

**MEETING: REGULAR MEETING OF THE PUBLIC WORKS &
HIGHWAYS COMMITTEE**

DATE & TIME: Wednesday, March 6, 2024 at 5:30 PM

**LOCATION: Germantown Village Hall Board Room
N112 W17001 Mequon Road**

Any member of the body and/or citizen may attend the meeting virtually through the WebEx platform, Meeting #: **2555 672 0428** Password: **ZNmFyjsD343** which can be accessed by phone at 408-418-9388 or by logging on at: <https://villageofgermantown.my.webex.com/villageofgermantown.my/j.php?MTID=mc28ed9f85300bb8f63267a15d2f40b55>

Citizens not wishing to attend the meeting personally or virtually may submit any public comments by sending an email to comments@germantownwi.gov by 4 p.m. on the day of the meeting so that it can be provided to the members of the body for their consideration.

Previously recorded Village Board Meeting Videos can be viewed at https://www.youtube.com/channel/UCOYp0EgELzTCa9X_iCohyhQ.

AGENDA

- I. **CALL TO ORDER:** *This meeting has been given public notice in accordance with Section 19.83 and 19.84, Wis. Stats, in such form that will apprise the general public and news media of subject matter that is intended for consideration and action.*
- II. **ROLL CALL:** *Chairperson Kaminski and Trustees R. Miller, Hudson and Warren are all present.*
- III. **APPROVAL OF MINUTES:**
 - A. PWHC 2/7/24 Minutes for Approval
- IV. **PUBLIC COMMENT:** *Please be advised per State Statute Section 19.84(2), information will be received from the public. It is the policy of this municipality that there be a three-minute time period, per person, with time extensions per the Chief Presiding Officer's discretion; be further advised that there may be limited discussion on the information received, however, NO ACTION will be taken under public comments.*
- V. **NEW BUSINESS:**
 - A. 2024 Articulating Wheel-Loader Purchase
 - B. 2024 Senior Center Exterior Painting Project
 - C. 2024 Firemen's Park Bandshell Painting Project
 - D. Acceptance of Improvements Keller Town 9
 - E. Blanket PO - Ferguson Water Works
 - F. Blanket PO - Core and Main
 - G. Blanket PO - Adaptor Inc.
 - H. Blanket PO - Visu-Sewer
 - I. Blanket PO - William/Reid LLC
 - J. Blanket PO - Residential Yard Waste Facility Material Processing

- K. Award Contract for Donges Bay Reconstruction Project from STH 145 Fond du Lac Avenue to Wasaukee Road to Vinton Construction of Two Rivers, Wisconsin, in the amount of \$2,517,416
- L. Award a Contract for Construction Management, Construction Inspection, Construction Staking Services of the Donges Bay Road Project to Graef in the amount not to exceed \$249,648
- M. Award Contract to Prepare Conceptual Designs for Division Road Public Information Meetings in Summer 2024 to Kapur and Associates, Inc. of Milwaukee, Wisconsin in the Amount of \$30,980
- N. DPW Facility Construction Update
- O. Approval of Bid Package #4 -DPW Facility
- P. ANR Pipeline Update
- Q. Approval of ANR Pipeline Access Easement and Agreements

VI. DIRECTORS REPORT:

- A. March Director's Report

VII. NEXT MEETING DATE: *Set April meeting date.*

VIII. ANNOUNCEMENTS:

IX. ADJOURNMENT:

UPON REASONABLE NOTICE, efforts will be made to accommodate the needs of disabled individuals through appropriate aids and services. For additional information or to request this service, please contact the Village Clerk at (262)250-4745 at least 2 days prior to the meeting.

MEETING:	REGULAR MEETING OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE
DATE AND TIME:	Wednesday, February 7, 2024 5:30 PM
LOCATION:	Germantown Village Hall Board Room N112 W17001 Mequon Road

MINUTES

- I. **CALL TO ORDER:** Chairperson Kaminski called the meeting to order at 5:30pm.
- II. **ROLL CALL:** Chairperson Kaminski and Trustees R.Miller, Hudson and Warren are all present.
- III. **APPROVAL OF MINUTES:**
 - A. PWHC 1/9/24 Minutes for Approval
Motion: Approve as presented
Motioned By: Phil Hudson
Seconded By: Robert Warren
Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren
No: None
Abstain: None
Motion Passed (Yes 4, No 0, Abstained 0)
- IV. **PUBLIC COMMENT:** 2 residents spoke.
- V. **UNFINISHED BUSINESS**
- VI. **NEW BUSINESS:**
 - B. Open PO to replace hydrants, valves, water service repairs and water main breaks in 2024

Director of Public Works Mortwedt stated that the Water Utility has requested an open PO on a time and material basis for hydrant replacements, water main and water lateral repairs, gate valve repairs and hardscape restoration. This is an ongoing replacement program and emergency repairs as they come and as we identify old and malfunctioning water infrastructure. Staff recommends authorizing water utility staff to:

 - Hire as needed contract services for the replacement of hydrants, lead, valve assembly and hardscape restoration not to exceed \$215,000.00 from account #50642000-531730 and account #50000000-182330
 - Hire as needed contract services for water lateral repair and hardscape restoration not to exceed \$50,000.00 from account #50642000-531770.
 - Hire as needed contract services for the repair of water mains, gate valve repair and hardscape restoration not to exceed \$150,000.00 from account #50642000-553000 and #50000000-182480

Motion: Approve as presented

Motioned By: Phil Hudson

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

C. Contract Award - Tower 3 Rehab Construction and Grant Administration
Director of Public Works Mortwedt stated the scope of services for the Tower #3 Rehab Construction & Grant Administration. Staff recommends approval of the Foth contract services agreement in the amount not to exceed \$147,000. Funds will be used from account #50000000-182170 until reimbursement from the DNR Safe drinking water loan program.

Motion: Approve as presented

Motioned By: Rick Miller

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion (Yes 4, No 0, Abstained 0)

D. Proposed Infrastructure Improvement Projects around GBP, Truck Country and TID's 7 & 8

Administrator Kreklow provided a map of and discussed several additional utility and road improvements that could be considered around Holy Hill Road and the Freistadt district. These projects are not included in the IGA with the Village of Richfield that we may want to consider: 1. Rockfield Rd - extending water, sewer and road improvements going east from Goldendale to Gateway Crossing. The road is in bad shape, and he thinks the Village Board should consider getting all the roadwork needed done at the same time as the water extension included in the IGA. 2. Lift Station - Germantown has the opportunity to upsize that station for future planning and development. The 2050 plan does include future growth in that area, allowing for lift station capacity increases. 3. Potential construction of a frontage road from Rockfield to Holy Hill Rd is no longer an option. 4. High Point Pass would give access from Holy Hill Road going south into the Freistadt district, which includes a RR crossing in that area. When Truck Country goes into that area, they will need a private road or access via a public road. Without a public road, we would lose access to that site for the potential RR Crossing. 5. Going south of the RR tracks the VB could decide to construct a road south proactively. Staff isn't recommending it, but it is an option. 6. We could look at continuing installation of water & sewer lines on Freistadt Rd going west along Hwy 41. Both D.J. Frank & Germantown Mutual Insurance Co have both requested access to sewer & water if possible and the road is not in the best condition in that area, so road improvements could also be made at that time.

The VB asked staff to look into funding sources: 1st option is to pay for these improvements through our regular budgeting process, which would include additional borrowing that would go on the tax levy and increase property tax bills, 2nd option would be to borrow money and pay for them out of sewer & water revenues which would include rate increases which would impact what residents are paying, 3rd option

would be to have TID 7 & 8 pay for them. TID 8 has more cash flow capacity than TID 7. That money comes from the property tax payments from the businesses in those TIDs. In rough #'s 7.5-8 million to fund these projects out of TID 8 would extend the TID for 2-3 years to pay for these projects and TID 7 would be extended 3-4 years. He would like to get design and bid documents done by September so the roads are only torn up once and the updates are made all at once.

Discussion Followed: How will this affect debt service for residents? Property taxes would remain the same if we use the TID's. If Truck Country wasn't coming in would we be looking at this now? Yes, we would, these were planned before they came into play, only the timing is affected by Truck Country. Could we create a new TID instead of using existing ones? After talking with Ehler, because the tax flow is so healthy in TID 7 & 8 it would make more sense to use those rather than creating a new TID. All the improvements in the TID have come from development in the TID's themselves. That adds up to \$360,000,000 for a 15 million dollar investment. Freistadt Road would be the highest priority and with water and sewer going into that area it will develop. Would it be possible to continue with water and sewer under the freeway west on Freistadt Road? Yes, that is also possible.

Staff recommends proceeding with all proposed improvements and move this onto the VB for discussion.

Motion: Proceed with proposed improvements and forward to VB as presented with a positive recommendation.

Motioned By: Rick Miller

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Robert Warren

No: Phil Hudson

Abstain: None

Motion Passed (Yes 3, No 1, Abstained 0)

E. Contract Award - 2024 Water Main Relay Project Design

Director of Public Works Mortwedt stated that as part of the 2024 budget, the Water Utility has identified three priority projects, including water main relays and the Menomonee River Crossing at County Line Road. Staff received proposals from 3 Engineering Consultants with the low bid coming from Kapur. The schedule for the projects is to complete a survey in the spring of 2024, complete design in summer with construction in fall 2024. Staff recommends approval of the proposal from Kapur for \$89,444 and forward it to the Village Board with a positive recommendation.

Motion: Approve as presented

Motioned By: Phil Hudson

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

F. Status of Current Tree Trimming Contract

Director of Public Works Mortwedt stated that in November 2023, a tree pruning project was approved by the Public Works Committee and the Village Board. The remaining 10% of the project was delayed due to trees that were decorated for the Christmas season and staff were asked by elected officials to pause the project for further discussion. He included a memo from Wachtel stating that the contractor did

as the spec stated when trimming trees along the road ROW, making 1 cut on the tree and then waiting several years to make additional cuts on the other side, which makes the tree look imbalanced. We would like to finish this project as proposed.

6 residents spoke on this topic. They were unanimously unhappy with the results of the tree trimming project so far.

Discussion followed. Trustee Miller stated that we only had 16 trees left and Director Mortwedt stated we would work with the contractor for more balanced trimming. If it's in the ROW, it is the responsibility of the village. Wachtel acts as the Village Forester and Crawford Tree Service is the contractor. Both are certified arborists.

Superintendent Anderson stated that it is the goal of the Village to do street tree trimming on a regular cycle. Up until 2014, there were parts of that neighborhood being trimmed routinely, but since then there have been trees that have been becoming a concern to the traveling public, which is why we brought it up to this committee. The project was previously approved, so no action is required.

Motion: Approve - Move forward with the current contract but the arborist needs to be involved while trimming.

Motioned By: Rick Miller

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Robert Warren

No: Phil Hudson

Abstain: None

Motion (Yes 3, No 1, Abstained 0)

G. ROW Tree Trimming Discussion

Director of Public Works Mortwedt discussed potential policy changes available regarding management and maintenance of right-of-way (ROW) trees.

1. Maintain the current tree ordinance with no changes: In this scenario, the Village continues to develop a program for tree care and regularly performs maintenance on ROW trees.

2. Modify the tree ordinance to shift primary responsibility for ROW tree maintenance to the adjacent property owners. This would not limit the village's liability. An inspection and enforcement mechanism would have to exist. Failure to perform maintenance could result in the village assessing the cost of tree care for a property owner.

3. Adopt a HOA-by-HOA or Subdivision-by-Subdivision approach: The Village Attorney advised that this is not a legal or recommended approach.

4. Adopt a hybrid approach

5. Reducing planting of right-of-way trees or future developments could shift responsibility for planting trees to private property owners.

Discussion Followed. Chairman Kaminski feels that we need to keep the ordinance as it is with more citizen input/involvement in the future. We need to have a plan in place with possibly a representative for the area involved with the planning. Trustee Miller wants to implement a 5-year plan for tree planting and trimming. Trustee Warren stated that it's a bit of sticker shock because there has been no trimming in 23 years, and residents are seeing it now. His concern is that we cannot have pruning by committee because it would take so much time to reach a consensus on how a tree should look and what type of tree it should be etc. He's been involved in this for over 40 years, so he understands how sensitive this topic is. Chairperson Kaminski doesn't want committee involvement, just 1 or 2 HOA representatives. Recommend no change

to the ordinance and look to make communication, planning and operational modifications to the program. Chairperson Kaminski asked that this topic be brought back before them in about 3 months.

H. Mailbox Policy Discussion

Director of Public Works Mortwedt discussed potential changes available regarding the existing Mailbox Replacement Policy which is part of the Winter Operations Manual. He summarized and said that we had 139 complaints of mailbox damage and that we have only taken responsibility for the repair of 7 which were determined to have been physically hit by the snowplow. We made temporary repairs whenever possible, and we have about 40 temporary mailboxes to put out where/when needed. We do not make repairs if the damage is determined to be caused by the weight of snow. There is an appeal policy in place that the resident can bring their complaint to committee and get reimbursement that way as well.

Options to consider:

1. Make no changes: Inspect complaints, determine the cause of the damage, direct plow blade strikes, qualify the property owner for reimbursement, keep reimbursement at \$75.
2. Offer no reimbursement: There are nearby jurisdictions that take this approach.
3. Offer reimbursement to every complainant: The Village would need to allocate a budget to fund this annually.
4. Adjust the \$75 reimbursement amount.
5. Some combination of the changes above.

Director Mortwedt did some research with other communities in the area, and stated that we are in the middle. Chairperson Kaminski asked for an explanation of the weight of the snow policy. Director Mortwedt explained that with 26.1 inches of heavy, wet snow it could weigh up to 20 lbs per square foot. So we were at the top of that weight so you need a faster plow to push that heavy snow off the streets. We have determined that a majority of the damages were due to weight of snow. Trustee Warren road along in a plow and witnessed very competent driving. They battle parked and stuck cars, cars that are traveling too close, etc. So to ask them to focus on mailboxes and to slow down or plow further away is just not realistic. He saw a lot of mailboxes either tipped over or being buried during plowing. There was so much snow that it was flying over the top of the wing on the plow. It's not just the wet snow or the driver being too close it's also the condition of the mailboxes. There are a lot of mailboxes that were constructed incorrectly, very cheaply, have rotten posts, are old, not maintained or put too close to the road. He did a cost estimate on a mailbox replacement and for materials it totaled about \$86. He thinks we are good where we are at. Trustee Miller stated that the rural road that he lives on was hit rather hard and you expect that. He thinks the reimbursement of \$75 pays for the materials to replace it and he would like to keep it the same. Trustee Hudson stated that he doesn't see how we would make any logical changes to this policy. We can't possibly be that careful with where the snow is going to go and there's no way to guarantee no damage to mailboxes and if we plow further into the street and then the mail can't be delivered by the post office. Wherever we can regardless of fault, we do temporary repairs or put out a temporary mailbox if we have one available. Superintendent Anderson clarified what they look for in the inspection, like evidence of physical

damage to the box, dents, paint striped off etc. The post office specifies where a mailbox should be placed. Staff does not recommend any particular approach.

Motion: Keep the policy the same but up the reimbursement with receipt to \$150 for residents or businesses

Motioned By: Phil Hudson

Seconded By: Rick Miller with discussion regarding the reimbursement amount. How long has it been at \$75? Probably 6-8 years.

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

Amended Motion: Keep the policy the same but up the reimbursement to \$100

Motioned By: Terri Kaminski

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

I. 2024 Tar & Mastic Purchase

Director of Public Works Mortwedt stated that each year, we perform crack sealing on village roadways as needed to improve longevity by minimizing water intrusion in cracks. Sherwin Industries is the sole provider of this product in our region.

Crafco Asphalt Rubber Plus: \$14,167.73

Crafco Mastic One: \$18,018.00

Total cost: \$32,185.73

Staff recommends the purchase of Crafco Asphalt Rubber Plus and Crafco Mastic One for the amount of \$32,185.73 and to forward this request to the Village Board with a positive recommendation.

Motion: Approve as presented

Motioned By: Phil Hudson

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

J. 2024 Center and Edge-Line Striping

Director of Public Works Mortwedt stated that annually, we perform center and edge-line striping on main throughfares throughout the village. This season the cost from Washington County is estimated to be \$1300 per mile of painting, and we intend to paint approximately 46.75 miles of roadway. Staff recommends contracting with Washington County to paint the center and edge-line as needed on village throughfares for \$60,775 and to forward this request to the Village Board with a positive recommendation.

Motion: Approve as presented

Motioned By: Rick Miller

Seconded By: Robert Warren

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

K. 2024 Fire Department Interior Painting Project

Director of Public Works Mortwedt stated that as reflected in the 2024 Buildings & Grounds non-borrowed capital budget, funds were allocated to paint the interior offices, corridors, and parking bay of the Fire Station. Staff has solicited pricing from area contractors and the results are listed below:

MACORP LLC: \$30,863.00

Service Painting Corporation: \$52,600.00

Hess Sweitzer Painting LLC: Responded but did not submit a proposal.

Staff recommends contracting with MACORP LLC to complete the painting project for an amount not to exceed \$30,863.00, and to forward this request to the Village Board with a positive recommendation.

Motion: Approve as presented

Motioned By: Phil Hudson

Seconded By: Rick Miller

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

A. Director's Report

Director of Public Works Matt Mortwedt gave his Director's Report which included: Departmental updates, complaint summary, project updates, and we are working on more robust communication with residents. The MS4 permit is up for renewal this year. It's a 5-year permit. Two (2) areas where he is expecting stricter compliance, include salt reduction and impervious surface reduction.

Motion: Move item to last on the agenda as presented

Motioned By: Rick Miller

Seconded By: Terri Kaminski

Yes: Terri Kaminski, Rick Miller, Phil Hudson, Robert Warren

No: None

Abstain: None

Motion Passed (Yes 4, No 0, Abstained 0)

VII. **NEXT MEETING DATE:** March meeting date was set for Wednesday, March 6th at 5:30pm.

VIII. **ANNOUNCEMENTS:** None.

IX. **ADJOURNMENT:** Chairperson Kaminski adjourned the meeting at 7:49pm.

Debbie Remich

From: noreply@civicplus.com
Sent: Wednesday, February 7, 2024 1:21 PM
To: Comments
Subject: Online Form Submittal: Meeting Comment Form for Committees and Village Board

CAUTION: This email originated from outside the organization.

Do not click links or open attachments unless you recognize the sender and know the content is safe.

Meeting Comment Form for Committees and Village Board

First Name	Scott
Last Name	Hefle
Address1	W159N10514 Old Farm Road
City	Germantown
State	WI
Zip	53022
Section Break	
Which Committee/Commission/Board do you have comments for?	Public Works & Highway Committee
What is the date of the meeting?	2/7/2024
For which item do you wish to provide comments?	TID 7 and 8 Borrowing Proposals
What is your opinion of the item?	I OPPOSE the item.
Would you like to speak at the meeting?	No, I do not wish to speak at the meeting. I only want to submit my comments through this form.
Comments	I am both confused and angered by the proposal on the agenda for tonight. I need clarity, as it sounds like we are looking to put the Germantown taxpayer's money into MORE infrastructure for the Green Bay Packaging and

Truck Country proposals. When I see the phrase "TID borrowing", it makes nervous. We have done nothing since 2017 but open TIDs and use taxpayer money fund things our residents never asked for and had no input on! This needs to stop! I am tired of the Board using a "taxpayer funded credit card" to pay for everyone's development. It is high time these projects pay a significant impact fee, as the reason we NEED things such as a frontage road is due to THERI development. We might not have NEEDED a frontage road or access road if their project was not accepted. This amounts to a taxpayer handout in my view. We need to go on a debt diet, not expand our debt to atmospheric levels. Look at the 2022 ACFR: Debt Per Resident was \$1,346 in 2018, in 2022 it was \$4,598, an increase of an increase of 342% in FIVE years! All the while our population as a village has only increased from 20,183 to 21,015, an increase of 4.12%. We are NOT growing like we did in the 80's and 90's, yet are still borrowing like we are!

Email not displaying correctly? [View it in your browser.](#)

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: 2024 Articulating Wheel-Loader Purchase

SUBMITTED BY: Scott Anderson, Superintendent

SUMMARY EXPLANATION:

As part of the 2024 Parks Department capital budget, \$120,000.00 was allocated to purchase a compact articulating wheel-loader. This piece of equipment was budgeted as a replacement for a skid-loader in our fleet, which is currently 24 years old. In looking closely at our operations, it was decided that an articulating loader would better serve the needs of the department. Staff solicited several regional Caterpillar vendors, and the pricing is listed below:

Fabrick Cat – Milwaukee \$119,100.00

Altorfer Cat – Wauconda \$131,900.00

Ziegler Cat – Rochester \$133,000.00

ATTACHMENT:

RECOMMENDATION:

Staff recommends the purchase of a Caterpillar 906 compact articulating wheel-loader from Fabrick Cat of Milwaukee for an amount not to exceed \$119,100.00, and to forward this request to the Village Board with a positive recommendation. If approved, the funds shall be allocated from the Parks Department Capital account: 40-564-000-591000

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: 2024 Senior Center Exterior Painting Project

SUBMITTED BY: Scott Anderson, Superintendent

SUMMARY EXPLANATION:

As reflected in the 2024 Buildings & Grounds non-borrowed capital budget, \$23,000.00 was allocated to caulk and paint all previously painted exterior surfaces of the Senior Center. Most of the areas to be painted are wood or stucco / EIFS, with caulked seams. The project will reduce the possibility of water intrusion, helping to prolong the life of the wood and trim. The project will also enhance the aesthetic value of the building. Staff has solicited pricing from area contractors and the results are listed below:

MACORP LLC: \$21,198.00

Service Painting Corporation: \$42,000.00

Hess Sweitzer Painting LLC: Responded but did not submit a proposal.

ATTACHMENT:

RECOMMENDATION:

Staff recommends contracting with MACORP LLC to complete the painting project for an amount not to exceed \$21,198.00, and to forward this request to the Village Board with a positive recommendation. If approved, funds shall be allocated from the Buildings and Grounds non-borrowed capital account: 10563000-591900.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: 2024 Firemen's Park Bandshell Painting Project

SUBMITTED BY: Scott Anderson, Superintendent

SUMMARY EXPLANATION:

As reflected in the 2024 Parks Department non-borrowed capital budget, \$30,000.00 was allocated to paint the metal roof and column structures of the Fireman's Park bandshell. As discussed during the budget process, deficiencies in the preparation of the metal surfaces caused a premature paint failure. To correct the issue, staff has specified that all surfaces be media blasted to ensure that all peeling or loose paint is removed. This process will also ensure that all metal surfaces are prepared correctly and will minimize the likelihood of future failure. An alternate bid was accepted to paint the handrail and entry doors, so that all painted surfaces match. This alternate bid came at a cost of \$2,593.00 and puts the project slightly over budget. Staff recommends moving forward with the alternate pricing and utilizing some remaining funds from the Senior Center project, which came in under budget. Staff has solicited pricing from area contractors and the results are listed below:

MACORP LLC: \$32,063.00

Service Painting Corporation: \$33,500.00

Hess Sweitzer Painting LLC: Responded but did not submit a proposal.

ATTACHMENT:

RECOMMENDATION:

Staff recommends contracting with MACORP LLC to complete the painting project for an amount not to exceed \$32,063.00, and to forward this request to the Village Board with a positive recommendation. If approved, funds shall be allocated from the Parks Department's non-borrowed capital account: 10564000-592100, and the Buildings and Grounds non-borrowed capital account: 10563000-591900.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Acceptance of Improvements Keller Town 9

SUBMITTED BY: Timothy Zimmerman, Superintendent

SUMMARY EXPLANATION:

Keller Inc. extended sanitary sewer to their development site located at N104W12667 Donges Bay Rd. The work was performed by PTS out of Green Bay, WI. The utility inspected this relay and found it to be true to alignment and grade.

ATTACHMENT:

RECOMMENDATION:

It is the Wastewater Utility's recommendation to accept the improvements as constructed by PTS on behalf of Keller, Inc. and begin the one-year warranty period effective today March 6, 2024.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Blanket PO - Ferguson Water Works

SUBMITTED BY: Timothy Zimmerman, Superintendent

SUMMARY EXPLANATION:

I am seeking authorization to execute a blanket purchase order to Ferguson Waterworks for miscellaneous manhole repair materials to include Neenah R-1661 castings, lids, and pavement adjusting rings, Cretex Pro Ring PPE adjusting rings, Gun grade butyl sealant, and M-1 polymer construction adhesive in the amount not to exceed \$30,000. Materials will be utilized for the 2024 road projects and other areas throughout the system.

ATTACHMENT:

RECOMMENDATION:

It is staff's recommendation to approve a Blanket PO to Ferguson Waterworks for the amount not to exceed \$30,000 for the purchase of miscellaneous manhole repair materials and forward this request to the Village Board with a positive recommendation. Funds to be allocated from 60720000-531960 Collection System maintenance.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Blanket PO - Core and Main

SUBMITTED BY: Timothy Zimmerman, Superintendent

SUMMARY EXPLANATION:

I am seeking authorization to execute a blanket purchase order to Core and Main for the purchase of Ladtech HDPE manhole adjusting rings and other miscellaneous materials in the amount not to exceed \$25,000. Rings will be utilized for the 2024 road projects and other areas throughout the system.

ATTACHMENT:

RECOMMENDATION:

It is staff's recommendation to approve the Blanket PO to Core and Main for the amount not to exceed \$25,000 for the purchase of Ladtech HDPE manhole adjusting rings and other miscellaneous materials and forward this request to the Village Board with a positive recommendation. Funds to be allocated from 60720000-531960 Collection System maintenance.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Blanket PO - Adaptor Inc.

SUBMITTED BY: Timothy Zimmerman, Superintendent

SUMMARY EXPLANATION:

I am seeking authorization to execute a blanket purchase order to Adaptor, Inc. for internal/external manhole chimney seals and extensions as required for an amount not to exceed \$28,000. Adaptor, Inc. is the manufacturer of the seals and gives the Village distributor pricing because we are a legacy customer. Seals will be utilized for the 2024 road projects and other areas throughout the system.

ATTACHMENT:

RECOMMENDATION:

It is staff's recommendation to approve a Blanket PO to Adaptor, Inc. for the amount not to exceed \$28,000 for the purchase of chimney seals and extensions and forward this request to the Village Board with a positive recommendation. Funds to be allocated from 60720000-531960 Collection System Maintenance.

ACTION BY Committee:

The proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Blanket PO - Visu-Sewer

SUBMITTED BY: Timothy Zimmerman, Superintendent

SUMMARY EXPLANATION:

I am seeking authorization to execute a blanket purchase order to Visu-Sewer for miscellaneous manhole grouting to control inflow and infiltration in the amount not to exceed \$40,000. Payment will be on a time and material basis.

ATTACHMENT:

RECOMMENDATION:

It is staff's recommendation to approve the Blanket PO to Visu-Sewer Clean and Seal for the amount not to exceed \$40,000 for miscellaneous manhole grouting and other inflow and infiltration efforts and forward this request to the Village Board with a positive recommendation. Funds to be allocated from 6000000-182070 Collection System Capital.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Blanket PO - William/Reid LLC

SUBMITTED BY: Timothy Zimmerman, Superintendent

SUMMARY EXPLANATION:

I am seeking authorization to execute a blanket purchase order to William/Reid, LLC for miscellaneous service on lift station equipment throughout the system for the amount not to exceed \$20,000. Payment will be on a time and material basis.

ATTACHMENT:

RECOMMENDATION:

It is staff's recommendation to approve the Blanket PO to William/Reid, LLC for the amount not to exceed \$20,000 for miscellaneous service on lift station equipment throughout the system and forward this request to the Village Board with a positive recommendation. Funds to be allocated from 60720000-531930 Lift Station Maintenance.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Blanket PO - Residential Yard Waste Facility Material Processing

SUBMITTED BY: Timothy Zimmerman, Superintendent

SUMMARY EXPLANATION:

I am seeking authorization to execute a blanket purchase order to Enercon for material processing for the Residential Yard Waste Facility for 2024, in an amount not to exceed \$30,400. This amount will cover 8 days of wood and yard waste material processing at the facility.

ATTACHMENT:

RECOMMENDATION:

It is staff's recommendation to approve the Blanket PO to Enercon for the amount not to exceed \$30,400 for material processing at the Residential Yard Waste Facility and forward this request to the Village Board with a positive recommendation. Funds to be allocated from Recycling Budget line item 10565000-532700.

ACTION BY Committee:

Proper parliamentary procedure to deny a request is to have a motion made in the affirmative and, by voting NAY, would deny the request if there was a majority vote.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Award Contract for Donges Bay Reconstruction Project from STH 145 Fond du Lac Avenue to Wasaukee Road to Vinton Construction of Two Rivers, Wisconsin, in the amount of \$2,517,416

SUBMITTED BY: Kevin Driscoll, Village Engineer

SUMMARY EXPLANATION:

This roadway reconstruction project is located within TID#9. It was approved in the 2024 budget and is essential for coordination of opening the new Department of Public Works Facility once Town 9 Parkway opens this September. This project was advertised in February, and the Village received 5 bidders.

Contractor	Amount
Vinton	\$2,517,416.12
Musson Bros. Inc	\$2,704,459.26
James Peterson Sons, Inc.	\$2,719,575.88
SuperWestern	\$2,722,450.45
Zignego	\$2,943,201.88

These bids are below the \$3.4M construction estimate. The schedule for the work is to begin this spring, in time for Donges Bay Road to re-open for the new Public Works Building this fall. During this project a detour is required due to the box culvert replacement at the stream crossing. As a result the road will be closed except for construction equipment, and staff sent notification letters to adjacent property owners to plan ahead along with a link to the project webpage: <https://www.germantownwi.gov/176/Construction-Projects> .

ATTACHMENT:

1. Germantown 2401_Donges Bay Rd_Contract_Award

RECOMMENDATION:

Staff requests the Public Works and Highways Committee recommend to the Village Board, approval of a contract for the Donges Bay Reconstruction Project with Vinton Construction, the lowest qualified bidder, and include a 10% contingency, in the amount of \$251,742, for a total authorization of \$2,769,158 in account 45-409440-542800.

ACTION BY Committee:

A motion to support authorize staff and a vote "Aye" is in the affirmative to support the contract award.



Graef-USA Inc.
275 West Wisconsin Avenue, Suite 300
Milwaukee, WI 53203
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

collaborāte / formulāte / innovāte

February 29, 2024

Mr. Matt Mortwedt
Director of Public Works
Village of Germantown
N112W17001 Mequon Road
Germantown, WI 53022-0337

SUBJECT: Donges Bay Road Reconstruction
Project No. 2401
Recommendation of Award

GRAEF attended the virtual bid opening for the Donges Bay Road Reconstruction, Project No. 2401 on February 29, 2024, at 10am. Five bids were received for the project. A tabulation of the bids are enclosed with this letter.

The low bidder for the above referenced project was Vinton Construction Company with a bid of \$2,517,456.12. The five bids ranged from \$2,517,456.12 to \$2,943,201.88.

In summary, GRAEF recommends that the Donges Bay Road Reconstruction Project No. 2401 be awarded to Vinton Construction Company for the amount of \$2,517,456.12. Should you have any further questions, please feel free to contact us.

Sincerely,

Graef-USA Inc.

A handwritten signature in blue ink that reads "Julie Chapman". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Julie Chapman, P.E.
Associate

JAC:jac

Enclosure

				Engineer Estimate				Vinton Construction Company				Musson Bros. Inc.				James Peterson Sons, Inc.				Super Western, Inc.				Zignego			
Section Title	Line Item	Item Code	Item Description	UoFM	Quantity	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension				
1- Primary Bid							\$0.00		\$2,517,456.12		\$2,704,459.26		\$2,719,575.88		\$2,722,450.45		\$2,943,201.88										
	1	203.0100	Removing Small Pipe Culverts	EACH	4	\$550.00	\$2,200.00	\$335.00	\$1,340.00	\$224.00	\$896.00	\$950.00	\$3,800.00	\$900.00	\$3,600.00	\$224.00	\$896.00										
	2	203.0220	Removing Structure (Box Culvert)	EACH	1	\$20,000.00	\$20,000.00	\$11,700.00	\$11,700.00	\$4,530.00	\$4,530.00	\$14,030.00	\$14,030.00	\$18,797.45	\$18,797.45	\$4,530.00	\$4,530.00										
	3	204.0120	Removing Asphaltic Surface Milling	SY	17040	\$5.00	\$85,200.00	\$1.65	\$28,116.00	\$1.65	\$28,116.00	\$1.65	\$28,116.00	\$1.65	\$28,116.00	\$1.65	\$28,116.00										
	4	204.0150	Removing Curb & Gutter	LF	1252	\$7.50	\$9,390.00	\$4.20	\$5,258.40	\$4.30	\$5,383.60	\$1.92	\$2,403.84	\$2.63	\$3,292.76	\$2.00	\$2,504.00										
	5	204.0155	Removing Concrete Sidewalk	SY	24	\$20.00	\$480.00	\$10.00	\$240.00	\$2.60	\$62.40	\$7.21	\$173.04	\$18.32	\$439.68	\$20.00	\$480.00										
	6	204.0165	Removing Guardrail	LF	384	\$6.00	\$2,304.00	\$2.49	\$956.16	\$2.95	\$1,132.80	\$5.00	\$1,920.00	\$4.25	\$1,632.00	\$2.95	\$1,132.80										
	7	205.0100	Excavation Common	CY	18519	\$22.00	\$407,418.00	\$11.75	\$217,598.25	\$16.00	\$296,304.00	\$13.40	\$248,154.60	\$9.12	\$168,893.28	\$18.33	\$339,453.27										
	8	205.0400	Excavation Marsh	CY	1692	\$24.00	\$40,608.00	\$15.60	\$26,395.20	\$15.00	\$25,380.00	\$14.85	\$25,126.20	\$17.58	\$29,745.36	\$20.00	\$33,840.00										
	9	206.2001	Excavation for Structures Culverts B-66-148	EACH	1	\$25,000.00	\$25,000.00	\$40,200.00	\$40,200.00	\$40,000.00	\$40,000.00	\$19,900.00	\$19,900.00	\$23,147.04	\$23,147.04	\$40,000.00	\$40,000.00										
	10	210.2500	Backfill Structure Type B	TON	1323	\$32.00	\$42,336.00	\$30.15	\$39,888.45	\$25.50	\$33,736.50	\$19.75	\$26,129.25	\$17.74	\$23,470.02	\$25.50	\$33,736.50										
	11	305.0110	Base Aggregate Dense 3/4-Inch	TON	143	\$50.00	\$7,150.00	\$46.00	\$6,578.00	\$23.50	\$3,360.50	\$46.22	\$6,609.46	\$31.33	\$4,480.19	\$50.00	\$7,150.00										
	12	305.0120	Base Aggregate Dense 1 1/4-Inch	TON	11455	\$22.00	\$252,010.00	\$9.57	\$109,624.35	\$13.50	\$154,642.50	\$16.45	\$188,434.75	\$15.21	\$174,230.55	\$14.56	\$166,784.80										
	13	310.0110	Base Aggregate Open Graded	TON	15	\$60.00	\$900.00	\$31.10	\$466.50	\$22.00	\$330.00	\$50.00	\$750.00	\$88.48	\$1,327.20	\$22.00	\$330.00										
	14	311.0110	Breaker Run	TON	16946	\$19.00	\$321,974.00	\$19.32	\$327,396.72	\$16.50	\$279,609.00	\$18.66	\$316,212.36	\$19.22	\$325,702.12	\$24.83	\$420,769.18										
	15	455.0605	Tack Coat	GAL	2611	\$2.75	\$7,180.25	\$2.25	\$5,874.75	\$2.25	\$5,874.75	\$2.25	\$5,874.75	\$2.25	\$5,874.75	\$2.25	\$5,874.75										
	16	460.6223	HMA Pavement 3 MT 58-28 S	TON	2665	\$90.00	\$239,850.00	\$61.50	\$163,897.50	\$61.50	\$163,897.50	\$61.50	\$163,897.50	\$61.50	\$163,897.50	\$61.50	\$163,897.50										
	17	460.6424	HMA Pavement 4 MT 58-28 H	TON	3863	\$110.00	\$424,930.00	\$72.50	\$280,067.50	\$72.50	\$280,067.50	\$72.50	\$280,067.50	\$72.50	\$280,067.50	\$72.50	\$280,067.50										
	18	465.0120	Asphaltic Surface Driveways and Field Entrances	TON	8	\$250.00	\$2,000.00	\$75.00	\$600.00	\$75.00	\$600.00	\$75.00	\$600.00	\$75.00	\$600.00	\$75.00	\$600.00										
	19	504.0100	Concrete Masonry Culverts	CY	39	\$2,500.00	\$97,500.00	\$0.01	\$0.39	\$840.00	\$32,760.00	\$1,035.00	\$40,365.00	\$1,100.00	\$42,900.00	\$840.00	\$32,760.00										
	20	504.1001.S	Precast Concrete Wingwalls B-66-148	EACH	4	\$10,000.00	\$40,000.00	\$0.01	\$0.04	\$6,500.00	\$26,000.00	\$5,705.00	\$22,820.00	\$0.01	\$0.04	\$6,500.00	\$26,000.00										
	21	504.2000.S	Precast Concrete Box Culvert 10 FT x 5 Ft	LF	192	\$1,600.00	\$307,200.00	\$1,570.00	\$301,440.00	\$1,780.00	\$341,760.00	\$1,168.00	\$224,256.00	\$1,500.00	\$288,000.00	\$1,780.00	\$341,760.00										
	22	505.0400	Bar Steel Reinforcement HS Structures	LB	1610	\$2.25	\$3,622.50	\$0.01	\$16.10	\$1.13	\$1,819.30	\$1.50	\$2,415.00	\$4.25	\$6,842.50	\$1.13	\$1,819.30										
	23	516.0500	Rubberized Membrane Waterproofing	SY	3	\$55.00	\$165.00	\$100.00	\$300.00	\$150.00	\$450.00	\$225.00	\$675.00	\$20.00	\$60.00	\$1,000.00	\$3,000.00										
	24	522.1012	Apron Endwalls for Culvert Pipe Reinforced Concrete 12-Inch	EACH	1	\$1,500.00	\$1,500.00	\$600.00	\$600.00	\$1,270.00	\$1,270.00	\$750.00	\$750.00	\$1,347.00	\$1,347.00	\$1,270.00	\$1,270.00										
	25	522.1030	Apron Endwalls for Culvert Pipe Reinforced Concrete 30-Inch	EACH	1	\$2,250.00	\$2,250.00	\$1,510.00	\$1,510.00	\$1,910.00	\$1,910.00	\$1,750.00	\$1,750.00	\$1,993.00	\$1,993.00	\$1,910.00	\$1,910.00										
	26	601.0407	Concrete Curb & Gutter 18-Inch Type D	LF	150	\$41.00	\$6,150.00	\$33.00	\$4,950.00	\$33.00	\$4,950.00	\$33.00	\$4,950.00	\$33.00	\$4,950.00	\$24.94	\$3,741.00										
	27	601.0411	Concrete Curb & Gutter 30-Inch Type D	LF	594	\$37.00	\$21,978.00	\$23.00	\$13,662.00	\$23.00	\$13,662.00	\$23.00	\$13,662.00	\$23.00	\$13,662.00	\$25.17	\$14,950.98										
	28	601.0557	Concrete Curb & Gutter 6-Inch Sloped 36-Inch Type D	LF	675	\$38.00	\$25,650.00	\$27.50	\$18,562.50	\$27.50	\$18,562.50	\$27.50	\$18,562.50	\$27.50	\$18,562.50	\$27.50	\$18,562.50										
	29	602.0505	Curb Ramp Detectable Warning Field Yellow	SF	66	\$55.00	\$3,630.00	\$55.00	\$3,630.00	\$55.00	\$3,630.00	\$55.00	\$3,630.00	\$55.00	\$3,630.00	\$60.00	\$3,960.00										
	30	602.0605	Curb Ramp Detectable Warning Field Radial Yellow	SF	59	\$70.00	\$4,130.00	\$80.00	\$4,720.00	\$80.00	\$4,720.00	\$80.00	\$4,720.00	\$80.00	\$4,720.00	\$74.00	\$4,366.00										
	31	602.0410	Concrete Sidewalk 5-Inch	SF	9551	\$8.50	\$81,183.50	\$6.00	\$57,306.00	\$5.80	\$55,395.80	\$5.80	\$55,395.80	\$5.80	\$55,395.80	\$5.94	\$56,732.94										
	32	602.3010	Concrete Surface Drain	CY	6	\$1,500.00	\$9,000.00	\$500.00	\$3,000.00	\$500.00	\$3,000.00	\$500.00	\$3,000.00	\$500.00	\$3,000.00	\$850.00	\$5,100.00										
	33	606.0100	Riprap Light	CY	11	\$145.00	\$1,595.00	\$93.25	\$1,025.75	\$134.00	\$1,474.00	\$110.00	\$1,210.00	\$132.15	\$1,453.65	\$134.00	\$1,474.00										
	34	606.0300	Riprap Heavy	CY	34	\$155.00	\$5,270.00	\$95.35	\$3,241.90	\$165.00	\$5,610.00	\$110.00	\$3,740.00	\$117.18	\$3,984.12	\$165.00	\$5,610.00										
	35	608.3012	Storm Sewer Pipe Class III-A 12-Inch	LF	518	\$75.00	\$38,850.00	\$59.40	\$30,769.20	\$65.00	\$33,670.00	\$67.00	\$34,706.00	\$68.00	\$35,224.00	\$65.00	\$33,670.00										
	36	608.3018	Storm Sewer Pipe Class III-A 18-Inch	LF	141	\$110.00	\$15,510.00	\$94.95	\$13,387.95	\$75.00	\$10,575.00	\$74.00	\$10,434.00														

65	631.0300	Sod Water	MGAL	12	\$65.00	\$780.00	\$28.00	\$336.00	\$40.00	\$480.00	\$32.00	\$384.00	\$15.00	\$180.00	\$40.00	\$480.00
66	631.1000	Sod Lawn	SY	1051	\$10.00	\$10,510.00	\$5.50	\$5,780.50	\$11.00	\$11,561.00	\$6.25	\$6,568.75	\$8.65	\$9,091.15	\$11.00	\$11,561.00
67	631.1100	Sod Erosion Control	SY	21	\$42.00	\$882.00	\$5.50	\$115.50	\$20.00	\$420.00	\$15.00	\$315.00	\$50.00	\$1,050.00	\$20.00	\$420.00
68	634.0612	Posts Wood 4x6-Inch x 12 Ft.	EACH	13	\$120.00	\$1,560.00	\$100.00	\$1,300.00	\$135.00	\$1,755.00	\$135.00	\$1,755.00	\$150.00	\$1,950.00	\$135.00	\$1,755.00
69	634.0614	Posts Wood 4x6-Inch x 14 Ft.	EACH	1	\$115.00	\$115.00	\$100.00	\$100.00	\$145.00	\$145.00	\$145.00	\$145.00	\$150.00	\$150.00	\$145.00	\$145.00
70	637.2210	Signs Type II Reflective H	SF	71.69	\$28.00	\$2,007.32	\$24.29	\$1,741.35	\$28.00	\$2,007.32	\$27.00	\$1,935.63	\$30.00	\$2,150.70	\$28.00	\$2,007.32
71	637.2230	Signs Type II Reflective F	SF	9	\$32.00	\$288.00	\$25.29	\$227.61	\$28.00	\$252.00	\$31.00	\$279.00	\$30.00	\$270.00	\$28.00	\$252.00
72	638.2102	Moving Signs Type II	EACH	2	\$140.00	\$280.00	\$80.00	\$160.00	\$140.00	\$280.00	\$100.00	\$200.00	\$150.00	\$300.00	\$140.00	\$280.00
73	638.2602	Removing Signs Type II	EACH	13	\$43.00	\$559.00	\$19.00	\$247.00	\$25.00	\$325.00	\$50.00	\$650.00	\$45.00	\$585.00	\$25.00	\$325.00
74	638.3000	Removing Small Sign Supports	EACH	13	\$42.00	\$546.00	\$19.00	\$247.00	\$25.00	\$325.00	\$45.00	\$585.00	\$45.00	\$585.00	\$25.00	\$325.00
75	645.0111	Geotextile Type DF Schedule A	SY	94	\$6.00	\$564.00	\$2.50	\$235.00	\$0.84	\$78.96	\$8.00	\$752.00	\$3.21	\$301.74	\$10.00	\$940.00
76	645.0105	Geotextile Type C	SY	410	\$5.00	\$2,050.00	\$2.50	\$1,025.00	\$2.90	\$1,189.00	\$5.00	\$2,050.00	\$13.46	\$5,518.60	\$10.00	\$4,100.00
77	645.0120	Geotextile Type HR	SY	21	\$10.00	\$210.00	\$5.00	\$105.00	\$10.00	\$210.00	\$10.00	\$210.00	\$16.99	\$356.79	\$10.00	\$210.00
78	645.0130	Geotextile Type R	SY	32	\$9.00	\$288.00	\$5.00	\$160.00	\$10.00	\$320.00	\$10.00	\$320.00	\$16.51	\$528.32	\$10.00	\$320.00
79	646.1020	Marking Line Epoxy 4-Inch	LF	23422	\$1.00	\$23,422.00	\$0.80	\$18,737.60	\$0.80	\$18,737.60	\$0.80	\$18,737.60	\$0.80	\$18,737.60	\$0.80	\$18,737.60
80	646.3020	Marking Line Epoxy 8-Inch	LF	1074	\$2.50	\$2,685.00	\$1.40	\$1,503.60	\$1.40	\$1,503.60	\$1.40	\$1,503.60	\$1.40	\$1,503.60	\$1.40	\$1,503.60
81	646.5020	Marking Arrow Epoxy	EACH	30	\$275.00	\$8,250.00	\$285.00	\$8,550.00	\$285.00	\$8,550.00	\$285.00	\$8,550.00	\$285.00	\$8,550.00	\$285.00	\$8,550.00
82	646.5120	Marking Word Epoxy	EACH	6	\$325.00	\$1,950.00	\$300.00	\$1,800.00	\$300.00	\$1,800.00	\$300.00	\$1,800.00	\$300.00	\$1,800.00	\$300.00	\$1,800.00
83	646.5220	Marking Symbol Epoxy	EACH	27	\$250.00	\$6,750.00	\$145.00	\$3,915.00	\$145.00	\$3,915.00	\$145.00	\$3,915.00	\$145.00	\$3,915.00	\$145.00	\$3,915.00
84	646.5320	Marking Railroad Crossing Epoxy	EACH	2	\$1,750.00	\$3,500.00	\$1,235.00	\$2,470.00	\$1,235.00	\$2,470.00	\$1,235.00	\$2,470.00	\$1,235.00	\$2,470.00	\$1,235.00	\$2,470.00
85	646.6020	Marking Stop Line Epoxy 12-Inch	LF	48	\$14.00	\$672.00	\$12.50	\$600.00	\$12.50	\$600.00	\$12.50	\$600.00	\$12.50	\$600.00	\$12.50	\$600.00
86	646.6120	Marking Stop Line Epoxy 18-Inch	LF	158	\$16.00	\$2,528.00	\$15.00	\$2,370.00	\$15.00	\$2,370.00	\$15.00	\$2,370.00	\$15.00	\$2,370.00	\$15.00	\$2,370.00
87	646.7120	Marking Diagonal Epoxy 12-Inch	LF	1079	\$11.50	\$12,408.50	\$7.00	\$7,553.00	\$7.00	\$7,553.00	\$7.00	\$7,553.00	\$7.00	\$7,553.00	\$7.00	\$7,553.00
88	646.7420	Marking Crosswalk Epoxy Traverse Line 6-Inch	LF	314	\$12.00	\$3,768.00	\$10.00	\$3,140.00	\$10.00	\$3,140.00	\$10.00	\$3,140.00	\$10.00	\$3,140.00	\$10.00	\$3,140.00
89	690.0150	Sawing Asphalt	LF	517	\$1.75	\$904.75	\$4.00	\$2,068.00	\$1.39	\$718.63	\$2.50	\$1,292.50	\$1.39	\$718.63	\$5.00	\$2,585.00
90	690.0250	Sawing Concrete	LF	20	\$3.25	\$65.00	\$3.00	\$60.00	\$2.00	\$40.00	\$10.00	\$200.00	\$2.00	\$40.00	\$5.00	\$100.00
91	SPV.0060.01	Traffic Control and Detour (Section 02790)	EACH	1	\$15,000.00	\$15,000.00	\$10,000.00	\$10,000.00	\$10,000.00	\$10,000.00	\$9,482.00	\$9,482.00	\$9,482.00	\$9,482.00	\$23,000.00	\$23,000.00
92	SPV.0060.02	Apron Endwalls for Reinforced Concrete Pipe Arch 36x22-Inch (Section 02472)	EACH	2	\$2,000.00	\$4,000.00	\$2,155.00	\$4,310.00	\$2,060.00	\$4,120.00	\$1,960.00	\$3,920.00	\$2,821.00	\$5,642.00	\$2,060.00	\$4,120.00
93	SPV.0060.03	Maintaining Temporary Drainage (Section 02250)	EACH	1	\$30,000.00	\$30,000.00	\$18,800.00	\$18,800.00	\$23,000.00	\$23,000.00	\$84,050.00	\$84,050.00	\$26,036.08	\$26,036.08	\$23,000.00	\$23,000.00
94	SPV.0060.04	Remove, Salvage, and Relocate Hydrant (Section 02535)	EACH	3	\$20,000.00	\$60,000.00	\$8,405.00	\$25,215.00	\$11,000.00	\$33,000.00	\$5,780.00	\$17,340.00	\$9,398.00	\$28,194.00	\$11,000.00	\$33,000.00
95	SPV.0060.05	Adjust Hydrant (Section 02530)	EACH	1	\$12,000.00	\$12,000.00	\$1,225.00	\$1,225.00	\$2,230.00	\$2,230.00	\$2,000.00	\$2,000.00	\$2,603.00	\$2,603.00	\$2,230.00	\$2,230.00
96	SPV.0060.06	Adjust Water Valve (Section 02520)	EACH	10	\$2,500.00	\$25,000.00	\$375.00	\$3,750.00	\$243.00	\$2,430.00	\$300.00	\$3,000.00	\$615.00	\$6,150.00	\$243.00	\$2,430.00
97	SPV.0060.07	Reconstruct Sanitary Manhole (Section 02665)	EACH	4	\$3,000.00	\$12,000.00	\$906.00	\$3,624.00	\$2,000.00	\$8,000.00	\$2,350.00	\$9,400.00	\$2,902.00	\$11,608.00	\$2,000.00	\$8,000.00
98	SPV.0060.08	Water Main Connection, 12-Inch (Section 02515)	EACH	2	\$8,500.00	\$17,000.00	\$5,885.00	\$11,770.00	\$5,340.00	\$10,680.00	\$4,000.00	\$8,000.00	\$5,472.00	\$10,944.00	\$5,340.00	\$10,680.00
99	SPV.0060.09	Remove, Salvage, and Install New 12" Gate Valve (Section 02525)	EACH	1	\$9,000.00	\$9,000.00	\$10,075.00	\$10,075.00	\$6,140.00	\$6,140.00	\$7,595.00	\$7,595.00	\$9,018.00	\$9,018.00	\$6,140.00	\$6,140.00
100	SPV.0090.01	Concrete Curb & Gutter 66-Inch Type D (Section 02425)	LF	3116	\$45.00	\$140,220.00	\$30.30	\$94,414.80	\$30.30	\$94,414.80	\$30.30	\$94,414.80	\$30.30	\$94,414.80	\$32.80	\$102,204.80
101	SPV.0090.02	Pipe Railing (Section 02820)	LF	320	\$225.00	\$72,000.00	\$228.00	\$72,960.00	\$228.00	\$72,960.00	\$228.00	\$72,960.00	\$295.00	\$94,400.00	\$228.00	\$72,960.00
102	SPV.0090.03	Reinforced Concrete Pipe Arch 36x22-Inch (Section 02470)	LF	85	\$225.00	\$19,125.00	\$223.80	\$19,023.00	\$155.00	\$13,175.00	\$300.00	\$25,500.00	\$183.00	\$15,555.00	\$155.00	\$13,175.00
103	SPV.0090.04	Remove and Install New 12-Inch PVC Water Main (Section 02510)	LF	422	\$500.00	\$211,000.00	\$154.35	\$65,135.70	\$173.00	\$73,006.00	\$180.00	\$75,960.00	\$265.00	\$111,830.00	\$173.00	\$73,006.00
Base Bid Total:						\$3,769,124.82		\$2,517,456.12		\$2,704,459.26		\$2,719,575.88		\$2,722,450.45		\$2,943,201.88

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Award a Contract for Construction Management, Construction Inspection, Construction Staking Services of the Donges Bay Road Project to Graef in the amount not to exceed \$249,648

SUBMITTED BY: Kevin Driscoll, Village Engineer

SUMMARY EXPLANATION:

The consulting firm, Graef, has been instrumental as the Design Engineer for Village on the Donges Bay Road Reconstruction Project, the Town 9 Parkway project and the new Public Works Facility. In addition, consultants with Graef have provided various construction inspection services and staking for these projects, and continue to provide engineering services for ongoing project work.

Staff requested Graef to provide a scope of services for Construction Management, Construction Inspection and Construction Staking, on a time and materials basis, to successfully complete the Donges Bay Road Reconstruction project. This work is anticipated to begin in April, with final completion in September 2024.

ATTACHMENT:

1. Construction Services_Donges Bay Road_2024-0209

RECOMMENDATION:

Staff requests the Public Works and Highways Committee recommend to the Village Board, approval of a contract for Construction Management, Construction Inspection, Construction Staking Services of the Donges Bay Road Project to Graef of Milwaukee, Wisconsin, on a time and materials basis in the amount not to exceed \$249,648 in account 45-409440-542800.

ACTION BY Committee:

A motion to support authorize staff and a vote "Aye" is in the affirmative to support the contract award.



The Avenue
275 West Wisconsin Avenue, Suite 300
Milwaukee, WI 53203
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

collaborāte / formulāte / innovāte

February 9, 2024

Mr. Matt Mortwedt
Director of Public Works
Village of Germantown

SUBJECT: Donges Bay Road Reconstruction, Construction Services

Dear Mr. Mortwedt:

We are very pleased to provide you with this proposal for professional services. When accepted, this proposal will amend the Master Agreement between Graef-USA Inc. (GRAEF) and Village of Germantown (Client).

This proposal is for Construction Services for the reconstruction of Donges Bay Road (Project). It is subject to GRAEF's Standard Terms and Conditions, a copy of which were attached to the original agreement.

For this Project, GRAEF proposes to provide the following Basic Services:

- Construction Administration
 - Shop drawing review of materials and bid items
 - Review recommendation of payment by the contractor (EJCDC Application for Payment)
 - Progress meeting attendance
 - Respond to requests for information by contractor
 - Project start-up and close-out documentation
- Construction Inspection
 - Full-time inspection from May 1, 2024 to September 12, 2024. (Assumed 10-hour work days, Monday thru Friday)
 - Part-time inspection as requested during times of multiple crews or Town 9 Parkway activities (Assumed 10-hour work days for 25% of construction schedule)
 - Inspection reports, pictures and quantities completed on daily basis for construction activities
 - Weekly erosion control inspection and documentation for WDNR
 - GPS verification for water main installation as-builts
- Construction Staking
 - Assumed 1 visit per construction staking category below:
 - Storm sewer structures (24 Each)
 - Subgrade
 - Base



- Curb & Gutter (4,535 LF)
- Pipe Culverts (1 Each)
- Structure Layout (1 Each)
- Curb Ramps (9 Each)
- Sidewalk
- Supplemental Control
- Slope Stakes
- Staking spreadsheets provided to inspector and contractor

GRAEF will endeavor to perform the Basic Services in conformance to the following schedule:

Preconstruction Meeting (Contractor dependent)	April 2024
Begin Construction (contractor dependent)	May 1, 2024
Substantial Completion	August 30, 2024
Final Completion	September 12, 2024

You agree to compensate GRAEF for all basic services noted above on an hourly rate and direct expense basis. This approximate fee is further broken down as follows:

Construction Administration	\$ 65,863.00
Construction Inspection	\$166,685.00
<u>Construction Staking</u>	<u>\$ 16,100.00</u>
Total	\$249,648.00

Direct expenses of mileage will be billed at the federal rate at the time incurred. Other Direct Expenses will be billed at cost and are in addition to the fee quoted above.

You agree to compensate GRAEF for all Additional Services on an hourly rate and direct expense basis.

To accept this proposal, please sign and date below and return one copy to us. Upon written authorization, GRAEF will commence work on the project.

We look forward to working with you on this critical project. Please call us at (414) 266-9127 if you have any questions regarding this proposal.



collaborāte / formulāte / innovāte

Sincerely,

Graef-USA Inc.

**Accepted by:
Matt Mortwedt**

A handwritten signature in blue ink that reads "Julie Chapman".

Julie A. Chapman, PE
Associate

(Signature)

(Name Printed)

A handwritten signature in blue ink that reads "Michael N. Paulos".

Michael N. Paulos, PE
Principal

(Title)

(Date)

X:\ML\2022\20220820-04\Project Management\Contracts\Construction

GENERAL INFORMATION	
Project Name:	Donges Bay Rd Construction
Client Name:	Village of Germantown
Date:	2/9/24
Discipline:	Construction
Prepared by:	Julie Chapman
Rate Table:	Custom 2
PM % of Fee:	0%
Contingency % of Fee:	0%



CONSTRUCTION													
Construction			Project Team	Project Management		Design			Modeling/Drafting		Administrative	Expenses	
				PIC	PM	Engineer 1	Engineer 2	Engineer 3	Technician 1	Technician 2			
			Classification		P8	P5	T6	T4	T2	T5	T4	Administrative	
Rate		\$235	\$175	\$160	\$125	\$110	\$135	\$125	\$87	\$			
Task #	Task Hrs	Task Description	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours			
1	0	Construction Administration	Paulos	Julie	Ryan C	Williams	Juan/Joey	Koslo	Luis				
2	32	Shop Drawing Review		16		16							
3	80	Pay Applications (Assumed 4 total)		40		40							
4	160	Progree Meeting Attendance (Assumed weekly - 20 meetings)	80	80									
5	48	Response to Contractor RFIs		24		24							
6	60	Start-Up and Close-Out Documentation		20		40							
7	0	Mileage									\$563		
8	0	Construction Inspection											
9	1000	Full-Time May 1 to Sept 12 (10-hour days M-F)				1000							
10	370	Part-Time (10-hour days, 35% of Full-Time)			20		350						
11	0	Mileage									\$985		
12	0	Construction Staking											
13	120	10 visits total (assumed 8-hour day per visit)						80	40				
14	0	Mileage									\$300		
15	0												
16	0												
17	0												
18	0												
19	0												
20	0												
21	0												
22	0												
23	0												
24	0												
25	0												
Total Tasked Hours =			1870.0	Tasked Hours =	80	180	20	1120	350	80	40	0	\$1,848
Total PM Hours =			0.0	PM Hours =	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Contingency Hours =			0.0	Contingency Hours =	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Hours =			1870.0	Hours =	80.0	180.0	20.0	1120.0	350.0	80.0	40.0	0.0	
Total Labor Cost =			\$247,800	Labor Cost =	\$18,800	\$31,500	\$3,200	\$140,000	\$38,500	\$10,800	\$5,000	\$0	Construction Summary
Total Expenses =			\$1,848										
Total Cost This Project =			\$249,648										

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Award Contract to Prepare Conceptual Designs for Division Road Public Information Meetings in Summer 2024 to Kapur and Associates, Inc. of Milwaukee, Wisconsin in the Amount of \$30,980

SUBMITTED BY: Kevin Driscoll, Village Engineer

SUMMARY EXPLANATION:

As part of the 5-year paving program, Village staff identified Division Road as a priority for resurfacing or reconstruction. Based on direction from the Public Works and Highways Committee and Village Board, staff requested proposals from reputable firms with capabilities for this type of preliminary design work, including coordination and hosting a public information meeting. The fees and hours are summarized in the table.

Firm	Hours	Amount
Kapur	199	\$30,980
Lakeside	365	\$39,497
KL Engineering	551	\$64,550
raSmith	578	\$97,680

The schedule for this work is to begin a traffic analysis in April, and that includes installation of temporary cameras to count traffic, complete a traffic analysis, prepare conceptual drawings in May, and host two public information meetings anticipated for June and July with an online survey.

The funding for this work is anticipated from American Rescue Plan Act (ARPA) funding.

ATTACHMENT:

1. Division Road Proposed Contract

RECOMMENDATION:

Staff requests the Public Works and Highways Committee recommend to the Village Board, approval of a contract to prepare conceptual designs for Division Road Public Information Meetings in summer 2024 to Kapur and Associates, Inc. of Milwaukee, Wisconsin in the amount of \$30,980

ACTION BY Committee:

A motion to support authorize staff and a vote "Aye" is in the affirmative to support the contract award.

February 29, 2024

Mr. Kevin Driscoll, PE
Village Engineer
Village of Germantown
N112 W17001 Mequon Road, P.O. Box 337
Germantown, WI 53022-0337

RE: Proposed Contract for Professional Engineering Services
Division Road Conceptual Designs for Public Information Meeting
Project #2406

Dear Kevin,

Kapur is pleased to submit this proposed contract to provide professional engineering services for the referenced project. The following contract includes traffic counts, traffic report, conceptual plans for Division Road alternatives and public involvement as described in the proposal submitted on February 27, 2024.

SCOPE OF SERVICES

The provided scope of services shall remain as previously submitted and subsequent revised clarifications per phone call.

SCHEDULE

Kapur will begin work upon authorization and as described in the proposal.

FEES AND BILLINGS

The professional fees for the work as described will be charged as Time and Material and as included in the attached proposal.

ACCEPTANCE

If this proposal is acceptable, please sign and date this original copy on Standard General Contract Terms and return it to our office.

Thank you for the opportunity to submit this proposed contract. We look forward to working with you on this project. Should you have any questions, or require further information, please call us at (414) 751-7200.

STANDARD GENERAL CONTRACT TERMS FOR PROFESSIONAL ENGINEER/SURVEY SERVICES

Article 1 Scope of Services

ENGINEER shall provide CLIENT with services in connection with the Project as described in Scope of Services. ENGINEER shall use the standard of care typically exercised in conducting professional practices outlined in the Scope of Services. ENGINEER makes no warranties, express or implied, under this Agreement or otherwise, in connection with the ENGINEER's service.

Unless otherwise specifically included in the proposal, ENGINEER's scope of services does not include geotechnical or environmental audits for the identification of hazardous wastes, wetlands, floodplains or any other structural or environmental qualities of the land, air or water.

Article 2 Schedule of Services

ENGINEER shall start and complete work as set forth in the Scope of Services. ENGINEER shall conduct the work in an expeditious manner subject to limitations such as weather, information acquisition, communications and other factors outside of ENGINEER's control. Both parties recognize that the schedule of services is subject to factors that may be unknown at the time of this Agreement.

Article 3 CLIENT's Responsibility

CLIENT shall do the following in a timely manner so as not to delay the service of ENGINEER:

3.1 Provide all criteria and full information as to CLIENT's requirements for the Project, including design objectives and constraints.

3.2 Assist ENGINEER by placing at ENGINEER's disposal all available information pertinent to the Project including previous reports and any other data relative to design or construction of the Project; all of which the ENGINEER may use and rely upon in performing the services under this Agreement. Verification of the accuracy and completeness of any information provided by the CLIENT is beyond the scope of this agreement.

Article 4 Payment Terms

CLIENT agrees to pay all fees within 45 days of the date of the invoice. Balances due over 45 days will be assessed an interest rate of 1.5 % per month. CLIENT agrees to pay for any costs of collection including, but not limited to lien costs, court costs or attorneys' fees involved in or arising out of collecting any unpaid or past due balances.

CLIENT understands and agrees to pay for all services rendered regardless of CLIENT's ability or inability to proceed with the project for any reason, gain governmental approvals or permits or secure financing for the project.

Article 5 Term and Termination

ENGINEER's obligation to render services under this Agreement will extend for a period that may reasonably be required for the services to be provided, including extra work and required extensions. If CLIENT fails to give prompt authorization to proceed with any phase of services after completion of the immediately preceding phase, or if ENGINEER's services are delayed or suspended by CLIENT for more than three months for reasons beyond ENGINEER's control, ENGINEER may, after giving seven days' written notice to CLIENT, suspend or terminate services under this Agreement.

If payment is not received within 45 days of the date of invoice, ENGINEER reserves the right, after giving seven days' written notice to CLIENT, to suspend services to the CLIENT or to terminate this Agreement. ENGINEER shall not be liable to CLIENT or any third parties for any damages caused by the suspension or termination of work for non-payment. CLIENT may terminate this Agreement for any reason or without cause upon 30 days' written notice to ENGINEER. If any work covered by this Agreement is suspended, terminated or abandoned for any reason other than ENGINEER'S breach of the Agreement, the CLIENT shall compensate the ENGINEER for

services rendered to the date of written notification of such suspension, termination or abandonment.

Article 6 Indemnity

CLIENT and ENGINEER each agree to indemnify and hold the other harmless, and their respective officers, employees, agents and representatives, from and against liability for all claims, losses, damages and expenses, including reasonable attorneys' fees, to the extent such claims, losses, damages or expenses are caused by the indemnifying party's negligent or intentional acts, errors or omissions. In the event claims, losses, damages or expenses are caused by the joint or concurrent negligence of CLIENT and ENGINEER, they shall be borne by each party in proportion to its negligence. Nothing contained within this Agreement is intended to be a waiver or estoppel of the contracting municipality CLIENT or its insurer to rely upon the limitations, defenses, and immunities contained within Wisconsin law, including those contained within Wisconsin Statutes §§ 893.80, 895.52, and 345.05. To the extent that indemnification is available and enforceable, the municipality CLIENT or its insurer shall not be liable in indemnity or contribution for an amount greater than the limits of liability for municipal claims established by Wisconsin Law.

Article 7 Ownership and Copyright of Documents

All documents prepared or furnished by ENGINEER pursuant to this Agreement are instruments of ENGINEER's professional service, and ENGINEER shall retain an ownership and property interest therein, including all copyrights. ENGINEER grants CLIENT a license to use instruments of ENGINEER's professional service for the purpose of purchasing or identifying property or constructing the project. Reuse or modification of any such documents by CLIENT, without ENGINEER's written permission, shall be at CLIENT's sole risk, and CLIENT agrees to indemnify and hold ENGINEER harmless from all claims, damages and expenses, including attorneys' fees, arising out of such use by CLIENT or by others acting through the CLIENT.

Article 8 Electronic Media

Copies of documents that may be relied upon by the CLIENT are limited to the printed copies (also known as hard copies) that are signed or sealed by ENGINEER. Files in electronic formats, or other types of information furnished by ENGINEER to CLIENT such as text, data or graphics, are only for the convenience of CLIENT. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. When transferring documents in electronic formats, ENGINEER makes no representations as to long-term compatibility, usability, or readability of documents resulting from the use of software applications packages, operating systems or computer hardware differing from those in use by ENGINEER at the beginning of this project.

ENGINEER

Kapur & Associates, Inc.

By: Neal Styka
Print: Neal Styka
Title: Project Manager
Date: 2-29-24

The above and foregoing proposal is hereby accepted and ENGINEER is authorized to proceed with the work.

CLIENT

Village of Germantown

By: _____
Print: _____
Title: _____
Date: _____



PROPOSAL TO PROVIDE ENGINEERING SERVICES FOR

DIVISION ROAD CONCEPTUAL DESIGNS FOR PUBLIC INFORMATION MEETING

Germantown, WI // February 27, 2024



Presented to:

Kevin Driscoll, PE
Village Engineer
Village of Germantown
N112 W17001 Mequon Road
PO Box 337
Germantown, WI 53022-0337

Presented by:

Neal Styka, PE, PTOE, RSP1
Project Manager
Kapur & Associates, Inc.
7711 N. Port Washington Road
Milwaukee, WI 53217

February 27, 2024

Kevin Driscoll, PE
Village Engineer
N112 W17001 Mequon Rd.
P.O. Box 337
Germantown, WI 53022-0337

RE: Feb. 7, 2024 RFP for Division Road Conceptual Designs for Public Information Meeting

Dear Mr. Driscoll,

Having spent the past 40 years mastering the comprehensive skillset needed to deliver award-winning work, **Kapur & Associates, Inc. (Kapur)** also knows achieving that recognition is only possible when public input and involvement are a high priority. As a firm deeply invested in the communities and individuals our work impacts, we appreciate not only your desire to create meaningful change on Division Road, but to engage with stakeholders ahead of time, and our team of professionals is immediately available and ready to assist you with this exciting undertaking.

Each team member who will serve you has been selected with consideration for their prior experience and proven ability to perform at the highest level. That includes myself, having garnered recognition over my 16 years of working on traffic design projects throughout southeastern Wisconsin, as well as Athena Kuhl, whose career in public involvement has been highlighted by leading efforts for the Reimagining WIS 175 Study in Milwaukee and the Wisconsin Valley Development Roads in Racine – both high-profile projects for which she has earned glowing feedback and praise.

Our commitment to thoroughly and efficiently gathering community input is unmatched, and the strong local connections and experience of our team will no doubt lead us to exceed your expectations. By partnering with a firm known for its successful collaborations with local municipalities and state and federal agencies, you can be certain our work together will be something we can look back on with pride.

The following proposal and scope have been prepared in accordance with the requirements outlined in the February 7, 2024, RFP, and we appreciate having the opportunity to submit it.

We eagerly await your review and feedback – please feel free to contact me with any questions.

Sincerely,

A handwritten signature in blue ink that reads "Neal Styka".

Neal Styka, PE, PTOE, RSP1
Project Manager
414.751.7238
nstyka@kapurinc.com

This project understanding was developed from field reviews of the corridor, a search of the Wisconsin Remediation and Redevelopment Database, and a review of the WDNR Surface Water Data Viewer. After the project is awarded, Kapur and the Village will have a kickoff meeting to discuss the proposed alternatives and the overall concept for an improved Division Road. A 2D layout of the alternatives can begin while traffic data is being collected. Collecting these in April and May on days when the weather is favorable to more people getting outside will allow for the inclusion of bike and pedestrian counts, as well as vehicle turning movement counts. The bike and pedestrian counts, along with the intersection geometry and physical constraints discussed below, will determine where pedestrian crossings will be proposed. Traffic counts will also be used in determining intersection operations and what changes to turn/bypass lane configurations would be recommended, including if a TWLTL would be warranted.

MULTI-USE PATH DESIGN

Multi-use path plans and typical sections will be developed in accordance with WisDOT's Facilities Development Manual (FDM) and in coordination with the Village of Germantown. Our project manager, Neal Styka, is knowledgeable in delivering designs following ADA and PROWAG guidelines and works to develop scopes and schedules that meet the owner's budget while improving safety for all roadway users.

TYPICAL SECTION CONSIDERATIONS

Multiple typical sections will be developed and displayed in both plan view and typical section view. There are two on-street bike facility alternatives that would be laid out. Both would be a 5-foot bike lane. The difference is whether it is an urban typical section or a rural typical section. In some cases along Division Road, there already is a 5-foot paved shoulder, while in much of the roadway there isn't, and adding the bike lanes will require roadway widening. Additionally, resurfacing or widening the existing path will be evaluated. Cost estimates will be prepared for these alternatives. Some of the considerations that will influence the ultimate design include:

- Consider a hybrid approach to converting to an urban typical section. In some locations where there are deep ditches and 5-foot paved shoulders, keeping that as existing may make more sense than converting to an urban section.
- The path, which is approximately 5 feet wide in most locations, is nearly continuous from County Line Road to Mequon Road on one side of the road or both. The notable exception is from just south of Wendy Lane to Dotty Way, a gap of five parcels, four of which would likely need right-of-way acquisition to complete the path.
- The path ideally would be widened away from the roadway edge when the right-of-way permits to keep separation between vehicle travel way and the active transportation users. Some exceptions are discussed below:
 - North of Revere Lane, the large culvert that runs under Division Road will need to be inspected before the next phase of design can begin. Any potential roadway widening may require lengthening the box culvert. In these cases, widening toward the roadway edge may be more feasible.
 - Some sections of the trail, between Bittersweet Trail/Lone Oakes Drive and Donges Bay Road for instance, will be hard to widen away from the roadway edge due to the proximity of large mature trees. In these cases widening towards the roadway edge may be more feasible (narrowing the terrace).



MATURE TREES ALONG PATH

APPROACH

- The bridge over the waterway just south of Juniper Drive already has wide paved shoulders and a path on the east side. Due to costs, keeping the existing path on the east side would be recommended while extending the paved shoulders if that typical section is preferred.
- Adjacent to the northbound right-turn lane approaching Hawthorne Trail, the path is directly adjacent to the roadway and is currently around 5 feet wide with some newly relocated power poles behind the path. In this case, any widening or changes to the existing typical section utility relocations will be required and any final cost estimates could be prepared.
- Kapur will assess and, where possible, minimize impacts to existing infrastructure, including storm sewer, fire hydrants, street lighting, and traffic signals.
- There are mapped wetlands and waterways along the corridor, specifically between Juniper Drive and Old Farm Road on the west side of the road and on the east side of the road north of Revere Road. Other non-mapped waterways would need to be determined when preliminary design begins.
- Adding a two-way left-turn lane to the whole corridor will significantly widen the roadway, at times making it hard to fit the trail and a paved shoulder. Based on traffic operations and observations, a more targeted approach to adding dedicated left-turn lanes at critical locations should be considered.



EXISTING PATH ON THE EAST SIDE



UTILITY POLE BEHIND PATH



EXAMPLE OF AN ENHANCED CROSSWALK WITH HIGH VISIBILITY MARKINGS AND RRFB

PEDESTRIAN CROSSING IMPROVEMENTS

- Existing and proposed crossings of Division Road:
 - Width would likely be 8 feet unless the path is not widened
 - Consider enhanced treatments such as:
 - High Visibility Markings
 - Advanced Yield Lines
 - Signing
 - Rectangular Rapid Flashing Beacons (RRFBs) – Kapur has recent experience with RRFBs in several Milwaukee County communities
 - High Intensity Activated Crosswalk (HAWK) Beacon – Kapur recently installed a HAWK as part of the CTH KR project in Racine County

PUBLIC INVOLVEMENT

Division Road, in the Village of Germantown, demands a thorough and inclusive public involvement strategy, mainly because it is a heavily residential corridor. Ensuring the active participation of residents, especially those living near critical facilities like The Gables of Germantown and Virginia Highlands Care and Rehab Center, is essential. These facilities represent vital stakeholders, and coordinating access for maintenance and construction during the design phase is imperative for them, as well as nearby business owners such as Wendland Landscape Services and Nursery and Kessler's Diamonds. Inclusivity in the planning process will enable a comprehensive understanding of the unique needs and concerns of residents and businesses along Division Road, fostering a collaborative environment for effective decision-making and ultimately leading to a design that prioritizes the well-being and convenience of the community. After the first PIM, with feedback collected and processed, Kapur and the Village can meet to discuss and refine the displays for PIM, if authorized.

COSTS

	TASK	Project Manager	Project Engineer III	Staff Engineer II	Tech III	Admin	Total Task Hours	Total Task Cost
		\$185.00	\$165.00	\$125.00	\$125.00	\$82.00		
Project 1	Tasks for Division Road							
Task 1	Measure roadway width	--	--	8	--	--	8	\$1,000
	Create base maps	--	--	4	--	--	4	\$500
	Create 5 overview exhibits for 4 alternatives with and without shoulders/side path or sidewalk reconstruction and 1 with the TWLTL	--	3	26	--	15	44	\$4,975
	Exhibits for pedestrian accommodations at 6 intersections (as listed in RFP)	--	8	--	--	--	8	\$1,320
	SUBTOTAL TASK 1	--	11	38	--	15	64	\$7,795
Task 2	Traffic analysis of AM, mid-day, and PM peak hour at 4 representative locations	--	2	4	--	--	6	\$830
	Traffic counts at 4 representative intersections (8 hour counts, 1 day each - 6AM to 9AM, 11AM to 1PM, and 3PM to 6PM peaks with 3 vehicle group classifications), counts to be collected mid-week (Tues., Wed., Thurs.) and coordinated with Village and Police Department staff	--	6	5	--	--	11	\$1,615
	Evaluate turning movements (taper lengths and acceleration/deceleration lengths)	--	4	6	--	--	10	\$1,410
	Traffic Memo with conceptual exhibits	2	16	6	5	--	29	\$4,385
	Traffic camera video processing fees (4 locations)	--	--	--	--	--	--	\$1,000
	SUBTOTAL TASK 2	2	26	17	5	--	50	\$9,240
Task 3	PIM (attended by 2 Kapur staff)	--	8	--	8	--	16	\$2,320
	PIM preparation, coordination, and survey form creation	--	--	--	25	--	25	\$3,125
	Printing and mounting exhibit boards (15 24"x36" boards for each)	--	--	--	--	--	--	\$700
	Printing informational letters and postage (1,200 letters for 2 PIMs)	--	--	--	--	--	--	\$1,608
	SUBTOTAL TASK 3	--	8	--	33	--	41	\$7,753

COSTS

Task 4	Cost estimate preparation (based on conceptual exhibits prepared for PIM #1)	--	4	--	--	--	4	\$660
	Rural with gravel shoulder and ditches	--	--	4	--	--	4	\$500
	Urban with curb and gutter	--	--	4	--	--	4	\$500
	5-ft wide path resurface	--	--	2	--	--	2	\$250
	8-ft wide path reconstruction	--	--	3	--	--	3	\$375
	QA/QC	2	--	--	--	--	2	\$370
	SUBTOTAL TASK 4	--	4	13	--	--	17	\$2,655
Task 5	Update conceptual drawings	--	2	6	--	5	13	\$1,490
	Administration	--	--	--	--	4	4	\$328
	Meetings	2	4	4	--	--	10	\$1,530
	SUBTOTAL TASK 5	2	6	10	--	9	27	\$3,348
TOTAL TASKS (1-5):		4	55	78	38	24	199	\$30,791
	Mileage							\$189
Total Project:								\$30,980

Assumptions:

For Task 1 & 5 - 2D Layouts Only

Geotechnical Investigation, Hazmat Analysis, and Wetland Delineation are not included in this scope

No Field Survey is Involved

Village to Share GIS Access for Duration of Project

CONCLUSION

This project has the potential to help create safer pedestrian and bike accommodations for the growing number of residents who live along Division Road. The Kapur team is excited to leverage its knowledge of substantive safety, roadway and path design, and public engagement experience to help gain meaningful feedback on the variety of proposed typical sections and to help the Village come up with a preferred alternative.



Kapur & Associates, Inc. (Kapur) is a multi-discipline consulting engineering firm with a corporate office in Milwaukee and branch offices in downtown Milwaukee, Burlington, Appleton, Madison, and Wausau. Established in 1981, Kapur employs more than 425 professionals and provides services to cities, counties, state agencies, sewerage districts, and developers.

We've been fortunate to become the trusted business partner to so many through a demonstrated history of providing exceptional and economical technical knowledge across every phase of our client's projects. The collective efforts and expertise of our personnel provide timely, cost-effective, and sustainable solutions to those we work with, many of whom we're also fortunate enough to call neighbors and friends.

In addition to being driven by having our work make an impact locally, Kapur rewards employees by making them an owner under our Employee Stock Ownership Program. This encourages every individual to take ownership and pride in our company and projects, resulting in personalized service and allowing us to forge long-term relationships with clients. We nurture an atmosphere of teamwork and innovation, and our forward-thinking has allowed us to become associated with some of Wisconsin's most memorable projects.

Our mission is to develop the close, professional, and honest relationships needed to understand the expectations of our clients so that we can provide the quality services required to exceed their definition of success. We're passionately committed to delivering infrastructure, protecting the environment, cultivating relationships, and connecting with the community.

Kapur's overall firm services include:

- | | | |
|------------------------------|--------------------------|---------------------------|
| ■ Transportation engineering | ■ Landscape architecture | ■ Construction management |
| ■ Public involvement | ■ Environmental | ■ GIS & asset management |
| ■ Structural engineering | ■ Natural resources | ■ Power & energy |
| ■ Land survey/platting | ■ Wastewater/water | ■ Economic development |
| ■ Municipal engineering | ■ Stormwater management | |
| ■ Site development | ■ 3D modeling & scanning | |

TRANSPORTATION DESIGN SERVICES

Kapur has a staff of 25+ transportation design professionals who can quickly respond to critical schedules and peak workloads. Their experience covers the planning, design, and street reconstruction improvements, including municipal street, storm sewer, sanitary sewer, and water infrastructure. Our pavement rehabilitation experience empowers us to recommend solutions that are economical and sustainable, and our relationship with WisDOT and agency staff provides substantial benefits to our clients when coordinating improvements to roadways.



MILWAUKEE AVENUE, BURLINGTON, WI

We offer a range of services to provide clients with the best solutions to their transportation needs:

- Location & corridor planning studies
- Environmental documents (EIS/EA/ER)
- Phase I through IV hazardous material investigation & remediation
- Right-of-way plat
- Local street repair & reconstruct
- Rural & urban highways
- Freeways & interchanges
- Multi-use trails
- Roadway lighting
- Drainage analysis & design
- Erosion control
- Traffic control & staging
- Marking & signing
- Utility coordination
- Agency coordination & permitting
- Parking studies
- Traffic modeling
- Traffic counts & analysis
- Traffic signal design



WIS 175 PUBLIC INVOLVEMENT MEETING

PUBLIC INVOLVEMENT

Involving the community in two-way dialogue is critical to the successful completion of any public works project, and Kapur routinely demonstrates a strong commitment to public involvement. Throughout the course of the project, clear and consistent information will be shared with project stakeholders – citizens, elected officials, and community representatives. When stakeholders receive information that is readily understood, they can provide input that is meaningful and helpful to achieving a successful project. We bring a commitment to seek input thoroughly and

quickly from the community. We have strong local connections, which will allow us to work efficiently. Knowing how busy our clients are, our role is to accomplish as much behind the scenes as necessary, so all you need to do is approve our work and attend the meetings. We will handle all the details for you.

Our public involvement tools and services include:

- Newspaper inserts/ads
- Fact sheets
- Newsletters
- Direct mail
- Website information
- Issue papers
- Briefings for elected officials
- Focus groups
- Public information meetings
- Public hearings
- Advisory groups
- Meeting facilitation/strategy
- Exhibits
- Renderings/Google Earth imagery

PREVIOUS EXPERIENCE



WISCONSIN AVENUE BRIDGE

Wauwatosa, WI

PROJECT DETAILS

Determined to be structurally deficient, Kapur began working with the City of Wauwatosa and WisDOT toward replacing the Wisconsin Avenue bridge, which allows entry to the Children's Hospital of Wisconsin, Froedtert Hospital, the Medical College of Wisconsin, Curative Care, Milwaukee County's Behavioral Health Division, and the Versiti Blood Center of Wisconsin Blood Research Institute.

Following Kapur's initial hydraulic analysis, roadway and structural engineers developed a roadway profile and bridge layout to raise the new bridge and prevent future overtopping.

With construction starting in 2024, the project includes:

- Roadway reconstruction work along Wisconsin Avenue and Honey Creek Parkway
- Installing a traffic signal at the Wisconsin Avenue intersection with Honey Creek Parkway
- Removing on-street parking from the south side of Wisconsin Avenue to provide room for installing bicycle lanes in each direction within the existing Wisconsin Avenue roadway footprint
- Replacing existing sidewalk
- Installing ADA-compliant curb ramps at the Wisconsin Avenue and Honey Creek Parkway intersection
- Realigning the existing pedestrian path on the west side of Honey Creek
- Replacing municipal sewer and water main facilities

PUBLIC INVOLVEMENT DETAILS

Kapur played a crucial role in organizing and coordinating Public Involvement Meetings (PIM) with the City of Wauwatosa, MMSD, and Milwaukee County Parks for this project, including two during the design phase. Kapur's responsibilities encompassed establishing the venue, developing the meeting invitation, and ensuring the accuracy of a high-quality mailing list. Additionally, Kapur created 13 project-specific exhibits, designed meeting wayfinding signage, and produced a comprehensive four-page 11x17 handout detailing project components and proposed detour routes during construction. Kapur's involvement extended to facilitating meeting sign-in, managing photography documentation throughout the event, and actively participating in the setup and takedown of the meeting space. Furthermore, Kapur provided valuable assistance to the public, addressing inquiries and guiding attendees to the appropriate personnel during the PIM.

"I live in the neighborhood right next to the proposed reconstruction project, and I just wanted to send you a quick note to say the organization and communication on this project has been really exceptional – very much appreciate all the efforts to inform the community and answer questions about the project. I wish whoever was in charge of this was in charge of all government projects!"

- City of Wauwatosa Resident

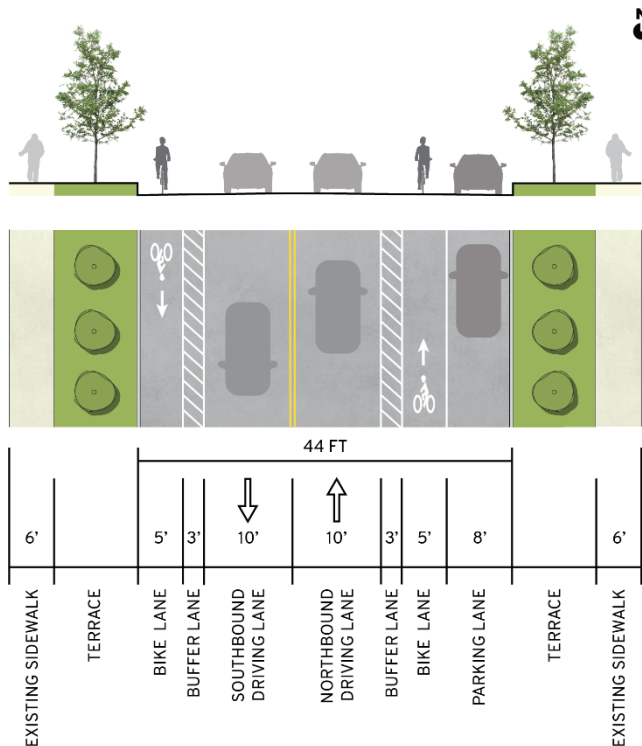
CLIENT CONTACT

Bill Wehrley, PE
City Engineer
City of Wauwatosa
wwehrley@wauwatosa.net
414.479.8927

SERVICES PROVIDED

- Traffic Signal Design
- Agency Coordination
- Utility Coordination
- Public Involvement
- Traffic Report
- Signal Warrant Analysis
- Pedestrian Crossing Analysis & ADA Curb Ramp Design

PREVIOUS EXPERIENCE



STH 32 (LAKE DRIVE) UPGRADES Shorewood, WI

PROJECT DETAILS

STH 32 (Lake Drive) between Edgewood Avenue and Kensington Boulevard is an urban four-lane undivided roadway with curb and gutter, combined sewer, isolated storm sewer, and sidewalk. The outside lanes are generally dedicated to on-street parking and biking. However, between Shorewood Boulevard and approximately 500 feet north of Capitol Drive, outside lanes function as traffic lanes. The purpose of this project is to address deteriorating pavement conditions and upgrade existing municipal underground facilities.

Improvements will include:

- An urban roadway reconstruction within the Shorewood Village limits, including curb and gutter
- Improvements to pedestrian and on-street parking access.
- Incorporating ADA-compliant curb ramps.
- Replacing municipal combined sewer and water main facilities.

PUBLIC INVOLVEMENT DETAILS

Kapur contributed to the Village of Shorewood's Lake Drive PIMs, including two during the design phase. Kapur demonstrated its expertise in coordinating and facilitating meeting logistics, including creating and disseminating meeting postcards and securing a suitable facility. Kapur's responsibilities included the creation of numerous project-specific exhibits, a comprehensive project handout, overseeing meeting sign-in procedures, managing event photography, and actively participating in the efficient setup and takedown of the meeting space.

CLIENT CONTACTS

Debra Tarnow
Project Manager
WisDOT SE Region
Debra.tarnow@dot.wi.gov
262.548.6766

Leeann Butschlick
Director of Public Works
Village of Shorewood
lbutschlick@villageofshorewood.org
414.847.2650

SERVICES PROVIDED

- Field Survey
- Agency Coordination
- Utility Coordination
- Public Involvement
- Traffic Report
- Pedestrian Crossing Analysis & ADA Curb Ramp Design
- Traffic Calming
- Preliminary Design
- Final Roadway Design
- Combined Sewer & Water Main Design
- Drainage Analysis
- Section 106
- Hazardous Materials Investigation
- Environmental Analysis
- Design Study Report
- PS&E Documents
- Traffic Control Plan/Staging

PREVIOUS EXPERIENCE



UNDERWOOD CREEK PARKWAY

Milwaukee, WI

PROJECT DETAILS

Serving facilities like Wil-O-Way, Firefly Ridge, Forestry Exploration Center, MMSD County Grounds Basin, and Hansen Golf Course, Underwood Creek Parkway is in poor condition, allowing Kapur to provide planning, design, and construction documents for its replacement.

Underwood Creek Parkway will be designed for shared use to accommodate bicycles, along with wayfinding signage. The approved capital project envisions a public outreach phase of work to create and evaluate several design alternatives and related feedback to determine the preferred alternative.

Stormwater best management practices, including curb cuts with a concrete ribbon, green infrastructure, natural areas restoration, and management will be incorporated where applicable. Lighting will be evaluated for both safety and natural resource impacts.

PUBLIC INVOLVEMENT DETAILS

Kapur is actively collaborating with Milwaukee County Parks to organize a PIM for this project. Kapur's responsibilities encompass securing a suitable meeting venue, designing a comprehensive meeting graphic flyer, and identifying key stakeholders for the dissemination of meeting invitations, including Oak Leaf Trail users. Additionally, Kapur has developed yard signs to be strategically placed at designated locations, crafted meeting exhibits, and prepared a four-page meeting handout. During the PIM, Kapur will oversee the sign-in table, assist in meeting setup and takedown, and address inquiries, ensuring attendees are directed to the appropriate personnel.

