



SUBJECT Temporary Water Management (TWM) Plans Drafting Guidance	FINAL NUMBER GE14-01(B)	EFFECTIVE DATE 06/01/2014	VALIDATION DATE 	SUPERSEDES or RESCINDS New
TOPIC/PROGRAM <u>Statewide TWM Program</u>	WEB LINK(S) http://www.oregon.gov/ODOT/HWY/TECHSERV/Pages/technicalguidance.aspx Original Signed by Original signed by: Susan Haupt Geo-Environmental Section Manager			

PURPOSE

The intent of this bulletin is to provide guidance on developing contract plans for Temporary Water Management (TWM) projects. The CAD and drafting standards outlined are used in the creation of TWM Plan sheets for contract plans. The Contract Plans Development Guide (CPDG) does not contain a chapter on TWM Plans development at this time. This bulletin, along with ODOT's MicroStation Engineering Workspace, provides users with the necessary standards.

GUIDANCE

At such time this information is transferred to the CPDG, this bulletin will be rescinded and any further additions to TWM CAD and drafting standards will appear on ODOT's Engineering Workspace and in future updates of the CPDG.

Engineering Workspace

ODOT's Engineering Workspace contains the TWM CAD standards. The workspace contains the most accurate up-to-date CAD standards available for ODOT's engineering disciplines. The workspace is considered to rank highest in the line of standards guidance available to users and takes precedence over the CPDG. Provided in the workspace are discipline specific levels, line styles, cell libraries, seed files and tasks.

Plan Sheet Standards

The sheet setup and layout of a TWM plan follows the basic rules of standard ODOT Roadway plans development by incorporating standard text styles, naming conventions, sheet border, titleblock, etc. Users should refer to chapters 1, 2, and 6 of the CPDG for general information, and the Appendices for more specific information. Guidance contained further in this bulletin applies specifically to TWM plans development.

DEFINITIONS

CPDG - The Contract Plans Development Guide (CPDG) presents the policies, procedures, methods, and standards for developing and preparing final contract plans using Computer Aided Design (CAD) in MicroStation.

Workspace - A CAD workspace is a customized drafting environment in which MicroStation can be set up for specific purposes. A workspace consists of “components” and “configuration files”. ODOT’s Engineering Workspace contains the standard files and tools needed for the design and drafting of various discipline specific products.

TWM - Temporary Water Management is water control and treatment when facilities are built or repaired in the riparian zone, such as bridges, culverts, embankments, fish passage measures, and streambed restorations. These control and treatment measures are temporary. They are usually installed just before construction and removed immediately after construction is complete.

Full Isolation - Full isolation is implemented when work will occur from bank to bank of a stream. Barriers are placed upstream and downstream of the work area and span the width of the active channel. The barriers keep streamflow out of the work area while a temporary bypass system reroutes the water around the work area.

Partial Isolation – Partial isolation is implemented when work will occur along or near the bank of a stream. Barriers are placed next to and along the bank to establish a work area. Partial isolation allows for flow conditions to continue through the non-isolated channel.

BACKGROUND/REFERENCE

This is the first set of CAD standards provided for TWM plans development. This Technical Bulletin is in conjunction with the publication of the newly revised TWM chapter (now chapter 18) of the Hydraulics Manual, and the introduction of the TWM CAD standards to the engineering workspace in MicroStation. These CAD and drafting standards provide users with the necessary tools to prepare a TWM plan in accordance with the design standards set forth in the Hydraulics Manual. Having these standards gives all project development staff (including consultant staff), the same tools for developing plans; ensuring statewide consistency.

EXPLANATION

Described in the following pages are the TWM CAD and Drafting standards, their use and location. Basic instructions for the set up and completion of a TWM Plan, example drawings, and a drawing check list are included in this bulletin. All the standards are accessed in the cell library (TWM.cel), the task for TWM, and in the seed file (seed_TWM.dgn). These standards files are contained in ODOT’s Engineering

Workspace and are available to all ODOT MicroStation users. The workspace is available to consultants as a download through the consultant portal on [ODOT's website](#).

Cell Library

The TWM cell library is located in the engineering workspace. TWM.cel contains individual cell drawings used on TWM plan sheets. These cells range from plan view symbols, to details that can be modified for individual projects, plus standard notes, construction notes, and sheet and view titles.

