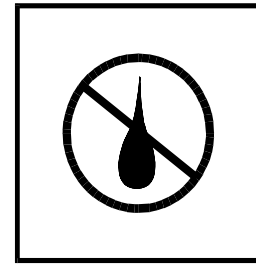
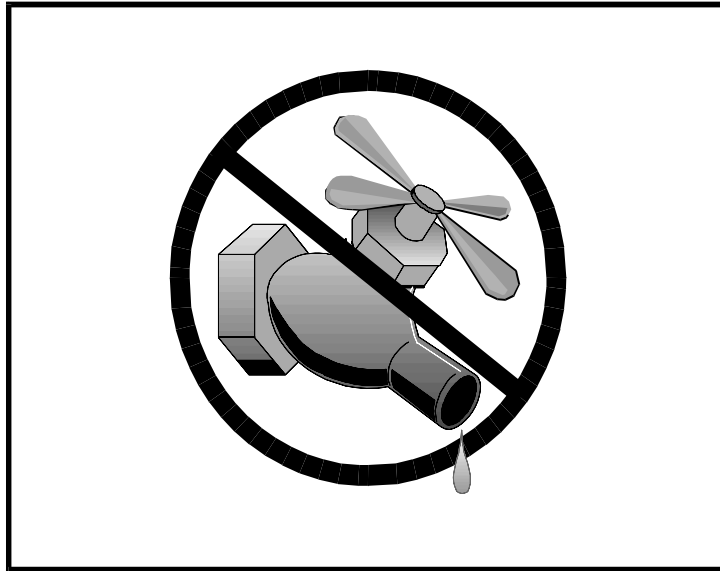


# Water Conservation Practices

NS-1



- BMP Objectives**
- Soil Stabilization
  - Sediment Control
  - Tracking Control
  - Wind Erosion Control
  - Non-Storm Water Management
  - Materials and Waste Management

## Definition and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and/or the transport of pollutants off site.

## Appropriate Applications

- Water conservation practices are implemented wherever water is used.
- Applies to all construction projects.

## Limitations

- None identified.

## Design Guidelines and Considerations

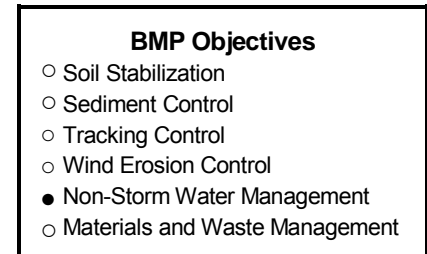
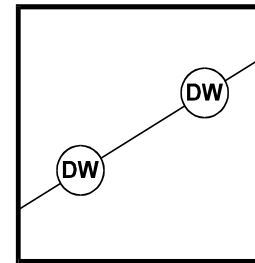
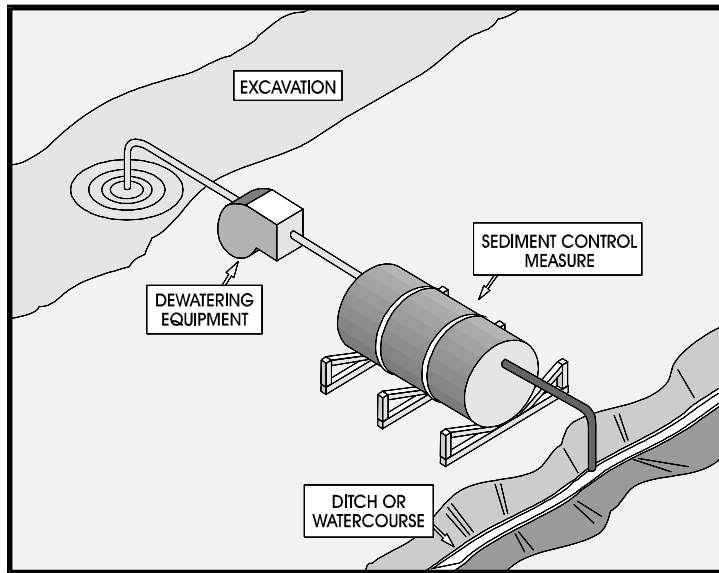
- Keep water equipment in good working condition.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. Paved areas shall be swept and vacuumed.
- Direct construction water runoff to areas where it can soak into the ground.
- Apply water for dust control in accordance with MDT Standard Specifications.

## Maintenance, Inspection and Removal

- Inspect water equipment at least weekly.

# Dewatering Operations

NS-2



## Definition and Purpose

Dewatering operations are practices that manage the discharge of pollutants from groundwater and accumulated precipitation dewatering operations. All appropriate State and Federal permits are required. Permits to be completed by the MDT Environmental Services Bureau.

## Appropriate Applications

These practices are implemented where groundwater or accumulated precipitation will be discharged from a construction site. Controlling sediment from dewatering operations is required on all projects that pump sediment-laden water from work areas and plan to discharge the pumped water into a conveyance system or water body. Dewatering discharges include but are not limited to:

- Removal of uncontaminated groundwater.
- Removal of accumulated rainwater from work areas.
- Removing water from cofferdams or diversions.

## Limitations

- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this BMP address sediment only. If the presence of polluted water is identified in the contract, the contractor shall implement dewatering pollution controls as required by the contract documents. If the quality of water to be removed by dewatering is not identified as polluted in the contract documents, but is later determined by observation or testing to be polluted, the contractor shall notify the Engineer and comply with MDT Standard Specifications.

- The controls detailed in this BMP only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Dewatering operations will require, and must comply with, applicable local permits.
- Avoid dewatering discharges where possible by using the water for dust control, by infiltration, etc.

