Reconnecting Waterways

Understanding State Permitting for Culvert Replacement and Dam Removal

VT DEC Watershed Management

Rivers Program – River Management Section

December 2024

Topics to Discuss – Presentation Agenda

Regulated Streams

Jurisdiction and Technical Guidance

Definition and Field Characteristics

Intermittent Streams and the MRGP

Other State Regulatory Requirements

Stream Crossing Structure Replacement

Design Standards

Construction Plans

Inspection Frequency

Dam Removals and Stream Restoration

Design Standards

Phasing and Sequencing Plans

Dewatering and Flow Controls

Inspection Frequency

List of Bureaucratic Acronyms

Vermont Department of Environmental Conservation (VT DEC)

Flood Hazard Areas and River Corridor (FHARC)

Municipal Road General Permit (MRGP)

Stormwater Construction General Permit (CGP)

Stream Alteration General Permit (SAGP)

Wetlands Non-Reporting General Permit (NRGP)

Active Channel Width (ACW)

Bankfull Channel Width (Wbkf)

Bankfull Channel Depth (Dbkf)

Environmental Stone, i.e. placed stream bed material (E-stone)

Jurisdiction of the VT DEC Stream Alteration General Permit (SAGP)

Jurisdiction of the Stream Alteration General Permit

B.1 Definitions

(38) "Perennial stream" means a watercourse or portion, segment, or reach of a watercourse, generally exceeding 0.5 square miles in watershed size, in which surface flows are not frequently or consistently interrupted during *normal* seasonal low flow periods. Perennial streams that begin flowing subsurface during low flow periods, due to natural geologic conditions, remain defined as perennial. All other streams, or stream segments of significant length, shall be termed intermittent. A perennial stream shall not include the standing waters in wetlands, lakes, and ponds.

B.2. Jurisdictional Limits B.2.2. Within Watercourses - A person shall not change, alter, or modify the course, current, or cross section of any watercourse or of any designated outstanding resource waters, within or along the boundaries of this State either by movement, fill, or by excavation of ten cubic yards or more of material in any year, unless authorized by the Secretary. A watercourse is any perennial stream.

Technical Guidance for Identification of Perennial Streams For the Purpose of Jurisdictional Determinations Under 10 VSA Section 1021(a) and 1002(10)

Definition of Perennial Stream - A perennial stream is a watercourse, or portion, segment or reach of a watercourse that, in the absence of abnormal, extended or severe drought, continuously conveys surface water flow. Human caused interruptions of flow; i.e. flow fluctuations associated with hydroelectric facility operations, or water withdrawals, shall not influence the determination. A perennial stream shall not include the standing waters of wetlands, lakes, and ponds.

All other streams or portions thereof shall be considered and termed intermittent. A stream may, along its course, cycle from intermittent to perennial to intermittent through multiple iterations

What does this all really mean? Call the regional River Management Engineer!

Technical Guidance for Identification of Perennial Streams

Evaluative Parameters

A perennial stream may be characterized by any of the following:

1. Direct observation or compelling evidence obtained that surface flow is uninterrupted.
2. Presence of one or more geomorphic characteristics typically associated with perennial streams including:
   a. Bed forms; i.e. riffles, pools, runs, gravel bars, other depositional features, bed armor layer
   b. Bank erosion and/or bed scour
   c. Indications of waterborne debris and sediment transport
   d. Defined bed and banks.
3. Watershed size greater than 0.25 square miles.
4. VHD data layer-derived application of USGS regression for intermittent stream flow probability.
5. Presence of aquatic organisms requiring uninterrupted flow for survival.
6. Base flows are primarily supported by groundwater recharge as indicated by bank seeps, springs or other indicators.
7. Presence of highly permeable channel (particularly streambed) boundary conditions in conjunction with occasional to frequent decline of the groundwater table below the streambed elevation.
8. Surrounding topography exhibits characteristics of being formed by fluvial processes.

https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_guidance_for_the_identification_of_perennial_streams.pdf

What is a Perennial Stream?

A reach or segment of a stream in which surface flows are not frequently or consistently interrupted during seasonal, low flow periods; and supports aquatic life (not just fish!)

Wild brook trout collected from Heartwellville Brook.

What about Intermittent Stream Channels?

What is an Intermittent Stream Channel

Intermittent Streams:

A seasonal stream channel which flows for part of the year

Still has a defined bed and bank, sediment and debris transport

May support aquatic organisms including resident fish populations

NOT regulated under the SAGP since they are not perennial, these stream channels are jurisdictional under the VT DEC Municipal Roads General Permit (MRGP); focused on reducing stormwater related erosion on municipalities roads

Sizing of replacement structures is based on ACTIVE CHANNEL WIDTH (ACW); scour line along bottom of bank similar to USACE Ordinary High Water (OHW)

Intermittent Streams – Municipal Culvert Sizing under MRGP using Active Channel Width (ACW)

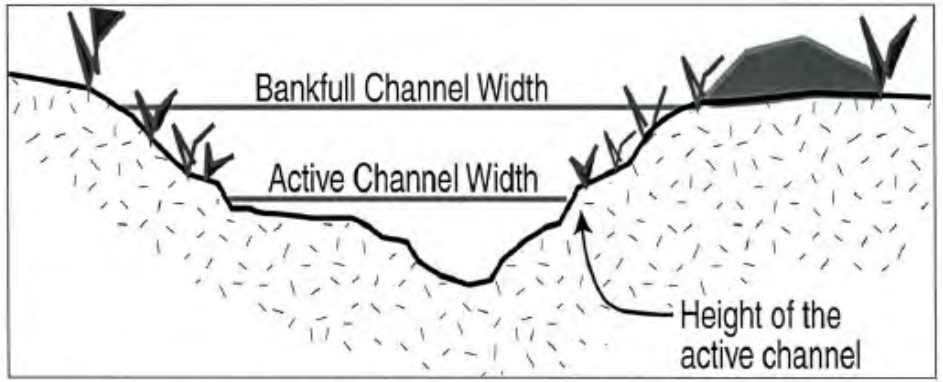
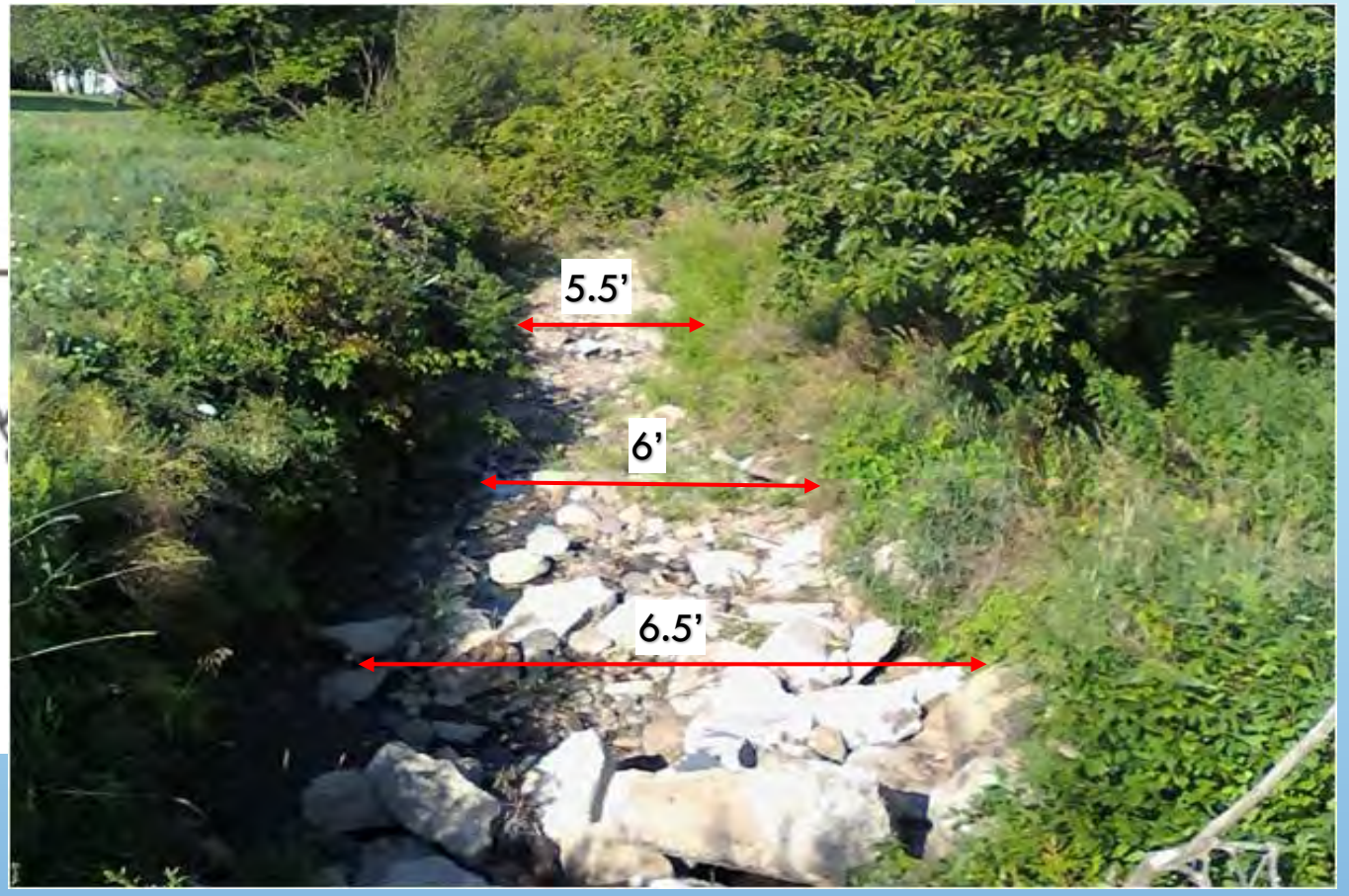


Figure IX-3. Active channel width versus bankfull channel width.

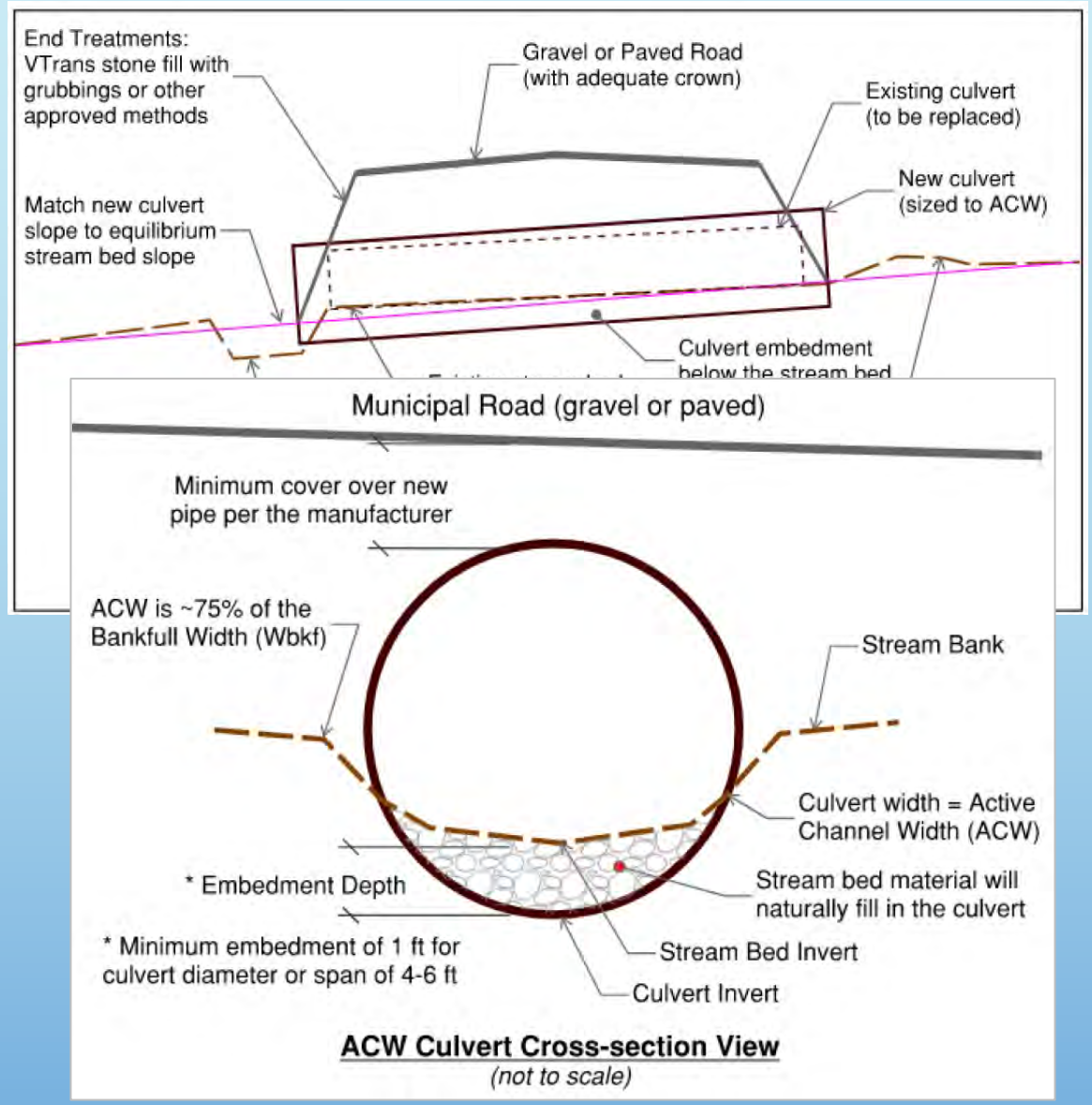
Figure IX-4. Example of active and bankfull channel margin.



