Appendix A

Best Management Practice Toolbox

BEST MANAGEMENT PRACTICE TOOLBOX

A BMP is simply a tool, and a tool can be used appropriately and inappropriately. A good analogy would be the use of a hammer to install a screw. Although it may ultimately work, the hammer is not the best tool for the job. Similarly, use of the wrong BMP for a particular application might ultimately work, however, the task will not be done as effectively as it would be with the right tool or BMP. Information about BMP selection and implementation, as well as maintenance (if applicable), is provided in this BMP Toolbox. Alternate individual engineering solutions will be reviewed and considered.

Acronyms used in this appendix:

ADEC..... Alaska Department of Environmental Conservation
ADOT&PF..... Alaska Department of Transportation and Public Facilities
AWWU.....Anchorage Water and Wastewater Utility
BMP..... Best Management Practice
cfs .....Cubic Feet per Second
CGP..... Construction General Permit
DCM .....Design Criteria Manual
EPA ..... Environmental Protection Agency
ESC .....Erosion and Sediment Control
LID.....Low Impact Development
MOA ..... Municipality of Anchorage
MS4 ..... Municipal Separate Storm Sewer System
NOI ..... Notice of Intent
NOT..... Notice of Termination
NPDES .....National Pollutant Discharge Elimination System
OGS..... Oil and Grit Separator
SPCC..... Spill Prevention, Control, and Countermeasure Plans
SWPPP..... Storm Water Pollution Prevention Plan
SWTP .....Storm Water Treatment Plan
SWTPRGM..... Storm Water Treatment Plan Review Guidance Manual
WMS..... Watershed Management Services

Table A1 Matrix of Best Management Practices

SC – Source Control RT – Runoff Treatment FA – Flow Attenuation

			Temporary Controls		Permanent Controls				Required
Page in Appendix	Fact Sheet Provided?	**Best Management Practice**	**Erosion and Sediment Control**	**Waste, pollutant management**	**Infiltration**	**Flow control and Detention**	**Biofiltration**	**Procedural or Maintenance**	**Consideration for All Sites**
		EROSION CONTROL							
A-5	Yes	Scheduling to Minimize Soil Exposure	SC						✓
A-6	Yes	Phased clearing and grading	SC						
A-7	Yes	Flagging and fencing of clearing limits	SC						
A-8	Yes	Benching	SC						
A-9	Yes	Slopes requiring cut and fill design	SC						✓
A-10	Yes	Effects of erosion control on adjacent property	SC						✓
A-11	Yes	Surface roughening	SC						
A-12	Yes	Plastic covering	SC						
A-13	Yes	Mulching	SC						
A-14	Yes	Erosion control blankets	SC						
A-15	Yes	Seeding	SC				SC		
	No	Sodding	SC				SC		
A-16	Yes	Slope revegetation	SC				SC		
		TEMPORARY SEDIMENTATION CONTROL							
A-17	Yes	Silt fence	RT						
A-19	Yes	Sandbag filter	RT						
A-20	Yes	Catchbasin insert	RT						
A-21	Yes	Catchbasin covering	RT						
A-22	Yes	Block and gravel barrier	RT						
A-24	Yes	Catchbasin silt fence	RT						
A-26	Yes	Curb inlet protection	RT						
A-28	Yes	Wattles	RT						
		FLOW CONTROL AND ENERGY DISSIPATION							
A-30	Yes	Interceptor ditch	SC						
A-31	Yes	Temporary diversion dike	SC						
A-32	Yes	Down drain	SC						
A-22	Yes	Gravel check dam	RT						
A-35	Yes	Storm drain diffuser	RT			RT			
A-36	Yes	Outlet protection	RT			RT			
A-59	Yes	Rock swale	SC			SC			
		CONSTRUCTION ACTIVITIES CONTROLS							
	No	Inspection and maintenance		SC					
	No	Stockpile maintenance							
A-38	Yes	Stockpile organic soils for revegetation		SC			SC		
A-39	Yes	Concrete washout	SC						
A-40	Yes	Dewatering Controls	RT						
A-48	Yes	Dust control		SC					✓
A-49	Yes	Sweeping		SC				SC	✓
A-50	Yes	Gravel construction exit	SC						✓
A-51	Yes	Truck wheel wash basin	SC						▪
A-52	Yes	Mud mats	SC						

Table A1 Matrix of Best Management Practices (continued)

SC – Source Control RT – Runoff Treatment FA – Flow Attenuation

Page in Appendix	Fact Sheet Provided?	Best Management Practice	Temporary Controls		Permanent Controls				Required Consideration for All Sites
			Erosion and Sediment Control	Waste, pollutant management	Infiltration	Flow Control and Detention	Biofiltration	Procedural and/or Maintenance	
		PERMANENT PHYSICAL CONTROLS							
A-60	Yes	Outfall protections	RT			RT, FA			
A-53	Yes	Sedimentation basin (wet pond)	RT			RT, FA			
	No	Infiltration basin			RT, FA				
	No	Infiltration trench (see the MOA LID Design Guidance Manual)			RT, FA				
	No	Presettling basin				RT			
	No	Extended detention dry pond				RT, FA			
A-55	Yes	Proprietary oil and grit separators				RT			
A-57	Yes	Vegetated filter strip					RT		
A-58	Yes	Bioswale (Grassed swale)					RT		
A-62	Yes	Constructed wetlands					RT, FA		
A-61	Yes	Use of existing wetlands					RT, FA		
	No	Riparian improvements					RT		
	No	Restore native plant species					RT		
		DESIGN PHASE and OTHER LID CONTROLS							
A-63	Yes	Preservation of natural drainage systems	SC						
A-64	Yes	Preservation of natural vegetation	SC, FA		SC, FA		SC, FA		
A-66	Yes	LID: reinforced turf driveways			SC				
A-65	Yes	LID: reduced lot grading			SC				
A-67	Yes	LID: rain garden (see the MOA LID Design Guidance Manual)			SC, FA		SC, FA		
A-68	Yes	Minimize disturbance/maintenance via cluster development			SC				
56	No	LID: minimize impervious areas			SC				
57	No	Reduce hydraulic connectivity of impervious surfaces			SC, FA				
		SOURCE CONTROLS FOR URBAN LAND USE ACTIVITIES (see Appendix D)							
A-69	Yes	Parking lot management						SC	
A-70	Yes	Snow storage facility operations						SC	
A-72	Yes	Liquid Storage						SC	
A-71	Yes	Vehicle and equipment washing						SC	
A-73	Yes	Materials storage						SC	
	No	Fuel and vehicle maintenance staging areas						SC	
	No	Spill prevention and control plan						SC	
	No	Maintenance of urban runoff facilities						SC	
	No	Roof runoff management				FA		SC	
	No	Herbicide, pesticide, and fertilizer application		SC				SC	
	No	Petroleum product handling		SC				SC	
	No	Solid waste disposal		SC				SC	

Erosion and Sediment Control Practice Symbols

The use of symbols for different ESC BMPs is helpful in site plans for SWPPP submissions. The symbols are a basic shorthand for the plan preparation. The symbols shown in Figure 1A are an example; any symbols are acceptable as long as a key identifying them is provided.

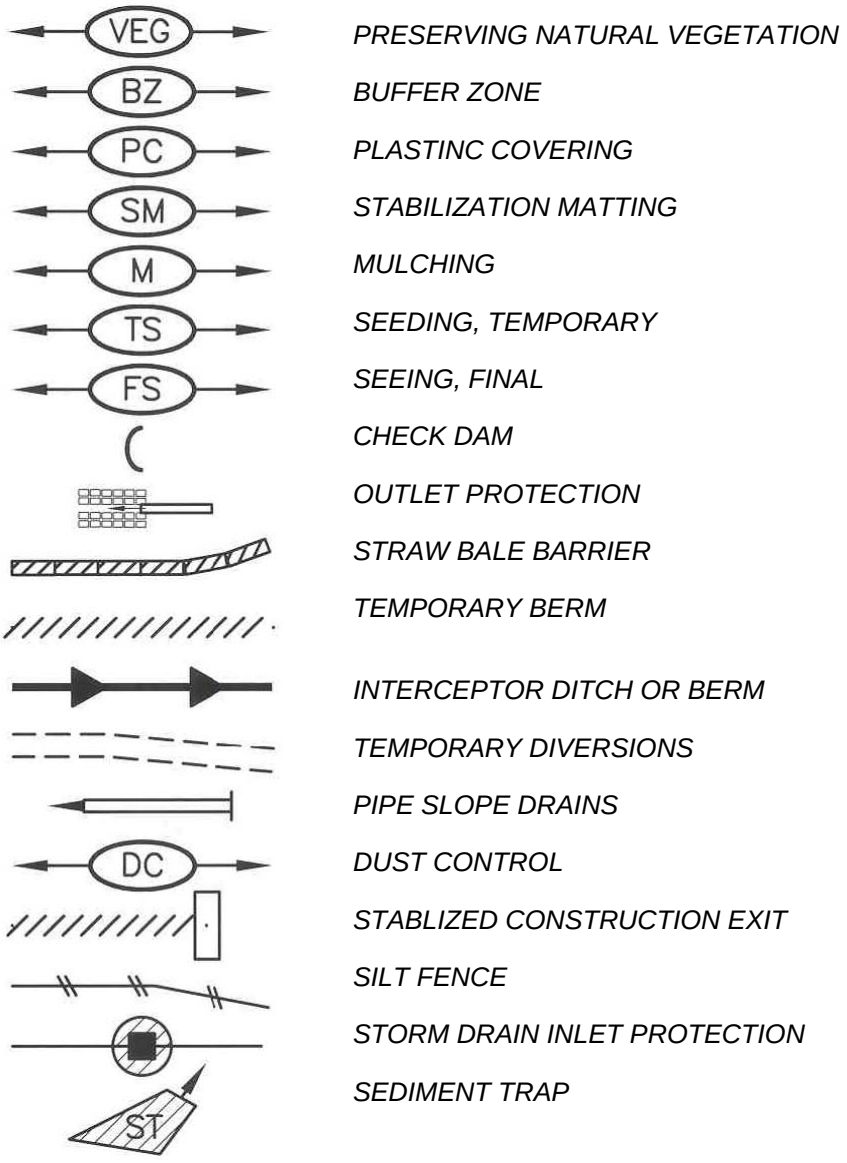


Figure 1A: ESC Practice Symbols

Scheduling to Minimize Soil Exposure

The short construction season in Anchorage does not always allow flexibility for mass earthwork on each project to be performed at the ideal time of year. Because nothing is more unpredictable than the weather, contingencies must be developed to cover variations in climatic conditions. However, certain weather trends do exist in Anchorage and must be addressed in the project schedule. Care must be taken to minimize weather impacts. Although it may be advantageous to an owner or contractor to work in early spring or late fall, the downside must be understood – ESCs will require more attention and maintenance during these periods. Scheduling is a temporary BMP.

Selection

Any project can benefit from a well-conceived schedule that takes into account seasonal ESC issues.

Implementation

Discussions with the owner or contractor can aid in understanding the construction process in Anchorage and how to take advantage of dry periods to reduce erosion and sediment concerns.

Phased Clearing and Grading

Phased clearing and grading can significantly reduce the amount of disturbed area on a construction site. By phasing the construction, the time that soils are left exposed and the total area that is exposed during the rainy season can be reduced. Phasing the clearing and grading operations is a temporary BMP.

Selection

- Any project can benefit from a schedule that phases the construction to account for ESC issues.
- Discussions with the owner or contractor can aid in understanding the critical construction timelines in Anchorage and how to phase the land clearing construction activities to coincide with periods of expected dry weather.

Implementation

- Show areas to be cleared and graded in phases clearly on the site plan.
- Clear and grade as necessary for immediate construction only.

Maintenance

- Apply erosion control practices to cleared areas.
- Comply with CGP temporary stabilization requirements if the cleared area will not be worked immediately.

Flagging and Fencing of Clearing Limits

Flagging and fencing of clearing limits is the most positive method to ensure that the area of disturbance is controlled. As construction progresses and excavation and stockpiles occur at the site, it is easy to inadvertently expand the area of disturbance into areas to be protected without the presence of visual cues or physical barriers. Delineation of clearing limits is a temporary BMP. Figure 2A illustrates the flagging and fencing clearing limits BMP.

Selection

Flagging and fencing of clearing limits is applicable for all construction sites.

Implementation

- Designate areas of retained vegetation clearly on the plans. Required buffers should also be designated on the site design plan.
- Delineate the clearing limits with a continuous length of brightly colored tape. Support highly visible tape with vegetation or stakes, 3 to 6 feet high.
- Individual trees and shrubs that are to be preserved within the cleared area should be identified.
- If the area is to be flagged only, the flagging should be spaced no greater than 200 feet apart and closer in wooded or hilly areas.

Maintenance

- Immediately repair or replace damaged fencing or flagging necessary to ensure the area of disturbance does not enlarge should be repaired or replaced.
- Check that vandals have not moved stakes or flagging.
- Make sure that the construction is staying within the clearing limits.

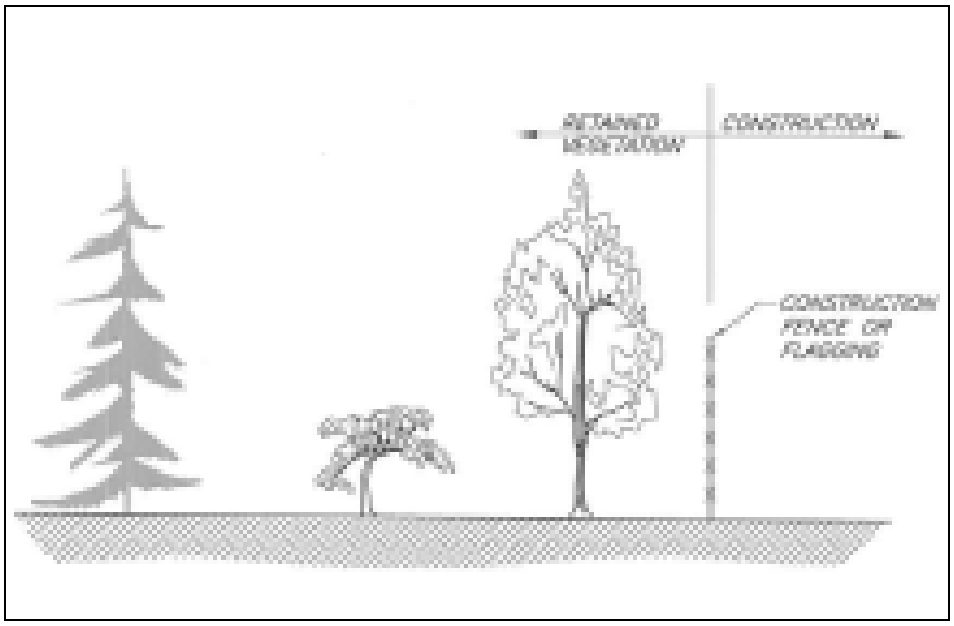


Figure 2A: Flagging and Fencing of Clearing Limits

Benching

Benching reduces erosion damage by segmenting the effective slope length, thus intercepting surface runoff and conveying the discharge along the benches at a slower velocity. Figure 6A shows a benching diagram.

Selection

Benches should not be used in sandy areas or on soils that are too rocky for construction and maintenance. Benching should only be used where the concentrated flows from the benches can be discharged without erosion of downstream areas.

Implementation

The plans and specifications for the bench construction should be followed. Benches must be constructed along contours in order to minimize the velocity of intercepted runoff.

Maintenance

Maintenance should be performed as needed. Benches should be inspected regularly; at least once a year and after large storm events.

- Check for and correct erosion of the benches.
- Check for and remove trash collecting in the benches.
- Look for and correct erosion at the bench discharge points.

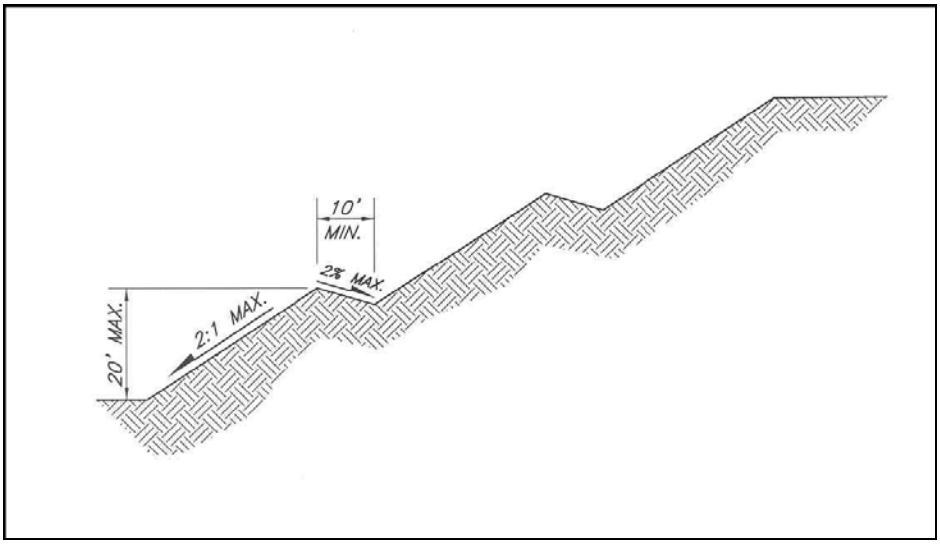


Figure 6A: Benching

Slopes Requiring Cut and Fill Design

Cut and fill slopes should be constructed in a manner that will minimize erosion by taking into consideration the length and steepness of slopes, soil types, upslope drainage areas, and groundwater conditions.

Selection

For use on all cut or fill slopes higher than 3 feet.

Implementation

Design cut and fill slopes to be at stable angles, or less than the normal angle of repose, to minimize erosion and slope failure potential.

Maintenance

Slopes should not be left at angles steeper than their final design any longer than necessary for other site activities.

Effects of Erosion Control Measures on Adjacent Properties

Plan and design all streambank, shoreline, and navigation structures so that they do not transfer erosion energy or otherwise cause visible loss of surrounding streambanks and shorelines. Many streambank or shoreline protection projects result in a transfer of energy from one area to another, which causes increased erosion in the adjacent area. Property owners should consider the possible effects of erosion control measures on other properties located along the shore.

Surface Roughening

Surface roughening, also called cat-tracking, is used on slopes to provide small pockets for trapping runoff and allowing infiltration. This temporary BMP is shown in Figure 5A. Surface roughening aids in the establishment of vegetation cover by providing a rough soil surface with horizontal depressions.

Selection

Surface roughening works on most sloped areas, except hard pan.

Implementation

- The contractor should run tracked machinery along the fall line of the slope with the blade raised.
- Roughening with tracked machinery needs to be limited to avoid compaction of 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.

Maintenance

Surface roughening is a temporary measure and should be inspected and shaped after each rainfall that causes erosion or after no more than 90 days since the last shaping, to minimize erosion.

- Make sure the area is adequately covered with tracking.
- Check for erosion after significant rainstorms. If rills appear, regrade and roughen again and reseed eroded area immediately, as appropriate.

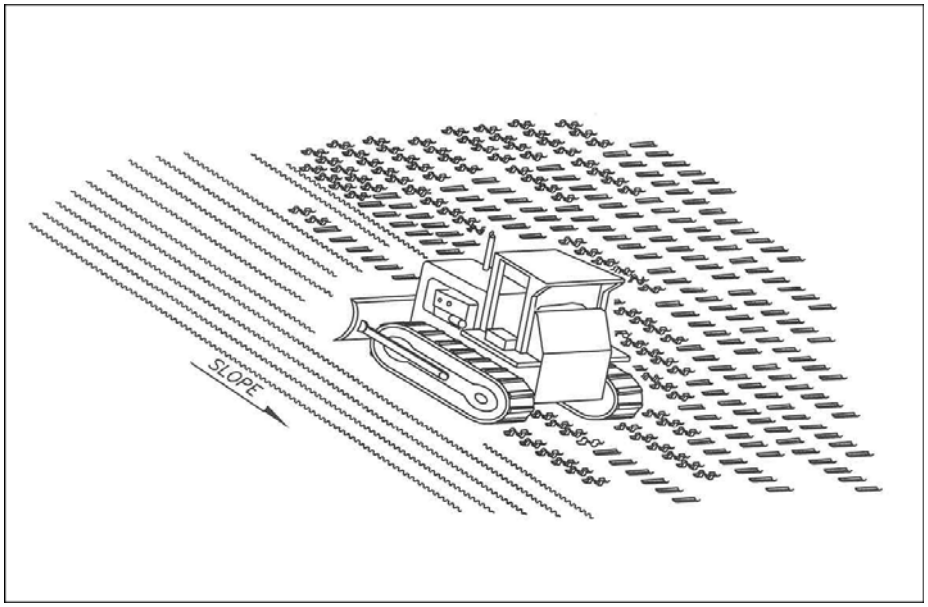


Figure 5A: Surface Roughening

Plastic Covering

Plastic covering, shown in Figure 3A, is used on steep slopes and material stockpiles to reduce erosion. This temporary BMP is a very reliable way to protect from erosion.

Selection

Plastic covering works on many surfaces that require protection from erosion. Clear plastic can be used to promote seed germination. Do not use upslope of areas that might be adversely impacted by concentrated runoff, such as steep or unstable slopes.

Implementation

- Plastic sheeting should have a minimum thickness of 0.06 mm.
- The plastic covering should be secured at the top of slope and should be anchored with tires, sandbags, or other appropriate ballast material to prevent plastic from being blown apart by wind.
- Space weights at a maximum of every 10 feet in all directions.
- Once the sheeting is anchored, secure edging at the top and toe of slope by tucking them into shallow trenches and backfilling.
- The plastic covering should overlap a minimum of one foot between sheets, the overlaps should run perpendicular to the slope, and the seams should be weighted or taped. The plastic covering should extend past the bottom of the slope.

Maintenance

- Check whether anchors are working properly.
- Verify that plastic is secured at the top of slope.
- Look for and replace torn or deteriorated plastic.
- Assure that the seams are taped or weighted and one foot overlap exists.
- Verify that the plastic extends past the top and bottom of slope.
- Remove plastic when it is no longer needed.

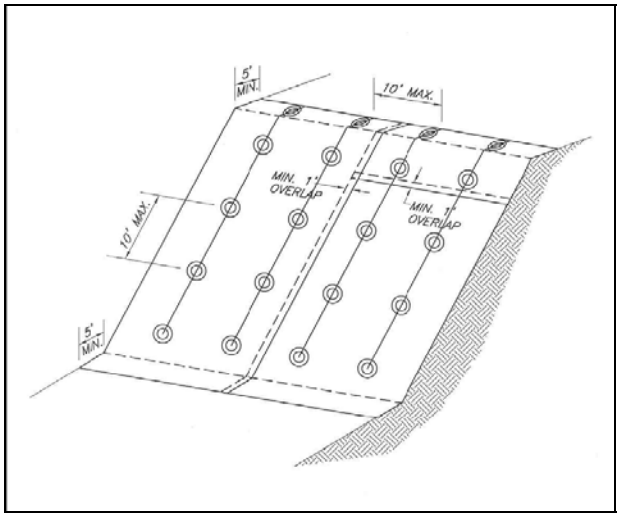


Figure 3A: Plastic Covering

Mulching

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 prior to 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 in Anchorage. Mulch design life is six months or less. Appropriate for use on slopes of 3:1 or flatter.

Implementation

Mulch is most commonly used in conjunction with seeding. Mulch should be uniformly spread by hand or blower to provide 75 percent ground cover. When straw mulch may be exposed to wind, it must be anchored immediately after spreading. Mulch should be applied immediately after seeding to improve seed germination. Depth of the applied mulch should be not less than one inch and not more than 2 inches.

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, mulch-covered areas should be checked for adequate cover and remulched if necessary. To be effective, mulch must last until vegetation develops to provide an erosion-resistant cover.

- Confirm mulch is adequately watered.
- Check to ensure erosion is not occurring.
- Watch for and repair washout of mulch.
- Mulching may degrade slowly in Anchorage's climate; therefore, some mulches may need to be removed once vegetation is established.

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 less 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.	• May be obtained from trees cleared on 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	• This may include 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 adhesive that form an erosion resistant blanket • Biodegradable; promotes growth of vegetation	• Apply hydraulically • Typically applied at rates from 3,000 to 4,000 pounds per 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)	• Apply hydraulically • Typically applied at rates of 3,500 pounds per acre

Erosion Control Blankets

Erosion control blankets are used as an alternative to mulch but can also be used to provide structural erosion protection. They aid in controlling erosion on areas by providing a temporary or semi-permanent protective cover made of straw, jute, wood, plant fibers, or artificial products. Figure 4A depicts the use of erosion control blankets.

Selection

Erosion control blankets 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 steeper than 3H:1V and greater than 10 feet of vertical relief.

Implementation

- The manufacturer's recommendations for installation should be followed.
- Blankets must be anchored; spacing depends on type of material and slope steepness,
- Maintain a firm continuous contact between the blanket and soil to prevent erosion below the blanket.

Maintenance

When erosion blankets have been installed and anchored properly, little additional maintenance is required during the first few months. After high winds or significant rainstorms have occurred, blanketed areas should be checked for adequate cover and repaired if necessary. The blanket must last until vegetation develops to provide an erosion-resistant cover. After any damaged slope or drainage course has been repaired, the material should be reinstalled.

- Check that surfaces adhere, fasteners remain secure, and covering is in tight contact with soil surface beneath.
- After significant rainstorms, check for erosion and undermining and repair promptly.
- Look for and repair washouts.

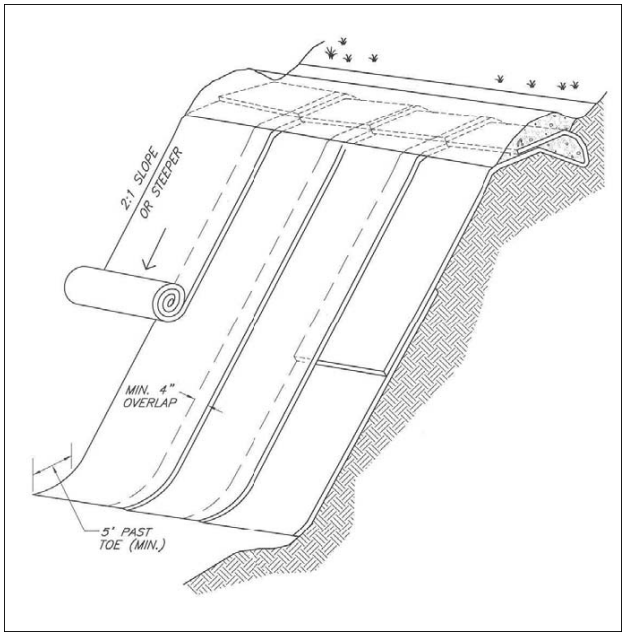


Figure 4A: Erosion Control Blankets

Seeding

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. Other temporary stabilization should be considered.

Implementation

Proper seedbed preparation and the use of high quality seed are essential to the success of this practice.

- Seeding shall take place as soon as practicable after the last ground-disturbing activities in an area, but not during the period August 15 through May 1 unless dormant seeding is used.
- Supplement topsoil as necessary to ensure a minimum of 4 inches of topsoil in areas to be permanently seeded. Work topsoil into the layer below for a depth of at least 6 inches.
- The project plans and specifications produced by the landscape architect or engineer shall be followed.