Task Dialog

The TWM task is located in the engineering workspace as a side bar under the Geo Hyd Env dialog tab. The TWM task is set up similar to the tasks for Erosion Control and Material Source. The items in the task access cells from the cell library plus any custom linestyles used on TWM plans.

Seed File

The seed file (Seed_TWM.dgn) is located with other seed files in the workspace. The file contains a ready-made plan sheet (template), which includes a standard sheet border and titleblock. The sheet is placed at an x and y coordinate location of 0,0; using the lower left corner of the yellow plot border as the cell origin. The purpose of this type of seed file is to provide a working template for quick, easy preparation of TWM plans.

Included in the seed file drawing are some standard elements used in every TWM plan.

- A Fish Screen Sump detail.
- A sandbag footprint detail.
- A set of construction notes for Full Isolation projects.
- A set of construction notes for Partial Isolation projects.
- Standard General Notes.
- An Estimated Discharge table.
- A Plan View title.
- A Section View title.

Several “notes to drafter”, explaining the use of certain components in the template, are included. These notes are construction elements so will not print but should be deleted prior to project completion.

Levels

Two levels are typically used for TWM plan sheet elements; Level P_HY_DESIGN_GENERAL is used for detail line work and level P_HY_DESIGN_GENERALTX is used for text, dimension lines, leader lines and table border lines.

Sheet Number Conventions

Number the plan sheet or first sheet in the set as GG. If drafting multiple sheets, the sheet numbers that follow are GG-2, GG-3 and so on. See chapter 2.0 - General Information, of the CPDG for sheet numbering conventions.

File Naming Conventions

See chapter 2.0 - General Information of the CPDG for standard file naming conventions.

Example Drawings

See Appendix A of this bulletin for example plan sheets. Appendix A contains a Full Isolation design plan and a Partial Isolation design plan. These example drawings are also located on the Drafting page of the Geo-Environmental Section website at:

<http://www.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/Pages/drafting.aspx>.

Refer to the Hydraulics Manual for the required components of each type of Isolation design.

Design Base Map Setup

To create a design base map for TWM, reference the existing files for topography, right-of-way and the proposed road design. These files may be referenced into a separate design file. Name the design file keynutw.dgn. Add design elements using the custom linestyles and cell drawings available in the task and/or cell library.

Plan Sheet Development

TWM plan sheets should use the project roadway base mapping and bridge information if needed. This keeps plan graphic elements consistent throughout the entire plan set and prevents reproducing work unnecessarily. The drafter and/or designer assigned to the project should set up the TWM drawings to include basic topographic features, right-of-way information and the design base map. Reference these files to the plan sheet (template) file and position into the plan view area of the sheet. For full setup instructions see the chapter on Plan Sheet Setup, in the CPDG.

TWM plan sheets contain construction notes, describing location of work to be performed, and bid item names, plus quantities. General notes about design and material standards, plus any work-related information about the site that contractors may need to know, are included. The Estimated discharge table should be filled in with data provided by the project engineer or designer. The standard Width-to-Height Ratio Sandbag Barrier detail, cross section/s and additional details are also included and can be placed on a second sheet if needed. Name the plan sheet keynutw.pl?; as noted in chapter 2 of the CPDG. (See the Plans Check List section of this bulletin for all items to be included).

Plan Sheet Complete

In preparing a TWM plan drawing for review by the Engineer of Record, complete the following.

1. Delete the set of isolation construction notes that do not apply to the project.
2. Delete the notes to drafter.
3. Fill in the Title block.
4. Reference in a plan view design.
5. Add cross section/s and details (use second sheet if needed).
6. Delete unused items from the legend.
7. Add status stamp or "V" number.

Plans Check List

The following is a check list of items to include on TWM plans. For a list of typical design components, see Step 8a – Coordinate TWM Concept Plan Drafting, in chapter 18 of the Hydraulics manual.

