Chapter 4
Temporary Storm Water Controls

4.0 Introduction

This chapter focuses on temporary controls to address pollutants during active construction. Temporary controls include practices installed at active construction sites such as erosion and sediment controls (e.g., silt fence), passive or active treatment methods, or good housekeeping controls (e.g., concrete washouts). Temporary construction-phase storm water controls are typically described in a SWPPP that is required for most sites disturbing greater than one acre.

Uncontrolled sediment from active construction sites can significantly affect receiving waters. However, construction site operators with a basic understanding of ESC principles (described in Section 4.1) can develop an effective SWPPP (described in Section 4.2) to address construction-phase storm water problems. The key components of an effective SWPPP are ESC BMPs (Section 4.3), good housekeeping BMPs (Section 4.4), and appropriate inspection, maintenance and recordkeeping procedures (Section 4.5). To help construction project designers avoid making the same mistakes, a list of *common problems* with SWPPPs and temporary BMPs is also included (Section 4.6).

4.1 Erosion and Sediment Control Principles

To effectively address storm water runoff from construction sites, a basic understanding of ESC principles is needed. ESC practices fall into three major classes: erosion prevention, erosion control, and sediment control (MOA 2007). These three classes are discussed in more detail below.

Erosion Prevention

Erosion prevention is any means used to keep soil particles in place. Erosion prevention is the least expensive option of all ESC practices and should be the first line of defense

employed. Many erosion prevention efforts can occur without physically modifying a site, and include planning, training, scheduling, sequencing and land management practices. The easiest and most cost-effective erosion prevention measure is to minimize the area of disturbance and retain existing vegetation.

Erosion Control

Erosion control is a practical complement to the exclusive use of erosion prevention, and should be the primary ESC practice employed on construction sites. In its simplest form, erosion control consists of preventing soils in construction areas from moving downslope. Erosion control minimizes the forces from raindrops, concentrated runoff flows, and wind, each of which detach and transport soil particles. Erosion controls treat the soil as a valued resource that must be conserved in place. Current literature on erosion control promotes several key concepts:

Minimize areas of disturbance—Undisturbed natural vegetation is the best inhibitor of erosion. The time it takes for erosion rates of areas disturbed by construction and subsequently revegetated to return to pre-construction rates varies considerably across Alaska because of the wide range of conditions present.

Cover and stabilize disturbed areas as soon as possible—Any efforts to quickly cover areas of disturbance are rewarded with reduced soil erosion.

Sequence and schedule construction to take advantage of drier weather patterns—Proper sequencing and scheduling of construction offers many benefits, such as reduced ESC costs, quicker reestablishment of vegetation, and protection of the environment.

Divert runoff around erodible areas—Measures that keep flow from traversing disturbed areas reduce the need for additional sediment control efforts. Diversion ditches and benching are effective means of routing runoff away from erodible surfaces. To prevent erosion of the diversion channels themselves, ensure that they are lined.

Reduce runoff quantities and velocities—Keeping runoff velocities low offers significant savings in ESC. The doubling of runoff velocity theoretically results a 64-fold increase in the size of a particle that can be transported. Appropriately designed drainage channels lined with materials such as rock, erosion control blankets or vegetation reduces velocities and enables the channels to perform more similarly to natural stream channels than channels with smooth armoring. Ensure that such

measures are employed only in constructed channels and not natural drainages, unless the work is permitted by the COE.

Prepare the drainage system to handle flows occurring during both construction and post-construction conditions—Construction of drainage systems and impervious surfaces alters the natural runoff regime and results in higher peak flows and increased runoff volumes. These changes in the flow regime must be addressed at the discharge points downstream of the site to ensure that adverse effects do not occur. Measures to control peak flow (such as rock check dams, outlet protection or sediment basins) might be necessary at points where erosion is possible.

Inspect and maintain erosion control measures—Erosion control measures can become sources of pollutants and sediment if they are not properly maintained. In some cases, unmaintained ESC measures can create bigger problems than if no controls were present.

Sediment Control

Sediment controls are used to keep sediment from leaving a construction site. Sediment control is any mechanism that removes sediment from water by filtration, gravity or other means. Unlike erosion controls, sediment controls treat the soil as a waste product that must be continually removed and disposed of properly. Sediment control is the least cost-effective means to meet ESC objectives, because removing sediment from runoff is more costly and less effective than keeping soil in place.

BMP Treatment Train

Most ESCs at construction sites are not installed in isolation, but instead are part of a *suite* of BMPs that are all designed to work together. Designers should use this treatment train approach to design a series of practices that minimize storm water pollution and achieve compliance with Alaska Pollutant Discharge Elimination System (APDES) CGP requirements. For example, a designer could use as a series of BMPs a diversion ditch at the top of a disturbed slope (to minimize storm water flowing down the slope), mulching on the slope (to minimize erosion) and silt fence at the bottom of the slope (to capture sediment). This treatment train would help protect the slope better than relying on a single BMP, such as silt fence.

Keys to Effective ESC

The following list presents 10 key principles (USEPA 2007) in the control of erosion and sediment at construction sites. Construction operators should ensure that their SWPPP includes BMPs to address each of these principles where they apply.

Principles 1–5: Erosion Prevention and Erosion Control (keeping the dirt in place)

ESC Principle 1: Minimize disturbed area and protect natural features and soil. As an SWPPP is developed, carefully consider the natural features of the site. Delineate and control the area that will be disturbed by grading or construction activities to reduce the potential for soil erosion and storm water pollution problems. Limit disturbed areas to only those necessary for the construction project. Natural vegetation is the best and cheapest erosion control BMP.

Protecting and preserving topsoil is also a good BMP. Removing topsoil exposes underlying layers that are often more prone to erosion and have less infiltration capacity. Keeping topsoil in place preserves the natural structure of the soils and aids the infiltration of storm water. Preservation of topsoil should not be used alone. However, it should be combined with other ESCs to prevent erosion of the topsoil itself.

ESC Principle 2: Phase construction activity. Another technique for minimizing the duration of exposed soil is phasing. Schedule or sequence construction work and concentrate it in certain areas to minimize the amount of soil that is exposed to the elements at a time. Limiting the area of disturbance to places where construction activities are underway and stabilizing them as quickly as possible can be one of the most effective BMPs. In climates with frozen soils, excavation work could be scheduled for winter although ESCs will need to be in place before spring break-up.

ESC Principle 3: Control storm water flowing onto and through the project. Plan for any potential storm water, surface water or groundwater flows coming onto the project area from upstream locations, and divert (and slow) flows to prevent erosion. Likewise, the location, volume and velocity of on-site storm water runoff should be controlled to minimize soil erosion.

ESC Principle 4: Stabilize soils promptly. Stabilize exposed soils to minimize erosion where construction activities have temporarily or permanently ceased. Stabilization measures should be in place after grading activities have ceased. The CGP that is applicable in Alaska requires stabilization within 14 days in portions of the site where construction activities have ceased. Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as

practicable. Provide either temporary or permanent cover to protect exposed soils. Temporary measures are necessary when an area of a site is disturbed but where activities in that area are not completed or until permanent BMPs are established. Topsoil stockpiles should also be protected to minimize any erosion from these areas. Temporary-cover BMPs include temporary seeding, mulches, matrices, blankets and mats, and the use of soil binders or tackifiers (there might be additional state and local requirements for using chemical-based soil binders). Permanent-cover BMPs include permanent seeding and planting, sodding, channel stabilization and vegetative buffer strips. Silt fence and other sediment control measures are not stabilization measures.

ESC Principle 5: Protect slopes. Protect all slopes with appropriate erosion controls. Steeper slopes, slopes with highly erodible soils or long slopes require a more complex combination of controls. Erosion control blankets, bonded fiber matrices or turf reinforcement mats can be very effective options. Terracing, including the use of silt fence or fiber rolls as terraces can be effective to help control erosion on moderate slopes and should be installed on level contours spaced at 10- to 20-foot intervals. Also, use diversion channels and berms to keep storm water off slopes.

Principles 6–10: Sediment Controls (the second line of defense)

ESC Principle 6: Protect storm drain inlets. Protect all inlets that could receive storm water from the project until final stabilization of the site has been achieved. Install inlet protection before soil-disturbing activities begin. Maintenance throughout the construction process is important. Upon completion of the project, storm drain inlet protection is one of the temporary BMPs that should be removed. Storm drain inlet protection should be used not only for storm drains within the active construction area, but also for storm drains outside the area that might receive storm water discharges from the project. If there are storm drains on private property that could receive storm water runoff from the project, coordinate with the owners of that property to ensure proper inlet protection.

ESC Principle 7: Establish perimeter controls. Maintain natural areas around the project's perimeter and supplement them with silt fence and fiber rolls around the perimeter of the site to help prevent soil erosion and stop sediment from leaving the site. Install these controls on the downslope perimeter of projects (it is often unnecessary to surround the entire site with silt fence). Sediment barriers can be used to protect stream buffers, riparian areas, wetlands, or other waterways. They are effective only in small areas and should not be used in areas of concentrated flow. Do not install silt fences so that they run downslope (which channels and concentrate flow) or cross areas of concentrated flow.

ESC Principle 8: Retain sediment on-site and control dewatering practices. Sediment barriers described in ESC Principle 7 can trap sediment from small areas, but when sediment retention from a larger area is required, consider using a temporary sediment trap or sediment basin. Such practices detain sediment-laden runoff for a period of time, allowing sediment to settle before the runoff is discharged. Proper design and maintenance are essential to ensure that the practices are effective.

Use a sediment basin for common drainage locations that serve an area with 10 or more acres disturbed at a time. The basin should be designed to provide storage for the volume of runoff from the drainage area for at least a 2-year, 24-hour storm (or 3,600 cubic feet of storage per acre drained, which is enough to contain 1 inch of runoff, if the 2-year, 24-hour calculation has not been performed). Sediment basins should be in low-lying areas of the site and on the downgradient side of bare soil areas where flows converge. Do not put sediment traps or basins in or adjacent to flowing streams or other waterways.

Where a large sediment basin is not practical, use smaller sediment basins or sediment traps (or both) where feasible. At a minimum, use silt fences, vegetative buffer strips or equivalent sediment controls for all downgradient boundaries (and for those side-slope boundaries deemed appropriate for individual site conditions).

Dewatering practices are used to remove groundwater or accumulated rain water from excavated areas. Pump muddy water from these areas to a temporary or permanent sedimentation basin or to an area completely enclosed by silt fence in a flat, vegetated area where discharges can infiltrate the ground. Alternatively, try to conduct excavation when groundwater levels are lower to reduce or eliminate the need for dewatering.

If possible, pump clean groundwater out of the area to be excavated *before* disturbance occurs, so discharges contain less sediment.

Never discharge muddy water into storm drains, streams, lakes, or wetlands.

ESC Principle 9: Establish stabilized construction exits. Vehicles entering and leaving the site have the potential to track significant amounts of sediment onto streets where wind or rain can convey it into storm drains. Identify and clearly mark one or two locations where vehicles will enter and exit the site and focus stabilizing measures at those locations. Construction entrances are commonly made from large crushed rock. They can be further stabilized using stone pads or concrete. Also, steel wash racks and a hose-down system will remove even more mud and debris from vehicle tires. Divert runoff from wash areas to a sediment trap or basin. No system is perfect, so sweep the street regularly to remove any sediment before it reaches storm drains.

ESC Principle 10: Inspect and maintain controls. Inspection and maintenance is just as important as proper planning, design, and installation of controls. Without adequate maintenance, ESCs will quickly fail, sometimes after just one rainfall, and cause significant water quality problems and potential violations of the APDES CGP. To maintain BMPs, establish an inspection and maintenance approach or strategy that includes both regular and spot inspections. Inspecting both before predicted storm events and after will help ensure that controls are working effectively. Perform maintenance or corrective action as soon as problems are noted.

4.2 Construction SWPPP Development

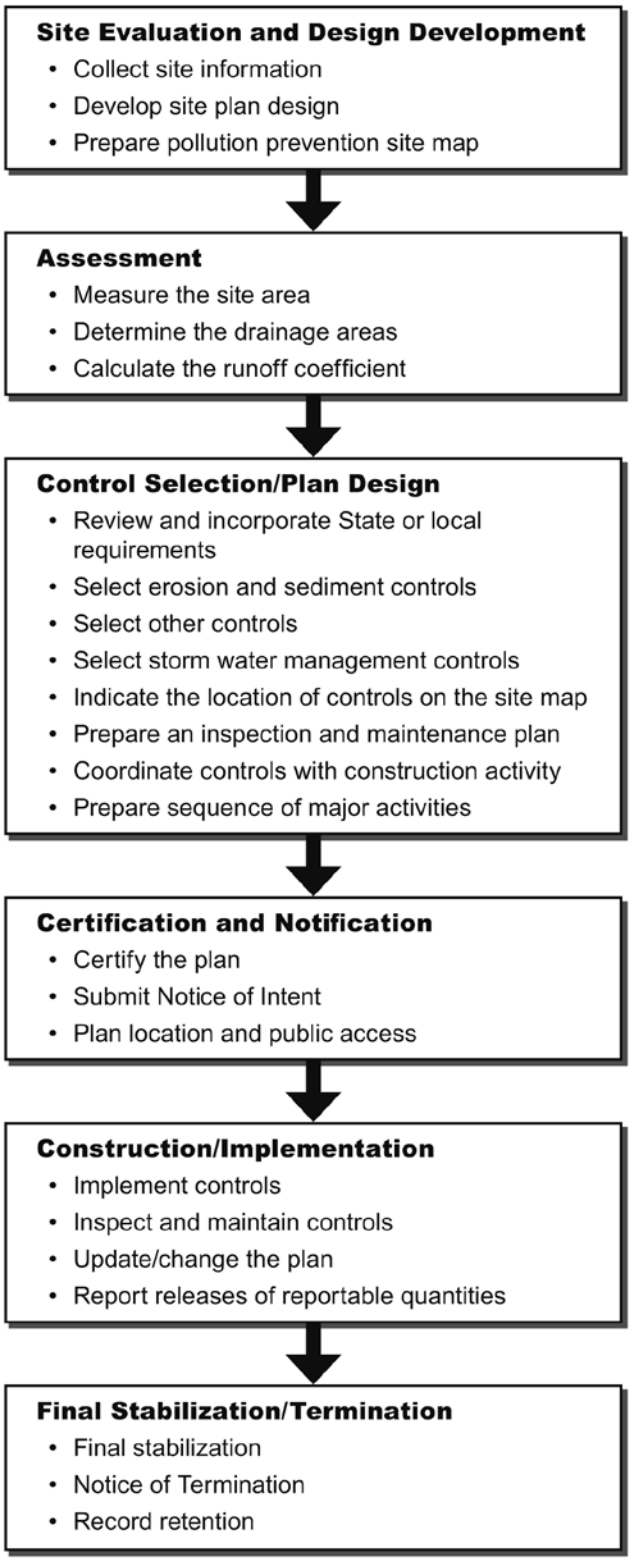
As described in Section 1.1.1, operators of construction sites disturbing greater than one acre with a storm water discharge will need to apply for an APDES permit and develop an SWPPP. EPA describes six phases for developing and implementing construction SWPPPs (USEPA 2007).

The first three phases involve developing the SWPPP; the last three phases involve implementing the SWPPP.

The first phase (**Site Evaluation and Design Development**) in preparing an SWPPP for a construction project is to define the characteristics of the site and the type of construction that will be occurring. This phase includes collecting site information, developing the site design, describing the construction activity and preparing the pollution prevention site map.

The second phase (**Assessment**) measures the size of the land disturbance and estimates the impact the project will have on storm water runoff from the site on the basis of information collected in the first phase. This assessment phase includes measuring the site area, measuring the drainage areas and calculating the runoff coefficient.

The third phase (**Control Selection/Plan Design**) of SWPPP development is to design a plan to prevent and control pollution of storm water runoff from the construction site. This includes reviewing and incorporating state and local requirements, selecting ESCs, selecting good housekeeping controls, selecting storm water management controls, indicating the location of controls in the site map, preparing an inspection and maintenance plan, preparing a description of controls and preparing a sequence of major activities.



The fourth phase (**Certification and Notification**) begins implementation of the SWPPP. The SWPPP must be certified by an authorized official (such as a company president, vice president or a duly authorized representative) and the construction operator must submit an NOI to ADEC. For a description of when and where SWPPPs must be submitted to state and local government agencies, see Chapter 1.

The fifth phase (**Construction/ Implementation**) begins as soon as the permit coverage is granted (generally within 7 days of receipt by ADEC). This phase implements the SWPPP including implementing controls, inspecting and maintaining controls, maintaining records of construction activities, updating/changing the plan to keep it current, taking proper action when there is a reportable quantity spill and having plans accessible.

The sixth and last phase (**Final Stabilization/Termination**) occurs when (1) the permittee no longer meets the definition of an operator of a construction site and another operator has assumed responsibility for the site; or (2) the construction activity is complete, all disturbed soils have been finally stabilized, and temporary ESCs have been or wiI be removed. A permittee should submit a notice of termination (NOT) to inform ADEC that he/she is no longer an operator of a construction activity.

4.3 Erosion and Sediment Control BMPs

The following information in Table 4-1 on common BMPs is summarized from the ADOT&PF's *Storm Water Pollution Prevention Guide* (ADOT&PF 2005) and Anchorage's *Storm Water Treatment Plan Review Manual* (MOA 2007). Following the table are illustrations and details of each Construction BMP in the order listed in the table.