Intermittent Stream Culvert Designs for Municipalities

INTERMITTENT STREAM CROSSINGS:

- Match long slope of the stream channel when setting slope of the new crossing structure
- Minimum pipe embedment (20-30% of rise) or 1-1.5 feet below the long bed slope
- Select pipe shape based on road height, i.e. benefits of round vs squashed culvert
- No infill with ANR E-stone due to height restrictions, assumed accumulation of sediment in culvert with DS grade controls installed
- Reference Appendix C of VT DEC MRGP



Other State Permits for Barrier Removal Projects

Potential Applicable Permits for Barrier Removals

Project Type	Federal			State							Municipal	
	US ACE	SHPO	ESA	Stream Alteration	Wetlands	Dam Safety	Stormwater	Lakes/Ponds	FHARC GP	NRB Act 250	Floodplains (NFIP)	Local Zoning
Bridge or Culvert Replacement	✓			✓	✓						✓	
Dam Removal and Stream Restoration	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Permits for Culvert and Bridge Replacement Projects

VT DEC Stream Alteration General Permit (SAGP)

General Permit – most projects in compliance with the performance standards are processed as a "Registration', higher risk projects are processed as "Applications"

VT DEC State Wetlands Permit

Allowed Use – a one-time expansion of 250 sf beyond the maintained road prism
Non-reporting General Permit (NRGP) – up to 1,000 sf of permanent impacts to wetlands and buffers with up to 5,000 sf of temporary impacts for access/reroutes

Municipal bylaws under National Flood Insurance Program (NFIP)

In Special Flood Hazard Area (SFHA) – upsizing culverts and bridges in FEMA mapped floodplains often triggers a local review by the Town zoning or planning commission

Permits for Dam Removal and Restoration Projects

VT DEC Stream Alteration General Permit (SAGP)

General Permit – more complex or higher risk projects processed as 'Applications' which include a 14-day public notice period, posting on the Environmental Notice Bulletin (ENB)

Individual Permit (IP) – projects with post-construction monitoring requirements for either water quality, channel evolution, or sediment transport concerns; 30-day posting to ENB

VT DEC State Wetlands Permit

Allowed Use – stream restoration plan is reviewed and approved by Wetland Biologist

General Permit (GP) – placement of fill within a regulated wetland or its buffer often triggers the need for a permit; including temporary construction access and stockpiles. Access routes/haul roads placed on timber mats or temporary road within the excavation footprint of impounded sediments are excluded; 14-day public notice period on ENB

* *disposal of sediments in a wetland, floodplain, or river corridor is rarely approved*

Permits for Dam Removal and Restoration Projects

continued

VT DEC Dam Safety Program (DSP)

Dam Safety Order (DSO) – jurisdiction over the removal of dams which are non-power, non-federal dams with water/sediment impoundment volume of 500k cubic feet or more

VT DEC Stormwater Program

Construction General Permit (CGP) – jurisdiction when there is 1 acre or more of soil disturbance beyond the 2-year flood inundation limits behind the dam impoundment; calculate area of haul roads, cleared and staging-laydown areas, disposal sites, etc…)

VT DEC Lakes and Ponds

Lake Encroachment – jurisdiction over FERC hydroelectric dams, DSP dams are Exempt
Shoreline Protection - jurisdiction over the creation of new impervious surface and new cleared area within 250 feet of the mean water level (not typical for dam removals)

Permits for Dam Removal and Restoration Projects

continued

Flood Hazard Areas and River Corridor General Permit

FHARC GP - jurisdiction over activities which are exempt from municipal regulations, i.e. state-owned and operated institutions and facilities; review by DEC Floodplain Manager

State Transporation Projects under Title 19

Stream Crossings - consultation with RME on design plans satisfying SAGP standards

Dam Removal - likely jurisdictional under both DSP and SAGP due to extent of stream restoration outside of state ROW; same design standards as a regular dam removal

Natural Resource Board (NRB) Act 250

Criterion 1D Floodways - those parcels which are under the jurisdiction of Act 250 will need to comply with criterion 1D Flood Hazard Areas and River Corridors (FHARC) *

**basically the reconnection of the stream to its historic floodplain and the river corridor*

Individual Permit for Stream Alteration Activities

Individual Permit (IP):

Crossing Structures:

Not installing a stream crossing that complies with bankfull channel dimensions:
Clear span = Bankfull Width (Wbkf); Clear Rise =4 x Bankfull Depth (Dbkf)

Design Standards not feasible due to:

1. Urban setting confined by unmovable public infrastructure or habitable structures
2. Stream setting with a sediment transport-dominated stream with a very high volume of coarse bedload (i.e., prone to high deposition and scour)

Dam Removals:

1. Significant volume of accumulated sediment not being removed
2. Downstream water quality standards will be negative impacted

Designing and Permitting for Stream Crossings

Identification of Bankfull Stage on Perennial Streams

Identification of Bankfull Stage Vermont Stream Geomorphic Assessment

Vermont Agency of Natural Resources April 2004

https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_identification_of_bankfull_stage.pdf

Field Indicators of Bankfull Stage

The following physical features that result from the erosion and deposition associated with the bankfull flow serve as indicators of the bankfull stage:

- Nearly flat top of developing point bars: as the channel migrates across the valley it builds the active floodplain in its wake through the development of point bars
- Flat depositional benches or lateral bars
- Location of change on the bank from steep to a more gentle slope (break in slope)
- Erosion or scour features and often the lower extent of persistent woody vegetation.

* Bankfull channel filled during bankfull flow, typically at 1.5-2 year recurrence interval

Determining the Bankfull Channel Dimensions

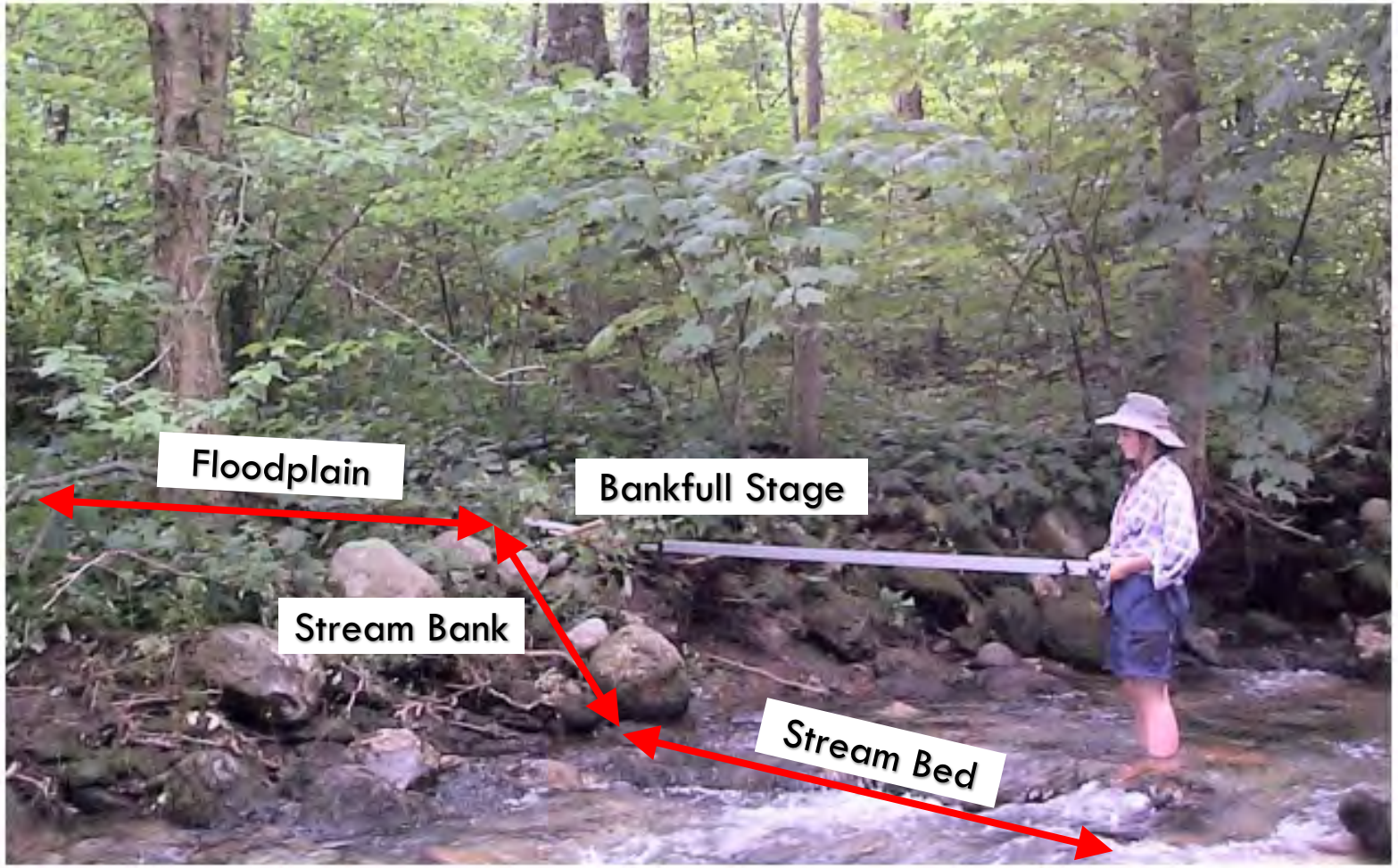
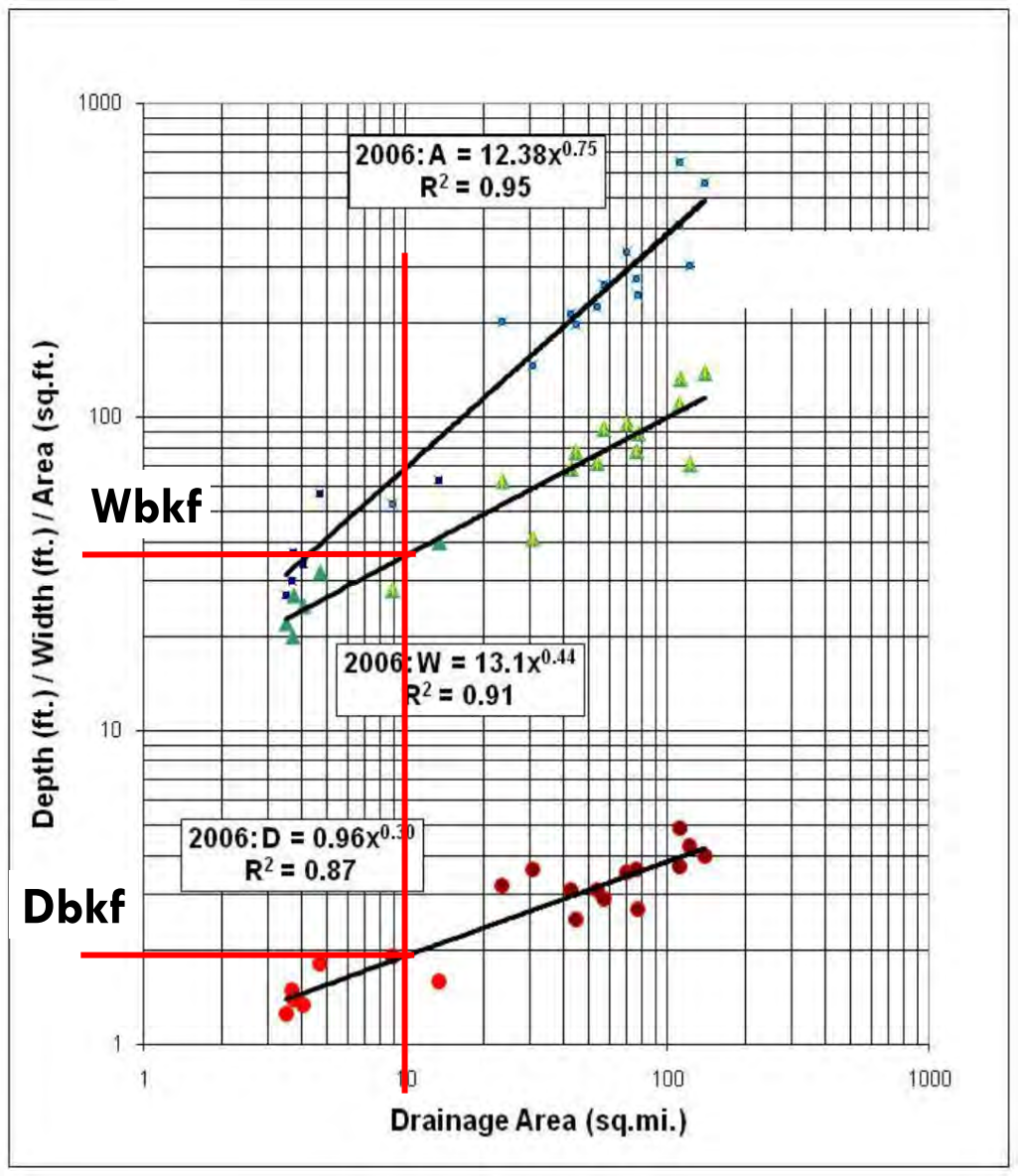


Figure 7 Example of a well developed floodplain in a system characterized by boulder size boundary material.

