

BMP 34.00 & 35.00. Temporary Diversion Conveyance

DESIGN CONSIDERATIONS

Objectives

The purpose of Temporary Diversion Conveyance is to temporarily route a concentrated flow around a construction area and reduce sediment pollution from construction work from entering the concentrated flow.

Description

Temporary Diversion Conveyances are a ditch, pipe, or lined channel used to divert water from upstream of the project area, route it around the construction area, and discharge it downstream.

Other Names

Clear Water Diversion, Diversion Ditch.

Applicability

Temporary diversion methods are often required during culvert replacements; the construction of detention ponds, dams, in-stream grade control structures, or utility installation; and bank, channel, and other in-water maintenance and other activities that require working in waterways. Since this BMP is temporary, it would not involve additional analysis in community locations that participate in the National Flood Insurance Program; however, it should comply with local ordinances.

Selection Considerations

Temporary Diversion Conveyances will disturb the concentrated flow paths during installation and removal of diversion activities. The design should consider whether the temporary diversion will cause greater environmental impacts than if the project is constructed without temporary diversion.

Where possible, use natural streambed materials such as larger cobbles and boulders for temporary embankment/slope protection, or other temporary soil stabilization methods. If fish habitat or passage is required in the Temporary Diversion Conveyance, coordinate with Alaska Department of Fish and Game (ADF&G) for details of design.

Where possible, avoid or minimize diversion/encroachment impacts by limiting construction to periods of low flow or when the stream is dry.

Additional specific permit requirements, including allowable work time periods or mitigation measures, may be required by agencies, such as the U.S. Army Corps of Engineers, Alaska Department of Environmental Conservation, ADF&G, Alaska Department of Natural Resources, etc. The designer should allow adequate time to apply for and receive permits and be cognizant of permit requirements, in order to design a system that will meet permit conditions.

Site topography may not allow for gravity flow, in which case pumps would be required.

Design

Consider having the Regional Hydraulics Engineer review the design.

Flow Rate: Size for system base flow plus flows estimated from a minimum of a 2-year, 24-hour rainfall event, including runoff from drainage area during the anticipated time of construction. Consider tributary area and seasonal rainfall patterns. If there are large paved areas upslope, consider a larger sized system. Include the flow rate that will be used in the contract so the contractor can properly size the pump.

Temporary Dams: Select dam material to be erosion resistant, such as steel pipe plate, sheetpile, sandbags, continuous berms, inflatable water bladders, etc. Fish removal and a fish-proof barrier may be required under an ADF&G Fish Habitat Permit.

Temporary Bypass Structure: The structure may include one or more plastic or metal pipes or an excavated channel lined with plastic sheeting or other known non-erosive material. Determine the location of the channel and the topography along the channel route. Size the conveyance structure based on slope, conveyance roughness, and conveyance geometry (e.g., Manning's equation or similar methodology) with appropriate factors of safety or, for open channels, freeboard.

Outlet Protection: You must add stormwater discharge energy dissipation to the design to prevent scour and erosion at the outlet. Temporary lining of the discharge area (e.g., sandbags or riprap) may be used.

Relationship to Other Erosion and Sediment Control Measures

Pumped stream diversion techniques may be needed for dewatering and diverting intermittent and low flows.

Common Failures or Misuses

- Improper diversion sizing leading to flooding or washouts.
- Complete damming of the flow.
- Insufficient water passing downstream preventing the maintenance of aquatic life downstream.
- Stream bank stabilization is not provided causing erosion to occur.
- Barriers between the flow path and the construction area are not adequate to prevent the flow of muddy water into the concentrated flow.

SPECIFICATIONS

Standard Specification

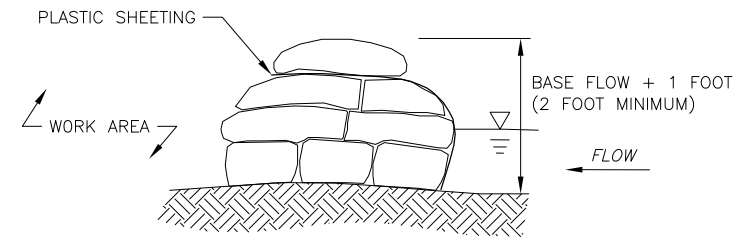
686 – Temporary Diversion Conveyance

Drawing

- BMP-34.00 Temporary Diversion Conveyance (Notes & Piped Detail)
- BMP-35.00 Temporary Diversion Conveyance (Channel Detail)

Reference Drawing

- BMP-15.00 Pumped Stream Diversion



SECTION A-A

SANDBAG DAM
NOT TO SCALE

PIPED DIVERSION NOTES:
MATERIALS

PIPE: A FLEXIBLE HOSE, PLASTIC OR METAL PIPE (SECTION 706-2.06, 706-2.07, 707-2.03).