Table 4-1. Feasibility of construction BMPs based on Alaskan climatic regions

	Alaskan climatic regions				
Construction BMPs	**Coastal**	**Southcentral**	**Western**	**Interior**	**Arctic**
Preserving Natural Vegetation	○	○	○	○	○
Temporary Vegetative Buffer Strip	○	○	○	○	○
Surface Roughing	□	○	○	○	○
Mulching	□	○	○	○	□
Temporary Seeding	□	○	○	○	■
Rolled Erosion Control Products	○	○	○	○	○
Brush Barrier	○	○	○	○	□
Silt Fence	○	○	○	○	○
Straw Wattle	○	○	○	○	○
Sediment Basin/Sediment Trap	□	○	○	○	□
Storm Drain Inlet Protection	○	○	□	○	○
Interception/Diversion Ditch	○	○	✪	□	■
Slope Drain	○	○	○	○	○
Rock Flume	○	○	□	○	○
Rock Check Dam	○	○	□	○	○
Outlet Protection	○	○	□	○	○
Storm Water Conveyance Channel	○	○	□	○	■
Vehicle Tracking Entrance/Exit	○	○	○	○	○

Feasibility symbols:

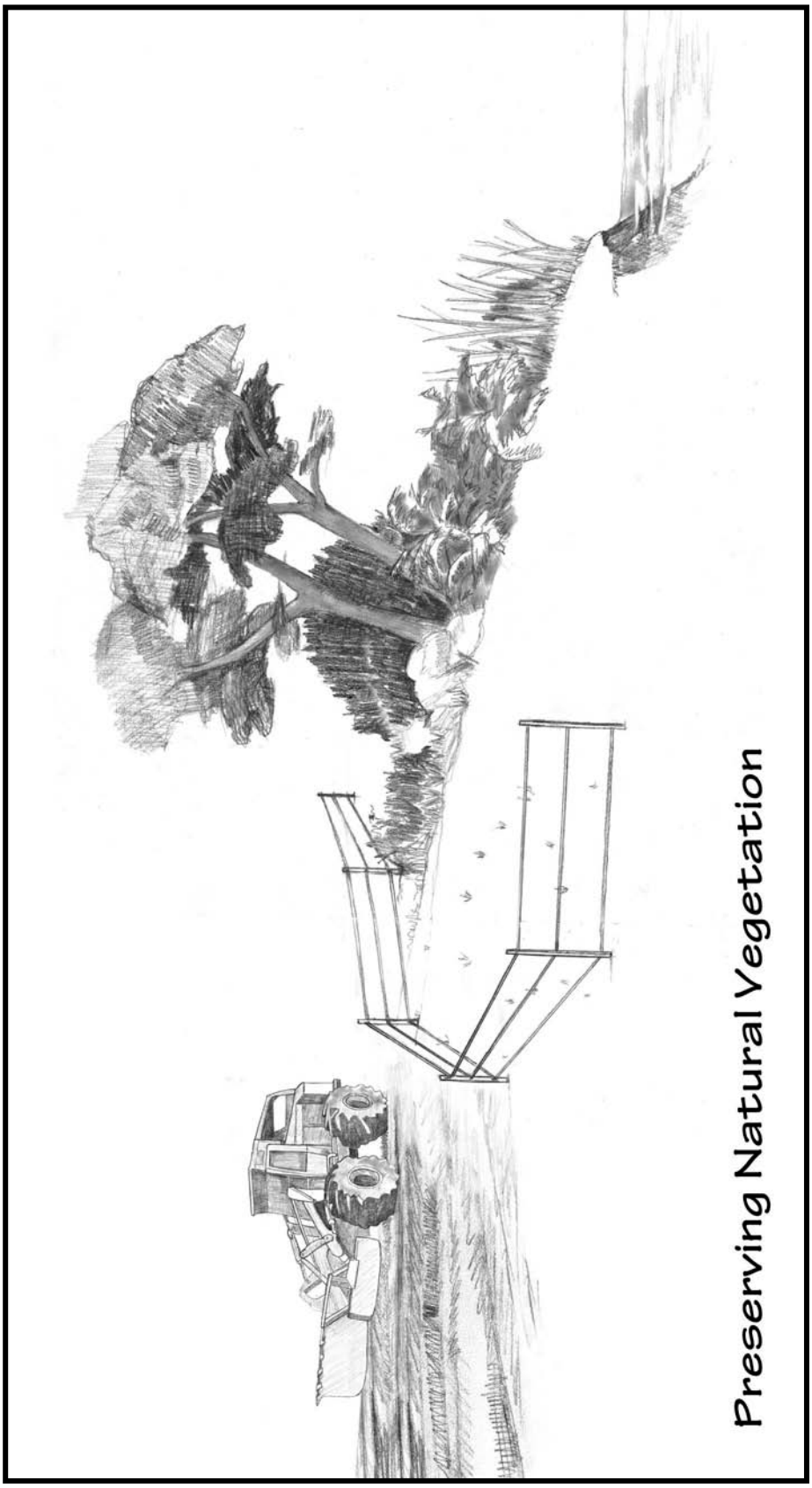
○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended

Note: These recommendations are general guidance; site-specific conditions will dictate proper BMP selection


Preserving Natural Vegetation

Preserving Natural Vegetation

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Preserving Natural Vegetation Feasibility	○	○	○	○	○
Description	The principal advantage of preserving natural vegetation is protecting desirable trees, vines, bushes and grasses from damage during project development. Vegetation provides erosion control, storm water detention, biofiltration and aesthetic values to a site during and after construction activities. Any existing vegetation should be saved unless it is determined to be invasive or otherwise harmful.				
Selection	Designers should be aware of and respond to local climate and other conditions, including project scheduling, that might influence the use of natural vegetative stabilization measures. Before clearing activities begin, clearly mark the vegetation that is to be preserved. Prepare a site map with the locations of trees and boundaries of environmentally sensitive areas and buffer zones to be preserved. Plan the location of roads, buildings and other structures to avoid these areas. This requires careful site management to minimize the impact of construction activities on existing vegetation. Protect large trees near construction zones because damage during construction activities could result in reduced vigor or death after construction has ceased. Extend and mark the boundaries around contiguous natural areas and tree drip lines to protect the root zone from damage.				
Maintenance	Even if workers take precautions, some damage to protected areas might occur. If this happens, repair or replace damaged vegetation immediately to maintain the integrity of the natural system. When planning for new vegetation, choose kinds that enhance the existing vegetation. Ensure that new structures do not harm protected areas.				

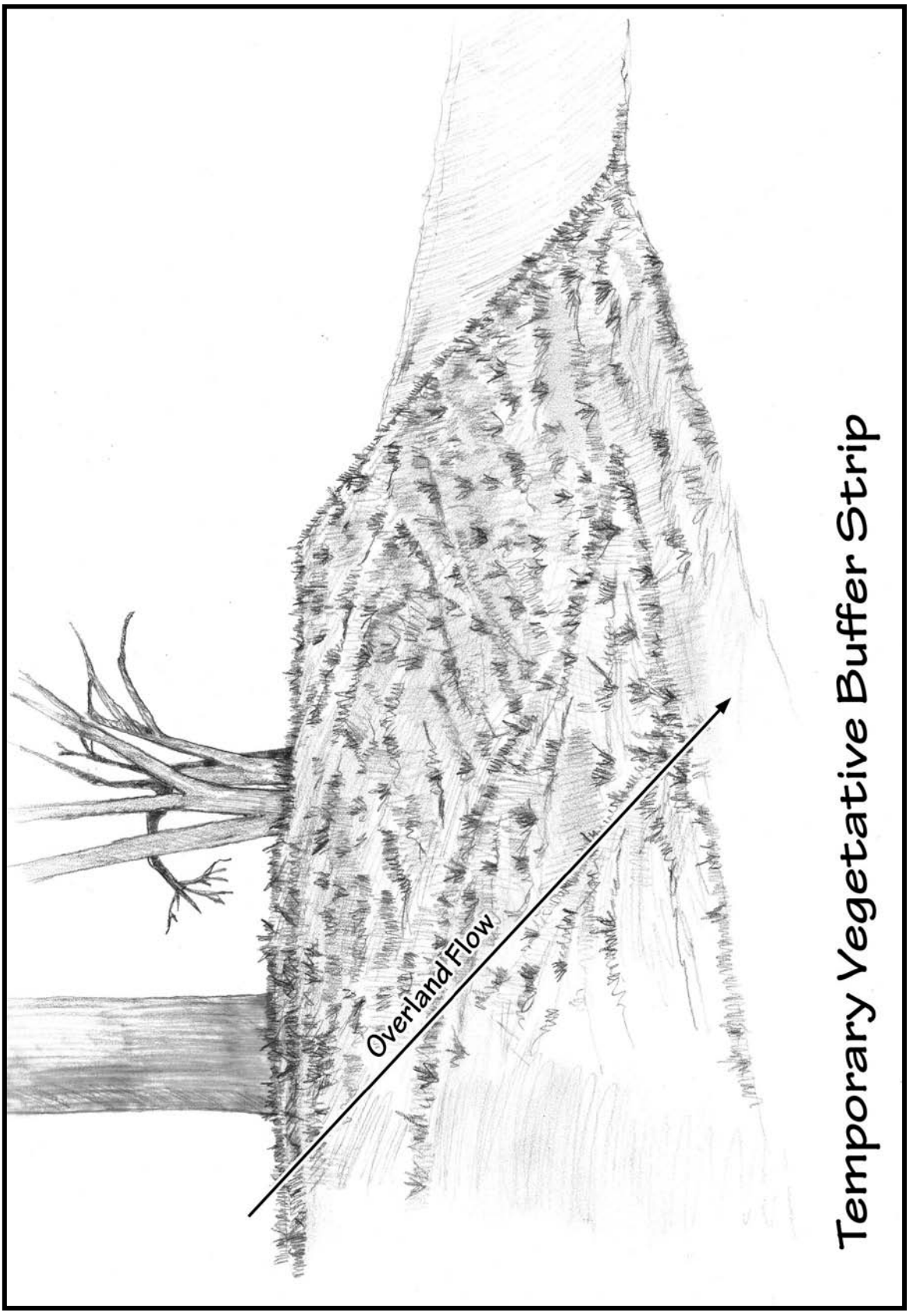
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Temporary Vegetative Buffer Strip
Overland Flow

Temporary Vegetative Buffer Strip

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Temporary Vegetative Buffer Strip Feasibility	○	○	○	○	○
Description	Temporary vegetated buffer strips are areas of natural or established vegetation maintained to protect the water quality of neighboring areas. Buffer strips slow storm water runoff, provide an area where runoff can permeate the soil, contribute to groundwater recharge and filter sediment. Slowing runoff also helps to prevent soil erosion and streambank collapse.				
Selection	Temporary vegetated buffers can be used in any area able to support vegetation. They are most effective and beneficial on floodplains, near wetlands, along streambanks and on unstable slopes. Jurisdictional wetlands cannot be used as vegetated buffer strips unless permitted by the COE.				
Implementation	• Make sure soils are not compacted. • Make sure slopes are less than 5 percent unless temporary erosion control mats are also used. • Determine buffer widths after carefully considering slope, vegetation, soils, depth to impermeable layers, runoff sediment characteristics, type and amount of pollutants, and annual rainfall. • Make sure buffer widths increase as slope increases. • Intermix zones of vegetation (native vegetation in particular), including grasses, deciduous and evergreen shrubs, and understory and overstory trees. • In areas where flows are concentrated and fast, combine buffer zones with other practices such as level spreaders, infiltration areas or diversions to prevent erosion and rilling.				
Maintenance	Keeping vegetation healthy in temporary vegetated buffers requires routine maintenance. Depending on species, soil types, and climatic conditions, maintenance can include weed and pest control, mowing, fertilizing, liming, irrigating and pruning. Inspection and maintenance are most important when buffer areas are first installed. Once established, vegetated buffers do not require maintenance beyond the routine procedures and periodic inspections.				

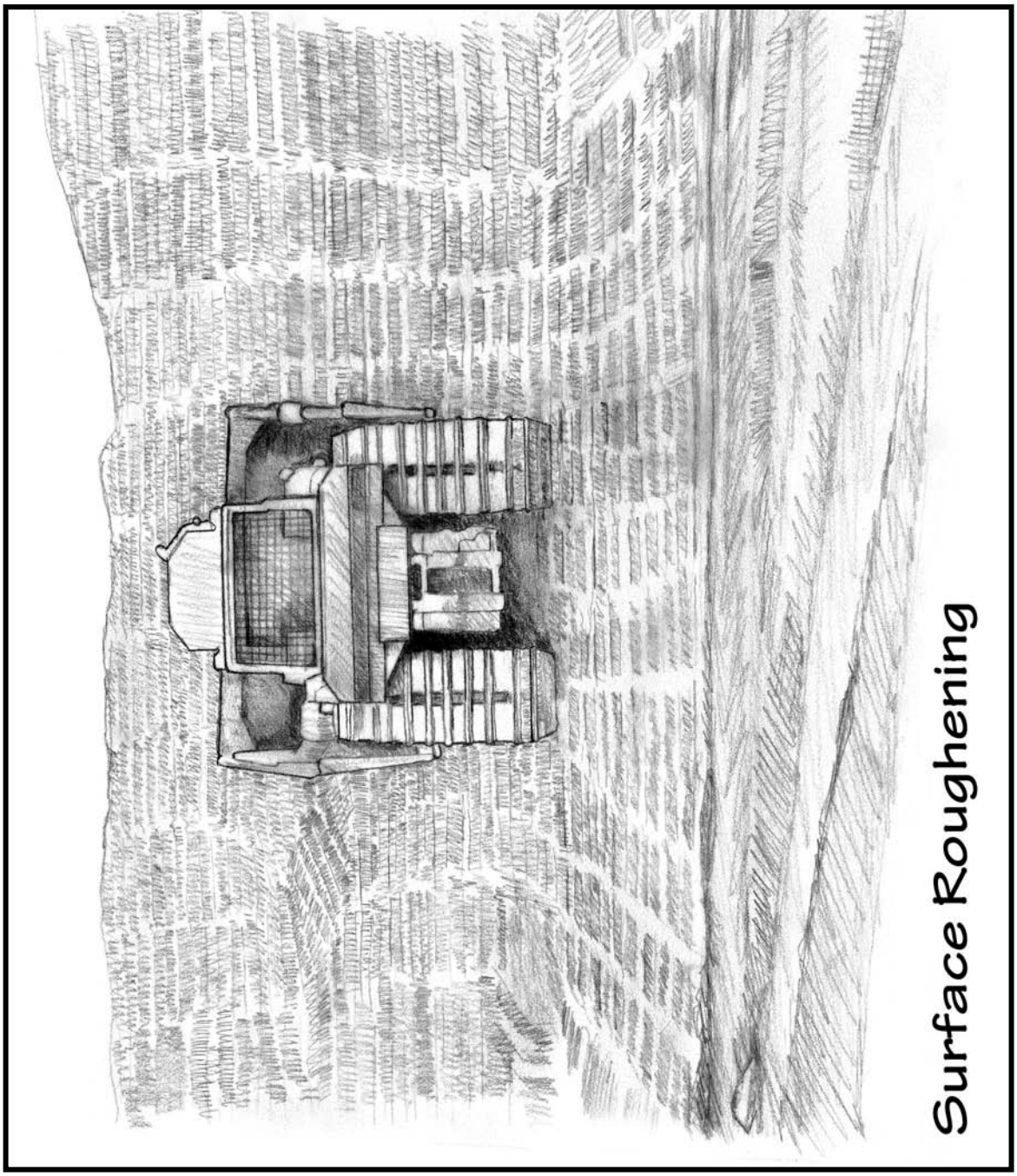
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Surface Roughening

Surface Roughening

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Surface Roughening Feasibility	☐	○	○	○	○
Description	Surface roughening, also called cat-tracking, is used on slopes to provide small pockets for trapping runoff and allowing infiltration. Surface roughening helps establish vegetation cover by providing a rough soil surface with horizontal depressions.				
Selection	Surface roughening works on most sloped areas, except hard pan. Surface roughening in high precipitation areas (Coastal climatic region) might not be feasible depending on soil type and slope.				
Implementation	• The contractor should run tracked machinery along the fall line of the slope with the blade raised. • Roughening with tracked machinery must be limited to avoid compacting the soil surface. • Tracking should be performed in a manner that covers the slope with no more than one foot between tracks. • Roughened areas should be seeded and mulched immediately. • Ensure that track marks are parallel and not perpendicular to the contour of the slope.				
Maintenance	Surface roughening is a temporary measure and should be inspected and shaped after a rainfall that causes erosion. Surface roughing decreases the erosion potential and, in the majority of cases, should be used in conjunction with other BMPs to be considered stabilized. • Make sure the area is adequately covered with tracking. • Check for erosion after significant rainstorms. If rills appear, regrade and roughen again and reseed the eroded area immediately, as appropriate.				

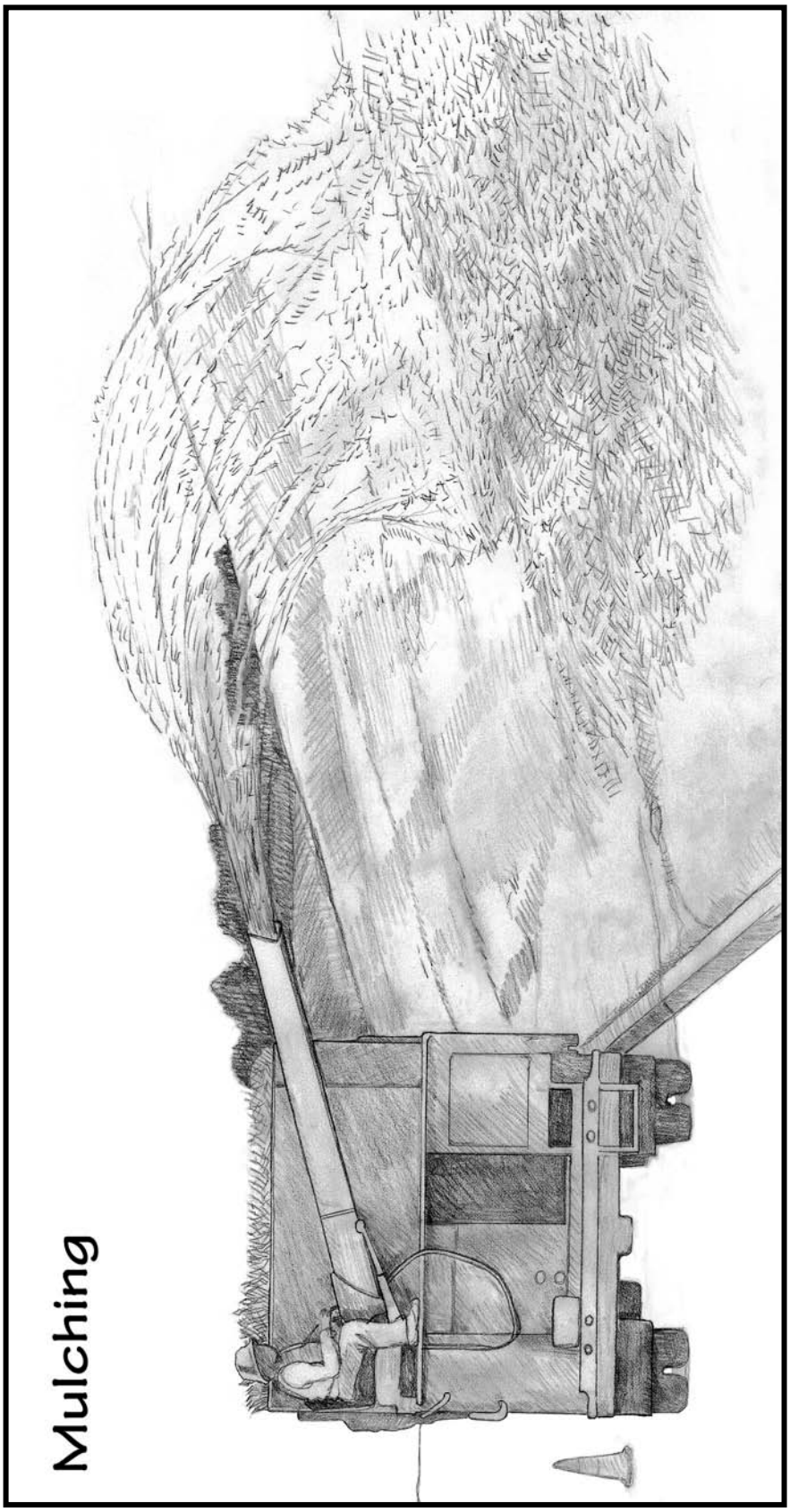
Feasibility symbols:

○ Widely feasible

☐ Might be feasible in certain situations

✪ Feasible only with major design adaptation

■ Infeasible and not recommended


Mulching

Mulching

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Mulching Feasibility	☐	○	○	○	☐
Description	Mulching is the application of plant materials such as straw or other materials to the soil surface. Surface mulch is an effective and cost-effective means of controlling runoff and erosion on disturbed areas before revegetation. Mulch absorbs the raindrop impact energy and minimizes soil detachment, which is the first step of erosion. Mulching is a temporary BMP that helps seedlings germinate and grow by conserving moisture and can be used in unseeded areas to protect against erosion during winter or until final grading and stabilization can be accomplished. Mulches should be free of weeds and unwanted seeds to prevent invasive plants.				
Selection	Mulch can be used successfully on the majority of construction projects. There are many types of mulches available for use on various slopes (see the specifications on the next page). Mulching in the Arctic climatic region might be limited unless additional measures are taken to hold the mulch in place on frozen ground and in wind-prone areas.				
Implementation	Mulch is most commonly used in conjunction with seeding. Mulch should be uniformly spread by hand or blower, and it should cover all ground surface if used alone and without seed. When straw mulch could be exposed to wind, it must be anchored immediately after spreading. Mulch should be applied immediately after seeding to improve seed germination.				
Maintenance	After mulch has been applied and anchored properly, little additional maintenance is required during the first few months. After high winds or significant rainstorms, check the mulch-covered areas for adequate cover and remulched if necessary. To be effective, mulch must last until vegetation develops to provide an erosion-resistant cover. • Confirm that the mulch is adequately watered. • Check to ensure that erosion is not occurring. • Watch for and repair washout of mulch. • Mulching can degrade slowly; therefore, some mulches might need to be removed once vegetation is established.				

Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended

Mulching Specifications

Mulch type	Characteristics	Application
Straw	• Should be air dried, come from wheat or oats, and be free of weeds and coarse material. • Most commonly used in conjunction with seeding and where the need for protection is for shorter than 3 months.	• Spread by hand or machine to a minimum 4 inches thick. • Anchor by crimping, disking, rolling, or punching into the soil, covering with netting or keeping moist.
Wood Chips	• Should be small enough to use as a mulching medium. • Suitable for areas that will not be closely mowed and around ornamental plantings.	• Can be obtained from trees that were cleared from the site to provide inexpensive mulch. • Apply to slopes less than 6 percent (16:1) to avoid clogging of drainage inlets by chips washed downslope.
Bark Chips	• Should be small enough to use as a mulching medium. • Use in landscape plantings.	• Use in areas to be planted with grasses and not closely mowed. • Apply by hand or mechanically.
Wood Fiber Cellulose (partially digested wood fibers)	• Dyed green; should not contain growth-inhibiting factors. • Short cellulose fibers do not required tacking, but longer fiber lengths provide better erosion control.	• Use in hydroseeding operations as part of the slurry. • Apply with hydromulcher: 25 to 30 pounds per 1,000 square feet.
Bonded Fiber Matrix	• Hydraulically applied fibers and adhesives that form an erosion resistant blanket • Biodegradable, promotes growth of vegetation	• Apply hydraulically • Typically applied at rates from 3,000 to 4,000 lb/acre • Do not apply immediately before, during or after rainfall
Flexible Growth Medium	• Generally provides good protection • No cure time (can be applied under most conditions)	• Hydraulically applied • Typically applied at rates of 3,500 lb/acre

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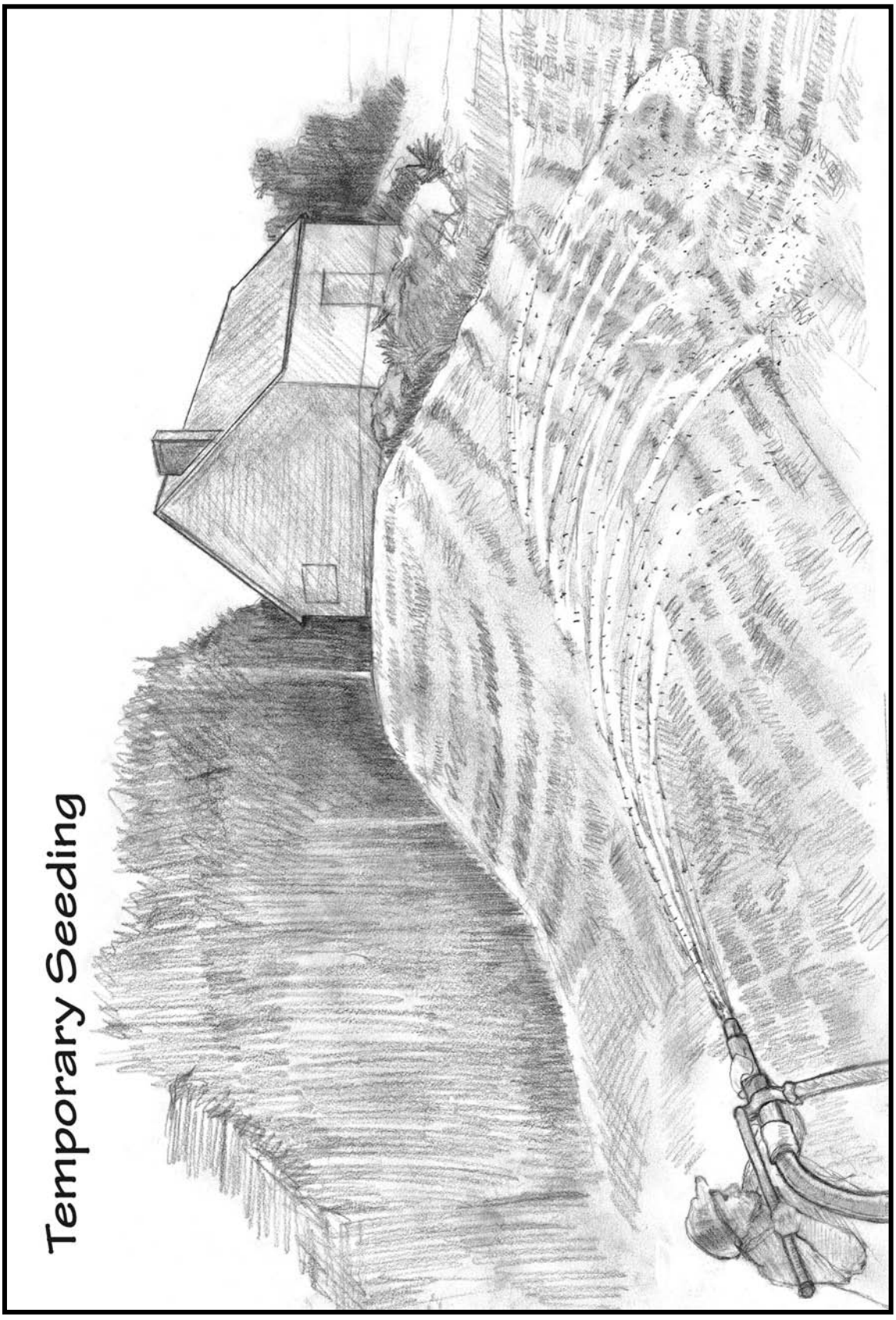

Temporary Seeding

Temporary Seeding

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Temporary Seeding Feasibility	☐	○	○	○	■

Description	Seeding is the establishment of perennial vegetation, usually lawns, on disturbed areas from seed. Seeding can be a temporary or permanent measure. The seed mixture should be free of weeds and unwanted seeds to prevent invasive plants.
Selection	This practice is used when vegetation is desired for temporary or final stabilization. Temporary seeding is not recommended if permanent seeding will be completed in the same growing season. The temporary seed mix is usually different from the permanent seed mix. Other temporary stabilization should be considered. Temporary seeding typically requires additional control measures to provide stabilization until vegetation is established.
Implementation	Proper seedbed preparation and the use of high quality seed are essential to the success of this practice. • Seeding should take place as soon as practicable after the last ground-disturbing activities in an area. For specific planting recommendations for your part of the state, contact the Alaska Department of Natural Resources, Plant Materials Center. • Supplement topsoil as necessary to ensure a minimum of 4 inches of topsoil, or the thickness specified in the plans, in areas to be permanently seeded. Work the topsoil into the layer below for a depth of at least 6 inches, or the thickness specified in the plans. • Follow the project plans and specifications produced by the landscape architect or engineer. • Seeding itself is not an erosion control until the seed germinates and vegetative cover grows. Seeding should be used in conjunction with mulch or other controls to protect the topsoil while seed germinates.
Maintenance	All seeding should be inspected periodically following installation. Seeded areas should be checked for erosion and flooding after significant rainstorms. Any repairs must be made immediately. • Water seeded areas daily until initial ground cover is established if rainfall does not provide moisture for seed germination. • Check the area to ensure the grass is growing; replant at appropriate times if required. • Look for damage to the seeded area due to runoff and repair before the next runoff event. • Check for erosion and flooding after significant rainstorms and repair before the next runoff event.

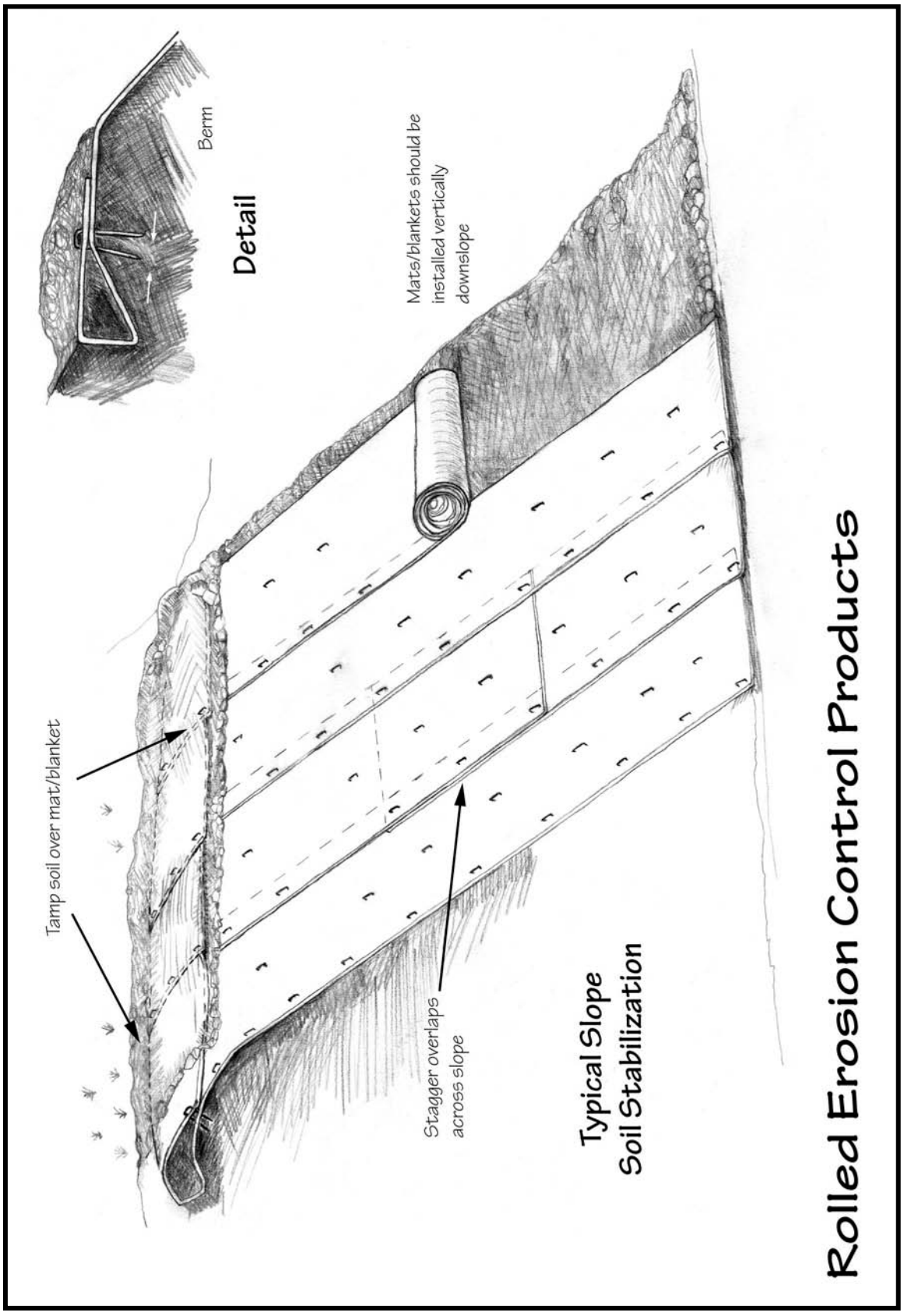
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended


Rolled Erosion Control Products
Typical Slope
Soil Stabilization
Tamp soil over mat/blanket
Stagger overlaps across slope
Mats/blankets should be installed vertically downslope
Detail
Berm

Rolled Erosion Control Products

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Rolled Erosion Control Products Feasibility	○	○	○	○	○
Description	Rolled erosion control products (RECPs) are manufactured, long sheets or coverings that can be unrolled onto unvegetated cut or fill slopes where erosion control or soil stabilization is needed. They are used where temporary seeding and mulching alone are inadequate or where mulch must be anchored and other methods such as crimping or tackifying are infeasible.				
Selection	RECPs function best in providing a protective cover on slopes and channels where the erosion hazard is high and plant growth is likely to be slow, generally on slopes stepper than 3H:1V and greater than 10 feet of vertical relief.				
Implementation	• Follow the manufacturer's recommendations for installation. • RECPs must be anchored; spacing depends on type of material and slope steepness. • Maintain a firm continuous contact between the RECP and soil to prevent erosion below the RECP.				
Maintenance	When RECPs have been installed and anchored properly, little additional maintenance is required during the first few months. After high winds or significant rainstorms have occurred, check the RECP areas for adequate cover and repair if necessary. The RECP must last until vegetation develops to provide an erosion-resistant cover. After any damaged slope or drainage course has been repaired, reinstall the material. • Check that surfaces adhere, fasteners remain secure and covering is in tight contact with the soil surface beneath. • After significant rainstorms, check for erosion and undermining and repair promptly. • Look for and repair washouts.				

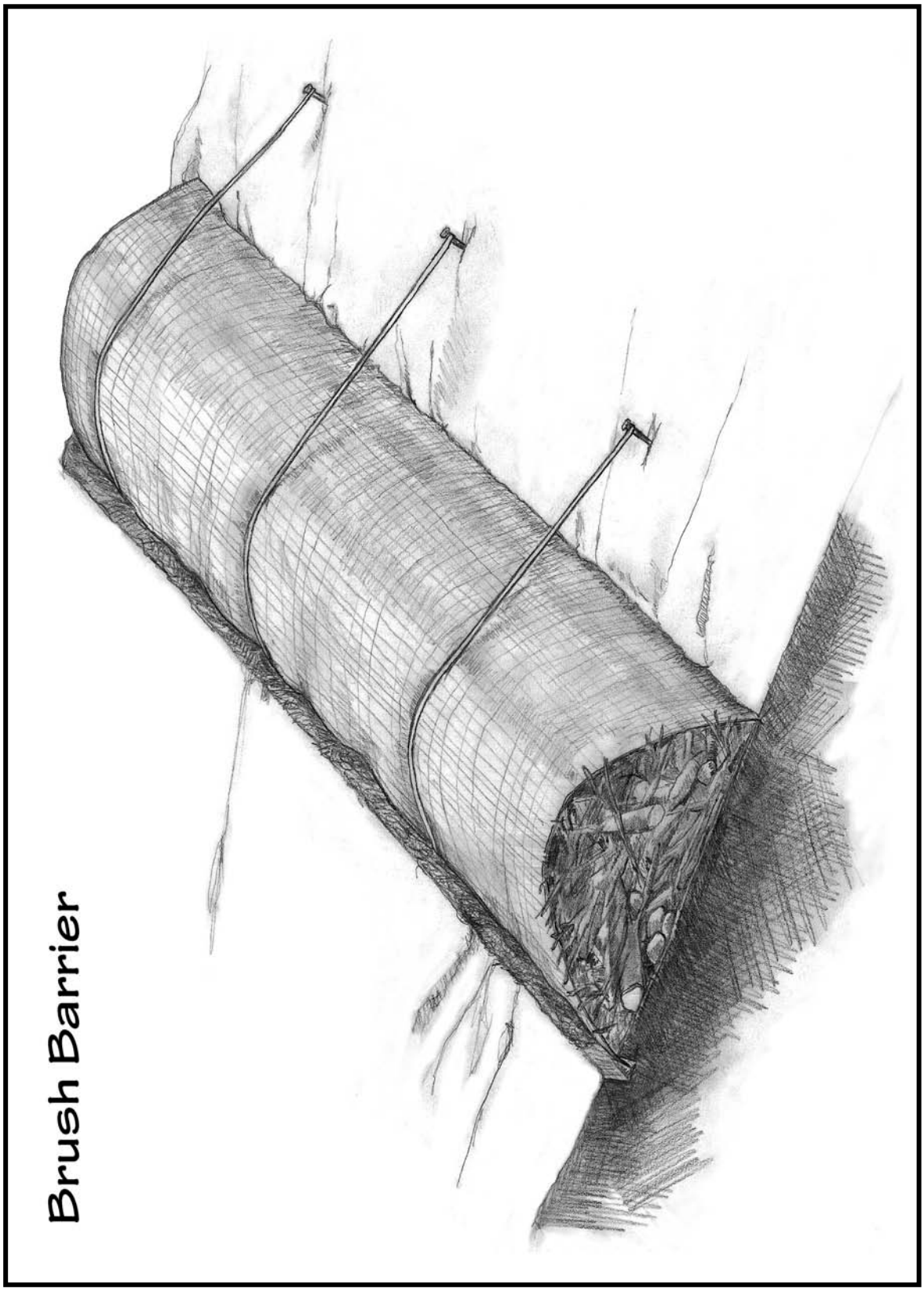
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended


Brush Barrier

Brush Barrier

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Brush Barrier Feasibility	○	○	○	○	□
Description	Brush barriers are perimeter sediment control structures constructed of material such as small tree branches, root mats, stone or other non-erodible debris left over from site clearing and grubbing. Brush barriers can be covered with a filter cloth to stabilize the structure and improve barrier efficiency.				
Selection	The drainage area for brush barriers must be no greater than 0.25 acre per 100 feet of barrier length. In addition, the drainage slope leading down to a brush barrier must be no greater than 2:1 and no longer than 100 feet. Brush barriers have limited usefulness because they are constructed of materials that decompose.				
Implementation	It is recommended that brush barriers be covered with a filter fabric barrier to hold the material in place and increase sediment barrier efficiency. The barrier mound should be at least 3 feet high and 5 feet wide at its base. Material with a diameter larger than 6 inches should not be used, because this material might be too bulky and create void spaces where sediment and runoff will flow through the barrier. The edge of the filter fabric cover should be buried in a trench 4 inches deep and 6 inches wide on the drainage side of the barrier. This is done to secure the fabric and create a barrier to sediment while allowing storm water to pass through the water-permeable filter fabric. The filter fabric should be extended just over the peak of the brush mound and secured on the down-slope edge of the fabric by fastening it to twine or small-diameter rope that is staked securely. Install the brush barrier parallel to the contour of the slope and without gaps that would allow runoff to bypass the barrier.				
Maintenance	Inspect brush barriers according to the schedule specified in the SWPPP to ensure their continued effectiveness. If channels form through void spaces, reconstruct the barrier to eliminate the channels. Accumulated sediment should be removed from the uphill side of the barrier when sediment height reaches between one-third and one-half the height of the barrier. When the entire site has reached final stabilization, remove the brush barrier and dispose of it properly.				

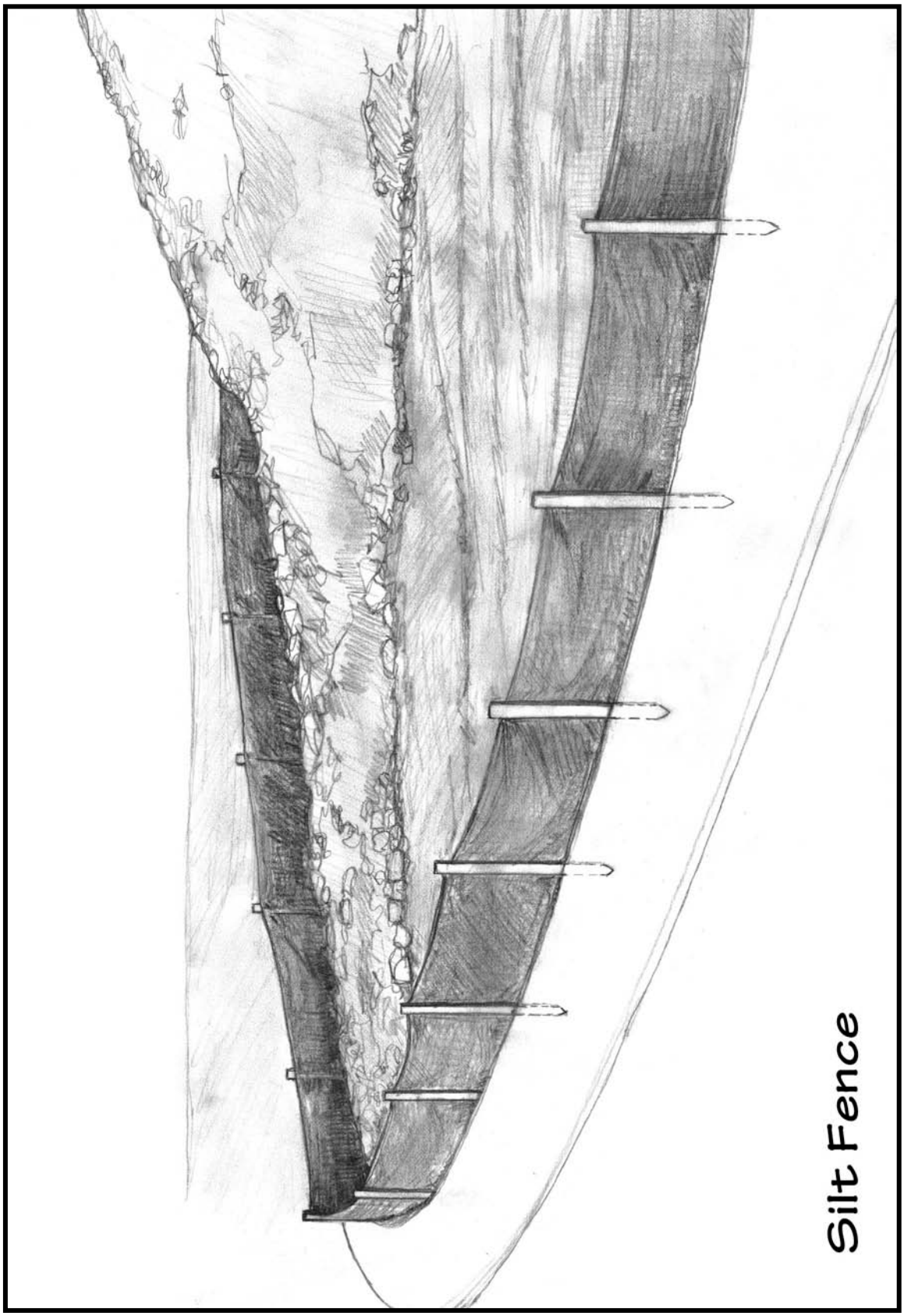
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Silt Fence

Silt Fence

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Silt Fence Feasibility	○	○	○	○	○
Description	Silt fences are used to pond sheet flow runoff on sloped areas, thus allowing heavy sediment particles to settle out while water and lighter particles leak slowly through the fence material. The fences can be very effective in removing sediment from runoff.				
Selection	Silt fences are appropriate for the majority of construction sites that are not more than moderately sloped. The design life a silt fence is 6 months or less. The maximum contributory sheet flow drainage area should not exceed 0.25 acres per 100 feet of silt fence. Use of a silt fence is usually more complex, expensive, and maintenance-prone than other sediment control measures. Silt fence might not be the most appropriate control measure for uneven terrain or when vegetative mat contains high density of roots that preclude keying in the fabric.				
Implementation	Silt fences should be installed at right angles to the slope and along contours. Silt fences should be installed at the bottom of a slope or on a bench on a slope. Because of the difficulty of installing silt fence on frozen ground, installation should take place, where possible, before the ground freezes. Posts should be securely installed with the fabric attached to the uphill side of the post. The filter fabric should be securely attached to the posts. The filter fabric should be keyed into the surrounding earth. Silt fences should *not* be used in locations with concentrated flow, including streams or other storm water conveyances. Silt fence should only be used to contain sediment on-site.				
Maintenance	The filter fabric should be kept up to maintain its function. If it is torn or frayed, replace it. The posts should be reinstalled if loose. The filter fabric should be reinstalled if it is not keyed into the surrounding earth. The silt fence should be cleaned when sediment accumulates (see the most current CGP for specific requirements; the CGP specifies 50 percent of design capacity) and cleaned or replaced when it is covered with sediment. • Confirm that the fence posts are secure. • Assure that the filter fabric is securely attached to the fence posts. • Look for and repair filter fabric that is torn or frayed. • Check for evidence of runoff overtopping the filter fabric; correct as necessary. • Verify that the silt fence is not leaning over. • Check for underflow and re-key if necessary. • Remedy fence sags as needed.				