### **Design Guidelines and Considerations**

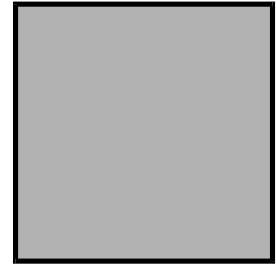
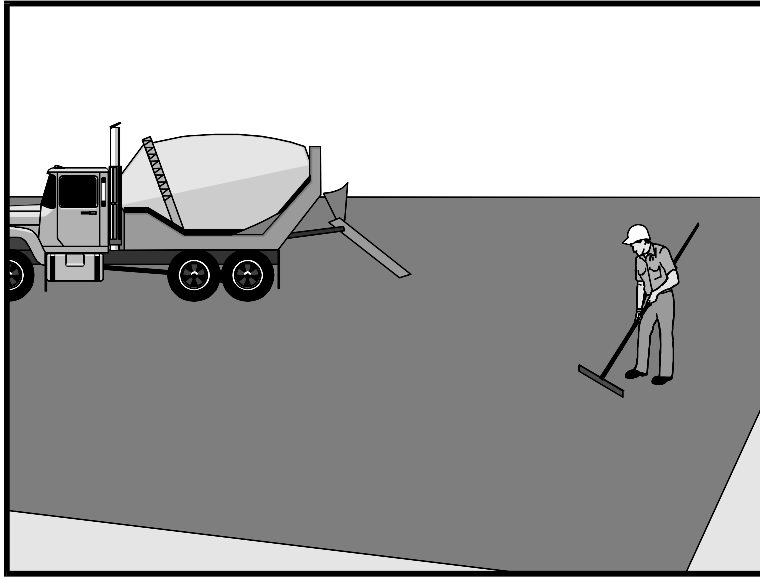
- Contractor shall notify the Engineer of planned discharges.
- The Engineer will coordinate monitoring and permit compliance.
- Discharges must comply with regional and watershed-specific discharge requirements.
- Ensure that dewatering discharges do not cause erosion at the discharge point.
- **Sediment Control Treatment:** Dewatering effluent (groundwater and accumulated precipitation) that is laden with suspended solids shall be treated by a device designed to remove soil particles down to 0.02 mm (0.0008 in) in size. Desilting basins (see BMP SC-2) and sediment traps (see BMP SC-3) are examples of temporary treatment devices; these devices shall be designed according to the respective BMPs.
- A filtration device may be substituted for a desilting basin or sediment trap if the Contractor can demonstrate, to the Engineer's satisfaction, that the filtration device provides equivalent or greater removal of suspended solids than the basin.
- Filter bags may be used for small-scale dewatering operations.

### **Maintenance, Inspection, and Removal**

- Prior to completion of permit application, notify MDT's Environmental Services Bureau to perform testing requirements and complete necessary paper work for the permit.
- Inspect filtering device frequently and repair or replace once the sediment build-up prevents the structure from functioning as designed.
- Accumulated suspended solids removed from a dewatering device shall be spread on the project site and stabilized at locations designated by the Engineer, or shall be disposed of outside the right-of-way in conformance with the MDT Standard Specifications.

# Paving and Grinding Operations

## NS-3



### BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

### Definition and Purpose

Procedures that minimize pollution of storm water runoff during paving operations, including new paving and preparation of existing paved surfaces for overlays.

### Appropriate Applications

These procedures are implemented where paving, surfacing, resurfacing, or saw cutting, may pollute storm water runoff or discharge to the storm drain system or watercourses.

### Limitations

- Finer solids are not effectively removed by filtration systems.
- Paving opportunities may be limited during wet weather.

### Design Guidelines and Considerations

- Substances used to coat asphalt transport trucks and asphalt trucks and asphalt spreading equipment shall not contain soap and shall be non-foaming and non-toxic.
- Place drip pans or absorbent materials under paving equipment while not in use, to catch and/or contain drips and leaks. See also BMP WM-10, "Liquid Waste Management".
- When paving involves asphaltic concrete (AC), the following steps shall be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - Minimize the washing of sand or gravel from new asphalt into storm drains, streets, and creeks by sweeping where practical.
  - Old or spilled asphalt must be disposed as approved by the Engineer.

- AC grindings, pieces, or chunks used in embankments or shoulder backing must not be allowed to enter any storm drains or watercourses. Apply temporary perimeter controls until structure is stabilized or permanent controls are in place. Examples of temporary perimeter controls can be found in the following BMPs: SS-10, “Earth Dikes/Drainage Swales & Ditches”; SC-1, “Silt Fence”; or SC-5, “Fiber Rolls”.
  - Collect and remove all broken asphalt and recycle when practical; otherwise, dispose in accordance with MDT Standard Specification.
  - Any AC chunks and pieces used in embankments must be placed above the water table and covered by at least 0.3 m (1 ft) of material.
  - Use only non-toxic substances to coat asphalt transport trucks and asphalt spreading equipment.
- Drainage inlet structures and manholes shall be covered with filter fabric during application of seal coat, tack coat, slurry seal, and/or fog seal.
  - Seal coat, tack coat, slurry seal, or fog seal shall not be applied if rainfall is predicted to occur during the application or curing period.
  - Clean asphalt coated equipment off-site whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in BMP WM-5, “Solid Waste Management”. Any cleaning on site shall follow BMP NS-8, “Vehicle and Equipment Cleaning”.
  - Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect and return to aggregate base stockpile, or dispose of properly.
  - Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in BMP WM-08, “Concrete Waste Management”, or pump the water to the sanitary sewer if allowed by the local wastewater authority.
  - Do not allow saw-cut Portland Concrete Cement Pavement (PCCP) slurry to enter storm drains or watercourses. Residue from grinding operations shall be picked up by means of a vacuum attachment to the grinding machine, shall not be allowed to flow across the pavement, and shall not be left on the surface of the pavement. See also BMP WM-8, “Concrete Waste Management” and BMP WM-10, “Liquid Waste Management”.