- Border, title block, sheet title, sheet number
- Title block information completed
- Professional of record stamp
- ODOT logo
- "V" number or project status stamp
- Plan with north arrow
- Existing roadway
- Existing structure (bridge, culvert, etc.)
- Existing utilities
- Structure number in label of existing and proposed structures
- Waterway
- Top of bank
- Ordinary high water line
- Right-of-way lines
- Temporary construction easements
- Construction limits
- Limits of isolation
- Proposed roadway/or structure
- Proposed TWM design elements
- Cross section/s (use InRoads, or modify a generic section detail)
- Barrier detail (Sandbag footprint detail or other)
- Fish Screen Sump detail
- Details (project specific)
- TWM discharge table
- Construction notes
- General notes
- Notes (other)

Printing

Refer to the ODOT MicroStation V8i User Guide for step by step instructions on using Print Dialog and Print Organizer for plan sheet printing. Locate the latest version of the guide at <http://www.oregon.gov/ODOT/CS/east/Pages/Home.aspx>. Use the computer support help desk to get in contact with a member of EAST for further assistance.

RESPONSIBILITIES

Plan preparation is a team effort requiring regular communication between the design engineer and the drafter. The design engineer is responsible for the content and constructability of the design. The drafter is responsible for the presentation of those ideas on the plans in a format that is consistent with statewide standards.

ODOT's Senior Hydraulic Engineer is the owner of the TWM CAD standards. They review, recommend and approve the CAD and Drafting standards for TWM plans development.

The Geo/Environmental Section CADD Standards Program Coordinator is responsible for approving, developing, maintaining and providing accessibility to these standards. Any party preparing TWM plans for ODOT will use these standards.

ACTION REQUIRED

Implementation of the guidance identified in this document shall be performed by anyone developing Contract Plans for ODOT projects.

CONTACT INFORMATION

Title: Senior Hydraulics Engineer
Branch/Section: Technical Services/Geo-Environmental Section
Phone: (503)986-3365
E-mail: Alvin Shoblom – Alvin.SHOBLOM@odot.state.or.us
Wade Holaday – Wade.HOLADAY@odot.state.or.us (Temporary position backfill – ends June-2014)
Dan Gunther – Daniel.C.Gunther@odot.state.or.us (Temporary position backfill – ends June-2015)

Title: CADD Standards Program Coordinator
Branch/Section: Technical Services/Geo-Environmental Section
Phone: (503)986-3380
E-mail: Kim Taylor – Kim.E.Taylor@ODOT.state.or.us

APPENDIX A:

Example drawings of TWM concept plans for a Full Isolation design and a Partial Isolation design.

PARTIAL ISOLATION NOTES:

- ① Isolating the work site: Install sandbag barrier along the stream channel. Size the barrier based on site and stream flow conditions. The discharge table below can be used to estimate water depth to establish the barrier width and height.
- ② Provide adequate sediment control measures during dewatering of the work area to insure sediment laden water does not leave the site.
- ③ Install energy dissipater pad downstream from sediment control facility. Location to be set based on topography and easements available.

