or detergents used in vehicle and equipment washing and
- Toxic or hazardous substances from a spill or other release.

INSPECTION REQUIREMENTS

Control of sediment and erosion on construction sites requires the use of BMPs. However, if they are to be effective, BMPs must be inspected frequently and regularly. When, and how frequently? What should be inspected? What guidelines should be followed? What should be reported? To whom should reports be submitted?

Answers to these and other questions require input from those who continually evaluate and observe methods used on construction sites to control sediment. In addition, construction projects in areas where rainfall is frequent will have different inspection criteria to follow as compared to those where rainfall is sparse.

Designers, Inspectors, and Contractors

If contractors are going to maintain effective sediment and erosion control plans, they must understand what is required to complete inspections. Likewise, inspectors must know what is required for BMPs to operate in an effective manner. Finally, both contractors and inspectors must continually educate and work with designers to ensure effective plans are implemented.

Construction sites are dynamic. Site conditions and staging are continually changing. Consequently, it is recommended periodic updates (e.g., weekly, or biweekly) to sediment and erosion control plans be completed. An essential element in these updates is an understanding of what is required for inspections.

Role & Responsibilities of an Inspector

Again, the goal of an inspector is to work with the contractor to reduce the amount of pollution leaving a construction site to the maximum extent practicable.

Purpose of Inspections

The purpose of an inspection is to ensure regulated facilities have:

- A permit to discharge storm water runoff from the construction site,
- An updated Erosion and Sediment Control (ESC) Plan, including the report and sediment and erosion control drawings, and
- Ensure that the regulated entity is following the specifications in the permit and in their ESC Plan.

Background of an Inspector

This means that an inspector must complete inspections and report his/her findings in a manner that provides:

- An independent review of BMPS and their effectiveness,
- An observation of what is happening on site, and
- An opportunity to determine if the regulated facility is meeting the ultimate goal.

Qualities of a Good Inspector

- An unbiased entity
- Knowledgeable
- Appropriate ESC training and experience
- Consistent and proactive

Motto of a Canadian CISEC

Observe, inspect, and report on what you found.
Avoid mandating your requirements (unless you are qualified).

Inspector Responsibilities Before Construction Activities

An inspector's responsibilities begin before the first site inspection. The inspector should know the project and the construction site. Even before attending a pre-construction meeting (if one is held), the following items should occur:

Understanding the ESC Plan

Designing and implementing an effective ESC Plan is essential for minimizing the potentially adverse environmental effects originating from a construction site. An effective ESC Plan comprises both an ESC Plan Report and the ESC Plan drawings.

An ESC Plan Report is strongly recommended in addition to the ESC Plan Drawings in order to effectively summarize the base information, descriptions, and calculations upon which the ESC Plan was formulated. For example, a Stormwater Management Design Brief or similar type report typically includes documentation of the ESC requirements not listed or effectively illustrated on the ESC Plan Drawings. For an inspector, this report will provide valuable background information about the site.

Determine if the ESC Plan is complete and whether some additional items may need to be addressed. Some general guidelines include the following:

Review the ESC Plan (report and drawings) before attending the meeting.

1. Understand Federal and local requirements,
2. Determine if the ESC Plan is complete,
3. Does the Plan only allow for certain BMPs?
4. Who gives who direction?
5. Understand site drawings:
   a) Legends – Know what the symbols mean.
   b) Topography – Get a feel for the "lay of the land."

c) Before Grading – Understand what is to occur before construction activities begin for minimizing the discharge of sediment when excavation activities happen. Usually, BMP installation should occur before other construction activities begin.

d) During Grading and During Construction – Understand what is to occur during grading and construction activities to minimize the discharge of sediment from the site. Use of both sediment and erosion control should occur during both these phases.

e) After construction – Understand the type of erosion control practices that are to be implemented.

f) Post construction conditions.

g) Identify BMPs and locations – Does the location seem to make sense.

h) Identify purpose of the BMP – In this application what was the designer trying to accomplish with this BMP? The way it is implemented, does it achieve the original goal?

6. Identify concerns and issues, such as:
   a) Determine if high risk areas are identified on the drawings (i.e., areas adjacent to stockpile locations, dewatering locations, protected features, receiving watercourses, etc.) and appropriately protected or are contingency plans in place,
   b) Or if any additional items not covered in the Plan needs to be addressed.

Basic Principles of ESC

As an inspector, keep these principles in mind when familiarizing yourself with the ESC Plan for a site:

- Multi-barrier approach,
- Retain existing vegetation,
- Minimize land disturbance area,
- Slow down and detain runoff to promote settling,
- Divert runoff from problem areas,
- Minimize slope length and gradient of disturbed areas,
- Maintain overland sheet flow and avoid concentrated flows,
- Store/stockpile soil away from:
  - √ Watercourses,
  - √ Drainage features,
  - √ Top of steep slopes,
- The ESC Plan is dynamic, and
- The ESC Plan will be continually updated based on the results of site inspections.

The following table lists the recommended information that should be provided in the ESC Plan report.

Background of an Inspector

ESC Plan Report - Recommended Requirements
Project Descriptions: Brief description of the nature and purpose of the land disturbing activity. Also include the legal description of the property and a reference to adjacent properties and landmarks.
Condition of Existing Site: Description of the land use, site topography, vegetation, and drainage of the site under existing conditions.
Condition of Existing Receiving Water: Description of local receiving waters such as watercourses and lakes (e.g., warm water fisheries, cold water fisheries; aquatic habitat use, confined or unconfined valley).
Adjacent Areas and Features: Description of neighboring areas, such as residential and commercial areas, reserves, natural areas, parks, storm sewers, and roads that might be affected by the land disturbance.
Soils: A description of soils on the site, including erodibility, and grain size analysis. This description should include a summary of the soils/geotechnical report for the site.
Critical Areas: Description of areas within the development site that have potential for serious erosion or sediment problems.
Permanent Stabilization: Description of how the site will be stabilized after construction is completed. This will require a phasing plan (to be provided on the ESC Plan drawing) of the stripped area to be reseeded and the expected time of stabilization.
Design Details of Erosion and Sediment Control Measures: The supporting calculations and design details of the sediment control measures. Specifically for ESC ponds - calculations and details include permanent pool and extended detention volumes, pond sizing volume, and calculations for the pond outlet and emergency overflow outlet.
Record Keeping Procedure: Include sample inspection and maintenance forms. Maintenance Record keeping procedure including name/designate of the personal who will keep the inspection and maintenance record.
Stockpile Details: Stockpile details to include the height and volume at each proposed location.
Emergency Contact: Provide a list of emergency and non-emergency contacts (e.g., owner, site supervisor)
Stamped and Signed: ESC document/report must be stamped and signed by a Professional Engineer.

Source: GGHCA Erosion & Sediment Control Guideline for Urban Construction, 2006

Background of an Inspector

Attend Pre-Construction Meetings

If a pre-construction meeting is held, attend it with the contractor and designer to ensure coordination of issues and concerns are addressed. During this session, the inspector should complete the following:

a) Identify where posting of permits, drawings and contact names and telephone numbers will occur,
b) Identify (any) concerns found during the ESC Plan review,
c) Work with the designer to determine if the ESC Plan meets permit requirements,
d) Announce the frequency of inspections. A 'walk-through' inspection of the site should be undertaken in anticipation of large storm events (or a series of rainfall and/or snowmelt days) that could potentially yield significant runoff volumes. The regular inspections should occur during all construction stages and should be based on, at a minimum, the requirements identified in the permits and approvals. Commonly this frequency is:
    i. On a weekly basis
    ii. After every rainfall event
    iii. After significant snowmelt events; and,
    iv. Daily during extended rain or snowmelt periods
    v. During inactive construction periods, where the site is left alone for 30 days or longer, a monthly inspection should be conducted.
e) Review the chain-of-command and open the lines of communication between the contractor and the regulating agency.

Stages of Construction

- Earthworks – topsoil removal and grading
- Servicing
- Construction and stabilization

Assessing Risk

Bad ESC practices can result in:

- *Ecological consequences*
- *Project consequences*
- *Legal consequences*

Assessing the environmental risk is important to demonstrate reasonable care was taken for erosion and sediment control.

"MORE" Effective ESC

Multi-Barrier Approach

Ongoing Process

Regular Inspection, Monitoring & Maintenance

Education and Training

Background of an Inspector

ASSESSING AN ESC REPORT

Background of an Inspector

Stormwater Team

Permittee: Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Contact Information: I. M. Aperson
Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Person Responsible for Plan: Mr. Loman Onthetotempol

Project Name: Example Development

Project Location: Southeast of the intersection of South “K” Avenue and West “A” Avenue in Any Town, Any Province, Postal Code.

Receiving Waters: Storm waters discharge into the “Lake” via local tributaries that drain into major drainage channels.

Nature of Construction Activity

This project consists of developing land for a subdivision and commercial area. Construction activities on the site will consist of removing existing vegetation, grading of the land, installing utilities, paving, and development of the land for a subdivision and commercial area. This project will disturb approximately 15.0 hectares (37.1 acres) out of a total of 17.0 hectares (42.1 acres).

Sequence for Major Activities:

Construction tasks to be completed will include the following sequential activities.

- Removal of existing vegetation,
- Clearing and grubbing of the land,
- Grading,
- Installing utilities,
- Development and paving of roads, and
- Construction of commercial and single-family homes.

Site Map:

A map has been included with this ESC report.

Site Planning Documentation

Soils on the project have the following characteristics:

Symbol	Type of Soil Material	Percent of Site	Wind Erodibilty	Comments
A5b5	Sandy Loam	100%	3	Low to moderate water erosion and wind hazards and moderate to high runoff potential.

Background of an Inspector

Predominate soils of the site are moderately deep and well drained.

Historic vegetation for this area is pasture grass.

Construction Site Pollutants

It will be the responsibility of the heavy equipment contractor to take appropriate actions to ensure pollution of storm water does not occur. Fueling areas will be at least 30 metres (100-ft.) from drainage channels and/or storm sewer systems. The heavy equipment contractor will be responsible for protecting the soil from contamination due to any hydrocarbon or other hazardous spills associated with his contractual obligations.

Contractors will also be responsible for preventing soil contamination where building materials, fertilizers, chemicals, waste piles or other potential hazardous materials may exist.

No dedicated concrete or asphalt batch plants will exist on this site.

Non-Storm Water Components of Discharge

There is no non-storm water components of discharge associated with this project.

Descriptions of Stormwater Control Measures

Reduction of sediment in runoff waters will occur in the following manner (see the S&E Control drawings for more detailed illustrations).

1. Before overlot grading activities begin, the following BMPs will be installed:
    a) Installation of a storm sewer pipe to convey offsite flows away for the project site.
    b) Silt fence barriers as illustrated on the drawings.
    c) Install rock barrier at culvert.
    d) Vehicle tracking pads at major entrances into the site.
2. During initial overlot grading activities, installation of one or more of the following BMPs will occur:
    a) As soon as feasible, complete a rough installation of the detention ponds (with outlet structures) and convert them into sediment containment systems (SCSs).
    b) Install additional silt fence barriers as necessary to minimize discharge of sediment into waterways.
    c) Apply erosion control materials.
3. During major overlot grading activities, one or more of the following tasks will occur:
    a) Install diversion structures to ensure the discharge of runoff into an SCS.
    b) Maintain all sediment and erosion control BMPs.
    c) Install utilities.
    d) Install barriers at inlet.
    e) Apply erosion control materials.
4. After grading activities are completed, the following tasks will occur:
    a) Paving of roads.
    b) Construction of homes.
    c) Installation of landscaping material.
    d) Maintenance of SCSs until 80% full buildout of development.
    e) Maintenance of sediment and erosion control methods.

Background of an Inspector

Sediment and Erosion Control Methods

Sediment control measures will include one or more following techniques with installation of additional methods occurring as deemed necessary by the designer.

- Silt fence and/or diversion barriers
- Barriers in front of “sump” inlets
- Vehicle tracking pads
- Sediment containment systems

Offsite tacking of soil will be minimized by at least weekly removal of accumulated sediment in access streets. More frequent sediment removal will occur when significant buildup is evident.

Erosion control measures will include one or more of the following methods:

- Construction of homes
- Installing landscaping materials
- Placement of pavement
- Applying erosion control materials

Final stabilization of the site will occur by placement of pavement, planting temporary and/or perennial grass seed on disturbed lands, and installing landscape material on the lots and in common areas.

Inspection and Maintenance

Inspections of sediment and erosion control measures will occur after any significant wind or precipitation event that causes runoff. As a minimum, inspection of all sediment and erosion control facilities will occur at least once every 14 days while construction activities occur.

Inspections will occur until final stabilization of the site has occurred, which is defined as vegetative cover of at least 70% of historic conditions, completion of 100% of the commercial area, and completion of 100% of the homes sites.

Inspection of sediment and erosion control measures will include at least the following:

- Removal of accumulated material collected by SCSs or barriers once a 50% reduction of the storage capacity for the structures becomes evident,
- Repairing damage to sediment control structures,
- Adding or eliminating sediment and/or erosion control measures as deemed necessary,
- Immediate repair and/or replacement of BMPs when failure occurs or the mitigation measures are ineffective.

Records of each inspection will reside with the contractor, developer, or their representative.

Training

Documentation is on file for each operator.

Endangered Species

There are no known endangered species on this project site.

Historic Properties

There are no known historic properties on this project site.

Background of an Inspector

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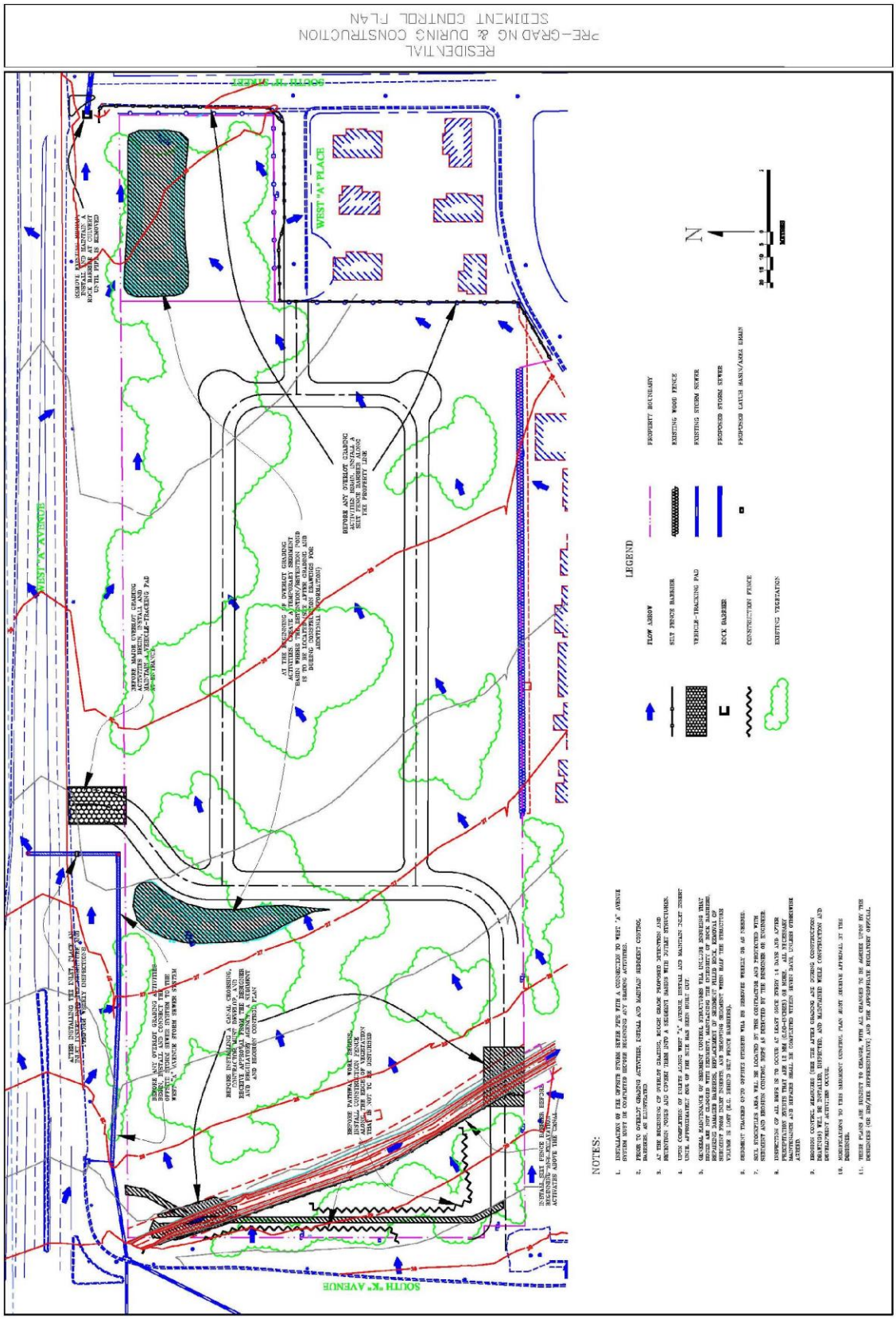
Background of an Inspector

ASSESSING SEDIMENT AND EROSION CONTROL DRAWINGS

Background of an Inspector



Background of an Inspector

Pre-Grading and During Construction Notes

1. INSTALLATION OF THE OFFSITE STORM SEWER PIPE WITH A CONNECTION TO WEST "A" AVENUE SYSTEM MUST BE COMPLETED BEFORE BEGINNING ANY GRADING ACTIVITIES.

2. PRIOR TO OVERLOT GRADING ACTIVITIES, INSTALL AND MAINTAIN SEDIMENT CONTROL BARRIERS, AS ILLUSTRATED.

3. AT THE BEGINNING OF OVERLOT GRADING, ROUGH GRADE PROPOSED DETENTION AND RETENTION PONDS AND COVERT THEM INTO A SEDIMENT BASINS WITH OUTLET STRUCTURES.

4. UPON COMPLETION OF INLETS ALONG WEST "A" AVENUE, INSTALL AND MAINTAIN INLET PROTECTION UNTIL APPROXIMATELY 80% OF THE SITE HAS BEEN BUILT OUT.

5. GENERAL MAINTENANCE OF SEDIMENT CONTROL STRUCTURES WILL INCLUDE ENSURING THAT ROCKS ARE NOT CLOGGED WITH SEDIMENT, MAINTAINING THE INTEGRITY OF ROCK BARRIERS, REPAIRING DAMAGED BARRIERS, REPLACEMENT OF SEDIMENT FILLED ROCK, REMOVAL OF SEDIMENT FROM INLET INSERTS, AND REMOVING SEDIMENT WHEN HALF THE STRUCTURE VOLUME IS LOST (E.G. BEHIND SILT FENCE BARRIERS).

6. SEDIMENT TRACKED ONTO OFFSITE STREETS WILL BE REMOVED WEEKLY OR AS NEEDED.

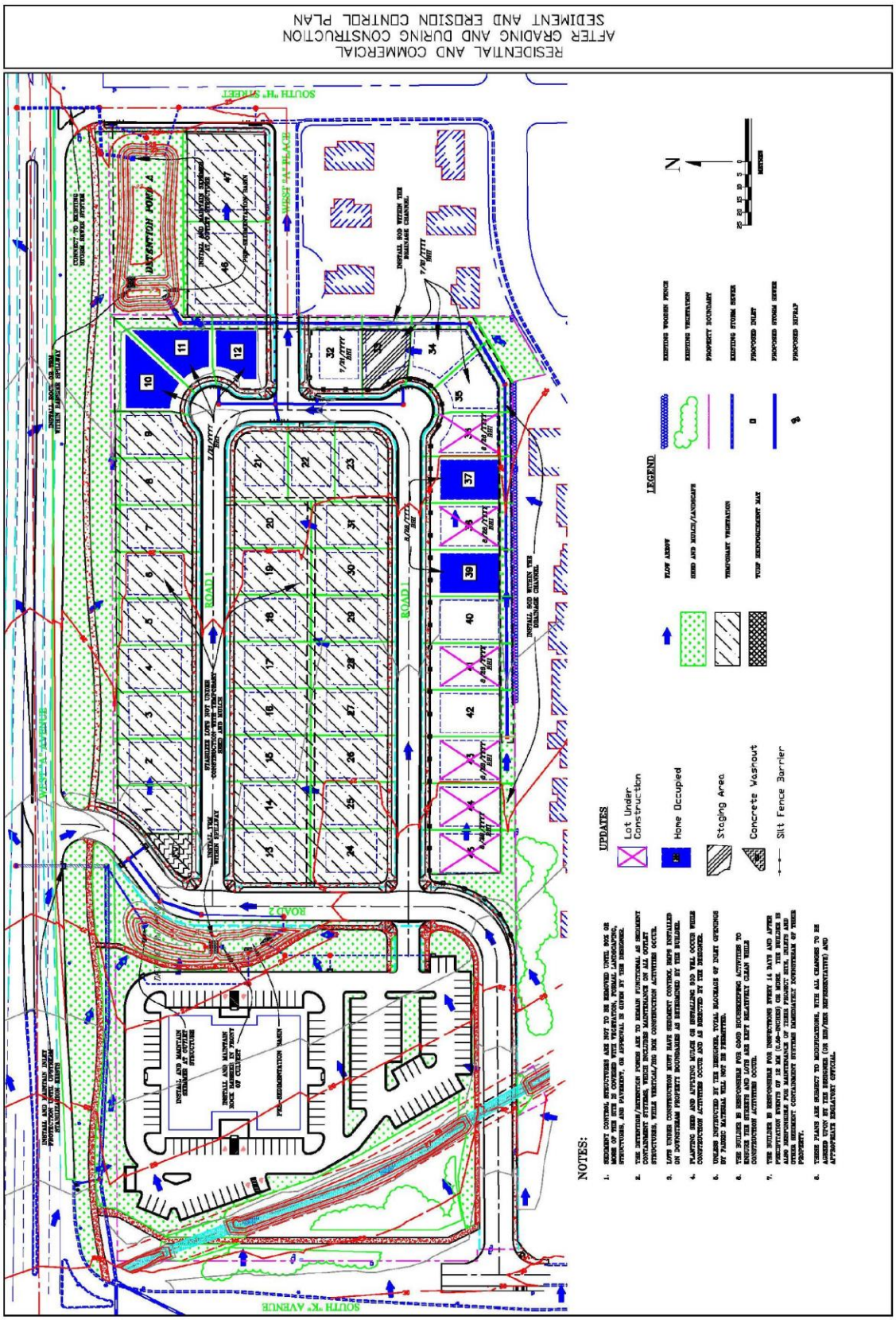
7. SOIL STOCKPILES AREA WILL BE LOCATED BY THE CONTRACTOR AND PROTECTED WITH SEDIMENT AND EROSION CONTROL BMPS AS DIRECTED BY THE DESIGNER OR ENGINEER.

8. INSPECTION OF ALL BMPS IS TO OCCUR AT LEAST ONCE EVERY 14 DAYS AND AFTER PRECIPITATION EVENTS THAT ARE 12 mm (0.50-IN.) OR MORE. ALL NECESSARY MAINTENANCE AND REPAIRS SHALL BE COMPLETED WITHIN SEVEN DAYS, UNLESS OTHERWISE AGREED.

9. EROSION CONTROL MEASURES (SEE THE AFTER GRADING AND DURING CONSTRUCTION DRAWINGS) WILL BE INSTALLED, INSPECTED, AND MAINTAINED WHILE CONSTRUCTION AND DEVELOPMENT ACTIVITIES OCCUR.

10. THESE PLANS ARE SUBJECT TO CHANGE, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNERS (OR HIS/HER REPRESENTATIVE) AND THE APPROPRIATE GOVERNMENTAL AGENCY OFFICIAL.

Background of an Inspector



Background of an Inspector

After-Grading and During Construction Notes

1. SEDIMENT CONTROL STRUCTURES ARE NOT TO BE REMOVED UNTIL 80% OR MORE OF THE SITE IS COVERED WITH VEGETATION, FORMAL LANDSCAPING, STRUCTURES, AND PAVEMENT, OR APPROVAL IS GIVEN BY THE DESIGNER.

2. THE DETENTION/RETENTION PONDS ARE TO REMAIN FUNCTIONAL AS SEDIMENT CONTAINMENT SYSTEMS, WHICH INCLUDES MAINTENANCE ON ALL OUTLET STRUCTURES, WHILE VERTICAL/BIG BOX CONSTRUCTION ACTIVITIES OCCUR.

3. LOTS UNDER CONSTRUCTION MUST HAVE SEDIMENT CONTROL BMPS INSTALLED ON DOWNSTREAM PROPERTY BOUNDARIES AS DETERMINED BY THE BUILDER.

4. PLANTING SEED AND APPLYING MULCH OR INSTALLING SOD WILL OCCUR WHILE CONSTRUCTION ACTIVITIES OCCUR AND AS DIRECTED BY THE DESIGNER.

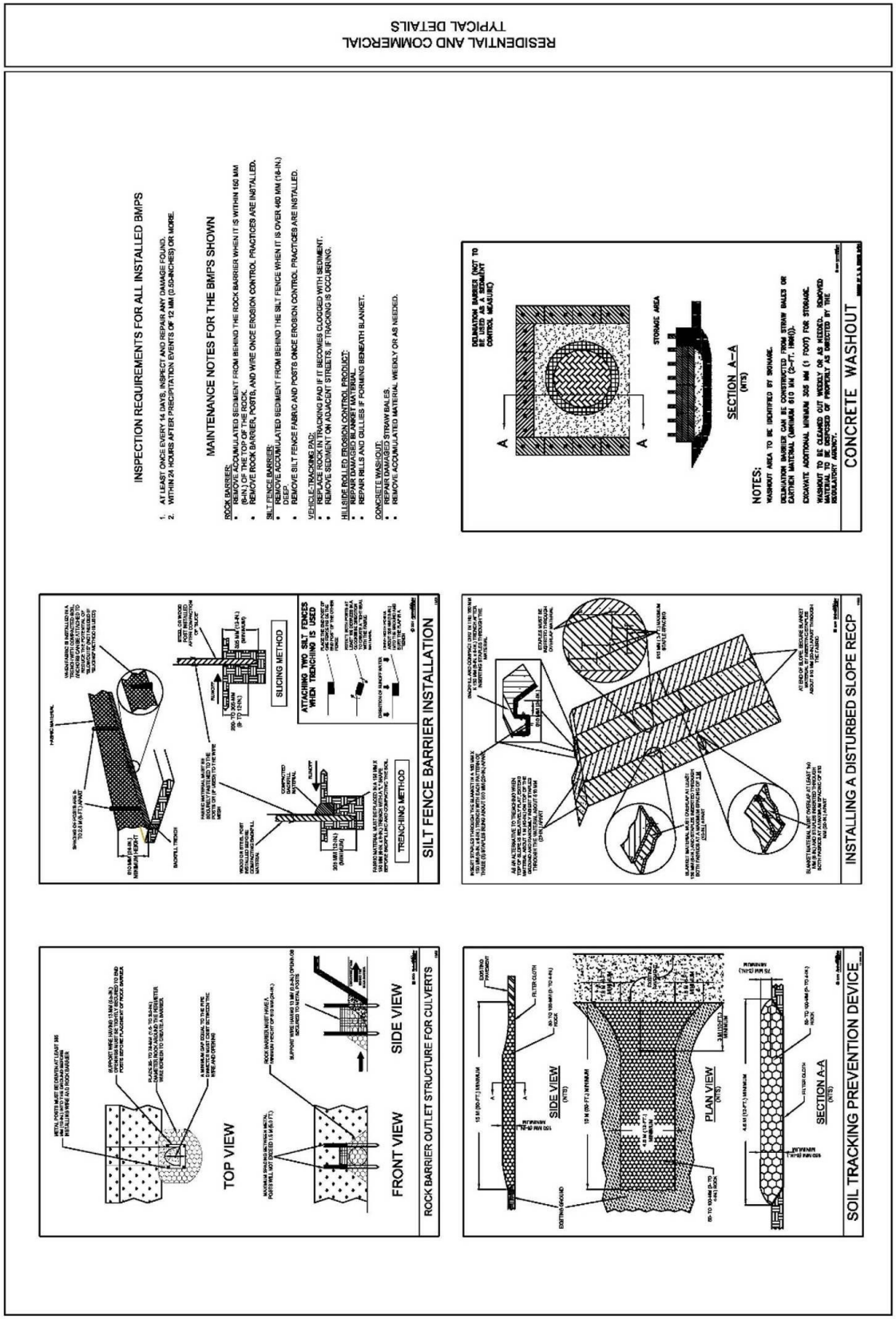
5. UNLESS INSTRUCTED BY THE DESIGNER, TOTAL BLOCKAGE OF INLET OPENINGS BY FABRIC MATERIAL WILL NOT BE PERMITTED.