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.

Slope Revegetation

Slope revegetation is used to re-establish a live organic surface on disturbed slopes to inhibit erosion. It is usually a permanent installation on a completed portion of the work, but can be used as a temporary or interim measure. See Figure 30A for an illustration.

Selection

All disturbed land areas with slopes steeper than 3H:1V should be protected or revegetated to inhibit erosion.

Implementation

The slope revegetation should be completed as early in the planting season as practicable, generally between May and August. The revegetation should occur on adequately prepared areas. This BMP shall not be used in excessively wet or frozen ground conditions.

Maintenance

The slope revegetation should receive adequate moisture through either watering or precipitation to establish a vegetative mat. Eroded areas should be stabilized and reseeded. Diseased or dead areas should be revegetated. Mowing and fertilization should occur to maintain healthy growth.

- Check whether adequate water is being supplied and correct as necessary.
- Look for and correct areas that have eroded.
- Look for dead or diseased areas; remove or treat as necessary.
- Confirm that growth is green and lush.

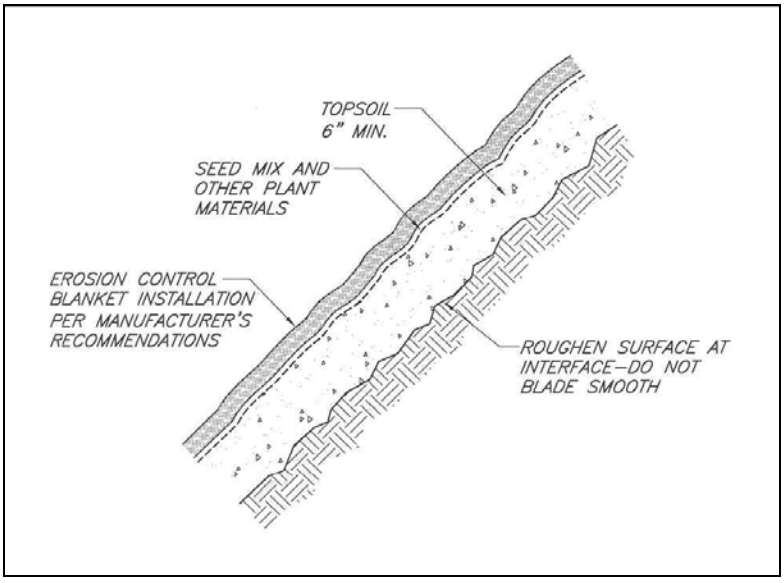


Figure 30A: Slope Revegetation

Silt Fence

Silt fences are used to filter sediments from sheet flow runoff on sloped areas. The fences can be very effective in removing sediment from runoff. See Figure 15A for details on this temporary BMP.

Selection

Silt fences are appropriate for the majority of construction sites. The design life a silt fence is six months or less. The maximum contributory sheet flow drainage area shall 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 slope stabilization measures.

Implementation

Silt fences should be installed at right angles to the slope and along contours. Posts should be securely installed. The filter fabric should be securely attached to the posts. The filter fabric should be keyed into the surrounding earth.

Maintenance

The filter fabric should be kept up to maintain its function. It should be replaced if it is torn or frayed. 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 to nine inches in height, 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 the silt fence is not leaning over.
- Check for underflow, re-key if necessary.
- Remedy fence sags as needed.

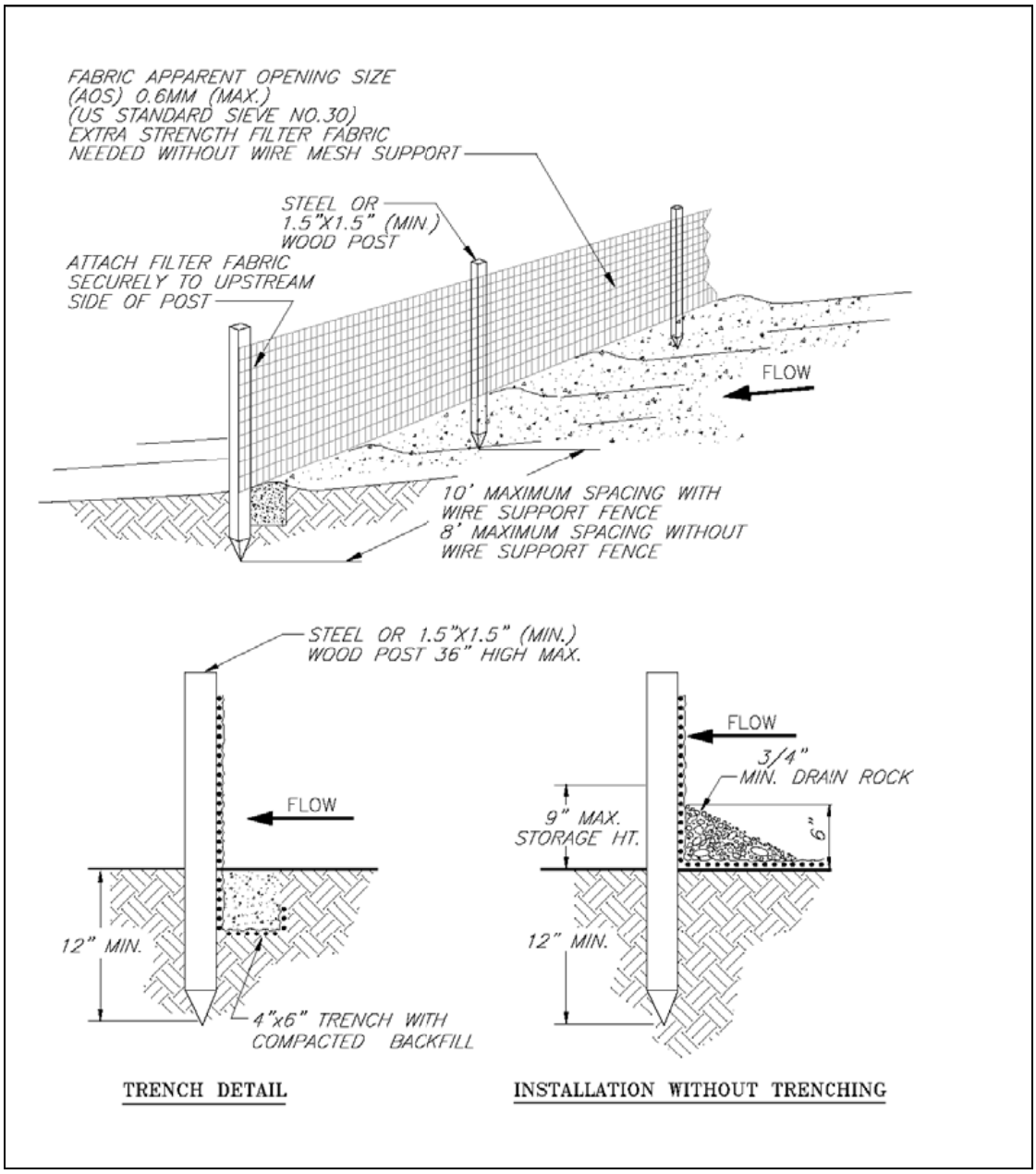


Figure 15A: Silt Fence

Sandbag Filters

A sandbag filter uses sandbags to prevent sediment from exiting small construction sites. See Figure 31A for an illustration of this temporary control.

Selection

Use of sandbag filters is appropriate for remodeling or redevelopment projects in paved areas.

Implementation

Sandbags should be placed around the disturbed work area.

Maintenance

The sandbag filters used for protection must be regularly inspected and cleaned. Sediment should be removed from behind sandbags after each significant storm to provide adequate storage volume for the next rain. Damaged sandbags should be replaced. All sediment should be immediately removed from adjacent paved parking and roadway areas. The sediment should be disposed of in locations where it cannot enter a storm drain or stream, or be transported off site.

- Check sandbags after each storm.
- Confirm that collected sediment is disposed of properly.
- Check sandbags to ensure they are not packed with sediment.
- Replace damaged sandbags.

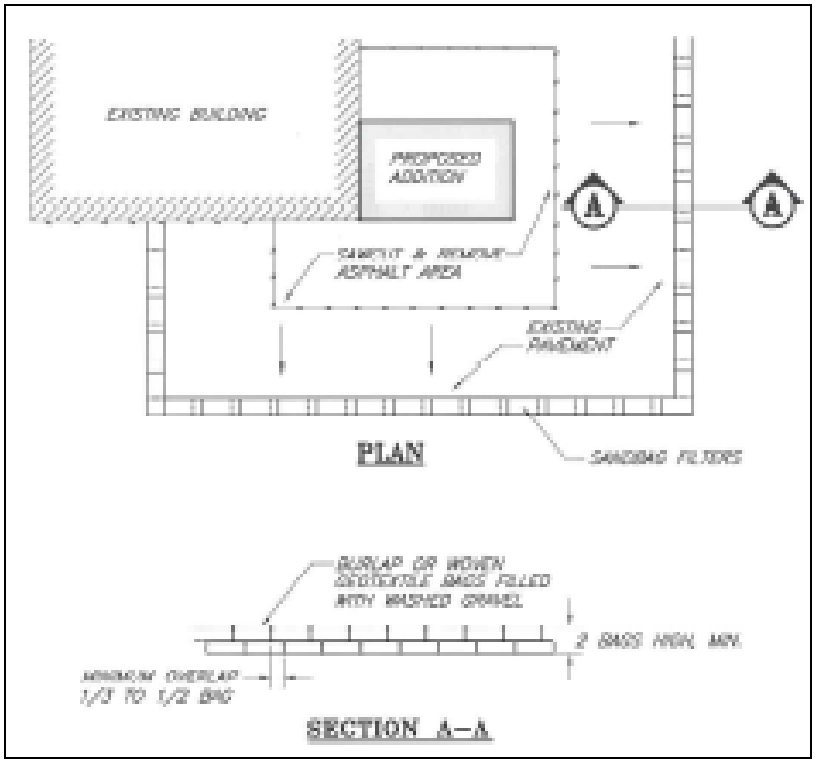


Figure 31A: Sandbag Filters

Catchbasin Insert

A catchbasin insert is a “sock” made from a porous fabric with an apparent opening size (AOS) U.S. Standard Sieve No. 30 (0.6 millimeter) that is installed in the drainage structure to filter the sediments from the runoff. This temporary BMP is a last line of defense for containing sediments on-site. See Figure 16A for an illustration.

Selection

Catchbasin inserts are applicable for use on projects where the quantity of sediment anticipated would average 0.1 cubic yards per month or less. The insert should be properly sized for the catch basin and the drainage area and it should allow flow bypass during significant runoff events. Oversized inserts may be difficult to remove when full and, under freezing conditions may cause pipe damage. Inserts that are tapered are easier to maintain.

Implementation

The insert should be installed in a fashion that holds the device securely in place and prohibits it from falling into the catchbasin.

Maintenance

- The insert should be cleaned when half full of sediment. It should be replaced if torn or frayed.
- Confirm that the insert is securely fastened.
- Look for and replace insert material that is torn or frayed.
- Remove sediment or replace the insert if the insert is half full.
- Look for evidence that the sediment or runoff is traveling around and not entering the catchbasin and make corrections as necessary.

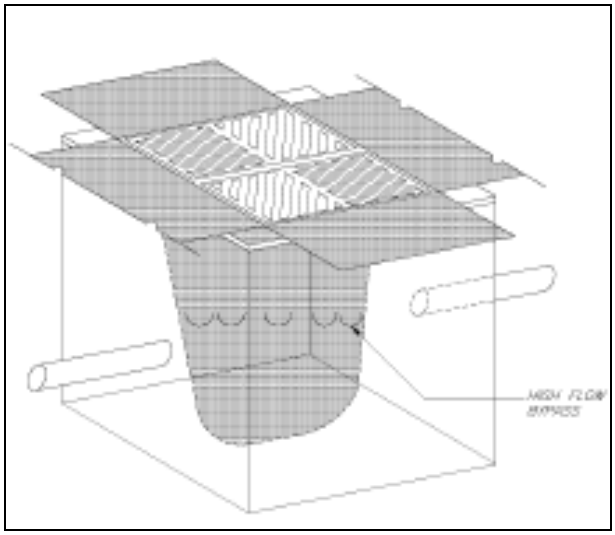


Figure 16A: Catchbasin Insert

Catchbasin Covering

Another last line of defense for containing sediments on-site, a catchbasin covering is a porous fabric with an apparent opening size (AOS) U.S. Standard Sieve No. 30 (0.6 millimeter) that removes sediment from runoff before it enters a catchbasin. See Figure 17A for an illustration of this temporary BMP.

Selection

The catchbasin covering is an applicable protection measure for all catchbasins on sites where small quantities of sediments are mobilized. It is not effective in removing large quantities of sediment because the sediment clogs the covering and requires frequent maintenance.

Implementation

Catchbasin coverings should be installed so that a sump is constructed around the catchbasin. The sump allows water velocities to slow and deposit sediments before they enter the catchbasin. The filter fabric should be installed in a manner that completely covers the catchbasin opening. The washed gravel should encircle the catchbasin and act as a filter.

Maintenance

The washed gravel should be cleaned or replaced when the catchbasin covering becomes half filled with sediments. The sump should be reshaped at the same time the washed gravel is maintained.

- Check for washed gravel that is bermed around the catchbasin.
- Look for evidence that the washed gravel is filled with sediment.
- Confirm that the filter fabric is covering the opening.
- Look for and replace filter fabric that is torn or frayed.
- Check on whether the filter fabric needs cleaning; remove as necessary.

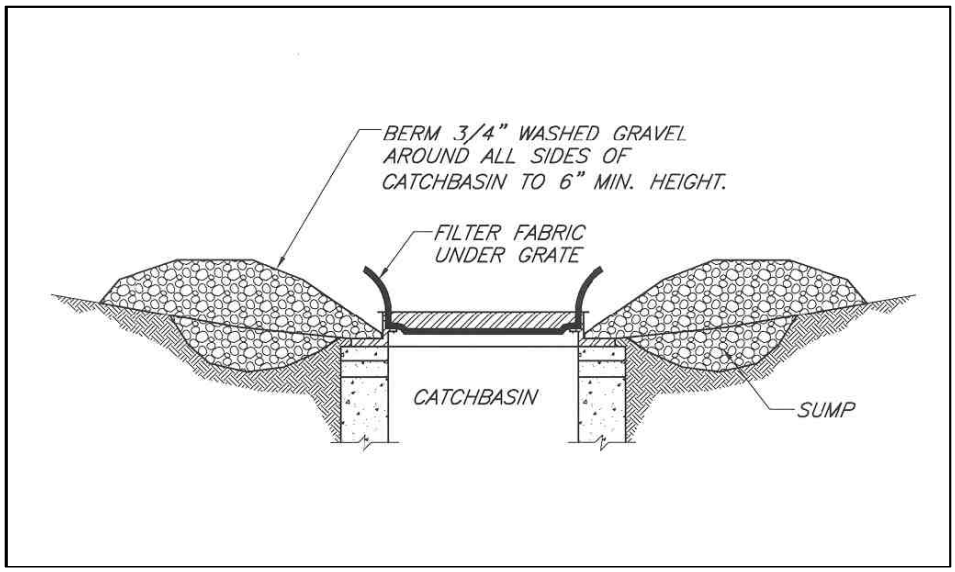


Figure 17A: Catchbasin Covering

Block and Gravel Barrier

The block and gravel barrier is another type of last line of defense for containing sediments onsite. It is a filter that uses concrete blocks, gravel, and a porous fabric with an apparent opening size (AOS) U.S. Standard Sieve No. 30 (0.6 millimeter), to remove sediment from runoff prior to entering a catchbasin. See Figures 18A and 19A for illustrations of these temporary BMPs.

Selection

Block and gravel barriers are applicable for all catchbasins on sites where small quantities of sediments are mobilized. This BMP is not effective in removing large quantities of sediment because the sediment clogs the barrier and requires frequent maintenance. The block and gravel barrier BMP is also ineffective in situations in which high runoff flow occurs because the barriers become hydraulically overloaded and allow untreated runoff to enter the catchbasins. Block and gravel barriers must not be used in areas open to bicycle and motor vehicle traffic.

Implementation

The block and gravel barrier should be installed so that a sump is created by effectively raising the height of the top of the catchbasin. The blocks should hold the filter fabric securely in place. The washed gravel and blocks should encircle the catchbasin.

Maintenance

The washed gravel should be cleaned or replaced when it becomes half filled with sediments.

- Confirm that the washed gravel and blocks encircle the catchbasin.
- Check whether the washed gravel is filled with sediment.
- Look for filter fabric that is covered with sediment.
- Look for and repair filter fabric that is torn or frayed.
- Look for evidence of sediment having entered the catchbasin.
- Repair any structural damage immediately.

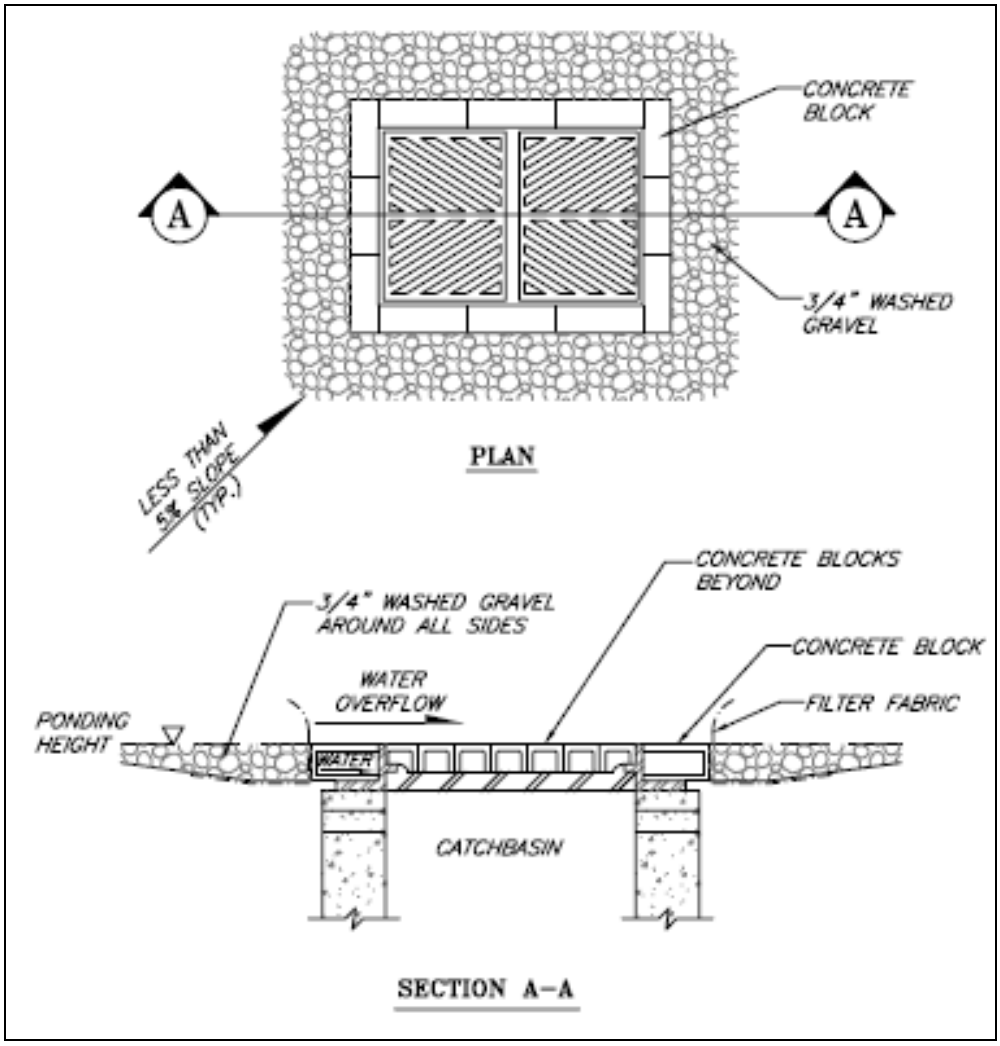


Figure 18A: Block and Gravel Barrier

Catchbasin Silt Fence

Another last line of defense for containing sediments on-site, a catchbasin silt fence, comprised of a porous fabric with an apparent opening size (AOS) U.S. Standard Sieve No. 30 (0.6 millimeter), is a filter that removes sediment from runoff before it enters a catchbasin. See Figure 20A for an illustration of this temporary BMP.

Selection

Catchbasin silt fences are applicable protection measures for all catchbasins on sites where small quantities of sediments are mobilized. This BMP is not effective in removing large quantities of sediment because the sediment causes clogging and requires frequent maintenance. The anticipated height of the runoff should not exceed half the height of the filter fence. The design flow shall be 0.5 cubic feet per second or less.

Implementation

The catchbasin silt fence should be installed so that a sump is constructed around the catchbasin. The sump allows water velocities to slow and deposit sediments before they enter the catchbasin. The filter fabric should be installed to provide a “fence” around the catchbasin. It should be keyed into the surrounding earth and should be securely fastened to the posts. The washed gravel should encircle the catchbasin.

Maintenance

The washed gravel should be cleaned or replaced when half filled with sediments. The sump should be reshaped at the same time the washed gravel is maintained. The filter fabric should be cleaned if it becomes covered with sediment. It should be reinstalled if it is not keyed into the surrounding earth. The posts should be reinstalled if they become loose.

- Confirm that the washed gravel is bermed around the catchbasin.
- Check whether the washed gravel is filled with sediment.
- Confirm that the fence posts are secure.
- Confirm that the filter fabric is securely attached to the fence posts.
- Look for and repair filter fabric that is torn or frayed.
- Check whether the filter fabric needs cleaning.
- Look for evidence of runoff overtopping the filter fabric.
- Look for evidence of the filter fabric and fence posts leaning over.
- Look for evidence that sediment has entered the catchbasin.
- Repair any structural damage immediately.

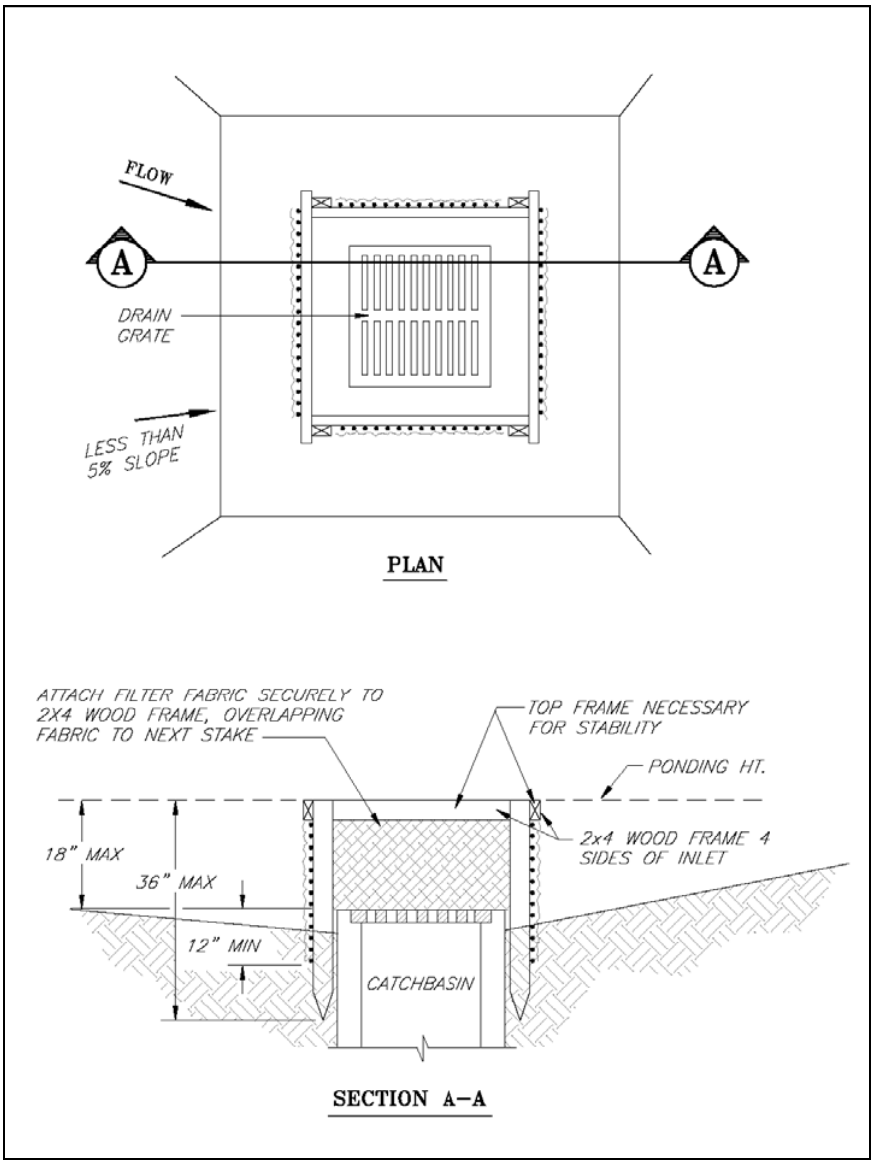


Figure 20A: Catchbasin Silt Fence

Curb Inlet Protection

Curb inlet protection uses sandbags to prevent sediment from entering curb inlet drainage structures. Figures 21A and 22A show sample installations of this temporary BMP.

Selection

Curb inlet protection must not be used in areas open to bicycle and motor vehicle traffic. Use of curb inlet protection is appropriate for construction projects near roadways with curb and gutter drainage systems that are closed to traffic.

Implementation

At a minimum, sandbags should be placed upstream of curb inlet.

Maintenance

Curb inlet protection should be inspected and cleaned regularly. Sediment should be removed from behind sandbags after each significant storm to provide adequate storage volume for the next event, and damaged sandbags should be replaced as necessary. All sediment should be removed immediately from the roadway. The sediment should be disposed of in a location where it cannot enter a storm drain or stream, or be transported off site.

- Check sandbags after each storm.
- Confirm that sandbags are not packed with sediment.
- Replace damaged sandbags.
- Remove sandbags in traveled ways before winter freeze up.