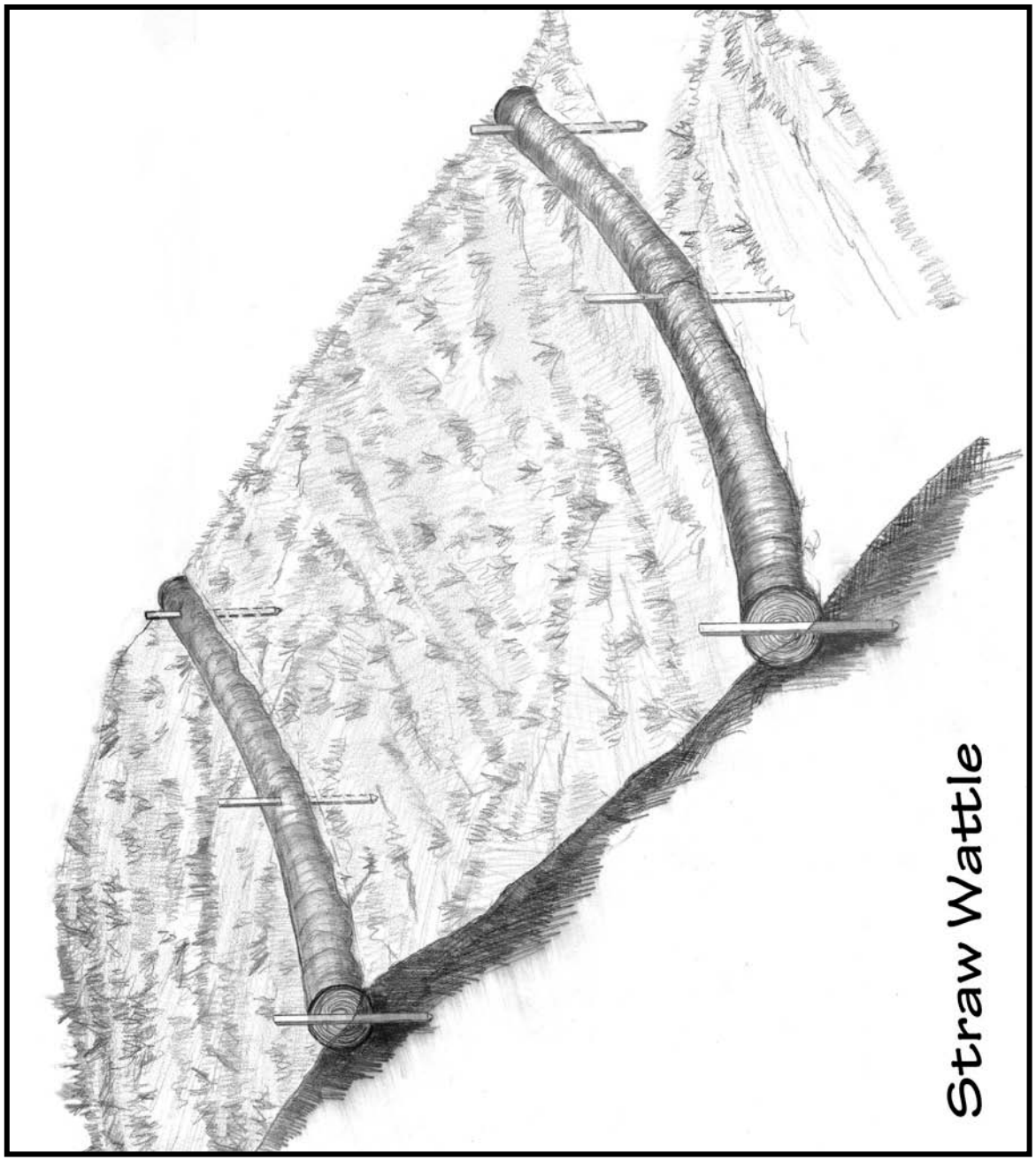
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended


Straw Wattle

Straw Wattle

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Straw Wattle Feasibility	○	○	○	○	○
Description	Straw wattles, also called fiber rolls, consist of straw, flax or other similar materials bound into a tight tubular roll. When straw wattles are placed at the toe and on the face of slopes, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. By interrupting the length of a slope, straw wattles can also reduce erosion.				
Selection	Straw wattles are appropriate for the majority of construction sites that are not more than moderately sloped. Straw wattles can be used around temporary stockpiles, down-slope of exposed soil areas, along the perimeter of a project, or as grade breaks along a slope.				
Implementation	To be effective, straw wattles must be trenched (2–4 inches deep) and staked. Similar to silt fence, straw wattles should be placed on the contour. On slopes, straw wattles should be placed at intervals depending on the degree of slope.				
Maintenance	Inspect as specified in the SWPPP. Inspect straw wattles to indentify locations that are split, torn, unraveling or slumping. Repair or replace straw wattles in those locations. Remove sediment from behind wattles when it reaches at least one-half the height of the wattle.				

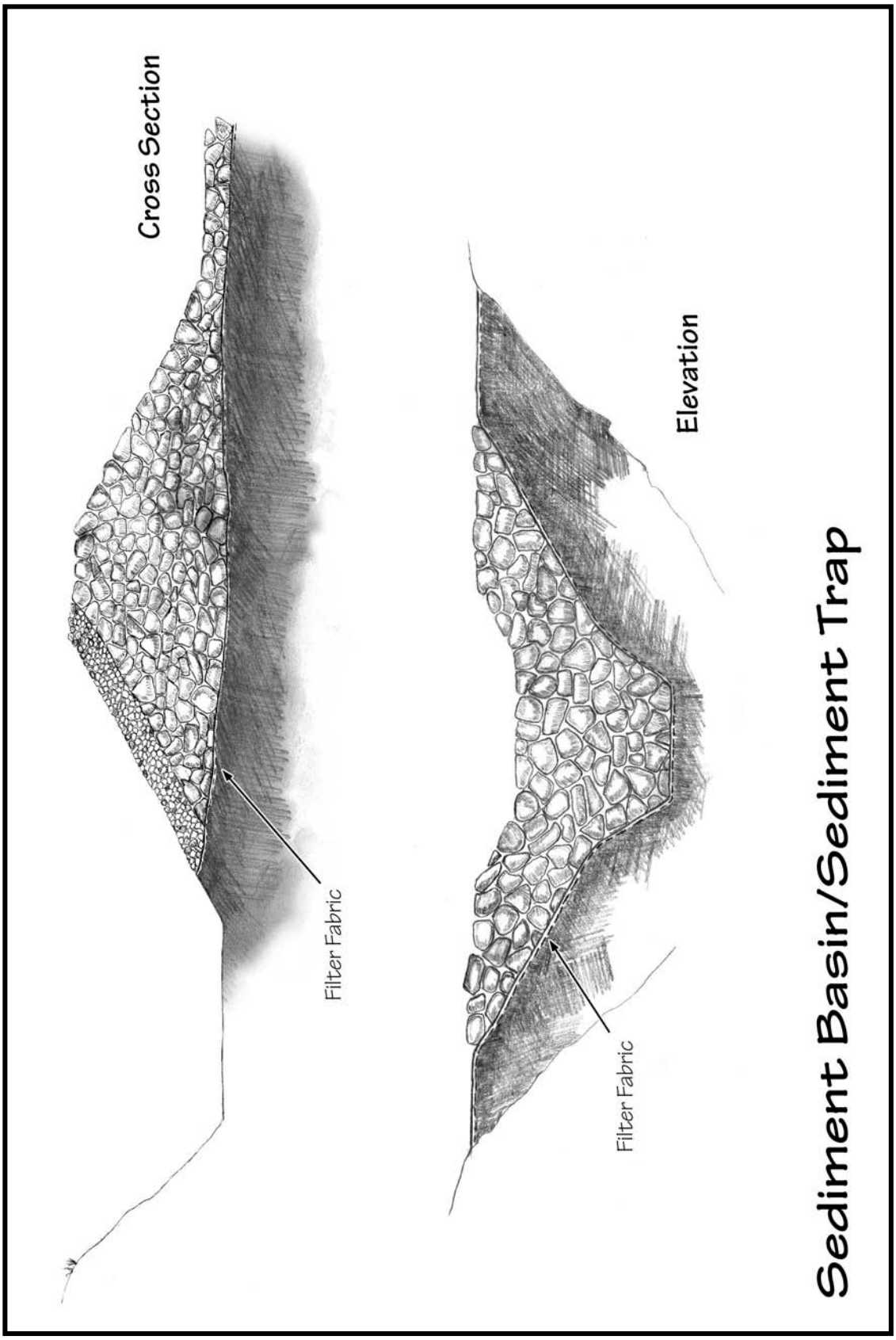
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Cross Section
Filter Fabric
Elevation
Filter Fabric
Sediment Basin/Sediment Trap

Sediment Basin/Sediment Trap

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Sediment Basin/Sediment Trap Feasibility	☐	○	○	○	☐
Description	Sedimentation basins are used to remove large quantities of sediment from runoff. The basin can be designed to remove fine-grained sediments such as clays or silts as well as some chemicals. The basin can also serve an added function for runoff detention. A temporary sediment trap is a small temporary ponding area, with a rock outlet, formed by excavating below grade or by constructing an earth embankment or both. A sediment trap is a temporary structure that is used to detain runoff from small drainage areas so that sediment can settle out.				
Selection	Sedimentation basins are generally used on medium- to large-scale projects, and where sediment discharge would damage environmentally sensitive areas. Sediment traps generally are used for drainage areas less than 5 acres, and sediment basins are used for drainage areas greater than 5 acres. They should be in areas where access can be maintained for sediment removal and proper disposal. Sediment basins are required on construction site drainage areas that are 10 acres or larger, unless infeasible, in which case, equivalent smaller sediment traps must be used.				
Implementation	The sedimentation basin should be installed according to approved plans and specifications, or as required by the SWPPP. Because the facilities are customized for each project, the approved construction plans provide the best source of information on implementation. Sizing of the basins, at a minimum, should meet the ADEC CGP requirement (storage for the volume of runoff from the drainage area for at least a 2-year, 24-hour storm).				
Maintenance	Sediment should be removed from the sedimentation basin yearly or when it accumulates to a depth of one foot, or as specified in the SWPPP. For the sediment trap, remove sediment and restore the trap to its original dimensions when the sediment has accumulated to one-half its design storage capacity. If sediment impairs the function of the outlet structure, clean the trap more frequently. Rocks and washed gravel should be cleaned or replaced when they become filled with sediment. Sediment basins should be maintained to prevent their becoming a pollutant source. If sloughing or erosion of side slopes occurs, repair the sedimentation basin. • Confirm that the construction plans have been followed. • Check that sediment accumulation is within acceptable limits. • Confirm that the outlet structure is functioning properly. • Confirm that sediment is not *passing through* to the downstream end. • Check for accumulations of floating debris. • Check to ensure that the emergency overflow spillway is not obstructed.				

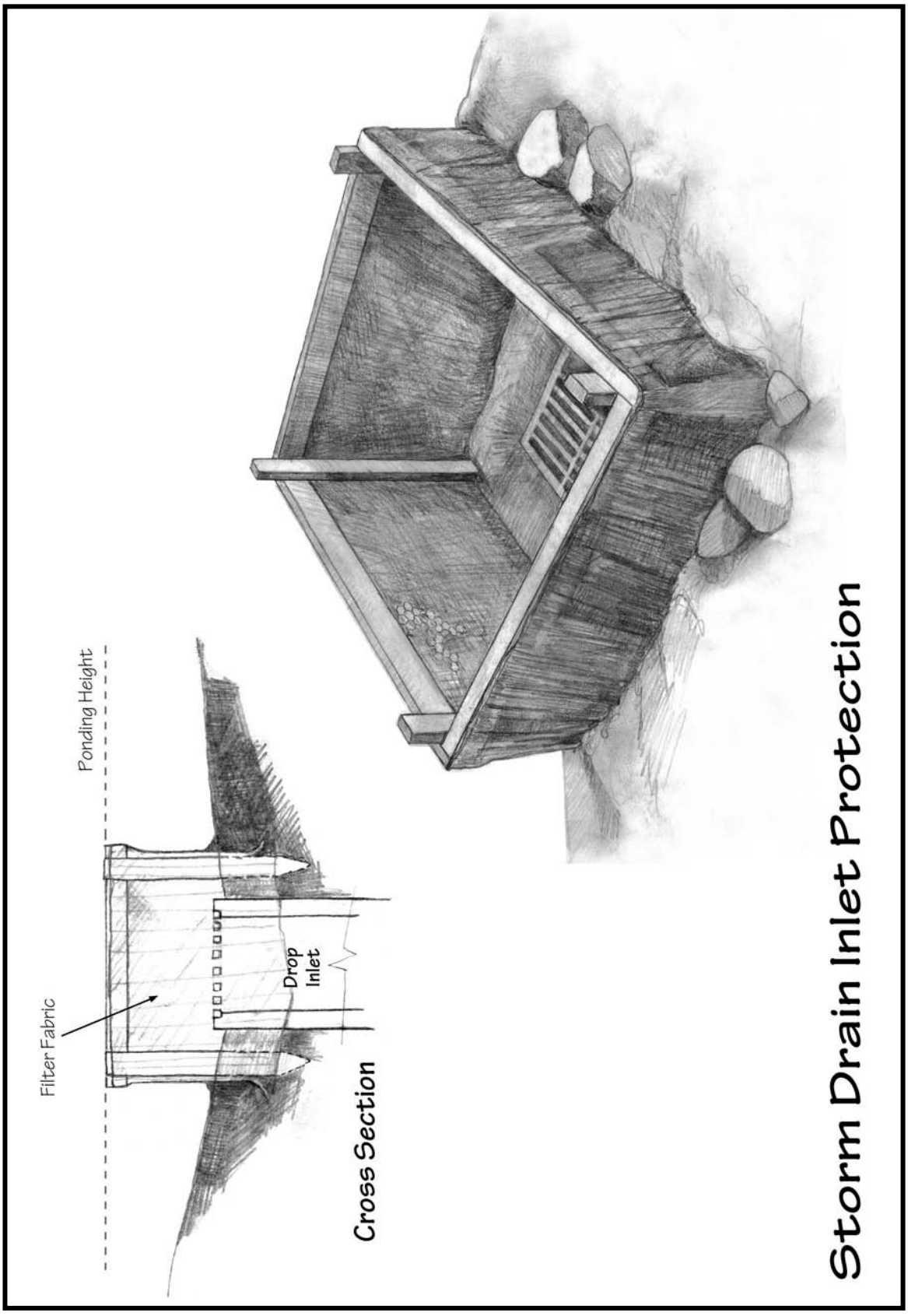
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended


Storm Drain Inlet Protection
Ponding Height
Filter Fabric
Drop Inlet
Cross Section

Storm Drain Inlet Protection

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Storm Drain Inlet Protection Feasibility	○	○	□	○	○
Description	Storm drain inlet protection is a temporary filtering measure placed around a drop inlet or curb inlet to trap sediment and prevent the sediment from entering the storm drain system. This measure is used where storm drain inlets are to be made operational before permanent stabilization of the disturbed area, where a permanent storm drain structure is being constructed on-site and there is potential for sediment accumulating in an inlet, and where ponding of storm water around the inlet structure could be a problem to the traffic on the site.				
Selection	Storm drain inlet protection is a secondary control, used in combination with other ESCs at a construction site. It should be used at all operational storm drains that can receive storm water discharges from the construction site.				
Installation	There are several different inlet protection methods that can be used, depending on the storm drain inlet type. Several of these are described below: **Filter Fabric Fence—**For drop inlets in unpaved areas. Place a stake at each corner of the inlet no more than 3 feet apart. Drive stakes into the ground a minimum of 12 inches. For stability, install a frame of 2x4 inch wood strips around the top of the overflow area. Excavate a trench 8 inches wide by 12 inches deep around the outside perimeter of the stakes. If a sediment trapping sump is being provided, the excavation can be as deep as 20 inches. Staple the filter fabric to the wooden stakes with heavy duty staples; ensure that 32 inches of filter fabric extends at the bottom so it can be formed into the trench. Place the bottom of the fabric into the trench, and backfill with washed gravel all the way around. **Block and Gravel Filter—**For drop or curb inlets. Secure the inlet grate to prevent seepage. Place wire mesh over the inlet so that it extends 12 inches to 20 inches beyond the inlet structure. Place filter fabric (optional) over the mesh and extend it 20 inches beyond the inlet structure. Place concrete blocks in a single row—lengthwise on their sides with the open ends of the blocks facing outward, not upward—over the wire mesh or filter fabric; ensure that adjacent ends of blocks abut. For curb inlet applications, cut a 2x4 wood stud the length of the curb inlet, plus the width of the two end blocks, and place the stud through the outer hole of the end blocks to keep the blocks in place. Place wire mesh over the outside of the vertical face (open end) of the blocks to prevent gravel from being washed through the blocks. Place gravel against the wire mesh to the top of the blocks. Avoid using this BMP on roads open to traffic, and if used, remove it before winter freeze-up.				

Storm Drain Inlet Protection *(continued)*

Installation *(continued)*	**Gravel and Wire Mesh Filter—**Secure the inlet grate. Place wire mesh over the inlet so that the mesh extends 12 inches beyond each side of the inlet structure. Place filter fabric over the mesh, extending it 20 inches beyond the inlet structure. Place washed gravel over the fabric/wire mesh to a depth of 12 inches. **Gravel Bag Barrier—**Use sand bags made of geotextile fabric (not burlap) filled with 0.75-inch rock or 0.25-inch pea gravel, or other appropriate sizes. Place several layers of bags around inlet. **Proprietary Inlet Protection Devices—**For both drop and inlet filters, there are a number of proprietary devices available that either block and filter the sediment from in front of the inlet, or sit inside the inlet and capture sediment before it reaches the storm drain. Check with the manufacturer for specific design and installation requirements.
Maintenance	Inspect the inlet protection as specified in the SWPPP and after every storm to look for sediment accumulation and structural damage. Remove sediment and restore structure to its original dimensions when sediment has accumulated to one-half the design depth. On gravel and mesh designs, clean (or remove and replace) the gravel filter or filter fabric if it becomes clogged. Repair any structural damage immediately.