6. THE BUILDER IS RESPONSIBLE FOR GOOD HOUSEKEEPING ACTIVITIES TO ENSURE THE STREETS AND LOTS ARE KEPT RELATIVELY CLEAN WHILE CONSTRUCTION ACTIVITIES OCCUR.

7. THE BUILDER IS RESPONSIBLE FOR INSPECTIONS EVERY 14 DAYS AND AFTER PRECIPITATION EVENTS OF 12 mm (0.50-IN.) OR MORE. THE BUILDER IS ALSO RESPONSIBLE FOR MAINTENANCE OF THEIR PROJECT SITE, INLETS AND OTHER SEDIMENT CONTAINMENT SYSTEMS IMMEDIATELY DOWNSTREAM OF THEIR PROPERTY.

8. THESE PLANS ARE SUBJECT TO MODIFICATIONS, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNER (OR HIS/HER REPRESENTATIVE) AND THE APPROPRIATE GOVERNMENTAL AGENCY OFFICIAL.

Background of an Inspector



Background of an Inspector

INSPECTION REQUIREMENTS FOR ALL INSTALLED BMPS

1. AT LEAST ONCE EVERY 14 DAYS, INSPECT AND REPAIR ANY DAMAGE FOUND.
2. WITHIN 24 HOURS AFTER PRECIPITATION EVENTS OF 12 MM (0.50-INCHES) OR MORE.

MAINTENANCE NOTES FOR THE BMPS SHOWN

ROCK BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE ROCK BARRIER WHEN IT IS WITHIN 150 MM (6-IN.) OF THE TOP OF THE ROCK.
- REMOVE ROCK BARRIER, POSTS, AND WIRE ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

SILT FENCE BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE SILT FENCE WHEN IT IS OVER 460 MM (18-IN.) DEEP.
- REMOVE SILT FENCE FABRIC AND POSTS ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

VEHICLE-TRACKING PAD:
- REPLACE ROCK IN TRACKING PAD IF IT BECOMES CLOGGED WITH SEDIMENT.
- REMOVE SEDIMENT ON ADJACENT STREETS, IF TRACKING IS OCCURRING.

HILLSIDE ROLLED EROSION CONTROL PRODUCT:
- REPAIR DAMAGED BLANKET MATERIAL.
- REPAIR RILLS AND GULLIES IF FORMING BENEATH BLANKET.

CONCRETE WASHOUT:
- REPAIR DAMAGED STRAW BALES.
- REMOVE ACCUMULATED MATERIAL WEEKLY OR AS NEEDED.

Background of an Inspector

INSPECTOR RESPONSIBILITIES DURING CONSTRUCTION ACTIVITIES

1. Review the ESC Plan to see if it is current:
   a) Have BMPs have been installed as illustrated?
   b) Have updates occurred?
   c) Do sediment and erosion control drawings match field conditions or are modifications required?
2. Review site conditions to see if BMPs are functional:
   a) Inspect as required by local regulations,
   b) Evidence of, or the potential for, sediment leaving from disturbed areas and material storage areas,
   c) Installed sediment and erosion control measures to ensure they are operating correctly,
   d) Locations where vehicles enter or exit the site,
   e) Discharge points to assess whether erosion control measures are effective in preventing impacts to receiving waters,
   f) Observe if BMPs are being maintained,
   g) Assess whether new BMPs are needed,
   h) Assess whether BMPs can be removed,
   i) Collect samples, if appropriate, and
   j) Be aware of a contingency plan (if available).
3. Document findings:
   a) Communicate findings to contractor, designer, or other interested parties,
   b) Don't be confrontational to the contractor.
4. Ensure that BMPs are effective in storm events – one of the best times to do an Erosion and Sediment Control inspection is during a storm.
5. Be prepared to inspect for winter shut down conditions:
   a) It is important that mitigation measures be in place to ensure they will provide the needed protection when spring conditions result in snowmelt.
6. Be prepared to require temporary suspension of construction activities.
7. Do **not** redesign the ESC Report or the accompanying sediment and erosion control drawings:
   a) Do **not** to tell the contractor what to do. The primary responsibilities of the inspector are to observe and report, not direct the activities,
   b) Do **not** mandate. This is a liability issue. You must protect yourself and the entity you work for.
      i. **The inspector is not responsible if BMPs are not working properly,**
      ii. **The inspector is not responsible to fix BMPs that need to be fixed.**

      Know your limitations!

Background of an Inspector

PURPOSE OF INSPECTIONS – TO CREATE A SNAPSHOT IN TIME

- To assess the BMPs on site and to understand their limitations and effectiveness – are they functioning properly?
- To ensure that the ESC Plan is being implemented,
- To observe what is happening on the site,
- To determine if additional measures are warranted,
- To accurately document site conditions, and
- To maintain communication and work toward the ultimate goal of environmental protection.

INSPECTION REPORTS

A sample copy of an inspection report is included on the following pages. While the report itself can be modified to suit individual site conditions, certain key information should be included on every report.

Key pieces of information to provide on every inspection report include:

- Name(s) and qualifications of personnel conducting the inspection.
- Permit information.
- Date of the inspection.
- Location and time of the inspection.
- Reason for inspection (weekly, after precipitation event, etc.).
- Noting whether discharges are occurring.
- Who was informed/notified about the observations/findings of the inspection.
- Observations relating to the implementation of the ESC Plan and the existing BMPs onsite.
- Corrective Actions required.
- Incidents of non-compliance.
- If no incidents of non-compliance were found, the report must contain a certification that the facility is following the Plan and permit.

It is recommended that the report be retained as part of the Plan for up to three years after the site has been stabilized.

Background of an Inspector

Erosion and Sediment Control Inspection Report
(SAMPLE)

Project: _____
_____
Permit No.: _____

Prime Contractor: _____

Inspector: _____
Inspector Qualifications: _____
Verbal/Written Notification given to: _____

Stage of Construction: _____

Construction Activities on Site: _____
_____

Site Area (ha.): _____
Receiving Water (i.e. creek, lake): _____

Inspection:
Date: _____
_____
Time: _____
Duration (hours): _____
Date of Last Inspection: _____
Reason for Inspection:
Weekly _____
Rainfall Event _____
Snowmelt Event _____

Current Weather Conditions: _____
Previous Weather Conditions for site: _____
Rainfall amount (mm): _____
Rainfall duration (hours): _____
Snowmelt amount (mm): _____

Information	Yes	No	N/A	Inspector's Comments and Action(s)
1. Do (or can) offsite flows enter the site?				
2. Is there evidence of, or the potential for, increased pollutant (e.g., sediment, fuel, concrete waste, portable toilet waste, etc.) discharging from the site?				If yes, see attached detail sheet for comments.
3. Do installation, repair and/or maintenance of sediment control BMPs need to occur?				If yes, see attached detail sheet for comments.
4. Do installation, repair and/or maintenance of erosion control BMPs need to occur?				If yes, see attached detail sheet for comments.
5. Do installation, repair and/or maintenance of in-stream control BMPs need to occur?				If yes, see attached detail sheet for comments.
6. Is there evidence of sediment discharging off the construction site and onto downstream location?				If yes, see attached detail sheet for comments.
7. Are vehicles tracking sediment off the construction site?				If yes, see attached detail sheet for comments.
8. If applicable, is soil, construction material, landscaping items, or other debris evident on the streets?				If yes, see attached detail sheet for comments.
9. Do locations exist where consideration of installing additional BMPs not found in the ESC plan should occur?				If yes, see attached detail sheet for comments.
10. Do location exist where consideration of removing existing BMPs identified and shown in the ESC plan can occur?				If yes, see attached detail sheet for comments.
11. Is a photo inventory provided?				If yes, see attached detail sheet for comments.
12. Does you site evaluation indicate a need to possibly update and document the ESC plan within the next seven (7) days?				If yes, see attached detail sheet for comments.
13. Have all previous inspection items been addressed and documented by the close of the next full work day or within seven (7) calendar days after an inspection?				If yes, see attached detail sheet for comments.

Background of an Inspector

Erosion and Sediment Control Inspection Report
(SAMPLE)

Project:_____ Date:_____ Page ____ of ____

Inspector:_____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

_____ Date: _____

(Print Inspector Name) (Signature)

Title/Qualification of the Inspector:_____

Background of an Inspector

DOCUMENTATION

An inspection report is one form of documentation. The purpose of an inspection is to create "a snapshot in time," capturing what is happening on a construction site at the time the inspection occurred. Many different techniques and tools can be used to help create the snapshot. Appropriate methods of creating the snapshot might include:

1. Log books of completed inspection reports and notes on maintenance and repairs.
2. Photographs and Videos – When taking photographs or videos, a few basic guidelines can make the photographs more useful:
   a) Make sure the lighting allows the viewer to see what is being photographed,
   b) Use proper scale. Include items in the photograph that define size and space,
   c) Define extent of subject matter. Try to record the subject matter in context.
      i. Use different angles to document three dimensional aspects of the subject matter,
      ii. Take large scale photographs that show how the subject matter ties in to the surroundings,
      iii. Take close up photographs to show the detail of the subject matter, and
      iv. Use multiple shots to create a panorama if it is not possible to include all the information in one picture.
   d) You can never take too many photographs,
   e) Ensure photos are date-stamped,
   f) Take photos of what is ***good*** on the site, not just what is bad,
   g) A picture is worth a thousand words, and
   h) Be aware if projects are not allowed to have photographs taken (e.g., military projects).
3. Field Notes and Sketches – some things are difficult to capture with pictures. Taking field notes and drawing sketches are other appropriate methods of documenting what is happening on a construction site. Using a set of plans with notes is a great way to record your findings on a construction site. It is best if these notes are made in the field while you are making the observations.
4. Interviews – because a site is changing constantly, it is not possible for an inspector to see and record everything that happens on a site. If there is evidence of problems, and you are not sure what has happened or how it happened, it is good to ask questions. It is appropriate for an inspector to interview workers, neighbors or other potential witnesses to help them better understand what is happening. These interviews should be included in the inspection reports.

Background of an Inspector

COMMUNICATION

For any construction site inspection to be effective, the inspector must communicate what he or she has observed with someone else. Communication comes in many forms and styles. The style that an inspector uses is personal and needs to be one that he or she is comfortable with. The form used is more standard.

Some of the basic communications skills that can be used on almost any construction site include:

1. **Making observations** – as an inspector, your primary role is to observe – not dictate, not boss, not fine, not fix, not design – but simply observe. Learn to observe carefully. Learn to look for clues and evidence that help you understand what it is that you are actually observing. Sharp eyes and a clear mind are two of the best observation tools that you have. Use them.
2. **Verbalize** – while it is important to clearly and concisely state what you have observed, you must be careful what you say. Remember it is not your role to dictate or fix problems. Don't be afraid to ask questions. If you do not understand why something is being done a certain way, ask. Question workers and others on the site.
3. **Write** – much has already been discussed relative to inspection reports. This will be the primary method of communication on most construction sites. All verbal communications should be followed up with written correspondence to solidify and document these communications. As with verbalization, written communications should be clear and concise. They should also be direct. If your handwriting is difficult to read, have reports and correspondence typed.
4. **Listen** – this method of communication is often abused and overlooked, but it is one of the keys to affective communication. A good rule of thumb in listening is, there are two ears for every mouth. You should listen twice as much as you talk.
5. **Documentation** – this form of communication has been discussed previously. Written documentation should be kept for at least three years from the time that the Notice of Termination is filed.

On most construction sites, the inspector is required to communicate with at least two entities; the contractor and the regulating agency. In most cases, the inspector will be working for one of these entities.

The inspector needs to make sure that both the contractor and the regulator are getting the same picture of what is happening on the site. An inspector is expected to be neutral and simply document their observations, regardless of the situation.

Copies of the inspection report should be kept on file at the construction site and with the regulating agency.

Background of an Inspector

WORKING WITH CONTRACTORS

For any project to be successful, it requires cooperation and working together. The relationship between a contractor and an inspector can greatly affect the outcome of a project. An inspector can make a contractor's life miserable and a contractor can make an inspector's life miserable.

Realize that you are both on the same team. You don't necessarily have to like one another, but you need to respect each other. The contractor has a big job with many responsibilities. Here are a few pointers to help in building a good working relationship:

1. **Build a trusting relationship** – follow through. When you say something, do it. The contractor may not like it, but he will learn to respect you when you are honest with him.
2. **Realize you are both on the same team** – the goal is to successfully complete the project. In order for it to be a success it needs to be completed on time and in budget. Understand this. Work with the contractor to help him stay on task, while still addressing the pollution prevention needs of the project.
3. **Show respect for other opinions** – if you see something that you don't understand or that you are concerned with, talk to the contractor. Get their input. Give the inspector a chance to explain what is going on before jumping to conclusions. Let him be a part of solving the problems.
4. **Don't be a bully** – it is not your place as an inspector to "run" the project. Sometimes you might be tempted to exercise a little muscle and let the contractor know you mean business. You do have authorities, but don't abuse them. Maintain a professional relationship. Give the contractor time to react to situations on site. If pollutants are being discharged, bring it to his attention and work together to get things stabilized. Then take a step back and let him work on a solution.
5. **Don't assume you know the contractor's job** – things are not always what they appear to be. Quite often there are situations and circumstances that you are not aware of as the inspector. This is where asking questions can help you understand what is really happening. You may see silt fence that is being placed up and down a slope and think that it is not being installed properly. If you ask what is happening, you might find out that the contractor has decided to use silt fence to delineate a boundary. When you understand, it makes more sense.
6. **Work together** – working as a unit will ensure the project will remain compliance rather than create unnecessary fines and legal actions.

Background of an Inspector

TEST YOUR UNDERSTANDING

1. **S&EC drawings approved by regulatory agencies cannot be updated or modified.**
    a. **True**
    b. **False**

2. **The CGP mandates that designers of S&EC drawings be registered professionals.**
    a. **True**
    b. **False**

3. **At any time, contractors can replace any BMP with mitigation measures of their own choosing.**
    a. **True**
    b. **False**

4. **Inspectors should always mandate to contractors what BMPs to install on construction sites.**
    a. **True**
    b. **False**

Background of an Inspector

ETHICS

Discussion About Ethics

- Which one of the following best defines “Ethics?”
  1. A system of moral principles.
  2. The branch of philosophy dealing with right and wrong of certain actions and with the good and bad of such actions.
  3. The philosophical study of the qualities perceived in works of art.
  4. All of the above.
  5. Both 1 and 2

- A compromise of ethics is often thought of as an extreme situation.

- Inspections can place inspectors in potential situations that may violate their ethics.

- You may experience the following:
  - √ Using your “friendship” to not document a finding or to “give him another chance.”
  - √ “Can’t we just settle this between the two of us?”
  - √ Requested to look the other way and let it go this time.

- As an inspector, you may be:
  - √ Pressured or intimidated by someone in a position of authority.
  - √ Challenged about a finding if it is insignificant to harming the environment.
  - √ Pressured to find violations for the purpose of generating revenue.

- A compromise of ethics will:
  - √ Undermine the credibility of an inspector,
  - √ Eventually destroy relationships of trust and respect,
  - √ Could mean trouble if your site is subject to an enforcement inspection, and
  - √ Could lead to legal or criminal action, loss of CAN-CISEC status, and employment loss.

Which of the following do you think is <u>NOT</u> part of the CAN-CISEC Code of Ethics?

1. A CAN-CISEC shall not issue a false statement or false information at any time.
2. A CAN-CISEC shall not write an inspection report that is detrimental to his/her employer or client.
3. A CAN-CISEC shall not divulge any information given in confidence.
4. A CAN-CISEC shall not falsely or maliciously attempt to damage the reputation of another.

Background of an Inspector

CAN-CISEC CODE OF ETHICS

Article I. General Principles

1. The privilege of professional practice imposes obligations of morality and responsibility as well as professional knowledge.
2. Each Canadian Certified Inspector of Sediment and Erosion Control (hereafter called CAN-CISEC) agrees to be guided by the highest standards of ethics, personal honor, and professional conduct.

Article II. Relation of Professional to the Public

1. A CAN-CISEC shall not give a professional opinion or make a recommendation without being as thoroughly informed as might reasonably be expected of a similarly situated professional.
2. A CAN-CISEC shall not knowingly permit the use of his or her reports or other documents for any unsound or illegitimate undertaking.
3. A CAN-CISEC shall not issue a false statement or false information at any time.
4. A CAN-CISEC shall not make any sensational, exaggerated, and/or unwarranted statements in any professional opinion or in the course of performing any professional services.
5. A CAN-CISEC may publish dignified business, professional, or announcement cards, but shall not advertise his or her work or accomplishments in a self-laudatory, exaggerated, or unduly conspicuous manner.

Article III. Relation of Professional to Employer and Client

1. A CAN-CISEC shall not use, directly or indirectly, any employer or client's information in any way that would violate the confidence of the employer or client.
2. A CAN-CISEC shall protect, to the fullest extent possible, the interest of their employer or client insofar as such interest is consistent with the law and his or her professional obligations and ethics.
3. A CAN-CISEC who finds that his or her obligations to their employer or client conflict with his or her professional obligation or ethics should address such objectionable conditions or resign.
4. A CAN-CISEC who has performed an investigation for any employer or client shall not seek to profit economically from the information gained.
5. A CAN-CISEC shall not divulge any information given in confidence.
6. A CAN-CISEC shall engage, or advise his employer or client to engage, and cooperate with other industry specialists whenever the employer or client's interests would be best served by such service.

Article IV. Relation of Professionals to Each Other

1. A CAN-CISEC shall not falsely or maliciously attempt to damage the reputation of another.
2. A CAN-CISEC shall refrain from plagiarism in oral and written communications.
3. A CAN-CISEC shall endeavor to cooperate with others in the profession and encourage the ethical dissemination of technical knowledge.

Article V. Duty to the Profession

1. A CAN-CISEC shall uphold this Code of Ethics by example and encourage other CISECs to do the same.

Article VI. Conflicts of Interest

1. A CAN-CISEC shall not inspect properties under contingent arrangements whereby any compensation or future referrals are dependent on reported findings.
2. A CAN-CISEC shall not receive compensation for an inspection from more than one party unless agreed to by the client(s).
3. A CAN-CISEC shall not accept compensation, directly or indirectly, for recommending contractors, services, or products to inspection clients or other parties having an interest in inspected properties.

Background of an Inspector

Which of the following is an acceptable gift according to the CAN-CISEC Code of Ethics?

1. $50 cash for falsifying an inspection report.
2. A gift certificate from a client in gratitude for help on a completed project.
3. Free hockey tickets from your client for not reporting non-compliance problems.
4. A bonus from your employer for not documenting deficiencies.
5. None of the above.

MOTTO OF A CAN-CISEC

Observe, inspect, and report on what you found
Avoid mandating your requirements
(unless you are qualified)

Module 2

Inspecting Best Management Practices

Inspecting Best Management Practices

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Inspecting Best Management Practices

TABLE OF CONTENTS

Inspecting Best Management Practices

Inspecting Best Management Practices

Objectives of Module 2

To provide a detailed overview of inspection requirements for various types of BMPS

Pop Quiz

Identify which of the following BMPs is Erosion Control (EC), Sediment Control (SC), Wind Erosion Control (WEC), or None (N). There may be more than one answer for each of the BMPs.

BMP	Treatment	BMP	Treatment
Fibre Roll Barrier		Silt Fence Barrier	
Hillside ECB		Hydraulic or Straw Mulch	
Soil Binder		Earthen Diversion Berm	
Rock Check Dam		Rock Barrier in front of a 2% grade street inlet opening	
Established vegetation		Turbidity Barrier	
Inlet Insert		Vehicle Tracking Pad	
Sediment Pond		Slope Drain	
Channel TRM		Planted seed (with no mulch) that has not yet germinated	

Writing Inspection Reports

What would you put in your inspection report?

1.

2.

3.

Inspecting Best Management Practices

Goal: Be descriptive but not prescriptive

Be descriptive about your observations

- Possible Statement No. 1:
  - √ ***"Erosion is occurring"***
    - Is this an enough description and is something missing?

Avoid being prescriptive about a solution

- Possible Statement No. 2:
  - √ ***"Replace soil, plant seed, and re-apply mulch"***
    - Are there other choices?

Look at the entire situation

- Possible Statement No. 3
  - √ ***"Need to assess establishment of embankment vegetation"***
    - Don't just report on the obvious

Basic Guidelines

1. *Be clear and concise*
2. *Write legibly*
3. *Use proper English*
4. *Share your results with the superintendent or contractor*
5. *Write reports as if an attorney will use them in court (it might happen).*

Review of Construction Site BMPs

Sediment Control BMPs

The purpose of sediment controls is to **minimize** eroded soil from being carried off the site by a mobile agent. This is accomplished by:

- Reducing runoff velocities
- Dissipating energy
- Providing an opportunity for sediments to settle

Methods that remove sediment from runoff waters are generally identified as "structural" methods

Sediment control does not control erosion

Erosion control minimizes sediment

Inspecting Best Management Practices

Sediment Control BMPs

Inspecting Best Management Practices

Silt Fence Barrier

When should it be installed?

When should it not be installed?

- Where concentrated flows are expected unless properly supported.
- After construction activities are completed.

What needs to be inspected?

- Are stakes on the downstream side?
- Is the fabric embedded in the ground?
- Does runoff flow under the fabric?
- Is the fabric attached to posts?
- Has runoff "flattened" the structure?
- Will runoff flow around the fence?
- Is the fabric torn or UV degraded?
- Has wind destroyed the fence?
- Check for proper joints between sections of silt fence.

What maintenance activities can be expected?

- Repair and replacement of material.
- Removal of sediment.
- Removal of fence material.

General Information

- Silt fence barriers do not filter small-suspended particles from runoff waters.
- Using wire backing for support may cause disposal problems.
- Compacting trench fill material is very critical.

Inspecting Best Management Practices

Inspecting Barriers

General Guidelines

Will flows go underneath?

Will flows go around the edges?

Will flows go between the structures?

Inspecting Best Management Practices

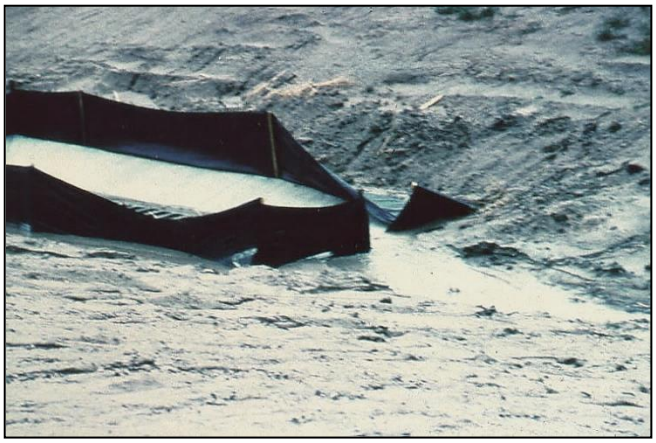
Is the installation correct?

Will the BMP be practical and effective?

Are there limitations?

Inspecting Best Management Practices

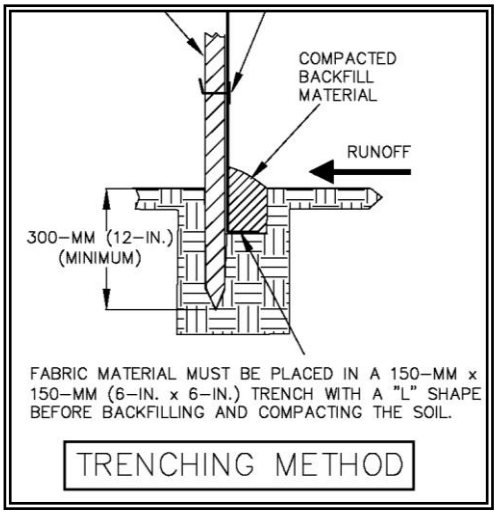
Silt Fence

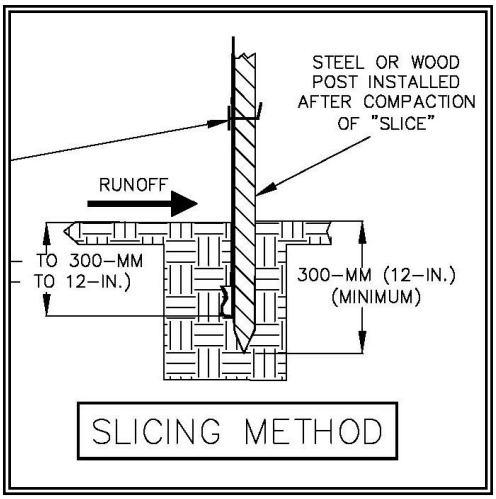


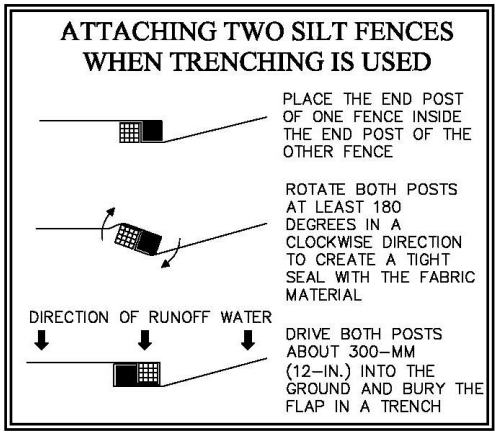
- ➢ *Widely used on construction sites*
- ➢ *Does not remove sediment by "filtration" through fabric material*
- √ However, they do cause ponding to allow for deposition of sediments
- ➢ *Should not be used where concentrated flows occur unless properly supported*

Inspecting Silt Fence Barriers

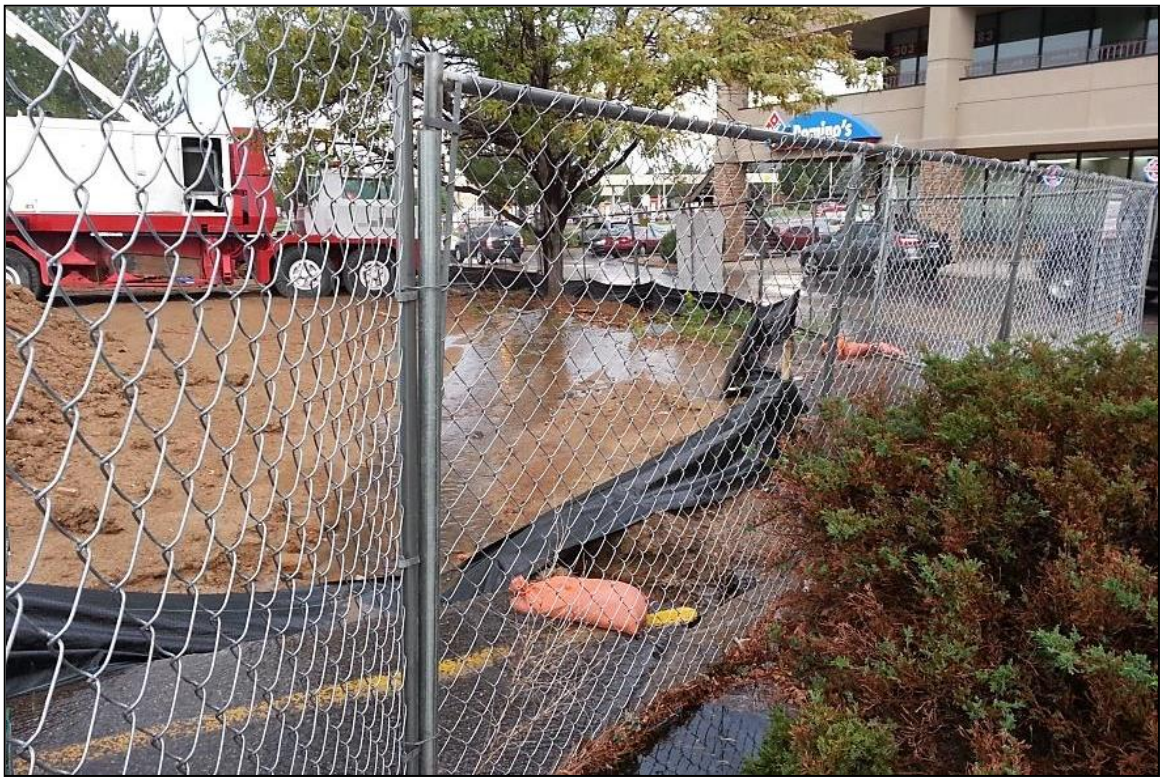
- ➢ *General*
- √ Are posts on the downstream side?
- √ Will containment of runoff occur?
- √ Does UV degradation of material exist?
- √ Is the material attached to a stake?
- ➢ *Trenching*
- √ Is fabric embedded in the ground per the specifications?
- √ Does compaction of backfill material exist?
- ➢ *Slicing*
- √ Has "slicing" of material into the soil occurred?
- √ Has compaction of the soil occurred?







Inspecting Best Management Practices



Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2. Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

Inspecting Best Management Practices

Bale Barrier

When should it be installed?