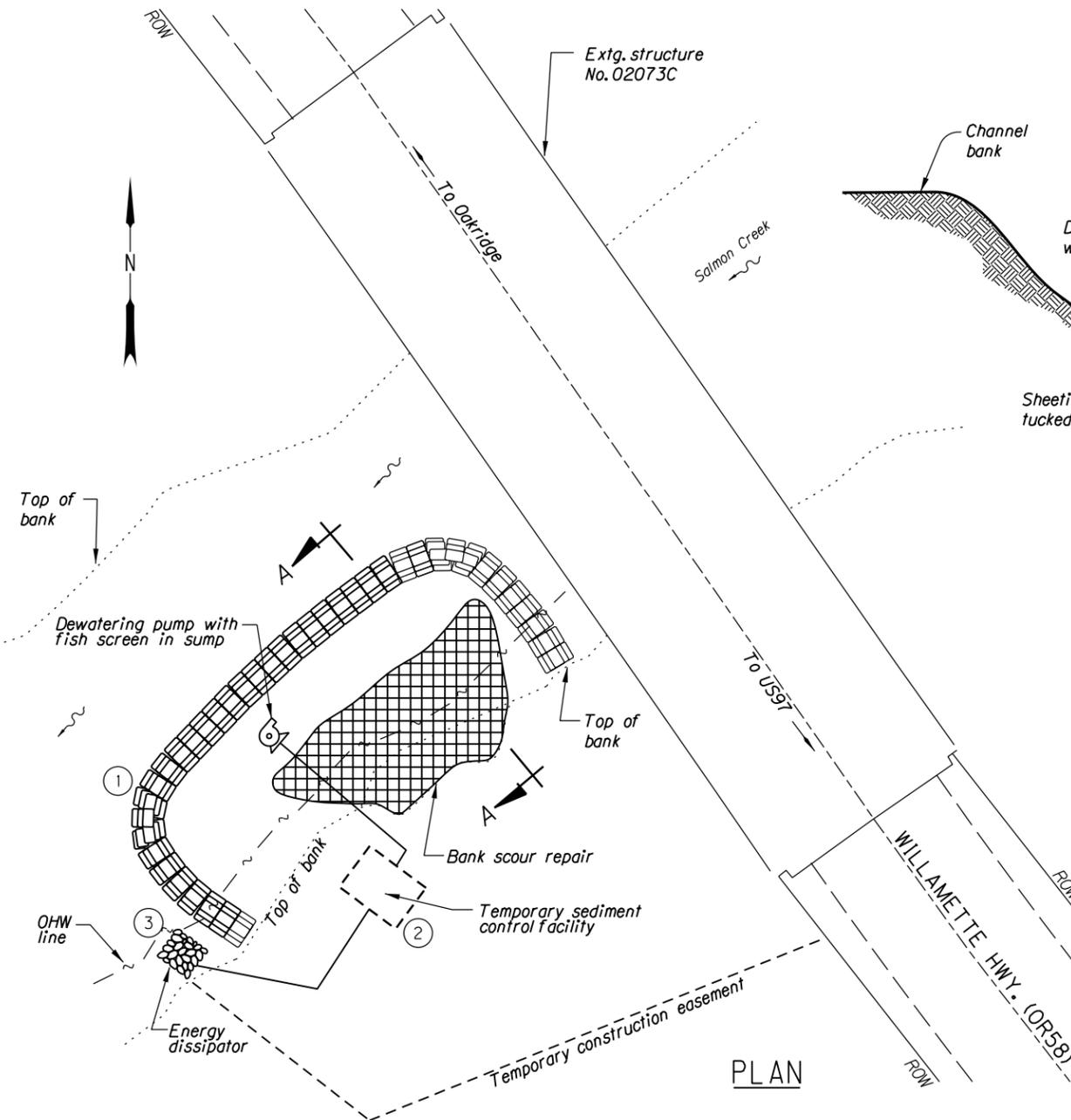
GENERAL NOTES:

The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

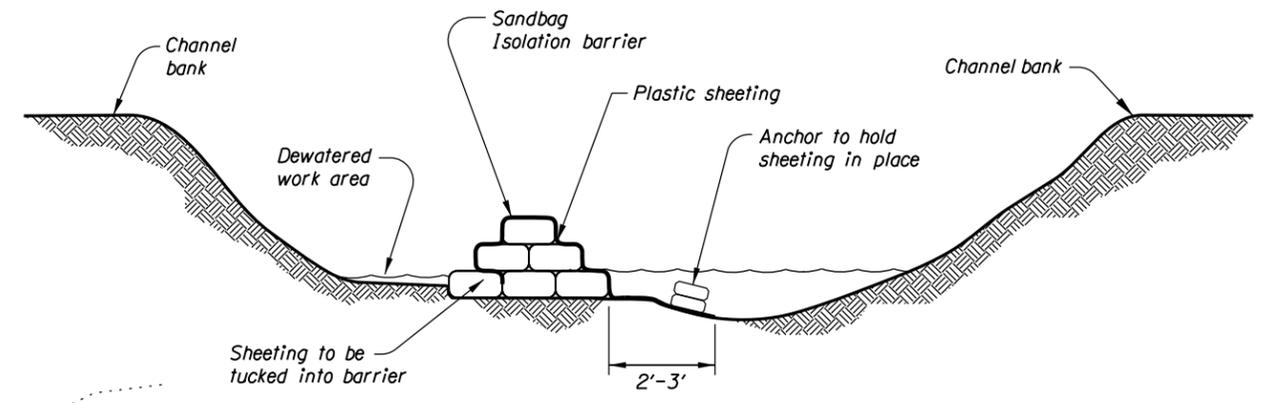
The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.