INSTALLATION

1. USE WATERTIGHT FITTINGS AT ALL CONNECTIONS.
2. SECURELY FASTEN THE EXPOSED SECTION OF THE PIPE WITH GROMMETS OR STAKES AT 10-FOOT SPACING.
3. ESTABLISH THE FLOW IN THE PIPE AND INSTALL TEMPORARY DAMS TO FORCE WATER TO BE DIVERTED.
4. ENSURE THAT DIVERSION PIPE INLET IS SECURE AND BETWEEN THE ELEVATIONS OF THE TOP OF THE DAM AND THE STREAM CHANNEL.
5. INSTALL ENERGY DISSIPATER.

INSPECTION

1. INSPECT THE PIPE FOR BREAKS OR BLOCKAGE.
2. INSPECT INLET FOR SEDIMENT BUILDUP.

MAINTENANCE

1. INSTALL A HEADWALL IF NECESSARY TO CONTROL EROSION AROUND THE INLET.
2. REPAIR ANY BREAKS IN THE PIPE.
3. TIGHTEN FITTINGS AT LEAKING CONNECTION POINTS.
4. CLEAR ANY CLOGS THAT REDUCE FLOW THROUGH THE PIPE.

ADDITIONAL NOTES

1. SEE TEMPORARY DIVERSION CONVEYANCE GENERAL NOTES ON BMP-34.00 TEMPORARY DIVERSION CONVEYANCE (NOTES AND PIPED DETAIL), THIS SHEET.

TEMPORARY DIVERSION CONVEYANCE GENERAL NOTES:
MATERIALS

DAM MATERIAL: SANDBAGS COVERED WITH PLASTIC SHEETING (30 MIL OR 2 OR MORE LAYERS OF 10 MIL), RIPRAP, STEEL PIPE PLATE, SHEETPILE, INFLATABLE BLADDERS, OR EQUIVALENT.

CONVEYANCE STRUCTURE: PIPE OR CHANNEL.

ENERGY DISSIPATER: RIPRAP, SANDBAGS, T-BAR SPREADER, OR EQUIVALENT

INSTALLATION

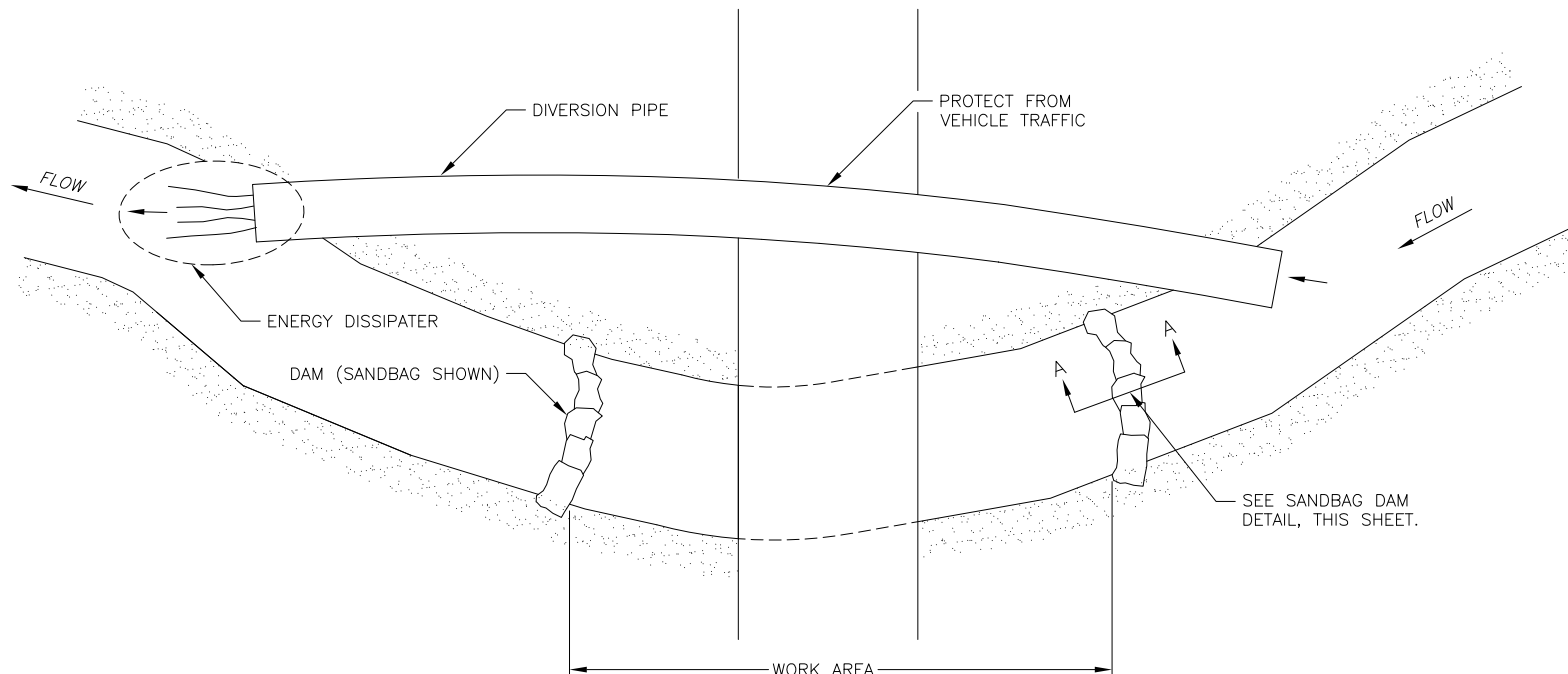
1. DISTURBANCE OR REMOVAL OF VEGETATION SHALL NOT EXCEED THE MINIMUM NECESSARY TO COMPLETE OPERATIONS.
2. INSTALL DIVERSION ON THE INSIDE OF THE STREAM BEND, WHERE POSSIBLE.