- Before construction activities begin.
- While construction activities are occurring.

When should it not be installed?

- After construction activities are completed.

What needs to be inspected?

- Are the bales in a trench?
- Are wood stakes used?
- Will runoff flow over the bales?
- Does runoff flow between bales?
- Will runoff flow around the bales?
- Does runoff flow under the bales?
- Does upstream backfill material exist?
- Is the twine or wire above the ground?

What maintenance activities can be expected?

- Repair and replace bales.
- Repair of eroded ground.
- Remove bales.
- Remove deposited sediment.

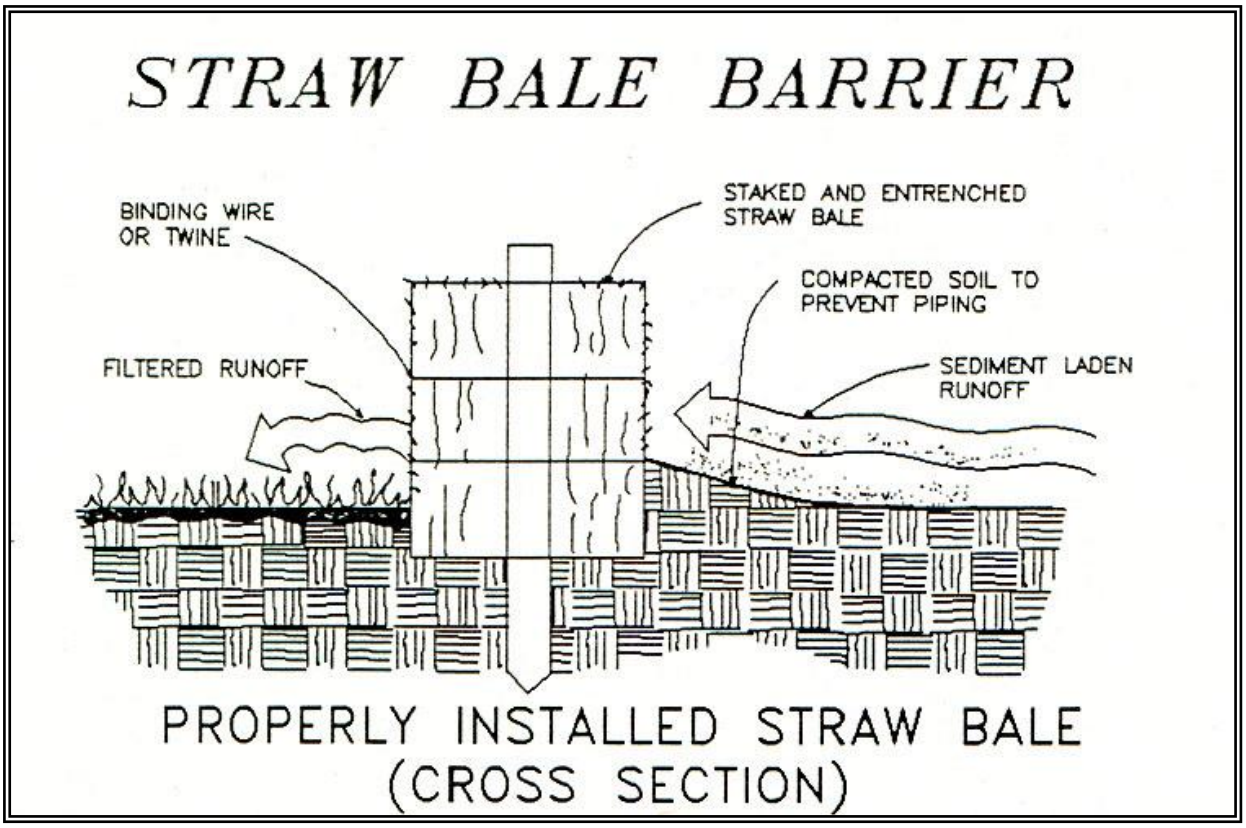
General Information

- Bale barriers are nearly 100% ineffective in reducing sediment in runoff waters when not installed correctly.
- Bale barriers experience more failures than successes.
- Bale barriers do not filter runoff waters.
- Bale barriers are expensive to install and maintain.

Inspecting Best Management Practices

Bales

- *Are the bales in a trench?*
- *Are wood stakes used?*
- *Does runoff flow over the bales (correct installation)?*
- *Does runoff flow between bales (incorrect)?*
- *Does runoff flow under the bales (incorrect)?*
- *Does runoff flow around the bales (incorrect)?*
- *Does upstream backfill material exist?*
- *Is the twine or wire above the ground?*



Inspecting Best Management Practices

Fibre Logs/Rolls for Individual Lots

When should it be installed?

- Before construction activities begin.
- While construction activities are occurring.

When should it not be installed?

What needs to be inspected?

- Does it meet specifications?
- Is the barrier staked properly?
- Is the barrier placed within a depression and backfilled?
- Does runoff flow under the barrier?
- Is the barrier “pinned” on the upstream side?
- Has traffic "flattened" the structure?
- Will runoff flow around the barrier?

What maintenance activities can be expected?

- Repair and replacement of the fibre log/roll.
- Removal of sediment.

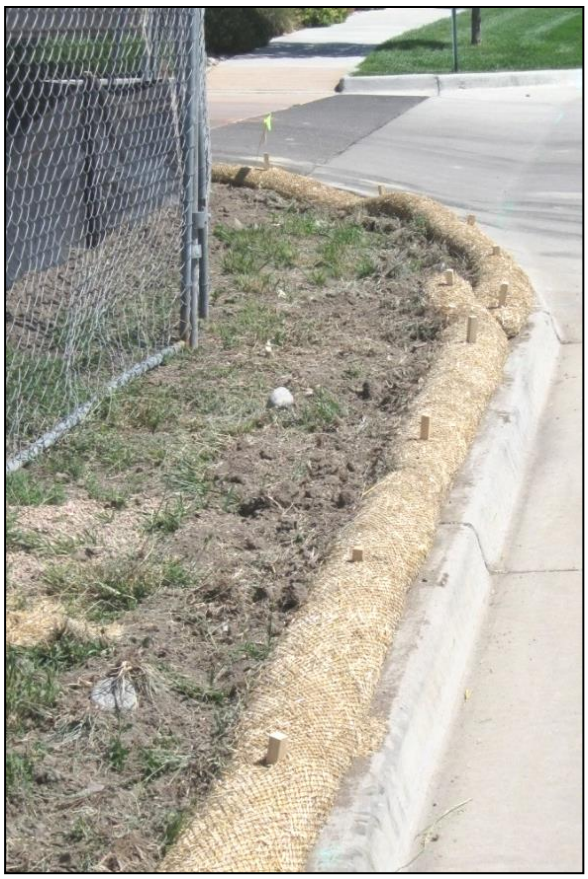
General Information

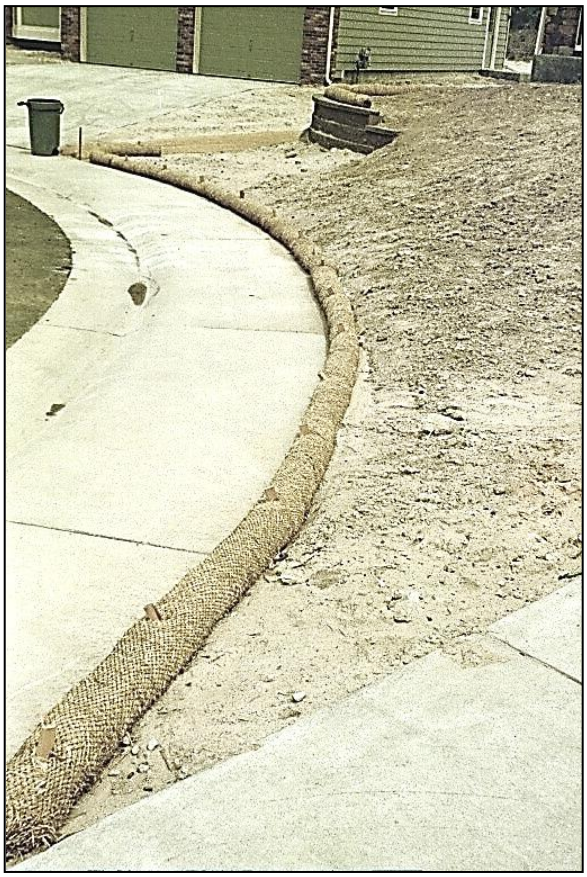
- Fibre logs/rolls should not to be used where concentrated flows of runoff are anticipated such as in drainage ditches, around inlets, or above/below where culverts discharge.
- Fibre logs/rolls can create a very small sediment containment system to allow for deposition of suspended particles.
- Fibre logs/rolls do not filter small-suspended (e.g., clay) particles from runoff waters.
- High rate of failure due to incorrect installation and maintenance.

Inspecting Best Management Practices

Fibre Logs/Rolls

- *Is the barrier within a depression and backfilled?*
- *Is the correct size installed?*
  - √ Check the specifications.
- *Are stakes holding the barrier in place?*
- *Will the barrier contain runoff?*
- *Will the barrier divert runoff and cause downstream problems?*
- *Is runoff flowing under the barrier?*
- *Has the structure been impacted by traffic or not properly re-installed after removal for vehicular access?*





Inspecting Best Management Practices

Compost Material

- *Has the correct material been used?*
  - √ Check specifications
- *Is the location appropriate?*
  - √ Example: not located upstream of a sensitive area unless approved
- *Will runoff flow around the barrier?*
- *Will the barrier contain runoff?*

Berm

- *Does an adequate base and height exist?*
  - √ Base width = 2 x height
  - √ For slopes up to 3H:1V, height should be 300 to 600 mm (1- to 2-feet)
- *Are the ends upslope to contain runoff?*
- *Has damage to the berm occurred after runoff?*
- *Is the berm becoming vegetated?*
  - √ May not be successful in arid and semi-arid climates due to limitations of consistent moisture
- *Is an overflow location needed?*

Sock

- *Has the sock been filled to correct specifications?*
- *Will runoff flow under the barrier?*
- *Is the barrier secured per the specifications?*

Inspecting Best Management Practices

Check Structures

Main purpose

Slow down runoff

Capture suspended particles

Allow for erosion control

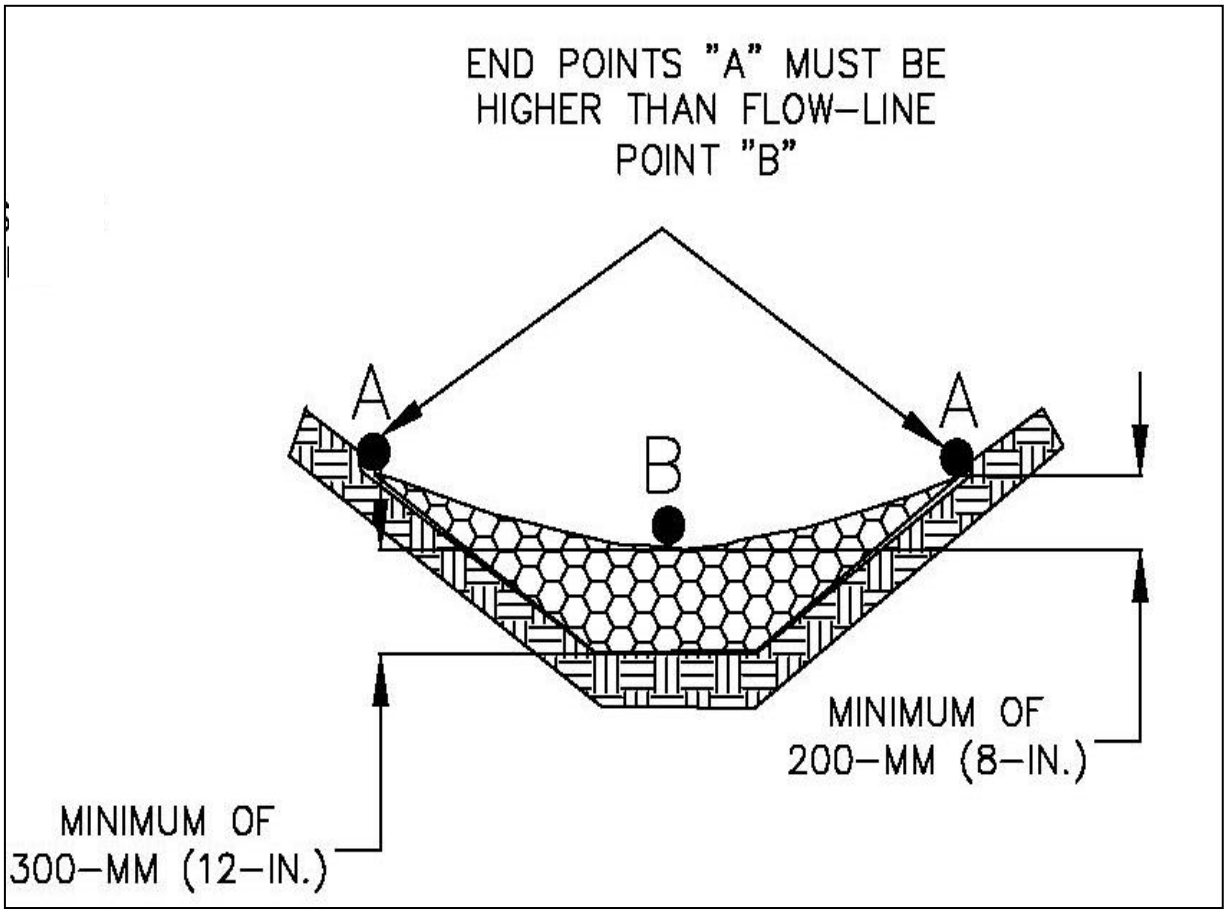
Can be a variety of materials.

Minimum Requirements for Effectiveness

Critical: Low point to allow for overflow conditions

End points higher than overflow point

Must convey flows without failure



Inspecting Best Management Practices

Rock Check Structure

When should it be installed?

- While construction activities are occurring.

When should it not be installed?

- After construction activities are completed.

What needs to be inspected?

- Are the correct rock diameters used?
- Is there a low point for flows?
- Will runoff flow over the rocks?
- Will runoff flow around the rocks?
- Is the spacing correct (sediment control barrier vs. erosion control barrier)?
- Is “piping” occurring?

What maintenance activities can be expected?

- Repair and replacement of rock.
- Removal of sediment.
- Repair of eroded ground.
- Removal of rock.

General Information

- Proper rock selection is very important.
- Flows must discharge through a low point within the rocks and not around the structure.
- If not properly spaced, erosion will occur between the structures.

Inspecting Best Management Practices

Rock

- *Must have a low point in the flow line for runoff*
- *Edges must be higher than flow line*
- *Rock must be properly sized*
  - √ Check the specifications
- *Does a mixture exist?*
  - √ Check specifications, this is a designer's responsibility

Silt Fence

Not designed for concentrated flows without proper reinforcement (e.g., wire backing and T-Posts)

If not supported correctly, will likely require extensive maintenance

Without proper installation, failure is usually the norm

Inspecting Best Management Practices

Bale Barrier Check Structure

When should it be installed?

- While construction activities are occurring.

When should it not be installed?

- After construction activities are completed.

What needs to be inspected?

- Are the bales in a trench?
- Are wood stakes used?
- Is the spacing correct for erosion control?
- Will runoff flow over the bales?
- Does runoff flow between bales?
- Will runoff flow around the bales?
- Does runoff flow under the bales?
- Does upstream backfill material exist?
- Is the twine or wire above the ground?

What maintenance activities can be expected?

- Repair and replacement of bales.
- Repair of eroded ground
- Removal of the bales.
- Removal of sediment.

General Information

- Bale check structures are nearly 100% ineffective in reducing sediment in runoff waters.
- Bale check structures experience more failures than success and often cause extensive downstream and side slope erosion
- Bale check structures do not filter runoff waters.
- Bale check structures are expensive to install and maintain.

Inspecting Best Management Practices

Bales

- *Can be one of the more expensive BMPs on construction sites*
  - √ Labor costs are high for installation and repair
- *Requires proper installation*
  - √ Same inspection requirements as a bale barrier
- *Must have a low point in the flow line for runoff*
- *Edges must be higher than flow line*
- *Replacement of bales must occur if existing ones are damaged*
- *Requires continuous maintenance*

Inspecting Best Management Practices

Geosynthetic Check Structure

When should it be installed?

- Before construction activities begin.
- While construction activities are occurring.

When should it not be installed?

- After construction activities are completed.

What needs to be inspected?

- Is the structure installed per manufacturer specifications?
- Is it properly stapled or staked?
- Will runoff flow over the structure?
- Will runoff flow around the structure?
- Does runoff flow between overlapped structures?
- Does runoff flow under the structure?

What maintenance activities can be expected?

- Repair and replacement of structures.
- Removal of sediment.
- Repair of eroded ground.
- Removal of structures.

Additional Information

- Variety of products including rigid and flexible materials.

Inspecting Best Management Practices

Geosynthetic

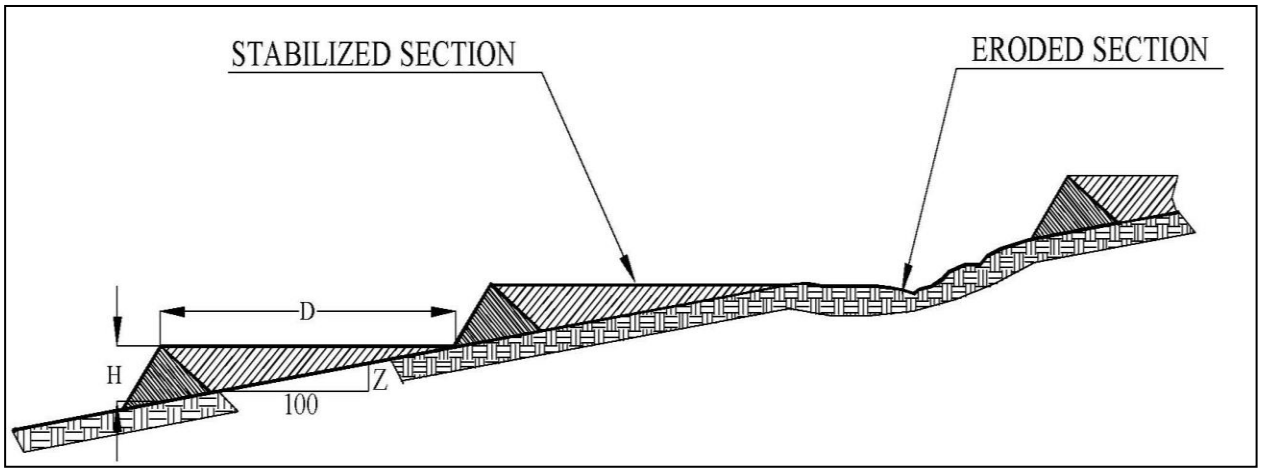
- *A variety of products exist*
  - √ Rigid
  - √ Flexible
- *Check manufacturer's specifications to make sure barriers are installed correctly*
- *Low point must exist for runoff to flow over*
- *Check structure is working correctly when runoff ponds behind the structure and creates a "plateau"*
  - √ Reduces velocity of runoff, allowing the deposition of sediment to occur
- *Check if spacing of barriers is required*
  - √ Based on if barriers are designed as sediment control or erosion control (more information appears later in this document)

Inspecting Best Management Practices

Fibre Log/Roll

- *Should have a diameter of at least a 300-mm (12-inches)*
- *Was the roll installed per manufacture's specifications?*
  - √ *Same* inspection *requirements as a Fibre Log/Roll Barrier*
- *Provides minimal reduction in flow velocities*
- *Provides minimal capturing of sediment*
- *Have a high chance for failure*
- *Low point must exist for runoff to flow over*
- *High chance for failure if joint between two rolls is at low point*
- *May need to be replaced by a more effective BMP*
  - √ As determined by a designer

Inspecting Best Management Practices



Spacing of Check Structures

- *Spacing is **critical** between check structures for **erosion protection***
- *Top of the downstream structure must be in line with the bottom of the upstream structure to minimize erosion*

- *Spacing is **not critical** between check structures for **sediment control***
  - √ Height is critical for effective containment volume

- *Removal of accumulated deposited material must occur regularly for structures installed as sediment control*
- *Possible use of various erosion control BMPs or repair of eroded channel*

Inspecting Best Management Practices

Inspection No. 1 Worksheets

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2. Time:_____ ☐ Discharges are Occurring		
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Inspecting Best Management Practices

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Inspecting Best Management Practices

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Location No. 3 Time:_____ ☐ Discharges are Occurring		

Inspecting Best Management Practices

Writing Reports (Review)

Avoid general statements:

- Erosion is evident!
  - True, but what are suggestions for the situation?
- Need to stop runoff from the bare soil!
  - Impossible to prevent for all storm events
- Replace the silt fence barrier with a fibre log!
  - Do not specify specific replacements
- Plant seed and apply straw mulch!
  - (What if this is not the best solution?)

Remember, When Writing Reports:

- Be clear and concise
- Write legibly
- Use proper English
- Share your results with the superintendent or contractor
- Write reports as if an attorney will use them in court (it might happen)

Inspecting Best Management Practices

Curb Inlet "Sump" Barrier

When should it be installed?

- While construction activities are occurring.
- Only where sump conditions exist.

When should it not be installed?

- After construction activities are completed.
- Where sump conditions do not exist.

What needs to be inspected?

- Is correct material being used (e.g., at least 25 mm (1.0-in.) diameter rock)?
- Does runoff flow through the barrier?
- Can runoff flow over the barrier?
- Will runoff be diverted downstream?
- Should the barrier be replaced?
- Does gap exist for overflow conditions?
- Is ponding occurring?
- Have vehicles destroyed the structure?

What maintenance activities can be expected?

- Repair and replacement of structure.
- Removal of sediment.
- Removal of structure.

General Information

- Barriers are to be installed in "sump" conditions only.
- Barriers in front of inlets provide little filtering effect and capture little sediment from runoff waters.
- Warning signs should be used to alert drivers of the structures.
- Barriers in front of inlets may cause destruction of the pavement due to excess seepage of runoff or freezing conditions.
- If placed on a grade, the structure will divert runoff downstream and may cause flooding.

Inspecting Best Management Practices

BMPs for Inlets

Curb Opening Barriers

- *Do "sump" conditions exist?*
  - √ Downstream flooding and sedimentation may occur if "sump" conditions do not exist
- *Does a gap exist between the barriers and curb in front of the opening for overflows?*
- *Will runoff enter the inlet from behind the structure?*
- *Will the barrier divert runoff around an inlet?*
  - √ Remember, inlets are designed to capture runoff
- *Is ponding of runoff occurring in front of the barrier?*
- *When can the barriers be removed?*
- *When are contributing lands stabilized?*

Inspecting Barriers in Front of Curb Inlets

- *Is there debris on top of barrier?*
  - √ Indicates overflow conditions have occurred
- *Is there uniform sedimentation in front of the barrier?*
  - √ Lack of uniformity indicates failure of the barrier is occurring
- *Is there sediment entering from behind the inlet?*
- *Need to check upstream for source of sediment and downstream for sedimentation*

Inspecting Best Management Practices

Curb and Gutter Containment System

When should it be installed?

- While construction activities are occurring.
- Where street grades exist.

When should it not be installed?

- After construction activities are completed.
- As the only method for controlling sediment from construction sites.

What needs to be inspected?

- Are the bags about 2/3 full?
- Was the correct material used to fill the bag per specification?
- Is bag tight to the curb with no gaps?
- Is runoff bypassing the bag?
- Is deposited sediment removed?
- Is the spacing correct?
- Have vehicles destroyed the bags?

What maintenance activities can be expected?

- Repair and replacement of bags.
- Removal of sediment.
- Removal of bags.

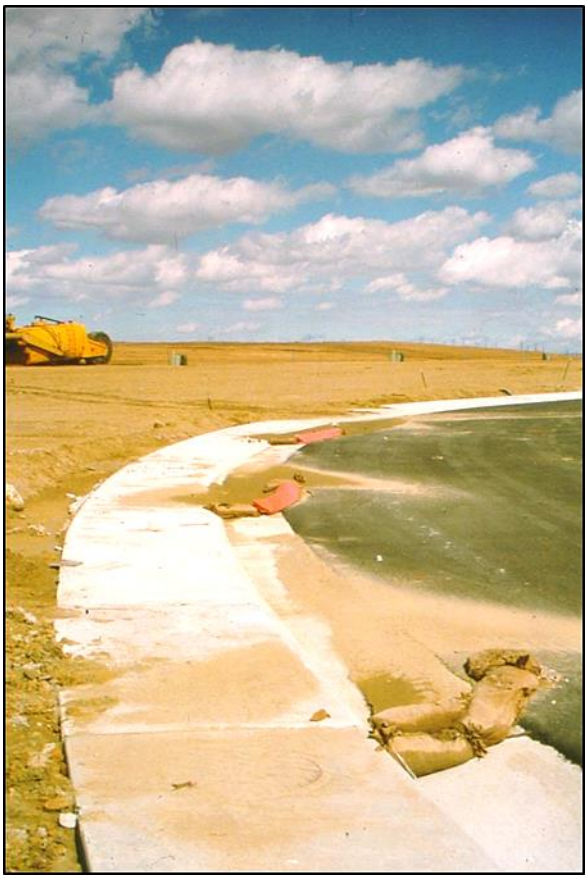
General Information

- Vehicles will destroy the bags.
- Warning signs should be used.
- Deposited sediment must be removed after every runoff event.
- Runoff waters should not be allowed to remain behind the bags.

Inspecting Best Management Practices

Curb and Gutter Systems

- *Use when an inlet is on a grade*
- *Install upstream of the curb opening*
- *Check that correct material was used inside the bag*
- *Subject to vehicular damage*
  - √ May need signage
- *Small effectiveness to remove sediment from runoff waters*



Inspecting Best Management Practices

Area Drain Rock Barrier

When should it be installed?

- While construction activities are occurring.
- Only where sump conditions exist.

When should it not be installed?

- After construction activities are completed.
- Where sump conditions do not exist.

What needs to be inspected?

- Is at least 25 mm (1.0-in.) diameter rock used?
- Does runoff flow through the rock?
- Has wire mesh been used?
- Does the rock need "raking?"
- Can runoff flow over the rock?
- Will runoff be diverted downstream?
- Should the rock be replaced?
- Is ponding occurring?

What maintenance activities can be expected?

- Repair and replacement of rock and materials.
- Removal of sediment.
- Removal of rock and materials.

General Information

- Rock barriers around area drains will allow runoff to drain.
- Only wire mesh should be used instead of materials such as chicken wire.
- Rock barriers are to be installed in "sump" conditions only. Rock barriers in front of inlets on a grade will divert runoff to downstream locations.
- Rock barriers in front of inlets provide little filtering and capture little sediment from runoff waters for large frequency storm events.

Inspecting Best Management Practices

Area Drain Bale Barrier

When should it be installed?

- While construction activities are occurring.
- Only where sump conditions exist.

When should it not be installed?

- After construction activities are completed.
- Where sump conditions do not exist.

What needs to be inspected?

- Are the bales in a trench?
- Are wood stakes used?
- Will runoff flow over the bales?
- Does runoff flow between bales?
- Will runoff be diverted downstream?
- Does runoff flow under the bales?
- Does upstream backfill material exist?
- Is the twine or wire above the ground?
- Is ponding occurring?

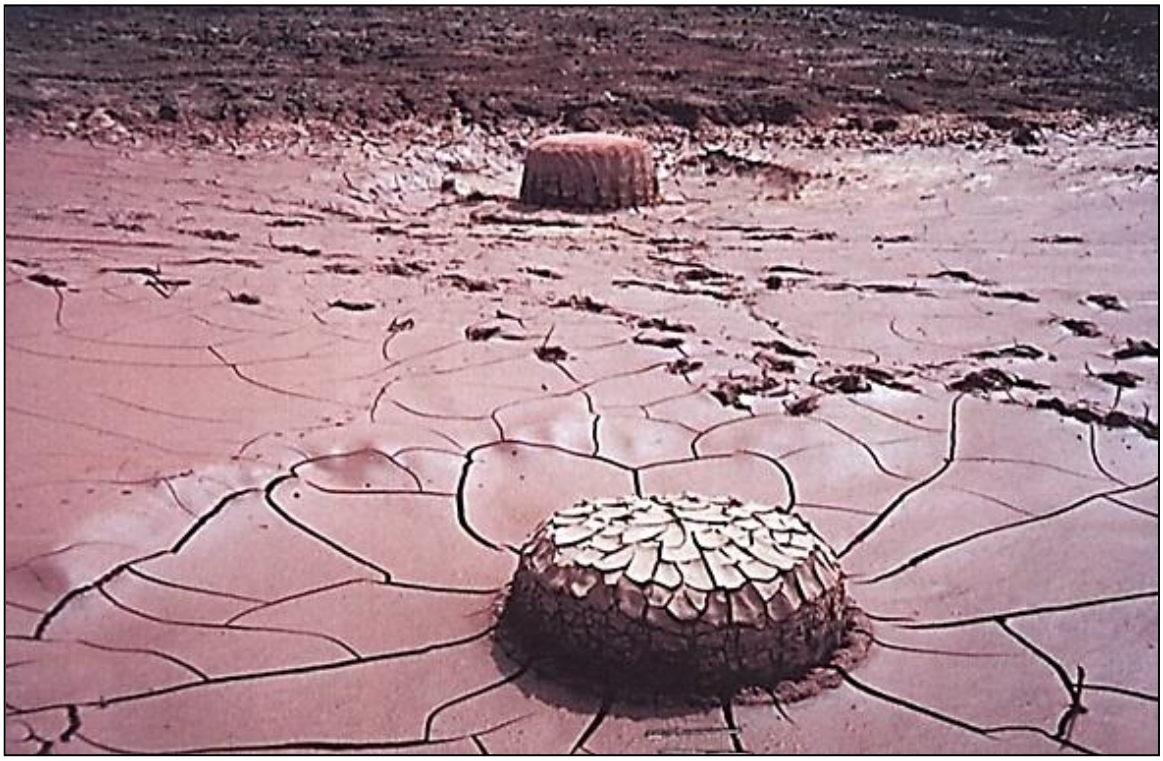
What maintenance activities can be expected?