Feasibility symbols:

○ Widely feasible	✪ Feasible only with major design adaptation
□ Might be feasible in certain situations	■ Infeasible and not recommended

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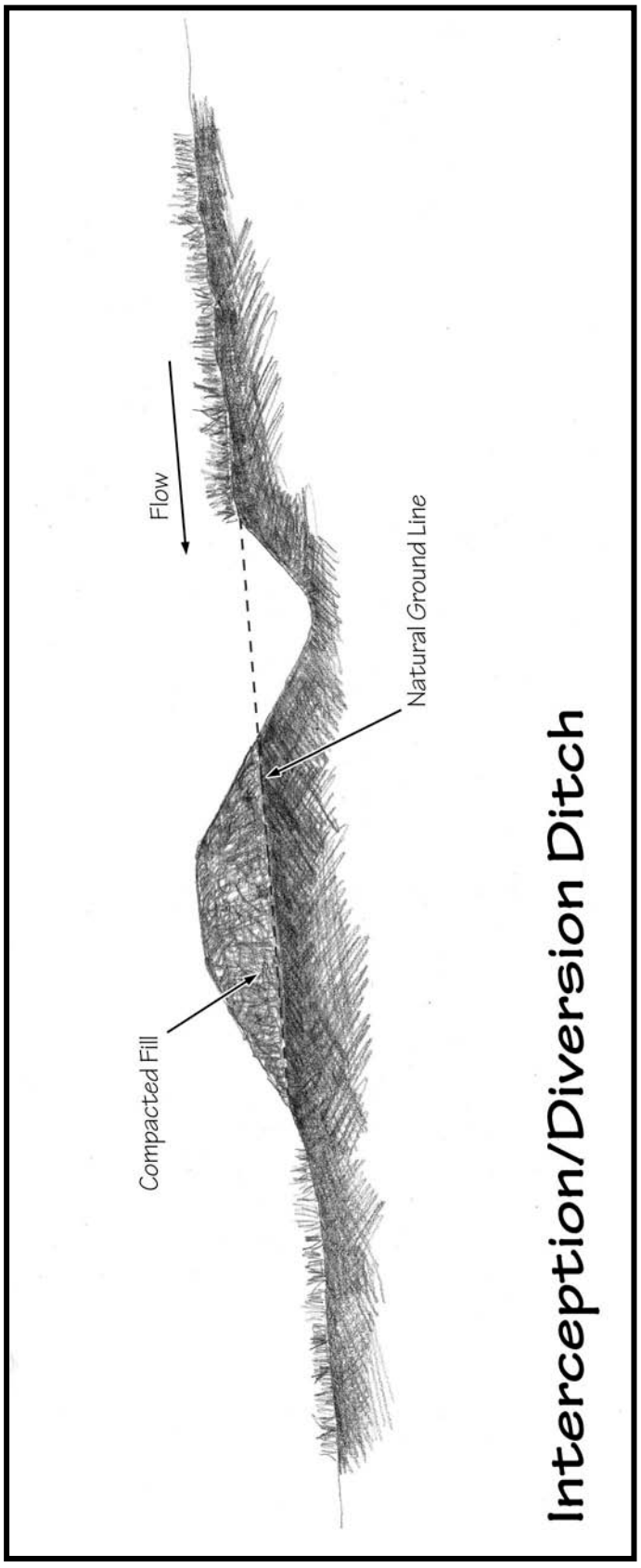

Interception/Diversion Ditch
Flow
Natural Ground Line
Compacted Fill

Interception/Diversion Ditch

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Interception/Diversion Ditch Feasibility	○	○	✪	□	■
Description	An interception/diversion ditch is an earthen perimeter control usually consisting of a dike or a combination dike and channel constructed along the perimeter of and within the disturbed part of a site. The interception is typically accomplished with a ridge of compacted soil, often accompanied by a ditch or swale with a vegetated lining, at the top or base of a sloping disturbed area. The primary objective is to control the velocity or route (or both) of run-on water (natural surface water, drainages, storm water runoff or groundwater seeps) and to keep this cleaner run-on water away from disturbed soil and other pollutant sources.				
Selection	The decision to use an interception/diversion ditch depends on the topography of the area surrounding the construction site. When determining the appropriate size and design of an interception/diversion ditch, consider the shape and drainage patterns of the landscape. Also consider the amount of runoff to be diverted, the velocity of runoff in the diversion, and the erodibility of soils on the slope and in the diversion channel or swales.				
Installation	Construct diversion dikes and fully stabilize them before any major land disturbance begins.				
Maintenance	Inspect interception/diversion ditches as specified in the SWPPP to ensure continued effectiveness. Maintain dikes at their original height. Repair any decrease in height due to settling or erosion immediately. To remain effective, earth dikes must be compacted at all times.				

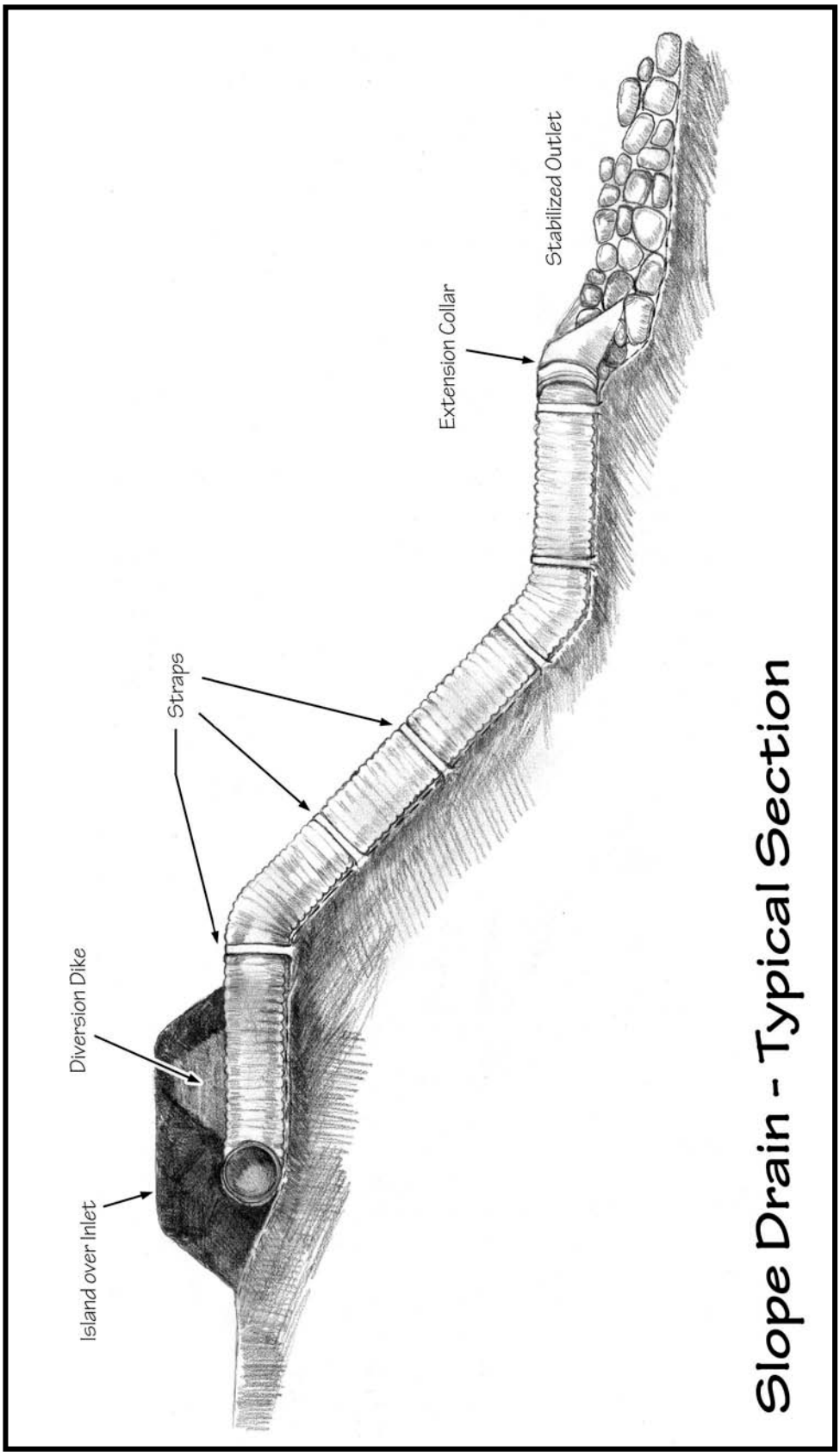
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Slope Drain - Typical Section
Island over Inlet
Diversion Dike
Straps
Extension Collar
Stabilized Outlet

Slope Drain

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Slope Drain Feasibility	○	○	○	○	○
Description	Slope drains are pipe systems used to convey concentrated storm water runoff down a steep slope to avoid erosion of the slope. Typically, slope drains are used to convey storm water collected in diversion dikes and benching for discharge at the bottom of steep slopes. Slope drains can be either temporary or permanent.				
Selection	Long, uninterrupted slopes are ideal for slope drains. Contributing flow drainage area should not exceed 5 acres per down drain.				
Implementation	Follow the design information in the project plans and specifications. Provide both inlet and outlet protection to minimize erosion at these locations. The slope drain must be adequately secured, all connections must be watertight, and the conduit must be securely staked.				
Maintenance	Inspect the slope drain as specified in the SWPPP and make any required repairs. When the protected area has undergone final stabilization, remove temporary measures and dispose of the materials. • Check inlet and outlet points regularly, especially after storms. • Look for and repair undercutting of the inlet. • Check for outlet protection at the outlet point. • Look for and repair erosion at the outlet point. • Check for and remove debris lodged in the pipe.				

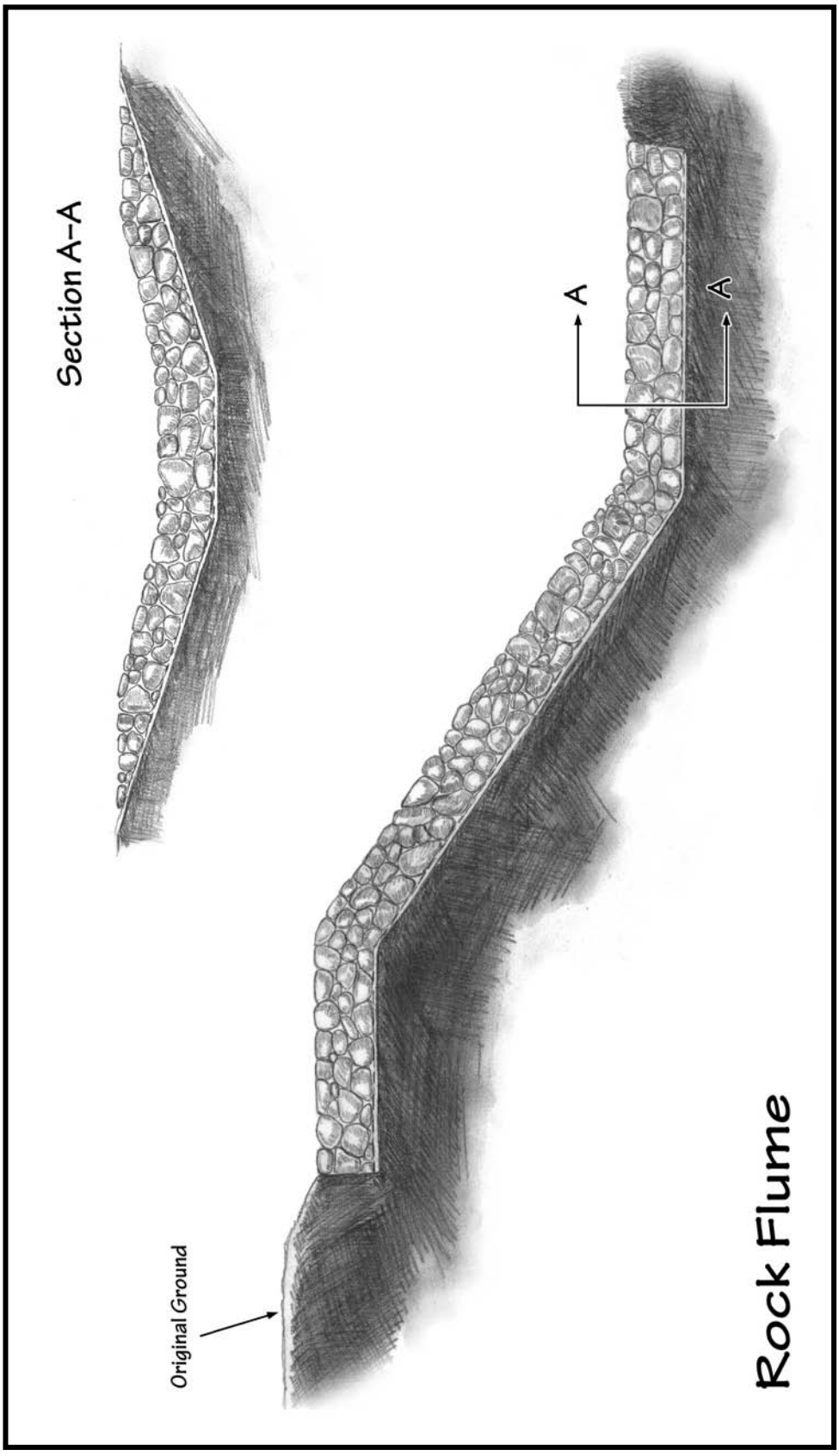
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Section A–A
A
A
Original Ground
Rock Flume

Rock Flume

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Rock Flume Feasibility	○	○	□	○	○
Description	A rock flume is a riprap-lined channel to convey water down a relatively steep slope without causing erosion problems on or below the slope.				
Selection	Drainage area should not exceed 10 acres per rock flume. Do not install in natural drainages unless permitted by the COE.				
Installation	Remove all unsuitable material, such as trees, brush, roots, or other obstructions before installation. Shape the channel to proper grade and cross-section as shown in the plans, with no abrupt deviations from design grade or horizontal alignment. Compact all fills to prevent unequal settlement. Design the rock flume for the local conditions and have the hydraulic capacity for rain storms and break-up. Consider placing geotextile under the riprap where appropriate.				
Maintenance	Check the rock flume channels periodically to ensure that scouring is not occurring beneath the fabric underlying the riprap layer, or that the stones have not been displaced by the flow. If sediment reduces the capacity of the channel, remove the sediment.				

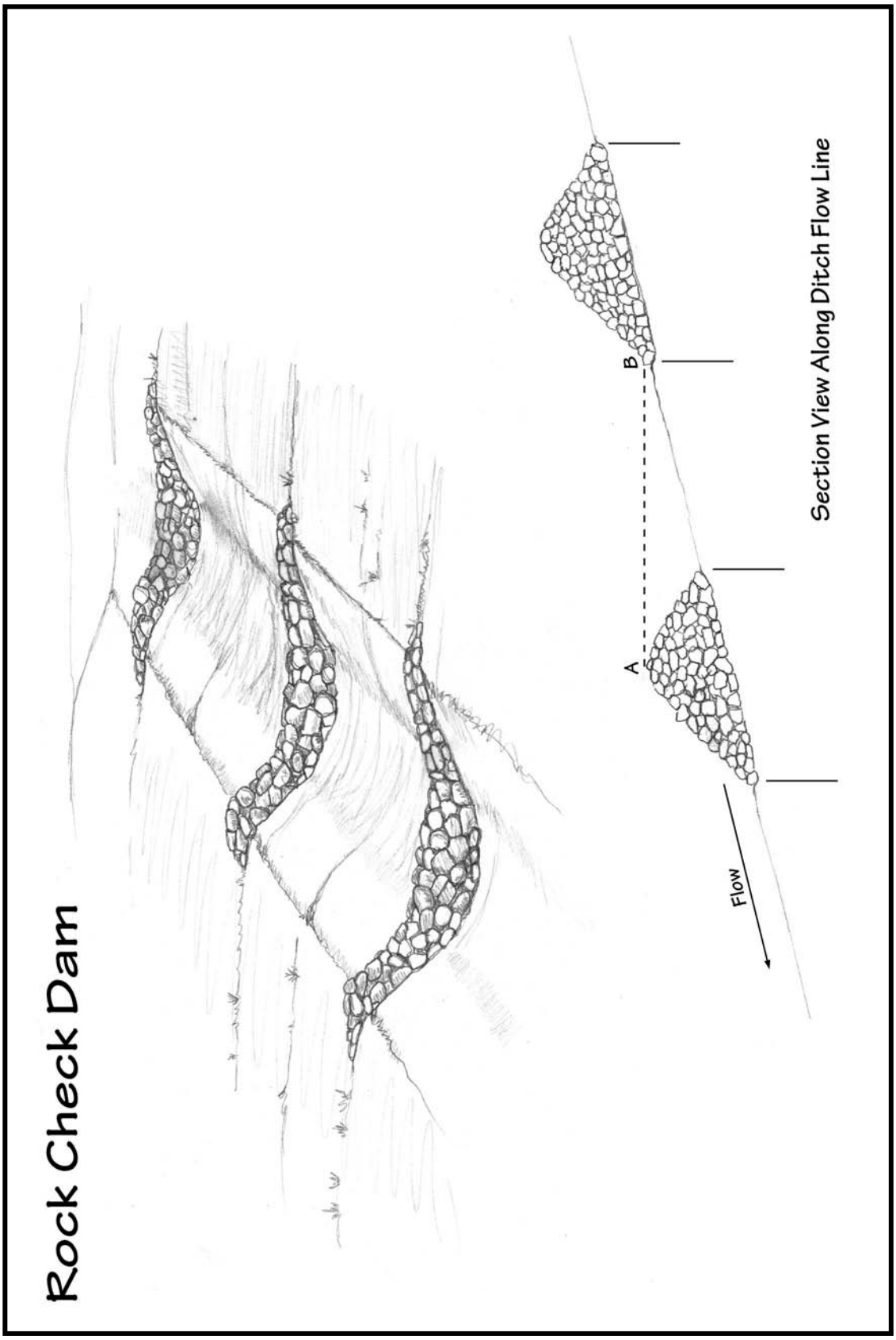
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Rock Check Dam
Section View Along Ditch Flow Line
A
B
Flow

Rock Check Dam

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Rock Check Dam Feasibility	○	○	□	○	○
Description	A rock check dam is a temporary measure to protect narrow, erosion-susceptible constructed storm water drainage channels and/or reduce the sediment loads in channeled flows. Check dams are used in series and can be used as permanent measures. Outlet protection should be designed for site specific conditions. Do not install in natural waterways without a COE permit.				
Selection	Check dams can be made of a variety of materials. They are most commonly made of rock, logs, or sandbags. When using rock, the material diameter should be 2 to 15 inches. Logs should have a diameter of 6 to 8 inches. Regardless of the material used, design the check dam carefully to ensure its effectiveness. Check dams need to be properly spaced so that water ponded behind the downstream check dam reaches just above the base of the upstream check dam, like a staircase.				
Installation	Install dams as soon as drainage routes are established. Place rock by hand or mechanical means, distributing smaller rocks to the upstream side to prevent transport. The center of a check dam should always be lower than its edges.				
Maintenance	Inspect check dams as specified in the SWPPP to ensure their structural integrity. Ensure that the center of a check dam is still lower than its edges. Additional stone might be required to maintain the correct height. Check for water flowing around the side of the check dam. During inspection, remove large debris, trash, and leaves. When the sediment has reached a height of approximately one-half the original height of the dam (measured at the center), remove accumulated sediment from the upstream side of the dam. When check dams are removed, be sure to remove all dam materials to ensure proper flow within the channel. If erosion or heavy flows cause the edges of a dam to fall to a height equal to or below the height of the center, repair it immediately. In addition, before removing a check dam, remove all accumulated sediment. Remove a check dam only after the contributing drainage area has been completely stabilized. Stabilize the area from which the dam material is removed.				