***Pavement Grinding and Removal***

- Collect material that was excavated by mechanical or manual methods. This material may be recycled if approved by the Engineer for use as shoulder backing or base material at locations approved by the Engineer.
- If digout material cannot be recycled, transport the material back to a maintenance facility or approved storage site.
- Digout activities shall not be conducted in the rain.

- When approved by the Engineer, stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses.
- Disposal of PCCP and AC waste shall be in conformance with MDT Standard Specifications. See also BMP WM-8, “Concrete Waste Management”.

### ***Thermoplastic Striping***

- All thermoplastic striper and pre-heater equipment shutoff valves shall be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the storm water drainage system, or watercourses.
- The pre-heater shall be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave 150 mm (6 in) of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move when the vehicle is deadheaded.
- Contractor shall not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible recycle thermoplastic material. Thermoplastic waste shall be disposed of in accordance with MDT Standard Specifications.

### ***Raised/Recessed Pavement Marker Application and Removal***

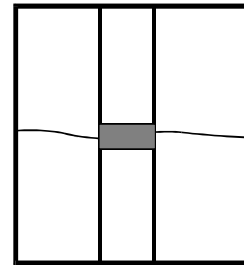
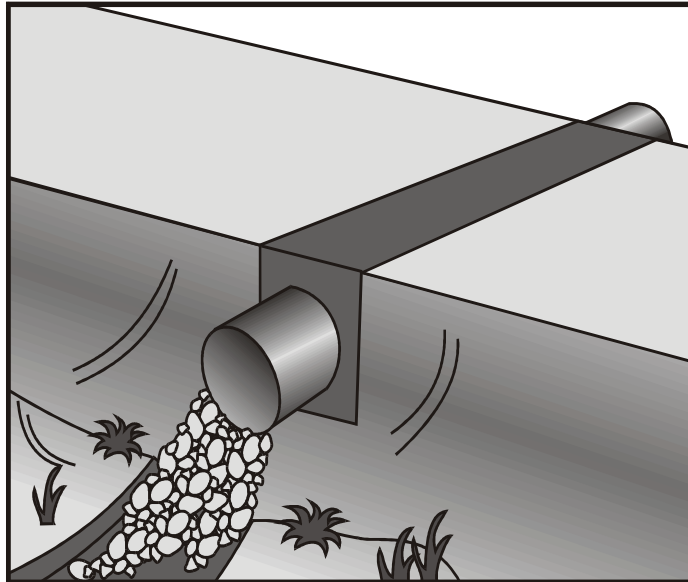
- Do not transfer or load bituminous material near drain inlets, the storm water drainage system or watercourses.
- Melting tanks shall be loaded with care and not filled to beyond 150 mm (6 in) from the top to leave room for splashing when vehicle is deadheaded.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.
- Waste shall be disposed of in accordance with MDT Standard Specifications.

### **Maintenance, Inspection, and Removal**

- Inspect and maintain machinery regularly to minimize leaks and drips.
- Ensure that employees and subcontractors are implementing appropriate measures during paving operations.

# Temporary Stream Crossing

NS-4



BMP Objectives	
●	Soil Stabilization
○	Sediment Control
○	Tracking Control
○	Wind Erosion Control
●	Non-Storm Water Management
○	Materials and Waste Management

## Definition and Purpose

A temporary stream crossing is a structure placed across a waterway, which allows vehicles to cross the waterway during construction without entering the water, eliminating erosion and downstream sedimentation caused by the vehicles. All appropriate State and Federal permits are required. Permits to be completed by the MDT Environmental Services Bureau.

## Appropriate Applications

Temporary stream crossings are installed at sites:

- Where appropriate permits have been secured.
- Where construction equipment or vehicles need to frequently cross a waterway.
- When alternate access routes impose significant constraints.
- When crossing perennial streams or waterways causes significant erosion.
- Where construction activities will not last longer than one year.

## Limitations

- Will usually disturb the waterway during installation and removal.
- Requires appropriate State and Federal permits. Permits to be completed by the MDT Environmental Services Bureau.
- Installation may require dewatering or temporary diversion of the stream. See BMP NS-2, "Dewatering Operations".

- May become a constriction in the waterway, which can obstruct flood flow and cause flow backups or washouts. If improperly designed, flow backups can increase the pollutant load through washouts and scouring.

## **Design Guidelines and Considerations**

### ***General Considerations***

Location of the temporary stream crossing shall address:

- Site selection where erosion potential is low.
- Areas where the side slopes from highway runoff will not spill into the side slopes of the crossing.

The following types of temporary stream crossings shall be considered:

- Culverts - Used on perennial and intermittent streams.
- Fords - Appropriate during the dry season in arid areas. Used on dry washes and ephemeral streams. Avoid use on perennial streams.
- Bridges - Appropriate for streams with high flow velocities, steep gradients and/or where temporary restrictions in the channel are not allowed.

Design and installation requires knowledge of stream flows and soil strength. Designs shall be prepared under direction of, and approved by, a registered civil and/or structural engineer. Both hydraulic and construction loading requirements shall be considered with the following:

- Comply with the requirements for culvert and bridge crossings, as contained in the MDT Hydraulics, Bridge and Road Design Manuals, particularly if the temporary stream crossing will remain through the rainy season.
- Provide stability in the crossing and adjacent areas to withstand the design flow. The design flow and safety factor shall be selected based on careful evaluation of the risks due to over topping, flow backups, or washout.
- Install sediment traps immediately downstream of crossings to capture sediments. See BMP SC-3, "Sediment Trap".
- Avoid oil or other potentially hazardous waste materials for surface treatment.

### ***Construction Considerations***

- Stabilize construction roadways, adjacent work area and stream bottom against erosion.
- Construct during dry periods to minimize stream disturbance and reduce costs.
- Construct at or near the natural elevation of the streambed to prevent potential flooding upstream of the crossing.