- Repair and replacement of bales.
- Removal of the bales.
- Removal of sediment.

General Information

- Bale barriers are nearly 100% ineffective in reducing sediment in runoff waters, when not properly installed.
- Bale barriers experience more failures than successes.
- Bale barriers do not filter runoff waters.
- Bale barriers are expensive to install and maintain.
- Bale barriers are to be installed in “sump” conditions only.

Inspecting Best Management Practices



Area Drain Frame and Filter Barrier

When should it be installed?

- While construction activities occur.
- Only where sump conditions exist.

When should it not be installed?

- After construction activities are completed.
- Where sump conditions do not exist.

What needs to be inspected?

- Is the unit placed over the grate?
- Do “sump” conditions exist?
- Is there enough soil or gravel to seal the cover at the base?
- Is the fabric material torn?
- Does accumulated sediment cover 2/3 of the filter barrier height?
- Is the frame supporting the fabric?
- Is ponding occurring?
- Does it appear that runoff is flowing under the fabric material?
- Does runoff drain through the fabric material?

What maintenance activities can be expected?

- Repair and replacement of gravel in the pocket that creates a seal with the ground.
- Removal of sediment around the unit.
- Replacement of fabric material and/or frame.

General Information

- These barriers are to be installed in "sump" conditions only.
- It is critical that a good seal exist between the ground and fabric material.

Inspecting Best Management Practices

Area Inlet Barriers

Rock

- *Allows water to drain*
- *Do "sump" conditions exist?*
- *Must have an internal support*
- *Rock diameter is important*
  - √ Does 40 to 50 mm (1½- to 2-inch) diameter rock exist?
  - √ Does "raking" of the rock need to occur?
- *Is ponding occurring?*
- *Is sedimentation occurring?*
  - √ Does sediment need to be removed?

Silt Fence

- *High likelihood of failure*
- Not meant for concentrated flows unless adequately supported
- *High maintenance*

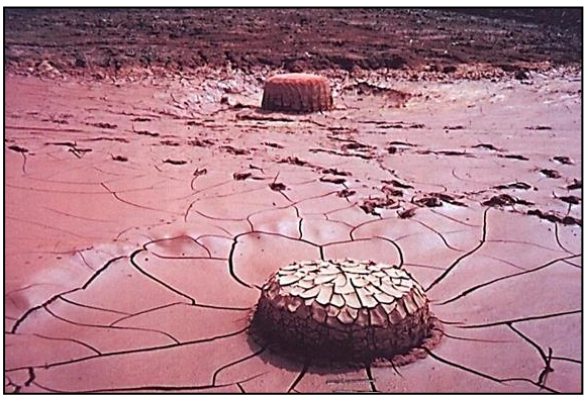
Inspecting Best Management Practices

Bale

- *Do "sump" conditions exist?*
- *Are the bales installed correctly?*
- *Is ponding occurring?*
- *Is sedimentation occurring?*
- *Is maintenance necessary?*

Rigid Frame

- *Provides a rigid frame over the inlet*
- *Provides a geotextile barrier with a seal at the base*
- Usually small rock around the base
- *Must be installed in a "sump" location*



Inspecting Best Management Practices

Inlet Insert

When should it be installed?

- While construction activities are occurring
- Within inlets that are on a grade or in a sump

When should it not be installed?

- At a location to serve as the only sediment containment system.

What needs to be inspected?

- Is the fabric material torn?
- Will runoff flow into the structure?
- Is the containment bag over ½ full?
- Does sediment and debris need to be removed?

What maintenance activities can be expected?

- Repair and replacement of fabric material.
- Removal of sediment.
- If freezing conditions occur, removal of sediment as part of the winterizing procedure.

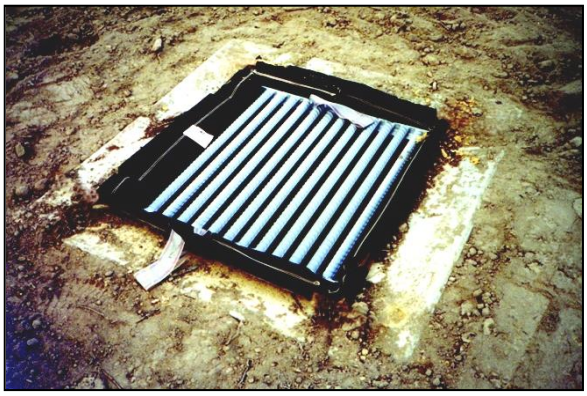
General Information

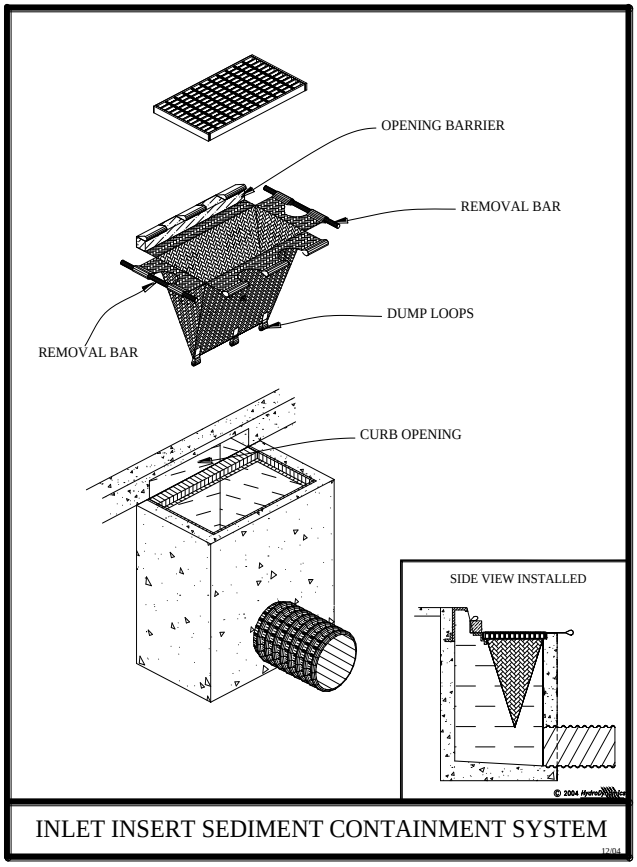
- Be sure to empty the units before winter freezing conditions occur.
- Do not rely on these units to be the only sediment control device on a construction site.

Inspecting Best Management Practices

Inlet Inserts

- *Is the installation correct per manufacture's specifications?*
- *Is material being damaged?*
- *Is contained material significantly reducing the containment volume?*
- *Has "winterizing" occurred by emptying the bag?*





INLET INSERT SEDIMENT CONTAINMENT SYSTEM

Inspecting Best Management Practices

Stockpile Management

When should it be installed?

- While construction activities are occurring.
- When storage of excess soil (including topsoil) must occur.

When should it not be installed?

- Adjacent to water courses, drainage ways, bodies of water, sensitive areas or inlets.
- After construction activities.

What needs to be inspected?

- Is the stockpile in an appropriate location?
- Is the stockpile below regulated maximum height?
  - √ Under burden vs. topsoil
- Will runoff intercept the stockpile?
- Do downstream BMPs exist and are they functional?
- Do erosion control measures need to be applied?
- Is wind erosion occurring and do BMPs need to be installed?
- Does access exist for maintenance/installation of BMPs?
- How long has the stockpile been stored?

What maintenance activities can be expected?

- Repair and replacement and/or installation of BMPs.
- Removal of accumulated sediment upstream of BMPs.
- Removal of stockpile.

Items of Importance

Stockpile Management

Inspecting Best Management Practices

- *Storage should not be longer than 12-months.*
- *Minimize compaction of the soil.*
- *Protect from offsite flows and wind.*
- *Access must exist for the addition and removal of material and BMPs.*
- *BMPs must be in place to capture sediment laden runoff from the stockpile and local area.*
- *Local regulations should dictate maximum stockpile height.*

Protecting the Quality of Topsoil

- *Avoid over saturated conditions.*
- *Be relatively free of debris, trash, stumps, large rocks or noxious waste.*
- *Be free of toxic and hazardous substances.*
- *Height should not be more than 1.2 m (4-ft.) and have a short storage time:*
  - √ Minimizes micro-organisms being deprived of oxygen and moisture.
  - √ Minimizes impacts to bacteria, mycorrhizal fungus, algae and other living organisms.
  - √ Critical to establishment of vegetation.

Inspecting Best Management Practices

Turbidity Barrier

When should it be installed?

- Before construction activities begin.
- While construction activities are occurring.

When should it not be installed?

- Where water currents move the curtain and dislodge collected sediments.
- After construction activities.

What needs to be inspected?

- Does the curtain move?
- Does the curtain capture sediment?
- Does the barrier float?
- Was it installed per specifications?

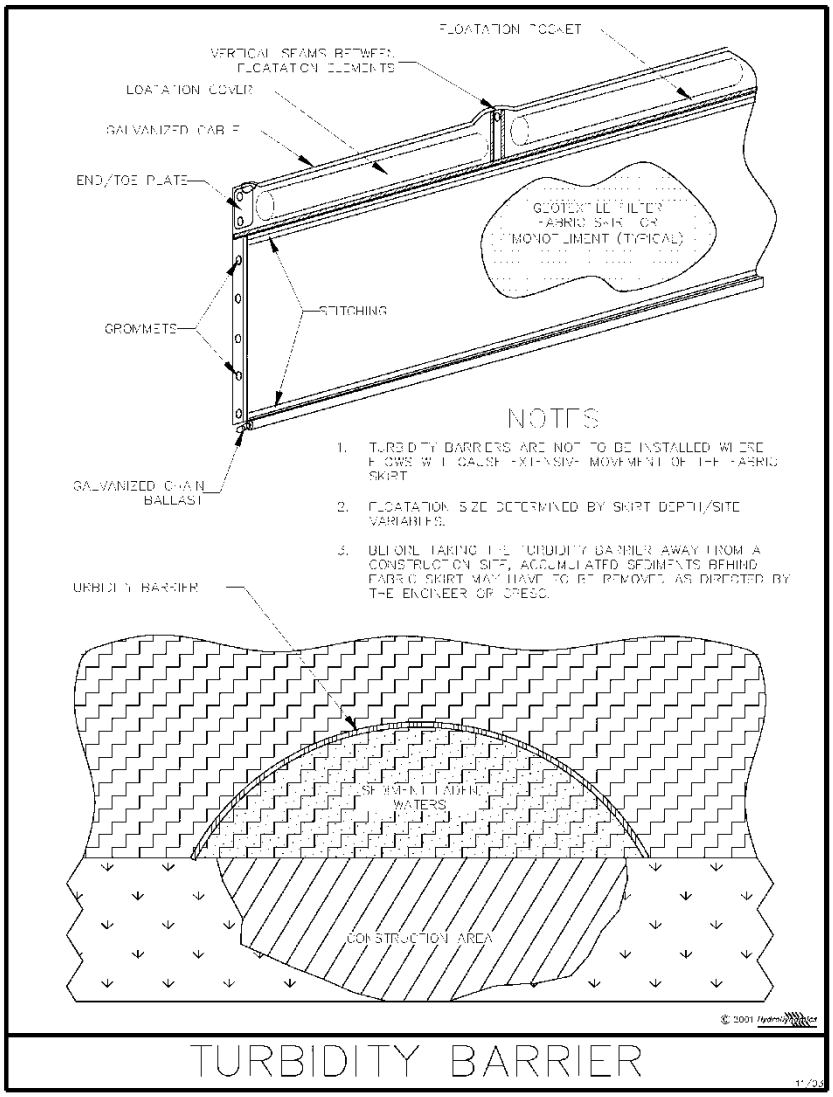
What maintenance activities can be expected?

- Repair and replacement of material.
- Removal of sediment from curtain.
- Removal of curtain material.

Items of Importance

- Do not install turbidity barriers where the flow of water will remove accumulated sediment and/or significantly move the curtain (e.g., in areas where tidal flows exist).
- When used in a live stream, turbidity barriers must be installed parallel, not perpendicular, to the flow.
- Removal of captured sediment behind the curtain may need to occur prior to removing the barrier.

Inspecting Best Management Practices



Inspecting Best Management Practices

Inspection No. 2 Worksheets

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2. Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

Inspecting Best Management Practices

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Inspecting Best Management Practices

Sediment Containment Systems (SCSs)

Sediment Basin/Pond

- *Detention Structures*
  - √ Large contributing areas
  - √ Medium size silts and larger particles
- *Important Parameters*
  - √ Elliptical or rectangular shape
  - √ Long inflow-to-outflow distance
    - Containment pond be least 750 mm (30-in.) deep
  - √ Adequate detention time
    - Upstream clay soils: 48- to 72-hours
    - Upstream sandy soils: 24- to 48-hours
  - √ Controlled discharge outlet structure
    - Surface removal of water or
    - Perforated riser pipe or perforated orifice plate
  - √ Designed flood flow (e.g., 2-year) discharge outlet structure

Sediment Trap

- *Retention Structures*
  - √ Any shape
    - Retain all runoff waters
    - Convey designed flood flows
- *Detention Structures*
  - √ Nearly the same parameters as for a sediment basin/pond
    - Medium size sands and larger particles
    - Long inflow-to-outflow distances
    - At least 24-hour detention time
    - Controlled discharge outlet structure
    - Designed flood flow discharge outlet structure

Inspecting Best Management Practices

Temporary Sediment Trap

- *Smaller units*
  - √ Sands, gravel and larger suspended particles
  - √ Maximize inflow-to-outflow distances
  - √ Remove water from top of pond
  - √ Accommodate overflows

Filter Bag

- *Captures large suspended particles*
  - √ May require approval by designer or regulatory personnel

- *Limitations*
  - √ *Pumping rate into the bag can exceed seepage out of bag.*
  - √ *Bag can become clogged*
  - √ *Failure can occur*

Inspecting Best Management Practices

Outlet Structures

Rock Barriers

- *Can replace troublesome outlet structure openings*
- *Can be part of a drainage system*
- *Need to minimize clogging of rock material*
  - √ Does 40 to 50 mm (1½ - to 2-in.) rock exist?
  - √ Does raking of the rock need to occur?
  - √ Does the rock barrier have enough height?

Perforated Riser Pipe

- *Is the correct size pipe used?*
  - √ Do perforations exist?
- *Is (25 to 50 mm) 1- to 2-inch rock placed around the pipe?*
  - √ Smaller rocks will clog
- *Is the height of the rock barrier adequate?*
  - √ Rock should be up to the same height of the top perforation.
- *Avoid wrapping perforated pipe with fabric material*
  - √ Material usually clogs

Perforated Orifice Plate

- *Holes can easily be clogged by debris*
- *Rock barriers may increase effectiveness*

Inspecting Best Management Practices

Skimmer Outlet Structure

When should it be installed?

- Immediately after sediment containment systems are constructed.
- Before construction activities begin.
- While construction activities are occurring.

When should it not be installed?

- No limitations.

What needs to be inspected?

- Overall appearance of the skimmer?
- Is the trash screen clogged?
- Are there any cracks or broken pieces?
- Is the skimmer draining properly?
- Is the skimmer able to rise and fall with the water column?
- Is the skimmer right side up?

What maintenance activities can be expected?

- Removal of trash from orifice.
- Repair of unit due to vandalism.

General Information

- Unless advised otherwise, resident time of contained waters within a sediment containment system should be at least 48 hours.

Inspecting Best Management Practices

Skimmer

- *Removes water from the upper 75 mm (3-in.) of contained waters.*
  - √ More effective than rock barriers, perforated riser pipes or perforated orifice plates.
- *Must be installed correctly.*
- *Will the structure rise as runoff enters the pond?*
- Is the vent pipe on top?
- Is trash blocking the opening?

Inspecting Sediment Containment Systems

- *Does enough storage volume exist for inflow waters?*
  - √ May need confirmation by the contractor, surveyor or designer.
  - √ Do accumulated sediments need to be removed?

- *Are the embankments stabilized?*
  - √ May not be necessary for temporary systems.

- *Is the outlet structure functioning in a correct manner?*
  - √ Most critical part of an SCS.
  - √ Functional controlled discharge structure.
    - Skimmer is preferred
  - √ Maximum distance between inflow and outflow structures.
  - √ Is there a method to safely discharge flood flow waters?

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Inspection No. 3 Worksheet

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
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Location No. 3 Time:_____ ☐ Discharges are Occurring		

Inspecting Best Management Practices

Vehicle Tracking Pad

When should it be installed?

- While construction activities are occurring.
- Before major over lot grading activities begin.

When should it not be installed?

- When only impervious surfaces exist.
- After all construction activities cease.

What needs to be inspected?

- Are the correct rock diameters used?
- Is there a depression for runoff?
- Is rock being carried out into a street?
- Is sediment being tracked onto the street?
- Does rock need to be replaced?

What maintenance activities can be expected?

- Replacement of rock.
- Removal of sediment on adjacent streets.
- Removal of structure.

General Information

- When small diameter rock is used, it will be tracked onto streets and could create liability problems with vehicles. Large diameter rock can get stuck between the tires.
- The purpose of a filter cloth is to ensure minimal movement of rock into the earthen material.

Inspecting Best Management Practices

Stabilized Construction Entrances

Rock Vehicle Tracking Pad

- *Pad of rock material on top of filter cloth at site entrance/exit*
- *Causes removal of mud from construction equipment*
- *Can be expensive to install and maintain*
- *Must use sufficiently large diameter rock*
  - √ 50 to 100 mm (2- to 4-in.)
  - √ Avoid 150 mm (6-inch) or larger rocks since they can get lodge between the dual tires of trucks
- *Are bare spots within the rock pad becoming evident?*

Grates or Ridges

- *Does enough length exist?*
- *Are the grooves clean?*
- *Does treatment for one-wheel rotation exist?*
- *Does a rock pad exist and is it functional?*

Tire Washing

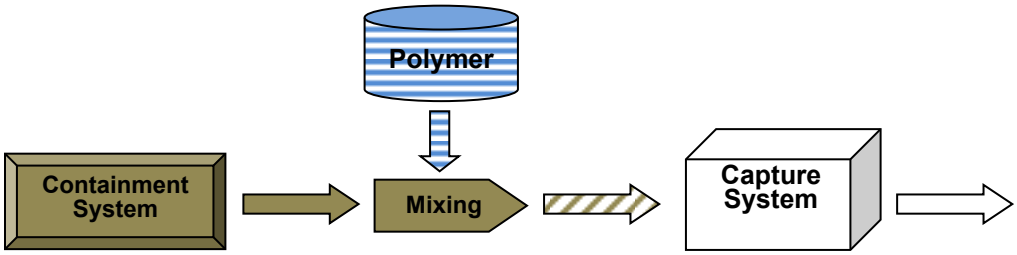
- *Labor intensive*
- *Need to recycle the wastewater*
- *Is wastewater discharging from the site?*
- *Continual cleanup is necessary*
  - √ Is sediment being tracked away from the washing facility?

Inspecting Best Management Practices

Using Flocculants

Only the use of flocculants will removal of small suspended particels (e.g., clays) occur from runoff waters when captured by a sediment basin/trap. However, the methods require proper design, installation and inspections.

Liquid Treatment System



- *Is water being removed near the pond surface?*
- *Is injection of polymer occurring?*

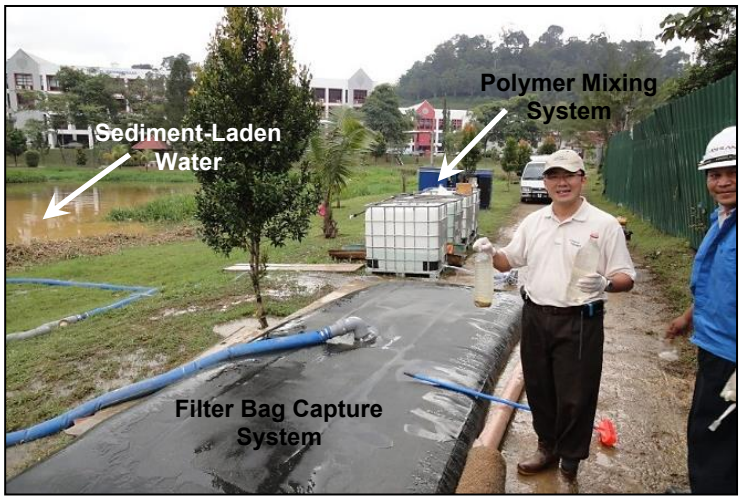
- *Are the hoses leaking?*
- *Are problems with the filters evident?*

- *Do discharges have an odor or appear to contain large amounts of sediment?*

Inspecting Best Management Practices

Using Liquid Treatment System with Temporary Filter Bags

- *Removing sediment-laden waters from a containment system*
- *Mix sediment-laden waters with a polymer*
- *Polymer treated waters are pumped into a capture system*

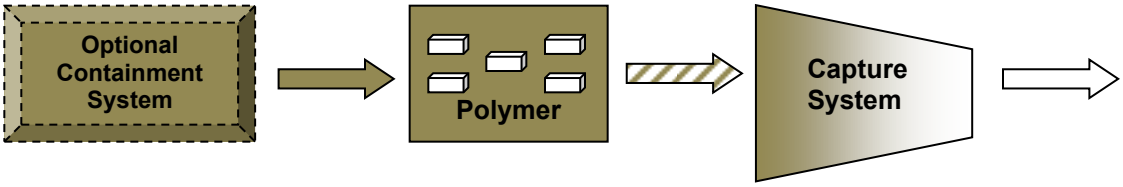


- *Accumulated sediments captured by the filter bag*
  - √ *Frequent replacement of filter bags may be necessary*

- *Potential problems*
  - √ Inflow pumping rate may exceed the bag seepage rate
  - √ Bag can become clogged
  - √ Failure can occur at connectors

Inspecting Best Management Practices

Solid Treatment System



Solid Treatment System Inspection

- *Are inflows in contact with the polymer blocks?*

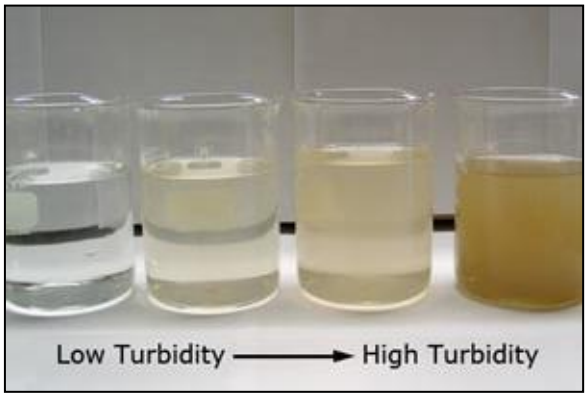
- *Is "bridging" of the blocks occurring?*
  - √ Blocks are coated with sediments

Inspecting Best Management Practices

- *Is deposition occurring in the capture chamber?*

- *Do discharges have an odor or appear to contain large amounts of sediment?*

Inspector's Responsibilities



- *Is the treatment method functional?*
- *Has sediment rendered the polymer source ineffective?*
- *Is deposition of sediment evident?*
- *Compile records and reports*
  - √ Information on inflow and outflow waters
  - √ Qualifications of personnel collecting samples
  - √ Turbidity of inflow and outflow waters
  - √ Water quality parameters
- *Has contact been maintained with the designer and regulatory agencies?*
- *Understand the designer's plan for implementation*

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
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Inspecting Best Management Practices

Erosion Control BMPs

Inspecting Best Management Practices

Erosion Control BMPs

Erosion controls generally perform one of two functions:

- dissipate energy
- divert surface runoff

Erosion controls are the most important line of defense!

Earthen Dike/Berm

- *Used to direct runoff (e.g., toward an SCS)*
- *Inspection requirements*
  - √ Will runoff remain within the diversion channel?
  - √ Are the embankments stabilized?
  - √ Is the discharge area stabilized?

Slope Drain

When should it be installed?

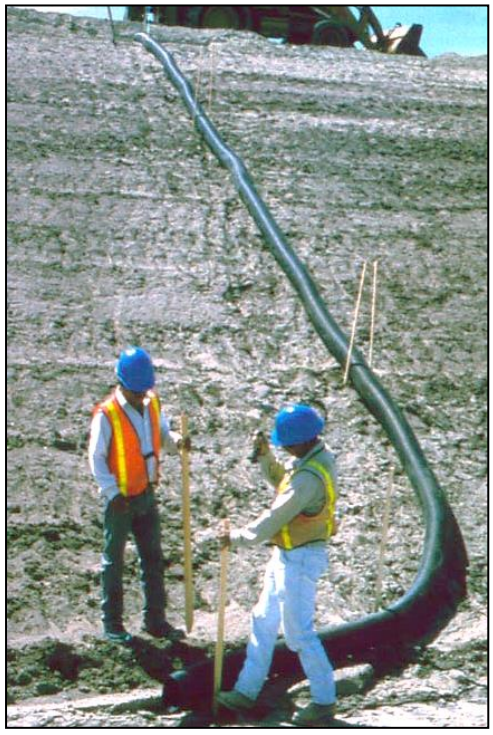
- *While construction activities are occurring*
- *After construction activities are finished*

When should it not be installed?

- *When contributory basins are large*

What needs to be inspected?

- *Are there areas where the earthen berm has been breached?*
- *Will runoff flow into the drainpipe?*
- *Is runoff flowing around the slope drainpipe?*
- *Is the proper diameter pipe installed?*
- *Is runoff discharging into an embankment?*
- *Is the pipe secured to the hillside?*
- *Is there protection (e.g., riprap) at the end of the drainpipe?*



What maintenance activities can be expected?

- *Repair or replacement of slope drain*
- *Replacement of riprap*
- *Repair breached sections of earthen berm*
- *Removal of pipe*

Inspecting Best Management Practices

Importance of Vegetation

Staging Removal

- *Staging the removal of vegetation will minimize erosion and can reduce the need for sediment control measures*
- *Areas not under construction require delineation*

Vegetative Buffer Strip

- *Traps sediment in runoff waters*
- *Limited use:*
  - √ May need sediment control barriers upstream of buffer strip
  - √ Need to minimize disturbance areas
  - √ Need to delineate disturbance area
- *Requires maintaining existing vegetation*

What needs to be inspected?

- *Ensure vegetated areas are properly marked and protected*
- *Is the buffer strip width per specification?*
- *Are construction activities encroaching onto protected areas?*
- *Should sediment be removed from the existing vegetation area?*

What maintenance activities can be expected?

- *Maintain fencing and barriers as needed*
- *Inspect existing vegetation for signs of stress. If needed, apply seed or transplant vegetation to maintain natural vegetative covering where possible*
- *Removal of deposited soil material may be necessary*

Inspecting Best Management Practices

Sod

What needs to be inspected for installing sod?

- *Has a proper soil bed been prepared?*
- *Is the sod "live" and viable?*
- *If on a hillside, has the sod been "pegged" in place?*
- *Has the sod been installed in a correct manner?*
- *Is the sod becoming established?*

What maintenance activities can be expected?