CLIENT CONTACT

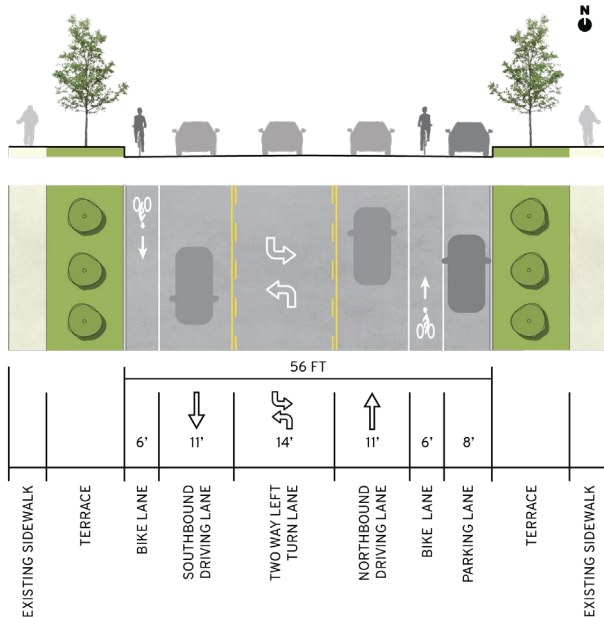
Mike Marlin, PLA
Senior Landscape Architect
Milwaukee County Parks
michael.marlin@milwaukeecountywi.gov

David S. Gulgowski, PE
Architecture, Engineering & Environmental Services
DAS – Facilities Management Division
Milwaukee County
david.gulgowski@milwaukeecountywi.gov
414.278.4942

SERVICES PROVIDED

- Historical & Archaeological Survey
- Conceptual Layout & Alternatives Analysis
- Public Engagement & Public Input Meeting
- Roadway Design
- Retaining Wall Analysis & Design
- Storm Sewer Design
- Erosion Control Plans
- Utility Coordination
- Construction Cost Estimate
- Permitting

PREVIOUS EXPERIENCE



39TH AVENUE

Kenosha, WI

PROJECT DETAILS

Currently in the design phase, the City of Kenosha, in partnership with WisDOT, created a preferred roadway rebuilding improvement plan based on findings by Kapur, including an evaluation of a two-way left-turn lane.

To address deteriorating pavement conditions, improve bicycle and pedestrian accommodations, and replace aging municipal underground facilities in the City of Kenosha, Kapur conducted traffic counts and prepared a traffic memo using Highway Capacity Manual methodology for 39th Avenue that analyzed a potential road diet, reducing the number of driving lanes from two lanes to one lane in each direction with parking and bike lanes and also studied the reduction of lanes with a two way left turn lane.

Additionally, Kapur led a parking study to determine parking occupancy and demand. This removal of parking will allow for a bike lane.

PUBLIC INVOLVEMENT DETAILS

Kapur played a pivotal role in organizing and coordinating a PIM for this project in the City of Kenosha. Kapur's responsibilities encompassed the development of a comprehensive meeting postcard and verifying the project mailing list to ensure accuracy. Kapur demonstrated proficiency by creating a set of project-specific exhibits, including a detailed four-page 11x17 handout outlining the project's purpose and need, preferred proposed typical section, project components, and schedule. Kapur's commitment extended beyond documentation to facilitating meeting sign-in, overseeing photography throughout the event, and actively participating in the efficient setup and takedown of the meeting space.

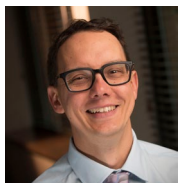
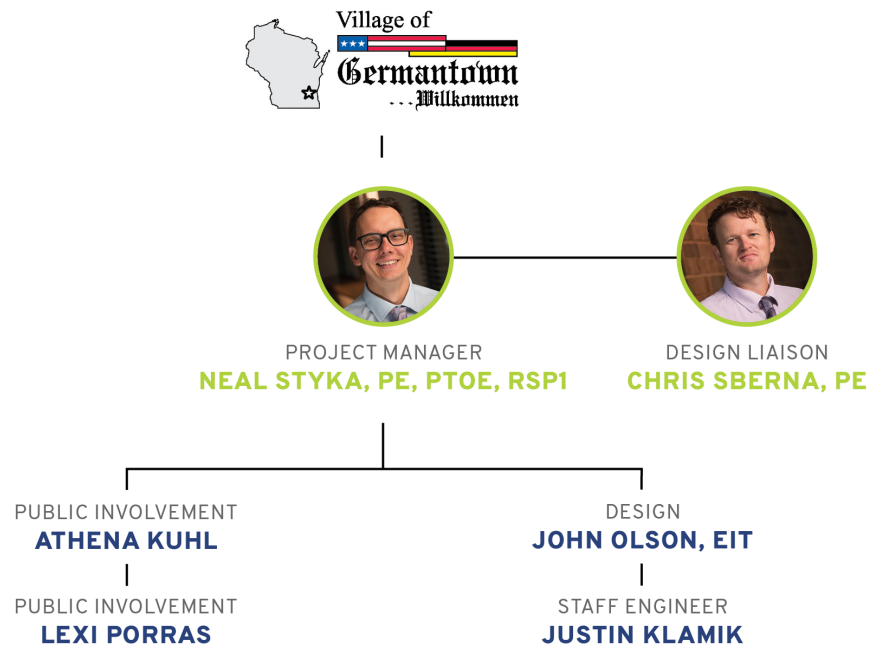
CLIENT CONTACT

Greg Hafeman, PE
Local Program Project Manager – Design
WisDOT SE Region
greg.hafeman@dot.wi.gov
262.548.8677

Greg Boldt, PE
Deputy Director Of Public Works/City Engineer
City of Kenosha
gboldt@kenosha.org
262.653.4057

SERVICES PROVIDED

- Field Survey
- Agency Coordination
- Utility Coordination
- Public Involvement
- Traffic Report
- Preliminary Design
- Final Roadway Design
- Storm Sewer Design
- Drainage Analysis
- Section 106
- Hazardous Materials Investigation
- Environmental Analysis
- Design Study Report
- PS&E Documents
- Traffic Control Plan/Staging

FIRM QUALIFICATIONS**NEAL STYKA, PE, PTOE, RSP1 – PROJECT MANAGER**

BS, Civil Engineering, Marquette University, 2008

Neal is a project manager with 16 years of experience specializing in 3D modeling, traffic safety analyses, traffic signal design, pedestrian safety, and traffic simulation modeling. He has worked on numerous award-winning projects and his experience and knowledge of substantive safety initiatives have helped improve safety and reduce crash severity.

39th Avenue, Kenosha, WI

Conducted traffic counts and prepared a traffic memo using *Highway Capacity Manual* methodology that analyzed a two-way left-turn lane alternative and a road diet alternative. The road diet alternative was the preferred alternative. It reduced the driving lanes from two to one in each direction with parking and bike lanes. Led a parking study to determine occupancy and demand. The removal of parking allowed for a bike lane.

Various Intersections, Lake Geneva & Burlington, WI

Evaluated intersection control to improve vehicle and pedestrian safety. Developed plans to improve pedestrian safety by adding sidewalks and new pedestrian crossings.

Wisconsin Avenue Bridge & Signal Project, Wauwatosa, WI

Conducted a signal warrant analysis and crash analysis at the intersection of Honey Creek Parkway and Wisconsin Avenue, which had a high volume of school-age children walking to their nearby schools. Neal designed new traffic signals at the intersection.

Bloomfield Road & Edwards Boulevard (STH 120) Traffic Signal, Lake Geneva, WI

Analyzed the existing geometry using Synchro traffic modeling software to determine queue lengths and appropriate turn bay lengths on Bloomfield Road. Neal also designed the intersection widening that was a result of adding turn lanes on Bloomfield Road. A new traffic signal was designed at the intersection to improve operations and safety for traffic coming and going to the high school.

FIRM QUALIFICATIONS**CHRIS SBERNA, PE – DESIGN LIAISON****BS, Civil Engineering, University of Wisconsin-Platteville, 2014**

Having been a project engineer for seven years, Chris has experience in street design, underground utility design, construction management, and inspection. He is responsible for the design and preparation of cost estimates, construction documents, and specifications.

St. Francis Neighborhood Reconstruction Phase 1, Greenfield, WI

Project engineer assisting with the design and preparation of construction and bidding documents for this reconstruction of 1.2 miles of roadway. Chris also prepared cost estimates and performed construction management and inspection, including overseeing 3,900 feet of storm sewer installation, street lighting, grading, curb and gutter, and paving operations. Coordination with City staff, contractor, and homeowners was a continual effort to keep the project on schedule and the public aware of the upcoming work.

Grand Avenue & Spring Street Reconstruction, Random Lake, WI

Project engineer responsible for the design, acquiring permits, and preparation of construction and bidding documents for the reconstruction of 1 mile of roadway. The design included 2,000 feet of new storm sewer, replacement of water main and sanitary sewer, ADA-compliant curb ramps, and concrete sidewalk. Chris also prepared cost estimates and performed inspection, including grading, curb and gutter, and sidewalk.

Appleton Street Reconstruction, Plymouth, WI

Project engineer responsible for the design, preparation of cost estimates, acquiring permits, and construction and bidding documents for the rehabilitation of 800 feet of roadway and reconstruction of 1 mile of roadway. The design also included the assessment of existing concrete sidewalk and curb and gutter for spot repair, 500 feet of new storm sewer, replacement of water main and sanitary sewer, assessment and rehabilitation of sanitary sewer, ADA-compliant curb ramps, and concrete sidewalk.

**JOHNATHAN OLSON, EIT – DESIGN****BS, Civil Engineering, University of Wisconsin-Platteville, 2017**

A staff engineer with six years of experience in roadway rehabilitation and reconstruction, John has designed approximately 400 curb ramps to follow ADA compliance across 17 different projects. Specializing in geometric roadway design, he has delivered projects to WisDOT, provided utility coordination services, and understands the Trans 220 and DT1077/DT1078 process.

WIS 175 (Appleton Avenue)/Pilgrim Road Intersection Improvements, Menomonee Falls, WI

Staff engineer responsible for the design of intersection geometric improvements, storm sewer redesign, construction staging, traffic control, and upgrades to pedestrian accommodations at three intersections.

CTH KR, Racine & Kenosha Counties, WI

Staff engineer responsible for the preliminary and final design of this 4.5-mile rural-to-urban roadway expansion. Duties included horizontal and vertical roadway design, roadway modeling, drainage design, construction staging, and traffic control, as well as detailed coordination with stakeholders and agencies.

Wauwatosa Road, Cedarburg, WI

Staff engineer for the design of improvements to 18 curb ramps to meet ADA standards.

Portland Avenue, Wauwatosa, WI

Staff engineer for the design of improvements to four existing curb ramps to meet ADA standards.

Edgewood Avenue Near Surface Collector Extension, Milwaukee, WI

Staff engineer for the design of improvements to two existing curb ramps to meet ADA standards, traffic control plan, pavement removal plan, and pavement plan.

FIRM QUALIFICATIONS**JUSTIN KLAMIK – STAFF ENGINEER****BS, Civil Engineering, Milwaukee School of Engineering, 2022**

Following three years with the Michels Corporation, Justin has become adept at assisting Kapur in delivering transportation, site, and municipal projects. Justin has helped draft plan sets, create proposals, coordinate utilities, and analyze traffic.

Wisconsin Avenue Bridge, Wauwatosa, WI

Justin assisted in creating a signal plan for replacing the existing bridge over Honey Creek, as well as quantities and PS&E.

CTH T, Waukesha, WI

Justin assisted with the permanent and temporary signal design as well as the signal removal plan, quantities, and PS&E.

I-43 North-South Freeway, Brown Street to Capitol Drive, Milwaukee County, WI

Justin assisted with creating cross-sections for this 2.7-mile mill and overlay, which included reconstructing the inside shoulders, replacing the median barriers, and widening the outside.

**ATHENA KUHL – PUBLIC INVOLVEMENT****AD, Graphic Communications, Gateway Technical College, 2018****AD, Marketing Communications, Gateway Technical College, 2018**

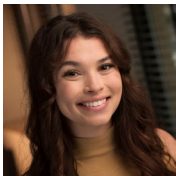
A graphic communications and public involvement professional, Athena has five years of experience and is responsible for design and construction project communications, including stakeholder issues, document development, and public meeting planning and execution.

County Q/County U Intersection Improvements, Kenosha County, WI

During the reconstruction of the County Q and County U intersection to accommodate the 150-acre Bristol Business Park development, Athena was involved in all major aspects of public outreach efforts by hosting and presenting a public involvement meeting and providing stakeholders with construction updates.

WIS 11 (Durand Avenue), Kearney Avenue to Memorial Drive, Racine County, WI

As public involvement lead, Athena led all outreach efforts for this project involving a new traffic signal and intersection improvements. In addition to meeting with impacted residents and businesses, her responsibilities included attending and coordinating a public involvement meeting, preparing and distributing informational brochures, and working with the project team to provide weekly updates.

**LEXI PORRAS – PUBLIC INVOLVEMENT****Civil Engineering Technician, Moraine Park Technical College, 2001**

A graphic designer for Kapur's Communications Department, Lexi has two years of professional experience and assists in design and construction project communication, including document development and exhibit creation.

STH 32 (Lake Drive), Shorewood, WI

Lexi is currently assisting the project team with public involvement efforts, including invitations, exhibits, and presentations for public involvement meetings.

Wisconsin Avenue Bridge, Wauwatosa, WI

Lexi is currently assisting the project team with public involvement efforts that include typical sections and public involvement meeting displays.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Presentation

ITEM TITLE: DPW Facility Construction Update

SUBMITTED BY: Matthew Mortwedt, Public Works Director

SUMMARY EXPLANATION:

Overview of construction progress for the new Department of Public Works facility. The facility is approximately 65% complete and is anticipated to open on September 1, 2024.

ATTACHMENT:

1. 022924 - DPW Facility Construction Progress

RECOMMENDATION:

None

ACTION BY Committee:

None

Department of Public Works Facility

Construction Progress Update

- Approximately 65% complete
- On or ahead of schedule set in November
- Anticipate schedule adjustment in early spring
- Trades In Progress:
 - o Interior Masonry – Near completion
 - o Drywall – Office area, moving to the mezzanine
 - o Roofing – Salt shed
 - o Carpentry – Door frames
 - o Precast panels – nearing completion
 - o Fuel system and storage tanks – installed; programming, testing, etc., remain
- New Trades Anticipated in March
 - o Interior painting
- Items being evaluated:
 - o Prep spaces for future offices
 - o Network connection options
 - o SCADA coordination
- Site work / paving – Spring and early summer
- Coordination with Donges Bay Rd reconstruction
- Move coordination meetings beginning in March
- Target Opening, September 1, 2024

Department of Public Works Facility

Construction Progress Photos – Early February

Site – looking north – southern elevation



Site – looking south – northern elevation



Site – looking east – western elevation



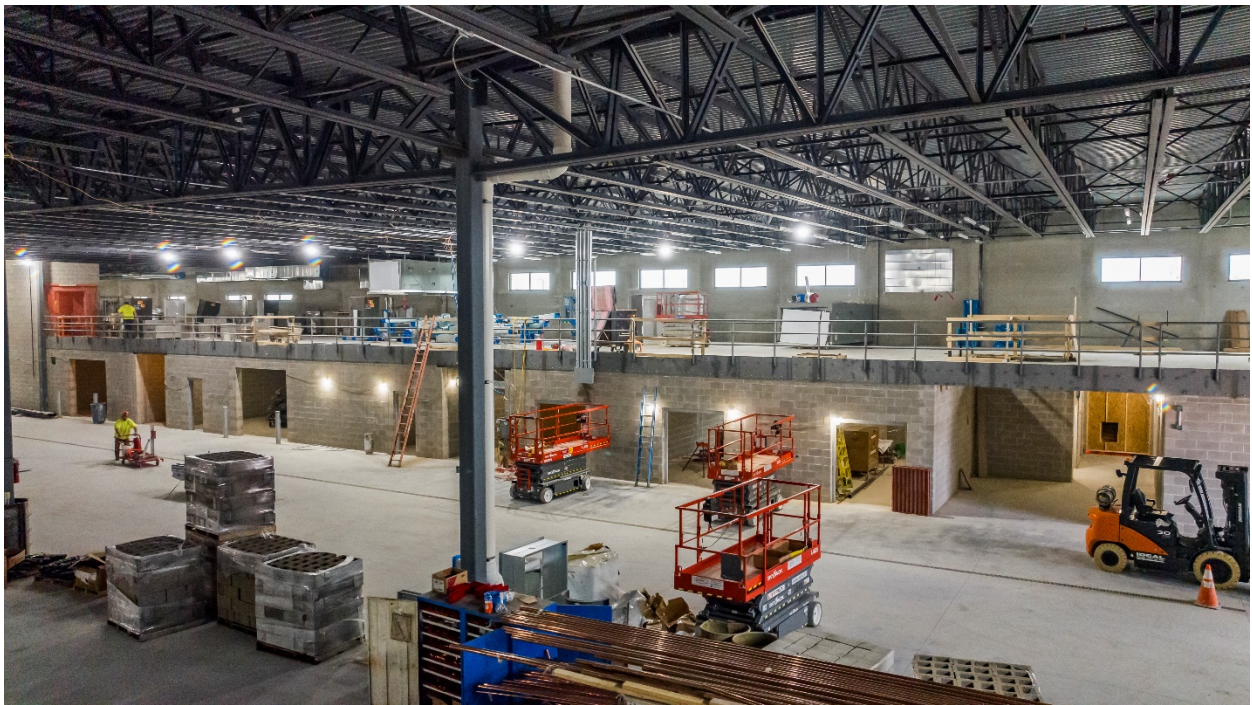
Garage - final large concrete pour



Salt shed construction



Interior – View of shops from garage looking west



BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Approval of Bid Package #4 -DPW Facility

SUBMITTED BY: Matthew Mortwedt, Public Works Director

SUMMARY EXPLANATION:

Bid Package #4 included 12 individual bid items for the demolition and restoration of the existing Department of Public Works facility and site. Moore Construction estimated the total of the bid items to be approximately \$866,635. We received bids on 11 of the items for a total of \$604,744. In addition, we are requesting an allowance for item #5 (Electrical) in the amount of \$25,000. In total, with the addition of fees, insurance, bonds and contingencies, we are requesting approval in the amount of \$814,693.00 for Moore Construction Services.

ATTACHMENT:

1. Bid Package #4 Results Summary 2.29.24

RECOMMENDATION:

Approval of bid package #4 in the amount of \$814,693.00, and authorization for Moore Construction Services to enter into the appropriate contracts for each bid item on behalf of the Village of Germantown.

ACTION BY Committee:

The low bids received are as follows:

1. Affordable Environmental Tech Inc. (Asbestos Abatement)	\$35,325
2. Wolverine Construction (Earthwork / Demolition)	\$174,999
3. Joe DeBelak Plumbing & Heating Co (Site Utilities)	\$8,872
4. Northern Metal & Roofing Co., Inc. (Roofing)	\$109,600
5. Electrical Allowance	\$25,000
6. Payne & Dolan, Inc. (Asphalt Paving)	\$153,045
7. Johnson and Sons Paving Co. (Site Concrete)	\$36,050
8. All-Ways Contractors Inc. (Landscaping)	\$43,335
9. Northway Fence (Fencing)	\$15,700
10. EnergiTech Services LLC (Fuel Pump Removal)	\$19,030
11. Joe DeBelak Plumbing & Heating Co (Septic System Removal)	\$3,831
12. Joe DeBelak Plumbing & Heating Co (Well Abandonment)	\$4,957

1. Project Requirements	\$37,785
2. CM Fee	\$15,019
3. Liability Insurance	\$5,802
4. Performance Bond	\$6,825
5. Contingency	\$69,518
6. Monument Sign Allowance	\$50,000

TOTAL: \$814,693

Original Budget: \$41,490,170

Final Budget through BP#4: \$38,958,324

Staff and Moore Construction Services have reviewed the bids submitted and determined that all bids were responsive to the requirements of the Advertisement for Bids.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Presentation

ITEM TITLE: ANR Pipeline Update

SUBMITTED BY: Matthew Mortwedt, Public Works Director

SUMMARY EXPLANATION:

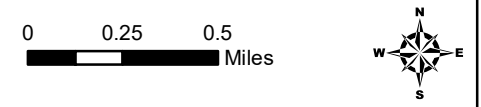
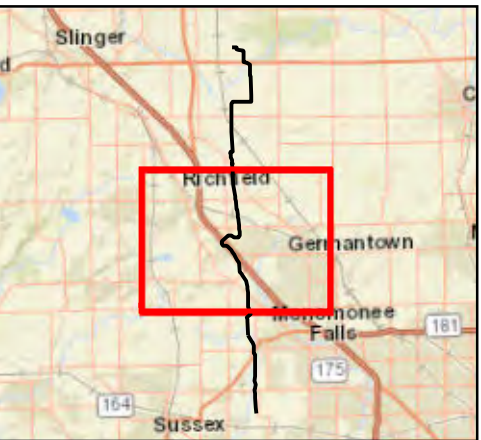
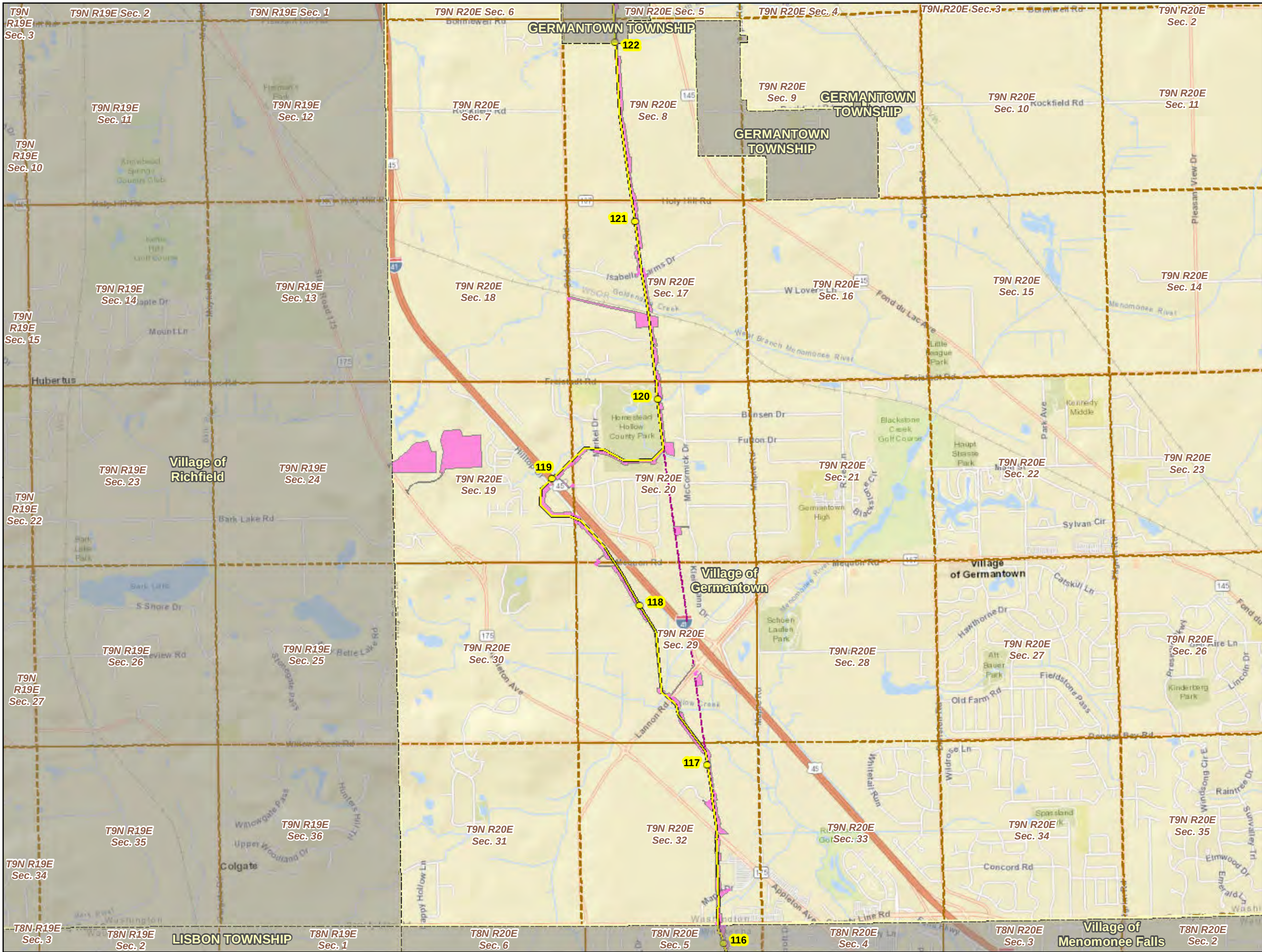
The portion of the project located in the Village of Germantown includes the replacement of existing 14-inch diameter pipe with 5.89 miles of 30-inch-diameter pipe on Mainline (ML) ML-301 from milepost (MP) MP 116.1 (County Line Road) to MP 122. Minor modifications to an appurtenant facility will be the upsizing of existing mainline valve (MLV) MLV-12A. In addition, the proposed Germantown Staging Area will be utilized to support construction activities.

ATTACHMENT:

1. ANR Project Path
2. ANR Wisconsin Reliability Project_V of Germantown 09 19 23

RECOMMENDATION:

ACTION BY Committee:

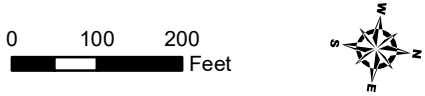
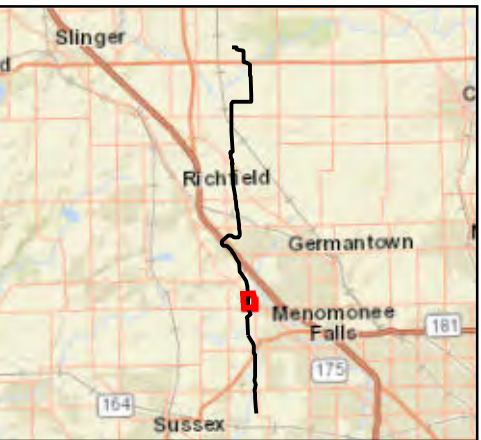
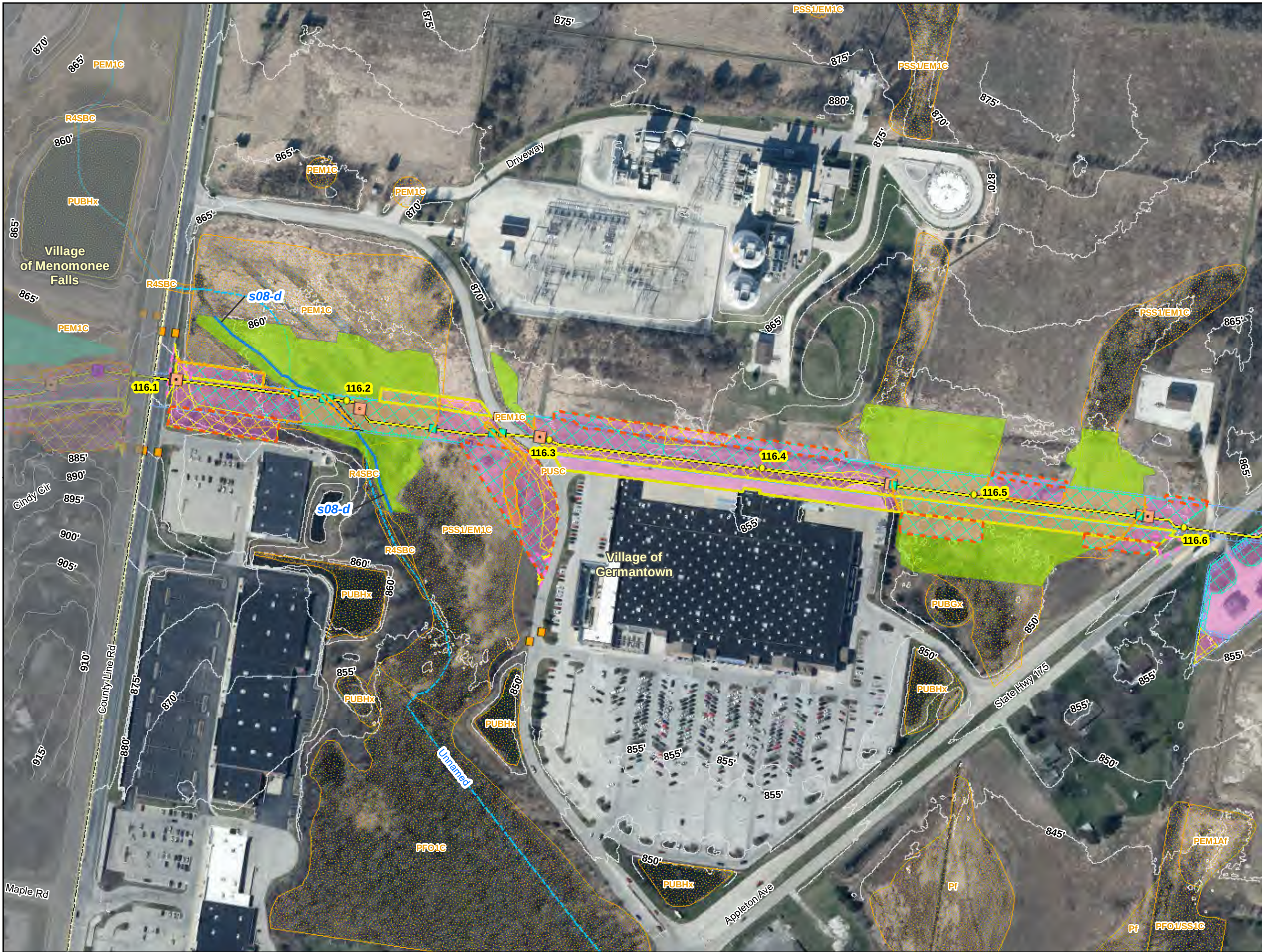


- Proposed Mile Posts
- Proposed Centerline
- Existing Pipe Centerline
- Construction Work Area
- Rock Construction Entrance
- Municipal Boundary
- PLSS Sections

Figure 1.
Project Location
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



Page 1 of 14

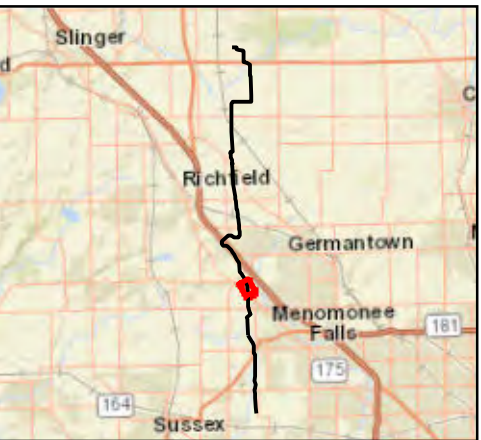
- Inlet Protection
- Trench Plug/Breaker
- CP Structures
- AC Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Shallow Marsh
- Shrub-Carr
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only

Source: Z:\Clients\Q_T\TransCanada\WI_Reinforcement\Project\Permitting\Local\Village_of_Germantown\Figure 2 Site Plan Village of Germantown.mxd



- Inlet Protection
- Trench Plug/Breaker
- CP Structures
- AC Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Existing Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Shallow Marsh
- Delineated Waterbody
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only

Source: 3/13/2023) 2:\Clients\Q:\TransCanada\WI_Reinforcement\Project\Permitting\Local\Village_of_Germantown\Figure 2 Site Plan Village of Germantown.mxd



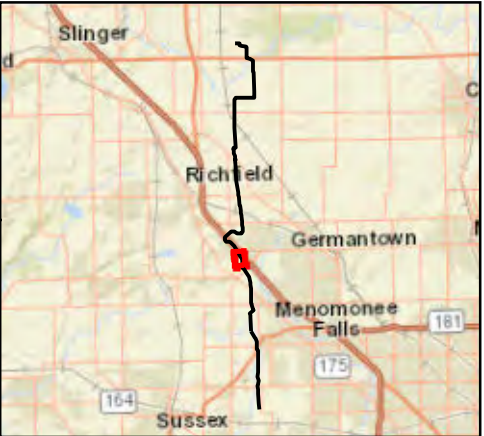
0 100 200 Feet

Page 3 of 14

- Inlet Protection
- Trench Plug/Breaker
- CP Structures
- Sediment Barrier
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Existing Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Hardwood Swamp
- Delineated Waterway (10' OHWM or less)
- Delineated Waterway (>10' OHWM)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

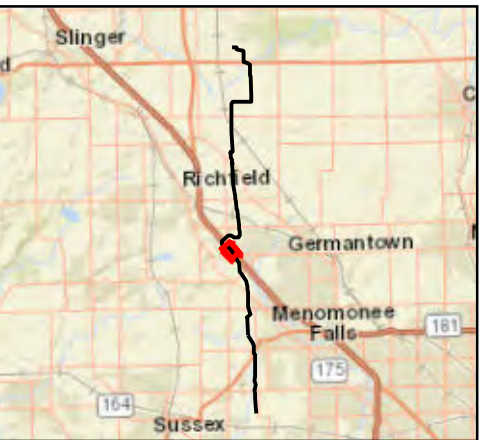
merjent.
For Environmental Review Purposes Only



- Trench Plug/Breaker
- Sediment Barrier
- Municipal Boundary
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Hardwood Swamp
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin





- Trench Plug/Breaker
- CP Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Construction Work Area
- Desktop Fresh (Wet) Meadow
- Desktop Hardwood Swamp
- Access Road
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



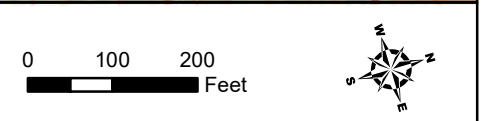
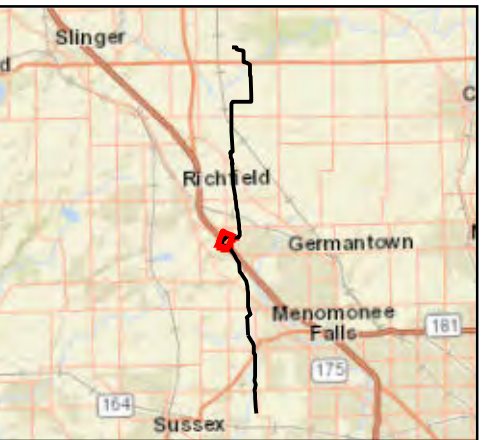
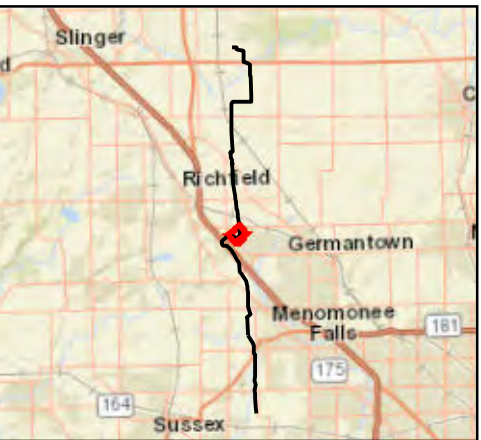


Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

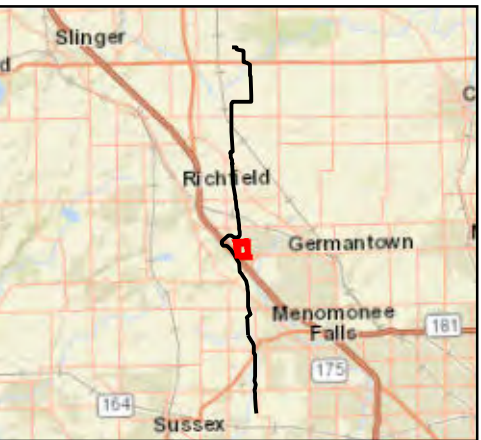
merjent.
For Environmental Review Purposes Only



Page 7 of 14

- Trench Plug/Breaker
- CP Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Existing Easement
- Construction Work Area
- Hardwood Swamp
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

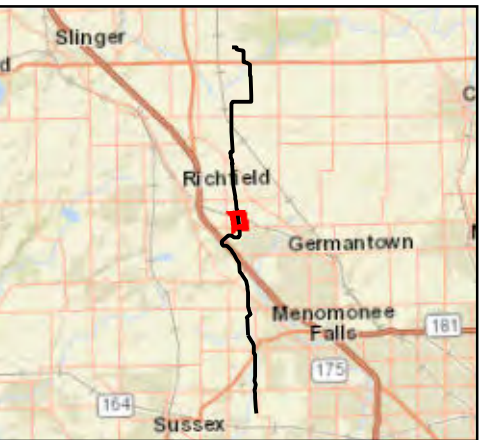
Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



- Inlet Protection
- Sediment Barrier
- Municipal Boundary
- Seed and Mulch
- Additional Temporary Workspace
- Existing Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Shallow Marsh
- Shrub-Carr
- Desktop Shrub-Carr
- Access Road
- Delineated Waterbody
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

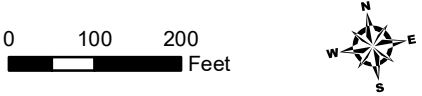
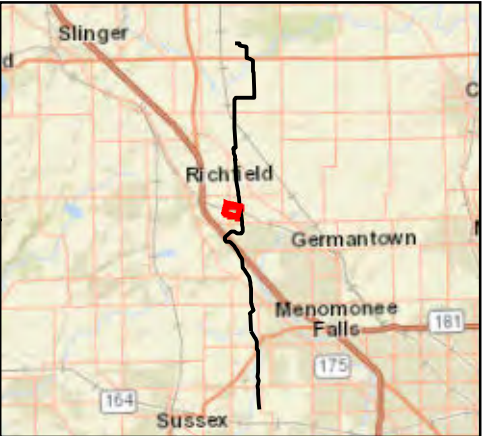




- Inlet Protection
- Trench Plug/Breaker
- CP Structures
- Slope Breaker
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Above Ground Facility
- Construction Work Area
- Fresh (Wet) Meadow
- Desktop Fresh (Wet) Meadow
- Shrub-Carr
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

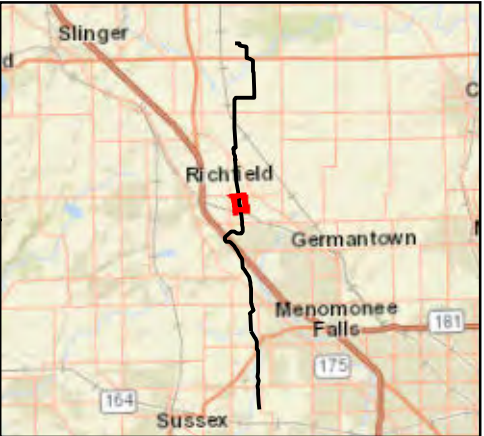
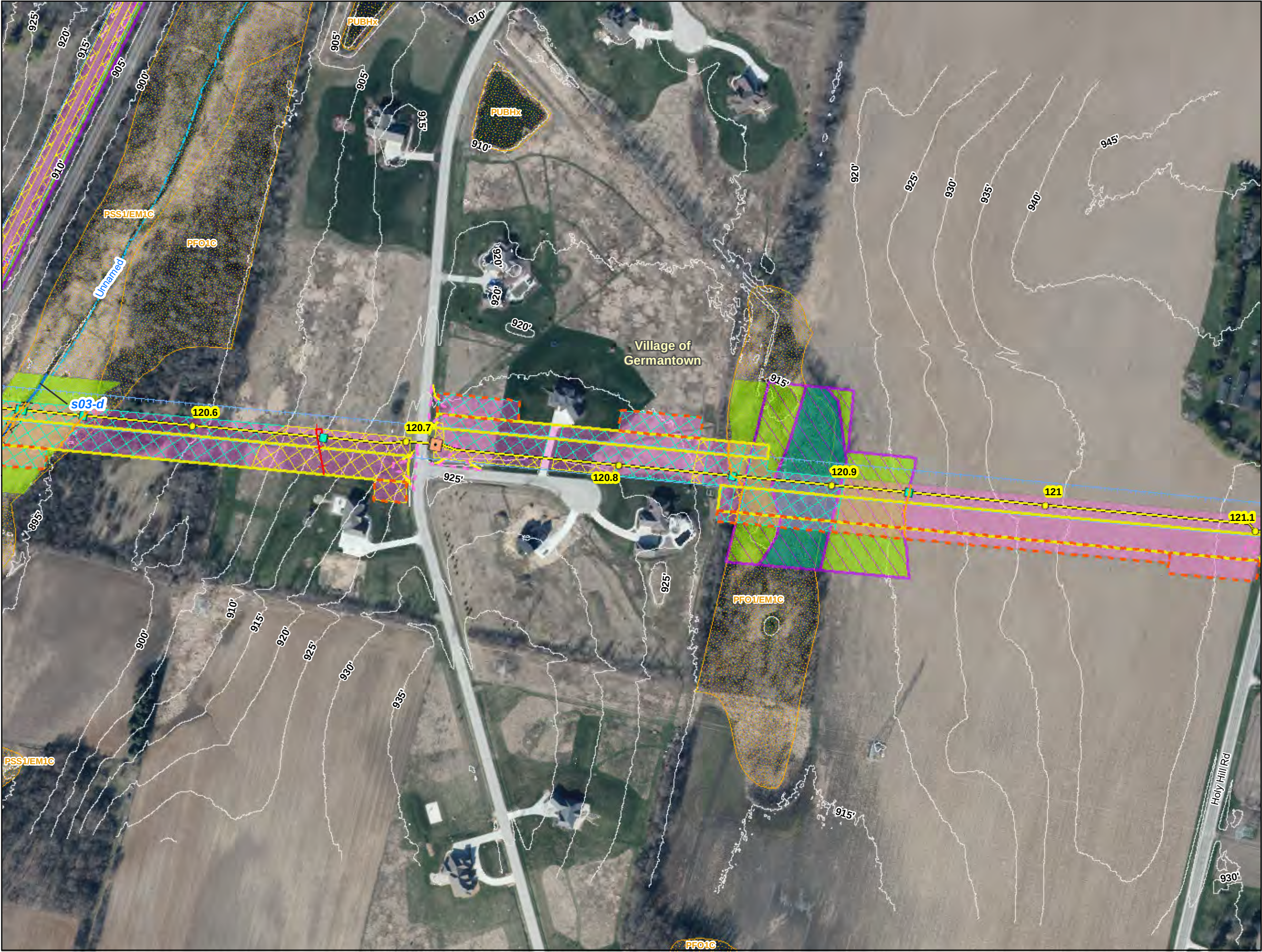




- Trench Plug/Breaker
- CP Structures
- Slope Breaker
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Above Ground Facility
- Construction Work Area
- Fresh (Wet) Meadow
- Desktop Fresh (Wet) Meadow
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin





Page 11 of 14

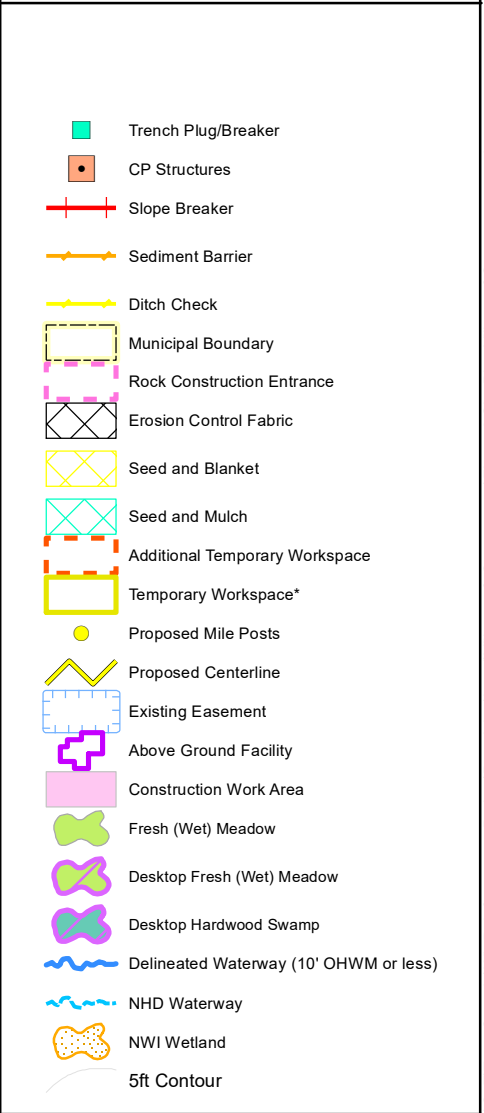
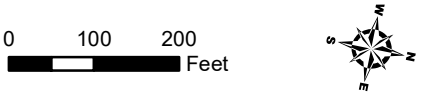


Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

merjent.
For Environmental Review Purposes Only



- CP Structures
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Construction Work Area
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin





September 19, 2023

TC Energy - ANR Pipeline Company
700 Louisiana Street, Suite 700
Houston, TX 77002-2700

Mr. Larry Ratayczak
Director of Public Works
Village of Germantown
N112 W17001 Mequon Road
P.O. Box 337
Germantown, WI 53022-0337

Robert Revenaugh
Environmental Analyst, US Environment

tel 832.320.5642
fax 832.320.6642
email bobby_revenaugh@tcenergy.com
web www.anrpl.com

Submitted via email: lratayczak@village.germantown.wi.us

Re: Wisconsin Reliability Project

TC Energy - ANR Pipeline Company
Application for Erosion Control Permit, Village of Germantown, WI

Dear Mr. Ratayczak,

ANR Pipeline Company (ANR), a subsidiary of TC Energy, is planning an expansion and reliability project designed to provide much-needed natural gas supply to meet the increasing market demand of residential, commercial, and industrial consumers in the State of Wisconsin, called the Wisconsin Reliability Project (Project). The Project will increase the reliability and efficiency of ANR's existing system and consists of:

- replacing approximately 51 miles of existing pipeline at three distinct locations in Wisconsin and Illinois;
- uprating and/or replacing compressor units at two existing compressor stations (CS) in Wisconsin;
- upgrading six existing meter stations in Wisconsin; and
- modifying other existing minor appurtenant facilities in Wisconsin and Illinois.

Upon receiving all required Project approvals, ANR anticipates commencing construction in 2024 with a target in-service date of November 1, 2025.

The portion of Project located in the Village of Germantown includes the replacement of existing 14-inch diameter pipe with 5.89 miles of 30-inch-diameter pipe on Mainline (ML) ML-301 from milepost (MP) MP 116.1 (County Line Road) to MP 122. Minor modifications to an appurtenant facility will be the upsizing of existing mainline valve (MLV) MLV-12A. In addition, the proposed Germantown Staging Area will be utilized to support construction activities.

Enclosed is an Application for Erosion Control Permit and Supplemental Information. Based on the Village of Germantown Fee Schedule the Project qualifies for the maximum fee amount of \$5,000 for Commercial/Industrial Projects after confirmation the permit application fee will be paid via the Village's online payment system.

Village of Germantown
ANR Wisconsin Reliability Project

If you have any questions, please reach out to Emily Nelson (emily.nelson@merjent.com; 612-746-3667), Tom Janssen (tom.janssen@merjent.com; 651-295-2588) from Merjent, Inc., ANR's environmental consultant, or me per contact information at the top of this letterhead.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Robert Revenaugh', is shown above a horizontal line.

Robert Revenaugh
Environmental Analyst, US Environment

Enclosed: Permit application
 Supplemental Information

VILLAGE OF GERMANTOWN
APPLICATION FOR EROSION CONTROL PERMIT

N112 W17001 Mequon Road - P.O. Box 337 - Germantown, WI 53022

Phone (262) 250-4760

PERMIT #E -

The undersigned hereby applies for a permit to build, construct or to install according to the following statement:

1. Owner Robert Revenaugh, ANR Pipeline Company Phone 832-320-5642
Address 700 Louisiana Street, Suite 700 City/State Houston, TX 77002-2700
2. Location of Structure see attached Supplemental Information Zoning District _____
3. Name of Contractor TBD Phone _____
Address _____ City/State _____
4. Parcel Description: Lot _____ Subdivision see attached Supplemental Information
5. Description of Land Disturbing Activity:
Excavating or Filling _____ Cubic Yards Trenching 31,100 Linear Feet
Grading/Removal of Ground Cover 6,552,100 Sq. Ft. Total Area Disturbed 6,552,100 Sq. Ft.
6. Erosion Control Permit Fee \$ 5,000

CONDITIONS OF APPROVAL

1. Property Owner/Applicant is responsible for compliance with the Erosion Control Ordinance or COMM 21.125 and Conditionally Approved Plan. Owner/Applicant is responsible for activities of any subcontractors which may affect non-compliance situations.
2. Install Erosion Control devices as identified in the Approved Erosion Control Plan.
3. Use of #3 aggregate stone or other approved stone with a minimum 3" diameter required for access drives, 6" depth, 30'-50' length, 14'-20' width.
4. Protect all storm sewer inlets with approved Erosion Control devices.
5. Remove tracking (i.e. sediment) from street at the end of each work day. Maintain all road drainage systems and tracking provisions, stormwater drainage systems, control measures and other facilities identified in the Erosion Control Plan.
6. Repair any siltation or erosion damage to adjoining surfaces and drainageways resulting from land development or disturbing activities.
7. All soil storage piles shall be located at least 25 feet from any downslope road, lake, stream, wetland, ditch, channel or other watercourse.
8. Stock piles that are left for more than seven (7) days should be seeded, covered with a tarp or have erosion control - silt fence/straw bales installed on the downslope side(s) of the stock pile.
9. Inspect all Erosion Control devices after each rain of 0.5 inches or more and at least once each week and make needed repairs.
10. Maintain all Erosion Control devices until disturbed areas are stabilized (seed/sod/mulch disturbed areas as soon as possible.)
11. Keep a copy of the Conditionally Approved Erosion Control Plan on site.

Acceptance of conditions by applicant. (In case of applicant not being the owner of the parcel, the applicant shall act as the agent for the owner and the owner's permission and acceptance of all conditions shall be in force as soon as the applicant is permitted by the owner to proceed with the work outlined herein.)

I hereby certify that I fully understand the provisions of the Village of Germantown Erosion Control Ordinance and that I accept responsibility for carrying out the control plan for the referenced project, as approved by the Village.

In addition to the Conditions of Approval, this permit must be transferred to the new home owner and the site must be stabilized or protected at the time of occupancy. (No occupancy will be granted until the site is stabilized or protected.)

Signed  Print Robert Revenaugh Phone 832-320-5642
Owner/Applicant

PERMIT APPROVED: _____ Date _____

Wisconsin Reliability Project



Village of Germantown, Wisconsin Erosion Control Permit Application Supplemental Information

Prepared by:



September 19, 2023

TABLE OF CONTENTS

1.0	GENERAL PROJECT INFORMATION	4
2.0	SITE DESCRIPTION.....	5
2.1	PROJECT DESCRIPTION AND LOCATION	5
2.2	AREA OF DISTURBANCE	5
2.3	DESCRIPTION AND SEQUENCE OF CONSTRUCTION ACTIVITIES	5
2.4	CONSTRUCTION TIMING	6
2.5	SOILS DESCRIPTION	7
2.6	SITE CONTOURS, DRAINAGE PATTERNS, AND RECEIVING WATERS	8
3.0	CONSTRUCTION ACTIVITIES	8
3.1	PREPARATION OF THE WORKSPACE	8
3.2	PRE-CONSTRUCTION MEETING	8
3.3	CLEARING AND GRADING.....	9
3.4	INSTALLATION OF SEDIMENT AND EROSION CONTROL MEASURES	9
3.5	TRENCHING	10
3.6	TRENCH DEWATERING	10
3.7	LOWERING-IN AND BACKFILLING	10
3.8	HYDROSTATIC TESTING	11
3.9	RESTORATION AND CLEANUP.....	11
3.10	REVEGATION.....	12
4.0	OPERATIONAL CONTROLS.....	13
4.1	GOOD HOUSEKEEPING PRACTICES	13
4.1.1	Construction Waste	13
4.1.2	Removal of Sediment from Public Roadway	13
4.1.3	Dust Control.....	13
4.1.4	Fueling.....	13
4.1.5	Product Storage and Containment	14
4.2	SPILL PREVENTION AND RESPONSE PROCEDURES	14
4.3	CONCRETE WASH WATER, GRINDINGS, AND SLURRY	14
4.4	WINTER CONSTRUCTION	15
4.5	WORKING IN OR NEAR WETLANDS	15
4.6	WORKING IN OR NEAR WATERWAYS	17
4.6.1	Stream Dredging	17
4.6.2	Access Across Waterways	19
4.7	DEWATERING OPERATIONS	19
5.0	SESC CONTROLS INSTALLATION, PLACEMENT, AND MAINTENANCE	21
5.1	EROSION CONTROLS.....	21
5.1.1	Seeding and Mulching	21
5.1.2	Erosion Control Blankets	22
5.1.3	Drainage Ditch Stabilization	22
5.1.4	Steep Slopes	23
5.2	SEDIMENT CONTROLS.....	23
5.2.1	Sediment Traps	23
5.2.2	Construction Exits.....	23
5.2.3	Silt Fence or Fiber Logs (Wattles)	23
5.2.4	Berms	24
5.3	STORMWATER MANAGEMENT.....	24

5.4	BMP IMPLEMENTATION SCHEDULE	24
5.5	MAINTENANCE	24
6.0	INSPECTIONS.....	26
6.1	SITE INSPECTIONS	26
6.2	STORMWATER INSPECTIONS	26
7.0	FINAL STABILIZATION	27

LIST OF TABLES

Table 2.1-1	Public Land Survey System Locations for the Project	5
Table 2.4-1	Anticipated Construction Schedule.....	Error! Bookmark not defined.
Table 2.5-1	Mapped Soils within the Project.....	7

LIST OF APPENDICES

Appendix A	Figure 1 - Project Location Map Figure 2 - Site Plan and Site Plan Notes Figure 3 - Soils Map
Appendix B	WPDES General Permit No. WI-S067831-6
Appendix C	FERC's Upland Erosion Control, Revegetation, and Maintenance Plan FERC's Wetland and Waterbody Construction and Mitigation Procedures
Appendix D	WDNR Construction Site Erosion & Sediment Control Technical Standards
Appendix E	ANR's Erosion and Sediment Control Typical Figures
Appendix F	Wisconsin Reliability Project Fugitive Dust Control Plan
Appendix G	Wisconsin Reliability Project Spill Prevention, Control, and Countermeasure Plan

LIST OF ACRONYMS & ABBREVIATIONS

ANR	ANR Pipeline Company, a subsidiary of TC Energy
ATWS	Additional temporary workspace
BMPs	best management practices
CS	compressor station
CWA	Construction Work Area
DOT	U.S. Department of Transportation
Dth/d	Dekatherms per day
EI	Environmental Inspector
ERR	Endangered Resources Review
FERC	Federal Energy Regulatory Commission
General Permit	State of Wisconsin General Permit WI-S067831-6
GIS	Geographic Information System
Merjent	Merjent, Inc.
MLV	main line valve
MS	meter station
NOT	Notice of Termination
NRCS	Natural Resources Conservation Service
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Plan	Erosion Control and Storm Water Management Plan
Project	WRP Segment PL-2 Project
PSS	palustrine scrub-shrub
R&R	Remediation and Redevelopment
ROW	right-of-way
SESC	soil erosion and sediment control
SHPO	State Historic Preservation Office
SPCC	Spill Prevention, Control and Countermeasure Plan
SSURGO	Soil Survey Geographic Database
TCSB	temporary clear span bridge
TWS	temporary workspace
USACE	U.S. Army Corps of Engineers
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollution Discharge Elimination System
WRP	Wisconsin Reinforcement Project

1.0 GENERAL PROJECT INFORMATION

ANR is proposing the Wisconsin Reinforcement Project (WRP), a reliability and expansion project designed to improve system reliability, while simultaneously increasing incremental capacity to meet market demand in the states of Wisconsin and Illinois.

Within Wisconsin, the Project consists of:

- **Pipeline facilities:** Replacing a total of 37.3 miles of smaller-diameter pipeline with a total of 40.0 miles of larger-diameter steel pipeline at two distinct locations as described below:
 - Segment PL-2: Replace 13.7 miles of 14-inch-diameter pipe with 16.0 miles of 30-inch-diameter pipe on existing pipeline ML-301; and
 - Segment PL-3: Replace 23.6 miles of 24-inch-diameter pipe with 24.0 miles of 30-inch-diameter pipe on existing pipeline ML-226.
- **Aboveground facilities:** Work at existing aboveground facilities as described below:
 - Modifications at two existing compressor stations (CS);
 - Modifications at six existing meter stations (MS); and
 - Modifications at eight existing minor appurtenant facilities (Mainline Valves [MLV] and Taps).

Through the installation of these incremental facilities and the modification and optimization of existing infrastructure, the WRP will provide up to 150,000 dekatherms per day (Dth/d) of mainline capacity into the State of Wisconsin on ANR's pipeline system, while also increasing the reliability and efficiency of the system. Upon receiving all required approvals, ANR anticipates commencing construction in 2024 with a target in-service date of November 1, 2025.

Within the Village of Germantown the following work is proposed:

- Replacement of existing 14-inch diameter pipe with 5.89 miles of 30-inch-diameter pipe on Mainline (ML) ML-301 from milepost (MP) MP 116.1 (County Line Road) to MP 122.
- Minor modifications to an appurtenant facility will be the upsizing of mainline valve (MLV) MLV-12A. The existing MLV-12A is situated on land owned by ANR, located in the SW ¼ of Section 17, Township 9 North, Range 20 East.
- As part of the Project, ANR proposes to utilize an off-right-of-way area for pipe and material storage at the Germantown Staging Area located in the NW ¼ of Section 19, Township 9 North, Range 20 East, with access from Appleton Avenue (State Road 175) (**Appendix A**). ANR will lease the workspace and restore it to preconstruction conditions upon the completion of the Project, as requested by the landowner.

2.0 SITE DESCRIPTION

2.1 PROJECT DESCRIPTION AND LOCATION

ANR will use the Project workspace to construct the proposed Project described in Section 1.2. Table 2.1-1 provides Public Land Survey System locations for where the Project will be located. The Project is not located within Tribal land. A Project location figure is included as Figure 1 in Appendix A.

TABLE 2.1-1 Public Land Survey System Locations for the Project.		
County	Municipality	Township, Range, Section
Washington	Towns of Jackson and Germantown; Villages of Jackson and Germantown	Township 9 North, Range 20 East, Sections 5, 8, 17, 19, 20, 29, and 32; Township 10 North, Range 20 East, Sections 17, 20, 21, 28, 29, and 32
Waukesha	Villages of Menomonee Falls and Lannon	Township 8 North, Range 20 East, Sections 5, 8, 9, 16, 17, and 21

2.2 AREA OF DISTURBANCE

Construction activities will occur within temporary workspaces (TWS), additional temporary workspaces (ATWS), and access roads totaling approximately 150.42 acres in size within the Village of Germantown. The TWS and ATWS will be accessed directly from public roadway and via temporary access roads. All construction areas are shown on the Site Plan (see Figure 2 in Appendix A).

Project areas will be returned to pre-construction conditions at the conclusion of the project. As such, the primary BMP used to control impacts from stormwater runoff will be vegetation. All workspaces will be returned to pre-construction conditions and no new impervious surfaces will be created. No long-term post-construction BMPs will be used.

2.3 DESCRIPTION AND SEQUENCE OF CONSTRUCTION ACTIVITIES

The Project will be designed and executed in accordance with all applicable requirements included in the U.S. Department of Transportation's (DOT) Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards regulations in 49 CFR 192, and other applicable federal and state regulations, including U.S. Department of Labor Occupational Safety and Health Administration requirements. Construction activities will follow FERC's Upland Erosion Control, Revegetation, and Maintenance Plan and FERC's Wetland and Waterbody Construction and Mitigation Procedures (Appendix C).

Pipeline replacement generally will be completed using a sequential construction technique, which includes: purging and cleaning; surveying and staking; clearing and grading; trenching; existing pipe removal; new pipe stringing, bending, welding, and coating; lowering-in and backfilling; hydrostatic testing; commissioning; and cleanup and restoration. These construction techniques generally will proceed in an assembly line fashion, and construction crews will move down the construction right-of-way as work progresses.

Ground disturbing activities will be primarily temporary in nature. The sequence of construction activities will occur as follows:

- Mark the boundaries of approved work areas, as well as sensitive and protected resources, if present.
- Install access pad(s) from public road to the work areas, as necessary.
- Install appropriate soil erosion and sediment control (SESC) prior to ground disturbing activities.
- Segregate topsoil in the TWS to prevent mixing with subsoil.
- Replace segregated topsoil.
- Conduct rough grading to pre-construction grade, contours, and elevations.
- Decompact as necessary, and complete final grading.
- Apply seed and mulch in non-cultivated lands.

2.4 CONSTRUCTION TIMING

ANR anticipates commencing construction as early as the first quarter of 2024, subject to the receipt of necessary permits and approvals, and anticipates that all facilities will be placed in service in November 2025. Construction at any single point along the pipeline, from surveying and staking to cleanup and restoration, could last 8 weeks or more. Areas that require restoration will be temporarily restored promptly upon completion of construction, and permanent stabilization will occur as soon as possible.

ANR anticipates constructing the Project according to the schedule provided in Table 2.4-1 below.

TABLE 2.4-1	
Anticipated Construction Schedule.	
Project Activity	Preliminary Start Date
Vegetation Removal	January 2024
Pipe Installation	February 2024
Restoration ^a	August 2024
^a Restoration will occur at various times. Restoration will be completed as the Project progresses, with restoration crews following installation crews in any given area, as site and weather conditions permit.	

2.5 SOILS DESCRIPTION

Detailed soil characteristics within the Project were identified and assessed using the Natural Resources Conservation Service's (NRCS) Soil Survey Geographic database (SSURGO). The SSURGO database is a digital version of the original county soil surveys developed by the NRCS for use with GIS. It provides the most detailed level of soils information for natural resource planning and management. The soil descriptions for soils within the Project are provided in Table 2.5-1 below, and shown on Figure 3 in Appendix A.

TABLE 2.5-1					
Mapped Soils within the Project					
Map Unit	Map Unit Name	Slope %	Erosion Hazard ^a	Hydrologic Group ^b	K Factor ^c
BsA	Brookston silt loam, 0 to 2 percent slopes	1.0	Slight	C/D	0.33
CeB2	Casco loam, 2 to 6 percent slopes, eroded	4.0	Moderate	B	0.08
CeC2	Casco loam, 6 to 12 percent slopes, eroded	9.0	Severe	B	0.08
CeD2	Casco loam, 12 to 20 percent slopes, eroded	15.4	Severe	B	0.08
CrD2	Casco-Rodman complex, 12 to 20 percent slopes, eroded	16.0	Severe	B	0.07
Cw	Colwood silt loam, 0 to 2 percent slopes	1.0	Slight	C/D	0.39
Dt	Drummer silt loam, gravelly substratum	1.0	Slight	B/D	0.32
FsB	Fox silt loam, 2 to 6 percent slopes	4.0	Moderate	B	0.14
GP	Gravel pit	0.0	Not rated		0.05
HeB	Hebron loam, 2 to 6 percent slopes	4.0	Moderate	C	0.34
HmB2	Hochheim loam, 2 to 6 percent slopes, eroded	3.9	Moderate	D	0.59
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	9.0	Severe	D	0.41
Hu	Houghton mucky peat, 0 to 2 percent slopes	1.0	Slight	A/D	0.00
KIA	Kendall silt loam, 1 to 3 percent slopes	1.9	Slight	B/D	0.49
KwB	Knowles silt loam, 2 to 6 percent slopes	3.9	Moderate	C	0.44
LmA	Lamartine silt loam, 0 to 3 percent slopes	1.4	Slight	B/D	0.42
MmA	Matherton silt loam, 1 to 3 percent slopes	1.9	Slight	B/D	0.37
MoA	Mayville silt loam, 0 to 2 percent slopes	1.0	Slight	C	0.36
MoB	Mayville silt loam, 2 to 6 percent slopes	4.0	Moderate	C	0.36
MtA	Mequon silt loam, 1 to 3 percent slopes	1.9	Slight	C/D	0.43
Mzb	Montgomery silty clay loam	1.1	Slight	C/D	0.29
OuB	Ozaukee silt loam, high carbonate substratum, 2 to 6 percent slopes	3.9	Moderate	C	0.41
Pc	Palms mucky peat, 0 to 2 percent slopes	1.0	Slight	B/D	0.55
Ph	Pella silt loam, 0 to 2 percent slopes	1.1	Slight	B/D	0.32
RaA	Radford silt loam, 0 to 3 percent slopes	1.0	Slight	B/D	0.52
RkB	Ritchey silt loam, 2 to 6 percent slopes	4.0	Moderate	D	0.33
RkC2	Ritchey silt loam, 6 to 12 percent slopes, eroded	9.0	Severe	D	0.33

TABLE 2.5-1

Mapped Soils within the Project

Map Unit	Map Unit Name	Slope %	Erosion Hazard ^a	Hydrologic Group ^b	K Factor ^c
ScB	St. Charles silt loam, 2 to 6 percent slopes	3.7	Moderate	B	0.40
SeB	St. Charles silt loam, gravelly substratum, 2 to 6 percent slopes	4.0	Moderate	B	0.32
Sm	Sebewa silt loam, 0 to 2 percent slopes	1.0	Slight	B/D	0.12
ThB	Theresa silt loam, 2 to 6 percent slopes	4.0	Moderate	C	0.43
VsA	Virgil silt loam, gravelly substratum, 0 to 3 percent slopes	1.0	Slight	B/D	0.26

^a Slight = erosion is unlikely under ordinary climatic conditions; Moderate = some erosion is likely and that erosion-control measures may be needed; Severe = erosion is very likely; and Very Severe = significant erosion is expected.

^b Hydrologic Soil Groups are used to estimate runoff from precipitation: A = high infiltration rate, low runoff potential; B = moderate infiltration rate; C = slow infiltration rate; and D = very slow infiltration rate, high runoff potential.

^c K Factor indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to erosion.

2.6 SITE CONTOURS, DRAINAGE PATTERNS, AND RECEIVING WATERS

The Site Plan (see Figure 2 in Appendix A) displays the general site conditions, roads, surface waters, wetlands, flow patterns, boundaries of the construction site, contours, and areas of soil disturbance.

ppropriate SESC BMPs will be installed to minimize impacts to sensitive features, as identified on the Site Plan (see Figure 2 in Appendix A) and further discussed in the following sections.

3.0 CONSTRUCTION ACTIVITIES

This Plan provides operational controls, and structural and non-structural activity specific to SESC BMPs. SESC BMPs selected for each activity are based upon expected construction conditions and methods. The Plan can be modified in accordance with actual conditions encountered in the field. The erosion and sediment controls are dependent upon adjacent land use, overland slope, watershed area, and drainage patterns. Secure perimeter protection shall surround any potential staging/storage areas. Recommendations for the type and location of erosion prevention and sediment control BMPs are noted on the Site Plan (see Figure 2 in Appendix B). Construction activities that will occur at the site are discussed below.

3.1 PREPARATION OF THE WORKSPACE

All workspaces will be staked prior to ground disturbance. During development of access, silt fences, vehicle tracking pads, installation of storm sewer inlet protection (where applicable), and other applicable erosion control measures will be installed.

3.2 PRE-CONSTRUCTION MEETING

Prior to construction, a pre-construction meeting will be held, at which the EI will provide environmental compliance training for all construction crews working on the Project. Project-specific environmental compliance training and monitoring will be conducted in accordance with:

- WDNR NR 216 Permit Conditions (see Appendix B)

- WDNR Construction Site Erosion and Sediment Control Technical Standards (see Appendix D)
- Federal, State, and/or Local permit conditions
- This Plan, including:
 - o Site Plan (see Figure 2 in Appendix A)
 - o Operational Controls (see Section 4)
 - o SESC BMP Installation, Placement, and Maintenance (see Section 5)
 - o Inspections, including record location and retention (see Section 6)
 - o Final Stabilization (see Section 7)

3.3 CLEARING AND GRADING

Clearing and grading will remove trees, shrubs, brush, roots, and large rocks from CWA and will level the ground surface to allow for safe operation of construction equipment.

Vegetation generally will be cut or scraped flush with the surface of the ground, leaving rootstock in place where possible. In wetlands that are not in actively cultivated cropland, removal of stumps below the ground surface will be limited to the trench line only, where excavation will occur. Brush and other clearing debris may be grinded, burned, chipped, or mulched within the construction ROW in non-wetland and non-agricultural areas, or temporarily stored within the CWA before being hauled to an appropriate disposal location. If chipped or mulched, the depth will not exceed 3 inches as to not impede natural hydrology patterns or revegetation growth.

Grading will be conducted where necessary to provide a reasonably level work surface. Extensive grading may be required in uneven terrain and where the ROW traverses steep slopes and side slopes. ANR will separate topsoil from subsoil over the full width of the ROW in upland agricultural land, residential areas, and open upland outside of the trench line (i.e., topsoil stripping). Topsoil stripping outside of the trench line will not occur in wetland areas, including farmed wetlands. At least the top 12 inches of topsoil will be stripped where 12 or more inches of topsoil is present. In areas with less than 12 inches of topsoil, ANR will strip the entire topsoil layer. During backfilling, subsoil will be returned to the trench first, followed by topsoil such that spoil will be returned to its original horizon.

3.4 INSTALLATION OF SEDIMENT AND EROSION CONTROL MEASURES

Temporary sediment and erosion control measures slow the flow velocity of water off-site to minimize erosion, stop the movement of sediments off the CWA, and prevent the deposition of sediments into sensitive resources. The Contractor will install temporary sediment and erosion control measures after initial clearing and before disturbance of the soil, which will be maintained throughout construction. Typical drawings for ANR's erosion and sediment control devices are provided in Appendix E. However, temporary sediment and erosion control devices will be installed prior to and/or during clearing activities, as needed per site conditions, if there is potential for erosion and sediment discharge during or as a result of clearing activities. Temporary sediment and erosion control measures will remain in place until permanent erosion controls are installed or restoration is completed. ANR will employ environmental inspectors (EI) during

clearing to help determine the need for erosion controls and ensure they are properly installed and maintained.

3.5 TRENCHING

Soil will be removed over the existing pipeline to expose the pipe so it can be pulled out of the ground and to create a trench into which the new pipeline can be placed. A track-mounted excavator or similar equipment will be used to dig up the existing pipeline and excavate the trench. Topsoil will be segregated from subsoil during excavation activities, except for in standing water or saturated soil wetlands.

Trench dimensions will generally be a maximum of 20 feet wide and 8 feet deep. The depth of cover of the new pipe will be 3 to 5 feet, except at specific locations that may require greater depth (e.g., railroad crossings).

Excavated materials will be stockpiled along the spoil side of the construction ROW, away from construction traffic. Where the new pipeline will not be installed in the same trench, the existing pipeline will not need to be excavated. Instead, the abandoned pipeline, which will have already been cleaned, will either be filled with air (most locations) or grout (under railroads and most roads). It then will be capped with steel plates and allowed to remain in place indefinitely.

In most areas where the existing pipeline is excavated, the trench may be backfilled with subsoil after removing the existing pipeline, then re-excavated before installing the new pipeline. However, in some areas, the trench may remain open until the new pipeline is installed.

3.6 TRENCH DEWATERING

Groundwater or stormwater runoff may accumulate in the trench during construction activities. If trench dewatering is necessary to complete the installation of the pipe, the Contractor will pump the discharge through a sediment filter bag or a straw bale dewatering structure in such a manner that prevents the flow of heavily silt laden water into wetlands or waterways.

The Contractor will use a floating suction hose, or other similar measures, to elevate the intake from the bottom of the trench and reduce the potential for capturing heavy sediment-laden trench water to be discharged. The Contractor will direct water to well-vegetated upland areas when available, and discharge at a rate to promote filtering and infiltration into the ground. The EI will work with the Contractor to select suitable dewatering operation discharge sites that minimizes runoff into waterways or wetlands. The Contractor may use multiple filtering mechanisms (e.g., geotextile bag within a straw bale dewatering structure), where necessary to achieve appropriate discharge water treatment.

3.7 LOWERING-IN AND BACKFILLING

The trench will be inspected to be sure it is free of rocks and other debris that could damage the pipe or protective coating before the pipe is lowered into the trench. The pipeline will then be lowered into the trench by a series of side-boom tractors (tracked vehicles with hoists on one side and counterweights on the other), which will carefully lift the pipeline and place it on the bottom of the trench.

In wet areas, such as areas of high groundwater or at stream or wetland crossings, the pipe may need to be coated with concrete or equipped with set-on weights to provide negative buoyancy and keep it anchored to the bottom of the trench. ANR will conduct concrete coating a minimum of 100 feet back from wetlands and waterways on the ROW.

After the pipe is lowered in the trench, trench breakers (stacked sandbags or polyurethane foam) will be installed in the trench on slopes at specified intervals to prevent subsurface water movement along the pipeline. When the trench crosses streams or wetlands, trench plugs will be installed to minimize the flow of water from the intersected body into the trench. The trench will then be backfilled using the excavated material, returning the topsoil and subsoil to their original stratum.

During backfilling, special care will be taken to minimize erosion, restore the natural ground contour, and restore surface drainage patterns as close to preconstruction conditions as practical. A crown of soil about the width of the trench and up to 12 inches high may be left over the trench in non-agricultural areas to compensate for settling. The depth of mounding would be dependent on-site specific conditions such as soil type, soil saturation, and time of year, but would be no more than 12 inches. Appropriately spaced breaks may be left in the crown to prevent interference with stormwater runoff.

In rocky areas, padding material such as sand, approved foam, or other protective materials will be placed in the bottom of the trench to protect the pipeline. Once the pipe is sufficiently covered with suitable backfill, the excavated rocky soil will be used for backfilling up to the original rocky soil horizon. Topsoil will not be used for padding.

3.8 HYDROSTATIC TESTING

ANR will hydrostatically test the pipeline after backfilling to ensure the new facilities can withstand the operating pressure for which it was designed. Hydrostatic testing typically involves filling the pipeline with water to a designated test pressure and maintaining that pressure for approximately 8 hours. Actual test pressures and durations will be consistent with the requirements of 49 CFR 192. Any leaks will be repaired, and the section of pipe retested until the required specifications are met.

Water for hydrostatic testing will be obtained from surface waters and municipal water sources. Following satisfactory completion of hydrostatic testing, the test water will be discharged in accordance with applicable permits. Test water will contact only new pipe and ANR does not propose to add chemicals or biocides to any test water that would be discharged. The water will be sampled prior to discharge and tested in accordance with applicable permit requirements to determine suitability for discharge. The discharge of hydrostatic test water will be performed in a manner that minimizes erosion. The energy of the released test water will be dissipated by discharging the water into a well-vegetated upland area and/or through sediment filter devices or a sediment trap to filter out various particulate matter or allow it to infiltrate through the soil. If chemicals, such as glycol, are mixed with the test water to prevent freezing in cold weather, ANR will handle and dispose of the water in accordance with applicable laws.

3.9 RESTORATION AND CLEANUP

Cleanup involves removing construction debris, including litter generated by construction crews, excess rock, and construction mats. Initial cleanup and rough-grading activities may take place simultaneously. Rough and final grading includes restoring disturbed areas as near as practicable to preconstruction conditions, returning the topsoil, preparing a seedbed (where applicable) for permanent seeding, installing and/or repairing temporary erosion control devices, and installing permanent erosion controls. Construction work area cleanup and stabilization will commence within 72 hours after backfilling the trench, weather and site conditions permitting.

Within 20 days of final trench backfilling (10 days in residential areas) all work areas will be final graded and restored to preconstruction contours and natural drainage patterns as closely as possible. If seasonal or other weather conditions prevent backfilling within these timeframes, temporary erosion controls will be maintained until conditions allow final cleanup. Cleanup and restoration over abandoned pipeline segments will be limited in scope because no disturbance will occur past the area that is needed to cut and cap the abandoned pipeline.

Topsoil and subsoil will be tested for compaction at regular intervals in agricultural and residential areas disturbed by construction. Severely compacted agricultural areas will be plowed, and appropriate soil compaction mitigation will be performed in residential areas. Cut and scraped vegetation will be spread back across the ROW. Large shrubs and trees cut during clearing will be hauled away for disposal in accordance with applicable laws. Surplus construction material and debris will be removed from the ROW unless the landowner or land-managing agency approves otherwise. Excess rock and stone will be removed from at least the top 12 inches of soil in agricultural and residential areas, and, at the landowner's request, in other areas such that the size, density, and distribution of rock on the construction ROW will be similar to adjacent non-ROW areas.

Markers showing the location of the pipeline will be installed at fence and road crossings to identify the owner of the pipeline and convey emergency information in accordance with applicable governmental regulations, including USDOT safety requirements. Special markers providing information and guidance for aerial patrol pilots will also be installed.

Following construction, all new roads and road improvements from construction will be left in place, except in wetland areas or where removal is requested by the landowner or land-managing agency. In those locations, areas affected by access roads and improvements will be restored to preconstruction condition.

3.10 REVEGATION

ANR will conduct restoration activities in accordance with landowner agreements, permit requirements, and written recommendations obtained from the local conservation authority or other duly authorized agencies.

Temporary revegetation may be established in construction work areas where 14 days or more will elapse between the completion of final grading at a site and the establishment of permanent vegetation, and/or where there is a high risk of erosion due to site-specific soil conditions and topography. ANR may require the Contractor to conduct temporary seeding sooner than 14 days at site-specific locations near sensitive resource areas and/or areas prone to wind/water erosion. Unless specifically requested by landowners or land managing agencies, ANR does not intend to establish temporary vegetation in actively cultivated land, standing water wetlands, and/or other standing water areas. Temporary vegetation will be established at any time between April 1 and September 1. Attempts at temporary revegetation after this date should be assessed on a site-specific basis.

ANR will reestablish permanent vegetation in areas disturbed within the CWA, except in actively cultivated areas and standing-water wetlands. ANR will select seed mixes to augment regrowth of the natural seed bank in the topsoil, which are not intended to change the natural species composition. The establishment of invasive species will be minimized with the use of a cover crop (e.g., annual oats, annual rye). The Contractor will apply seed uniformly at specified rates across the prepared ROW by drilling, broadcasting, hydroseeding, and/or air seeding. The

Contractor will suspend seeding activities if conditions are such that equipment would cause rutting of the surface in the designated seeding areas. The EI will monitor the success of revegetation efforts in restored areas in accordance with landowner agreements, Project permits, and plans.

4.0 OPERATIONAL CONTROLS

4.1 GOOD HOUSEKEEPING PRACTICES

4.1.1 Construction Waste

All construction waste will be disposed of in a timely manner and stored in labeled dumpsters prior to offsite disposal by a licensed waste management contractor. Dumpsters will be emptied on an as-needed basis. No wastes shall be buried, dumped, or discharged at the construction site.

4.1.2 Removal of Sediment from Public Roadway

Access to the Project area will occur via public and private roadways. If sediment escapes from the site (such as at the entrance/access road or outside the boundaries of the Project work area), it must be removed in a manner, and at a frequency, sufficient to minimize off-site impacts. Street scraping and sweeping will be used to retrieve sediment that has been tracked onto paved surfaces at a minimum of once every 48 hours. If sediment is cleaned from the pavement using a street sweeper, the pavement would be swept using water, and immediately collected by the pickup brooms before it could run off the pavement. Pavement wash water is not anticipated to be a runoff issue. Water spraying without a collection sweeper is not anticipated (WDNR Technical Standard 1057).

4.1.3 Dust Control

Dust is not anticipated to pose a problem based on the timing and nature of this Project. If water is required for dust control, the water used for dust control is not anticipated to pose a contamination/pollution issue. During dry periods when dust control is needed, the small amount of water that would be applied should be absorbed into the soil. Volume and rate of water application will be monitored and regulated to promote infiltration and to prevent erosion and stormwater discharge. Dust control practices will follow WDNR Technical Standard 1068 and ANR's Dust Control Plan (see Appendix F).

4.1.4 Fueling

Designated fueling areas, if needed, will be established and protected by a secondary containment system and shall not be washed or rinsed with water, since this could cause fuel spills to be discharged into stormwater systems or infiltrated into groundwater.

The following procedures should be followed as precautions:

- No refueling or hazardous material transfer will occur within 100 feet of a wetland, waterbody, spring, or well unless approved by the EI or designated environmental representative.

- Where conditions require that construction equipment be refueled within 100 feet of wetlands or waterbodies, sufficient oil and fuel containment booms and absorbent materials will be on-hand to allow for rapid containment and recovery of a spill.
- Fuel, oil, and other petroleum products, equipment and any solid waste should not be stored below the ordinary high-water mark at any time or in the adjacent floodway, when practical.

4.1.5 Product Storage and Containment

Fuels, lubricants, liquid wastes, potentially hazardous chemicals/material, and any other regulated substances must be stored in securely closed, properly labeled, aboveground storage containers that conform to all federal, state, and local regulations. Products shall be properly stored to prevent vandalism or unauthorized access. All products shall be kept in their original container, with original labels still attached, unless the container is not re-sealable. An effort should be made to store only enough products to do the required job, and secondary containment must be provided with a volume capacity of at least 110% of the volume of the largest container. Products are not allowed to contact the ground surface, be exposed to groundwater, or be released to a surface or groundwater. All fuel will be stored 100 feet away from any wetlands or waterbodies, if present. Used or waste products will be removed from the site on a weekly basis and disposed of in accordance with federal, state, and local regulations.

4.2 SPILL PREVENTION AND RESPONSE PROCEDURES

To protect against accidental release of lubricant, coolant, or fuel, equipment will have catch pans and absorbing pads. The contractor will have equipment and materials on-site needed to prevent and/or contain an accidental spill. Concrete washout water, grindings and slurry, shall not be discharged to waters of the state, storm water conveyance systems, or allowed to drain onto adjacent properties. Concrete washout waste must be contained and removed from the Project area for disposal.

The on-site EI and/or Contractor must notify ANR immediately of any spill of a petroleum product or hazardous liquid, regardless of volume or location. ANR and/or its representatives will notify appropriate federal, state, and local agencies (including WDNR) of any spill that may seriously endanger human health or the environment as soon as possible, but no later than 24 hours after a spill is identified. Information on the WDNR's Spill Reporting Guidelines can be found at this link: <https://dnr.wi.gov/files/PDF/pubs/rr/RR560.pdf>.

ANR's Spill Prevention Containment and Countermeasures Plan (SPCC) is provided in Appendix G. The on-site EI and/or Contractor must notify ANR immediately of any spill of a petroleum product or hazardous liquid, regardless of volume or location. ANR and/or its representatives will notify appropriate federal, state, and local agencies (including WDNR) of any spill that may seriously endanger human health or the environment as soon as possible, but no later than 24 hours after a spill is identified.

4.3 CONCRETE WASH WATER, GRINDINGS, AND SLURRY

Concrete washout waste is not anticipated to be generated by the Project. If concrete washout waste is generated, it must be contained and removed from the Project area for disposal. The

contractor may choose from a variety of methods to contain wash water including (but not limited to) lined trap systems, bermed trap systems, dumpsters, chute washout systems, and/or concrete truck and pumper systems. Concrete washout water, grindings, and slurry shall not be discharged to waters of the state (including groundwater), stormwater conveyance systems, or allowed to drain onto adjacent properties.

4.4 WINTER CONSTRUCTION

For areas that require construction during frozen wintertime conditions, ANR will prepare a Winter Construction Plan that addresses procedures for snow removal, frozen soil handling, erosion control (especially during spring thaw), backfilling, and restoration (especially soil subsidence and compaction repair).

4.5 WORKING IN OR NEAR WETLANDS

Wetland crossings will be completed in accordance with local, state, and federal permits and follow the measures described in ANR's construction plans. ANR proposes to primarily use the open-cut trench method, as well as trenchless methods at select locations, to construct the pipeline across wetlands.

Prior to the start of construction, ANR will mark the boundaries of environmentally sensitive areas, including wetlands. Construction equipment working in wetlands will be limited to that essential for clearing, excavating the trench, removing the pipe to be replaced, fabricating and installing the new pipe, backfilling the trench, and restoration. In unstable areas of saturated soils or standing water, equipment will work from construction mats to reduce the risk for soil compaction, soil rutting, and the mixing of topsoil with subsoil. If site conditions allow, such as during dry, stable, and/or frozen ground conditions, tracked and/or low ground pressure equipment will be used instead of construction matting to minimize wetland impact from vehicle and equipment access. Topsoil stripping (temporary grading) will not occur outside of the trench line in wetlands (including cultivated wetlands).

ANR will typically reduce the 110-foot-wide construction ROW to 75-foot-wide (referred to as a neck-down) through non-cultivated wetlands, except where site-specific conditions necessitate an increased ROW width. ATWS may be required on both sides of wetlands to stage construction equipment, fabricate the pipeline, and store materials. ATWS for wetland crossings will be located in upland areas a minimum of 50 feet from the wetland edge, except where adjacent upland consists of actively cultivated or rotated cropland or other previously disturbed land.

Clearing of vegetation in wetlands will be limited to woody vegetation (trees and shrubs), which will be cut flush with the surface of the ground and debris removed from the wetland. To avoid excessive disruption of wetland soils and the native seed and rootstock within the topsoil, stump removal will be limited to the area immediately over the trench line. A limited amount of stump removal and grading may be conducted in other areas to ensure a safe working environment. Brush and other clearing debris may be burned, chipped, or mulched within the construction ROW in non-wetland and non-agricultural areas, or temporarily stored within the CWA before being hauled to an appropriate disposal location.

During clearing, sediment barriers, such as silt fence and staked straw bales, will be installed and maintained adjacent to wetlands and within CWA as necessary to minimize the potential for sediment runoff. Sediment barriers will be installed across the full width of the CWA at the base of slopes adjacent to wetland boundaries. Silt fence or straw bales installed across the working side of the construction ROW will be removed during the day when vehicle traffic is present and

will be replaced each night. Sediment barriers also will be installed within wetlands along the edge of the CWA, where necessary, to minimize the potential for sediment to run off into wetland areas outside the CWA. Where wetlands are located at the base of slopes, permanent interceptor dikes and trench plugs will be installed in upland areas adjacent to the wetland boundary. Trench plugs will be installed at the edges of the wetland, which are designed to minimize sediment discharges into the wetland from the adjacent trench. Temporary sediment barriers will be in place until revegetation is achieved. Once revegetation is achieved, sediment barriers will be removed and disposed of properly.

Excavation within wetland areas will be scheduled so that the trench is not excavated across the wetland until immediately prior to pipe removal and/or pipe-laying activities. The trench width will be minimized as much as possible in wetlands. The width of the trench in wetlands is dependent on site conditions, including soil type and soil saturation. The width at the bottom of the trench will be sufficient to accommodate the pipeline, which is to be installed with a minimum of 5 feet depth of cover, as discussed in Section 3.6.5. The width at the top of the trench will vary to allow the sides of the trench to be adapted to the specific site conditions at the time of construction and to safely allow personnel into the trench. ANR will minimize the length of time the trench is open to reduce the potential for slumping and/or cave-ins. Trench boxes may also be used, when needed and as appropriate, to maintain the integrity of the trench and reduce trench width. The use of trench boxes will be determined based on field conditions at the time of construction.

During excavation activities, the top 12 inches of topsoil from the trench line in unsaturated wetlands will be segregated and stored separately from the subsoil. Topsoil segregation generally will not be possible in saturated soils or areas of standing water. If trench dewatering is necessary in wetlands, the trench water will be discharge in stable, vegetated, upland areas and/or filtered through a filter bag or siltation barrier. No heavily silt-laden water will be allowed to flow into a wetland. Prior to backfilling, trench breakers will be installed where necessary to prevent the subsurface drainage of water from wetlands. In areas where wetlands overlie rocky soils, the pipe will be padded with rock-free soil or sand before backfilling with native bedrock and soil. Where topsoil has been segregated from subsoil, the subsoil will be backfilled first, followed by topsoil. Topsoil will be replaced to the original ground level, leaving a slight crown (maximum of 12 inches) over the trench line for soil settlement over the next natural freeze-thaw cycle. Excess soil material will be spread over adjacent upland areas and stabilized during restoration. Construction mats and other temporary materials will be removed during rough grading and final cleanup, then preconstruction contours will be restored.

Where wetland soils are saturated and located adjacent to a waterway, sheet pile may be required to create safe working conditions and maintain the integrity of the trench.

Where wetland soils are saturated and/or inundated and the pipe cannot be transported into the wetland using sideboom tractors or other heavy equipment, the new pipeline may be installed using the push-pull technique. The push-pull technique involves stringing and welding the new pipeline outside of the wetland, then excavating the trench over the existing pipeline using a backhoe supported by construction mats. The existing pipe in the wetland will typically be cut into segments and pulled out of the wetland using backhoes or a winch. Depending on the size of the wetland, the amount of workspace available, and logistics of removing an existing pipeline before installing a new pipeline, the trench in the wetland may be temporarily backfilled between existing pipeline removal and new pipeline installation. After the trench is ready for the new pipeline, the new pipe will be "floated" across the wetland on water that seeps into the trench from the surrounding area. Flotation devices may be attached to the pipe and pulled across the wetland. After the pipe is floating in place in the wetland, the floats are removed, and the new pipeline is allowed to sink into place. Pipe installed in saturated wetlands is typically coated with concrete

or equipped with set-on weights to provide negative buoyancy. After the pipeline sinks to the bottom of the trench, a track hoe working on equipment mats backfills the trench and completes cleanup. Pipeline removal and re-installation in wetlands may require up to three weeks or longer to complete.

Following backfilling, cleanup will commence, which includes removal of construction debris, including litter generated by construction crews, excess rock, and construction mats. Initial cleanup and rough-grading activities may take place simultaneously. Rough and final grading includes restoring disturbed areas as near as practicable to preconstruction conditions, returning the topsoil, preparing a seedbed (where applicable) for permanent seeding, installing or repairing temporary erosion control devices, and installing permanent erosion controls. Construction work area cleanup and stabilization will commence within 72 hours after backfilling the trench, weather and site conditions permitting.

Wetlands will be restored as near as practicable to preconstruction conditions. Following final grading, revegetation activities will be implemented to wetlands disturbed by construction activities. Saturated and standing water wetland areas will be allowed to return to preconstruction conditions using the original seed stock contained in the topsoil layer. In unsaturated wetlands, it is anticipated that bare, exposed ground will be observed following the removal of construction matting. These areas will be seeded with a cover crop to stabilize and help prevent invasive species infestation while allowing the natural seedbank to establish perineal vegetation and achieve revegetation standards. If bare, exposed ground is not observed upon construction matting removal, wetlands will be allowed to revegetate naturally.

