

NDDOT Erosion & Sediment Control – Construction Course

Module 2: Regulations & Special Provisions



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Permitting Authority



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Clean Water Act

Section 402

Established the National Pollutant Discharge Elimination System (NPDES)

Allowed for delegation to individual States for waters within their jurisdictions



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ND Authority

1975 ND was granted primacy of NPDES

Established NDCC § 61-28 and NDAC § 33-16



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ND Authority

NDCC § 61-28-06(1)

Makes it unlawful for a person to cause pollution
to any waters of the state



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ND Authority

NDCC § 61-28-06(2)

Allows the North Dakota Department of Health
the ability to issue a construction stormwater
permit



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ND Authority

NDCC § 61-28-08(4)

Establishes the penalty of:

Up to \$12,500 per day per violation



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State Construction General Permit (NDR10-0000)



Division of Water Quality
(701) 328-5210



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Definitions

“Waters of the State”

All waters within the jurisdiction of this state, including all streams, lakes, ponds, impounding reservoirs, marshes, watercourses, waterways, and all other bodies or accumulations of water on or under the surface of the earth, natural or artificial, public or private, situated wholly or partly within or bordering upon the state, except those private waters that do not combine or effect a junction with natural surface or underground waters just defined.

Definitions

“Wastes”

All substances which cause or tend to cause pollution of any waters of the state, including dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radiological materials, heat, wrecked or discarded equipment, *rock, sand, and cellar dirt* and industrial, municipal, and agricultural pollution discharged into any waters of the state.

Definitions

“Pollution”

Manmade or man-induced alteration of the physical, chemical, biological, or radiological integrity of any waters of the state.



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State Construction General Permit

Permit # NDR10-0000

Reissued April 1, 2015

Expires March 31, 2020



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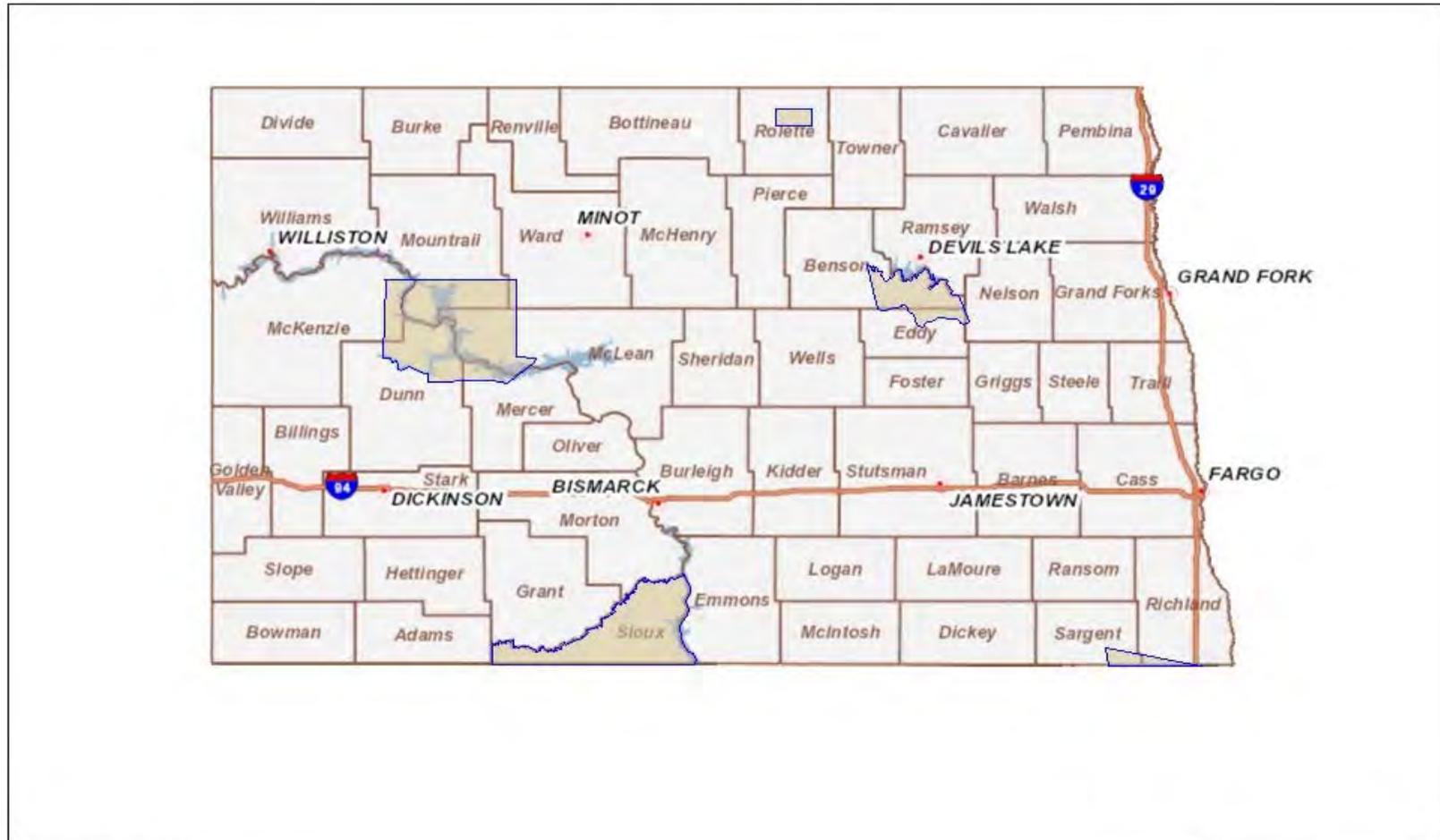
State and Federal Authority

North Dakota Department of Health

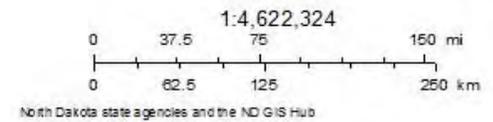
U.S. Environmental Protection Agency (EPA)



North Dakota, USA



December 19, 2014



Discharges Part I(A) and (B)

Discharges Covered by the Permit (Part I(A))

Stormwater Discharges from Construction Activity and Support Activities

Stormwater Discharges from Construction Activity

Sites that disturb 1 acre or more

Sites that disturb less than 1 acre and are part of a
larger common plan of development

Stormwater Discharges from Support Activities

Concrete or asphalt batch plants

Equipment staging yards

Material storage areas

Excavated material disposal areas

Borrow areas

Discharges Not Covered by the Permit (Part I(B))

Stormwater from industrial activity

Wastewater discharges

Dredge or fill activity (U.S. Army Corps of
Engineers Section 404 permits)

Water quality standard violations



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Permit Responsibility

Owner (NDDOT and their consultants) is responsible for compliance with all terms and conditions of the permit

Operator (prime contractor) has day-to-day supervision of construction activities **and is jointly responsible** for compliance as they pertain to the activities delegated to the operator.