- *Replacement of sections where, if in drainage channels, "rolling" of sod occurs after experiencing flows*
- *Replacement of sections due to lack of establishment, perhaps due to lack of moisture*

Establishing Vegetation from Seed

Topsoil Material

- *During excavation is topsoil being saved.*
  - √ Often contains historic seed and nutrients
  - √ May include weed seed
- *Apply topsoil before planting seed*

Preparing a Seedbed

- *Scarify and prepare the soil for planting*
- *On hillsides (if possible), track up and down*
- *Avoid tracking along the contour*
- *Avoid creating depressions perpendicular to the contours*
  - √ Increases erosion

Inspecting Best Management Practices

Methods for Planting Seed

- *Drill seed into the ground*
- *Dry broadcast seed on the ground*
  - √ Application rate of seed can be up to two times the drill rate for arid/semi-arid climates
- *Hydraulically applying seed on the ground*
  - √ Application rate of seed can be up to 4 or 6 times the drill rate for arid/semi-arid climates

What needs to be inspected

- *Is the correct seed mixture being used?*
- *Has the drill been calibrated?*
- *Is the correct application rate of seed occurring depending upon the planting methods?*
- *Has "raking" of the soil occurred after broadcasting of seed?*
- *Is there a need for a "two step" process for planting seed and applying mulch by hydraulic methods?*
- *Have you collected the seed tags to ensure correct seed is used?*
- *Will soil amendments be required and, if so, when will they be applied?*

What maintenance activities can be expected

- *Repair coverage and re-apply seed material as needed*
- *If plant seeds fail to germinate, or established plants die, area may have to be re-planted*

Inspecting Best Management Practices

Soil Amendments

Types

- *Organic*
  - √ Manure, topsoil, compost
- *Inorganic*
  - √ Chemicals

Nutrients

- *Major*
  - √ Nitrogen
  - √ Phosphorus
  - √ Potassium
- *Secondary*
  - √ Calcium
  - √ Sulfur
  - √ Magnesium
- *Soil testing is advisable*

What needs to be inspected?

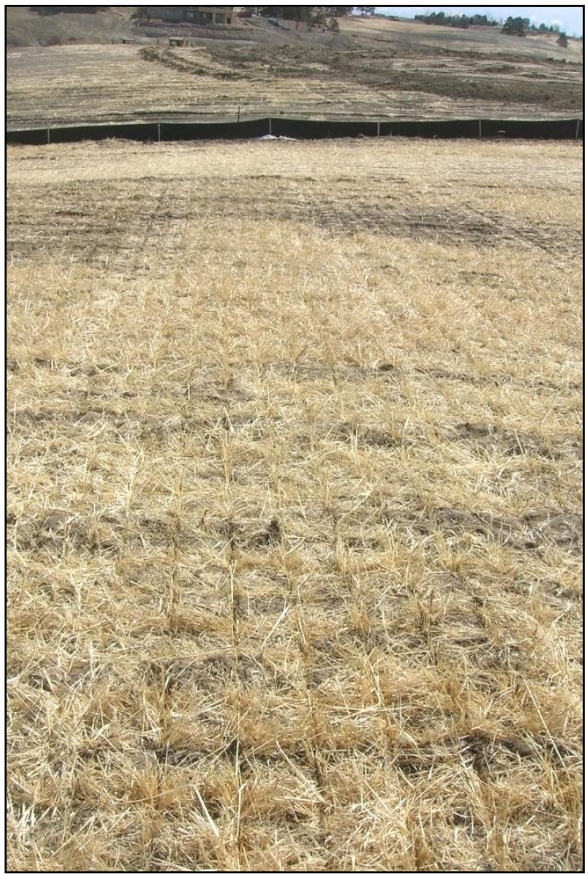
- *What was the nutrient composition?*
  - √ Percentages as found on bag
  - √ Check specifications
- *What is the method of application?*
- *What is the amount applied per unit area?*
- *What was the date of application?*

Inspecting Best Management Practices

Mulches

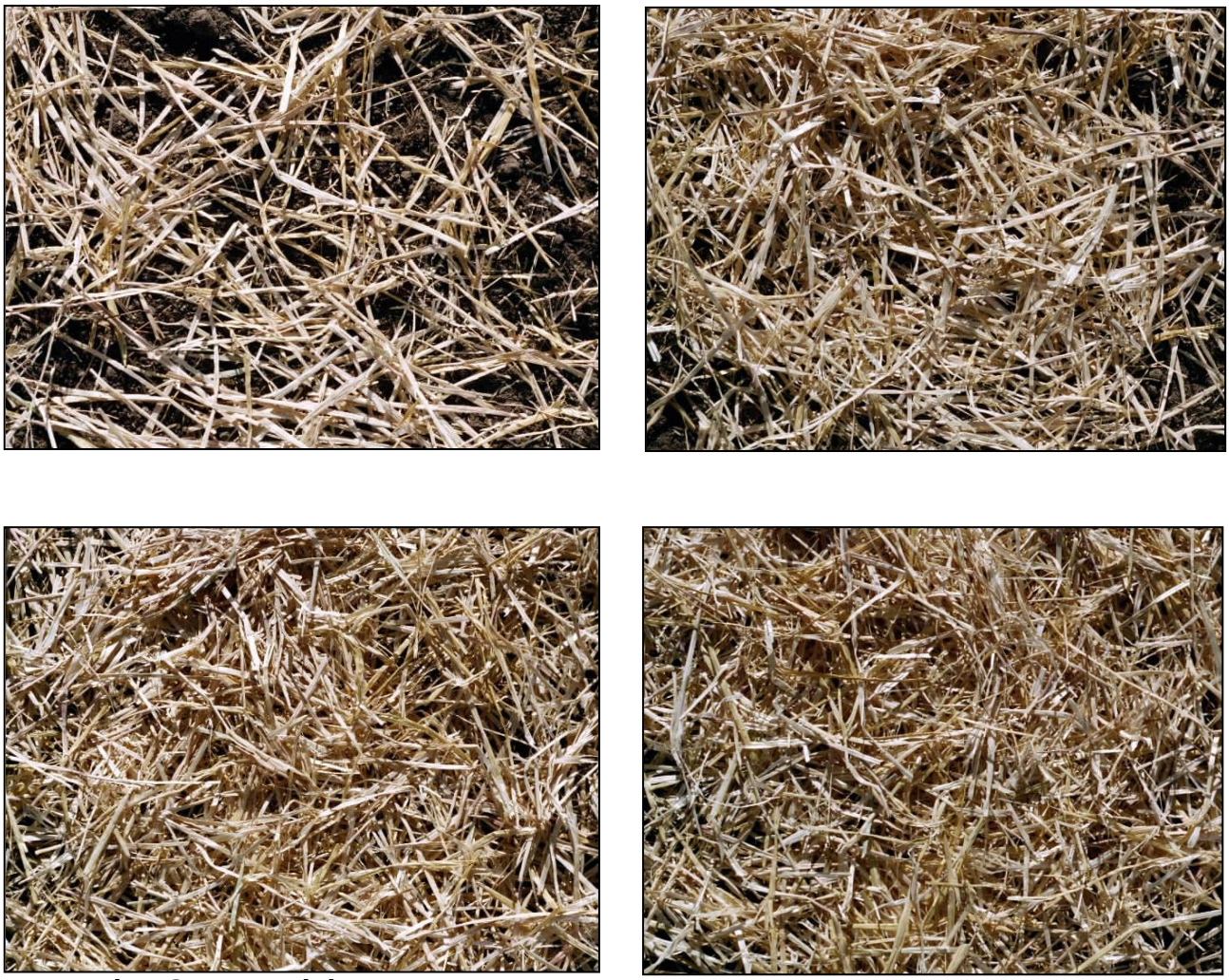
- *Reduces soil erosion by wind and raindrop impact*
- *Provides temporary cover of newly planted seed until establishment of vegetation*
- *May add organic matter to the soil*
- *Decreases the velocity of runoff over exposed soil areas*
- *Can assist in increasing runoff infiltration*

Straw or Hay



- *Standard application rate is about 4.5 tonnes/ha (2.0 tons/acre)*
- *Minimum fiber lengths of 150 to 200 mm (6.0- to 8.0-inches)*
- *Seek 80% to 100% ground coverage*
- *Hold in place by crimping or applying a tackifier*
- *A tackifier "glues" the fibers together*
- *Strong winds can remove sections of "tackified" dry mulches*

Module on Best Management Practices



Inspecting Straw Mulch

- *Are the fibers at least 150 mm (6-in.) in length?*
- *Is there at least 80% coverage of the soil?*
- *Is the material held in place by crimping or applying a tackifier?*
- *Removal of mulch by wind requires replacement*
- *Is mulch being applied immediately after planting of seed?*

Module on Best Management Practices

Hydraulic

- *Cover the ground and do not have to be crimped as with dry mulches*
- *A mixture of shredded wood, paper, or corn stalk fiber and often include a stabilizing emulsion, tackifier, or polymer*
- *Without a "tackifier" to help bind the material, hydraulic mulches are susceptible to removal by precipitation and runoff*

Inspecting hydraulic applications

- *Is the amount of material applied per specifications?*
  - √ Did you count the number of bags?
- *Is the specified mulch being used?*
- *Is the cover uniform?*
  - √ Do “shadows” exist
  - √ Does nearly100% coverage exist?
- *Can mulch be applied during wet soil conditions?*
- *In Arid and Semi-Arid Climates*
  - √ Apply seed prior to the application of mulch
  - √ Ensures good contact of seed with the soil

Module on Best Management Practices

ECB for Disturbed Hillsides

When should it be installed?

- While construction activities are occurring.
- After construction activities are finished.

When should it not be installed?

- Over very rough ground having extensive amounts of rock, rills, or gullies.
- On slopes where weeds or existing vegetation is established.

What needs to be inspected?

- Does the ECB have any damage?
- Did planting of seed occur before installing the ECB?
- Is runoff flowing under the blanket and causing erosion?
- Is the material secured to the slope with enough staples?
- Was the ECB installed correctly?
- Was the top of material secured in a trench or by some other method?
- Is the material properly overlapped?

What maintenance activities can be expected?

- Repair and replacement of material.
- Repair of eroded ground.

General Information

- ECBs are composed of natural material including straw, straw-coconut, coconut (or coir), wood excelsior, and so forth.
- Material must be placed in an uphill trench or adequately stapled at the top of a slope.
- Additional information on ECBs can be found at www.ectc.org.

Module on Best Management Practices

RECPs, ECBs, and TRMs

- *RECP = Rolled Erosion Control Products*
- *ECB = Erosion Control Blanket*
- *TRM = Turf Reinforcement Mat*
- *Organic and inorganic material*
- *Net and net less material*

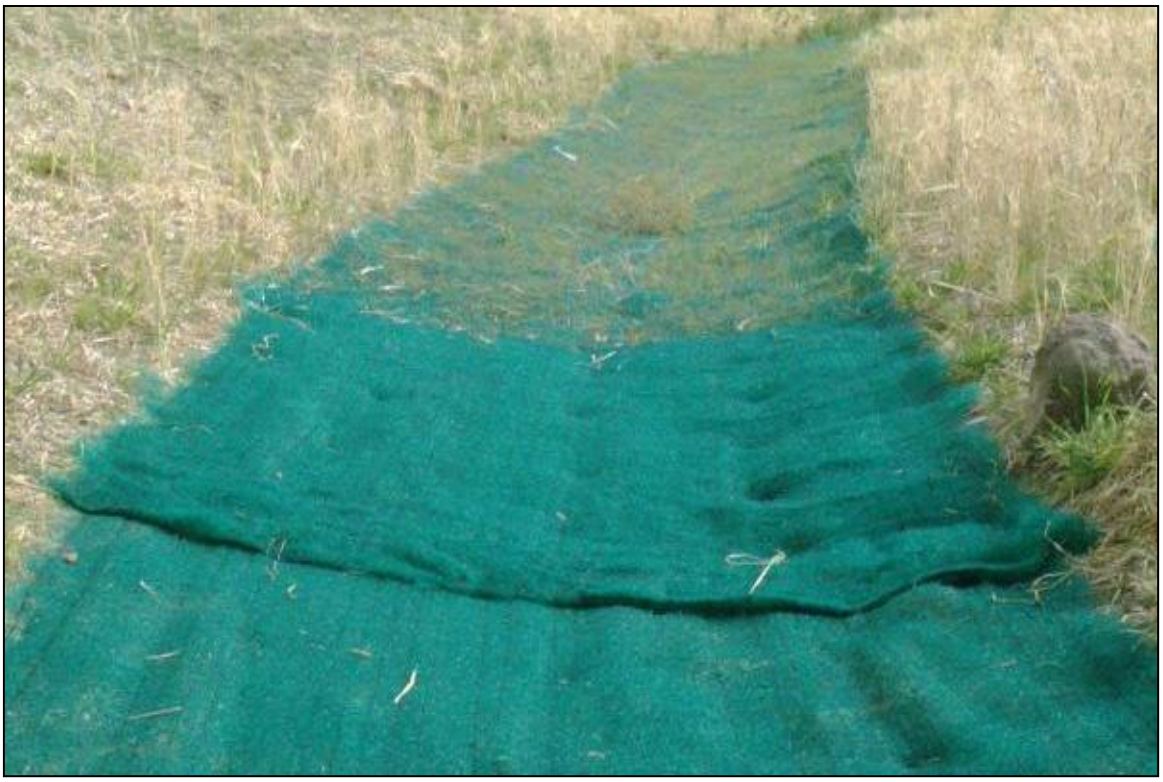
Inspecting hillside ECB installations

- *Is material anchored?*
- *Do enough staples exist down the hill to ensure maximum soil contact?*

- *Is "tenting" occurring?*

- *How good is the vegetation establishment?*

Module on Best Management Practices



TRM for a Drainage Channel

When should it be installed?

- While construction activities are occurring.
- After construction activities are finished.

When should it not be installed?

- Over impervious surfaces.
- On very rough ground.

What needs to be inspected?

- Does the TRM display any damage?
- Was the channel bed smooth before the TRM was installed?
- Have check structures (staple, trench, or other) been installed?
- Is runoff flowing under the blanket and causing erosion?
- Are enough numbers of staples used within the material and along the flowline?
- Is the correct material used?
- Was seed planted before installing the TRM?

What maintenance activities can be expected?

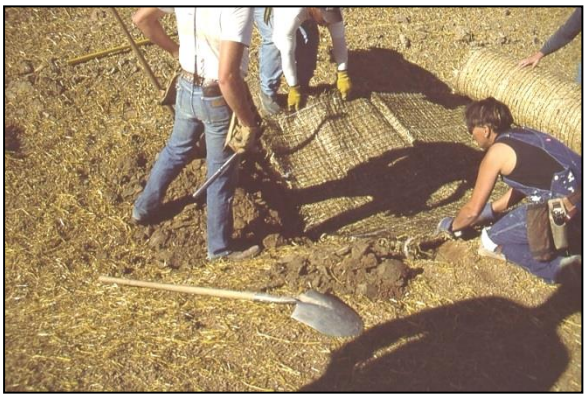
- Repair and replacement of material.
- Repair of eroded ground.

General Information

- TRMs are composed of 100% polypropylene or nylon straw-coconut or coconut matter reinforced with strands of polypropylene threads and held in place with netting sewn on both sides of the material.
- Additional information on TRMs can be found at www.ectc.org.

Module on Best Management Practices

Inspecting channel TRM installations



- *Has seed been planted?*
- *Is the material anchored at the top?*
- *Is proper overlap evident?*

- *Do adequate check structures or slots exist?*

- *Are the edges secured?*

- *Is there good contact with the channel bed?*
- *Do enough numbers of staples exist?*
- *Does runoff discharge onto the material?*

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Inspection No. 4 Worksheet

Module on Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2. Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

Module on Best Management Practices

Compost

Inspection Items

- *Is the material used per specifications?*
- *Does adequate coverage per specifications exist?*
- *Are repairs necessary and runoff events?*
- *Is establishment of vegetation in the material occurring?*

Rock/Riprap

Inspection Items

- *Is sediment accumulating in the rock?*
- *Is the rock becoming undercut and/or collapsing?*
- *Has it been installed correctly, per specifications?*
- *Is the rock placement correct and secure?*
- *Is failure of rock evident?*
- *Are animals' burrows compromising the integrity?*
- *Is replacement and/or cleanout required?*

Module on Best Management Practices

Gabions

Inspection Items

- *Have they been installed correctly?*
  - √ Requires proper design
- *Must be secured to each other and hillside*
- *Has fabric been installed behind the gabions?*
  - √ Minimizes sediment from discharging thought the structure
- *Is bulging of structure occurring or spaces appearing?*

Cellular Confinement Systems

Inspection Items

- *Has it been installed correctly?*
- *Is the product secured as required by the specifications?*
- *Has the correct material been used in the cells?*
- *Is vegetation becoming established?*
- *Is erosion undercutting or causing the material to collapse?*
- *Is the product providing erosion protection?*
- *Are cells failing?*

Module on Best Management Practices

Wind Erosion

Physical Barriers

- *Need openings for wind to "flow" through*
- *Every foot in elevation results in about 2.4 to 3.0 m (8- to 10-foot) deposition zone on the leeward side*
- *High maintenance*
- *Problems with deposition impacting downwind properties*
- *Susceptible to damage*
- *Solid barriers (e.g., silt fence) are not designed to be wind barriers*
  - √ Destroyed by the wind

Soil Roughening

- *Can temporarily reduce wind erosion by up to 80%*
  - √ 150 mm (6-inches) in height
- *Avoid smooth ground*
  - √ Enhances saltation
- *High maintenance*
  - √ Ridges fill in with wind borne soil particles

Module on Best Management Practices

Liquid Applications

Water

- *High maintenance*
- *Rapid evaporation*
- *Continual reapplication required*
- *Is application adequate?*
  - √ Is dust still evident after application?

Chemical

- *Soil binders*
- *Magnesium Chloride*
  - √ Creates a crust
  - √ Destroyed by vehicular traffic
- *High maintenance*
- *Does material have to be reapplied?*
- *Is application adequate?*
  - √ Is dust still evident after application?
- *Check specifications for longevity?*

Stabilization

- *Maintain non-erodible material*
- *Keep existing vegetation*
  - √ Root system minimizes erosion
- *Soil binder, establish vegetation or applying hydraulic mulch*

Module on Best Management Practices

Dewatering and Sump Pumping

- *Inspect discharge location*
  - √ Is sedimentation occurring?
  - √ Is erosion occurring?
- *Sump-pumped water can contain large amounts of sediment*

- *Consider use of other sediment control barriers (e.g., dirt bags, sediment traps or basins)*

- *If ground water is discharged into a storm sewer system or offsite*
  - √ Must be clear of sediment
  - √ Requires regulatory approval

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Module on Best Management Practices

Hazardous and Waste Materials

Module on Best Management Practices

Concrete Washouts

- *Direct all wash water into a leak-proof container or leak-proof pit*
- *Temporary concrete containment facilities*
  - √ Are signs posted?
  - √ Is the washout material contained within the structure?
  - √ Has material filled volume greater than 50%?
  - √ Does material have to be removed and disposed of properly?
  - √ Is there a vehicle-tracking pad at the facility?
  - √ Does it meet specifications?
  - √ Local regulations may require lining
- *Alternatives*
  - √ Portable containment systems
  - √ Small containment volume
  - √ Limitations

Module on Best Management Practices

While inspectors usually associate BMPs with sediment and erosion control methods, they also need to be ready to assess methods that prevent spillage on potentially hazardous waste sites. Usually, the general contractor or builder provides BMP controls/measures for these areas.

Inspecting Hazardous and Waste Materials

Several items must be considered when inspecting hazardous and waste materials. These items include, but are not limited to:

Containment

- *Are facilities away from water bodies?*
- *Do facilities have enough spill containment areas?*
- *Are facilities on located impervious surfaces?*
- *Does enough containment volume exist?*

Storage and Labeling

- *Do locations exist for storing of materials?*
- *Does labeling of drums and pressurized tanks exist?*

Module on Best Management Practices

Spill Prevention

- *Are methods in place to prevent or clean up spills?*
- *Do procedures exist for addressing and reporting spills?*

Maintenance

- *Do locations exist for refueling and maintenance of large equipment?*
- *Do locations exist for cleaning of paint related equipment?*
- EPA requires all wash water be directed into leak-proof containers or leak-proof pits

Module on Best Management Practices

Disposal

- *Are portable toilets:*
  - √ Away from storm sewer systems?
  - √ Away from water bodies?
  - √ Away from drainage ways?
  - √ Away from wetlands?
  - √ Away from paved road?
  - √ Staked in position?
  - √ Are additional secondary containment facilities needed?

- *Does proper disposal of waste material exist*
  - √ Are there metal bins with covers?
  - √ Does regular trash removal exist?
  - √ Does regular removal of concrete waste material occur?

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Regulations and Compliance

Module 3

Regulations and Compliance

Regulations and Compliance

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Regulations and Compliance

Table of Contents

Regulations and Compliance

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Regulations and Compliance

MODULE 3 OBJECTIVES

- To provide an overview of the regulatory agencies and applicable legislation that relates to the protection of aquatic environments
- To provide a clear understanding of the potential penalties that exist for non-compliance

INTRODUCTION

There are extensive environmental legislation and regulations that have been enacted to guide construction activities away from natural environmental impacts. It is from within these regulatory boundaries that a construction project must be considered at the beginning through to completion. Understanding the regulatory environment in which an undertaking is developed and implemented is critical in ensuring that every effort is made to acquire and comply with all the necessary approvals and permits.

The potential consequences of non-compliance with any such applicable legislation are extensive. These might include, but are not limited to:

Increased regulatory scrutiny;
Tarnished professional reputations;
Construction shutdowns;
Costs of additional assessments/restoration;
Substantial legal costs;
Monetary fines;
Relinquished work permits; and/or,
Imprisonment – in some cases.

Under Canadian law, there are two categories of offences: **common law offences** and **regulatory offences**. Common law offences are based on previous court decisions rather than written law. Regulatory offences are those offences that are created by statutes, such as the *Fisheries Act* or the *Canadian Environmental Protection Act (CEPA)*.

Statutes are passed by Federal and Provincial legislatures. Federal statutes apply across the entire country, while statutes passed provincially only apply within the respective Provincial jurisdiction. Most environmental statutes contain provisions for enforcement inspections and investigations, as well as penalties that may be levied against individuals and companies.

It is important to note that the specific details provided below are not meant to be exhaustive as the intricacies of each undertaking are matched equally to the regulatory requirements. It is highly recommended that practitioners familiarize themselves with the specific details of all applicable legislation.

References to the Federal legislation discussed in this module are found at the end of this module. The Acts pertaining to erosion and sediment control are not limited to those listed in this module.

Regulations and Compliance

DUE DILIGENCE

The defence of due diligence is commonly available to an accused person charged with an offence, including charges laid under statutes, such as the *Fisheries Act*. The primary means of demonstrating due diligence is to demonstrate that "all reasonable steps" to prevent the offence from occurring were taken.

These "reasonable steps" is referred to as the "standard of care", and must be more than that expected of an ordinary citizen and at the very least, that of a professional with expertise in the area. The requirement to take "all reasonable steps" places a significant responsibility on the erosion and sediment control designer and inspector.

*Exercising **due diligence** means:*

- demonstrating every reasonable effort was made
- addressing any problems that are foreseeable and preventable
- addressing problems in a timely manner to minimize environmental impacts
- Ensuring required actions have been carried out

Regulations and Compliance

REGULATORY REQUIREMENTS

Federal Legislation

Federal Environmental legislation includes:

- *Fisheries Act;*
- *Species at Risk Act;*
- *Canadian Environmental Protection Act;*
- *Navigation Protection Act*

FEDERAL LEGISLATION
Fisheries Act

The *Fisheries Act* is administered by Fisheries and Oceans Canada (DFO) and established to manage and protect Canadian fish and fish habitats. The Act applies to all Canadian fisheries waters (public or private) and may apply to both permanently wetted areas and intermittently wetted habitat features. Through this legislation, management of physical, chemical and biological attributes, which are required by fish to carry out their life processes, can occur

DFO is responsible for developing and implementing policies and programs in support of Canada's economic, ecological and scientific interests in oceans and inland waters.

Indigenous peoples participated in consultations during the review of the changes to the Fisheries Act. They informed DFO that they wanted to be more involved in the conservation and protection of fish and fish habitat. As a result, Canada launched the Indigenous Habitat Participation Program with $50 million on June 7, 2019. The program supports Canada’s commitment to advance reconciliation with Indigenous peoples in Canada.

KEY DEFINITIONS

Indigenous Peoples of Canada – “has the meaning assigned by the definition aboriginal peoples of Canada in subsection 35(2) of the Constitution Act, 1982; (peuples autochtones du Canada)”

Fish – “parts of fish; shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals; and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals”

Regulations and Compliance

Fish Habitat – “spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes”

Fishery – “(a) any of its species, populations, assemblages and stocks, whether the fish is fished or not,
(b) any place where fishing may be carried on,
(c) any period during which fishing may be carried on,
(d) any method of fishing used, and
(e) any type of fishing gear or equipment or fishing vessel used;”

Deleterious Substance – “(a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or
(b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water,
and without limiting the generality of the foregoing includes
(c) any substance or class of substances prescribed pursuant to paragraph (2)(a),
(d) any water that contains any substance or class of substances in a quantity or concentration that is equal to or in excess of a quantity or concentration prescribed in respect of that substance or class of substances pursuant to paragraph (2)(b), and
(e) any water that has been subjected to a treatment, process or change prescribed pursuant to paragraph (2)(c); (substance nocive)”

Canadian fisheries waters – “all waters in the fishing zones of Canada, all waters in the territorial sea of Canada and all internal waters of Canada”

Water frequented by fish – “means Canadian fisheries waters”.

Regulations and Compliance

APPLICABLE PROVISIONS

Section 35(1): No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat.

Section 35(2): A person may carry on a work, undertaking or activity without contravening subsection (1) if
(a) the work, undertaking or activity is a prescribed work, undertaking or activity or belongs to a prescribed class of works, undertakings or activities, as the case may be, or is carried on in or around prescribed Canadian fisheries waters, and the work, undertaking or activity is carried on in accordance with the prescribed conditions;
(b) the carrying on of the work, undertaking or activity is authorized by the Minister and the work, undertaking or activity is carried on in accordance with the conditions established by the Minister;
(c) the carrying on of the work, undertaking or activity is authorized by a prescribed person or prescribed entity and the work, undertaking or activity is carried on in accordance with the conditions set out in the authorization;
(d) the harmful alteration, disruption or destruction results from the doing of anything that is authorized, permitted or required under this Act;
(e) the work, undertaking or activity is carried on in accordance with the regulations;
(f) the work, undertaking or activity is carried on in accordance with a permit issued under subsection 35.1(3), in the case of a work, undertaking or activity that is part of a designated project and that is designated by the Minister under subsection 35.1(2); or
(g) the work, undertaking or activity is a prescribed work, undertaking or activity under paragraph 35.2(10)(a) or belongs to a prescribed class of works, undertakings or activities under that paragraph, as the case may be, and is carried on in an ecologically significant area in accordance with an authorization issued under subsection 35.2(7).

Section 36(3): no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Section 38(4): Creates a duty to notify the death of or a serious and imminent danger to fish

Section 38(5): Creates a duty to notify the deposit of a deleterious substance

Section 38(6) requires any person responsible to prevent an occurrence or to counteract, mitigate or remedy any adverse effects that results or may result from an occurrence.

Regulations and Compliance

Section 38(7.1): An inspector or fishery officer has the authority to take all reasonable measures and direct action if immediate action is deemed necessary
Section 78(6): No person shall be convicted of an offence under this Act if the person:

- Exercised all due diligence to prevent the commission of the offence; or
- Reasonably and honestly believed in the existence of facts that would render the person's conduct innocent

Projects near water

Fisheries act requires that projects avoid causing serious harm to fish unless authorized.

Measures to be considered to avoid harm (online):

1. Project Planning
2. Erosion and sediment control
3. Shoreline revegetation and stabilization
4. Fish protection
5. Operation of machinery

Applies to all projects and replaces all operational statements previously produced by DFO

Does DFO need to review a project?

- Types of water bodies where DFO review is not required
  - ✓ Artificial water bodies **not connected** to Canadian fisheries waters (i.e. off-line ponds, swim ponds, agricultural drains, drainage ditches, quarries and pits, etc.)
- Project **activities and criteria** where DFO review is not required
  - ✓ Bridges, culverts, cottage boating recreation, drainage, flood control, water taking, dewatering, stormwater and wastewater

Deposit of a Deleterious Substance

Section 36(3) prohibits the deposit of deleterious substances (including sediment) into water frequented by fish, and includes both intentional or unintentional releases

The authorized deposit of a deleterious substance can only occur if authorized by a regulation. It is important to take all reasonable measures to prevent violations by designing, implementing, inspecting and maintaining appropriate ESC measures.

Regulations and Compliance

Section 38(5) has a duty to notify a deposit of a deleterious substance in water frequented by fish, or if a serious and imminent danger of a deposit may be expected to result. It is the responsibility of the person, who at any time:

- owns the deleterious substance or has the charge, management or control thereof, or
- causes or contributes to the deposit or danger thereof

Duty to Take Corrective Measures

Section 38(6) states “any person shall, as soon as feasible, take all reasonable measures consistent with public safety and with the conservation of fish and fish habitat to:

- Prevent any occurrence, or
- To counteract, mitigate or remedy any adverse effects that results or may reasonably be expected to result”

Fishery Officers and other DFO designates have the power of inspection and can direct works through an Inspector’s Direction Order s.38 (7.1)

Public Registry

The Fisheries Act (FA) Registry is now accessible on the Common Project Search platform, a common registry where Canadians can search and browse through projects and assessments submitted to multiple Government of Canada departments. Information can also be downloaded as a dataset that is updated monthly through Open Government.