- Vehicles and equipment shall not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as authorized by the Engineer, as necessary to complete the work.
- Temporary water body crossings and encroachments shall be constructed to minimize scour. Cobbles used for temporary water body crossings or encroachments shall be clean, rounded river cobble.
- The exterior of vehicles and equipment that will encroach on the water body within the project shall be power washed to remove residues.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment.
- Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble shall be removed upon completion of project activities.
- Any temporary artificial obstruction placed within flowing water shall only be built from material, such as clean gravel or sandbags, which will cause little or no siltation.
- Drip pans shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.
- Conceptual temporary stream crossings are shown in the Detailed Drawings.

### ***Specific Considerations***

- Culverts are relatively easy to construct and able to support heavy equipment loads.
- Fords are the least expensive of the crossings, with maximum load limits.
- Temporary fords are not appropriate if construction will continue through rainy season, if thunderstorms are likely, or if the stream is perennial.
- Bridges are generally more expensive to design and construct, but provides the least disturbance of the streambed and constriction of the waterway flows.

### **Maintenance, Inspection, and Removal**

Maintenance provisions shall include:

- Periodic removal of silt behind fords, in culverts, and under bridges.
- Replacement of lost aggregate from inlets and outlets of culverts.

- Removal of temporary crossing promptly when it is no longer needed.

Inspection shall, at a minimum, occur weekly and after each significant rainfall, and include:

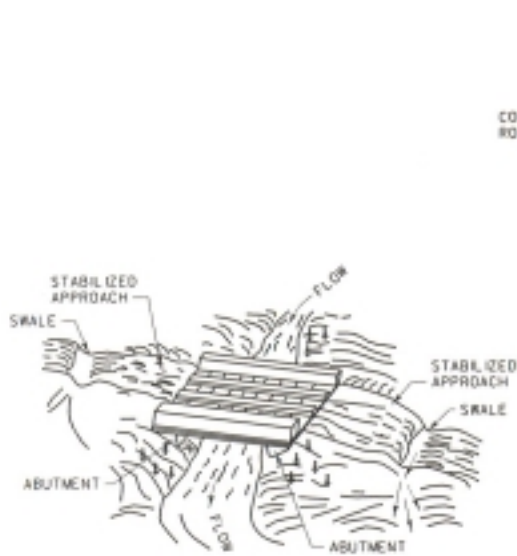
- Checking for blockage in the channel, sediment buildup in culverts or behind fords, or trapped debris.
- Checking for erosion of abutments, channel scour, riprap displacement, or piping in the soil.
- Checking for structural weakening of the temporary crossing, such as cracks, and undermining of foundations and abutments.

SYMBOL: \_\_\_\_\_

TEMPORARY STREAM CROSSINGS NS-4:

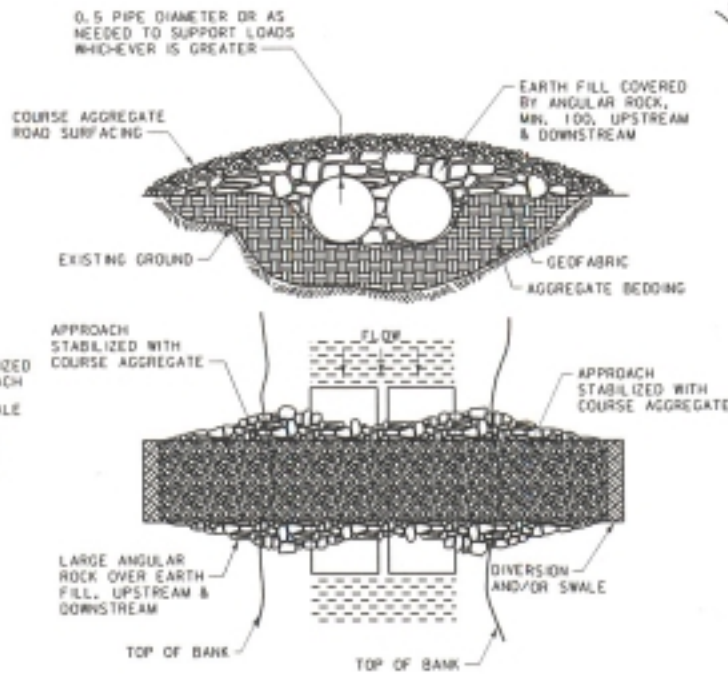
A TEMPORARY STREAM CROSSING IS A STRUCTURE PLACED ACROSS A WATERWAY THAT ALLOWS VEHICLES AND/OR HEAVY EQUIPMENT TO CROSS THE WATERWAY DURING CONSTRUCTION. THE STREAM CROSSINGS PROTECT THE STREAM BANKS AND CHANNELS FROM DAMAGE CAUSED BY VEHICLE MOVEMENT WHICH RELEASES SEDIMENT.

TEMPORARY STREAM CROSSINGS CAN CONSIST OF BRIDGES, CULVERTS OR FORDS. FOLLOW STREAM CROSSING GUIDELINES PROVIDED IN THE MD1/FPW TASK FORCE RECOMMENDATIONS REPORT. TEMPORARY STREAM CROSSINGS REQUIRE THE ACQUISITION OF SPECIAL PERMITS.