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Local Authority Part II(D)

Local Requirements (Part II(D))

Does not take the place of local authority

- City
- County
- NDDOT Specifications

Memorandum of Agreement (MOA)

Agreement between NDDOT and NDDoH

Identifies responsibilities and coordinates efforts

Serves as signature for NDDOT, as owner, where required by the permit (e.g., Notice of Intent)

Outlines termination process



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Obtaining Coverage Part I(C)



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Obtaining Coverage

Must submit a complete Notice of Intent (NOI)

Permit coverage becomes effective 7 days after the notice of intent is received by the NDDoH



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Application Process Part I(D)



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Application Process

**Owner (NDDOT) information must be included
on the notice of intent**

**Operator (prime contractor) information must be
included on the notice of intent**

**Operator (prime contractor) submits the notice of
intent**



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Application Process

Notices of intent shall be signed and certified by:

**A responsible corporate officer, a general partner,
or a principal executive officer**



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Application Process

According to the Memorandum of Agreement, the NDDOT is not required to sign notices of intent for its projects

The Memorandum of Agreement is the NDDOT signature



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Stormwater Pollution Prevention Plan (SWPPP) Part II(C)



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SWPPP

All permitted construction projects must develop and implement a SWPPP until final stabilization is achieved

A SWPPP for the project must be prepared and available for review, upon request, by the department at the time of application



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SWPPP

A SWPPP must be completed prior to the start of construction

As per the Memorandum of Agreement and the DOT Specifications, the Prime Contractor is required to prepare the SWPPP



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SWPPP

Identifies potential sources of sediment or other pollution from construction activity

Ensures practices are used to reduce pollution from construction site runoff



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SWPPP

A NDDoH template is available

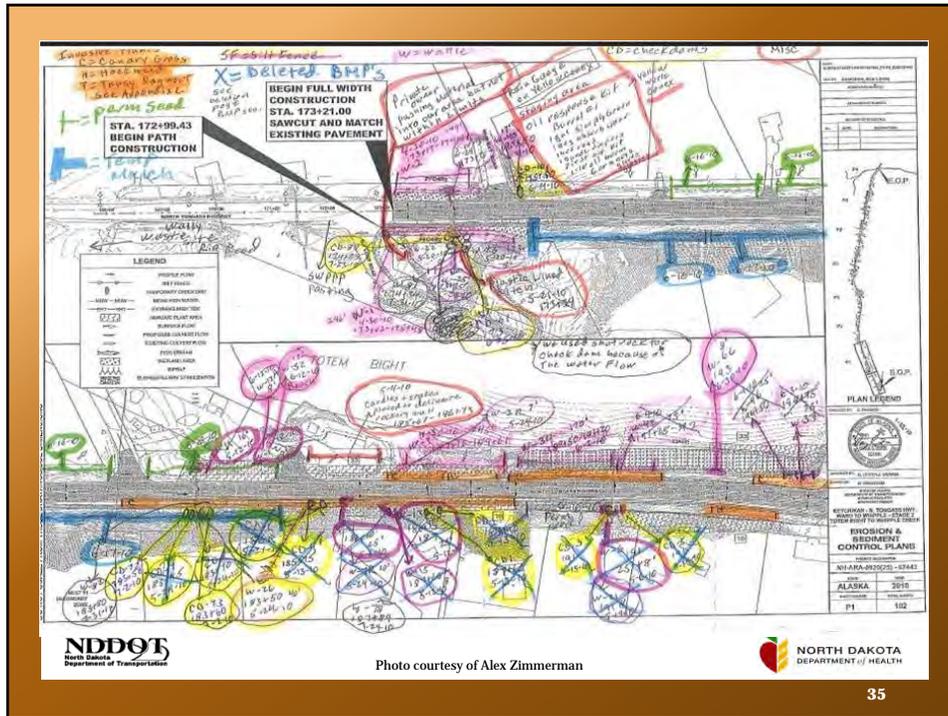
Company SWPPPs can be used, but must meet the requirements of the permit

Intended to be a “living” document



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Module 2: Regulations & Special Provisions –
NDDOT Erosion & Sediment Control – Construction Course



SWPPP Site Description
(Part II(C)(1))

Description of overall activity

Proposed timetable/schedule, which includes

- Major phases/stages
- BMP installation and removal

Identify surface waters and municipal systems

SWPPP Site Description (Part II(C)(1))

Soil description within disturbed areas



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SWPPP Site Description (Part II(C)(1))

**Identify impaired water bodies for sediment,
suspended solids, or turbidity**

– Identify the water body and impairment

**Identify water bodies with a total maximum daily
load (TMDL)**

– SWPPP must describe and conform to TMDL



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SWPPP Site Map

1. Project boundaries
2. Areas of ground disturbance
3. Areas of avoidance
4. Drainage patterns
5. Location of all temporary and permanent sediment and erosion controls during each phase



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SWPPP Site Map

6. Sources of potential pollution (e.g., portable toilets, dumpsters, barrels, etc.)
7. Location of soil stockpiles
8. Surface waters, including an aerial extent of wetland acreage
9. Surface water crossings



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SWPPP Site Map

10. Stormwater discharge points
11. Location of any impervious surfaces upon completion
12. If part of the project, site maps for batch plants, equipment staging areas, borrow sites, and excavated fill disposal sites



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Narrative (Part II(C)(2))

Description of the selected operational controls, and sediment and erosion controls

Must include at a minimum:

- Installation, removal (if applicable), and maintenance requirements of selected BMPs
- Rationale for selection
- If BMPs are temporary or permanent
- Any descriptions of infeasibility



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SWPPP Operational Controls Part II(3)

SWPPP Operational Controls

The plan must identify a person knowledgeable and experienced in the application of erosion and sediment control measures

Develop a chain of responsibility with all operators to ensure the SWPPP is implemented

Good Housekeeping

Maintain a clean and orderly site

Handle litter, debris, chemicals and parts properly to minimize exposure to stormwater



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Good Housekeeping

Reduce and remove sediment tracked offsite by vehicles or equipment

Control dust



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Preventive Maintenance

**Maintain erosion and sediment control devices
and equipment used or stored on site**

**– Must describe proper inspection procedures for
erosion and sediment control devices**



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Spill Prevention and Response Procedures

**Must be developed where potential spills can
occur**

Must have adequate leak and spill protection

**Specific handling procedures, storage
requirements, spill containment, cleanup and
disposal procedures**



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Employee Training

Personnel must understand the requirements of the permit as it pertains to their role in implementing the SWPPP

Employee Training

At least annually

As new employees are hired or as necessary to ensure compliance with the SWPPP and permit

Employee Training

On-site personnel must know:

- The purpose and requirements of the SWPPP
- How the SWPPP will be implemented
- Location of all BMPs
- Correct installation, function, maintenance, and removal of BMPs

Employee Training

Personnel who conduct inspections must understand:

- When inspections must be conducted
- What must be inspected
- How to record findings
- When to initiate corrective actions
- How to document corrective actions

Employee Training

Maintenance personnel must understand:

- When maintenance must be performed
- What needs to be recorded for corrective actions and maintenance records

Concrete Grindings and Slurry

SWPPP must describe how grindings and slurry will be managed on-site

Wastewater from concrete washout
and other building materials

Cannot be discharged to waters of the state or
curb and gutter systems

Must be collected in a leak-proof container or
leak-proof pit

– Must be designed and maintained so that
overflows will not occur



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Dewatering

Limited to un-contaminated stormwater,
groundwater, and surface water

Operate to minimize the release of sediment

Use BMPs to minimize erosion caused by the
discharge

Utilize BMPs which draw from the surface, unless
infeasible



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Dewatering Inspections

Inspect dewatering activity daily

Must include:

- Dewatering site
- BMPs
- Discharge location

Dewatering Inspection Records

Date and Time

Inspector

Approximate volume

Findings

Corrective Actions

Documentation of SWPPP amendments

Inspector signature

Erosion and Sediment Control Part II(C)(4)

Erosion and Sediment Control Selection Considerations

Expected amount, frequency, intensity, and
duration of precipitation events

Channelized flow

Soil types

Nature of run-on and run-off at the project

Photo courtesy of Alex Zimmerman



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Erosion and Sediment Control Selection Considerations