Updated automatically, it includes project-specific information on authorizations that have been issued since the amended Fisheries Act came into force on August 28, 2019.

The 2019 amended Fisheries Act (FA) contains a provision that requires DFO to have a public facing Registry to provide public access to records relating to fish and fish habitat protection and pollution prevention, including:

- Ministerial agreements
- Standards and Codes of practice
- Ministerial orders
- Fisheries Act Authorizations
- Permits for designated projects
- Fish habitat restoration plans

Regulations and Compliance

Table 1 – FEDERAL LEGISLATION – FISHERIES ACT - Offences and Penalties

RELEVANT SECTIONS	APPLICABLE PROVISION	PENALTIES – PERSONS AND CORPORATIONS
Section 35(1)	No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat	□ $100,000 TO $4,000,000 (first summary offence) □ $200,000 to $8,000,000 (subsequent offences) □ $500,000 to $6,000,000 (first indictable offence) □ $1,000,000 to $12,000,000 (subsequent indictable offences) *minimum sentences * other penalty provisions established for individuals and small revenue corporations
Section 36(3)	*No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.*	
Section 38 (4), (5),(6) and (7)	*(4) Duty to notify of serious harm, (5) Duty to notify of deleterious substance, (6) Person responsible for substance deposited shall remedy or mitigate any adverse effects and (7.1) Inspectors may take remedial measures or direct that they be taken.*	□ Up to $200,000 (first offence) □ Up to $200,000 and/or 6 months imprisonment (subsequent offences)
Sections 35(2), 37(1), 38(7)	*Other Offences: Fail to comply with a prescribed conditions of an authorization; Fail to provide material, information or report; Fail to comply with a direction of Inspector of Fishery Officer*	

Regulations and Compliance

FEDERAL LEGISLATION

Species at Risk Act (SARA)

Environment Canada is the lead federal government department responsible for issues concerning species at risk, however Fisheries and Oceans Canada is responsible for the protection of aquatic species and habitat at risk.

The Act is designed to meet one of Canada's key commitments under the International Convention on Biological Diversity. The goal of the Act is to protect endangered or threatened organisms and their habitats. It also manages species which are not yet threatened, but whose existence or habitat is in jeopardy.

SARA defines a method to determine the steps that need to be taken in order to help protect existing relatively healthy environments, as well as recover threatened habitats. It identifies ways in which governments, organizations, and individuals can work together to preserve species at risk and establishes penalties for failure to obey the law.

The Act applies on federal lands, including national parks, and other protected heritage areas administered by Parks Canada, species protected under the *Migratory Birds Convention Act*, or aquatic species as defined in the *Fisheries Act*, SARA applies automatically on provincial and territorial lands and waters as well.

KEY DEFINITIONS

Aquatic Species - a wildlife species that is a fish, as defined in the *Fisheries Act*, or a marine plant, as defined in that Act.

Critical Habitat - the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.

Endangered Species - means a wildlife species that is facing imminent extirpation or extinction.

Extirpated Species - means a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.

Threatened Species - means a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.

APPLICABLE PROVISIONS

Section 58: no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if

(*a*) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;

(*b*) the listed species is an aquatic species; or

(*c*) the listed species is a species of migratory birds protected by the Migratory Birds Convention Act, 1994.

FEDERAL LEGISLATION
Canadian Environmental Protection Act

The Canadian Environmental Protection Act (CEPA) is administered by Environment Canada and Health Canada and is "An Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development."

The goal of the renewed Canadian Environmental Protection Act (CEPA) is to contribute to sustainable development through pollution prevention and to protect the environment, human life and health from the risks associated with toxic substances.

CEPA also recognizes the contribution of pollution prevention and the management and control of toxic substances and hazardous waste to reducing threats to Canada's ecosystems and biological diversity.

APPLICABLE PROVISIONS

Section 64 of CEPA states “a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that:

a) Have or may have an immediate or long-term harmful effect on the environment or its biological diversity;
b) Constitute or may constitute a danger to the environment on which life depends; or
c) Constitute or may constitute a danger in Canada to human life or health.”

Section 95 states that when a toxic substance is released into the environment, the person responsible must report the release, take measures to prevent the release, and mitigate any danger to the environment or public safety.

Particulate Matter is typically produced through the burning of fossil fuels and other industrial processes; however, dust from construction sites also contributes to Particulate Matter in the air, and in specified quantities, is identified in the “List of Toxic Substances” under Schedule 1 of CEPA.

Regulations and Compliance

FEDERAL LEGISLATION

Navigation Protection Act

The *Canadian Navigable Waters Act (CNWA)* is administered by Transport Canada and is designed to protect the public right of navigation in Canadian waters. The Act prohibits unauthorized "work" involving construction or placement in, on, over, under, through, or across any navigable water.

Recent amendments to the Act are intended to clarify when approval in navigable waters will be required. The *Canadian Navigable Waters Act* lists the major waterways for which approval is required and apply the common law to protect navigation in unlisted waterways; allow proponents to work in unlisted waters, such as municipalities and provinces; and expand the list of low risk works (like minor repairs on bridges) to be pre-approved because they pose very little impact on safe navigation.

KEY DEFINITIONS

Navigable water - "A body of water, including a canal or any other body of water created or altered as a result of the construction of any work, that is used by vessels, in full or in part, for any part of the year as a means of transport or travel for commercial or recreational purposes, or as a means of transport or travel for Indigenous peoples of Canada exercising rights recognized and affirmed by Section 35 of the Constitution Act, 1982 and:
There is public access by land or by water
There is no such public access but there are two or more riparian owners; or
The only riparian owner is either the Federal Government or a Provincial Government".

Does not include artificial irrigation channels or drainage ditches

Works - Anything permanent or temporary made by humans that is in, on, over, under, through or across any navigable water and/or includes dumping of fill into, dredging or removing of materials from the bed of a navigable water.

Consists of two types:

- Minor Works (with or without registration)
    - Registration is required for erosion-protection works, aerial cables, submarines cables, buried pipelines, outfalss and water intakes, dredging and watercourse crossings
    - No registration needed for temporary works, docks/boathouses, slipways and boat-launching ramps, pipelines and cables used for power or telecommunication purposes attached to an existing work,

works within an area bounded by a boom, mooring systems, swim areas and scientific equipment

- Major Works
    - Aquaculture facilities, bridges, causeways, water control structures and ferry cables

APPLICABLE PROVISIONS

Section 21 states “no person shall throw or deposit or cause, suffer or permit to be thrown or deposited any sawdust, edging, slabs, bark or like rubbish or any description whatever that is liable to interfere with navigation in any water, any part of which is navigable or that flows into any navigable water”.

Regulations and Compliance

Table 2 – FEDERAL LEGISLATION - Offences and Penalties

LEGISLATION	RELEVANT SECTIONS	APPLICABLE PROVISION	PENALTIES
CANADIAN NAVIGABLE WATERS ACT	**Section 21**	*No person shall throw or deposit or cause, suffer or permit to be thrown or deposited any sawdust, edging, slabs, bark or like rubbish of any description whatever that is liable to interfere with navigation in any water, any part of which is navigable or that flows into any navigable water.*	• $50,000 and/or six month imprisonment per offence • Separate offence for each day on which it is committed or continues
CANADIAN ENVIRONMENTAL PROTECTION ACT	**Section 64** **Section 95**	*Defines a toxic substance.* *Releases of toxic substances must be reported, prevented and mitigated to prevent any danger to the environment or human life or health.*	• Up to $300,000 and/or six month imprisonment (summary offence) • Up to $1,000,000 and/or three years imprisonment (indictable offence)
SPECIES AT RISK ACT	**Section 58**	*No person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species*	• Up to $50,000 and /or one year imprisonment for an individual or non-profit organization. • Up to $300,000 for corporation (summary offence) • Up to $250,000 and/or five years imprisonment for an individual or non-profit organization. Up to $1,000,000 for corporation. (indictable offence)

Regulations and Compliance

Federal References

Government of Canada, Fisheries Act (R.S.C., 1985, c. F-14)

Government of Canada, Canadian Environmental Protection Act (S.C. 1999, c. 33)

Government of Canada, Species at Risk Act (S.C. 2002, c. 29)

Government of Canada, Navigation Protection Act (R.S.C., 1985, c. N-22)

Greater Golden Horseshoe Conservation Authorities, “Erosion and Sediment Control Guidelines for Urban Construction”, 2006

City of Calgary “Environmental Regulatory Review and Responsibilities: Calgary Construction Sites”, 2009

FISHERIES ACT - Fisheries & Oceans Canada, www.dfo-mpo.gc.ca

CANADIAN ENVIRONMENTAL PROTECTION ACT - Environment Canada, www.ec.gc.ca

SPECIES AT RISK ACT - Environment Canada, www.ec.gc.ca

CANADIAN NAVIGABLE WATERS ACT - Transport Canada, www.tc.gc.ca

Regulations and Compliance

ENVIRONMENTAL PROTECTION

Whose job is it?

Environmental protection is everyone's responsibility

Ultimate responsibility lies with the owner
Liability shared with project team
Inspectors have critical responsibilities

LEGAL LIABILITY

- directly tied to Legislation
- requires Permits and/or Authorizations
- requires certain actions be taken
- prohibits certain activities from occurring
- compliance is often measured through the demonstration of ***due diligence***

NON-COMPLIANCE

*Consequences of **non-compliance**:*

- increased expense
- regulatory scrutiny
- tarnished reputations
- costs - impact assessments and restoration
- charges - legal costs and monetary fines
- relinquished work permits and shutdowns

Regulations and Compliance

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Module 4

Conducting Construction Site Inspections

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Conducting Construction Site Inspections

Table of Contents

Conducting Construction Site Inspections

Conducting Construction Site Inspections

ULTIMATE GOAL

Work with the contractor and permittee to minimize pollutants leaving a job site to the maximum extent practical.
In addition, prevent prohibited discharges from leaving a site, which can include:

- Wastewater from washout of concrete, stucco, paint, form release oils, curing compounds, and other construction materials,
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance,
- Soaps, solvents, or detergents used in vehicle and equipment washing and
- Toxic or hazardous substances from a spill or other release.

DURING THE SITE INSPECTION

During the site inspection, an inspector needs to verify what is shown on the ESC Drawings is what is actually installed in the field.

CLASSROOM EXAMPLE

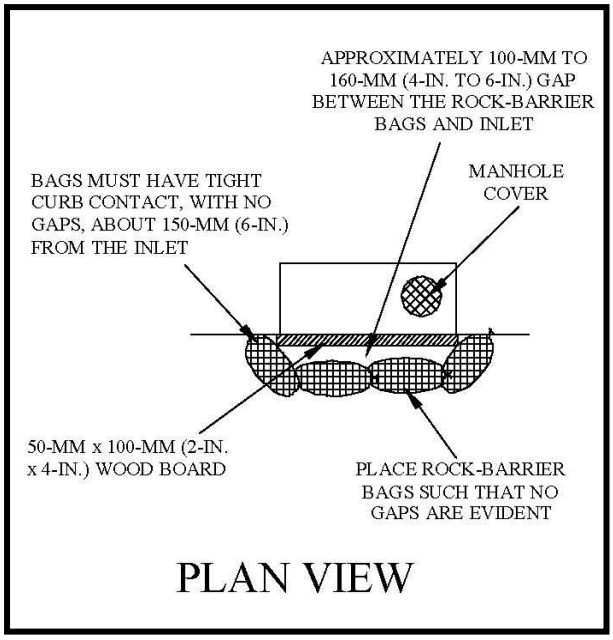

Figure 1 Detail from the ESC drawing

Figure 2 BMP installed on the construction site

1. Is the BMP installed properly and similar to the detail sheet or as amended?
    a. Does the installation follow what is found on the ESC Drawings?
        i. If not, what is different?
    b. Will it function correctly as found on the site?
        i. If not, what needs to occur?
    c. Should changes occur at the site or in the ESC Report and/or drawings?

Conducting Construction Site Inspections

MAINTENANCE OF BMPS

Contractors should follow the following for effective BMPs:

- **I**nstall BMPs in a correct manner.
- **I**nspect BMPs frequently.
- **M**aintain BMPs.

If sediment and erosion control measures are to remain effective, they must be installed correctly, inspected in a timely manner, *and* maintained. Repairing barriers, removing accumulated sediment from containment systems, and evaluating whether vegetation is established are a few of the many items that need to be considered.

Maintenance completed on sediment and erosion control measures must be recorded on inspection forms. Completed inspection reports be kept at the construction site and available for review by regulatory (federal, state, and local) agencies. It is recommended that all inspection forms be retained by the applicant for three years.

The following tables provide suggested minimal inspection and maintenance requirements of sediment and erosion control measures found on construction sites. Space has been provided for the reader to add additional requirements that may be necessary due to local regulations, specific site conditions, personnel preferences, and so forth.

TABLE 1: INSPECTION AND MAINTENANCE OF BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
Sediment Containment Systems	Constructed to specifications?	List what action is required.
	Functional outlet structure?	Repair or replace.
	Accumulated sediment?	Remove, place upstream, and stabilize.
	Long flow-path length?	Install baffles.
Bale Barriers	Installed in a trench?	If not, reinstall.
	Backfilled?	If not, backfill the bales.
	Staked?	At least two per bale are needed.
	Destroyed?	Replace.
	Accumulated sediment?	Remove, place upstream, and stabilize.
Silt-Fence Barriers	Proper placement of stakes?	If not, reinstall.
	Material in a trench?	If not, reinstall.
	Accumulated sediment?	Remove, place upstream, and stabilize.
	Used in a drainage ditch	Remove the structure

Conducting Construction Site Inspections

Table 1: Inspection and Maintenance of BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
Silt Fence Barriers (cont.)	Used around inlets	Remove the structures
Other Barriers	Improper installation?	Install another method.
Bale Check Structures	Installed in a trench?	If not, reinstall.
	Side slopes steeper than 7H:1V?	Look for other measures.
	End bales above flow line bales?	If not, reinstall to force runoff over the flow line bales.
Rock Check Structures	Correct rock diameter?	If wrong diameter, replace.
	Water flowing around the end?	Extend rock.
Other Check Structures		
Inlet Protection	Cover over structure?	Create an opening.
	Bale barrier on concrete?	Replace with rock.
Diversion Dikes	Erosion of the structure?	Complete repairs and stabilize.
	Improper location?	Remove and relocate.
Slope Drains	Runoff not flowing into the structure?	Repair the containment system. Check to see if runoff is being diverted to the structure.
	Runoff flowing into and past the pipes?	Install a larger-diameter pipe. Contact the designer to determine whether the design storm event was exceeded. Add more drains.
	"Tunneling" of the containment Dike is evident?	Repair the embankment with sandbags.

Conducting Construction Site Inspections

Table 1: Inspection and Maintenance of BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
Controlling Wind-Borne Particles	Is the ground smooth?	Develop furrows perpendicular to the prevailing wind direction.
	Do barriers exist?	Install barriers perpendicular to the prevailing wind direction.
Vegetation Establishment	Has the specified mixture been used?	If not, reseed.
	Inadequate growth?	Evaluate time of year; plant again.
	Spotty growth?	Soil conditions, excess moisture, or need to apply more seed.
	Intrusion of noxious weeds?	Implement weed control.
Dry Mulch	Coverage 80% to 100%?	If not, reapply.
	Movement of material?	Need to anchor to the ground by crimping or tackifier.
Hydraulic Mulch and Other Products	Adequate coverage?	If not, reapply.
	Deterioration?	If not evident, do nothing. If evident and vegetation is not evident, repair and reapply. If evident but vegetation is occurring, wait and complete another inspection at a later date.
	Is vegetation becoming established?	If no, evaluate whether climatic conditions have been adequate for establishment. If no, reapply. If yes, do nothing.
RECP for Slope Protection	Improper installation at top?	Put in trench or extend onto flat area.
	Inadequate number of staples?	Add more staples.
	Sides not in trench or stapled?	Install staples or place in a trench.

Conducting Construction Site Inspections

Table 1: Inspection and Maintenance of BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
RECP for Slope Protection (cont.)	Has seeding been completed?	If not, remove product and plant seed.
ECB and TRM for Channel Protection	Proper material used?	Work with the designers to ensure proper selection has occurred
	Improper installation at top?	Repair or use riprap check.
	Lack of staple checks?	Install staple or riprap checks.
Additional Techniques		
Wind Erosion Control	Use of cover crops?	Timing of planting, type of grass.
	Use of hydraulic mulch?	Increase application rate.

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MATERIAL FOR SCENARIO NO. 1

ESC Report, ESC Drawings and Records

Conducting Construction Site Inspections

PROJECT CONDITIONS

- **You are contracted to conduct storm water compliance inspections.**
- **Today is a routine inspection (not triggered by a rainfall event).**
- **Assume you are contracted to do all updates.**
- **Project status is unknown this time.**
  - **However, grading activities have been occurring for six months.**
- **Some roads are paved.**
- **There is a construction trailer on the site.**

Conducting Construction Site Inspections

STORMWATER TEAM

Permittee: Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Contact Information: I. M. Aperson
Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Person Responsible for Plan: Mr. Loman Onthetotempol

Project Name: Example Development

Project Location: Southeast of the intersection of South “K” Avenue and West “A” Avenue in Any Town, Any Province, Postal Code.

Receiving Waters: Storm waters discharge into the “Lake” via local tributaries that drain into major drainage channels.

NATURE OF CONSTRUCTION ACTIVITY

This project consists of developing land for a subdivision and commercial area. Construction activities on the site will consist of removing existing vegetation, grading of the land, installing utilities, paving, and development of the land for a subdivision and commercial area. This project will disturb approximately 15.0 hectares (37.1 acres) out of a total of 17.0 hectares (42.1 acres).

SEQUENCE FOR MAJOR ACTIVITIES:

Construction tasks to be completed will include the following sequential activities.

- Removal of existing vegetation,
- Clearing and grubbing of the land,
- Grading,
- Installing utilities,
- Development and paving of roads, and
- Construction of commercial and single-family homes.

SITE MAP:

A map has been included with this ESC report.

SITE PLANNING DOCUMENTATION

Soils on the project have the following characteristics:

Symbol	Type of Soil Material	Percent of Site	Wind Erodibilty	Comments
A5b5	Sandy Loam	100%	3	Low to moderate water erosion and wind hazards and moderate to high runoff potential.

Predominate soils of the site are moderately deep and well drained.

Historic vegetation for this area is pasture grass.

CONSTRUCTION SITE POLLUTANTS

It will be the responsibility of the heavy equipment contractor to take appropriate actions to ensure pollution of storm water does not occur. Fueling areas will be at least 30 metres (100-ft.) from drainage channels and/or storm sewer systems. The heavy equipment contractor will be responsible for protecting the soil from contamination due to any hydrocarbon or other hazardous spills associated with his contractual obligations.

Contractors will also be responsible for preventing soil contamination where building materials, fertilizers, chemicals, waste piles or other potential hazardous materials may exist.

No dedicated concrete or asphalt batch plants will exist on this site.

NON-STORM WATER COMPONENTS OF DISCHARGE

There is no non-storm water components of discharge associated with this project.

DESCRIPTIONS OF STORMWATER CONTROL MEASURES

Reduction of sediment in runoff waters will occur in the following manner (see the S&E Control drawings for more detailed illustrations).

1. Before overlot grading activities begin, the following BMPs will be installed:
   a) Installation of a storm sewer pipe to convey offsite flows away for the project site.
   b) Silt fence barriers as illustrated on the drawings.
   c) Install rock barrier at culvert.
   d) Vehicle tracking pads at major entrances into the site.
2. During initial overlot grading activities, installation of one or more of the following BMPs will occur:
   a) As soon as feasible, complete a rough installation of the detention ponds (with outlet structures) and convert them into sediment containment systems (SCSs).
   b) Install additional silt fence barriers as necessary to minimize discharge of sediment into waterways.
   c) Apply erosion control materials.
3. During major overlot grading activities, one or more of the following tasks will occur:
   a) Install diversion structures to ensure the discharge of runoff into an SCS.
   b) Maintain all sediment and erosion control BMPs.
   c) Install utilities.
   d) Install barriers at inlet.
   e) Apply erosion control materials.
4. After grading activities are completed, the following tasks will occur:
   a) Paving of roads.
   b) Construction of homes.
   c) Installation of landscaping material.
   d) Maintenance of SCSs until 80% full buildout of development.
   e) Maintenance of sediment and erosion control methods.

Conducting Construction Site Inspections

Sediment and Erosion Control Methods

Sediment control measures will include one or more following techniques with installation of additional methods occurring as deemed necessary by the designer.

- Silt fence and/or diversion barriers
- Barriers in front of “sump” inlets
- Vehicle tracking pads
- Sediment containment systems

Offsite tacking of soil will be minimized by at least weekly removal of accumulated sediment in access streets. More frequent sediment removal will occur when significant buildup is evident.

Erosion control measures will include one or more of the following methods:

- Construction of homes
- Installing landscaping materials
- Placement of pavement
- Applying erosion control materials

Final stabilization of the site will occur by placement of pavement, planting temporary and/or perennial grass seed on disturbed lands, and installing landscape material on the lots and in common areas.

Inspection and Maintenance

Inspections of sediment and erosion control measures will occur after any significant wind or precipitation event that causes runoff. As a minimum, inspection of all sediment and erosion control facilities will occur at least once every 14 days while construction activities occur.

Inspections will occur until final stabilization of the site has occurred, which is defined as vegetative cover of at least 70% of historic conditions, completion of 100% of the commercial area, and completion of 100% of the homes sites.

Inspection of sediment and erosion control measures will include at least the following:

- Removal of accumulated material collected by SCSs or barriers once a 50% reduction of the storage capacity for the structures becomes evident,
- Repairing damage to sediment control structures,
- Adding or eliminating sediment and/or erosion control measures as deemed necessary,
- Immediate repair and/or replacement of BMPs when failure occurs or the mitigation measures are ineffective.

Records of each inspection will reside with the contractor, developer, or their representative.

Training

Documentation is on file for each operator.

Endangered Species

There are no known endangered species on this project site.

Historic Properties

There are no known historic properties on this project site.

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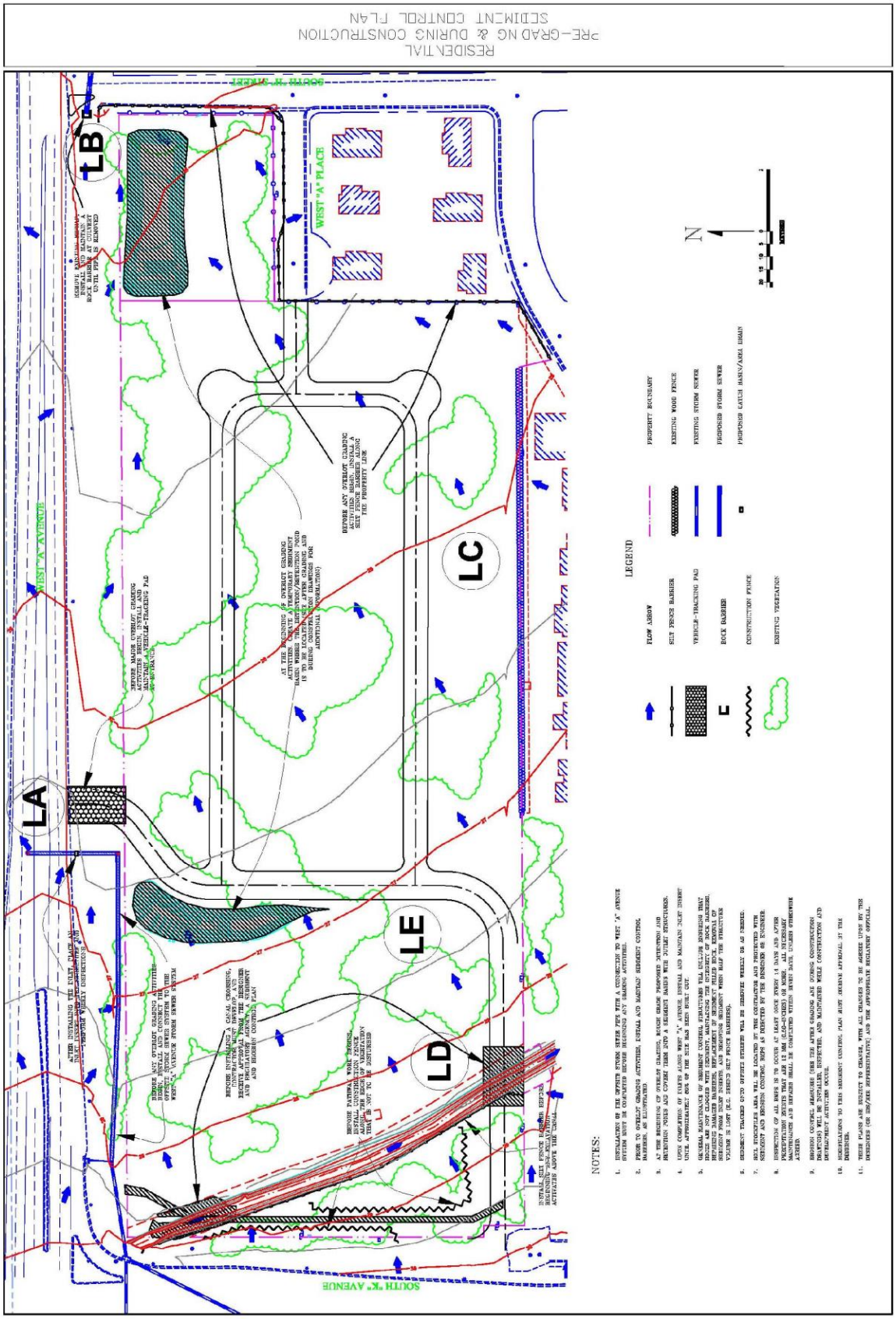
SEDIMENT AND EROSION CONTROL DRAWINGS

Conducting Construction Site Inspections



Conducting Construction Site Inspections

Pre-Grading and During Construction Notes

1. INSTALLATION OF THE OFFSITE STORM SEWER PIPE WITH A CONNECTION TO WEST "A" AVENUE SYSTEM MUST BE COMPLETED BEFORE BEGINNING ANY GRADING ACTIVITIES.

2. PRIOR TO OVERLOT GRADING ACTIVITIES, INSTALL AND MAINTAIN SEDIMENT CONTROL BARRIERS, AS ILLUSTRATED.

3. AT THE BEGINNING OF OVERLOT GRADING, ROUGH GRADE PROPOSED DETENTION AND RETENTION PONDS AND COVERT THEM INTO A SEDIMENT BASINS WITH OUTLET STRUCTURES.

4. UPON COMPLETION OF INLETS ALONG WEST "A" AVENUE, INSTALL AND MAINTAIN INLET PROTECTION UNTIL APPROXIMATELY 80% OF THE SITE HAS BEEN BUILT OUT.

5. GENERAL MAINTENANCE OF SEDIMENT CONTROL STRUCTURES WILL INCLUDE ENSURING THAT ROCKS ARE NOT CLOGGED WITH SEDIMENT, MAINTAINING THE INTEGRITY OF ROCK BARRIERS, REPAIRING DAMAGED BARRIERS, REPLACEMENT OF SEDIMENT FILLED ROCK, REMOVAL OF SEDIMENT FROM INLET INSERTS, AND REMOVING SEDIMENT WHEN HALF THE STRUCTURE VOLUME IS LOST (E.G. BEHIND SILT FENCE BARRIERS).