DEC Hydraulic Geometry Equations for Bankfull Dimensions

Vermont Bankfull Channel Dimensions Table					
Drainage Area (mi^2)	Bankfull Width (ft.)	Bankfull Depth (ft.)	Drainage Area (mi^2)	Bankfull Width (ft.)	Bankfull Depth (ft.)
5	27	1.6	110	104	3.9
10	36	1.9	115	106	4.0
15	43	2.2	120	108	4.0
20	49	2.4	125	110	4.1
25	54	2.5	130	112	4.1
30	59	2.7	135	113	4.2
35	63	2.8	140	115	4.2
40	66	2.9	145	117	4.3
45	70	3.0	150	119	4.3
50	73	3.1	155	121	4.4
55	76	3.2	160	122	4.4
60	79	3.3	165	124	4.4
65	82	3.4	170	126	4.5
70	85	3.4	175	127	4.5
75	88	3.5	180	129	4.6
80	90	3.6	185	130	4.6
85	93	3.6	190	132	4.6
90	95	3.7	195	133	4.7
95	97	3.8	200	135	4.7
100	99	3.8	205	136	4.7
105	102	3.9	210	138	4.8

Drainage area can be measured using the U.S. Geological Survey Stream Stats Tool at http://streamstats.usgs.gov/Vermont.html



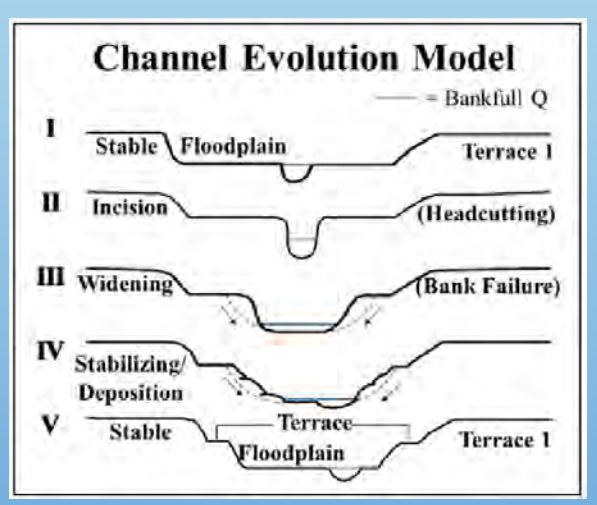
Stream Alteration Performance Standards

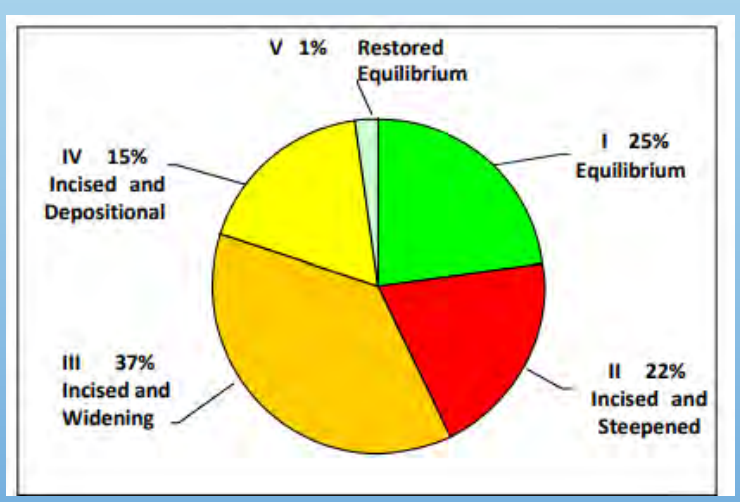
B.3.2 Performance Standards for SAGP Activities

B.3.2.1. Equilibrium Standard - An activity shall not change the physical integrity of the stream in a manner that causes it to depart from, further depart from, or impedes the attainment of the channel width, depth, meander pattern, and slope associated with the stream processes and the equilibrium conditions of a given reach of stream. The equilibrium standard is met when it can be shown that, following the stream alteration, the water flow, sediment, and woody debris produced by the watershed will be transported by the stream channel in such a manner that the stream maintains its dimension, general pattern, and slope with no unnatural aggrading (raising) or degrading (lowering) of the channel bed elevation along the longitudinal stream bed profile.

In Reality… figure out where the project location is currently within the channel evolution process and then design the project for that stage

Stage influences bankfull dimensions





B.3.2 Performance Standards for SAGP Activities

B.3.2.2. Connectivity Standard - An activity shall not change physical stream forms or alter local channel hydraulics, natural streambank stability, or floodplain connectivity in a manner such that changes in the erosion or deposition of instream materials results in localized, abrupt changes to or disconnects within the horizontal alignment of streambanks or vertical profile of the stream bed. A person shall not, unless authorized by the Secretary, change the course, current, or cross-section of a watercourse so as to create a physical obstruction or velocity barrier to the movement of aquatic organisms or change the vertical stream bed profile in a manner that impedes the movement of aquatic organisms.

Simplified… the project must maintain or restore bankfull dimensions, channel alignment and roughness, and bed slope while providing for AOP

Stream Crossing Design Standards

Steps for Project Coverage under the SAGP

Field Visit with River Management Engineer (RME):

Schedule site visit with RME to confirm bankfull dimensions, alignment, slope, other issues

Confirm Hydraulic Capacity:

USGS Stream Stats and HY-8 model (FHWA) to confirm HW/D ratio and size E-stone

Design Plans:

Sketch Plan or Engineering Plans – used communicate to contractor what will be installed

Application Submittal:

Complete 2 page form, landowner signature, submit with fee, authorization < 30 days

Construction Inspections:

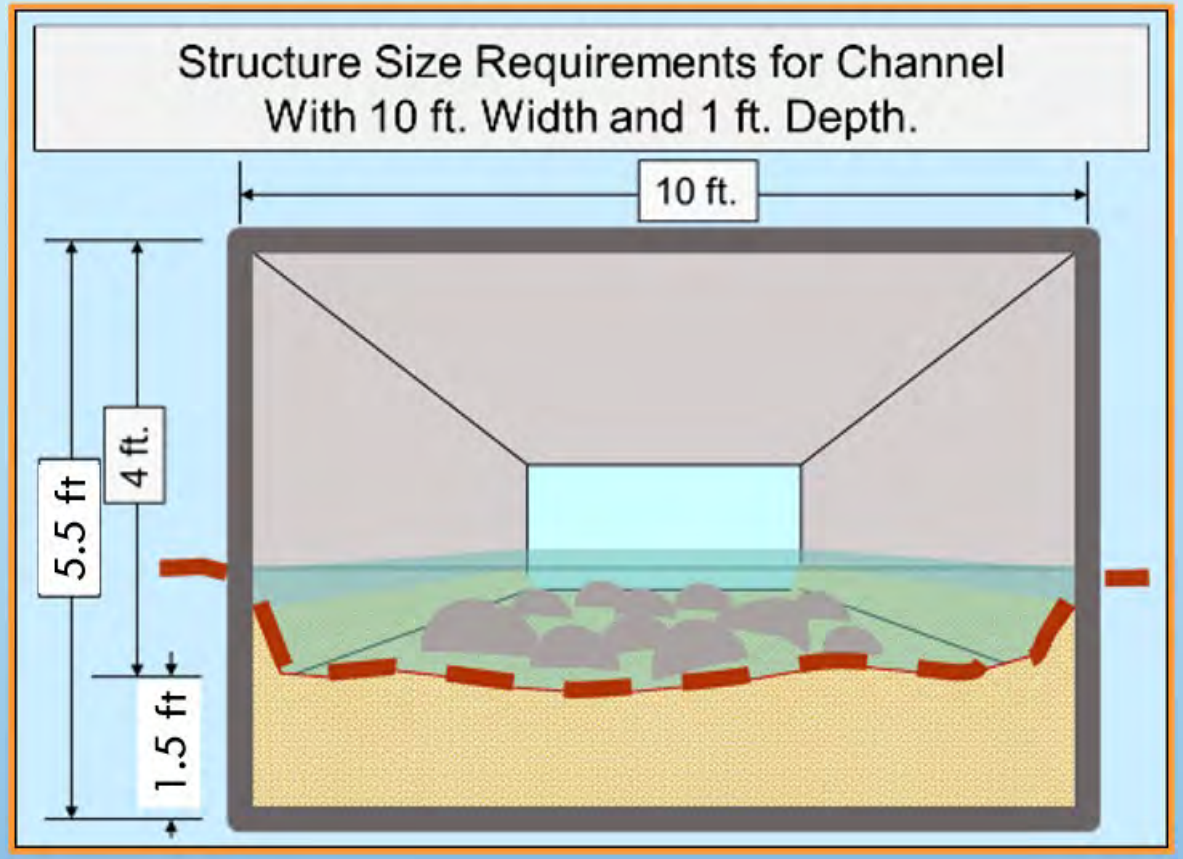
Pre-construction Meeting then construction inspections

Final inspection by RME to confirm site compliance

Stream Crossing Design Standards
under the Stream Alteration General Permit (SAGP)

SAGP Stream Crossing Minimum Design Requirements	
Open Width (span)	Minimum 1 times W_{bkf}
Open Height (rise)	Minimum 4 times D_{bkf}
Headwater to Depth (HW/D ratio)	< 1.0 at Design Flow; minimum of Q25 *
Structure Slope	Match Long Bed Profile
Embedded Depth	Greater of E Stone Sizing or 30% of O.H
Aquatic Organism Passage (AOP)	Provided with ANR E-stone

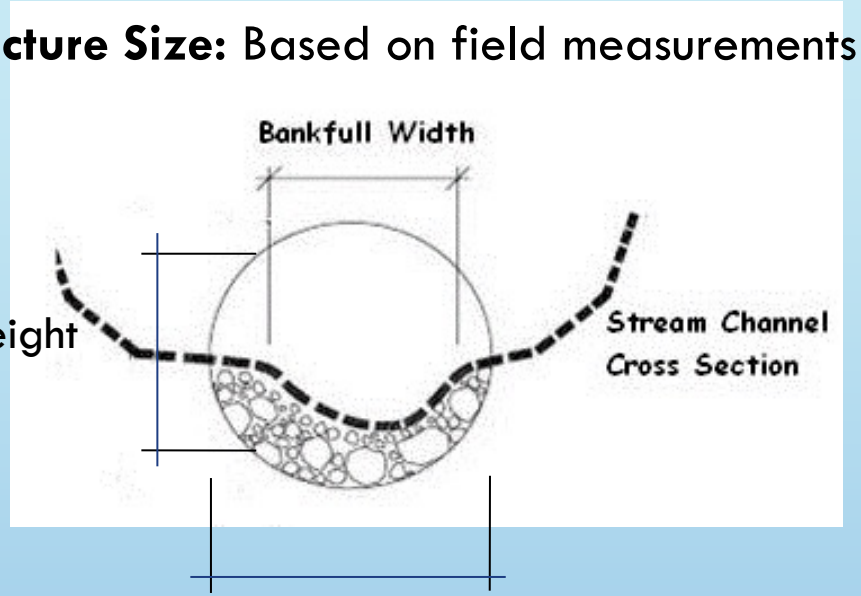
* **Design Flow** either the Q25 or Q50
(based on the road classification)

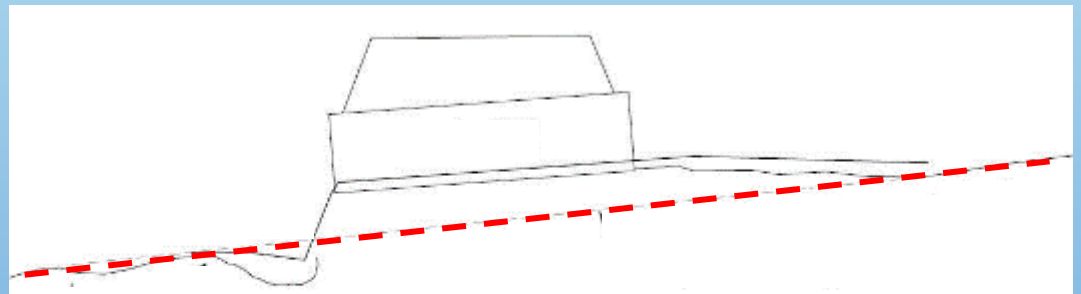


Note: illustrations from Rivers and Roads Tier 2 field manual

Stream Crossing Design Standards
under the Stream Alteration General Permit (SAGP)

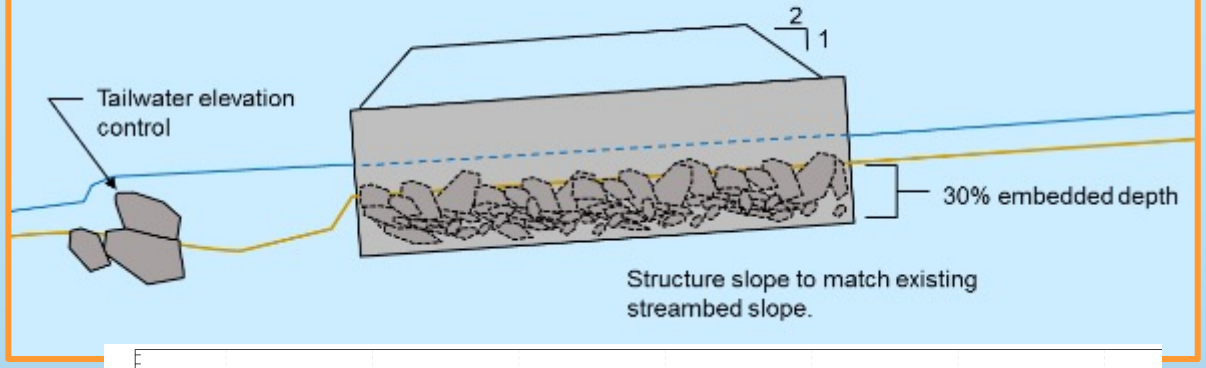
Structure Size: Based on field measurements