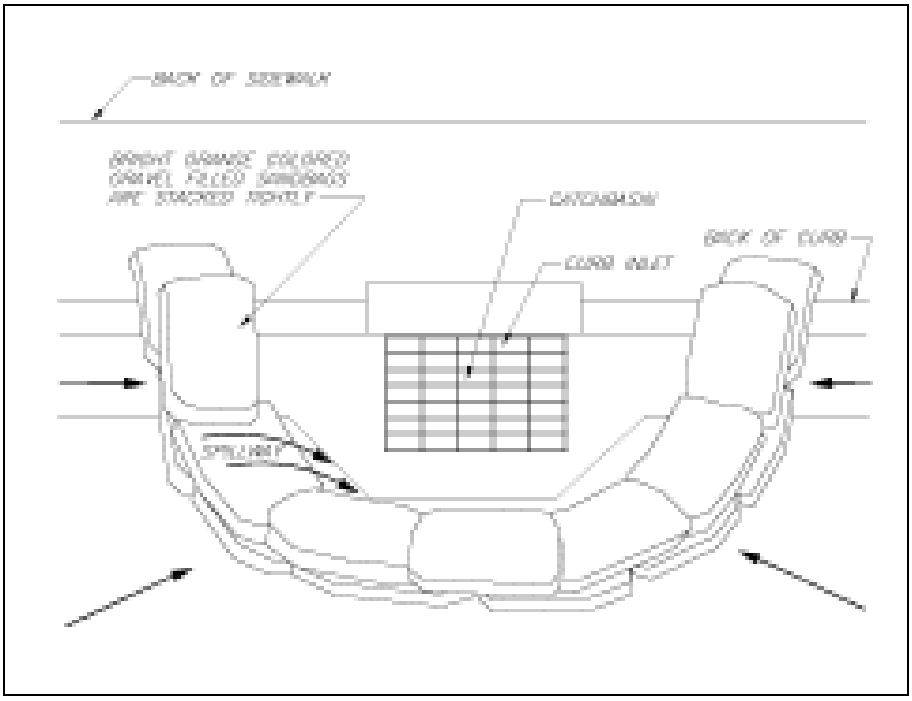


Figure 21A: Curb Inlet Protection

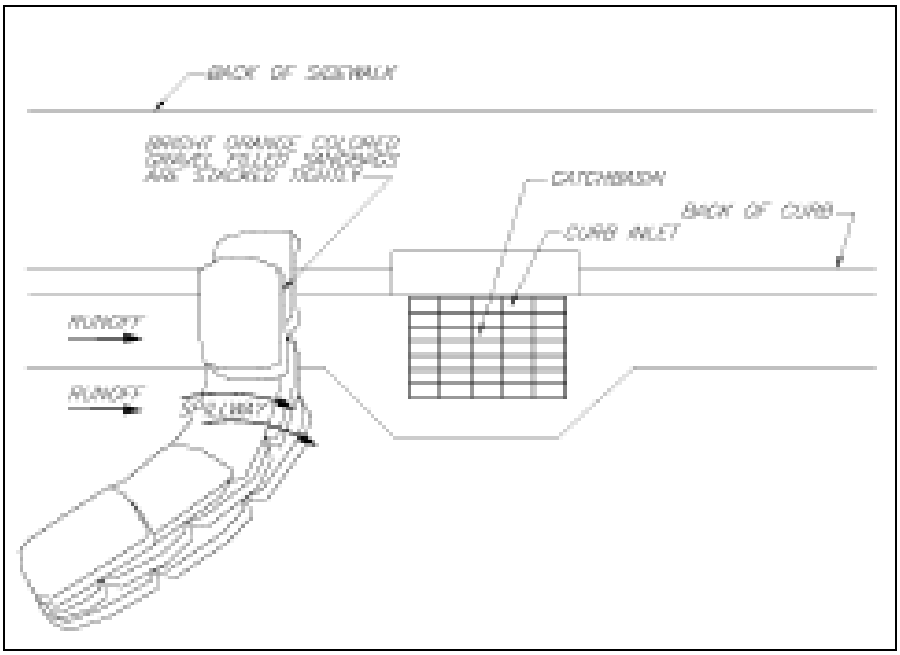


Figure 22A: Curb Inlet Protection

Wattles

Wattles are used to control soil erosion and to filter surface runoff leaving a construction site. Wattles are manufactured from fibers such as straw and coconut. They are typically bound into eight- or nine-inch diameter tubes that are seven to twenty-five feet long. The binding is biodegradable plastic netting allowing the whole structure to decompose over time. See Figure 23A for an illustration of this temporary BMP.

Selection

Wattles are placed in shallow trenches perpendicular to newly constructed or disturbed slopes. They are useful to break up slope length and thus reduce the potential for erosion on slopes susceptible to sheet and rill erosion.

The use of wattles treated with chemical coagulants or flocculants must be stated in the SWPPP and the location shown on the site plan. Treated wattles will not be allowed near storm drain inlets and at project site stormwater discharge points.

Implementation

Trenches should be deep enough to accommodate half the diameter of the wattle. Wattles must be staked a minimum of every four feet but may require more staking in order to hold them tightly to the soil. Stakes should extend twelve inches into undisturbed soil. Wattles can be left in place to biodegrade. This is a particularly appealing option when live willow stakes have been used in place of rebar or wood stakes. The wattle will hold moisture to help the willow get established, and then will slowly decompose as the plant grows. Wattles can be used in place of silt fences on steep slopes.

Maintenance

Wattles should be inspected once per week on active construction sites, and every two weeks on inactive sites. In addition to this regular inspection routine, inspections should be made after any rainfall event greater than half an inch. Wattles that are no longer in contact with the soil should be restaked. If a wattle becomes too sediment laden to filter runoff then it should be replaced.

- Check that the wattle is properly staked and is in tight contact with the soil surface beneath.
- After significant rainstorms, check for erosion and undermining.
- Check that wattles are securely fastened together.

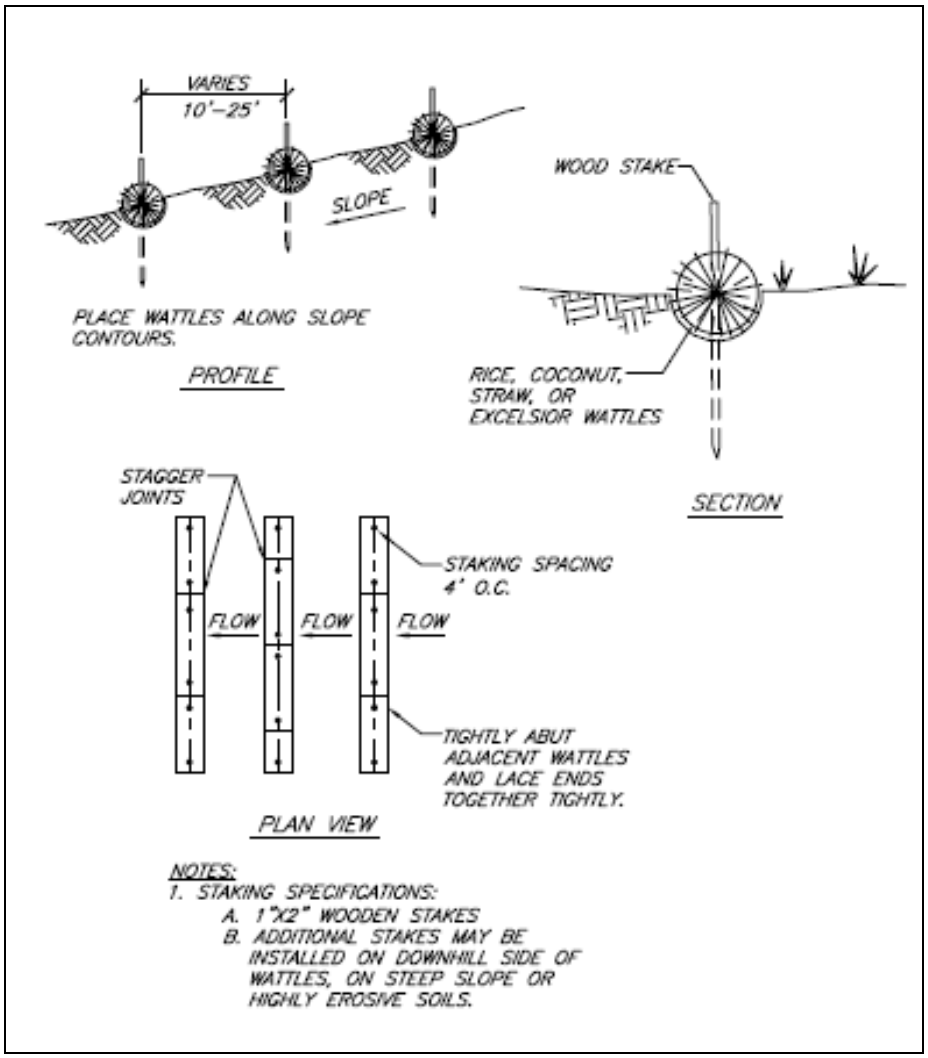


Figure 23A: Wattles

Interceptor Ditch

Interceptor ditches can either be temporary or permanent, and are used to capture runoff on the project site and route it to treatment or discharge facilities. A representative interceptor ditch is shown in Figure 10A.

Selection

Interceptor ditches are applicable for use on projects that have the available land and grades necessary for the ditch installation.

Implementation

The interceptor ditch should be constructed in a manner that results in longitudinal slopes of six percent or less, and side slopes of 2H:1V or less. The ditch should be constructed with a nonerodible covering such as grass or stones.

Maintenance

Any eroded areas should be repaired. Cleaning of the ditch is required when it becomes half full of sediment.

- Check for erosion in the ditch.
- Look for sediment filling the ditch.
- Verify that the ditch is capturing runoff and sediment on-site.

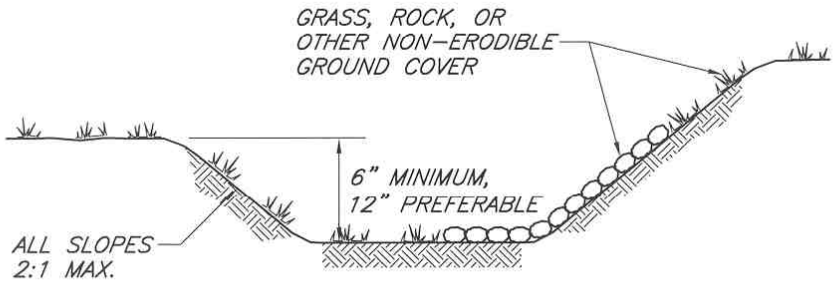


Figure 10A: Interceptor Ditch

Temporary Diversion Dike

A temporary diversion dike is a channel constructed across a slope with an excavated ditch, a compacted berm, or both in combination. Most diversions are constructed by excavating a ditch and using the excavated material to construct a berm on the downhill side. Diversion dikes may be either temporary or permanent. This BMP is illustrated in Figure 11A.

Selection

Use of a temporary diversion dike works well on sites where storm water runoff can be redirected to protect areas from erosion and sediment. Temporary diversion dikes are used to temporarily divert storm water runoff to protect disturbed areas and slopes, or to retain sediment on-site during construction. This measure should be used in construction areas where runoff can be diverted and disposed of properly to control erosion, sedimentation, or flood damage. Berms to intercept and divert runoff should not be used where the drainage area exceeds 10 acres. Diversion dikes should be carefully designed where ditch slopes are steeper than 10 percent.

Implementation

Temporary diversion dikes should be designed so that the runoff velocities are high enough to create self-cleaning flows so that sediment deposition in the channel is minimized. Compact the berm to prevent unequal settlement and to provide stability against seepage. Stabilize the diversion after installation.

Maintenance

Temporary diversion dikes should be inspected periodically for erosion damage, especially after heavy rainfall. Sediment should immediately be removed from the flow area. Outlet areas should be checked, and timely repairs should be made as needed.

- Look for flow impediments in the channel.
- Check for erosion at the outfall.
- Remove trash accumulations.
- Check for sediment accumulations; remove when deeper than 2 inches.

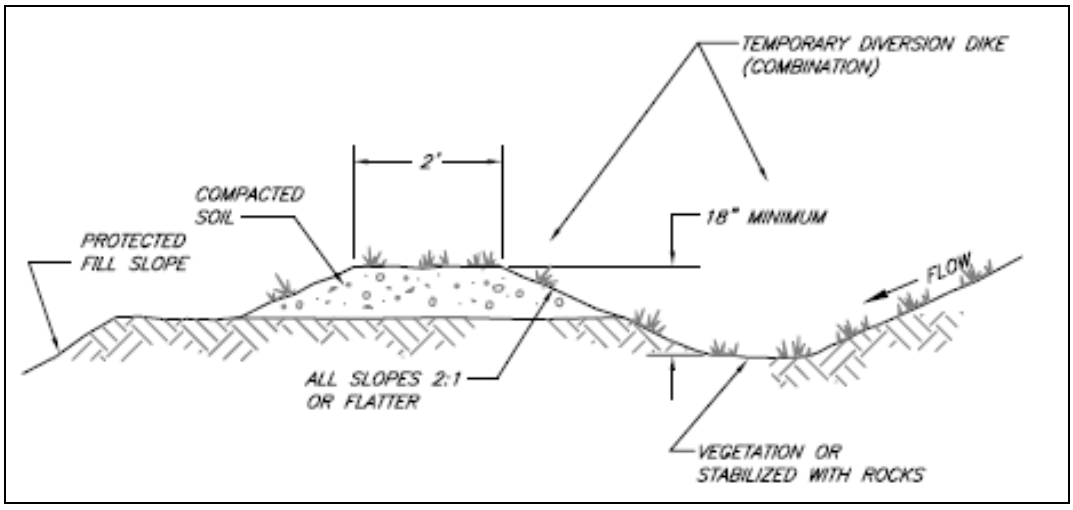


Figure 11A: Temporary Diversion Dike

Down Drains

Down drains, also called slope drains, are applicable wherever concentrated storm water runoff must be conveyed down a steep slope to avoid erosion of the slope. Typically, down drains are used to convey storm water collected in diversion dikes and benching for discharge at the bottom of steep slopes. Down drains may be either temporary or permanent. See Figure 12A.

Selection

Long uninterrupted slopes are ideal for down drains. Contributing flow drainage area should not exceed five acres per down drain.

Implementation

The design information in the project plans and specifications should be followed. Provide both inlet and outlet protection to minimize erosion at these locations. The down drain must be adequately secured, all connections must be watertight, and the conduit must be securely staked.

Maintenance

After every significant rainfall, the down drain should be inspected and any required repairs made. When the protected area has undergone final stabilization, temporary measures may be removed and materials may be disposed of.

- 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.

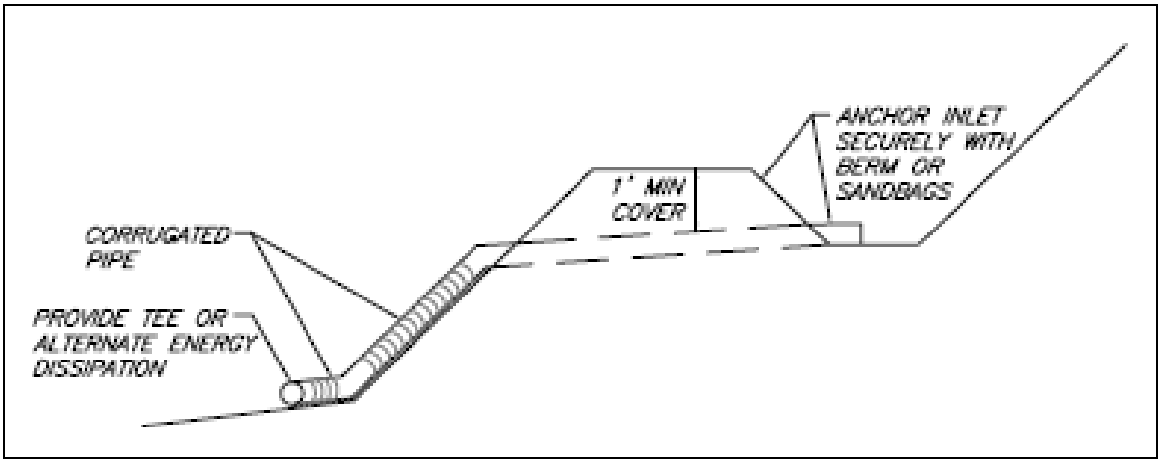


Figure 12A: Down Drain

Gravel Check Dam

Gravel check dams are used to reduce the velocity of the runoff in a ditch as shown in Figure 8A. By reducing the velocity of the runoff, they reduce the potential for ditch erosion. Gravel check dams can be both a temporary or permanent control measure.

Selection

Gravel check dams are appropriate for any ditch where the runoff velocity is no greater than 6 feet per second. Check dams installed in grass lined structures may kill the vegetative lining if siltation is excessive or the dam remains submerged for extended periods of time. Rock check dams are used in narrow ditches and gullies. Straw bales are used primarily in wide swales.

Implementation

Gravel check dams should be constructed from angular rock, sized for the design flow velocity (refer to the MOA Design Criteria Manual Chapter 2). They should be keyed into the surrounding earth to prevent erosion. The check dams should be placed closer together on steeper slopes. The layout of the check dams must be done in a manner that overtopping of the ditch does not occur. Runoff from the contributing drainage area should be evaluated along with expected velocities in order to assure appropriate BMP design.

Maintenance

Cleaning is required if the rocks become half full of sediment. If the earth near the check dam is eroded, the area must be stabilized with rocks or other materials.

- Look for sediment filling the check dam.
- Check to see if the area near the check dam is eroded.
- Look for erosion in the ditch between check dams.
- Check for overtopping of the ditch.
- Repair check dam voids and undercuts.

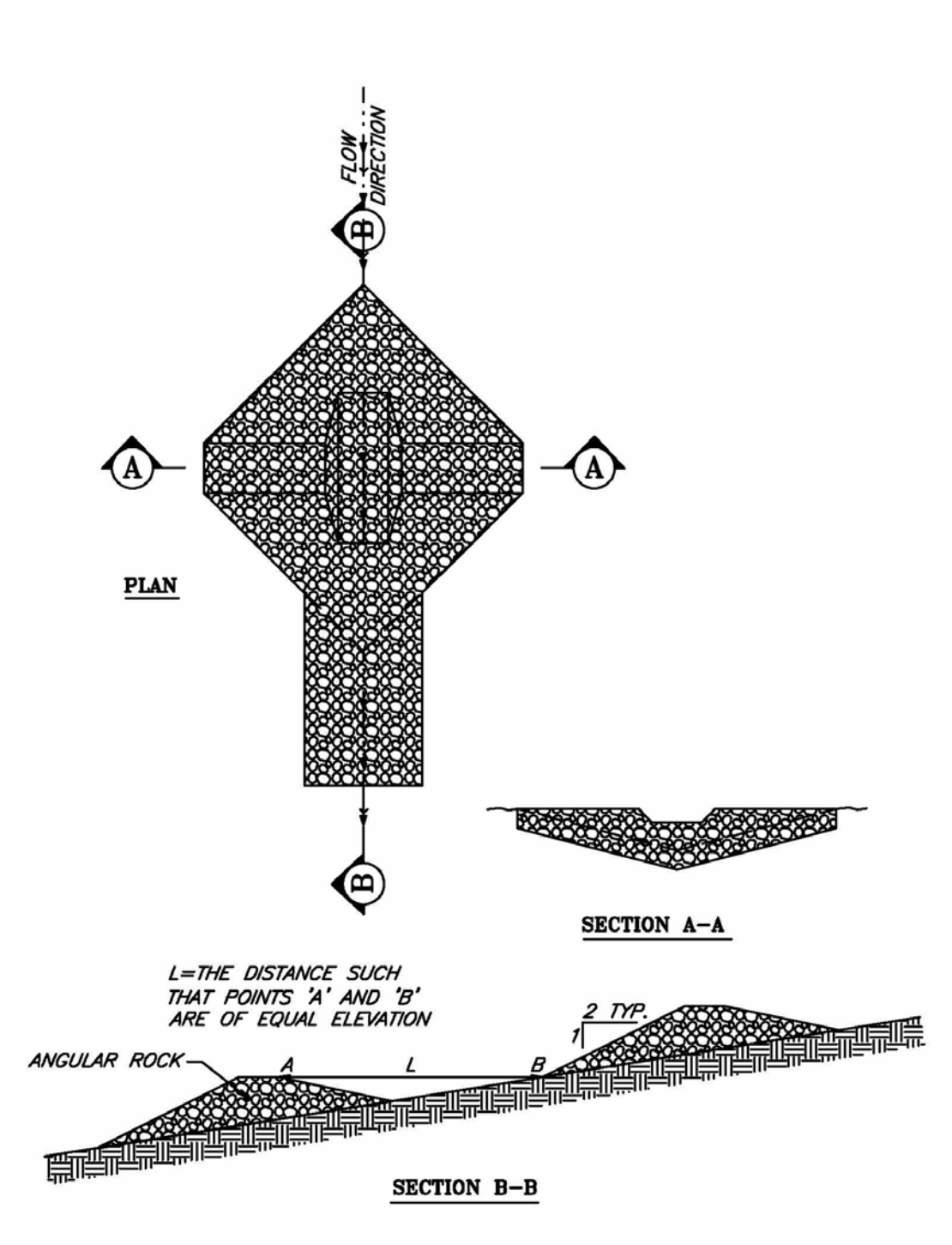


Figure 8A: Gravel Check Dam

Storm Drain Diffuser

Storm drain diffusers are useful in areas where drainage systems do not exist to address concentrated runoff from a site. Figure 29A shows plan and section views of a storm drain diffuser. A storm drain diffuser can function as both a temporary and permanent measure.

Selection

Storm drain diffusers are used when a concentrated flow of water needs to be dispersed over a large area with existing stable vegetation.

Implementation

The outflow must be essentially level to work correctly. Care must be taken to not create a surcharged drainage system or a system that does not drain entirely.

Maintenance

The diffuser should be inspected after every runoff event to ensure that it is functioning correctly.

- Look for and remove trash accumulation in the diffuser.
- Look for and remove sediment accumulation in the diffuser.
- Check for and repair erosion on the diffuser outlet.
- Check the drainage system for blockages and clear any blockage.
- Confirm that the system drains properly before freeze-up.

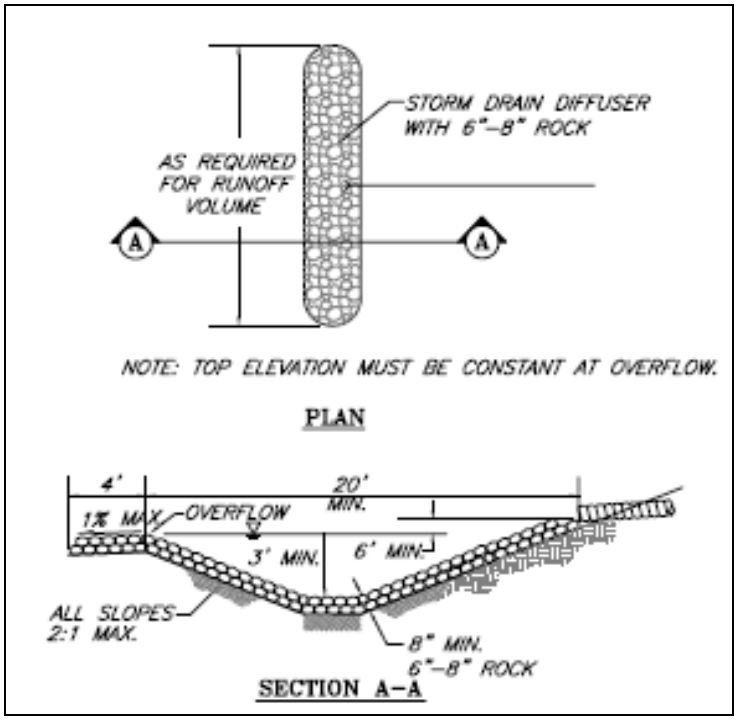


Figure 29A: Storm Drain Diffuser

Outlet Protection

Outlet protection can be either a temporary or permanent control that prevents scour at pipe outlets and reduces the velocity of the concentrated discharge. Guidelines for implementation of outlet protection are shown in Figure 9A.

Selection

Outlet protection is applicable wherever high-velocity discharge must be released on erodible soils. A lined apron is the most commonly used practice for this purpose because of its low cost and ease of installation. Select the gravel or riprap diameter based on the design flow velocity (refer to the MOA Design Criteria Manual Chapter 2). Stilling basins or plunge pools should be considered in lieu of aprons where pipe outlets are perched or where high flows would require excessive apron length.

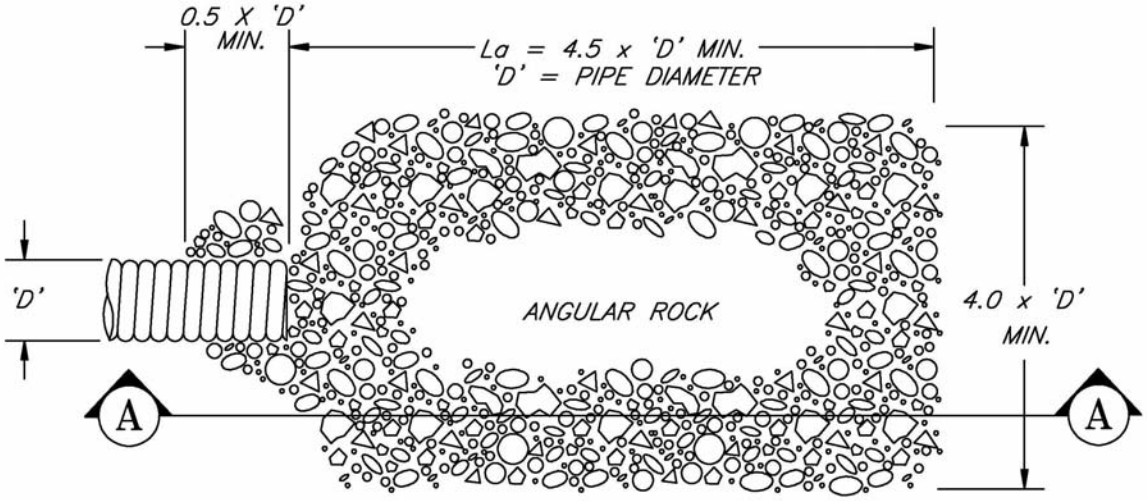
Implementation

The installation must conform to the required lines and grades shown in the plan. All elements of the outlet protection installation should follow the plans and specifications. Designs will vary based on discharge specifics and receiving area conditions.

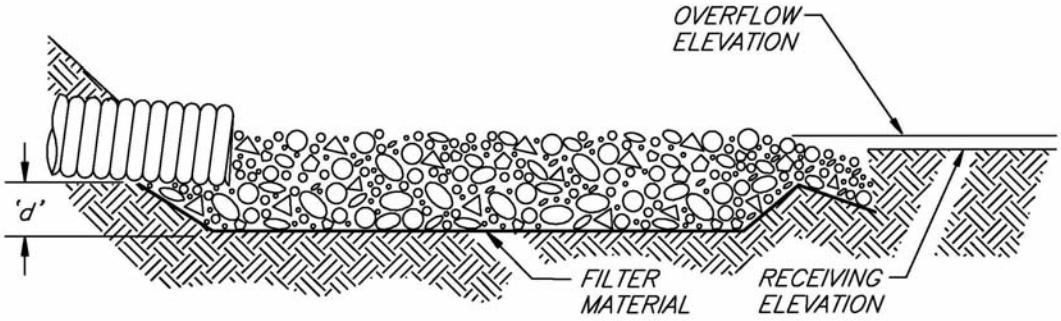
Maintenance

Outlet protection should be inspected after heavy rains to see if any erosion has occurred or if rock has been dislodged. All repairs should be made immediately to prevent further damage.

- Look for and correct erosion at the outlet.
- Check that rocks are in place and replace them as necessary.
- Ensure that any geotextile installed is in working order.
- Remove sediment when it fills the voids between rocks.



PLAN



THICKNESS ('d') = 1.5 x MAX. ROCK DIAMETER – 6" MIN.