4.6 WORKING IN OR NEAR WATERWAYS

Waterway crossings will be completed in accordance with local, state, and federal permits and follow the measures described in ANR's construction plans. ANR proposes to primarily use the open-cut trench method to construct the pipeline under waterways (referred to as stream dredging), as well as trenchless methods at select locations. Temporary bridges will also be required to traverse waterway channels with construction equipment. Each of these crossing methods are further discussed in the following sections.

ATWS necessary for waterway crossings will be located a minimum of 50 feet from the waterway edge, where feasible and except where adjacent upland consists of actively cultivated or rotated cropland or other previously disturbed land, or when localized workspace requirements and limitations occur.

4.6.1 Stream Dredging

ANR proposes to cross waterways that have perceptible flow at the time of the crossing using a stream flow bypass system, which includes the dam-and-pump or dam-and-flume method, discussed below. Upland construction techniques will be used to cross waterways when there is no perceptible flow for the duration of the dredging activity, including restoration. Equipment to install a stream flow bypass system will be kept immediately available as a contingency, in case flow could occur during construction, such as for anticipated rain events or snow melt.

The dam-and-pump crossing method involves installation of temporary dams upstream and downstream of the proposed waterway crossing location. ANR will typically use sandbags and plastic sheeting to construct temporary dams. Earthen dams will not be used. Following dam installation, ANR will use appropriately sized pumps to dewater the in-stream work area and transport the stream flow downstream of the in-stream work area. Intake screens will be installed

at the pump inlets to prevent entrapment of aquatic life, and energy dissipating devices will be installed at the pump discharge point to minimize erosion and streambed scour. Trench excavation and pipeline installation will then commence through the dewatered in-stream work area.

As part of the dam-and-pump crossing method, the installation of sheet pile may be required to create safe working conditions and to maintain the integrity of the trench. Sheet pile may be needed at crossing locations where the waterway channel is not straight (such as at a meander) and where there is a saturated riparian wetland. Steel sheet piles are long structural sections with a vertical interlocking system that create a temporary continuous wall. The sheet piles are driven in adjacent or staggered to create a barrier to ensure the integrity of the trench. Upon installation of the pipe and backfill is complete the sheet piles are removed and the waterway bed and bank are restored to preconstruction contours.

The dam-and-flume crossing method consists of temporarily directing the flow of water through one or more flume pipes over the in-stream excavation area. This method allows excavation of the pipe trench to occur completely underneath the flume pipes, without disruption of water flow in the waterway. Stream flow will be diverted through the flumes by installing temporary dams upstream and downstream, typically using sandbags and plastic sheeting. Earthen dams will not be used. Trench excavation and pipeline installation will then commence through the dewatered in-stream work area.

Both options of stream flow bypass systems are proposed in order to provide construction flexibility, for the Contractor to determine which bypass method is most appropriate per site conditions at the time of construction and to select the bypass method that will result in the shorter duration to minimize impact.

A backhoe, trackhoe, or other similar equipment will be used to excavate the in-stream trench. All equipment will work from the waterway's banks, or from a temporary bridge (further discussed in Section 5.7.2). The size of the trench will be minimized as much as practicable. Material excavated from the waterway will be stockpiled a minimum of 10-feet from the waterway's banks and used for backfilling the trench and streambed restoration. Containment structures for the stockpiled material will typically be silt fences and/or straw bales and will serve to minimize the potential for soil entering the waterway. Concrete weights or coatings may be required to provide negative buoyancy.

Following completion of pipeline installation, excavated stream bed material will be replaced in its original stratum and elevation upon backfilling, and the waterway bed restored to pre-existing conditions. Larger rocks or boulders moved prior to construction will be replaced in the stream channel within the construction area following backfill of the trench. The waterway banks will be restored to pre-existing conditions and will be stabilized with seed and erosion control blankets. Final grading, seeding, and bank stabilization will be completed no later than 24 hours after backfilling the in-stream trench, weather and soil conditions permitting. Following backfill and restoration, the bypass system will be removed and flow through the waterway channel will be restored.

Site-specific factors such as stream velocity, bank slope, and flow direction may require additional restoration efforts, such as the installation of rock riprap, to stabilize disturbed waterway banks. The installation of riprap is not anticipated at this time. Rock riprap will only be used where site-specific conditions require additional stabilization and where ANR has acquired applicable permits and approvals to place riprap.

In-stream work would occur during no or low flow conditions to minimize erosion and downstream impacts by a specialized construction crew focused on waterway crossings. In-stream work will be completed in the most efficient manner possible to limit in-stream disturbance. To limit the time required for construction of a waterway crossing, the construction ROW will be prepared on either side of the waterway prior to the construction of the actual crossing. It is anticipated that all dredging activities (including restoration) will be completed in 24 hours for ephemeral and intermittent waterways and 72 hours for perennial waterways.

At this time, it is anticipated stream dredging activities could occur between the timeframe of March to October. A more specific timeframe for each waterway crossing cannot be determined until closer to construction, once more information is known, such as site conditions at the time of construction in a specific section of the Project and outage approval periods, which vary along each segment of the pipe.

4.6.2 Access Across Waterways

ANR proposes to complete one-pass through waterways (driving on the bed) to facilitate clearing activities. The crossings will be completed during low or no-flow conditions. During or following clearing activities, ANR will install temporary bridges to facilitate construction activities. All temporary bridges will be clear-span, spanning from bank to bank, with no center-support pilings in the waterway channel. These temporary clear span bridges (TCSBs) will typically consist of a construction mat placed across the waterway, above the ordinary high-water mark. Wide waterway crossings may require a metal bridge with wood or manufactured decking attached (e.g., use of a railcar, semitrailer, or mobile home frame).

TCSBs will be placed from the waterway banks and equipment will not need to work in the waterway channel to install or remove the TCSBs. TCSBs will be removed after final clean up and restoration activities have been conducted. Appropriate sediment and erosion control devices will be installed along the sides and bottom of the TCSBs, as necessary, to prevent sediment from entering the waterway during use of the TCSBs. TCSBs will be inspected on a regular basis and anchored to prevent movement. Upon TCSB removal, waterway banks will be restored to pre-existing conditions.

4.7 DEWATERING OPERATIONS

Groundwater or stormwater runoff may accumulate in the excavations during construction activities. If dewatering is necessary to complete the Project activities, the discharge will be handled in accordance with Wisconsin Administrative Code NR 216. The following conditions will be followed if dewatering activities are necessary:

- Discharges shall be contained to the approved work areas as much as practicable and shall not create any nuisance conditions, including pooling or ponding outside of the discharge area or erosion of the discharge area or surrounding areas.
- The intake hose will be suspended above the bottom of the trench to minimize sediment uptake during all trench dewatering activities.
- All water shall be discharged into geotextile filter bag or a dewatering structure.

- The dewatering structure will be constructed using staked straw bales lined with geotextile filter fabric.
- Dewatering operations will be monitored to ensure that discharge rates and sediment loads do not exceed the capacity of the dewatering devices.
- At no time shall discharge rate or volume exceed the capacity of the dewatering device, if used. The discharge rate and volume shall be determined with a flow meter or estimated by suitable means.
- As an alternative to discharging water to the ground, the Contractor may truck the water to a licensed disposal facility. No temporary or permanent drainage ditches may be constructed to drain water from the construction site.

5.0 SESC CONTROLS INSTALLATION, PLACEMENT, AND MAINTENANCE

SESC BMPs include erosion and sediment control devices, staging of construction activities, minimizing ground disturbance, restoration, and stabilization activities. These SESC BMPs have been designed pursuant to the WDNR approved erosion and sediment control technical standards and the requirements in Section 3.1.6 of the General Permit. These BMPs will be used to minimize exposure of pollutants to storm water, minimize erosion of bare soils, remove excess sediments from storm water before flowing offsite, and reduce the velocity of storm water flowing on and offsite. Implementation of BMPs, coupled with reestablishment of existing contours and vegetation, will minimize the erosion potential or changes to the runoff coefficients.

Overland storm water flow within the Project site will be managed at all times. Erosion controls are used for temporary stabilization measures and can be used in conjunction with seeding to achieve permanent stabilization. Temporary sediment barriers (e.g., silt fence) will be installed and maintained as necessary in order to contain soil erosion and sedimentation to the approved work areas. All stockpiled soils will be maintained so as to prevent erosion from leaving the site. All temporary synthetic, structural, and non-biodegradable erosion and sediment control measures shall be removed after restoration is considered successful.

Soil susceptibility to erosion is a complex function of characteristics, such as soil texture and structure, topography, surface roughness, vegetative cover, and climate. Erosion may also be influenced by the length of time the soils are bare and by disruption of drainage and erosion control structures. This Plan, and attached Project Plans, describe the erosion and sediment control practices that will be implemented by the Project before, during, and after construction activities.

No storm water infiltration system or ponds are anticipated to be used as part of this Project. All storm water management practices associated with the Project will be located an adequate distance from all ground water wells, in accordance with Wisconsin Code NR 812.08, to provide adequate protection from well contamination.

Erosion and sediment control supplies will be maintained on-site at all times for immediate usage.

5.1 EROSION CONTROLS

The following erosion controls are options for temporary stabilization measures and can be used in conjunction with seeding to achieve permanent stabilization.

5.1.1 Seeding and Mulching

Temporary revegetation may be established in construction work areas where 14 days or more will elapse between the completion of final grading at a site and the establishment of permanent vegetation, and/or where there is a high risk of erosion due to site-specific soil conditions and topography. ANR may require the Contractor to conduct temporary seeding sooner than 14 days at site-specific locations near sensitive resource areas and/or areas prone to wind/water erosion. Unless specifically requested by landowners or land managing agencies, ANR does not intend to establish temporary vegetation in actively cultivated land, standing water wetlands, and/or other standing water areas. Temporary vegetation will be established at any time between April 1 and September 1. Attempts at temporary revegetation after this date should be assessed on a site-specific basis and with ANR approval.

Mulch, such as wood chips, straw, or compost can be used independently as a temporary soil stabilization practice or in conjunction with seeding activities. Mulch acts as a soil surface protection while vegetation is being established. Mulch should not be installed in active agricultural lands. Seed to be used on projects will be consistent with pre-construction vegetation. All temporarily casted soil stockpiles that are not being actively worked shall be seeded and/or mulched to prevent erosion and sedimentation. All seeding or mulching accounted for during restoration activities must be completed prior to frozen ground conditions. If either permanent or temporary soil stabilization by seeding or mulching is not accomplished by the time frozen ground conditions are present, additional erosion control practices will be required. These practices may include additional mulching, application of erosion control matting, sodding, or application of polymer tackifiers. Seeding and mulching practices will follow WDNR Technical Standards 1058 (mulching) and 1059 (seeding).

5.1.2 Erosion Control Blankets

Erosion control blankets are available in a variety of natural and synthetic materials (i.e., coconut fiber, jute, nylon, straw, hay or wood excelsior) and may be used in combination or individually to form blankets. The materials are glued, woven, or structurally bound with a netting or mesh. Netting or mesh materials come in biodegradable, photodegradable, as well as a non-degradable material.

Plastic or polypropylene netting associated with erosion control blanket netting does not allow for independent movement of strands, which can easily entrap snakes and other wildlife moving through the area, and cause dehydration, desiccation, and eventually mortality. Biodegradable jute/twine netting with the “leno” or “gauze” weave (containing strands that are able to move independently) has the least impact on snakes. If erosion matting will be used for this project, use the following matting (or something similar):

- American Excelsior “FibreNet” or “NetFree” products;
- East Coast Erosion biodegradable jute products;
- Erosion Tech biodegradable jute products;
- ErosionControlBlanket.com biodegradable leno weave products;
- North American Green S75BN, S150BN, SC150BN, or C125BN; or,
- Western Excelsior “All Natural” products.

Erosion Control Mat practices will follow WDNR Technical Standard 1053 and/or 1052.

5.1.3 Drainage Ditch Stabilization

Should ditches require stabilization, the EI shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Ditches shall be kept in a rough, graded but smooth condition in order to properly install erosion control seeding, mulch, mats, and blankets. Stabilization methods for ditch bottom wetted perimeters will include one of the following, or combinations of, erosion control blankets, mats, riprap, biorolls, or rock check dams. The method chosen will be based on an analysis of the tractive forces on the lining. Above the wetted perimeter, the ditch will be stabilized by seeding and mulch, and/or erosion control blankets, depending on side slope steepness and length.

5.1.4 Steep Slopes

Although the Project area is relatively flat, the Project will cross some areas with slopes greater than 5 percent. The Project crosses about 10.1 miles of land with slopes greater than 5 percent on Segment PL-2. Only nine of the slopes are greater than 1,000 feet in length, and one is greater than 2,000 feet in length.

Clearing, grading, and trenching on slopes can increase the potential for soil erosion and sediment runoff. In these areas, ANR will install and maintain specific temporary and permanent erosion and sedimentation controls. During construction, temporary slope and trench breakers consisting of compacted earth, sandbags, or other materials will be placed in the work area to reduce runoff velocity and divert water off the construction right-of-way (ROW). Temporary trench plugs, consisting of compacted earth or similar low-permeability material, will be installed at the entry and exit points of wetlands and waterbodies to minimize channeling along the ditch and maintain subsurface hydrology patterns. Additional types of temporary erosion control such as silt fence, straw bales, erosion control matting, and hydro-mulching may be used. Upon installation of the new pipeline, permanent trench breakers and plugs, consisting of sandbags, gravel, foam, cement, or cement-filled sacks, will be installed over and around the pipeline and permanent slope breakers generally consisting of compacted earth and rock will be installed across the ROW during grade restoration. Topsoil and surface contours will be returned to preconstruction conditions and revegetation of the ROW will commence. ANR will monitor the ROW during operation and take measures as necessary to ensure the effectiveness of erosion control and revegetation.

5.2 SEDIMENT CONTROLS

5.2.1 Sediment Traps

An appropriate combination of equivalent sediment controls, such as small temporary sediment basins, and/or sediment traps, silt fences, fiber logs, vegetative buffer strips, berms, etc. are required for all down-slope boundaries of the disturbance area, and for those side slope boundaries as may be appropriate for site conditions.

5.2.2 Construction Exits

Construction exits shall be used where traffic leaves the construction site. Appropriately sized and well-maintained construction exits reduce off-site sedimentation by reducing/eliminating the tracking of sediment from construction sites.

5.2.3 Silt Fence or Fiber Logs (Wattles)

Silt fence or fiber logs (or straw wattles) are used as a perimeter control down-gradient of exposed soils during construction to capture sediment particles on-site to the extent possible. Straw bales alone are not considered an adequate or effective sediment control device and should only be used in conjunction with silt fence. Silt fence will be installed prior to initial grading activities and will remain in place until final site stabilization has occurred. Once construction has begun, the site will be analyzed to determine whether additional silt fencing is required. Fiber logs or straw wattles are used as a sediment and storm water velocity control device; these are tubes of plastic netting or biodegradable burlap material filled with straw, rice straw, or coconut fiber. If straw is used, it should be Certified Weed Free Forage. Fiber logs come in a variety of sizes, from 9 to

20 inches in diameter, and in different lengths. Maintenance of the fiber log will continue until the site has achieved final stabilization.

5.2.4 Berms

Although not anticipated to be used, berms are a dike of material (topsoil, compost, rock, cornstalks, etc.) that is placed perpendicular to sheet flow runoff to control erosion in disturbed areas and retain sediment. Berms can be used in place of a traditional sediment and erosion control tool such as a silt fence. The berm retains sediment and other pollutants (e.g., suspended solids, metals, oil and grease) while allowing the cleaned water to flow through the berm.

5.3 STORMWATER MANAGEMENT

The Project area will be returned to pre-construction conditions at the conclusion of the Project. The Project is exempt from the post-construction performance standards per NR 151.121(2)(a). The scope of work will not result in an increase in the amount of impervious surface greater than ten percent. No long-term, post-construction BMPs will be used. The scope of work will not result in an increase in the amount of impervious surface greater than ten percent. No long-term post-construction BMPs will be used.

5.4 BMP IMPLEMENTATION SCHEDULE

Erosion prevention and sediment control BMPs shall be installed immediately prior to or concurrent with disturbance of up-gradient soils/areas. A BMP Implementation Schedule should be created and maintained, along with inspection reports, as an aid to define and track the timing of SESC BMPs.

5.5 MAINTENANCE

All on-site equipment, temporary and permanent erosion and sediment control practices will be maintained and repaired as needed to ensure continued performance of their intended function. ANR and their EI are responsible for the operation, preventative maintenance, and inspection of temporary and permanent SESC BMPs until the NOT is submitted to the WDNR.

At a minimum, the following guidelines will be used to determine if erosion and sediment control devices require maintenance, repair, or replacement:

- All sediment control devices (e.g., silt fence, straw bales, fiber rolls) must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches 1/2 the height of the device. These repairs must be made within 24 hours of discovery, or as soon as field conditions allow access.
- All sediment deltas and deposits off-site must be removed from surface waters, drainage ways, catch basins and other drainage systems. All areas where sediment removal results in exposed soil must be re-stabilized. The removal and stabilization must take place within 24 hours, and no more than seven (7) days after discovery, unless precluded by legal, regulatory, or physical access constraints. All reasonable efforts must be used to obtain access.
- If inlet protection/culvert protection devices appear plugged with sediment or have standing water around them, the EI or the Contractor shall remove the sediment

and clean or replace the filter as soon as practicable, but not to exceed 24 hours after detection or notification.

6.0 INSPECTIONS

6.1 SITE INSPECTIONS

Surface waters, including drainage ditches, must be inspected for evidence of sediment being deposited by erosion. ANR must remove sediment deposited in surface waters, and re-stabilize the areas where sediment removal results in exposed soil. The removal and stabilization must take place no more than seven days after discovery.

Each piece of construction equipment will be inspected prior to entering the site and during work on the site to verify the integrity of fuel and hydraulic fluid reservoirs on the vehicle and maintain documentation of inspections. The Inspector shall also regularly inspect hoses, pipes, valves, and tanks on equipment, and on refueling station containers, for leaks and deterioration. Leaks or deterioration that are identified shall be fully repaired prior to resuming use of the equipment on the Project.

The entrance/access road must be inspected daily and maintained to ensure off-site tracking of sediment onto public roads is minimized. Accumulations of tracked and deposited sediment must be removed from all off-site paved surfaces within 24 hours of discovery.

All dewatering activities must have on-going monitoring or frequent inspections. The inspection must include the dewatering site, areas where the BMPs are being implemented, and the discharge location. A record should be maintained to document the inspections of the dewatering operations and actions taken to correct any problems that may be identified.

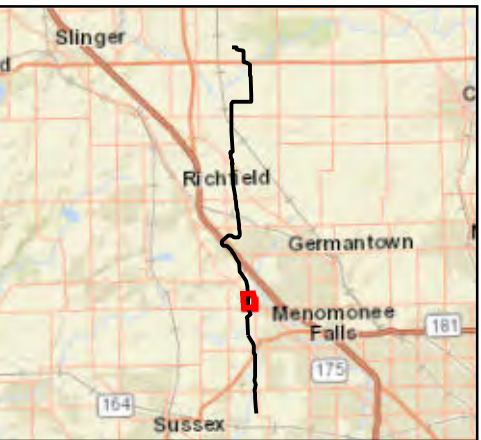
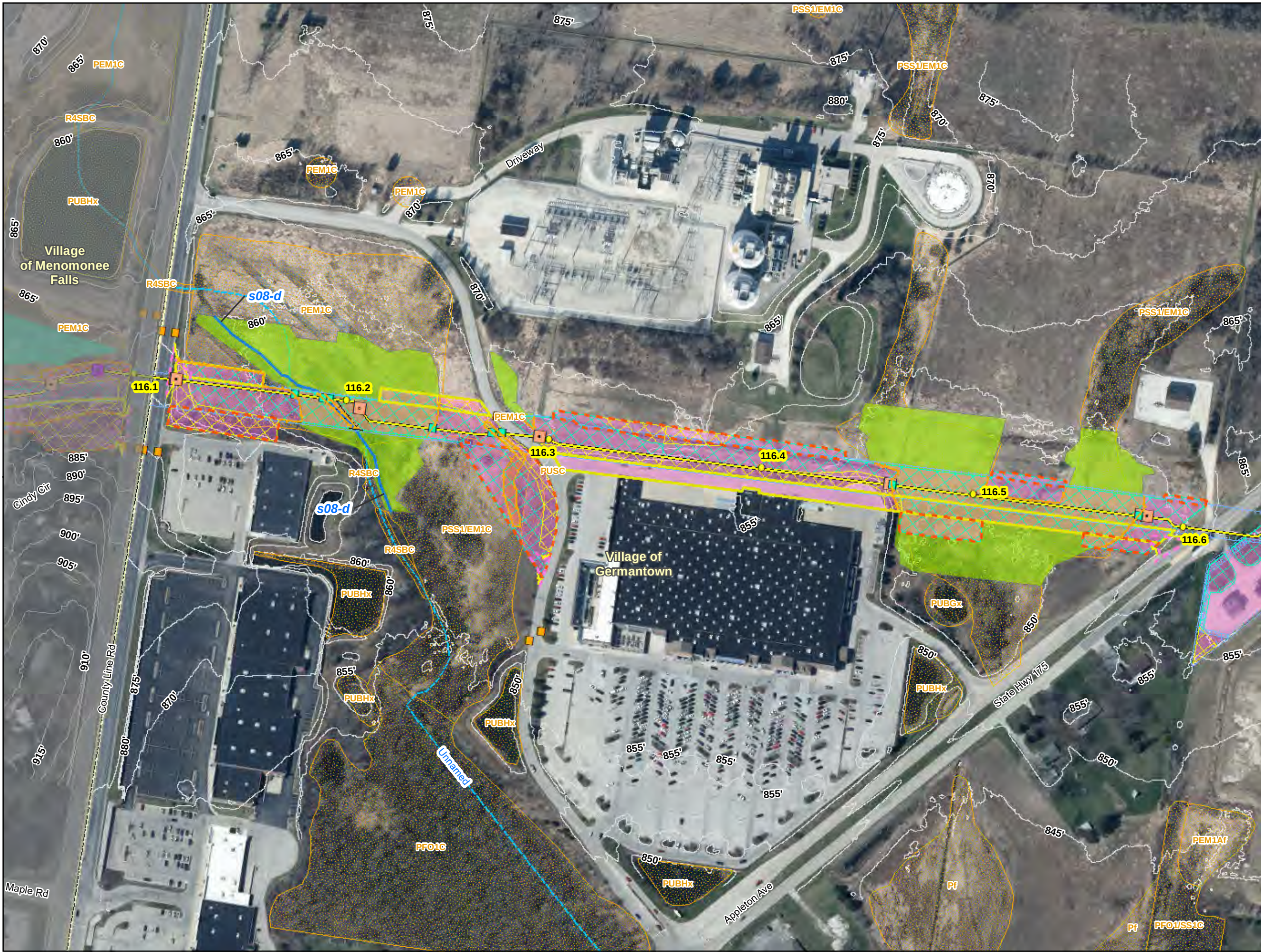
6.2 STORMWATER INSPECTIONS

Inspections of erosion and sediment controls will be completed by an on-site, qualified inspector on a weekly basis, and within 24 hours after a rainfall event of 0.5-inch or greater, as required by the General Permit. Inspections will begin once land disturbance activities begin, and they will continue until permit termination conditions have been achieved and confirmation received. Records of construction site inspections will be maintained until coverage is terminated. All erosion and sediment control repairs and maintenance will be done within 24 hours of an inspection and in accordance with WDNR-approved technical standards.

7.0 FINAL STABILIZATION

ANR will conduct restoration activities in accordance with landowner agreements, permit requirements, and written recommendations obtained from the local conservation authority or other duly authorized agencies.

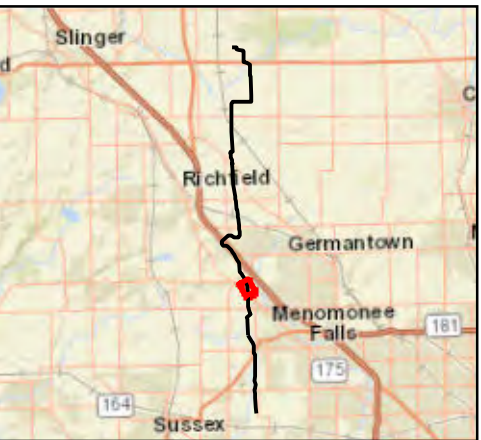
Appendix A Figure 1 - Project Location Map
 Figure 2 - Site Plan and Site Plan Notes
 Figure 3 - Soils Map



- Inlet Protection
- Trench Plug/Breaker
- CP Structures
- AC Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Shallow Marsh
- Shrub-Carr
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin





- Inlet Protection
- Trench Plug/Breaker
- CP Structures
- AC Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Existing Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Shallow Marsh
- Delineated Waterbody
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only

Source: (3/13/2023) Source: Z:\Clients\Q_T\TransCanada\WI_Reinforcement_Project\Permitting\Local\Village_of_Germantown\Figure 2 Site Plan Village of Germantown.mxd



0 100 200 Feet

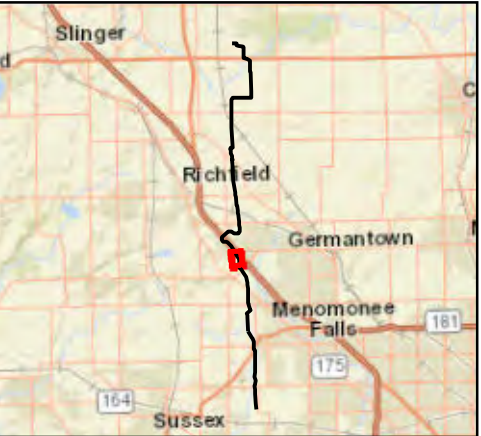
Page 3 of 14

-
- Legend:
- Inlet Protection
 - Trench Plug/Breaker
 - CP Structures
 - Sediment Barrier
 - Municipal Boundary
 - Rock Construction Entrance
 - Erosion Control Fabric
 - Seed and Blanket
 - Seed and Mulch
 - Additional Temporary Workspace
 - Temporary Workspace*
 - Proposed Mile Posts
 - Proposed Centerline
 - Proposed Easement
 - Existing Easement
 - Construction Work Area
 - Fresh (Wet) Meadow
 - Hardwood Swamp
 - Delineated Waterway (10' OHWM or less)
 - Delineated Waterway (>10' OHWM)
 - NHD Waterway
 - NWI Wetland
 - 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



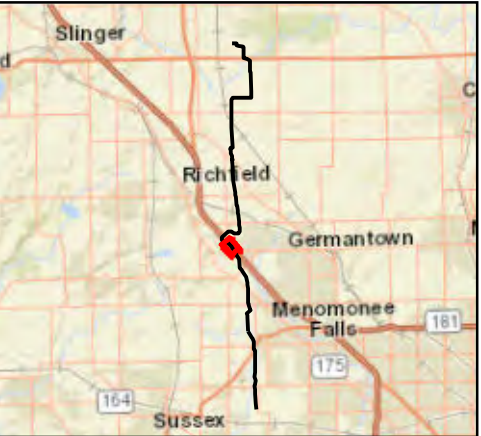
Page 4 of 14

- Trench Plug/Breaker
- Sediment Barrier
- Municipal Boundary
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Hardwood Swamp
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



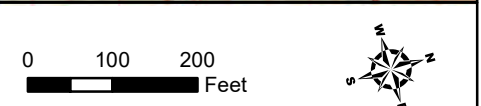
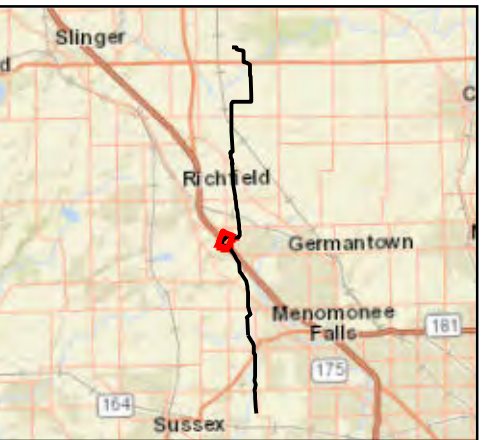
For Environmental Review Purposes Only



- Trench Plug/Breaker
- CP Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Construction Work Area
- Desktop Fresh (Wet) Meadow
- Desktop Hardwood Swamp
- Access Road
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



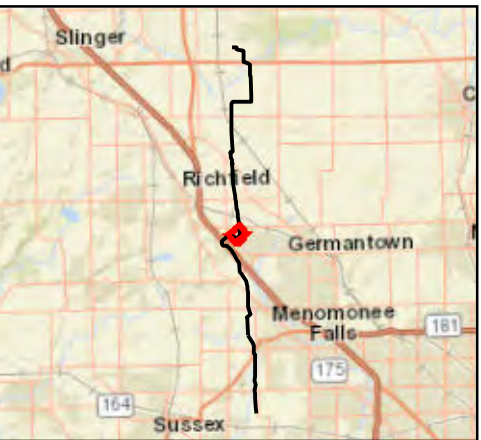


- Trench Plug/Breaker
- CP Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Hardwood Swamp
- Shrub-Carr
- Access Road
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



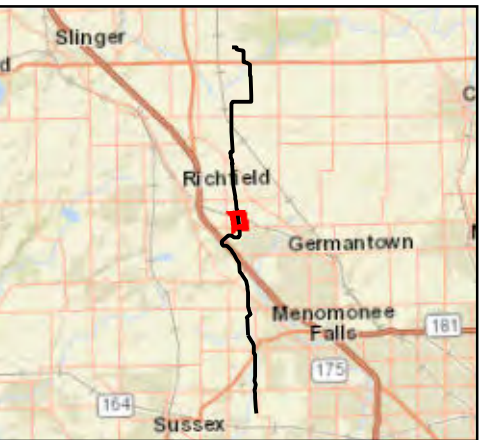
Page 7 of 14

- Trench Plug/Breaker
- CP Structures
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Proposed Easement
- Existing Easement
- Construction Work Area
- Hardwood Swamp
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



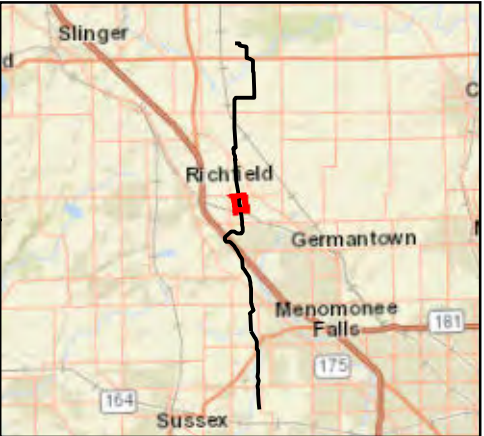
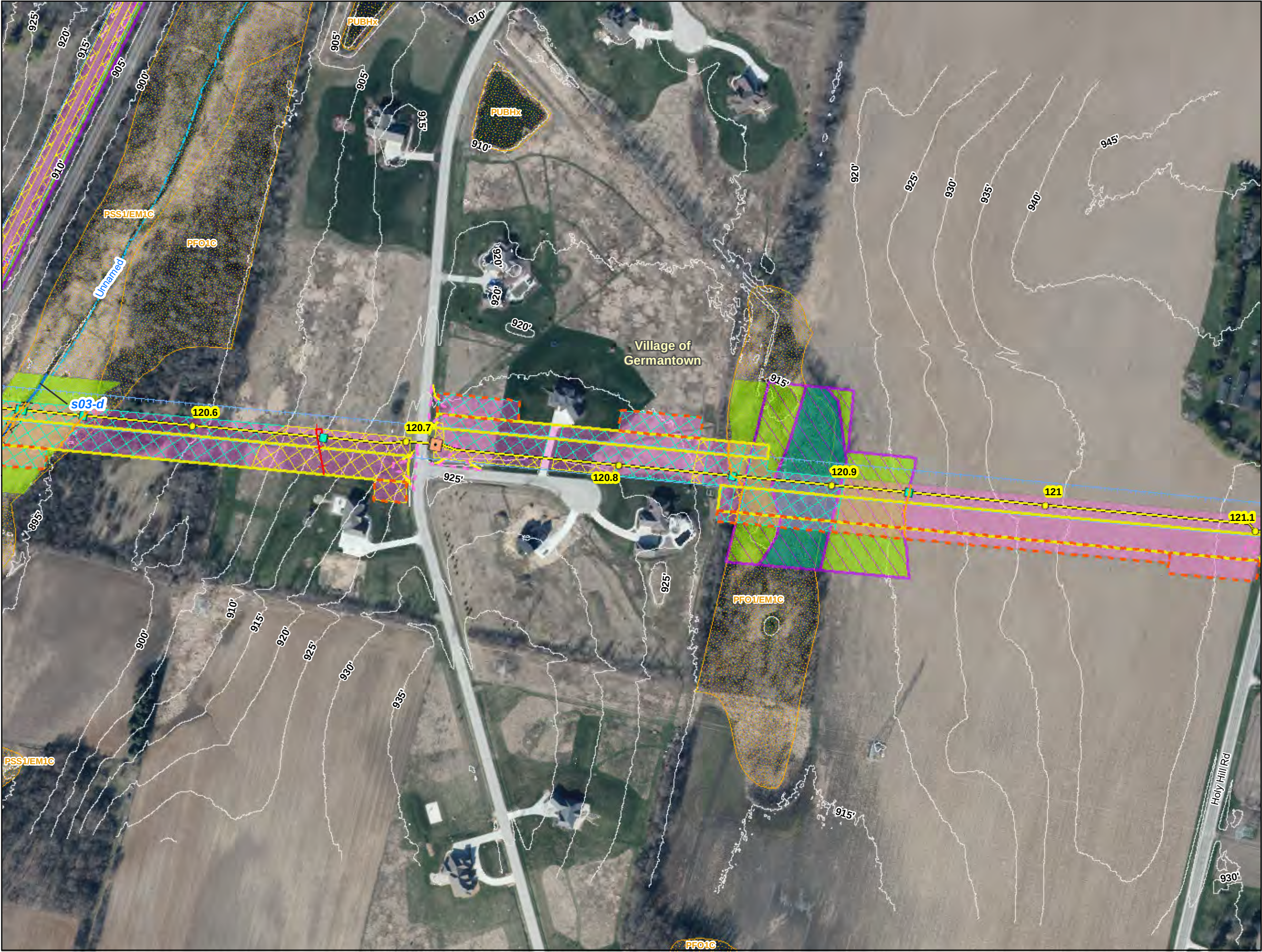
Page 9 of 14

- Inlet Protection
- Trench Plug/Breaker
- CP Structures
- Slope Breaker
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Above Ground Facility
- Construction Work Area
- Fresh (Wet) Meadow
- Desktop Fresh (Wet) Meadow
- Shrub-Carr
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



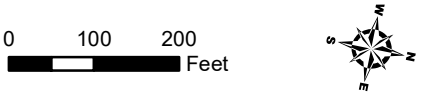
Page 11 of 14

- Trench Plug/Breaker
- CP Structures
- Slope Breaker
- Sediment Barrier
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Above Ground Facility
- Construction Work Area
- Fresh (Wet) Meadow
- Desktop Fresh (Wet) Meadow
- Desktop Hardwood Swamp
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



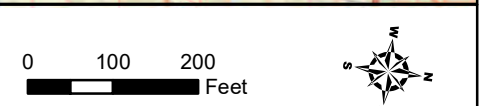
For Environmental Review Purposes Only



- CP Structures
- Ditch Check
- Municipal Boundary
- Rock Construction Entrance
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Construction Work Area
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



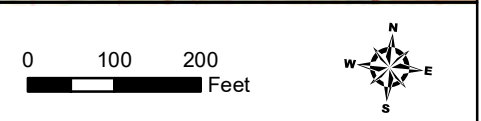
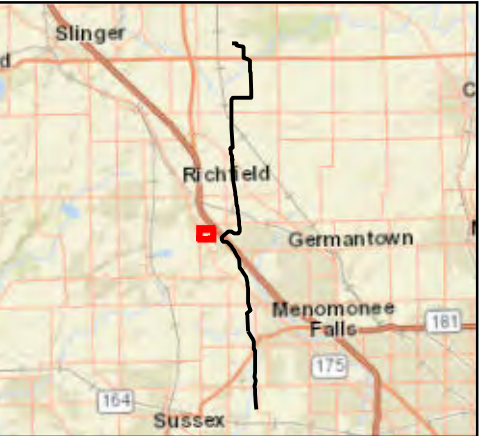


- Trench Plug/Breaker
- CP Structures
- Sediment Barrier
- Municipal Boundary
- Erosion Control Fabric
- Seed and Blanket
- Seed and Mulch
- Additional Temporary Workspace
- Temporary Workspace*
- Proposed Mile Posts
- Proposed Centerline
- Existing Easement
- Construction Work Area
- Fresh (Wet) Meadow
- Hardwood Swamp
- Delineated Waterway (10' OHWM or less)
- NHD Waterway
- NWI Wetland
- 5ft Contour

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only

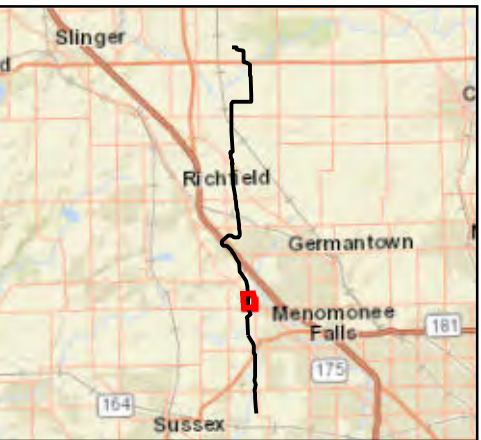
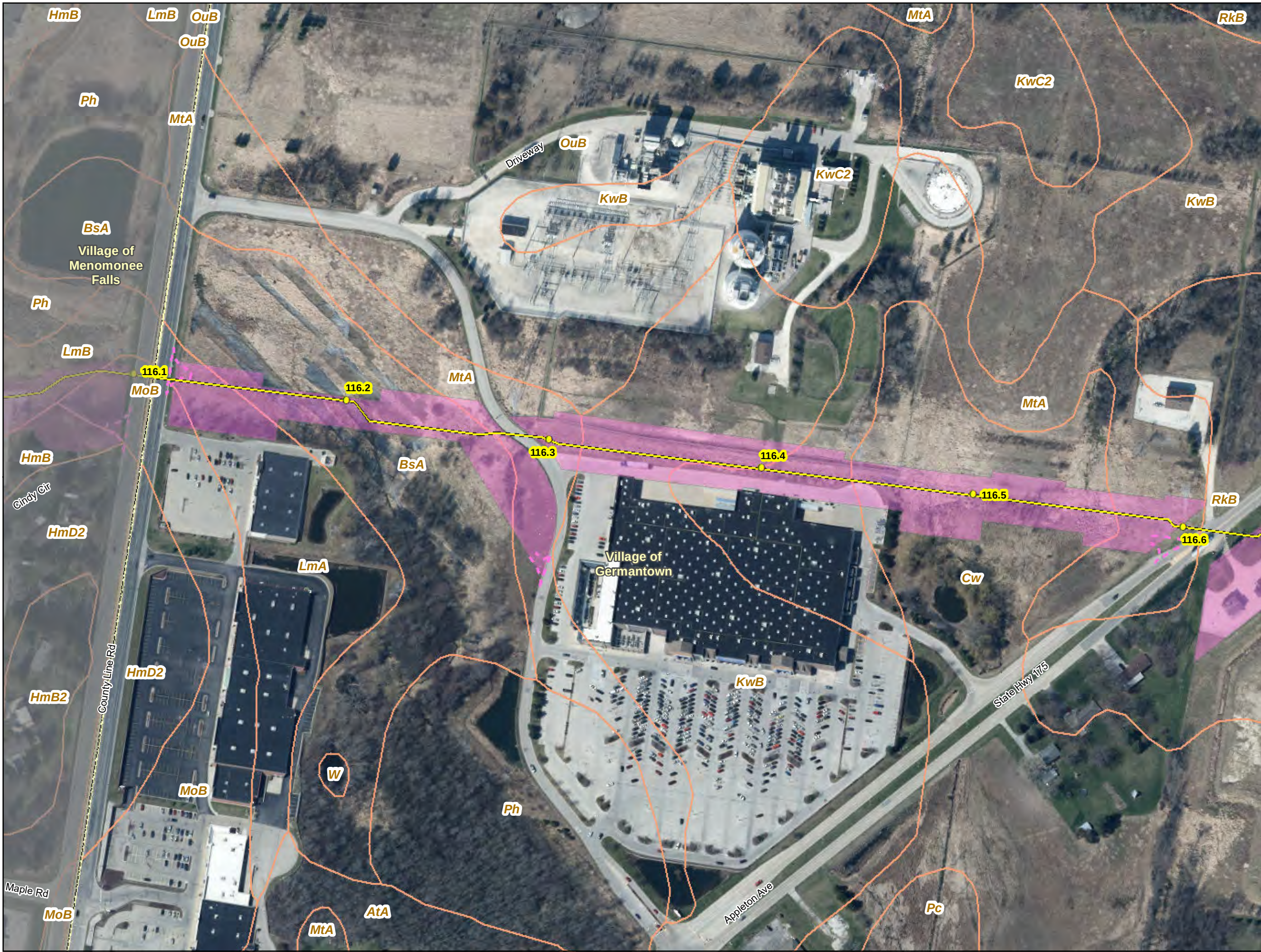


- Sediment Barrier
- Municipal Boundary
- Seed and Blanket
- Seed and Mulch
- Staging Yard
- Construction Work Area
- Fresh (Wet) Meadow
- Shrub-Carr
- Access Road
- Delineated Waterbody
- NHD Waterway
- NWI Wetland

Figure 2. Site Plan
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



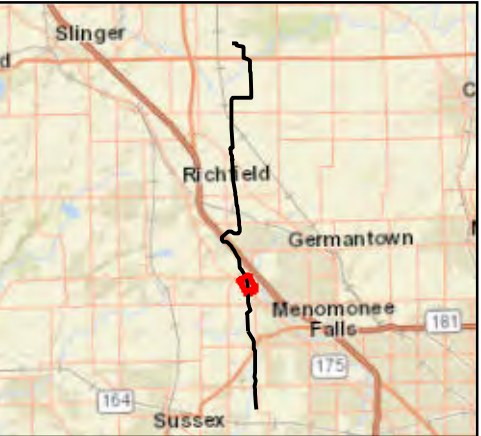
Page 1 of 14

- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only



- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin





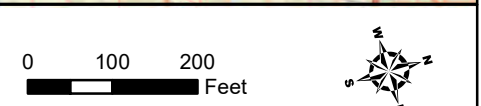
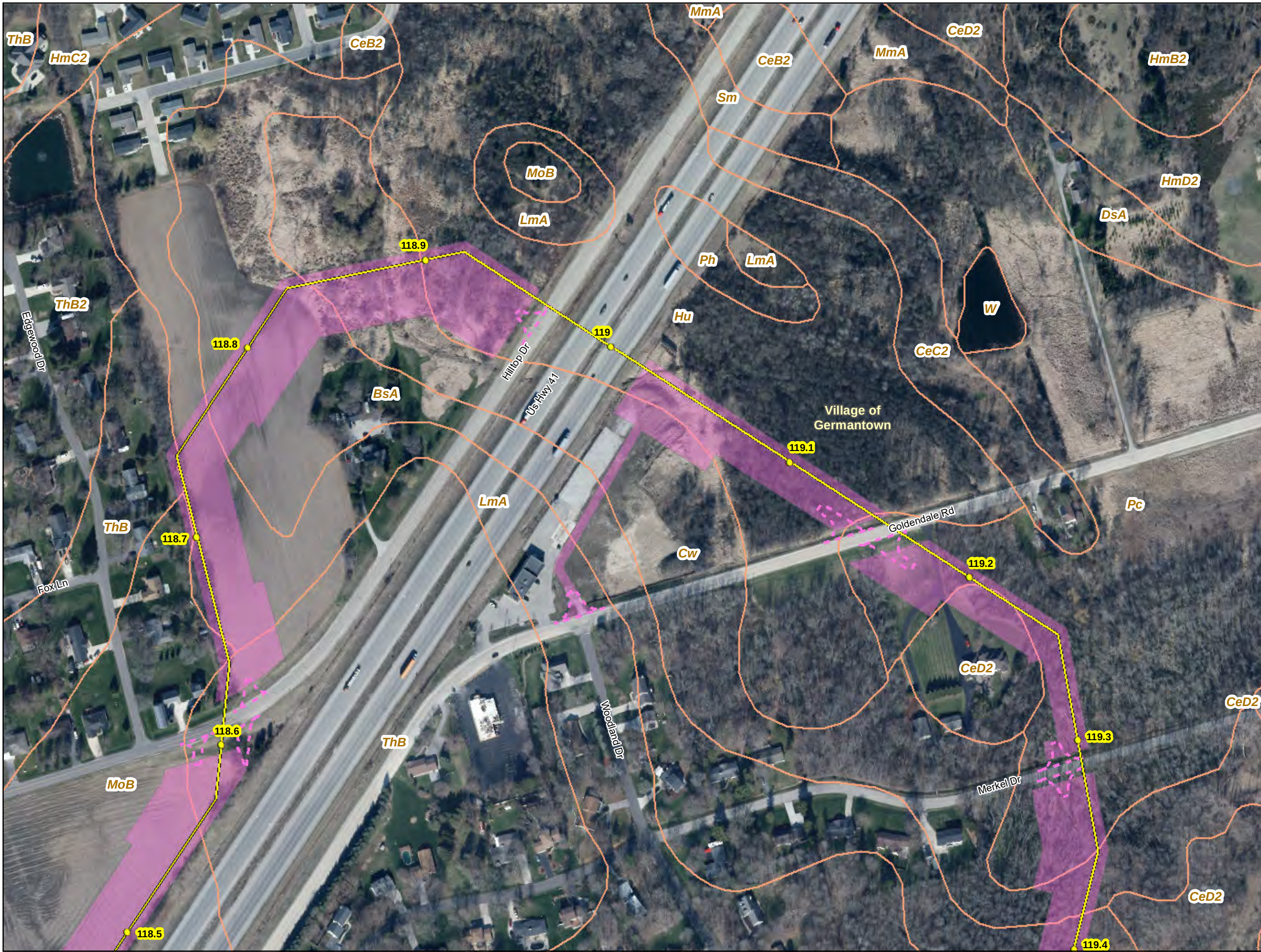
Page 4 of 14

- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



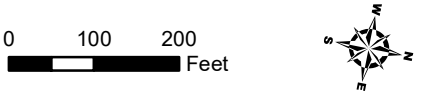
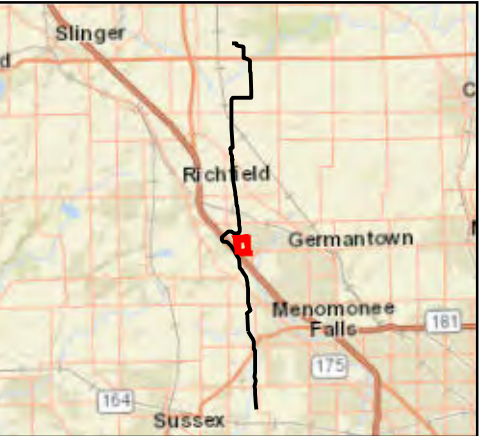
For Environmental Review Purposes Only



- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

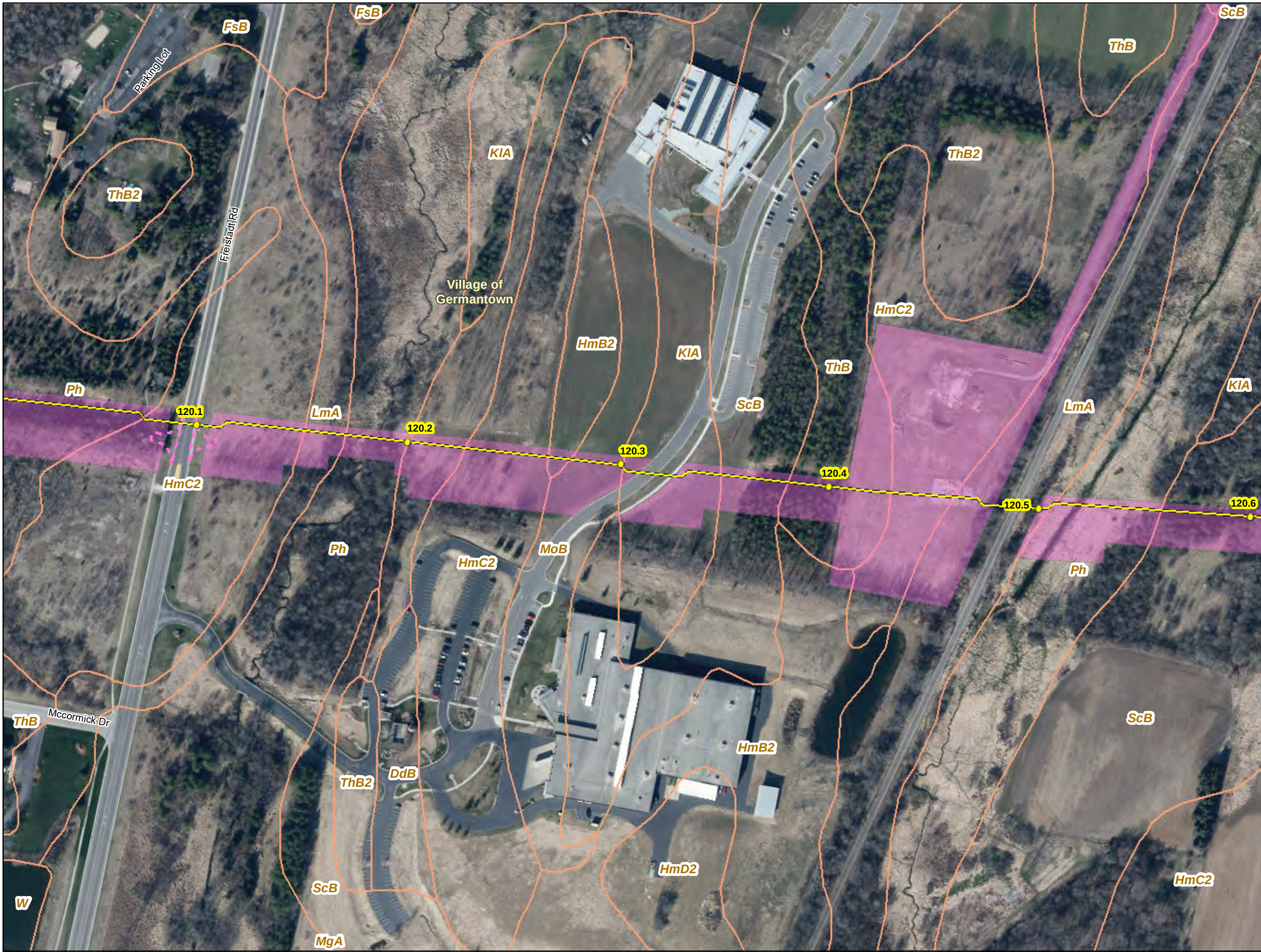




-  Construction Work Area
-  Mapped Soil Unit
-  Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

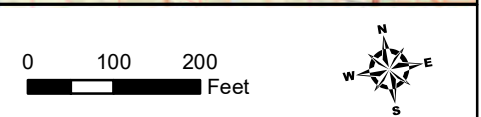




- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin





Page 10 of 14

- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



For Environmental Review Purposes Only

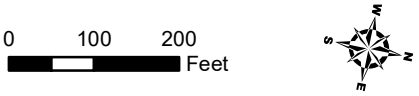
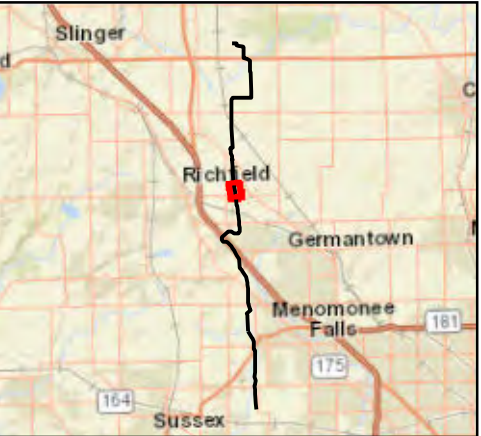
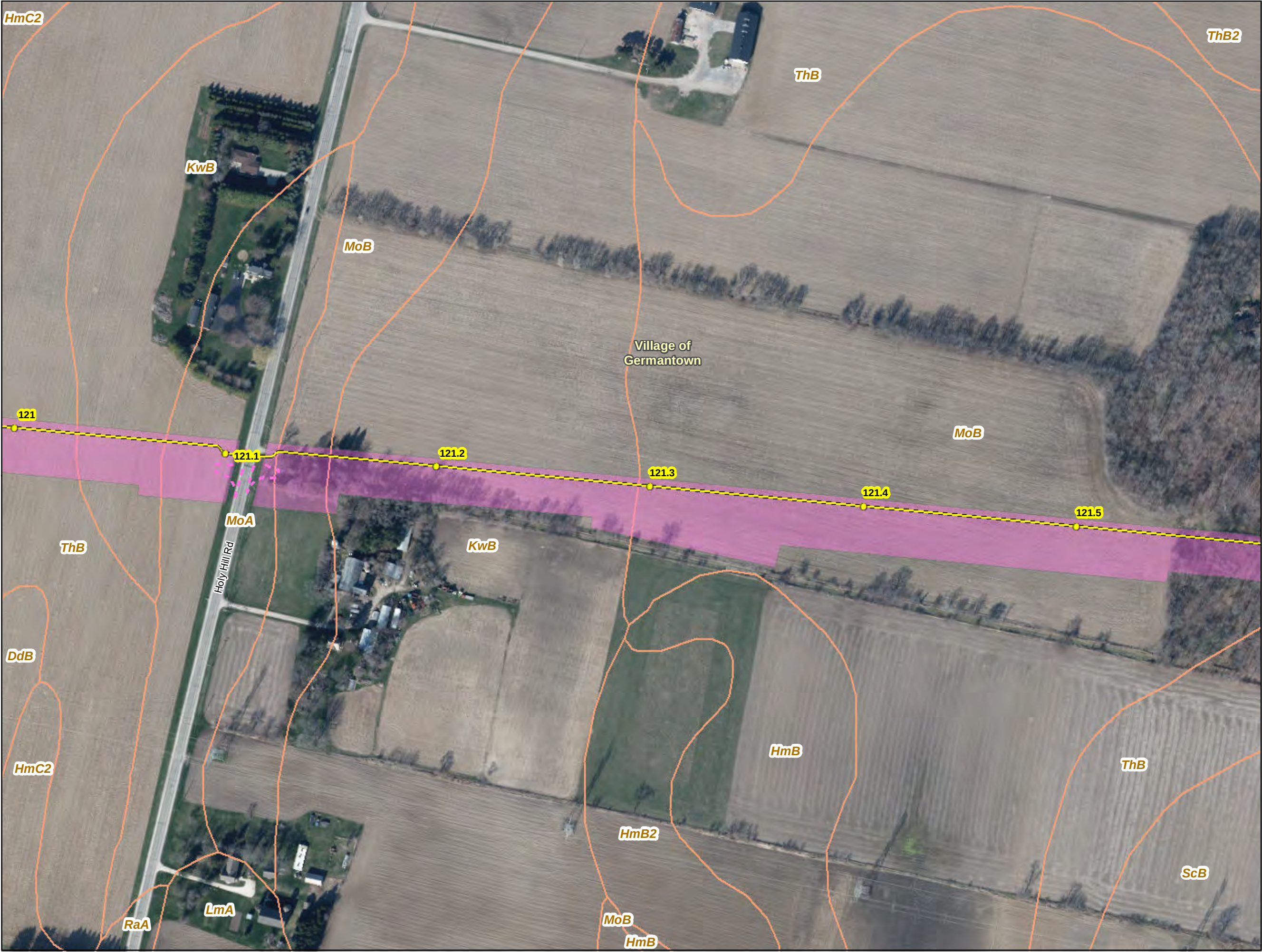


- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



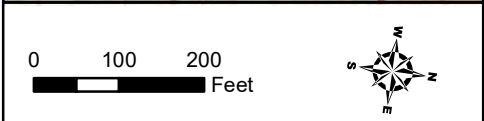
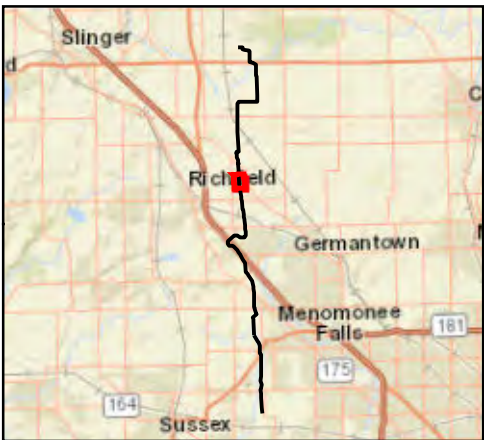
For Environmental Review Purposes Only



- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Rock Construction Entrance
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin

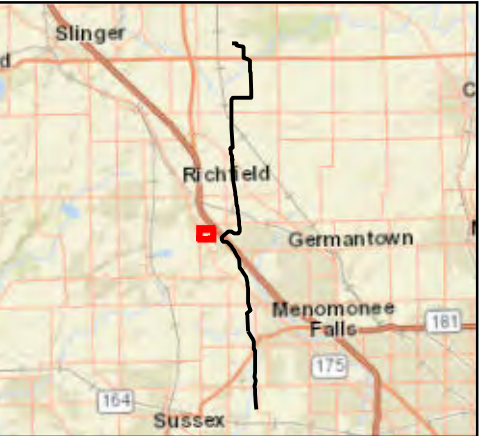




- Proposed Mile Posts
- Proposed Centerline
- Construction Work Area
- Mapped Soil Unit
- Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin





-  Construction Work Area
-  Mapped Soil Unit
-  Municipal Boundary

Figure 3. NRCS Soils
Wisconsin Reliability Project
Village of Germantown
ANR Pipeline Company
Washington County, Wisconsin



Appendix B WPDES General Permit No. WI-S067831-6



**STATE OF WISCONSIN DEPARTMENT OF
NATURAL RESOURCES**

**GENERAL PERMIT TO DISCHARGE UNDER THE WISCONSIN
POLLUTANT DISCHARGE ELIMINATION SYSTEM
WPDES Permit No. WI-S067831-6**

In compliance with the provisions of ch. 283, Wis. Stats., and chs. NR 151 and 216, Wis. Adm. Code, a landowner of a construction site engaging in land disturbing construction activities including clearing, grading and/or excavating, but excluding storm water discharges within Indian Country, that discharges

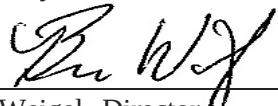
**STORM WATER ASSOCIATED WITH LAND DISTURBING CONSTRUCTION
ACTIVITY**

is authorized to discharge storm water to waters of the state provided that the discharge is in accordance with the conditions set forth in this permit.

Unless notified in writing by the Department of Natural Resources (department) to the contrary, the effective date of coverage under this permit is 14 working days after an applicant's complete Notice of Intent has been received by the department.

Permit coverage continues until submittal of a Notice of Termination for a project and terminates upon written confirmation by the department. The maximum period of permit coverage for any project is limited to 3 years per Notice of Intent. Therefore, after 3 years of initial permit coverage, the permittee is no longer authorized to discharge under this permit unless another Notice of Intent for the original project including the application fee is submitted to retain coverage under this permit or a reissued version of this permit.

State of Wisconsin Department of Natural Resources
For the Secretary

By 
Brian Weigel, Director
Bureau of Watershed Management

September 30, 2021
Date

PERMIT EFFECTIVE DATE: October 1, 2021 **EXPIRATION DATE:** September 30, 2026

TABLE OF CONTENTS

	PAGE
1. APPLICABILITY CRITERIA	3
2. NOTICE OF INTENT, NOTICE OF TERMINATION, AND MINIMUM CONTROL REQUIREMENTS	10
3. EROSION CONTROL AND STORM WATER MANAGEMENT PLANS	13
4. WATER QUALITY STANDARDS, MONITORING, AND RECORDS	19
5. GENERAL CONDITIONS	25
6. DEFINITIONS	27

1. APPLICABILITY CRITERIA

1.1 Eligibility

1.1.1 Subject to the provisions of sections 1.1.3, 1.1.4 and 1.2.1 through 1.2.6:

1.1.1.1 Under the applicability criteria in s. NR 216.42, Wis. Adm. Code, this general Wisconsin Pollutant Discharge Elimination System (WPDES) permit is applicable to all new and existing storm water discharges from land disturbing construction activity occurring after the effective date of this permit until permit coverage is terminated in accordance with section 2.7 or automatically terminates under section 2.8. Construction activities eligible for coverage by this permit are those that involve land disturbing construction activity affecting or anticipated to affect one acre or more of land.

1.1.1.2 The department may require the landowner of any storm water discharge associated with land disturbing construction activity to apply for and obtain a storm water discharge permit if the storm water discharge is contributing to the violation of a water quality standard or contributing significant pollution to waters of the state.

1.1.2 This permit also authorizes pit and trench dewatering discharges at a construction site covered under this permit subject to the following conditions:

1.1.2.1 Dewatering is from a trench or pit not meeting the definition of a well as defined under s. 281.34(1)(h), Wis. Stats., and regulated under ch. NR 812, Wis. Adm. Code.

1.1.2.2 Dewatering discharge is treated in accordance with the department's sediment control dewatering technical standard 1061 or equivalent methodology.

1.1.2.3 Dewatering is not from an area subject to remedial action operations or from an area containing contamination that would be subject to remedial action operations.

Note¹: Examples of some dewatering activities that may be regulated by this permit include dewatering of construction pits, sewer extension construction, pipe trenches, and other similar operations. The department's sediment control dewatering technical standard 1061 is available at: https://dnr.wi.gov/topic/stormwater/standards/const_standards.html.

Note²: Dewatering well systems with a combined pumping capacity of 70 gallons per minute or more may require temporary high capacity dewatering well approval. Dewatering well systems must meet the requirements of ch. NR 812, Wis. Adm. Code.

Note³: Discharges from dewatering well systems may require coverage under a wastewater general permit for dewatering operations. The wastewater permit for dewatering operations is available at: <https://dnr.wisconsin.gov/sites/default/files/topic/Wastewater/WI0049344permit.pdf>.

Note⁴: Dewatering discharges at construction sites or properties where there is environmental pollution and/or a discharge of a hazardous substance subject to regulation under chs. 289 or 292, Wis. Stats, may require additional approvals and be subject to the [Contaminated Groundwater from Remedial Action Operations General Permit \(WI-0046566-07-0\)](#). Chapter 292, Wis. Stats., defines "remedial action."

1.1.3 This permit authorizes storm water discharges from land disturbing construction activities

that may become mixed with other storm water discharges. Subject to compliance with the terms and conditions of this permit, storm water discharges from temporary support activities such as portable concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas are authorized under this permit provided that the support activity is directly related to and part of the construction site covered under this permit. The erosion control plan required under section 3.1 of this permit shall include provisions to prevent and control the discharge of pollutants to waters of the state from any temporary support activity. This permit does not authorize a support activity that is a commercial operation serving multiple unrelated construction sites or that operates beyond the completion of the permitted construction site associated with the support activity. Other storm water or wastewater discharges that require coverage under another general or individual WPDES permit are not authorized under this permit such as wastewater discharges from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials; fuels, oils and other pollutants used in vehicle operation and maintenance; and soaps or solvents used in vehicle and/or equipment washing.

1.1.4 Storm water discharges associated with industrial activity that are subject to an industrial storm water WPDES permit or which are issued an individual WPDES construction site storm water discharge permit are not authorized by this permit.

Note: For example, non-metallic mining is an industrial activity that includes land disturbance as a normal part of its operation and such land disturbance is regulated under an industrial stormwater permit for that activity. If an industrial facility underwent construction or expanded its operations and land disturbance is not a normal part of its operations, then coverage under this permit would be applicable.

1.1.5 This general permit does not apply to construction sites otherwise eligible for this permit where the department determines, pursuant to s. NR 216.51(5), Wis. Adm. Code, that coverage under an individual WPDES storm water discharge permit is more appropriate. The department may require individual permit coverage for storm water discharge from a construction site otherwise eligible for coverage under this permit if any of the following occur:

1.1.5.1 The storm water discharge from a construction site is determined to be a significant source of pollution and more appropriately regulated by an individual WPDES storm water discharge permit.

1.1.5.2 The storm water discharge from a construction site is not in compliance with the terms and conditions of this general permit or subch. III of ch. NR 216, Wis. Adm. Code.

1.1.5.3 A change occurs in the availability of demonstrated technology or best management practices (BMPs) for the control or abatement of pollutants from the storm water discharge.

1.1.5.4 Effluent limitations or standards are promulgated for a storm water discharge from the construction site different from the conditions contained in ch. 216, Wis. Adm. Code.

1.2 Exclusions

The following are not eligible for coverage under this permit:

1.2.1 Storm water discharges within Indian Country.

Note: Indian Country is defined under 18 USC §1151 and includes all lands within the exterior boundaries of federally recognized Indian reservations and on lands held in federal trust status. Facilities that are located within Indian Country should contact the United States Environmental Protection Agency (USEPA) to apply for permit coverage. Dischargers that previously held permit coverage under previous versions of this permit are no longer eligible for coverage under this permit and must contact USEPA to apply.

USEPA's website contains information on the Construction General Permit: <https://www.epa.gov/npdes/stormwater-discharges-construction-activities>. Proposed discharges within Indian country who are seeking coverage under the NPDES construction permit should verify eligibility for coverage under the general permit. Discharges not eligible may require individual permits from USEPA.

1.2.2 Land disturbing construction activity and associated storm water discharges that affect wetlands, unless the department determines that the land disturbing construction activity and associated storm water discharges comply with the wetland water quality standards provisions in ch. NR 103, Wis. Adm. Code. A landowner applying for permit coverage under section 2.1 shall provide information to the department with the application documenting whether wetlands are present in the project area and how the presence or absence of wetlands was determined. The storm water management plan in section 3.4.3 shall include the technical basis for the chosen BMPs and describe how the chosen practices do not cause adverse impacts to receiving water quality.

Note: The department's wetland screening and delineation procedures are available at: <https://dnr.wi.gov/topic/stormwater/construction/>.

1.2.3 Land disturbing construction activity and associated storm water discharges that affect endangered and threatened resources, unless the department determines that the land disturbing construction activity and associated storm water discharges comply with the endangered and threatened resource protection requirements of s. 29.604, Wis. Stats., and ch. NR 27, Wis. Adm. Code.

1.2.4 Land disturbing construction activity and associated storm water discharges that affect any historic property that is listed property, or on the inventory or on the list of locally designated historic places under s. 44.45, Wis. Stats., unless the department determines that the land disturbing construction activity and associated storm water discharges will not have an adverse effect on any historic property pursuant to s. 44.40(3), Wis. Stats.

1.2.5 Storm water discharges that the department, prior to authorization of coverage under this permit, determines will cause or have reasonable potential to cause or contribute to an excursion above any applicable water quality standard. Where such determinations have been made prior to authorization, the department may notify the applicant that an individual permit application is necessary.

1.2.6 Storm water discharges from transportation activity carried out under the direction and supervision of the Wisconsin Department of Transportation.

Note: "Transportation activity" has the meaning given in s. 30.2022(1g), Wis. Stats. Section 283.33(4m)(b)1., Wis. Stats., directs the Department of Natural Resources to issue a distinct general permit that authorizes the Department of Transportation to discharge storm water from

the site of a transportation activity.

1.3 Authorization

1.3.1 A landowner planning a land disturbing construction activity of one acre or more shall submit a completed Notice of Intent (NOI) to the department in accordance with the requirements of section 2.1 of this permit to be authorized to discharge storm water under this permit.

1.3.2 Only a landowner or person who becomes a qualified landowner, and who submits an NOI in compliance with section 2 of this permit is authorized to discharge storm water from a land disturbing construction activity of one acre or more under the terms and conditions of this permit.

1.4 More than One General Permit Can Apply

This permit may be issued to existing holders of general or individual WPDES permits, resulting in multiple WPDES permits for some sites. Facilities having other permits which do not regulate storm water discharges from land disturbing construction activities shall be subject to this permit when construction activities will disturb one acre or more of land at the site. However, storm water discharges from land disturbing construction activity associated with the normal operation of an industrial facility do not require coverage under this permit when it is regulated under an industrial storm water permit pursuant to subch. II of NR 216, Wis. Adm. Code.

1.5 Transfers

A permittee who does not intend to control the permitted activities on the site may transfer authorization under this permit to the person who will control the permitted activities. The transfer shall occur upon written notification, signed by both the current permittee and the proposed permittee and sent via certified or registered mail to the department. Unless the department notifies the permittee to the contrary, the department will recognize this permit coverage transfer upon receipt of written notification. The department may require additional information to be filed prior to granting the transfer of permit coverage. The department may, if appropriate, require an application for an individual WPDES storm water discharge permit.

Note: Transfer of permit coverage may not occur where the original landowner still owns a portion of the construction site that requires permit coverage. Where multiple landowners are required to have construction site permit coverage, each must file an NOI with the department. Multiple landowners may utilize the same erosion control and storm water management plans if the plans address the specific needs of the construction site that they own.

Note: The Transfer of Coverage form (Form 3400-222) is available on the department's website at: <https://dnr.wisconsin.gov/topic/Stormwater/construction/forms.html>.

1.6 Authorized Local Program

Section NR 216.415, Wis. Adm. Code, establishes the requirements for a municipal authorized local program. The landowner of a construction site regulated by an authorized local program shall comply with this section 1.6.

Note: Currently, Waukesha County is the only municipality with an authorized local program conditionally-approved by the department. The department will not approve any other municipal authorized local program until revisions to the applicable sections of ch. NR 216, Wis. Adm. Code, are promulgated.

1.6.1 Unless otherwise directed by the department, a landowner regulated by an authorized local program shall comply with the ordinances established by the authorized local program and reviewed by the department as part of the establishment and management of the authorized local program. For Waukesha County, the ordinances are contained in Chapter 14, article VIII of the County Code of Ordinances (available at:

<https://www.waukeshacounty.gov/globalassets/parks--land-use/land-conservation/stormwater/final-2005-storm-water-ordinance---waukesha-co-web-version.pdf>).

1.6.2 Notwithstanding the establishment of an authorized local program, a landowner regulated by an authorized local program who has submitted a permit application in accordance with section 1.6.3 shall comply with this permit. The department may enforce against the landowner of a construction site for a violation of this permit.

1.6.3 A landowner regulated by an authorized local program shall comply with the application requirements established by the authorized local program under s. NR 216.415(6), Wis. Adm. Code.

1.6.4 If an authorized local program is terminated pursuant to s. NR 216.415(10), Wis. Adm. Code, the department will notify an affected landowner in writing with instructions on how to remain in compliance with this permit.

2. NOTICE OF INTENT, NOTICE OF TERMINATION, AND MINIMUM CONTROL REQUIREMENTS

2.1 Application Procedures

2.1.1 Except as provided in section 1.6.3, a person required to obtain coverage under this permit (applicant) for storm water discharge from a construction site shall submit a completed NOI to the department in accordance with the requirements of subch. III of ch. NR 216, Wis. Adm. Code. At a minimum, the applicant shall submit the completed NOI to the department in accordance with the requirements of this section, at least 14 working days prior to beginning any land disturbing construction activities. The department may confer permit coverage within the 14 working days or may withhold permit coverage beyond 14 working days to request additional information or to review project compliance with erosion control, storm water management, wetland protection, endangered and threatened resources, or historic property requirements. In either case, the department will notify the applicant in writing. The applicant shall submit the NOI electronically through the department's construction site electronic application process. The Notice of Intent requires applicants to provide information on the applicant, facility location, and applicable information pursuant to ss. NR 216.46 and NR 216.47 Wis. Adm. Code.

Note: The department's construction site electronic application process webpage is available at: <http://dnr.wi.gov/topic/Stormwater/construction/forms.html>. For applicants with no computer capability, the department may accept a paper version of the NOI application on a case-by-case basis. The paper application must be obtained directly by contacting the department at 888-936-7463 or by writing to the Wisconsin DNR, Storm Water Program – WT/3, Box 7921, Madison, Wisconsin 53707-7921. Submittal of the paper application must be accompanied by a letter from the department approving its use.

2.1.2 The applicant shall submit erosion control and storm water management plans as described in Section 3 of this permit to the department as required by s. NR 216.44(2), Wis. Adm. Code, with the NOI.

2.1.3 The applicant shall submit the application fee to the department in accordance with s. NR 216.43(2), Wis. Adm. Code.

2.1.4 The NOI form shall be signed in accordance with s. NR 216.43(3), Wis. Adm. Code.

2.2 Permit Certificate

The permittee shall post the permit certificate (DNR Publication # WT-813 rev. 10/11) in a conspicuous place on the construction site. The department will provide the permit certificate to the permittee with the letter of permit coverage.

Note: The requirement to post the permit certificate in a conspicuous place on the construction site is intended to provide the public an easily accessible and viewable document with contact information for the construction site. The department recommends posting the certificate near each main entrance to the construction site in a location where it is legible from a public right-of-way. Permittees should consider providing sufficient weather protection to avoid the certificate from becoming unreadable.

2.3 Failure to Notify

Persons who fail to notify the department of their intent to be covered under this permit and who discharge storm water to waters of the state associated with land disturbing construction activities of one acre or more, are in violation of ch. 283, Wis. Stats., ch. NR 216, Wis. Adm. Code. Failure to

obtain permit coverage may result in forfeitures of up to \$10,000 per day, pursuant to s. 283.91(2), Wis. Stats.

2.4 Incomplete Notice of Intent

Within 14 working days after the date the department receives the NOI, the department may require an applicant to submit data necessary to complete any deficient NOI or may require the applicant to submit a complete new NOI when the deficiencies are extensive or the appropriate application process has not been used.

2.5 Date Coverage Effective

Unless notified by the department to the contrary, applicants who submit a complete NOI in accordance with the provisions of subch. III of ch. NR 216, Wis. Adm. Code, are authorized to discharge storm water from land disturbing construction sites under the terms and conditions of this permit 14 working days after the date the department receives the NOI. The department may deny coverage under this permit and require submittal of an application for an individual WPDES permit based on a review of the completed NOI or other information.

2.6 Use of Information

All information contained in the NOI other than that specified as confidential by the department shall be available to the public. Confidential treatment will be considered only for information identified in documents submitted by the applicant separate from non-confidential information which meets the requirements of s. 283.55(2)(c), Wis. Stats., and for which written application for confidentiality has been made pursuant to s. NR 2.19, Wis. Adm. Code.

2.7 Notice of Termination

Permittees shall submit a Notice of Termination (NOT) to the department within 45 days after a construction site has undergone final stabilization, temporary sediment control practices have been removed and all land disturbing construction activities that required coverage under this permit have ceased. The NOT shall be submitted consistent with all of the following:

2.7.1 The permittee shall submit the NOT on the electronic form available from the department.

Note: Electronic forms are available at <https://dnr.wisconsin.gov/topic/Stormwater/construction/forms.html>. For applicants with no computer capability, the department may accept a paper version of the NOT on a case-by-case basis. The paper form must be obtained directly by contacting the department at 888-936-7463 or by writing to the Wisconsin DNR, Storm Water Program – WT/3, Box 7921, Madison, Wisconsin 53707-7921. Submittal of the paper form must be accompanied by a letter from the department approving its use.

2.7.2 The Permittee shall sign the NOT form in accordance with s. NR 216.43(3), Wis. Adm. Code.

2.7.3 The department shall use the information submitted with the NOT as basis for confirming or denying termination of coverage.

2.7.4 The department shall provide written confirmation of permit coverage termination to the permittee. Termination of coverage shall not be effective until the department provides confirmation to the permittee.

2.8 Permit Coverage Renewal and Automatic Termination

The maximum period of permit coverage for any project is limited to three years per NOI. After three years of initial permit coverage, the permittee is no longer authorized to discharge under this permit unless renewal of coverage is granted by the department. A permittee may request renewal of coverage under this permit or a reissued version of this permit by submitting an electronic form to the department and paying the application fee for the total area of project disturbance. Reapplication for coverage must occur prior to the end of the three-year period. Unless a permittee renews permit coverage, the department may automatically terminate the initial permit coverage after three years. The permittee is responsible for determining whether a renewal of permit coverage is necessary.

2.9 Minimum Control Requirements

The permittee shall design, install, and maintain BMPs to meet the applicable performance standard in either s. NR 151.11, Wis. Adm. Code, for construction sites that are not transportation facilities or s. NR 151.23, Wis. Adm. Code, for transportation facility construction sites.

2.9.1 Evaluation and implementation of BMPs

The permittee shall utilize the following BMPs:

2.9.1.1 Limiting the size and duration of exposed soil areas subject to erosion via staging of land disturbance. This includes temporary stabilization of areas that will not be subject to further land disturbance during winter months.

2.9.1.2 Develop a spill prevention and response plan.

2.9.1.3 Encourage infiltration through maintaining natural buffers around surface waters and directing storm water to vegetated areas.

2.9.1.4 Utilizing BMPs for which the department has developed technical standards or equivalent methodology.

Note: The storm water technical standards are available on the department's internet site at: <https://dnr.wi.gov/topic/stormwater/standards/>.

2.9.2 BMP Design

The permittee shall consider all of the following factors when designing BMPs:

2.9.2.1 The expected amount, frequency, intensity, and duration of precipitation.

2.9.2.2 The nature of storm water runoff and run-on at the site. Factors such as expected flow from impervious surfaces, slopes, and site drainage features shall be considered. Best Management Practices shall be designed to meet the applicable requirements for erosion and sediment control and post- construction storm water management.

2.9.2.3 The soil type and range of soil particle sizes expected to be present on the site.

2.9.2.4 Both existing and proposed topography.

Note: Clearing, grubbing, and topsoil stripping are types of land disturbance that usually occur before mass grading. Therefore, temporary controls are needed for features that are present in existing topography that may not be present in proposed topography.

2.9.2.5 The proposed construction schedule, if known.

2.9.2.6 Good engineering design practices, including use of applicable technical standards or their or equivalent methodology.

2.9.3 Installation of BMPs

The permittee shall install the following by the time each phase of construction activities has begun:

2.9.3.1 Before land disturbing construction activities in any portion of the site begins, install and direct water to any erosion or sediment controls that prevent or treat discharges from the initial site clearing, grading, excavating, and other land disturbing construction activities.

Note: The requirement to install BMPs prior to each phase of construction activities for the site does not apply to the land disturbance associated with the actual installation of these BMPs. The permittee shall take all reasonable actions to minimize the discharges of pollutants during the installation of storm water BMPs.

2.9.3.2 Following the installation of these initial controls, install and direct water to all BMPs needed to control discharges prior to subsequent land disturbing activities.

2.9.4 Maintenance of BMPs

The permittee shall ensure that all BMPs are maintained and remain effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness. The permittee shall:

2.9.4.1 Follow any specific maintenance requirements for the BMPs used to comply with this permit.

2.9.4.2 Initiate any needed maintenance work so that it is completed by the close of the next business day. The permittee shall repair or replace storm water BMPs as necessary within 24 hours of an inspection performed in accordance with section 4.5 of this permit or after notification by the department that repair or replacement is needed.

Note: A permittee's operator may assist a permittee to comply with these provisions where the operator has a contract or other agreement with the permittee to meet these requirements.

2.9.5 Corrective Actions

If a selected BMP is ineffective in meeting the requirements of this permit, the permittee shall comply with the corrective action requirements in section 3.3.

2.9.6 Compliance with Runoff Management Performance Standards

The permittee shall comply with the construction site performance standards in s. NR 151.11(6m), (7) and (8), Wis. Adm. Code, for construction sites that are not transportation facilities or s. NR 151.23(4m), (5) and (6), Wis. Adm. Code, for transportation facility construction sites. The BMPs installed to meet the performance standards shall be maintained to meet the control and/or treatment capability of the practice. In accordance with section 3.2.6 of this permit, the permittee shall ensure that any permanent structures installed to meet a post- construction performance standard in ss. NR 151.121 to 151.128, Wis. Adm. Code, or ss. NR 151.241 to 151.248, Wis. Adm. Code, are maintained to meet the treatment capability as designed.

2.9.7 Unauthorized Discharges

This permit authorizes storm water discharges from land disturbing construction activities that may become mixed with other storm water discharges. Other storm water or wastewater discharges that require coverage under another general or individual WPDES permit are not authorized under this permit such as wastewater discharges from washout and cleanout of concrete, paint, form release oils, curing compounds and other construction materials; fuels, oils and other pollutants used in vehicle operation and maintenance; and soaps or solvents used in vehicle and/or equipment washing.

3. EROSION CONTROL AND STORM WATER MANAGEMENT PLANS

3.1 Erosion Control Plan Requirements

The landowner or applicant shall develop a site-specific construction site erosion control plan for each construction site regulated under subch. III of ch. NR 216, Wis. Adm. Code. The erosion control plan shall include all of the following:

3.1.1 Description of the construction site and the nature of the land disturbing construction activity, including representation of the limits of land disturbance on a USGS 7.5-minute series topographical map or equivalent.

Note: The map requirement can be met for applicants using the department's electronic permit submittal process that includes an outline of the disturbed area on the surface water data viewer, or submits a shape file with the outline as required in the application process.

3.1.2 Description of the intended timing and sequence of major land disturbing construction activities for major portions of the construction site, such as grubbing, excavating, or grading.

Note: The department encourages inclusion of a staging map, dividing sites into smaller areas with proposed dates for start of land disturbance in each area, start of temporary stabilization, and final stabilization for each area on the map. This staging map is strongly encouraged for all projects expected to have more than 50 acres of land disturbance or land disturbance extending more than 24 months from initial disturbance to final stabilization.

3.1.3 Estimates of the total area of the construction site and the total area that is expected to be disturbed by construction activities.

3.1.4 Available data describing the surface soil as well as subsoils.

3.1.5 Name of immediate named receiving water from the USGS 7.5-minute series topographic maps or department surface water data viewer, and whether the receiving water is an outstanding resource water (ORW), exceptional resource water (ERW), or an impaired water. See Section 4.2 to 4.4 for additional requirements related to designated surface waters.

Note: ORWs and ERWs are listed in ss. NR 102.10 and 102.11, Wis. Adm. Code, respectively. Also, a list of ORWs and ERWs may be found on the department's internet site at: <https://dnr.wi.gov/topic/surfacewater/orwerw.html>.

3.1.6 Description of BMPs and actions that together meet the applicable performance standard in either s. NR 151.11, Wis. Adm. Code, for construction sites that are not transportation facilities or s. NR 151.23, Wis. Adm. Code, for transportation facility construction sites. If BMPs cannot be designed and implemented to meet the sediment reduction performance standard, the construction site erosion control plan shall include a written and site-specific explanation of why the performance standard is not attainable.

Note: Department-approved erosion and sediment control technical standards can be obtained through the department's storm water internet site at: https://dnr.wi.gov/topic/stormwater/standards/const_standards.html.

3.1.7 The construction site erosion control plan shall include a description of appropriate erosion and sediment control BMPs that will be installed and maintained at the construction site to prevent or reduce pollutants from reaching waters of the state. The construction site erosion control plan shall clearly describe the appropriate erosion and sediment control BMPs for each major land disturbing construction activity and the timing during the period of land disturbing construction activity that the erosion and sediment control BMPs will be implemented. Erosion and sediment control BMPs shall be implemented in accordance with either s. NR 151.11(8), Wis. Adm. Code, for construction sites that are not transportation facilities or s. NR 151.23(6), Wis. Adm. Code, for transportation facility construction sites. The description of erosion and sediment control BMPs shall include the following minimum requirements:

3.1.7.1 Description of interim and permanent stabilization practices, including a schedule for implementing the practices. The construction site erosion control plan shall ensure that existing vegetation is preserved where feasible and that disturbed portions of the construction site are stabilized as soon as practicable.

3.1.7.2 Description of any structural practices to divert flow away from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from the construction site.

3.1.7.3 Management of overland flow at all areas of the construction site, unless otherwise controlled by outfall controls.

3.1.7.4 Trapping of sediment in channelized flow.

3.1.7.5 Staging land disturbing construction activities to limit exposed soil areas subject to erosion.

3.1.7.6 Protection of downslope drainage inlets where they occur.

3.1.7.7 Prevent tracking of sediment from the construction site onto roads and other paved surfaces.

3.1.7.8 Prevent the discharge of sediment as part of site de-watering.

3.1.7.9 Protect separate storm drain inlet structures from receiving sediment.

3.1.7.10 Clean up of off-site sediment deposits.

3.1.7.11 Stabilization of drainage ways.

3.1.7.12 Prevent the discharge of sediment eroding from soil stockpiles existing for more than 7 days.

3.1.7.13 Prevent the transport by runoff into waters of the state of untreated wash water from vehicle and wheel washing.

3.1.7.14 Installation of permanent stabilization practices as soon as possible after final grading.

3.1.7.15 Description of erosion and sediment control practices put in place for the winter to prevent soil from leaving the construction site during periods of winter and spring thaw and rains.

3.1.7.16 Description of the expected level of sediment control on the construction site that achieves compliance with s. NR 151.11 or 151.23, Wis. Adm. Code, where applicable. The construction site erosion control plan shall document compliance with the 5 tons per acre per year sediment performance standard using the procedures provided by the department to estimate soil loss and sediment discharge from sheet and rill erosion and measures to limit sediment discharge from concentrated flows and steep slopes. This requirement is in addition to providing the minimum control measures in subsections of 3.1.7 of this permit and is not intended to result in reduction of erosion and sediment control measures.

Note: The department developed the Construction Site Soil Loss and Sediment Discharge Calculation Guidance, dated September 2017. This guidance document establishes a procedure to document compliance with the 5 tons per acre per year sediment performance standard for construction sites. The guidance is available on the department's internet site at: <https://dnr.wi.gov/topic/stormwater/publications.html>.

3.1.7.17 Use and storage of chemicals, cement and other compounds and materials used on the construction site shall be managed during the construction period to prevent their transport by runoff into waters of the state.

3.1.7.18 Minimization of dust to the maximum extent practicable.

3.1.7.19 Minimization of soil compaction and preservation of topsoil.

3.1.7.20 Minimization of land disturbing construction activity on slopes of 20% or more.

3.1.7.21 Spill prevention and response procedures.

3.1.7.22 Additional items necessary to address site-specific conditions.

3.2 Erosion Control Map The construction site erosion control plan shall include a site map with the following items:

3.2.1 Existing topography and drainage patterns, roads and surface waters.

Note: Contour maps at 1- or 2-foot intervals are preferred. Many counties have topographic information available in geographic information system format.

3.2.2 Boundaries of the construction site.

3.2.3 Drainage patterns and approximate slopes anticipated after major grading activities.

Note: Proposed contour maps at 1- or 2-foot intervals are preferred.

3.2.4 Areas of soil disturbance.

3.2.5 Location of erosion and sediment control BMPs identified in the construction site erosion control plan.

3.2.6 Location of areas where stabilization practices will be employed.

3.2.7 Areas that will be vegetated following land disturbing construction activities.

3.2.8 Area and location of wetland acreage on the construction site and locations where storm water is discharged to a surface water or wetland within one-quarter mile downstream of the construction site.

3.2.9 Areas that will be used for infiltration of post-construction storm water runoff.

3.2.10 A method of referencing locations within the site, such as an alphanumeric or equivalent coordinate system for the entire construction site.

3.2.11 Additional items necessary to depict site-specific conditions.

Note: The department encourages inclusion of notes communicating erosion and sediment control requirements to those working on the construction site. The department has a list of recommended notes at:

<https://dnr.wi.gov/topic/stormwater/documents/WTErosionControlNotes.pdf>.

3.3 Erosion and Sediment Control Plan Implementation Requirements

The permittee or the permittee's representative shall implement and maintain, as required by this permit and subch. III of NR 216, Wis. Adm. Code, all BMPs specified in the construction site erosion control plan from the start of land disturbing construction activities until final stabilization of the construction site. Implementation shall include all of the following:

3.3.1 Sediment control BMPs shall be constructed and placed in operation prior to runoff entering waters of the state.

Note: While regional treatment facilities are appropriate for control of post-construction pollutants they should not be used for construction site sediment removal.

3.3.2 No solid materials, including building materials, may be discharged in violation of chs. 30 and 31, Wis. Stats., or 33 USC 1344 or a U.S. Army Corps of Engineers Section 404 permit issued under 33 USC 1344.

3.3.3 Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive flow from the structure to a watercourse so that the natural physical and biological characteristics and functions of the watercourse are maintained and protected.

3.3.4 Sediment basins and traps used for sediment removal shall be constructed and operated in accordance with good engineering practices and design standards.

Note: The department maintains technical standards for sediment basin and traps:
https://dnr.wisconsin.gov/topic/Stormwater/standards/const_standards.html.

3.3.5 All maintenance shall be done in accordance with technical standards developed pursuant to subch. V of ch. NR 151, Wis. Adm. Code, and the erosion control plan. Where measures are not in accordance with the technical standards, a description of the procedures used to maintain effective operating conditions of vegetation, erosion and sediment control BMPs and other protective measures shall be identified in the erosion control plan.

Note: The storm water technical standards are available on the department's internet site at: https://dnr.wi.gov/topic/stormwater/standards/const_standards.html.

3.4 Storm Water Management Plan Requirements

3.4.1 A storm water management plan shall be developed to address pollution caused by storm water discharges from the site after construction is completed, including rooftops, parking lots, roadways and maintained landscaped or grassy areas. A storm water management plan shall be developed prior to submitting a NOI to the department.

Note: The requirements of sections 4.2 to 4.4 of this permit apply to erosion control and storm water management plans for all construction sites regulated under this permit.

3.4.2 The storm water management plan shall meet the applicable performance standards in ch. NR 151, Wis. Adm. Code, as follows:

3.4.2.1 For construction sites that are not transportation facilities, meet the applicable performance standards in ss. NR 151.121 through NR 151.128, Wis. Adm. Code.