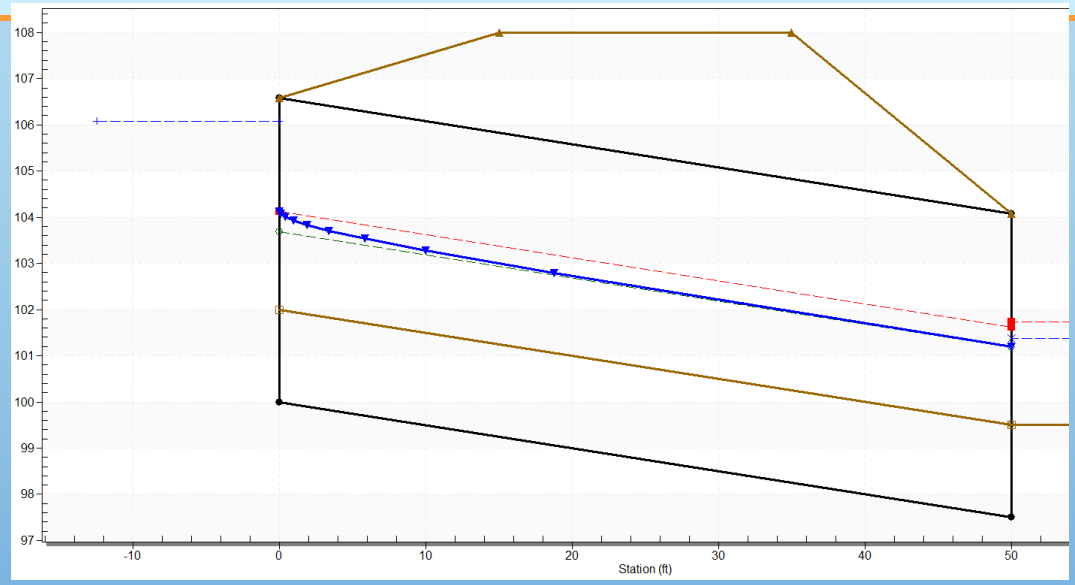




Structure Slope: Determined by long bed slope

Minimum Embedment Depth: based on E-stone sizing

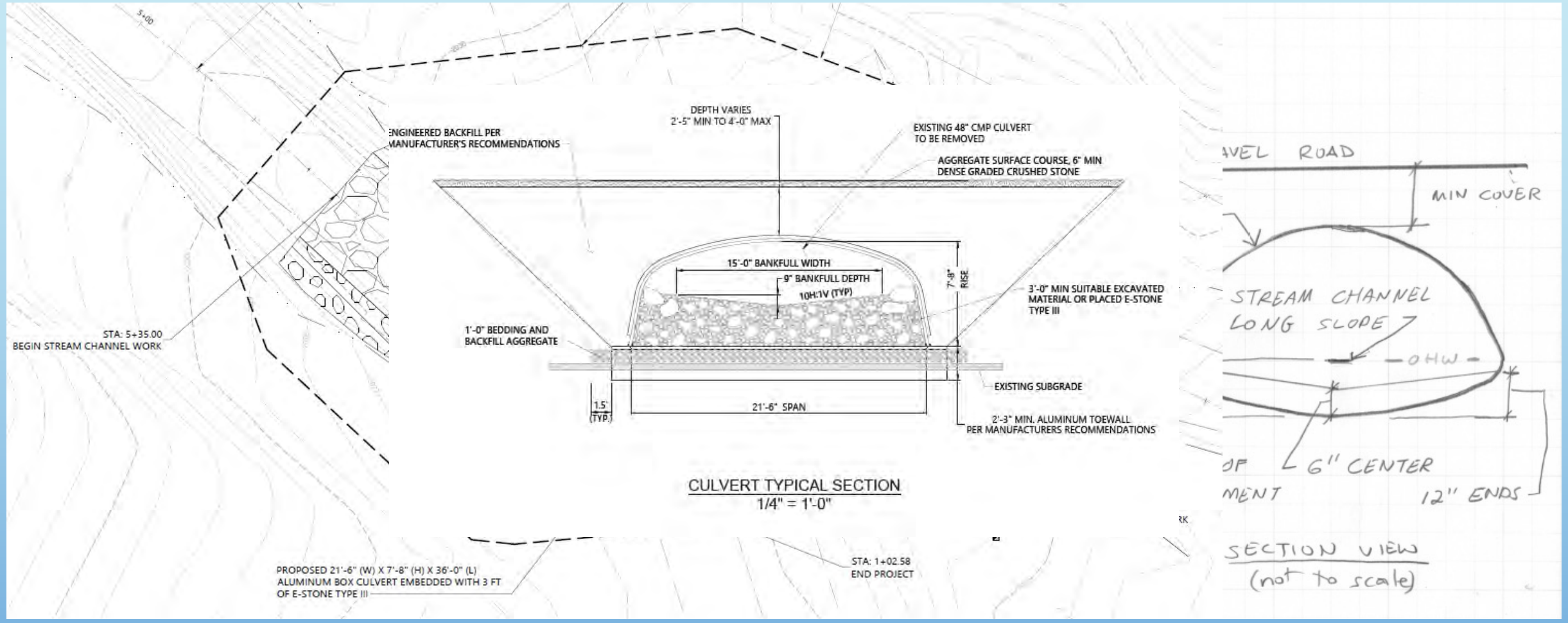




HW/D Ratio at Design Flow: HY-8 model output

Design Plans for Stream Crossing Projects

SAGP Requirements: *Sketch Plan, i.e.* a drawing (not necessarily to scale) depicting both the existing and proposed conditions; communicate the project details to contractor. Engineered Plans are not required



Design Plans for Stream Crossing Projects

Requirements for other Permits:

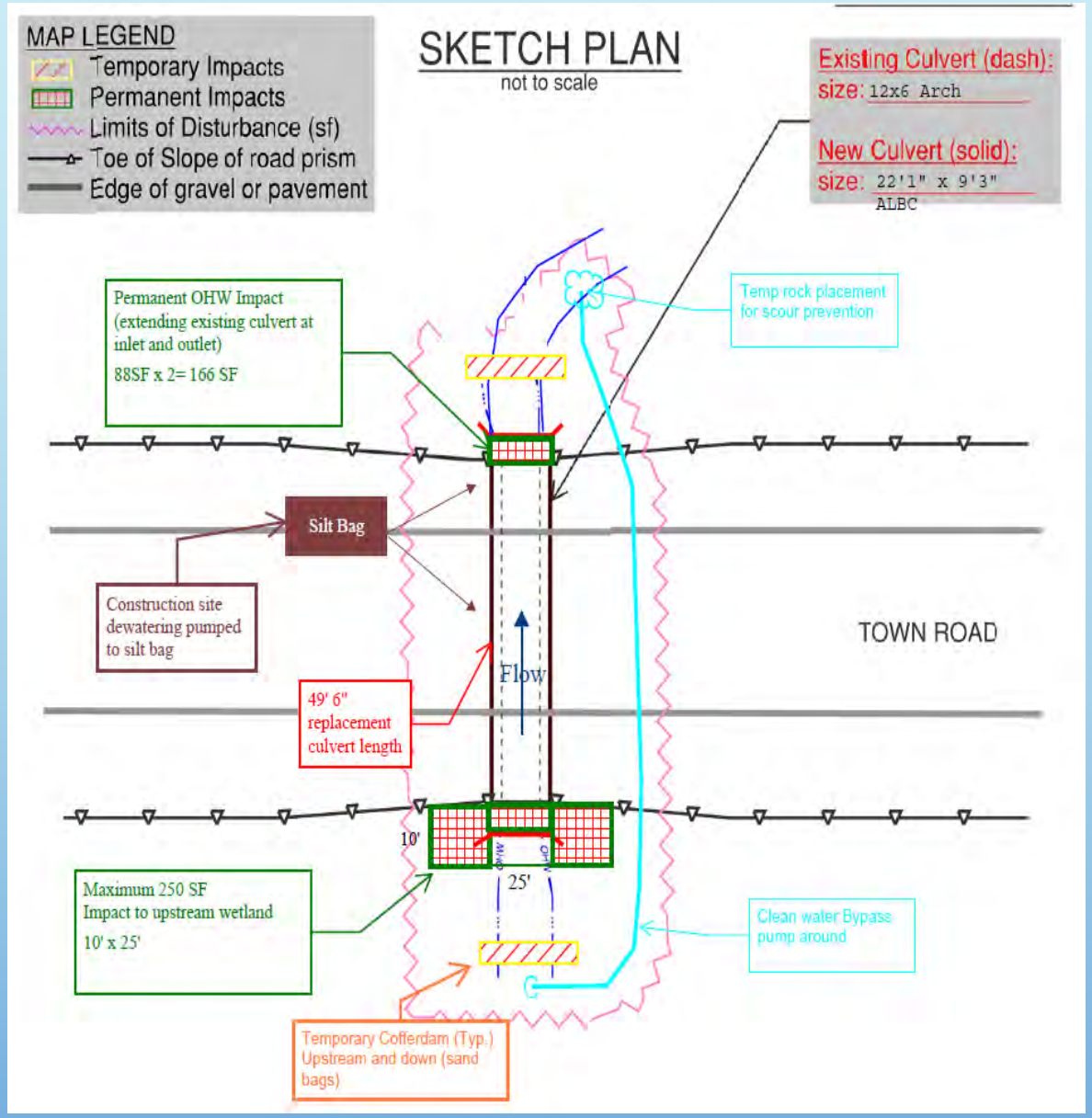
USACE Vermont General Permit:

- Quantify impacts to Ordinary High Water (OHW) and all wetlands.
- Limits of Disturbance (total area)
- Trees to be cut if >= 3" DBH
- Square footage of temporary and permanent impacts and materials

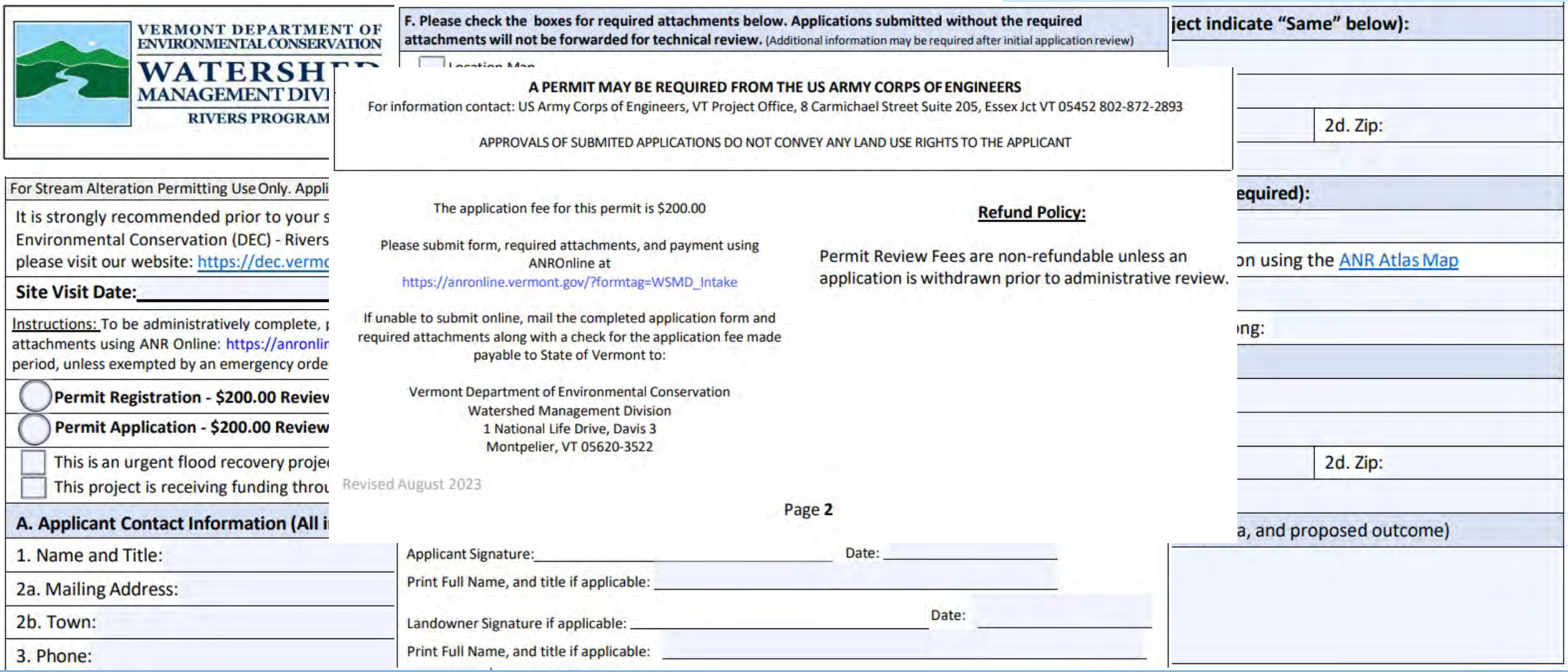
State Wetlands:

- Limits of Wetland and Buffer Zones
- Extent of road prism (toe of slope)
- Temporary and Permanent Impacts
- Cutting of woody vegetation vs use of timber mats placed on top of shrubs
- Delineation by Wetlands Biologist

* Engineered Plans not required though beneficial for quantifying each impact



SAGP Permit Application Form



VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVI
RIVERS PROGRAM

F. Please check the boxes for required attachments below. Applications submitted without the required attachments will not be forwarded for technical review. (Additional information may be required after initial application review)

Location Map

A PERMIT MAY BE REQUIRED FROM THE US ARMY CORPS OF ENGINEERS
For information contact: US Army Corps of Engineers, VT Project Office, 8 Carmichael Street Suite 205, Essex Jct VT 05452 802-872-2893

APPROVALS OF SUBMITED APPLICATIONS DO NOT CONVEY ANY LAND USE RIGHTS TO THE APPLICANT

The application fee for this permit is $200.00

Please submit form, required attachments, and payment using ANROnline at
https://anronline.vermont.gov/?formtag=WSMD_Intake

If unable to submit online, mail the completed application form and required attachments along with a check for the application fee made payable to State of Vermont to:

Vermont Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Davis 3
Montpelier, VT 05620-3522

Refund Policy:

Permit Review Fees are non-refundable unless an application is withdrawn prior to administrative review.

Revised August 2023

Page **2**

ject indicate "Same" below):

2d. Zip:

equired):

on using the ANR Atlas Map

ng:

2d. Zip:

a, and proposed outcome)

For Stream Alteration Permitting Use Only. Appli

It is strongly recommended prior to your s
Environmental Conservation (DEC) - Rivers
please visit our website: https://dec.vermo

Site Visit Date:

Instructions: To be administratively complete, p
attachments using ANR Online: https://anronlir
period, unless exempted by an emergency orde

Permit Registration - $200.00 Reviev
Permit Application - $200.00 Review
This is an urgent flood recovery proje
This project is receiving funding throu

A. Applicant Contact Information (All i

1. Name and Title:
2a. Mailing Address:
2b. Town:
3. Phone:

Applicant Signature: _____ Date: _____
Print Full Name, and title if applicable: _____
Landowner Signature if applicable: _____ Date: _____
Print Full Name, and title if applicable: _____

https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_StreamAlterationGeneralPermit_Application.pdf

Standard Conditions of the SAGP Authorization

AUTHORIZATION TO CONDUCT
STREAM ALTERATION ACTIVITIES

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION

B.3.3. Stream Alteration Erosion and authorized under this General Permit sha compliance with the Vermont Water Qua

B.3.3.1. The permittee shall comply construction stormwater pe

B.3.3.2. All equipment shall be cle and gear oil leaks.

B.3.3.3. There shall be no discharg watercourse.

B.3.3.4. All areas of streambank di shaped and stabilized with tion of the project. Stream vegetation shall be minimi

B.3.3.5. The method and duration disturbance of stream flow charge of sediment.

B.3.3.6. Work must be isolated from stream flow with appropriate sediment controls to the maximum extent practicable. Pumping from excavation areas shall be discharged to an overland area or off-stream settling basins such that the effluent shall be essentially clarified before reentering the stream flow.

B.3.3.7. If a permittee cannot comply with the foregoing requirements of Section B.3.3. of this General Permit, the permittee must propose alternative methods to avoid discharges of sediment and receive prior approval from the River Management Engineer before proceeding with work.

B.3.3.8. For those activities requiring reporting, governed by section C.2.2., C.2.3. and C.2.4 of this document, permittee must submit a water control plan detailing instream controls to the regional River Management Engineer, no less than 7 days prior to the start of construction and receive approval prior to the start of construction. Changes to an approved water control plan must be notified to the regional River Management Engineer for written approval.