SECTION A–A

NOTES:
1. 'La' = LENGTH OF APRON. DISTANCE 'La' SHALL BE OF SUFFICIENT LENGTH TO DISSIPATE ENERGY.
2. APRON SHALL BE SET AT A ZERO GRADE AND ALIGNED STRAIGHT.
3. FILTER MATERIAL SHALL BE FILTER FABRIC OR 6" THICK MINIMUM GRADED GRAVEL LAYER.

Figure 9A: Outlet Protection

Stockpile Topsoil and Reapply to Revegetate Site

Because of the high organic content of topsoil, it cannot be used as fill material or under pavement, and is typically removed. Since topsoil is essential to establish new vegetation, it should be stockpiled and then reapplied to the site for revegetation, if appropriate. Unprotected stockpiles are very prone to erosion and therefore must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles should be stabilized by erosion blankets, seeding, and/or mulching.

Concrete Washout

Concrete waste management includes procedures and practices that minimize or eliminate the discharge of concrete waste materials to the storm drain systems or watercourses.

Selection

Concrete washout facilities should be considered on construction projects where

- Slurries containing Portland cement concrete (PCC) or asphalt concrete (AC) are generated, such as from sawcutting, coring, grinding, grooving, and hydro-concrete demolition
- Concrete trucks and other concrete-coated equipment are washed on site, and
- Mortar-mixing stations exist.

Implementation

- Temporary concrete washout facilities shall be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses,
- Each facility shall be located away from construction traffic or access areas to prevent disturbance or tracking.
- Install a sign adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Plastic lining material shall be a minimum of 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material.
- The soil base shall be prepared free of rocks or other debris that may cause tears or holes in the plastic lining material.
- Temporary washout facilities shall have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.

Maintenance

- Supervise onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Vacuum slurry residue and dispose in a temporary facility and allow slurry to dry. Dispose of dry slurry residue and concrete wastes as solid waste.
- Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 4 inches for above grade facilities and 2 inches for below grade facilities.
- Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete and returning the facilities to a functional condition.
- Existing facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- Temporary concrete washout facilities shall be inspected for damage (i.e. tears in PVC liner, missing sand bags, etc.). Damaged facilities shall be repaired.

Dewatering Controls

Definition and Purpose

Dewatering controls are practices that manage the discharge of pollutants when non-storm water and accumulated precipitation (storm water) must be removed from a work location so that construction work may be accomplished.

Controls are required to ensure that water that is discharged to surface waterbodies or the storm drain system meets water quality standards and does not cause erosion or flooding.

Appropriate Applications

- These practices are implemented for discharges of non-storm water and storm water (accumulated rain water) from construction sites. Non-storm water includes, but is not limited to, groundwater, dewatering of piles, water from cofferdams, water diversions, and water used during construction activities that must be removed from a work area.
- Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (storm water) from depressed areas at a construction site.
- Excavation dewatering options include:
  - Haul it off for proper disposal elsewhere
  - Discharge to sanitary sewer (requires permit from AWWU)
  - Discharge clean water to storm sewer (requires permit from MOA)
  - Discharge to uplands or areas that provide infiltration and no runoff to surface waters
  - Install well points and discharge clean water
  - Provide for settling prior to discharge to storm sewer (requires permit from MOA) or waterbody
  - Provide filtration prior to discharge to storm sewer (requires permit from MOA) or waterbody
- A dewatering plan shall be submitted as part of the SWPPP detailing the location of dewatering activities, equipment, and discharge point. PM&E may require that the planned be stamped by a registered engineer.

Limitations

- Dewatering operations for non-storm water will require, and must comply with, applicable state permits, project-specific permits, and regulations.
- Discharges to surface water must comply with state of Alaska Water Quality Standards, which can be found in 18 Alaska Administrative Code 70.020.
- Coverage under the Alaska Department of Environmental Conservation (ADEC) General Permit for excavation dewatering is required for discharges that don't otherwise have coverage under the EPA NPDES CGP. Written authorization from ADEC for the ADEC permit is required for sites within 1 mile of a contaminated site for discharges greater than 250,000 gallons (over the life of the project). More information can be found at http://www.dec.state.ak.us/water/wwdp/online_permitting/ind_ww_apps.htm
- Site conditions will dictate design and use of dewatering operations.
- Removal efficiency by settling (sedimentation) depends on particle size, flow rate, water temperature, and other factors. This may not be a treatment option if soil particles are fine. Consult the Design Criteria Manual for additional information on design of sedimentation facilities.
- The controls discussed in this best management practice (BMP) address sediment only. If the presence of polluted water with hazardous substances is identified in the contract, the contractor shall contact the ADEC. If the quality of water to be removed by dewatering is not identified as

polluted in the dewatering plan, but is later determined by observation or testing to be polluted, the contractor shall notify PM&E and ADEC.

- Avoid dewatering discharges where possible by using the water for dust control, by infiltration, etc.
- Dewatering discharges must not cause flooding or erosion at the discharge point.
- Dewatering records shall be maintained for a period of 3 years.

Maintenance and Inspection

- Inspect all BMPs implemented to comply with permit requirements frequently and repair or replace to ensure the BMPs function as designed.
- Conduct water quality monitoring pursuant to the "Storm Water Dewatering Operations BMP Discharge Monitoring Forms".
- Accumulated sediment removed during the maintenance of a dewatering device may be incorporated in the project at locations designated in the dewatering plan or disposed of outside the right-of-way in conformance with applicable laws and regulations.
- Accumulated sediment that is commingled with other pollutants must be disposed of in accordance with all applicable laws and regulations.
- Assure that there is no downstream flooding if discharges are made to storm sewers, creeks, or streams.

Summary of Water Quality Standards (see 18 Alaska Administrative code 70.200.)

Maximum Concentrations in Dewatering Effluent

Indicator	**Maximum Concentration or value**
Turbidity	5 nephelometric turbidity units above natural conditions
Total aqueous hydrocarbons	15 microgram/liter
Total aromatic hydrocarbons	10 micrograms/liter
Settleable solids	0.2 milliliters per liter
pH	Between 6.5 and 8.5 pH units
Additives, such as antifreeze or solvents	None in detectable amounts
Toxic substances	None in detectable amounts
Sheen due to grease and oils	None in detectable amounts
Foam in other than trace amounts	None
Garbage, debris, or other contaminants	None in detectable amounts

Sediment Treatment

A variety of methods can be used to treat water during dewatering. Several devices are presented in this section that provide options to achieve sediment removal. The size of particles present in the sediment and receiving water quality limitations are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate.

Category 1: Constructed Settling Technologies

The devices discussed in this category are to be used exclusively for dewatering operations only. Removal efficiency depends on particle size, flow rate, water temperature, and other factors. This may not be a treatment option if soil particles are fine. Consult the Design Criteria Manual for additional information on design of sedimentation facilities.

Sediment/Desilting Basin

Description:

A desilting basin is a temporary basin with a controlled release structure that is formed by excavation and/or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging.

Appropriate Applications:

Effective for the removal of trash, gravel, sand, and silt and some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary desilting basins must be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap

Description:

A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging.

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets shall be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Category 2: Mobile Settling Technologies

These devices are typical of tanks that can be used for sediment treatment of dewatering operations.

Weir Tank

Description:

A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

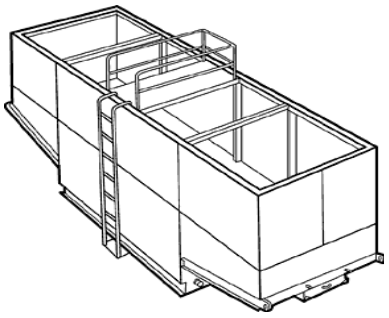
The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors shall be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal must be by licensed waste disposal company.



Weir Tank

Dewatering Tank

Description:

A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors shall be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal must be by licensed waste disposal company.

Dewatering Tanks

Category 3: Basic Filtration Technologies

Gravity Bag Filter

Description:

A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects sand, silt, and fines.

Appropriate Applications:

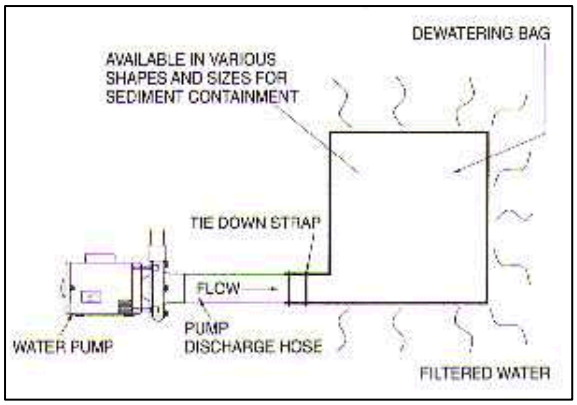
- Effective for the removal of sediments (gravel, sand, and silt). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the bottom and sides of the bag.
- A secondary barrier, such as a rock filter bed or straw/hay bale barrier, is placed beneath and beyond the edges of the bag to capture sediments that escape the bag.
- Assure that the size and mesh openings of the bag are appropriate for site soils and anticipated flow rate.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Dispose of the bag off-site.



Gravity Bag Filter

Category 4: Advanced Filtration Technologies

Sand Media Particulate Filter

Description:

Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed.

Sand Media Particulate Filters

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for standalone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require monthly service to monitor and maintain the sand media.

Pressurized Bag Filter

Description:

A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header, allowing for the discharge of flow in series to an additional treatment unit. Vendors provide pressurized bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential exceeds the manufacturer's recommendation.

Cartridge Filter

Description:

Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with pressurized bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential exceeds the manufacturer's recommendation.

Cartridge Filter

DEWATERING OPERATIONS DISCHARGE MONITORING FORM

GENERAL INFORMATION				
Project Name				
Operator				
Location				
Sampler's Name				
Sampler's Signature				
Date Discharge Began			Date of Sampling	
Size of Pump			Hours of operation	
Time pump started		Time pump shut off		
WATER SAMPLE LOG				
Constituent	**Units**	**Sample Results**		
Turbidity	NTUs			

One sample shall be taken at a point representative of discharge prior to its entering the receiving water. A second sample shall be taken of the receiving water upstream of the discharge point or in the case of receiving waters with low or no flow, prior to discharge at a location representative of the receiving water. Both samples shall be taken during the same day within a reasonable timeframe (i.e., thirty minutes).

DISCHARGE LIMITATION (See Alaska Water Quality Standards in 18 Alaska Administrative Code 70.200)

Constituent	Units	Receiving Water
pH	Standard	between 6.5 and 8.5
Turbidity	NTUs	5 NTU above background

Notes:

Dust Control

Dust control is a temporary BMP that is necessary during dry periods when soil is exposed to wind. This BMP prevents dust from leaving disturbed soil surfaces and falling onto surface waters, which causes sedimentation.

Selection

Dust control is necessary on construction haul routes and disturbed areas.

Implementation

The most common method for dust control is application of water to exposed soil surfaces to reduce the generation of dust, with re-application as needed. Alternate dust control methods include covering and acrylic soil treatments.

Other soil treatments may be acceptable; check with PM&E.

Sweeping

Street sweeping is an effective temporary BMP to prevent construction mud and sediment from entering the storm water collection system.

Selection

All construction sites shall institute sweeping or equivalent measures to ensure that sediment and mud is not tracked onto roadways.

Implementation

- The haul route within a 500-foot radius of the construction exit, or further as required, shall be cleaned from curb to curb thoroughly at the end of each day, and more often as necessary to ensure that sediment and mud is not tracked onto roadways.
- The entire haul route shall be cleaned thoroughly from curb to curb each week.
- Sediment shall be removed from roads by shoveling or pickup sweeping and shall be transported to a controlled sediment disposal area. Street washing will be allowed only after sediment is removed in this manner.
- Street sweeping equipment, such as vacuum trucks, must be equipped with an effective baghouse or other filtering devices. The use of sweeping equipment with air pollution control devices that are in disrepair is prohibited.
- Mechanical devices without filtering equipment may be used only when wet sweeping methods are effectively employed.
- Vacuum sweepers must be used with water.
- The use of leaf blowers and other similar equipment for sweeping is prohibited.
- Manual broom sweeping is allowed
- Reasonable measures must be employed to prevent dust from becoming airborne during any operation where particulate matter is handled, transported or stored.
- Control dust and particulate matter to comply with MOA fugitive emissions standards (AMC 15.35.090).

Maintenance

- Each hour during hauling operations, check to see that sediment and mud are not tracked onto the roadways.

Gravel Construction Exit

The gravel construction exit is used to reduce mud and sediment on a roadway adjacent to a construction site. Figure 13A illustrates this BMP. The gravel acts to remove the excess dirt on dump trucks as they travel across the bumpy surface. Gravel construction exists are a temporary measure used during construction. The effectiveness of this BMP is enhanced when used with a truck wash basin.

Selection

Gravel construction exits are appropriate on all projects where soil is being hauled from the site. Mud on a road can create a safety hazard as well as a sediment problem. If the exit is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This will include street sweeping, an increase in the dimensions of the entrance, or the installation of a truck wash basin.

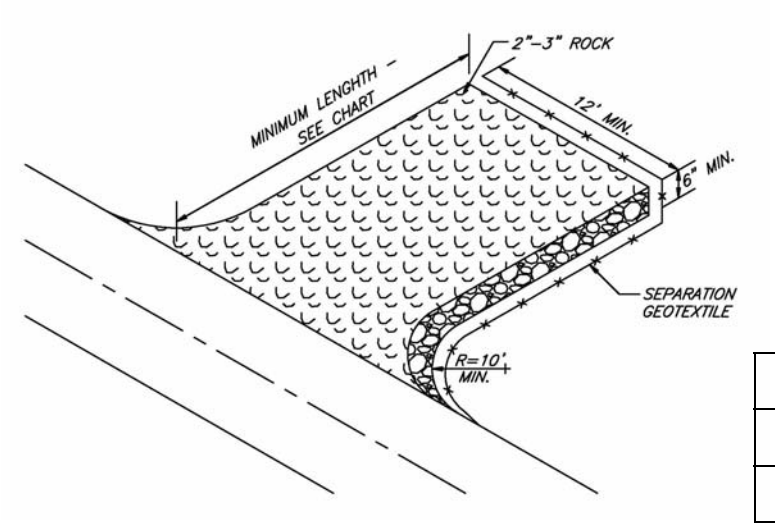
Implementation

The gravel construction exits should be installed at all construction site exits in a manner that minimizes sediment leaving the site. They should not be placed at locations that have steep grades or at curves in public roads where sight distance may be a problem. Rocks should be installed so that a bumpy and rough surface is created.

Maintenance

The gravel construction exit should be cleaned or replaced as needed. Remove all mud and sediment deposited on paved roadways within 24 hours.

- Check for and remove dirt present on roadways adjacent to the site.
- Verify that the dump trucks leaving the site are using the exit.
- Confirm that the surface is rough and bumpy.
- Check for sediment that has accumulated in the rocks. Replace or provide additional gravel as necessary.



Area of Disturbance	Minimum Length
Less than 10,000 square feet	25 feet
10,000 square feet or more	50 feet

Figure 13A: Gravel Construction Exit

Truck Wheel Wash Basin

Truck wheel wash basins are a temporary measure for removing dirt and debris from dump trucks to reduce tracking of sediment onto roadways adjacent to the construction site. An illustration is shown in Figure 14A. The basins are most effective when used in combination with a gravel construction exit.

Selection

Truck wheel wash basins are appropriate on all projects where soil is being hauled from the site.

Implementation

The truck wheel wash basin should be installed at all construction site egress points in a manner that keeps sediments from leaving the site. The rocks should be installed so that a bumpy and rough surface is created. Construction of the truck wash basin should prevent the water from overflowing the basin.

Maintenance

The truck wash basin water should be replaced weekly or more frequently as necessary to clean the trucks. The rocks should be cleaned or replaced as needed.

- Check for dirt present on roadways adjacent to site.
- Verify that dump trucks leaving the site are using the basin.
- Check for and correct water overflowing the basin.
- Check on whether the water needs changing.
- Look for the accumulation of sediment in the rocks and remove or add additional gravel as necessary.
- Confirm that the basin is rough and bumpy.

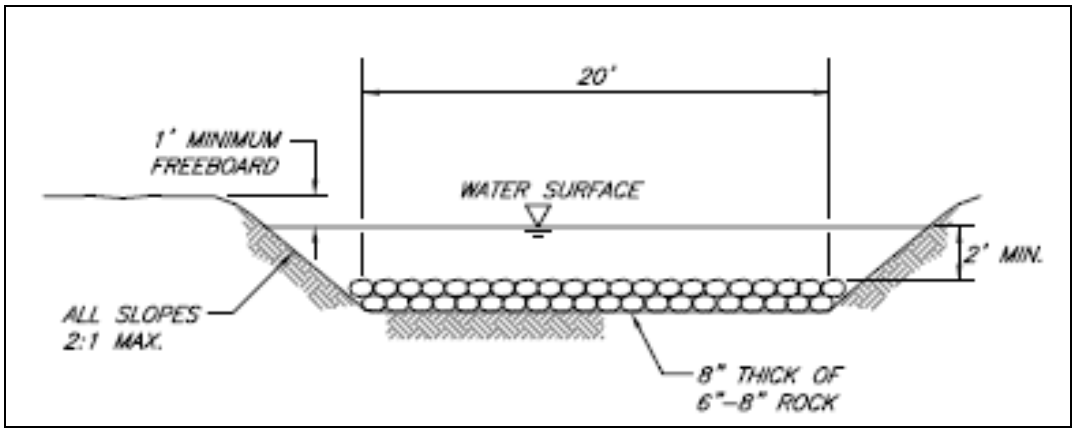


Figure 14A: Truck Wheel Wash Basin

Mud Mats

Mud mats are a temporary measure for providing parking on dirt surfaces to reduce tracking of sediment onto roadways adjacent to the construction site. The mats are most effective when used in on flat slopes with light to moderate traffic.

Selection

Mud mats are appropriate on projects where worker parking is not provided in stabilized areas.

Implementation

Mud mats should be installed at all dirt parking areas in a manner that keeps sediments from leaving the site, either by foot or on vehicle wheels. The mats should be installed so that the entire area that may be used for parking or driving is covered..

Maintenance

The mud mat should be inspected weekly or more frequently as necessary to assure proper coverage and usage. The mats should be cleaned or replaced as needed.

- Check for dirt present on roadways adjacent to site.
- Verify that workers are parking in designated areas.
- Check on whether the mats need changing or sweeping.

Sedimentation Basin

Sedimentation basins are used to remove large quantities of sediment from runoff. The basins can be designed to remove fine-grained sediments such as clays or silts as well as some chemicals through physical, chemical, and biological processes. The basins can also serve a dual function for runoff detention. Figure 28A shows a representative installation of this temporary and permanent BMP. Design criteria for permanent sedimentation basins are available in the MOA DCM.

Selection

Sedimentation basins are generally used on medium- to large-scale projects, and where sediment discharge would damage environmentally sensitive areas such as wetlands or streams.

Implementation

The sedimentation basin should be installed according to the plans and specifications, and if required, the SWPPP. Because the facilities are customized for each project, the approved construction plans provide the best source of information on implementation. The engineer who stamped the plans should be consulted for any clarification. Design temporary sedimentation basins for projects requiring Type 2 or Type 3 SWPPPs based on the 2-year 24-hour rainfall event. Design and calculations for permanent sedimentation basins should follow the guidance in latest edition of the MOA DCM.

Maintenance

Sediment should be removed from the sedimentation basin yearly or when it accumulates to a depth of one foot. More frequent cleanings should occur if sediment impairs the function of the outlet structure. Rocks and washed gravel should be cleaned or replaced when they become filled with sediment. If sloughing or erosion of side slopes occurs, the sedimentation basin should be repaired.

- 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 downstream end.
- Check for accumulations of floating debris.
- Check to ensure that the emergency overflow spillway is not obstructed.

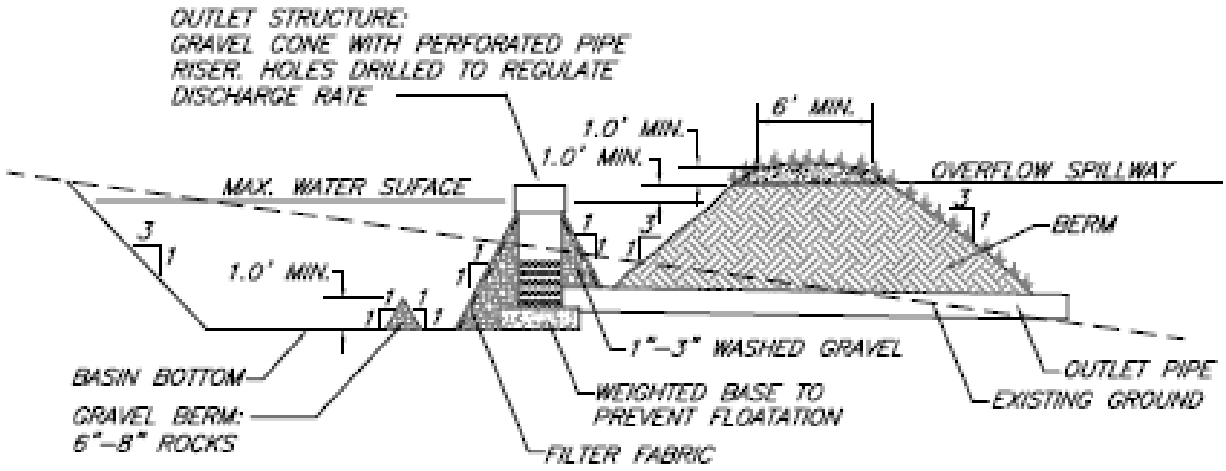


Figure 28A: Sedimentation Basin

Proprietary Oil and Grit Separator

Many proprietary oil grit separators (OGS) are available. Most of the devices remove oil and sediments through plates, baffles, filters, vortices, or a combination of these elements. A sample illustration of this permanent BMP is shown in Figure 25A. Design criteria are available in the MOA DCM.

Selection

The design engineer is responsible for selecting the appropriate device and for the proper sizing. In general, OGS devices are available to handle most applications.

Implementation

The OGS should be installed according to the plans, specifications, and manufacturer's information. The engineer that prepared the design should be consulted if any questions arise or if further information is needed.

Maintenance

OGS devices require frequent cleaning, at least once a month during construction, and at least twice a year thereafter. Depending on the system, cleaning usually involves removal of floating debris, sediments, oils, and in some instances, filter cartridge replacement.

- Check for and remove floating debris in the device.
- Check for and remove accumulations of sediment in the device.
- Check for accumulation of oil in the device; remove and dispose of properly.
- Confirm that the filter replacement schedule is being followed.
- Look for evidence of sediments or oils leaving the device.
- Check screens for evidence of clogging; repair or replace as necessary.
- Check for infiltration or exfiltration in the device.

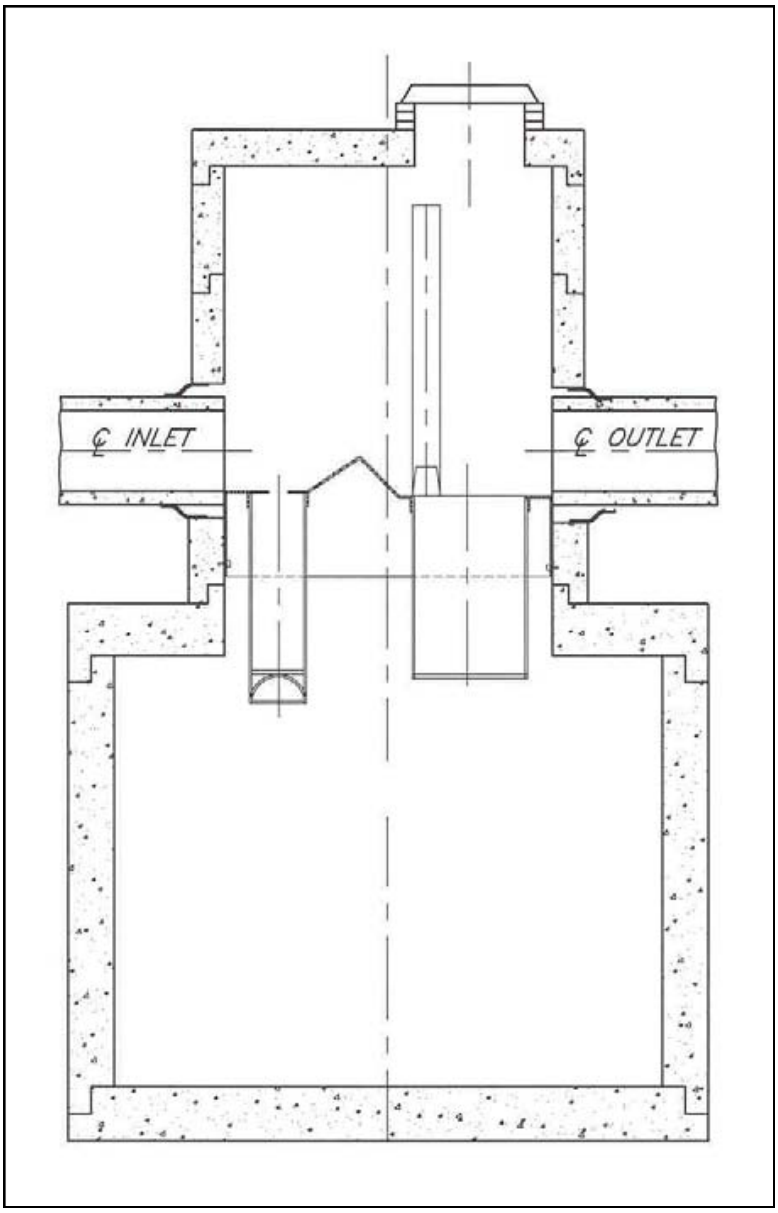


Figure 25A: Proprietary Oil Grit Separator

Vegetated Filter Strip

A vegetated filter strip is highly efficient in reducing sediment transportation from a construction site by providing a barrier to sediment and reducing the runoff velocities of overland flow. Vegetated filter strips are similar to bioswales, except that they are designed to intercept sheet flow and not concentrated flow. Vegetated filter strips are typically a permanent BMP, see Figure 24A. Design criteria are available in the MOA DCM.

Selection

Vegetated filter strips are desirable where the runoff occurs as sheet flow, and the available land for storm water treatment is scarce. Vegetated filter strips generally only trap coarse sediments. Vegetated filter strips shall be a minimum of 15 feet wide.

Implementation

Ideally, vegetated filter strips should use undisturbed native vegetation with soil conditions that allow for infiltration of runoff. Use fencing or flagging to prevent disturbance to the areas used as vegetative filter strips. Do not used planted or seeded ground as a filter strip for sediment trapping until the vegetation is established.

Maintenance

Any areas damaged by erosion or construction activity should be seeded immediately and protected by mulch.

- Look for channelized flow.
- Check for damaged or unhealthy grass.
- Look for accumulation of trash.
- Repair or replace fencing or flagging as necessary.