Photo courtesy of Alex Zimmerman

Seasonal Conditions



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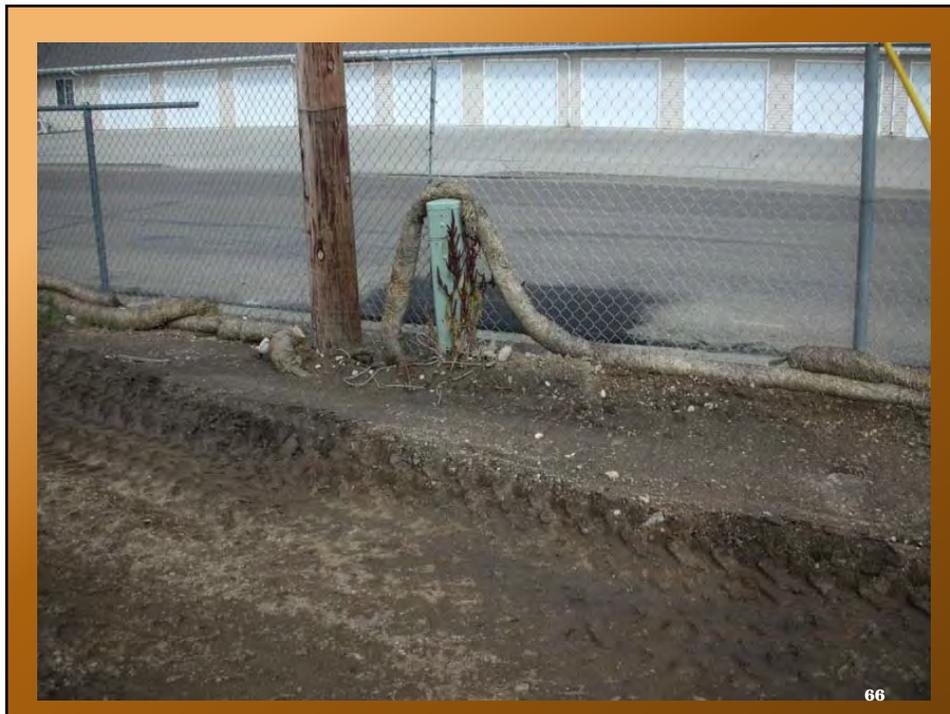
Temporary Erosion Protection or Permanent Cover

Temporary or permanent erosion protection and stabilization must be initiated immediately, and completed in accordance with Appendix 1(A), for all exposed soil areas where activities have been completed or temporarily ceased



Erosion & Sediment Controls

- Select, install, and maintain in accordance to manufacturer's specifications
- Can deviate from manufacturer's specifications with documentation
- Must be replaced or modified when used inappropriately or incorrectly
- Changes must be made prior to the next anticipated rainfall event or within 24 hours of discovery



Off-site Accumulations



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Stormwater Controls

Must withstand and function properly during precipitation events of up to the 2-year, 24-hour storm event

– Consider high intensity, short duration events (1-year, 60-minute; etc.)



Total Maximum Daily Load (TMDL)

If water flows from the site to a TMDL water body, the SWPPP needs to be consistent with the BMP or control requirements of the approved TMDL

Stormwater Management Part II(C)(5)

Stormwater Management

Identify permanent practices or other post-construction stormwater management features

Example: stormwater ponds, flow reduction devices, velocity/energy dissipation devices, infiltration areas

Parts II(C)(6)-(8)

Part II(C)(6)

Maintenance

- Erosion and sediment control measures and other BMPs identified in the SWPPP must be maintained in effective operating condition
- SWPPP must indicate maintenance or clean out interval for sediment controls

Part II(C)(7)

Inspections

- Conduct site inspections per Part III of the permit
- Inspection personnel must meet the requirements of Part II(C)(3)(e) of the permit

Part II(C)(8)

SWPPP Review and Revisions

- Must be signed in accordance with signatory requirements (Part IV (A)(6))
- SWPPP must be made available to the department, EPA, or municipality upon request

Part II(C)(8)

SWPPP Review and Revisions

- Must be amended:

Whenever changes to design, construction, operation, maintenance, or BMPs occur

If the plan is found to be ineffective in controlling pollutants

- Must be amended as soon as practicable

Final Stabilization Part II(E)

In Accordance with MOA

Erosion control measures and stabilization methods must be selected, designed, and installed along with an appropriate seed base to provide erosion control for at least 3 years and achieve 70% of the pre-existing vegetative cover within 3 years without active maintenance

Conditions of Final Stabilization

Soil disturbing activities at the site have been completed

Drainage ditches that drain water from the site have been stabilized to preclude erosion

Temporary ESC devices such as silt fence have been removed

Conditions of Final Stabilization

**Sediment has been removed from conveyances
and permanent water quality basins**

Land Used for Agricultural Purposes

**Areas which are restored to their pre-construction
agricultural use are not subject to the final
stabilization criteria**

**– If construction activity removed standing crop,
must be restored in accordance with the
landowner**

Self Inspections Part III

Inspection Requirements

Once every 14 calendar days and within 24 hours of any storm event greater than 0.25 inches of rain per 24-hour period

Use a rain gauge which is representative of the site

Inspect during normal working hours

When Inspections May Be Put On Hold



There may be times when an inspection cannot be conducted due to adverse weather conditions like flooding, high winds, electrical storms, site access constraints, etc.

- Documentation must be provided
- Inspection must be conducted during the next working day, or as conditions allow

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Records of Each Inspection and Maintenance Activity

All inspections and maintenance activities must be recorded in writing

1. Date and time of the inspection
2. Name of person(s) conducting the inspection and signature
3. Findings of the inspection, including recommendations for corrective actions

Records of Each Inspection and Maintenance Activity

4. Corrective actions taken, if any, including dates, times, and party completing maintenance activities
5. Date and amount of rainfall events greater than 0.25 inches within 24 hours
6. Documentation when the SWPPP has been amended



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Reduced Inspections

Completed areas that have been stabilized but do not meet 70% perennial vegetative cover:

- Inspected 1/month

Areas which meet final stabilization requirements (Part II(E)):

- Inspections may be suspended

Update SWPPP to identify these areas



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Suspended Inspections

Photo courtesy of Alex Zimmerman

Inspections may be suspended where earthwork has been suspended due to frozen ground conditions

Inspections must resume as soon as runoff occurs or the ground begins to thaw

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Erosion and Sediment Control Requirements Appendix 1

Erosion and Sediment Control Practices Appendix 1(A)



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Stabilization

Exposed soil areas must be stabilized

Initiated immediately where activities have been permanently or temporarily ceased on any portion of the site and activities will not resume for a period exceeding 14 calendar days (including winter shutdown)

Completed as soon as possible, but no later than 14 calendar days after initiation



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Stabilization

For slopes with a grade of 3:1 or greater

- Stabilization must be completed as soon as possible, but no later than 7 calendar days



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Stabilization

The normal wetted perimeter of temporary or permanent drainage ditches which drain water from the site or around the site must be stabilized 200 linear feet from the property edge or point of discharge

- Remaining portion, within 14 calendar days



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Normal Wetted Perimeter

The red line shows the wetted perimeter



TYPICAL STREAM CHANNEL CROSS SECTION

Source: Lawlor, Sean M., United States Geological Survey, in cooperation with Montana Department of Transportation and the U.S. Department of Agriculture-Forest Service, Lolo National Forest. *Determination of Channel Morphology Characteristics, Bankfull Discharge, and Various Design-Peak Discharges in Western Montana*. Avail. On-line at: <http://www.usgs.gov/>, 2004.