C. Standard Conditions:

Submittal of Flow Control and Dewatering Plan

Prepared by the contractor – an illustration or description with sufficient detail to communicating control methods

Renaud Bros., Inc. 283 Fort Bridgman Road, Vernon, VT 05354 802-257-7383

R A Filskov & Sons, Inc.

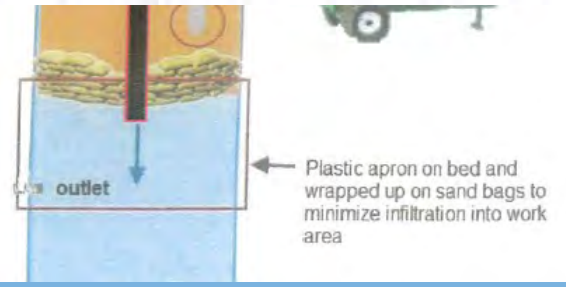
Whipple Hollow Rd., Pittsford, VT Project – Culvert Replacement

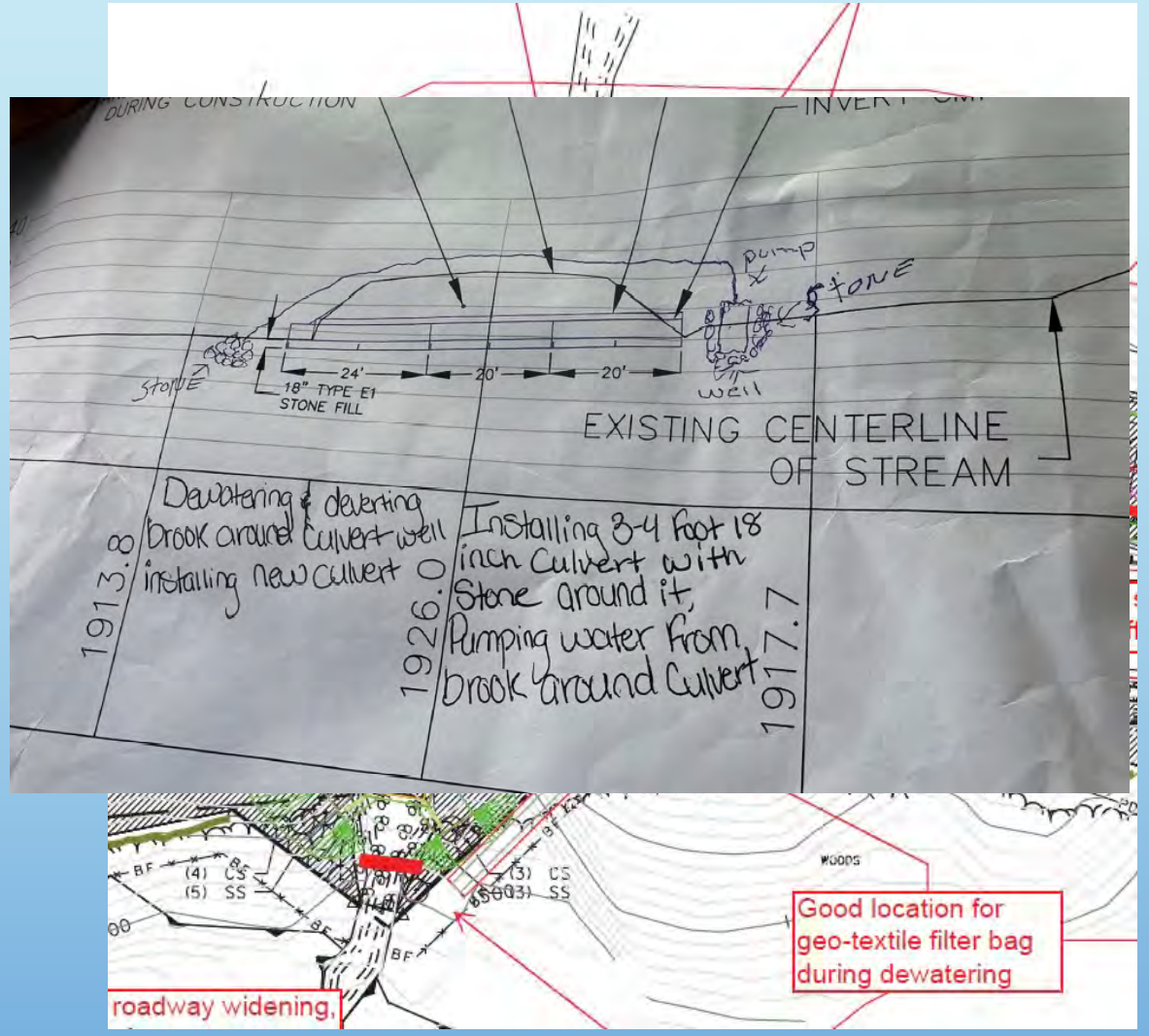
October 8 – 11, 2024

Water Flow Control Plan

Stream water will be controlled during the culvert replacement project by using a cofferdam immediately upstream of the culvert area. The water flow currently is minimal to non-existent.

The cofferdam will be constructed utilizing pre-cast concrete waste blocks with a poly liner to capture any water flow. The water captured will be pumped through a 3" line at a low velocity to minimize disturbance of stream bed down-stream of culvert installation area. Water will be filtered through a hay/grassy media prior to re-entry into the stream.





Implementing Flow Control and Dewatering Plans

Low point sump with stone for dewatering

Temporary bypass culvert for stream low flows

Cofferdam used to isolate the active work area

Site Inspections for Culvert/Bridge Replacement Projects

Required under the VT DEC SAGP

Pre-Construction Meeting

Meeting at the site with the RME, contractor, engineer, and municipality or landowner to review design plans, project sequencing, construction schedule, E-stone bed infill material, extent of bed restoration, slope stabilization, and the dewatering and flow control plan

** Must notify the RME when construction begins and when the project is completed **

Recommended (the RME is not an inspector)

During Construction by Engineer

Elevation References - survey benchmarks for setting inverts and slope of new structure
Implementation of Flow Controls - confirm approved plan is implemented or modified
Structure Placement - slope, gradation of backfill material, and compaction requirements
E-stone - source and mixture gradation, placement and consistency, wetting to settle fines
Slope Stabilization – all disturbed soils stabilized by seed and mulch or VTrans stone fill

E-Stone Gradation and Specifications

E-stone is a custom mixture of native stream material and larger boulders or bank run with quarry stone

Streambed Stone Fill Design Guidance

Type	Q50 Velocity (fps)*	Embeddedness (in)	Sug
E1	V < 9	18	0.0
E2	9 < V < 11	24	0.0
E3	11 < V < 13	36	0.0
E4	13 < V < 15	48	0.0

*Maximum velocity should be based on a minimum 50-yea
flow rate (AEP 2% or Q50) and calculated at the structure o

Item xxx.xxx CY Streambed Stone Fill Specification

Type E1. The longest dimension of the stone shall be at least 18 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E2. The longest dimension of the stone shall be at least 24 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 18 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E3. The longest dimension of the stone shall be at least 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 24 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

at least 48 inches, and at least 50 percent of the
ion of 36 inches, and at least 25 percent of the
; and be well graded material.

Notes

- The streambed stone fill shall be hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). Similar sized river sediment is an acceptable alternative as is a mixture of angular material and river sediment.
- Stone placed inside of a closed structure shall be placed such that the structure is not damaged.
- Care shall be taken to limit segregation of the materials.
- Add sand borrow item as needed to seal the bed and prevent subsurface flow.
- There shall be no subsurface flow upon final inspection.

*** Finer portion of E-stone helps seal the void spaces of the larger stone to keep stream flows on the surface**

E-Stone Mixture, Placement, and Wetting Techniques

Salvaging the excavated stream bed material

Closed top structures require smaller equipment

Supplement mix with larger stone and/or fines

Split box culverts are ideal for top loading E-stone

Reasons installed E-Stone does not function correctly

Insufficient percentage of fines in the mixture

Consistency in mixture and in wetting the layer

Excessively large stone with no medium portion

Lack of natural sediment transport from upstream

Permitting for Dam Removal and Stream Restoration

Submittals for Dam Removal and Stream Restoration

Design Plans

Location Map: town, roads and parcels, dam impoundment, orthophoto image, etc…

Existing Conditions: features and topography within project limits which have importance

Proposed Conditions: proposed grades and features of dam removal/stream restoration.

Resource Boundaries: streams, wetlands, floodplains, river corridors, protected sites, etc…

Long Profile: usually10-20 bankfull widths for crossings, need longer with dam removals due to influence of the impoundment on the stream channel extending beyond the dam

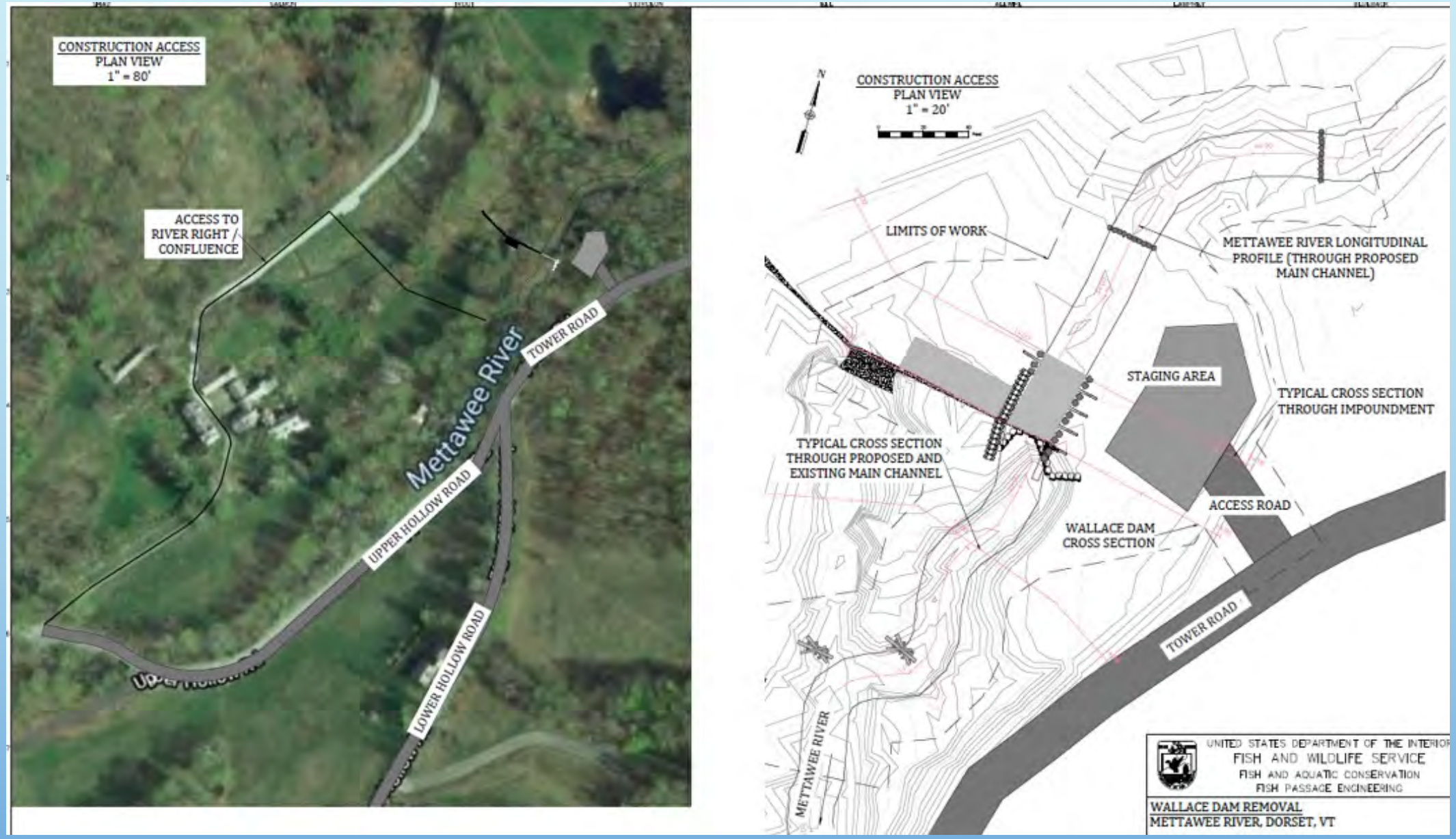
Cross-sections: views for each feature being constructed, note the XS locations on plans

Erosion Prevention and Sediment Controls: what practices are required and where used; details from VT DEC EPSC manual, maintenance requirements, and removal of practices