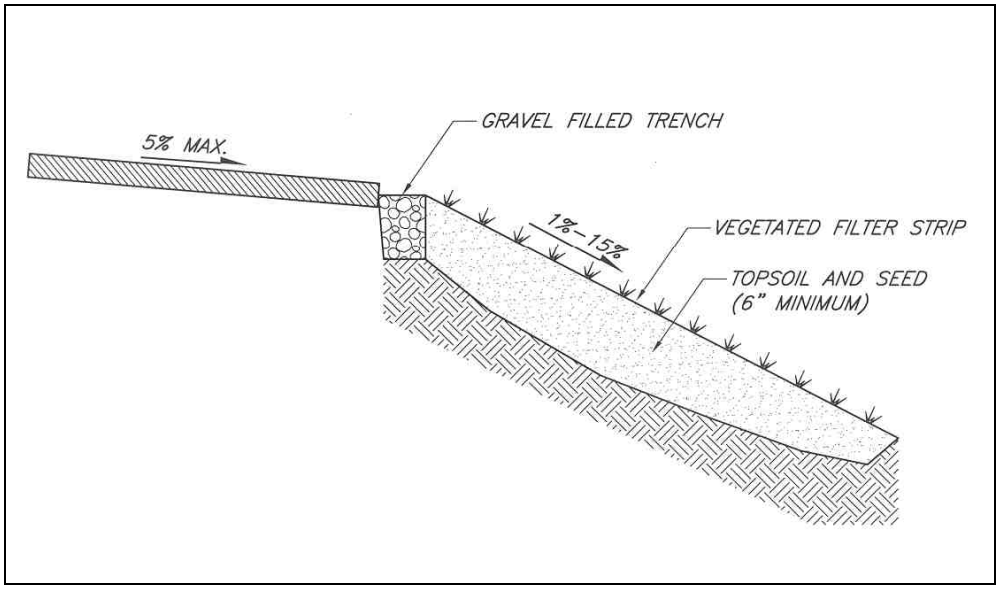


Figure 24A: Vegetated Filter Strip

Bioswale

Bioswales are grass lined ditches that remove sediment through filtration and reduction of runoff velocities. See Figure 26A for an illustration of this temporary or permanent control. Design criteria are available in the MOA DCM.

Selection

The bioswale BMP is appropriate for construction sites where concentrated runoff needs to be handled to prevent erosion or encourage infiltration.

Implementation

A healthy grass cover and moderate ditch slopes are needed, per the MOA DCM.

Maintenance

Bioswales should be repaired and grass re-established as necessary. The bioswale should be checked for scour and repairs should be made immediately. All flow impediments should be removed to maintain the ditch hydraulics. The grass must be maintained in a healthy condition at all times because it is the primary erosion protection for the bioswale. Reinforced turf may be required.

- Look for and remove trash accumulations in the ditch.
- Check for accumulated sediment in the ditch.
- Look for diseased or unhealthy vegetation and repair or correct as necessary.
- Check for and repair signs of erosion.

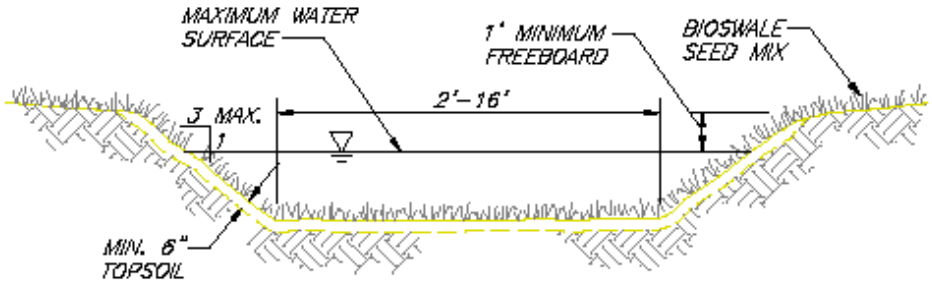


Figure 26A: Bioswale

Rock Swale

Rock swales are used to reduce water velocities and provide an erosion-resistant channel. See Figure 27A for this temporary or permanent BMP.

Selection

Rock swales are generally used on steeper slopes or in situations where water velocities are anticipated to exceed five feet per second. The contributing flow area shall not exceed 10 acres per swale.

Implementation

The inlet and outlet should have appropriate devices to inhibit erosion. The channel should have the rock placed in a manner that adequately covers the underlying soils. The stone shall be adequately sized to prevent displacement during the design storm. The ditch should be deep enough to convey the water without overtopping. If geotextile is included in the installation, it should be firmly attached with staples and should be keyed into the surrounding earth. Provide both inlet and outlet protection to minimize erosion at these locations.

Maintenance

The inlet, outlet, and channel should be kept free of flow impediments. The channel should be checked for scour and additional rock should be installed if scour has occurred. The rock should be cleaned or replaced if sediment accumulates to one half the height of the rock. If geotextile fabric is included in the installation, it shall be kept in operable condition.

- Look for evidence that the rock swale needs cleaning of flow impediments or sediment.
- Check for erosion of the inlet and outlet.
- Confirm that the inlet and outlet are functioning properly.
- Confirm that the geotextile is anchored.
- Look for geotextile that is torn or frayed.
- Confirm that the stones have not been displaced by the flow.

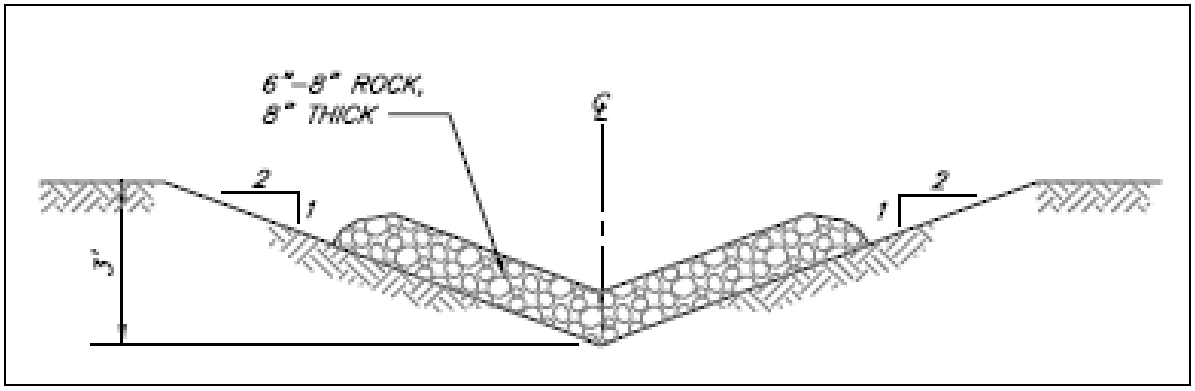


Figure 27A: Rock Swale

Outfall Protection

Outfall protection prevents scour along lines where drainage leaves paved surfaces and enters a swale or ditch system. See Figure 32A for an illustration of this temporary or permanent control measure.

Selection

Outfall protection is applicable wherever high-velocity discharge is released from impervious surfaces to erodible soils.

Implementation

After underlying soils are compacted, geotextile should be placed and secured with anchors. Rocks should be placed on fabric following the line and grade to transition from the pavement surface to the ditch invert. The rocks shall be adequately sized to prevent displacement during the design storm.

Maintenance

Outfall protection must be inspected after heavy rains to see if maintenance is required. All repairs should be made immediately to prevent further damage.

- Check for erosion of soil.
- Confirm that rocks are in place.
- Confirm that any geotextile installed is in working order.

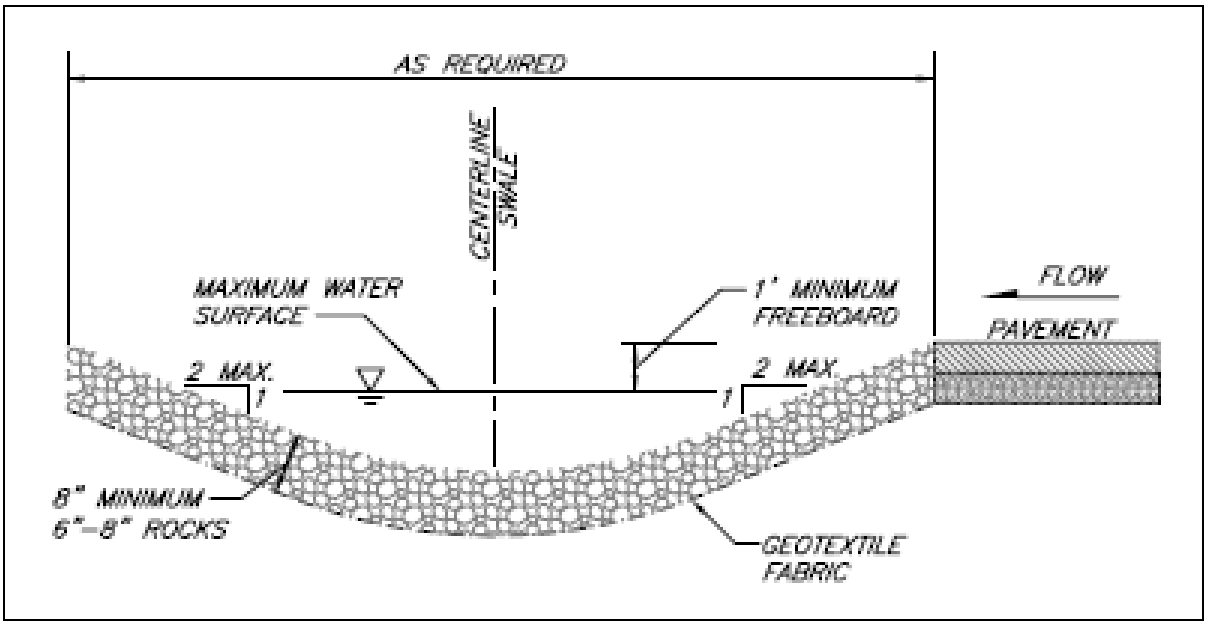


Figure 32A: Outfall Protection

Existing Wetlands

An alternative to constructed wetlands, detention basins or sedimentation basins is to discharge storm water into existing wetlands. The MOA has developed planning level guidance in the document *Anchorage Storm Water Treatment in Wetlands: 2002 Guidance*. It is available on the WMS web page. Discharge of storm water, following treatment for removal of sediment and floatables, can function to rehabilitate wetlands that have been dried out due to urbanization.

Selection

This BMP is an attractive option when longer hydraulic residence times are necessary for pollutant removal and wetlands with adequate capacity are available.

Implementation

- Install pretreatment to remove sediment.
- Use flow dissipators to reduce channelization.

Maintenance

Existing wetlands normally do not need maintenance other than cleaning of accumulated debris and trash. These systems are typically self-cleaning.

- Make sure the wetland is free of trash, debris, and litter.
- Make sure the pretreatment facility and outlet structures are operating properly.
- Look for damaged or unhealthy aquatic plants that need replacement. Repair damaged vegetation. Determine the causes, such as chlorides, excessive flow, or other factors, and mitigate them.

Constructed Wetlands

Properly designed constructed wetlands can decrease the frequency and severity of flooding while improving water quality by providing decentralized controls, infiltration, and advanced treatment of storm water flows. Constructed wetlands are typically a permanent BMP.

Selection

Once established, constructed wetlands work best when there are available lands and a constant base flow to sustain the wetland. This BMP is an attractive option when longer hydraulic residence times are necessary for pollutant removal.

Implementation

The design and construction of wetlands is a significant undertaking that involves an adequate understanding of hydrology, landscape architecture, geotechnical engineering, groundwater science, and chemistry. Because of these requirements, a team of professionals is needed to properly simulate natural wetlands for storm water treatment.

Maintenance

Constructed wetlands normally do not need maintenance other than cleaning of accumulated debris and trash. These systems are typically self-cleaning.

- Make sure the wetland is free of trash, debris, and litter.
- Make sure the inlet and outlet structures are operating properly.
- Check for beaver and muskrat dams.
- Look for damaged or unhealthy aquatic plants that need replacement.

Preservation of Natural Drainage Systems

Preservation of natural drainage systems is a permanent procedural BMP that can significantly reduce stream bank erosion.

Selection

Preserving the natural drainage system works on any site that has existing drainage courses on or adjacent to the site. Natural channels reach a steady state in which sediment transport and deposition are balanced. Generally minimal increases in flow rates or duration can be accommodated in the natural system without upsetting the natural balance. However, major increases in flow are best accommodated by using alternative disposal methods.

Implementation

To use a natural drainage system, a thorough downstream analysis must be undertaken to ensure adverse affects do not occur to the system. Flow attenuation or energy dissipation devices may be needed at the discharge point. An erosion-resistant connection of the flow path between the new storm drainage system and the natural drainage system is necessary.

Maintenance

The beauty of using a natural drainage system is that it normally does not need maintenance other than cleaning of accumulated debris and trash. However, structural damage caused by storm events must be repaired as soon as possible to prevent further erosion of the stream bank.

- Look for erosion, undercutting, and channel instability.
- Make sure the drainage path is free of trash, debris, and litter.

Preservation of Natural Vegetation and Buffer Zones

A buffer zone is an undisturbed area of natural vegetation or other established plantings that will reduce soil erosion that is a result of runoff from uphill and reduce runoff velocity and capture sediment by providing a living filter. Natural vegetation should be preserved wherever practicable, but definitely on steep slopes and adjacent to perennial and intermittent drainages system inlets, water courses, swales, creeks, lakes, and wetlands.

Selection

Preserving natural vegetation is principally a component of the project site planning; however, preservation requires special attention during construction. Construction equipment can cause plant injury both above and below the ground. Damage results from scarring and cutting of roots and with compaction of soil.

Preserving natural vegetation can be part of scheduling and project phasing.

Implementation

- See the Flagging and Fencing BMP for specific implementation requirements.
- Retain a minimum of 50-foot wide vegetation buffer zones on each side of wetlands, creeks, lakes, drainage systems, or other waterway, with increases subject to other onsite sensitive conditions, existing vegetative conditions, and erosion hazard potential. Where the slope is less than 4:1, the buffer may be reduced to 25 feet wide.
- Uphill of the are where vegetation is to be preserved, implant erosion and sediment control measures prior to clearing or other land disturbing activities.
- Avoid disturbing the ground at least as far out as a tree's dripline.
- Minimize raising or lowering the natural ground level. Since most tree and shrub plant roots are n the upper foot of the soil, cuts and fills of only 2 to 3 inches can cause serious injury. To protect roots, terrace the immediate area around the plant to be saved.

Maintenance

- Inspect the area frequently to ensure that flagging remains in place, that no disturbance has occurred to the preserved vegetation, and that uphill control measures prevent concentrated runoff from entering the preserved area.
- If tree roots have been exposed or injured, recover or reseal them..

LID: Reduced-Lot-Grading

During the grading portion of the development process, the land is generally sloped away from each home in an effort to move storm water runoff away from the foundation. Typically this slope is 2%. This slope is necessary to protect the foundation of a structure. However, this slope is often extended from the foundation all the way to the property boundaries. The effect is that storm water is not given an ample opportunity to infiltrate into the soil. The Reduced Lot Grading approach uses the 2% grade from the edge of the building to a distance of 20 feet in order to protect the foundation. The remaining lot area is sloped to drain away from the home at lesser grades ranging from 0.5% to 1.5%. This grading scheme will still direct storm water away from the foundation, but will also slow runoff and encourage infiltration.

Selection

New residential development on relatively flat land within the MOA is well suited for the application of reduced-lot-grading.

Implementation

Reduced-lot-grading is only applicable in areas that are relatively flat prior to development. Reduced-lot-grading is not effective if the soil on a site has been compacted due to the use of heavy equipment. It is best to keep the use of heavy equipment limited to paved surfaces. If compaction cannot be avoided, tilling or scarification of the soil to a depth of 12 to 24 inches prior to laying sod will restore the infiltration capacity of the compacted soil.

Maintenance

Reduced lot grading requires no long-term maintenance.

LID: Reinforced-Turf-Driveways

Reinforced-turf-driveways (also called turf pavers) retain the weight bearing capacity necessary for a driveway but allow infiltration and plant growth, thus reducing the amount of impervious surface in the new development. The structures consist of modular paving blocks, or cast-in-place concrete grids, and are commonly referred to as “turf pavers.” Rather than be planted with turf, the voids in turf pavers can alternately be filled with sand or small gravel to provide the infiltration benefit and reduce the amount of maintenance required to keep healthy turf. There are several turf pavers available on the commercial market.

Selection

Urban and suburban driveways make excellent candidates for the use of turf pavers. The pavers can make up the entire driveway or only be placed in light use areas within the driveway, such as the area of the driveway straddled by automobiles entering and exiting.

Implementation

The usefulness of turf pavers is limited to areas where soils are permeable. Subbase depth for turf pavers depends on application and existing soils. For driveway application, a subbase of 8 to 12 inches is recommended. Manufacturers of turf pavers generally provide recommendations for subbase depth with their products. Turf pavers should be installed per the manufacturer’s specifications. Once installed, the voids in the turf pavers can be prepared for seeding.

Maintenance

Turf pavers require maintenance similar to lawn maintenance. Care must be taken in winter months not to damage plant life or the pavers during snow removal.

Rain Gardens

Rain gardens are one of the most popular and rewarding LID BMPs. A rain garden is simply a small, vegetated depression that is planted with shrubs, grasses, and flowering perennials for the purpose of promoting storm water infiltration. See Figure 33A for an illustration of this LID element. Design guidelines are available on the MOA WMS website. For residential applications, see http://www.anchorageraingardens.com/). For commercial applications, see http://www.muni.org/Departments/project_management/Publications/LID_Design_Guidance_1208.pdf.

Selection

Rain gardens can be planted almost anywhere in a residential setting. For larger scale applications, amended soils and an overflow are typically used.

Implementation

Rain gardens are easily excavated and planted in an afternoon. They can be placed to collect and absorb rooftop, driveway, or sidewalk runoff. Native plants that can withstand periods of inundation and the climate in Anchorage should be used. Local greenhouses are a good source of information on plant selection.

Maintenance

To insure that a rain garden remains functional and attractive it must be tended to regularly. Weeds must be pulled and some plants may need to be replaced in the spring.

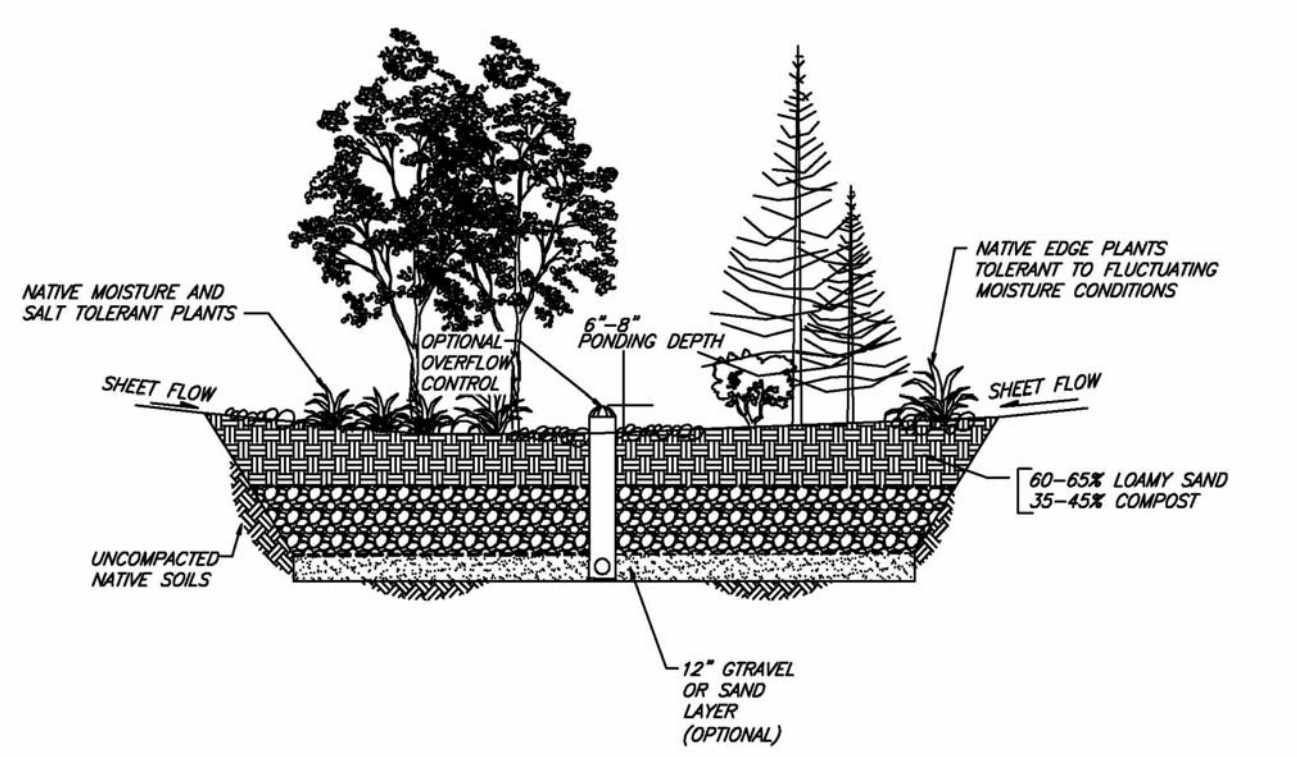


Figure 33A: Rain Garden

Minimum Disturbance/Minimum Maintenance and Cluster Development:

Only those areas essential for completing construction activities should be cleared, and other areas should remain undisturbed. Avoid disturbing vegetation on steep slopes or other critical areas. Landscapes that demand significant amounts of chemical treatment should be avoided; thereby minimizing nonpoint source impacts associated with the application of fertilizers, pesticides, and herbicides that result from a new land development.

Parking Lot Management

Snow from streets and parking facilities contains many pollutants, with trash being the most visible of these materials. However, unseen pollutants from vehicles such as lead, zinc, copper, and petroleum products may also be present. In addition, the snow contains sand and salt used on streets and parking lots during the winter. Chloride levels in runoff rise sharply during periods of melting and taper off after a few weeks of warm weather. Because chloride and other pollutants can be present at high levels during breakup, the discharges from snow storage facilities and parking lot snow piles have a high potential to impact local water quality. Below are some general guidelines for storing and managing snow on parking lots and general parking lot maintenance. See also

- The *Anchorage Parking Lots: 2002 Best Management Practices Guidance [http://wms.geonorth.com/library/Documents/Reports/BMP_Guidance/02_Pkglot_doc.pdf]* provides design and maintenance information to reduce impacts of snowmelt runoff, and control pollutants from sand and deicers used for traction and ice control.
- *Private Snow Disposal Sites (On-Site Snow Storage Only) [http://wms.geonorth.com/library/Documents/Reports/BMP_Guidance/PrivtSnoBMPs.pdf]* provides information for management of on-site snow storage areas associated with parking lots.

Selection

- Avoid placing snow piles on slopes where runoff will be difficult to control.
- Never pile snow on, in to, or next to lakes, streams, or wells.
- If possible, pile snow on a grassy surface.

Implementation

- Place snow at a low point on site allowing the meltwater to pond in order to keep runoff contained and easier to control.
- Stack snow high in a single pile rather than in multiple piles around the site. The snow will melt more slowly and allow storm drains to drain properly.
- Use large or coarse grained material for sanding, since it is less likely to be transported off site.
- If salting is necessary, use magnesium chloride instead of sodium chloride. Magnesium chloride is better for the environment and is less abrasive to pavement.
- If using salt, apply it lightly just before it snows or after plowing.

Maintenance

- Before breakup, check that erosion problems will not occur when runoff begins.
- As the snow pile melts, remove garbage that becomes exposed.
- Sweeping
  - Sweeping equipment, such as vacuum trucks, must be equipped with an effective baghouse or other filtering device.
  - Mechanical devices without filtering equipment may be used only when wet sweeping methods are effectively employed.
  - The use of leaf blowers and other similar equipment for sweeping is prohibited.
  - Manual broom sweeping is allowed
  - At a minimum, sweep once before May 15 or as snowmelt conditions permit to remove winter sand and once between August 15 and October 15, with the last sweep as close to the first snowfall as can be predicted. This last sweep will reduce the amount of sediment available for runoff in the following spring breakup. More frequent sweeping, including a second pass following breakup (before May 15) and another before the August rains (between June 15 and August 15) are recommended for lots that have high usage or high particulate buildup.
  - Control dust and particulate matter to comply with MOA fugitive emissions standards (AMC 15.35.090).

Snow Storage Facility Operations

Following the requirements of AMC 21 and the desire to protect water quality, the establishment of a new storage facility must follow the MOA DCM.

Selection

Consider and design for the effects of:

- Noise impacts;
- Drainage and water quality plan, and analysis of the effects of the snow storage facility upon water quality;
- Site plan;
- Volume and height of snow;
- Snow collection area;
- Snow storage facility illumination methods;
- Traffic access and haul routes;
- Lot size and coverage;
- Yard requirements;
- Visual buffering;
- Landscaping and maintenance;
- Parking;
- Signage; and
- Security and public safety measures.

Specific guidelines for planning a commercial snow disposal site include:

- A holding pond shall be provided to manage the flow rate and water quality of meltwater.
- The site should be as flat as possible with allowances for grading to maintain drainage to the holding pond.
- Armored channels and perimeter berms are to encircle the disposal area with an allowance for truck access.

Implementation

- Snow is to be disposed of in a single pile with side slopes as steep as possible.
- Street sweepings are not to be stored or disposed of on the snow pad.
- Garbage is to be periodically removed from the site during spring melt periods.
- The site shall not be disturbed during spring breakup and shall be allowed to revegetate during summer.

Maintenance

- Prepare and implement a dust and litter control plan
- Identify and train individuals responsible for noise, litter, and dust control
- Prepare and implement a revegetation plan for areas where vegetation damage or die-off occurs

Vehicle and Equipment Washing

Commercial car washes have interior wash water recirculation systems and are connected to the sanitary sewer system. Most facilities have exterior wash water collection systems as well. These systems are designed to reduce the amount of oil and grease, suspended solids, heavy metals, soluble organics, soaps, and detergents that are exposed to storm water. Conversely, non-commercial or uncontrolled car and equipment washing activities direct wash water, along with the associated pollutants, to the ground, then to the storm sewer system, and eventually to surface waters. Vehicles, construction equipment, aircraft, vessels, restaurant equipment, carpet cleaning equipment, industrial equipment, and large buildings may be cleaned with the following proper measures in place to protect the environment from contaminated storm water discharges.

- In order to keep storm water separated from pollutant sources, washing activities should ideally occur in an enclosure and drain to a sump or the sanitary sewer, or should occur in a building that drains to a sanitary sewer. Contaminated wash water must be routed to a sanitary sewer (which requires permission from AWWU), temporarily stored before being properly disposed of, or recycled with no discharge to the ground, a storm drain, or surface water.
- To conduct uncovered outside washing operations, a designated paved wash area that has containment must be provided to prevent storm water from running through the site or the fugitive discharge of wash water. The area must convey the wash water to a sanitary sewer or sump for collection and disposal.
- Phosphate-free biodegradable detergents should be used whenever possible.
- At non-commercial car washes where it is not possible to discharge the wash water to a sanitary sewer, a temporary plug or sump can be used at the storm drain to collect wash water for off-site disposal; a vegetative buffer can be used to infiltrate wash water; the washing could occur within a portable spill containment liner; or the vehicles can be rinsed without soaps or detergents of any kind.
- The wash water from building washing operations should be collected for treatment or routed to a sanitary sewer system if it contains oils, soaps, or detergents. Clean wash waters are allowed to drain into soils that have sufficient infiltrative capacity.