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If Stabilization Requirements Cannot be Met

If vegetative stabilization was planned, install temporary non-vegetated stabilization

Complete all methods of initiating stabilization as soon as conditions or circumstances allow

Conditions must be documented

Permittees are responsible for implementing winter stabilization methods during frozen ground conditions



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Stream diversions or temporary permanent drainage ditches or trenches

If they have continuous flow

- Must be stabilized prior to connection with any surface water
- Must be stabilized to bankfull height



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Working around surface waters

Sediment and erosion controls must be used above the anticipated level of the surface water

Floating silt curtain does not satisfy the down slope and side slope boundary requirements

- Unless activity is on or below the elevation of the surface water

Floating silt curtain must be as close to shore as possible

Install sediment controls where soils drain to surface water once construction activity is complete



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Storm Drain Inlets

All storm drain inlets in the immediate vicinity of the construction site must be protected by the appropriate measures during construction

Inlet protection devices are a last line of control

Vegetative Buffers

1 foot of buffer for every 5 feet of disturbed area which drains to the buffer

Slope of buffer should be 5% or less

Slope of the disturbed area draining to the buffer should be 6% or less

Concentrated flows should be minimized

Natural Buffers

50 foot natural buffer or equivalent ESCs must be provided when a project is within 50 feet of a surface water and stormwater flows to the surface water

If working within 100 feet of a surface water impaired for sediment, suspended solids or turbidity:

– 100 foot natural buffer or equivalent controls

If using equivalent controls, document rationale



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Chemical treatment for sediment removal

NDDoH must approve the use

Provide chemical treatment information 60 days prior to use

Discharge of chemically treated stormwater may not cause a water quality violation and must conform to the dewatering or basin draining requirements



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Steep Slopes

Minimize the duration of exposed soils on steep slopes

Maintenance Considerations Appendix 1(B)

Inspect All ESC Measures



Repair, Replace, or Supplement ESC Measures

All nonfunctional ESCs must be repaired, replaced, or supplemented with functional ESCs

Remove nonfunctional ESCs

Corrections must be made prior to the next anticipated rainfall event or within 24 hours of discovery



Repair, Replace, or Supplement ESC Measures

Provide documentation with a plan of action if field conditions do not allow access for performing maintenance

Fiber rolls must be replaced when $\frac{1}{2}$ of the original above ground height is lost due to flattening or other damage

Surface Waters

Surface waters, including drainage ditches and conveyance systems, must be inspected for evidence of sediment deposited by erosion



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Removal of Sediment from Surface Waters

Conduct immediately, but no more than 7 days after discovery unless prohibited by legal, regulatory, or physical access constraints

–Removal and stabilization must be conducted immediately, but no more than 7 days after obtaining access

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DEPARTMENT OF HEALTH

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Vehicle Tracking

Vehicle tracking must be minimized by ESCs

Tracked and deposited sediment must be removed by the end of the work day, shift or, if applicable, within a shorter time period specified by a local authority or the NDDoH

Permittees are responsible for, or making arrangements for, street sweeping and/or scraping if ESCs are not adequate to prevent tracked sediment



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Photo courtesy of Alex Zimmerman



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Vegetative Buffers

Must be inspected for proper flow distribution

Eroded areas must be repaired and stabilized
within 24 hours of discovery, or as soon as
conditions allow access

Operational Controls Appendix 1(C)

Properly Handle Construction Debris

Debris and waste must be handled appropriately until disposal

– Collect and store to reduce the potential for wind and water to carry materials off-site or leachate

Properly store liquids and soluble materials

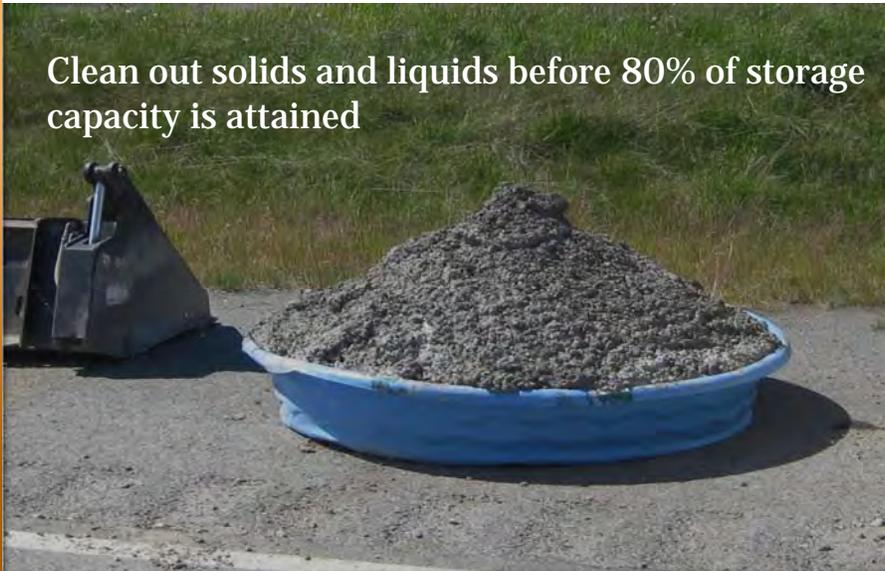


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Wash Water Containments

Photo courtesy of Alex Zimmerman

Clean out solids and liquids before 80% of storage capacity is attained



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BMPs used in Surface Waters

Must be cleaned immediately upon removal from surface waters to prevent the transfer of aquatic nuisance species

Records Part III(C)

What must be kept at the construction site?

1. A copy of the completed and signed Notice of Intent (NOI)
2. The coverage letter from the department of health
3. SWPPP
4. Site inspection and maintenance records
5. The construction general permit, NDR10-0000

Where must the documentation be kept?

Field office, trailer, shed, or vehicle that is on-site during normal working hours (electronic copies are acceptable)

If a reasonable on-site location is not available, then the documents must be retained at a readily available alternative location

If the site is inactive, then documents may be stored at a local office

Signatory Requirements Part IV(A)(6)

All reports or information submitted to the NDDoH shall be signed and certified by either:

A responsible corporate officer, a general partner, or a principal executive officer

A duly authorized representative

Termination

In accordance with the MOA

**NDDOT will file a NOT with the NDDoH
indicating the project meets the criteria for final
stabilization**

**NDDOT may release a contractor from a contract
before submitting a NOT**



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When project is complete

**Contractor may submit a permit modification
form to remove themselves from coverage under
the permit and keep coverage active for the
NDDOT**



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Differences Between State and Federal Permits

Permit Application

Tribal land – EPA Electronic Notice of Intent
(eNOI)

14 day waiting period after applying

EPA Permit Notification Sign Requirements

Must post sign or other notice near project site

Sign must contain:

Permit # and Contact info.

SWPPP URL or EPA contact statement

EPA violation website



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Surface Draw Down from Sediment Basins

EPA requires drawdown from surface

State requires drawdown from surface for sediment basins and dewatering activities



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Concrete Wash Water

EPA requires leak-proof container

**State requires leak-proof container and clean out
prior to 80% capacity**



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Modifying a Permit

**Cannot modify an EPA Construction General
Permit**

Original operator must submit an NOT

New operator must submit a new NOI



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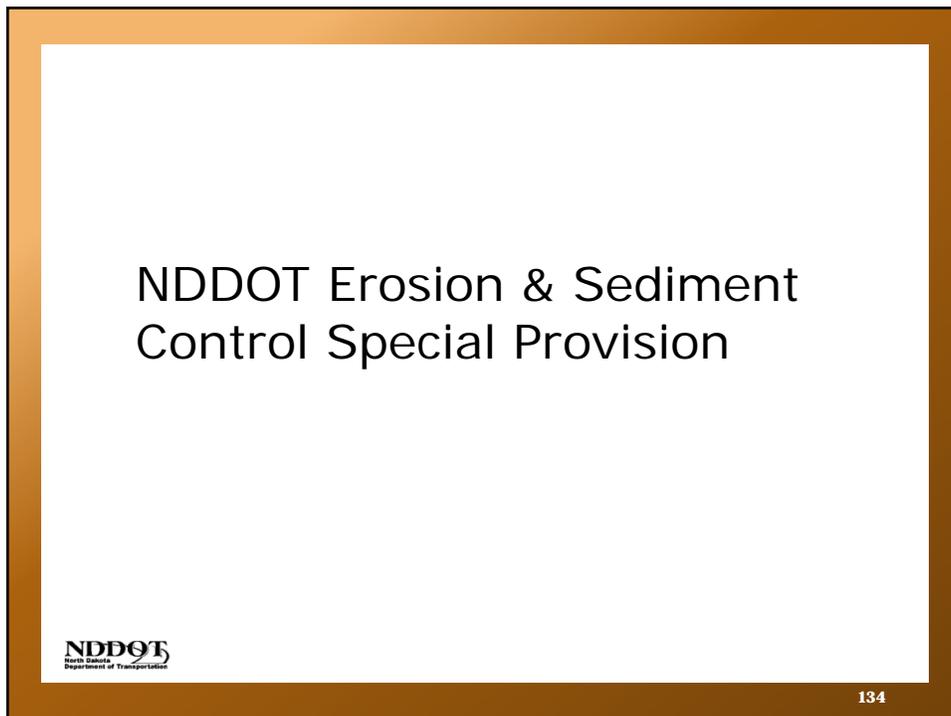
Stabilization Deadlines

EPA requires stabilization within 14 days of ceasing activities on any area of a site with less than 5 acres disturbed at one time

If there are over 5 acres disturbed, the stabilization deadline is cut to 7 days

Liability for violations

The EPA permit states that all operators are jointly and severally liable for violations



What is covered in this section?