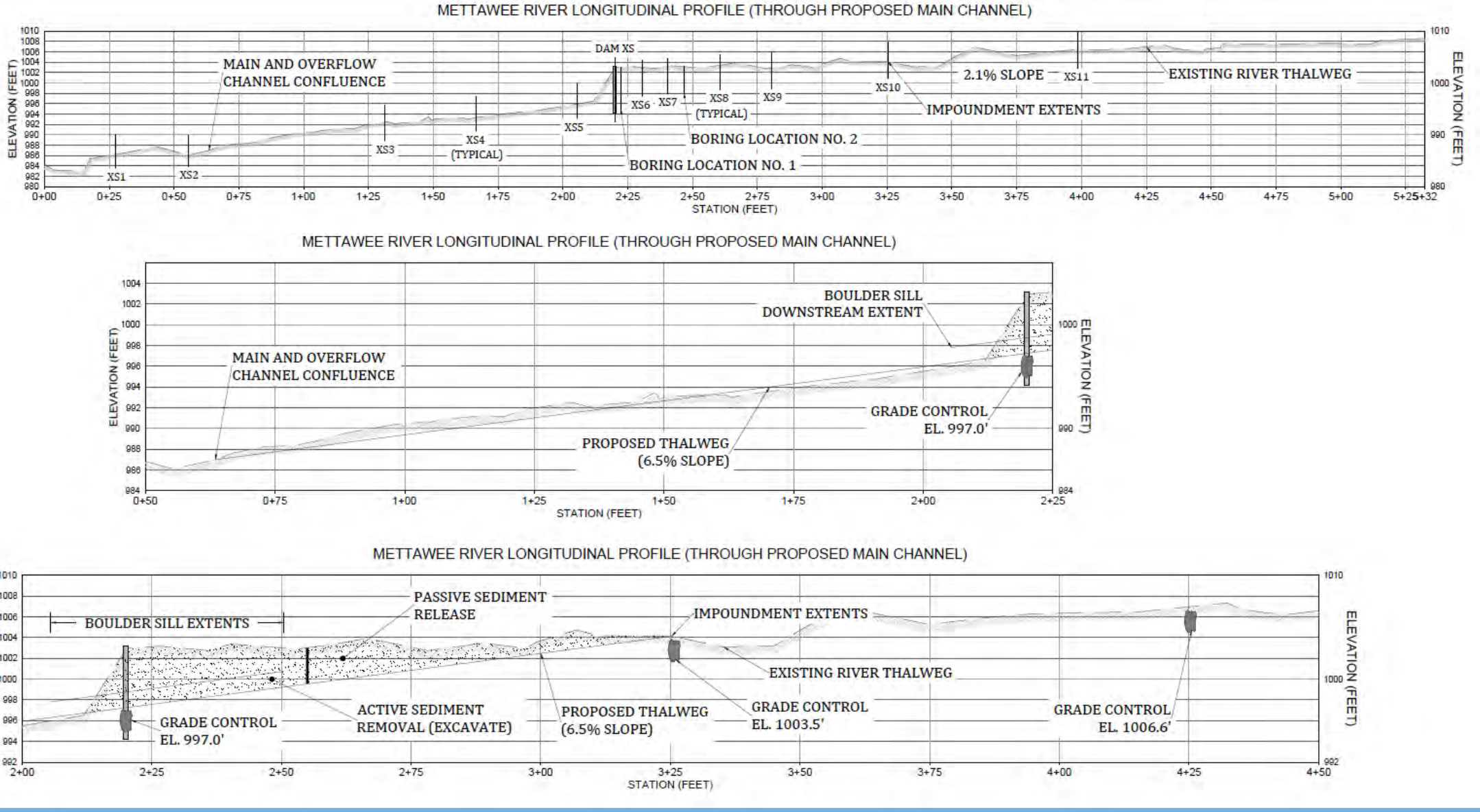
* Construction Phasing/ Sequencing Plan: regulatory requirements vs contractor submittal

* Dewatering and Flow Control Plan: management of stream flows and/or dewatering

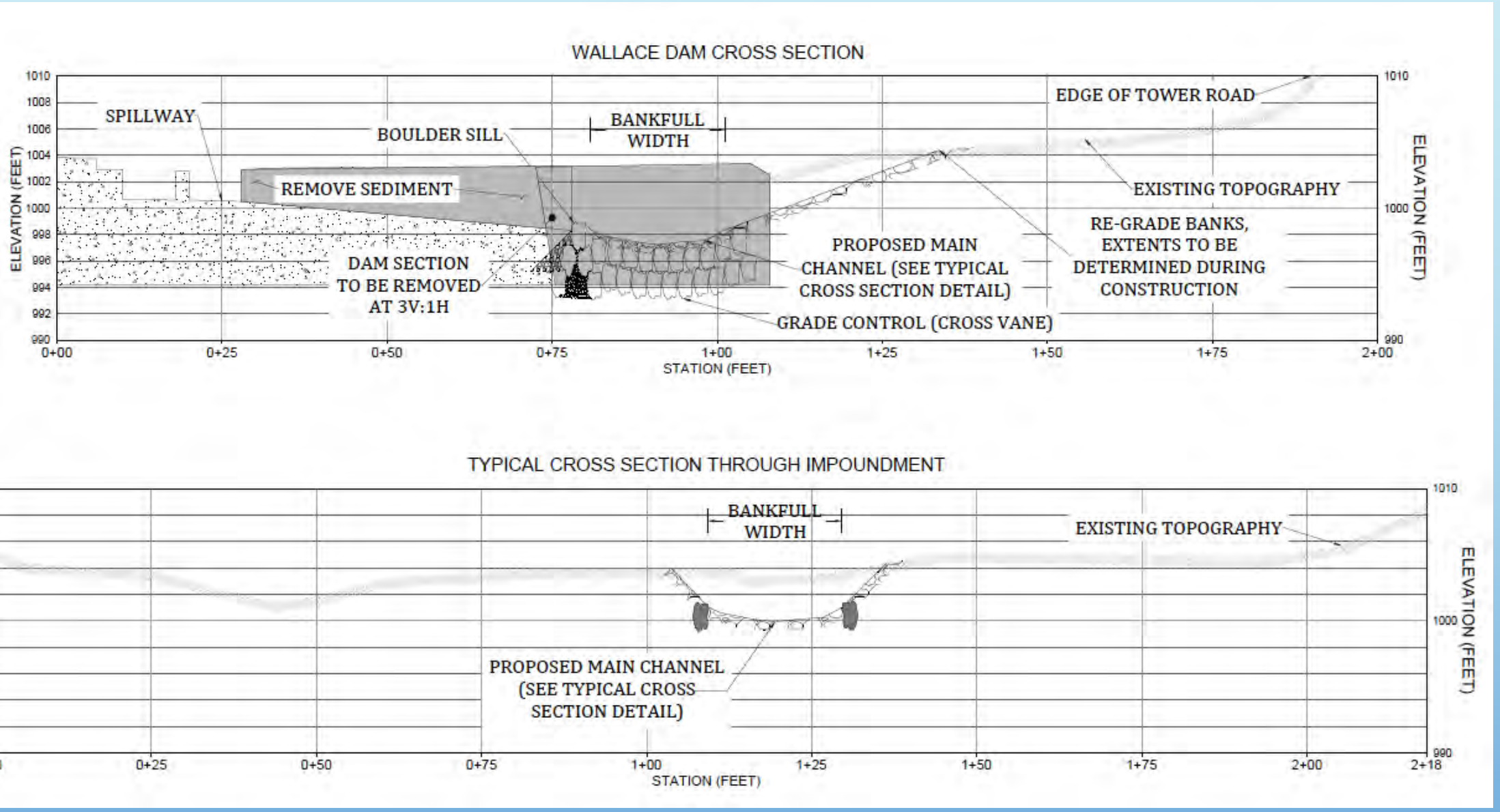
Submittals for Dam Removal and Stream Restoration



Submittals for Dam Removal and Stream Restoration

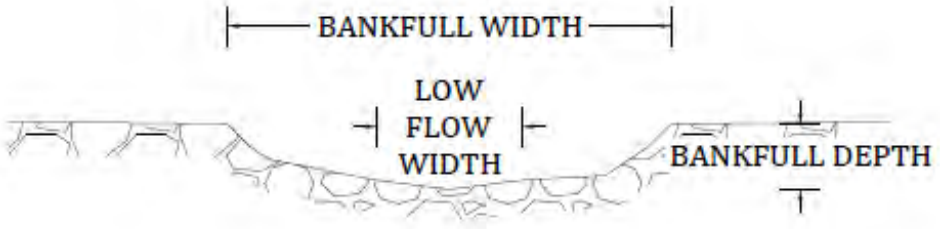


Submittals for Dam Removal and Stream Restoration



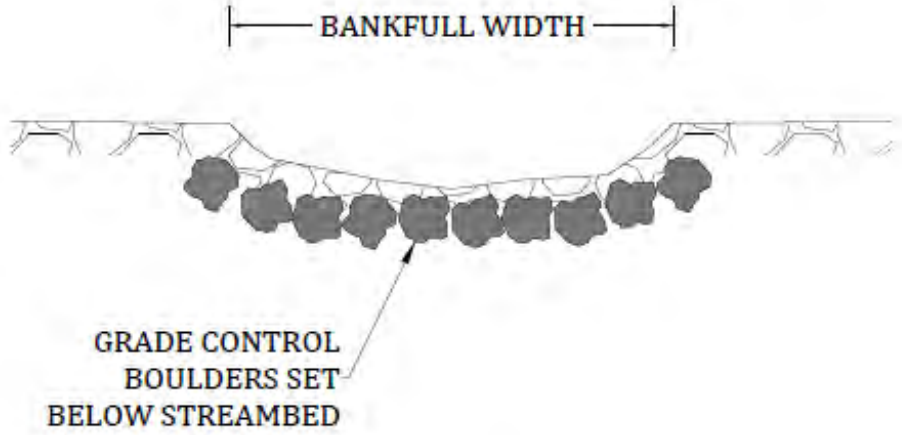
Submittals for Dam Removal / Stream Restoration Projects

Scaling from drawings works in the office, include sufficient dimensions/details on plans!



TYPICAL CROSS SECTION

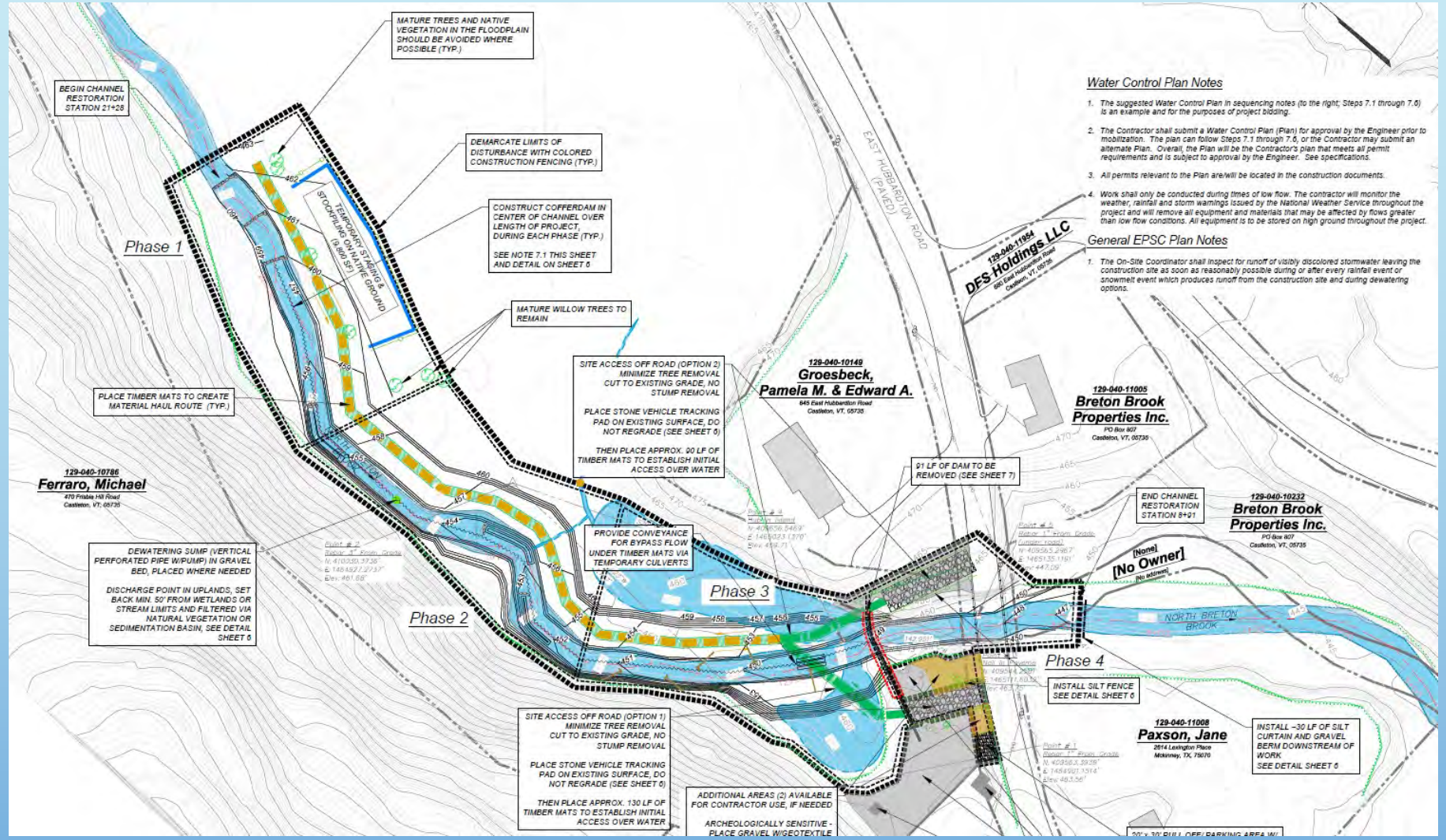
- TYPICAL CHANNEL DIMENSIONS ARE AS FOLLOWS:
  - LOW FLOW CHANNEL WIDTH = 6.75 FT
  - BANKFULL CHANNEL WIDTH = 20.3 FT
  - BANKFULL CHANNEL DEPTH = 1.1 FT
- SET LOW FLOW CHANNEL WIDTH TO APPROXIMATELY 1/3 OF THE BANKFULL CHANNEL WIDTH.
- ALIGNMENT OF THE LOW FLOW CHANNEL TO BE LOCATED IN THE FIELD DURING CONSTRUCTION BY THE PROJECT ENGINEER.
- DISTURBED BANKS TO BE REINFORCED WITH 2-3 FT BOULDERS AND TREES WITH ROOTWADS.
- PROPOSED CHANNEL TO BE CONSTRUCTED USING NATIVE CHANNEL BED MATERIAL FROM IMPOUNDMENT. MAINTAIN ROUGH AND IRREGULAR CROSS SECTION. ANY TREES REMOVED DURING CONSTRUCTION CAN BE USED WITHIN STREAM CHANNEL FOR HABITAT DIVERSITY. KEEP ROOTWAD INTACT IF POSSIBLE.