Liquid Storage

When working with aboveground tanks containing liquids, leaks and spills can occur at connection points and during liquid transfer. Liquid materials spread rapidly when spilled. These liquids mobilize during storms or cleaning operations, and gain entry into the storm drain system and pollute storm water discharges. Protection devices must address potential spills of liquid materials for storm water pollution prevention.

By providing preventative controls for accidental discharge of liquids, costly recovery and clean up operations are avoided. Similar to erosion and sediment controls, the more effort to reduce the entry of liquid pollutants into storm water discharges, the less effort will be needed to remove liquid pollutants from storm water.

Implementation

- A secondary containment system should be installed or a double-walled tank should be used.
- All tanks and containers should be stored in a secure area, which is covered, bermed or diked, and is impervious so that it contains leaks and spills.
- Tanks and containers stored in an area where unauthorized persons may gain access must have locked valves and taps.
- Protective guard posts should be provided around tanks to protect against vehicle or forklift damage.
- Containment tanks must be inspected regularly to check components such as fittings, pipe connections, and valves. Inspection should identify leaks, spills, cracks, and corrosion. Containment tanks that are leaking, corroded, or otherwise deteriorating must be replaced or repaired.
- All paved tank storage areas should be swept and cleaned regularly to keep pollutants out of storm water.
- Place identification tags on valves to reduce human error.
- Drip pans should be placed beneath all operational spigots, and potential drip or spill locations during liquid transfers.

Operations and Maintenance

Storm water in containment areas may need to be collected for treatment or be discharged to the sanitary sewer if it is not clean.

For storm water in a containment area with a sump, the sump can be discharged to a sanitary sewer with permission of AWWU. The sump outlet should be equipped with tag-out and lock-out valves to prevent the accidental release of spilled or leaked liquids. The valve should be opened only during disposal and cleaning operations. Another option for discharge of contaminated storm water is to pump it to a tank truck for off-site treatment and disposal.

Materials Handling

Proper materials handling keeps sites clean and orderly. A significant amount of debris can accumulate at uncovered loading and unloading areas. These areas may contain raw materials, intermediate products, waste materials, and scrap metals that must be kept out of storm water discharges. If a site operator keeps the facility clean and orderly, the potential for storm water to mobilize debris, trash, scraps, and by-products is reduced. Any reduction in pollutant sources is desirable.

Selection

Source controls are more cost-effective than treatment methods. Some source controls are outlined below:

- Uncovered materials storage and loading / unloading areas should be swept frequently to remove materials that can be transported by storm water; and
- The loading and unloading areas should be covered and contained where necessary to prevent contamination of storm water running through the area.

Implementation

- Prepare and maintain a clean up contingency plan for the facility to ensure the immediate clean up of material spillage in the work area when a significant spill occurs, or no later than the end of the working day for minor spills.
- Employees, especially forklift operators, should be trained in plan execution, and the plan should be readily available to all employees.
- Materials used for clean up should be stored on the site, and employees should be trained in material containment and clean up.

Appendix B

MOA Handout AG.21
Stormwater Treatment Plan Review

Municipality of Anchorage

Handout AG.21

Storm Water Treatment Plan Review for New and Redevelopment Projects

Procedures

1. Review the Municipality of Anchorage's Storm Water Treatment Plan Review requirements presented, in part, in this handout and in the *Storm Water Treatment Plan Review Guidance Manual* available on the Municipality's website in the Watershed Management Services section (http://wms.geonorth.com/permit_guidance/PermitGuidance.aspx) or through the Project Management and Engineering Department webpage (http://www.muni.org/Departments/project_management/Pages/StormWaterTreatmentPlanReview.aspx).

2. Identify what plan for temporary controls during construction of your project is required (whether it requires a Type 1, 2, or 3 *Storm Water Pollution Prevention Plan* (SWPPP)) and locate the associated Plan Review Checklist (Checklist #1 or #2) in this packet. Develop a plan for temporary controls using "Best Management Practices" appropriate to your project site. Complete and submit either Checklist #1 or #2 AND Checklist #3.

3. For land-disturbing activities disturbing 1 acre or more, or those that are part of a common plan of development that collectively disturbs 1 acre or more, after preparing the Type 3 SWPPP, send your Notice of Intent (NOI) to the Alaska Department of Environmental Conservation in accordance with their Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit (CGP) requirements. The Municipality requires proof of your compliance with the ADEC permit before your building permit may be issued.

4. For projects that are not either single family residential or duplex, develop a plan for permanent stormwater quality control and prepare the additional information required for plan approval.

5. Submit to the Municipality of Anchorage, Development Services, Building Safety Permitting, two (2) copies of the appropriate signed Stormwater Site Plan Review Checklist (#1 or #2), Checklist #3, and, as required, the Storm Water Treatment Plan including documentation, drawings, and specific details with your building permit application, supporting documents, and permit fee. Identify the project name and number, subdivision, lot, block, tract, and parcel numbers on all documents for easy filing and tracking.

6. Type 2 and Type 3 SWPPPs (as applicable) and Permanent Storm Water Quality Control Plans shall be approved before a building or clearing and grading permit may be issued.

7. Prior to ground disturbance, prepare and implement erosion and sediment controls on your construction site and maintain them throughout your project. Keep your SWPPP easily accessible on your project site. BMPs must be implemented and installed prior to disturbing the ground and maintained throughout construction until the site is permanently stabilized.

8. Revisions to plans for permanent storm water controls must be submitted to the Municipal Plan Storm Water Reviewer for plan approval.

Program Information

To prevent new construction sites from becoming additional sources of pollution for Anchorage's water bodies, the Alaska Department of Environmental Conservation (ADEC) established project permitting and plan review requirements to improve and better manage stormwater runoff to conform to state and federal laws and regulations. Authority for plan review by ADEC is vested in 18 AAC 72.600(a). ADEC transferred the plan review responsibilities for all private projects within Municipality of Anchorage jurisdiction to the Municipality of Anchorage on May 10, 1999. The Municipality and ADEC agreed that plan review activities and implementation and enforcement of stormwater runoff controls would be best accomplished at the local government level.

New projects shall be constructed under the requirements of the Municipal Separate Storm Sewer System (MS4) Alaska Pollutant Discharge Elimination System (APDES) Permit No. AKS-052558. Prior to the commencement of any work, Storm Water Treatment Plans shall be submitted to Project Management and Engineering Department, Watershed Management Services, for plan review and approval. Included with this submittal shall be details showing the proposed methods to be used for stormwater control and treatment, as described in the Municipality's "*Storm Water Treatment Plan Review Guidance Manual."*

Control of runoff must be addressed at the construction, post construction, and operational phases. A Storm Water Treatment Plan shall include (1) temporary erosion, sediment, dewatering, and materials management controls to be implemented during construction, and (2) permanent site controls for stormwater quality and the operations and maintenance procedures and responsibilities for those controls. Compliance with stormwater runoff control requirements is demonstrated through the preparation and implementation of a stormwater treatment plan specific to site and development characteristics and which includes the selection, design, and implementation of *"Best Management Practices."*

"Best Management Practices" (BMPs) *are schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control facility site runoff, spills or leaks, sludge or waste disposal, or drainage from raw material storage.*

The following criteria shall be factored into designs for sizing all BMPs.

1. Construction site controls: BMPs for the construction phase shall be designed to handle two-year, 24-hour duration storm without damage to the BMP itself and without any degradation to the water quality of the receiving water body. The two-year 24-hour storm event is defined in the *Municipality of Anchorage Drainage Design Guidelines.*
2. Permanent site controls. As required by Chapter 2 of the *Municipality of Anchorage Design Criteria Manual*, permanent storm drainage water quality improvements, or BMPs, shall be designed to treat the first one-half inch of runoff from each storm and must be able to treat at a rate of 0.005 inches per minute.

Appendix A of the *Storm Water Treatment Plan Review Guidance Manual* has examples of BMPs for temporary and permanent controls.

The Alaska Department of Environmental Conservation's regulations related to the Clean Water Act require that construction projects in Alaska resulting in the disturbance of one or more acres comply with the Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit. These requirements are adopted as Municipal requirements as described in the *Storm Water Treatment Plan Review Guidance Manual*.

The Municipal Stormwater Plan Reviewer can be contacted for more information at (907) 343-8078.

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review

Project Classifications

Review the Development Scenarios in the table below. Scenarios and submittal requirements are described in greater detail in the *Storm Water Treatment Plan Review Guidance Manual.*

1. *Temporary (construction phase) controls:* Determine whether the project will require a Type 1, 2, or 3 Storm Water Pollution Prevention Plan (SWPPP).
2. *Permanent Controls:* As indicated on the Development Scenarios table, the Storm Water Treatment Plan must include permanent stormwater controls if the development is any project other than a single family residence or duplex.

Development Scenarios

	Single Family or Duplex	All other projects [1]
Construction Controls		
If Area of Disturbance is:	Type of SWPPP required	
less than 500 square feet, less than 4 feet in depth, and the project has sufficient buffer [2] and is not part of a common plan of development that disturbs 10,000 square feet or more	No submittal required. Must comply with Type 1 SWPPP standards.	
less than 500 square feet and less than 4 feet in depth and insufficient buffer and is not part of a common plan of development that disturbs 10,000 square feet or more [3]	Type 1	Type 1
500 to 10,000 square feet OR 4 feet or more in depth and is not part of a common plan of development that disturbs 10,000 square feet or more [3]	Type 1	Type 1
10,000 square feet or greater but less than 1 acre and not part of a common plan of development that disturbs one acre or more [3]	Type 2	Type 2
1 acre or greater, or part of a plan of common development that disturbs one or more acres [4]	Type 3	Type 3
Permanent Controls	No	Required

[1] "All other projects" includes, but is not limited to, triplexes and larger multi-housing projects; other commercial developments; road, street, and drainage construction projects; filling and grading, and utility construction.

[2] There is sufficient buffer if the distance between the disturbed area and adjacent creeks or wetlands is the greatest of one of the following:
-- 25 feet if the slope is flatter than 4:1 and 50 feet if the slope is steeper than 4:1
-- The stream setback width required under Anchorage Municipal Code Title 21
-- A distance specifically required by MOA

[3] If a project is part of a common plan of development that collectively disturbs 10,000 square feet up to 1 acre, a Type 2 SWPPP is required. If a project is part of a common plan of development that collectively disturbs 1 acre or more, a Type 3 SWPPP is required.

[4] In addition to submittal of the Storm Water Treatment Plan, these projects must obtain coverage under the APDES General Permit for stormwater discharges from construction activities (the CGP) which can be found at http://www.dec.state.ak.us/water/wnpspc/stormwater/docs/AKR100000CGP.pdf .

Dewatering. Projects planning dewatering activities must include a detailed dewatering plan in the Storm Water Treatment Plan. Projects greater than 500 square feet or 4 feet in depth that do not plan to dewater must have a contingency dewatering plan. Projects that discharge 250,000 gallons or more may require written approval from the Department of Environmental Conservation (ADEC) under its Wastewater General Permit. Projects involving dewatering that will discharge less than 250,000 gallons do not require written approval from ADEC; however effluent from the site must meet State of Alaska water quality standards. More information is provided in the Municipality's *Storm Water Treatment Plan Review Guidance Manual.*

_____, Building Official

Concurrence
PUBLIC WORKS

Revised: July 2010
(Ref. 96-01, 00-03, 02-05; 03-09)

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review
Submittal Requirements for Storm Water Treatment Plan Review

	Type of Activity:		Any new or redevelopment project				
	Land disturbance area or depth and project setting:		Less than 500 sq ft, less than 4 ft in depth, and sufficient buffer [1]	Less 500 sq feet and less than 4 feet in depth but have insufficient buffer [1]	Greater than 4 feet in depth OR 500 sq feet up to 10,000 sq feet	Greater than 10,000 square feet but less than 1 acre	1 acre or greater
	SWTP Element or Submittal Item		**Submittal Required?**				
1	Applicable checklists and signed certification from MOA Handout AG.21		No submittal required [2]	AG.21 checklists #1 and #3	AG.21 checklists #1 and #3	AG.21 checklists #2 and #3	AG.21 checklists #2 and #3
2	Existing and proposed conditions		No	No	No	Yes	Yes
3	Plot Plan or Construction Plan		No	Yes	Yes	Yes	Yes
4	Stormwater Pollution Prevention Plan		Follow AG.21 checklist #1 [3, 4]	Type 1 SWPPP [4, 5]	Type 1 SWPPP [4, 5]	Type 2 SWPPP [4, 6]	Type 3 SWPPP [7]
5	Copy of Notice of Intent for CGP		No [8]	No [8]	No [8]	No [8]	Yes
6	Dewatering Plan		No	Required if pumped discharges will be involved			
7	Permanent Stormwater Quality Control Plan [9]	Single family or duplex	No	No	No	No	No
		All other [10]	No	Yes	Yes	Yes	Yes
8	Permanent Maintenance and Operations Plan	Single family or duplex	No	No	No	No	No
		All other [10]	No	Yes	Yes	Yes	Yes
9	Other information [11]	Single family or duplex	No	No	No	Yes	Yes
		All other [10]	No	Yes	Yes	Yes	Yes
10	As-built drawings [12]	Single family or duplex	No	No	No	No	No
		All other [10]	No	Yes	Yes	Yes	Yes

[1] There is sufficient buffer if the distance between the disturbed area and adjacent creeks or wetlands is the greatest of one of the following:
-- 25 feet if the slope is flatter than 4:1 and 50 feet if the slope is steeper than 4:1
-- The stream setback width required under Anchorage Municipal Code Title 21
-- A distance specifically required by MOA

[2] Submittal is required if project is part of a common plan of development that collectively disturbs 10,000 square feet or more.

[3] Although no submittal is required if project is not part of a common plan of development that collectively disturbs 10,000 square feet or more, operators of these projects must follow the controls specified in Checklist #1 of this handout. These sites are subject to municipal inspection.

[4] See page 3 of this handout for SWPPP requirements for projects that are part of a larger common plan of development.

[5] Type 1 SWPPP – Certify to and follow requirements for erosion and sediment control as shown in AG.21 Checklist #1 (included in Appendix B).

[6] Type 2 SWPPP – Prepare, certify, and implement a SWPPP as described in Section 5 of the Storm Water Treatment Plan Review Guidance Manual,. Generally the SWPPP is prepared in accordance with the APDES General Permit for stormwater discharges from construction activities (CGP) but submittal of an NOI is not required for a Type 2 SWPPP.

[7] Type 3 SWPPP – Prepare, certify and implement a SWPPP in accordance with the CGP. Submit NOI for the CGP to ADEC and a copy to MOA and fulfill permit requirements applicable to the construction project.

[8] Required if the project is part of a common plan of development that collectively disturbs one or more acres

[9] Permanent stormwater controls are discussed in Chapter 7 and Appendix A of the Storm Water Treatment Plan Review Guidance Manual.

[10] "All other" includes, but is not limited to, triplexes and larger multi-housing projects; commercial developments; road, street, and drainage construction projects; filling and grading, and utility construction.

[11] Other information includes a Drainage Plan, if prepared in compliance with Title 21.67, 21.07, and/or the DCM; special reports and studies, such as soils, geotechnical, wetlands, or hydrological reports or analyses; pollution prevention plans applicable to permanent site activities, such as an MSGP SWPPPs or Spill Prevention, Control and Countermeasure (SPCC) plans; and copies of other permits

[12] To be submitted when construction of BMPs and stormwater control facilities is completed

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review
CHECKLIST #1 – page 1 of 4
Type 1 Storm Water Pollution Prevention Plan

Project Name: _____ Permit Number_____

Single Family/Duplex or Commercial? _____Area of Disturbance (sq. ft)_____ Project Depth (ft): _____

Subdivision:_____ Lot:_____ Block:_____ Tract:_____ Parcel:_____

Street Address: _____

Contact Name_____ Phone Number:_____

The Minimum Requirements that may apply to any proposed new development or redevelopment are identified here and, if applicable, satisfied through the submission of this completed Checklist 1. Contents of Storm Water Treatment Plans vary with the size of parcel, type and size of proposed development, individual site characteristics, and other information required by the Municipality to assess compliance with Chapter 21 of the Municipal Code.

A Type 1 SWPPP must be submitted if your project is within the MOA and if it:

- Disturbs 500 square feet up to 10,000 square feet or is 4 feet or more in depth
- Is smaller than either of the above categories, but for which there is not sufficient buffer between the disturbed area and any creek or wetlands AND
- Is not part of a larger common plan of development. **"**Common Plan of Development**"** is a contiguous construction project where multiple separate and distinct construction activities may be taking place at different times on different schedules but under one plan. Included in this definition are most subdivisions and industrial parks

In particular, the operators of these projects must:

- Submit a site plan sketch showing the project and the location of:
  - ✓ stabilized construction exits
  - ✓ silt fencing
  - ✓ sediment trap (if necessary)
  - ✓ areas to be stabilized and method of stabilization
- Conduct work in a "good housekeeping" manner.
- Implement appropriate BMPs for control of stormwater runoff during construction, including:
  - ✓ Isolate construction materials from rainfall and snowfall events
  - ✓ Prevent the transport of sediment beyond site boundaries
  - ✓ Stabilize soil on non-building site areas
- Perform inspections and properly maintain erosion and sediment controls
- Achieve final site stabilization

If your project is smaller than those listed above and has sufficient buffer, a submittal is not required, but the practices on this Checklist #1 must be installed. ALL projects will be inspected as part of building and right-of-way permits and other MOA Plan reviews. Municipal inspections and inspection fees will start with permit issuance. **It is your responsibility to notify Watershed Management Services if the project start will be later than the permit issuance date.**

OWNER'S STATEMENT FOR TYPE 1 SWPPP PROJECTS

I have read the above checklist, completed and attached Checklist #3, and have enclosed the necessary design information concerning the above referenced proposed project demonstrating it is a Type 1 SWPPP Project. By my signature I certify the enclosed information, that I will install or perform necessary BMPs and maintain them throughout the project, and that the project is (check one):

____ privately owned and that I am the owner. ____ privately owned and that I am the developer.

I further certify that the project ____ is or ___is not part of a larger common plan of development.
If the project is part of a common plan of development that collectively disturbs 1 or more acres, submit a copy of the NOI.

_____
Signature (please sign in ink) Date

_____
Name and Official Title (print or type)

_____
Company or Agency (if applicable)

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review

CHECKLIST #1 – page 2 of 4

Type 1 Storm Water Pollution Prevention Plan

IF YOUR AREA OF LAND DISTURBANCE IS 10,000 SQUARE FEET OR MORE, YOU CANNOT USE THIS CHECKLIST.

Check appropriate blanks below and complete the site diagram with necessary information.

Com-pleted	Not Applicable	
		Site Characteristics
____	____	North arrow and site boundary. Indicate and name adjacent streets or roadways.
____	____	Location of existing drainage ways, streams, rivers, lakes, wetlands, or wells near the site.
____	____	Location of existing and planned storm sewer inlets and culvert crossings within 100 feet of the site.
____	____	Location of existing and proposed buildings and paved areas.
____	____	Areas of land disturbance, which includes areas of soil disturbance for any purpose, including footings, foundations, parking, driveways, staging, temporary access, on-site wastewater systems, and on- and off-site utilities
____	____	Limits and approximate dimensions of the proposed disturbed area on the site.
____	____	Approximate gradient and direction of slopes before grading operations
____	____	Approximate gradient and direction of planned slopes after grading operations.
____	____	Overland runoff (sheet flow) coming onto the site from adjacent areas.
		Erosion Controls Practices
____	____	Location of temporary soil storage piles.
		Note: Soil storage piles should be placed behind a silt fence, 25-foot (minimum) wide vegetative strip, or be covered with a tarp and located more than 25 feet from any down slope road or drainage way.
____	____	Location of temporary gravel access drive(s).
		Note: Gravel drives shall have 2 to 3 inch aggregate stone laid at least 10 feet wide and 6 inches thick. Drives shall extend from the roadway 50 feet or to the building (whichever is less).
____	____	Location of sediment controls (filter fabric fence, rock sediment trap, 25-foot wide vegetative buffer strip or other planned practices) that prevent eroded soil from leaving the site.
		Note: Sediment controls should be installed along the downslope sides of the disturbed areas. Sediment Controls will be installed around soil storage piles, around inlets, at outlets of drainageways, and along adjacent drainageways which receive runoff from the site.
____	____	Location of sediment barriers around storm sewer inlets.
____	____	Location of diversions.
		Note: Concentrated flow (drainageways, ditches, channels) shall be diverted (redirected) around disturbed areas. Overland runoff (sheet flow) from adjacent areas greater than 10,000 sq. ft. shall also be diverted around disturbed areas in a manner that will not adversely impact adjacent landowners. 2) Diversions will be stabilized with seeding and mulching *within 24 hours* of diversion completion.
____	____	Location of practices that will control erosion in areas of concentrated flow.
____	___	Location of practices that will be applied to control erosion on steep slopes (greater than 12% grade)
		Note: Drainage ways will be stabilized with seeding, mulching, erosion control mats, in-channel fabric, or rock riprap. When used, a given in-channel barrier should not receive drainage from more than two acres of unpaved area, or one acre of paved area. In-channel practices should not be installed in perennial stream. Stabilization and other appropriate measures should be completed within 24 hours of drainageway completion. Sediment controls will be installed at the outlet ends of drainageways.

CHECKLIST #1 – page 3 of 4

Type 1 Storm Water Pollution Prevention Plan

Planned	Not Planned	Management Strategies
____	____	Temporary stabilization of disturbed areas.
		Note: Disturbed areas and soil piles left inactive for more than 14 days must be stabilized by seeding (between May 1 and September 1) or by other cover, such as a tarp or heavy mulching.
____	____	Permanent stabilization of site by revegetation, lawn establishment, or other means as soon as possible.
		Indicate re-vegetation method: Seed ___ Sod ___ Other _____
		Expected date of permanent re-vegetation _____
		Revegetation the responsibility of: Builder ____ Owner/Buyer _____
		Planned temporary stabilization if site is not seeded by September 1 or sodded by September 15?
		_____
____	____	Use of downspout to direct runoff away from structures and onto sod or pavement until vegetation is stable. After grass is well established, downspouts shall be permanently directed to grass areas.
____	____	Trapping sediment during site dewatering operations. Location:_____
		Note: Sediment laden discharge should be temporarily ponded behind a sediment barrier until most of the sediment settles out. If dewatering is anticipated, a dewatering plan must be submitted with this checklist.
____	____	Proper disposal of building material waste so that pollutants and debris do not are not carried off-site by wind or water.

Inspection Requirements

Site operator must inspect disturbed areas, areas used for storage of materials that are exposed to precipitation, physical controls, and vehicle exits at a minimum every 14 days from March until freeze-up. Inspections must also be conducted throughout the year within 24 hours after events that produce runoff or during runoff events that last more than 24 hours.

Maintenance Requirements

If inspections reveal erosion and sediment control practices that are not effective, or appear likely to be ineffective for anticipated conditions (due to anticipated site activities and weather), the practices must be adjusted (including repair, modification, replacement, sediment removal, or additional practices) as soon as practicable, but no later than 7 calendar days following the inspection.

Final Stabilization Requirements

At the completion of land disturbing activities, all disturbed and exposed soil shall be stabilized. Areas that are uphill of installed ESC practices shall be stabilized prior to removal of those controls.

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review

CHECKLIST #1 – page 4 of 4

Type 1 Storm Water Pollution Prevention Plan

Instructions:

1. Complete this plan by filing in the requested information, completing the site diagram, and marking appropriate boxes on pages 2 and 3.
2. When completing the site diagram, give consideration to potential erosion that may occur before, during, and after grading. Water runoff patterns can change significantly as a site is reshaped.
3. Submit this plan and the rest of the checklist at the time of building permit application.

	Erosion Control Plan Legend
	Property Line
	Outline of area(s) of land disturbance *
	Temporary Diversion
	Existing Drainage
	Finished Drainage
	Limits of Grading
	Silt Fence
	Gravel Exit
	Vegetation Specification
	Tree Preservation
	Stockpiled Soil
	Please indicate north
	↑ ← N → ↓

* Land disturbance includes areas of soil disturbance for any purpose, including foundations, footings, parking, driveways, staging, temporary access, on-site wastewater systems, and on- and off-site utilities.

Project Location: _____
(Address) (Street) (Lot)

Builder: _____ Owner: _____

Worksheet completed by:_____

Installation and maintenance of
erosion control practices responsibility of:

Name: _____ Phone: _____

Permanent seeding/sodding responsibility of:

Name: _____ Phone: _____

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review

CHECKLIST #2 – page 1 of 2

Projects disturbing 10,000 square feet or more

Use this checklist for all projects that disturb 10,000 square feet or more. This includes, but is not limited to, triplexes and larger multi-housing projects; commercial developments; single family residential or duplex; road, street, and drainage construction projects; filling and grading, and utility construction.

Project Name: _____ Permit Number_____

Area of Disturbance (acres):____ Project Type (single family/duplex/commercial/other): _____

Subdivision:_____ Lot:_____ Block:_____ Tract:_____ Parcel:_____

Street Address: _____

Contact Name_____ Phone Number:_____

The Minimum Requirements that may apply to any proposed new development or redevelopment are identified here and, if applicable, satisfied through the submission of an acceptable Storm Water Treatment Plan. Contents of Storm Water Treatment Plans vary with the size of parcel, type and size of proposed development, individual site characteristics, and other information required by the Municipality to assess compliance with Chapter 21 of the Municipal Code. Below is a list of the minimum components required for a complete submission of a Storm Water Treatment Plan.

SWTP Element	Area of Disturbance		
	Less than 10,000 square feet	10,000 square feet or more but less than one acre	One acre or greater
	Submittal of SWTP Element Required?		
Existing and Proposed Conditions, including: Description of o Existing conditions and Proposed development o Timetable of construction activities o Site drainage and receiving waters Location of wetlands, drainageways, streams and associated setbacks and easements Calculations used to determine runoff quantity and to design/select BMPs	No	Yes	Yes
Construction Stormwater Quality Control – Type of SWPPP	Type 1 [2, 3]	Type 2 [2, 4]	Type 3 [4]
• Site plan showing location of erosion and sediment control practices	Yes	Yes	Yes
• Dewatering plan	Yes [1]	Yes [1]	Yes [1]
• Copy of NOI	No [5]	No [5]	Yes
Preliminary Conditions Summary	Yes	Yes	Yes
Permanent Stormwater Quality Control Plan including Site plan showing location of permanent BMPs Calculations used to determine runoff quantity and to design/select BMPs	Yes [7]	Yes [7]	Yes [7]
Special Reports and Studies [6]	Yes	Yes	Yes
Other Permits	Yes	Yes	Yes
Operations and Maintenance Manual for permanent BMPs	Yes	Yes	Yes

[1] Required if groundwater or pumped discharges will be involved
[2] UNLESS: If the project is part of a common plan of development that collectively disturbs 10,000 square feet up to 1 acre, a Type 2 SWPPP is required. If the project is part of a common plan of development that collectively disturbs 1 acre or more, a Type 3 SWPPP is required.
[3] Type 1 SWPPP projects must submit Checklist #1.
[4] Type 2 and Type 3 SWPPP projects must submit a SWPPP in accordance with the Storm Water Treatment Plan Review Guidance Manual.
[5] UNLESS: A copy of the NOI is required if the project is part of a common plan of development that collectively disturbs one or more acres.
6 Special reports and studies includes a Drainage Plan, if prepared in compliance with Title 21.07 and the DCM; special reports and studies, such as soils, geotechnical, wetlands, or hydrological reports or analyses; pollution prevention plans applicable to permanent site activities, such as MultiSector General Permit SWPPPs or Spill Prevention Control and Countermeasure (SPCC) plans; and copies of other permits, such as a wetlands permit.
7 Permanent stormwater treatment BMPs are not required for single lot single-family residential or duplex projects.