3.4.2.2 For transportation facility construction sites, meet the applicable performance standards in ss. NR 151.241 through NR 151.249, Wis. Adm. Code.

3.4.3 The storm water management plan shall include a description of the BMPs that will be installed during the construction process to control total suspended solids and peak flow, enhance infiltration, maintain or restore protective areas and reduce petroleum in runoff that will occur after construction has been completed. The storm water management plan shall include an explanation of the technical basis used to select the BMPs

Note: Storm water management post-construction technical standards developed per Subch. V NR 151, Wis. Adm. Code, can be obtained at: https://dnr.wisconsin.gov/topic/Stormwater/standards/postconst_standards.html. For final stabilization after construction is completed the establishment of a perennial vegetative cover the procedures for permanent seeding in accordance with the department's seeding technical standard 1059 or equivalent methodology shall be followed.

3.4.4 When permanent infiltration systems are used, appropriate on-site testing shall be conducted to determine if seasonal high groundwater elevation or top of bedrock is within 5 feet of the bottom of the proposed infiltration system.

3.4.5 Storm water BMPs shall be adequately separated from wells to prevent contamination of drinking water, and the following minimum separation distances shall be met:

3.4.5.1 Storm water infiltration systems and ponds shall be located at least 400 feet from a well serving a community water system unless the department concurs that a lesser separation distance would provide adequate protection of a well from contamination.

3.4.5.2 Storm water BMPs shall be located with a minimum separation distance from any well serving a non-community or private water system as listed within s. NR 812.08, Wis. Adm. Code.

Note: Chapter NR 815, Wis. Adm. Code, regulates injection wells including storm water injection wells. Construction or use of a well to dispose of storm water directly into groundwater is prohibited under s. NR 815.11(5), Wis. Adm. Code.

3.4.6 For any permanent structures, provisions shall be made for long-term maintenance with the municipality or other responsible party. For an NOI submitted to the department, a copy of the signed long-term maintenance agreement shall be submitted to the department with the NOI unless the department agrees that it may be submitted by an alternative date prior to termination of permit coverage. The department may withhold permit coverage until the long-term maintenance agreement is submitted to the department.

Note: The long-term maintenance agreement is an important requirement and the department wants to ensure that appropriate steps are being taken to secure the agreement. The department encourages the landowner to obtain a municipal agreement for long-term maintenance of regional treatment structures. Long-term storm water BMPs should be maintained after permit termination in accordance with the maintenance agreement and NR 216.005, Wis. Adm. Code.

3.5 Amendments

3.5.1 The permittee shall amend the erosion control and/or storm water management plans if any of the following occurs:

3.5.1.1 There is a change in design, construction, operation or maintenance at the construction site, which has the reasonable potential for the discharge of pollutants and has not otherwise been addressed in the erosion control and storm water management plans.

3.5.1.2 There is a change in the sequence, schedule, or phasing of construction at the construction site which has a reasonable potential to cause an exceedance of the 5 tons per acre per year sediment performance standard.

3.5.1.3 The actions required by the erosion control and storm water management plans fail to reduce the impacts of pollutants carried by construction site storm water runoff.

3.5.2 For construction sites for which there has been earlier department review of the erosion control and storm water management plans, if the permittee identifies changes needed in either plan, the permittee shall notify the department regional storm water contact at least 5 working days prior to making the changes in the plan.

Note: Land disturbance outside the limits depicted in plans submitted to the department, an increase in proposed impervious area, or changes to the design of post-construction site treatment practices typically require changes to the erosion control or storm water management plans. The department may require a permittee to file a new notice of intent if the amended site requires resource screening of additional area, the amended site no longer meets an exemption from post-construction performance standards under ss. NR 151.121 to 151.125, Wis. Adm. Code, the plans do not meet one or more requirements of sub. III of NR 216, Wis. Adm. Code, or the conditions of a permit issued pursuant to this subchapter.

3.5.3 The department may, upon request of a permittee or upon finding of just cause, modify the compliance and reporting schedules or any requirement of a storm water discharge permit.

4. WATER QUALITY STANDARDS, MONITORING, AND RECORDS

4.1 Water Quality Standards

This permit specifies the conditions under which storm water may be discharged to waters of the state for the purpose of achieving water quality standards contained in chs. NR 102 through 105, NR 140, and NR 207, Wis. Adm. Code. For the term of this permit, compliance with water quality standards will be addressed by adherence to general narrative-type storm water discharge limitations, compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, and implementation of the erosion control and storm water management plans and BMPs. A permittee with a construction site covered under this permit shall select, install, implement and maintain BMPs as necessary to meet applicable water quality standards. Unless notified by the department in writing to the contrary, compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, shall be deemed as stringent as necessary to ensure that storm water discharges covered by this permit do not cause or contribute to an excursion above any applicable water quality standard.

4.2 Outstanding and Exceptional Resource Waters

4.2.1 Before beginning land-disturbing construction activity, the permittee shall determine whether any part of its construction or post-construction site storm water will discharge to an outstanding resource water (ORW) or exceptional resource water (ERW). ORWs and ERWs are listed in ss. NR 102.10 and 102.11, Wis. Adm. Code, respectively.

Note: The department recommends that an applicant for permit coverage check for ORWs and ERWs during project planning prior to submitting an NOI. A list of ORWs and ERWs may be found on the department's internet site at: <https://dnr.wi.gov/topic/surfacewater/orwerw.html>.

4.2.2 The permittee may not establish a new storm water discharge of pollutants directly to an ORW or an ERW unless the discharge of pollutants is equal to or less than existing levels of pollutants immediately upstream of the discharge site. The erosion control and storm water management plans required under section 3 of this permit shall include BMPs designed to meet this requirement for a new storm water discharge.

4.2.2.1 "New storm water discharge" means a storm water discharge that would first occur after the permittee's start date of coverage under this permit to a surface water to which the construction site or post-construction site did not previously discharge storm water.

4.2.3 The permittee's erosion control and storm water management plans required under this permit shall be designed to prevent the discharge of sediment and other pollutants to any ORW or ERW in excess of the background level within the water body. Unless notified by the department in writing to the contrary, compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, shall be deemed in compliance with the requirements of this section. If the department has sufficient site-specific data to determine that the permittee's construction or post-construction site storm water will discharge a pollutant in excess of the background level within an ORW or ERW, then the department shall notify the permittee in writing that the permittee shall include a written section in the erosion control and storm water management plans that discusses and identifies the management practices and control measures the permittee will implement to prevent the discharge of any pollutant in excess of the background level within the water body. This section of the permittee's plans shall specifically identify control measures and practices that will collectively be used to prevent the discharge of a pollutant in excess of the background level within the water body.

Note: Reducing or eliminating surface water discharges to an ORW or ERW by infiltrating runoff is a method to help prevent the discharge of pollutants to an ORW or ERW in excess of background levels. It is expected that post-construction storm water management practices will be designed to maintain or increase infiltration rates for the site as compared to pre-development infiltration rates for areas that discharge to any ORW or ERW. However, prohibitions, exclusions, or exemptions from infiltrating runoff may apply to runoff from potential sources of contamination or into areas that are prone to groundwater contamination as identified in s. NR 151.12(5)(c)5. and 6., Wis. Adm. Code, or s. NR 151.124(3) and (4), Wis. Adm. Code. Infiltration systems shall be designed to comply with the groundwater quality standards contained in ch. NR 140, Wis. Adm. Code.

4.2.4 Protective areas of at least 75 feet shall be maintained adjacent to any ORW and ERW as required under ss. NR 151.12 (5)(d), NR 151.125, 151.24(6), or NR 151.245, Wis. Adm. Code.

4.3 Fish and Aquatic Life Waters

4.3.1 Before beginning land-disturbing construction activity, the permittee shall determine if the site will have a storm water discharge to a fish and aquatic life water as defined in s. NR 102.13, Wis. Adm. Code.

Note: The department recommends that an applicant check for fish and aquatic life waters during project planning prior to submitting an NOI. Most receiving waters of the state are classified as a fish and aquatic life water and this classification includes all surface waters of the state except ORWs, ERWs, Great Lakes system waters and variance water identified within ss. NR 104.05 to 104.10, Wis. Adm. Code. The department may be consulted if the applicant is not certain of the classification.

4.3.2 The permittee may not establish a new storm water discharge of pollutants to a fish and aquatic life water if the discharge will result in the significant lowering of water quality of the fish and aquatic life water. Significant lowering of water quality is defined within ch. NR 207, Wis. Adm. Code. If discharges result in the significant lowering of water quality, the procedures of s. NR 207.04 (c) 1., Wis. Adm. Code may apply, and the permittee shall include this as additional information pursuant to s. NR 216.48 (3), Wis. Adm. Code. Unless notified by the department in writing to the contrary, compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, shall be deemed in compliance with the requirements of this section. "New storm water discharge" has the meaning given in section 4.2.2.1 of this permit.

4.4 Impaired Water Bodies and Total Maximum Daily Load Requirements

4.4.1 "Pollutant(s) of concern" means a pollutant that is contributing to the impairment of a water body.

4.4.2 Before beginning land-disturbing construction activity, the permittee shall determine whether any part of its construction or post-construction site storm water will discharge to an impaired water body listed in accordance with Section 303(d)(1) of the federal Clean Water Act, 33 USC §1313(d)(1)(C), and the implementing regulation of the US Environmental Protection Agency, 40 CFR §130.7(c)(1). Impaired waters are those that are not meeting applicable water quality standards.

Note: The list of Wisconsin impaired surface water bodies may be obtained by contacting the department or by searching for keyword "impaired waters" on the department's internet site. The department updates the list approximately every two years. The updated list is effective upon

approval by the USEPA. The current list may be found on the department's Internet site at: <https://dnr.wisconsin.gov/topic/SurfaceWater/ConditionLists.html>.

4.4.3 A permittee that will discharge a pollutant of concern via storm water to an impaired water body shall include a written section in the erosion control and storm water management plans that specifically identifies control measures and management practices that will collectively be used to reduce, with the goal of eliminating, the storm water discharge of pollutant(s) of concern that contribute to the impairment of the water body and explain why these control measures and management practices were chosen as opposed to other alternatives. Unless notified by the department in writing to the contrary, compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, shall be deemed to be compliance with the requirements of this section.

4.4.4 The permittee may not establish a new storm water discharge of a pollutant of concern to an impaired water body or increase an existing discharge of a pollutant of concern to an impaired water body unless the new or increased discharge causes the receiving water to meet applicable water quality standards, or the discharge is consistent with a USEPA approved total maximum daily load (TMDL) allocation for the impaired water body. Unless notified by the department in writing to the contrary, compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, shall be deemed to be compliance with the requirements of this section. "New storm water discharge" has the meaning given in section 4.2.2.1 of this permit.

4.4.5 Before beginning land-disturbing construction activity, the permittee shall determine whether any part of its construction or post-construction site storm water will discharge a pollutant of concern via storm water to a water body included in a State and Federal approved TMDL. If so, the permittee shall assess whether the TMDL wasteload allocation for the facility's discharge will be met through the existing erosion control and storm water management plans and compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, or whether changes to the plans are necessary.

Note: The department recommends that an applicant for permit coverage check for approved TMDLs during project planning prior to submitting an NOI. State and Federal approved TMDLs can be identified by contacting the department, or by searching for keyword "TMDL" on the department's internet site at dnr.wi.gov. The current State and Federal approved Final TMDLs may be found on the department's internet site at: <https://dnr.wisconsin.gov/topic/TMDLs>.

4.4.6 After determining whether the construction or post-construction site storm water discharge is included in a USEPA approved TMDL and determining that any TMDL wasteload allocation for the construction or post-construction site's discharge is not being met, the permittee shall amend the erosion control and storm water management plans. The amended plans shall include the necessary control measures to meet the requirements of the USEPA approved TMDL wasteload allocation for the construction or post-construction site. If a specific wasteload allocation has not been assigned to the construction or post-construction site under a TMDL, compliance with the applicable performance standards of subch. III or IV of ch. NR 151, Wis. Adm. Code, and this permit shall be deemed to be compliance with the TMDL.

4.5 Inspections and Maintenance

The permittee shall:

4.5.1 Conduct the following construction site inspections:

4.5.1.1 Weekly inspections of erosion and sediment control BMPs; and

4.5.1.2 Inspections of erosion and sediment control BMPs within 24 hours after a rainfall event of 0.5 inches or greater. A “rainfall event” may be considered to be the total amount of rainfall recorded in any continuous 24-hour period.

Note: More frequent visual monitoring is recommended for activities such as dewatering and trackout.

4.5.2 Repair or replace erosion and sediment control BMPs as necessary within 24 hours of an inspection or notification indicating that repair or replacement is needed.

4.5.3 Maintain, at the construction site or via an internet site, weekly written reports of all inspections conducted by or for the permittee. If an internet site method is used, the landowner shall provide the internet address to the department prior to its use. Weekly inspection reports shall include all of the following:

4.5.3.1 The date, time and exact location of the inspection.

4.5.3.2 The name of the individual who performed the inspection.

4.5.3.3 An assessment of the condition of erosion and sediment control BMPs.

4.5.3.4 A description of any erosion and sediment control installation or maintenance performed in response to the inspection.

4.5.3.5 A description of the present phase of construction at the site and any schedule modifications that may increase sediment discharge.

Note: The department has developed an inspection report form that includes the above items and it is available through the department’s storm water Internet site at:
<https://dnr.wisconsin.gov/topic/Stormwater/construction/forms.html>.

4.5.4 Submit the information maintained in accordance with section 4.5.3 to the department upon request.

4.6 Records

4.6.1 The permittee shall retain records of all construction site inspections, copies of all reports and plans required by this permit, and records of all data used to obtain coverage under this permit. Minimum periods of retention are as follows:

4.6.1.1 If there is a secure location, such as a construction site trailer, the erosion control and storm water management plans and amendments to the erosion control and storm water management plans shall be retained at the construction site until permit coverage is terminated.

4.6.1.2 All reports required by subch. III of ch. NR 216, Wis. Adm. Code, or information submitted to obtain coverage under this permit, including the erosion control and storm water management plans, amendments, and background information used in their preparation, shall be kept by the permittee for a period of at least 3 years from the date of termination of permit coverage.

4.6.2 A landowner operating a construction site under approved municipal erosion and sediment plans, grading plans, or storm water management plans shall also submit signed copies of the NOI to the local agency approving the plans. If storm water from the construction site discharges to a municipal separate storm sewer system that is operating pursuant to a municipal storm water discharge permit issued pursuant to subch. I of ch. NR 216, Wis. Adm. Code, then a signed copy of the NOI shall also be sent to the operator of the system.

4.6.3 Upon request by the department the permittee shall provide a copy of the erosion control and storm water management plans, construction site inspections and any additional data requested, within 5 working days to the department, to the operator of the municipal storm sewer system that receives the discharge, and any municipal agency approving erosion and sediment plans, grading plans or storm water management plans. Additional information may be requested by the department for resource waters that require additional protection such as outstanding or exceptional resource waters, or other sensitive water resources.

4.7 Compliance with Other Applicable Regulations

4.7.1 The erosion control and storm water management plans shall document other applicable municipal regulatory provisions, compliance with which will also meet the requirements of this permit. Subject to the requirements for uniform statewide standards established by the department under s. 281.33(3), Wis. Stats., if these municipal provisions are more stringent than those provisions appearing in this permit issued pursuant to subch. III of ch. NR 216, Wis. Adm. Code, the erosion control and storm water management plans shall also include a description of how compliance with the municipal provisions will be achieved.

4.7.2 The erosion control and storm water management plans shall comply with applicable state plumbing regulations.

4.8 Department Actions

4.8.1 The department may notify the permittee at any time that the erosion control and storm water management plans do not meet one or more of the minimum requirements of subch. III of ch. NR 216, Wis. Adm. Code, or this permit, for reducing and preventing the discharge of pollutants. The notification shall identify those provisions that are not being met by the erosion control and storm water management plan and identify which provisions of the plan require modification in order to meet the requirements. Within the time frame identified by the department in its notification, the permittee shall make the required changes to the erosion control and storm water management plans, perform all actions required by the revised plans, and submit to the department a written certification that the requested changes have been made and implemented, and such other information the department requires. The department may revoke coverage under this permit for failure to comply with this section or it may take action under s. 283.89, Wis. Stats., or both. The landowner of a construction site where the department has revoked coverage under this permit may not discharge storm water to waters of the state from the construction site unless an individual WPDES permit for storm water discharge is issued to the landowner.

4.8.2 The department shall withdraw a construction site from coverage under this permit and issue an individual WPDES permit upon written request of the discharger. This permit authorizing storm water discharges from the construction site remains in effect until the department acts on such a request and issues a specific individual WPDES permit.

4.8.3 The department may deny coverage under this permit and require submittal of an application for an individual WPDES storm water discharge permit based on a review of the completed NOI or other relevant information. The landowner of a construction site denied or revoked coverage under this permit may not discharge storm water to waters of the state from the construction site until an individual WPDES permit for storm water discharge is issued to the landowner.

4.8.4 The department may require the landowner of any storm water discharge covered by this permit, to apply for and obtain an individual WPDES storm water discharge permit if any of the following occur:

4.8.4.1 The storm water discharge is determined to be a significant source of pollution and more appropriately regulated by an individual WPDES storm water discharge permit.

4.8.4.2 The storm water discharge is not in compliance with the terms and conditions of subch. III of ch. NR 216, Wis. Adm. Code, or of this permit.

4.8.4.3 A change occurs in the availability of demonstrated technology or BMPs for the control or abatement of pollutants from the storm water discharge.

4.8.4.4 Effluent limitations or standards are promulgated for a storm water discharge that is different than the conditions contained in subch. III of ch. NR 216, Wis. Adm. Code.

4.8.5 Any person may submit a written request to the department that it take action under section 4.8.4 above.

5. GENERAL CONDITIONS

The general conditions in s. NR 205.07(1), (3), and (5), Wis. Adm. Code, are hereby incorporated by reference into this permit, except for s. NR 205.07(1)(n) and(3)(b), Wis. Adm. Code. Under s. NR 205.08(9), Wis. Adm. Code, dischargers covered under a storm water general permit are not required to submit an application for reissuance unless directed to do so by the department under s. NR 216.22(9), Wis. Adm. Code. The requirements for spill reporting are in section 5.5 below.

Note¹: Chapter NR 205 is available at the following website:
https://docs.legis.wisconsin.gov/code/admin_code/nr/200.

Note²: Activities performed in wetland areas, in floodplains, or near shorelands may require permits or approvals through applicable state law, state regulations, or county or local ordinances. Additionally, state permits and/or contracts required by chs. 30, 31 and 87, Wis. Stats. and s. 281.36, Wis. Stats. (or Wisconsin Administrative Code promulgated under these laws), and federal permits may be applicable.

5.1 Continuation of the Expired General Permit As provided in s. NR 205.08(9), Wis. Adm. Code, and s. 227.51, Wis. Stats., the terms and conditions of this general permit shall continue to apply until this general permit is reissued or revoked or until an individual permit is issued for the discharge to which the general permit applied.

5.2 Liabilities under Other Laws Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the federal Clean Water Act (33 USC s. 1321), any applicable federal, state, or local law or regulation under authority preserved by Section 510 of the Clean Water Act (33 USC s. 1370).

5.3 Severability The provisions of this permit are severable, and if any provisions of this permit or the application of any provision of this permit to any circumstance is held invalid the remainder of this permit shall not be affected thereby.

5.4 Spill Reporting The permittee shall notify the department immediately of any release or spill of a hazardous substance to the environment in accordance with s. 292.11, Wis. Stats., and ch. NR 706, Wis. Adm. Code.

Note: The 24-hour toll free spills hotline number is (800) 943-0003. Information about hazardous substance spills is available from the department's website at:
<https://dnr.wisconsin.gov/topic/Spills>.

5.5 Submitting Records Unless otherwise specified, any reports submitted to the department in accordance with this permit shall be submitted to the appropriate department regional storm water contact or to the Wisconsin DNR, Storm Water Program – WT/3, Box 7921, Madison, WI 53707-7921.

5.6 Enforcement Any violation of s. 283.33, Wis. Stats., ch. NR 216, Wis. Adm. Code, or this permit is enforceable under s. 283.89, Wis. Stats.

5.6.1 Upon becoming aware of any permit noncompliance that may endanger public health or the environment, the permittee shall report this information by a telephone call to the Department regional storm water specialist within 24 hours. A written report describing the noncompliance shall be submitted to the Department regional storm water specialist within 5 days after the permittee became aware of the noncompliance. The Department may waive the written report on a case-by-case basis based on the oral report received within 24 hours. The written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps

taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

5.7 Petition to Move to Individual Permit Coverage Any person may submit a written request to the department to withdraw coverage under this general permit and to replace it with an individual storm water permit under s. NR 205.08(5), Wis. Adm. Code.

6. DEFINITIONS

Definitions for some of the terms found in this permit are as follows:

6.1 Authorized Local Program means a municipality that has received a conditional approval from the department pursuant to s. NR 216.415, Wis. Adm. Code.

6.2 Best Management Practices or BMPs means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize soil, sediment or pollutants carried in runoff to waters of the state.

6.3 Construction Site means an area upon which one or more land disturbing construction activities occur that in total will disturb one acre or more of land, including areas that are part of a larger common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan such that the total disturbed area is one acre or more.

6.4 Department means the State of Wisconsin Department of Natural Resources.

6.5 Erosion means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.

6.6 Final Stabilization means that all land disturbing construction activities at the construction site have been completed and that a uniform perennial vegetative cover has been established with a density of at least 70% of the cover for the unpaved areas and areas not covered by permanent structures or that employ equivalent permanent stabilization measures.

6.7 Infiltration means the entry and movement of precipitation or runoff into or through soil.

6.8 Infiltration System means a device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration, but does not include natural infiltration in pervious surfaces such as lawns, redirecting of rooftop downspouts onto lawns or minimal infiltration from practices, such as swales or road side channels designed for conveyance and pollutant removal only.

6.9 Land Disturbing Construction Activity means any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover that may result in storm water runoff and lead to increased soil erosion and movement of sediment into waters of the state. Land disturbing construction activity includes, but is not limited to, clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities.

6.10 Landowner means any person holding fee title, an easement or other interest in property that allows the person to undertake land disturbing construction activity on the property.

6.11 Municipality means any city, town, village, county, county utility district, town sanitary district, town utility district, school district or metropolitan sewage district or any other public entity created pursuant to law and having authority to collect, treat or dispose of sewage, industrial wastes, storm water or other wastes.

6.12 Performance Standard means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.

6.13 Permittee means a person who has applied for and received WPDES permit coverage for storm

water discharge under NR 216, Wis. Adm. Code, and this permit.

6.14 Sediment means settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.

6.15 Stabilize means the process of making a site steadfast or firm, minimizing soil movement by the use of practices such as mulching and seeding, sodding, landscaping, paving, graveling or other appropriate measures.

6.16 Storm Water means runoff from precipitation including rain, snow, ice melt or similar water that moves on the land surface via sheet or channelized flow.

6.17 Storm Water Management Plan means a comprehensive plan designed to reduce the discharge of pollutants from storm water, after the site has undergone final stabilization, following completion of the construction activity.

6.18 Waters of the State means those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin, all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, water courses, drainage systems and other surface water or groundwater, natural or artificial, public or private within the state or under its jurisdiction, except those waters which are entirely confined and retained completely upon the property of a person.

6.19 Working Day means any day except Saturday and Sunday and holidays designated in s. 230.35(4)(a), Wis. Stats.

6.20 WPDES Permit means a Wisconsin Pollutant Discharge Elimination System permit issued pursuant to ch. 283, Wis. Stats.

Appendix C FERC's Upland Erosion Control, Revegetation, and Maintenance Plan
 FERC's Wetland and Waterbody Construction and Mitigation Procedures

**WETLAND AND WATERBODY CONSTRUCTION AND
MITIGATION PROCEDURES**

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

TABLE OF CONTENTS

I.	<u>APPLICABILITY</u>	1
II.	<u>PRECONSTRUCTION FILING</u>	2
III.	<u>ENVIRONMENTAL INSPECTORS</u>	3
IV.	<u>PRECONSTRUCTION PLANNING</u>	3
V.	<u>WATERBODY CROSSINGS</u>	5
A.	NOTIFICATION PROCEDURES AND PERMITS	5
B.	INSTALLATION	5
1.	Time Window for Construction	5
2.	Extra Work Areas	5
3.	General Crossing Procedures	6
4.	Spoil Pile Placement and Control	7
5.	Equipment Bridges	7
6.	Dry-Ditch Crossing Methods	8
7.	Crossings of Minor Waterbodies	9
8.	Crossings of Intermediate Waterbodies	10
9.	Crossings of Major Waterbodies	10
10.	Temporary Erosion and Sediment Control	10
11.	Trench Dewatering	11
C.	RESTORATION	11
D.	POST-CONSTRUCTION MAINTENANCE	12
VI.	<u>WETLAND CROSSINGS</u>	13
A.	GENERAL	13
B.	INSTALLATION	14
1.	Extra Work Areas and Access Roads	14
2.	Crossing Procedures	15
3.	Temporary Sediment Control	16
4.	Trench Dewatering	17
C.	RESTORATION	17
D.	POST-CONSTRUCTION MAINTENANCE AND REPORTING	18
VII.	<u>HYDROSTATIC TESTING</u>	19
A.	NOTIFICATION PROCEDURES AND PERMITS	19
B.	GENERAL	19
C.	INTAKE SOURCE AND RATE	19
D.	DISCHARGE LOCATION, METHOD, AND RATE	20

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES (PROCEDURES)

I. APPLICABILITY

- A. The intent of these Procedures is to assist project sponsors by identifying baseline mitigation measures for minimizing the extent and duration of project-related disturbance on wetlands and waterbodies. Project sponsors shall specify in their applications for a new FERC authorization, and in prior notice and advance notice filings, any individual measures in these Procedures they consider unnecessary, technically infeasible, or unsuitable due to local conditions and fully describe any alternative measures they would use. Project sponsors shall also explain how those alternative measures would achieve a comparable level of mitigation.

Once a project is authorized, project sponsors can request further changes as variances to the measures in these Procedures (or the applicant's approved procedures). The Director of the Office of Energy Projects (Director) will consider approval of variances upon the project sponsor's written request, if the Director agrees that a variance:

1. provides equal or better environmental protection;
2. is necessary because a portion of these Procedures is infeasible or unworkable based on project-specific conditions; or
3. is specifically required in writing by another federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Sponsors of projects planned for construction under the automatic authorization provisions in the FERC's regulations must receive written approval for any variances in advance of construction.

Project-related impacts on non-wetland areas are addressed in the staff's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

B. DEFINITIONS

1. “Waterbody” includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes:
 - a. “minor waterbody” includes all waterbodies less than or equal to 10 feet wide at the water’s edge at the time of crossing;
 - b. “intermediate waterbody” includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water’s edge at the time of crossing; and
 - c. “major waterbody” includes all waterbodies greater than 100 feet wide at the water’s edge at the time of crossing.
2. “Wetland” includes any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current federal methodology for identifying and delineating wetlands.

II. PRECONSTRUCTION FILING

- A. The following information must be filed with the Secretary of the FERC (Secretary) prior to the beginning of construction, for the review and written approval by the Director:
 1. site-specific justifications for extra work areas that would be closer than 50 feet from a waterbody or wetland; and
 2. site-specific justifications for the use of a construction right-of-way greater than 75-feet-wide in wetlands.
- B. The following information must be filed with the Secretary prior to the beginning of construction. These filing requirements do not apply to projects constructed under the automatic authorization provisions in the FERC’s regulations:
 1. Spill Prevention and Response Procedures specified in section IV.A;
 2. a schedule identifying when trenching or blasting will occur within each waterbody greater than 10 feet wide, within any designated coldwater fishery, and within any waterbody identified as habitat for federally-listed threatened or endangered species. The project sponsor will revise the schedule as necessary to provide FERC staff at least 14 days advance notice. Changes within this last 14-day period must provide for at least 48 hours advance notice;

3. plans for horizontal directional drills (HDD) under wetlands or waterbodies, specified in section V.B.6.d;
4. site-specific plans for major waterbody crossings, described in section V.B.9;
5. a wetland delineation report as described in section VI.A.1, if applicable; and
6. the hydrostatic testing information specified in section VII.B.3.

III. ENVIRONMENTAL INSPECTORS

- A. At least one Environmental Inspector having knowledge of the wetland and waterbody conditions in the project area is required for each construction spread. The number and experience of Environmental Inspectors assigned to each construction spread shall be appropriate for the length of the construction spread and the number/significance of resources affected.
- B. The Environmental Inspector's responsibilities are outlined in the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

IV. PRECONSTRUCTION PLANNING

- A. The project sponsor shall develop project-specific Spill Prevention and Response Procedures that meet applicable requirements of state and federal agencies. A copy must be filed with the Secretary prior to construction and made available in the field on each construction spread. This filing requirement does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.
 1. It shall be the responsibility of the project sponsor and its contractors to structure their operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. The project sponsor and its contractors must, at a minimum, ensure that:
 - a. all employees handling fuels and other hazardous materials are properly trained;
 - b. all equipment is in good operating order and inspected on a regular basis;
 - c. fuel trucks transporting fuel to on-site equipment travel only on approved access roads;
 - d. all equipment is parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary. These activities can occur closer only if the Environmental Inspector determines that there is no reasonable alternative, and the

project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

- e. hazardous materials, including chemicals, fuels, and lubricating oils, are not stored within 100 feet of a wetland, waterbody, or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas;
 - f. concrete coating activities are not performed within 100 feet of a wetland or waterbody boundary, unless the location is an existing industrial site designated for such use. These activities can occur closer only if the Environmental Inspector determines that there is no reasonable alternative, and the project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;
 - g. pumps operating within 100 feet of a waterbody or wetland boundary utilize appropriate secondary containment systems to prevent spills; and
 - h. bulk storage of hazardous materials, including chemicals, fuels, and lubricating oils have appropriate secondary containment systems to prevent spills.
2. The project sponsor and its contractors must structure their operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials. At a minimum, the project sponsor and its contractors must:
- a. ensure that each construction crew (including cleanup crews) has on hand sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials and knows the procedure for reporting spills and unanticipated discoveries of contamination;
 - b. ensure that each construction crew has on hand sufficient tools and material to stop leaks;
 - c. know the contact names and telephone numbers for all local, state, and federal agencies (including, if necessary, the U. S. Coast Guard and the National Response Center) that must be notified of a spill; and

- d. follow the requirements of those agencies in cleaning up the spill, in excavating and disposing of soils or other materials contaminated by a spill, and in collecting and disposing of waste generated during spill cleanup.

B. AGENCY COORDINATION

The project sponsor must coordinate with the appropriate local, state, and federal agencies as outlined in these Procedures and in the FERC's Orders.

V. WATERBODY CROSSINGS

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply to the U.S. Army Corps of Engineers (COE), or its delegated agency, for the appropriate wetland and waterbody crossing permits.
2. Provide written notification to authorities responsible for potable surface water supply intakes located within 3 miles downstream of the crossing at least 1 week before beginning work in the waterbody, or as otherwise specified by that authority.
3. Apply for state-issued waterbody crossing permits and obtain individual or generic section 401 water quality certification or waiver.
4. Notify appropriate federal and state authorities at least 48 hours before beginning trenching or blasting within the waterbody, or as specified in applicable permits.

B. INSTALLATION

1. Time Window for Construction

Unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis, instream work, except that required to install or remove equipment bridges, must occur during the following time windows:

- a. coldwater fisheries - June 1 through September 30; and
- b. coolwater and warmwater fisheries - June 1 through November 30.

2. Extra Work Areas

- a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water's edge, except where

the adjacent upland consists of cultivated or rotated cropland or other disturbed land.

- b. The project sponsor shall file with the Secretary for review and written approval by the Director, site-specific justification for each extra work area with a less than 50-foot setback from the water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the conditions that will not permit a 50-foot setback and measures to ensure the waterbody is adequately protected.
- c. Limit the size of extra work areas to the minimum needed to construct the waterbody crossing.

3. General Crossing Procedures

- a. Comply with the COE, or its delegated agency, permit terms and conditions.
- b. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.
- c. Where pipelines parallel a waterbody, maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right-of-way, except where maintaining this offset will result in greater environmental impact.
- d. Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.
- e. Maintain adequate waterbody flow rates to protect aquatic life, and prevent the interruption of existing downstream uses.
- f. Waterbody buffers (e.g., extra work area setbacks, refueling restrictions) must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.
- g. Crossing of waterbodies when they are dry or frozen and not flowing may proceed using standard upland construction techniques in accordance with the Plan, provided that the Environmental Inspector verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. In the event of perceptible flow, the project sponsor must comply with all applicable Procedure requirements for "waterbodies" as defined in section I.B.1.

4. Spoil Pile Placement and Control

- a. All spoil from minor and intermediate waterbody crossings, and upland spoil from major waterbody crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas as described in section V.B.2.
- b. Use sediment barriers to prevent the flow of spoil or silt-laden water into any waterbody.

5. Equipment Bridges

- a. Only clearing equipment and equipment necessary for installation of equipment bridges may cross waterbodies prior to bridge installation. Limit the number of such crossings of each waterbody to one per piece of clearing equipment.
- b. Construct and maintain equipment bridges to allow unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:
 - (1) equipment pads and culvert(s);
 - (2) equipment pads or railroad car bridges without culverts;
 - (3) clean rock fill and culvert(s); and
 - (4) flexi-float or portable bridges.

Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Do not use soil to construct or stabilize equipment bridges.

- c. Design and maintain each equipment bridge to withstand and pass the highest flow expected to occur while the bridge is in place. Align culverts to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.
- d. Design and maintain equipment bridges to prevent soil from entering the waterbody.
- e. Remove temporary equipment bridges as soon as practicable after permanent seeding.
- f. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove temporary equipment bridges as soon as practicable after final cleanup.

- g. Obtain any necessary approval from the COE, or the appropriate state agency for permanent bridges.

6. Dry-Ditch Crossing Methods

- a. Unless approved otherwise by the appropriate federal or state agency, install the pipeline using one of the dry-ditch methods outlined below for crossings of waterbodies up to 30 feet wide (at the water's edge at the time of construction) that are state-designated as either coldwater or significant coolwater or warmwater fisheries, or federally-designated as critical habitat.

- b. Dam and Pump

- (1) The dam-and-pump method may be used without prior approval for crossings of waterbodies where pumps can adequately transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.
 - (2) Implementation of the dam-and-pump crossing method must meet the following performance criteria:
 - (i) use sufficient pumps, including on-site backup pumps, to maintain downstream flows;
 - (ii) construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
 - (iii) screen pump intakes to minimize entrainment of fish;
 - (iv) prevent streambed scour at pump discharge; and
 - (v) continuously monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

- c. Flume Crossing

The flume crossing method requires implementation of the following steps:

- (1) install flume pipe after blasting (if necessary), but before any trenching;
 - (2) use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required to achieve an effective seal);

- (3) properly align flume pipe(s) to prevent bank erosion and streambed scour;
- (4) do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts; and
- (5) remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

d. Horizontal Directional Drill

For each waterbody or wetland that would be crossed using the HDD method, file with the Secretary for the review and written approval by the Director, a plan that includes:

- (1) site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;
- (2) justification that disturbed areas are limited to the minimum needed to construct the crossing;
- (3) identification of any aboveground disturbance or clearing between the HDD entry and exit workspaces during construction;
- (4) a description of how an inadvertent release of drilling mud would be contained and cleaned up; and
- (5) a contingency plan for crossing the waterbody or wetland in the event the HDD is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

The requirement to file HDD plans does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

7. Crossings of Minor Waterbodies

Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

- a. except for blasting and other rock breaking measures, complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours.

Streambanks and unconsolidated streambeds may require additional restoration after this period;

- b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and
- c. equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification or protected status (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in section V.B.5.

8. Crossings of Intermediate Waterbodies

Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

- a. complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible;
- b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and
- c. all other construction equipment must cross on an equipment bridge as specified in section V.B.5.

9. Crossings of Major Waterbodies

Before construction, the project sponsor shall file with the Secretary for the review and written approval by the Director a detailed, site-specific construction plan and scaled drawings identifying all areas to be disturbed by construction for each major waterbody crossing (the scaled drawings are not required for any offshore portions of pipeline projects). This plan must be developed in consultation with the appropriate state and federal agencies and shall include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues. The requirement to file major waterbody crossing plans does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

The Environmental Inspector may adjust the final placement of the erosion and sediment control structures in the field to maximize effectiveness.

10. Temporary Erosion and Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the waterbody or adjacent upland.

Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan; however, the following specific measures must be implemented at stream crossings:

- a. install sediment barriers across the entire construction right-of-way at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. Removable sediment barriers (or driveable berms) must be installed across the travel lane. These removable sediment barriers can be removed during the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent;
- b. where waterbodies are adjacent to the construction right-of-way and the right-of-way slopes toward the waterbody, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the waterbody; and
- c. use temporary trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody.

11. Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any waterbody. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

C. RESTORATION

1. Use clean gravel or native cobbles for the upper 1 foot of trench backfill in all waterbodies that contain coldwater fisheries.
2. For open-cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities. For dry-ditch crossings, complete streambed and bank stabilization before returning flow to the waterbody channel.
3. Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector.
4. Install erosion control fabric or a functional equivalent on waterbody banks at the time of final bank recontouring. Do not use synthetic monofilament

mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

5. Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.
6. Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.
7. Revegetate disturbed riparian areas with native species of conservation grasses, legumes, and woody species, similar in density to adjacent undisturbed lands.
8. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody. In addition, install sediment barriers as outlined in the Plan.

In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody.

9. Sections V.C.3 through V.C.7 above also apply to those perennial or intermittent streams not flowing at the time of construction.

D. POST-CONSTRUCTION MAINTENANCE

1. Limit routine vegetation mowing or clearing adjacent to waterbodies to allow a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark, to permanently revegetate with native plant species across the entire construction right-of-way. However, to facilitate periodic corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the permanent right-of-way. Do not conduct any routine vegetation mowing or clearing in riparian areas that are between HDD entry and exit points.
2. Do not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.
3. Time of year restrictions specified in section VII.A.5 of the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of riparian areas.

VI. WETLAND CROSSINGS

A. GENERAL

1. The project sponsor shall conduct a wetland delineation using the current federal methodology and file a wetland delineation report with the Secretary before construction. The requirement to file a wetland delineation report does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

This report shall identify:

- a. by milepost all wetlands that would be affected;
- b. the National Wetlands Inventory (NWI) classification for each wetland;
- c. the crossing length of each wetland in feet; and
- d. the area of permanent and temporary disturbance that would occur in each wetland by NWI classification type.

The requirements outlined in this section do not apply to wetlands in actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands.

2. Route the pipeline to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. Where looping an existing pipeline, overlap the existing pipeline right-of-way with the new construction right-of-way. In addition, locate the loop line no more than 25 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline.
3. Limit the width of the construction right-of-way to 75 feet or less. Prior written approval of the Director is required where topographic conditions or soil limitations require that the construction right-of-way width within the boundaries of a federally delineated wetland be expanded beyond 75 feet. Early in the planning process the project sponsor is encouraged to identify site-specific areas where excessively wide trenches could occur and/or where spoil piles could be difficult to maintain because existing soils lack adequate unconfined compressive strength.
4. Wetland boundaries and buffers must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

5. Implement the measures of sections V and VI in the event a waterbody crossing is located within or adjacent to a wetland crossing. If all measures of sections V and VI cannot be met, the project sponsor must file with the Secretary a site-specific crossing plan for review and written approval by the Director before construction. This crossing plan shall address at a minimum:
 - a. spoil control;
 - b. equipment bridges;
 - c. restoration of waterbody banks and wetland hydrology;
 - d. timing of the waterbody crossing;
 - e. method of crossing; and
 - f. size and location of all extra work areas.
6. Do not locate aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation regulations.

B. INSTALLATION

1. Extra Work Areas and Access Roads
 - a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.
 - b. The project sponsor shall file with the Secretary for review and written approval by the Director, site-specific justification for each extra work area with a less than 50-foot setback from wetland boundaries, except where adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the site-specific conditions that will not permit a 50-foot setback and measures to ensure the wetland is adequately protected.
 - c. The construction right-of-way may be used for access when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been appropriately stabilized to avoid rutting (e.g., with timber riprap, prefabricated equipment mats, or terra mats).

In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall

use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way.

- d. The only access roads, other than the construction right-of-way, that can be used in wetlands are those existing roads that can be used with no modifications or improvements, other than routine repair, and no impact on the wetland.

2. Crossing Procedures

- a. Comply with COE, or its delegated agency, permit terms and conditions.
- b. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.
- c. Use “push-pull” or “float” techniques to place the pipe in the trench where water and other site conditions allow.
- d. Minimize the length of time that topsoil is segregated and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering in.
- e. Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.
- f. Cut vegetation just above ground level, leaving existing root systems in place, and remove it from the wetland for disposal.

The project sponsor can burn woody debris in wetlands, if approved by the COE and in accordance with state and local regulations, ensuring that all remaining woody debris is removed for disposal.

- g. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety-related construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.
- h. Segregate the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are

saturated. Immediately after backfilling is complete, restore the segregated topsoil to its original location.

- i. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction right-of-way.
- j. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.
- k. Remove all project-related material used to support equipment on the construction right-of-way upon completion of construction.

3. Temporary Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Except as noted below in section VI.B.3.c, maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

- a. Install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all wetland crossings where necessary to prevent sediment flow into the wetland.
- b. Where wetlands are adjacent to the construction right-of-way and the right-of-way slopes toward the wetland, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the wetland.
- c. Install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way through wetlands. Remove these sediment barriers during right-of-way cleanup.

4. Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any wetland. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

C. RESTORATION

1. Where the pipeline trench may drain a wetland, construct trench breakers at the wetland boundaries and/or seal the trench bottom as necessary to maintain the original wetland hydrology.
2. Restore pre-construction wetland contours to maintain the original wetland hydrology.
3. For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from the wetland, or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.
4. Do not use fertilizer, lime, or mulch unless required in writing by the appropriate federal or state agency.
5. Consult with the appropriate federal or state agencies to develop a project-specific wetland restoration plan. The restoration plan shall include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of invasive species and noxious weeds (e.g., purple loosestrife and phragmites), and monitoring the success of the revegetation and weed control efforts. Provide this plan to the FERC staff upon request.
6. Until a project-specific wetland restoration plan is developed and/or implemented, temporarily revegetate the construction right-of-way with annual ryegrass at a rate of 40 pounds/acre (unless standing water is present).
7. Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.
8. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after revegetation and stabilization of adjacent upland areas are judged to be successful as specified in section VII.A.4 of the Plan.

D. POST-CONSTRUCTION MAINTENANCE AND REPORTING

1. Do not conduct routine vegetation mowing or clearing over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees within 15 feet of the pipeline with roots that could compromise the integrity of pipeline coating may be selectively cut and removed from the permanent right-of-way. Do not conduct any routine vegetation mowing or clearing in wetlands that are between HDD entry and exit points.
2. Do not use herbicides or pesticides in or within 100 feet of a wetland, except as allowed by the appropriate federal or state agency.
3. Time of year restrictions specified in section VII.A.5 of the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of wetland areas.
4. Monitor and record the success of wetland revegetation annually until wetland revegetation is successful.
5. Wetland revegetation shall be considered successful if all of the following criteria are satisfied:
 - a. the affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation);
 - b. vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;
 - c. if natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and
 - d. invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.
6. Within 3 years after construction, file a report with the Secretary identifying the status of the wetland revegetation efforts and documenting success as defined in section VI.D.5, above. The requirement to file wetland restoration reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advance notice provisions in the FERC's regulations.

For any wetland where revegetation is not successful at the end of 3 years after construction, develop and implement (in consultation with a

professional wetland ecologist) a remedial revegetation plan to actively revegetate wetlands. Continue revegetation efforts and file a report annually documenting progress in these wetlands until wetland revegetation is successful.

VII. HYDROSTATIC TESTING

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply for state-issued water withdrawal permits, as required.
2. Apply for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.
3. Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

B. GENERAL

1. Perform 100 percent radiographic inspection of all pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands.
2. If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, address secondary containment and refueling of these pumps in the project's Spill Prevention and Response Procedures.
3. The project sponsor shall file with the Secretary before construction a list identifying the location of all waterbodies proposed for use as a hydrostatic test water source or discharge location. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

C. INTAKE SOURCE AND RATE

1. Screen the intake hose to minimize the potential for entrainment of fish.
2. Do not use state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.
3. Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.
4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

D. DISCHARGE LOCATION, METHOD, AND RATE

1. Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow.
2. Do not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

**UPLAND EROSION CONTROL, REVEGETATION, AND
MAINTENANCE PLAN**

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

TABLE OF CONTENTS

I. <u>APPLICABILITY</u>	1
II. <u>SUPERVISION AND INSPECTION</u>	2
A. ENVIRONMENTAL INSPECTION	2
B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS	2
III. <u>PRECONSTRUCTION PLANNING</u>	4
A. CONSTRUCTION WORK AREAS	4
B. DRAIN TILE AND IRRIGATION SYSTEMS	4
C. GRAZING DEFERMENT	5
D. ROAD CROSSINGS AND ACCESS POINTS	5
E. DISPOSAL PLANNING	5
F. AGENCY COORDINATION	5
G. SPILL PREVENTION AND RESPONSE PROCEDURES	6
H. RESIDENTIAL CONSTRUCTION	6
I. WINTER CONSTRUCTION PLANS	6
IV. <u>INSTALLATION</u>	7
A. APPROVED AREAS OF DISTURBANCE	7
B. TOPSOIL SEGREGATION	8
C. DRAIN TILES	9
D. IRRIGATION	9
E. ROAD CROSSINGS AND ACCESS POINTS	9
F. TEMPORARY EROSION CONTROL	9
1. Temporary Slope Breakers	9
2. Temporary Trench Plugs	10
3. Sediment Barriers	10
4. Mulch	11
V. <u>RESTORATION</u>	12
A. CLEANUP	12
B. PERMANENT EROSION CONTROL DEVICES	13
1. Trench Breakers	13
2. Permanent Slope Breakers	14
C. SOIL COMPACTION MITIGATION	14
D. REVEGETATION	15
1. General	15
2. Soil Additives	15
3. Seeding Requirements	15
VI. <u>OFF-ROAD VEHICLE CONTROL</u>	16
VII. <u>POST-CONSTRUCTION ACTIVITIES AND REPORTING</u>	17
A. MONITORING AND MAINTENANCE	17
B. REPORTING	18

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (PLAN)

I. APPLICABILITY

- A. The intent of this Plan is to assist project sponsors by identifying baseline mitigation measures for minimizing erosion and enhancing revegetation. Project sponsors shall specify in their applications for a new FERC authorization and in prior notice and advance notice filings, any individual measures in this Plan they consider unnecessary, technically infeasible, or unsuitable due to local conditions and fully describe any alternative measures they would use. Project sponsors shall also explain how those alternative measures would achieve a comparable level of mitigation.

Once a project is authorized, project sponsors can request further changes as variances to the measures in this Plan (or the applicant's approved plan). The Director of the Office of Energy Projects (Director) will consider approval of variances upon the project sponsor's written request, if the Director agrees that a variance:

1. provides equal or better environmental protection;
2. is necessary because a portion of this Plan is infeasible or unworkable based on project-specific conditions; or
3. is specifically required in writing by another federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Sponsors of projects planned for construction under the automatic authorization provisions in the FERC's regulations must receive written approval for any variances in advance of construction.

Project-related impacts on wetland and waterbody systems are addressed in the staff's Wetland and Waterbody Construction and Mitigation Procedures (Procedures).

II. SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during construction and restoration (as defined by section V). The number and experience of Environmental Inspectors assigned to each construction spread shall be appropriate for the length of the construction spread and the number/significance of resources affected.
2. Environmental Inspectors shall have peer status with all other activity inspectors.
3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC's Orders, stipulations of other environmental permits or approvals, or landowner easement agreements; and to order appropriate corrective action.

B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Inspecting construction activities for compliance with the requirements of this Plan, the Procedures, the environmental conditions of the FERC's Orders, the mitigation measures proposed by the project sponsor (as approved and/or modified by the Order), other environmental permits and approvals, and environmental requirements in landowner easement agreements.
2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;
3. Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction;
4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;
5. Identifying erosion/sediment control and soil stabilization needs in all areas;
6. Ensuring that the design of slope breakers will not cause erosion or direct water into sensitive environmental resource areas, including cultural resource sites, wetlands, waterbodies, and sensitive species habitats;

7. Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive environmental resource areas, including wetlands, waterbodies, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities;
8. Ensuring that subsoil and topsoil are tested in agricultural and residential areas to measure compaction and determine the need for corrective action;
9. Advising the Chief Construction Inspector when environmental conditions (such as wet weather or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction;
10. Ensuring restoration of contours and topsoil;
11. Verifying that the soils imported for agricultural or residential use are certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;
12. Ensuring that erosion control devices are properly installed to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) and onto roads, and determining the need for additional erosion control devices;
13. Inspecting and ensuring the maintenance of temporary erosion control measures at least:
 - a. on a daily basis in areas of active construction or equipment operation;
 - b. on a weekly basis in areas with no construction or equipment operation; and
 - c. within 24 hours of each 0.5 inch of rainfall;
14. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts;
15. Keeping records of compliance with the environmental conditions of the FERC's Orders, and the mitigation measures proposed by the project sponsor in the application submitted to the FERC, and other federal or state environmental permits during active construction and restoration;

16. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase; and
17. Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with section III.E.

III. PRECONSTRUCTION PLANNING

The project sponsor shall do the following before construction:

A. CONSTRUCTION WORK AREAS

1. Identify all construction work areas (e.g., construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads) that would be needed for safe construction. The project sponsor must ensure that appropriate cultural resources and biological surveys are conducted, as determined necessary by the appropriate federal and state agencies.
2. Project sponsors are encouraged to consider expanding any required cultural resources and endangered species surveys in anticipation of the need for activities outside of authorized work areas.
3. Plan construction sequencing to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas.

B. DRAIN TILE AND IRRIGATION SYSTEMS

1. Attempt to locate existing drain tiles and irrigation systems.
2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.
3. Develop procedures for constructing through drain-tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.
4. Engage qualified drain tile specialists, as needed to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialists from the project area, if available.

C. GRAZING DEFERMENT

Develop grazing deferment plans with willing landowners, grazing permittees, and land management agencies to minimize grazing disturbance of revegetation efforts.

D. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

E. DISPOSAL PLANNING

Determine methods and locations for the regular collection, containment, and disposal of excess construction materials and debris (e.g., timber, slash, mats, garbage, drill cuttings and fluids, excess rock) throughout the construction process. Disposal of materials for beneficial reuse must not result in adverse environmental impact and is subject to compliance with all applicable survey, landowner or land management agency approval, and permit requirements.

F. AGENCY COORDINATION

The project sponsor must coordinate with the appropriate local, state, and federal agencies as outlined in this Plan and/or required by the FERC's Orders.

1. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.
2. Develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of invasive species, noxious weeds, and soil pests resulting from construction and restoration activities.
3. Develop specific procedures in coordination with the appropriate agencies and landowners, as necessary, to allow for livestock and wildlife movement and protection during construction.
4. Develop specific blasting procedures in coordination with the appropriate agencies that address pre- and post-blast inspections; advanced public notification; and mitigation measures for building foundations, groundwater wells, and springs. Use appropriate methods (e.g., blasting mats) to prevent damage to nearby structures and to prevent debris from entering sensitive environmental resource areas.

G. SPILL PREVENTION AND RESPONSE PROCEDURES

The project sponsor shall develop project-specific Spill Prevention and Response Procedures, as specified in section IV of the staff's Procedures. A copy must be filed with the Secretary of the FERC (Secretary) prior to construction and made available in the field on each construction spread. The filing requirement does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

H. RESIDENTIAL CONSTRUCTION

For all properties with residences located within 50 feet of construction work areas, project sponsors shall: avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified in landowner agreements; fence the edge of the construction work area for a distance of 100 feet on either side of the residence; and restore all lawn areas and landscaping immediately following clean up operations, or as specified in landowner agreements. If seasonal or other weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

I. WINTER CONSTRUCTION PLANS

If construction is planned to occur during winter weather conditions, project sponsors shall develop and file a project-specific winter construction plan with the FERC application. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

The plan shall address:

1. winter construction procedures (e.g., snow handling and removal, access road construction and maintenance, soil handling under saturated or frozen conditions, topsoil stripping);
2. stabilization and monitoring procedures if ground conditions will delay restoration until the following spring (e.g., mulching and erosion controls, inspection and reporting, stormwater control during spring thaw conditions); and
3. final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

IV. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Project-related ground disturbance shall be limited to the construction right-of-way, extra work space areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the FERC's Orders. Any project-related ground disturbing activities outside these areas will require prior Director approval. This requirement does not apply to activities needed to comply with the Plan and Procedures (i.e., slope breakers, energy-dissipating devices, dewatering structures, drain tile system repairs) or minor field realignments and workspace shifts per landowner needs and requirements that do not affect other landowners or sensitive environmental resource areas. All construction or restoration activities outside of authorized areas are subject to all applicable survey and permit requirements, and landowner easement agreements.
2. The construction right-of-way width for a project shall not exceed 75 feet or that described in the FERC application unless otherwise modified by a FERC Order. However, in limited, non-wetland areas, this construction right-of-way width may be expanded by up to 25 feet without Director approval to accommodate full construction right-of-way topsoil segregation and to ensure safe construction where topographic conditions (e.g., side-slopes) or soil limitations require it. Twenty-five feet of extra construction right-of-way width may also be used in limited, non-wetland or non-forested areas for truck turn-arounds where no reasonable alternative access exists.

Project use of these additional limited areas is subject to landowner or land management agency approval and compliance with all applicable survey and permit requirements. When additional areas are used, each one shall be identified and the need explained in the weekly or biweekly construction reports to the FERC, if required. The following material shall be included in the reports:

- a. the location of each additional area by station number and reference to previously filed alignment sheets, or updated alignment sheets showing the additional areas;
- b. identification of the filing at FERC containing evidence that the additional areas were previously surveyed; and

- c. a statement that landowner approval has been obtained and is available in project files.

Prior written approval of the Director is required when the authorized construction right-of-way width would be expanded by more than 25 feet.

B. TOPSOIL SEGREGATION

1. Unless the landowner or land management agency specifically approves otherwise, prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoil side method) in:
 - a. cultivated or rotated croplands, and managed pastures;
 - b. residential areas;
 - c. hayfields; and
 - d. other areas at the landowner's or land managing agency's request.
2. In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.
3. Where topsoil segregation is required, the project sponsor must:
 - a. segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil); and
 - b. make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil.
4. Maintain separation of salvaged topsoil and subsoil throughout all construction activities.
5. Segregated topsoil may not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.
6. Stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

C. DRAIN TILES

1. Mark locations of drain tiles damaged during construction.
2. Probe all drainage tile systems within the area of disturbance to check for damage.
3. Repair damaged drain tiles to their original or better condition. Do not use filter-covered drain tiles unless the local soil conservation authorities and the landowner agree. Use qualified specialists for testing and repairs.
4. For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

D. IRRIGATION

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe and accessible conditions at all road crossings and access points during construction.
2. If crushed stone access pads are used in residential or agricultural areas, place the stone on synthetic fabric to facilitate removal.
3. Minimize the use of tracked equipment on public roadways. Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions. Repair any damages to roadway surfaces, shoulders, and bar ditches.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls immediately after initial disturbance of the soil. Temporary erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers
 - a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope

breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.

- b. Install temporary slope breakers on all disturbed areas, as necessary to avoid excessive erosion. Temporary slope breakers must be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland, and road crossings at the following spacing (closer spacing shall be used if necessary):

<u>Slope (%)</u>	<u>Spacing (feet)</u>
5 - 15	300
>15 - 30	200
>30	100

- c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.
- d. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive environmental resource areas.

2. Temporary Trench Plugs

Temporary trench plugs are intended to segment a continuous open trench prior to backfill.

- a. Temporary trench plugs may consist of unexcavated portions of the trench, compacted subsoil, sandbags, or some functional equivalent.
- b. Position temporary trench plugs, as necessary, to reduce trenchline erosion and minimize the volume and velocity of trench water flow at the base of slopes.

3. Sediment Barriers

Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments beyond approved workspaces or into sensitive resources.

- a. Sediment barriers may be constructed of materials such as silt fence, staked hay or straw bales, compacted earth (e.g., driveable berms across travelways), sand bags, or other appropriate materials.

- b. At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.
 - c. Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.
- 4. Mulch
 - a. Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.
 - b. Mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.
 - c. Mulch all disturbed upland areas (except cultivated cropland) before seeding if:
 - (1) final grading and installation of permanent erosion control measures will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas), as required in section V.A.1; or
 - (2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.
 - d. If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.
 - e. If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).

- f. Ensure that mulch is adequately anchored to minimize loss due to wind and water.
- g. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.
- h. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

V. RESTORATION

A. CLEANUP

1. Commence cleanup operations immediately following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (i.e., temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup.

If construction or restoration unexpectedly continues into the winter season when conditions could delay successful decompaction, topsoil replacement, or seeding until the following spring, file with the Secretary for the review and written approval of the Director, a winter construction plan (as specified in section III.I). This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed as specified in section IV.F. and inspected and maintained as specified in sections II.B.12 through 14. When access is no longer required the travel lane must be removed and the right-of-way restored.
3. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench shall be considered construction debris, unless approved for use as mulch or for some other use on the construction work areas by the landowner or land managing agency.

4. Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.
5. Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.
6. Remove construction debris from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.
7. Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers
 - a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.
 - b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.
 - c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.
 - d. At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Install trench breakers at wetland boundaries, as specified in the Procedures. Do not install trench breakers within a wetland.

2. Permanent Slope Breakers

- a. Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction right-of-way, and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, stone, or some functional equivalent.
- b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, unless requested by the landowner, using spacing recommendations obtained from the local soil conservation authority or land managing agency.

In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way:

<u>Slope (%)</u>	<u>Spacing (feet)</u>
5 - 15	300
>15 - 30	200
>30	100

- c. Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the breaker.
- d. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey requirements.

C. SOIL COMPACTION MITIGATION

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.
2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil.

If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

D. REVEGETATION

1. General

- a. The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted in section V.D.1.b.
- b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.

2. Soil Additives

Fertilize and add soil pH modifiers in accordance with written recommendations obtained from the local soil conservation authority, land management agencies, or landowner. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as practicable after application.

3. Seeding Requirements

- a. Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.
- b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or the request of the landowner or land management agency. Seeding is not required in cultivated croplands unless requested by the landowner.
- c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in section IV.F and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Dormant seeding or temporary

seeding of annual species may also be used, if necessary, to establish cover, as approved by the Environmental Inspector. Lawns may be seeded on a schedule established with the landowner.

- d. In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting, subject to the specifications in section V.D.3.a through V.D.3.c.
- e. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.
- f. Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydro).
- g. In the absence of written recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary, a seed drill equipped with a cultipacker is preferred for seed application.

Broadcast or hydroseeding can be used in lieu of drilling at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding. In rocky soils or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the Environmental Inspector.

VI. OFF-ROAD VEHICLE CONTROL

To each owner or manager of forested lands, offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These measures may include:

- A. signs;
- B. fences with locking gates;
- C. slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and
- D. conifers or other appropriate trees or shrubs across the right-of-way.

VII. POST-CONSTRUCTION ACTIVITIES AND REPORTING

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas, as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons.
2. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise.

Continue revegetation efforts until revegetation is successful.

3. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful.
4. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the landowner or land managing agency per section V.A.6), revegetation is successful, and proper drainage has been restored.
5. Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion/leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service.
6. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and permanent access roads as necessary.

B. REPORTING

1. The project sponsor shall maintain records that identify by milepost:
 - a. method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
 - b. acreage treated;
 - c. dates of backfilling and seeding;
 - d. names of landowners requesting special seeding treatment and a description of the follow-up actions;
 - e. the location of any subsurface drainage repairs or improvements made during restoration; and
 - f. any problem areas and how they were addressed.
2. The project sponsor shall file with the Secretary quarterly activity reports documenting the results of follow-up inspections required by section VII.A.1; any problem areas, including those identified by the landowner; and corrective actions taken for at least 2 years following construction.

The requirement to file quarterly activity reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advanced notice provisions in the FERC's regulations.

Appendix D WDNR Construction Site Erosion & Sediment Control Technical Standards

Land Application of Additives for Erosion Control (1050)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

The land application of products containing water-soluble and non-soluble *additives*¹ (products that are added to soil to create soil particle bonding) to temporarily reduce erosion. Products include *polyacrylamide (PAM)* and other *polymers*.

II. Purpose

The purpose of this practice is to reduce erosion deposition from wind and water on construction sites and agricultural lands until vegetation is established.

III. Conditions Where Practice Applies

This practice is intended for direct soil surface application to sites where the timely establishment of vegetation may not be feasible or where vegetative cover is absent or inadequate. Such areas may include agricultural lands where plant residues are inadequate to protect the soil surface and construction sites where land disturbing activities or winter shutdown prevent establishment or maintenance of a cover crop.

This practice is intended for land application of additives (with an established *allowable usage rate*) when runoff could enter *surface waters of the state* as defined by the Wisconsin Department of Natural Resources (WDNR) ch. NR 102, Wis. Adm. Code. Additives shall not be directly applied to *surface waters of the state*.

IV. Federal, State and Local Laws

Additive application shall comply with all federal, state, and local laws, rules or regulations governing additives. The operator is responsible for securing required permits. This standard does not contain the text of the federal, state, or local laws governing additives.

V. Criteria

A. Toxicity Criteria

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

Where additives could discharge to surface waters of the state, the WDNR reviews toxicity data for the *additive mixture* based on the guidance titled [“Water Quality Review Procedures for Additives”](#).

This technical standard outlines the toxicological analysis of land applied additive mixtures to arrive at an allowable usage rate (in mg/l or ppm) that is environmentally benign, harmless to fish, aquatic organisms, wildlife, and plants. This guidance lists the toxicity test results, parameters, and physical information needed to enable the WDNR to calculate the allowable usage rate for the specific product.

When additives could discharge to groundwater, polyacrylamide additives shall have < 0.05% free acrylamide monomer by weight as established by the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA).

B. Application Criteria

1. Application rates shall not exceed manufacturer's written application rate recommendations or the WDNR *allowable application rate* (expressed in lbs/acre).
2. The allowable application rate (lbs/acre) is determined by multiplying the allowable usage rate (mg/l) by (lbs/acre)/1.4 mg/l.
3. The application method shall provide uniform coverage to the target area and avoid drift to non-target areas.
4. The manufacturer or supplier shall provide written instructions (including the *Material Safety Data Sheet* or the *Safety Data Sheet*) to ensure proper safety, storage, and mixing of their product. The manufacturer shall provide general written application methods based on site conditions (such as slope and soil type) and the product degradation rate and rainfalls before the need for re-application.

5. The additive shall be used in conjunction with other Best Management Practices (BMPs).
6. When used on bare soil, without seed or mulch, additives shall be used on slopes 3:1 or flatter.
7. Additives shall not be applied to channel bottoms.
8. Unused additive mixtures shall be minimized. Excess material shall not be applied at a rate greater than the allowable application rate. Disposal shall not occur in storm water conveyance systems (i.e., storm sewer manholes, storm sewer inlets, ditches, or culverts).
9. At the time of application, the applicator of the additive mixture shall document the following:
 - Name of applicator
 - Application rate in lbs/acre
 - Date applied
 - Product type
 - Weather conditions during application
 - Method of application

Copies of this documentation shall be entered into the contractor's monitoring log or a project diary and made available upon request.

10. The manufacturer or distributor shall provide the following for the applicator:
 - Labels affixed to the additive mixture containers that indicate the recommended application rate and the allowable application rate based on the allowable usage rate.
 - A product expiration date for the additive mixture based on product expiration dates of the polymer.
 - General written application methods.
 - Written instructions to provide proper safety, storage, and mixing of the product.

C. Product Review Criteria

1. Toxicity test results for the additive mixtures shall be submitted to: Runoff Management Section-Additive Review, WDNR, 101 South Webster St., P.O. Box 7921, Madison, WI 53707, as a pre-qualification for field use.

The WDNR will review the toxicity test (water flea minimum) results and will provide a written product allowable usage and application rate.

2. The additive mixture shall be resubmitted for toxicity testing if any portion of the mixture is altered subsequent to its receiving an allowable application rate. Such alterations may include:
 - The amendment of base additive and/or any other additives.
 - The ratios of individual components.
3. Additives reviewed with regard to toxicity may still be subject to additional performance evaluation by end users.
4. Land applied additives intended for use on WisDOT sponsored projects shall be reviewed through the WisDOT pre-approval process for erosion control materials. Information can be found at the WisDOT [product acceptability list \(PAL\)](#).

Questions may be sent to:

New Products Engineer, WisDOT, Technology Advancement, 3502 Kinsman Blvd., Madison, WI 53704.

VI. Considerations

The following are additional recommendations, which may enhance the use of or avoid problems with the practice.

- A. Additive mixtures may be tested for erosion control performance under ASTM D6459, as modified in the American Association of State Highway and Transportation Officials (AASHTO) National Transportation Product Evaluation Program (NTPEP) work plan for erosion control products and sediment retention devices. Information about this program may be obtained at: <http://www.ntpep.org/Pages/default.aspx>.
- B. Adding seed to the additive provides additional erosion protection beyond the life of the additive.
- C. Anionic (negative charge) additives are recommended and are less toxic than cationic (positive charge) additives, which are highly toxic to fish.

Note: The WisDOT will not approve the use of cationic polyacrylamide.

- D. Additives not containing a mulch component do not enhance vegetation establishment and need to be combined with another practice for that purpose.
- E. Using a minimum 30 foot setback when applying an anionic polyacrylamide mixture near waters of the state is recommended.
- F. Applying an additive mixture to soil may provide benefits of improved water quality, infiltration, soil fertility, and visibility by reducing wind and water erosion.
- G. For erosion control, the additive may be applied upgradient of lands planted in food crops.
- H. Application of additives may be particularly effective in the following situations:
 - During rough grading operations
 - Phased construction projects
 - Stockpiles
 - After final grading and before paving or final seeding and planting
 - Sites having a winter shutdown
 - Agricultural lands where plant residues are inadequate
 - Sites receiving final landscaping, but where adequate vegetation cannot be established prior to winter.
- I. Application of additives may be ineffective in the following situations:
 - When the soil surface is pure sand or gravel with no fines.
 - When applied over snow cover.
- J. Visible tracer or colorant to visually track application is recommended.
- K. Additive mixtures may be applied in liquid and granular forms.
- L. Application rates of additive mixtures may need to be adjusted based on soil type, slope, and type of erosion targeted (i.e., wind or water). Based on manufacturer's recommendations, higher application rates may be necessary when applied in granular form, but cannot exceed the allowable application rate.
- M. Additive mixtures combined with water are very slippery and can be a safety hazard. Care must be taken to prevent spills of additive mixtures onto paved surfaces. During an application of additive

mixture, prevent over-spray from reaching pavement as pavement will become slippery.

- N. Care should be taken when applying additive mixtures in liquid form on saturated slopes due to the possibility of slope structural failure. Additive mixtures may be applied to steeper slopes when used with other erosion control BMPs such as seed and mulch or erosion mat.

VII. Specifications

Erosion control and storm water management plans specifying additive mixtures for erosion control shall be consistent with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

VIII. Operation and Maintenance

Maintenance will consist of reapplying additive mixtures to disturbed areas, including high use traffic areas, which interfere in the performance of this practice. Additive mixtures may lose effectiveness in as little as two months due to weather conditions. Additive mixtures should be reapplied in areas where wind or rill erosion is apparent and whenever an area has been graded, driven upon, or otherwise disturbed since the additive mixture was last applied. Representative additive locations shall be inspected at least once per week to evaluate effectiveness.

IX. References

Bubenzer, G.D., and Patterson, A.E., *Intake Rate: Sprinkler Infiltrometer*, Method of Soil Analysis, Part 1, Physical and Mineralogical Method, Second Edition, Chapter 33, pp. 845-870. (Agronomy Monograph Series #9, 1982).

"Water Quality Guidelines for the Great Lakes System" 40 CFR 132 (1995)

Weber, C., et al. 2002. *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 5th Edition. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH. EPA/600/4-90/027F. (http://water.epa.gov/scitech/methods/cwa/wet/disk2_index.cfm)

Weber, C., et al. 2002. *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms*, 4th Edition. Environmental Monitoring Systems Laboratory, U.S. Environmental

Protection Agency, Cincinnati, OH. EPA-821-R-02-013. (http://water.epa.gov/scitech/methods/cwa/wet/disk3_index.cfm)

Managing Irrigation-Induced Erosion And Infiltration With Polyacrylamide, Proceedings From First Conference, University of Idaho Miscellaneous Publication No. 101-96, (Kimberly, Idaho, USDA-ARS Northwest Irrigation and Soils Research Lab, 1996).

Roa-Espinosa, A., Bubenzer, G.D. and Miyashita, E., *Sediment and Runoff Control on Construction Sites Using Four Application Methods of Polyacrylamide Mix*, National Conference on Tools for Urban Water Resource Management and Protection, Chicago, February 7-10, 2000, pp. 278- (EPA, 2000).

Roa-Espinosa, A., Bubenzer, G.D. and Miyashita, E., *Determination of PAM Use in Erosion Control on Construction Sites*, 1st Inter-Regional Conference on Environment-Water: Innovative Issues in Irrigation and Drainage, Lisbon, Portugal, September 1998 (Portuguese National Committee of ICID, 1998).

Roa- Espinosa, A., *Are there Safety Concerns or Environmental Concerns with PAM?* (Dane County Land Conservation Department, 1997).

Sojka, R.E. and Lentz, R.D., "A PAM Primer: A brief history of PAM and PAM related issues," <http://kimberly.ars.usda.gov/pamprim.ssi>, (Kimberly, ID: USDA-ARS Northwest Irrigation and Soils Research Lab, 1996).

Wisconsin Department of Natural Resources 2004. State of Wisconsin Aquatic Life Toxicity Testing Methods Manual 2nd Edition. (<http://dnr.wi.gov/topic/wastewater/WET.html>).

Wisconsin Department of Natural Resources. 2014. *Whole Effluent Toxicity Program Guidance Document, Revision #9*. (<http://dnr.wi.gov/topic/wastewater/WETguidance.html>)

X. Definitions

Additive (I): Substance, typically a commercial product including cellulose, starch, and glucosamides; vegetable-based gums (e.g., guar, plantago) or rubber (e.g., natural latex) materials used as mulch tackifiers; and pre-mixed products containing natural or synthetic binding agents combined with a fibrous or mulch component (e.g., bonded-fiber matrix), that has the potential to be directly discharged to a *surface water of the state* and may cause

toxicity to fish and aquatic organisms.

Additive Mixture (V.A): Any reference to additive mixtures refers to the whole manufactured product, including the polymer and any additives.

Allowable Application Rate (V.B.1) is expressed in lbs/acre and is based on the product allowable usage rate.

Allowable Usage Rate (III): Identifies the concentration (expressed in mg/l) as calculated using the procedures described in the "[Water Quality Review Procedures for Additives](#)" guidance, below which a product is not expected to cause acute toxicity in the aquatic environment.

Material Safety Data Sheet or Safety Data Sheet (V.B.4): Provide basic information on a material or chemical product intended to help someone work safely with the material. This includes a brief synopsis of the hazards associated with using a material, how to use it safely, and what to do if there is an emergency. The retail distributor and/or manufacturer as per OSHA's Hazard Communication Standard, 29 CFR 1910.1200, must provide MSDS, with the purchase of potentially hazardous products.

Polyacrylamide (I): A generic term for polymers made up of many repeating units of the monomer acrylamide (a simple organic compound).

Polymer (I): Polymers are materials that are either natural or synthetic and that have a chain of carbon-based molecules that are identical, repeating units. Polymers can be positively charged (cationic), negatively charged (anionic) or have no charge (non-ionic).

Surface Waters of the State (III): "Surface" refers to the sub portion of the waters of the state that discharge at the surface. "Waters of the State", as defined by s. 283.01(20), Wis. Stats, means those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin, all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, water courses, drainage systems and other surface water or groundwater, natural or artificial, public or private within the state or under its jurisdiction, except those waters which are entirely confined and retained completely upon the property of the person.

Water Application of Additives for Sediment Control (1051)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

The water application of products containing water-soluble *additives*¹ to remove suspended solids in *sediment control structures* (water clarification). Products include additives such as *polyacrylamide (PAM)* and other *polymers*.

II. Purpose

The purpose of this practice is to clarify water prior to discharge by settling suspended *sediment* within sediment control structures for construction or post-construction process systems.

III. Conditions Where Practice Applies

This practice is to be used with self-contained sediment control structures, on a temporary basis for construction sites, in an emergency for post-construction sites, and if needed, to improve the sediment removal efficiency of a structure. Sediment control structures shall not be within *surface waters of the state*. An *allowable application rate* is needed if treated storm / process water is discharged to surface waters of the state. Additives shall not be directly applied to surface waters of the state.

This practice is intended for water application of additives (with an established *allowable usage rate*) when water could enter surface waters of the state as defined by the Wisconsin Department of Natural Resources (WDNR) ch. NR 102, Wis. Adm. Code.

IV. Federal, State and Local Laws

Additive application shall comply with all federal, state, and local laws, rules or regulations governing additives. The operator is responsible for securing required permits, and additive allowable usage rates. This standard does not contain the text of the federal, state, or local laws governing additives.

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

V. Criteria

A. Toxicity Criteria

Where an additive could discharge to surface waters of the state, the WDNR reviews toxicity data for the *additive mixture* based on the guidance titled "[Water Quality Review Procedures for Additives](#)".

This guidance document outlines the toxicological analysis of water applied additive mixtures to arrive at an allowable usage rate (in mg/l or ppm) that is environmentally benign, harmless to fish, aquatic organisms, wildlife, and plants. This guidance lists the toxicity test results, parameters, and physical information needed to enable the WDNR to calculate the allowable usage rate for the specific product.

When additives could discharge to groundwater, polyacrylamide additives shall have < 0.05% free acrylamide monomer by weight as established by the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA).

B. Application Criteria

1. Application rates shall not exceed manufacturer's written application rate recommendations and shall not exceed the WDNR allowable application rate
2. (expressed in lbs/acre-ft).
3. The allowable application rate (lbs/acre-ft) is determined by multiplying the allowable usage rate (mg/l) by (1.35 lbs/acre-ft)/(mg/l).
4. The manufacturer or supplier shall provide written instructions (including the *Material Safety Data Sheet* or the *Safety Data Sheet*) to ensure proper safety, storage, and mixing of their product. The manufacturer shall provide general written application methods.
5. Additive mixtures shall be applied in conjunction with other erosion control BMPs and under an erosion and sediment control or stormwater management plan.

6. Where additive mixtures are used with temporary sediment control structures for work in a stream, such as during bridge construction, the structure shall not be removed until the water is clarified. If the resulting sediment floc is more than 6 inches deep it shall be excavated or filtered.

7. The applicator of the additive mixture shall at the time of application, document the following:

- Name of applicator
- Application rate in lbs/(acre-ft) of storm water runoff
- Date applied
- pH in sediment control structure after application
- Product type
- Weather conditions during application
- Method of application

Copies of this documentation shall be entered into the contractor's monitoring log or a project diary and made available upon request.

8. The manufacturer or distributor shall provide the following for the applicator:

- Labels affixed to the additive mixture containers that indicate the recommended application rate and the allowable application rate based on the allowable usage rate.
- A product expiration date for the additive mixture based on product expiration dates of the polymer.
- General written application methods.
- Written instructions to provide proper safety, storage, and mixing of their product.

9. The application method shall ensure uniform distribution of the product in the sediment control structure and shall consist of either:

- Passive Applications: Additives applied by non-mechanically dosing the sediment - laden inflow prior to it entering the impoundment area of the sediment control structure. The manufacturer shall base

passive application rates on the dissolution rate and/or the dead storage volume of the sediment control structure.

OR

- Active or Mechanical Applications: Additive applied by mechanically or hydraulically mixing directly into a sediment control structure.
10. Unused additive mixtures shall be minimized. Excess material shall not be applied at a rate greater than the allowable application rate. Disposal shall not occur in storm water conveyance systems (i.e., storm sewer manholes, storm sewer inlets, ditches, or culverts).

C. Product Review Criteria

1. Where sediment control structures may discharge to surface waters of the state, toxicity test results shall be submitted to: Runoff Management Section – Additive Review, WDNR, 101 South Webster St., P.O. Box 7921, Madison, WI 53707, as a pre-qualification for field use. The WDNR will review the toxicity test results and will provide a written product allowable usage and application rate.
2. The additive mixture shall be resubmitted for toxicity testing if any portion of the mixture is altered subsequent to its established allowable application rate. Such alterations may include:
 - The amendment of base additive and/or any other additives.
 - The ratios of individual components.
3. Additives reviewed with regard to toxicity may still be subject to additional performance evaluation by end users.

VI. Considerations

The following are additional recommendations, which may enhance the use of, or avoid problems with, the practice.

- A. Additive mixtures should achieve $\geq 95\%$ sediment reduction as measured by the standpipe method outlined in Appendix I.

slippery and can pose a safety hazard.

- B. The performance of additive mixtures should be verified and field-tested in a body of water that is not discharging directly into the surface waters of the state. The body of water should be a minimum of 1/3-acre surface area and an average depth of at least 3 feet.
- C. The total suspended solids prior to the additive treatment should be tested and verified by an independent testing lab, and should have a minimum value of 800 ppm or equivalent *Nephelometric Turbidity Units (NTU)* and be visibly turbid. The relationship between total suspended solids (TSS) and NTU is site-specific and the derivation of a unique TSS-NTU relationship should be conducted for each sediment control structure. A minimum of two samples per acre-foot of water should be taken from random locations within the test site.
- D. Within 48 hours from the initial treatment of the water body, the total suspended solids should have a maximum of 80 ppm, or equivalent NTU.
- E. Testing sites should not be used for subsequent testing for a period of 3 months from the time of initial application.
- F. The WDNR should be notified at least 7 days prior to testing, and allowed to monitor any such testing.
- G. When using products in impoundments immediately adjacent to, or within waters of the state, consider using products for which the manufacturer's recommended application rate is considerably lower than the allowable application rate.
- H. The applicator should use the least amount of additive mixture needed to achieve optimal performance.
- I. Care should be taken to prevent spills of additive mixtures. Follow the manufacturer's recommended cleanup procedures in the event of a spill.
- J. Inhaling granular additive may cause choking or difficulty breathing. Persons handling and mixing additive should use personal protective equipment of a type recommended by the manufacturer.
- K. Additive mixtures combined with water are very

- L. Additive mixtures should be considered as an aid to removing solids from dredge slurries.

VII. Specifications

Erosion control and storm water management plans specifying additive mixtures for sediment control shall be consistent with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

VIII. Operation and Maintenance

Sediment levels on the bottom of the sediment control structure should be monitored to measure the loss of storage capacity over time due to enhanced sedimentation by the additive mixture.

Test the pH of the water in the sediment control structure and follow the manufacturer's recommended pH range for their additive mixture, as pH will impact the effectiveness of additive mixtures.

IX. References

Voluntary Use Of Polymers In DNR Programs (A Field Guide). For copies of this companion document, contact Mary Anne Lowndes, Runoff Management Section Chief, Bureau of Watershed Management, 101 S. Webster St., Box 7921, Madison, WI 53707-7921.

WDNR, "State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, Edition 1." Bureau of Watershed Management, Wisconsin Department of Natural Resources, Madison, 1996 (WI. PUBL-WW-033-96).

USEPA, "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 3rd Edition." Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH, 1994 (EPA/600/4-91/002).

Roa-Espinosa, A., Bubenzer, G.D. and Miyashita, E., "Sediment and Runoff Control on Construction Sites Using Four Application Methods of Polyacrylamide Mix." National Conference on Tools for Urban Water Resource Management and Protection, Chicago, pp. 278, February 7-10, 2000.

Roa, A., "Are there Safety Concerns or Environmental Concerns with PAM?" Dane County Land Conservation Department, 1997.

Sojka, R.E. and Lentz, R.D., "A PAM Primer: A brief history of PAM and PAM related issues." Kimberly, ID: USDA-ARS Northwest Irrigation and Soils Research Lab, 1996. <http://kimberly.ars.usda.gov/pamprim.ssi>

Wirtz, J, R., "The Pros and Cons of the Use of Anionic Polyacrylamides to Control Erosion and Sedimentation in the Lake Mendota Priority Watershed". University of Wisconsin-Madison, MS Thesis, 2000.

X. Definitions

Additive (I): Substance, typically a commercial product (may include clay based products) that has the potential to be directly discharged to a surface water and may cause toxicity to fish and aquatic organisms.

Additive Mixture (V.A): Any reference to additive mixture refers to the whole manufactured product, including the additive and any components.

Allowable Application Rate (III) expressed in lbs/ (acre-foot) and is based on the product allowable usage rate.

Allowable Usage Rate (III): Identifies the concentration (expressed in mg/l) as calculated using the procedures described in the "[Water Quality Review Procedures for Additives](#)" guidance, below which a product is not expected to cause acute toxicity in the aquatic environment.

Material Safety Data Sheets or Safety Data Sheet (V.B.3): Provide basic information on a material or chemical product intended to help someone work safely with the material. This includes a brief synopsis of the hazards associated with using a material, how to use it safely, and what to do if there is an emergency. The retail distributor and/or manufacturer as per OSHA's Hazard Communication Standard, 29 CFR 1910.1200, must provide MSDS, with the purchase of potentially hazardous products.

Nephelometric Turbidity Units (NTU) (VI.C.): A measure of the amount of light scattered by suspended and dissolved materials in the sample.

Polyacrylamide (I): A generic term for polymers made up of many repeating units of the monomer acrylamide (a simple organic compound).

Polymer (I): Polymers are materials that are either natural

or synthetic and that have a chain of carbon molecules that are identical, repeating units. Polymers can be positively charged (cationic), negatively charged (anionic) or have no charge (non-ionic).

Sediment (II): Settleable soil, rock fragments and other solids suspended in runoff.

Sediment control structure (I): An impoundment or pond designed to intercept and detain sediment carried in runoff, or water from a process system, prior to reaching the main channel of a waterway or body of water. Placement of these structures must be outside of the main channel of a waterway and shall not span opposing stream banks in channelized flow. The sediment control structure must provide for dedicated sediment storage to at least a depth of two feet, such that the sediment will not be subject to re-suspension during high velocity flow conditions.

Impoundments may be created by a cofferdam, turbidity barrier, earthen berm, sheet piling, self-contained filtering systems or similar material. Examples include properly maintained construction or post-construction sediment ponds, discharging directly or eventually to a water body. They may also include surface water impoundments that are immediately adjacent to a waterway, whose function is to treat storm water or dredging material. Another potential application is to isolate localized areas surrounding bridge and culvert construction.

Surface Waters of the State (III.): "Surface" refers to the sub portion of the waters of the state that discharge at the surface. "Waters of the state", as defined by s. 283.01(20), Wis. Stats, means those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin, all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, water courses, drainage systems and other surface water or groundwater, natural or artificial, public or private within the state or under its jurisdiction, except those waters which are entirely confined and retained completely upon the property of the person.

APPENDIX I

LABORATORY STANDPIPE TEST METHODOLOGY

1. Place 40 grams of oven dried "soil" in 2 liters of distilled water within a 2 liter graduated cylinder with stopper. The 40 grams of "soil" represents a "realistic" runoff suspended solids load of 20,000 mg/L (20,000 mg/L x 2 L) according to data collected from commercial and residential construction sites (Owens, et. al. 2000). Repeat a minimum of four times so that there are a minimum of five replicates. The "soil" used in the standpipe test may be characterized by one of the following three options:

Clays A clay "soil" is characterized as having greater than 20% of its particles < 2 µm in size. This option is appropriate for those seeking approval* of a polymer for use in any soil condition (clay, silt, or other).

Silts A silt "soil" is characterized as having less than 20% of its particles < 2 µm in size AND greater than 20% of its particles 2-25 µm in size. This option is appropriate for those seeking approval* of a polymer for use only in silt soils. The 2-25 µm size is representative of fine to medium silt soils.

Site-Specific Use of a site-specific "soil" provides an alternative for those seeking approval* of a polymer that may be customized for optimum performance (in both terms of suspended sediment removal and amount of polymer used) at a particular site. The results of a mechanical soil analysis characterizing the site soil sample particle size composition must be provided. The results of this analysis should be submitted with the results of the standpipe test entered on the "Standpipe Test Data Sheet." This option is provided since each site will have at least slight differences, if not significant differences, in soil chemical and physical characteristics. These differences may influence the effectiveness of any given polymer.

Indicate which "soil" type is used in the standpipe test on the data sheet under "-V Soil Type Used."

* Note that final approval of a polymer is granted only after it is demonstrated through both the standpipe and field tests that the polymer is effective and can be effectively applied.

2. Mix the solutions by completely inverting each graduated cylinder 3 times.
3. Add polymer mixture to each graduated cylinder. The volume and concentration of polymer added is the manufacturer's or supplier's choice, but must include a set volume and a gradient of "low" to "high" concentrations. The volume and each polymer concentration must be recorded on the data sheet. The purpose is to determine the lowest polymer mixture concentration needed to achieve effective removal of suspended solids. Ultimately the least amount of polymer mixture needed to achieve optimal performance should be used in the field.

A minimum gradient of five polymer mixture concentrations is used to achieve the above stated purpose. The purpose of the five concentration gradient is to attempt to pinpoint the concentration that achieves optimal removal of suspended solids (i.e. least amount of polymer mixture required to remove a minimum of 95% of the suspended solids). This gradient should be sufficiently wide to show a range of effectiveness in removing suspended solids (with at least one, but preferably more, meeting the 95% removal level). A second goal of using a minimum of five concentrations is to avoid the occurrence of false negative outcomes in the polymer approval process. By having more concentrations across a gradient it is more likely to find truly effective concentrations that are less than the use restriction value. A polymer mixture will not be approved for field testing, and thus for inclusion on the PAL if its effective concentration (as determined in this laboratory stand pipe test) is greater than the use restriction value.

4. Mix the solutions by completely inverting each graduated cylinder 3 times.
5. Let the solution in each graduated cylinder settle for 5 minutes.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local DNR office or the Standards Oversight Council in Madison, WI at (608) 441-2677.

DNR, WI
12/2015

6. Determine the percent suspended solids reduction in each graduated cylinder as follows:

- a. Heat/dry one evaporating or drying dish at 103 – 105 °C for 1 hour for each graduated cylinder. Store the dishes in a desiccator until needed (steps b).
- b. Weigh a dish out to at least one, and preferably more decimal points. Record this weight on the data sheet.
- c. Collect 20 ml from within one of the graduated cylinders at the 1 liter mark and place in a pre-weighed evaporating or drying dish (from step a). Repeat steps b and c for each of the other graduated cylinders.
- d. Evaporate and dry each of the 20 ml samples from step b at 98 °C for at least 1 hour.
- e. Cool each dish with sample in a desiccator to balance temperature
- f. Weigh each dish with sample. Record this weight on the data sheet.
- g. Subtract the weight of the dried dish (from step b) to determine the weight of the solids from the sample.

Record this weight on the data sheet.

- These methods follow, with slight modification, those of Standard Methods 2540 B. (1989).

7. The polymer passes this effectiveness test if it achieves 95 % reduction of suspended solids. Thus, **95 % reduction is achieved if the weight of the solids from the sample is 0.2 mg.**

$$\frac{2000 \text{ ml}^1}{1000 \text{ mg/L}^2} = \frac{20 \text{ ml}^3}{X^4} \quad X = 10 \text{ mg/L}$$

¹ = volume of solution in the cylinder

² = suspended solids concentration in the cylinder at 95 % reduction

³ = volume of sample taken from 1 L mark of the cylinder

⁴ = sample solids concentration needed to achieve 95 % reduction

$$\frac{10 \text{ mg}}{\text{L}} \times \frac{\text{L}}{1000 \text{ mL}} \times 20 \text{ mL} = 0.2 \text{ mg}$$

8. A photocopy of the completed data sheet should be sent to the following address for WisDOT review: New Products Engineer, WisDOT, Technology Advancement, 3502 Kinsman Blvd., Madison, WI 53704.

STANDPIPE TEST DATA SHEET

Date(s): _____

Testing Laboratory: _____

Analyst(s) Initials: _____

Polymer Name: _____

Manufacturer Name: _____

Volume of Polymer Mixture Used: _____

-V Soil Type Used: ____Clay __Silt __Site-Specific Soil (mechanical analysis results enclosed)

Polymer Mixture Concentration (mg/L or % solution)	Weight of Evaporating/Drying Dish		Final Weight of Solids Sample
	Pre	With Sample	

Which polymer mixture concentration(s) achieved effective (? : 95%) reduction of suspended solids (i.e. final weight :: 0.2 mg solids)?

Notes/Comments:

Please send a photocopy of this completed data sheet to:
New Products Engineer, WisDOT, Technology Advancement, 3502 Kinsman Blvd., Madison, WI 53704.

Wisconsin Department of Natural Resources

Technical Standard

Non-Channel Erosion Mat

1052

DEFINITION

A protective soil cover made of straw, wood, coconut fiber or other suitable plant residue, or plastic fibers formed into a mat, usually with a plastic or biodegradable mesh on one or both sides. Erosion mats are rolled products available in many varieties and combinations of material and with varying life spans.

PURPOSE

The purpose of this practice is to protect the soil surface from the erosive effect of rainfall and prevent erosion during the establishment of grass or other vegetation, and to reduce soil moisture loss due to evaporation. This practice applies to both *Erosion Control Revegetative Mats (ECRM)* and *Turf-Reinforcement Mats (TRM)*.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to erosion mat selection for use on erodible slopes.

This standard is not for *channel* erosion. For channel applications, reference WDNR Technical Standard (1053) Channel Erosion Mat.

Be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of erosion mat. This standard does not contain the text of federal, state, or local laws.

CRITERIA

Products

Use erosion mat products identified on the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL).