GRADE CONTROL DETAIL
CROSS SECTION VIEW LOOKING UPSTREAM

Submittals for Dam Removal / Stream Restoration Projects

Phasing / Sequencing Plans – Prescriptive vs Descriptive, allow for contractor's input

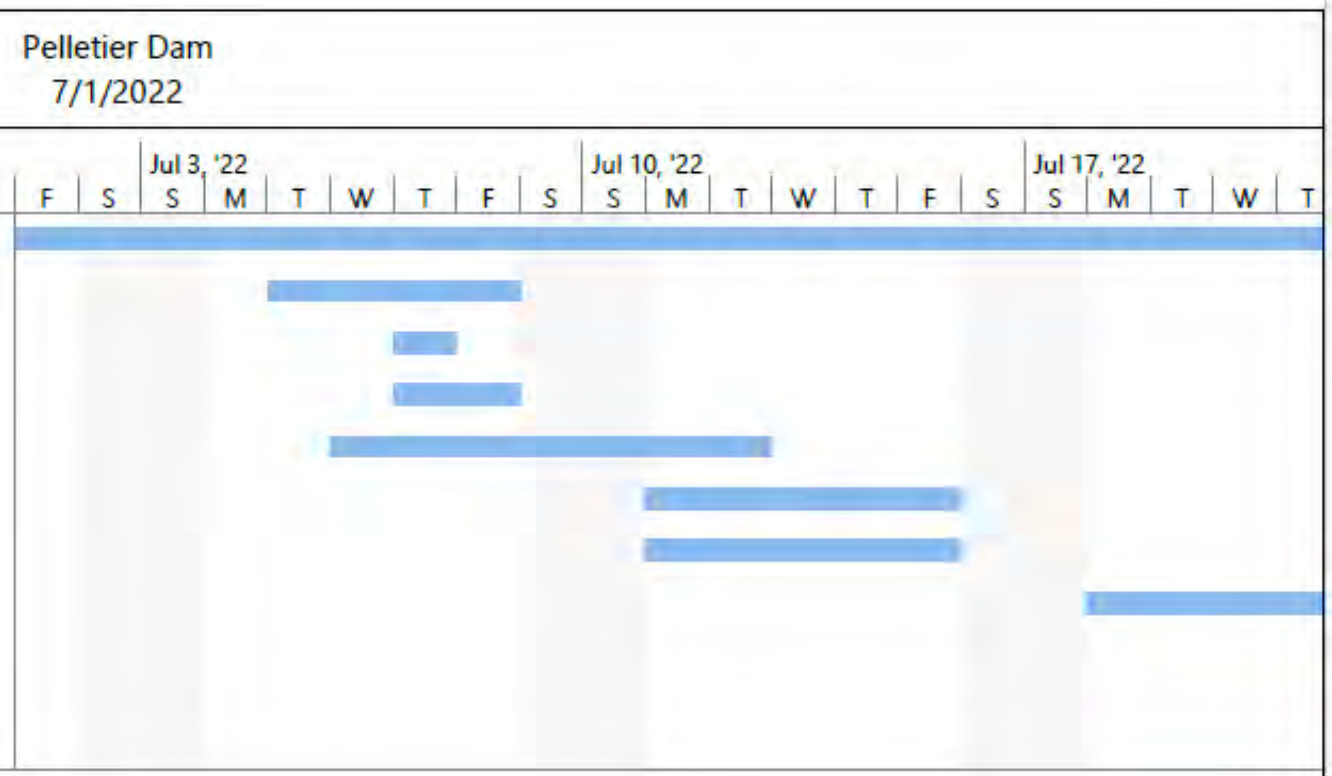


Submittals for Dam Removal / Stream Restoration Projects

<u>Contractor Construction Schedule</u> – flexibility due to weather and instream work dates; Normal - July 1 to October 1 or in streams with no rainbow trout - June 1 to October 1

Pelletier Dam
7/1/2022

ID	Task Name	Duration	Start	Finish
1	Pelletier Dam	67 days	Fri 7/1/22	Mon 10/3/22
2	Mobilization	4 days	Tue 7/5/22	Fri 7/8/22
3	Sign Package	1 day	Thu 7/7/22	Thu 7/7/22
4	Erosion Control	2 days	Thu 7/7/22	Fri 7/8/22
5	Dam Removal	5 days	Wed 7/6/22	Tue 7/12/22
6	Stream ByPass	5 days	Mon 7/11/22	Fri 7/15/22
7	Temp Access Road	5 days	Mon 7/11/22	Fri 7/15/22
8	Phase 1 - 4	27 days	Mon 7/18/22	Tue 8/23/22
9	Parking Lot Restoration	5 days	Mon 8/22/22	Fri 8/26/22
10	Demobilization	5 days	Mon 8/22/22	Fri 8/26/22



Submittals for Dam Removal / Stream Restoration Projects

Dewatering and Flow Control Plan - Flexibility is critical to allow contractor to rapidly adapt to changing site conditions; adjustments for economical and environmental benefits

Water Control Plan Notes

1. The suggested Water Control Plan in sequencing notes (to the right; is an example and for the purposes of project bidding.
2. The Contractor shall submit a Water Control Plan (Plan) for approval mobilization. The plan can follow Steps 7.1 through 7.6, or the Contr alternate Plan. Overall, the Plan will be the Contractor's plan that me requirements and is subject to approval by the Engineer. See specifi
3. All permits relevant to the Plan are/will be located in the construction
4. Work shall only be conducted during times of low flow. The contracto weather, rainfall and storm warnings issued by the National Weather project and will remove all equipment and materials that may be affe than low flow conditions. All equipment is to be stored on high groun

General EPSC Plan Notes

1. The On-Site Coordinator shall inspect for runoff of visibly discolored s construction site as soon as reasonably possible during or after every snowmelt event which produces runoff from the construction site and options.

7. Implement Water Control Plan measures:

7.1. Begin work in Phase 1 and excavate impounded sediment at station 21+28 and use material to create an earthen berm cofferdam. Construct cofferdam to maintain flow in one portion of the channel, and perform work in opposite (dry) side of channel. Once work is complete on the dry side, redirect flow to that side and complete work in remaining portion of channel.

7.2. Grade channel and floodplain, and install channel bed features (i.e. steps & pools) per Sheet 8. Segregate and stockpile the excavated sediments, soils, stone material and any wood material and store in the stockpile areas as needed. Some of the stockpiled materials will be utilized in the restoration of the areas to be temporarily impacted (i.e. use excavated wetland soils for surfaces of floodplain benches).

7.3. Utilize dewatering sump when and where needed throughout excavations, to maintain work in the dry.

7.4. Continue removal of dam per extents and elevations on plans. Move material out of site via site access route. Temporarily place dam materials in storage pile areas as needed.

7.5. Haul out excess material via the site haul route.

7.6. Overall, perform work in phases (see phase boundaries this sheet) starting from upstream to downstream (start at Phase 1 and work sequentially to end at Phase 4) as Contractor backs out of site. As listed above, work will include channel and floodplain grading, construction of channel bed, removing timber mats and application of seed and mulch per Note 8 below in each of four phases.

Submittals for Dam Removal / Stream Restoration Projects

Erosion and Sediment Control Plan – standard details, flexibility for changing conditions

STANDARD AND SPECIF
DEWATERING SU

Dischar
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pit will
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Definition & Scope

A **temporary** pit which is constructed using pipe and stone for pumping excessive water from excavations to a suitable discharge area.

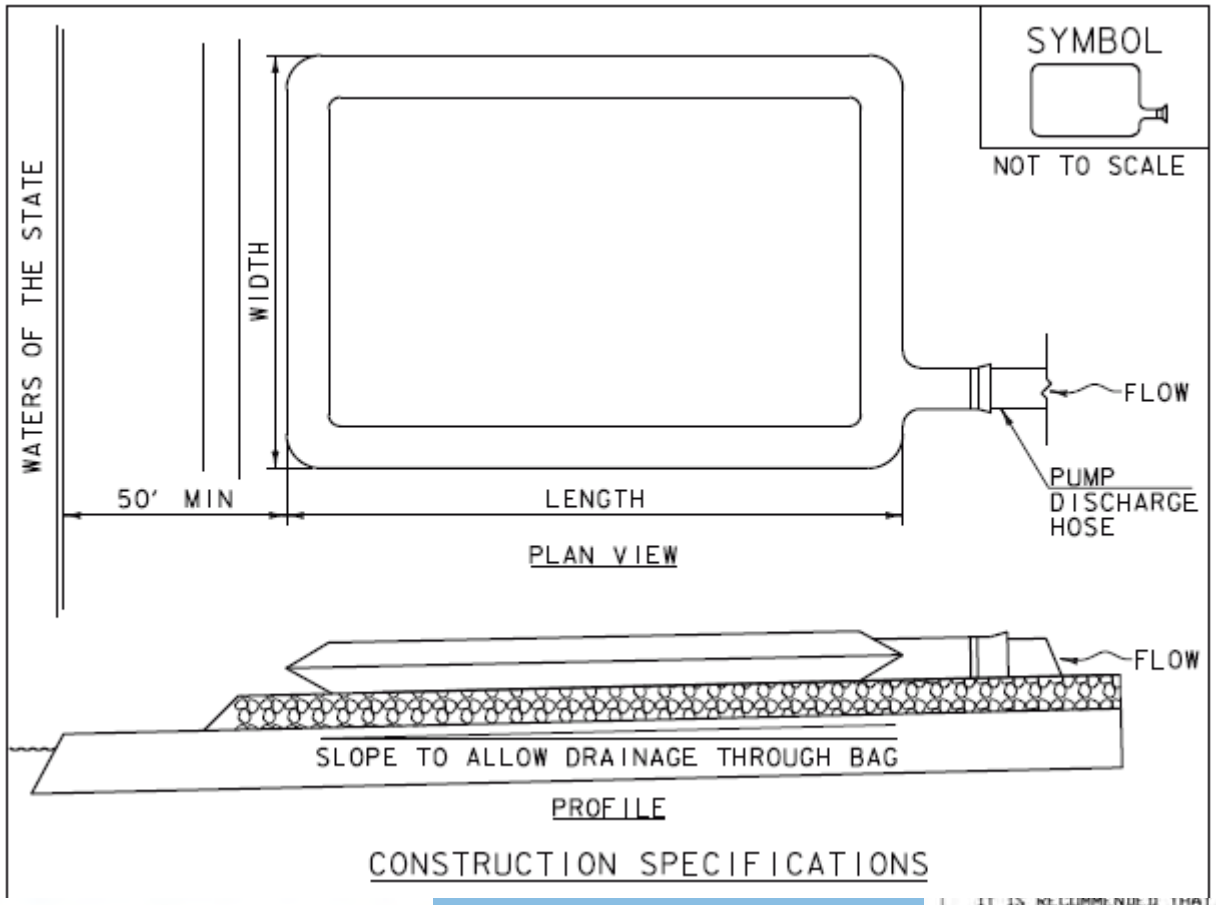
Conditions Where Practice Applies

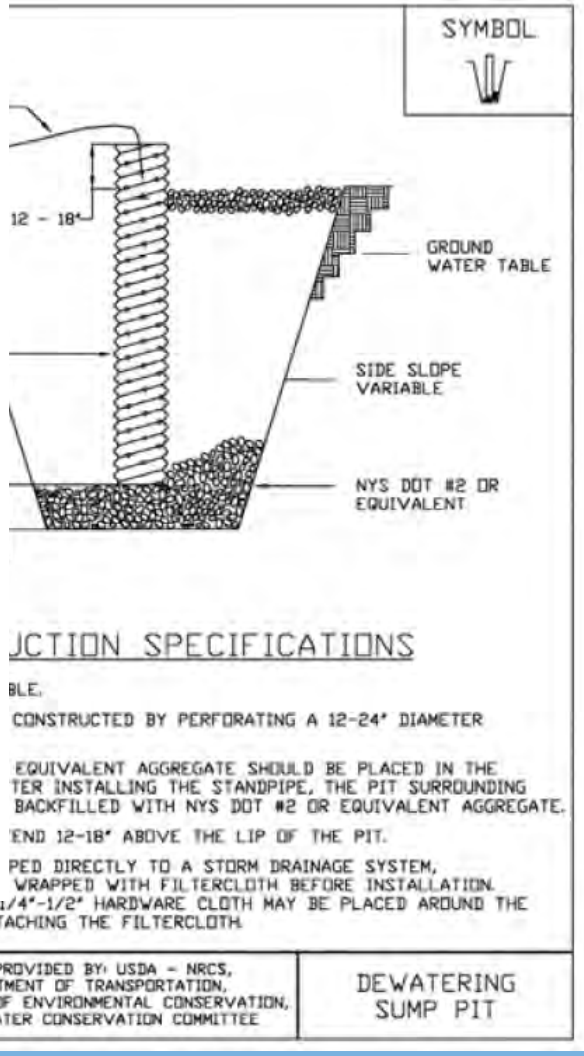
Sump pits are constructed when water collects during the excavation phase of construction. This practice is particularly useful in urban areas during excavation for building foundations. It may also be necessary during construction activities that encounter high ground water tables in floodplain locations.

Design Criteria

The number of sump pits and their locations shall be determined by the contractor/engineer. A design is not required, but construction should conform to the general criteria outlined on Figure 3.3 on page 3.8.

A perforated vertical standpipe is placed in the center of the pit and surrounded with a stone screening material to collect filtered water. Water is then pumped from the center of the pipe to a suitable discharge area.