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review

CHECKLIST #2 – page 2 of 2

Projects disturbing 10,000 square feet or more

OWNER'S or OWNER'S REPRESENTATIVE STATEMENT FOR STORM WATER TREATMENT PLAN REVIEWS

I have completed the above checklist and have enclosed the necessary design information concerning the above referenced proposed project and BMPs for review. The above items are required for project plan review and I understand that a review does not necessarily guarantee that an approval to construct will be issued by this Department. By my signature I certify that I will install or perform necessary BMPs, maintain them throughout the project, keep a copy of my approved Storm Water Treatment Plan on the construction site, and that the project is (check one):

____ privately owned and that I am the owner or duly authorized representative responsible for the overall management of the project.

____ owned by a sole proprietorship and that I am the proprietor or duly authorized representative responsible for the overall management of the project.

____ owned by a partnership of which I am a general partner or duly authorized representative responsible for the overall management of the project.

____ owned by a corporation of which I am a principal executive officer of at least the level of vice-president, or a duly authorized representative responsible for the overall management of the project.

____ owned by a municipal, state, or federal or other public agency, of which I am a principal executive officer, ranking elected official, or other duly authorized employee

If a Type 1 or Type 2 SWPPP is included in the submittal, I further certify that the project

____ is not part of a larger common plan of development OR

____ is part of a larger common plan of development which collectively disturbs ___ acres.

(If the project is part of a common plan of development that collectively disturbs 1 or more acres, submit a Type 3 SWPPP and a copy of the NOI.)

_____ Checklist #3 is completed and attached.

Municipal inspections and inspection fees will start with permit issuance. **It is your responsibility to notify Watershed Management Services if the project start will be later than the permit issuance date.**

_____

Signature (please sign in ink) Date

_____

Name and Official Title (print or type)

_____

Company or Agency (if applicable)

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review

CHECKLIST #3 – page 1 of 2

Storm Water Runoff Threat Assessment Form

Applicant:	Permit Application # :
Project Address:	Phone #
Applicant: Please complete this form to determine the priority of your site for stormwater runoff as a threat to water quality.	
SECTION A: Preliminary Identification of Low Priority Sites	
Question 1: Does the construction site disturb less than 10,000 sq ft of soil? Question 2: Is the site within 200 ft. or does it discharge directly to an Environmental Sensitive Area (ESA)? **Environmental Sensitive Area (ESA): Wetlands, Stream, Creek, or Lake**	1. Yes ☐ - Proceed to Question 2 No ☐ - Proceed to Section B 2. Yes ☐ - Proceed to section B No ☐ - Low Priority. Skip sections B and C, and check Low Priority box Section D, Priority Determination, on the last page of this form
SECTION B: Identification of Automatically HIGH Priority Sites	
Question 3: Does the construction site disturb 5 acres or more? Question 4: Is the site disturbance 10,000 sq ft or more **AND** within 200 feet of a wetland, stream, lake, or creek? If **NO** to **BOTH** questions then the applicant should proceed to **Section C** to evaluate prioritization.	3. Yes ☐ - Skip Section **C** and check the High Priority box in Section D, Priority Determination, on the last page of this form. No ☐ - Proceed to Question 4. 4. Yes ☐ - Skip Section **C** and check the High Priority box in Section D, Priority Determination, on the last page of this form. No ☐ - Proceed to Section C.
SECTION C: Project Prioritization Prioritization is evaluated by completing items A through E. A point value (1, 2, 3, 4, or 5) is assigned in each step, which is then totaled for a ranking score. Please circle the appropriate point value to the right of each item.	
ITEM A: Project disturbance area Construction sites disturbing less than 5 acres are ranked based upon the size of the area being disturbed. Indicate the area of disturbance.	1 = 0-499 sq ft 2 = 500 sq ft -5,000 sq ft 3 = 5,000 – 9,999 sq ft 4 = 10,000 sq ft – <1 acre 5 = 1 acre – less than 5 acres
ITEM B: Maximum Slopes Indicate the maximum finished slopes within the site.	1 = Slopes 20:1 or flatter 2 = 20:1<Slope<5:1 3 = 5:1<Slope<3:1 4 = 3:1<Slope<2:1 5 = Slopes 2:1 or Steeper
ITEM C: Vicinity of project to Environmentally Sensitive Area (ESA) Indicate the proximity of the construction site to an ESA. **Environmental Sensitive Area (ESA): Wetlands, Stream, Creek, or Lake**	1 = > 5,000 feet 2 = 1,001-5,000 ft. 3 = 501-1000 ft. 4 = 201-500 ft. 5 =< 200 ft.

MUNICIPALITY OF ANCHORAGE
Storm Water Treatment Plan Review

CHECKLIST #3 – page 2 of 2

Storm Water Runoff Threat Assessment Form

ITEM D: Potential to Produce Significant Non-Stormwater Discharges Indicate the project's potential to produce non-storm water discharges.	0 = Zero or low potential of non-storm water discharges. 3 = Potential non- storm water discharges from dust control, port-a-potty 5 = Potential non-storm water discharges from dewatering activities or landscaping irrigation.
ITEM E: Past Record of Non-Compliance Indicate the record of non-compliance by the operators of the construction site as documented in MOA inspection report or complaint records in the past 12 Months.	0 = No record 1= One instance of non-compliance 2 = More than one instance
TOTAL By totaling the scores determined above (items A-E), the priority as a threat to water quality can be determined. If the ranking total is **greater than or equal** to **18**, check the **High Priority** box in Section D below. If the ranking total is **less than 18,** check the **Low Priority** box in Section D below.	Ranking = A+B+C+D+E Ranking total= _____
SECTION D Priority Determination	
Please check the appropriate box to the right. **NOTE**: High priority triggers a Monthly inspection by MOA inspectors.	☐ High ☐ Low

By signing this form, I acknowledge that I have read and understand the statements above and certify the information provided on this form.

_____
Applicant/Owner Name (please print)

_____ _____
Applicant/Owner Name Signature Date

Construction Dewatering Request Form

Submit to the Municipality of Anchorage
Project Management & Engineering Department
Watershed Management Services
4700 Elmore Road P.O. Box 196650
Anchorage, Alaska 99519-6650
907-343-8105

Permit Number			
Project Name			
Location			
Project Description			
Contractor			
On-Site Contact Name			
Address			
City, State, Zip			
Phone		*Site Phone*	
E-mail		*Office Fax*	
Size of Area			

Volume in gallons per day (GPD)	
Pump rate in gallons per minute (GPM)	
Estimate of total volume to be discharged	
Start date of dewatering	*End date of dewatering*
Water Intake (pond, sump, well point, etc.)	
Discharge point (manhole, ditch, etc.)	
If discharging to ditch, provide analysis that the discharge will not adversely affect the rights of way or abutting	
If discharging to piped storm sewer, provide calculations that show pipe capacity to handle rate of discharge	
Site Dewatering Plan available?	
Description of method used to control solids:	
Remarks and unusual conditions:	

Signature of Applicant:	*Date:*
Signature of Approval:	*Date:*

Note: If discharging to a storm sewer system (pipe or ditch), a Municipal Right of Way permit is required. If discharging to the sanitary sewer, a permit from AWWU is required. **Post these permits at the site and include copies of them in the Site Dewatering Plan.**

Appendix C

Dewatering Discharge Forms

MOA WMS Construction Dewatering Request Form

MOA Right of Way Division Right Of Way Permit Application

Alaska DNR Application for Temporary Use of Water

AWWU Application for Discharge Permit

Construction Dewatering Request Form

Submit to the Municipality of Anchorage
Project Management & Engineering Department
Watershed Management Services
4700 Elmore Road P.O. Box 196650
Anchorage, Alaska 99519-6650
907-343-8105

Permit Number			
Project Name			
Location			
Project Description			
Contractor			
On-Site Contact Name			
Address			
City, State, Zip			
Phone		*Site Phone*	
E-mail		*Office Fax*	
Size of Area			

Volume in gallons per day (GPD)	
Pump rate in gallons per minute (GPM)	
Estimate of total volume to be discharged	
Start date of dewatering	*End date of dewatering*
Water Intake (pond, sump, well point, etc.)	
Discharge point (manhole, ditch, etc.)	
If discharging to ditch, provide analysis that the discharge will not adversely affect the rights of way or abutting private property	
If discharging to piped storm sewer, provide calculations that show pipe capacity to handle rate of discharge	
Site Dewatering Plan available?	
Description of method used to control solids:	
Remarks and unusual conditions:	
Signature of Applicant:	*Date:*
Signature of Approval:	*Date:*

Note: If discharging to a storm sewer system (pipe or ditch), a Municipal Right of Way permit is required. If discharging to the sanitary sewer, a permit from AWWU is required.

MUNICIPALITY OF ANCHORAGE

Development Services Department
Right of Way Division
Phone: (907) 343-8240 Fax: (907) 343-8250

RIGHT OF WAY PERMIT APPLICATION

(Utility installation, driveway construction, etc.)

Please Print **Date** _____

Application For: ROW Permit _____ Rental Permit _____ SA # _____

Driveway Permit _____ Land Use (Zoning) Case # _____

Building/Land Use Permit # _____ **ROW Permit #** _____

Permittee/Homeowner: _____ Address _____

Contractor: _____ Contact Person/Phone # _____

Utility Company W.O. #: _____ Utility Account #: _____

Site Address: _____ Cross Street: _____

Subdivision: _____ Lot/Tract: _____ Block: _____ Grid(s) _____

City/Town: _____

Location of use/work (i.e., 25 feet west of driveway at this address): _____

Construction method(s): (check those that apply)

- ☐ On the traveled road surface
- ☐ Trenching/Open Excavation
- ☐ Boring/trench-less Technology
- ☐ Using Existing Conduit/Duct
- ☐ Off the traveled road surface
- ☐ **Full Road Closure***
- ☐ Partial Road Closure
- ☐ Alleyway
- ☐ Utility Easement
- ☐ **On Arterial or Collector***

***Traffic Control Plan Required**

Road Closure Information: **Date/Time:** **From:** _____ **To:** _____

A full road closure or a partial road closure on an arterial or collector street requires an approved Traffic Control Plan signed by MOA Traffic Department before a Right of Way Permit may be issued.

Roadway surface: Gravel ☐ RAP/Chip Seal ☐ Paved ☐ Undeveloped Right of Way ☐

Description of use/work: _____

Starting date: _____ **Completion date:** _____

*Plans/drawings submitted: Yes ☐ No ☐

_____

***(Three copies of plans/drawings are required with this application)** **Applicant Signature**

FOR USE BY THE RIGHT OF WAY PERMIT OFFICE

Comments: _____

Date Received: _____ By: _____

Check Number: _____ Cash: _____

Credit Card: _____

Surety bond/cash deposit waived by: _____

Fees Received from: _____

Fees waived by: _____

Encroachment/Non-objection Existing: _____

Basic Fee: _____

Pavement Break: _____

Partial Closure: _____

Full Closure: _____

Pre-paid Inspection: _____

Total: _____

COMPANY INFORMATION

Company Name

MOA Vendor ID #

Principle Contact

Right of Way Bond #

Job Title

Cell Phone

CONTACT INFORMATION

Business Phone

Fax Number

Mailing Address

Principle Business Email Address

City

State

Zip

PERSON(S) AUTHORIZED TO SIGN FOR PERMITS (permits not valid without authorized signature)

Signature

Printed Name

Phone

Email

Signature

Printed Name

Phone

Email

Signature

Printed Name

Phone

Email

Signature

Printed Name

Phone

Email

Signature

Printed Name

Phone

Email

Fill in the form online by clicking in the appropriate field and typing. Print the completed application and mail in one signed copy of the form with fees and supporting documents.

You will not be able to save your data entry online, so print an extra copy for yourself.

Print

DIVISION OF MINING, LAND AND WATER
WATER RESOURCES SECTION
www.dnr.state.ak.us/mlw/water/index.htm

Alaska Department of NATURAL RESOURCES

Anchorage Office 550 West 7th Avenue, Suite 1020 Anchorage, AK 99501-3562 (907) 269-8600 Fax: (907) 269-8947	Juneau Office PO Box 111020 400 Willoughby Avenue Juneau, AK 99811-1020 (907) 465-3400 Fax: (907) 586-2954	Fairbanks Office 3700 Airport Way Fairbanks, AK 99709-4699 (907) 451-2790 Fax: (907) 451-2703	***For ADNR Use Only*** ***Date/Time Stamp***
For ADNR Use Only ***TWUP #***	***For ADNR Use Only*** ***CID #***	***For ADNR Use Only*** ***Receipt Type WR***	

APPLICATION FOR TEMPORARY USE OF WATER

INSTRUCTIONS

1. Complete one application for each project including up to five water sources (incomplete applications will not be accepted).
2. Attach legible map that includes meridian, township, range, and section lines such as a USGS topographical quadrangle or subdivision plat. Indicate water withdrawal point(s), location(s) of water use, and point(s) of return flow or discharge (if applicable).
3. Attach sketch, photos, plans of water system, or project description (if applicable).
4. Attach driller's well log for drilled wells (if available).
5. Attach copy of ADNR fish habitat permit (if applicable).
6. Attach completed Coastal Project Questionnaire (if applicable - see page 4).
7. Submit non-refundable fee (see page 4).

APPLICANT INFORMATION

Project Name

Organization Name (if applicable)

Agent or Consultant Name (if applicable)

Individual Name (if applicable)

Individual Co-applicant Name (if applicable)

Mailing Address | City | State | Zip Code

Daytime Phone Number

Alternate Phone Number (optional)

Fax Number (if available)

E-Mail Address (optional)

PROPERTY DESCRIPTIONS

Location of Water Use

Project Area (e.g. milepost range, place name, survey number)	Meridian	Township	Range	Section	Quarter Sections	
					¼	¼
					¼	¼

Location of Water Source

Geographic Name of Water Body or Well Depth	Meridian	Township	Range	Section	Quarter Sections	
					¼	¼
					¼	¼
					¼	¼
					¼	¼
					¼	¼

Location of Water Return Flow or Discharge (if applicable)

Geographic Name of Water Body or Well Depth	Meridian	Township	Range	Section	Quarter Sections	
					¼	¼
					¼	¼

METHOD OF TAKING WATER

Pump	Pump Intake _____ Inches Pump Output _____ GPM	Hours Working _____ Hours/Day Length of Pipe _____ Feet (from pump to point of use)
Gravity	Pipe Diameter _____ Inches Head _____ Feet	Length of Pipe _____ Feet (take point to point of use)
Ditch	L _____ H _____ W _____ Feet	Diversion Rate _____ ☐ GPM or ☐ CFS
Reservoir	L _____ H _____ W _____ Feet	Water Storage _____ Acre-feet
Dam	L _____ H _____ W _____ Feet	Water Storage _____ Acre-feet

AMOUNT OF WATER

Purpose of Water Use	Quantity of Water			Season of Use	
	Maximum Withdrawal Rate	Total Daily Amount	Total Seasonal Amount	Date Work Will Start	Date Work Will be Completed
Project Totals				Total years needed: _____	

PROJECT DESCRIPTION

What alternative water sources are available to your project should a portion of your requested diversion be excluded because of water shortage or public interest concerns?

Are there any surface water bodies or water wells at or near your site(s) that could be affected by the proposed activity? If yes, list any ground water monitoring programs going on at or near the sites, any water shortages or water quality problems in the area, and any information about the water table, if known.

Briefly describe the type and size of equipment used to withdraw and transport water, including the amount of water the equipment uses or holds.

Briefly describe what changes at the project site and surrounding area will occur or are likely to occur because of construction or operation of your project (e.g. public access, streambed alteration, trenching, grading, excavation).

Briefly describe land use around the water take, use, and return flow points (e.g. national park, recreational site, residential).

Will project be worked in phases? State reason for completion date.

Briefly describe your entire project:

_____

_____

_____

(Attach extra page if needed.)

11 AAC 93.220 sets out the required information on the application and authorizes the department to consider any other information needed to process an application for a temporary use of water. This information is made a part of the state public water records and becomes public information under AS 40.25.110 and 40.25.120. Public information is open to inspection by you or any member of the public. A person who is the subject of the information may challenge its accuracy or completeness under AS 44.99.310, by giving a written description of the challenged information, the changes needed to correct it, and a name and address where the person can be reached. False statements made in an application for a benefit are punishable under AS 11.56.210.

SIGNATURE

The information presented in this application is true and correct to the best of my knowledge. I understand that no water right or priority is established per 11 AAC 93.210-220, that the water used remains subject to appropriation by others, and that a temporary water use authorization may be revoked if necessary to protect the water rights of other persons or the public interest.

Signature _____ Date _____

Name (please print) _____ Title (if applicable) _____

REFERENCES

Measurement Units

GPD = gallons per day
CFS = cubic feet per second
GPM = gallons per minute
AF = acre-feet
AFY = acre-feet per year (325,851 gallons/year)
AFD = acre-feet per day (325,851 gallons/day)
MGD = million gallons per day

Conversion Table

5,000 GPD=	30,000 GPD=	100,000 GPD=	500,000 GPD=	1,000,000 GPD=
0.01 CFS	0.05 CFS	0.2 CFS	0.8 CFS	1.5 CFS
3.47 GPM	20.83 GPM	69.4 GPM	347. 2 GPM	694.4 GPM
5.60 AFY	33.60 AFY	112.0 AFY	560.1 AFY	1120.1 AFY
0.2 AFD	0.09 AFD	0.3 AFD	1.5 AFD	3.1 AFD
0.01 MGD	0.03 MGD	0.1 MGD	0.5 MGD	1.0 MGD

Fee required by regulation 11 AAC 05.010(a)(8)

- **$350** for all uses of water from up to five water sources

Make checks payable to "Department of Natural Resources".

Coastal Zone

If this appropriation is within the Coastal Zone, and you are planning to use more than 1,000 GPD from a surface water source or 5,000 GPD from a subsurface water source, you need to submit a completed Coastal Project Questionnaire with this application. For more information on the Coastal Zone, contact the Office of Project Management and Permitting; Anchorage 269-7470, Juneau 465-3562, www.dnr.state.ak.us/acmp/.

APPLICATION FOR DISCHARGE PERMIT
The Anchorage Water and Wastewater Utility
Industrial Pretreatment Program

The following information is required by the Anchorage Water and Wastewater Utility (AWWU) for the evaluation of any proposed one time discharge to the sewer system.

AWWU will not grant a variance to limitations in the sewer use ordinance or a temporary discharge permit until all the requested information has been received and evaluated.

For technical information call Ed Tatro at Pt. Woronzof Wastewater Treatment Plant at 751-2219.

Please submit form to:

R. Wayne Bennett, Field Service
Anchorage Water & Wastewater Utility
3000 Arctic Blvd.
Anchorage, AK 99503-3898

Fax No.: (907) 562-5427

For construction dewatering and discharge of other waters that meet Anchorage Municipal Sewer Use Code pollutant limits (AMC 26.50.050 and AMC 26.50.060) please contact R. Wayne Bennett, Field Services General Foreman, AWWU Customer Service Division at 564-2723.

Responsible Party:

Name:_____

Contact Person:_____Phone:_____

Mailing Address:_____

_____

Party Responsible for Bill (if different from above):

Name: _____

Contact Person:_____Phone:_____

Mailing Address:_____

_____

Site Address and/or Legal Description of Proposed Discharge:

_____

_____

Approximate Date(s) for the Proposed Discharge:

_____

Maximum Volume Estimate for Proposed Discharge:

_____(Gallons)

Source Description for the Proposed Discharge:

_____

_____

_____

Method of Proposed Discharge:

_____

_____

_____

_____

Detailed Explanation of Request and Evaluation of Alternatives: (Detailed explanation of why a variance or temporary discharge permit is being requested, and that alternatives to discharging into the Municipality of Anchorage sewer system have been evaluated.)

_____

_____

_____

_____

_____

Content of the Proposed Discharge:

Attach MSDS sheets for materials in the proposed discharge or analytical reports as appropriate. (For water from contaminated soil clean-ups, provide a description of the original site assessment to show that the submitted analytical data covers all contaminants excepted above normal background levels.)

_____

_____

_____

_____

Certification that the submitted information is representative of the proposed discharge.

_____

Signature Date

Appendix D

Common Pollutants Based on Land Use

BMPs Appropriate for Land Uses and Activities

Table D-1 Common Pollutants Related to Land Uses

Potential Pollutants / Type of Land Use	Fuel, Oil, and Other Vehicle Fluids Potentially Released During Routine Maintenance	Sediment, Solvents, and Other Pollutants Potentially Released During Equipment Washing	Bulk Chemical Spills Related to Potential Storage Tank Failure	Petroleum Products Used in Day to Day Operations and Potentially Released into Storm Water	Pollution Related to Snow Storage Melt (Sediment, Chloride, etc.)	Pesticide, Herbicide, and Fertilizer	Typical Parking Area Pollutants Such as Sediment, Vehicle Fluids, and Garbage
Industrial Activities							
Cement		X	X	X	X		X
Chemicals	X	X	X	X	X		X
Concrete Products		X	X	X	X		X
Food Products		X	X	X	X		X
Glass Products		X	X	X	X		X
Industrial Machinery	X	X	X	X	X		X
Metal Products		X	X	X	X		X
Paper Products		X	X	X	X		X
Petroleum Products	X	X	X	X	X		X
Printing and Publishing		X	X	X	X		X
Rubber and Plastic Products		X	X	X	X		X
Ship/Boat Building &Repair Yards	X	X	X	X	X		X
Wood Products		X	X	X	X		X
Wood Treatment		X	X	X	X	X	X
Other Manufacturing Business	X	X	X	X	X	X	X
Transportation and Communication							
Airfields and aircraft Maintenance	X	X	X	X	X		X
Fleet Vehicle Yards, including impound, salvage, storag	X	X	X	X	X		X
Railroads	X	X	X	X	X	X	X
Private Utility Corridors				X	X	X	X
Warehouses				X	X		X
Other Transportation and Communication	X	X	X	X	X	X	X
Wholesale and Retail Businesses							
Gas Stations	✓	X	X	X	X		X
Recyclers and Scrap Yards		X	X	X	X		X
Restaurants/Fast Foods				X	X		X
Retail General Merchandise	✓	X		X	X		X
Retail / Wholesale Vehicles and Equipment and Dealers	✓	X	X	X	X		X
Retail / Wholesale Nurseries and Building Materials	✓	X		X	X	X	X
Retail / Wholesale Chemicals and Petroleum	✓		X		X		X
Retail / Wholesale Foods & Beverages	✓	X	X	X	X	X	X
Hotels and Motels				X	X		X
Other Retail / Wholesale Business	✓	X			X		X
Service Businesses							
Animal Care Service							X
Commercial Car & Truck Washes	X	X					X
Equipment Repair	X	X		X			X
Laundries & Other Cleaning Services			X	X			X
Marinas and Float Plane Bases	X	X	X	X			X
Golf and Country Clubs, Golf Courses and Parks						X	X
Miscellaneous Services			X	X			X
Professional Services		X		X			X
Vehicle Maintenance and Repair	X	X	X		X		X
Multi-Family Residences		X		X	X	X	X
Construction Business	X	X	X	X	X		X
Public Agencies							
Public Buildings and Streets	X			X	X	X	X
Vehicle Equipment and Maintenance Shops	X	X	X	X			X
Maintenance of Open Space Areas						X	
Maintenance of Public Storm Water Facilities						X	
Maintenance of Roadside Vegetation and Ditches						X	
Maintenance of Public Utilities Corridors				X	X	X	
Water and Sewer Utilities				X			
Ports	X	X	X	X	X	X	X
Other Land Uses							
Subdivision Development				X	X	X	X

Table D-2 Potential Source Control BMPs Related to Land Uses

Potential Source Control BMPs / Land Use or Activity	Fuel And Vehicle Maintenance Areas	Maintain Equipment And Machinery In Confined Areas	Roof Runoff Management	Barriers Around Liquid Storage Areas	Petroleum Product Handling Controls	Material Storage Controls	Spill Prevention And Control Procedures	Pesticide, Herbicide, Fertilizer Application Controls	Maintenance Of Urban Runoff Facilities	Parking Lot Maintenance And Snow Storage Controls
Industrial Activities										
Cement		✓	✓	✓	✓	✓	✓		✓	✓
Chemicals		✓	✓	✓	✓	✓	✓		✓	✓
Concrete Products	✓	✓	✓	✓	✓	✓	✓		✓	✓
Food Products		✓	✓	✓	✓	✓	✓		✓	✓
Glass Products		✓	✓	✓	✓	✓	✓		✓	✓
Industrial Machinery	✓	✓	✓	✓	✓	✓	✓		✓	✓
Metal Products		✓	✓	✓	✓	✓	✓		✓	✓
Paper Products		✓	✓	✓	✓	✓	✓		✓	✓
Petroleum Products	✓	✓	✓	✓	✓	✓	✓		✓	✓
Printing and Publishing		✓	✓	✓	✓	✓	✓		✓	✓
Rubber and Plastic Products		✓	✓	✓	✓	✓	✓		✓	✓
Ship/Boat Building &Repair Yards	✓	✓	✓	✓	✓	✓	✓		✓	✓
Wood Products		✓	✓	✓	✓	✓	✓		✓	✓
Wood Treatment		✓	✓	✓	✓	✓	✓	✓	✓	✓
Other Manufacturing Business	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Transportation and Communication										
Airfields and aircraft Maintenance	✓	✓	✓	✓	✓		✓		✓	✓
Fleet Vehicle Yards, including impound, salvage, storage	✓	✓		✓	✓		✓		✓	✓
Railroads	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Private Utility Corridors					✓			✓	✓	✓
Warehouses			✓		✓		✓		✓	✓
Other Transportation and Communication	✓	✓	✓	✓	✓		✓	✓	✓	✓
Wholesale and Retail Businesses										
Gas Stations	✓	✓	✓	✓	✓		✓		✓	✓
Recyclers and Scrap Yards		✓	✓	✓	✓		✓		✓	✓
Restaurants/Fast Foods			✓		✓		✓		✓	✓
Retail General Merchandise	✓	✓	✓		✓		✓		✓	✓
Retail / Wholesale Vehicles and Equipment and Dealers	✓	✓		✓	✓		✓		✓	✓
Retail / Wholesale Nurseries and Building Materials	✓	✓	✓		✓	✓	✓	✓	✓	✓
Retail / Wholesale Chemicals and Petroleum	✓	✓	✓	✓	✓		✓	✓	✓	✓
Retail / Wholesale Foods & Beverages	✓	✓	✓	✓	✓		✓		✓	✓
Hotels and Motels			✓		✓		✓		✓	✓
Other Retail / Wholesale Business	✓	✓	✓		✓		✓		✓	✓
Service Businesses										
Animal Care Service			✓			✓			✓	✓
Commercial Car & Truck Washes	✓	✓					✓		✓	✓
Equipment Repair	✓	✓	✓		✓		✓		✓	✓
Laundries & Other Cleaning Services			✓	✓	✓		✓		✓	✓
Marinas and Float Plane Bases	✓	✓	✓	✓	✓		✓		✓	✓
Golf and Country Clubs, Golf Courses and Parks								✓		✓
Miscellaneous Services			✓	✓	✓		✓		✓	✓
Professional Services		✓	✓		✓		✓		✓	✓
Vehicle Maintenance and Repair	✓	✓	✓	✓			✓		✓	✓
Multi-Family Residences		✓	✓		✓			✓	✓	✓
Construction Business	✓	✓	✓	✓	✓		✓		✓	✓
Public Agencies										
Public Buildings and Streets	✓		✓		✓		✓	✓	✓	✓
Vehicle Equipment and Maintenance Shops	✓	✓	✓	✓	✓	✓	✓		✓	✓
Maintenance of Open Space Areas								✓		
Maintenance of Public Storm Water Facilities									✓	
Maintenance of Roadside Vegetation and Ditches								✓		
Maintenance of Public Utilities Corridors					✓			✓	✓	
Water and Sewer Utilities					✓				✓	
Ports	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other Land Uses										
Subdivision Development					✓	✓		✓	✓	✓

Appendix E

ADEC Spill Report Form

http://www.dec.state.ak.us/spar/perp/docs/spfrm_e.pdf

Clear Form

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

OIL & HAZARDOUS SUBSTANCES SPILL NOTIFICATION

ADEC SPILL #	ADEC FILE #	ADEC LC
PERSON REPORTING	PHONE NUMBER	REPORTED HOW? ☐ Troopers ☐ phone ☐ fax

DATE/ TIME OF SPILL	DATE/TIME DISCOVERED	DATE/TIME REPORTED

LOCATION/ADDRESS	LAT.		SUBSTANCE TYPE	PRODUCT
	LONG.		A) CR EHS HS NC PW UNK B) CR EHS HS NC PW UNK	A) B)

QUANTITY SPILLED	QUANTITY CONTAINED	QUANTITY RECOVERED	QUANTITY DISPOSED
_____ ☐ gallons ☐ pounds	_____ ☐ gallons ☐ pounds	_____ ☐ gallons ☐ pounds	_____ ☐ gallons ☐ pounds

POTENTIAL RESPONSIBLE PARTY C-Plan Holder? YES ☐ NO ☐	FACILITY TYPE

SOURCE OF SPILL	☐ >400 GT Vessel?