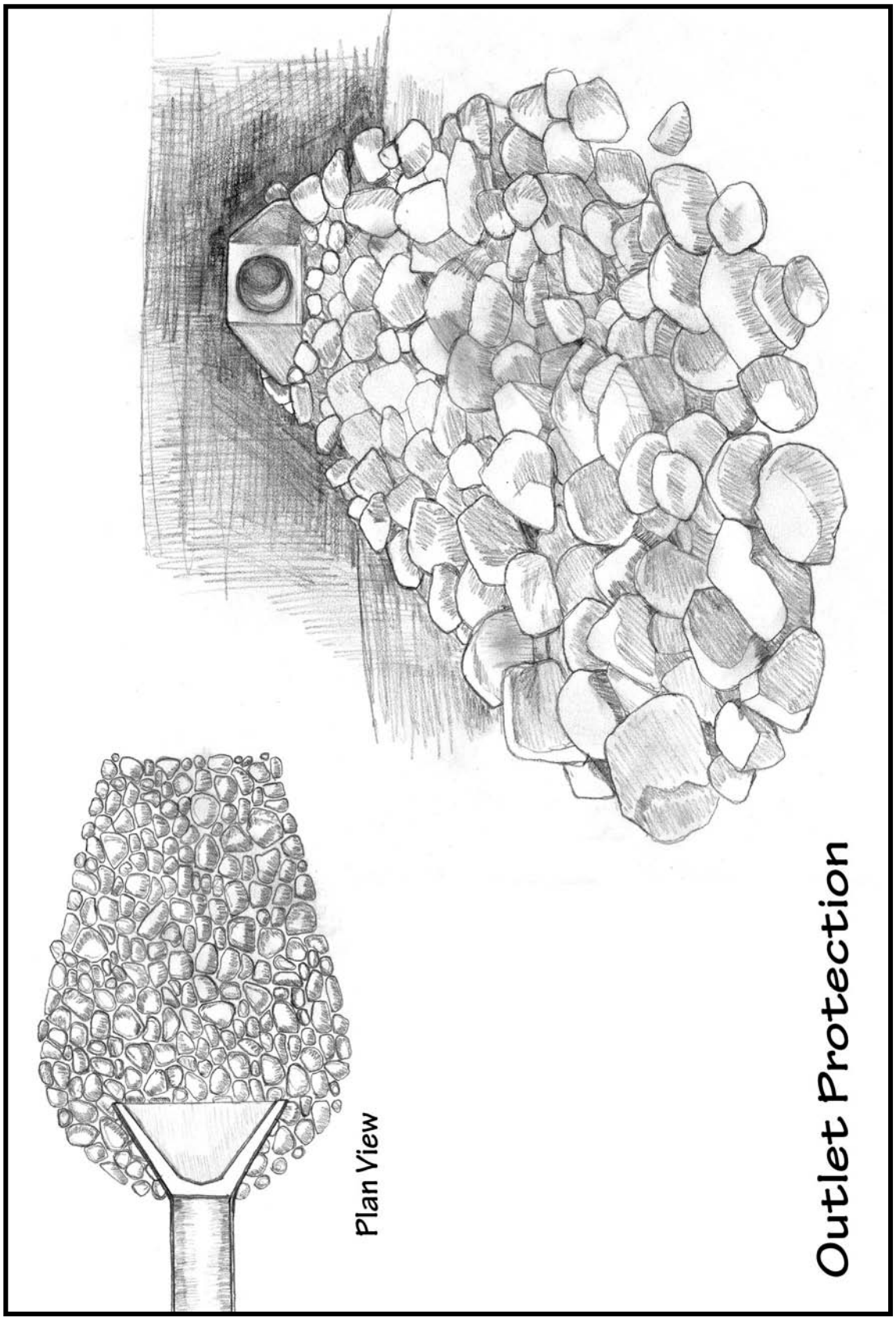
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Outlet Protection
Plan View

Outlet Protection

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Outlet Protection Feasibility	○	○	□	○	○
Description	An outlet protection is a structure designed for site-specific conditions to control erosion at the outlet of a pipe by armoring surrounding soils, reducing flow velocity and dissipating flow energy.				
Selection	Outlet protection should be used whenever the energy from runoff being discharged from a BMP or exiting a construction site needs to be dissipated.				
Installation	The riprap apron should be extended downstream until stable conditions are reached even though this might exceed the length calculated for design velocity control. If the pipe discharges into a well-defined channel, the side slopes of the channel should not be steeper than 2:1 (horizontal:vertical)				
Maintenance	Inspect outlet protection according to the schedule in the SWPPP to identify necessary repairs, such as scouring, sediment accumulation, or damage to the outfall. Make immediate repairs if any conditions noted under inspection are found. Sediment should be removed when it fills the voids between rocks.				

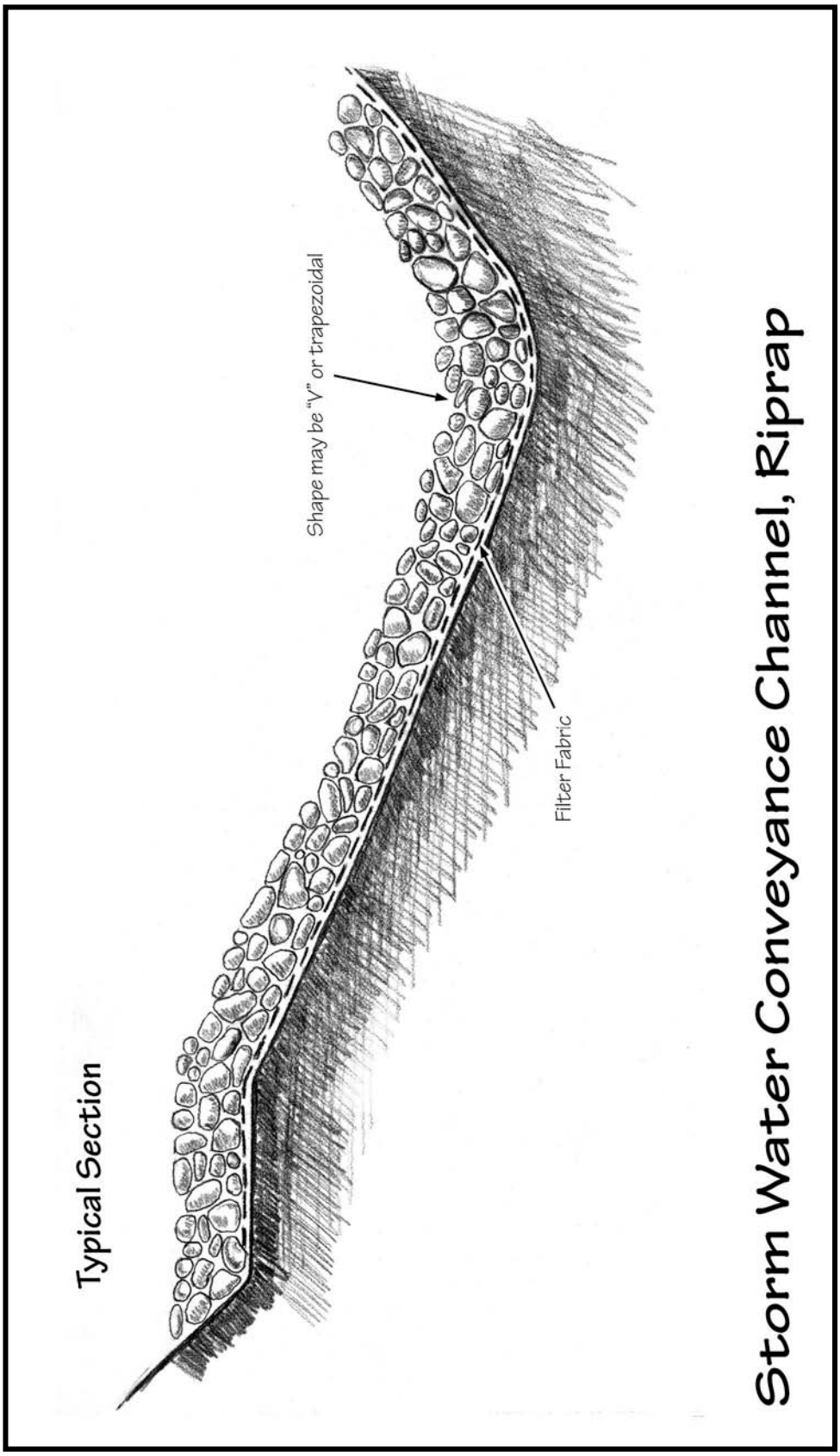
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Storm Water Conveyance Channel, Riprap
Typical Section
Shape may be "V" or trapezoidal
Filter Fabric

Storm Water Conveyance Channel

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Storm Water Conveyance Channel Feasibility	○	○	□	○	■
Description	A storm water conveyance is a channel lined with vegetation, riprap, or other flexible material designed for the conveyance and safe disposal of concentrated surface runoff to a receiving system without damage from erosion.				
Selection	• Channels should be located to conform with and use the natural gradient. • Grass-lined channels should not be subject to sedimentation from disturbed areas. • Grass-lined channels might be unsuitable if channel slopes over 5% predominate, continuous or prolonged flows occur, potential exists for damage from traffic (people or vehicles) or soils are erodible. • Channel side slopes should be 2:1 or flatter in the case of rock-riprap lining. Vegetated channel side slopes should be 4:1 or flatter.				
Installation	Remove all unsuitable material, such as trees, brush, roots, or other obstructions before installation. Shape the channel to proper grade and cross-section as shown in the plans, with no abrupt deviations from design grade or horizontal alignment. Compact all fills to prevent unequal settlement. Remove any excess soil and dispose of properly.				
Maintenance	Inspect and repair grass, riprap, or mat liner as necessary.				

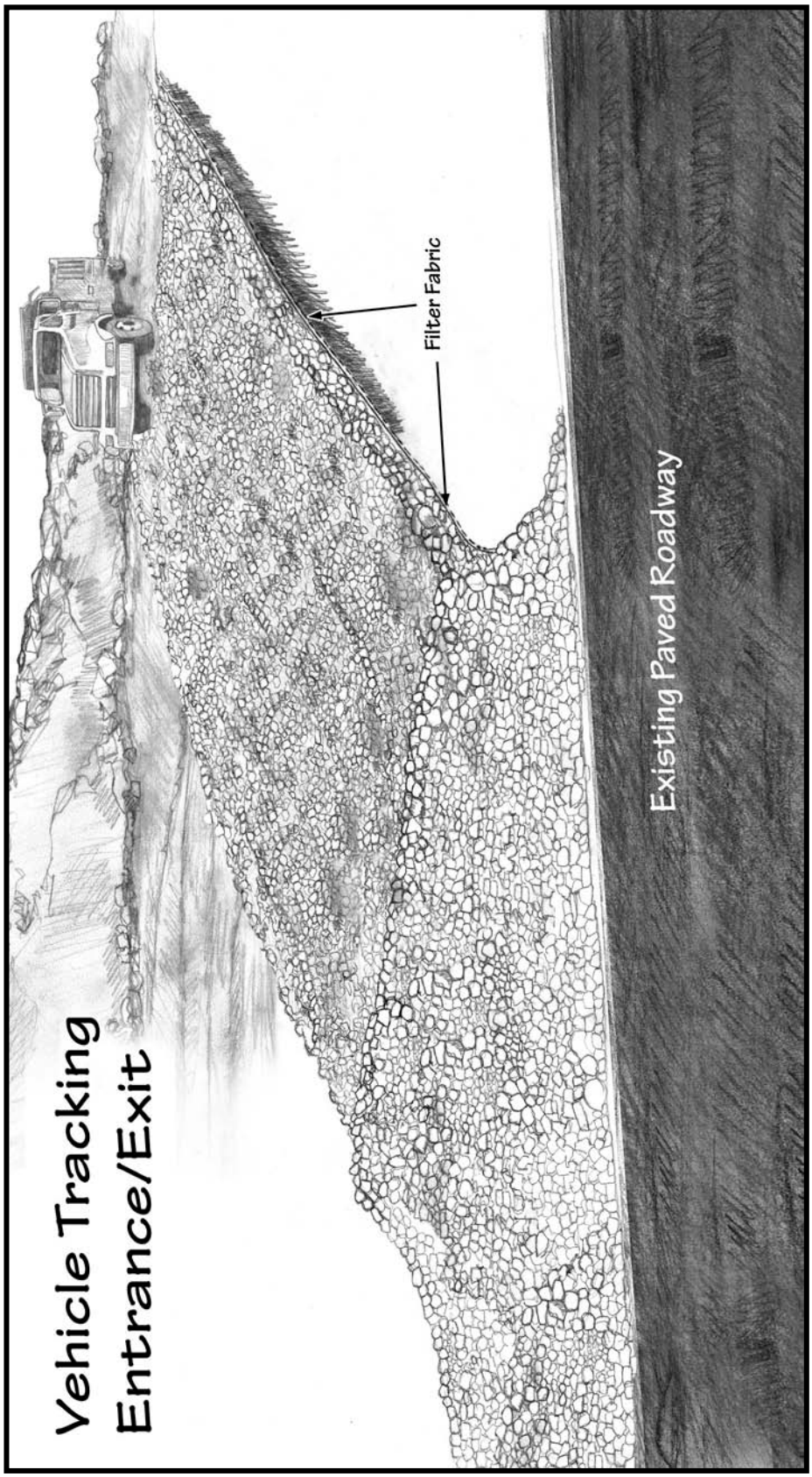
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Vehicle Tracking
Entrance/Exit
Filter Fabric
Existing Paved Roadway

Vehicle Tracking Entrance/Exit

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Vehicle Tracking Entrance/Exit Feasibility	○	○	○	○	○
Description	A vehicle tracking entrance/exit is a stabilized stone, concrete or gravel area or pad underlined with a geotextile and located where traffic enters or exits the construction site. This measure establishes a buffer area for vehicles to deposit mud and sediment and minimize the amount transported onto public roadways. Mud on a road can create a safety hazard as well as a sediment problem. This measure can be used with or without washdown, depending on the severity of the problem.				
Implementation	Clear the entrance and exit area of all vegetation, roots and other material and properly grade it. Place geotextile before placing the gravel. Place the gravel to the specific grade shown on the plans and smooth it. Provide drainage to carry water to a sediment trap rather than allowing it to directly discharge. Limit the ability of vehicles to bypass the stabilized entrances with fencing or other means. ADOT&PF: Gravel size: 2–3 inch minimum; pad thickness: minimum 6 inches; pad width: 12-foot minimum; pad length: 50-foot minimum or as specified in the SWPPP.				
Maintenance	Maintain each entrance in a condition that will prevent tracking of mud or sediment onto public rights-of-way. Replace gravel material when surface voids are visible. Top dress with 2-inch gravel when the pad becomes laden with sediment. Repair and clean out any structures used to trap sediment. Remove all mud and sediment deposited on the paved roadways within 24 hours. Remove the pad and any sediment trapping structures after they are no longer needed or within 30 days after final site stabilization. Remove and stabilize trapped sediment on-site.				

Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended

4.4 Chemical Applications in Erosion and Sediment Control

The 2011 ACGP allows for the use of treatment chemicals to reduce erosion from land or sediment in a storm water discharge. The ACGP describes conditions that must be met in order to use chemicals for erosion and sediment control. Whether to land or water, chemical applications should be used in combination with other appropriate physical control measures to ensure effectiveness of the treatment chemical. The application of chemicals to both land and water must be a sufficient distance upgradient or upstream to allow adequate mixing or reaction prior to reaching waters of the U.S.

When selecting treatment chemicals, the permittee must document that the chemical is approved by the EPA for potable water use, and approved by EPA or the states of California, Minnesota, Oregon, Washington, or Wisconsin for use in controlling erosion or sediment runoff from agricultural land or construction projects. Treatment chemical handling and application must be performed by personnel who are trained in their use.

Erosion and sediment control chemicals are typically developed, tested, and approved in regions of the country that may have significantly different site conditions (such as soils, soil and water temperatures, etc.) from Alaska. These differences must be considered by the permittee when selecting treatment chemicals for use at an Alaskan site.

The 2011 ACGP describes these and additional information requirements that must be met before using chemicals for erosion and sediment control.

4.4.1 Land Application

Anionic polyacrylamide (PAM) is a non-toxic chemical that may be applied to bare soil as a means of reducing erosion. PAM products reduce erosion and sedimentation by targeting the smallest soil particles, such as silts, clays, and colloidal materials, which are difficult to control using conventional BMPs. PAM works in two ways to reduce erosion and sedimentation. First, if increases adhesion of these particles to improve soil stability and reduce their potential for erosion, and decreases settling time for those particles that do become suspended in runoff. Secondly, PAM increases soil pore volume and soil permeability, increasing infiltration and reducing storm water discharge volume.

PAM can be applied either in dry form or mixed with water as a slurry. When applied dry, it should be spread over the area of disturbed ground in powder or granular form, preferably

before a rainfall. The permittee should apply PAM at the manufacturer's recommended dosage rate. Applying a straw or mulch cover over the treated soil may increase treatment effectiveness by extending the time between re-application of PAM.

PAM may be mixed with water and applied wet. The PAM should be mixed with water and allowed to completely dissolve in a concentrated slurry. Once dissolved, the concentrate can be diluted to achieve the desired dosage, then applied to the bare soil. When mixing the slurry, PAM should always be added to water, water should not be added to PAM.

Chemical Application to Land

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Chemical Application to Land Feasibility	○	○	○	○	○
Description	Treatment chemicals may be used to reduce erosion of bare soil, by increasing the soil porosity and therefore increasing infiltration and reducing the quantity of storm water runoff, and by increasing flocculation of suspended sediment which aids in deposition and reduces turbidity in storm water runoff. PAM is intended for use on areas that contain high percentages of silt, clay, or colloidal materials.				
Selection	Ensure the selected treatment chemical is appropriate for soils at the project site through project-specific tests of the chemical with local soils or project use data on projects with similar soils. Ensure the selected treatment chemical is appropriate for the site topography, amount of expected precipitation, and type of use. Use chemicals that have been approved for use by EPA or the states of California, Minnesota, Oregon, Washington, or Wisconsin. Only anionic polymers may be used; cationic polymers shall not be used in any application because of known aquatic toxicity problems.				
Installation	PAM may be applied to bare soil either in a dry (granular or powder) form, or dissolved in water. If in dry form, PAM should be applied during dry conditions. In dissolved form, PAM should be mixed with water long enough in advance of application to allow the PAM to completely dissolve. Covering a treated area with straw or other suitable material may increase the effectiveness of this treatment. PAM should not be overapplied – application rates above those recommended by the manufacturer will not provide additional effectiveness. PAM should not be applied to water or allowed to enter a water body. Apply PAM to bare soil before a storm event.				
Maintenance	PAM may not need to be reapplied to treated areas that have not been disturbed unless turbidity levels in runoff show the need for additional application (often 6 to 8 weeks or more). PAM may be reapplied after several days to areas that are actively worked.				

Feasibility symbols:

○ Widely feasible	✪ Feasible only with major design adaptation
☐ Might be feasible in certain situations	■ Infeasible and not recommended

4.4.2 Water Application

Anionic PAM can be used in a passive treatment system to facilitate flocculation and coagulation of fine-grained particles in flowing water. Gypsum and alum are other materials that may be used in a similar manner. In such an application, storm water runoff is channeled over solid blocks or logs of PAM, which releases the PAM as the block dissolves. The PAM block must be placed sufficiently upstream of a detention basin or sediment trap to allow proper mixing with runoff. Alternatively, powdered PAM can be spread on various materials, such as geotextile liners, jute mats, check dams, or other structures where the PAM can contact runoff. Sediment traps must be designed in a way to ensure adequate removal of sediments laden with treatment chemicals before discharges reach waters of the U.S.