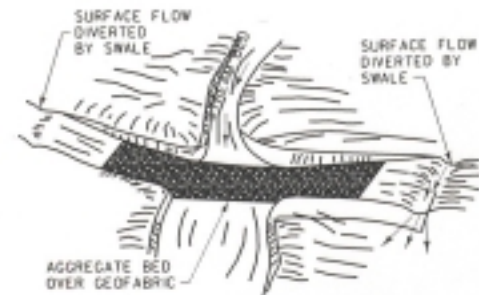


NOTE: SURFACE FLOW OF ROAD DIVERTED BY SWALE AND/OR DIKE

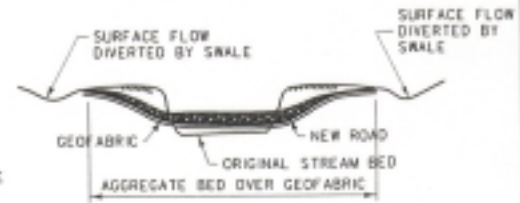
TYPICAL BRIDGE CROSSING



TYPICAL CULVERT CROSSING



AGGREGATE APPROACH  
5:1 MAXIMUM SLOPE ON ROAD



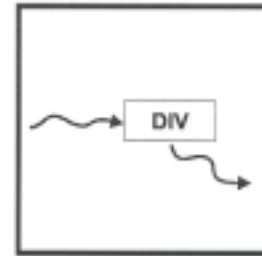
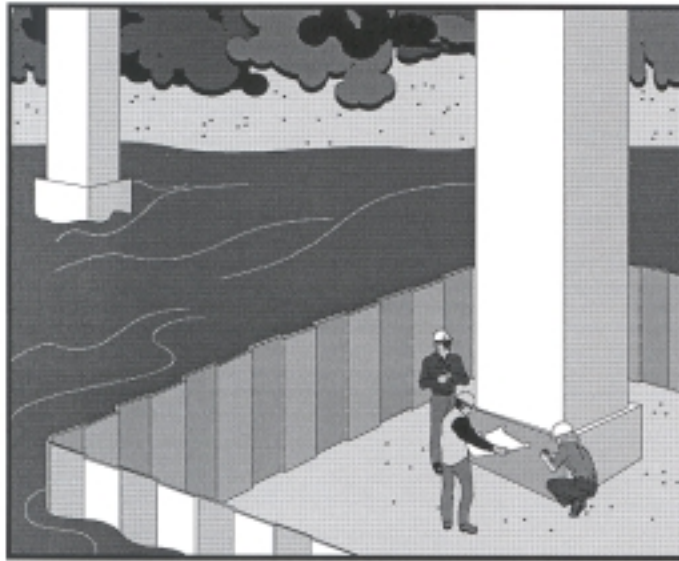
TYPICAL FORD CROSSING

PRELIMINARY

REFERENCE STANDARD SPEC. SECTION 208	DWG. NO. 208-27
TEMPORARY STREAM CROSSINGS (NS-4)	
EFFECTIVE:	
<b>CDM</b> Camp Dresser & McKee Inc.	

# Clear Water Diversion

NS-5



## BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

## Definition and Purpose

Clear water diversion consists of a system of structures and measures that intercept clear surface water runoff upstream of a project site, transport it around the site, and discharge it downstream with minimal water quality degradation for either the project construction operations or the construction of the diversion. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains, drainage, and interceptor swales.

## Appropriate Applications

Implemented where appropriate permits have been secured and work must be performed in a running stream or water body.

## Limitations

- Diversion/encroachment activities will usually disturb the waterway during installation and removal of diversion structures.
- Specific permit requirements or mitigation measures, such as the U.S. Army Corps of Engineers, Montana Department of Fish and Game, Federal Emergency Management Agency (FEMA), DEQ, etc. may be included in contract documents because of clear water diversion/encroachment activities.
- Diversion/encroachment activities may constrict the waterway, which can obstruct flood flows and cause flooding or washouts.

## Design Guidelines and Considerations

### General

- Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and streams. During construction of the barriers, muddying of streams shall be held to a minimum.

- Diversion structures must be adequately designed to accommodate fluctuations in water depth or flow volume due to tides, storms, flash floods, etc.
- Heavy equipment driven in wet portions of a water body to accomplish work shall be completely clean of petroleum residue, and water levels are below the gear boxes of the equipment in use, or lubricants and fuels are sealed such that inundation by water shall not result in leaks.
- Mechanical equipment operated in the water shall not be submerged to a point above any axle of said mechanical equipment.
- Excavation equipment buckets may reach out into the water for the purpose of removing or placing fill materials. Only the bucket of an excavator/backhoe may operate in a water body. The main body of the crane/excavator/backhoe shall not enter water covered portions of a water body, except as necessary to cross the stream to access the work site.
- Stationary equipment, such as motors and pumps, located within or adjacent to a water body shall be positioned over drip pans.
- When any artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall, at all times, be allowed to pass downstream to maintain aquatic life downstream.
- The exterior of vehicles and equipment that will encroach on a water body within the project shall be power washed to remove residues.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment.
- Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble shall be removed upon completion of project activities.
- Drip pans shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.
- Where possible, avoid or minimize diversion/encroachment impacts by scheduling construction during periods of low flow or when the stream is dry. See also the project special provisions for scheduling requirements. Scheduling shall also consider seasonal releases of water from dams, fish migration and spawning seasons, and water demands due to crop irrigation.

- Construct diversion structures with materials free of potential pollutants such as soil, silt, sand, clay, grease, or oil. If sandbags are used, they shall be filled with clean materials free of silt, clay, and organic substances.

### ***Temporary Diversions/Encroachments***

- Construct diversion channels in accordance with BMP SS-9, “Earth Dikes/Drainage Swales, and Ditches”.
- In high flow velocity areas, stabilize slopes of embankments and diversion ditches using an appropriate liner, in accordance with BMP SS-7, “Geotextiles, Mats/Plastic Covers and Erosion Control Blankets”, or, use rock slope protection, as described in MDT Standard Specifications
- Where appropriate, use natural streambed materials such as large cobbles and boulders for temporary embankment/slope protection, or other temporary soil stabilization methods.
- Provide for velocity dissipation at transitions in the diversion, such as the point where the stream is diverted to the channel and the point where the diverted stream is returned to its natural channel. See also BMP SS-10, “Outlet Protection/Velocity Dissipation Devices”.