INSPECTION

1. INSPECT DAMS FOR OVERTOPPING, BYPASS, UNDERCUTTING, OR OTHER DEFECTS.
2. INSPECT DISCHARGE POINT FOR EROSION OR FAILURE OF THE ENERGY DISSIPATER.

REMOVAL

1. REMOVE TEMPORARY DAM STRUCTURES AND DIRECT FLOW TO THE ORIGINAL PATH UPON COMPLETION OF WORK.
2. RECYCLE OR RE-USE THE DAM, IF APPLICABLE.
3. BACKFILL OR REGRADE AND RESTORE THE DIVERSION CONVEYANCE TO ORIGINAL CONTOURS.
4. REGRADE AND SEED OR PERMANENTLY STABILIZE ALL DISTURBED AREAS.
5. STABILIZE AS QUICKLY AS POSSIBLE BECAUSE THE WORK IS CLOSE TO WATER.



PLAN

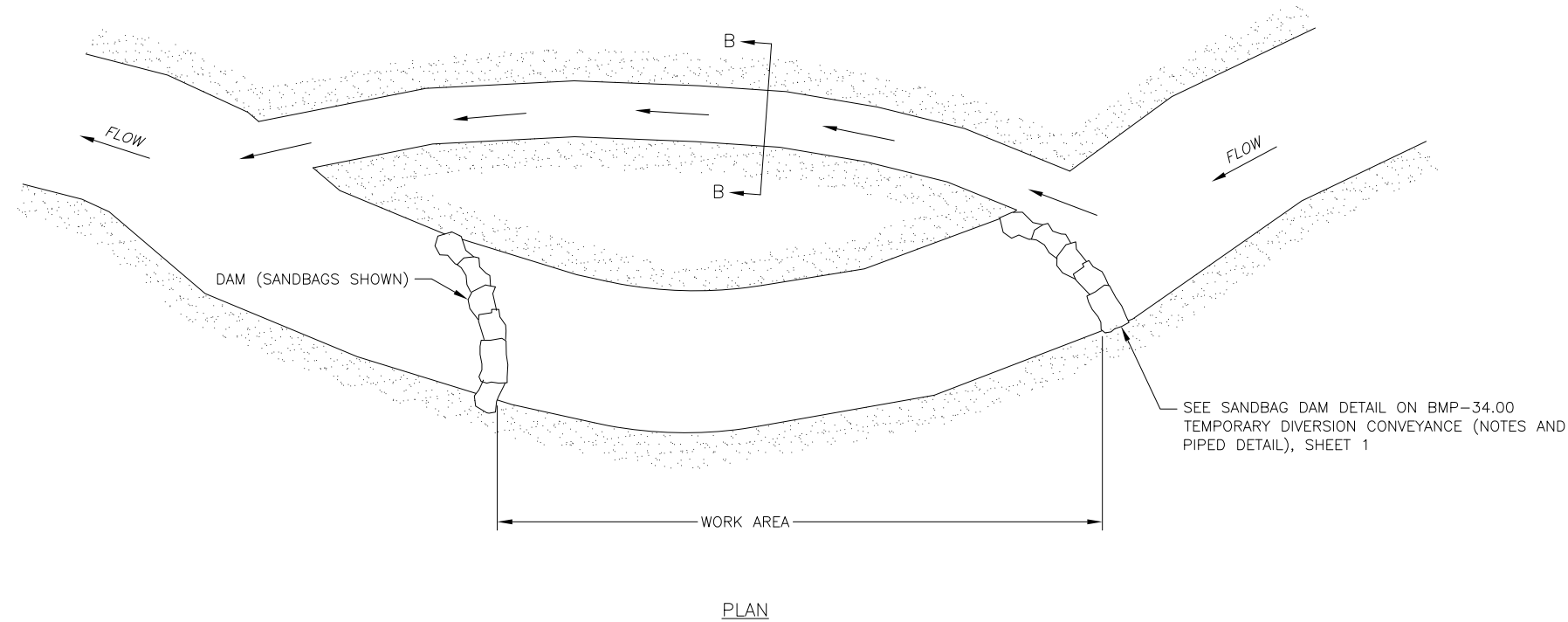
PIPED DIVERSION
NOT TO SCALE

REVISIONS		
Date	Description	By

State of Alaska DOT&PF
**TEMPORARY DIVERSION
CONVEYANCE
(NOTES & PIPED DETAIL)**

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Date **12/2015** X/XX/XX



CHANNEL DIVERSION NOTES:

MATERIALS

CHANNEL LINING: PLASTIC SHEETING (MINIMUM 30 MIL THICKNESS OR TWO OR MORE LAYERS OF 10 MIL FIBER REINFORCED THICKNESS).

INSTALLATION

1. REMOVE AND PROPERLY DISPOSE OF ALL TREES, BRUSH, STUMPS, OR OTHER OBJECTIONABLE MATERIAL.
2. BEGIN EXCAVATION OF THE CHANNEL AT THE PROPOSED DOWNSTREAM END AND WORK UPSTREAM.
3. EXCAVATE, SHAPE, AND STABILIZE THE DIVERSION TO LINE, GRADE, AND CROSS SECTION AS REQUIRED IN THE PLANS.