Chemical Application to Water

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Chemical Application to Water Feasibility	○	○	○	○	○
Description	Chemicals may be used to passively treat storm water runoff through flocculation and coagulation of fine particles that are otherwise difficult to remove with traditional means. Runoff is diverted to flow over solid blocks of PAM, or flow-diversion structures coated with PAM, which is then released to the water. Treated runoff must be directed to a sedimentation trap before discharge off-site.				
Selection	Ensure the selected treatment chemical is appropriate for soils at the project site through project-specific tests of the chemical with local soils or project use data on projects with similar soils. Because the rate of release of PAM into water is difficult to determine, the permittee will usually need to take a trial-and-error approach to achieve optimum effect. Use chemicals that have been approved for use by EPA or the states of California, Minnesota, Oregon, Washington, or Wisconsin.				
Installation	Construct drainage structures, such as trenches or channels, to direct storm water runoff to sedimentation basin or sediment trap. Install PAM or other treatment chemical in the drainage channel sufficiently upstream of the sedimentation basin to allow thorough mixing.				
Maintenance	PAM blocks should be checked weekly or after rainfall to ensure they remain in place, are moist, and are not covered in sediment. Sedimentation basins should be checked routinely; accumulations of sediment should be removed to ensure sediment, flocculants, or other treatment chemicals do not discharge to waters of the U.S.				

Feasibility symbols:

○ Widely feasible	✪ Feasible only with major design adaptation
☐ Might be feasible in certain situations	■ Infeasible and not recommended

4.5 Active Treatment Systems

The 2011 ACGP defines an Active Treatment System (ATS) as a treatment system comprised of automated chemical dispensing, mechanical aeration, pumps, and/or mechanical filtration that employs chemical coagulation, chemical flocculation, or electrocoagulation in order to reduce turbidity caused by fine suspended sediment. The system may also use gravity separation inert media filtration and absorptive media. It does not include the passive application of treatment chemicals through the use of pre-manufactured treatment products (e.g., floc logs, floc blocks, etc.).

ATS processes can be designed as batch treatments or flow-through treatments. A batch chemical treatment system generally consists of a storm water collection system, untreated storm water storage area, pump(s), chemical feed system, treatment cells, and ancillary piping. Storm water collected in the pre-treatment area is pumped through the chemical feed system into the treatment cells, where flocculation and sedimentation is allowed to occur. This clarification step may take from 30 minutes to several hours. Once the permittee has determined the water has been sufficiently treated, it may be discharged from the site.

Flow-through chemical treatment systems generally consist of a storm water collection system, untreated storm water storage area, pumps, and a chemical treatment/filtration system. The flow-through process must be closely monitored to ensure the discharge meets turbidity and chemical treatment residual requirements.

Batch and flow-through ATS processes must be carefully designed to ensure the selected chemical treatment is appropriate for the expected soil types, pH levels, flow rates, and other site conditions. A permittee who uses an ATS as a control measure must submit information required by the ADEC for review at least 14 days prior to start of the ATS at the site.

Active Treatment Systems

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Active Treatment System Feasibility	○	○	○	○	○
Description	An ATS may be used to actively treat storm water runoff through flocculation and coagulation of fine particles that are otherwise difficult to remove with traditional means. Runoff is collected prior to discharge then subjected to chemical augmentation to flocculation of fine suspended particles. In a batch process the treated runoff is stored in a sedimentation basin until turbidity is reduced to acceptable levels and then discharged off-site. In a flow-through process, the treated runoff is passed through a sand filter before being discharged off site.				
Selection	Ensure the selected treatment chemical is appropriate for soils at the project site through project-specific tests of the chemical with local soils or project use data on projects with similar soils. Chemical dosage rates must be carefully monitored to ensure runoff is not under- or over-treated. Treated runoff must be carefully monitored to ensure it meets applicable requirements before being discharged off-site. Use chemicals that have been approved for use by EPA or the states of California, Minnesota, Oregon, Washington, or Wisconsin. **ATS design information must be submitted to ADEC at least 14 days prior to its use on the project.**				
Installation	Construct drainage structures, such as trenches or channels, to direct storm water runoff to pretreatment sedimentation basin. Pre- and post-treatment storage and settling basins must be adequately sized to contain anticipated storm water volumes. Flow-through treatment systems must include provisions for recirculating discharge for additional treatment if necessary.				
Maintenance	Monitor total volume treated and discharged, flow rates, types and amounts of chemical used for treatment (including pH adjustment), influent and effluent turbidity and pH, receiving water turbidity and pH, and treatment chemical residuals. Remove sediment from storage or treatment cells as necessary. Sand filters must be maintained to ensure they operate as designed.				

Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended

4.6 Good Housekeeping BMPs

Construction projects generate large amounts of building-related waste, which can end up polluting storm water runoff if not properly managed. The suite of BMPs that are described in the SWPPP must include pollution prevention (P2) or good housekeeping practices that are designed to prevent contamination of storm water from a wide range of materials and wastes at the construction site. The six principles described below (USEPA 2007) are designed to help identify the P2 practices that should be described in SWPPPs and implemented at construction sites. The principles are followed by descriptions of several common good housekeeping BMPs.

A construction SWPPP is more than just an ESC plan! The SWPPP must address pollutants other than sediment that are often found at construction sites such as concrete waste, paint, trash and debris, fuel and oil.

P2 Principle 1: Provide for waste management. Design proper management procedures and practices to prevent the discharge of pollutants to storm water from solid or liquid wastes that will be generated at the construction site. Practices such as establishing dedicated trash disposal areas, recycling, proper material handling and cleanup measures can reduce the potential for storm water runoff to pick up construction site wastes and discharge them to surface waters.

Provide convenient, well-maintained, and properly located toilet facilities. Provide for regular inspections, service, and disposal. Locate toilet facilities away from storm drain inlets and waterways to prevent accidental spills and contamination of storm water. Ensure that toilet facilities are situated so they will not be overturned by vehicle collisions or other accidents. Treat or dispose of sanitary and septic waste in accordance with state or local regulations.

Proper material use, storage, waste disposal, and training of employees and subcontractors can prevent or reduce the discharge of hazardous and toxic wastes to storm water. Implement a comprehensive set of waste-management practices for hazardous or toxic materials, such as paints, solvents, petroleum products, pesticides, wood preservatives, acids, roofing tar and other materials. Practices should include storage, handling, inventory and cleanup procedures for spills (see the following P2 principles).

P2 Principle 2: Establish proper building material handling and staging areas. The SWPPP should include comprehensive handling and management procedures for building

materials, especially those that are hazardous or toxic. Paints, solvents, pesticides, fuels and oils, other hazardous materials or any building materials that have the potential to contaminate storm water should be stored indoors or under cover whenever possible or in areas with secondary containment. Secondary containment prevents a spill from spreading across the site and includes dikes, berms, curbing or other containment methods. Secondary containment techniques should also ensure the protection of groundwater. Designate staging areas for activities such as fueling vehicles, mixing paints, plaster, mortar and so on. Designated staging areas will help to monitor the use of materials and to clean up any spills. Training employees and subcontractors is essential to the success of this P2 principle.

P2 Principle 3: Designate and ensure use of washout areas. Where possible, concrete contractors should be encouraged to use the washout facilities at their own plants or dispatch facilities. If it is necessary to provide for concrete washout areas on-site, designate specific washout areas and design facilities to handle anticipated washout water. Washout areas should also be provided for paint and stucco operations. Because washout areas can be a source of pollutants from leaks or spills, locate them at least 50 feet away from storm drains and watercourses whenever possible. In no instance should washout water be allowed to discharge to a storm drain or surface water.

Regularly inspect and maintain washouts, which can fill up quickly when concrete, paint, and stucco work are occurring on large portions of the site. Inspect for evidence that contractors are using the washout areas and not dumping materials onto the ground or into drainage facilities. If the washout areas are not being used regularly, consider posting additional signage, relocating the facilities to more convenient locations or providing training to workers and contractors.

P2 Principle 4: Establish proper equipment/vehicle fueling and maintenance practices. Performing equipment/vehicle fueling and maintenance at an off-site facility is preferred over performing such activities on the site, particularly for road vehicles (e.g., trucks, vans). For grading and excavating equipment, this is usually not possible or desirable. Create an on-site fueling and maintenance area that is clean and dry. The on-site fueling area should have a spill kit, and staff should know how to use it. If possible, conduct vehicle fueling and maintenance activities in a covered area; outdoor vehicle fueling and maintenance is a potentially significant source of storm water pollution. Significant maintenance on vehicles and equipment should be conducted at a properly controlled, off-site facility.

P2 Principle 5: Control equipment/vehicle washing and allowable non-storm water discharges. Environmentally friendly washing practices can be practiced at every

construction site to prevent contamination of surface and groundwater from wash water. Procedures and practices include using off-site facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water or routing to the sanitary sewer; and training employees and subcontractors in proper cleaning procedures.

Allowable non-storm water discharges include the following:

- Discharges from fire-fighting activities
- Fire hydrant flushings
- Waters used to wash vehicles where detergents are not used
- Water used to control dust in accordance with Subpart 3.4.G of the CGP
- Potable water including uncontaminated water line flushings
- Routine external building wash down that does not use detergents
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
- Uncontaminated air conditioning or compressor condensate
- Uncontaminated groundwater or spring water
- Foundation or footing drains where flows are not contaminated with process materials such as solvents
- Uncontaminated excavation dewatering
- Landscape irrigation

P2 Principle 6: Develop and implement a spill prevention and response plan. Develop a spill prevention and response plan that will be included or incorporated into the SWPPP. The plan should clearly identify ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and response. The plan should also specify material handling procedures and storage requirements and ensure that clear and concise spill cleanup procedures are provided and posted for areas in which spills could occur. When developing a spill prevention and response plan, include, at a minimum, the following:

- Note the locations of chemical storage areas, storm drains, tributary drainage areas, surface water bodies on or near the site, and measures to stop spills from leaving the site

- Specify how to notify appropriate authorities, such as police and fire departments, hospitals or municipal sewage treatment facilities to request assistance
- Describe the procedures for immediate cleanup of spills and proper disposal
- Identify personnel responsible for implementing the plan if there is a spill
- Specify procedures to immediately document and clean up spills

The following information in Table 4-2 on common good housekeeping BMPs is summarized from EPA's Menu of BMPs (see Link 62 in Appendix A).

Table 4-2. Feasibility of good housekeeping BMPs, based on Alaskan climatic regions

Good housekeeping BMPs	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Concrete Washout	○	○	○	○	□
General Construction Site Waste Management	○	○	○	○	○
Spill Prevention and Control Plan	○	○	○	○	○
Vehicle Maintenance and Washing	○	○	○	○	○

Feasibility symbols:

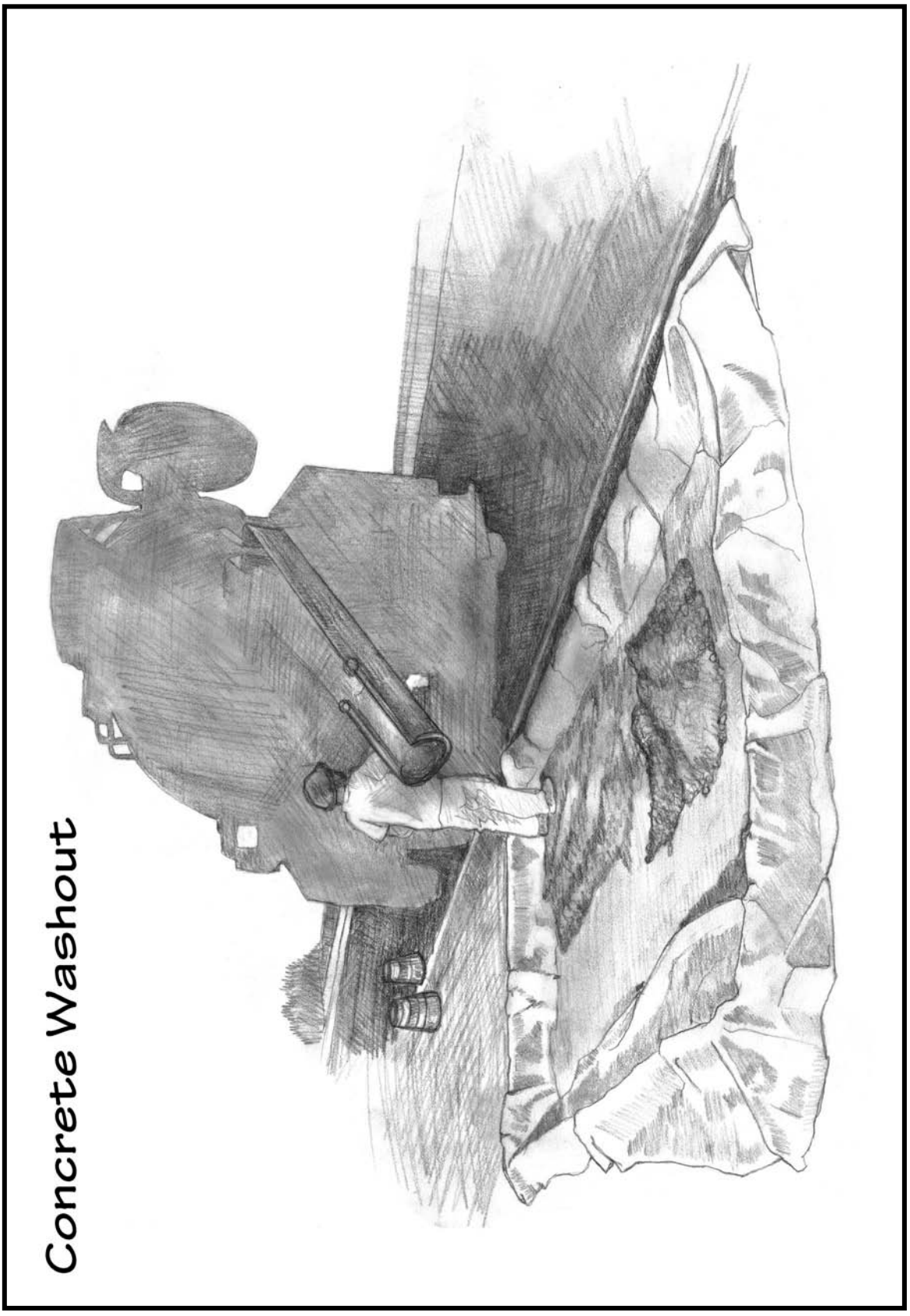
○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended

Note: These recommendations are general guidance; site-specific conditions will dictate proper BMP selection


Concrete Washout

Concrete Washout

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Concrete Washout Feasibility	○	○	○	○	□
Description	Concrete washouts are typically basins lined with plastic used to contain concrete and liquids when the chutes of concrete mixers and hoppers of concrete pumps are rinsed out after delivery. The washout facilities consolidate solids for easier disposal and prevent runoff of liquids. The wash water is alkaline and contains high levels of chromium, which can leach into the ground and contaminate groundwater. It can also migrate to a storm drain, which can increase the pH of area waters and harm aquatic life. Solids that are improperly disposed of can clog storm drain pipes and cause flooding. Installing concrete washout facilities prevents pollution and is a matter of good housekeeping at your construction site.				
Installation	Do not place concrete washout facilities within 50 feet of storm drains, open ditches or waterbodies. Place washouts in a location that allows convenient access for concrete trucks, preferably near the area where the concrete is being poured. Appropriate gravel or rock should cover paths to concrete washout facilities if the facilities are on undeveloped property. These areas should be far enough away from other construction traffic to reduce the likelihood of accidental damage and spills. The number of facilities installed should depend on the expected demand for storage capacity. On large sites with extensive concrete work, washouts should be placed in multiple locations for ease of use by concrete truck drivers.				
Maintenance	Check all concrete washout facilities daily to determine if they have been filled to 75 percent capacity, which is when materials need to be removed. Inspect both above- and below-ground self-installed washouts to ensure that plastic linings are intact and sidewalls have not been damaged by construction activities. Inspectors should also note whether the facilities are being used regularly; if drivers have washed out their chutes or hoppers in other locations, you might need to provide more education, install additional signage, or place additional washouts in more convenient locations. Concrete washouts are designed to promote evaporation where feasible. However, if stored liquids have not evaporated and the washout is nearing capacity, vacuum and dispose of liquids in an approved manner—check with the local sanitary sewer authority to determine if there are special disposal requirements for concrete wash water. Remove hardened solids whole or break them up first depending on the type of equipment available at the site. Then reuse the solids on-site or haul them away for recycling—crushed concrete makes excellent aggregate for roadbeds and other building applications.				

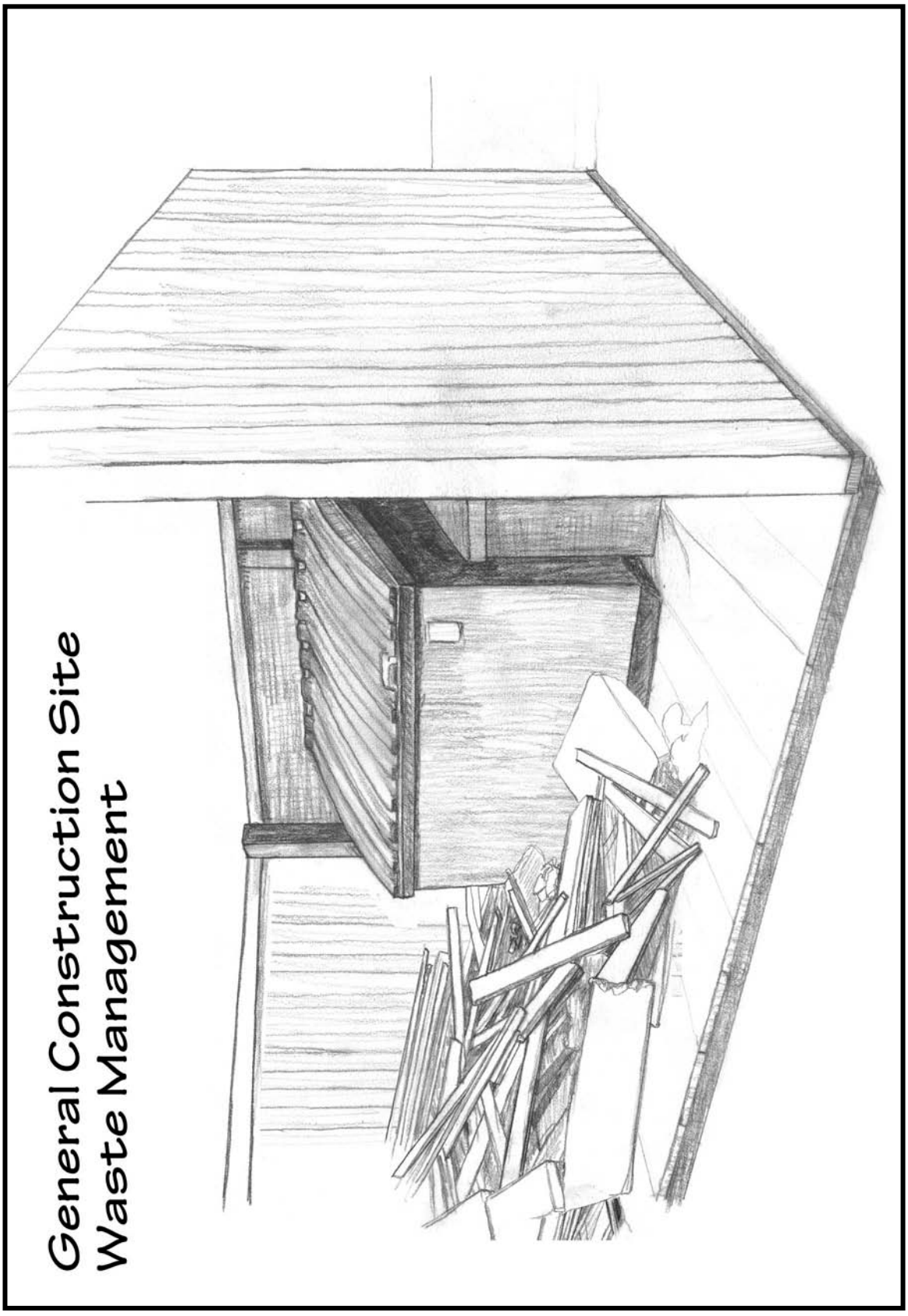
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


General Construction Site
Waste Management

General Construction Site Waste Management

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
General Construction Site Waste Management Feasibility	○	○	○	○	○
Description	Building materials and other construction site wastes must be properly managed and disposed of to reduce the risk of pollution from materials such as surplus or refuse building materials or hazardous wastes. Practices such as trash disposal, recycling, proper material handling, and spill prevention and cleanup measures can reduce the potential for storm water runoff to mobilize construction site wastes and contaminate surface or groundwater.				
Installation	**Solid Wastes:** • Designate a waste collection area on the site that does not receive a substantial amount of runoff from upland areas and does not drain directly to a waterbody. • Ensure that containers have lids so they can be covered before periods of rain, and keep containers in a covered area whenever possible. • If secondary containment is used, include a protocol in the SWPPP and train employees on disposal of accumulated precipitation. • Schedule waste collection to prevent the containers from overfilling. • Clean up spills immediately. For hazardous materials, follow cleanup instructions on the package. Use an absorbent material such as sawdust or kitty litter to contain the spill. • During the demolition phase of construction, provide extra containers and schedule more frequent pickups. • Collect, remove and dispose of all construction site wastes at authorized disposal areas. Contact a local environmental agency to identify these disposal sites. **Hazardous Materials and Wastes:** • Consult with local waste management authorities about the requirements for disposing of hazardous materials. • To prevent leaks, empty and clean hazardous waste containers before disposing of them. • Never remove the original product label from the container because it contains important safety information. Follow the manufacturer's recommended method of disposal, which should be printed on the label. • Never mix excess products when disposing of them, unless specifically recommended by the manufacturer.				