Why do we need a Special Provision?

Erosion Control Responsibilities

Temporary versus Permanent Controls

Contractor Controlled Areas

Consequences

Payment



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What are the learning objectives in this section?

1. Identify the Contractor's responsibilities for erosion and sediment control
2. Identify when erosion and sediment control measures (ESCMs) will be temporary or permanent
3. Identify what actions will be taken if there is noncompliance



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Why?

EPA Consent
Agreement:

- NDDOT
- Kansas DOT
- Missouri DOT



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Who is responsible for Erosion &
Sediment Control?

EVERYONE

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Definitions

**Temporary Erosion & Sediment
Controls**
Installed and maintained before and during
Removed when permanent are installed



Permanent Erosion & Sediment Controls

Installed and maintained once an area is completed

Some areas may never have temporary controls (i.e., Pipe Ends)



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May Be The Same!

Temporary = Permanent

Installed correctly

In functional condition

All accumulated sediment removed



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Stormwater Pollution Prevention Plan (SWPPP)

Identifies potential pollution sources, not just sediment

Identifies practices used to control and prevent pollution



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Contractor Controlled Areas

Project Areas not in the contract

Obtained and controlled by Contractor:

- Borrow Sites
- Batch Plants
- Staging Areas, etc.



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Maintenance

Action taken to
keep ESCMs in
working condition

Not just removing
sediment

Repairing Failures



Noncompliance

Any action or inaction that violates regulations:

– Permits, SP, or other Contract Documents

Failure of ESCM not always noncompliance:

– Repaired, replaced, supplemented

– No sediment discharged

Contractor Responsibilities

SWPPP

Develop SWPPP specific to project

Include plans and means and methods

Update SWPPP to show changes:

- Work schedules
- Sequence of Construction
- ESCM locations or types



**Plans Alone Are
Not a SWPPP**

Plans = Starting point

May need modification

Approve through Engineer

Meet all regulatory requirements



Perimeter Controls

First thing done

**Should not be the
only line of defense**



Stabilization ESCMs

Install as soon as possible

Areas of temporary or permanent work stoppage

Follow permit timelines



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Coordination of ESCMs

Never a time without protections

Go to permanent ASAP

Remove temporary devices

Maintenance of permanent devices = NDDOT after permit termination



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Inspections

Every 14 days

Within 24 hours of ¼
inch rainfall

Document

Prolonged rainfall = 2
inspections

Only during normal business hours

Rain gauge



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Inspections

Correct all deficiencies
within timelines

Install additional
ESCMs

Correct original
deficiencies ASAP

Document access
issues

Most inspections =
maintenance



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**Record Keeping
Provide Engineer
copies:**

- Inspections*
- Maintenance*
- Documentation
- Record keeping
- Remedial actions
- Repairs



***Within 3 working days**



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Record Keeping

At preconstruction conference, provide Engineer proof of NDDOT Erosion and Sediment Control Certification (ESCC) for:

- Prime Contractor's Erosion Control Supervisor
- Any Erosion Control Subcontractor Supervisor
- Engineer will provide a verification of their certification

Certifications must be maintained through the term of the contract



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SWPPP Changes

Notify Engineer in writing

Engineer reviews and makes final determination



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Permits

Contractor obtains Permit = Memorandum of Agreement (MOA)

Separate permit for Contractor Controlled Areas:

- Regardless of size**
- Contractor = Owner and Operator**
- NDDOT = No Responsibility**

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Permits

Do not commence activities in these areas until after permit coverage has begun.

Provide copies to Project Engineer:

- Completed and signed NOI – Before activities commence
- Permit Coverage Letters – Within 7 days of receipt from regulating agency

Accountability and Enforcement

Erosion Control Supervisor

Prime Contractor employee

Familiar with:

- Installation, maintenance and removal of ESCMs
- Requirements of SWPPP, plans, permits, specs, special provisions
- Competent to supervise personnel
- Certified through the NDDOT ESCC Training



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Duties

Provide ESCMs

Be onsite to supervise

Update SWPPP (narrative and illustrative)

Propose changes

Be onsite within 24 hrs

Submit documentation



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Performance

Correct noncompliance within 24 hrs from notification

If not, the Engineer may:

- Contract Price Reduction = \$500/day/instance
- Have work done by other Contractor
- Stop work
- Withhold Payment

Applied until corrected



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Basis of Payment



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Pay Items

Temporary = Permanent

**Includes labor,
materials, equipment,
disposal, SWPPP
modifications**

ESCM removal separate



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Replacing ESCMs

Replacement paid if:

Installed correctly

**No longer effective due
to normal deterioration**

**Engineer directs
replacement**



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ESCM Specific Payment Issues

Moving Flotation Silt Curtain

Removal of sediment = PS-1 schedule

Contractor Controlled Areas ESCM = No payment



NDDOT Stream Diversion Special Provision



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Why?

Extremely
environmentally
sensitive

Large risk

More consistent
bidding

Better understanding
of expectations



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Why?
Stream
Diversion =
Stream
Minimize
impacts
Negates other
work if done
wrong



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Stream Diversions as of September,
2015

May change from this
version

Traffic Bypasses may
be included in the
future



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How the SP should be viewed

Design and Plan

Specific Requirements for pieces of diversions that may be applicable

Contractor develops a plan based upon the situation and diversion type



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General Requirements

Prevent Soil/Water interaction

Stabilize topsoil and excavated material stockpiles \leq 200 feet away = 24 hours

Ensure permits are obtained



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General Requirements

Install diversion first

Isolate work area even when no water is present.

Strip and stockpile topsoil from diversion areas



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Plan

Submit a Diversion Plan that includes work drawings with SWPPP

Include provisions for:

- Preventing sediment accumulation**
- Concrete waste control**
- Construction debris control**



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Design

**Withstand 2 year
precipitation event**

**Maintain flow (no
flooding or stream
degradation)**

**Upstream water quality =
Downstream water
quality**

**Prevent sediment
accumulation**



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Diversion Components

**Components below (or
combination)**

**Methods approved by
engineer**

**Install Diversion before
work on structure**



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Dike

Divert stream and
isolate the work area

Upstream and
Downstream



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Dike

Prevent soil/water
interaction:

- Sandbags
- Sheet pile
- R1 wrapped soil/rock
- Prefabricated dams
- Water filled bladders
- Impermeable containers



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Work Area Dewatering

Operate and maintain the dewatering system to prevent any change in water quality.

Provide:

- Inlet control system that limits sediment
- Stabilized discharge

Inlet Control Systems

Surface skimmers

Aggregate filled
perforated containers

Inlet socks

Etc.