CAUSE OF SPILL (List Primary Cause first)	☐ Accident ☐ Human Factors ☐ Structural/Mechanical ☐ Other

CLEANUP ACTIONS

DISPOSAL METHODS AND LOCATION

RESOURCES AFFECTED/THREATENED (Water sources, wildlife, wells. etc.)	AIR	LAND	MARINE	FRESH	SURF. AREA AFFECTED	SURF. TYPE
	☐	☐	☐	☐		

COMMENTS

DEC USE ONLY

SPILL NAME, IF ANY	NAMES OF DEC STAFF RESPONDING	C-PLAN MGR NOTIFIED YES ☐ NO ☐ _____

DEC RESPONSE	CASELOAD CODE	CLEANUP CLOSURE ACTION
☐ phone follow-up ☐ field visit ☐ took report	☐ First and Final ☐ Open/No LC ☐ LC assigned	☐ NFA ☐ Monitoring ☐ Transferred to CS or STP

STATUS OF CASE (circle) OPEN CLOSED DATE CASE CLOSED _____

COMMENTS:

REPORT PREPARED BY	DATE

Appendix F

Example Checklists

SWPPP Completeness Checklist

Construction Site Inspection Form

Type 2 and 3 SWPPP Completeness Checklist

All items are required for Type 3 SWPPP. Items not required for Type 2 SWPPP denoted as "not req"

CGP * Citation	Description	Type 2 SWPPP	
	Construction Site Operators		
5.2.1	Identify all operators and areas of the site over which operator has control		
	Nature of Construction Activity		
5.2.2.1	Function of the project		
5.2.2.2	Intended sequence and timing of activities that disturb soils		
5.2.2.3	Estimate of total area to be disturbed, including dedicated offsite borrow and fill areas		
5.2.2.4	General location map identifying location of site and waters of U.S. within one mile	Not req	
	Site Map		
5.2.3	Must contain a legible site map, showing the entire site, identifying:		
5.2.3.1	Direction of stormwater flow and approximate slopes after grading activities		
5.2.3.2	Areas of soil disturbance and areas that will not be disturbed		
5.2.3.3	Locations of major structural and nonstructural BMPs		
5.2.3.4	Locations where stabilization is expected to occur		
5.2.3.5	Locations of off-site material, waste, borrow, or equipment storage areas		
5.2.3.6	Locations of waters of U.S. (including wetlands)		
5.2.3.7	Locations where stormwater discharges to a surface water		
5.2.3.8	Areas where final stabilization has been accomplished and no further permit requirements apply		
	Stormwater Pollution Prevention Plan Framework		
5.1.2	Identify all potential sources of pollutants that may affect the quality of stormwater discharges		
	Construction and Waste Management		
3.1..6.1	Prevent discharge of solid materials, including building materials, to waters of U.S.		
3.1.6.2	Minimize exposure of waste materials to stormwater, and occurrence of spills, through storage practices and prevention and response practices		
3.1.6.3	Prevent litter, debris, and chemicals from being a pollutant source in stormwater discharges		
5.2.4	Include a description of construction and waste materials expected to be stored on site		
	Spills/ Releases in Excess of Reportable Quantities		
3.1.9	When there is release containing a hazardous substance or oil in excess of reportable quantity, you must provide notice and description of release, and implement measures to prevent future releases	Not req	
	Non-Construction Wastes		
3.1.7	Minimize pollutant discharges from areas other than construction (example: dedicated asphalt and concrete plants)		
	Related to Endangered Species		
3.3	You must protect federally-listed endangered or threatened species and habitat	Not req	
5.5	Include documentation of supporting a determination of permit eligibility with regard to endangered species	Not req	
	Sediment Control		
3.1.1.1, 3.1.1.2, 3.1.1.3	As applicable, implement sediment basin or trap		
	Sediment Tracking and Dust		
3.1.2	Minimize off site vehicle tracking onto paved surfaces and generation of dust		
3.1.2	Off-site accumulations of sediment must be removed at a frequency to minimize off-site impacts		

* APDES Permit AKR100000, General Permit for Discharges from Large and Small Construction Activities

CGP * Citation	Description	Type 2 SWPPP	
	Runoff Management		
3.1.3	Divert flows from exposed soils, retain/detain flows or otherwise minimize runoff and pollutants from exposed area		
	Erosive Velocity Control		
3.1.4	Place velocity dissipation devices at discharge locations and along length of any outfall channel to provide non erosive flow		
	Erosion Control and Stabilization		
3.1.8.1	You must stabilize site, ensure existing vegetation is preserved where possible, avoid using impervious surfaces		
3.1.8.2	Initiate stabilization as soon as practicable where activities have ceased, but within 14 days		
	Regarding Non-Stormwater Discharges		
3.2	Minimize non-stormwater discharges		
5.4	Identify allowable non-stormwater discharges and describe pollution prevention measures used to eliminate or reduce non-stormwater discharges		
ADEC Note:	*Permittee will need State Excavation Dewatering permit for dewatering of 250,000+ gallons and within 1 mile of contaminated site*		
	Locations of Other Industrial Stormwater Discharges		
5.2.5	Describe and identify the location and description of any stormwater discharge associated with industrial activity other than at the construction site		
	Post-Construction Stormwater Management		
3.1.5	Comply with applicable federal, local, state, tribal requirements regarding design and installation of post-construction measures	Not	
ADEC Note:	*See 18 AAC 72.600 regarding stormwater disposal and engineering plan review*		
	Attainment of Water Quality Standards		
3.4.1	Select, install, implement, and maintain control measures at your construction site that minimize pollutants in discharge as necessary to meet applicable water quality standards		
	Related to Total Maximum Daily Loads (TMDL)		
3.5	If discharging into a water with a TMDL you must ensure discharge is within specific waste load allocation		
5.6	Include documentation supporting a determination of permit eligibility with regards to waters that have a TMDL		
	Maintenance of Control Measures		
3.6.1	Maintain controls in effective operating condition, perform maintenance as soon as possible and before next storm event whenever practicable		
3.6.2	If BMPs need modification or additions, complete implementation before next storm event whenever practicable		
3.6.3	Remove sediment from sediment traps and ponds when design capacity reduced by 50%		
3.6.4	Remove trapped sediment from silt fence before deposit reaches 50% of above ground height		
	Description of Control Measures to Reduce Pollutant Discharges		
5.3.1	Description of all control measures that will be implemented. For each major activity identified in project description document control measures, sequence during construction process in which the measure will be implemented, and which operator is responsible		
5.3.2	Include a description of interim and permanent stabilization practices, including schedule of implementation		
5.3.3	The following records must be maintained with SWPPP: dates when grading activities occur, dates when activities cease on a portion of the site, and dates when stabilization measures initiated		

* APDES Permit AKR100000, General Permit for Discharges from Large and Small Construction Activities

CGP * Citation	Description	Type 2 SWPPP	
	Applicable State, Tribal, or Local Programs		
3.8	Ensure controls implemented are consistent with applicable federal, state, tribal, and local requirements		
5.8	SWPPP must be updated as necessary to reflect any revisions in federal, state, tribal, or local requirements		
	Maintaining an Updated Plan		
	SWPPP must be modified:		
5.10.1	To reflect modifications to control measures made in response to a change in design, construction, operation, or maintenance		
5.10.2	If during inspections or investigations by site staff or government officials it is determined that the existing stormwater controls are ineffective		
5.10.3	Within 7 days following an inspection noting additional or modified BMPs are needed		
	Retention of SWPPP		
5.11.1	Retain copy of SWPPP on-site from date of commencement of construction activities to date of final stabilization		
	Availability of SWPPP		
5.11.3	SWPPP must be made available upon request from EPA, state, tribal, or local agency, USFWS, NMFS.		
	Signature and Certification		
5.11.4	SWPPP must be signed and certified in accordance with the permit	Not req	
	Copy of Permit Requirements		
5.7	Include a copy of the CGP permit and the NOI that was submitted to ADEC	Not req	
	Main Entrance Signage		
5.11.2	A sign or other notice must be posted near main entrance of construction site containing completed NOI, location of SWPPP or name and phone number of person for scheduling viewing	Not req	
	Training of Employees		
3.7	Train employees and subcontractors as necessary to make them aware of control measures implemented		
	Inspections		
5.9	Inspection records must be retained with SWPPP for 3 years after termination. Inspection reports must identify incidents of noncompliance, or certify compliance	Not req	
4.1	Specify the inspection frequency and schedule as at least every 7 days, or every 14 days and within 24 hours of the end of a storm event of 0.5 inches or greater		
4.2, 4.3	If the site is eligible for reduced inspection frequency, indicate why it is eligible and the dates of the waiver period		
4.4	Inspections must be conducted by qualified personnel, indicate who this will be		
	Inspection Reports		
	Inspection report must contain:		
4.8.1.1	Inspection date		
4.8.1.2	Name, title, and qualifications of personnel making inspection		
4.8.1.3	Weather info for the period since last inspection		
4.8.1,4	Weather info and description of any discharges occurring at time of inspection		
4.8.1.5	Locations of discharges of sediment or other pollutants from the site		
4.8.1.6	Locations of BMPs that need to be maintained		
4.8.1.7	Locations of BMPs that failed to operate as designed or are inadequate		
4.8.1.8	Locations where additional BMPs are needed		
4.8.1.9	Corrective action required included implementation dates		
4.8 2	Report must be signed in accordance with permit		

* APDES Permit AKR100000, General Permit for Discharges from Large and Small Construction Activities

Construction Site Self-Inspection Documentation

Minimum Requirements:

- The inspection date;
- Names, titles, certifications, and qualifications of personnel making the inspection;
- Weather information for the period since the last inspection (or since commencement of construction activities if it is the first inspection), including a best estimate of the time of beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
- Weather information and a description of any discharges occurring at the time of the inspection;
- Locations of discharges of sediment or other pollutants from the site;
- Locations of BMPs that need to be maintained;
- Locations of BMPs that failed to operate as designed or proved inadequate for a particular location;
- Locations where additional BMPs are needed that did not exist at the time of inspection; and
- Corrective action required, including any changes to the SWPPP necessary and implementation dates.

Sample Inspection Report

This sample inspection report has been developed as a helpful tool to aid you in completing your site inspections. This sample inspection report was created consistent with EPA's Developing Your Stormwater Pollution Prevention Plan. You can find both the guide and the sample inspection report (formatted in Microsoft Word) at www.epa.gov/npdes/swpppguide.

This inspection report is designed to be customized according to the BMPs and conditions at your site. For ease of use, you should take a copy of your site plan and number all of the stormwater BMPs and areas of your site that will be inspected. A brief description of the BMP or area should then be listed in the site-specific section of the inspection report. For example, specific structural BMPs such as construction site entrances, sediment ponds, or specific areas with silt fence (e.g., silt fence along Main Street; silt fence along slope in NW corner, etc.) should be numbered and listed. You should also number specific non-structural BMPs or areas that will be inspected (such as trash areas, material storage areas, temporary sanitary waste areas, etc).

You can complete the items in the "General Information" section that will remain constant, such as the project name, NPDES tracking number, and inspector (if you only use one inspector). Print out multiple copies of this customized inspection report to use during your inspections.

When conducting the inspection, walk the site by following your site map and numbered BMPs/areas for inspection. Also note whether the overall site issues have been addressed (customize this list according to the conditions at your site). Note any required corrective actions and the date and responsible person for the correction in the Corrective Action Log.

Stormwater Construction Site Inspection Report – page 1 of 3

General Information			
Project Name			
NPDES Tracking No. (Type 3 SWPPPs)		**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: ❑ Weekly ❑ Pre-storm event ❑ During storm event ❑ Post-storm event ❑ Other (describe)			
Weather Information			
Has there been a storm event since the last inspection? ❑Yes ❑No **If yes, provide:** Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds ❑ Other: Temperature:			
Have any discharges occurred since the last inspection? ❑Yes ❑No **If yes, describe:**			
Are there any discharges at the time of inspection? ❑Yes ❑No **If yes, describe:**			

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs and additional sheets as necessary).*
- *Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP – Type and Location	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes (note whether BMP failed to operate as designed or if the BMP is inadequate for the location).
1		❑Yes ❑No	❑Yes ❑No	
2		❑Yes ❑No	❑Yes ❑No	
3		❑Yes ❑No	❑Yes ❑No	
4		❑Yes ❑No	❑Yes ❑No	
5		❑Yes ❑No	❑Yes ❑No	
6		❑Yes ❑No	❑Yes ❑No	
7		❑Yes ❑No	❑Yes ❑No	
8		❑Yes ❑No	❑Yes ❑No	
9		❑Yes ❑No	❑Yes ❑No	
10		❑Yes ❑No	❑Yes ❑No	

Use continuation sheet, if necessary

Are any additional BMPs needed? ❑Yes ❑No If Yes, describe type and location

Type	Location

Stormwater Construction Site Inspection Report – page 2 of 3

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented? If Yes, include date	Maintenance Required?	Corrective Action Needed and Notes, including location
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	

12 Is there evidence of the discharge of sediment or other pollutants from the site? ❑Yes ❑No If yes, describe the location(s).

_____

Stormwater Construction Site Inspection Report – page 3 of 3

Is the construction in compliance with the MOA approved SWPPP and the permit requirements?	☐ Yes	☐ No
If no, should the SWPPP be modified?	☐ Yes	☐ No

If no, indicate tasks necessary to bring site into compliance in the "Corrective Action Needed" columns of this report and include the dates each task will be completed in the "Date for Corrective Action/Responsible Person" columns of this report.

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title:

_____

Signature:_____

Date:_____

Appendix G

List of Approved and Scheduled TMDLS within the Municipality

The most current list is maintained by the Alaska Department of Environmental Conservation at http://www.dec.state.ak.us/water/tmdl/tmdl_index.htm

Approved TMDLs

Waterbody	Impairment
Chester Creek, University Lake, Westchester Lagoon	Fecal Coliform Bacteria
Campbell Creek/Lake	Fecal Coliform Bacteria
Eagle River	Ammonia, Copper, Lead, Silver, Chlorine
Fish Creek, Anchorage	Fecal Coliform Bacteria
Furrow Creek	Fecal Coliform Bacteria
Jewel Lake	Fecal Coliform
Lakes Hood and Spenard	Fecal Coliform
Little Campbell Creek	Fecal Coliform Bacteria
Little Rabbit Creek	Fecal Coliform Bacteria
Little Survival Creek	Fecal Coliform Bacteria
Ship Creek	Fecal Coliform Bacteria

Scheduled TMDLs

Waterbody	TMDL to be completed	Impairment
Hood/Spenard Lake	2009	Dissolved Gas
Ship Creek	2007	Petroleum hydrocarbons, oil and grease, sediments

Appendix H

Land Development and Storm Water Pollutants Overview

Land Development and Storm Water Pollutants Overview

Erosion is the process of soil mobilization, and involves the removal of rock and soil by natural processes, principally running water, ice, waves, and wind. Sedimentation is the process of soil deposition, and involves the deposition of solid material suspended by air, water, or ice. Sources of erosion can be water and wind in uncontrolled contact with non-vegetated landmasses. Pathways for sedimentation can be shallow depressions, gullies, hills, and other areas where precipitation collects and moves down gradient. Receptors include all waterbodies, whether aboveground or subsurface.

Land disturbances such as clearing and grubbing, excavation, grading, and other activities associated with construction disrupt the land's natural ability to attenuate storm water runoff and associated pollutants. Such activities can potentially expose large quantities of soil and rock to erosion. Construction sites are considered point sources of pollution subject to regulation and control. Other pollutants, such as petroleum products and process wastes, are commonly associated with both construction and post-construction activities. Furthermore, postconstruction land management practices also play a part in the potential for soil erosion. **SWTPs must provide for control of all storm water drainage and pollutants that potentially could be found on or discharging from a project site, both during and after construction.** Requirements to control these pollutants are covered in more detail below.

Erosion Precursors

Erosion precursors are the environmental, construction, and physical parameters that affect soil erosion rates. The potential rate of erosion on a parcel can be estimated in various ways. Several erosion prediction models exist, including the Revised Universal Soil Loss Equation, Modified Universal Soil Loss Equation (MUSLE), and the Flaxman method. All of these methods consider similar factors: climate, soil characteristics, topography, and ground cover. Land management practices also play a part in soil erosion.

Erosion occurs in two steps: (1) loosening of the soil or rock through raindrop impact, freeze-thaw cycles, or wetting and drying cycles; and (2) the transport of soil and rock particles. Construction erosion stems largely from the movement of water. Erosion by water includes the processes of raindrop erosion, sheet erosion, rill and gully erosion, and stream and channel erosion. Each of these processes is described in more detail below.

Raindrop erosion - Raindrops hitting uncovered soils break down soil aggregate adhesion. The finer particles and organic constituents separate from the heavier soil particles, destroying the soil structure. When the soil dries, a hard crust often forms that reduces water infiltration and inhibits plant establishment. Raindrop erosion is a function of the energy imparted to the land surface and is directly related to raindrop size.

Sheet erosion - Sheet erosion transports saturated soil particles dislodged by raindrop impact in a uniform sheet. This shallow surface flow concentrates within a few feet into surface depressions.

Rill and gully erosion - Sheet erosion quickly concentrates into depressions and then incises grooves into the soil surface. These grooves, called rills, are only a few inches deep, but allow storm water carrying sediments to increase in velocity; which enhances the ability of the storm water to detach and transport soil particles. When water becomes concentrated into a channel, it can travel many times faster than sheet flow. As the energy of the sediment-laden storm water increases, the rills widen and combine into larger channels that create gullies. The majority of sediment from construction sites is produced by sheet, rill, and gully erosion. The magnitude at which gullies are able to erode soil far exceeds that for sheet and rill erosion.

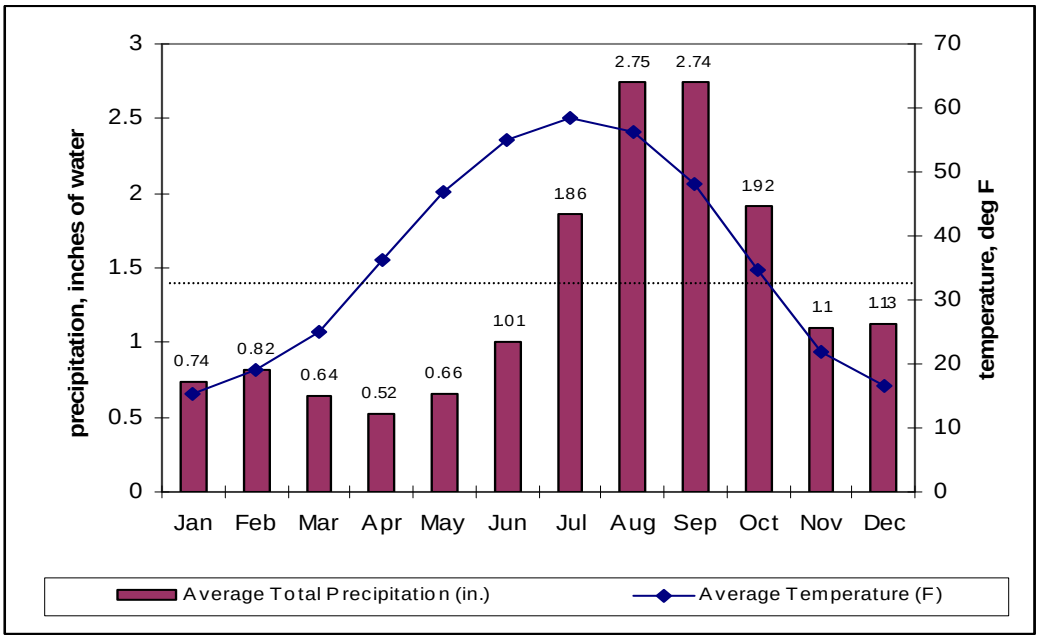
Stream and channel erosion - A stream that experiences augmentation of the natural flow as a result of human activities, or an increase in stream bank erodibility as a result of disturbance of bank vegetation responds with scouring, bank toe instability, bank sloughing, and stream meander instability.

Climate

Climate affects erosion rates through precipitation, precipitation event patterns, and average seasonal temperatures. Erosion rates are directly related to rainfall intensity, duration, and the kinetic energy of the precipitation. Rain contributes to erosion more substantially than does drizzle, snow, or sleet because of higher droplet impact forces. Droplet size, precipitation event frequency, and the intensity of storms are the governing climatic factors in soil erosion. High intensity rainfall events cause flashy runoff and large flow volumes that create rill and gully erosion. In sub-arctic climates, there are additional concerns related to frozen conditions and snowmelt. Meltwater produced during winter Chinook storms, or in the early spring when the ground is partially frozen and vegetative ground cover is at a minimum, can result in erosion events. When the ground is frozen or precipitation is frequent, erosion potential is higher due to reduced soil infiltrative capacity.

Anchorage Temperature and Precipitation, 1952-2007

As recorded at ANCHORAGE WSCMO AP, ALASKA (500280)



Vegetation growth and resulting natural ground cover is also determined by the climate. The amount and distribution of yearly rainfall, and soil temperatures drive vegetation growth rates and govern which plant species thrive in a particular location. Erosion rates are inversely related to vegetation productivity.

It is important to note that extreme events usually create the most severe erosion problems. The probability of extreme events is highest during the wet season. A given amount of rainfall that occurs when the ground is saturated often creates more damage than an equivalent amount of rainfall occurring when the ground is dry. Therefore, the design, implementation, and maintenance of effective erosion controls should provide contingencies for the wet season. BMPs for construction phase temporary controls shall be designed to handle two-year, 24-hour duration storm without damage to the BMP itself and without any degradation to the water quality

of the receiving water body. The two-year 24-hour storm event is defined in Chapter 2 of the *Municipality of Anchorage Design Criteria Manual.*

Soil Characteristics

Soil characteristics that affect soil erodibility include texture, organic content, structure, and permeability. These four characteristics are discussed in detail below.

Texture

The proportion of gravel, sand, silt, and clay particles in the soil determines soil texture, and these factors ultimately determine the erodibility of the soil, settling rates of the sediment, and runoff quantity. Soil texture also influences runoff volumes and infiltration potential. The coarser the texture of the soil, the faster the infiltration rate will be. Conversely, finer textured soils take longer to dry and remain unworkable for longer periods of time. Soil texture also influences the resulting turbidity of runoff, since finer textured soils create more turbidity and have reduced settling rates. However, the erodibility of soil decreases as the percentage of clay increases since clay acts as a binder and limits erodibility.

Organic content

Organic content improves soil structure by increasing the permeability, water-holding capacity, and fertility of the soil. Organic content, either naturally occurring or in mulch, reduces erosion and erosion potential.

Structure

Soil structure is the arrangement, orientation, and organization of soil particles. A granular soil structure with interconnected void spaces is most desirable for drainage. When the soil structure is protected from compaction, interconnected voids can exist in the soil. When the soil is compacted or the surface is crusted, voids are reduced in size and connectivity, and drainage runs off rather than infiltrates, consequently increasing erosion hazard with increased runoff.

Permeability

Soil permeability is a measure of the ease with which water and air pass through a given soil. Soils with a high permeability produce less runoff, which reduces erosion potential, and are more favorable for plant growth.

Topography

The size, shape, and slope of a construction site influence the runoff rate. The potential for erosion increases with increasing slope length and angle. The energy and the erosive potential of flowing water increases with flow velocity, and long slopes without interruptions allow runoff to build up high velocities. High-velocity runoff tends to concentrate in narrow channels and produce rills and gullies. Slope orientation is also a factor in determining erosion potential. South-facing slopes in northern latitudes are warmer and drier, which may result in poor growing conditions that make vegetation re-establishment difficult. Conversely, north-facing slopes receive less sun, have lower soil temperatures, and consequently have slower plant growth rates.

Ground Cover

Ground cover includes natural vegetation and artificial covers such as mulches, erosion control matting, wood chips, and crushed aggregates. Vegetation is the single most effective form of erosion control. It protects the soil surface from raindrop impact, reduces runoff velocity, filters sediment from runoff, prevents dislodging of soil particles, and enhances the soil's infiltrative

capacity through root zone uptake and evapotranspiration. In comparison, artificial ground cover only shields the soil surface from raindrop impact and slows runoff velocity.

Land Management Practices

Land management practices have a dramatic effect on erosion potential. A comprehensive land management plan that addresses land clearing, minimization of impervious areas, directly connected impervious areas, landscaping, and protection of buffers near waterbodies can significantly reduce erosion potential. The combined efforts can enhance the soil texture and groundcover, as well as mitigate the influence of rainfall and runoff.