6. SEDIMENT TRACKED ONTO OFFSITE STREETS WILL BE REMOVED WEEKLY OR AS NEEDED.

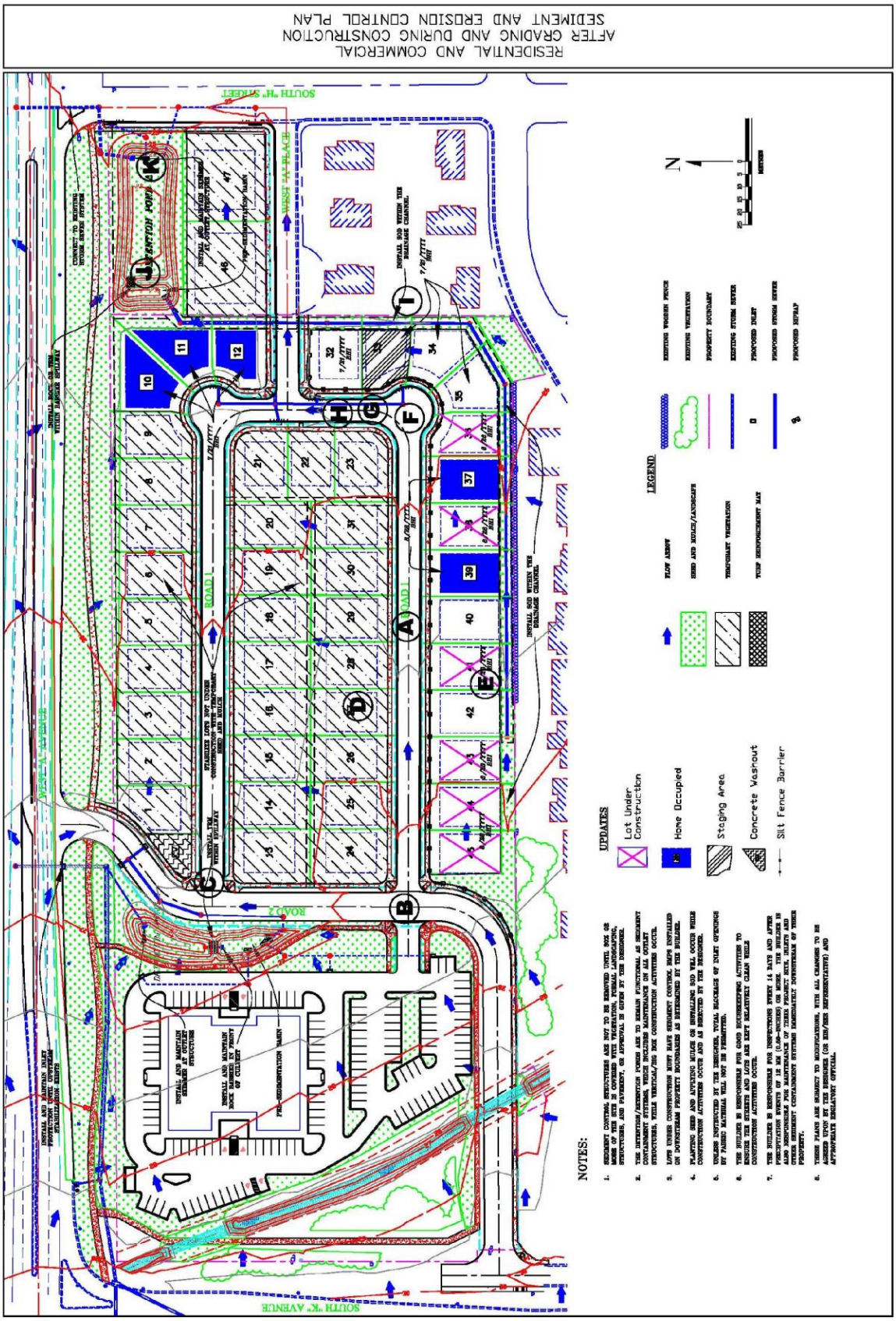
7. SOIL STOCKPILES AREA WILL BE LOCATED BY THE CONTRACTOR AND PROTECTED WITH SEDIMENT AND EROSION CONTROL BMPS AS DIRECTED BY THE DESIGNER OR ENGINEER.

8. INSPECTION OF ALL BMPS IS TO OCCUR AT LEAST ONCE EVERY 14 DAYS AND AFTER PRECIPITATION EVENTS THAT ARE 12 mm (0.50-IN.) OR MORE. ALL NECESSARY MAINTENANCE AND REPAIRS SHALL BE COMPLETED WITHIN SEVEN DAYS, UNLESS OTHERWISE AGREED.

9. EROSION CONTROL MEASURES (SEE THE AFTER GRADING AND DURING CONSTRUCTION DRAWINGS) WILL BE INSTALLED, INSPECTED, AND MAINTAINED WHILE CONSTRUCTION AND DEVELOPMENT ACTIVITIES OCCUR.

10. THESE PLANS ARE SUBJECT TO CHANGE, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNERS (OR HIS/HER REPRESENTATIVE) AND THE APPROPRIATE GOVERNMENTAL AGENCY OFFICIAL.

Conducting Construction Site Inspections



Conducting Construction Site Inspections

After-Grading and During Construction Notes

1. SEDIMENT CONTROL STRUCTURES ARE NOT TO BE REMOVED UNTIL 80% OR MORE OF THE SITE IS COVERED WITH VEGETATION, FORMAL LANDSCAPING, STRUCTURES, AND PAVEMENT, OR APPROVAL IS GIVEN BY THE DESIGNER.

2. THE DETENTION/RETENTION PONDS ARE TO REMAIN FUNCTIONAL AS SEDIMENT CONTAINMENT SYSTEMS, WHICH INCLUDES MAINTENANCE ON ALL OUTLET STRUCTURES, WHILE VERTICAL/BIG BOX CONSTRUCTION ACTIVITIES OCCUR.

3. LOTS UNDER CONSTRUCTION MUST HAVE SEDIMENT CONTROL BMPS INSTALLED ON DOWNSTREAM PROPERTY BOUNDARIES AS DETERMINED BY THE BUILDER.

4. PLANTING SEED AND APPLYING MULCH OR INSTALLING SOD WILL OCCUR WHILE CONSTRUCTION ACTIVITIES OCCUR AND AS DIRECTED BY THE DESIGNER.

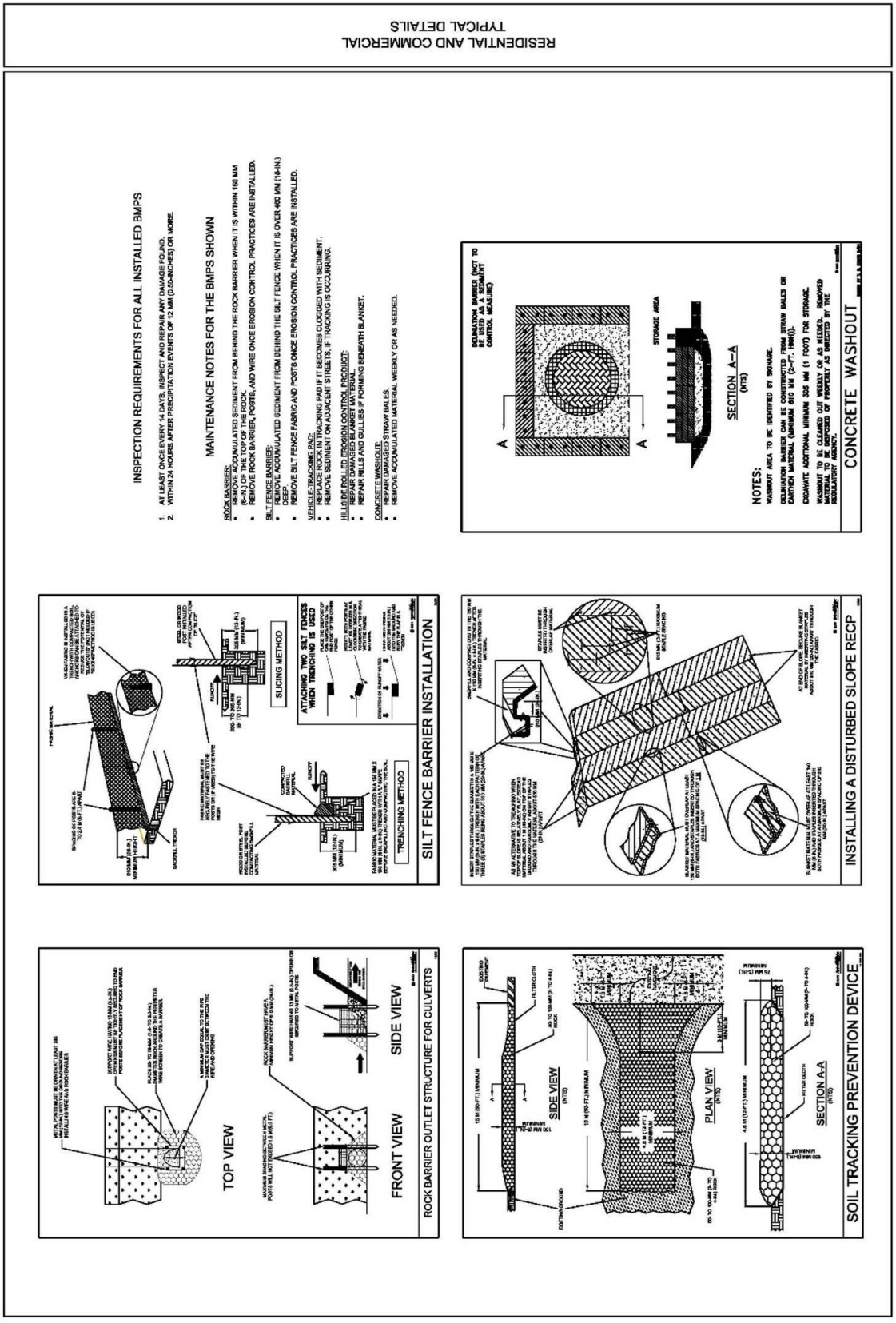
5. UNLESS INSTRUCTED BY THE DESIGNER, TOTAL BLOCKAGE OF INLET OPENINGS BY FABRIC MATERIAL WILL NOT BE PERMITTED.

6. THE BUILDER IS RESPONSIBLE FOR GOOD HOUSEKEEPING ACTIVITIES TO ENSURE THE STREETS AND LOTS ARE KEPT RELATIVELY CLEAN WHILE CONSTRUCTION ACTIVITIES OCCUR.

7. THE BUILDER IS RESPONSIBLE FOR INSPECTIONS EVERY 14 DAYS AND AFTER PRECIPITATION EVENTS OF 12 mm (0.50-IN.) OR MORE. THE BUILDER IS ALSO RESPONSIBLE FOR MAINTENANCE OF THEIR PROJECT SITE, INLETS AND OTHER SEDIMENT CONTAINMENT SYSTEMS IMMEDIATELY DOWNSTREAM OF THEIR PROPERTY.

8. THESE PLANS ARE SUBJECT TO MODIFICATIONS, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNER (OR HIS/HER REPRESENTATIVE) AND THE APPROPRIATE GOVERNMENTAL AGENCY OFFICIAL.

Conducting Construction Site Inspections



Conducting Construction Site Inspections

INSPECTION REQUIREMENTS FOR ALL INSTALLED BMPS

1. AT LEAST ONCE EVERY 14 DAYS, INSPECT AND REPAIR ANY DAMAGE FOUND.
2. WITHIN 24 HOURS AFTER PRECIPITATION EVENTS OF 12 MM (0.50-INCHES) OR MORE.

MAINTENANCE NOTES FOR THE BMPS SHOWN

ROCK BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE ROCK BARRIER WHEN IT IS WITHIN 150 MM (6-IN.) OF THE TOP OF THE ROCK.
- REMOVE ROCK BARRIER, POSTS, AND WIRE ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

SILT FENCE BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE SILT FENCE WHEN IT IS OVER 460 MM (18-IN.) DEEP.
- REMOVE SILT FENCE FABRIC AND POSTS ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

VEHICLE-TRACKING PAD:
- REPLACE ROCK IN TRACKING PAD IF IT BECOMES CLOGGED WITH SEDIMENT.
- REMOVE SEDIMENT ON ADJACENT STREETS, IF TRACKING IS OCCURRING.

HILLSIDE ROLLED EROSION CONTROL PRODUCT:
- REPAIR DAMAGED BLANKET MATERIAL.
- REPAIR RILLS AND GULLIES IF FORMING BENEATH BLANKET.

CONCRETE WASHOUT:
- REPAIR DAMAGED STRAW BALES.
- REMOVE ACCUMULATED MATERIAL WEEKLY OR AS NEEDED.

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PERMIT, INSPECTION AND CORRECTIVE ACTION REPORTS

Conducting Construction Site Inspections

The Contractor has decided that neither a permit nor inspections or corrective action reports are necessary

Conducting Construction Site Inspections

CONDUCTING AN INSPECTION FOR SCENARIO NO. 1

Conducting Construction Site Inspections

Erosion and Sediment Control Inspection Report (SAMPLE)

Project: _____

Permit No.: _____

Prime Contractor: _____

Inspector: _____

Inspector Qualifications: _____

Verbal/Written Notification given to: _____

Stage of Construction: _____

Construction Activities on Site: _____

Site Area (ha.): _____

Receiving Water (i.e. creek, lake): _____

Inspection:

Date: _____

Time: _____

Duration (hours): _____

Date of Last Inspection: _____

Reason for Inspection:

Weekly _____

Rainfall Event _____

Snowmelt Event _____

Current Weather Conditions: _____

Previous Weather Conditions for site: _____

Rainfall amount (mm): _____

Rainfall duration (hours): _____

Snowmelt amount (mm): _____

Information	Yes	No	N/A	Inspector's Comments and Action(s)
1. Do (or can) offsite flows enter the site?				
2. Is there evidence of, or the potential for, increased pollutant (e.g., sediment, fuel, concrete waste, portable toilet waste, etc.) discharging from the site?				If yes, see attached detail sheet for comments.
3. Do installation, repair and/or maintenance of sediment control BMPs need to occur?				If yes, see attached detail sheet for comments.
4. Do installation, repair and/or maintenance of erosion control BMPs need to occur?				If yes, see attached detail sheet for comments.
5. Do installation, repair and/or maintenance of in-stream control BMPs need to occur?				If yes, see attached detail sheet for comments.
6. Is there evidence of sediment discharging off the construction site and onto downstream location?				If yes, see attached detail sheet for comments.
7. Are vehicles tracking sediment off the construction site?				If yes, see attached detail sheet for comments.
8. If applicable, is soil, construction material, landscaping items, or other debris evident on the streets?				If yes, see attached detail sheet for comments.
9. Do locations exist where consideration of installing additional BMPs not found in the ESC plan should occur?				If yes, see attached detail sheet for comments.
10. Do location exist where consideration of removing existing BMPs identified and shown in the ESC plan can occur?				If yes, see attached detail sheet for comments.
11. Is a photo inventory provided?				If yes, see attached detail sheet for comments.
12. Does you site evaluation indicate a need to possibly update and document the ESC plan within the next seven (7) days?				If yes, see attached detail sheet for comments.
13. Have all previous inspection items been addressed and documented by the close of the next full work day or within seven (7) calendar days after an inspection?				If yes, see attached detail sheet for comments.

Conducting Construction Site Inspections

LOCATION LA (LOOKING SOUTH)

Project:_____ Date:_____ Page ____ of ____

Inspector:_____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	

Conducting Construction Site Inspections

LOCATION LB (LOOKING EAST)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

LOCATION LC (LOOKING NORTHEAST)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

LOCATION LD (LOOKING NORTHWEST)

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	

Conducting Construction Site Inspections

LOCATION LE (LOOKING APPROX. EAST)

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	

Conducting Construction Site Inspections

DID YOU SIGN THE INSPECTION FORM?

Erosion and Sediment Control Inspection Report
(SAMPLE)

Project:_____ Date:_____ Page ____ of ____

Inspector:_____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

_____ Date: _____

(Print Inspector Name) (Signature)

Title/Qualification of the Inspector:_____

MATERIAL FOR SCENARIO NO. 2
ESC Report and ESC Drawings

Conducting Construction Site Inspections

PROJECT CONDITIONS

- **You are a CISEC hired to replace the last person who was fired for not conducting inspections correctly.**
- **This is a routine inspection (not triggered by a rainfall event).**
- **Assume you are contracted to do updates.**
- **It is your understanding the land is represented by the "After Grading and During Construction" drawings.**
- **Vertical construction activities are occurring.**
- **Assume you are inspecting the site on 9/15/yyyy.**

Conducting Construction Site Inspections

STORMWATER TEAM

Permittee: Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Contact Information: I. M. Aperson
Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Person Responsible for Plan: Mr. Loman Onthetotempol

Designer: Ms. Meghan Little, CPESC

Subcontractors: S&EC Grading and Contracting *8/20/20XX*
Johnston Pipe Line Contractors *BHI*
Acme Painters
Seth Plumbing
AAA General Contractor
JJJ Builders

Project Name: Example Development

Project Location: Southeast of the intersection of South “K” Avenue and West “A” Avenue in Any Town, Any Province, Postal Code.

Receiving Waters: Storm waters discharge into the “Lake” via local tributaries that drain into major drainage channels.

NATURE OF CONSTRUCTION ACTIVITY

This project consists of developing land for a subdivision and commercial area. Construction activities on the site will consist of removing existing vegetation, grading of the land, installing utilities, paving, and development of the land for a subdivision and commercial area. This project will disturb approximately 15.0 hectares (37.1 acres) out of a total of 17.0 hectares (42.1 acres).

SEQUENCE FOR MAJOR ACTIVITIES:

Construction tasks to be completed will include the following sequential activities.

- Removal of existing vegetation,
- Clearing and grubbing of the land,
- Grading,
- Installing utilities,
- Development and paving of roads, and
- Construction of commercial and single-family homes.

SITE MAP:

A map has been included with this ESC report.

Conducting Construction Site Inspections

SITE PLANNING DOCUMENTATION

Soils on the project have the following characteristics:

Symbol	Type of Soil Material	Percent of Site	Wind Erodibility	Comments
A5b5	Sandy Loam	100%	3	Low to moderate water erosion and wind hazards and moderate to high runoff potential.

Predominate soils of the site are moderately deep and well drained.

Historic vegetation for this area is pasture grass.

CONSTRUCTION SITE POLLUTANTS

It will be the responsibility of the heavy equipment contractor to take appropriate actions to ensure pollution of storm water does not occur. Fueling areas will be at least 30 metres (100-ft.) from drainage channels and/or storm sewer systems. The heavy equipment contractor will be responsible for protecting the soil from contamination due to any hydrocarbon or other hazardous spills associated with his contractual obligations.

Contractors will also be responsible for preventing soil contamination where building materials, fertilizers, chemicals, waste piles or other potential hazardous materials may exist.

No dedicated concrete or asphalt batch plants will exist on this site.

NON-STORM WATER COMPONENTS OF DISCHARGE

There are no non-storm water components of discharge associated with this project.

DESCRIPTIONS OF STORMWATER CONTROL MEASURES

Reduction of sediment in runoff waters will occur in the following manner (see the S&E Control drawings for more detailed illustrations).

5. Before overlot grading activities begin, the following BMPs will be installed:
   a) Installation of a storm sewer pipe to convey offsite flows away for the project site.
   b) Silt fence barriers as illustrated on the drawings.
   c) Install rock barrier at culvert.
   d) Vehicle tracking pads at major entrances into the site.
6. During initial overlot grading activities, installation of one or more of the following BMPs will occur:
   a) As soon as feasible, complete a rough installation of the detention ponds (with outlet structures) and convert them into sediment containment systems (SCSs).
   b) Install additional silt fence barriers as necessary to minimize discharge of sediment into waterways.
   c) Apply erosion control materials.
7. During major overlot grading activities, one or more of the following tasks will occur:
   a) Install diversion structures to ensure the discharge of runoff into an SCS.

b) Maintain all sediment and erosion control BMPs.
c) Install utilities.
d) Install barriers at inlet.
e) Apply erosion control materials.

8. After grading activities are completed, the following tasks will occur:

a) Paving of roads.
b) Construction of homes.
c) Installation of landscaping material.
d) Maintenance of SCSs until 80% full buildout of development.
e) Maintenance of sediment and erosion control methods.

Sediment and Erosion Control Methods

Sediment control measures will include one or more following techniques with installation of additional methods occurring as deemed necessary by the designer.

- Silt fence and/or diversion barriers
- Barriers in front of "sump" inlets
- Vehicle tracking pads
- Sediment containment systems

Offsite tacking of soil will be minimized by at least weekly removal of accumulated sediment in access streets. More frequent sediment removal will occur when significant buildup is evident.

Erosion control measures will include one or more of the following methods:

- Construction of homes
- Installing landscaping materials
- Placement of pavement
- Applying erosion control materials

Final stabilization of the site will occur by placement of pavement, planting temporary and/or perennial grass seed on disturbed lands, and installing landscape material on the lots and in common areas.

INSPECTION AND MAINTENANCE

Inspections of sediment and erosion control measures will occur after any significant wind or precipitation event that causes runoff. As a minimum, inspection of all sediment and erosion control facilities will occur at least once every 14 days while construction activities occur. ***and after precipitation events of 12 mm (0.50-in.) or more,*** ***8/20/20XX BHI***

Inspections will occur until final stabilization of the site has occurred, which is defined as vegetative cover of at least 70% of historic conditions, completion of 100% of the commercial area, and completion of 100% of the homes sites.

Inspection of sediment and erosion control measures will include at least the following:

- Removal of accumulated material collected by SCSs or barriers once a 50% reduction of the storage capacity for the structures becomes evident,
- Repairing damage to sediment control structures,
- Adding or eliminating sediment and/or erosion control measures as deemed necessary,
- Immediate repair and/or replacement of BMPs when failure occurs or the mitigation measures are ineffective.

Records of each inspection will reside with the contractor, developer, or their representative.

Conducting Construction Site Inspections

TRAINING

Documentation is on file for each operator.

ENDANGERED SPECIES

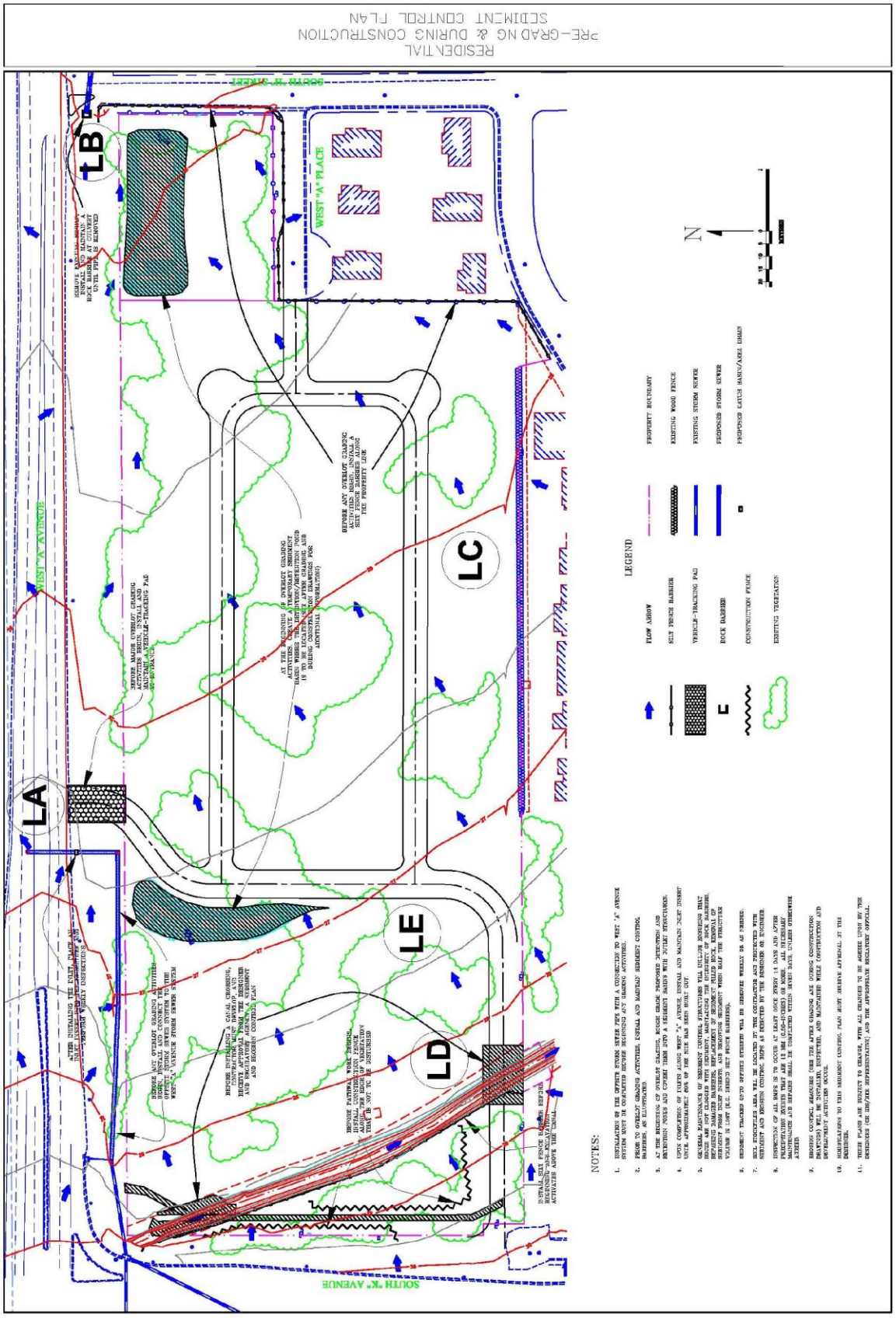
There are no known endangered species on this project site.

HISTORIC PROPERTIES

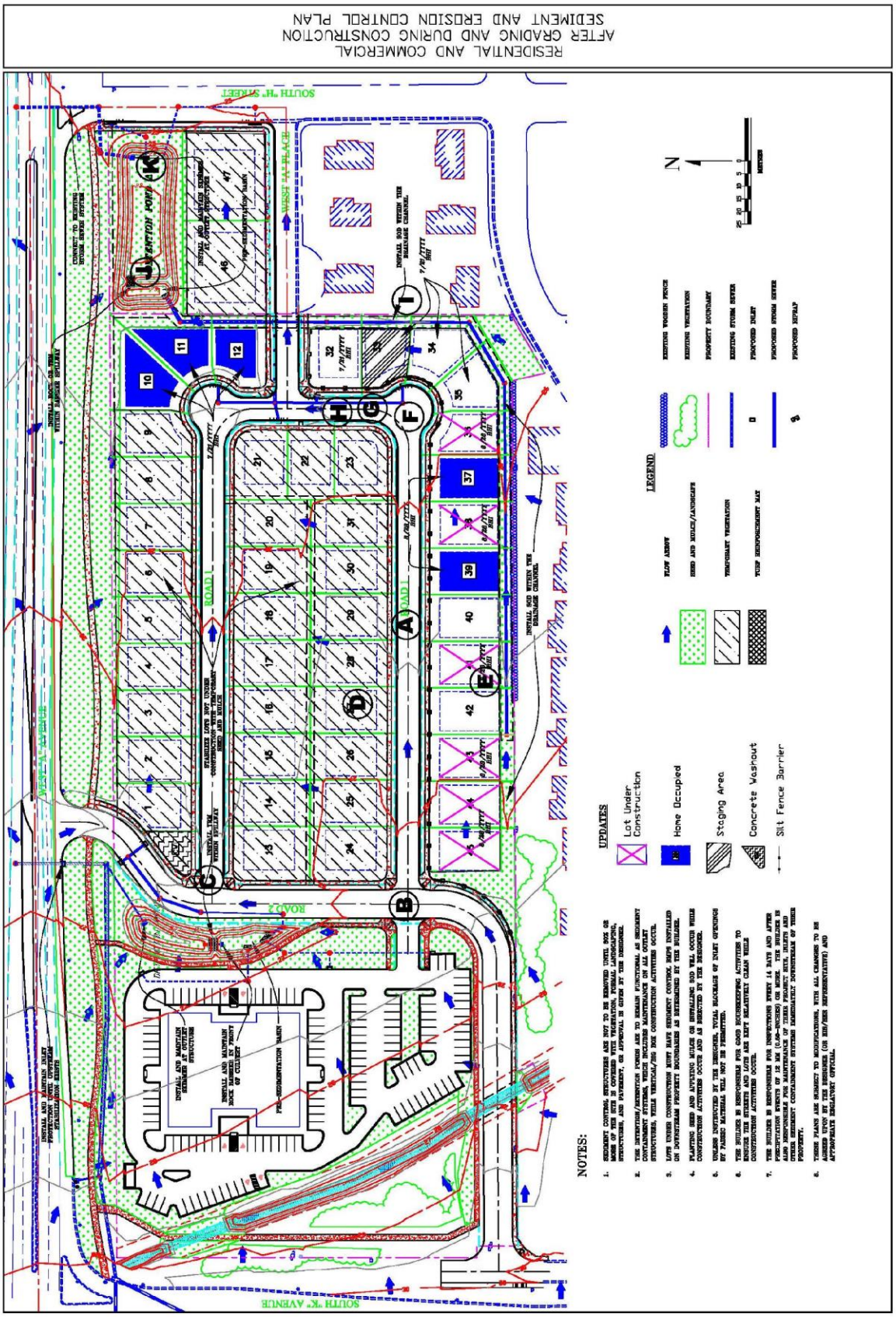
There are no known historic properties on this project site.