Stabilized Discharges

Dewatering basin

Sediment bag

Existing vegetation*



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Work Area Dewatering

No visible sediment
plume

Discharge causes no
erosion

**Do not discharge
directly to stream
or diversion**



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Types of Diversions

Pipe diversion:

– Suspended pipe diversion

– Pipe diversion

Channel diversion

Pump diversion

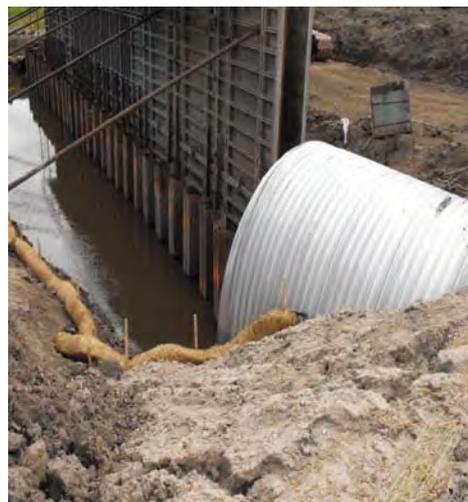
Existing cell or culvert



Culvert Diversions - General

Provide positive
drainage from
upstream to
downstream

Energy dissipation for
outlets



Suspended Pipe Diversion

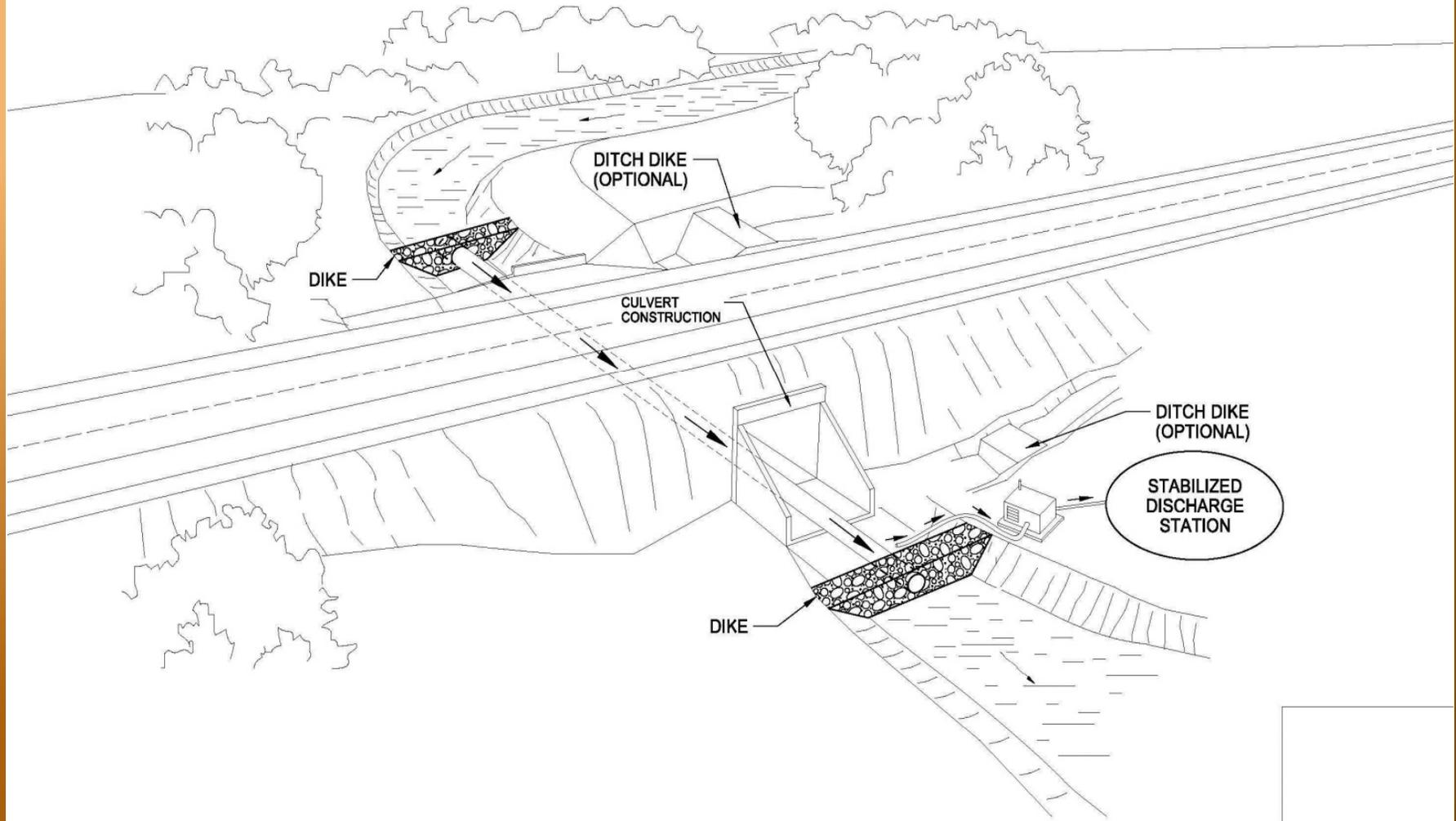
Suspend pipe through
existing culvert

Steps:

1. Install a temporary pipe through culvert
2. Anchor and seal the pipe at upstream dike
3. Extend pipe through downstream dike



PIPE-BOX DIVERSION

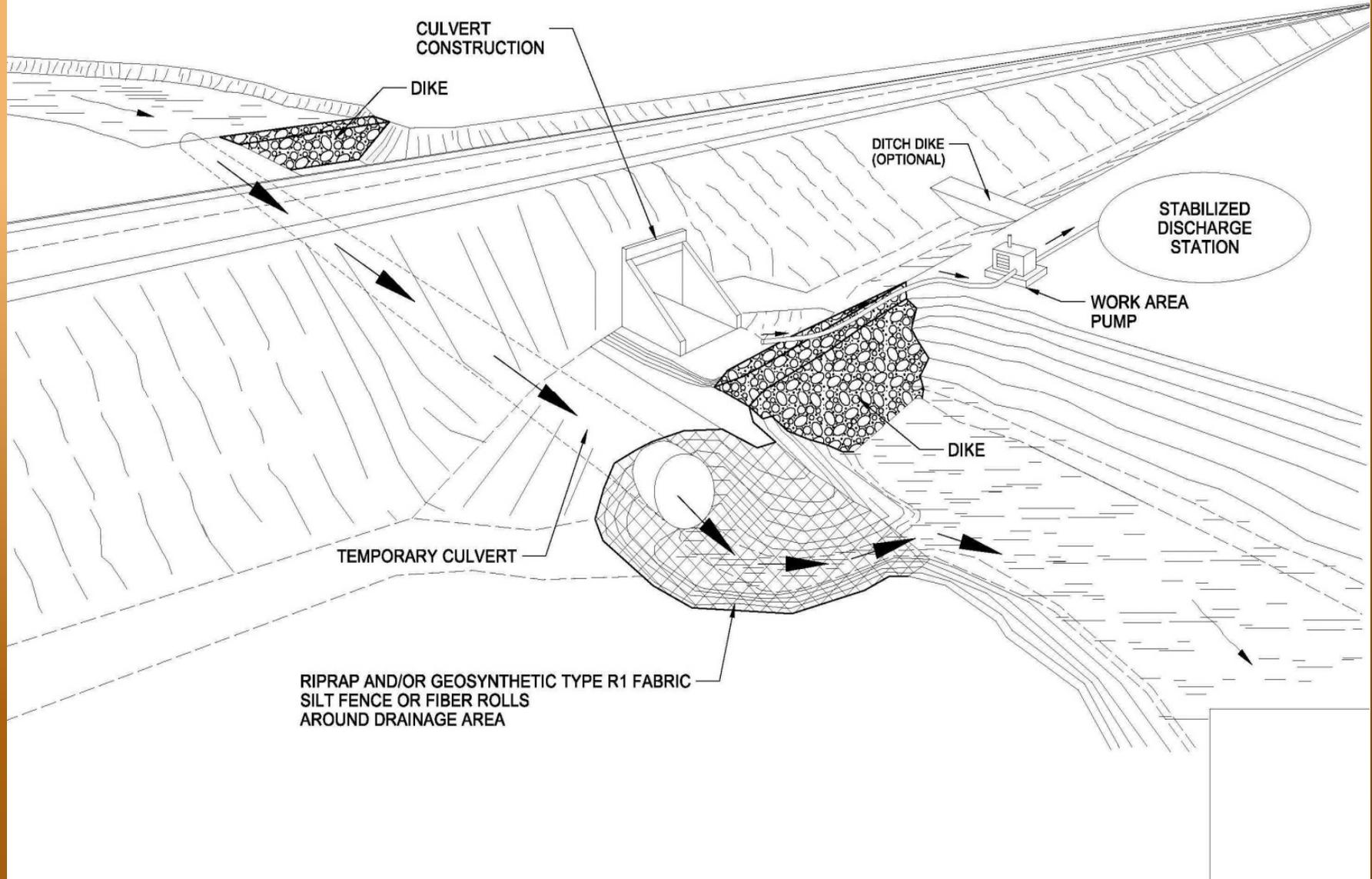


Pipe Diversion

Temporary pipe crossing under roadway near
existing culvert

Positive drainage upstream to downstream

PIPE DIVERSION



Channel Diversions

Side slopes 2:1 or flatter

Cover with R1 fabric at a minimum (lower permittivity and higher strength)