### ***Temporary Dry Construction Areas***

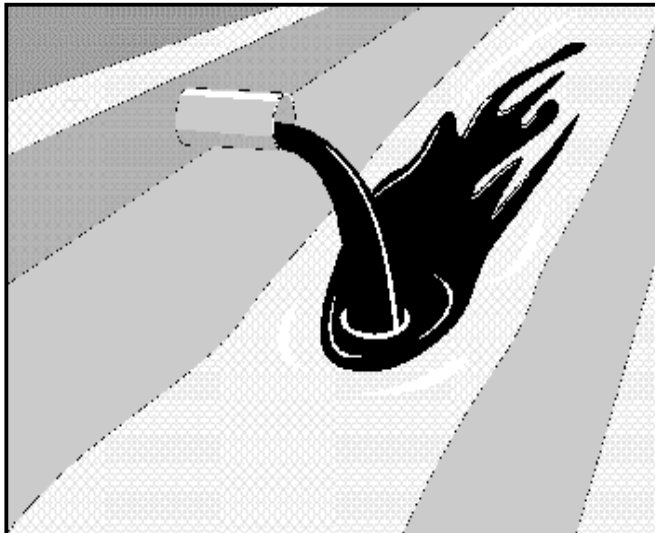
- When dewatering behind temporary structures to create a temporary dry construction area, such as cofferdams, pass pumped water through a sediment settling device, such as a portable tank or settling basin, before returning water to the water body. See also BMP NS-2, “Dewatering Operations”.
- If the presence of polluted water or sediment is identified in the contract, the contractor shall implement dewatering pollution controls as required by the contract documents. If the quality of water or sediment to be removed while dewatering is not identified as polluted in the contract documents, but is later determined by observation or testing to be polluted, the contractor shall notify the Engineer and comply with MDT Standard Specifications.
- Any substance used to assemble or maintain diversion structures, such as form oil, shall be non-toxic and non-hazardous.
- Any material used to minimize seepage underneath diversion structures, such as grout, shall be non-toxic, non-hazardous, and as close to a neutral pH as possible.

### ***Maintenance, Inspection, and Removal***

- Inspect diversion/encroachment structures before and after significant storms, and at least once per week while in service.
- Inspect embankments and diversion channels before and after significant storms, and at least once per week while in service for damage to the linings, accumulating debris, sediment buildup, and weakening of the slope protection. Remove debris and repair linings and slope protection as required.

# Illicit Connection/Illegal Discharge Detection and Reporting

NS-6



### BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

## Definition and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents to the Engineer.

## Appropriate Applications

- Illicit connection/illegal discharge detection and reporting is applicable anytime an illicit discharge is discovered or illegally dumped material is found on the construction site.
- This BMP applies to all construction projects.

## Limitations

- Unlabeled or non-identifiable material shall be assumed to be hazardous.
- Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor.
- Procedures and practices presented in this BMP are general. Contractor shall use extreme caution, immediately notify the Engineer when illicit connections or illegal dumping or discharges are discovered, and take no further action unless directed by the Engineer.
- If pre existing hazardous materials or wastes are known to exist on site, the contractor's responsibility will be detailed in separate special provisions.

## **Design Guidelines and Considerations**

### ***Planning***

- Inspect site before beginning the job for evidence of illicit connections or illegal dumping or discharges.
- Inspect site regularly during project execution for evidence of illicit connections or illegal dumping or discharges.
- Observe site perimeter for evidence or potential of illicitly discharged or illegally dumped material, which may enter the job site.
- Identification of illicit connections and illegal dumping or discharges.
- Solids - Look for debris or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- Liquids - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils.
  - Pungent odors coming from the drainage systems.
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes.
  - Abnormal water flow during the dry weather season.
- Urban Areas - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season.
  - Unusual flows in sub drain systems used for dewatering.
  - Pungent odors coming from the drainage systems.
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels, or drain boxes.
  - Excessive sediment deposits, particularly adjacent to or near active off-site construction projects.
- Rural Areas - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the dry weather season.



- Non-standard junction structures.
- Broken concrete or other disturbances at or near junction structures.

***Reporting***

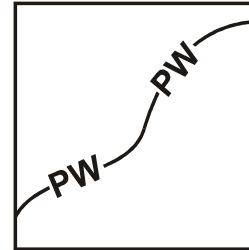
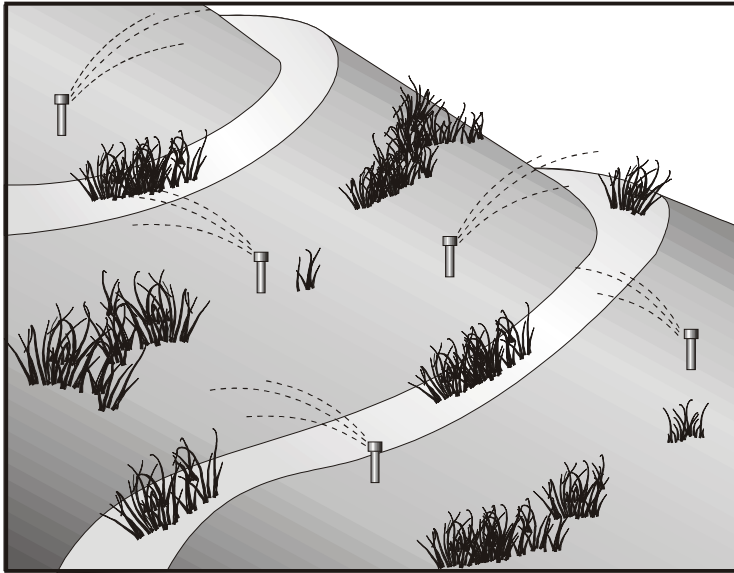
- Notify the Engineer of any illicit connections and illegal dumping or discharge incidents at the time of discovery. The Engineer will notify MDT Environmental Services Bureau for reporting.