Selection

Use WisDOT PAL classes and types to select and specify erosion mat.

Select the appropriate erosion mat based on site specific slope and slope length conditions in accordance with the WisDOT Facilities Development Manual (FDM Section 10-5) Slope Erosion Control Matrix.

Select erosion mat that will last long enough for turf grass or other vegetation to become densely established.

Use only mats containing exclusively organic material (no plastic) in or near *waterways* or other sensitive areas.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

WDNR
October 2018

¹ Words in the standard that are shown in italics are described in the Definitions section. The words are italicized the first time they are used in the text.

Installation

Install and anchor erosion mat in accordance with manufacturer's instructions.

At the time of installation, retain material labels and manufacturer's installation instructions until the site has been stabilized.

Install ECRMs after topsoil is placed and seeding is complete.

Install TRMs in conjunction with placement of topsoil, followed by ECRM installation.

Install erosion mat so that it bears completely on the soil surface.

Use staples that are at least 6 inches long.

Do not install Class I or Class II - Type B products that incorporate photo- or bio-degradable netting after September 1st of a given year.

CONSIDERATIONS

Use Class I Urban mats in locations where shortly mowed turf grasses are to be established.

ECRMs without topsoiling and seeding can be used for temporary soil stabilization during the non-growing season or for periods of inactivity.

Slope interruption products that are designed, installed and maintained in accordance with DNR Interim Manufactured Perimeter Control and Slope Interruption Products Technical Standard 1071 can be used to reduce slope length.

Some erosion mat products can have detrimental effects on local wildlife. Plastic netting without independent movement of strands can easily entrap small animals moving through the area, leading to dehydration, desiccation, and eventually mortality. Netting that contains biodegradable thread with the "leno" or "gauze" weave (contains strands that can move independently) have the least impact on wildlife.

PLANS AND SPECIFICATIONS

Prepare plans and specifications in accordance with the criteria of this standard and describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

Inspect erosion mat at least weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

If there are signs of rilling under the mat, install more staples or more frequent anchoring trenches. If rilling becomes severe enough to prevent establishment of vegetation, remove the section of mat where the damage has occurred. Fill the eroded area with topsoil, compact, reseed and replace the section of mat, trenching and overlapping ends per manufacturer's recommendations. Additional staking is recommended near where rilling was filled.

In situations where soil type, topography, or other conditions result in poor observed performance, use multiple practices such as adding mulch under the mat, or installing appropriately placed check devices to reduce local velocity.

If the reinforcing plastic netting has separated from the mat, remove the plastic and if necessary replace the mat.

Complete maintenance as soon as possible with consideration to site conditions.

REFERENCES

WisDOT “Erosion Control Product Acceptability List” is available online at:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

DEFINITIONS

Erosion Control Revegetative Mats (ECRM) (II): A blanket like covering laid on top of a prepared seed bed to protect the soil and seed from the erosive forces of nature.

Turf-Reinforcement Mats (TRM) (II): Helps to permanently stabilize the soil by acting as reinforcement for the roots of the vegetation. This open weaved, synthetic mat is installed on top of soil and filled with topsoil and seeded. As the vegetation grows, the roots intertwine into the mat and reinforces the turf.

Channel: A constructed swale or ditch designed to convey storm water.

Waterways: Natural watercourses such as lakes or streams.

Wisconsin Department of Natural Resources

Technical Standard

Channel Erosion Mat

1053

DEFINITION

A protective soil cover made of straw, wood, coconut fiber or other suitable plant residue, or plastic fibers formed into a mat, usually with a plastic or biodegradable mesh on one or both sides. Erosion mats are rolled products available in many varieties and combinations of material and with varying life spans.

PURPOSE

The purpose of this practice is to protect the *channel* from erosion, or to act as turf reinforcement during or after the establishment of grass or other vegetation in the channel. This practice applies to *Erosion Control Revegetative Mats (ECRM)* and *Turf-Reinforcement Mats (TRM)*.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies where storm runoff drains in channels in intermittent flow and vegetation is to be established. Some products may have limited applicability in projects adjacent to navigable *waterways* due to potential wildlife entrapment.

Be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of erosion mat. This standard does not contain the text of federal, state, or local laws.

CRITERIA

Products

Use channel erosion mat products identified on the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL).

Selection

Use WisDOT PAL classes and types to select and specify erosion mat.

Select the appropriate erosion mat based on the calculated shear stress, given drainage area characteristics and channel geometry for the design storm depth.

If applicable, select the appropriate channel erosion mat based on site channel grade and channel length in accordance with the WisDOT Facilities Development Manual (FDM Section 10-5) Channel Erosion Control Matrix.

Select erosion mat that will last until turf grass or other vegetation becomes densely established.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

WDNR
October 2018

¹ Words in the standard that are shown in italics are described in the Definitions section. The words are italicized the first time they are used in the text.

Installation

Install and anchor erosion mat in accordance with manufacturer's instructions.

At time of installation, retain material labels and manufacturer's installation instructions until the site has been stabilized.

Install ECRMs after topsoil is placed and seeding is complete.

Install TRMs in conjunction with placement of topsoil, followed by ECRM installation.

Install erosion mat so that it bears completely on the soil surface.

Use staples that are at least 6 inches long.

CONSIDERATIONS

Some erosion mat products can have detrimental effects on local wildlife. Plastic netting without independent movement of strands can easily entrap small animals moving through the area, leading to dehydration, desiccation, and eventually mortality. Netting that contains biodegradable thread with the "leno" or "gauze" weave (contains strands that can move independently) have the least impact on wildlife.

PLANS AND SPECIFICATIONS

Prepare plans and specifications in accordance with criteria of this standard and describe requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

Inspect erosion mat at least weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

If there are signs of erosion under the mat, install more staples or more anchor trenches. If erosion becomes severe enough to prevent vegetation, remove the section of mat where the damage has occurred. Fill eroded area with topsoil, compact, reseed and replace the section of mat, trenching and overlapping ends per manufacturer's recommendations. Additional staking is recommended at points of repaired erosion.

In situations where soil type, topography, or other conditions result in poor observed performance, use multiple practices such as adding additional mulch under the mat, or installing appropriately placed check devices to reduce local velocity.

If the reinforcing plastic netting has separated from the mat, remove the plastic and replace the mat, if necessary.

Complete maintenance as soon as possible with consideration to site conditions.

REFERENCES

WisDOT "Erosion Control Product Acceptability List" is available online at:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

DEFINITIONS

Channel: A constructed swale or ditch designed to convey storm water.

Channel Erosion: The deepening and widening of a channel due to soil loss caused by flowing water.

Erosion Control Revegetative Mats (ECRM) (II): A blanket like covering laid on top of a prepared seed bed to protect the soil and seed from the erosive forces of nature.

Turf-Reinforcement Mats (TRM) (II): Helps to permanently stabilize the soil by acting as reinforcement for the roots of the vegetation. This open weaved, synthetic mat is installed on top of soil and filled with topsoil and seeded. As the vegetation grows, the roots intertwine into the mat and reinforces the turf.

Waterways: Natural watercourses such as lakes or streams.

Vegetative Buffer For Construction Sites (1054)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

An area of *dense vegetation*¹ intended to slow runoff and trap sediment. Vegetative Buffers are commonly referred to as filter or buffer strips.

II. Purpose

The purpose of this practice is to remove sediment in *sheet flow* by velocity reduction.

III. Conditions Where Practice Applies

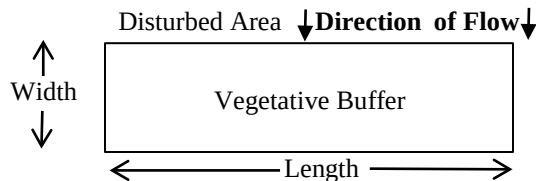
This practice applies to areas where sediment delivery is in the form of *sheet and rill erosion* from disturbed areas.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of a vegetative buffer. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.



- A. The vegetative buffer shall be located along the entire length of the down slope edge of the entire disturbed area for which the practice is being applied.

- B. The vegetative buffer shall be located on the contour.
- C. The *width* of the vegetative buffer shall have slopes less than 5 %.
- D. The disturbed area draining to the vegetative buffer shall have slopes of 6 % or less.
- E. The vegetative buffer shall have a minimum width of 25 feet. 25 feet is adequate for disturbed areas up to 125 feet upslope from the vegetative buffer. An additional one foot of width shall be added to the buffer for every 5 feet exceeding 125 feet upslope of the disturbed area draining to the vegetative buffer.
- F. To minimize compaction and destruction of the vegetative cover, designate the vegetative buffer as an area of no disturbance. Construction equipment shall be excluded from the designated area. Vegetative buffers shall be clearly shown on plans and marked in the field.
- G. Vegetative buffers shall be densely vegetated prior to upslope soil disturbance.

VI. Considerations

- A. Maintaining sheet flow is critical to the function of a vegetative buffer. In some conditions, a *level spreader* may need to be constructed at the upslope side of the vegetative buffer to minimize concentrated flow.
- B. Vegetative buffers may require large land areas compared to other erosion control practices.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

¹ Words in the standard that are shown in italics are described in IX. Definitions. The words are italicized the first time they are used in the text.

- C. Trees should not be cut down to establish a vegetative buffer. Other erosion control measures are preferred.

VII. Plans and Specifications

- A. Plans and specifications for vegetative buffers shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall address the following:
 - 1. Location of vegetative buffer.
 - 2. Limits and slopes of disturbed area and any additional contributory drainage area.
 - 3. Dimensions and slope of vegetative buffer.
- B. All plans, standard detail drawings, or specifications shall include schedule for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

- A. Vegetative buffers shall be inspected for proper distribution of flows, sediment accumulation and signs of rill formation. Vegetative buffers shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.
- B. If the vegetative buffer becomes silt covered, contains rills, or is otherwise rendered ineffective, other perimeter sediment control measures shall be installed. Eroded areas shall be repaired and stabilized. Repair shall be completed as soon as possible with consideration to site conditions.
- C. A stand of dense vegetation shall be maintained to a height of 3 – 12 inches.
- D. Prior to land disturbance the perimeter of vegetative buffers shall be flagged or fenced to prevent equipment from creating ruts, compacting the soil and to prevent damage to vegetation.

IX. Definitions

Dense vegetation (I): is defined as an existing stand of 3 – 12 inch high grassy vegetation that uniformly covers at least 90 % of a representative 1 square yard plot. Woody vegetation shall not be counted for the 90% coverage. No more than 10% of the overall buffer can be comprised of woody vegetation.

Level Spreader (VI.A): Level spreaders disperse flows over a wide area, dissipating the energy of the runoff and creating sheet flow. Common types of level spreaders are weirs and stone trenches.

Sheetflow (II): Sheet flow is over plane surfaces, where runoff water flows in a thin uniform sheet across the land before it collects in a concentrated flow.

Sheet and Rill Erosion (III): Sheet and rill erosion is the removal of soil by the action of rainfall and shallow overland runoff. It is the first stage in water erosion. As flow becomes more concentrated rills occur. As soil detachment continues or flow increases, rills will become wider and deeper.

Width (V.E): Is measured in the direction of flow.

Sediment Bale Barrier (Non-Channel) (1055)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

A temporary sediment barrier consisting of a row of entrenched and anchored straw bales, hay bales or equivalent material used to intercept sediment-laden sheet flow from small drainage areas of disturbed soil.

II. Purpose

The purpose of this practice is to reduce slope length of the disturbed area and to intercept and retain transported sediment from disturbed areas.

III. Conditions Where Practice Applies

A. This standard applies to the following applications where:

1. Erosion occurs in the form of *sheet and rill erosion*¹. There is no concentration of water flowing to the barrier (*channel erosion*).
2. Where adjacent areas need protection from sediment-laden runoff.
3. Effectiveness is required for less than 3 months.
4. Conditions allow for the bales to be properly entrenched and staked as outlined in the Criteria Section V.

B. Under no circumstance shall sediment bale barriers be used in the following applications:

1. Below the ordinary high watermark or placed perpendicular to flow in streams, swales, ditches or any place where flow is concentrated.

2. Where the maximum gradient upslope of the sediment bale barriers is greater than 50% (2:1).

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of the sediment bale barrier. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.

A. Placement

1. At a minimum, sediment bale barriers shall be placed in a single row, lengthwise on the contour, with the ends of adjacent sediment bale barriers tightly abutting one another. The holes between bales shall be chinked (filled by wedging) with straw, hay or equivalent material to prevent water from escaping between the bales.
2. The maximum allowable slope lengths contributing runoff to a sediment bale barrier are specified in Table 1.

Table 1.	
Slope	Barrier Row Spacing
< 2%	100 feet
2 to 5%	75 feet
5 to 10%	50 feet
10 to 33%	25 feet
33 to 50%	20 feet
> 50%	Not Permitted

3. Sediment bale barriers shall not be placed perpendicular to the contour.
 4. The end of the sediment bale barrier shall be extended upslope to prevent water from flowing around the barrier ends.
- B. Height – Installed sediment bale barrier shall be a minimum of 10 inches high and shall not exceed a maximum height of 20 inches from ground level.
- C. Anchoring and Support
1. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a sediment bale barrier and the length of the proposed barrier to a minimum depth of 4 inches. After bales are staked and chinked, the excavated soil shall be backfilled and compacted against the barrier. Backfill to ground level on the down slope side. On the upslope side of the sediment bale barrier backfill to 4 inches above ground level.
 2. At least two wood stakes, "T" or "U" steel posts, or ½ inch rebar driven through at equidistance along the centerline of the barrier shall securely anchor each bale. The minimum cross sectional area for wood stakes shall be 2.0 by 2.0 inches nominal. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes shall be driven a minimum 12-inches into the ground to securely anchor the sediment bale barriers.
 3. Bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales

in order to prevent deterioration of the bindings.

VI. Considerations

- A. Improper placement as well as improper installation and maintenance of sediment bale barriers will significantly decrease the effectiveness of this practice.
- B. Sediment bale barriers should not be used upslope of the disturbed area.
- C. A double row of sediment bale barriers may be installed in areas where additional protection is needed.
- D. For safety, place all anchoring flush with the sediment bale barrier or cap any exposed anchoring device.

VII. Plans and Specifications

- A. Plans and specifications for installing sediment bale barriers shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall address the following:
 1. Location of sediment bale barrier
 2. Contributory drainage area
 3. Schedules
 4. Standard drawings and installation details
 5. Restoration after removal
- B. All plans, standard detail drawings, or specifications shall include schedule for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

- A. Sediment bale barriers shall, at a minimum, be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.
- B. Damaged or decomposed sediment bale barriers, any undercutting, or flow channels

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
PERIMETER SEDIMENT CONTROL AND SLOPE INTERRUPTION
1056

DEFINITION

A practice used to intercept sheet flow from small areas of disturbed soil and encourage ponding of runoff to allow sediment to settle out. Examples include silt fence and manufactured products such as wattles, sediment logs and geotextile socks filled with natural materials.

PURPOSE

The purpose of this standard is to reduce the discharge of sediment in runoff from small areas at construction sites. The standard includes common methods which may be used to meet this purpose.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies in areas of construction sites where only *sheet and rill erosion*¹ occur and sediment control is needed prior to discharge from the site. These are typically perimeter areas but may include internal areas (e.g., temporary soil stockpiles or part of a treatment train) if appropriate. This standard also applies in areas of construction sites where slope interruption devices are needed to minimize the potential for concentrated flow forming on long or steep slopes.

This standard does not apply to:

- Locations below the ordinary high water mark of waterways or within wetlands without reporting or non-reporting permit coverage from the Wisconsin Department of Natural Resources (WDNR);
- Any area of concentrated flow, including ditches or swales; or

Note: Manufactured products can be used as ditch checks in accordance with WDNR Technical Standard 1062 Ditch Check.

- In areas where the slope in the contributing drainage area is steeper than 50% (2H:1V).

Note: Runoff from slopes steeper than 50% should be directed to sediment basins/traps or a flat ponding area should be maintained between the toe of the slope and the perimeter sediment controls.

CRITERIA

This section establishes the minimum standards for design, installation and performance requirements.

General Criteria (Silt Fence and Manufactured Products)

Laws and Regulations. Comply with applicable federal, tribal, state, and local laws, rules, regulations, or permit requirements including but not limited to those relating to Diggers Hotline, safety, and spills. This standard does not contain the text of federal, tribal, state, or local laws.

Location. Locate perimeter sediment controls on the contour to the maximum extent possible to create temporary ponding areas where particle settling can occur with the ends extended upslope to prevent water from flowing around the ends (see Figure 1).

¹ Words in the standard that are shown in italics are described in the Glossary section. The words are italicized the first time they are used in the text.

Design Parameters. Install perimeter sediment controls to form a series of *J-Hooks* (see Figure 2) where needed to maximize ponding areas.

For contributing drainage areas with slopes steeper than 33% (3H:1V) (e.g., soil stockpiles), maintain a ponding area between the toe of the slope and the perimeter sediment controls. The ponding area should be as flat as possible with perimeter sediment controls located at least 10 feet from the toe of the slope when possible. The 10-foot ponding area does not need to be considered toward the slope length and contributing drainage area limitations for slopes steeper than 33% (3H:1V) (see Tables 1 and 2).

Install perimeter sediment controls prior to disturbing the contributing drainage area.

Contributing Drainage Area – Silt Fence

Identify appropriate locations for silt fence so that slope lengths in the contributing drainage area do not exceed the criteria in Table 1.

Note: When contributing drainage area conditions are not appropriate for silt fence, runoff should be directed to sediment basins or traps.

Table 1				
Average Slope		Slope Length	Maximum Contributing Drainage Area Per 100 Feet of Silt Fence	
(%)	(H:V)	(Feet)	(Square Feet)	(Acres)
<2	<50:1	100	10,000	0.23
2 to 5	50:1 to 20:1	75	7,500	0.17
5 to 10	20:1 to 10:1	50	5,000	0.11
10 to 33	10:1 to 3:1	25	2,500	0.06
33 to 50	3:1 to 2:1	20	2,000	0.05

It is acceptable to use silt fence relief ditch checks (see Figure 3) where a low point in a silt fence line is unavoidable, provided the contributing drainage area to the low point is less than one acre.

When silt fence relief ditch checks are used, design and install the ditch check component in accordance with WDNR Technical Standard 1062 Ditch Check. Install silt fence relief openings that are between 3 and 8 feet wide based on the size of the contributing drainage area.

Contributing Drainage Area – Manufactured Products

Identify appropriate locations for manufactured perimeter control products so that slope lengths in the contributing drainage area do not exceed the criteria in Table 2 for the selected product height class in Table 3.

Note: When contributing drainage area conditions are not appropriate for manufactured products, runoff should be directed to sediment basins or traps.

Table 2					
Average Slope		Slope Length (feet) per Product Height Class			
(%)	(H:V)	I	II	III	IV
<2	<50:1	30	55	75	100
2 to 5	50:1 to 20:1	25	40	55	75
5 to 10	20:1 to 10:1	15	30	40	50
10 to 33	10:1 to 3:1	10	15	20	25
33 to 55	3:1 to 2:1	5	10	15	20

Table 3	
Product Height Class	Product Height (inches)
Class I	6-9
Class II	10-15
Class III	16-20
Class IV	> 20

It is acceptable to use manufactured perimeter control products for slope interruption when installed in rows that are spaced in accordance with Table 2 (see Figure 4).

Use product manufacturer recommendations if more restrictive than Table 2.

Material Specification – Silt Fence

Use geotextile consisting of either woven or non-woven polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride. Non-woven fabric may be needle punched, heat bonded, resin bonded, or combinations thereof.

Use geotextile that meets the criteria in Table 4.

Table 4		
Test Requirement	Method	Value ¹
Minimum grab tensile strength in the machine direction	ASTM D 4632	120 lbs. (550 N)
Minimum grab tensile strength in the cross machine direction	ASTM D 4632	100 lbs. (450 N)
Maximum apparent opening size equivalent standard sieve	ASTM D 4751	No. 30 (600 µm)
Minimum permittivity	ASTM D 4491	0.05 scc ⁻¹
Minimum ultraviolet stability percent of strength retained after 500 hours of exposure	ASTM D 4355	70%

¹ All numerical values represent minimum / maximum average roll values. (For example, the average minimum test results on any roll in a lot should meet or exceed the minimum specified values.)

Material Specification – Manufactured Products

Use temporary ditch check products identified on the WisDOT Erosion Control Product Acceptability List (PAL) or manufactured perimeter control and slope interruption products identified on the Wisconsin Department of Safety and Professional Services (DSPS) Approved Product List.

NOTE: Temporary ditch check products on the WisDOT PAL have product heights of at least 12 inches. It is acceptable to use smaller versions of these products for perimeter control or slope interruption applications.

For products filled with compost, use compost that meets WDNR Specification S100 Compost for Storm Water Management.

For products filled with reused materials regulated as solid waste, use materials that have received a WDNR exemption under NR 500, Wis. Adm. Code.

For products that include water-applied additives, use water applied additives that comply with WDNR allowable usage rates.

Note: WDNR maintains a list of additive allowable usage rates at <https://dnr.wisconsin.gov/topic/Wastewater/Additives.html>

Installation – Silt Fence (see Figure 5)

Install silt fence with a minimum height of 24 inches above the ground surface.

Anchor silt fence by constructing a trench on the upslope side of the fence or use a slicing machine that provides anchoring equivalent to a trench.

Construct an anchoring trench that is at least 4 inches wide and 6 inches deep. Spread the excess fabric in the trench, backfill the trench with soil and compact the soil.

Install wood support posts on the downslope side of the silt fence that support the full height of the fence. Use hardwood posts (e.g., oak, hickory) with a minimum size of 1-1/8 inch by 1-1/8 inch and at least 4 feet long.

Space support posts along the silt fence no more than 3 feet apart for non-woven fabric or 8 feet apart for woven fabric and install the posts at least 2 feet below the ground surface.

Staple silt fence on the upslope side of the posts in at least 3 places using at least 0.5-inch staples. At the end posts, wrap the fabric so that the staples are not visible.

Use silt fence with support cords or tension tape near the top of the fence and tighten to provide top support.

When joints are necessary, joint two lengths of silt fence using either the Twist Method or the Hook Method as shown on Figure 5.

Use silt fence with support cords or tension tape near the top of the fence and tighten to provide adequate top support.

Use steel support posts only when needed in compacted soil conditions or locations where higher support strength is necessary. Steel support posts should be at least 5 feet long with a strength of 1.25 pounds per linear foot and projections for the attachment of fasteners. Fabric should be attached to steel posts in at least three places using 50-pound plastic tie straps or wire fasteners.

Installation – Manufactured Products

Overlap products a minimum 24 inches or as required by the manufacturer if more restrictive. Do not allow gaps between adjacent, overlapping products.

Stake or anchor as needed to maintain constant ground contact along the entire length of product and prevent lateral movement and/or floatation. Perform staking or anchoring per product manufacturer recommendations.

On disturbed ground, entrench a minimum of 2 inches to ensure continuous ground contact. On vegetated, erosion matted or frozen ground, products may be installed without entrenchment per product manufacturer recommendations.

To prevent undercutting, fill any gaps and ruts under the installed product with soil or *log-type product* filler media.

Do not stack products individually on top of one another unless allowed in the manufacturer's recommended installation procedures.

CONSIDERATIONS

The following are not required but are recommendations:

- (1) Consider drainage patterns during all phases of construction to avoid subjecting perimeter controls to concentrated flows or runoff from drainage areas that exceed the slope or slope length criteria.
- (2) Avoid using perimeter sediment controls to define property boundaries or construction limits. This approach can result in perimeter control installations that are not installed on contour, creating low points where overtopping or undercutting occurs.
- (3) When placing silt fence near trees, take care to minimize damage to the root system. Avoid compaction and root cutting within 1.5 feet multiplied by the inch diameter of the tree (for example: for 10-inch trees keep out a 15-foot radius from the trunk).
- (4) In wooded areas, use manufactured products instead of silt fence when tree preservation is a goal.
- (5) Protect perimeter controls from damage in areas of active construction or heavy traffic using flagging or other methods to improve visibility.
- (6) To further support silt fence, use wire back silt fence or install staked straw bales (see WDNR Technical Standard 1055 Sediment Bale Barrier) on the down slope side.
- (7) To help ensure effectiveness, inspect and repair perimeter controls as necessary prior to forecasted rain events.
- (8) Where installation with wood posts is difficult, such as when hard or frozen ground is encountered, the use of steel post is recommended.
- (9) Steel posts can pose a hazard for snowmobiles and ATVs and should be avoided in areas where snowmobile and ATV traffic is possible.
- (10) Where perimeter control is placed adjacent to wetland boundaries, add high visibility fencing or signage to discourage intrusion into wetlands.
- (11) To prolong the life of log-type products, stakes should be crossed over the product instead of piercing the fabric.
- (12) For manufactured products that are filled with wood material, consider using recycled wood materials diverted from landfills.
- (13) It is acceptable to install redundant perimeter controls (e.g., double-row silt fence) adjacent to wetlands or other sensitive areas. However, redundant perimeter controls are considered one practice for design purposes.

PLANS AND SPECIFICATIONS

Specify the material options within the specifications for the project. Include the proposed product height class for manufactured perimeter control devices.

Depict the proposed location of perimeter controls on the erosion control plans in accordance with the criteria of this standard and describe the requirements for applying the practice to achieve its intended use. Include the location of J-hooks alignments where appropriate. Label locations where the placement requires modification after major grading operations.

OPERATIONS AND MAINTENANCE

General (Silt Fence and Manufactured Products)

Inspect perimeter sediment control practices at a minimum weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

Repair or replace any perimeter sediment controls that are damaged or decomposed.

Remove accumulated sediment when deposits reach $\frac{1}{2}$ the height of the perimeter sediment control practice.

It is acceptable to install an additional row of silt fence upslope from the initial row provided the accumulated sediment has been removed from the initial row.

If a perimeter control practice becomes undermined, backfill the voids with soil and compacted to prevent water flow under the practice.

Remove perimeter sediment controls once the contributing drainage area is *permanently stabilized*. After removal, dispose of perimeter sediment controls properly.

Manufactured Products

If a manufactured product rolls out of position, reposition the product and secure with additional stakes.

Remove and replace destroyed or irreparable sections of log-type product with new log-type product or a second log-type product may be placed immediately upslope with a minimum 24-inch overlap beyond the deformation.

It is acceptable to repair *small holes* in a log-type product by stitching or wrapping a new piece of fabric around the product and securing. For log-type product with larger holes, rips, or tears, remove and replace with new product or a second log-type product may be placed immediately upslope with a minimum 24 inches of overlap beyond the hole, rip, or tear.

Re-form pinched, settled, or deformed log-type products to their original diameter by hand if possible or a second log-type product shall be placed immediately upslope with a minimum 24-inch overlap beyond the deformation.

REFERENCES

Wisconsin Department of Transportation, Erosion Control Product Acceptability List (PAL), <https://wisconsindot.gov/pages/doing-business/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>.

Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, 2022. <https://wisconsindot.gov/pages/doing-business/eng-consultants/cnslt-rsrcs/rdw/stndspec.aspx>.

Wisconsin Department of Safety and Professional Services, Manufacturers of Approved Building Materials Database, <https://dsps.wi.gov/Pages/Programs/CommercialBuildings/Default.aspx>.

GLOSSARY

J-Hooks: A perimeter control installation method used to avoid long runs that have the potential to create a concentration of runoff in one section. J-Hooks break up the long run and create separate areas for ponding and settling to occur.

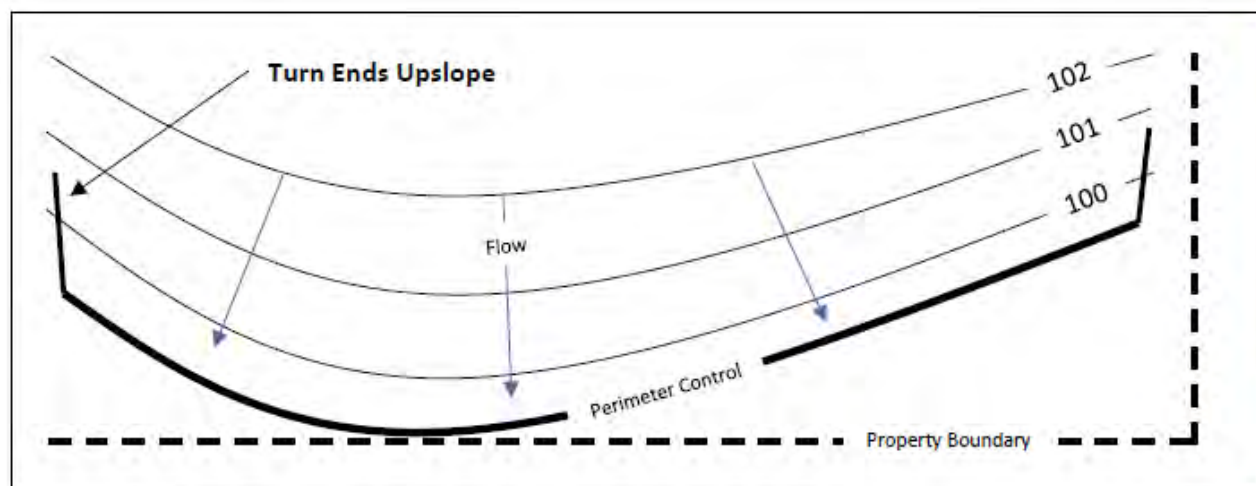
Log-Type Products: Sediment control products constructed of an outer sock of geotextile or other type of netting or permeable containment media surrounding an inner filtering media. Log-type products are commonly referred to as wattles or filter socks.

Permanently Stabilized: Disturbed areas in the contributing drainage area have been vegetated or covered so that perimeter sediment control is no longer needed.

Sheet and Rill Erosion: Sheet and rill erosion is the removal of soil by the action of rainfall and shallow overland runoff. It is the first stage in water erosion. Rills occur as flow starts to concentrate. As soil detachment continues or flow increases, rills will become wider and deeper forming gullies.

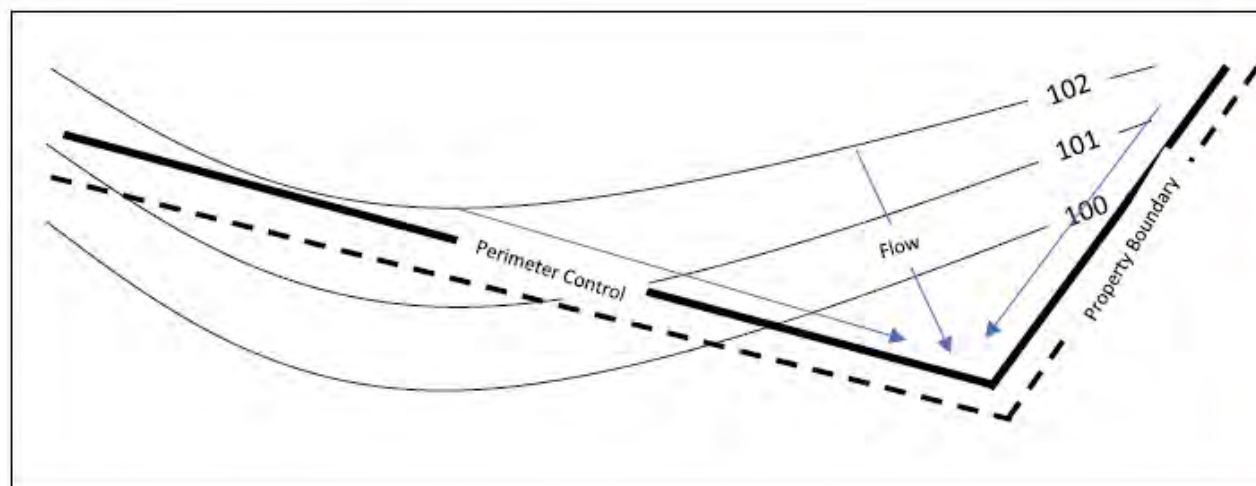
Small Holes: Holes that are less than 12 inches long and less than ½ inch wide located within the top 1/3rd of the log-type product.

**Figure 1:
Placement on Contour**



CORRECT PLACEMENT

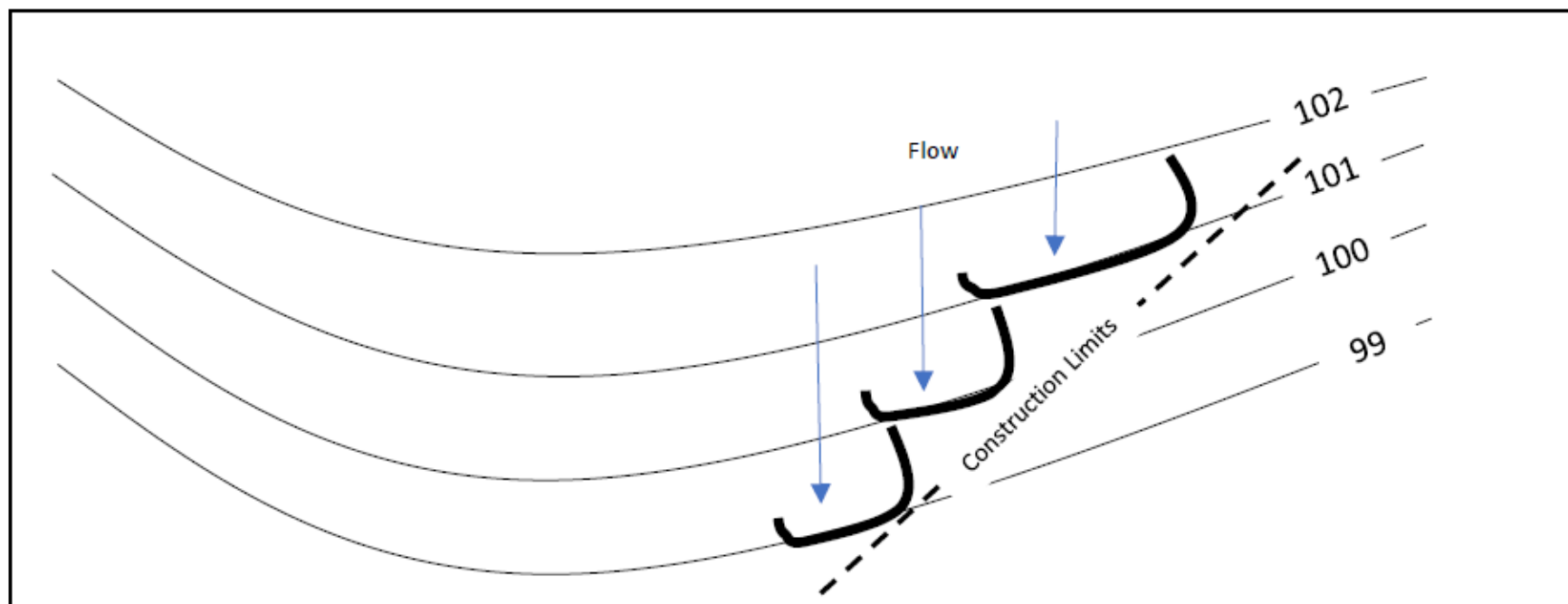
Install perimeter control on contour and turn the ends upslope. This will create the largest potential ponding area to maximize sediment removal efficiency.



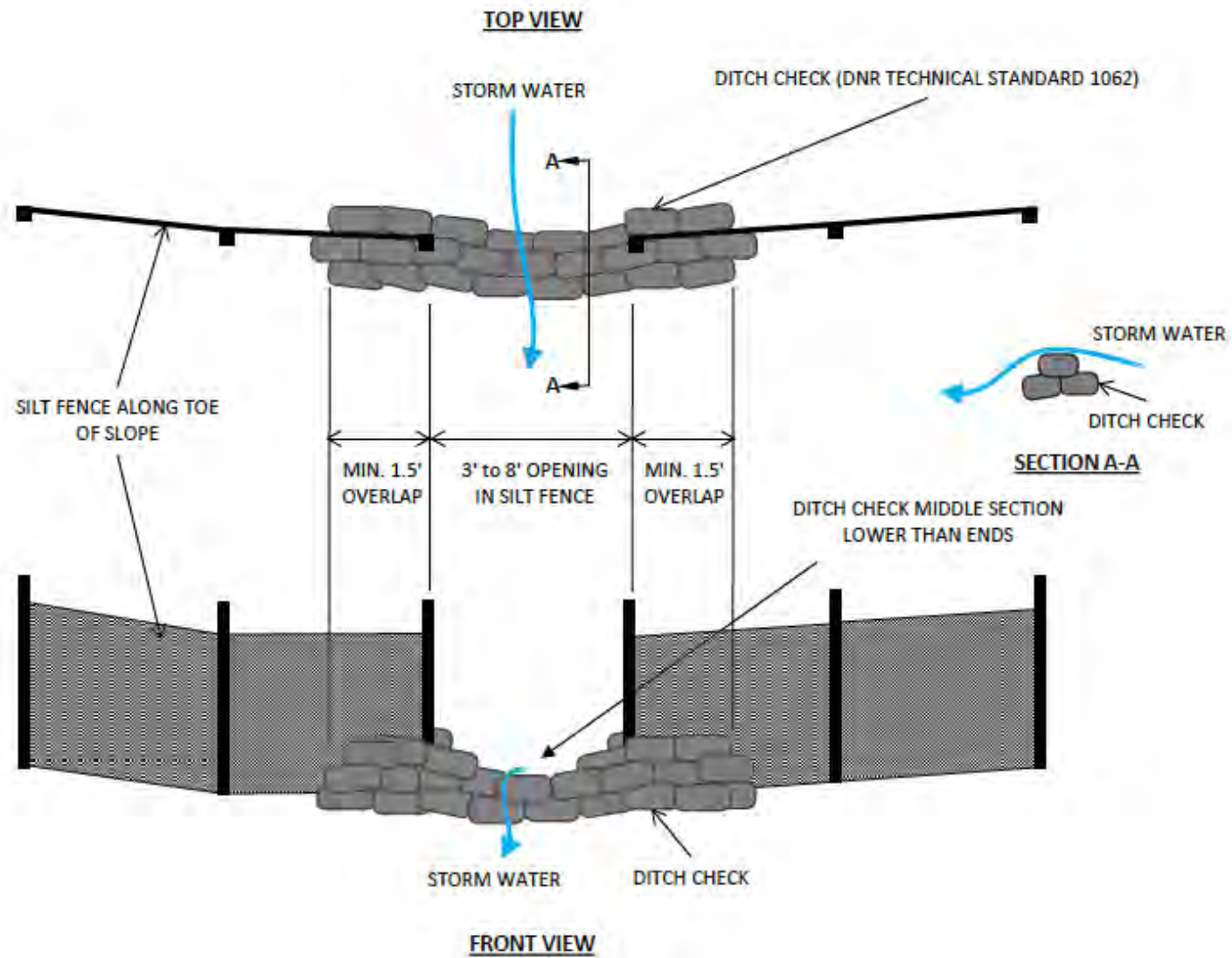
INCORRECT PLACEMENT

Do not install perimeter control along property boundaries, construction limits, roadways or other features that are not on contour. Installing perimeter control without regard to contour will cause runoff to concentrate at the low point and overwhelm the practice at this location.

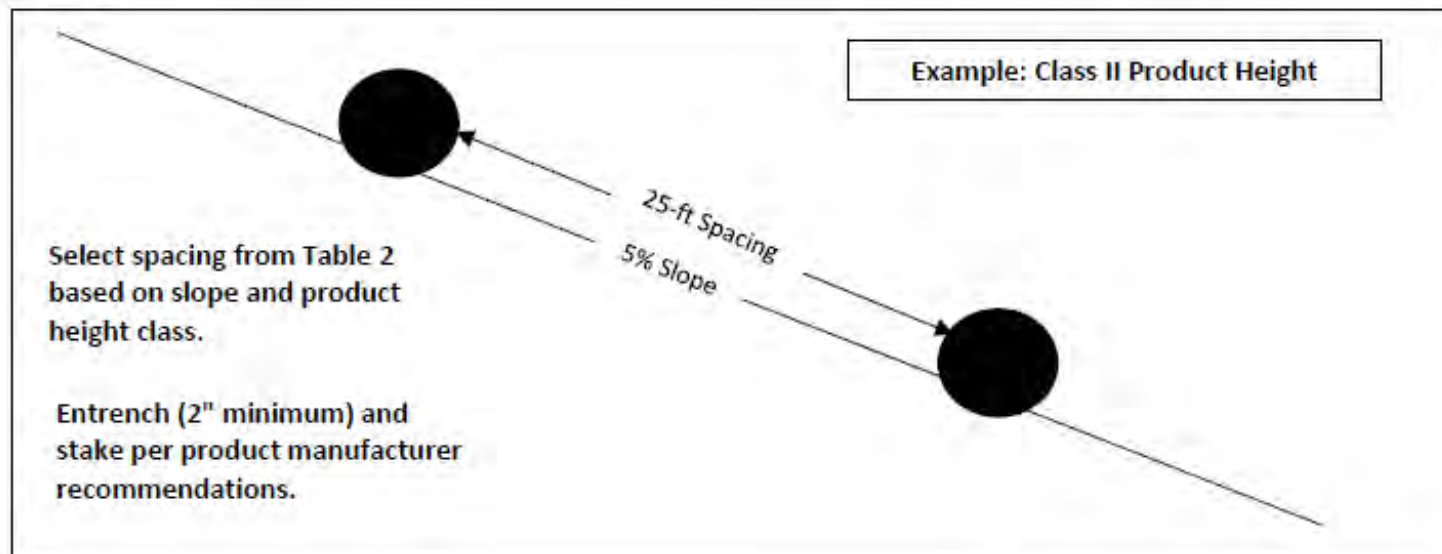
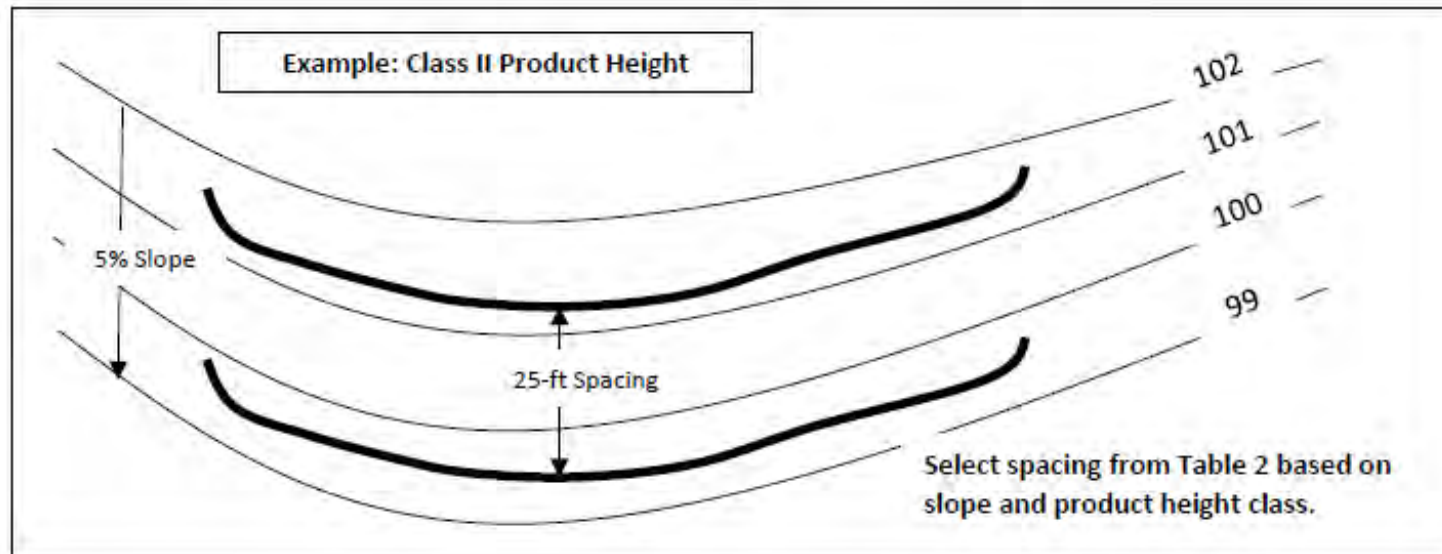
**Figure 2:
J-Hooks**



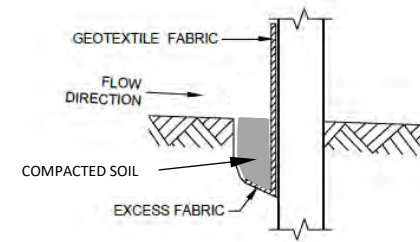
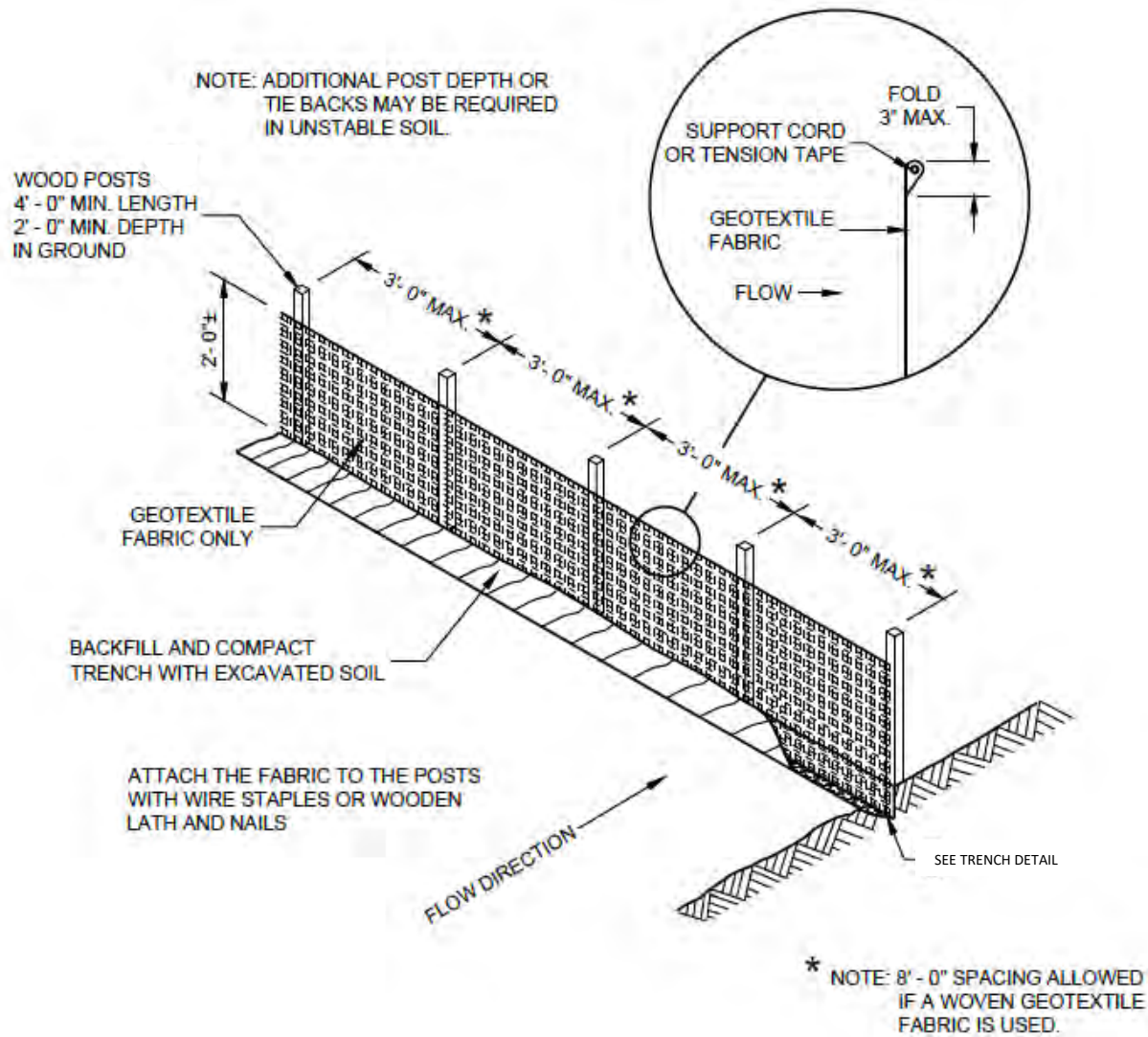
**Figure 3:
Silt Fence Relief**



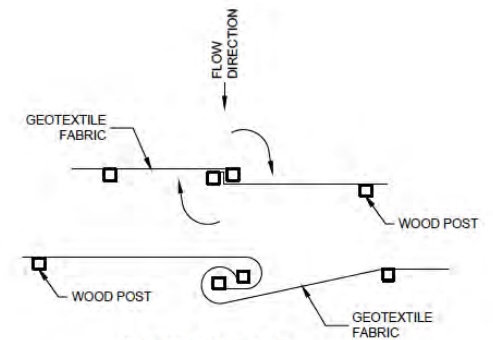
**Figure 4:
Slope Interruption**



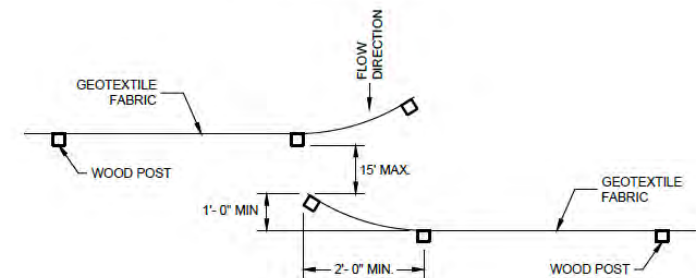
**Figure 5:
Silt Fence Installation**



TRENCH DETAIL



TWIST METHOD



HOOK METHOD

JOINING TWO LENGTHS OF SILT FENCE

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
TRACKOUT CONTROL PRACTICES
1057

DEFINITION

A practice or combination of practices used to prevent, reduce, or mitigate *trackout*¹ of sediment.

PURPOSE

Land-disturbing construction activity generally creates conditions where a vehicle comes in contact with exposed soil, which is then transported off *site* and/or deposited onto streets and roadways. This sediment can then become a road hazard and be carried from streets into drainage infrastructure and discharged into waters of the state. The purpose of this standard is to identify common methods which may be used to prevent, reduce, and/or mitigate the tracking of sediment.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies where land-disturbing activity is likely to result in trackout.

CRITERIA

General Criteria

Be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the practice. This standard does not contain the text of federal, state, or local laws.

Install one of the following practices, or a combination of practices, to prevent, reduce, or mitigate tracking of sediment off *site*.

Trackout is best managed by implementing controls in the order below. These controls may be implemented in series where conditions warrant.

- (1) Prevent trackout with stabilized work surfaces and reduced vehicle contact with soil,
- (2) Reduce trackout with stone tracking pad, manufactured trackout control devices, or tire washing,
- (3) Mitigate trackout with street cleaning.

Select a device capable of supporting the vehicle load. Provide an alternate stabilized egress for oversized or overweight loads if needed.

Provide stable approaches to and from the practice.

Provide a stable driving surface from the practice to the off-site street or road.

Limit water use to minimize the discharge of sediment into drainage infrastructure.

Apply dust control measures when necessary to minimize generation of airborne dust while implementing trackout control practices.

Criteria Applicable to Stabilized Work Surfaces

Install aggregate, concrete, asphalt, manufactured mats, or other material in work areas and haul roads to minimize contact of vehicles with exposed soils and standing water (Figure 1).

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

WDNR
July 2018

¹ Words in the standard that are shown in italics are described in the Definitions section. The words are italicized the first time they are used in the text.

Install signage or fencing as needed to support intended use.

This practice is applicable, but not limited, to the following areas:

- (1) Contractor staging areas and lay-down areas where major grading has been completed and soil stockpiles are not being constructed or removed,
- (2) Site trailer and construction employee parking areas,
- (3) Private property access routes,
- (4) Proposed parking areas,
- (5) Redevelopment sites, or
- (6) Short-term/low traffic access locations such as directional drilling pits.

Stabilized work surfaces may be used as a stand-alone practice if vehicles leaving the site are restricted to the stabilized surface and the surface is properly maintained.

If an administering authority determines that control is not being maintained, additional measures may be required.

Criteria Applicable to Stone Tracking Pads

Install the stone tracking pad to ensure vehicles that drive over exposed soil exit along the full length of the pad (Figure 2).

Use hard, durable, angular stone or recycled concrete meeting the gradation in Table 1. Where this gradation is not available, meet the gradation in Wisconsin Department of Transportation (DOT) 2018 Standard Specification, Section 312, Select Crushed Material. Use material substantially free from dirt, debris, steel, vegetable matter, and other deleterious material.

Table 1. Gradation for stone tracking pads

Sieve Size	Percent by weight passing
3"	100
2-1/2"	90-100
1-1/2"	25-60
3/4"	0-20
3/8"	0-5

Install the tracking pad across the full width of the access point, or restrict exiting traffic to a dedicated egress lane with a driving surface at least 12 feet wide.

Ensure the tracking pad is at least 50 feet long. If a 50-foot pad length is not possible due to site constraints, install the maximum length practicable and supplement with additional practices as needed to prevent or reduce trackout.

Where warranted due to soil type or high groundwater, underlay the stone tracking pad with geotextile fabric to minimize migration of underlying soil into the stone. Select fabric type based on soil conditions and vehicle loading.

Place the aggregate in a layer at least 12 inches thick.

Divert surface flows away from tracking pads or convey flow under and/or around using culverts and

swales. Direct runoff from tracking pads to sediment control practices.

Do not compact aggregate prior to use. Compaction, grouting, or other means of creating a smooth surface compromise the effectiveness of the tracking pad.

Remove stones lodged between the tires of dual wheel vehicles prior to leaving the construction site.

Criteria Applicable to Manufactured Trackout Control Devices

Install the manufactured trackout control device on a surface capable of supporting anticipated loads per manufacturer recommendations (Figure 3).

Situate the device to ensure vehicles that drive over exposed soil exit across the full length of the device. Provide a minimum device length of 32 feet for stand-alone installations. Add length if needed to reduce trackout in adverse conditions.

Criteria Applicable to Tire Washing

Select the type of washing station based on project conditions and water availability. If a wash rack is used, select a rack capable of supporting the vehicle loading.

Install the washing station on site in a stabilized area. If the device discharges untreated water, direct wash water to a sediment basin designed per the current Technical Standard 1064, Sediment Basin, or an equivalent device. Follow the current Technical Standard 1051, Water Application of Additives for Sediment Control, for flocculants used at the tire washing station. Return sediment collected in the sediment basin to the site or dispose of appropriately.

Direct vehicles that drive over exposed soil to exit through the station.

This practice may be applicable, but not limited, to the following areas:

- (1) Areas with prolonged periods or significant quantity of hauling on or off site, or
- (2) Sites which drain to a sensitive resource such as an Outstanding Resource Water or Exceptional Resource Water.

Perform tire washing per manufacturer's directions until the majority of sediment is removed from the tires.

Criteria Applicable to Street/Pavement Cleaning

Scrape and/or sweep pavements and gutters until a shovel-clean or broom-clean condition is obtained. Repeat as needed to maintain public safety and reduce sediment delivery to drainage infrastructure or water resources, and at the end of each work day.

Use available equipment or select equipment per the recommendations in Table 2.

Return sediment to the site or dispose of appropriately.

CONSIDERATIONS

- (1) An extended stabilized work surface such as a 150-foot long aggregate driveway within the site may be used as trackout control if sediment control is provided along the portions of driveways subject to sediment accumulation.
- (2) Other methods of trackout control may be utilized if they do not generate dust or result in discharge of untreated water to drainage infrastructure or water resources.

- (3) Manual removal of sediment from vehicles may be needed when working in heavy mud cannot be avoided.
- (4) Implement traffic guidance (e.g., signs, barriers, fences, flags) to restrict exiting traffic to the trackout device and prevent the circumvention of unfamiliar devices.
- (5) Inform drivers of device weight limits and the location of alternate stabilized egress for oversized and/or overweight loads.
- (6) Document in the erosion control plan whether stabilized impervious surfaces, such as staging areas, are temporary or permanent. Post-construction performance standards may apply in accordance with s. NR 151.121-128 or s. NR 151-421-249 Wis. Adm. Code.
- (7) Vehicles traveling across trackout control practices should maintain a slow constant speed.
- (8) Extend the tracking control length and/or implement additional trackout control practices to supplement primary control measures during major hauling operations, in heavy clay soils, or when conditions render the practice insufficient.
- (9) All trackout control practices, especially stone tracking pads, generally need more maintenance during and immediately after completion of major hauling operations.
- (10) If known soil and/or groundwater contamination is present on site as documented on the Bureau for Remediation and Redevelopment Tracking System (BRRTS on the Web) or has been identified through activities on site, then the potential for contamination transport should be assessed. If contamination is identified, impacted soil or water should be characterized and stored, treated or disposed of in compliance with applicable standards and rules. If this is a new contaminant release, consult Wisconsin Department of Natural Resources (DNR) staff in the regional Remediation and Redevelopment Program.
- (11) Methods of street cleaning vary based on project size, conditions, and availability of equipment. These methods require the contractor to follow OSHA standards for silica dust control and may require additional safeguards to meet current standards.

Table 2. Street cleaning methods

Method	Effective for:						Notes
	Larger clumps	Wet	Dry	Sand	Clay/Silt	Minimizing dust	
Shovel and broom by hand	Yes	Yes	Yes	Yes	Yes	Yes	Good for incidental tracking from low traffic sites or minor accumulations.
Power angle broom	Yes	Yes	Yes, with dust control	Yes	Yes	Less effective, but better with dust control	Harder to control collection of debris.
Power pick up broom	Yes	Yes	Yes, with dust control	Yes	Yes	Yes, with dust control	Generally will not get close to edges without a gutter broom, which is less effective. Use in reverse to maximum effects. Better dust control than angle broom.
Traditional street sweeper	Yes	Yes	Yes, with dust control	Yes	Yes	Yes, with dust control	May not be cost effective for low traffic sites. Better dust control than an angle broom.
High efficiency sweeper (vacuum or regenerative air)	No	No	Yes	Yes	Dry – Yes Wet – No	Yes	May not be cost effective for low traffic sites. Presents difficulties with larger material. Best option for dust control.

PLANS AND SPECIFICATIONS

Address the following in plans and specification:

- (1) Location, materials, and dimensions of all stabilized work surfaces,
- (2) Location of all points of egress with all trackout control practices shown,
- (3) Material specifications conforming to this standard,
- (4) Sequence or schedule for installation and removal of practices through different phases of construction; clearly indicate if stabilized work surfaces are temporary or permanent,
- (5) Standard drawings and installation, and
- (6) Stabilization after removal.

Include the responsible party by name, or by title if not known (e.g., general contractor, land owner).

Include the frequency of inspection and maintenance in plans, standard detail drawings, or specifications.

Amend onsite erosion control plans to reflect modifications during the life of the project, including relocation or addition of site entrances and exits.

OPERATION AND MAINTENANCE

Monitor all trackout control practices and nearby streets and roads at least daily during construction and more frequently during heavy use.

Clean and maintain all practices as needed to minimize trackout.

Accumulation of sediment on off-site pavement near a site exit is an indication that street cleaning is needed and on-site prevention and control measures need maintenance or are not adequate. Relocate or add practices when construction egress locations are changed or when current control measures are not reducing trackout.

Clean streets and roads as needed to maintain traction, minimize further spread of sediment, and reduce discharge to drainage infrastructure.

Clean trackout control devices, mats, and other reusable materials prior to transport to a new site to reduce the potential for spread of invasive species and minimize further spread of sediment.

Add signage, fencing, steel posts, and/or traffic barriers as needed to improve use of practices.

Stabilized Work Surface

Monitor stabilized work surface areas for soil deposits, standing water, and damage. Remove soil deposits daily through scraping and/or pavement cleaning, and repair damage as needed. Top dress gravel surfaces as needed. Replace or repair torn or damaged mats.

Stone Tracking Pad

Monitor tracking pads for compaction, soil deposits, and mixing of underlying soils and stone layers.

Maintain a loosened, rough surface by scraping, loosening, or top-dressing with additional aggregate.

Replace geotextile and stone if less-intensive maintenance efforts fail to reestablish effectiveness.

Add stone as needed to maintain the minimum pad thickness.

Replace damaged or crushed culverts under tracking pad.

Manufactured Trackout Control Device

Monitor and maintain devices to minimize shifting, rutting of adjacent surfaces, and structural failure.

Remove accumulated sediment as required to maintain the function of the device.

Replace missing or damaged elements such as bars or anchors, and remove and reset devices if they shift during use.

Fill ruts in adjacent surfaces with aggregate or paving materials. Maintain a stable surface between the device and street or road.

Tire Washing

Monitor tire washing station for sediment accumulation, clogged hoses, appropriate water levels, and effectiveness.

Remove accumulated sediment.

Replenish flocculant as needed, and replace or replenish water as needed.

Maintain hoses to minimize clogging or freezing.

For manufactured tire washing stations, maintain per manufacturer's recommendations.

Modify operations as needed during cold weather to minimize formation of ice-hazards on roadways.

DEFINITIONS

Aggregate: A composite mixture of hard, durable, mineral materials that have been mechanically processed.

Broom-clean: A pavement condition where no measurable material is collected when a push broom is pushed lightly across the surface. This is generally applicable in dry conditions.

Drainage infrastructure: Features present above or below grade for the purpose of collecting and transmitting storm water. These features include, but are not limited to, ditches, storm sewers, drainage inlets, flumes, and manholes.

Manufactured trackout control device: A device installed and maintained at an egress location for reducing trackout of sediments through flexing and vibrating tires.

Trackout: The relocation of material from its intended location to offsite surfaces by vehicles.

Shovel-clean: A pavement condition where no measurable material is collected when a flat-edged shovel is pushed across the surface. This is generally applicable in wet conditions.

Site: The area within the construction limits. Construction limits may change over the course of a project.

Vehicle: Cars, trucks, and other equipment capable of moving persons or property using tires or tracks.

REFERENCES

Wisconsin Council on Forestry, Invasive Species Best Management Practices for Transportation and Utility Rights-of-Way, <https://councilonforestry.wi.gov/Documents/InvasiveSpecies/ROW-Manual.pdf>

Wisconsin DNR, Outstanding and Exceptional Resource Waters, <http://dnr.wi.gov/topic/SurfaceWater/orwerw.html>

Wisconsin DNR, Storm Water Construction Technical Standards, http://dnr.wi.gov/topic/stormwater/standards/const_standards.html

Wisconsin DNR, Storm Water Post-Construction Technical Standards, http://dnr.wi.gov/topic/stormwater/standards/postconst_standards.html

Wisconsin Department of Transportation, *Select Crushed Material*, 2018 Standard Specification, Section 312, <http://wisconsindot.gov/rdwy/stndspec/ss-03-12.pdf>

Figure 1:
Example of a common setup that can be used to implement a stabilized surface area.

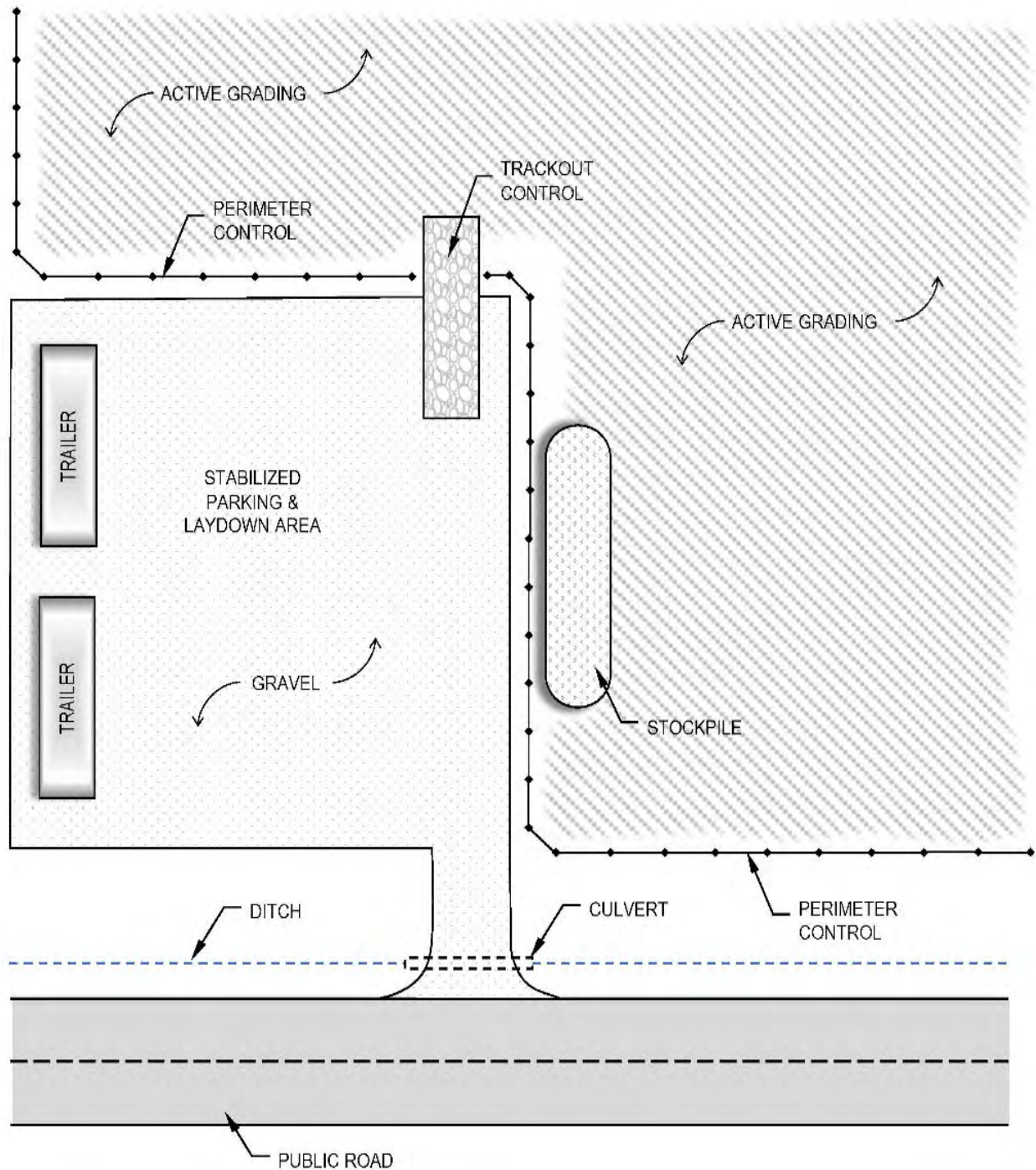
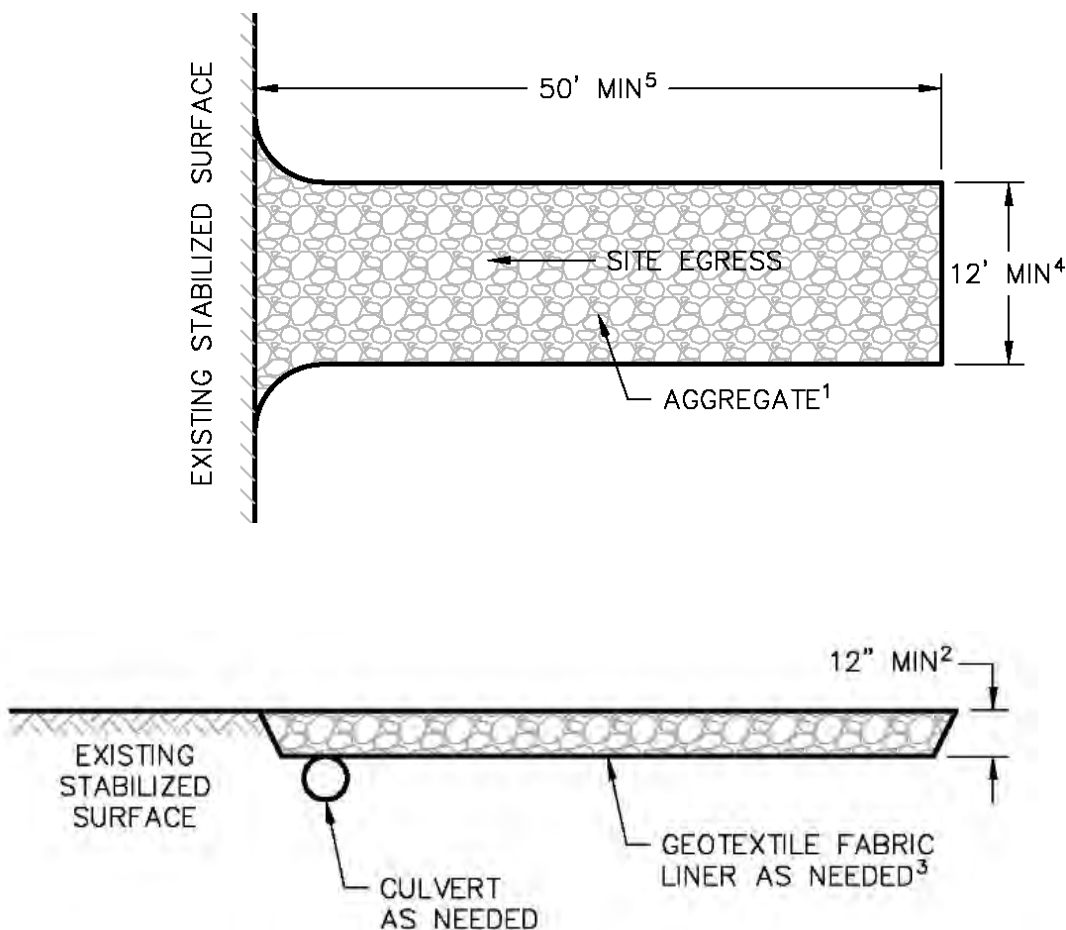


Figure 2:
Stone tracking pad detail



Note 1 Use hard, durable, angular stone or recycled concrete meeting the gradation in Table 1. Where this gradation is not available, meet the gradation in Wisconsin Department of Transportation (DOT) 2018 Standard Specification, Section 312, Select Crushed Material.

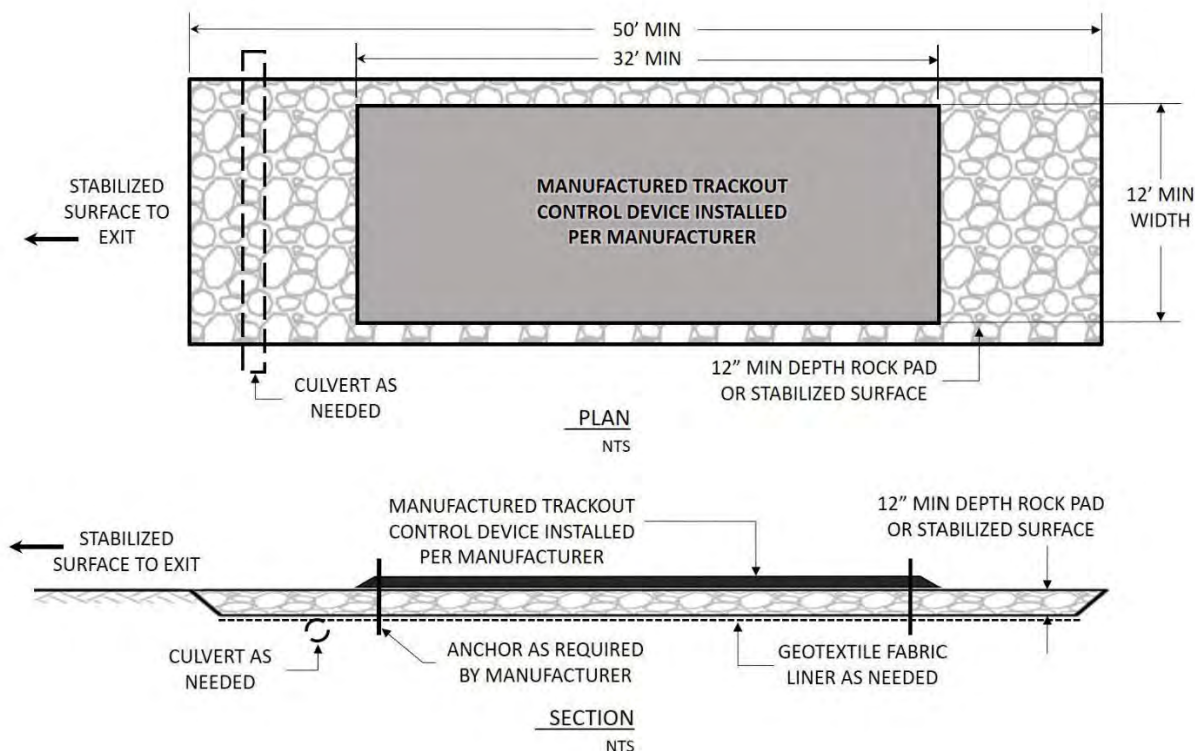
Note 2 Slope the stone tracking pad in a manner to direct runoff to an approved treatment practice.

Note 3 Select fabric type based on soil conditions and vehicles loading.

Note 4 Install tracking pad across full width of the access point, or restrict existing traffic to a dedicated egress lane at least 12 feet wide across the top of the pad.

Note 5 If a 50' pad length is not possible due to site geometry, install the maximum length practicable and supplement with additional practices as needed.

Figure 3:
Example manufactured trackout control device detail.



Note 1 This detail is provided as an example. Comply with manufacturer's specifications while also meeting the minimum manufactured tracking pad length and width described in this technical standard.

Note 2 Install such that runoff flows to an approved treatment practice.

Note 4 A thinner stone layer or other stable surface may be acceptable such that rutting is minimized as vehicles mount or dismount from the manufactured trackout control device.

Note 5 Select fabric type based on soil conditions and vehicles loading.

Note 6 Direct all exiting vehicles over manufactured trackout control device. Stone tracking pad installation across remaining access width is recommended. A 12' minimum can be used when exiting traffic is restricted to a dedicated egress lane.

Note 7 If minimum installation length is not possible due to site geometry, install the maximum length practicable and supplement with additional practices as needed.

Note 7 Accommodate exiting vehicles in excess of manufactured trackout control device weight capacity with other treatment practices.

Mulching For Construction Sites (1058)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

Mulching is the application of organic material to the soil surface to protect it from raindrop impact and overland flow. Mulch covers the soil and absorbs the erosive impact of rainfall and reduces the flow velocity of runoff.

II. Purpose

This practice may be used to:

- Reduce soil erosion
- Aid in seed germination and establishment of plant cover
- Conserve soil moisture

III. Conditions Where Practice Applies

This practice may be applied on exposed soils as a temporary control where soil grading or landscaping has taken place or in conjunction with temporary or permanent seeding. Mulching is generally not appropriate in areas of concentrated flow.

IV. Federal, State, and Local Laws

Users of this standard shall comply with applicable federal, state and local laws, rules, regulations or permit requirements governing mulching. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.

A. Site Preparation:

Soil surface shall be prepared prior to the application of mulch in order to achieve the desired purpose and to ensure optimum contact between soil and mulch. All areas to be mulched shall be reasonably free of rills and gullies.

B. Materials:

Mulch shall consist of natural biodegradable material such as plant residue (including but not limited to straw, hay, wood chips, bark and wood cellulose fiber), or other equivalent materials of sufficient dimension (depth or thickness) and durability to achieve the intended effect for the required time period.

Mulch shall be environmentally harmless to wildlife and plants. Materials such as gravel, plastic, fabric, sawdust, municipal solid waste, *solid waste byproducts*¹, shredded paper, and non-biodegradable products shall not be used.

Mulch shall be free of diseased plant residue (i.e. oak wilt), *noxious weed* seeds, harmful chemical residues, heavy metals, hydrocarbons and other known environmental toxicants.

Marsh hay shall not be used as mulch in lowland areas but may be used on upland sites to prevent the spread of invasive, non-native species (i.e. reed canary grass) commonly found in marsh hay.

Straw and hay mulch that will be crimped shall have a minimum fiber length of 6 inches.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

Wood chips or wood bark shall only be used for sites that are not seeded.

C. Application Rate:

1. Mulch shall cover a minimum of 80% of the soil surface for unseeded areas. For seeded areas, mulch shall be placed loose and open enough to allow some sunlight to penetrate and air to circulate but still cover a minimum of 70% of the soil surface.
2. Mulch shall be applied at a uniform rate of 1½ to 2 tons per acre for sites that are seeded, and 2 to 3 tons per acre for sites that are not seeded. This application results in a layer of ½ to 1½ inches thick for seeded sites, and 1½ to 3 inches thick for sites not seeded.
3. Wood chips or wood bark shall be applied at a rate of 6 to 9 tons per acre to achieve a minimum of 80% ground cover. This application should result in a layer of wood chips or wood bark ½ to 1½ inches thick.

D. Mulch Anchoring Methods

Anchoring of mulch shall be based on the type of mulch applied, site conditions, and accomplished by one of the following techniques:

1. Crimping

Immediately after spreading, the mulch shall be anchored by a mulch crimper or equivalent device consisting of a series of dull flat discs with notched edges spaced approximately 8 inches apart. The mulch shall be impressed in the soil to a depth of 1 to 3 inches.

2. Polypropylene Plastic, or Biodegradable Netting

Apply plastic netting over mulch application and staple according to manufacturer's recommendations.

3. Tackifier

Tackifier shall be sprayed in conjunction with mulch or immediately

after the mulch has been placed. Tackifiers must be selected from those that meet the WisDOT Erosion Control Product Acceptability List (PAL). Asphalt based products shall not be applied.

The tackifiers shall be applied at the following minimum application rates per acre:

- a. Latex-Base: mix 15 gallons of adhesive (or the manufacturer's recommended rate which ever is greater) and a minimum of 250 pounds of recycled newsprint (pulp) as a tracer with 375 gallons of water.
- b. Guar Gum: mix 50 pounds of dry adhesive (or the manufacturer's recommended rate which ever is greater) and a minimum of 250 pounds of recycled newsprint (pulp) as tracer with 1,300 gallons of water.
- c. Other Tackifiers: (Hydrophilic Polymers) mix 100 pounds of dry adhesive (or the manufacturer's recommended rate which ever is greater) and a minimum of 250 pounds of recycled newsprint (pulp) as a tracer with 1,300 gallons of water.

VI. Considerations

- A. Wood products typically absorb available soil nitrogen as they degrade, thus making it unavailable for seed.
- B. The use of mulch behind curb and gutter may not be desirable unless anchored by netting, because air turbulence from nearby traffic can displace the mulch. Consider the use of erosion mat or sod as an alternative.
- C. In areas where lawn type turf will be established, the use of tackifiers is the preferred anchoring method. Crimping will tend to leave an uneven surface and plastic netting can become displaced and entangled in mowing equipment.

- D. A heavier application of mulch may be desired to prevent seedlings from being damaged by frost.
- E. It may be beneficial to apply polyacrylimide in addition to mulch. Refer to WDNR Technical Standard (1050) Erosion Control Land Application of Anionic Polyacrylamide for information about the advantages and proper use of polymers.
- F. Concentrated flows above the site where mulch is applied should be diverted.
- G. Mulch should be placed within 24 hours of seeding.
- H. Mulching operations should not be performed during periods of excessively high winds that would preclude the proper placement of mulch.
- I. Materials such as gravel may be effective for erosion control but are not considered mulches.

VII. Plans and Specifications

- A. Plans and specifications for mulching shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall address the following:
 - 1. Type of mulch used
 - 2. Application rate
 - 3. Timing of application
 - 4. Method of anchoring
- B. All plans, standard detail drawings, or specifications shall include schedules for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

Mulch shall, at a minimum, be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

Mulch that is displaced shall be reapplied and properly anchored. Maintenance shall be completed as soon as possible with consideration to site conditions.

IX. References

WisDOT's Erosion Control Product Acceptability List (PAL) can be found on the WisDOT web site:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

Printed copies are no longer being distributed.

X. Definitions

Noxious weed (V.B): Any weed a governing body declares to be noxious within its respective boundaries. The State of Wisconsin list of noxious weeds can be found in Statute 66.0407.

Solid Waste Byproducts (V.B): Includes industrial, commercial, residential, and agricultural wastes that have been processed, incinerated, or composted and still contain inorganic wastes such as glass and metals and organic wastes including plastics, textiles, rubber, leather, and other miscellaneous organic wastes which may be toxic or hazardous in nature.

Seeding For Construction Site Erosion Control (1059)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

Planting seed to establish temporary or permanent vegetation for erosion control.

II. Purpose

The purpose of *temporary seeding*¹ is to reduce runoff and erosion until permanent vegetation or other erosion control practices can be established. The purpose of *permanent seeding* is to permanently stabilize areas of exposed soil.

III. Conditions Where Practice Applies

This practice applies to areas of exposed soil where the establishment of vegetation is desired. Temporary seeding applies to disturbed areas that will not be brought to final grade or on which land-disturbing activities will not be performed for a period greater than 30 days, and requires vegetative cover for less than one year. Permanent seeding applies to areas where perennial vegetative cover is needed.

IV. Federal, State and Local Laws

Users of this standard shall be aware of all applicable federal, state and local laws, rules, regulations or permit requirements governing seeding. This standard does not contain the text of federal, state or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.

A. Site and Seedbed Preparation

Site preparation activities shall include:

1. Temporary Seeding

- a. Temporary seeding requires a seedbed of loose soil to a minimum depth of 2 inches.
- b. Fertilizer application is not generally required for temporary seeding. However, any application of fertilizer or lime shall be based on soil testing results.
- c. The soil shall have a pH range of 5.5 to 8.0.

2. Permanent Seeding

- a. *Topsoil* installation shall be completed prior to permanent seeding.
- b. Permanent seeding requires a seedbed of loose topsoil to a minimum depth of 4 inches with the ability to support a *dense* vegetative cover.
- c. Application rates of fertilizer or lime shall be based on soil testing results.
- d. Prepare a tilled, fine, but firm seedbed. Remove rocks, twigs foreign material and clods over two inches that cannot be broken down.
- e. The soil shall have a pH range of 5.5 to 8.0.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

B. Seeding

1. Seed Selection

- a. Seed mixtures that will produce dense vegetation shall be selected based on soil and site conditions and intended final use. Section IX References, lists sources containing suggested seed mixtures.
- b. All seed shall conform to the requirements of the Wisconsin Statutes and of the Administrative Code Chapter ATCP 20.01 regarding noxious weed seed content and labeling.
- c. Seed mixtures that contain potentially invasive species or species that may be harmful to native plant communities shall be avoided.
- d. Seed shall not be used later than one year after the test date that appears on the label.
- e. Seed shall be tested for purity, germination and noxious weed seed content and shall meet the minimum purity and germination requirements as prescribed in the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

2. Seed Rates

a. Temporary Seeding (Cover Crop)

Areas needing protection during periods when permanent seeding is not applied shall be seeded with annual species for temporary protection. See Table 1 for seeding rates of commonly used species. The residue from this crop may either be incorporated into the soil during seedbed preparation at the next permanent seeding period or left on the soil surface and the planting made as a no-till seeding.

Table 1 Temporary Seeding Species and Rates

Species	Lbs/Acre	Percent Purity
Oats	131 ¹	98
Cereal Rye	131 ²	97
Winter wheat	131 ²	95
Annual Ryegrass	80 ²	97

¹ Spring and summer seeding

² Fall seeding

b. Permanent Seeding

Rates shall be based on pounds or ounces of Pure Live Seed (PLS) per acre. Section IX contains some possible reference documents that provide seeding rates. Permanent seeding rates may be increased above the minimum rates shown in the reference documents to address land use and environmental conditions.

If a nurse crop is used in conjunction with permanent seeding, the nurse crop shall not hinder establishment of the permanent vegetation.

A nurse crop shall be applied at 50% its temporary seeding rate when applied with permanent seed.

3. Inoculation

Legume seed shall be inoculated in accordance with the manufacturer's recommendations. Inoculants shall not be mixed with liquid fertilizer.

4. Sowing

Seed grasses and legumes no more than ¼ inch deep. Distribute seed uniformly. Mixtures with low seeding rates require special care in sowing to achieve proper seed distribution.

Seed may be broadcast, drilled, or hydroseeded as appropriate for the site.

Seed when soil temperatures remain consistently above 53° F. *Dormant seed* when the soil temperature is consistently below 53° F (typically

Nov. 1st until snow cover). Seed shall not be applied on top of snow.

VI. Considerations

- A. Consider seeding at a lower rate and making two passes to ensure adequate coverage.
- B. Compacted soil areas may need special site preparation prior to seeding to mitigate compaction. This may be accomplished by chisel plowing to a depth of 12 inches along the contour after heavy equipment has left the site.
- C. Sod may be considered where adequate watering is available.
- D. When working in riparian areas refer to the NRCS Engineering Field Handbook, Chapter 16, Streambank and Shoreline Protection and Chapter 18, *Soil Bioengineering* for Upland Slope Protection and Erosion Reduction.
- E. A site assessment should be conducted to evaluate soil characteristics, topography, exposure to sunlight, proximity to natural plant communities, proximity to nuisance, noxious and/or invasive species, site history, moisture regime, climatic patterns, soil fertility, and previous herbicide applications.
- F. Use *introduced species* only in places where they will not spread into existing natural areas.
- G. Lightly roll or compact the area using suitable equipment when the seedbed is judged to be too loose, or if the seedbed contains clods that might reduce seed germination.
- H. See Section IX. References for suggested seed mixes (NRCS, WisDOT, UWEX) or use their equivalent.
- I. Turf seedlings should not be mowed until the stand is at least 6 inches tall. Do not mow closer than 3 inches during the first year of establishment.
- J. Seeding should not be done when the soil is too wet.

- K. Consider watering to help establish the seed. Water application rates shall be controlled to prevent runoff and erosion.
- L. Prairie plants may not effectively provide erosion control during their establishment period without a nurse crop.
- M. Topsoil originating from agricultural fields may contain residual chemicals. The seedbed should be free of residual herbicide or other contaminants that will prevent establishment and maintenance of vegetation. Testing for soil contaminants may be appropriate if there is doubt concerning the soil's quality.
- N. Consider using mulch or a nurse crop if selected species are not intended for quick germination. When mulching refer to WDNR Technical Standard Mulching for Construction Sites (1058).

VII. Plans and Specifications

Plans and specifications for seeding shall be in keeping with this standard and shall describe the requirements for applying this practice.

All plans, standard detail drawings, or specifications shall include schedule for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

- A. During construction areas that have been seeded shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period. Inspect weekly during the growing season until vegetation is densely established or permit expires. Repair and reseed areas that have erosion damage as necessary.
- B. Limit vehicle traffic and other forms of compaction in areas that are seeded.
- C. A fertilizer program should begin with a soil test. Soil tests provide specific fertilizer recommendations for the site and can help to avoid over-application of fertilizers.

IX. References

A. Seed Selection References

United States Department of Agriculture – Natural Resources Conservation Service Field Office Technical Guide Section IV, Standard 342, Critical Area Planting.

UWEX Publication A3434 Lawn and Establishment & Renovation.

WisDOT, 2003. State of Wisconsin Standard Specifications For Highway and Structure Construction. Section 630, Seeding.

B. General References

Association of Official Seed Analysts, 2003. Rules for Testing Seed. <http://www.aosaseed.com>.

Metropolitan Council, 2003. Urban Small Sites Best Management Practice Manual, Chapter 3, Vegetative Methods 3-85 – 3-91. Minneapolis.

The State of Wisconsin list of noxious weeds can be found in Statute 66.0407.

United States Department of Agriculture – Natural Resources Conservation Service. Engineering Field Handbook, Chapters 16 and 18.

UWEX Publication GWQ002 Lawn & Garden Fertilizers.

Nurse Crop (V.B.2.b): Also known as a companion crop; is the application of temporary (annual) seed with permanent seed.

Permanent seeding (II) Seeding designed to minimize erosion for an indefinite period after land disturbing construction activities have ceased on the site.

Soil Bioengineering (VI.D) Practice of combining mechanical, biological and ecological concepts to arrest and prevent shallow slope failures and erosion.

Temporary Seeding (II) Seeding designed to control erosion for a time period of one year or less that is generally removed in order to perform further construction activities or to permanently stabilize a construction site.

Topsoil (V.A.2.a) Consists of loam, sandy loam, silt loam, silty clay or clay loam humus-bearing soils adapted to sustain plant life with a pH range of 5.5 – 8.0. Manufactured topsoil shall through the addition of sand or organic humus material, peat, manure or compost meet the above criteria.

X. Definitions

Dense (V.A.2.b) A stand of 3-inch high grassy vegetation that uniformly covers at least 70% of a representative 1 square yard plot.

Dormant seed (V.B.4): Seed is applied after climatic conditions prevent germination until the following spring.

Introduced Species (VI.F) Plant species that historically would not have been found in North America until they were brought here by travelers from other parts of the world. This would include smooth brome grass and alfalfa. Some of these species may have a wide distribution such as Kentucky bluegrass.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
STORM DRAIN INLET PROTECTION FOR CONSTRUCTION SITES
1060

DEFINITION

A temporary device installed in or around a storm drain inlet, drop inlet, or curb inlet.

PURPOSE

This practice is intended to minimize sediment from entering storm drainage systems in areas where the contributing drainage area is temporarily disturbed or receives traffic from temporarily disturbed areas nearby.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where runoff from construction sites enters conveyance system inlets, such as drain inlets, drop inlets, and curb inlets. Inlet protection devices are for drainage areas of one acre or less. Runoff from areas larger than one acre shall be routed through a properly designed sediment trapping or settling practice upstream of the inlet.

CRITERIA

General Criteria

Be aware of applicable federal, state and local laws, rules, regulations, or permit requirements governing the use and placement of storm drain inlet protection. This standard does not contain the text of federal, state, or local laws.

Install the appropriate type of inlet protection prior to drain, drop, or curb inlet receiving runoff.

Keep the inlet protection in place and maintain until the disturbed contributing area is stabilized. Use Table 1 to select inlet protection type.

Table 1 Inlet Device Selection			
Inlet Type	Project Phase	Inlet Protection	Notes
Yard Drain or Field Inlet	Major grading through final stabilization	Type A	Allow ponding around drain if conditions allow
Paved Area Drain	Pre-Paving	Type A	After castings are in place, use Type D Series when needed for safety, or use Type B if insufficient depth is available
	Post-Paving	Type D, D-M, D- HR, or D-RF	Use Type B if inlet is not deep enough for Type D Series
Curb Inlet	Pre-Paving	Type A	After castings are in place, use Type D Series when needed for safety, or use Type C if insufficient depth is available
	Post-Paving/Curbing	Type D, D-M, D- HR, or D-RF	Use Type C if inlet is not deep enough for Type D Series

To provide additional sediment settling, allow ponding below inlet rim where it will not interfere with traffic, create a safety hazard, impede site access, or cause property damage.