Channel Liner

Using R1:

- Splices and Joints = 36 inches minimum**
- Secure liner so not disturbed by 2 year flow**
- Methods may include:**

Staples, Pins, Sandbags, or Riprap

Channel Liner

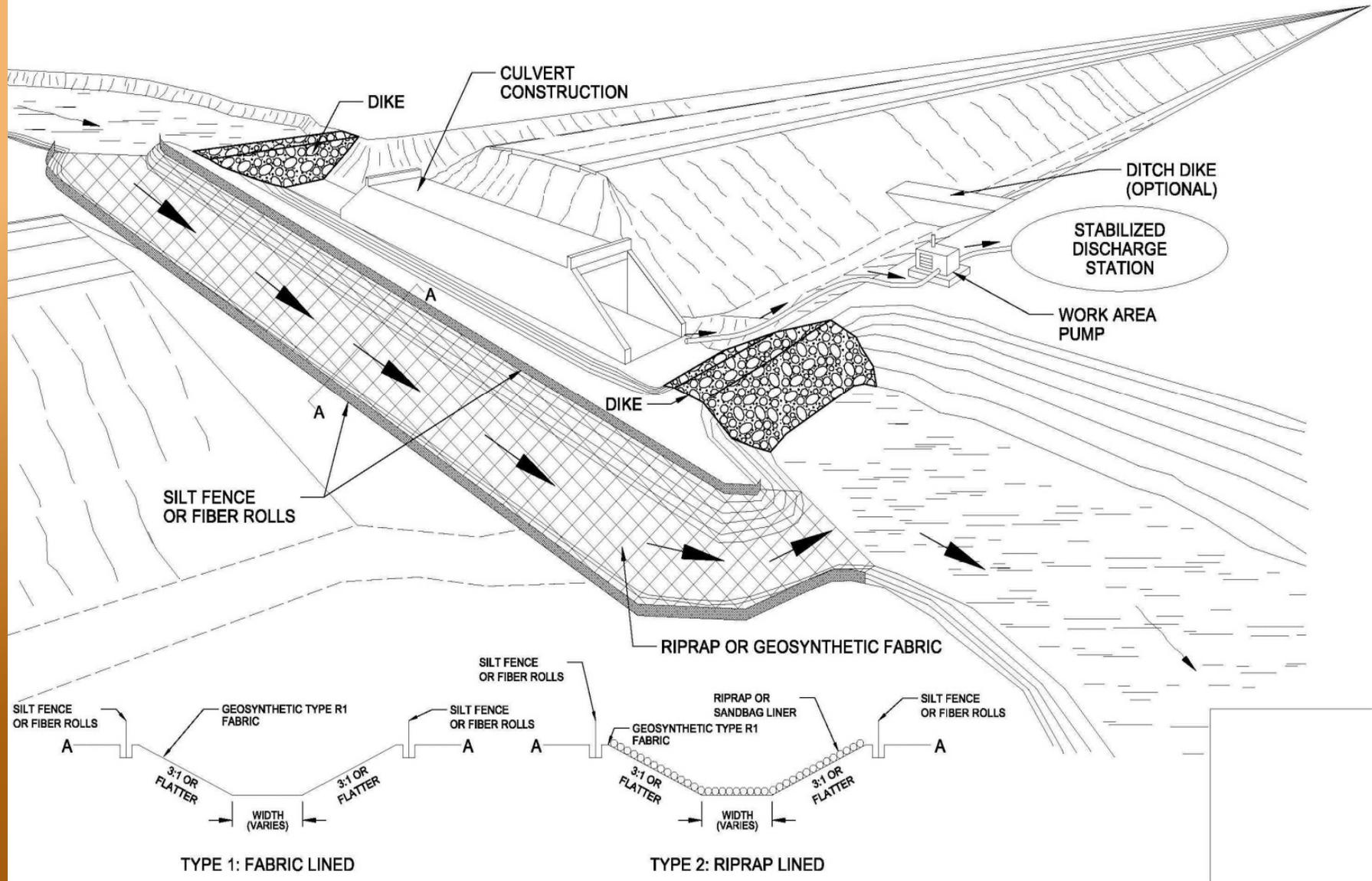
Patch damaged areas with 36 inches minimum