***Cleanup and Removal***

- The contractor is not responsible for investigation and clean up of illicit or illegal dumping or discharges not generated by the Contractor. MDT may direct Contractor to clean up non-hazardous dumped or discharged material on the construction site.

# Potable Water/Irrigation

NS-7



- BMP Objectives**
- Soil Stabilization
  - Sediment Control
  - Tracking Control
  - Wind Erosion Control
  - Non-Storm Water Management
  - Materials and Waste Management

## Definition and Purpose

Potable Water/Irrigation consists of practices and procedures to reduce the possibility for the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

## Appropriate Applications

Implement this BMP whenever the above activities or discharges occur at or enter a construction site.

## Limitations

None identified.

## Design Guidelines and Considerations

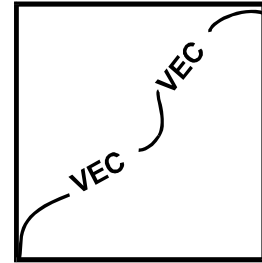
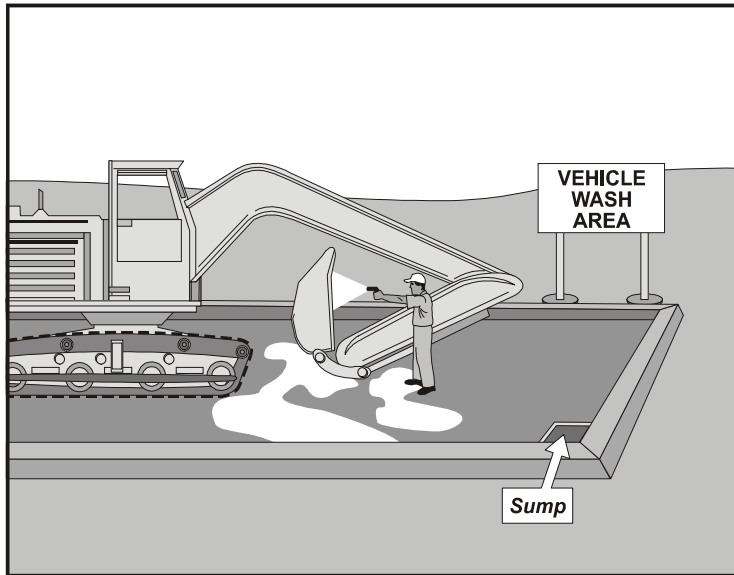
- Where possible, direct water from off-site sources around or through a construction site in a way that minimizes contact with the construction site.
- When possible, discharges from water line flushing shall be reused for landscaping purposes.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream storm water drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to

minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

### **Maintenance, Inspection, and Removal**

- Repair broken water lines as soon as possible or as directed by the Engineer.

# Vehicle and Equipment Cleaning NS-8



- BMP Objectives**
- Soil Stabilization
  - Sediment Control
  - Tracking Control
  - Wind Erosion Control
  - Non-Storm Water Management
  - Materials and Waste Management

## Definition and Purpose

Procedures and practices used to minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning operations to storm drain system or to watercourses.

## Appropriate Applications

These procedures are applied on all construction sites where vehicle and equipment cleaning is performed.

## Limitations

None.

## Design Guidelines and Considerations

- On-site vehicle and equipment washing is discouraged.
- Cleaning of vehicles and equipment with soap, solvents, or steam shall not occur on the project site unless the Engineer has been notified in advance and the resulting wastes are fully contained and disposed of outside the right-of-way in conformance with the provisions in MDT Standard Specifications. Resulting wastes shall not be discharged or buried within the right-of-way.
- Vehicle and equipment wash water shall be contained for percolation or evaporative drying away from storm drain inlets or watercourses and shall not be discharged within the right-of-way.
- All vehicles/equipment that regularly enter and leave the construction site must be cleaned off-site.

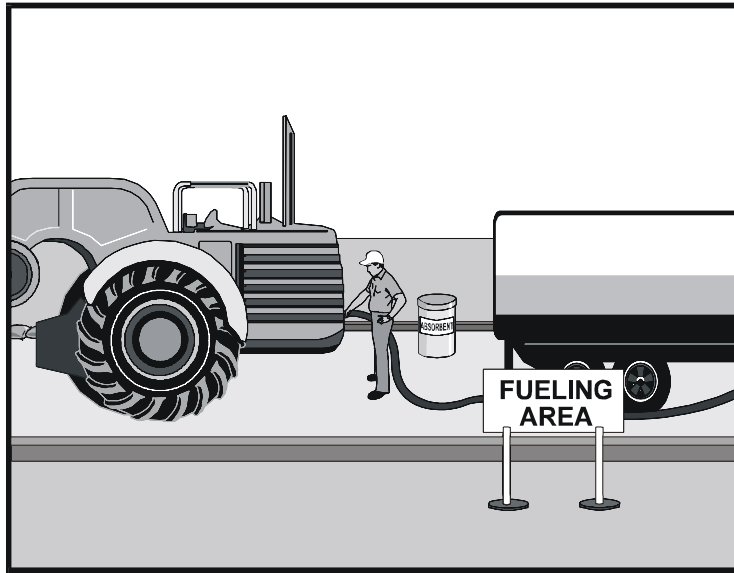
- When vehicle/equipment washing/cleaning must occur on-site and the operation can be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area shall have the following characteristics, and shall be arranged with the construction storm water coordinator:
  - Located away from storm drain inlets, drainage facilities, or watercourses.
  - Paved with concrete or asphalt and bermed to contain wash waters and to prevent run-on and runoff.
  - Configured with a sump to allow collection and disposal of wash water.
  - Wash waters shall not be discharged to storm drains or watercourses.
  - Used only when necessary.
- When cleaning vehicles/equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose, and shall be considered.
  - Use positive shutoff valve to minimize water usage.