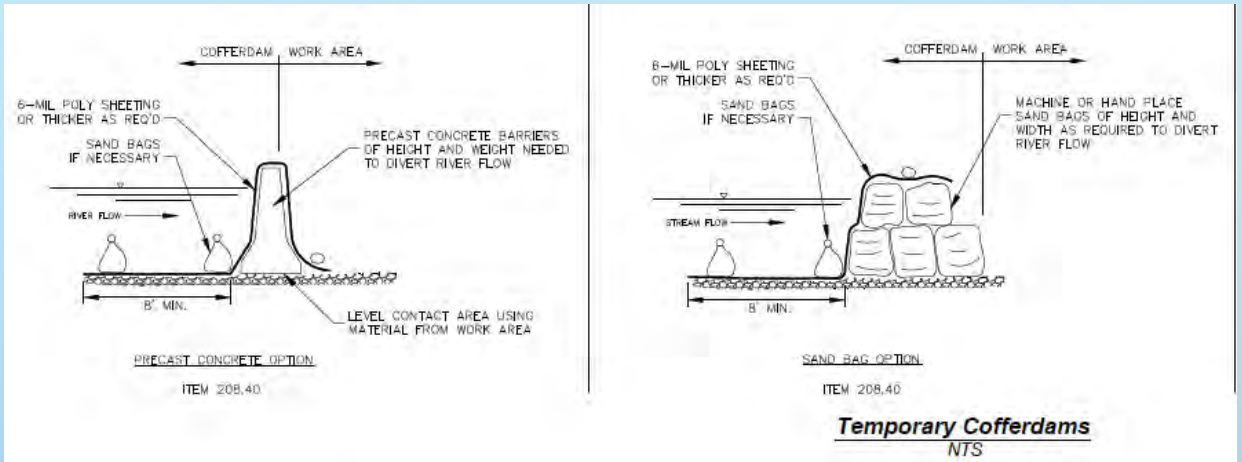




** Approved alternatives suggested by contractor*

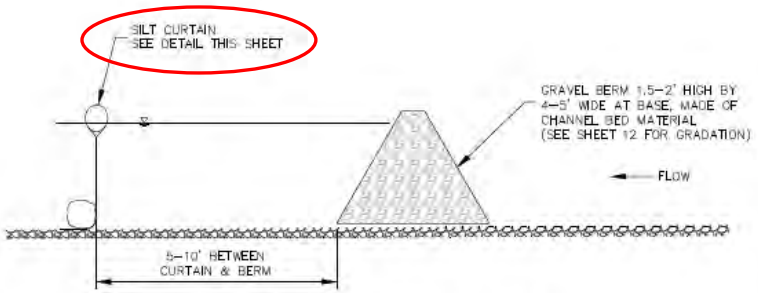
Submittals for Dam Removal / Stream Restoration Projects

Dewatering and Flow Control Plan – show details for intent of suggested control measures



Temporary Cofferdams
NTS

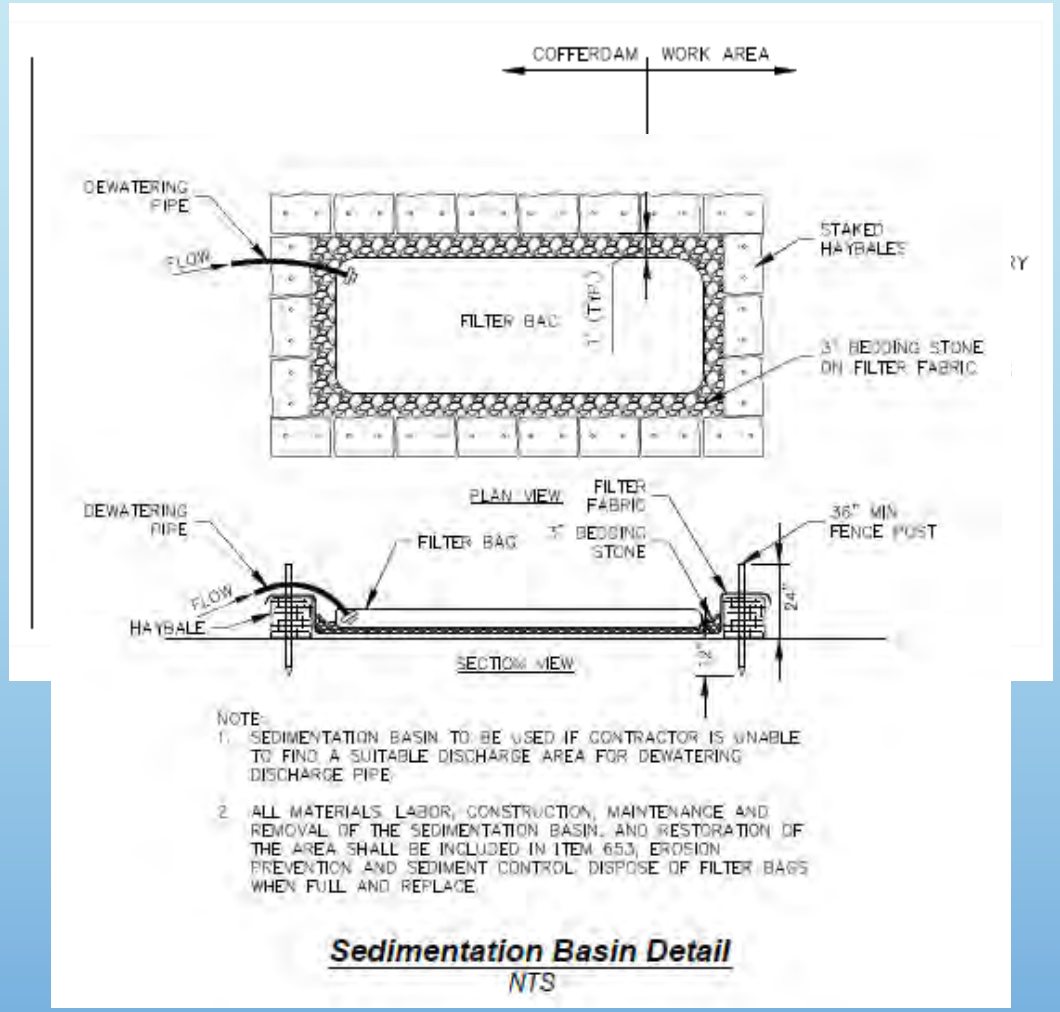
** Turbidity curtains do not function across flowing water*



Downstream Sediment Control
NTS

Downstream Sediment Control Notes:

1. *Downstream sediment control components include 1) a gravel berm placed the full width of the stream channel with it's crest just above dry weather water surface elevation, positioned approximately 5-10' upstream of the silt curtain. The purpose of the gravel berm is to encourage a mild to moderate slow down of stream flow to promote settling of any suspended sediments upstream of the berm, and to also provide filtering (through the berm) of sediments that remain suspended. 2) A silt curtain as illustrated in the silt curtain detail found on this sheet.*
2. *The gravel berm will provide primary treatment of suspended sediment while the silt curtain will provide secondary treatment.*
3. *The channel bed material used for the gravel berm should be washed and void of any sands or fines prior to placement, per inspection and approval by the Engineer.*
4. *Check for collected sediment upstream of both components daily and remove sediment manually, placing removed material out of floodway.*
5. *In the event a runoff producing storm is predicted for the following day, remove any collected sediment from the channel at both components.*
6. *The Contractor is required to remove the gravel berm and silt curtain from the channel once all upstream earthwork is complete.*



Sedimentation Basin Detail
NTS

Site Inspections for Dam Removal / Stream Restoration

Required under the VT DEC SAGP

Pre-Construction Meeting

Meeting at the site with the RME, contractor, engineer, and municipality or landowner to review design plans, project sequencing, construction schedule, extent of stream, wetland, and floodplain restoration, site stabilization, and implementation of the flow control plan

** Must notify the RME when construction begins and when the project is completed **

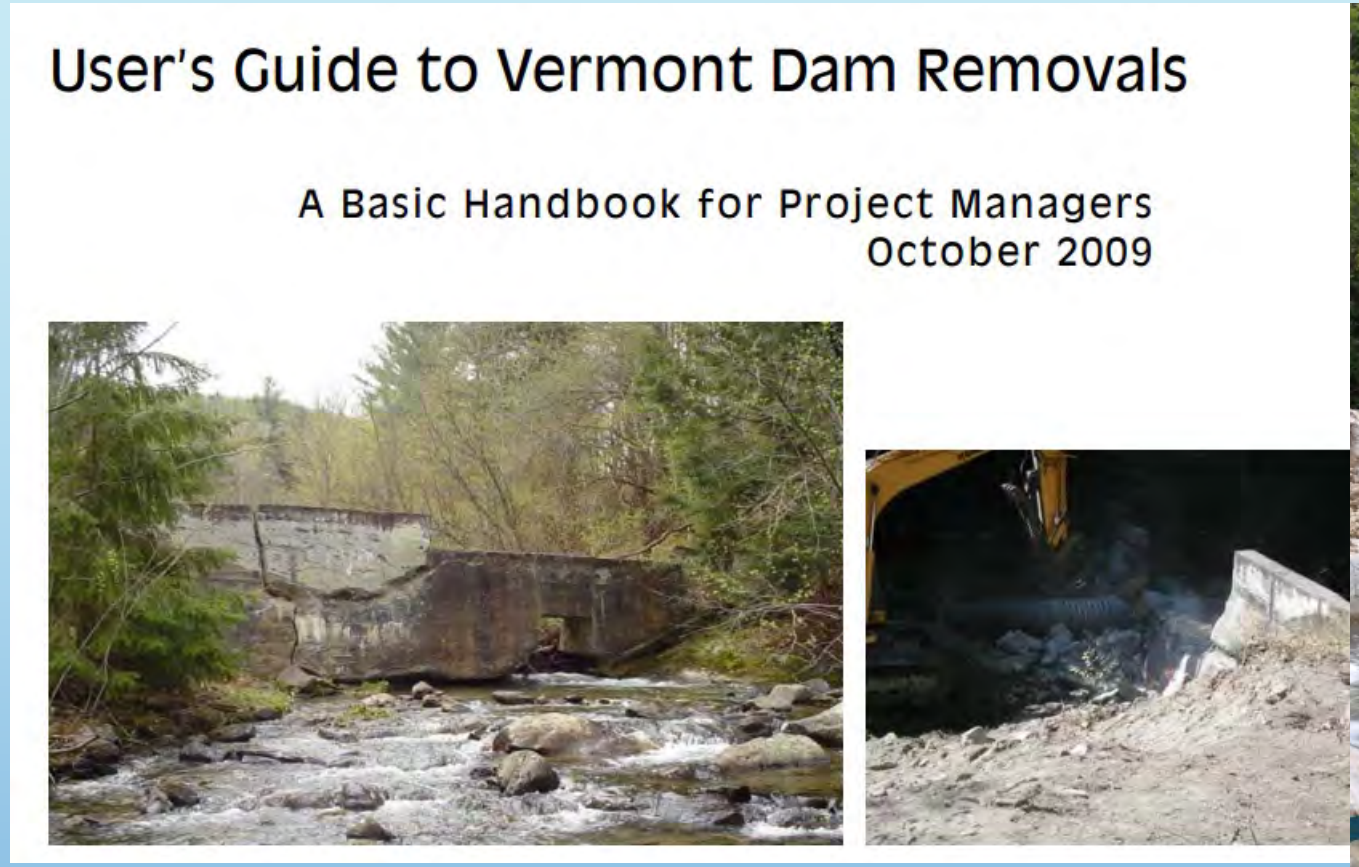
Recommended (the RME is not an inspector)

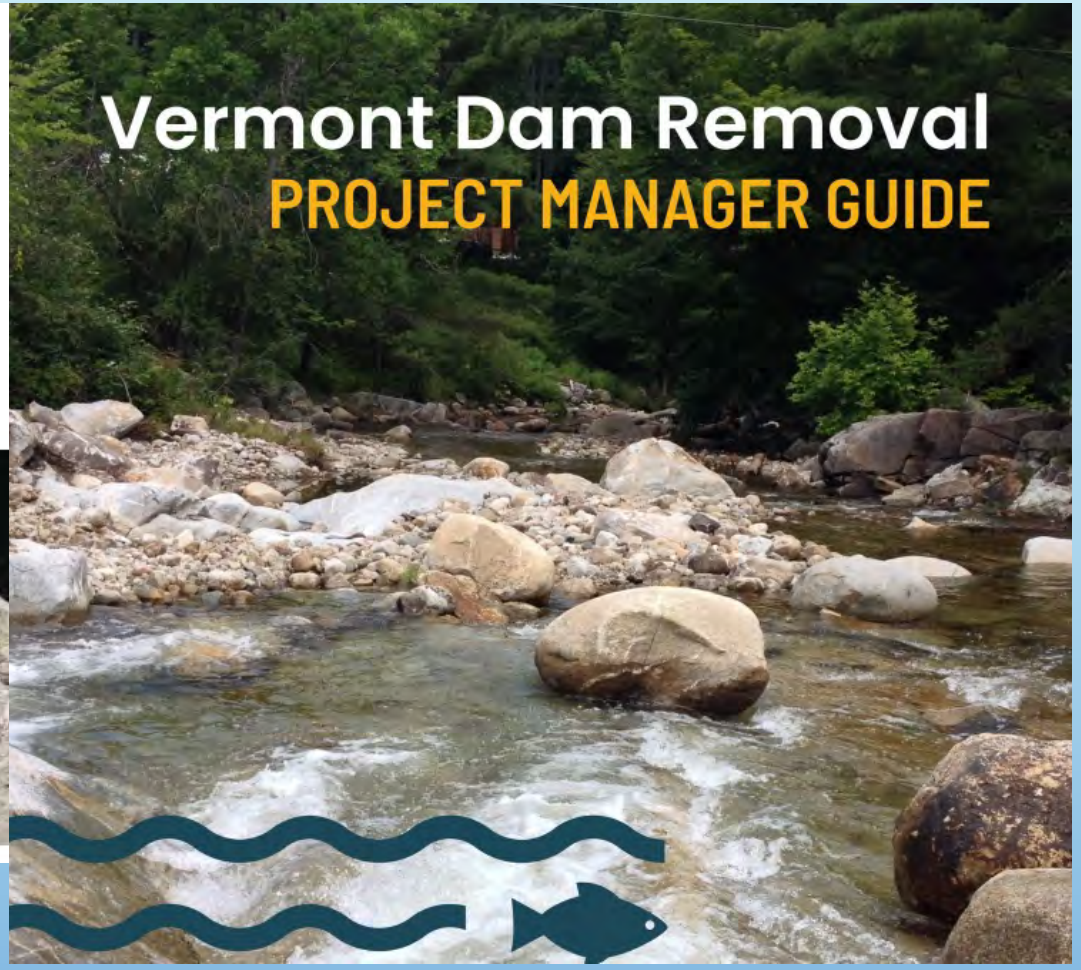
During Construction by Engineer

Pre-construction - survey benchmarks, flag protected resources, limits of construction
Implementation of Flow Controls - confirm approved plan is implemented and modified
Typical Restored Stream - excavation to armoring layer, channel/floodplain dimensions
Post-rainfall - check to see how site responded to flood event and modify as needed
Site Stabilization - all disturbed soils stabilized by seed and mulch and native plants
* Dam Structure - DSP requires design engineer to certify removal of the dam structure *

Resources for Dam Removals in Vermont

https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/drw_usersguide.pdf





https://www.americanrivers.org/wp-content/uploads/2024/01/VTDamRemovalGuide_2023.pdf

Useful Barrier Removal Websites

VT DEC Rivers Program River Management
https://dec.vermont.gov/watershed/rivers/river-management

Vermont Stream Crossing Handbook
https://vtfishandwildlife.com/sites/fishandwildlife/files/documents/Learn%20More/Library/REPORTS%20AND%20DOCUMENTS/AOP/AOP%20HANDBOOK.pdf

VT DEC Stream Alteration General Permit (SAGP) –
https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/StreamAlterationGeneralPermit_2022-04-19.pdf

Technical Guidance for Identification of Perennial Streams-
https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_guidance_for_the_identification_of_perennial_streams.pdf

Vermont Rivers & Roads Tier 2 and Tier 3 Trainings
https://dec.vermont.gov/event/vermont-rivers-roads-tier-2-and-tier-3-training