SEDIMENT AND EROSION CONTROL DRAWINGS

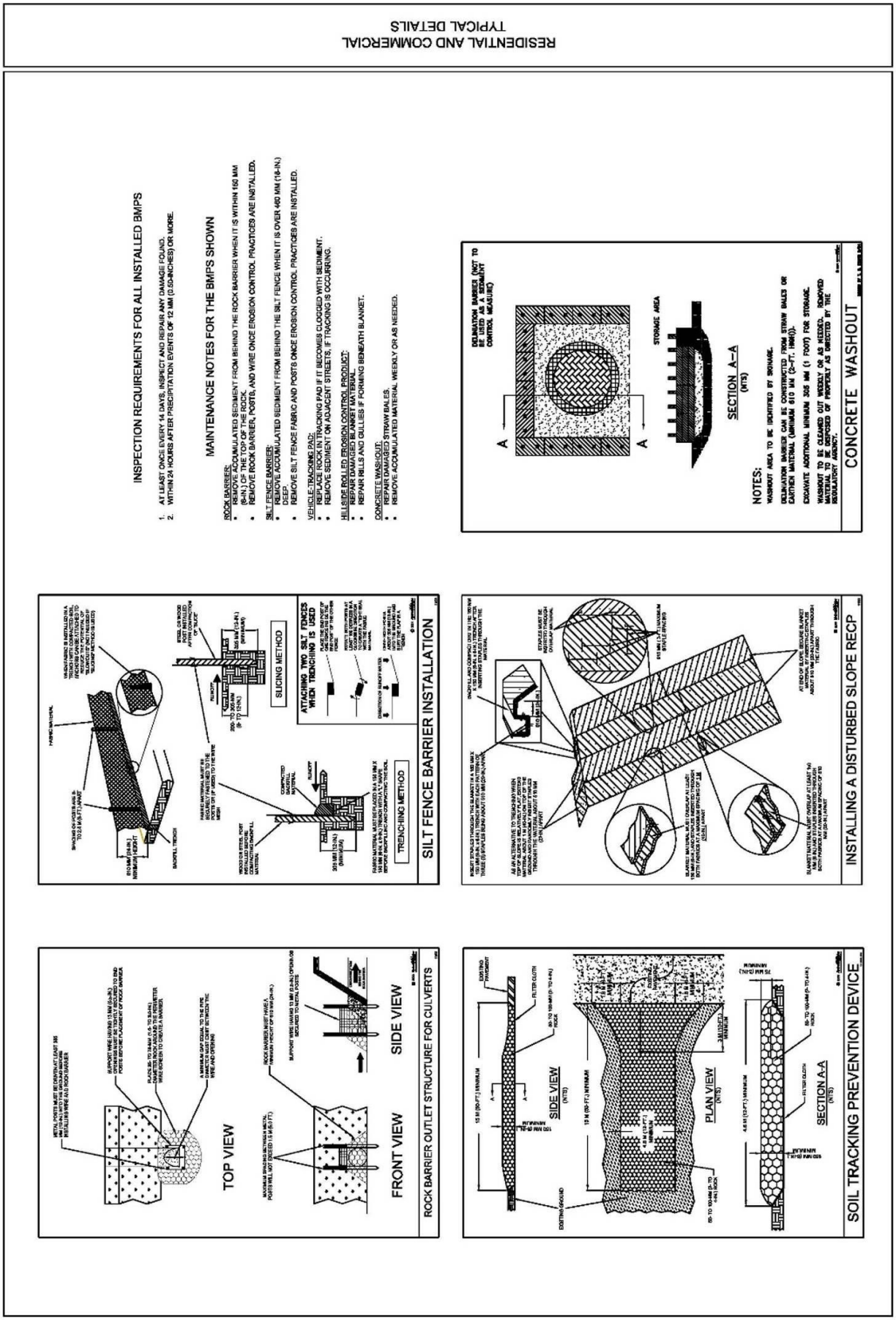
Conducting Construction Site Inspections



Conducting Construction Site Inspections



Conducting Construction Site Inspections



Permit and Inspection Records

Conducting Construction Site Inspections

Assume that the Contractor has obtained the proper permit. See the following pages for inspection reports.

Conducting Construction Site Inspections

Project: Example Development Date: 08/25/yyyy Page ____ of ____

Inspector: _____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1. Lot 43, 44 & 45: Repair silt fence barrier	
2. Lot 32: Erosion is evident	
3. Commercial Pond: Water is contained by the structure	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

Date: _____

(Print Inspector Name) (Signature)

Title/Qualification of the Inspector: _____

Conducting Construction Site Inspections

Project: Example Development Date: 08/05/yyyy Page ____ of ____

Inspector: Sam A. Fred

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1. Site is in total compliance and no problems are evident	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

Date:

(Print Inspector Name) (Signature)

Title/Qualification of the Inspector:

Conducting Construction Site Inspections

Project: Example Development Date: 07/19/yyyy Page ____ of ____

Inspector: R. J. Crook

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1. Main Detention Pond: Need to install skimmer per plans	07/25/yyy ZWI
2. Lot 32: Port-a-potty needs to be removed from the street	07/25/yyy ZWI
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

R. J. Crook (Print Inspector Name) (Signature) Date: 07/19/yyyy

Title/Qualification of the Inspector: Certified Inspector

Conducting Construction Site Inspections

Erosion and Sediment Control Inspection Report (SAMPLE)

Project: _____

Permit No.: _____

Prime Contractor: _____

Inspector: _____

Inspector Qualifications: _____

Verbal/Written Notification given to: _____

Stage of Construction: _____

Construction Activities on Site: _____

Site Area (ha.): _____

Receiving Water (i.e. creek, lake): _____

Inspection:

Date: _____

Time: _____

Duration (hours): _____

Date of Last Inspection: _____

Reason for Inspection:

Weekly _____

Rainfall Event _____

Snowmelt Event _____

Current Weather Conditions: _____

Previous Weather Conditions for site: _____

Rainfall amount (mm): _____

Rainfall duration (hours): _____

Snowmelt amount (mm): _____

Information	Yes	No	N/A	Inspector's Comments and Action(s)
1. Do (or can) offsite flows enter the site?				
2. Is there evidence of, or the potential for, increased pollutant (e.g., sediment, fuel, concrete waste, portable toilet waste, etc.) discharging from the site?				If yes, see attached detail sheet for comments.
3. Do installation, repair and/or maintenance of sediment control BMPs need to occur?				If yes, see attached detail sheet for comments.
4. Do installation, repair and/or maintenance of erosion control BMPs need to occur?				If yes, see attached detail sheet for comments.
5. Do installation, repair and/or maintenance of in-stream control BMPs need to occur?				If yes, see attached detail sheet for comments.
6. Is there evidence of sediment discharging off the construction site and onto downstream location?				If yes, see attached detail sheet for comments.
7. Are vehicles tracking sediment off the construction site?				If yes, see attached detail sheet for comments.
8. If applicable, is soil, construction material, landscaping items, or other debris evident on the streets?				If yes, see attached detail sheet for comments.
9. Do locations exist where consideration of installing additional BMPs not found in the ESC plan should occur?				If yes, see attached detail sheet for comments.
10. Do location exist where consideration of removing existing BMPs identified and shown in the ESC plan can occur?				If yes, see attached detail sheet for comments.
11. Is a photo inventory provided?				If yes, see attached detail sheet for comments.
12. Does you site evaluation indicate a need to possibly update and document the ESC plan within the next seven (7) days?				If yes, see attached detail sheet for comments.
13. Have all previous inspection items been addressed and documented by the close of the next full work day or within seven (7) calendar days after an inspection?				If yes, see attached detail sheet for comments.

Conducting Construction Site Inspections

LOCATION A (LOOKING NORTHEAST)

Project:_____ Date:_____ Page ____ of ____

Inspector:_____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	

Conducting Construction Site Inspections

LOCATION B (LOOKING SOUTHEAST)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

LOCATION C (LOOKING NORTHEAST)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

LOCATION D (LOOKING SOUTHEAST)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

LOCATION E (LOOKING EAST)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

LOCATION F (LOOKING SOUTHWEST)

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	

Conducting Construction Site Inspections

LOCATION G (LOOKING EAST)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

LOCATION H (LOOKING NORTHEAST)

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	

Conducting Construction Site Inspections

LOCATION I (LOOKING SOUTHWEST)

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	

Conducting Construction Site Inspections

LOCATION J (LOOKING SOUTHWEST, STANDING IN THE PRE-SEDIMENTATION BASIN)

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	

Conducting Construction Site Inspections

LOCATION K (LOOKING NORTH)

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.		
2.		
3.		
4.		
5.		
6.		

Conducting Construction Site Inspections

DID YOU SIGN THE INSPECTION FORM?

Erosion and Sediment Control Inspection Report (SAMPLE)

Project:_____ Date:_____ Page ____ of ____

Inspector:_____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

_____ Date: _____

(Print Inspector Name) (Signature)

Title/Qualification of the Inspector:_____

Appendix

APPENDIX A – FEDERAL LEGISLATION

1. Fisheries Act

Serious harm to fish

35. (1) No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.

Exception

(2) A person may carry on a work, undertaking or activity without contravening subsection (1) if

- (*a*) is prescribed or carried on in or around Canadian fisheries waters, and in accordance with the prescribed conditions;
- (*b*) is authorized by the Minister and carried on in accordance with conditions established;
- (*c*) is authorized by a prescribed person or entity and carried on in accordance with the prescribed conditions;
- (*d*) the serious harm is produced as a result of doing anything that is authorized, otherwise permitted or required under this Act; or
- (*e*) is carried on in accordance with the regulations.

Regulations

(3) The Minister may, for the purposes of paragraph (2)(*a*), make regulations prescribing anything that is authorized to be prescribed.

Deposit of deleterious substance prohibited

36. (3) Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Deposits authorized by regulation

(4) No person contravenes subsection (3) by depositing or permitting the deposit in any water or place of

- (*a*) waste or pollutant type, in a quantity and under conditions authorized by regulations made by the Governor in Council under any Act other than this Act;

Appendix

- (*b*) a deleterious substance of a class and under conditions — which may include conditions with respect to quantity or concentration — authorized under regulations made under subsection (5)
- (*c*) a deleterious substance the deposit of which is authorized by regulations made under subsection (5.2) and that is deposited in accordance with those regulations.

Regulations for authorizing certain deposits

(5) The Governor in Council may make regulations prescribing

- (*a*) deleterious substances or classes authorized to be deposited
- (*b*) waters or places where any deleterious substances authorized to be deposited
- (*c*) works or undertakings or conduct of which deleterious substances are authorized to be deposited;
- (*d*) the quantities or concentrations of deleterious substances authorized to be deposited;
- (*e*) the conditions or circumstances subject to which any deleterious substances are authorized to be deposited; and
- (*f*) the persons who may authorize the deposit of any deleterious substances and the conditions or circumstances under which requirements subject to which those persons may grant the authorization.

Regulations — Minister

(5.2) the Minister may make regulations

- (*a*) authorizing the deposit of deleterious substances specified in the regulations, or substances falling within a class of deleterious substances specified in the regulations;
- (*b*) authorizing the deposit of deleterious substances into waters or places falling within a class of waters or places;
- (*c*) authorizing the deposit of deleterious substances resulting from a work, undertaking or activity falling within a class of works, undertakings or activities;
- (*d*) establishing conditions, which may include conditions with respect to quantity or concentration, for the deposit of deleterious substances referred to in paragraphs (*a*) to (*c*); and
- (*e*) establishing, for the purposes of paragraphs (*a*) to (*c*), classes of
  - (i) deleterious substances,
  - (ii) waters and places, and
  - (iii) works, undertakings and activities.

Appendix

Directions by the Minister

(6) A person authorized to deposit a deleterious substance shall, when directed by the Minister, conduct any sampling, analyses, tests, measurements or monitoring, install or operate any equipment or comply with any procedures, and report any information, required by the Minister to determine the deposit is in the manner authorized.

Minister may require plans and specifications

37. (1) If a person carries on or proposes to carry on any work, undertaking or activity or to deposit a deleterious substance, the Minister can require plans, specifications, studies, procedures, schedules, analyses, samples, evaluations and other information to determine

- (*a*) the potential to result in serious harm to fish that constitutes or would constitute an offence and what measures, if any, would prevent that result or mitigate its effects; or
- (*b*) the deposit of a deleterious substance constitutes or would constitute an offence and what measures, if any, would prevent that deposit or mitigate its effects.

Ecologically significant areas

(1.1) a proposal in any ecologically significant area, the Minister may request— in the manner and circumstances prescribed by regulations, any prescribed material and other information relating to the habitat that likely to be affected

Marginal note: Powers of Minister

(2) If, it is of the opinion that an offence is being or is likely to be committed, or likely to result in harm to fish in an ecologically significant area, the Minister or the designated person may, by order,

(*a*) require modifications or additions to the plans, specifications, procedures or schedules considered necessary in the circumstances, or

- (*b*) restrict the carrying on of the work, undertaking or activity.

The Minister or the designated person may also direct the closing of the work or undertaking or the ending of the activity for any period that the Minister or the designated person considers necessary in the circumstances.

Authority to enter

38.(3) An inspector may, for a purpose of compliance, enter any place or premises, other than a private dwelling in which the inspector believes on reasonable grounds that

- (*a*) there is anything that is detrimental to fish habitat; or

Appendix

- (*b*) there has been carried on, is being carried on or is likely to be carried on any work, undertaking or activity resulting or likely to result in
  - (i) serious harm to fish
  - (ii) the deposit of a substance in water frequented by fish

Powers on entry

(3.1) The inspector may, for a purpose related to verifying compliance with this Act, examine any substance or product in the place or premises, take samples of it and conduct tests and measurements.

Duty to notify — serious harm to fish

(4) Every person shall without delay notify an inspector, a fishery officer or an authority prescribed by the regulations of an occurrence that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery, that is not authorized under this Act, or of a serious and imminent danger of such an occurrence, if the person at any material time

- (*a*) owns or has the charge, management or control of the work, undertaking or activity that resulted in the occurrence or the danger of the occurrence; or
- (*b*) causes or contributes to the occurrence or the danger of the occurrence.

Duty to notify — deleterious substance

(5) If there occurs a deposit of a deleterious substance in water frequented by fish that is not authorized under this Act, or if there is a serious and imminent danger of such an occurrence, and detriment to fish habitat or fish or to the use by humans of fish results or may reasonably be expected to result from the occurrence, then every person shall without delay notify an inspector, a fishery officer or an authority prescribed by the regulations if the person at any material time

- (*a*) owns or has the charge, management or control of
  - (i) the deleterious substance, or
  - (ii) the work, undertaking or activity that resulted in the deposit or the danger of the deposit; or
- (*b*) causes or contributes to the occurrence or the danger of the occurrence.

Duty to take corrective measures

(6) Any person shall, as soon as feasible, take all reasonable measures consistent with public safety and with the conservation and protection of fish and fish habitat to prevent the occurrence or to counteract, mitigate or remedy any adverse effects that result from the occurrence or might reasonably be expected to result from it.

Appendix

Report

(7) As soon as feasible after the occurrence or after learning of the danger of the occurrence, the person shall provide an inspector, fishery officer or an authority prescribed by the regulations with a written report on the occurrence or danger of the occurrence.

Corrective measures

(7.1) An inspector or fishery officer, on reasonable grounds that immediate action is necessary in order to take any measures, take any measures at the expense of any person or direct such a person to take them at that person's expense.

Regulations

(9) The Governor in Council may make regulations prescribing

- (*a*) the manner in which the notification is to be made, the information to be contained in the notification and the circumstances in which no notification need be made;
- (*b*) the manner in which the report under that subsection is to be made, the information to be contained in the report and the circumstances in which no report need be made;
- (*c*) the manner in which inspectors and fishery officers may take any measures or give any directions
- (*d*) the manner and circumstances in which any measures taken or directions given under may be reviewed, rescinded or varied; and
- (*e*) any other matters necessary for or incidental to carrying out the purposes and provisions of this section.

Assistance to inspectors

(10) The owner or person in charge of any place or premises entered by an inspector shall give the inspector all reasonable assistance to enable the inspector to carry out their duties and functions and shall provide the inspector with any information with respect to verifying compliance with this Act.

Appendix

Offence and punishment

40. (1) Every person who contravenes subsection 35(1), 36(1) or (3) is guilty of an offence

Indictable Offence

- Individual
  - not less than $15,000 and not more than $1,000,000
  - not less than $30,000 and not more than $2,000,000, or to imprisonment for a term not exceeding three years, or to both, for a subsequent offence
- corporation (person)
  - not less than $500,000 and not more than $6,000,000
  - not less than $1,000,000 and not more than $12,000,000 for a subsequent offence
- small revenue corporation
  - not less than $75,000 and not more than $4,000,000
  - not less than $150,000 and not more than $8,000,000 for a subsequent offence

- **Summary Offence**,
  - individual
    - not less than $5,000 and not more than $300,000
    - not less than $10,000 and not more than $600,000, or to imprisonment for a term not exceeding six months, or to both, for a subsequent offence
  - corporation (person)
    - not less than $100,000 and not more than $4,000,000,
    - not less than $200,000 and not more than $8,000,000, for a subsequent offence
  - small revenue corporation
    - not less than $25,000 and not more than $2,000,000
    - not less than $50,000 and not more than $4,000,000 for a subsequent offence.

Small revenue corporation status

(2.1) a court may determine a corporation to be a small revenue corporation if the court is satisfied that the corporation's gross revenues for the 12 months immediately before the day on which the proceedings arose— were not more than $5,000,000.

Appendix

Relief from minimum fine

(2.2) The court may impose a fine that is less than the minimum amount provided if the minimum fine would cause undue financial hardship.

Other offences

- fail to comply with a prescribed condition of an authorization
- fail to provide material or information requested by the Minister or within a reasonable time after the request is made
- fail to provide or submit any material, information or report that is to be provided or submitted under regulations
- fail to provide notification that is required (serious harm or deleterious substance)
    - carries on any work, undertaking or activity other than in accordance with material or information provided to the Minister
    - other than in accordance with material or information required to be modified by any order of the Minister, or
    - contrary to any order made by the Minister
- fail to take any reasonable measures required to take under or fails to take measures in the required manner
- fail to provide a report that he or she is required to provide
- fails to comply with the whole or any part of a direction of an inspector or a fishery officer
- fail to comply with a request of the Minister made under section 20????

First Offence - not exceeding two hundred thousand dollars

Subsequent Offence - not exceeding two hundred thousand dollars or to imprisonment for a term not exceeding six months, or to both.

Matters of proof

- a “deposit” takes place whether or not any act or omission resulting in the deposit is intentional; and
- no water is “water frequented by fish”, where proof is made that the water is not, has not been and is not likely to be frequented in fact by fish.

Application of fines

(6) All fines received by the Receiver General in respect of the commission of an offence under this section are to be credited to the Environmental Damages Fund and

used for purposes related to the conservation and protection of fish or fish habitat or the restoration of fish habitat, or for administering that Fund.

Recommendations of court

(7) The court imposing the fine may recommend to the Minister that all or a portion of the fine credited to the Environmental Damages Fund be paid to a person or an organization specified by the court for a purpose referred to in subsection (6).

42. (1) Where there occurs a deposit of a deleterious substance in water frequented by fish that is not authorized under section 36 or a serious and imminent danger thereof by reason of any condition, the persons who at any material time

- owns the deleterious substance or have the charge, management or control over, or
- who cause or contribute to the causation of the deposit or danger thereof,

are jointly and severally liable for all costs and expenses incurred by Her Majesty in right of Canada or a province, to the extent that those costs and expenses can be established to have been reasonably incurred in the circumstances, of and incidental to the taking of any measures to prevent any such deposit or condition or to counteract, mitigate or remedy any adverse effects that result or may reasonably be expected to result therefrom.

Recovery

(2) All the costs and expenses are recoverable by Her Majesty in right of Canada or a province with costs in proceedings brought or taken therefor in the name of Her Majesty in any such right in any court of competent jurisdiction.

Liability to fishermen

(3) Where, as a result of a deposit that is not authorized under section 36, a deleterious substance enters water frequented by fish, the persons described in paragraphs (1)(*a*) and (*b*) jointly and severally liable for all loss of income incurred by any licensed commercial fisherman, and costs in proceedings taken in any court of competent jurisdiction.

Due diligence defence

78.6 No person shall be convicted of an offence under this Act if the person establishes that the person

(*a*) exercised all due diligence to prevent the commission of the offence; or

(*b*) reasonably and honestly believed in the existence of facts that, if true, would render the person's conduct innocent

Appendix

Fishery (General) Regulations
To Persons

62. (1) Where an information is laid by a person in circumstances relating to an offence under the Act, the payment of the proceeds of any penalty imposed arising from a conviction for the offence shall be made

- (*a*) one half to the person; and
- (*b*) one half to the Minister or, where all of the expenses incurred in the prosecution of the offence are paid by a provincial government, to that provincial government.

FISHERIES ACT

Definitions:

2. (1) In this Act,

Aboriginal

"Aboriginal", in relation to a fishery, means that fish is harvested by an Aboriginal organization or any of its members for the purpose of using the fish as food, for social or ceremonial purposes or for purposes set out in a land claims agreement entered into with the Aboriginal organization;

Canadian fisheries waters

"Canadian fisheries waters" means all waters in the fishing zones of Canada, all waters in the territorial sea of Canada and all internal waters of Canada;

commercial

"commercial", in relation to a fishery, means that fish is harvested under the authority of a licence for the purpose of sale, trade or barter;

fish

"fish" includes

- (*a*) parts of fish,
- (*b*) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and
- (*c*) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals;

Appendix

fishery

"fishery" includes the area, locality, place or station in or on which a pound, seine, net, weir or other fishing appliance is used, set, placed or located, and the area, tract or stretch of water in or from which fish may be taken by the said pound, seine, net, weir or other fishing appliance, and also the pound, seine, net, weir, or other fishing appliance

fish habitat

"fish habitat" means spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes

recreational

"recreational", in relation to a fishery, means that fish is harvested under the authority of a licence for personal use of the fish or for sport;

Serious harm to fish

For the purposes of this Act, serious harm to fish is the death of fish or any permanent alteration to, or destruction of, fish habitat.

"**deleterious substance"** means

- (*a*) any substance that, if added to any water, would degrade or alter the quality of that water so that it is, or is likely to be, deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or
- (*b*) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or the quality of that water so that it is, or is likely to be, deleterious to fish or fish habitat or to the use by man of fish that frequent that water,

"**water frequented by fish**"

"water frequented by fish" means Canadian fisheries waters.

Appendix

2. Species at Risk Act (SARA)

Overview:

The Species at Risk Act is designed to meet one of Canada's key commitments under the International Convention on Biological Biodiversity. The goal of the Act is to protect endangered or threatened organisms and their habitats. It also manages species which are not yet threatened, but whose existence or habitat is in jeopardy.

SARA defines a method to determine steps that need to be taken in order to help protect existing healthy environments, as well as recover threatened habitats. It defines ways in which governments, organizations and individuals can work together to preserve species at risk.

Key Definitions:

"**Aquatic species**" means a wildlife species that is a fish, as defined in section 2 of the *Fisheries Act*, or a marine plant, as defined in section 47 of that Act.

"**Critical habitat**" means the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.

"**Federal land**" means

(*a*) land that belongs to Her Majesty in right of Canada, or that Her Majesty in right of Canada has the power to dispose of, and all waters on and airspace above that land;

(*b*) the internal waters of Canada and the territorial sea of Canada; and

(*c*) reserves and any other lands that are set apart for the use and benefit of a band under the *Indian Act*, and all waters on and airspace above those reserves and lands.

"**Endangered species**" means a wildlife species that is facing imminent extirpation or extinction.

"**Extirpated species**" means a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.

"**Threatened species**" means a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.

Destruction of critical habitat

58. (1) Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed

extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if

(*a*) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;

(*b*) the listed species is an aquatic species; or

(*c*) the listed species is a species of migratory birds protected by the *Migratory Birds Convention Act, 1994*.

Protected areas

(2) If the critical habitat or a portion of the critical habitat is in a national park of Canada named and described in Schedule 1 to the *Canada National Parks Act*, a marine protected area under the *Oceans Act*, a migratory bird sanctuary under the *Migratory Birds Convention Act, 1994* or a national wildlife area under the *Canada Wildlife Act*, the competent Minister must, within 90 days after the recovery strategy or action plan that identified the critical habitat is included in the public registry, publish in the *Canada Gazette* a description of the critical habitat or portion that is in that park, area or sanctuary.

Application

(3) If subsection (2) applies, subsection (1) applies to the critical habitat or the portion of the critical habitat described in the *Canada Gazette* under subsection (2) 90 days after the description is published in the *Canada Gazette*.

Application

(4) If all of the critical habitat or any portion of the critical habitat is not in a place referred to in subsection (2), subsection (1) applies in respect of the critical habitat or portion of the critical habitat, as the case may be, specified in an order made by the competent minister.

Due diligence

100. Due diligence is a defence in a prosecution for an offence.

Appendix

3. Canadian Environmental Protection Act (CEPA) - amendments pending

Overview:

The Canadian Environmental Protection Act is “an Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development”.

The goal of CEPA is to contribute to contribute to sustainable development through pollution prevention and to protect the environment and human health from the risks associated with toxic substances.

CEPA also recognizes the contribution of pollution prevention and the management and control of toxic substances and hazardous waste to reducing threats to Canada’s ecosystems and biological diversity.

In determining whether a substance should be declared "toxic" under CEPA the likelihood and magnitude of releases into the environment and the harm it may cause to human health or ecosystems at levels occurring in the Canadian environment are taken into account. If a substance is found to be "toxic," the Ministers recommend that the substance be added to the List of Toxic Substances (Schedule 1). The federal government then works with the provinces, territories, industry, non-government organizations and other interested parties to develop a management plan to reduce or eliminate the harmful effects the substance has on the environment and the health of Canadians.

Key Definitions:

“**pollution prevention**” means the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to the environment or human health.

“**sustainable development**” means development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Toxic substances

64. For the purposes of this Part and Part 6, except where the expression “inherently toxic” appears, a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that

(*a*) have or may have an immediate or long-term harmful effect on the environment or its biological diversity;

(*b*) constitute or may constitute a danger to the environment on which life depends; or

(*c*) constitute or may constitute a danger in Canada to human life or health.

Appendix

Report and remedial measures

95. (1) Where there occurs or is a likelihood of a release into the environment of a substance specified on the List of Toxic Substances in Schedule 1 in contravention of a regulation made under section 92.1 or 93 or an order made under section 94, any person described in subsection (2) shall, as soon as possible in the circumstances,

(*a*) subject to subsection (4) and any regulations made under paragraph 97(*b*), notify an enforcement officer or any other person designated pursuant to the regulations and provide a written report on the matter to the enforcement officer or other person;

(*b*) take all reasonable measures consistent with the protection of the environment and public safety to prevent the release or, if it cannot be prevented, to remedy any dangerous condition or reduce or mitigate any danger to the environment or to human life or health that results from the release of the substance or may reasonably be expected to result if the substance is released; and

(*c*) make a reasonable effort to notify any member of the public who may be adversely affected by the release or likely release.

Application

(2) Subsection (1) applies to any person who

(*a*) owns or has the charge, management or control of a substance immediately before its release or its likely release into the environment; or

(*b*) causes or contributes to the release or increases the likelihood of the release.

Report by property owner

(3) Where there occurs a release of a substance as described in subsection (1), any person, other than a person described in subsection (2), whose property is affected by the release and who knows that it is a substance specified on the List of Toxic Substances in Schedule 1 shall, as soon as possible in the circumstances and subject to subsection (4), report the matter to an enforcement officer or to any person that is designated by regulation.

Defence:

283. No person shall be found guilty of an offence under this Act, other than an offence under section 273 if the offence is committed knowingly or under section 228 or 274, where the person establishes that the person exercised all due diligence to prevent its commission.

Appendix

4. Navigation Protection Act (NPA)

Overview:

The NPA is administered through Transport Canada and is designed to protect the public right of navigation in Canadian waters. At the same time, the Act allows individuals and agencies to proceed with projects that interfere with navigation, provided they obtain approval from the Minister. In this sense, the Act both reinforces the historic common right to navigation for Canadians and creates a legal process for limiting or interfering with this right.

Recent amendments to the Act have been approved with changes aimed at simplifying the process of building and maintaining bridges or other infrastructure, providing greater certainty in planning for works, and reducing time and project costs.

Key Definitions:

"**Navigable water**" includes a canal and any other body of water created or altered as a result of the construction of any work.

"**Work**" includes

(*a*) any man-made structure, device or thing, whether temporary or permanent, that may interfere with navigation; and

(*b*) any dumping of fill in any navigable water, or any excavation of materials from the bed of any navigable water, that may interfere with navigation.

Throwing or depositing sawdust, etc., prohibited

21. No person shall throw or deposit or cause, suffer or permit to be thrown or deposited any sawdust, edgings, slabs, bark or like rubbish of any description whatever that is liable to interfere with navigation in any water, any part of which is navigable or that flows into any navigable water.

Appendix

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