Leave no gaps in the material that would allow the flow of water to bypass the inlet protection device, except for overflow holes or “emergency spillways” needed to limit ponding to avoid interfering with the flow of traffic, creating a safety hazard, impeding site access, or causing property damage.

Use fabrics that meet Wisconsin Department of Transportation (WisDOT) specifications for the specified fabric.

Use *FF fabric*¹ as specified in the WisDOT Erosion Control Product Acceptability List (PAL), for Type A, B, C or D inlet protection.

Use *R*, *DF*, and *HR fabrics* as specified in the WisDOT Standard Specifications for Highway and Structure Construction.

Criteria for Type A Devices

Install frame and trench-in FF fabric around entire perimeter of device. (See Type A detail in Figure 1.)

Criteria for Type B Devices

Use Type B inlet protection only where there is no curb inlet and there is insufficient depth to install Type D Series inlet protection.

For Type B inlet protection, use FF fabric.

Leave at least 6 inches of geotextile fabric ‘flap’ around the perimeter of the grate. Stand on or hold the flap while removing grate for maintenance to prevent discharge of accumulated sediment into inlet. (See Type B detail in Figure 1.)

Criteria for Type C Devices

Use Type C inlet protection only where there is a curb inlet and there is insufficient depth to install Type D Series inlet protection.

For Type C inlet protection, use FF fabric.

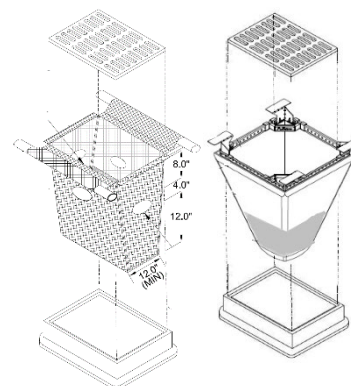
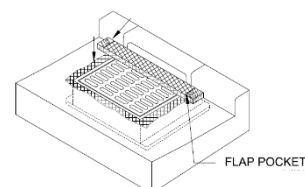
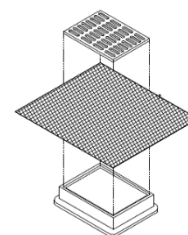
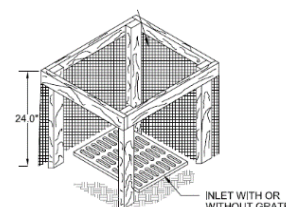
Wrap a 2-inch by 4-inch (nominal) piece of wood, secure it in the fabric and place in front of the curb head, as shown in Figure 1. Do not block the entire opening of the curb box with wood. Secure wood to the grate with wire or plastic ties. Water ponding more than 2 inches around the inlet should be able to overflow into the curb box. Leave at least 6 inches of geotextile fabric ‘flap’ around the perimeter of the grate. Stand on or hold the flap while removing grate for maintenance to prevent discharge of accumulated sediment into inlet. (See Type C detail in Figure 1.)

Criteria for Type D Series Devices

For Type D Series inlet protection devices, keep three inches of clearance between the bag and the sides of the inlet to prevent the filter bag from blocking overflow water. Cinch device bags when used in inlets less than 30 inches in depth to provide the required 3-inch clearance for overflow.

In general, device bags should not extend below the lowest outlet for inlets with sumps.

Refer to Table 2 for filter fabric type and exposed soil texture and particle diameter where a Type D Series device is appropriate.



¹ Words in the standard that are shown in italics are described in the Glossary section. The words are italicized the first time they are used in the text.

Table 2 Fabric Selection			
Exposed Soil Texture	Exposed Soil Average Particle Diameter (mm)	Filtering Fabric	Inlet Protection Type
Coarse (Sand)	≥ 0.0625	FF*	D, D-M, D-RF
Medium (Silt Loam)	0.0624 – 0.005	DF**	D-M, D-RF
Fine (Clay)	≤ 0.004	R	D-M, D-RF
		HR	D-HR, D-RF

Notes: * DF, R or HR fabrics may be used where FF is the required minimum standard.

** R or HR fabrics may be used where DF is the required minimum standard.

For **Type D** inlet protection, use FF fabric. (See Type D detail in Figure 2.)

For **Type D-M** inlet protection, use FF fabric for both the upper section and the outer lower sections of the device. Select the replaceable interior filter fabric type according to the particle size trapped. (See Type D-M detail in Figure 3.)

For **Type D-HR** inlet protection, use FF fabric for the upper half of the device and use HR fabric in the lower half of the device. (See Type D-HR detail in Figure 4.)

For **Type D-RF** inlet protection, include a rigid frame and a removable geosynthetic bag fixed to the frame with adequate strength to support the weight of the sediment bag when completely full. Use FF fabric for the upper section of the bag and a nonwoven liner based according to the particle size trapped. Bags can be a dual fabric bag sewn together, or a nonwoven liner sewn inside of an FF bag. Bypass overflows, within the frame or the sediment bag, shall be sized so that the flow through the overflows shall equal or exceed the design flow of the inlet required at a specific drainage location. (See Type D-RF detail in Figure 5.)

Criteria for Other Inlet Protection Methods

Rock bags, straw bales, stone weepers, and other ditch check devices can be used to settle sediment or divert flow. These devices are not applicable to areas adjacent to traffic and are not approved for inlet protection use on WisDOT projects.

- Manufactured rock bags shall conform to the WisDOT specification for rock bag material, including fill material.
- Ditch check device installation shall conform to the criteria outlined in the WDNR Technical Standard 1062 Ditch Check.
- Stone weeper installation shall conform to the criteria in WDNR Technical Standard 1063 Sediment Trap.

CONSIDERATIONS

- (1) Inlet protection is only one element in an erosion control plan and can be the last line of defense before runoff leaves a site. Use other practices, including temporary stabilization and area clean up, upstream of the inlet. Good construction site housekeeping measures, such as maintaining clean gutters and street sweeping, are also important.
- (2) Temporarily close or seal inlets completely to prevent entrance of runoff and sediment when site conditions allow.

- (3) Stabilize and restore disturbed areas as quickly as possible. Timely stabilization is the most effective method to control sediment entering the storm sewer.
- (4) Inlet protection should be considered for use along haul routes to supplement trackout control measures in WDNR Technical Standard 1057 Trackout Control Practices.
- (5) Inlet protection is only as effective as the filter or device used around the inlet. In general, inlet protection provides relatively good removal of coarse and medium-sized soil particles from runoff; however, to effectively trap fine soil particles, other practices such as the use of polyacrylamides, may be required (see WDNR Technical Standard 1050 Land Application of Additives for Erosion Control.)
- (6) Inlet protection requires routine inspection and maintenance. Effectiveness decreases rapidly if the inlet protection is not properly maintained. Field inspections have shown where inlet protection causes excessive ponding that the device is removed, punctured, or bypassed. In such situations, upstream erosion control effectiveness should be evaluated and replacement with a device including an overflow mechanism is appropriate, instead of simply removing the inlet protection device.
- (7) The effectiveness of inlet protection devices in unpaved areas can be enhanced by additional excavation to increase the storage capacity around the inlet.
- (8) The use of fabric intended for a finer soil type on a construction site with coarser soil may increase the required maintenance frequency due to faster clogging.
- (9) Consider using Type D-M, D-HR, and D-RF inlet protection rather than Type B, C, or D in areas with fine soils where more effective filtering is desired.
- (10) Inlet protection devices listed in the WisDOT PAL are accepted for use in accordance with this standard.
- (11) Stabilize contributing drainage area prior to winter season. Once contributing area is stabilized, remove inlet protection to prevent flooded conditions. Replace inlet protection prior to site disturbance in spring. Where this is not feasible, Type D-RF is recommended for inlets on snow plow routes.
- (12) Where vegetated buffers are present around yard drains or field inlets, Type B inlet protection may be sufficient.
- (13) Permanent inlet filters for stormwater management should not be installed until after construction is complete and the site has been stabilized as they may clog prematurely.

PLANS AND SPECIFICATIONS

Develop all plans and specifications in accordance with this standard, and to describe the requirements for applying the practice to achieve its intended purpose. In the plans and specifications address the following:

- (1) Locations and types of inlet protection. If the type of inlet protection will change as construction progresses, note this in the plans.
- (2) Material specification conforming to this standard.
- (3) In all construction documents, identify the responsible party and include a schedule for installation, inspection, and maintenance requirements.
- (4) Include a copy of the applicable inlet protection details in the construction plans.

OPERATIONS AND MAINTENANCE

Remove inlet protection devices once the contributing drainage area is stabilized with appropriate vegetation or impervious surface.

At a minimum, inspect inlet protection weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period. Use a flashlight to improve visibility when necessary.

When maintaining and removing inlet protection devices, exercise care to minimize sediment falling into the inlet. Immediately remove all material that has fallen into inlets. Deposit sediment removed from the device in a suitable area and stabilize.

Replace inlet protection if flaps become too damaged to allow cleaning without material falling into the inlet.

Operations and Maintenance (O&M) for Type A, B or C Inlet Protection

Remove sediment deposits when sediment has accumulated between $\frac{1}{3}$ to $\frac{1}{2}$ of the design height or the device is no longer functioning as designed.

Inspect the device routinely, and as necessary repair and restore to original condition.

Ponding may indicate that the device's fabric needs maintenance and sediment removal. Unless extraordinary circumstance arise, fabric should not be cut to bypass the fabric. If filter fabric is cut, replace inlet protection as soon as water levels recede enough to do so.

O&M for Type D, D-M, and D-HR Inlet Protection

Remove sediment when it accumulates to within 6 inches of the bottom of the overflow holes.

If standing water remains within 6 inches of the bottom of the overflow holes 24 hours after a runoff event, remove accumulated sediment to restore the fabric's filtering capacity.

Holes in the FF fabric less than 2 inches in length may be repaired by stitching. The bag must be replaced if holes greater than 2 inches are observed in the FF fabric.

Replace insert filters and HR fabrics if any holes are observed.

The filter must be replaced if the flap pockets sustain damage that compromises the integrity of the filter or the ability to perform maintenance. If in good condition, bags can be cleaned and reused on subsequent project sites.

O&M for Type D-RF Inlet Protection

Remove sediment deposits when sediment has accumulated between $\frac{1}{3}$ to $\frac{1}{2}$ of the design storage depth or the device is no longer functioning as designed.

Holes in the FF fabric less than 2 inches in length may be repaired by stitching. The bag must be replaced if holes greater than 2 inches are observed in the FF fabric.

Replace the bag if any holes are observed in the nonwoven liner fabric. If in good condition, bags can be cleaned and reused on subsequent project sites.

REFERENCES

Wisconsin Department of Transportation, Erosion Control Product Acceptability List, <https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, <https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/rdwy/stdnspec.aspx>.

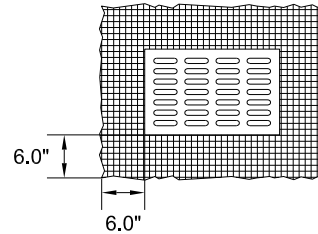
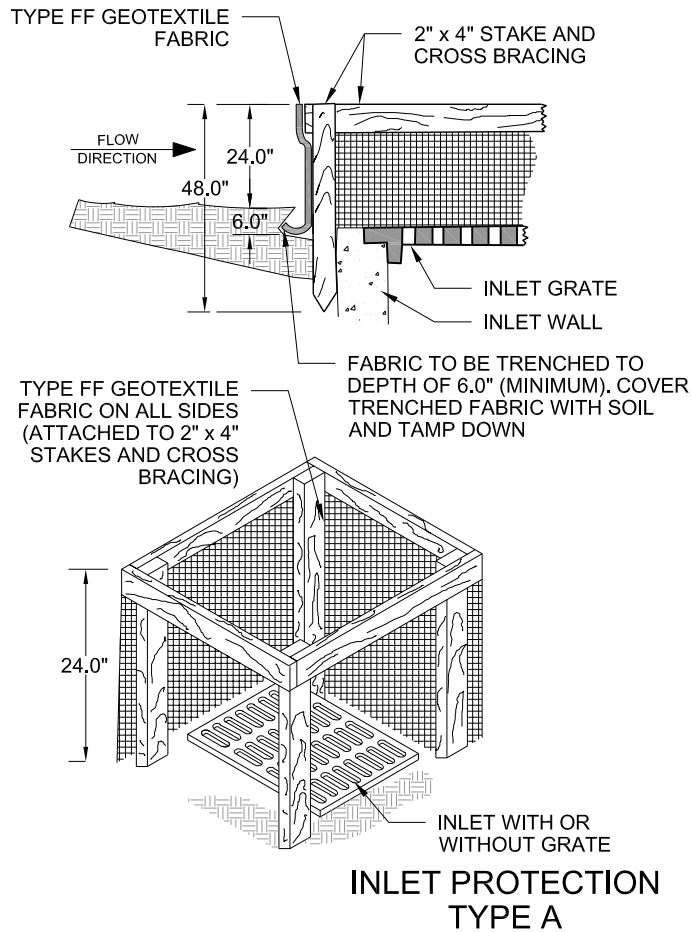
ASTM International. *D8057-17 Standard Specification for Inlet Filters with a Rigid Frame*. West Conshohocken, PA, 2017.

GLOSSARY

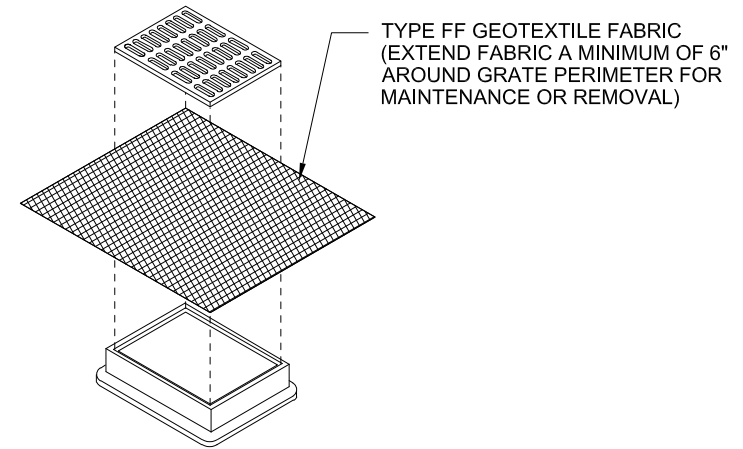
FF Fabric is a woven polypropylene monofilament geotextile and is resistant to biological degradation and commonly-encountered soil chemicals.

R, DF and HR Fabrics are nonwoven geotextiles composed of bonded polypropylene fibers and are resistant to biological degradation and commonly-encountered soil chemicals.

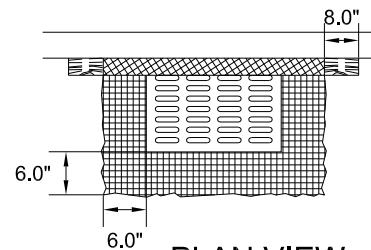
FIGURE 1. INLET PROTECTION TYPES A, B AND C



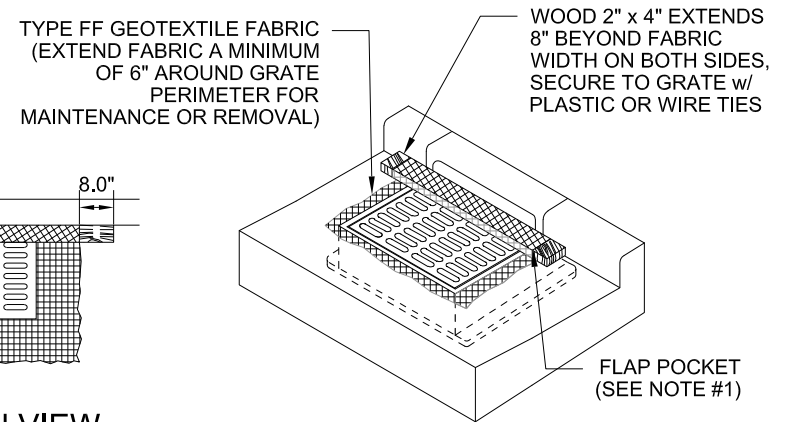
**PLAN VIEW
TYPE B
WITHOUT CURB BOX**



**INLET PROTECTION
TYPE B
WITHOUT CURB BOX**



**PLAN VIEW
TYPE C
WITH CURB BOX**



**INLET PROTECTION
TYPE C
WITH CURB BOX**

NOTES:

1. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

MAINTENANCE NOTES:

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.

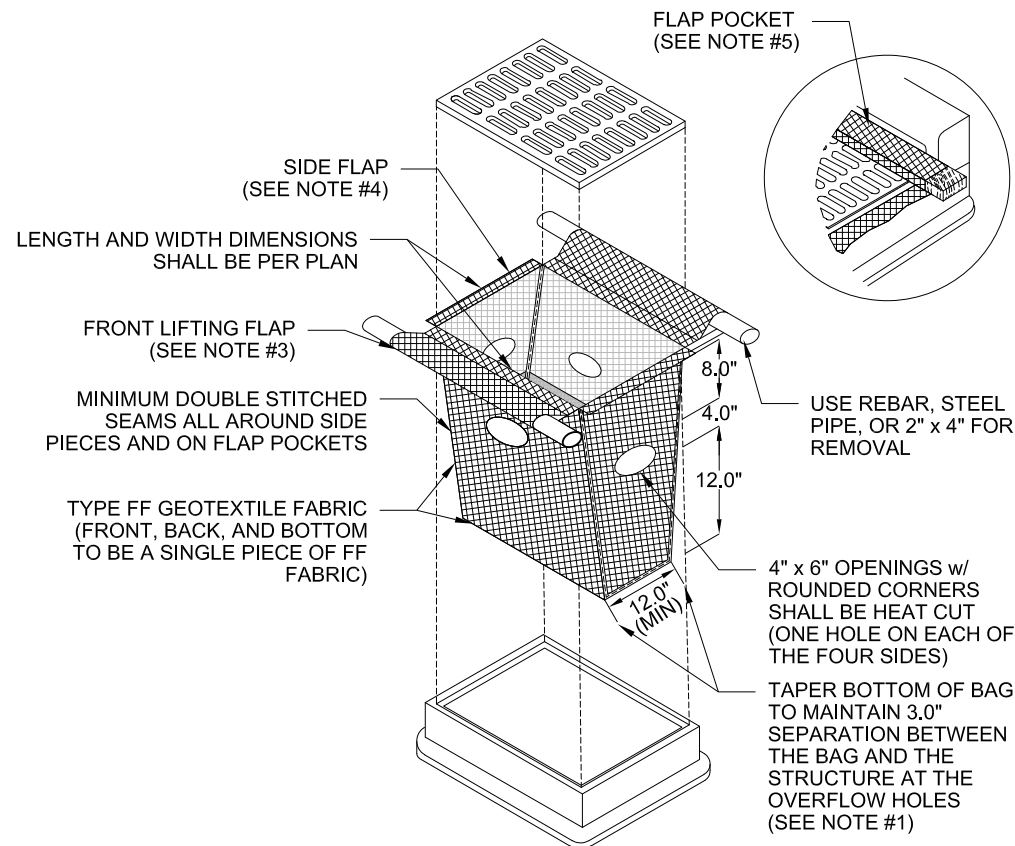


1060
TECHNICAL STANDARD No.

12/2021
REVISION DATE

Page 262 of 384

FIGURE 2. INLET PROTECTION TYPE D



INLET PROTECTION TYPE D

CAN BE INSTALLED IN INLETS
WITH OR WITHOUT CURB BOXES

NOTES:

1. TAPER BOTTOM OF BAG TO MAINTAIN 3" OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF 2" LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

MAINTENANCE NOTES:

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.



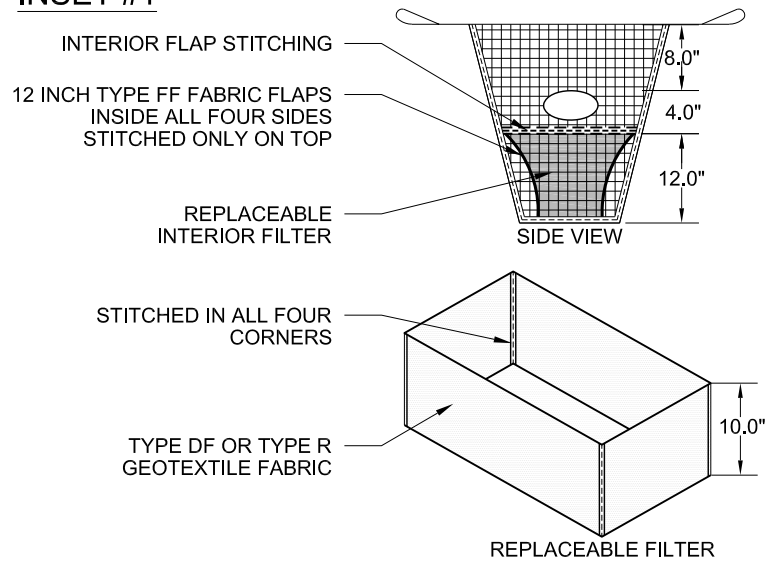
1060
TECHNICAL STANDARD No.

12/2021
REVISION DATE

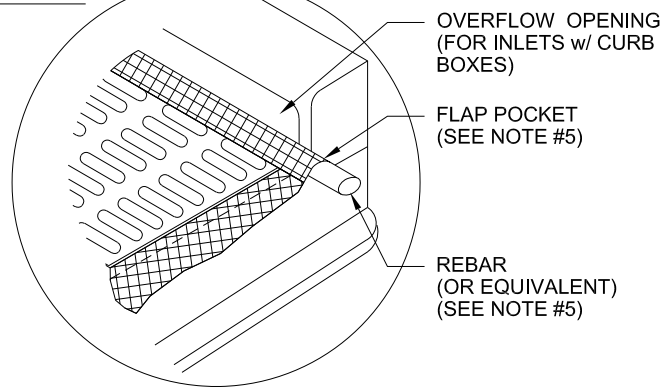
Page 263 of 384

FIGURE 3. INLET PROTECTION TYPE D-M

INSET #1



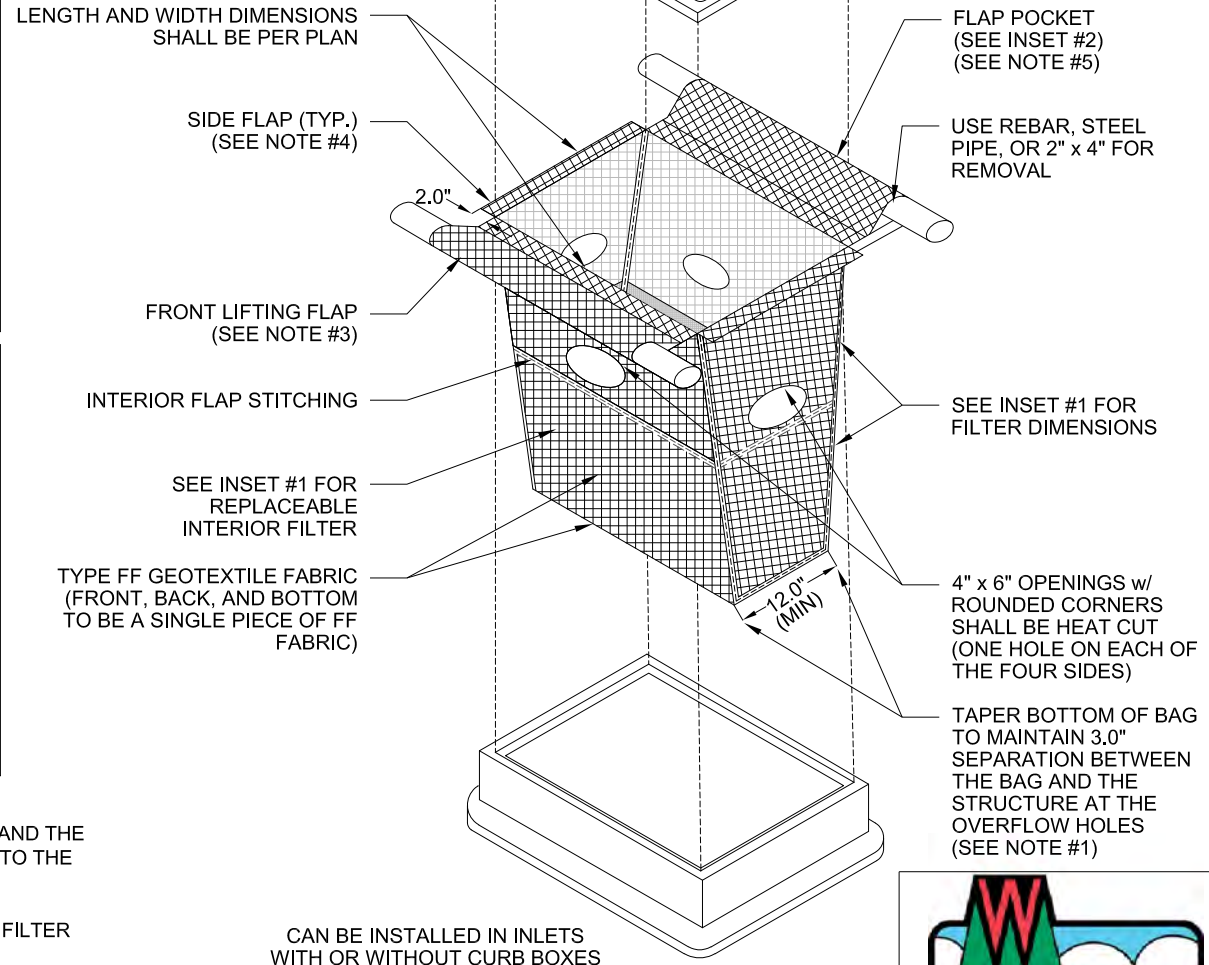
INSET #2



NOTES:

1. TAPER BOTTOM OF BAG TO MAINTAIN 3" OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF 2" LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

LENGTH AND WIDTH DIMENSIONS SHALL BE PER PLAN



CAN BE INSTALLED IN INLETS WITH OR WITHOUT CURB BOXES

MAINTENANCE NOTES:

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE STRUCTURE SHALL BE IMMEDIATELY REMOVED.



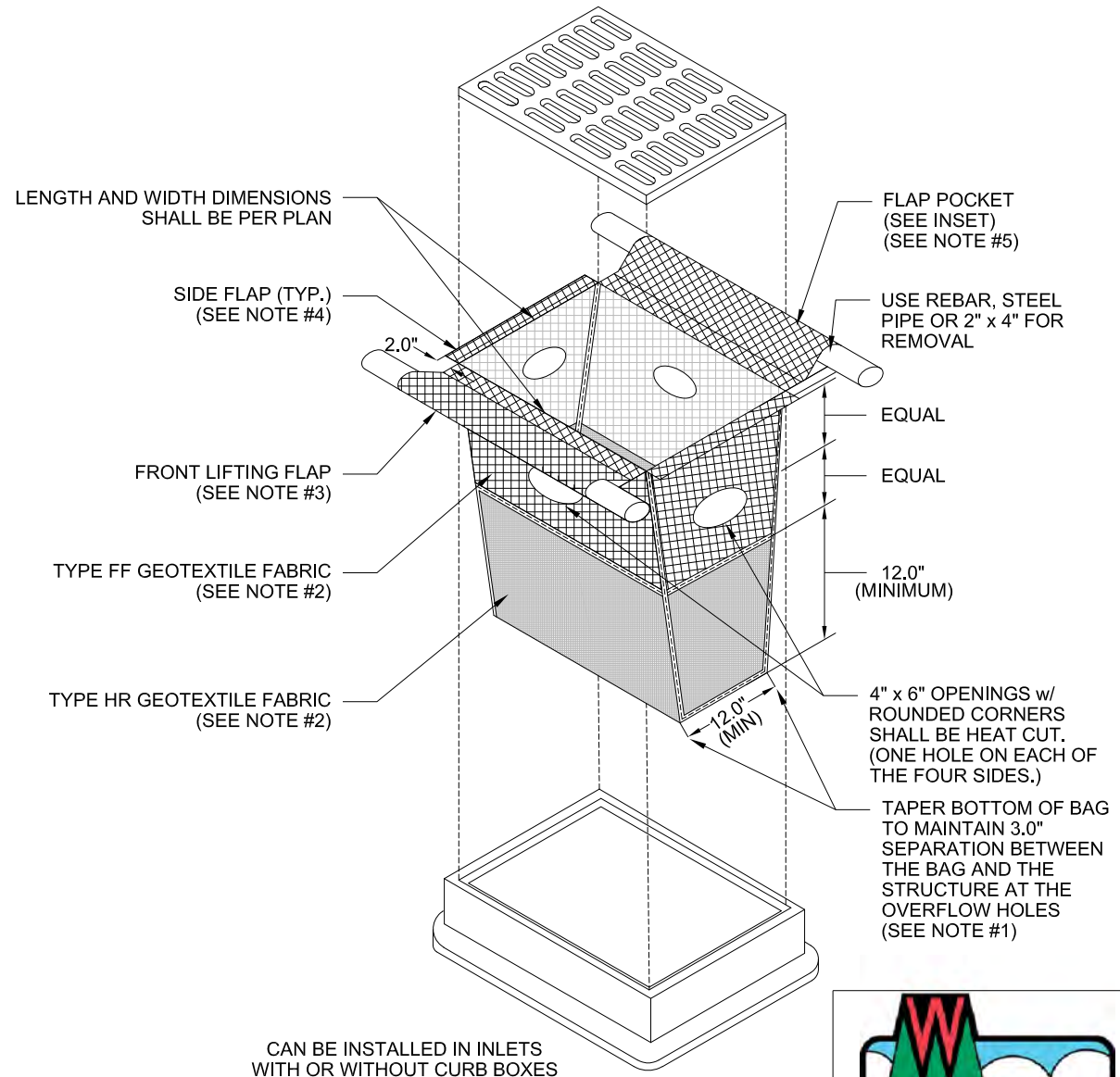
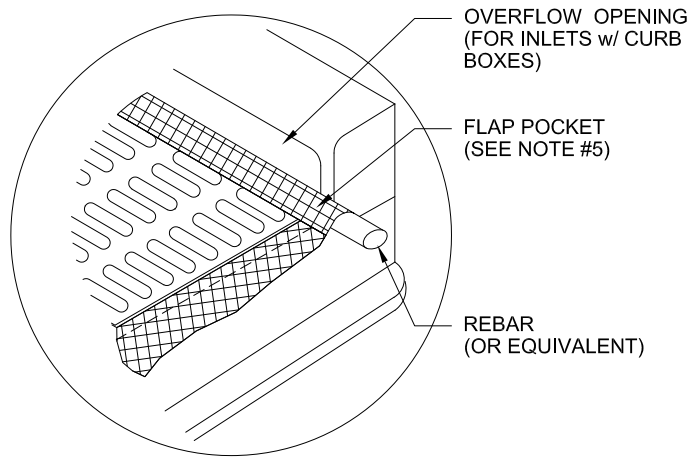
1060
TECHNICAL STANDARD No.

12/2021
REVISION DATE

Page 264 of 384

FIGURE 4. INLET PROTECTION TYPE D-HR

INSET



NOTES:

1. TAPER BOTTOM OF BAG TO MAINTAIN 3" OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC, TYPE FF FOR FLAPS AND TOP HALF OF FILTER BAG. GEOTEXTILE FABRIC, TYPE HR FOR BOTTOM HALF OF FILTER BAG WITH FRONT, BACK, AND BOTTOM BEING ONE PIECE. DUAL FABRIC BAGS SHALL BE STITCHED TOGETHER
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF 2" LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

MAINTENANCE NOTES:

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE STRUCTURE SHALL BE IMMEDIATELY REMOVED.

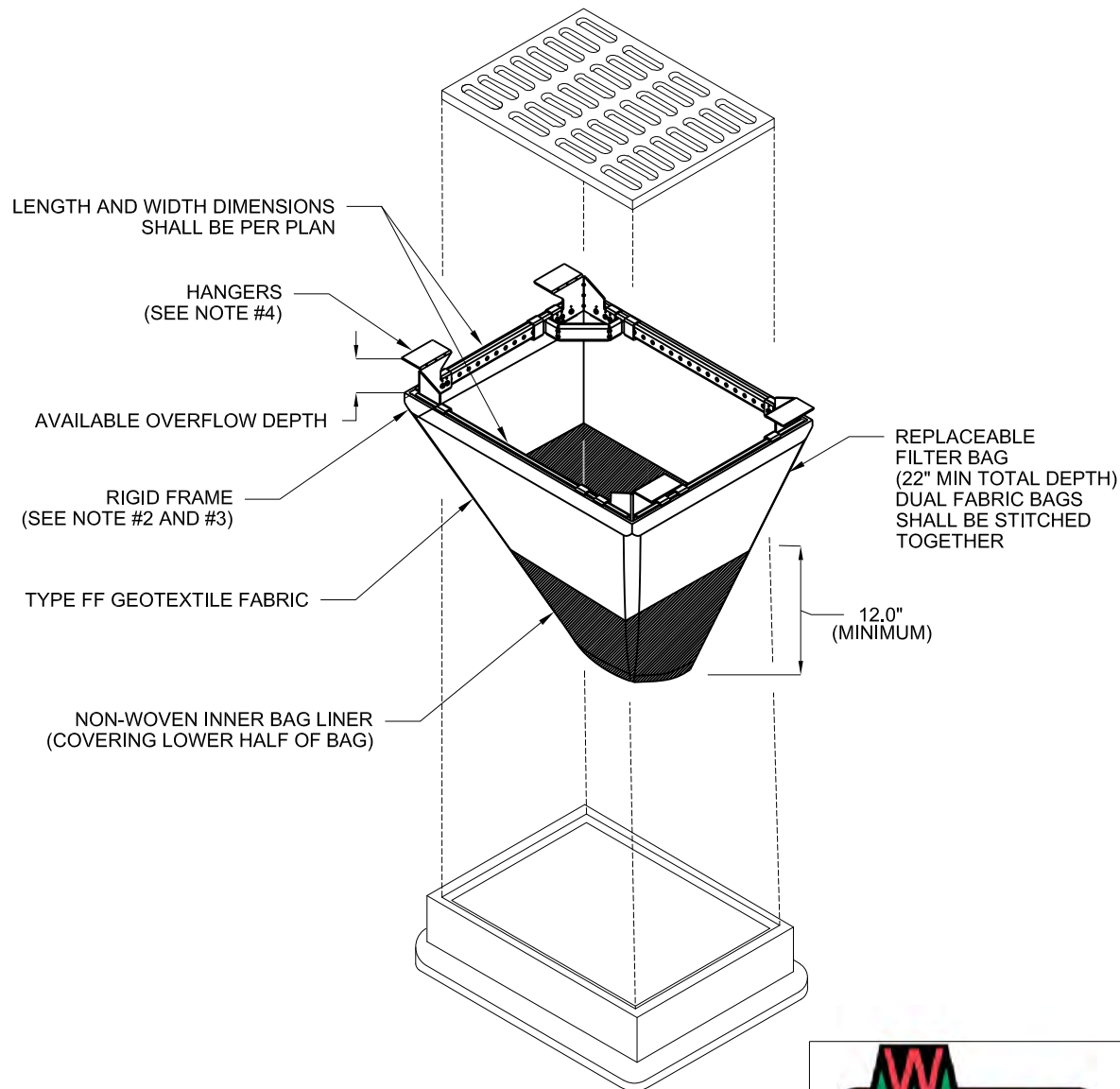
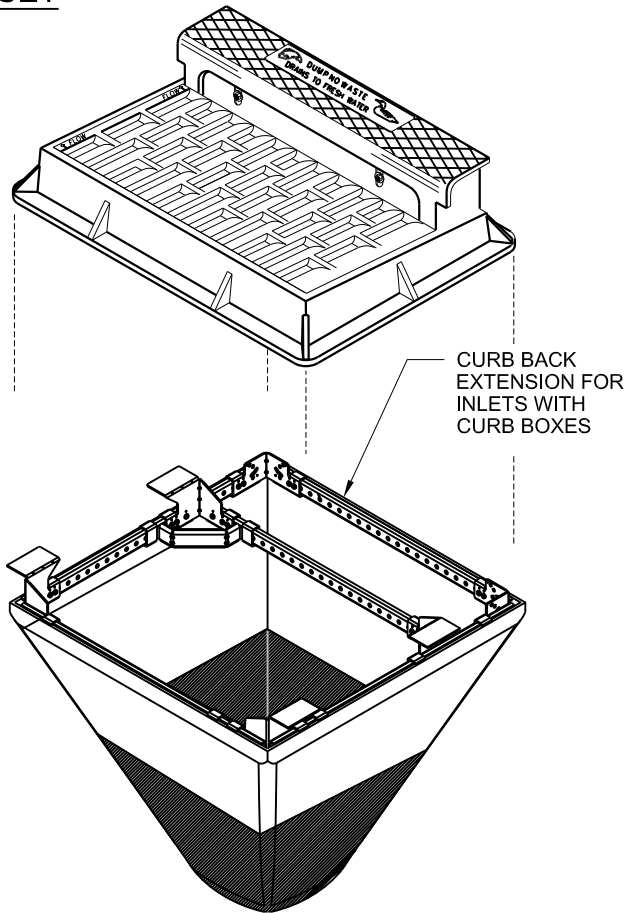


1060
TECHNICAL STANDARD No.

12/2021
REVISION DATE

FIGURE 5. INLET PROTECTION TYPE D-RF

INSET



CAN BE INSTALLED IN INLETS
WITH OR WITHOUT CURB BOXES

NOTES:

1. TAPER BOTTOM OF BAG TO MAINTAIN 3" OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. THE RIGID FRAME SHALL BE CONSTRUCTED OF GALVANIZED STEEL AND HAVE ADEQUATE STRENGTH TO SUPPORT THE WEIGHT OF THE SEDIMENT BAG WHEN COMPLETELY FULL.
3. THE RIGID FRAME SHALL NOT INTERFERE WITH OR ELEVATE THE GRATE MORE THAN 1/8".
4. DROP THE INLET FILTER THROUGH THE CLEAR OPENING SUCH THAT THE HANGERS REST FIRMLY ON THE LIP OF THE STRUCTURE.

MAINTENANCE NOTES:

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE STRUCTURE SHALL BE IMMEDIATELY REMOVED.



1060
TECHNICAL STANDARD No.

12/2021
REVISION DATE

Page 266 of 384

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
DEWATERING PRACTICES FOR SEDIMENT CONTROL
1061

DEFINITION

A practice or combination of practices that are used to prevent or reduce the discharge of sediment-laden water from dewatering operations.

PURPOSE

The purpose of this standard is to prevent water pollution from the discharge of sediment during dewatering of construction sites. The standard identifies several common methods which may be used to meet this purpose and specifies best management practices to ensure their effectiveness.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to land disturbing construction activities such as construction of buildings or roads, or the installation of utilities where sediment-laden runoff and/or groundwater accumulates in ponds, pits, trenches or other excavations and needs to be removed by pumping or other means of dewatering.

CRITERIA

General Criteria

Be aware of applicable federal, state, and local laws, regulations, or permit requirements governing dewatering operations. This standard does not contain the text of federal, state, or local laws.

Select and design dewatering practices that are appropriate for the: 1) pumping or *discharge rate*¹, and 2) and removal of the *target soil particle*, which is determined based on the predominant soil texture in the immediate area surrounding the accumulated water and the contributing drainage area.

Use combinations of dewatering practices (e.g., settling followed by filtering, *water-applied additive* followed by settling and/or filtering) when stand-alone practices are not effective for removal of the target soil particle (see Operation and Maintenance).

Discharge Locations

Locate and install dewatering practices so that discharges from the practice will not come in contact with or flow across exposed soils. Discharge to *stable surfaces* is not necessary for *internally drained areas*.

Provide energy dissipation at the outfalls of dewatering practices to minimize the potential for erosion caused by concentrated flows.

For discharges to storm sewer or sanitary sewer systems, contact the owner of the system to determine if flow rate or other discharge limitations apply.

Avoid discharges to steep slopes.

For discharges to waterways or wetlands:

- (1) Do not discharge at a rate or volume that will increase erosion or flood elevations in the receiving water.

¹ Words in the standard that are shown in italics are described in the Glossary section. The words are italicized the first time they are used in the text. Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

- (2) Do not discharge pollutant concentrations or pollutant loads that will cause or contribute to exceedance of water quality standards or does not protect or preserve the functional values or uses of wetlands.

Do not discharge at a rate or volume that will increase erosion or flooding on off-site properties.

Avoid discharging to a *karst feature* or other direct groundwater connection.

Contact the Wisconsin Department of Natural Resources (DNR) if proposing to discharge to an Outstanding Resource Water (ORW) or Exceptional Resource Water (ERW).

Note: Locations of ORW and ERW waterbodies can be found at <https://dnr.wi.gov/topic/surfacewater/swdv/>.

Dewatering Best Management Practices

It is acceptable to use the following dewatering best management practices:

Internally Drained Areas

Discharges to internally drained upland areas meeting the following criteria do not require sediment removal prior to discharge:

- (1) The area is either on-site or the off-site landowner has provided written approval for the discharge.
- (2) The area can contain and infiltrate the volume of water without a surface discharge. If applicable, the impact of frozen ground conditions and/or other sources of water (e.g., runoff, groundwater) should be evaluated.
- (3) The area is not considered or does not contain a wetland or waterway.
- (4) The area does not contain endangered resources or cultural resources that can be impacted by the discharge.
- (5) The area is not an existing or proposed storm water infiltration practice.
- (6) The area is not a *karst feature* or other direct groundwater connection.

Internal drained areas can be created using temporary containment barriers (e.g., berm).

Sediment Basins and Sediment Traps

Discharge to existing construction site sediment traps (WDNR Technical Standard 1063) sediment basins (WDNR Technical Standard 1064) and provided the discharge does not cause an exceedance of the design discharge rates for target soil particle removal from the basin or trap.

Temporary or Portable Settling Basins/Tanks

Discharge to temporary or portable settling basins/tanks with at least two baffled compartments.

Provide at least 3 feet of depth as measured from the bottom of the basin/tank to the invert of the outlet from the basin/tank.

Determine the minimum surface area of the basin/tank using the following equations:

Target Particle Size	Basin or Tank Surface Area Equation
Sand*	$Sa = 1.83 \times Q$
Silt**	$Sa = 30 \times Q$
Clay	$Sa = 180 \times Q$

Sa = Surface area (square feet), Q = Pumping rate and/or discharge rate (gallons per minute).

* Use the sand equation for silty soils when filter baffles and/or water-applied additives are used.

** Use silt equation for clayey soils when filter baffles and/or water-applied additives are used.

It is acceptable to reduce the settling basin or tank surface area when filter baffles and/or water-applied additives are used to increase the removal efficiency.

Geotextile Filtering Practices

Discharge to *geotextile filter bags* (Figures 1 and 2) or *geotextile filter basins* (Figure 3) fabricated using WisDOT Type R, WisDOT HR or equivalent geotextile.

Provide a minimum geotextile surface area of 100 square feet. Geotextile surface areas of less than 100 square feet can be used for low volume discharges (less than 100 cubic feet).

Determine the required geotextile surface area based on the specified geotextile product water flow rate (gallons per minute/square feet) and the following correction factors (see Example 1):

- (1) Reduce the specified geotextile product water flow rate by 50% to account for clogging.
- (2) For filter bags and basins, do not consider the bottom geotextile surface area unless the bag or basin is placed on permeable bedding material (e.g., open-graded base) that will not impede or reduce the flow through the geotextile.

Use water-applied additives prior to geotextile filters when needed to increase removal efficiency.

Example 1

- 1) Calculate the required geotextile filter surface area based on a pumping rate of 1,000 gallons per minute and a geotextile product flow rate of 50 gallons per minute/square foot.

Solution 1

- 1) Multiply the geotextile product flow rate (50 gpm/sf) by 50% to get the corrected flow rate to account for clogging (25 gpm/sf).
- 2) Divide the pumping rate (1,000 gpm) by the corrected flow rate (25 gpm/sf) to get the required geotextile surface area (40 sf).

NOTE: Increase the geotextile surface area to at least 100 square feet if a filter bag or basin will be used.

Filter Baffles

Discharge to settling basins/tanks or *dewatering channels* with one or more filter baffle (Figures 4 and 5).

Fabricate filter baffles with geotextile or other materials providing equivalent particle filtering.

Control discharge rates so that no filter baffle overtopping or bypassing occurs. For filter baffles in series, overtopping or bypassing can occur prior to the last baffle.

Use water-applied additives prior to filter baffles when needed to increase removal efficiency.

Manufactured Filtering Practices

Discharge to manufactured filtering devices such as sand, wound cartridge or membrane filters in accordance with manufacturer specifications.

Use water-applied additives prior to manufactured filtering devices when needed to increase removal efficiency.

Water-Applied Additives

Use water-applied additives as needed to increase the removal efficiency of filtering or settling practices.

Select water-applied additives that have WDNR allowable usage rates.

Do not use water-applied additives above the WDNR allowable usage rate for specific additive.

Select water-applied additives in accordance with manufacturer's specifications.

Note: WDNR maintains a list of additive allowable usage rates at

<https://dnr.wi.gov/topic/stormWater/documents/allowableUsageRatesWaterAppliedAdditives.pdf>

Groundwater Dewatering Wells

During well development, discharge sediment-laden water to appropriate dewatering practices.

During well operation, it is acceptable to bypass dewatering practices with clear water discharges if applicable discharge location criteria are met.

If *high capacity well systems* will be constructed, contact the WDNR Drinking Water and Groundwater program for information on applicable permits and requirements.

If a dewatering well has the potential to discharge contaminated groundwater, contact the WDNR Wastewater program to discuss testing, storage and discharge options. Additional WPDES permits may be required.

If a groundwater dewatering well will discharge to waters of the state, contact the WDNR Wastewater program to determine if a dewatering wastewater general permit is required.

CONSIDERATIONS

- (1) If available and appropriate, discharge to internally drained areas or existing sediment traps or basins before using the other options.
- (2) Effective removal of clay-sized particles can be difficult using stand-alone practices such as geotextile filters or portable settling tanks. When the target soil particle is clay, plan for the use of combinations of practices to provide effective treatment.
- (3) Geotextile with lower apparent opening size (AOS) may be more effective for removal of small particles. However, rapid clogging of the geotextile may occur.
- (4) For long-duration pumping operations, plan for the potential replacement of dewatering practices due to clogging.
- (5) If possible, site-specific dewatering plans should be developed. The plans should show all components of the dewatering system and adjacent construction operations to verify that adequate space is available and potential conflicts are minimized.
- (6) The practices in this standard are not appropriate for treatment or discharge of contaminated water or groundwater. If oily sheens, odors or colors indicating potentially contaminated water are observed, stop dewatering operations and notify the WDNR spills hotline at 1-800-943-0003.
- (7) See Figure 6 for practice specific considerations.

PLANS AND SPECIFICATIONS

Prepare plans and specifications in accordance with the criteria of this standard and describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

General

Unless conducting a hydraulic dredging operation, utilize a floating suction hose or equivalent method to minimize the potential for pumping sediment directly from the bottom of a pond, pit or trench.

During dewatering operations, conduct at least daily monitoring of dewatering practices and discharge locations and keep monitoring records.

Evaluate sediment removal effectiveness of dewatering practices during daily monitoring. Use a *transparency tube* (Figure 7) or other field test method to evaluate sediment removal effectiveness. If transparency cannot be observed through 12.5 cm (5 inches) of water, modification or enhancement of dewatering practices is needed.

Modify or enhance dewatering practices that are not providing effective sediment removal.

Properly dispose of all sediment collected in dewatering practices. Sediment can be disposed on-site.

Settling Basin or Tanks

Remove accumulated sediment as needed to maintain effectiveness.

Geotextile Filters

Slowly increase the pumping rate to allow a filter cake to develop on the fabric and improve the ability of the fabric to remove soil particles that are smaller than the fabric openings.

Securely connect inflow hoses to filter bags to minimize leakage.

Replace clogged, torn or damaged geotextile filters.

Filter Baffles

Replace clogged, torn or damaged filter baffles.

Manufactured Filters

Operate and maintain filters per manufacturer's instructions.

If filter backwashing is required, properly dispose of the backwash water.

Water-Applied Additives

Apply or introduce water-applied additives in accordance with the manufacturer's instructions.

Verify proper dosing (lbs/gallon) with the manufacturer and limit to WDNR allowable usage rates.

Provide appropriate contact/mixing time prior to the filtering or settling practice.

GLOSSARY

Dewatering channels: Ditches or swales with stable surfaces and one or more filter baffle.

Discharge rate: The rate of water flow (e.g., gallons per minute) to a dewatering practice from a pump or other mechanism.

Filter baffle: A vertically oriented filter that is fabricated with geotextile or other materials that provide filtration.

Geotextile filter bag: Geotextile fabric sewn into a completely enclosed bag with double-stitched seams and a snout to allow for a hose connection.

Geotextile filter basin: A temporary water storage area created with and/or over permeable material (e.g. open graded stone) and overlain with geotextile fabric.

High-capacity well systems: Any well or combinations of wells that in aggregate have a combined pumping capacity of 70 or more gallons per minute.

Internally drained areas: Areas that can contain and infiltrate the entire dewatering volume without generating a surface discharge.

Jar test: A pilot-scale test that simulates the coagulation/flocculation process in water.

Karst feature: An area or geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps or swallets.

Stable Surfaces: Surface that is not susceptible to rapid erosion when subject to moving water. Examples include areas covered with 6 inches or more of wash aggregate, pavement, dense vegetation in good condition or anchored erosion control mat.

Target soil particle: The soil particle (sand, silt or clay) that needs to be removed by the dewatering practice (See Figure 8).

Transparency tube: A tube with a black and white disc in the bottom, which is marked in centimeters or inches along its side. It is used for assessing the clarity of water.

Water-applied additive: Chemical products used for water clarification.

Wells: Drillholes or other excavations or openings deeper than they are wide that extend more than 10 feet below the ground surface constructed for the purpose of obtaining groundwater.

REFERENCES

Wisconsin DNR, Outstanding and Exceptional Resource Waters,
<https://dnr.wi.gov/topic/SurfaceWater/orwerw.html>

Wisconsin DNR, Storm Water Construction Technical Standards,
https://dnr.wi.gov/topic/stormwater/standards/const_standards.html

Wisconsin DNR, Water Application of Additives for Sediment Control, Technical Standard 1051,
<https://dnr.wi.gov/topic/stormwater/documents/1051WaterAppliedAdditives.pdf>

Wisconsin DNR, Remediation and Redevelopment Database (WRRD), Contamination Sites,
<https://dnr.wi.gov/topic/Brownfields/wrrd.html>.

Wisconsin DNR, High Capacity Wells, <https://dnr.wi.gov/topic/Wells/HighCap/Apply.html>

Wisconsin DOT, Geosynthetics, Standard Specification Section 645,
<https://wisconsindot.gov/rdwy/stndspec/ss-06-45.pdf>

University of Wisconsin Extension, Transparency, A Water Clarity Measure,
<https://wateractionvolunteers.org/files/2019/10/5Transparency-Monitoring2010.pdf>

Figure 1:
Geotextile Filter Bag

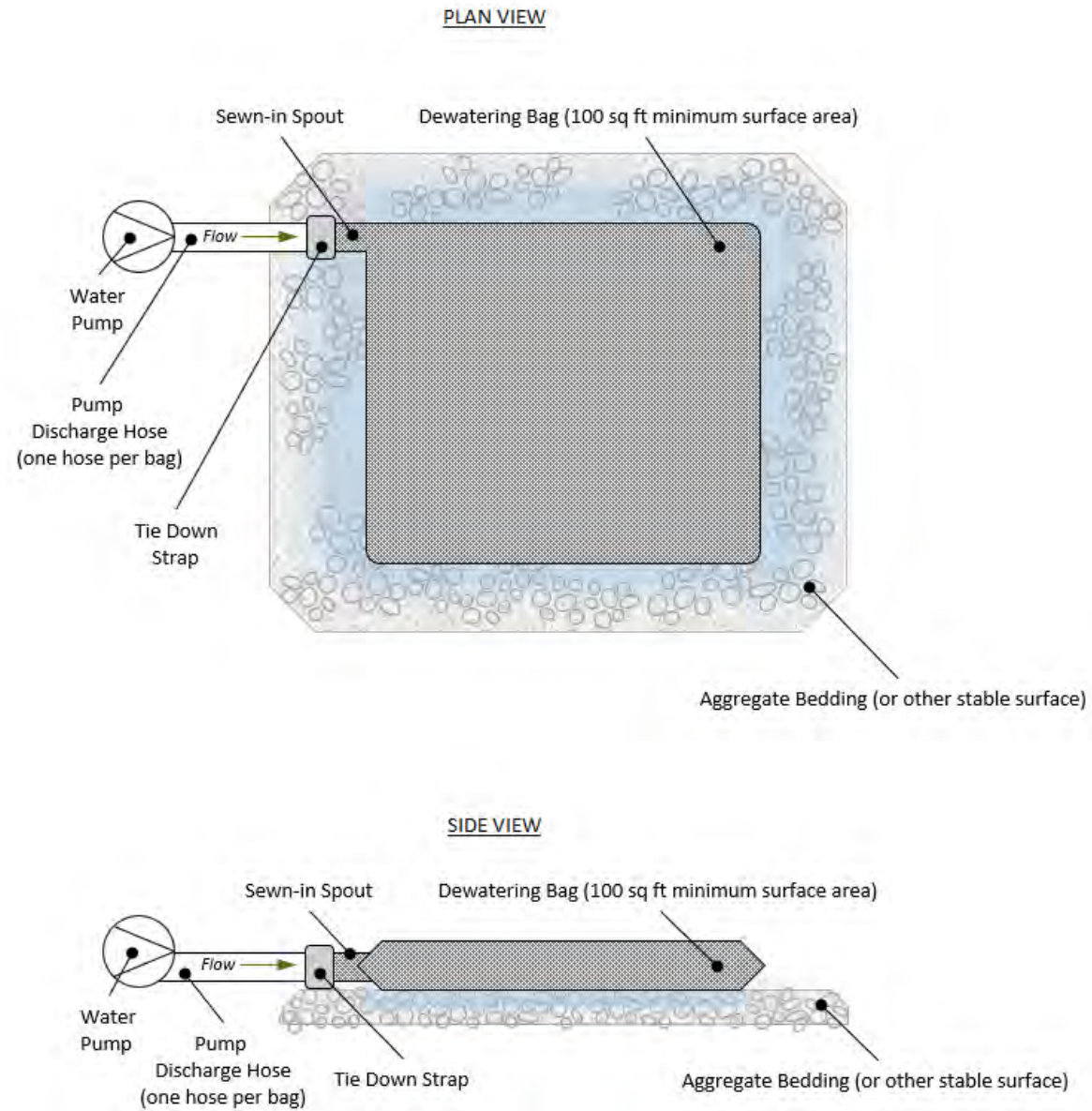


Figure 2:
Geotextile Filter Bag with Water-Applied Additive

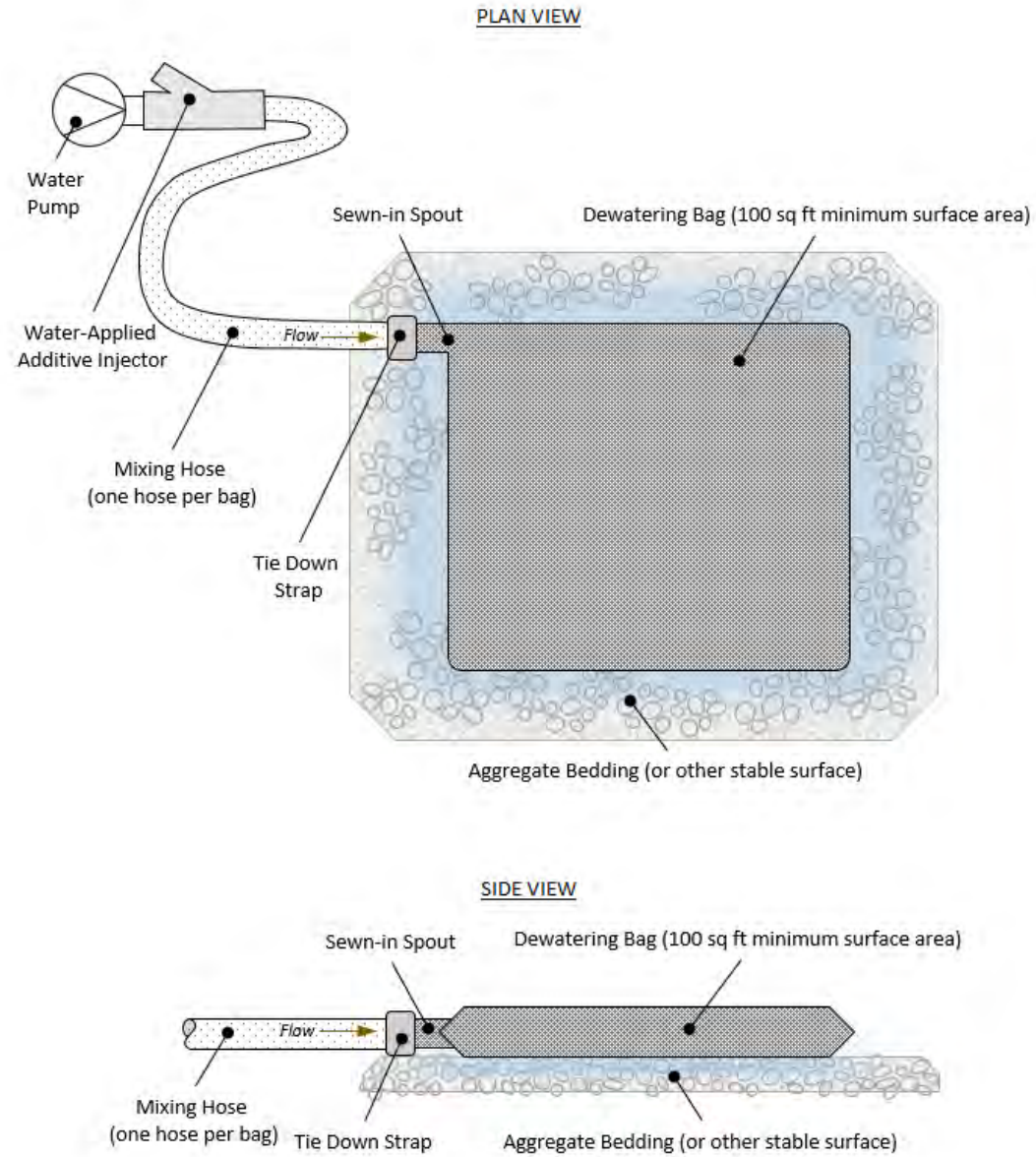


Figure 3:
Geotextile Filter Basin

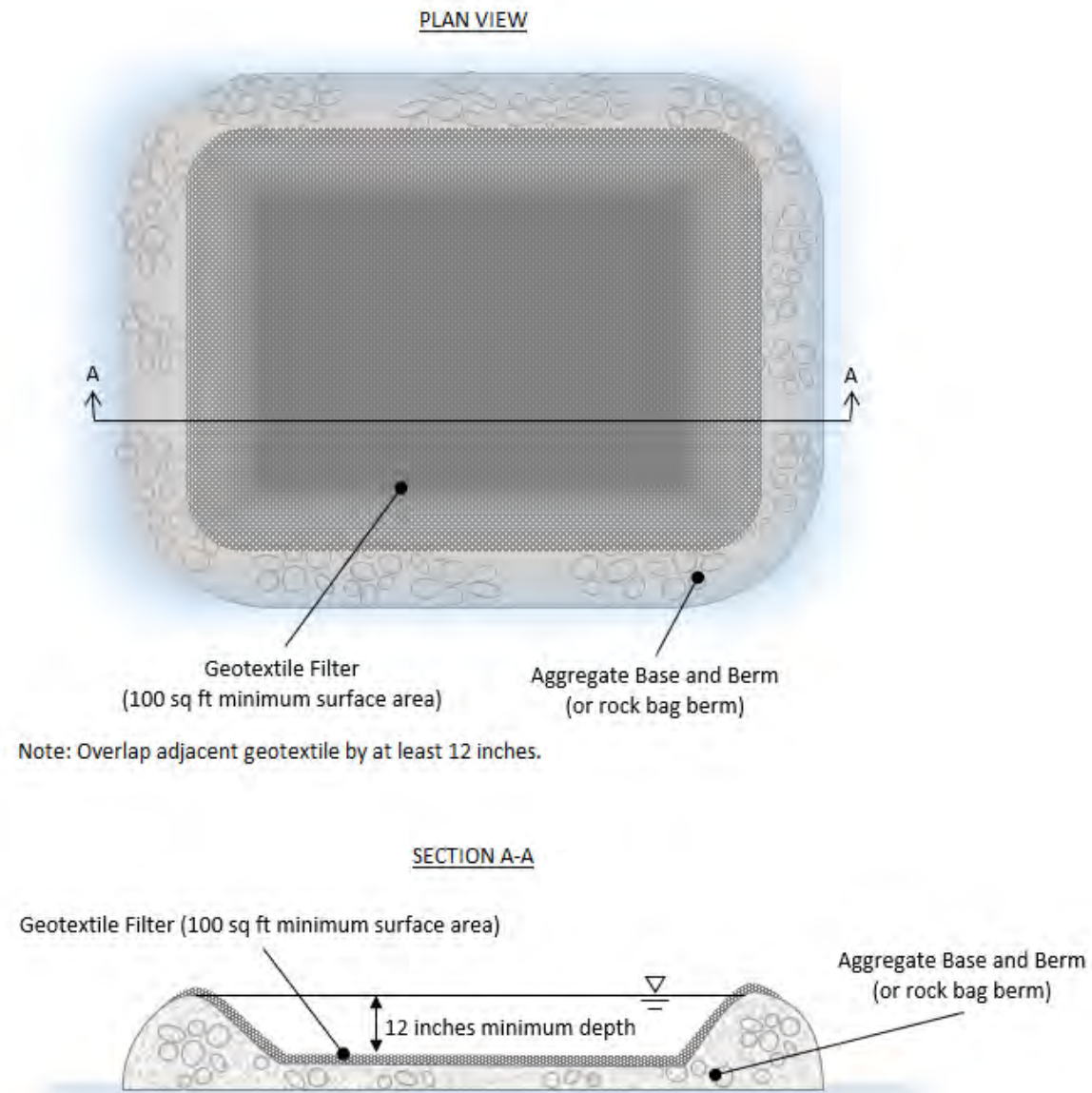


Figure 4:
Settling Tank with Geotextile Filter Baffles

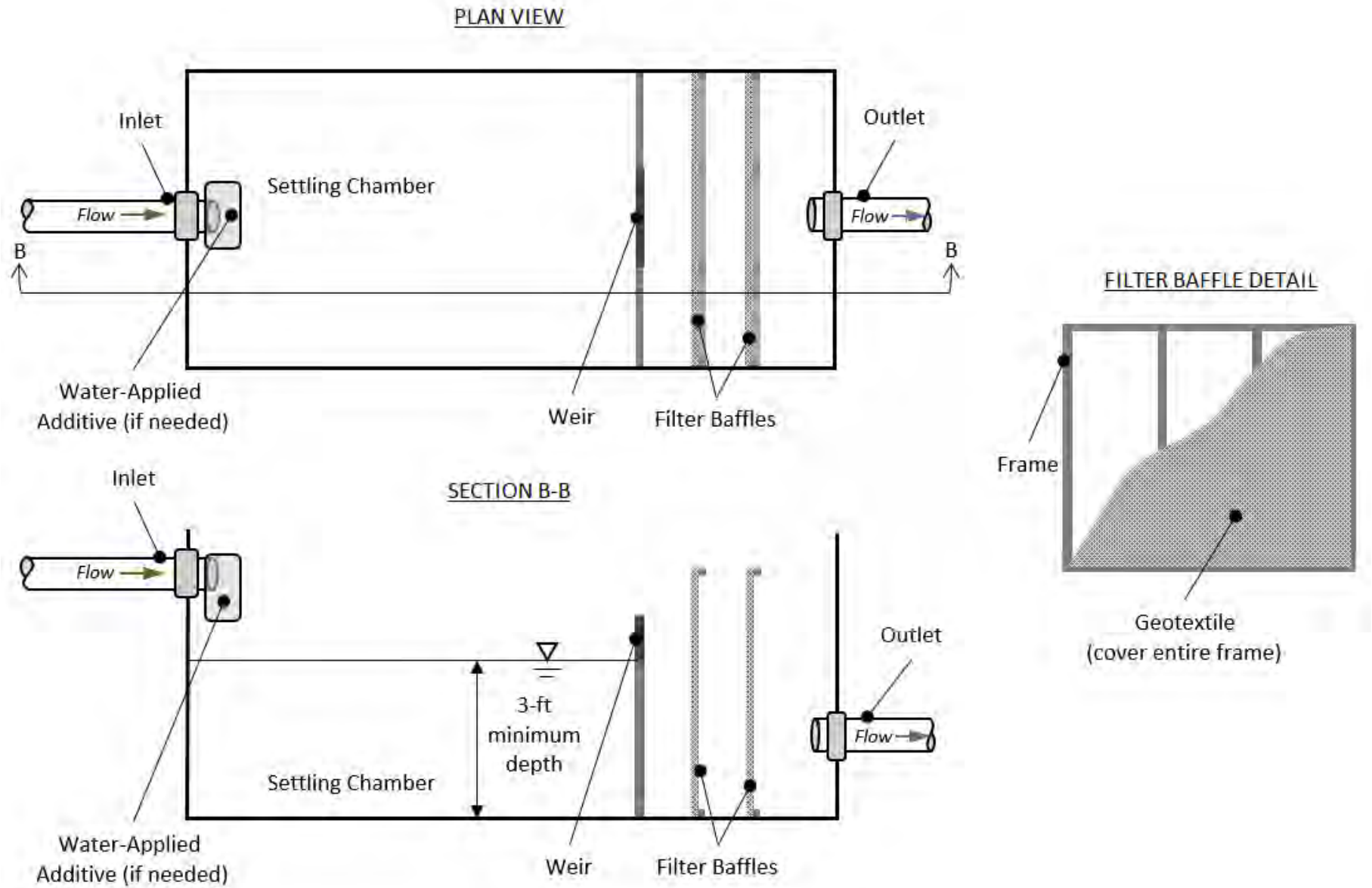
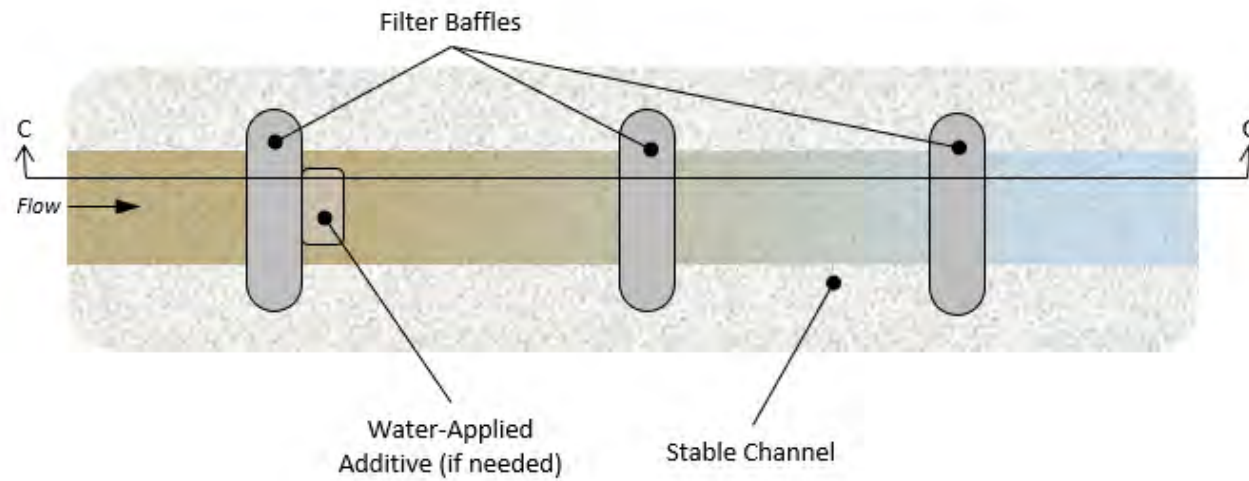


Figure 5:
Dewatering Channel

PLAN VIEW



SECTION C-C

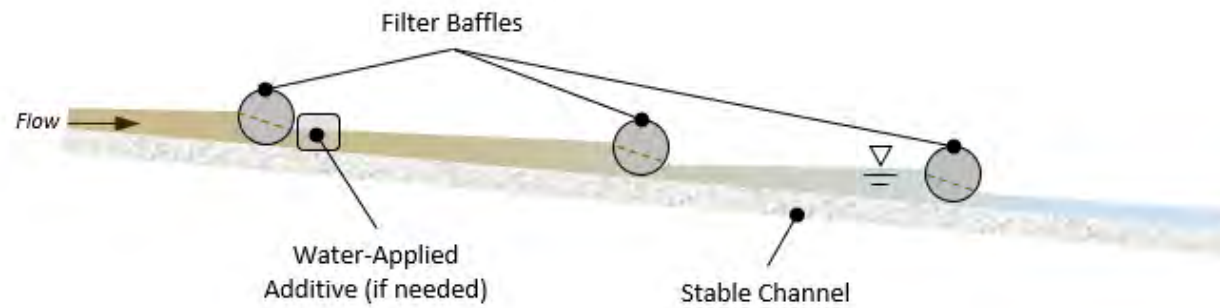


Figure 6:
Dewatering Practice Considerations

Dewatering Practice	Considerations
Sediment Basins/ Traps	• The target soil particle size should be consistent with the soil texture that was used to design the sediment basin or trap. • For sediment basins, the discharge rate from the basin should not exceed the design inflow and discharge rates from the basin for a 1-yr, 24-hr design storm. • For sediment traps, the discharge rate to the trap should not exceed the peak runoff rate to the trap for a 1-yr, 24-hr design storm.
Settling Basins/Tanks	• For silt and clay particles, discharge rates may be limited by available basin/tank sizes. If needed, a flow splitter can be used to direct the inflow to multiple basins/tanks.
Geotextile Filters	• Discharge rates may be limited by available geotextile sizes. If needed, a flow splitter can be used to direct the inflow to multiple filter bags or basins.
Manufactured Filters	• DNR does not maintain a list of approved manufactured filter devices and cannot provide information regarding the performance of these devices. • Manufactured filters can potentially treat high flow rates (1,000 gallons per minute or more).
Water-Applied Additives	• The ability of water-applied additives to effectively flocculate silt and/or clay particles is site-specific. <i>Jar testing</i> (or equivalent) should be conducted to verify that the product will be effective prior to full scale implementation.

Figure 7:
Sediment Control Effectiveness Using Transparency to Determine
Sediment Control Effectiveness

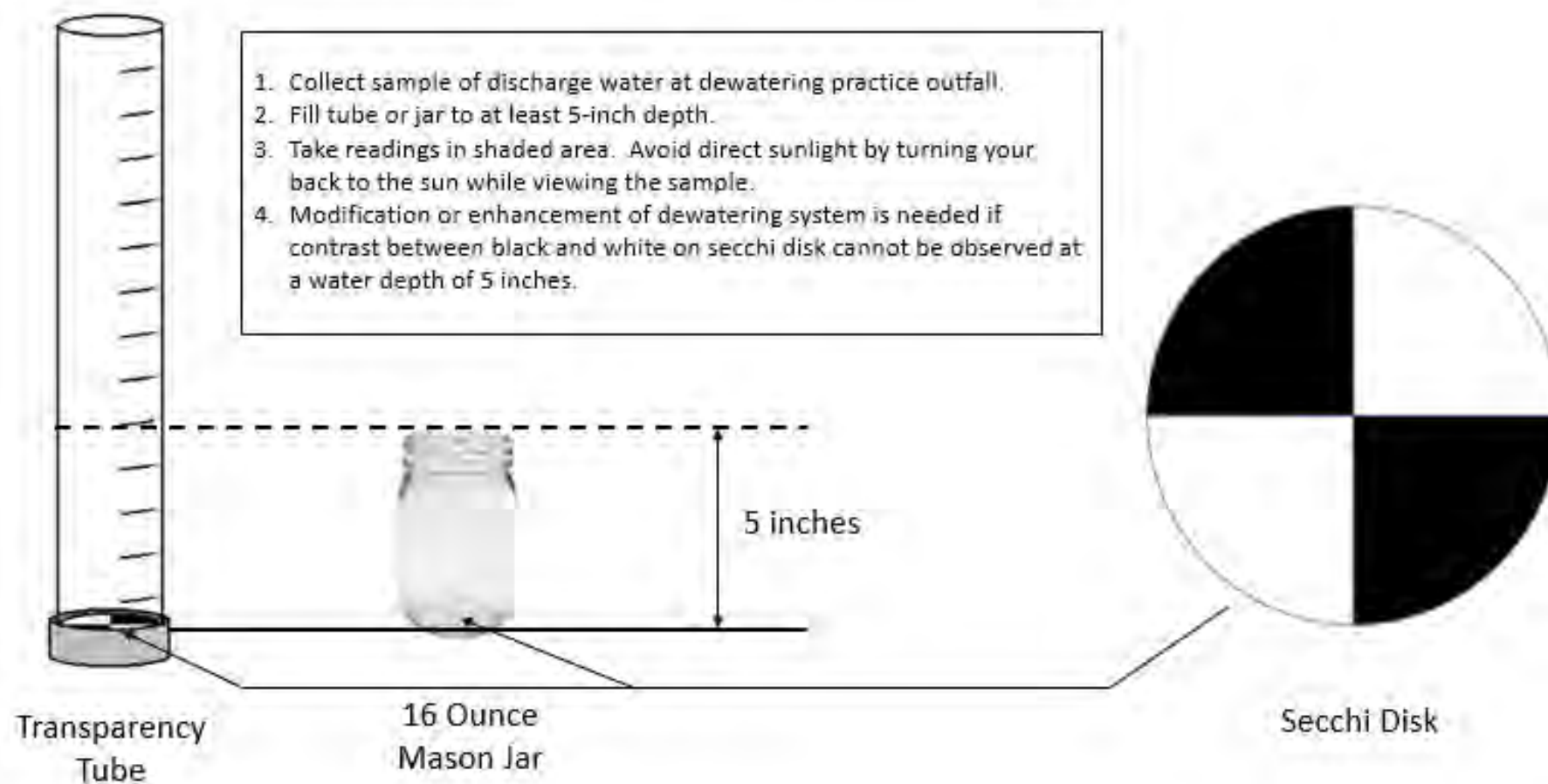


Figure 8:
Target Soil Particle Based on Soil Texture

Soil Texture	Target Soil Particle
Sand	Sand
Loamy Sand	
Sandy Loam	
Loam	Silt
Silt	
Silt Loam	
Clay Loam	Clay
Silty Clay	
Clay	

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
DITCH CHECK
1062

DEFINITION

A ditch check is a temporary dam constructed across a swale, drainage ditch, channel, or other area of concentrated flow to reduce the velocity of water. Ditch checks are constructed using stone, straw bales or manufactured products identified on the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL).

PURPOSE

The purpose of this practice is to reduce flow velocity and to pond water, thereby reducing active channel erosion and promoting settling of suspended solids behind the ditch check.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies where grading activity occurs in areas of channelized flows and a temporary measure is needed to control erosion and sediment transport until permanent stabilization practices can be applied. For contributing drainage areas less than one acre, ditch checks can be used as construction site sediment control practices. For drainage areas of one acre or more, a sediment trap or basin may be installed for construction site sediment control in accordance with WDNR Technical Standard 1063 Sediment Trap or 1064 Sediment Basin.

Do not place ditch checks in an intermittent or perennial stream under any circumstances without permission from WDNR. Do not use ditch checks as a substitute for major construction site sediment control practices such as sediment basins.

Materials and installation for ditch checks used on WisDOT projects are subject to the requirements of the WisDOT Standard Specifications and the WisDOT Erosion Control PAL/User Guide.

CRITERIA

This section establishes the minimum standards for design, installation and performance requirements.

General Criteria

Laws and Regulations. Be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of ditch checks. This standard does not contain the text of federal, state, or local laws.

Design Parameters.

Design and install all ditch checks to have a minimum height of 10 inches after installation.

Place ditch checks such that the resultant ponding will not adversely impact or damage adjacent areas.

Design and install ditch checks to be capable of withstanding the anticipated flow, volume and velocity.

Use ditch checks during rough grading and remove ditch checks once final grading and stabilization is applied, unless intended as permanent storm water management features.

Do not use either silt fence or single rows of straw bales as ditch checks.

Do not use steel posts or rods to stake ditch checks as they are potential safety hazards for ATVs, snowmobiles and bicycles.

Channel Applications

Use the following equation to calculate the spacing of ditch checks in channels:

$$L = H / S$$

Where:

L = distance between ditch checks, in feet

H = height of the ditch check measured from ditch check overflow invert to channel bottom on the downslope side of ditch check, in feet

S = longitudinal slope of the channel in decimal form (e.g., 2% = 2'/100' = 0.02)

Place ditch checks perpendicular to the flow line of the ditch and extend up the slope such that the bottoms of the ends are at least 6 inches higher in elevation than the top of the lowest middle section to assure that runoff will flow through or over the check, or both. If this is not done, flows are forced to the edge of the ditch check causing scour around the sides of the ditch check.

Design ditch checks to fit the channel cross-section to allow for proper installation and prevent washout from occurring. If the ditch check cannot be designed to fit the cross-section of the channel, use a different control measure.

Ditch Check Sediment Traps

It is acceptable to use a ditch check as a construction site sediment control practice when the contributing drainage area to the check is less than one acre.

It is acceptable to use ditch checks at low points in a silt fence line in cases where low points are unavoidable (see Figure 1).

Stone Ditch Checks (See Figure 2)

Design and install stone ditch checks to have a minimum top width of 2 feet measured in the direction of flow with a maximum slope of 2:1 (2 horizontal to 1 vertical) on the upslope and downslope sides.

It is acceptable to use any of the following stone specifications:

- (1) Well-graded angular stone with a D_{50}^1 of 3 inches or greater with no more than 5% passing the #4 sieve.
- (2) 1-foot layer of 1-inch (#2) washed stone over 3 to 6-inch clear stone.
- (3) Angular stone meeting the gradation for WisDOT specification 312 select crush or local equivalent.

It is acceptable to construct stone ditch checks using bags or socks filled with stone.

Straw Bale Ditch Checks (See Figure 3)

Install straw bale ditch checks using two rows of bales per check with bales on their sides so the twine wrapped around the bale is off the ground. Stagger the joints between adjacent rows of bales.

Anchor each straw bale using two wooden stakes. Stake the bales tightly against one another. Drive the stakes flush with the top of the bale when soil conditions permit.

Embed or entrench each straw bale 4 inches deep.

¹ The particle size for which 50% of the material by weight is smaller than that size.

Design and install straw bales such that the bottom elevation of the end straw bales are a minimum of 6 inches higher than the top of the lowest middle straw bale.

When installed on bare soils, place channel erosion mat or other non-erodible materials on the downstream side of a straw bale ditch check, and extended a minimum of 6 feet to prevent scour and washing out the toe of the ditch check. WDNR Technical Standard 1053 Channel Erosion Mat contains criteria for the placement of erosion mat in this location.

Manufactured Ditch Checks

For manufactured ditch check products, use those identified on the WisDOT PAL.

Manufactured ditch check materials shall be installed in accordance with the manufacturer-supplied methods used in prequalification testing for listing on the WisDOT PAL.

CONSIDERATIONS

- (1) To enhance sediment control, consider using temporary sumps located on the upstream side of a ditch check.
- (2) For added stability, key the base of a stone or rock ditch check into the soil to a depth of 6 inches.
- (3) It is acceptable to underlay stone ditch checks with a nonwoven geotextile fabric to ease ditch check installation and removal.
- (4) Ditch checks installed in grass-lined channels may kill the vegetation if water is ponded for extended periods or excessive siltation occurs. Proper maintenance is required to keep areas above and below the ditch check stabilized.
- (5) The best way to prevent sediment from entering the storm sewer system is to stabilize the disturbed area of the site as quickly as possible, preventing erosion and stopping sediment transport at its source.
- (6) When placing ditch checks in swales adjacent to roadways consider designating a 'clear zone' free of obstacles posing a threat to out of control vehicles.
- (7) Mowing operations may throw stones from ditch checks causing a potential safety hazard.
- (8) Failure of straw bale ditch checks due to improper installation is commonly reported. Consider alternatives to straw bale ditch checks in locations where proper installation will be difficult.
- (9) The various types of ditch checks function in different ways. Some ditch checks act as virtually impermeable dams and others allow flow to pass through. How a ditch check will function should be considered when selecting a type of ditch check that is appropriate for site specific conditions.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

Inspect ditch checks at a minimum weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

Unless incorporated into a permanent storm water management system, remove ditch checks once the final grading and channel stabilization is applied.

Remove sediment deposits when deposits reach half the height of the ditch check. Removal of sediment may require replacement of stone. Complete maintenance as soon as possible with consideration to site conditions.

REFERENCES

WisDOT, Erosion Control Product Acceptability List, <https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

Figure 1:
Silt Fence Relief

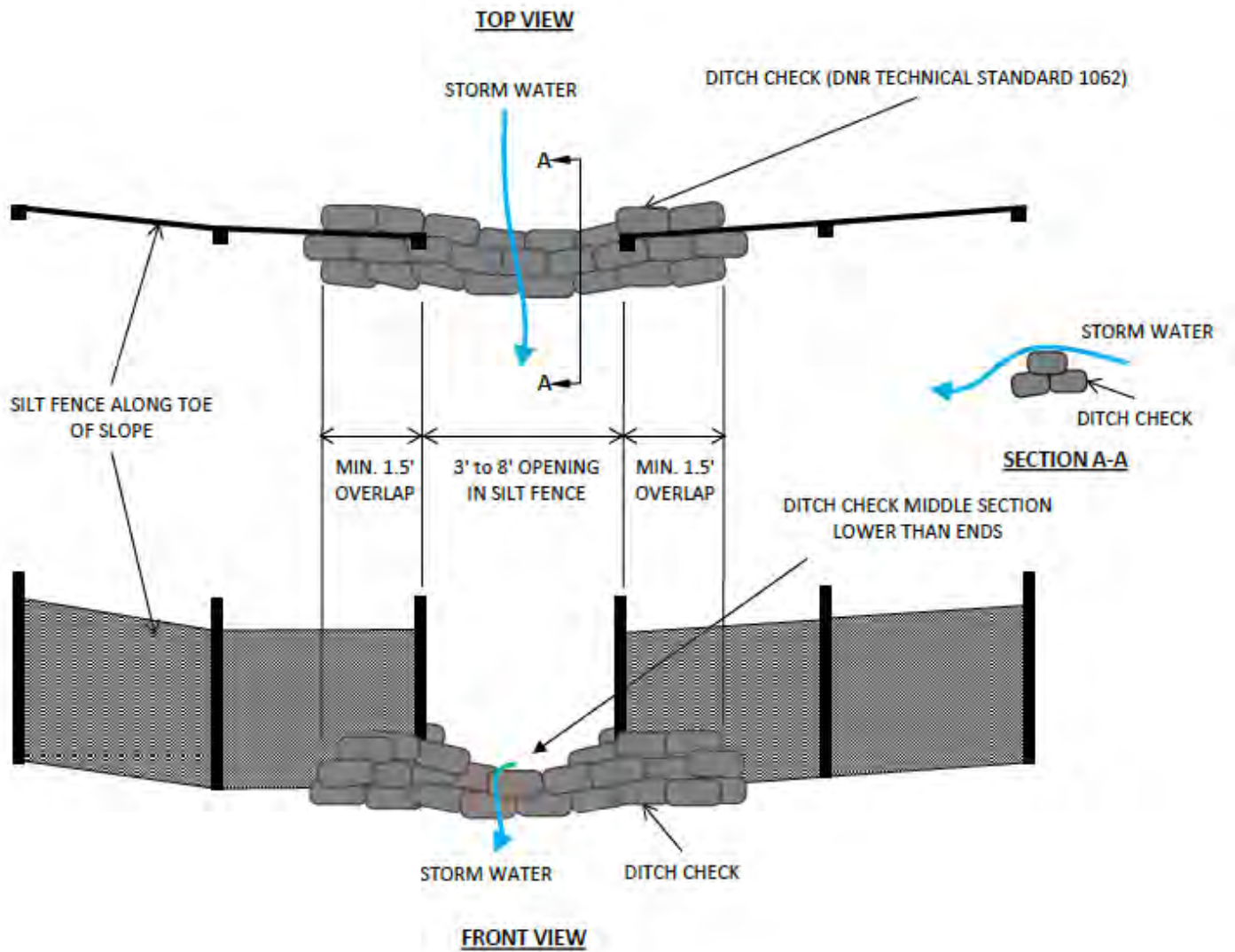
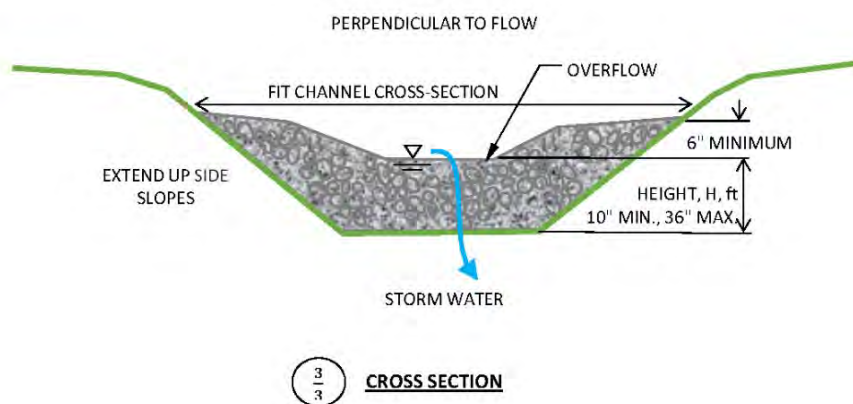
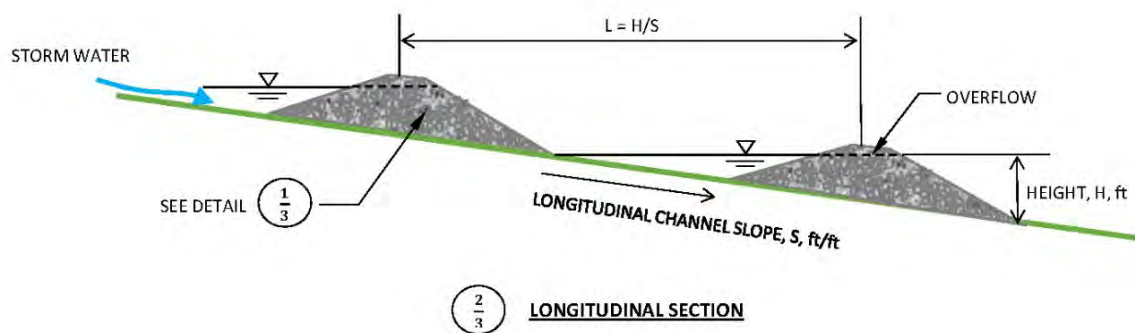
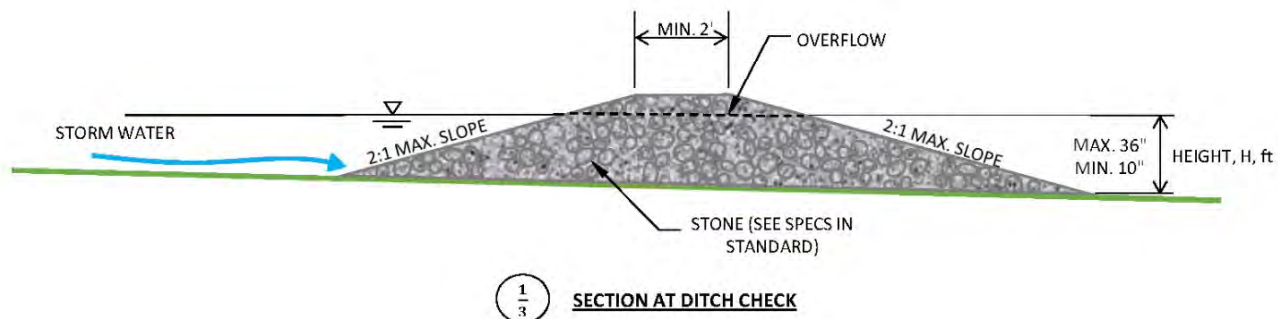


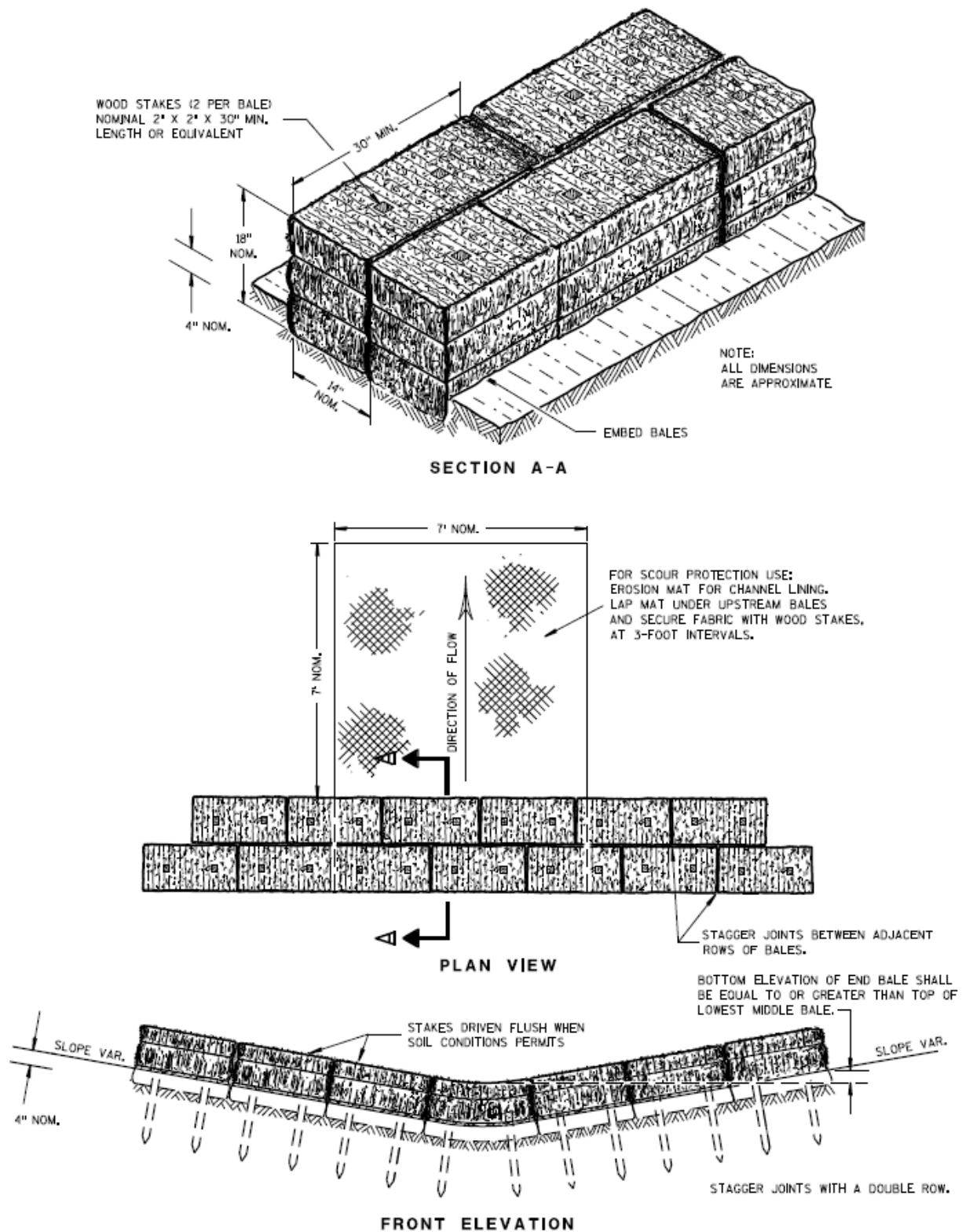
Figure 2:
Stone Ditch Checks



WDNR
2019

WDNR
11/2022

Figure 3:
Straw Bale Ditch Check



Sediment Trap

(1063)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

A *temporary*¹ sediment control device formed by excavation and/or embankment to intercept sediment-laden runoff and to retain the sediment.