General Construction Site Waste Management *(continued)*

Installation *(continued)*	**Pesticides and fertilizers:** • Follow all federal, state and local regulations that apply to the use, handling or disposal of pesticides and fertilizers. • Store pesticides and fertilizers in a dry, covered area. • Construct berms or dikes to contain stored pesticides and fertilizers in case of spillage. • Follow the recommended application rates and methods. • Have equipment and absorbent materials available in storage and application areas to contain and clean up any spills that occur. **Petroleum Products:** • Store new and used petroleum products in covered areas, where practicable, and place within berms or dikes to contain any spills. • Immediately contain and clean up any spills with absorbent materials. • Have equipment available in fuel storage areas and in vehicles to contain and clean up any spills that occur. **Detergents:** • Use detergents only as recommended, and limit their use on the site. Do not dump wash water containing detergents into the storm drain system; direct it to a sanitary sewer or contain it so that it can be treated at a wastewater treatment plant.
Maintenance	Inspect storage and use areas and identify containers or equipment that could malfunction and cause leaks or spills. Check equipment and containers for leaks, corrosion, support or foundation failure, or other signs of deterioration, and test them for soundness. Immediately repair or replace any that are found to be defective.

Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

☐ Might be feasible in certain situations

■ Infeasible and not recommended

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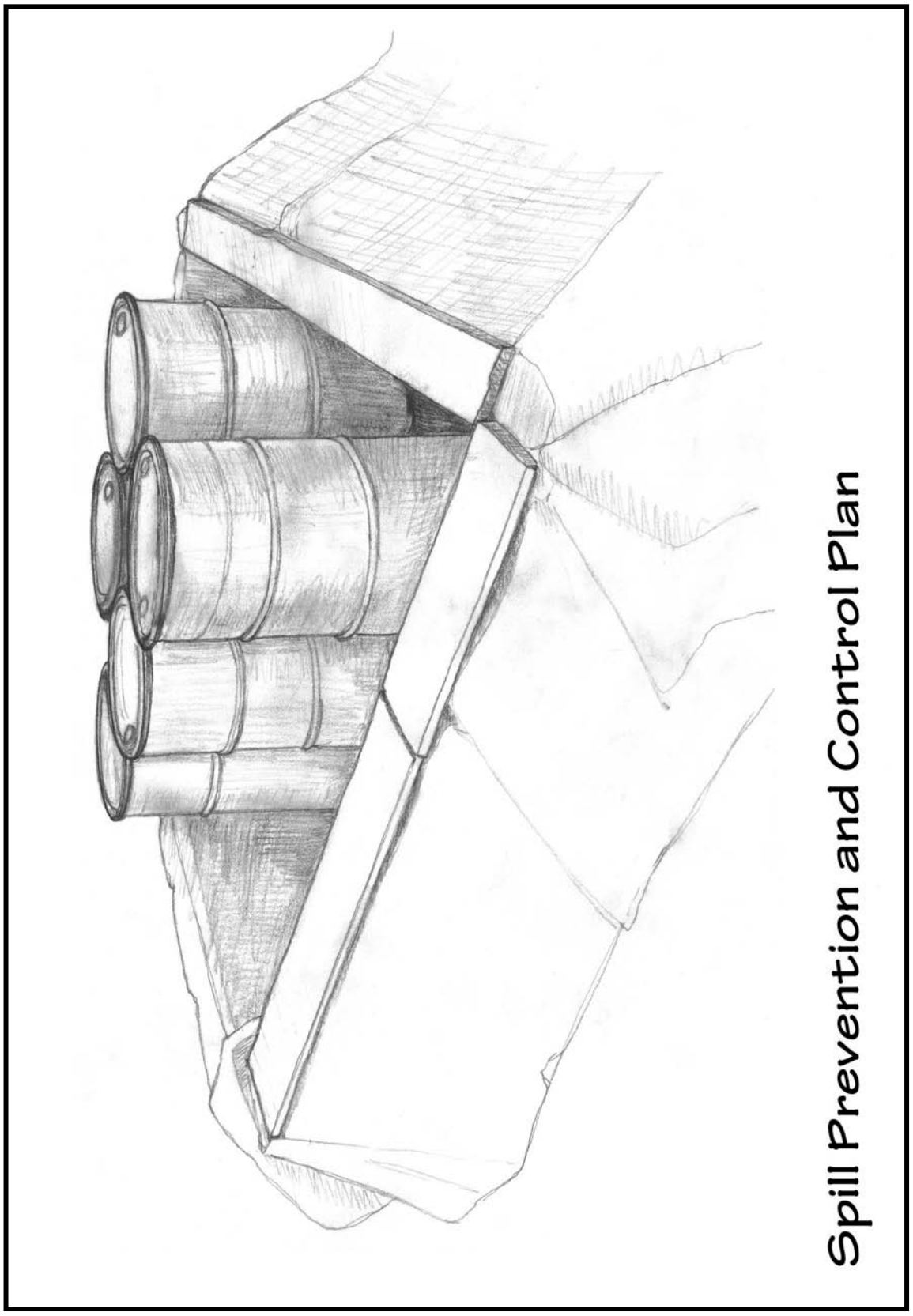

Spill Prevention and Control Plan

Spill Prevention and Control Plan

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Spill Prevention and Control Plan Feasibility	○	○	○	○	○
Description	Spill Prevention and Control Plans (SPCP) should clearly state measures to stop the source of a spill, contain the spill, clean up the spill, dispose of contaminated materials and train personnel to prevent and control future spills.				
Installation	When developing an SPCP, a construction site operator should identify potential spill or source areas, such as loading and unloading, storage, and processing areas; places where dust or particulate matter is generated; and areas designated for waste disposal. Also, evaluate spill potential for stationary facilities, including manufacturing areas, warehouses, service stations, parking lots and access roads. Conduct this evaluation during the project planning phase, and reevaluate it during each phase of construction. The SPCP should define material handling procedures and storage requirements and outline actions necessary to reduce spill potential and impacts on storm water quality. The SPCP should document the locations of spill response equipment and procedures to be used and ensure that procedures are clear and concise. The plan should include step-by-step instructions for the response to spills at a construction site.				
Maintenance	Update the SPCP regularly to accommodate any changes in the site, procedures, or responsible staff. Conduct regular inspections in areas where spills might occur to ensure that procedures are posted and cleanup equipment is readily available.				

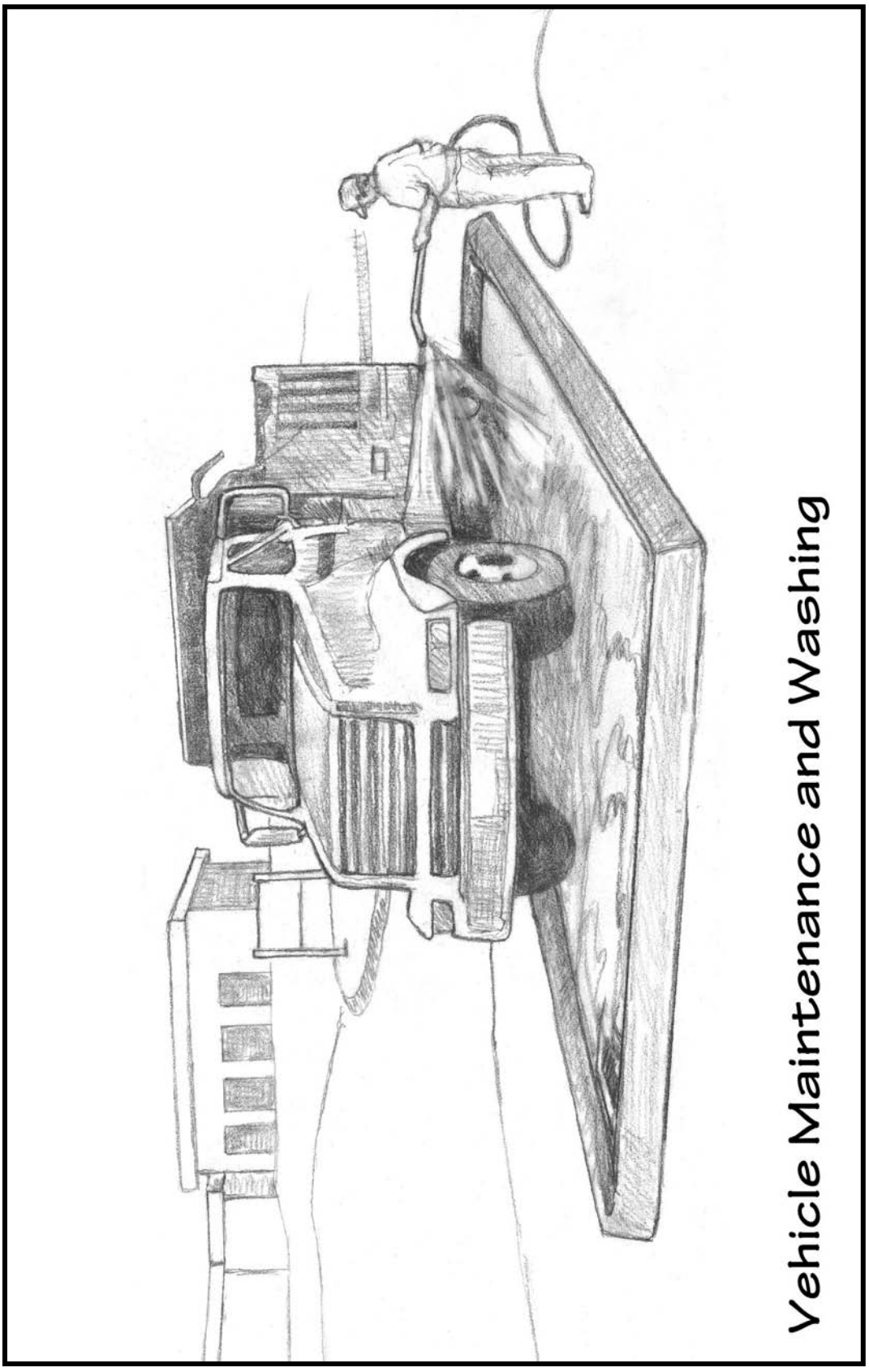
Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended


Vehicle Maintenance and Washing

Vehicle Maintenance and Washing at Construction Sites

Construction BMP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
Vehicle Maintenance and Washing at Construction Sites Feasibility	○	○	○	○	○
Description	Ideally, vehicle maintenance and washing occurs in garages and wash facilities, not on active construction sites. However, if these activities must occur on-site, operators should follow appropriate BMPs to prevent untreated nutrient-enriched wastewater or hazardous wastes from being discharged to surface water or groundwater. Wash water must also be prevented from causing erosion of soils and sediment discharges from the construction site.				
Installation	Inspect construction vehicles, and repair any leaks as soon as possible. Dispose of all used oil, antifreeze, solvents and other automotive-related chemicals according to manufacturer instructions. Such wastes require special handling and disposal. Used oil, antifreeze and some solvents can be recycled at designated facilities, but other chemicals must be disposed of at a hazardous-waste disposal site. In rural areas, certain materials will have to be hauled to larger communities for disposal. Local government agencies can help identify such facilities. Designate special paved areas for vehicle repair. To direct washwater to sanitary sewer systems or other treatment facilities, ensure that vehicle washing areas are impervious and are bermed. Use blowers or vacuums instead of water to remove dry materials from vehicles if possible. Because water alone can remove most dirt adequately, use high-pressure water spray without detergents at vehicle washing areas. If using detergents, avoid phosphate- or organic-based cleansers to reduce nutrient enrichment and biological oxygen demand in wastewater. Use only biodegradable products that are free of halogenated solvents. Clearly mark all washing areas, and inform workers that all washing must occur in this area. Do not perform other activities, such as vehicle repairs, in the wash area.				
Maintenance	Vehicle maintenance operations produce substantial amounts of hazardous and other wastes that require regular disposal. Clean up spills and dispose of cleanup materials as soon as possible. Inspect equipment and storage containers according to the schedule specified in the SWPPP to identify leaks or signs of deterioration.				

Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended

4.7 Inspections, Maintenance and Recordkeeping

Construction Site Inspections

BMPs must be maintained in good working order at all times. To ensure that BMPs are maintained, conduct regular inspections and document the findings of the inspections in the SWPPP.

Inspections must be conducted either at least once every 7 calendar days, or at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inch or greater. However, some construction sites will need to be inspected more frequently.

In developing an inspection schedule consider the following:

- Consider using spot inspections. Inspect certain parts of the site more frequently or even daily. Target places that need extra attention, such as areas around construction site entrances, check nearby streets for dirt, check inlet protection, and so on.
- Consider adding inspections before and during rain events. Consult the most recent CGP for inspection frequencies. The current ADEC CGP bases inspection frequencies on the mean annual precipitation rate for the project area. Consider adding inspections before or during predicted rain events, and conduct inspections after rain events of less than 0.5 inch and during significant snowmelt. Consult a local weather source and initiate inspections before predicted storm events as a way to ensure that controls are operational.
- Train staff and subcontractors. Use staff and subcontractors to help identify any potential problems with BMPs. Again, document any issues that are confirmed problems.

Inspection Reports

Complete an inspection report after each inspection. Retain copies of all inspection reports and keep them with or in the SWPPP. Generally, the following information is required to be included in an inspection report:

- Inspection date.
- Inspector information, including the names, titles and qualifications of personnel conducting the inspection.

- Weather information for the period since the last inspection (or for the first inspection since beginning construction activity) including a best estimate of the beginning of each storm, its duration, approximate amount of rainfall for each storm (in inches) and whether any discharges occurred. Create a log to record the basic weather information or keep copies of weather information from a reliable local source, such as the Internet sites of local newspapers, TV stations, local universities, and so on.
- Current weather information and a description of any discharges occurring at the time of the inspection.
- Descriptions of evidence of previous or ongoing discharges of sediment or other pollutants from the site.
- Location(s) of BMPs that need to be maintained.
- Location(s) of BMPs that failed to operate as designed or proved inadequate for a location.
- Location(s) where additional BMPs are needed but did not exist at the time of inspection.
- Corrective action required, including any necessary changes to the SWPPP and implementation dates.
- A certification that the site is in compliance with the most recent CGP or identification of noncompliance issues, signed by the appropriate responsible official.
- The Appendix G, Part 11.D certification statement (of the most recent CGP), along with the signature of an authorizing official or duly authorized representative.

Consider taking digital photographs during inspections to document BMPs, problems identified and progress in implementing the SWPPP.

Maintaining BMPs

Implementing a good BMP maintenance program is essential to an SWPPP's success and to efforts to protect nearby waterways. Maintain BMPs regularly and whenever an inspection (formal or informal) identifies a problem or potential issue. For instance, trash and debris should be cleaned up, dumpsters should be checked and covered, nearby streets and sidewalks should be swept daily, and so on. Maintenance on ESCs should be performed before the next storm event or as soon as site conditions allow. Consider the following points when conducting maintenance:

- Follow the designers or manufacturer's recommended maintenance procedures for all BMPs

- BMP maintenance will vary according to the specific area and site conditions
- Remove sediment from BMPs as appropriate and always before any sediment control reaches 50 percent of design capacity, and properly dispose of sediment into controlled areas to prevent soil from returning to the BMP during subsequent rain events
- Remove sediment from paved roadways and from around BMPs protecting storm drain inlets
- Ensure that construction support activities, including borrow areas, waste areas, contractor work areas, material storage areas, and dedicated concrete and asphalt batch plants are cleaned and maintained
- Replace damaged BMPs, such as silt fences, that no longer operate effectively
- Implement new BMPs where previous controls are found to be ineffective, and update the SWPPP accordingly within 7 days
- Keep a record of all maintenance activities, including the date, BMP, location, and maintenance performed in the SWPPP

Recordkeeping

Keep copies of the SWPPP, inspection records, copies of all reports required by the permit, and records of all data used to complete the NOI to be covered by the permit for a period of at least 3 years from the date that permit coverage expires or is terminated.

Records should include the following:

- A copy of the SWPPP, with any modifications
- A copy of the NOI and NOT and any storm water-related correspondence with federal, state and local regulatory authorities
- Inspection forms, including the date, place and time of BMP inspections
- Names of inspector(s)
- The date, time, exact location and a characterization of significant observations, including spills and leaks
- Records of any non-storm water discharges
- BMP corrective actions taken at the site (Corrective Action Log)

- Any documentation and correspondence related to endangered species and historic preservation requirements
- Weather conditions (e.g., temperature, precipitation)
- Date(s) when major land-disturbance activities (e.g. clearing, grading and excavating) occur in any portion of the site
- Date(s) when construction activities are either temporarily or permanently ceased in a portion of the site
- Date(s) when either temporary or permanent stabilization is initiated in an area

4.8 Common Problems with SWPPPs and Temporary BMPs

As the saying goes, "you learn from your mistakes." To help you avoid making the same mistakes, this final section under temporary storm water controls describes some of the most common problems found at construction sites (adapted from MPCA 2004):

Problem #1—Not using phased grading or providing temporary or permanent cover (i.e., soil stabilization)

In general, construction site operators should phase the grading activities so that only a portion of the site is exposed at any time. Also, disturbed areas that are not being actively worked should have temporary cover. Areas that are at final grade should receive permanent cover as soon as possible.

Problem #2—No sediment controls on-site

Sediment controls, including inlet protection, such as silt fences, sediment barriers, sediment traps and basins must be in place before soil-disturbance activities begin. Ensure that BMPs are always installed and maintained when in proximity to a stream or sensitive area. Do not proceed with grading work out-of-phase.

Problem #3—No erosion control for temporary stockpiles

Temporary stockpiles must be seeded, or otherwise covered, and surrounded by properly installed silt fence. Stockpiles should not be placed on paved surfaces.

Problem #4—Improper storm drain inlet protection

Storm drain lnlets that receive storm water discharges from an active construction site should be protected with a temporary filtering measure to trap sediment and prevent sediment from entering the storm drain system.

Problem #5—No BMPs to minimize vehicle tracking onto the road

Vehicle exits must use BMPs such as stone pads, concrete or steel wash racks, or equivalent systems to prevent vehicle tracking of sediment.

Problem #6—Improper solid waste or hazardous waste management

Solid waste (including trash and debris) must be disposed of properly, and hazardous materials (including oil, gasoline and paint) must be properly stored (which includes secondary containment). Properly manage portable sanitary facilities.

Problem #7—Dewatering and other pollutant discharges at the construction site

Construction site dewatering of contaminated water from building footings or other sources should not be discharged without treatment. Turbid water should be filtered or allowed to settle.

Problem #8—Poorly managed washouts (concrete, paint, stucco)

Water from washouts must not enter the storm drain system or a nearby receiving water. Make sure washouts are clearly marked, sized adequately and frequently maintained.

Problem #9—Inadequate BMP maintenance

BMPs must be frequently inspected and maintained if necessary. Maintenance should occur for BMPs that have reduced capacity to treat storm water or that have been damaged and need to be repaired or replaced (such as a storm drain inlet protection that has been damaged by trucks).

Problem #10—Inadequate documentation or training

Failing to develop an SWPPP, keep it up-to-date, or keep it on-site, are permit violations. Keep on-site all SWPPP documentation such as a copy of the NOI, inspection reports and updates to the SWPPP. Likewise, personnel working on-site must be trained on the basics of storm water P2 and BMP installation/maintenance.