### **Maintenance, Inspection, and Removal**

- The control measure shall be inspected at a minimum of once a week.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed or as directed by the Engineer.

# Vehicle and Equipment Fueling

NS-9



- BMP Objectives**
- Soil Stabilization
  - Sediment Control
  - Tracking Control
  - Wind Erosion Control
  - Non-Storm Water Management
  - Materials and Waste Management

## Definition and Purpose

Procedures and practices to minimize or eliminate the discharge of fuel spills and leaks into the storm drain system or to watercourses.

## Appropriate Applications

These procedures are applied on all construction sites where vehicle and equipment fueling takes place.

## Limitations

- On-site vehicle and equipment fueling shall only be used where it's impractical to send vehicles and equipment off-site for fueling.

## Design Guidelines and Considerations

- When fueling must occur on-site, the contractor shall select and designate an area to be used, subject to approval of the Engineer.
- Absorbent spill clean-up materials and spill kits shall be available in fueling areas and on fueling trucks and shall be disposed of properly after use.
- Drip pans or absorbent pads shall be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Dedicated fueling areas shall be protected from storm water run-on and runoff, and shall be located at least 15 m (50 ft) from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut-off to control drips. Fueling operations shall not be left unattended.

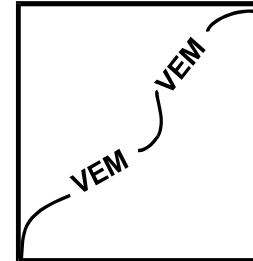
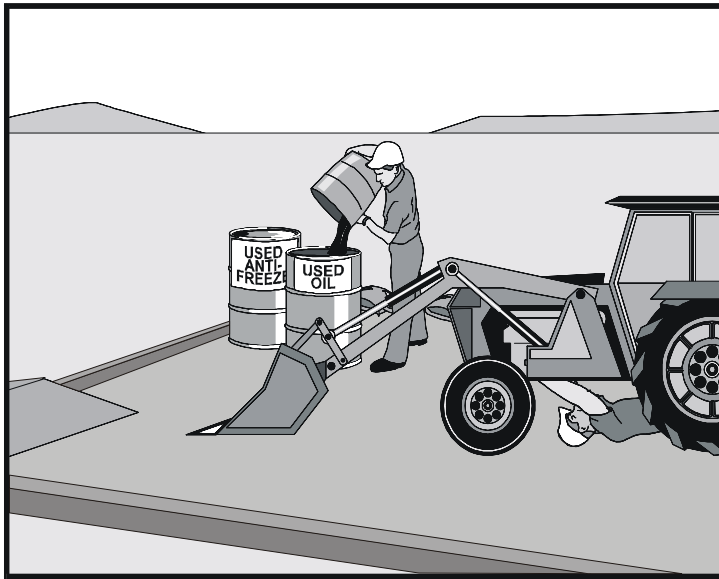
- Protect fueling areas with berms and/or dikes to prevent run-on, runoff, and to contain spills.
- Fuel tanks shall not be "topped-off."
- Vehicles and equipment shall be inspected each day of use for leaks. Leaks shall be repaired immediately, or problem vehicles or equipment shall be removed from the project site.
- Absorbent materials shall be used on small spills instead of hosing down or burying techniques. The spent absorbent material shall be removed promptly and disposed of properly.
- Federal, state, and local requirements shall be observed for any stationary above ground storage tanks.
- Mobile fueling of construction equipment throughout the site shall be minimized. Whenever practical, equipment shall be transported to the designated fueling area.

### **Maintenance, Inspection, and Removal**

- Fueling areas and storage tanks shall be inspected on a regular basis.
- Keep an ample supply of spill cleanup material on the site.
- Immediately cleanup spills and properly dispose of contaminated soil and cleanup materials.

# Vehicle and Equipment Maintenance

NS-10



- BMP Objectives**
- Soil Stabilization
  - Sediment Control
  - Tracking Control
  - Wind Erosion Control
  - Non-Storm Water Management
  - Materials and Waste Management

## Definition and Purpose

Procedures and practices to minimize or eliminate the discharge of pollutants to the storm drain system or to watercourses from vehicle and equipment maintenance procedures.

## Appropriate Applications

These procedures are applied on all construction projects where an on-site yard area is necessary for storage and maintenance of heavy equipment and vehicles.

## Limitations

None identified.

## Design Guidelines and Considerations

- Drip pans or absorbent pads shall be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Dedicated maintenance areas shall be protected from storm water run-on and runoff, and shall be located at least 15 m (50 ft) from downstream drainage facilities and watercourses.
- Drip Pans or plastic sheeting shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.



- Absorbent spill clean-up materials shall be available in maintenance areas and shall be disposed of properly after use. Substances used to coat asphalt transport trucks and asphalt-spreading equipment shall be non-toxic. Drainage inlet structures and manholes shall be covered with filter fabric when seal coat, tack coat, slurry seal, or fog seal is applied to adjacent surfaces. Seal coat, tack coat, slurry seal, or fog seal shall not be applied if rainfall or thunderstorms are predicted to occur during the application or curing period.
- Use off-site maintenance facilities whenever practical.
- For long-term projects, consider using portable tents or covers over maintenance areas.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not dump fuels and lubricants onto the ground.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.
- Repair leaks of fluids and oil immediately.
- Provide spill containment dikes or secondary containment around stored oil and chemical drums.

### **Maintenance, Inspection, and Removal**

- Maintain waste fluid containers in leak proof condition.
- Vehicle and equipment maintenance areas shall be inspected regularly.
- Vehicles and equipment shall be inspected on each day of use. Leaks shall be repaired immediately or the problem vehicle(s) or equipment shall be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.