II. Purposes

To detain sediment-laden runoff from disturbed areas for sufficient time to allow the majority of the sediment to settle out.

III. Conditions Where Practice Applies

Sediment traps are utilized in areas of concentrated flow or points of discharge during construction activities. Sediment traps shall be constructed at locations accessible for clean out. Sediment traps are designed to be in place until the contributory drainage area has been *stabilized*.

The contributory drainage area shall be a maximum of five acres. For concentrated flow areas smaller than one acre, ditch checks may be installed; refer to WDNR Technical Standard Ditch Check (1062).

For larger drainage areas and/or for sediment basins requiring an engineered outlet structure refer to WDNR Technical Standard Sediment Basin (1064) or Wet Detention Basin (1001).

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of sediment traps. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.

A. **Timing** – Sediment traps shall be constructed prior to disturbance of up-slope areas and placed so they function during all phases of construction. Sediment traps shall be placed in locations where runoff from disturbed areas can be diverted into the traps.

B. **Sizing Criteria** – Properly sized sediment traps are relatively effective at trapping medium and coarse-grained particles. To effectively trap fine-grained particles, the sediment trap must employ a large surface area or polymers.

The specific trapping efficiency of a sediment trap varies based on the surface area, depth of dead storage, and the particle size distribution and concentration of sediment entering the device.

1. **Surface Area** – The minimum surface area of a sediment trap shall be based on the dominant textural class of the soil entering the device. The surface area calculated below represents the surface for the permanent pool area (if wet) or the surface area for the dead storage. This surface area is measured at the invert of the stone outlet (see Figure 1).

a. For coarse textured soils (loamy sand, sandy loam, and sand):

$$A_{s \text{ (coarse)}} = 625 * A_{dr}$$

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI.

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

- b. For medium textured soils (loams, silt loams, and silt):

$$A_{s \text{ (medium)}} = 1560 * A_{dr}$$

- c. For fine textured soils (sandy clay, silty clay, silty clay loam, clay loam, and clay):

$$A_{s \text{ (fine)}} = 5300 * A_{dr}$$

For the equations above:

A_s = surface area of storage volume in square feet

A_{dr} = contributory drainage area in acres

Note: The equations above were derived using a representative particle distribution for detached sediment for each textural class. Sediment traps designed based on this standard will achieve 80% reduction of suspended solids for the drainage area.

- d. The surface area of sediment traps used in areas with fine to medium sized soils can be reduced when used in conjunction with water applied polymers. When employing polymers, size the surface area for controlling fine particles using the criteria for medium soils (V.B.1.b.) and when controlling medium sized particles use the sizing equation contained in (V.B.1.a.) for coarse soils. See WDNR Technical Standard Sediment Control Water Application of Polymers (1051) for criteria governing the proper use and selection of polymers.
2. Depth – The depth of the sediment trap measured from the sediment trap bottom to the invert of the stone outlet, shall be at least three feet to minimize re-suspension and provide storage for sediment.
3. Shape – The sediment trap shall have a length to width ratio of at least 2:1. The position of the outlet to the inlet shall be as such to minimize short-circuiting of the water flow path.

4. Side Slopes – Side slopes shall be no steeper than 2:1.

Note: A sediment trap sized with the surface area equations above, a three-foot depth, and 2:1 side slopes will generally result in an 80% sediment reduction. Slopes flatter than 2:1 will require larger surface areas to provide adequate storage.

- C. **Embankment** – Embankments of temporary sediment traps shall not exceed five feet in height measured from the downstream toe of the embankment to the top of the embankment. Construct embankments with a minimum top width of four feet, and side slopes of 2:1 or flatter. Earthen embankments shall be compacted.

Where sediment traps are employed as a perimeter control, the embankments shall have stabilization practices place prior to receiving runoff.

- D. **Outlet** – Sediment traps shall be constructed with both a principal and emergency spillway. The stone outlet of a sediment trap shall consist of a stone section of embankment (stone outlet) located at the discharge point. The stone outlet section provides a means of dewatering the basin back to the top of the permanent storage between storm events, and also serves as a non-erosive emergency spillway for larger flow events.

1. Outlet Size – The size of the outlet shall depend on the contributory drainage area and desired outflow. The length of the stone outlet / weir outlet can be calculated based on the size of the drainage area found in Table 1. Refer to section IX References for the equation used to calculate flow through a stone outlet or gabion.

Table 1 Weir Length

Drainage Area (acres)	Weir Length (feet)
1	4.0
2	6.0
3	8.0
4	10.0
5	12.0

The emergency spillway (top of the weir) shall be sized to adequately pass the 10-year 24-hour storm without overtopping the sediment trap. The crest of the spillway shall be at least one foot below the top of the embankment. The minimum weir lengths provided in Table 1 are adequate to pass the 10 year event.

Note: The weir length has little effect on overall treatment efficiency provided the sizing criteria in Section V.B. is adhered too.

The stone outlet shall have a minimum top width of 2 feet and a maximum side-slope of 2:1.

Discharge from the sediment basin shall be safely conveyed to a stormwater facility, drainage way, or waterbody. The discharge velocity shall be below the velocity to initiate scour unless appropriate stabilization methods are employed.

2. Stone Size – Stone shall consist of angular well graded 3 to 6 inch clear washed stone.
 3. Keyway Trench – The stone outlet shall be protected from undercutting by excavating a keyway trench across the stone foundation and up the sides to the height of the outlet. See Figure 1. Underlying with geotextile fabric is optional.
- E. Provide access for cleanout and disposal of trapped sediment.

VI Considerations

- A. Sediment traps generally require excessive surface areas to settle clay particles and fine silts. If these conditions exist on the site consider using a sediment basin (WDNR Technical Standard Sediment Basin 1064) or adding polymer to the sediment trap. See WDNR Technical Standard Sediment Control Water Application of Polymers (1051) for criteria governing the use of polymers

- B. To improve trapping efficiency, filter fabric can be placed on the up-slope side of the stone outlet / gabion and anchored with stone. When fabric is utilized to enhance filtering, more frequent maintenance is required to prevent clogging. When using fabric, a monofilament type fabric shall be used (such as WisDOT Type FF). The apparent opening size of the fabric, not the stone size, will dictate the flow rate through the outlet therefore outlet lengths need to be calculated since values in Table 1 are based on stone. When calculating the size of the outlet a clogging factor of 50% should be used for the fabric.
- C. Consider possible interference with construction activities when locating sediment traps.
- D. Provisions should be made for protecting the embankment from failure caused by storms exceeding the 10-year design requirement. Consider a stabilized and non-erosive emergency spillway bypass.
- E. In general, groundwater impacts from temporary sediment traps that have storage areas in contact with groundwater are not a major concern. However, sediment trap contact with groundwater should be avoided in areas with karst features, fractured bedrock, or areas of significant groundwater recharge.
- F. Sediment trapping is achieved primarily by settling within the pool formed by the trap. Sediment trapping efficiency is a function of surface area, depth of pool, and detention time. If site conditions permit, a length to width ratio greater than 2:1 will increase efficiency.
- G. If site conditions prevent the sediment trap from having a three-foot depth, then an equivalent storage volume must be created through increasing the surface area.
- H. For sediment traps in place longer than 6 months, consider outlets constructed of two types of stone. A combination of coarse aggregate and riprap (WisDOT light riprap classification) should be used to provide stability. A one-foot layer of one inch washed stone then should be placed on the up-slope face to reduce drainage flow rate.

VII Plans and Specifications

- A. Plans and specifications for installing sediment traps shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall address the following:
 - 1. Location and spacing of sediment traps
 - 2. Schedules and sequence of installation and removal
 - 3. Standard drawings and installation details
 - 4. Rock gradation
- B. All plans, standard detail drawings, or specifications shall include a schedule for installation, inspection, maintenance, and identify the responsible party.

VIII Operation and Maintenance

Sediment Traps shall, at a minimum, be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period. Sediment may need to be removed more frequently.

- A. Deposits of sediment shall be removed when they reach a depth of one foot.
- B. If the outlet becomes clogged it shall be cleaned to restore flow capacity.
- C. Recommend provisions for proper disposal of the sediment removed from the trap.
- D. Maintenance shall be completed as soon as possible with consideration given to site conditions.
- E. Sediment traps shall be removed and the location stabilized after the disturbed area draining to the sediment trap is stabilized and no longer susceptible to erosion.

IX References

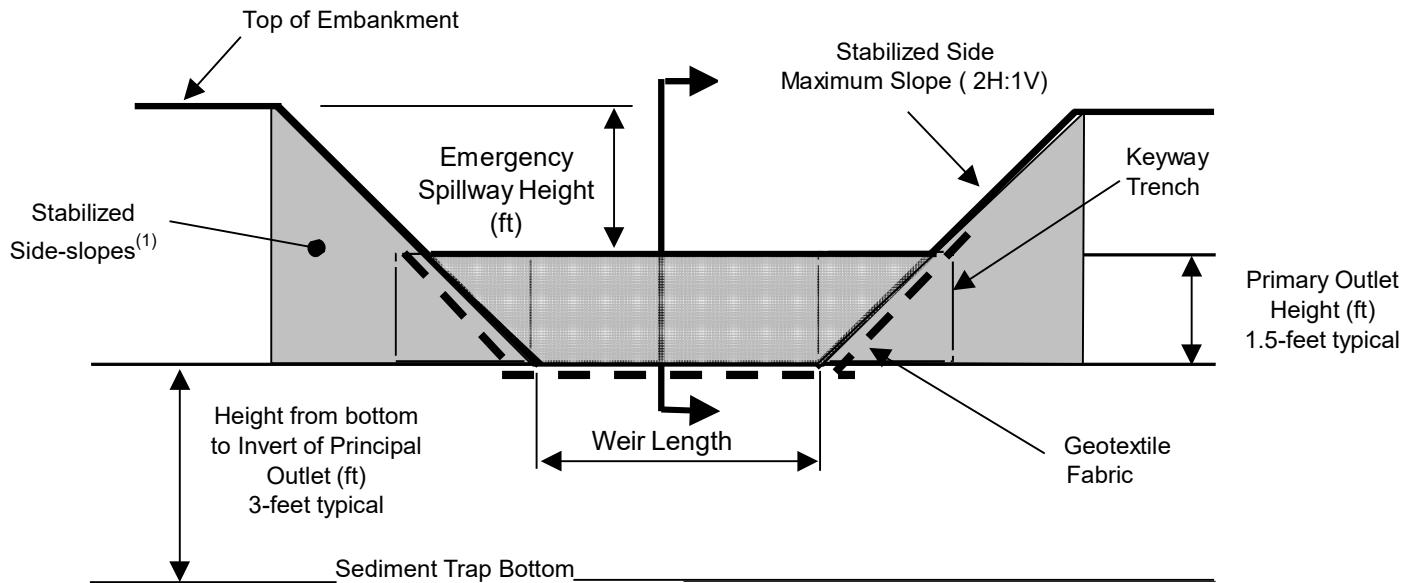
C. McIntyre, G. Aron, J. Willenbrock, and M. Deimler. Report No. 10: Analysis of flow through porous media as applied to gabion dams regarding the storage and release of storm water runoff. NAHB/NRC Designated Housing Research Center at Penn State, Department of Civil Engineering; August 1992.

X Definitions

Stabilized (III): Means that all land disturbing construction activities at the construction site have been completed and that a uniform perennial vegetative cover has been established with a density of at least 70% of the cover for the unpaved areas and areas not covered by permanent structures or that employ equivalent stabilization measures.

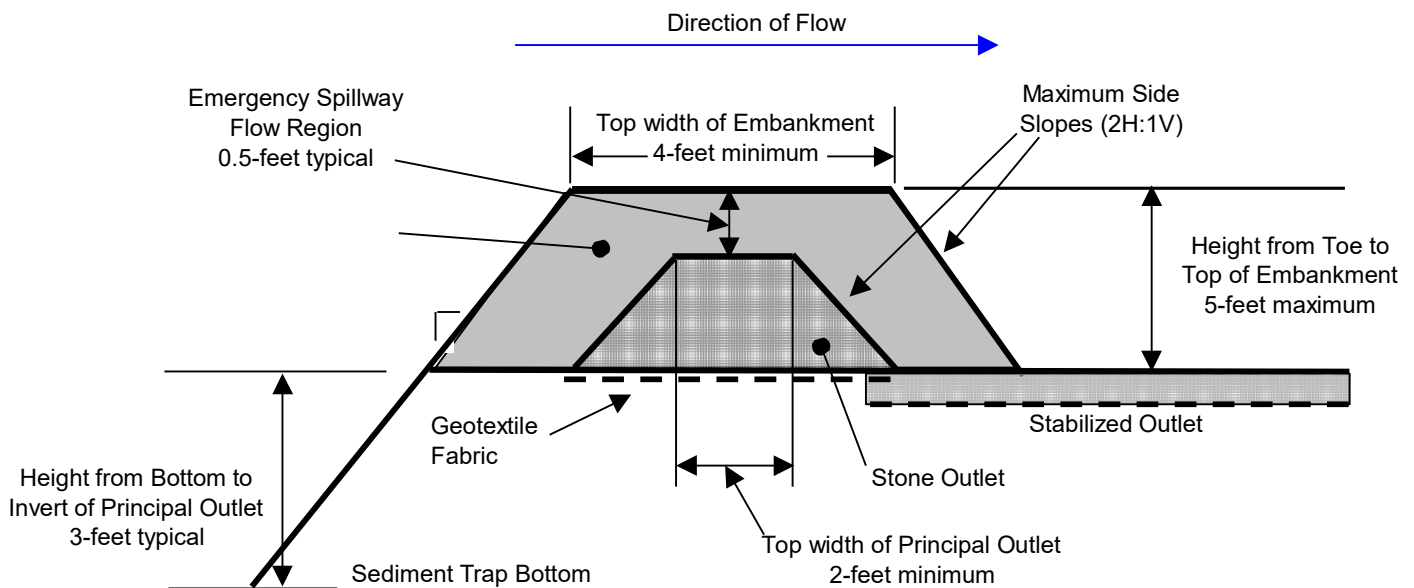
Temporary (I): An erosion control measure that is in place for the duration of construction or until the site is stabilized.

Figure 1: Sediment Trap Outlet Detail



Cross-section View of Principal Outlet

Notes: (1) Side-slopes and faces of earthen embankment around outlet shall be armored with riprap or stabilized with erosion mat sufficient to handle flows from the 10-year storm.



View A - A of Principal Outlet

Sediment Basin

(1064)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

A sediment control device constructed with an engineered outlet, formed by excavation or embankment to intercept sediment-laden runoff and retain the sediment.

II. Purposes

Detain sediment-laden runoff from disturbed areas for sufficient time to allow the majority of the sediment to settle out.

III. Conditions Where Practice Applies

Sediment basins are utilized in areas of concentrated flow or points of discharge during construction activities. Sediment basins shall be constructed at locations accessible for clean out. Site conditions must allow for runoff to be directed into the basin.

Sediment basins are designed to be in place until the contributory drainage area has been *stabilized*¹. Sediment basins are temporary and serve drainage areas up to 100 acres however other conservation practices are often more economical for smaller drainage areas. For drainage areas smaller than 5 acres sediment traps or ditch checks may be applicable; for design criteria refer to WDNR Technical Standard Sediment Trap (1063) or Ditch Check (1062).

Design to WDNR Technical Standard Wet Detention Basin (1001) when a permanent stormwater basin is required.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of sediment basins. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements. Sediment basins meeting these design criteria are deemed 80% effective by design in trapping sediment.

A. **Timing** – Sediment basins shall be constructed prior to disturbance of up-slope areas and placed so they function during all phases of construction. Sediment basins shall be placed in locations where runoff from disturbed areas can be diverted into the basin.

B. **Sizing Criteria** – Properly sized sediment basins are more effective at trapping fine-grained particles than sediment traps. Specific trapping efficiency varies based on the surface area and the particle size distribution of the sediment entering the device. See Figure 1 for clarification of terms. Attachment 1 includes a sample design problem.

1. **Treatment Surface Area** – The surface area of the sediment basin measured at the invert of the lowest outlet. The treatment surface area shall be sized based on the texture of the soil entering the device and the peak outflow during the 1-year, 24-hour design storm using Equation 1:

$$S_a = 1.2 * (q_{out} / v_s)$$

Where:

S_a = Treatment surface area measured at the invert of the lowest outlet of sediment basin (square feet)

q_{out} = Peak outflow (cubic feet / second) during the 1-year, 24-hour design storm for the principal outlet

v_s = Particle settling velocity (feet/second)

1.2 = EPA recommended safety factor.

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

Particle settling velocities (V_s) shall be based on representative soil class as follows:

- a. Soil Class 1: $v_s = 1.2 \times 10^{-3}$ ft/sec
- b. Soil Class 2: $v_s = 7.3 \times 10^{-5}$ ft/sec
- c. Soil Class 3: $v_s = 1.2 \times 10^{-5}$ ft/sec

Note: Particle settling velocities calculated assuming a specific gravity of 2.65 and a water temperature of 68 degrees Fahrenheit.

Soil Class 1 includes particles greater than 20 microns generally corresponding to sand, loamy sand, and sandy loam.

Soil Class 2 includes particles between 5 and 20 microns generally corresponding to loam, silt, and silt loam aggregates as transported in runoff.

Soil Class 3 includes particles between 2 and 5 microns generally corresponding to clay loam, silty clay, and clay aggregates as transported in runoff.

The representative soil class shall be selected based on the dominant textural class of the soil entering the device.

The treatment surface area of sediment basins can be reduced when used in conjunction with water applied polymers. When employing polymers, size the treatment surface area for controlling fine soils (Class 3) using the settling velocity for medium soils (Class 2). When designing for medium sized soils (Class 2) use the settling velocity for coarse soils (Class 1). See WDNR Technical Standard Sediment Control Water Application of Polymers (1051) for criteria governing the proper use and selection of polymers.

2. **Depth below Treatment Surface Area** – The depth below the treatment surface area as measured from the invert of the lowest outlet of the sediment basin shall be a minimum of 5 feet deep (2 feet for sediment storage plus 3 feet to protect

against scour/ resuspension) and a maximum of 10 feet deep to limit the potential for thermal stratification.

Due to side slope requirements and safety shelf considerations it may be difficult to maintain 5 feet of depth for the entire treatment surface area.

Therefore, 50% of the total treatment surface area shall be a minimum of 5 feet deep. For basins less than 5,000 square feet, maximize the area of 5 feet depth.

Interior side slopes below the lowest invert shall be 2:1 (horizontal: vertical) or flatter to maintain soil stability.

While a permanent pool of water below the lowest invert may form, it is not required to be maintained through irrigation or installation of a liner system.

3. **Active Storage Volume** – The volume above the treatment surface area shall be calculated using one of the following methods:

- a. The method outlined in TR-55 for determining the storage volume for detention basins. This can be accomplished by using Figure 2 where:

q_o = Peak outflow (cubic feet / second) during the 1-year, 24-hour design storm for the principal outlet calculated using Equation 1 (see section V.B.1).

q_i = Calculated peak inflow or runoff rate (cubic feet / second) during the 1-year, 24-hour design storm.

V_r = Calculated volume of runoff from the 1-year 24-hour design storm for the entire contributory area with the maximum area of disturbance characterized as bare soil.

V_s = Is the required active storage volume determined using Figure 2.

- b. The active storage volume may be calculated based on routing the 1-year, 24-hour storm provided the principal outlet requirements stipulated in section V.D.2 are maintained. This method will require the use of a model.

Note: Both these methods require iterative calculations.
 4. Shape – The length to width ratio of the flow path shall be maximized with a goal of 3:1 or greater. The flow path is considered the general direction of water flow within the basin including the treatment surface area and any forebay.
- C. **Embankments** – Earthen embankments shall be designed to address potential risk and structural integrity issues such as seepage and saturation. All constructed earthen embankments shall meet the following criteria.
1. The base of the embankment shall be stripped of all vegetation, stumps, topsoil and other organic matter.
 2. Side slopes shall be 3:1 or flatter. The minimum embankment top width shall be adequate to provide structural stability. Where applicable the top width shall be wide enough to provide maintenance access.
 3. There shall be a core trench or key-way along the embankment.
 4. Any pipes extending through the embankment shall be bedded and backfilled with equivalent soils used to construct the embankment. The bedding and backfill shall be compacted in lifts and to the same standard as the original embankment. Excavation through a completed embankment shall have a minimum side slope of 1:1 or flatter.
 5. Measures shall be taken to minimize seepage along any conduit buried in the embankment.
- D. **Outlet** – Sediment basins shall have both a principal outlet and an overflow spillway.
1. Timing – Outlets must be constructed in conjunction with the remainder of the basin and must be constructed prior to the basin receiving runoff. Sediment basins are ineffective until the outlet is constructed.
 2. Principal Water Quality Outlet – The principal water quality outlet shall be designed to pass the 1-year 24-hour storm without use of the overflow spillway or other outlet structures. The maximum outflow (Q_o) from the principal water quality outlet shall be less than or equal to the Q_o used in Equation 1 (V.B.1). If the sediment basin is to serve as a permanent stormwater basin, the principal outlet structure can be modified (i.e. removable plates) to meet flow requirements encountered during and after construction; separate outlet structures do not need to be constructed.
- Note:** Local ordinances may require control of larger storm events such as the 2-year 24 hour storms. In these cases, additional or compound outlets may be required.
3. Overflow (Emergency) Spillway – An overflow spillway shall be provided consisting of an open channel constructed adjacent to the embankment and built over a stabilized area. The spillway shall be designed to carry the peak rate of runoff expected from a 10-year, 24-hour design storm or one commensurate with the degree of hazard, less any reduction due to flow in the principal outlet. The top of the embankment shall be at least one foot above the design high water level and a minimum of 1 foot above the invert of the overflow spillway. The overflow spillway shall be protected from erosion. Flow from the overflow spillway shall be directed away from the embankment.
 4. Outlet Protection – All outlet designs shall incorporate preventive measures for ice damage, trash accumulation, and erosion at the outfall. For orifices less

than 8-inches in diameter, or equivalent, additional measures to prevent clogging are required.

- E. **Inlet Protection** – Inlets shall be designed to prevent scour and reduce velocities during peak flows. Possible design options include flow diffusion, plunge pools, directional berms, baffles, or other energy dissipation structures.
- F. **Location** – Temporary sediment basins should be located to provide access for cleanout and disposal of trapped sediment.
- G. **Removal** – Temporary sediment basins shall be removed after the contributing drainage area has been stabilized. Complete final grading and restoration according to the site plans. If standing water needs to be removed it shall be done in accordance with WDNR Technical Standard Dewatering (1061).

VI. Considerations

- A. When constructing a sediment basin that will also serve as the long-term stormwater detention pond, build the sediment basin to the larger of the two sizes required either for stormwater control or erosion control. In addition, when sizing the outlet structure first design the outlet for the long-term stormwater management requirements then check to satisfy the flow requirements for sediment control during construction. If additional flow restriction is needed consider use of a temporary restriction plates or other measures to avoid having to construct separate outlet structures for the sediment basin and stormwater basin.
- B. Over-excavation beyond the required depth in the sediment storage area of the sediment basin may allow for less frequent maintenance. Addition of other measures in the contributing drainage area may reduce sediment accumulation and associated maintenance requirements.
- C. The use of a sediment forebay can extend the useful life of the main sediment storage area by trapping the majority of sediment in the forebay area. Separation of the forebay from the rest of the basin requires construction of a submerged shelf (if wet) or

a stone or stabilized earthen embankment. The forebay should have a surface area equal to at least 12% of the total basin area.

- D. In addition to soil stability issues, interior slopes of sediment basins should be selected based on safety issues commensurate with the degree of hazard.

VII. Plans and Specifications

- A. Plans and specifications for installing sediment basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.
 - 1. Location of sediment basin
 - 2. Schedules and sequence of installation and removal
 - 3. Standard drawings and installation details
 - 4. Control structure detail and layout
 - 5. Sizing of sediment storage area
 - 6. Maintenance requirements
- B. All plans, standard detail drawings, or specifications shall include sequence for installation, inspection, and maintenance requirements. The responsible party shall be identified.

VIII. Operation and Maintenance

Sediment basins shall, at a minimum, be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

- A. Sediment shall be removed to maintain the three foot depth of the treatment surface area as measured from the invert of the principal outlet. Sediment may need to be removed more frequently.
- B. If the outlet becomes clogged it shall be cleaned to restore flow capacity.
- C. Provisions for proper disposal of the sediment removed shall be made.

- D. Maintenance shall be completed as soon as possible with consideration to site conditions.

IX. References

Chapter NR 333, Dam and Design Construction.

Hann, Barfield, and Hayes. Design Hydrology and Sedimentology for Small Catchments. Academic Press Inc., 1994.

Robert E. Pitt, Small Storm Hydrology.

US Bureau of Reclamation, Design of Small Dams.

http://www.usbr.gov/pmts/hydraulics_lab/pubs/index.cfm.

USDA, Natural Resources Conservation Service, Ponds – Planning, Design, Construction. Agriculture Handbook No. 590, Revised September 1997.

WDNR Technical Standard 1001
Wet Detention Basin.

X. Definitions

Active Storage Volume (V.B.3) – Is measured from the invert of the lowest outlet to the invert of the emergency spillway.

Stabilized (III) – Means protecting exposed soil from erosion.

Treatment Surface Area (V.B.1) – Is the surface area of the sediment basin measured at the invert of the lowest outlet.

Figure 1:

Clarification of Sediment Basin Terminology

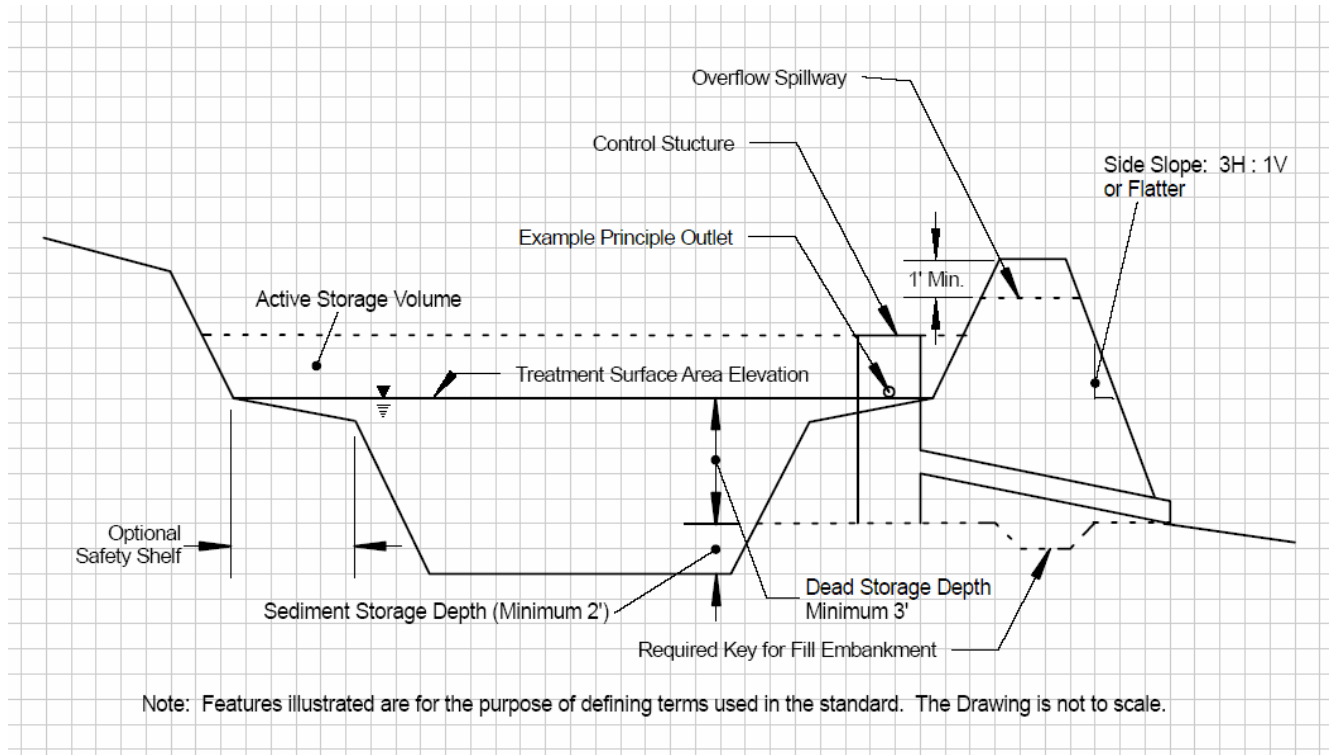
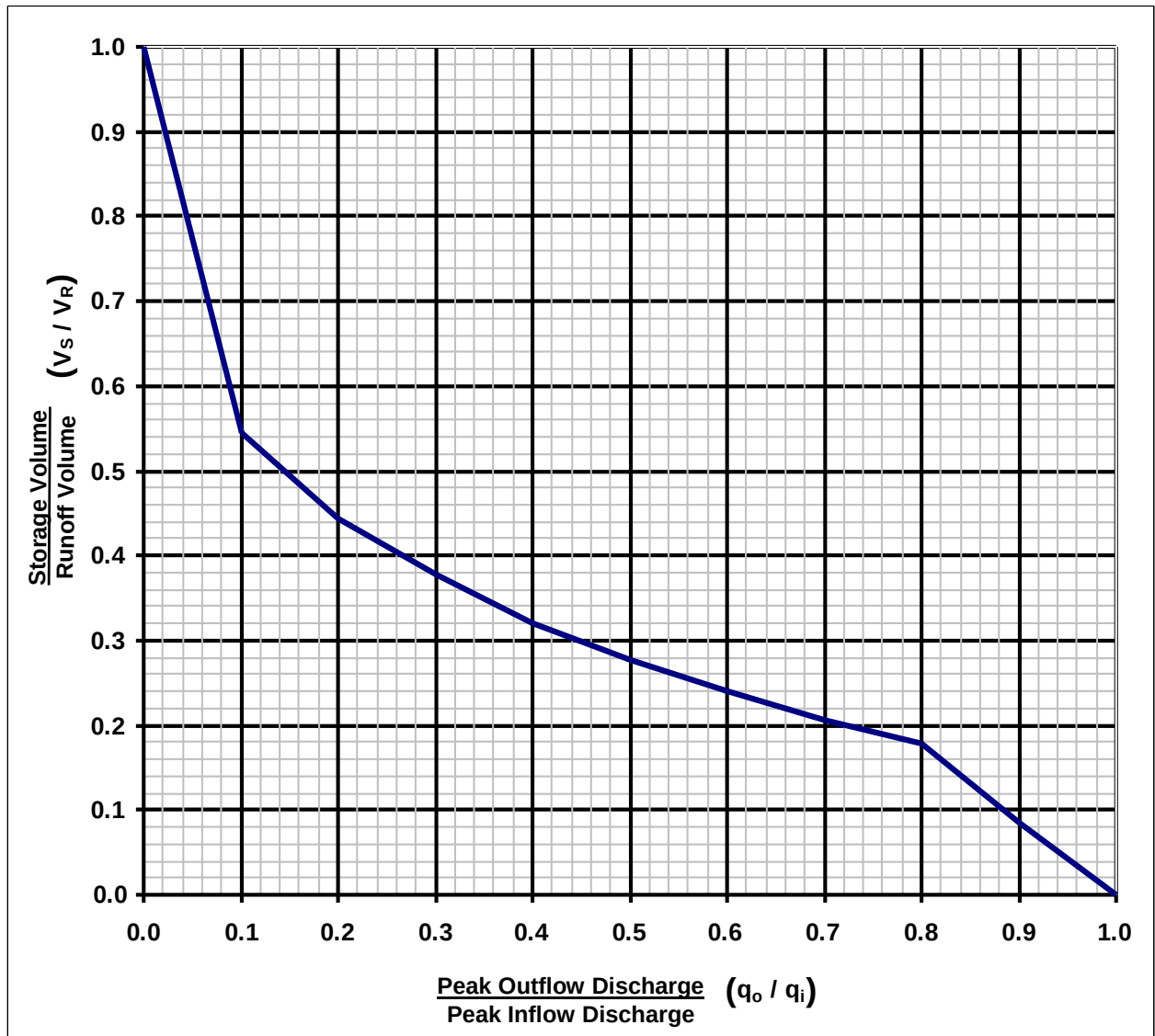


Figure 2:

Approximate Detention Basin Routing for Type II Storms



Source: Technical Release 55, United States Department of Agriculture, Natural Resources Conservation Service. Washington D.C. 1988.

Rainfall Quantities:

Table 1 provides a summary of the 1-year, 24-hour rainfall totals using NRCS mandated TP-40 which has not been updated since 1961. Table 2 provides a summary of more current data from the Rainfall Frequency Atlas of the Midwest published in 1992. Local requirements may dictate the use of one dataset over the other.

Table 1 - Rainfall for Wisconsin Counties for a 1 - year, 24 - hour Rainfall¹	
Inches of Rainfall	County
2.1 in.	Door, Florence, Forest, Kewaunee, Marinette, Oconto, Vilas
2.2 in.	Ashland, Bayfield, Brown, Calumet, Douglas, Iron, Langlade, Lincoln, Manitowoc, Menominee, Oneida, Outagamie, Price, Shawano, Sheboygan
2.3 in.	Barron, Burnett, Dodge, Fond du Lac, Green Lake, Marathon, Milwaukee, Ozaukee, Portage, Racine, Rusk, Sawyer, Taylor, Washburn, Washington, Waukesha, Waupaca, Waushara, Winnebago, Wood
2.4 in.	Adams, Chippewa, Clark, Columbia, Dane, Dunn, Eau Claire, Jackson, Jefferson, Juneau, Kenosha, Marquette, Pepin, Pierce, Polk, Rock, St. Croix, Walworth
2.5 in.	Buffalo, Green, Iowa, La Crosse, Monroe, Richland, Sauk, Trempealeau, Vernon
2.6 in.	Crawford, Grant, Lafayette
¹ TP - 40 - Rainfall Frequency Atlas of the United States, U.S. Department of Commerce Weather Bureau.	

Table 2 - Rainfall for Wisconsin Counties for a 1 - year, 24 - hour Rainfall²		
Zone	Inches of Rainfall	County
1	2.22	Douglas, Bayfield, Burnett, Washburn, Sawyer, Polk, Barron, Rusk, Chippewa, Eau Claire
2	2.21	Ashland, Iron, Vilas, Price, Oneida, Taylor, Lincoln, Clark, Marathon
3	1.90	Florence, Forest, Marinette, Langlade, Menominee, Oconto, Door, Shawano
4	2.23	St. Croix, Dunn, Pierce, Pepin, Buffalo, Trempealeau, Jackson, La Crosse, Monroe
5	2.15	Wood, Portage, Waupaca, Juneau, Adams, Waushara, Marquette, Green Lake
6	1.96	Outagamie, Brown, Kewaunee, Winnebago, Calumet, Manitowac, Fond Du Lac, Sheboygan
7	2.25	Vernon, Crawford, Richland, Sauk, Grant, Iowa, Lafayette
8	2.25	Columbia, Dodge, Dane, Jefferson, Green, Rock
9	2.18	Ozaukee, Washington, Waukesha, Milwaukee, Walworth, Racine, Kenosha
² Bulletin 71: Rainfall Frequency Atlas of the Midwest, Midwest Climate Center and Illinois State Water Survey, 1992.		

Attachment 1: Sample Sediment Basin Design Problem

The proper sizing and design of a sediment basin will often require iterative calculations. The technical standard for sizing sediment basins was written to give the designer as much flexibility as possible in designing the basin while meeting water quality requirements. The governing equation relates the surface area of the sediment basin to the outflow and critical particle settling velocity. The larger the sediment basin outflow, the larger the surface area required to settle the particle. As the outflow is reduced, a smaller surface area is required however the required storage volume dictates how small a surface area can become through the storage depth or hydraulic head acting on the outlet.

The particle settling velocities are listed in the standard requiring the designer to either start with a desired outflow based on an outlet size or an estimated starting surface area. The sample equation below starts with an estimated surface area.

Sample Problem:

A 10 acre site is being developed into condos. Eight acres of the site are being disturbed while 2 acres of forest are remaining undisturbed. The dominate soils on the site are silt loam. The 1-year, 24-hour design storm is 2.25 inches.

Step 1: Calculate runoff volume and peak using TR-55 or approved method.

From TR-55 the curve number (CN) for the disturbed area is 86 and the CN for the forested area is 55 resulting in a composite CN of 80. Using TR-55, the runoff volume calculated for the 1-year 24-hour design storm is 0.7 inches (0.6 acre-feet for the entire 10-acre site). The time of concentration was calculated as 0.4 hours resulting in a peak flow of 6 cfs.

Step 2: Begin sizing sediment basin using Equation 1. The technical standard lists silt loam under particle class 2 with a settling velocity of 7.3×10^{-5} ft/sec. We are also going to assume a starting surface area of 0.25 acres (10,890 ft²). An alternative approach is to assume an outflow velocity.

$$SA = 1.2 * (q_{out} / v_s)$$

$$\text{Solve for } q_{out}: 10,980 \text{ ft}^2 = 1.2 * (q_{out} / 7.3 \times 10^{-5} \text{ ft/sec})$$

$$q_{out} = 0.67 \text{ cfs}$$

Step 3: Using Figure 2: Approximate Detention Basin Routing for Type II Storms determines the volume of storage (V_s) needed.

$$q_{out} = 0.67 \text{ cfs (calculated in Step 2)}$$

$$q_{in} = 6.0 \text{ cfs (peak flow calculated using TR-55 in Step 1)}$$

$$V_R = 0.6 \text{ acre-feet (volume of runoff calculated using TR-55 in Step 1)}$$

$$q_{out} / q_{in} = 0.67 \text{ cfs} / 6.0 \text{ cfs} = 0.11. \text{ Using Figure 2 with a } q_{out} / q_{in} = 0.11, \text{ the } V_s / V_R \text{ is determined to be 0.54. Therefore the } V_s = 0.54 * 0.6 \text{ acre-feet} = 0.324 \text{ acre-feet (14,113 ft}^3\text{)}$$

Step 4: Check configuration: Calculate maximum head on outlet using surface area and volume.

$$SA = 10,890 \text{ ft}^2 \text{ and a } V_s = 14,113 \text{ ft}^3 \text{ we get a depth (H) of } 1.29 \text{ feet} = 14,113 \text{ ft}^3 / 10,890 \text{ ft}^2$$

Step 5: Size Outlet: Assuming an orifice type outlet calculate the size needed to meet the q_{out} calculated in Step 1 and the H calculated in Step 4.

Using the orifice equation: $q_{out} = C \cdot A \cdot (2gH)^{1/2}$ with $C=0.6$ (coefficient), A = Area = ft^2 , $g = 32.2$, and H = hydraulic head expressed in feet.

$$q_{out} = 0.6 \cdot A \cdot (2 \cdot 32.2 \cdot H)^{1/2} \quad \text{so} \quad 0.66 = 0.6 \cdot A \cdot (2 \cdot 32.2 \cdot 1.29)^{1/2} \quad \text{therefore} \quad A = .12 \text{ ft}^2$$

An area of 0.12 ft^2 corresponds to an orifice outlet of 4.7 inches in diameter.

Step 6: Iteration: While the above solution works, the sediment basin has not been optimally sized and we have an orifice diameter that is not a standard pipe size. An iterative approach can be used to reduce the surface area of the sediment basin and obtain a more common orifice diameter. We can assume a 4-inch orifice since it is close to diameter calculated in Step 5 and we can start with the depth we calculated in Step 4. The iterations below each represent Steps 2 through 5.

Iteration 1:

$q_{out} = 0.43 (H)^{1/2} = 0.43 (1.29)^{1/2} = 0.48 \text{ cfs}$ which is less than the 0.66 cfs calculated in Step 1. Therefore, we can go back to Step 1 and repeat the sizing procedure and downsize the sediment basin.

$$SA = 1.2 \cdot (q_{out} / v_s) = 1.2 \cdot (0.48 \text{ cfs} / 7.3 \cdot 10^{-5} \text{ ft/sec}) = 7,890 \text{ ft}^2$$

Using Figure 2:

$$q_{out} = 0.48 \text{ cfs}$$

$$q_{in} = 6.0 \text{ cfs (peak flow calculated using TR-55 in Step 1)}$$

$$V_R = 0.6 \text{ acre-feet (volume of runoff calculated using TR-55 in Step 1)}$$

$q_{out} / q_{in} = 0.48 \text{ cfs} / 6.0 \text{ cfs} = 0.08$. Using Figure 2 with a $q_{out} / q_{in} = 0.08$, the V_S / V_R is determined to be 0.62. Therefore the $V_S = 0.62 \cdot 0.6 \text{ acre-feet} = 0.372 \text{ acre-feet} (16,204 \text{ ft}^3)$

$$SA = 7,890 \text{ ft}^2 \text{ and a } V_S = 16,204 \text{ ft}^3 \text{ we get a depth (H) of } 2.05 \text{ feet} = 16,204 \text{ ft}^3 / 7,890 \text{ ft}^2$$

$$q_{out} = 0.43 (H)^{1/2} = 0.43 (2.05)^{1/2} = 0.61 \text{ cfs}$$
 which is more than the 0.48 cfs we used so iterate.

Iteration 2:

$$SA = 1.2 \cdot (q_{out} / v_s) = 1.2 \cdot (0.61 \text{ cfs} / 7.3 \cdot 10^{-5} \text{ ft/sec}) = 10,027 \text{ ft}^2$$

Using Figure 2:

$$q_{out} = 0.61 \text{ cfs}$$

$$q_{in} = 6.0 \text{ cfs (peak flow calculated using TR-55 in Step 1)}$$

$$V_R = 0.6 \text{ acre-feet (volume of runoff calculated using TR-55 in Step 1)}$$

$q_{out} / q_{in} = 0.61 \text{ cfs} / 6.0 \text{ cfs} = 0.10$. Using Figure 2 with a $q_{out} / q_{in} = 0.10$, the V_S / V_R is determined to be 0.54. Therefore the $V_S = 0.54 \cdot 0.6 \text{ acre-feet} = 0.324 \text{ acre-feet} (14,113 \text{ ft}^3)$

$$SA = 10,027 \text{ ft}^2 \text{ and a } V_S = 14,113 \text{ ft}^3 \text{ we get a depth (H) of } 1.41 \text{ feet} = 14,113 \text{ ft}^3 / 10,027 \text{ ft}^2$$

$q_{out} = 0.43 (H)^{1/2} = 0.43 (1.41)^{1/2} = 0.51 \text{ cfs}$ which is less than the 0.61 cfs we used so we are OK or we can iterate again until we have q_{out} that are almost identical.

After Iteration 2, we have a sediment basin with a $SA = 10,027 \text{ ft}^2$ and a $V_S = 14,113 \text{ ft}^3$. We have a principal water quality outlet consisting of a 4-inch orifice. This design meets the water quality requirements of the technical standard.

Construction Site Diversion (1066)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

A *temporary*¹ berm or channel constructed across a slope to collect and divert runoff.

II. Purpose

To intercept, divert, and safely convey runoff at construction sites in order to divert clean water away from disturbed areas, or redirect sediment laden waters to an appropriate sediment control facility.

III. Conditions Where Practice Applies

- A. This practice is applicable to construction sites where temporary surface water runoff control or management is needed. Locations and conditions include:
 - 1. Above disturbed areas, to limit runoff onto the site.
 - 2. Across slopes to reduce slope length.
 - 3. Below slopes to divert excess runoff to stabilized outlets.
 - 4. To divert sediment-laden water to sediment control facilities.
 - 5. At or near the perimeter of the construction area to keep sediment from leaving the site.
- B. This standard does not pertain to permanent diversions. Refer to appropriate design criteria and local regulations when designing permanent diversions.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of this practice. This standard does not contain the text of federal, state, or local laws.

V. Criteria

- A. The diversion shall have stable side slopes and shall not be overtopped during a 2-year frequency, 24-hour duration storm. The minimum berm cross section shall be as follows:
 - 1. Side slopes of 2:1 (horizontal:vertical) or flatter.
 - 2. Top width of two feet.
 - 3. Berm height of 1.5 feet.
- B. Sediment-laden runoff from disturbed areas shall be diverted into a sediment control practice. For typical sediment control practices see WDNR Technical Standards Sediment Trap (1063) or Sediment Basin (1065) for design criteria.
- C. When diverting clean water the diversion channel and its outfall shall be immediately *stabilized* for the 2-year frequency, 24-hour duration storm. Build and stabilize clean water diversions before initiating down slope land-disturbing activities.
- D. Diversions shall be protected from damage by construction activities. At all points where diversion berms or channels will be crossed by construction equipment, the diversion shall be stabilized or shaped appropriately. Temporary culverts of adequate capacity may be used.
- E. For diversions that are to serve longer than 30 days, the side slopes including the ridge, and down slope side the diversion shall be stabilized as soon as they are constructed. The diversion channel should be stabilized (i.e. erosion mat) or a larger sediment control practice shall be needed. For diversions serving less than 30 days, the

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

¹ Words in the standard that are shown in italics are described in IX. Definitions. The words are italicized the first time they are used in the text. Definitions apply to concepts found in this document and may not apply in other situations.

down slope side of the diversion shall be stabilized as soon as constructed.

diversion berm. Properly dispose of any sediment removed from the diversion.

VI. Considerations

- A. The channel cross section may be parabolic, v-shaped or trapezoidal. The use of "V" channels is generally discouraged due to potential erosion problems.
- B. Ditch checks may be used to enhance sediment removal. Ditch checks shall be designed in accordance with WDNR Technical Standard Ditch Check (1062).
- C. For diversion berms consider designing an emergency overflow section or bypass area to limit damage from storms that exceed the 2-year frequency 24-hour duration storm. The overflow section may be designed as a stabilized weir with riprap protection.

- D. Diversions shall be removed and the area stabilized according to construction plans.

IX. Definitions

Temporary (I): an erosion control measure that is utilized during construction and grading operations prior to final stabilization.

Stabilized (V.C): means protecting exposed soil from erosion.

VII. Plans and Specifications

- A. Plans and specifications for installing diversions shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall address the following:
 - 1. Diversion location.
 - 2. Channel grade or elevations.
 - 3. Typical cross section.
 - 4. Channel stabilization if required.
- B. All plans, standard detail drawings, or specifications shall include schedule for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

- A. Diversions shall, at a minimum, be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.
- B. Maintenance shall be completed as soon as possible with consideration to site conditions.
- C. Accumulated sediment shall be removed when it reaches one half the height of the

Temporary Grading Practices For Erosion Control

(Surface Roughening and Temporary Ditch Sumps)
(1067)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

*Temporary*¹ grading practices used to minimize construction site erosion. These practices include, but are not limited to surface roughening (directional tracking and tillage) and temporary ditch sumps.

II. Purpose

The purpose of these practices are to minimize erosion and sediment transport during grading operations on construction sites.

III. Conditions Where Practice Applies

These practices apply where land disturbing activities occur on construction sites. These practices shall be used in conjunction with other erosion control practices.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing these practices. This standard does not contain the text of federal, state, or local laws.

V. Criteria

These interim practices may be employed in addition to the approved grading plan to reduce erosion and sediment transport.

- A. Surface Roughening - Surface roughening is abrading the soil surface with horizontal ridges and depressions across the slope to reduce runoff velocities.
1. Directional Tracking - The process of creating ridges with tracked vehicles on unvegetated slopes. This method is used for short durations on sites actively being graded and shall be used in

conjunction with other practices. This practice shall be in place at the end of each workday.

Directional tracking involves driving a tracked vehicle up and down a slope. The tracks create horizontal grooves and ridges. The rough surface slows sheet runoff and helps to prevent rills from forming. (Conversely, if the tracked vehicle is driven along the contour the tracks create vertical grooves and ridges for the water to follow, increasing erosion.)

2. Tillage - Utilizing conventional tillage equipment to create a series of ridges and furrows on the contour no more than 15 inches apart.

- B. Temporary Ditch Sump - Temporary ditch sumps are ½ to 5 cubic yard excavations made in a drainageway during earthmoving operations. Their purpose is to slow and pond runoff during the time that drainageways are being graded. Sumps shall be in place prior to anticipated rain events.

Construction involves excavating sumps (holes) in the rough ditch grade, and using the excavated material to form a dike on the downstream side of the sump.

Temporary ditch sumps are not effective perimeter controls. Other sediment control practices shall be utilized prior to channels discharging into public waterways.

VI. Considerations

- A. Directional tracking may compact the soil, therefore additional seedbed preparation may be required. Refer to WDNR Technical Standard Seeding for

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

Construction Site Erosion Control (1059) for seedbed preparation and seeding criteria.

- B. When constructing a temporary ditch sump, compacting the dike provides additional stability.
- C. Consider at a minimum excavating ½ cubic yard per 1% gradient, for every 500 feet of channel when constructing temporary ditch sumps

VII. Plans and Specifications

Due to the interim nature of these practices, and the fact that location determinations are made in the field, they need only be referenced in the erosion control plan narration or general notes.

VIII. Operation and Maintenance

These practices shall be inspected and repaired or reinstalled after every runoff event.

IX. References

Virginia Department of Conservation and Recreation. 1992. Virginia Erosion and Sediment Control Handbook, Third Edition. Chapter 3 – 3.29 Surface Roughening.

Dane County. 2002. Dane County Erosion Control and Stormwater Manual, First Edition. Appendix Surface Roughening S-16.1.

X. Definitions

Temporary (I): An erosion control measure that is utilized during construction site grading activities.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
DUST CONTROL ON CONSTRUCTION SITES
1068

DEFINITION

Dust control includes practices used to reduce or prevent the surface and air transport of dust during construction.

Dust control measures for construction activities include minimization of soil disturbance, applying mulch and establishing vegetation, water spraying, surface roughening, applying additives (polymers), spray-on tackifiers, chlorides, and barriers.

PURPOSE

This practice may be used to:

- (1) Reduce wind erosion and dust.
- (2) Minimize deposition of dust and wind transported soils into water bodies through runoff or wind action.
- (3) Reduce respiratory problems.
- (4) Minimize low visibility conditions caused by airborne dust.

CONDITIONS WHERE PRACTICE APPLIES

Dust control measures may be applied at any construction site, but is particularly important for sites with dry exposed soils which may be exposed to wind or vehicular traffic.

CRITERIA

Comply with applicable federal, state and local laws, rules, regulations or permit requirements governing this practice. This standard does not contain the text of federal, state, or local laws.

This section establishes the minimum standards for design, installation and performance requirements.

Limit the area exposed for dust generation prior to implementing dust control practices.

Asphalt and petroleum based products cannot be used for dust control.

Mulch and Vegetation. Mulch or seed and mulch may be applied to protect exposed soil from both wind and water erosion. Refer to WDNR Technical Standards Mulching for Construction Sites (1058) and Seeding for Construction Site Erosion Control (1059) for criteria.

Water. Water until the surface is wet and repeat as needed. Water at rates so that runoff does not occur. Provide a stone tracking pad or tire washing station at treated soil surfaces that receive vehicle traffic. Refer to WDNR Technical Standard Stone Tracking Pad and Tire Washing (1057) for criteria.

Tillage. Tillage can be used as a control measure performed with chisel type plows on exposed soils. Begin tillage on the windward side of the site. Tillage is only applicable to flat areas.

Additives. Additives can be an effective practice for areas that do not receive vehicle traffic. Initially apply water to additives for activation to be effective for dust control. Refer to WDNR Technical Standard 1050 - Land Applied Additives for Erosion Control for application criteria.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

WDNR
November 2017

Tackifiers and Soil Stabilizers Type A. Select products and install at rates conforming to the WisDOT Erosion Control Product Acceptability List (PAL). Examples include vegetable based products such as natural Latex or Guar Gum.

Chlorides. Apply chlorides according to the most recent version of the WisDOT Standard Specifications for Highway and Bridge Construction.

Barriers. Place barriers at right angles to prevailing wind currents at intervals of about 15 times the barrier height. Solid board fences, snow fences, burlap fences, crate walls, bales of hay and similar material can be used to control air currents and blown soil.

CONSIDERATIONS

Some sites may require an approach that utilizes a combination of measures for dust control.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for dust control practices in keeping with this standard and to describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

Inspect daily areas that have dust control practices.

REFERENCES

WisDOT's Erosion Control Product Acceptability List (PAL) can be found on the WisDOT web site:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

Printed copies are no longer being distributed.

Turbidity Barrier (1069)

Wisconsin Department of Natural Resources
Technical Standard

I. Definition

A temporary fabric barrier with very low permeability, installed in or near the bed of a waterway or waterbody to minimize sediment transport and is installed parallel to flow. Turbidity barrier cannot be installed perpendicular to a moving channel.

II. Purposes

The purpose of this practice is to provide sediment containment while construction activities are occurring in or directly adjacent to a waterway or waterbody.

III. Conditions Where Practice Applies

This practice applies where construction activities intrude or are directly adjacent to a waterway or waterbody. This includes but is not limited to bridge construction, rip rap placement, utility work, streambank restoration, boat launches and dredging.

Use turbidity barriers in conditions with fine soils and flow velocities not exceeding 5 feet per second, unless additional reinforcement is installed.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of turbidity barriers. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.

A. Installation – Details of construction not listed in the text shall conform to the pertinent requirements of Figures 1 and 2.

1. The barrier shall be installed before construction activities are initiated in, or

adjacent to the waterway or waterbody. Install the turbidity barrier as close to the construction as practical. The barrier shall remain in place and be maintained until the construction activity is completed and the disturbed area *stabilized*¹.

2. The ends of the barrier shall be securely anchored and keyed into the shoreline to fully enclose the area where sediment may enter the water.
3. Driven steel posts shall be used to hold the barrier in position. The maximum spacing between posts shall be 10 feet. When barrier height exceeds 8 feet, post spacing may need to be decreased.

When bedrock prevents the installation of posts, float devices may be used. Flotation devices shall be flexible, buoyant units contained in an individual flotation sleeve or collar attached to the turbidity barrier. Use solid expanded polystyrene logs or equivalent having a 49 square inch minimum end area. Do not use polystyrene beads or chips. Buoyancy provided by the flotation devices shall be sufficient to support the weight of the turbidity barrier and maintain a freeboard of at least three inches above the water surface. Refer to Figure 1.

4. The barrier and steel posts shall extend from the bottom of the waterway or waterbody to an elevation 2 feet above the anticipated high water level during the time of year and duration the barrier will be in place. The elevation shall not exceed the top of bank.
5. Ballast shall be used to hold the barrier in a vertical position. Bottom load lines shall consist of a chain incorporated into the bottom hem of the screen, of sufficient weight to serve as ballast to hold the screen in a vertical position. Additional anchorage shall be provided if necessary.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI.

¹ Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

6. Danger buoys shall be used as directed by the Coast Guard or DNR permit when working in navigable waters.
7. Turbidity barriers shall be installed parallel to the direction of flow and shall not be installed across channels.

B. Material

1. Reusable components of the turbidity barrier system shall be clean and free of potential exotic species. Fabric cannot be reused.
2. Top load lines shall consist of 5/16 inch steel cable.
3. Fabric shall be selected according to the specifications in Table 1.

Table 1

Requirement	Method	Value
Min. grab tensile strength	ASTM D 4632	200 lb (890 N)
Min. puncture strength	ASTM D 4833	90 lb (400 N)
Maximum permeability	ASTM D 4491	$\leq 1 \times 10^{-7}$ cm/s
Min. ultraviolet stability	ASTM D 4355	70%

Source: WisDOT Spec 628.2.10.

VI. Considerations

- A. The 5 feet per second flow velocity specified in Section III can be the base flow of the stream or the base flow plus the addition of storm event runoff. Base flow can be used alone for short term projects (typically one day duration, i.e. culvert installation) when the chance of precipitation is low. Longer term projects (i.e. bridge work) should consider storm flow in addition to base flow (typically the two year event).
- B. If the current exceeds 5 feet per second, other methods to divert flow away from the turbidity barrier such as temporary concrete traffic barriers, coffer dams, pumping, or sheet piling should be considered.
- C. Sediment that has been settled out by the turbidity barrier should only be removed if so directed by the regulatory authority because re-

suspension of sediment will likely occur during the removal process. Use of polymers may help prevent resuspension of sediment. See WDNR Technical Standard 1051 Sediment Control Water Application of Polymers for further guidance.

- D. Turbidity barriers are meant to manage sediment in the waterbody. The best way to prevent sediment from entering the waterbody is through the implementation of effective upland erosion control, stopping sediment transport at its source.
- E. Turbidity barriers should not be used to reduce the conveyance capacity of the channel. An example is use on bridge projects where the turbidity barrier is installed adjacent to each abutment simultaneously.
- F. Turbidity barriers may be installed on the banks of a waterway or waterbody if higher water levels are anticipated during construction.

VII. Plans and Specifications

Plans and specifications for installing a turbidity barrier shall be in keeping with this standard and attached detail drawing and shall describe the requirements for applying the practice to achieve its intended purpose:

- A. Location of turbidity barrier.
- B. Material specification conforming to standard.
- C. All plans, standard detail drawings, or specifications shall include schedule sequence or notes for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

- A. Turbidity barriers shall be inspected daily and repaired if necessary.
- B. Turbidity barriers shall not be removed until the water behind the barrier has equal or greater clarity than the waterway or waterbody.
- C. Care shall be taken when removing the barrier to minimize the release or re-suspension of accumulated sediment.
- D. To prevent the spread of exotic species turbidity barriers shall not be reused on other sites. Buoys

and chains can be reused but shall be either disinfected with vinegar or cleaned with hot water greater than 104 deg. F then allowed to completely dry for a minimum period of five days. If there are any questions about the occurrence of zebra mussels, Eurasian water-milfoil, or other aquatic invasive species in a waterbody that you are working in, or intend to work in, contact your local DNR staff.

IX. References

WisDOT Facilities Development Manual: Chapter 10, Section 10, Subject 45, Turbidity Barrier

X. Definitions

Stabilized (V.A.1): Means that all land disturbing construction activities at the construction site have been completed, and that a uniform perennial vegetative cover has been established with a density of at least 70% of the cover for the unpaved areas and areas not covered by permanent structures, or that employ equivalent stabilization measures.

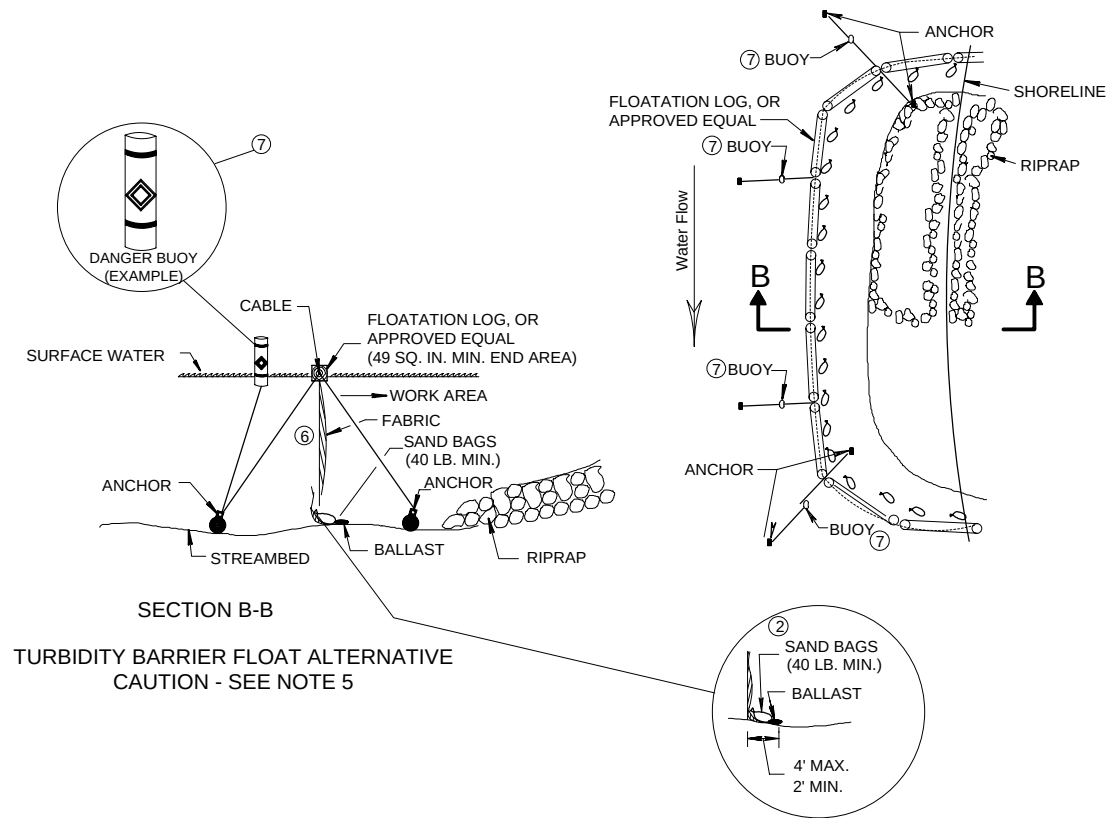
Figure 1. Turbidity Barrier Placement Details

GENERAL NOTES

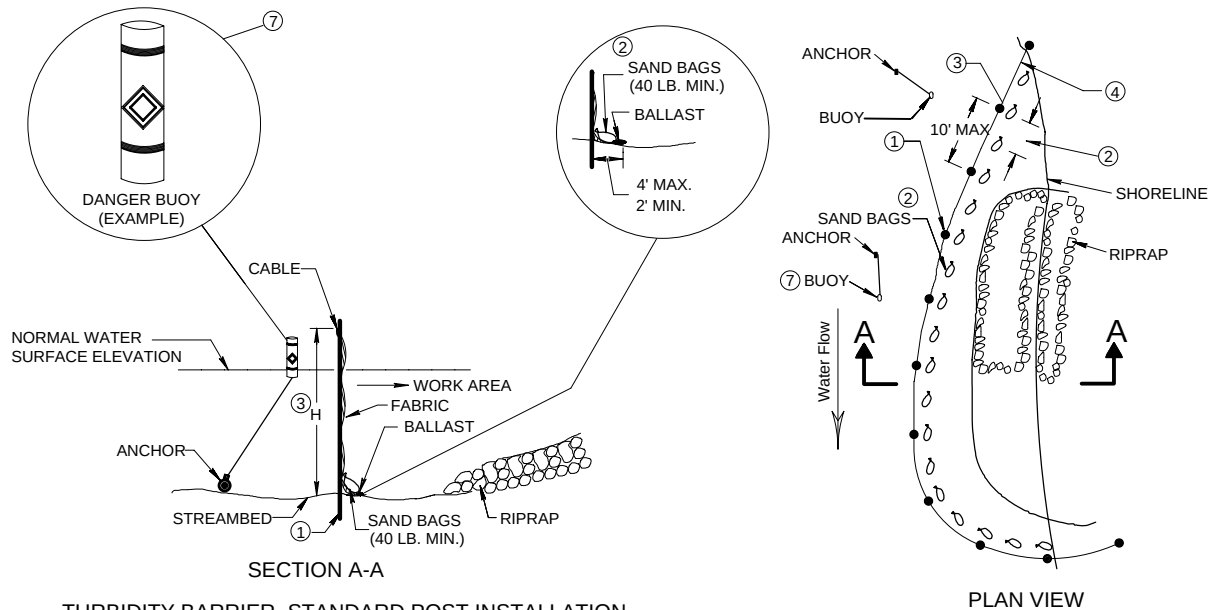
DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD AND THE APPLICABLE SPECIAL PROVISIONS

TURBIDITY BARRIER MAY BE REMOVED AT THE ENGINEERS OR PROJECT MANAGERS DISCRETION, WHEN PERMANENT EROSION CONTROL MEASURES HAVE BEEN ESTABLISHED.

- ① DRIVEN STEEL POSTS, PIPES, OR CHANNELS. LENGTH SHALL BE SUFFICIENT TO SECURELY SUPPORT BARRIER AT HIGH WATER ELEVATIONS.
- ② SANDBAGS TO BE USED AS ADDITIONAL BALLAST WHEN ORDERED BY THE ENGINEER OR PROJECT MANAGER TO MEET ADVERSE FIELD CONDITIONS. SPACE AS APPROPRIATE FOR SITE CONDITIONS.
- ③ WHEN BARRIER HEIGHT, H, EXCEEDS 8 FT., POST SPACING MAY NEED TO BE DECREASED.
- ④ IN WATERWAYS SUBJECT TO FLUCTUATING WATER ELEVATIONS, PROVISIONS SHOULD BE MADE TO ALLOW THE WATER TO EQUALIZE ON EACH SIDE OF THE BARRIER. THIS MAY BE ACCOMPLISHED BY LEAVING A PORTION OF THE BARRIER OPEN ON THE UPSTREAM END.
- ⑤ FLOAT ALTERNATIVE WILL ONLY BE ALLOWED WITH WRITTEN APPROVAL OF THE ENGINEER OR PROJECT MANAGER, AND IS MEANT FOR LOCATIONS WHERE BED ROCK PREVENTS THE INSTALLATION OF POSTS.
- ⑥ ALLOW SUFFICIENT SLACK VERTICALLY AND HORIZONTALLY SO THAT SEDIMENT BUILD UP WILL NOT SEPARATE OR LOWER THE TURBIDITY BARRIER.
- ⑦ USE AS DIRECTED BY COAST GUARD OR DNR PERMIT WHEN WORKING IN NAVIGABLE WATERWAYS.

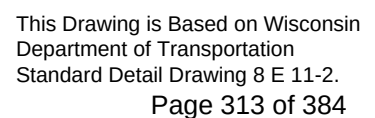


TURBIDITY BARRIER FLOAT ALTERNATIVE
CAUTION - SEE NOTE 5



NOT TO SCALE

FLOAT ALTERNATIVE WILL ONLY BE ALLOWED WITH WRITTEN APPROVAL OF THE ENGINEER OR PROJECT MANAGER AND IS MEANT FOR LOCATIONS WHERE BEDROCK PREVENTS THE INSTALLATION OF POSTS.



Silt Curtain (1070)

Wisconsin Department of Natural Resources Technical Standard

I. Definition

A temporary permeable fabric installed in a waterway or waterbody to minimize sediment transport. A silt curtain does not extend to the bottom of the channel and is placed parallel or perpendicular to the direction of flow.

II. Purposes

The purpose of this practice is to provide sediment containment while construction activities are occurring in or directly adjacent to a waterway or waterbody.

III. Conditions Where Practice Applies

This practice applies where construction activities intrude or are directly adjacent to a waterway or waterbody. This includes but is not limited to bridge construction, rip rap placement, utility work, streambank restoration, boat launches and dredging.

Silt curtain is intended for calm water conditions where it will not be subjected to wind, wave, or current. Silt curtains are appropriate to settle out coarse and granular soils where water depth at the time of construction is greater than or equal to 4 feet. For applications in finer sediment or moving water see WDNR Technical Standard 1069 Turbidity Barrier.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of silt curtains. This standard does not contain the text of federal, state, or local laws.

V. Criteria

This section establishes the minimum standards for design, installation and performance requirements.

A. Installation – Details of construction not listed in the text shall conform to the pertinent requirements of Figure 1.

1. The silt curtain shall be installed before construction activities are initiated in or adjacent to the waterway or waterbody. Install the silt curtain as close to the construction as practical. The curtain shall remain in place and be maintained until the construction activity is completed and the disturbed area is *stabilized*¹.
2. The ends of the silt curtain shall be securely anchored and keyed into the shoreline to fully enclose the area where sediment may enter the water.
3. A 2-foot gap shall exist between the weighted lower end of the curtain and the bottom of the waterway or waterbody.
4. Bottom anchors shall be used to hold the silt curtain in the same position relative to the bottom the waterway or waterbody without interfering with the function of the curtain. Anchors shall either be driven into the bottom of the waterway or waterbody or be weighted and attached to the curtain floatation device via an anchor line. Manufacturer's recommendations shall be followed for the number and spacing of anchors.
5. Danger buoys shall be used as directed by the Coast Guard or DNR permit when working in navigable waters.

B. Material:

1. Reusable components of the silt curtain system shall be clean and free of potential exotic species. Fabric cannot be reused.
2. The silt curtain shall be constructed from heavy woven filter fabric to allow water to pass through the barrier yet retain sediment.

All fabric seams shall be heat sealed or sewn. Silt curtain fabric shall conform to the specifications in Table 1.

Table 1

Requirement	Value
Thickness	15 mils (0.38 mm)
Min. grab tensile strength (ASTM D 4632)	120 lb (550 N)
Min. equivalent opening	No. 170 sieve (90 µm)

3. Floatation devices shall be flexible, buoyant units contained in an individual floatation sleeve or collar attached to the curtain. Use expanded polystyrene logs or equivalent having a 49 square inch minimum end area. Do not use polystyrene beads or chips. Buoyancy provided by the floatation device shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3 inches above the water surface level.
4. Top load lines shall consist of 5/16 inch steel cable.
5. Bottom load lines shall consist of a minimum ¼-inch steel chain incorporated into the bottom hem of the curtain. Larger chain sizes may be used where additional weight to serve as ballast to hold the curtain in a vertical position is required.

VI. Considerations

- A. Sediment that has settled out by the silt curtain should only be removed as directed by the regulatory authority because re-suspension of sediment will likely occur during the removal process. Use of polymers may help prevent resuspension of sediment. See WDNR Technical Standard 1051 Sediment Control Water Application of Polymers for further guidance.
- B. Silt curtains are meant to manage sediment in the waterbody. The best way to prevent sediment from entering the waterbody is through the implementation of effective upland erosion control, stopping sediment transport at its source.

VII. Plans and Specifications

Plans and specifications for installing a silt curtain shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose:

- A. Location of silt curtain.
- B. Material specification conforming to standard.
- C. All plans, standard detail drawings, or specifications shall include schedule for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

- A. Silt curtains shall be inspected daily and repaired if necessary.
- B. Regardless of upland stabilization conditions silt curtains shall not be removed until the water behind the curtain has equal or greater clarity than the waterway or waterbody. Soil particles shall be allowed to settle for a minimum of 24 hours prior to removal of the curtain.
- C. Care shall be taken when removing the silt curtain to minimize the release or re-suspension of accumulated sediment.
- D. To prevent the spread of exotic species silt curtains shall not be reused on other sites. Bouys and chains can be reused but shall be either disinfected with vinegar or cleaned with hot water greater than 104 deg. F then allowed to completely dry for a minimum period of five days. If there are any questions about the occurrence of zebra mussels, Eurasian water-milfoil, or other aquatic invasive species in a waterbody that you are working in or intend to work in contact your local DNR staff.

IX. References

Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.

WisDOT Facilities Development Manual: Chapter 10, Section 10, Subject 43, Silt Screen.

X. Definitions

Stabilized (V.A.1): Means that all land disturbing construction activities at the construction site have been completed, and that a uniform perennial vegetative cover has been established with a density of at least 70% of the cover for the unpaved areas and areas not covered by permanent structures, or that employ equivalent stabilization measures.

NOT TO SCALE

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD AND THE APPLICABLE SPECIAL PROVISIONS

- ① 2' SHALL BE MAINTAINED DURING CONSTRUCTION PERIOD
- ② USE AS DIRECTED BY COAST GUARD OR WDNR PERMIT WHEN WORKING IN NAVIGABLE WATERWAYS

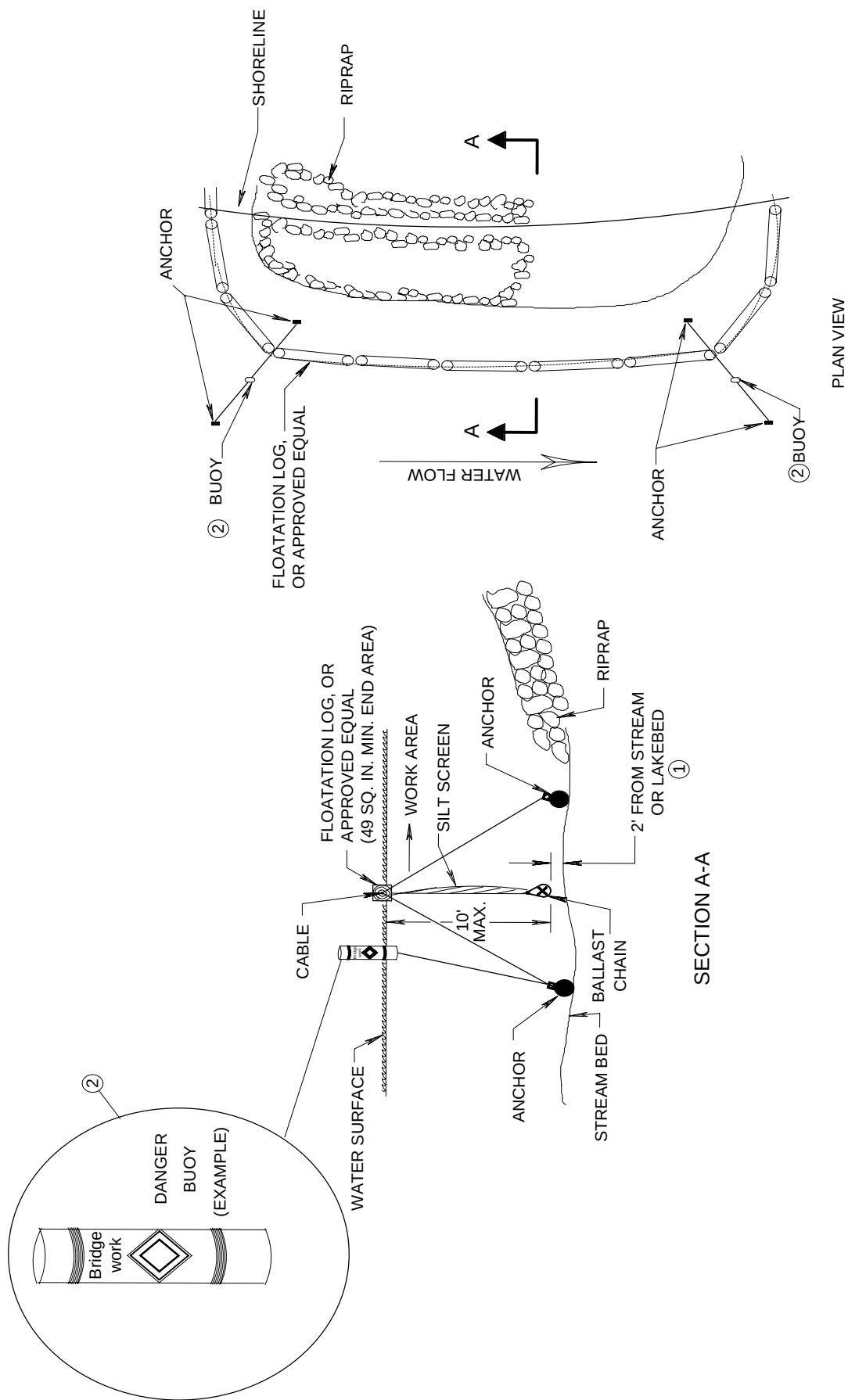


FIGURE 1. SILT CURTAIN PLACEMENT DETAIL

This drawing based on Wisconsin
Department of Transportation
Standard Detail Drawing 8 E 12-1.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
HORIZONTAL DIRECTIONAL DRILLING
1072

DEFINITION

*Horizontal directional drilling (HDD)*¹ is a trenchless method of installing underground utilities such as pipeline, conduit, or cable, using a surface-launched drilling rig. HDD is often used to avoid or minimize impacts to *wetlands*, *waterways*, *roads*, and other surface features.

PURPOSE

This technical standard identifies practices to protect water quality by reducing sediment discharge from work areas, reduce potential for runoff to carry construction materials into waters of the state, and clarifying expectations for spill prevention and response procedures that are relevant to HDD construction methods. This includes practices to reduce the risk of runoff carrying *drilling fluid* from *inadvertent releases (IRs)*, also known as a frac-out or inadvertent return, to *water resources* through prevention and response planning. This technical standard has been developed as provided in subchapter V of ch. NR 151, Wis. Adm. Code. This technical standard is not intended to provide comprehensive design guidance for all engineering and environmental considerations related to HDD.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to *drill paths* within projects using HDD as an installation method. Within this standard, *drill path segment* is used to reference a specific instance where HDD is used within a project. *HDD project* is used to refer to a larger project that may contain multiple drill path segments. Some drill path segments within a project may require more practices than others based on the presence or absence of resources and risk factors.

For HDD projects where only air is used, this standard does not apply.

This standard does not apply to installation of *service laterals* or *convenience drills* that are 6 inches or less in *product diameter* and less than or equal to 200 feet long.

CRITERIA

General Criteria

Laws and Regulations. Comply with applicable federal, tribal, state, and local laws, rules, regulations, or permit requirements including but not limited to those relating to HDD, ground water quality protection, safety, spills, cultural resources, invasive species, threatened or endangered species, wetland impacts, waterway impacts, waste disposal, and wastewater disposal. This standard does not contain the text of federal, tribal, state, or local laws and regulations.

Other Technical Standards. Follow other site erosion and sediment control technical standards, such as dewatering, that are applicable to HDD projects.

Organization of Criteria. Actions and documentation are described below in order of design development stage. Initial Design Criteria actions are intended to be completed during the very early stages of project development. Plan Development Criteria actions should be completed prior to

¹ Words in the standard that are shown in italics are described in the Glossary section. The words are italicized the first time they are used in the text.

submitting for permits for large drill paths and prior to the pre-construction meeting for medium and small drill paths. The actions are numbered sequentially for ease of reference.

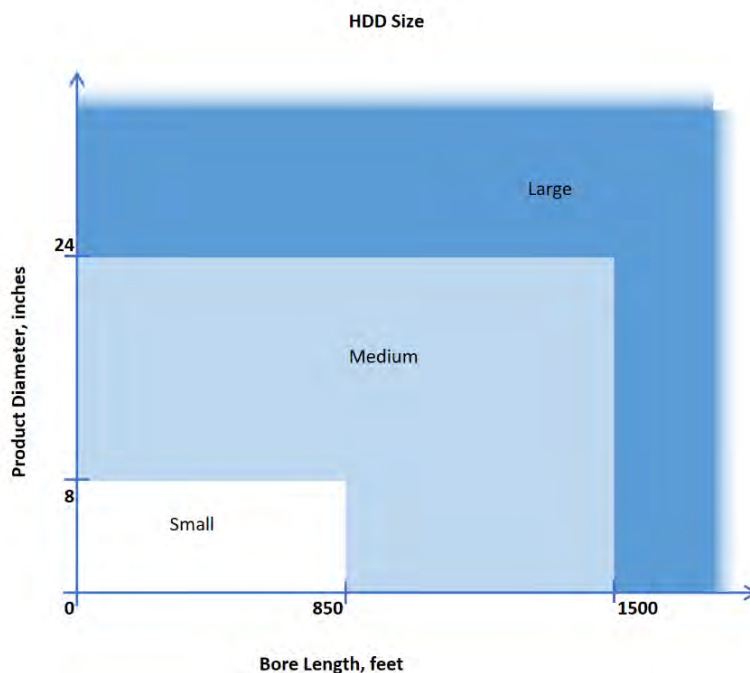
Attachment 1 contains criteria applicability matrices by drill path size. Please note that additional actions may be required where the length of the drill path moves it into the medium or large size category. Attachment 2 contains figures depicting typical HDD installation elements.

Dimensions. For purposes of this HDD technical standard, drill paths are classified as small, medium, or large in size as follows:

Small: Drill paths with *product diameter* of 8 inches or less, and drill path length measured in the horizontal plane or station distance of 850 feet or less.

Medium: Drill paths with product diameter less than 24 inches, and drill path length measured in the horizontal plane or station distance less than or equal to 1500 feet. Drill paths with a product diameter of 8 inches or less are considered medium if the length of the drill path exceeds 850 feet but is less than or equal to 1500 feet.

Large: Drill paths with product diameter of 24 inches or greater for any length, or drill path length measured in the horizontal plane or station distance greater than 1500 feet for any product diameter. Drill paths with a product diameter less than 24 inches are considered large if the drill path length exceeds 1500 feet.



Minimum Cover. Provide minimum cover listed in Table 1 unless there are site-specific design justifications for water resource crossings. Cover is measured from the top of the finished product to the bed or bank of a *navigable water or the soil surface* of wetlands and other waters of the state.

Table 1 Minimum Depth of Cover under Water Resources	
Product Diameter (in)	Depth of Cover (ft)*
≤ 6	4
≤ 15	6
≤ 24	10
> 24	15

*Minimum cover is to reduce risk of IR. More cover may be needed to prevent future pipe exposure due to erosion or scour or in floodways or dredging in navigation channels.

Drilling Fluid. Use water from a known safe source free of bacterial and chemical contamination. The water used for drilling shall be stored in such a manner as to prevent contamination of the clean water. Document the source of water used to produce drilling fluids.

Unless prior WDNR approval is granted, use only products included in the Wisconsin Department of Natural Resource Approved Drilling and Filling Sealing Products List (including Heat Exchange Drillhole

Products), the NSF/ANSI/CAN 60: Drinking Water Treatment Chemicals – Health Effects program, or the Wisconsin Department of Natural Resources Approved HDD Drilling Fluid Products. Links to these lists are provided in the References section. Follow any use restrictions listed for those products or specified by WDNR during pre-approval. Non-petrochemical-based, non-hazardous additives that are not on the referenced lists may be submitted to the WDNR for prior approval per the process described on the Approved HDD Drilling Fluid Products list.

Initial Design Criteria

- (1) **Desktop Site Assessment.** Conduct the following desktop reviews for the *HDD site* as part of initial design to identify water resources, potential constraints, and challenging slope or soil conditions. The desktop site assessment is intended to identify conditions that may elevate IR risk, reduce the need for field modifications, and confirm the extent of the HDD site for the purposes of erosion and sediment control.
 - (a) **Water Resources** – Complete a desktop review using the following data sets which may be accessed via the WDNR’s Surface Water Data Viewer (SWDV) tool (see References section) to identify all navigable waters and wetlands in the project area. For medium and large drill paths, note any resources that may be classified as *key wetland types*, *Areas of Special Natural Resources Interest (ASNRI) waters*, or navigable waters:
 1. Identify navigable waters for all drill paths. All waterways mapped in the WDNR 24K Hydrography Lakes and Open Water layer, 24K Hydrography Streams and Rivers layer, and any additional surface waters that are visible on aerial photos (leaf off is preferred), should be identified and presumed navigable unless determined non-navigable by WDNR through a navigability determination. If using the WDNR SWDV turn on the Surface Water layer. Under the Surface Water layer, the 24K Hydrography Lakes and Open Waters and 24K Hydrography Streams and Rivers sublayers should be reviewed. In addition, review available aerial photos to identify additional surface waters not identified in the SWDV layers.
 2. For small drill paths that are part of a larger project that has more than 1 acre of land disturbing construction activity, identify Outstanding Resource Waters (ORW) and Exceptional Resource Waters (ERW). If using the WDNR SWDV, turn on the Clean Water Act Standards & Uses Waterways layer, and review the OERW Waters sublayer and the Tribal OERW sublayer.
 3. For medium and large drill paths, identify ASNRI waters, noting any waters that are also designated as ORWs or ERWs:

If using the WDNR SWDV, turn on the Priority Navigable Waterways layer, and review the ASNRI sublayer. Note that the Other Priority Navigable Waterways sublayer should be turned off for this review.
 4. For all drill paths, note any indicators of past dredging or scour in waterways visible on topographic maps and aerial photos. Indicators of past dredging include recently scraped soil and abrupt changes in vegetation growth. Indicators of scour and streambed instability include steep eroded banks, perched culverts, and exposed foundations.
 5. For small drill paths that are part of a larger project that has more than 1 acre of land disturbing construction activity, medium drill paths, and large drill paths, complete a desktop review using the following data sets to identify all wetlands in the project area.
 - a. **Identify All Wetlands.**

All wetlands mapped in the Wisconsin Wetland Inventory as well as all areas mapped in the Wetland Indicators & Soils layer are conservatively assumed to be wetland unless the area is either covered by existing impervious

surface or is documented as upland consistent with existing regulatory coordination processes.

- i. If using the WDNR SWDV, turn on the Mapped Wetlands layer and review the Wisconsin Wetland Inventory sublayers. Next turn on the Wetland Indicators & Soils layer and review the Wetland Indicators sublayer. Finally, review available aerial photos to identify additional wetlands not identified in the SWDV layers. Additional guidance regarding wetland review is listed in the References section.
- ii. If a wetland delineation was already completed and concurred with by the WDNR, then utilize the wetland boundaries identified in the wetland delineation for this review in place of the conservative desktop site assessment described in section i. above.

b. Identify Key Wetland Types.

For medium and large drill paths for which key wetland types have not been identified during a wetland delineation and/or field reviews by qualified staff, complete the following to conservatively identify key wetland types:

- i. Wild rice areas, as mapped in the WDNR SWDV, Wild Rice Waters layer. Mapped wetlands located contiguous to the mapped wild rice areas are assumed to be key wetland types.
- ii. Wetlands within townships for which a National Heritage Inventory (NHI) review has identified an element occurrence of Great Lakes Ridge and Swale wetlands, interdunal wetlands, or coastal plain marshes. These typically occur in the following counties: Adams, Ashland, Brown, Douglas, Door, Jackson, Manitowoc, Marquette, Sheboygan, and Waushara.
- iii. Peat soils, as mapped in the NRCS soil survey, in project areas located outside of a road right-of-way. These are areas that may contain southern sphagnum bogs, boreal rich fens or calcareous fens.
- iv. Areas that are actively farmed in row crop. Key wetland types are assumed to not be present in row crop areas.

6. Note drainage features such as storm sewers, storm sewer inlets, culverts and swales along the drill path that provide connectivity to water resources and are visible on aerial photos.

- (b) **Constructability** – Review available resources (such as existing maps, interviews, Digger's Hotline planning locate, aerial imagery, county geographic information system (GIS) resources, etc.) to locate existing utilities, existing roads and right of way, topography, property boundaries, cultural resources, and other potential constraints. Include notes from review in project design documentation. Confirm conditions in the field as needed due to unclear desktop information.

During constructability review:

1. Verify access and space allocation for all elements of the HDD site, including space required for erosion and sediment control practices. Review drill path to confirm that proposed work can be completed within existing or proposed easements, fee ownership, or public right of way while minimizing impacts to *other protected resources*. Note land use adjacent to the drill path and known use restrictions.
2. Identify existing and proposed facilities within the project vicinity.
3. Verify required vertical and horizontal separation from existing and proposed facilities with existing facility owners to ensure construction crews can maintain

appropriate distances during installation, as separation requirements may be more restrictive than equipment or installation tolerances.

4. Review topography, visible geology, steep slopes, and signs of slope instability such as slumping.
5. Note any barriers to visual and physical access to drill path segments for IR monitoring or response. Note areas where tree removal within a wooded wetland may be required for IR monitoring or response but not otherwise required for the project.

(c) **Subsurface Conditions** – For medium and large drill paths, use existing subsurface condition information from previous site experience, historical borings, soil mapping services, and other sources (see References section) to determine soil and bedrock type and conditions. Note the presence of any of the following characteristics along the drill path route within application materials for any applicable permits:

1. Cobbles and boulders;
2. High gravel content;
3. Peat and/or muck soils;
4. Karst features and/or highly fractured bedrock;
5. Known or suspected artesian aquifers;
6. Shallow groundwater; and
7. Shallow bedrock.

(2) **Geotechnical Investigation.** For medium or large drill path segments, collect geotechnical information at the proposed drill path location, or utilize previous site experience or historical geotechnical data. For on-site work, perform soil borings, soil pits and/or rock coring to identify in-situ, site-specific soil, bedrock, and depth to groundwater information. Lab-test samples if needed for additional classification, such as soil gradations and gravel percentages. Offset the geotechnical boring locations from the proposed drill path in order to avoid a potential conduit for IRs. Existing soil boring information may be used if it extends at least as deep as the proposed drill path and is within a reasonable distance from the proposed drill path considering expected soil variability. Increase the number of borings as needed to characterize the subsurface conditions for the purposes of design.