- LEGEND:**
-  Sandbag isolation barrier
 -  Energy dissipator
 -  Sediment control facility
 -  Sump pump
 -  Bank scour repair

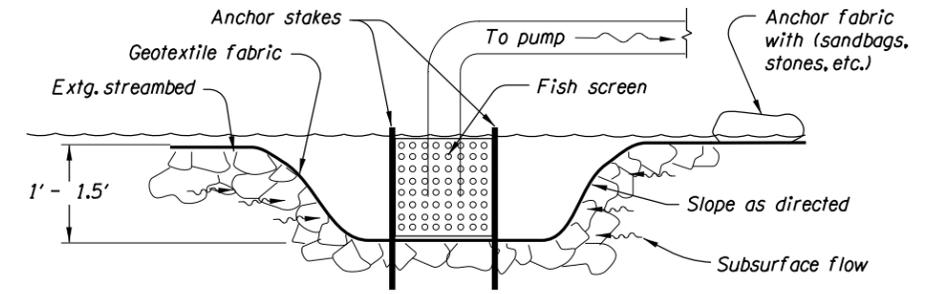


PLAN



PARTIAL ISOLATION DETAIL

NTS



FISH SCREEN SUMP DETAIL

NTS

**Salmon Creek at OR 58
ESTIMATED DISCHARGES FOR
TEMPORARY WATER MANAGEMENT**

NOTE	AVERAGE DAILY DISCHARGE IN CUBIC FEET PER SECOND (GALLONS PER MINUTE)		
	1	2	3
JULY	3.1 (1,400)	2.0 (900)	1.4 (630)
AUGUST	2.0 (900)	1.1 (490)	0.77 (350)
SEPTEMBER	2.5 (1,100)	1.3 (580)	0.68 (310)
OCTOBER	11.0 (5,000)	3.3 (1,500)	1.4 (630)

- 1) Average daily discharge expected to be exceeded 2 days each month.
- 2) Average daily discharge expected to be exceeded 8 days each month.
- 3) Average daily discharge expected to be exceeded 16 days each month.

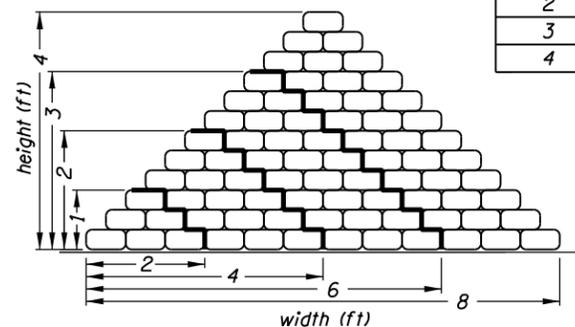
In-water work period extends from 1 July through 15 October.

Listed discharges are surface water from the upstream watershed. The estimated discharges are based on nearby gauged basins. Discharges in the subject watershed may differ.

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500



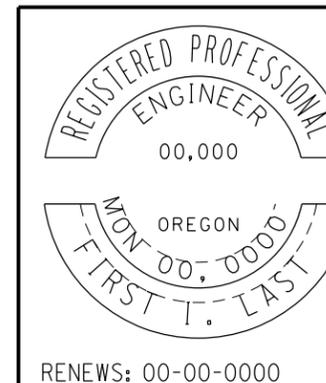
OREGON DEPARTMENT OF TRANSPORTATION

**OR58: SALMON CREEK BRIDGE
SCOUR REPAIR (OAK RIDGE) SEC.**
WILLAMETTE HIGHWAY
LANE COUNTY

Reviewed By - Alvin Shoblom
Designed By - Bo Miller
Drafted By - Kim Taylor

**TEMPORARY WATER
MANAGEMENT CONCEPT
PLAN**

SHEET NO.
GG



FULL ISOLATION NOTES:

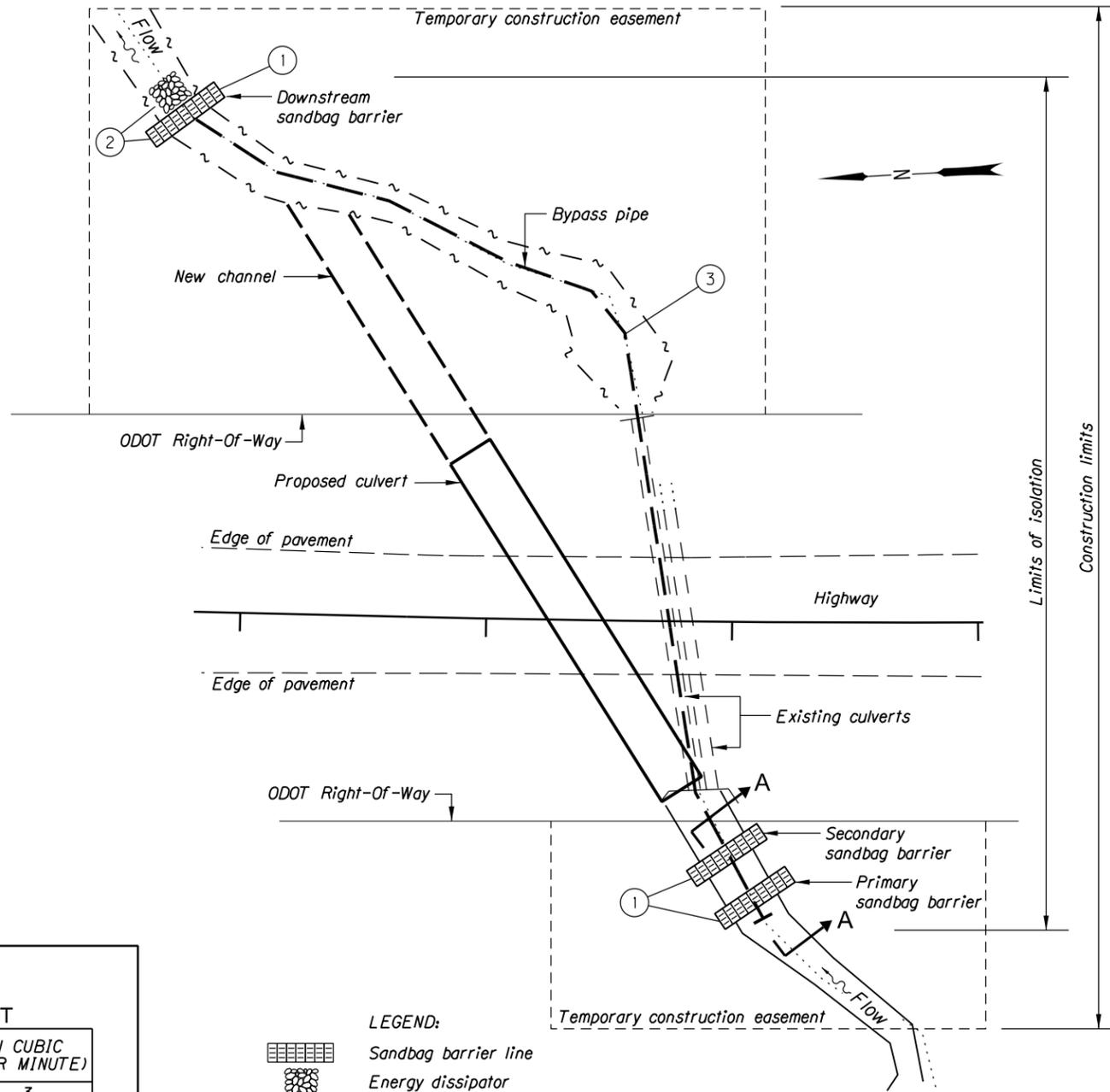
- ① Isolating the work site upstream: Install single primary sandbag barrier across the stream channel. If Needed, install secondary sandbag barrier. Downstream: Install sandbag barrier.
- ② Install sandbag barrier and energy dissipater pad downstream from work area. Location to be set based on topography and easements available.
- ③ Size the temporary water management facility based on site conditions. Route water around work area using pipe, pump or combination. The discharge table below can be used to estimate the size of the bypass pipe and/or pump.
- ④ Water seeping through the primary barrier and contained by the secondary barrier shall be returned to an area up stream of the sandbag barrier to a temporary settling basin or other approved location. See detail sht GG-2.
- ⑤ Provide adequate sediment control measures during dewatering of the work area to insure sediment laden water does not leave the site. See detail sht GG-2.