Secure perimeter of the patch

Install fiber rolls or silt fence along channel top

Connect downstream end before upstream end

CHANNEL DIVERSION



Pump Diversion

**Inlet control system
at pump inlets:**

- Surface Skimmers
- Aggregate filled perforated containers
- Inlet filter socks



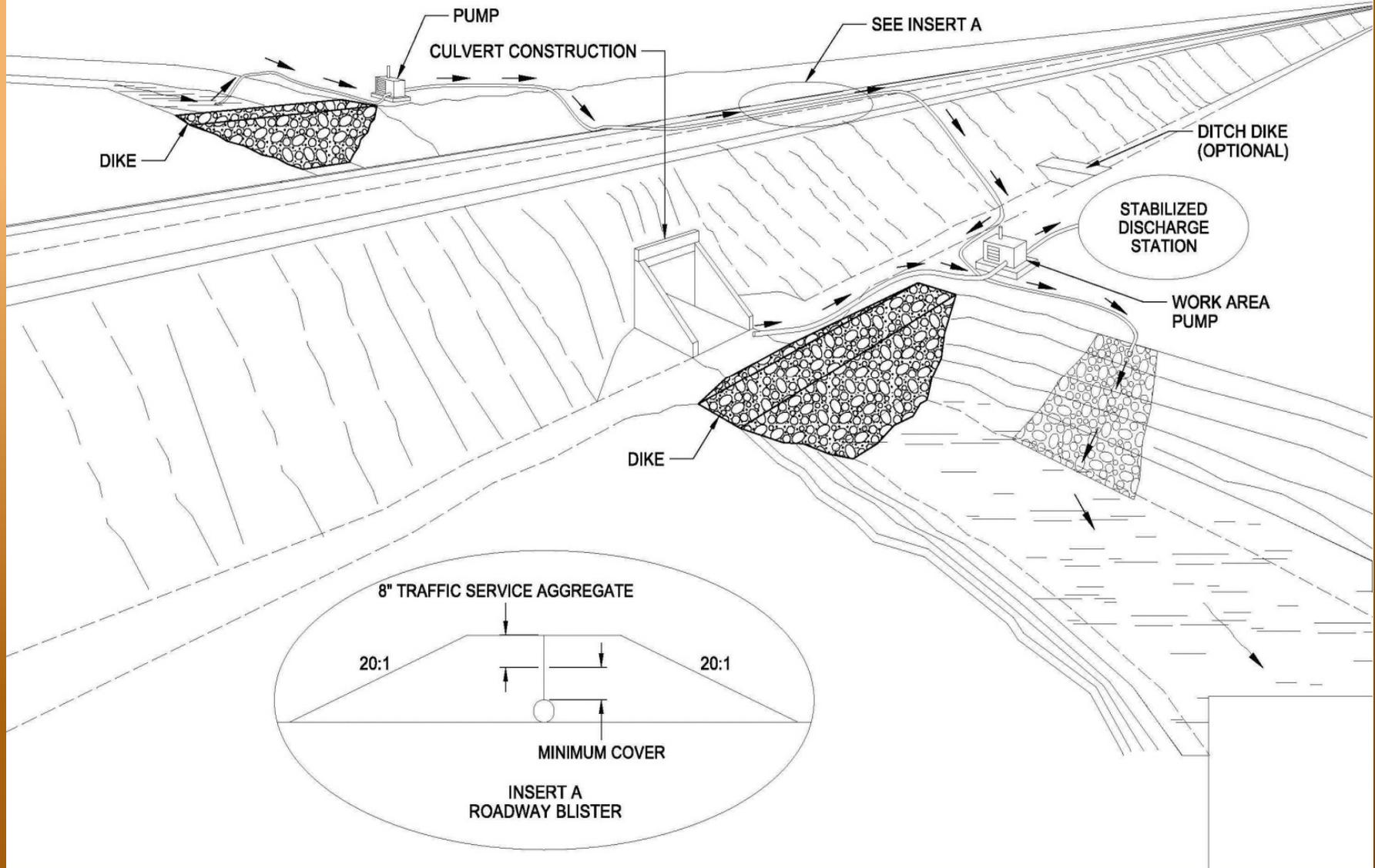
Pump Diversion

**No visible sediment
plume**

**Discharge causes no
erosion**



PUMP DIVERSION

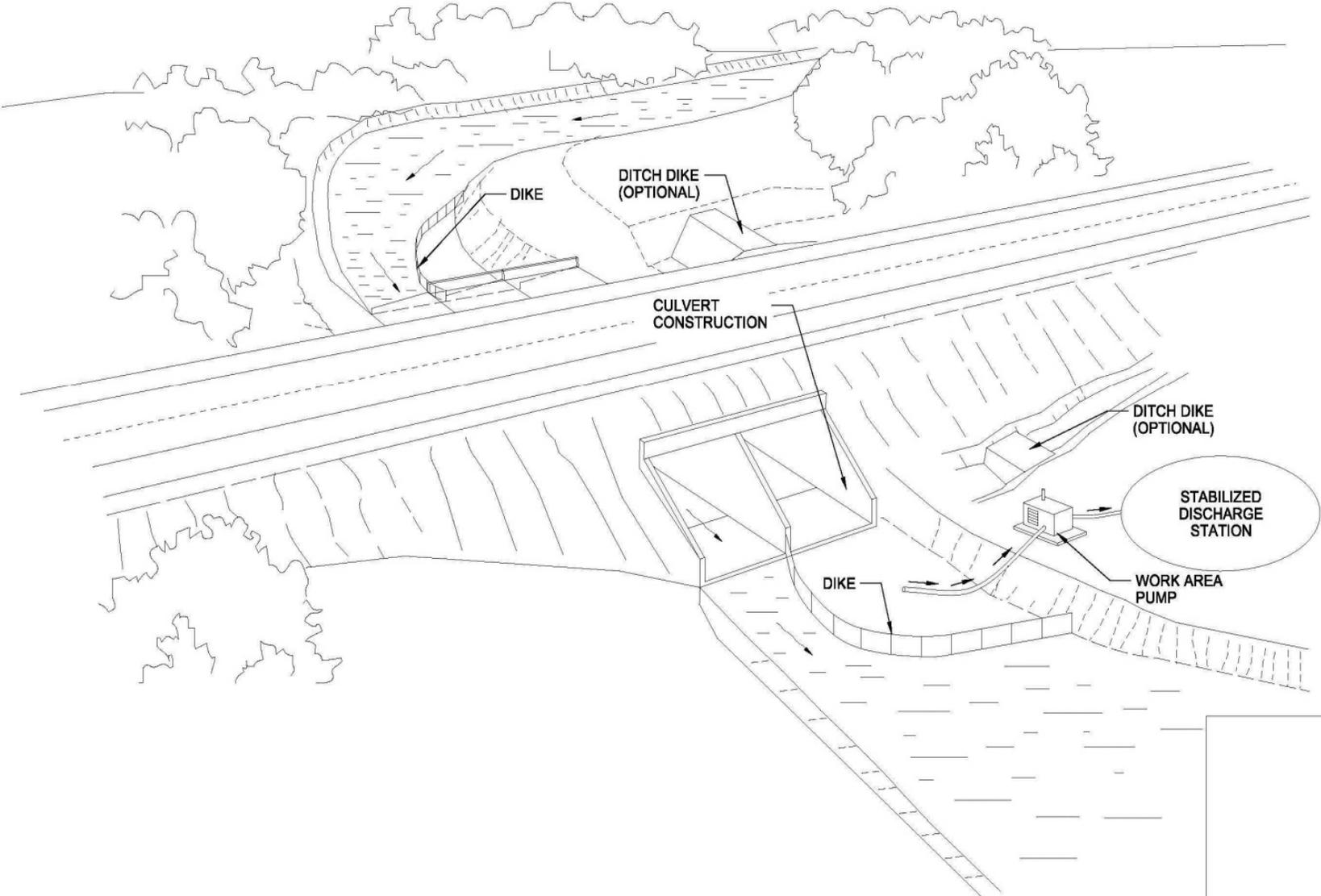


Diversion Through Existing Structure

Isolate work area with dikes



BOX DIVERSION



Removal

Permanent ESCMs and flow dissipation before opening to flow

Flow dissipation:

- Riprap
- Cable tied concrete
- Concrete jacks



Removal

Do not start removal until complete

Remove all materials used to construct diversion

Do not wait to remove diversion once work within the channel is complete

Includes placement of riprap and permanent ESCMs

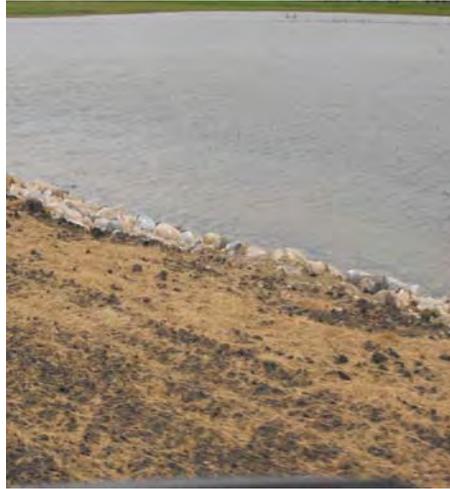
Restore diversion area to preexisting condition

Removal

Remove downstream dike first and stabilize

Remove upstream dike to restore flow and stabilize

Remove Suspended pipe with upstream dike



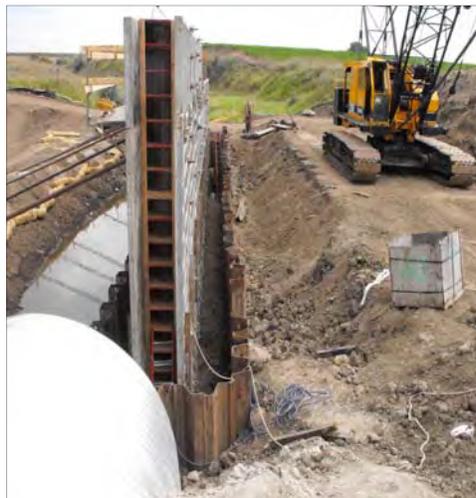
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Removal

Channel and pipe diversions

Remove upstream dike

Construct dike to prevent water from entering diversion



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Removal

Pipe:

- Remove pipe after restoring stream flow



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Removal

Channel:

- Backfill and compact
- According to Specifications



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Basis of Payment

**Pay Item = Temporary
Stream Diversion**

Pay Unit = Each

**75% paid upon
installation**

**Last 25% upon removal
and restoration**



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Basis of Payment

**Include cost of
installation,
maintenance and
removal of ESCMs**

**SP 03(14) does not
apply to ESCMs for
stream diversions**

**Payment is for designing, equipment, labor,
materials and incidentals to complete work**



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Questions?