4. STOCKPILE EXCAVATED MATERIAL TO BACKFILL DIVERSION AFTER FLOW HAS BEEN RE-DIRECTED TO THE ORIGINAL PATH.
5. PROVIDE BMPs FOR THE STOCKPILE SUCH THAT SEDIMENT FROM THE STOCKPILE DOES NOT ENTER THE WATER.
6. STABILIZE THE DIVERSION AFTER INSTALLATION.
7. BREACH THE UPSTREAM END AFTER EXCAVATION FOR THE TEMPORARY CHANNEL IS COMPLETE AND THE CHANNEL IS STABILIZED.
8. ESTABLISH FLOW IN THE EXCAVATED CHANNEL AND INSTALL TEMPORARY DAMS TO FORCE ALL WATER TO BE DIVERTED.

INSPECTION

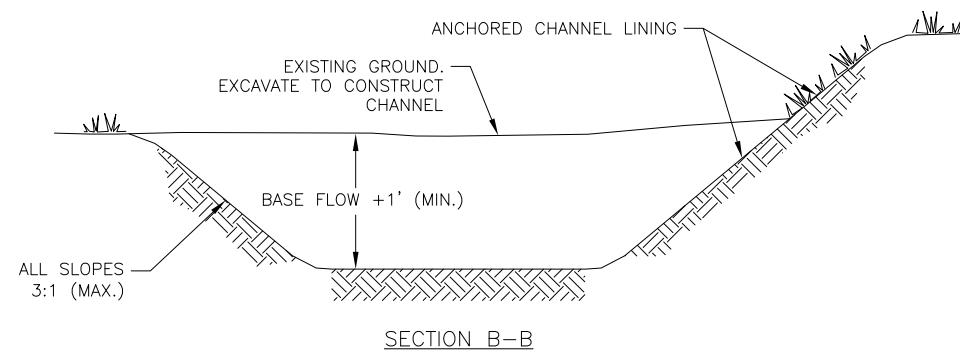
1. INSPECT FOR DAMAGE TO THE LININGS.
2. INSPECT FOR ACCUMULATING DEBRIS AND SEDIMENT BUILDUP.
3. ENSURE THE SLOPE IS ADEQUATELY PROTECTED.

MAINTENANCE

1. REMOVE ANY SEDIMENT OR OTHER OBSTRUCTIONS FROM THE DIVERSION CHANNEL.
2. REPAIR LININGS AND SLOPE PROTECTION.
3. REPAIR HOLES, GAPS, OR SCOUR.

ADDITIONAL NOTES

1. SEE TEMPORARY DIVERSION CONVEYANCE GENERAL NOTES ON BMP-34.00 TEMPORARY DIVERSION CONVEYANCE (NOTES AND PIPED DETAIL), SHEET 1.



CHANNEL DIVERSION
NOT TO SCALE

REVISIONS		
Date	Description	By

State of Alaska DOT&PF
**TEMPORARY DIVERSION
CONVEYANCE
(CHANNEL DETAIL)**

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