GENERAL NOTES:

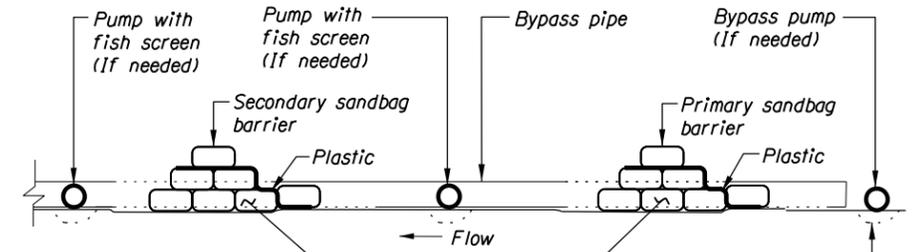
The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.



DRY CREEK BYPASS



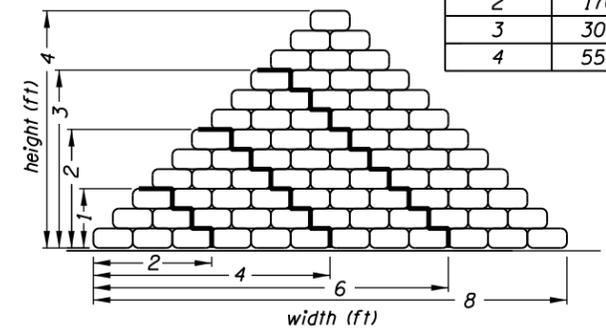
NOTE: Width and depth of sandbag barrier will vary depending on site and stream flow conditions.

SECTION A-A

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500

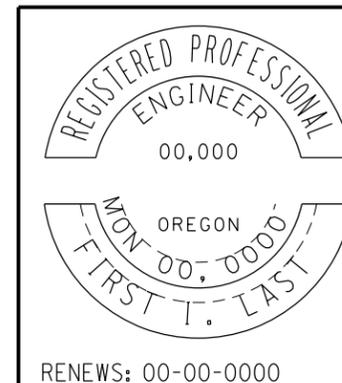


**DRY CREEK AT HWY 99 W
ESTIMATED DISCHARGES FOR
TEMPORARY WATER MANAGEMENT**

NOTE	AVERAGE DAILY DISCHARGE IN CUBIC FEET PER SECOND (GALLONS PER MINUTE)		
	1	2	3
JULY	3.1 (1400)	2.0 (900)	1.4 (630)
AUGUST	2.0 (900)	1.1 (490)	0.77 (350)
SEPTEMBER	2.5 (1100)	1.3 (580)	0.68 (310)
OCTOBER	11.0 (5000)	3.3 (1500)	1.4 (630)

1) Average daily discharge expected to be exceeded 2 days each month.
 2) Average daily discharge expected to be exceeded 8 days each month.
 3) Average daily discharge expected to be exceeded 16 days each month.
 In-water work period extends from 1 July through 15 October.
 Listed discharges are surface water from the upstream watershed. The estimated discharges are based on nearby gauged basins. Discharges in the subject watershed may differ.

LEGEND:
 Sandbag barrier line
 Energy dissipater



OREGON DEPARTMENT OF TRANSPORTATION

DRY CREEK CULVERT
 PACIFIC HWY WEST 1W (OR 091) MP 88.20
 BENTON COUNTY

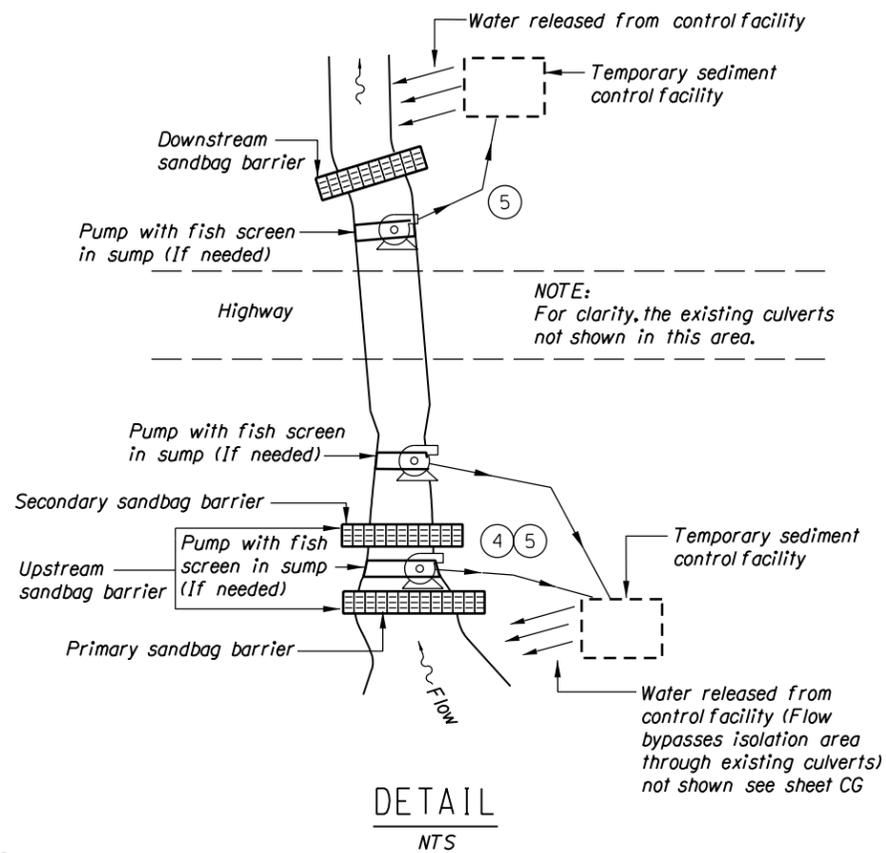
Reviewed By - Alvin Shoblom
 Designed By - Bo Miller
 Drafted By - Kim Taylor

**TEMPORARY WATER
 MANAGEMENT CONCEPT
 PLAN**

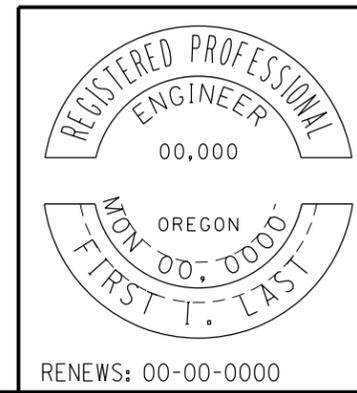
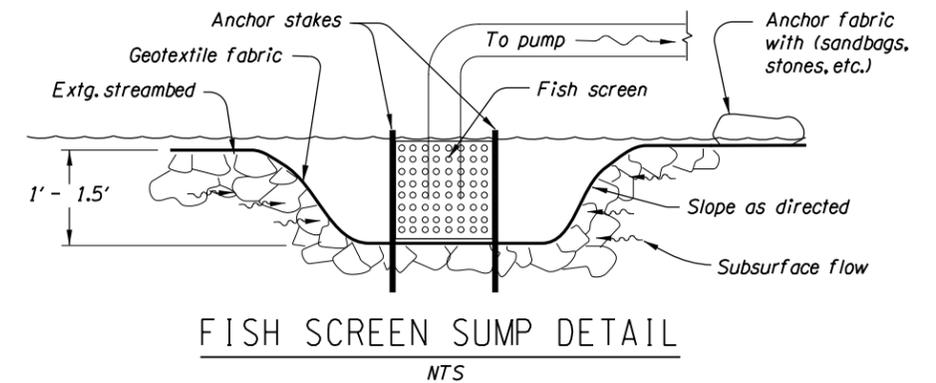
SHEET NO.
GG

FULL ISOLATION NOTES:

- ④ See sheet GG note.
- ⑤ See sheet GG note.



- LEGEND:
-  Sandbag barrier line
 -  Sediment control facility
 -  Sump pump



 OREGON DEPARTMENT OF TRANSPORTATION

DRY CREEK CULVERT
 PACIFIC HWY WEST 1W (OR 091) MP 88.20
 BENTON COUNTY

Reviewed By - Alvin Shoblom
 Designed By - Bo Miller
 Drafted By - Kim Taylor

TEMPORARY WATER MANAGEMENT CONCEPT DETAILS

SHEET NO.
 GG-2