- (a) For medium drill path segments, conduct at least one geotechnical boring, or use existing geotechnical data or previous drilling experience for the site. Extend geotechnical bore depth to a depth that establishes the subsurface conditions that the pilot hole could potentially go through.
- (b) For large drill path segments conduct at least two geotechnical borings or use existing geotechnical data or previous drilling experience for the site. Extend geotechnical bore depth to at least the planned drill path depth plus the pilot hole vertical tolerance.

Plan Development Criteria

(3) **Wetland Field Review.**

- (a) For large drill path segments where Desktop Site Assessment screening indicates wetland may be present within or in close proximity to the drill path area: Complete a wetland field review, as required by applicable regulatory agencies, to confirm the absence and presence of wetlands along the drill path and associated work areas. Identify wetland boundaries, quality, and site characteristics. Conduct all wetland field reviews in accordance with regulatory agency guidelines regarding the type and amount of information that must be collected and communicated.

- (b) If a wetland delineation or wetland field determination is completed for medium and large drill path segments, request that key wetland resources be confirmed during the field component of the review.
 - (c) Incorporate findings in HDD project documents to avoid or minimize impacts to wetlands. Depict wetlands on maps and *project plans* used during HDD project planning, permitting, and construction.
- (4) **Written Plans.** For all HDD projects, develop an HDD Summary and IR Plan as described below. For HDD projects with only small drill paths, develop a Spill Plan specific to the areas known to cross ERWs or ORWs. For all other HDD projects, develop a Spill Plan as described below. These plans may be generic except where additional site-specific plan content is required. The plans may be separate documents or combined. Maintain plans or access to the plans at the site. Submit plans with permit application materials.
- (a) **HDD Summary** – For all projects, develop a project summary describing the project and planned actions to reduce the risk of IR. Include the following information:
 1. A paragraph summarizing the following:
 - a. Project location, including municipalities and counties crossed;
 - b. The type of product to be installed (i.e., conduit, pipe, cable, bundled cables) and purpose (i.e., electric, telecommunications, natural gas, etc.);
 - c. The product diameter(s);
 - d. Total number of drill paths planned for the project that are in each of the size categories. Service laterals less than 6" in diameter and less than 200 feet long may be omitted;
 - e. Minimum depth of cover under water resources. If less than that listed in Table 1, please identify the location(s) and explain why;
 - f. Anticipated unique challenges, such as night-time drilling, winter construction, etc.;
 - g. A list of anticipated project permits.
 2. List drill paths in tabular format. For small drill paths, only list segments that cross ERWs and ORWs. For medium and large drill paths, list all drill paths within the project. Include the following columns in the table:
 - a. Drill path unique identification number or code;
 - b. Location description, including one of the following: station of an entry or exit point, nearby road or intersection, Township/Range/Section, street address, and sheet numbers the drill path is depicted on;
 - c. Diameter in inches;
 - d. Length in feet;
 - e. Category of water resources crossed or adjacent to the HDD site (i.e., wetland, key wetland type, ERW, ORW, ASNRI water); and
 - f. IR Risk Factors present including, but not limited to: steep slopes, indicators of slope instability, high gravel content, peat and/or muck soils, cobbles, boulders, karst features, highly fractured bedrock, artesian aquifers, shallow groundwater, shallow bedrock, less than minimum cover. List all risk factors that apply.
 3. For all drill paths, summarize measures taken to address the IR risk factors identified in the previous section, including planned monitoring of HDD operations for IR. For medium and large drill paths, include at minimum:
 - a. A description of any elective actions, such as those listed under Considerations, completed to address IR risk factors on specific drill paths.
 - b. How drill paths will be inspected for IRs (i.e., on foot, using binoculars, drones, boats, etc.);
 - c. The number and expected qualifications of those conducting inspections;

- d. How often the drill path will be inspected for IRs;
 - e. Additional steps to be taken if a *substantial fluid reduction or gain* occurs during drilling.
- 4. For all drill paths, describe the potential actions that may be taken if HDD encounters unforeseen obstacles or failures. Identify potential alternate installation methods. Identify the organizations (i.e., general contractor, regulatory agencies, owner representatives, etc.) that will be consulted if an alternate method must be implemented. Identify permits or approvals that may need to be obtained or amended if the installation method or location changes.
- 5. If hydrofracture analysis has been completed for any drill paths within the project, summarize the results in graphical format. Identify the calculation method used, the primary inputs to the calculations, and factors of safety used. Completion of a hydrofracture analysis is not required for all drill paths but may be part of a plan to address IR risk factors.
- 6. For medium and large drill paths, attach a geotechnical report or summarize the site-specific conditions from existing information, identifying the source of the information. Include a map showing the location the information was obtained from in relationship to the site.
- 7. For medium and large drill paths, identify anticipated drilling fluid products. Provide the following information in table format: manufacturer, product name, function, and maximum % by weight. Note in the table which products are on the Wisconsin Approved Drilling and Sealing Product List, the NSF/ANSI/CAN 60: Drinking Water Treatment Chemicals – Health Effects list, or the Wisconsin Approved Horizontal Directional Drilling Products List.
- 8. For medium and large drill paths, identify any planned disposal location options for drill fluid and cuttings that will be available to the HDD contractor.
- 9. For medium and large drill paths, attach a plan depicting the HDD site. Include the following information:
 - a. Drill path location;
 - b. Limits of proposed disturbance;
 - c. Topography/ground surface and features (e.g., from civil survey or LiDAR);
 - d. Workspaces with adequate space for the drill rig and supporting equipment, materials, and pipe, space to stage and weld pipe for pullback;
 - e. Access route for entry and exit points;
 - f. Water resources and locations with restrictions due to other protected resources. Label key wetland types and ASNRI waters;
 - g. Environmental protections for the HDD site including erosion and sediment controls, timber mats, dewatering, setbacks, etc.;
 - h. The location and size of existing and proposed utilities near or crossing the drill path;
 - i. Underground structures (seawalls, storage tanks, etc.); and
 - j. Limits of proposed containment berms, if applicable.
- 10. For large drill paths, attach a profile with the following information:
 - a. Existing and proposed ground surface;
 - b. Specific station and elevation data;
 - c. Vertical tolerance for the drill path;
 - d. Anticipated cover under water resources;
 - e. Proposed vertical alignment, including entry and exit angle, points of curvature, points of tangent, and radius of curvature;
 - f. Subsurface information including soil profile, water table elevation, bedrock elevation;

- g. The location and size of existing and proposed utilities near or crossing the drill path; and
- h. Boundaries of key wetland types and ASNRI waters.

(b) **Spill Plan** – Develop and implement a plan addressing spill prevention, containment and response appropriate for HDD projects. Provide a Spill Plan including the minimum contents in Table 2 for small drill paths that cross ERWs or ORWs and medium drill paths without key wetland types or ASNRI waters. For large drill paths or medium drill paths with key wetland types or ASNRI waters, also include the additional details. This information may be provided by drill path or groups of drill paths with similar site conditions and risk factors.

Table 2 Spill Plan Elements		
Plan Element	Minimum Contents	Additional Details
Potential Contaminants	List of most common pollutant sources present on HDD projects.	List materials and quantity expected on-site. *
Spill Containment	Include typical elements of a spill response kit.	Describe expected material storage areas, secondary containment, and locations of spill response kits and equipment (i.e., at fueling station or in liquid storage trailer). Describe additional protections planned where wetlands and waters of the state are within 250 feet of the site. For projects with multiple drill paths, identify the drill paths where the additional protections will be implemented. *
Spill Response Practices	Include typical practices used on HDD projects.	Location-specific contact information for agencies, the responsible party and response teams. If not known, include a position description (i.e., site superintendent or HDD foreman) and leave space to fill in contact information at the preconstruction meeting. Include WDNR contacts for spills coordinators, duty officers, and wardens.

Note: Items marked with “*” should be completed with the best available information based on previous projects and site-specific knowledge. Information can be modified as part of an amendment process for most permits.

(c) **IR Plan** – Develop and implement an IR response plan. For all projects, include the minimum contents in Table 3 and for large drill paths and drill paths crossing key wetland types or ASNRI waters also include the additional details. This information may be provided by drill path or groups of drill paths with similar site conditions and risk factors. Where access to drill path segments for IR response would require tree removal within a wooded wetland not otherwise required for the project or vehicle access through a key wetland type or ASNRI water, discuss IR response and control with regulatory authorities and include any site-specific approaches in the IR Plan.

Table 3 IR Plan Elements		
Plan Element	Minimum Contents	Additional Details
Response Training	Requirements for site personnel.	Identify site-specific resources as part of training or provide to pre-trained individuals.
On-site and On-call Equipment	List of materials and equipment types to be used during IR response and whether they are staged at the entry point, exit point, or on-call. Include at minimum: • Containment materials • Hydrovac (with capacity information).	Include matting (e.g., timber or composite mats) and low ground pressure equipment for response in key wetland types. Include a site-specific list of the types and capacities of on-site or on-call equipment. *
Access	Describe best management practices (BMPs) that will be utilized to minimize impacts associated with access.	Describe site-specific plans for access, and response actions for release into any areas that cannot be accessed by personnel. Identify alternate access options to avoid or minimize tree removal.
Response and Control	Describe required actions to commence as soon as a potential IR is identified.	Describe responses for site-specific environmental resources along the drill path.
Extended Response Actions	Describe actions required after immediate response is complete.	Describe responses for site-specific environmental resources along the drill path.
Resumption of Drilling	Describe what is required before drilling resumes after an IR.	Describe any site-specific considerations regarding resumption of drilling operations.
Post-IR Restoration	Describe methods to restore to original or better condition and the required timing of restoration.	Describe resource areas where specific restoration protocols are needed.
Communications and Notifications	List titles and organizations of those who must be communicated with in the event of project changes or an IR. Leave space for project-specific phone numbers to be added at the pre-construction meeting.	Location-specific contact information where needed for agencies and response teams. If the project is not bid prior to permit application, leave space for contractor contacts to be added at the pre-construction meeting.
Figures	Not required.	Figure showing HDD entry and exit points, the drill path, and all water resources.

Items marked with “*” should be completed with the best available information based on previous projects and site-specific knowledge. Information can be modified as part of an amendment process for most permits.

Construction Criteria

- (5) **HDD Pre-Construction Meeting.** For projects with medium and large drill paths, conduct a pre-construction meeting to go over site-specific constraints associated with the drill paths and potential convenience drills. This meeting is not required to be held at the job site or in person (may be a virtual/online meeting) and may be combined with the HDD Site Observation.

For projects with medium and large drill paths, invite those involved with the HDD project, including but not limited to representatives of the following:

- Project owner (required for large drill paths);
- General contractor (required for large drill paths);
- Drill contractor (required);
- Designers/engineers (if available); and
- Owner's environmental staff or consultant (required for large drill paths).

During the meeting, address the following as they relate to the HDD project:

- Location and required protections for key wetland types and ASNRI waters;
- Workspace boundaries and restricted areas;
- Mapped floodways and 100-year flood boundaries;
- Timing restrictions;
- Seasonal considerations;
- Permit compliance;
- Erosion and sediment control practices;
- HDD Summary, Spill Plan, and IR Plan;
- Monitoring, recordkeeping and reporting;
- Chain of command; and
- Restoration and final stabilization.

- (6) **HDD Site Observation.** For all projects, the HDD operator and locator shall physically walk or observe the HDD site prior to starting the drill. If remote sensing equipment will be used to monitor for IRs in less accessible portions of the drill path, test this equipment as part of the observation. During the observation identify potential obstacles and note the location of site-specific risk factors, environmental conditions, and water resources within the HDD site. For projects with only small drill paths, discuss the IR Plan. If erosion and sediment control practices have been installed prior to the observation, confirm that practices are in operational condition. Identify situations where a boat and/or drone is necessary to monitor for and respond to IRs. Modify the IR Plan to include additional equipment and supplies needed for monitoring and response as needed based on site conditions. Include additional personnel with the HDD operator and locator as follows:

- (a) For the observation of medium HDD drill paths, invite additional personnel, such as the project owner's representative and a design team representative.
- (b) For large drill paths, require attendance by a project owner's representative and a design team representative.
- (c) For medium and large HDD drill paths that cross ASNRI waters or key wetland types, require attendance by an environmental representative.

- (7) **Monitoring and Inspections.** For all HDD projects, during HDD installation, conduct monitoring and inspections of drill path to determine if the HDD is proceeding in accordance with its design and specifications, to identify IRs or other issues, and to confirm that appropriate equipment is on site to respond to IRs.

Monitor the returns continuously during drilling operations. Inspect the drill path immediately upon noted loss of drilling fluid. If no IR is found but there are sustained fluid losses, the drill path and surrounding area should be monitored continually until either losses are reduced or installation is complete. For medium and large drill paths, supplement monitoring returns with visual inspections at least every 4 hours.

Document any substantial fluid loss or gain. A *substantial fluid loss or gain* is one that is estimated to exceed the lesser of 50% of the *drill path volume* or 500 gallons. If fluid loss is recovered within a few hours due to adjustments to drilling operations, only the unrecoverable amount is considered when assessing if a substantial fluid reduction has occurred.

Maintain documentation that monitoring and inspections are completed as specified in this section and provide to WDNR upon request. For small drill paths and medium drill paths where the entire drill path is visible to the HDD contractor during drilling, documentation may be limited to describing the frequency of observations and the names of the staff observing the drill path in lieu of documenting individual inspections. For medium drill paths where the entire drill path is not visible to the HDD contractor during drilling, inspection documentation should include at minimum the date, time, name of inspector, and whether an IR was observed. For large drill paths, include the name of the inspector, the date, the time, the stage of installation (pilot hole, reaming, or pullback), and any observations that were made along with the location of the observation.

Additionally, for large drill paths and medium drill paths that cross key wetland types or ASNRI waters require the owner's construction or environmental representative to inspect the drill path at least once per day or more often after an IR occurs.

- (8) **Reporting.** For all HDD projects, report IRs, spills, and project modifications as required by applicable permits and federal, tribal, state, and local regulations. At a minimum notify WDNR Spills Hotline (1-800-943-0003) within 24 hours if drilling fluid enters an ERW or ORW or a substantial loss or gain has occurred. If a spill or IR enters a separate storm sewer inlet or drainage conveyance system, promptly notify the system owner that the discharge occurred, and include the estimated quantity of material discharged. If using an electronic, online project-tracking system, consider granting access to WDNR or make available tracking data as needed.

If requested by WDNR staff, provide regular status reports to WDNR including:

- HDD status;
- Monitoring and inspection summary;
- Issues (including spills and IRs) and associated responses;
- Estimated amount of fluid lost or gained;
- Estimated amount of fluid recovered during IR response;
- Project-specific concerns and how they were addressed.

PLANS AND SPECIFICATIONS

If applicable, include the following information in the *project plans* and specifications:

- Available soils information;
- Location and type of water resources;

- Requirements for timing, entry/exit point placement, or containment pit placement to avoid impacts to threatened or endangered species, trout streams, and cultural resources;
- Written HDD Summary, Spill Plan, and IR Plan;
- Potential convenience drill locations;
- Proper erosion and sediment control devices to protect workspace boundaries (refer to other WDNR Technical Standards);
- Requirements for documenting installed location.

If formal project plans are not completed, provide the applicable information above to the contractor in an alternate format.

OPERATIONS AND MAINTENANCE

Keep the HDD Summary, Spill Plan, and IR Plan on-site or accessible from the site during construction.

Replenish materials used for spill and IR response before proceeding with HDD installation.

If used, provide drill fluid containment pits with sufficient capacity to avoid overflowing during rain events.

Dispose of drilling fluid and cuttings in compliance with state and local requirements.

Convenience Drills. Prior to initiating a convenience drill, evaluate environmental risks and update or create an IR Plan for the convenience drills. For convenience drills with product diameters greater than 24 inches, follow the criteria for large drill paths.

CONSIDERATIONS

The following are not required under this technical standard but are recommendations and reminders of commonly overlooked measures that may be required under other rules, laws, and regulations:

General Considerations.

Additional cover over the HDD drill path may be warranted in locations with *highly variable soils* or topography, larger product diameter, or under waterways where evidence of erosion, head cutting, or path morphology is observed. The minimum depth of cover requirement should be considered by all parties early in the design phase of each HDD project. The HDD project design may need to be modified to meet the minimum depth of cover requirements including changing the angle of entry/exit or extending the length.

When evaluating the cover under a wetland, consult with HDD design engineer or geotechnical consultant AND environmental staff with expertise in wetlands to determine if additional cover is needed based on soil or wetland type.

If product will carry hazardous substances, federal minimum cover requirements may apply.

Avoid entry and exit elevation differences in excess of 50 feet where possible.

For small and medium drill path segments, consider implementing required actions for larger drill path segments voluntarily where conditions warrant. For example, consider developing a detailed plan and profile where subsurface conditions are highly variable.

Initial Design.

The US Army Corps of Engineers may regulate some wetlands that receive a Wisconsin artificial wetland exemption.

Tribal/inter-tribal guidelines for wetland delineation may be applicable for some projects.

Geotechnical investigation work may require coverage under wetland or waterway permits.

HDD has the potential to impact cultural resources, therefore review of publicly available spatial data from the Wisconsin Historical Society is recommended for all projects, regardless of size, and any potential impacts must be resolved prior to issuance of WDNR permits. Consult with a Cultural Resources Management contractor to assist in avoiding conflicts with historic sites at the design phase. Placement of entry or exit points, containment pits, utility location holes, HDD boring routes, access routes, or other construction activity may be affected by protection of cultural resources or human burial sites. Coordination between federal, state, and/or tribal historic preservation specialists may be necessary for some projects.

Collect existing site-specific geotechnical information for small drill paths if the information from the Desktop Site Assessment indicates there is a combination of site-specific factors that together would create a high risk of an IR that would have significant environmental consequences. These factors include presence of shallow bedrock, bedrock fractures, poor soils, highly variable soils, ASNRI waters, and key wetland types.

Consider conducting a Desktop Site Assessment for subsurface conditions for small drill paths outside areas of previous development.

Obtain additional geotechnical information for HDD installation under ASNRI waters if installation may be conducted during fish spawning periods.

Locate containment pits as far as practicable from wetland boundaries.

Obtain geotechnical borings every 500 feet along the drill path or as necessary to characterize subsurface conditions.

Document why some water resources are crossed by HDD and some are crossed with other installation methods.

Plan Development.

Document drill path field conditions using photos and notes prior to snow cover if construction is likely to begin after snow cover is in place.

Note any access constraints and append a map of alternate access routes where warranted.

For large drill paths, conduct field survey work to provide the most accurate information relating to right of way and existing utilities.

Conduct a bathymetric survey where needed to determine the depth of surface water features.

Timing of operations and/or placement of entry or exit points may be affected by protection of threatened or endangered species. Identify the purpose for these adjustments and modifications within the HDD Summary.

If a cultural resource monitor is required during HDD operations, include in the HDD Summary.

Where karst features underlay the drill path, perform geophysical surveying techniques to determine soil boundaries, soil moisture, soil type, bedrock depth and voids. Ground penetrating radar is the most common type of geophysical survey and is effective at finding karst and soil/rock boundaries.

For large drill paths or drill paths within loose soils or fractured bedrock that are suspected to have a high probability of drilling fluid circulation challenges and IRs, consider conducting a hydrofracture analysis. Hydrofracture happens when drilling fluid pressure exceeds the strength and confining stress of surrounding soils. An Annular Pressure Curve (APC) may be generated as part of a hydrofracture analysis to help inform project design limitations which, in turn, helps to minimize impacts to environmental resources. Review the following when performing a hydrofracture analysis or creating an APC:

- Topography;
- Proposed drill path length and depth;
- Subsurface soil conditions, including soil strata information and water table elevation;

- Minimum required drilling fluid pressure;
- Minimum factor of safety for calculations of annular pressure:
 - o Use at least 2.0 under water resources;
 - o Use at least 1.5 in all other locations;
 - o Mitigation measures to prevent IR where safety factors cannot be met, such as conductor casings or wash-over casings.
- Site-specific subsurface soil conditions and testing (to obtain calculation variables including friction angle, shear modulus, etc.).

Implementation.

Discuss all other protected resources during the pre-construction meeting, including construction timing restrictions, threatened and endangered species, invasive species management, and cultural resource monitoring requirements.

Increase cover and have an environmental monitor inspecting during installation under a high-quality water resource during fish spawning season.

Scan the drill path for locating system interference during the pre-construction walk-through.

In the event of an IR, notify landowners in the vicinity of the IR prior to resuming operations.

Inspect the drill path more frequently during pilot hole, reaming, or after an IR has occurred. Supplement contractor-responsible inspections with utility owner inspections.

Keep bore logs of soil types encountered for use in planning future HDD installations in the area. Prepare as-built plans for each drill path.

Revise the HDD Summary, Spill Plan, and IR Plan if project conditions change, convenience drills are added, or there are more HDD drill paths planned along a longer profile with similar expected conditions. Document unexpected conditions for future maintenance and future HDD projects in the area.

Implement additional steps to minimize IRs for convenience drills, including practices described under criteria appropriate to the size and length of the drill path.

For HDD installation in winter when snow cover is present and the ground is frozen, include the following additional measures for HDD installation: remove snow along the drill path where possible; evaluate alternate entry point and exit point locations; inspect the drill path and areas in the vicinity of the drill path for discolored snow, that may indicate an IR, particularly where water is likely to pool or leave the site; exercise additional caution with IR containment and cleanup; and inspect the drill path after snow melt for evidence of IRs.

Use drones and thermal imaging to assist with locating IRs in standing water or snow cover.

Document field changes on HDD plans, along with any unmapped utilities encountered, for future use in utility locates.

Implement measures to avoid the spread of invasive species due to construction activities.

Stop work and contact the State Historical Preservation Officer at the Wisconsin Historical Society if excavated material appears to contain cultural resources or human remains.

During construction, use relief wells during construction where needed to control downhole fluid losses.

Use the tracking capabilities of installation equipment to create a record of the installed product location, both vertically and horizontally.

The WDNR may require chemical analysis of the water used to produce drilling fluids.

The WDNR may take actions, within the context of regulatory programs established by statutes or rules, if those actions are necessary to protect public health and welfare or to prevent a significant damaging effect on groundwater or surface water quality for present or future consumptive or non-consumptive

uses, whether or not an enforcement standard and preventive action limit for a substance have been adopted under ch. NR 140, Wis. Adm. Code.

REFERENCES

- Bradbury, K.R., Karst and Shallow Carbonate Bedrock in Wisconsin, Wisconsin Geological and Natural History Survey, Factsheet 02, 2009. <https://wgnhs.wisc.edu/catalog/publication/000905/resource/fs02>
- Federal Energy Regulatory Commission, Guidance for Horizontal Directional Drill Monitoring, Inadvertent Return Response, and Contingency Plans, October 2019. <https://www.ferc.gov/natural-gas/environmental-overview/guidance-horizontal-directional-drill-monitoring-inadvertent-return-response-and-contingency-plans>
- Michigan Department of Environment, Great Lakes, and Energy, General Permit Categories in the State of Michigan, August 12, 2021. https://www.michigan.gov/documents/deq/wrd-general-permit-categories_555828_7.pdf
- NSF International, NSF/ANSI/CAN 60: Drinking Water Treatment Chemicals – Health Effects program, Certified Drinking Water Treatment Chemicals list. <https://info.nsf.org/Certified/PwsChemicals/>
- Swanson, S.K.; Graham, G.E.; Hart, D.J.; An Inventory of Springs in Wisconsin, 2019. <https://wgnhs.wisc.edu/catalog/publication/000968>
- Trotta, L.C.; Cotter, R.D.; Depth to Bedrock in Wisconsin, University of Wisconsin-Extension Geological and Natural History Survey, 1973. <https://wgnhs.wisc.edu/catalog/publication/000376>
- University of Wisconsin-Madison, Wisconsin State Cartographer's Office, Elevation/LiDAR Data. <https://www.sco.wisc.edu/data/elevationlidar/>
- US Army Corps of Engineers, Utility Regional General Permit, Effective February 21, 2018.
- US Army Corps of Engineers, Wetland Delineation Manual, Wetlands Research Program Technical Report Y-87-1, 1987. <https://www.cpe.rutgers.edu/Wetlands/1987-Army-Corps-Wetlands-Delineation-Manual.pdf>
- US Department of Transportation, Assessing Stream Channel Stability at Bridges in Physiographic Regions, Publication No. FHWA-HRT-05-072, July 2006. <https://www.fhwa.dot.gov/publications/research/infrastructure/hydraulics/05072/05072.pdf>
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Wisconsin Soil Surveys, various dates. <https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=W1>
- Wisconsin Department of Natural Resources, Approved Drilling and Filling Sealing Products List including Heat Exchange Drillhole Products. <https://dnr.wisconsin.gov/sites/default/files/topic/Wells/DrillAbandonProducts.pdf>
- Wisconsin Department of Natural Resources, Approved Well Disinfectant, Rehabilitation and Development Products List. <https://dnr.wisconsin.gov/sites/default/files/topic/Wells/WellDisinfectantProducts.pdf>
- Wisconsin Department of Natural Resources, Approved HDD Drilling Fluid Products List. <https://dnr.wisconsin.gov/sites/default/files/topic/Stormwater/PreviouslyReviewedHorizontalDirectionalDrillingAdditives.pdf>
- Wisconsin Department of Natural Resources, Natural Heritage Inventory (NHI) Portal. <https://dnr.wisconsin.gov/topic/nhi/calypso/portal.html>
- Wisconsin Department of Natural Resources, Spills Webpage. <https://dnr.wisconsin.gov/topic/Spills>
- Wisconsin Department of Natural Resources, Surface Water Data Viewer. <https://dnrmaps.wi.gov/H5/?Viewer=SWDV>

Wisconsin Department of Natural Resources, Wetland Screening and Delineation Procedures, Guidance Number 3500-2016-62, October 21, 2019.

https://dnr.wisconsin.gov/sites/default/files/topic/Wetlands/2019_Wetland_Screening_and_Delineation_Procedures.pdf

Wisconsin Historical Society, Wisconsin Historic Preservation Database (WHPD).

<https://www.wisconsinhistory.org/Records/Article/CS4091>

Wisconsin Historical Society, Wisconsin Burial Sites Catalog.

<https://www.wisconsinhistory.org/Records/Article/CS3130>

Wisconsin Department of Natural Resources, Well Construction Information System

<https://dnr.wisconsin.gov/topic/Groundwater/Data.html#wellreports>

GLOSSARY

Areas of Special Natural Resources Interest (ASNRI) waters: Waterbodies designated as state natural areas, trout streams, outstanding or exceptional resource waters, wild rice waters, waters in special area management plan or special wetland inventory study, coastal wetlands of Wisconsin, wild or scenic rivers, and sensitive areas of water bodies.

Bore pit: A containment pit used to monitor drilling fluid. Often these are located near the entry and exit points for a drill path.

Convenience drills: Convenience drills are HDD implementation during the course of a project when alternative installation methods are not suitable or would be more detrimental to the environment. Convenience drills can be any of the sizes listed in this standard.

Containment pit: An excavated area used to manage drill fluid. Containment pits are typically located near the entry or exit points.

Drilling fluid: A mixture of bentonite, water and/or additives/polymers.

Drill path or drill path segment: A length of HDD installation starting at the entry point and ending at the exit point.

Drill path volume: The diameter of the borehole times the length of the drill path at the time of the loss or gain.

Entry point: The location where a drill path begins.

Exit point: The location where a drill path ends.

Final stabilization: All land-disturbing construction activities at the construction site have been completed and a uniform perennial vegetative cover has been established with a density of at least 70% of the cover for the unpaved areas and the areas not covered by permanent structures or by equivalent permanent stabilization measures.

Highly variable soils: Soils where the soil textural classification and layer thickness are likely to change several times within the length of the drill path.

Horizontal directional drilling (HDD): A trenchless method of installing underground utilities such as pipeline, conduit or cable, using a surface-launched drilling rig. HDD is often used to avoid or minimize impacts to surface features such as waterways, wetlands, roads and other surface features.

HDD project: A project containing one or more drill paths.

HDD site: All areas needed to complete an HDD drill path. The HDD site includes space needed for equipment and operations at the entry point, exit point, containment pits, laydown area, pull-back area, and equipment staging areas. The HDD site also includes the drill path, associated areas of vegetation removal, and area needed to access all other parts of the site from public roads.

Inadvertent release (IR): An unintended return or release of drilling fluid during horizontal directional drilling. Also known as a frac-out or inadvertent return.

Key wetland type: Any wetland classified as Great Lakes ridge and swale complexes, interdunal wetlands, coastal plain marshes, emergent marshes containing wild rice, southern sphagnum bogs, boreal rich fens or calcareous fens.

Navigable waters: Any body of water which is navigable under the laws of this state ([s. 30.01\(4m\)](#), Wis. Stats.). Includes all lakes, streams, sloughs, bayous, and marsh outlets that meet the navigability criteria identified in [s. 30.10\(1\)](#) and [\(2\)](#), Wis. Stats., and s. [NR 310.03\(5\)](#), Wis. Adm. Code.

Navigable waterway: Any body of water with a defined bed and bank that is navigable under Wisconsin law. In Wisconsin a body of water is navigable if it is capable of floating on a regularly recurring basis the lightest boat or skiff used for recreation or any other purpose (s. [NR 310.03\(5\)](#), Wis. Adm. Code).

Other protected resources: Threatened or endangered species protected under s. [29.604](#), Wis. Stats. and historic property listed under ss. [44.45](#), Wis. Stats., burial sites protected under s. [157.70](#), Wis. Stats., and mapped floodways. The following resources may be used to identify other protected resources: [WDNR's NHI](#) portal and the spatial data available from the [Wisconsin Historical Society](#).

Product: The pipe, conduit, cable, or bundled cables being installed via HDD. The product is also known as a utility.

Product diameter: The nominal diameter of the pipe, conduit, casing, cable or bundled cables installed during an HDD operation. For bundled cables, the product diameter is the nominal outside diameter of the bundle.

Project plans: Engineered drawings, sketches, marked-up aerial photos, or other depiction of the proposed work for the purposes of communicating the location and scope of a construction project.

Service lateral: A distribution line from a distribution facility or main to an individual customer or building.

Soil surface: The surface profile of the existing ground above water level.

Substantial fluid reduction or gain: A change in the drill fluid volume that is estimated to exceed the lesser of 50% of the *drill path volume* or 500 gallons.

Water resources: Includes navigable waters, navigable waterways, and wetlands that are defined in this standard.

Waters of the state: Includes those portions of Lake Michigan and Lake Superior within the boundaries of this state, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems and other surface water or groundwater, natural or artificial, public or private, within this state or its jurisdiction. ([s. 281.01\(18\)](#), Wis. Stats.).

Wetland: An area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions ([s. NR 103.02\(5\)](#), Wis. Adm. Code).

Attachment 1A
Summary of Required Actions for Small Drill Paths

Project Stage	Description	Applicability
Initial Design	Desktop Site Assessment for Water Resources, Constructability, and Subsurface Conditions	Complete for all drill path segments. If small drill path is part of a project with at least 1 acre of land disturbing construction activity, identify ORWs and ERWs. The following reviews are optional: • Identification of key wetland types and ASNRI waters; and • Review of existing soils information.
	Geotechnical Investigation	Optional. Consider where poor or highly variable soils are present.
Plan Development	Wetland Field Review	Optional. Consider where key wetland types may be present.
	HDD Summary	Provide items 1-4 and item 5 if applicable.
	Spill Plan	Provide minimum contents for drill paths that cross ERWs and ORWs. Optional for all other drill paths.
	IR Plan	Provide minimum contents for all drill path segments. Provide additional details for drill paths crossing ERWs, ORWs, or where tree clearing in wooded wetland is likely to be needed for IR response.
	Geophysical Investigation	Optional. Consider where karst features are likely.
	Hydrofracture Analysis	Optional. Consider where fractured bedrock and/or karst features or loose soils may be present.
Construction	HDD Pre-construction Meeting	Optional. Consider combining with path observation.
	HDD Site Observation	Complete for all drill paths.
	Monitoring and Inspections	Required for all drill paths. Consider drill path inspection at least every 4 hours during drilling near key wetland types or ASNRI waters to supplement continuous monitoring of drilling fluid and returns.
	Reporting	Required for all drill path segments.

Note: Small drill paths have a product diameter of 8 inches or less, and drill path length measured in the horizontal plane or station distance of 850 feet or less.

Attachment 1B
Summary of Required Actions for Medium Drill Paths

Project Stage	Description	Applicability
Initial Design	Desktop Site Assessment for Water Resources, Constructability, and Subsurface Conditions	Complete for all drill path segments.
	Geotechnical Investigation	Complete for medium drill path segments. Existing geotechnical data or previous drilling experience may be used in lieu of a geotechnical boring.
Plan Development	Wetland Field Review	Optional for medium drill paths. Consider where key wetland types may be present.
	HDD Summary	Complete items 1-9.
	Spill Plan	Provide minimum contents for all drill path segments. Provide additional details for drill paths crossing key wetland types and ASNRI waters.
	IR Plan	Provide minimum contents for all drill path segments. Provide additional details for drill paths crossing key wetland types, ASNRI waters, or where tree clearing in wooded wetland likely to be needed for IR response.
	Geophysical Investigation	Optional. Consider where karst features are likely.
	Hydrofracture Analysis	Optional. Consider where fractured bedrock and/or karst features or loose soils may be present.
Construction	HDD Pre-construction Meeting	Complete for all HDD projects.
	HDD Site Observation	Complete for all drill paths.
	Monitoring and Inspections	Complete for all drill paths. Inspect drill paths at least every 4 hours during drilling to supplement continuous monitoring of drilling fluid pressure and returns. Where key wetland types or ASNRI waters are present, include an owner's construction or environmental representative at least once per day or more often after an IR.
	Reporting	Required for all drill path segments.

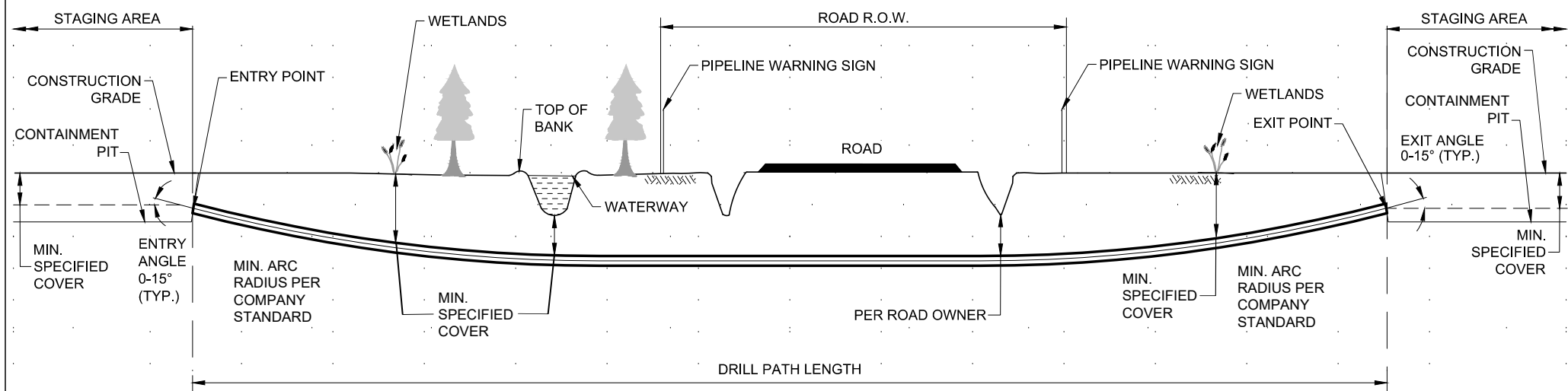
Note: Medium drill paths have a product diameter less than 24 inches, and drill path length measured in the horizontal plane or station distance less than 1500 feet. Drill paths with a product diameter of 8 inches or less may be considered medium if the length of the drill path exceeds 850 feet but is less than or equal to 1500 feet.

Attachment 1C
Summary of Required Actions for Large Drill Paths

Project Stage	Description	Applicability
Initial Design	Desktop Site Assessment for Water Resources, Constructability, and Subsurface Conditions	Complete for all drill path segments.
	Geotechnical Investigation	Complete for all drill path segments.
Plan Development	Wetland Field Review	Complete where wetlands may be present. Confirm location of key wetland types.
	HDD Summary	Complete Items 1-10.
	Spill Plan	Complete a plan with additional details for all drill path segments.
	IR Plan	Complete a plan with additional details for all drill path segments
	Geophysical Investigation	Optional for all drill path segments. Consider action where karst features underlay the drill path.
	Hydrofracture Analysis	Optional for all drill path segments. Consider action where fractured bedrock and/or karst features or loose soils may be present.
Construction	HDD Pre-construction Meeting	Complete for all HDD projects.
	HDD Site Observation	Complete for all drill paths.
	Monitoring and Inspections	Complete for all drill paths. Inspect drill paths at least every 4 hours during drilling to supplement continuous monitoring of drilling fluid pressure and returns. Where key wetland types or ASNRI waters are present, include an owner's construction or environmental representative at least once per day or more often after an IR.
	Reporting	Complete for all drill path segments.

Note: Large drill paths have a product diameter 24 inches or greater for any length, or the drill path length measured in the horizontal plane or station distance is 1500 feet or greater. Drill paths with a product diameter less than 24 inches may be considered large if the drill path length exceeds 1500 feet.

ATTACHMENT 2A TYPICAL DRILL PATH ELEMENTS



NOTE: REFER TO WISCONSIN DNR TECHNICAL STANDARD 1072 HORIZONTAL DIRECTIONAL DRILLING FOR DETAILED CRITERIA AND CONSIDERATIONS FOR HDD PROJECTS.



1072
TECHNICAL STANDARD No.
09/2022
REVISION DATE
NOT TO SCALE

Plan view of the proposed HDD alignment from station 0+00 to 5+00. The alignment is shown as a dashed line with station markers. Key features include:

- BH-01** at station 0+00.
- BH-02** at station 4+00.
- XXX (NAMED CREEK)** crossing the alignment between stations 1+00 and 2+00.
- 75' WIDE TEMP. WORKSPACE** at the HDD entry point (station 0+00).
- 250'x345'x255'x120'x205'x75'x75' EXTRA TEMP. WORKSPACE** at the HDD entry point.
- 250'x25'x250'x25' EXTRA TEMP. WORKSPACE** at the HDD exit point (station 5+00).
- 75' WIDE TEMP. WORKSPACE** at the HDD exit point.
- 250'x50'x250'x50' EXTRA TEMP. WORKSPACE** at the HDD exit point.
- PROPOSED ALIGNMENT** shown as a dashed line with station markers from 0+00 to 5+00.
- HDD ENTRY POINT** at station 0+00.
- HDD EXIT POINT** at station 5+00.
- XXX (NAMED CREEK)** crossing the alignment between stations 1+00 and 2+00.
- North Arrow** pointing towards the top right.

Profile view of the proposed 36-inch water main from station -5+00 to 5+00. The profile shows the existing ground surface (light gray) and the proposed pipe invert (thick black line). The pipe is 36 inches in diameter and has a 0.21% slope. Key features include:

- Stationing:** -5+00 to 5+00.
- Elevation:** 1015 to 1135 feet.
- Proposed Pipe Invert:** Thick black line.
- Existing Ground Surface:** Light gray line.
- Proposed Manholes:** -4+65 BH-01 (PROJECTED) and 3+35 BH-02 (PROJECTED).
- Proposed Wetland/Stream Buffer:** 0+00/8+96 WETLAND/STREAM BUFFER.
- Proposed Bend Radii:** 300' MINIMUM BEND RADIUS at stations -3+00 and 3+35.
- Proposed Arc Lengths:** 705' and 722' (3.5" OD, 0.21% WT, X52 (P-0421)).
- Proposed Slope:** 0.21%.
- Proposed Soil Types:** LEAN CLAY (CL), FAT CLAY (CH), FINE TO COURSE SAND (SP), CLAYEY SAND (SC), LEAN CLAY (CL).
- Proposed Notes:**
 - 4+65 BH-01 (PROJECTED)
 - 41' MIN. FROM TOP OF PIPE
 - 3+10 P.L. 8070'00" LT (P-3921)
 - 3+07 HDD ENTRY
 - 1-84 WETLAND/STREAM BUFFER
 - 1-33 NAMED CREEK
 - 1-28 TREE LINE
 - 0+75 TREE LINE
 - 0+51 BADGER CREEK
 - 0+00/8+96 WETLAND/STREAM BUFFER
 - 1+60 REF MP 0.2
 - 300' MINIMUM BEND RADIUS
 - 3+35 BH-02 (PROJECTED)
 - 3+98 HDD EXIT
 - 41' MIN. FROM TOP OF PIPE

Wisconsin Department of Natural Resources Approved Horizontal Directional Drilling Products List

Note: This list is intended to supplement the [Approved Drilling and Filling Sealing Products List including Heat Exchange Drillhole Products List](#) and the [National Sanitation Foundation \(NSF\) Drinking Water Treatment Chemicals NSF/ANSI/CAN 60-Health Effects](#) List . Products on both lists are approved for use in Horizontal Directional Drilling in addition to the products listed below.

Wisconsin Pre-Approved HDD Drilling Fluid Products:

Approval Date	Manufacturer or Distributor	Product Name	Material(s)	Uses	Special Conditions
6/20/22	Baroid Fluid Services/Haliburton	Polyselect Power Swell	Proprietary ingredients	Lost circulation material	
6/20/22	Bentonite Performance Materials/Halliburton	Polyselect Power Xan	Xanthan gum	Viscosifier	
6/20/22	Cetco	Drill-terge	Non-ionic surfactant	Drilling detergent/wetting agent	
6/20/22	Cetco	Rel-Pac Xtra-low	Polyanionic cellulose	Filtration control	
6/20/22	Cetco	Suspend-IT	Polysaccharid gum	Cutting transport	
6/20/22	DCS Fluid Solutions	Clay Breaker	Quaternary Ammonium Compound	Clay Stabilizer	Requires project-specific pre-approval
6/20/22	DCS Fluid Solutions	Polymud	Mineral Oil	Viscosifier	Requires project-specific pre-approval
6/20/22	DCS Fluid Solutions	Sandmaster	Xanthan gum	Viscosifier	
6/20/22	DCS Fluid Solutions	SealPac HV	Polysaccharide	Fluid Loss Reduction	
6/20/22	DCS Fluid Solutions	TorqBreaker	Quaternary Ammonium Alkyl dimethyl ammonium chloride Ethanolamine	Surfactant	Requires project-specific pre-approval
6/20/22	Halliburton Energy Services	Polyselect DMD Soda Ash	sodium carbonate	Buffer	
6/20/22	Lost Circulation Specialists, Inc.	Magna Fiber	Mineral fiber	Lost circulation material	
10/20/22	Northstar Fluid Solutions	Lubra-Star Plus	Proprietary, derived from oleo chemicals	Water soluble lubricant	Use product purchased after 10/15/22

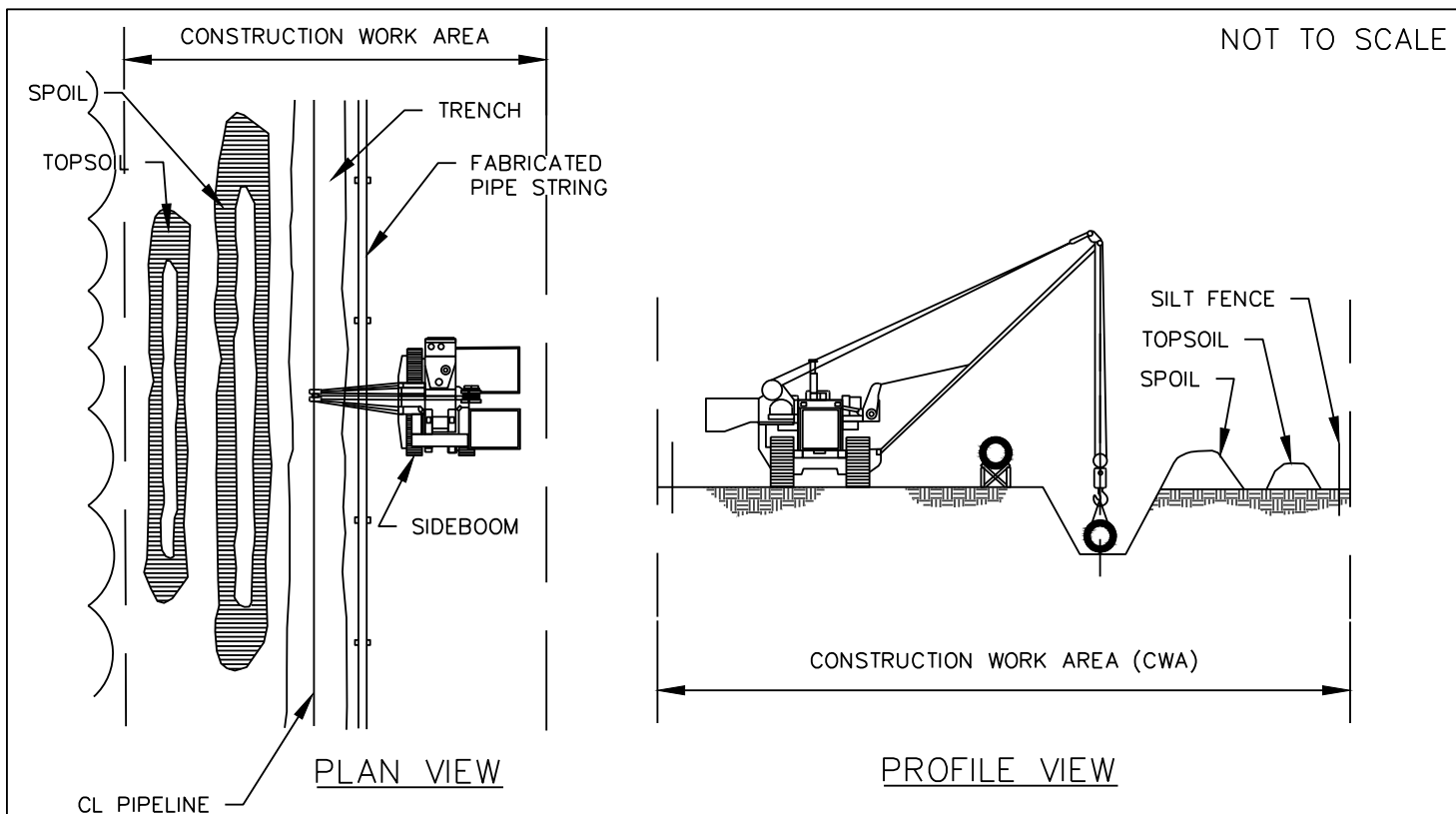
Wisconsin Department of Natural Resources Approved Horizontal Directional Drilling Products List

Approval Date	Manufacturer or Distributor	Product Name	Material(s)	Uses	Special Conditions
6/20/22	Northstar Fluid Solutions	Star-Plex	Poly Hydroxy Silicate, Proprietary Mg, Na, Al compounds	Viscosifier	

Last Update 10/20/2022

For review of products not on the pre-approved list, please submit the material safety data sheet and product sheets used for marketing to [Samantha Whitens](#), Office of Energy Storm Water Engineer or [Amy Minser](#), Statewide Storm Water Engineer. The safety data sheet or supplementary material must disclose the presence of any ingredients listed on Table 1 in s. [NR 140.10](#), Wis. Adm. Code and [Chemical List | Wisconsin Department of Health Services](#). Section NR 283.55, Wis. Adm. Code allows the department to handle trade secrets as confidential information. If information is considered a trade secret, confidential information should be provided in a separate document, clearly marked as confidential, and a request for confidentiality should be provided as required in s. [NR 2.19](#), Wis. Adm. Code. Disclosure of the information to the Wisconsin Department of Health Toxicologist may be required as part of the Department of Natural Resources review process.

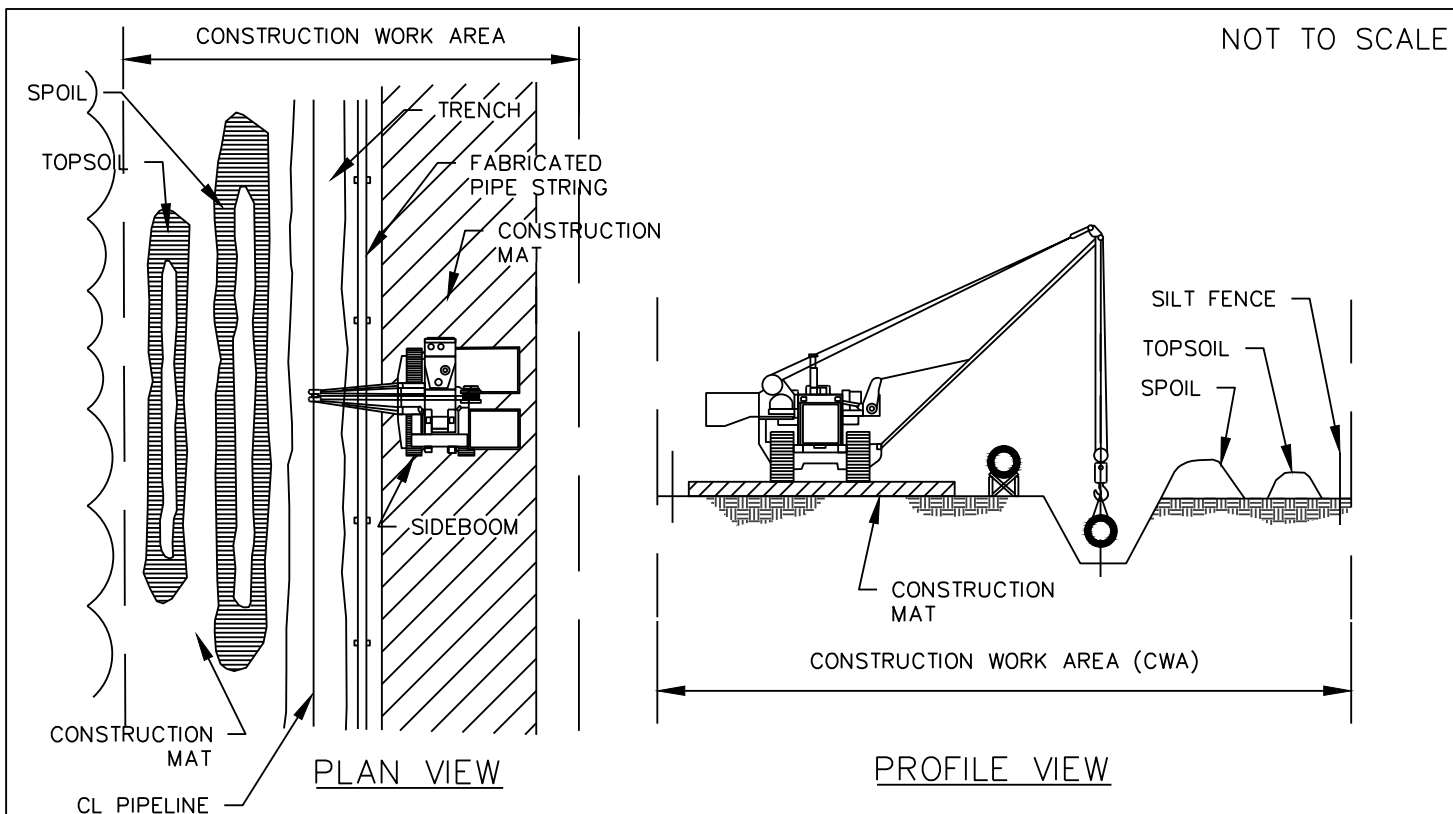
Appendix E ANR's Erosion and Sediment Control Typical Figures



CONSTRUCTION PROCEDURES:

1. THIS METHOD APPLIES TO WETLANDS WITH GROUND CONDITIONS FIRM ENOUGH TO SUPPORT EQUIPMENT WITHOUT RUTTING AND/OR SOIL MIXING AT THE TIME OF CROSSING.
2. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
3. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
4. INSTALL SLOPE BREAKER UPSLOPE WITHIN FIFTY (50) FEET OF WETLAND BOUNDARY IF NEEDED.
5. CONSTRUCT WHEN DRY, IF POSSIBLE. IF SITE BECOMES WET AT TIME OF TRENCHING, AVOID SOIL COMPACTION BY UTILIZING CONSTRUCTION MATS. GEOTEXTILE FABRIC MAY BE INSTALLED UNDER CONSTRUCTION MATS WHERE REQUIRED.
6. AVOID ADJACENT WETLANDS, INSTALL SEDIMENT BARRIERS AT DOWN SLOPE EDGE OF RIGHT-OF-WAY ALONG WETLAND EDGE IF EVIDENT, OTHERWISE INSTALL BARRIER ON BOTH EDGES AS REQUIRED. A SEDIMENT FILTER DEVICE WILL BE PLACED ACROSS THE WORKSPACE AT THE WETLAND'S EDGE, IMMEDIATELY UPSLOPE OF THE WETLAND BOUNDARY.
7. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE TRENCHLINE AND REMOVE STUMPS AND OTHER CLEARING DEBRIS FROM WETLAND FOR DISPOSAL.
8. CONDUCT TRENCHLINE SOIL SEGREGATION (IF TOPSOIL IS NOT SATURATED). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF TWELVE (12) INCHES. NOTE 1' SOIL SEPARATION BETWEEN TOPSOIL AND BACKFILL. TOPSOIL STRIPPING OUTSIDE OF THE TRENCHLINE IS NOT PERMITTED INCLUDING IN CULTIVATED WETLANDS. SPOILS STORED IN WETLANDS MUST BE STORED ATOP A BARRIER TO PREVENT SOIL MIXING.
9. TRENCH THROUGH WETLANDS.
10. PIPE SECTION TO BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
11. LOWER-IN PIPE PRIOR TO BACKFILLING TRENCH, IF REQUIRED, TRENCH PLUGS SHALL BE INSTALLED AS REQUIRED. BACKFILL TRENCH RETURNING SOIL LAYERS TO THEIR ORIGINAL STRATUM AND ELEVATIONS.
12. RESTORE GRADE TO PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.
13. IF UTILIZED, REMOVE TIMBER MATS OR PRE-FABRICATED MATS FROM WETLAND UPON COMPLETION WHEN NO LONGER NEEDED.

					
				ANR WISCONSIN RELIABILITY PROJECT	
NO.	REVISION	APR.	DATE	DRY WETLAND CROSSING METHOD	
1	MINOR EDITS TO DETAILS	JP	2/9/23	DATE: 11/29/2022	
				DRAWN BY: JGP	CHECKED BY: TJ
				DETAIL 1	



CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL SLOPE BREAKER UPSLOPE WITHIN FIFTY (50) FEET OF WETLAND BOUNDARY IF NEEDED.
4. CONSTRUCT WHEN DRY, IF POSSIBLE. IF SITE BECOMES WET AT TIME OF TRENCHING, AVOID SOIL COMPACTION BY UTILIZING CONSTRUCTION MATS. GEOTEXTILE FABRIC MAY BE INSTALLED UNDER CONSTRUCTION MATS WHERE REQUIRED.
5. AVOID ADJACENT WETLANDS, INSTALL SEDIMENT BARRIERS AT DOWN SLOPE EDGE OF RIGHT-OF-WAY ALONG WETLAND EDGE IF EVIDENT, OTHERWISE INSTALL BARRIER ON BOTH EDGES AS REQUIRED. A SEDIMENT FILTER DEVICE WILL BE PLACED ACROSS THE WORKSPACE AT THE WETLAND'S EDGE, IMMEDIATELY UPSLOPE OF THE WETLAND BOUNDARY.
6. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND REMOVE STUMPS AND OTHER CLEARING DEBRIS FROM WETLAND FOR DISPOSAL.
7. CONDUCT TRENCHLINE SOIL SEGREGATION (IF TOPSOIL IS NOT SATURATED). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF TWELVE (12) INCHES. NOTE 1' SOIL SEPARATION BETWEEN TOPSOIL AND BACKFILL. TOPSOIL STRIPPING OUTSIDE OF THE TRENCHLINE IS NOT PERMITTED. SPOILS STORED IN WETLANDS MUST BE STORED ATOP A BARRIER TO PREVENT SOIL MIXING.
8. TRENCH THROUGH WETLANDS.
9. PIPE SECTION TO BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
10. LOWER-IN PIPE PRIOR TO BACKFILLING TRENCH, IF REQUIRED, TRENCH PLUGS SHALL BE INSTALLED AS REQUIRED. BACKFILL TRENCH RETURNING SOIL LAYERS TO THEIR ORIGINAL STRATUM AND ELEVATIONS.
11. RESTORE GRADE TO PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.
12. IF UTILIZED, REMOVE TIMBER MATS OR PRE-FABRICATED MATS FROM WETLAND UPON COMPLETION WHEN NO LONGER NEEDED.



ANR WISCONSIN RELIABILITY PROJECT

STANDARD WETLAND CROSSING METHOD

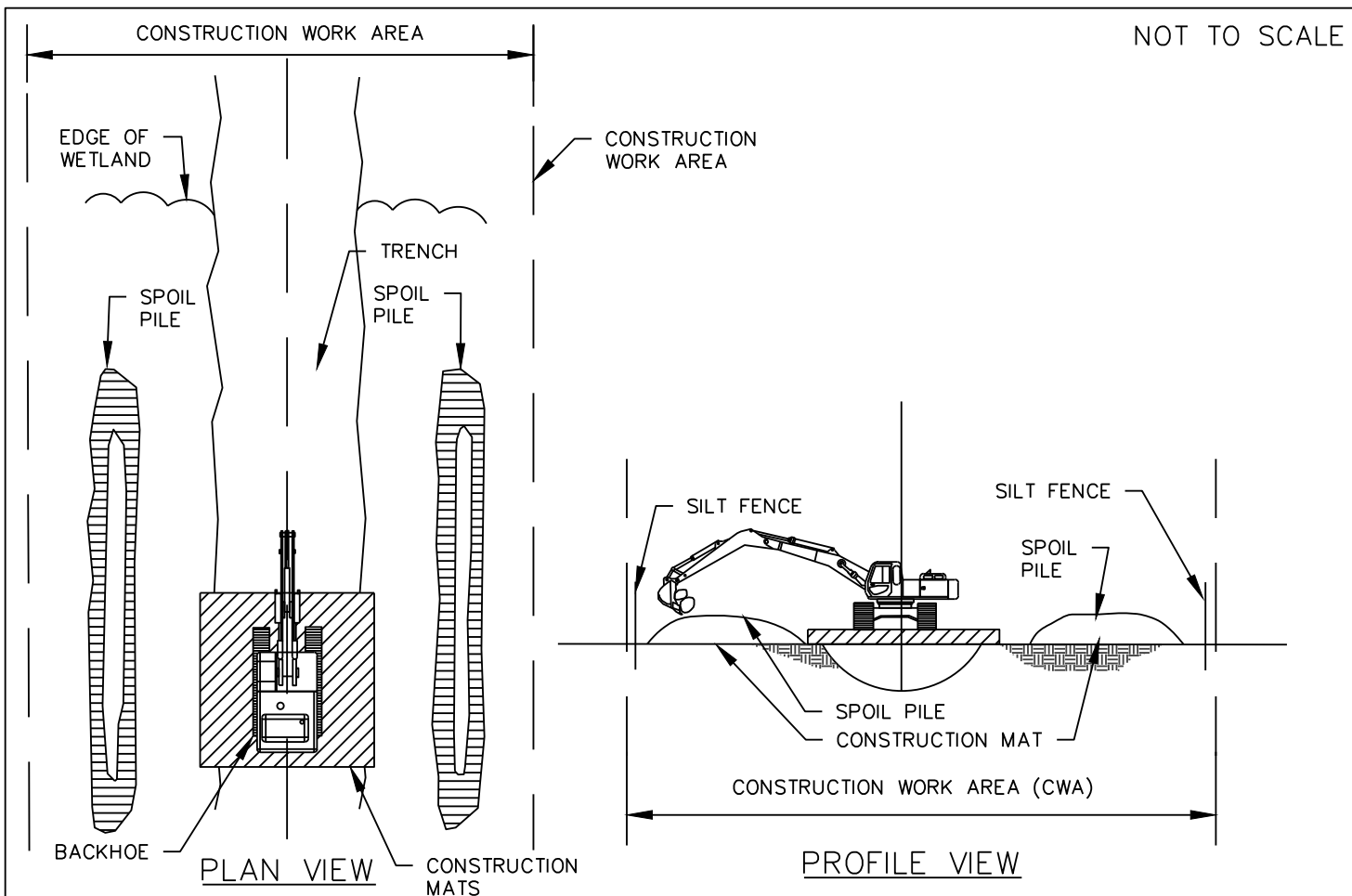
NO.	REVISION	APR.	DATE
1	MINOR EDITS TO DETAILS	JP	2/9/23

DATE: 11/29/2022

DRAWN BY: JGP

CHECKED BY: TJ

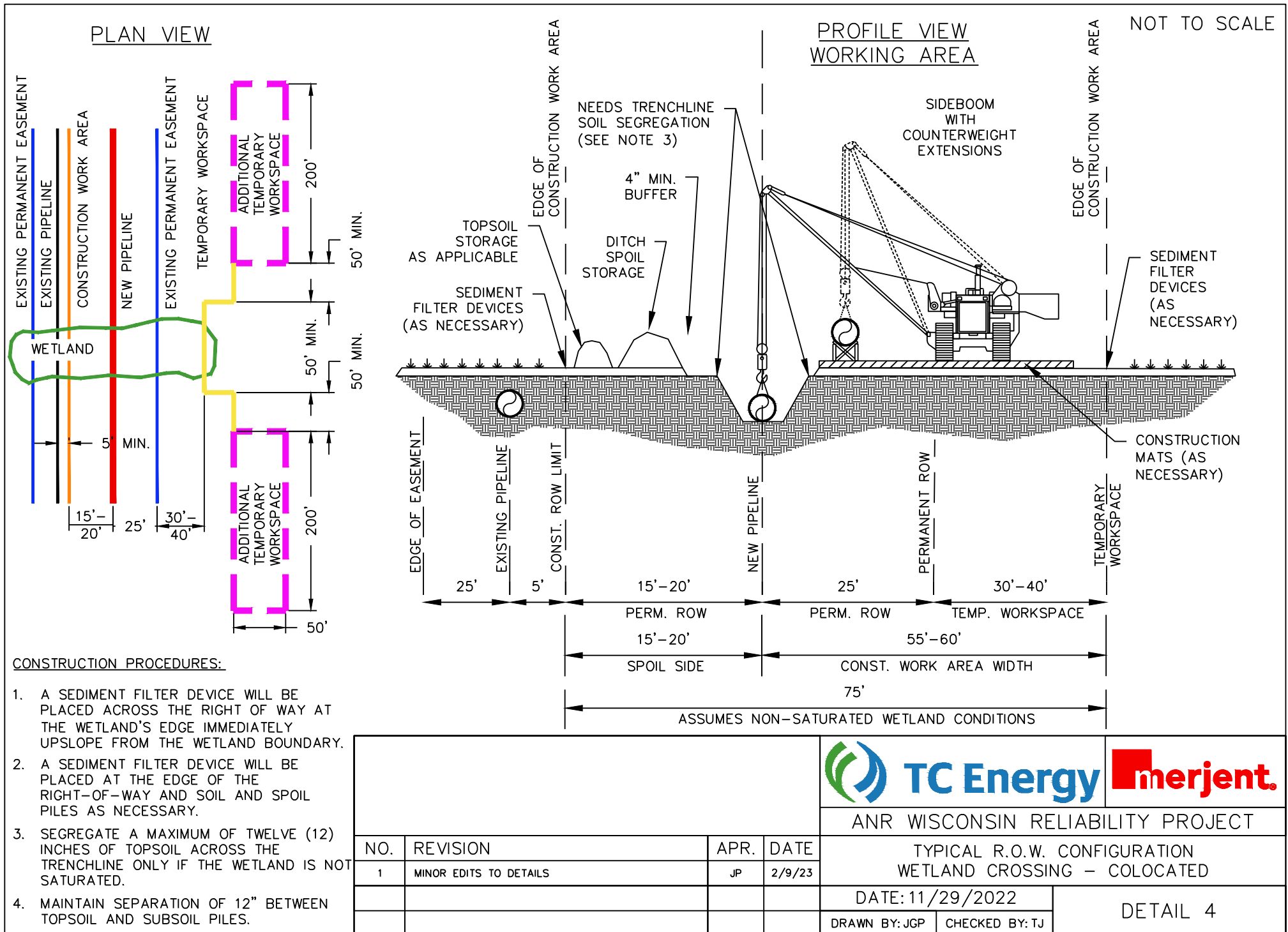
DETAIL 2

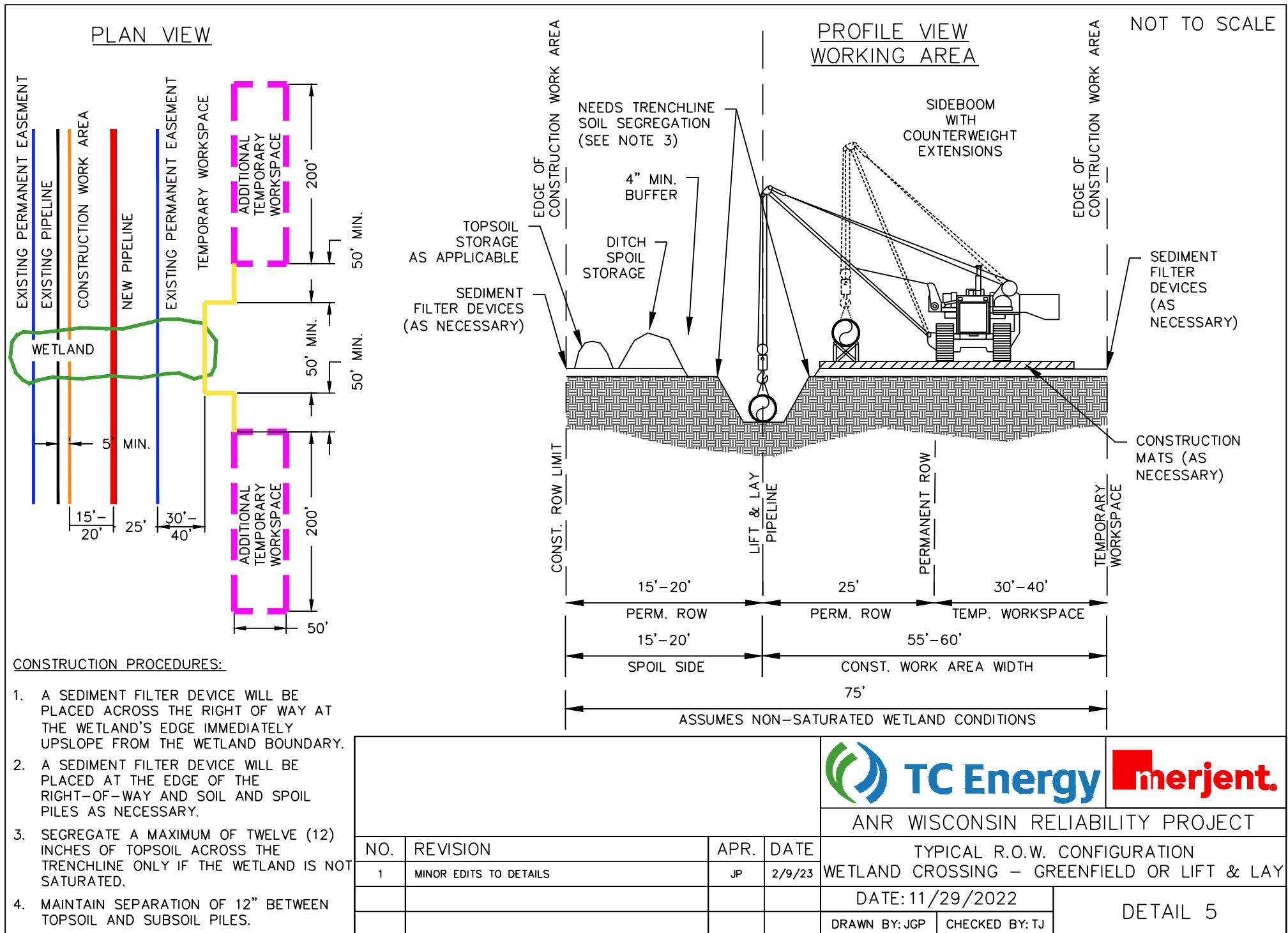


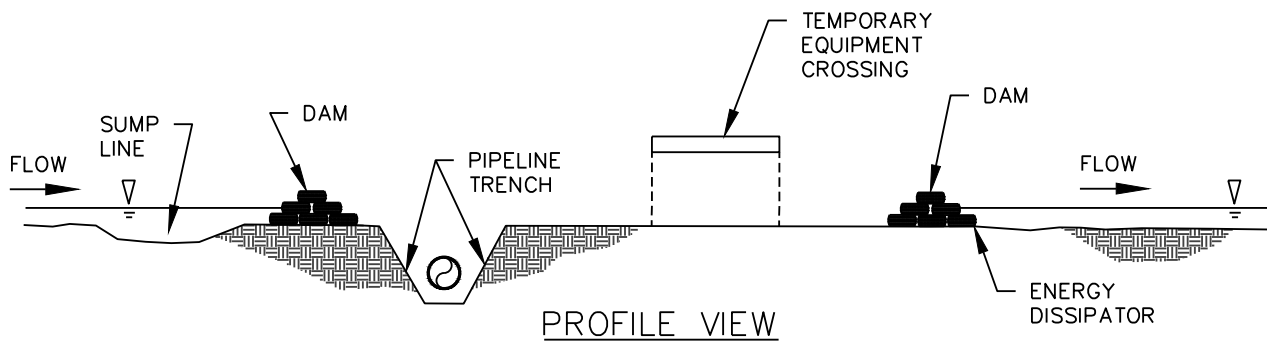
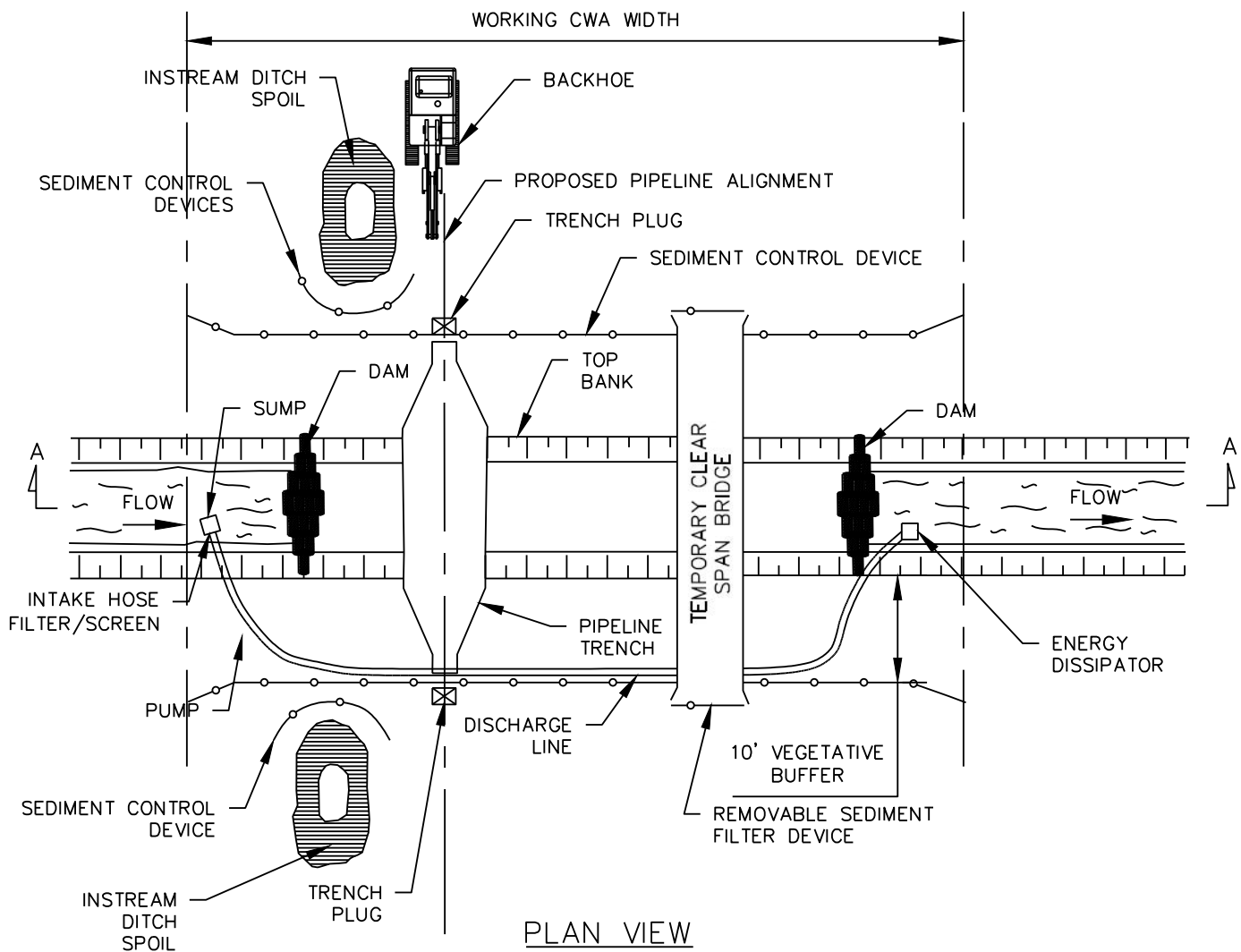
CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF NEEDED.
4. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND REMOVE STUMPS AND OTHER CLEARING DEBRIS FROM WETLAND FOR DISPOSAL.
5. TRENCHLINE SOIL SEGREGATION SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
6. IF CONSTRUCTION MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MAT FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE PATH. GEOTEXTILE FABRIC MAY BE INSTALLED UNDER MATS, WHERE REQUIRED.
7. AVOID ADJACENT WETLANDS, INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWN SLOPE EDGE OF RIGHT-OF-WAY ALONG EDGE OF EVIDENT, OTHERWISE INSTALL BARRIER ON BOTH EDGES AS REQUIRED.
8. FABRICATE PIPE IN STAGING AREA OUTSIDE OF THE WETLAND IN THE EXTRA WORK SPACE AS INDICATED ON THE CONSTRUCTION DRAWINGS.
9. LEAVE HARD PLUGS AT EDGE OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
10. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS AT WETLAND EDGES WHERE REQUIRED AND BACKFILL IMMEDIATELY.
11. REMOVE TIMBER MATS OR PRE-FABRICATED MATS FROM WETLAND EDGES AS REQUIRED AND BACKFILL IMMEDIATELY.
12. RESTORE GRADE TO PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL IF SALVAGED AND INSTALL PERMANENT EROSION CONTROL.
13. THE CONSTRUCTION RIGHT-OF-WAY FOR THIS TYPE OF CONSTRUCTION SHALL BE 75 FEET.

					
				ANR WISCONSIN RELIABILITY PROJECT	
NO.	REVISION	APR.	DATE	PUSH/PULL WETLAND CROSSING METHOD	
1	MINOR EDITS TO DETAILS	JP	2/9/23		
				DATE: 11/29/2022	DETAIL 3
				DRAWN BY: JGP CHECKED BY: TJ	







NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT-OF-WAY CONCEPTUAL ONLY.



TC Energy



ANR WISCONSIN RELIABILITY PROJECT

TYPICAL
DAM AND PUMP CROSSING

DATE: 11/29/2022

DETAIL 6.1

DRAWN BY: JGP

CHECKED BY: TJ

CONSTRUCTION PROCEDURES:

1. IF THERE IS ANY FLOW IN THE WATERCOURSE, OR IF ANY RAIN/SNOWMELT IS FORECASTED DURING THE DURATION OF THE INSTALLATION AND RESTORATION, INSTALL PUMPS TO MAINTAIN STREAMFLOW AROUND THE BLOCK OFF SECTIONS OF CHANNEL. A SECOND STANDBY PUMP OF EQUAL CAPACITY IS TO BE READILY AVAILABLE AT ALL TIMES. PUMP INTAKES WILL BE SCREENED AND FLOATING (NOT RESTING ON THE WATERWAY BED) TO MINIMIZE FISH ENTRAINMENT. AN ENERGY DISSIPATER IS TO BE BUILT TO ACCEPT PUMP DISCHARGE WITHOUT STREAMBED OR STREAMBANK EROSION. IF THE CROSSING IS PROLONGED BEYOND ONE DAY THE OPERATION NEED TO BE MONITORED OVERNIGHT.
2. SCHEDULE INSTREAM ACTIVITY FOR LOW FLOW PERIODS IF POSSIBLE.
3. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURE NEEDED TO PROTECT WATER QUALITY. INSTALL PRE-WORK SEDIMENT CONTROL MEASURES AS SPECIFIED IN THE PLAN OR IN ACCORDANCE WITH THE ECS. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE DAMS AND TO PUMP WATER MUST BE ON SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER CONSTRUCTION. PIPE SHOULD BE READY FOR INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
4. INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO SILT LADEN WATER ENTERS STREAM.
 - 4.1. NO SILT LADEN WATERS SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
 - 4.2. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
 - 4.3. SEDIMENT CONTROL DEVICE INSTALLATION SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE REMOVABLE SEDIMENT CONTROL DEVICE ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
 - 4.4. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
 - 4.5. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
 - 4.6. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.
5. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM TEN (10) FEET VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SEDIMENT CONTROL DEVICE UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE.
6. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN TEN (10) FEET OF THE WATERCOURSE. THIS MATERIAL MUST BE CONTAINED WITHIN BERM CONTAINMENT OR SEDIMENT CONTROL DEVICE WITH SECONDARY SILT FENCE PROTECTION TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE AS WELL AS MAINTAINING SOIL SEGREGATION.
7. CHEMICALS, FUELS, LUBRICATING OILS, SHALL NOT BE STORED AND EQUIPMENT REFILLED WITHIN 100 FEET OF THE WATERBODY. PUMPS ARE TO BE REFUELED AS PER THE PLANS.
8. STAGING AREAS ARE TO BE LOCATED AT LEAST TEN (10) FEET FROM THE WATERS EDGE (WHERE TOPOGRAPHIC CONDITIONS PERMIT) AND SHALL BE THE MINIMUM SIZE NEEDED.
9. DAMS ARE TO BE MADE OF STEEL PLATE, INFLATABLE PLASTIC DAM OR SAND BAGS. EARTHEN DAMS ARE NOT ALLOWED. DAMS MAY NEED KEYING INTO THE BANKS AND STREAMBED. ENSURE THAT THE DAM AND VEHICLE CROSSINGS ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION.
10. EXCAVATE TRENCH THROUGH PLUGS AND STREAMBED FROM BOTH SIDES, RE-POSITIONING DISCHARGE HOSE AS NECESSARY. LOWER THE PIPE IN THE TRENCH AND BACKFILL IMMEDIATELY. DURING THIS OPERATION WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
11. RESTORE THE STREAM BED AND BANKS TO PRE-CONSTRUCTION CONTOURS OR A STABLE ANGLE OF REPOSE, AS APPROVED BY THE ENVIRONMENTAL INSPECTOR.
 - 11.1. INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON SITE SPECIFIC BASIS.
 - 11.2. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING.
 - 11.3. MAINTAIN SEDIMENT CONTROL DEVICE ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.
12. WHEN THE STREAMBED HAS BEEN RESTORED, THE CREEK BANKS ARE TO BE CONTOURED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANCE MATERIAL COMPATIBLE WITH FLOW VELOCITY BETWEEN DAMS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ETC.) THE DAMS ARE TO BE REMOVED DOWNSTREAM FIRST. KEEP PUMP RUNNING UNTIL NORMAL FLOW IS RESUMED. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS. THE PLACEMENT OF STRUCTURES (E.G. ROCK RIP-RAP, TIMBER RIP-RAP, ETC.) IS NOT AUTHORIZED, UNLESS APPROVED BY THE APPLICABLE REGULATORY AGENCY(S).

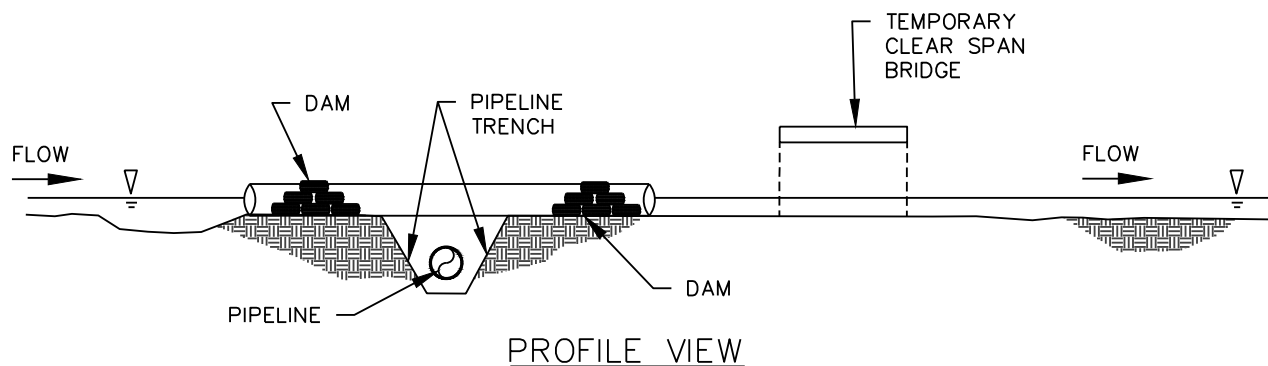
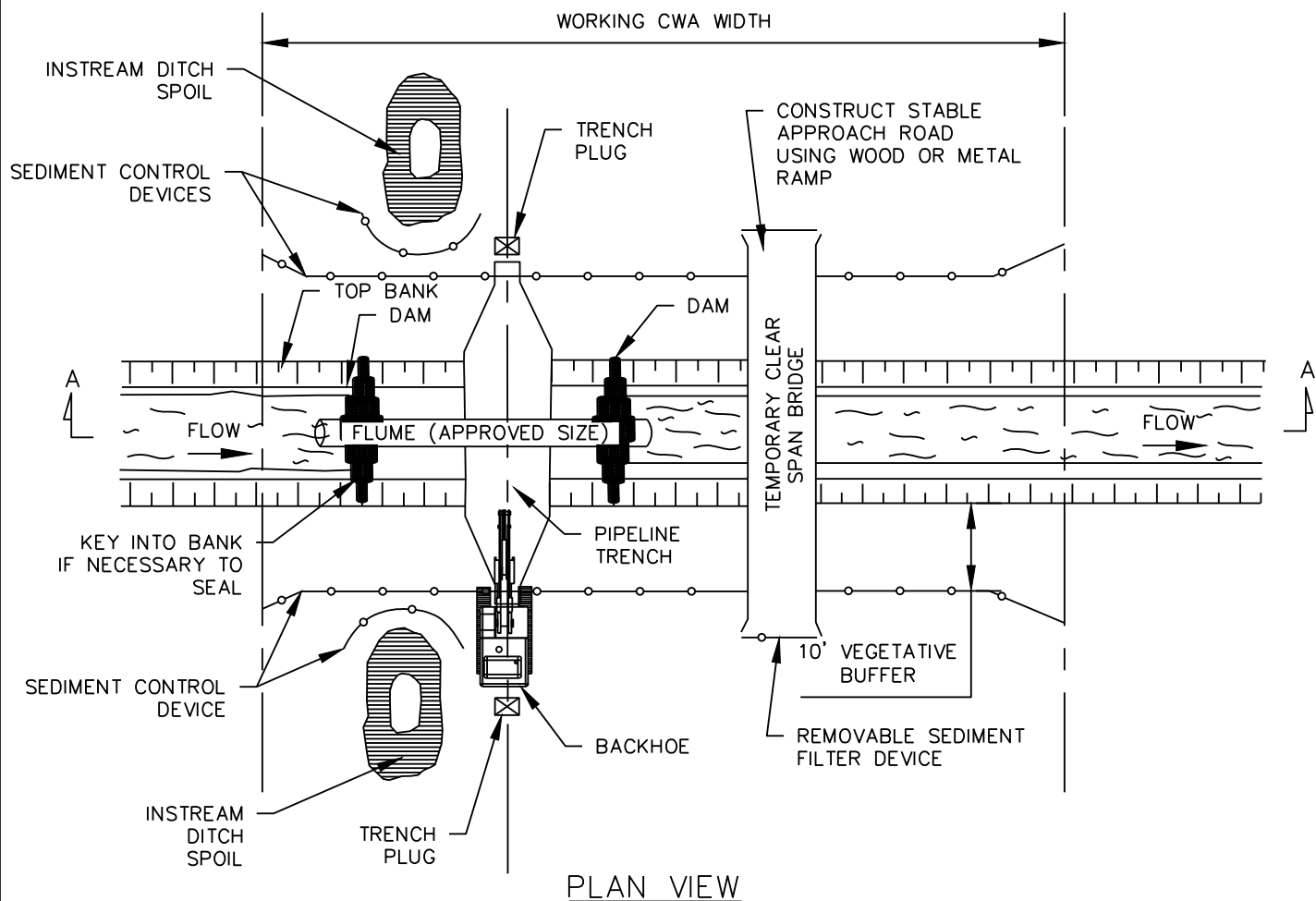


TC Energy



ANR WISCONSIN RELIABILITY PROJECT

NO.	REVISION	APR.	DATE	TYPICAL DAM AND PUMP CROSSING	
1	MINOR EDITS TO DETAILS	JP	2/9/23		
				DATE: 11/29/2022	DETAIL 6.2
				DRAWN BY: JGP CHECKED BY: TJ	



NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT-OF-WAY CONCEPTUAL ONLY.



ANR WISCONSIN RELIABILITY PROJECT

NO.	REVISION	APR.	DATE
1	MINOR EDITS TO DETAILS	JP	2/9/23

TYPICAL
FLUME CROSSING METHOD

DATE: 11/29/2022

DRAWN BY: JGP

CHECKED BY: TJ

DETAIL 7.1

CONSTRUCTION PROCEDURES:

1. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURE NEEDED TO PROTECT WATER QUALITY.
2. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE FLUME MUST BE ON-SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER WORK.
3. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM TEN (10) FEET VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SEDIMENT CONTROL DEVICE UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE.
4. INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO SILT LADEN WATER ENTERS STREAM.
 - 4.1. NO SILT LADEN WATERS SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
 - 4.2. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
 - 4.3. SEDIMENT CONTROL DEVICES SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE SEDIMENT CONTROL DEVICES ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
 - 4.4. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
 - 4.5. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OR THE CONSTRUCTION WORK AREA EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
 - 4.6. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY UNTIL THE WATERBODY CROSSING IS INSTALLED AND BACKFILLED.
5. PIPE SHALL BE READY FOR INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
6. ENSURE THAT THE DAMS AND VEHICLE CROSSINGS ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION.
7. FLUMES SHOULD BE SET WITH TEN (10) PERCENT OF THEIR DIAMETER BELOW STREAMBED LEVELS WHERE SOIL CONDITIONS PERMIT (OTHERWISE INSTALLED AT STREAM GRADE AND SLOPE). DREDGING TO INSTALL FLUME IS NOT ALLOWED.
8. FLUME PIPES WILL BE PROPERLY ALIGNED TO PREVENT BANK EROSION AND STREAMBED SCOUR.
9. PLACE IMPERVIOUS DAMS AT EACH END OF THE FLUME, UPSTREAM FIRST, THEN DOWN STREAM. ACCEPTABLE ALTERNATIVES INCLUDE SAND BAGS, STEEL PLATE. DURING INSTALLATION, INSTALL AN IMPERVIOUS MEMBRANE, IF NECESSARY, TO LIMIT LEAKAGE. DAMS MAY NEED KEYING INTO THE BANK AND STREAMBED. EXCAVATE TRENCH THROUGH PLUGS AND UNDER FLUME FROM BOTH SIDES. WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
 - 9.1. LOWER-IN PIPE BY PASSING UNDER FLUME AND BACKFILL IMMEDIATELY WITH SPOIL MATERIAL.
 - 9.2. IF BLASTING IS REQUIRED, USE CONTROLLED BLASTING TECHNIQUES TO PREVENT DAMAGE TO THE FLOW CONVEYANCE SYSTEMS. ALTERNATELY, BLASTING MAY BE ACCOMPLISHED PRIOR TO THE FLUME INSTALLATION BY RILLING THROUGH THE OVERBURDEN.
10. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN TEN (10) FEET OF THE WATERCOURSE. THIS MATERIAL SHALL BE CONTAINED TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.
11. FLUMES SHOULD BE REMOVED AS SOON AS POSSIBLE. WHEN NO LONGER REQUIRED FOR PIPE LAYING OR FOR ROAD ACCESS. IN THE FOLLOWING MANNER:
 - 11.1. REMOVE THE VEHICLE CROSSING RAMP. BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE FLOW CONDITIONS (E.G. EROSION CONTROL BLANKETS, ETC.) TO MAXIMUM EXTENT POSSIBLE BEFORE REMOVING THE DAMS.
 - 11.2. REMOVE DOWNSTREAM DAM.
 - 11.3. REMOVE UPSTREAM DAM.
 - 11.4. REMOVE FLUME.
 - 11.5. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.
12. RESTORE THE STREAMBED AND BANKS TO PRE-CONSTRUCTION CONTOURS. STABLE ANGLE OF REPOSE, AS APPROVED BY THE ENVIRONMENTAL INSPECTOR.
 - 12.1. INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE SPECIFIC BASIS OR IN ACCORDANCE WITH THE ENVIRONMENTAL CONSTRUCTION STANDARDS.
 - 12.2. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING.
 - 12.3. MAINTAIN SEDIMENT CONTROL DEVICES ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.



TC Energy



ANR WISCONSIN RELIABILITY PROJECT

NO.	REVISION	APR.	DATE
1	MINOR EDITS TO DETAILS	JP	2/9/23

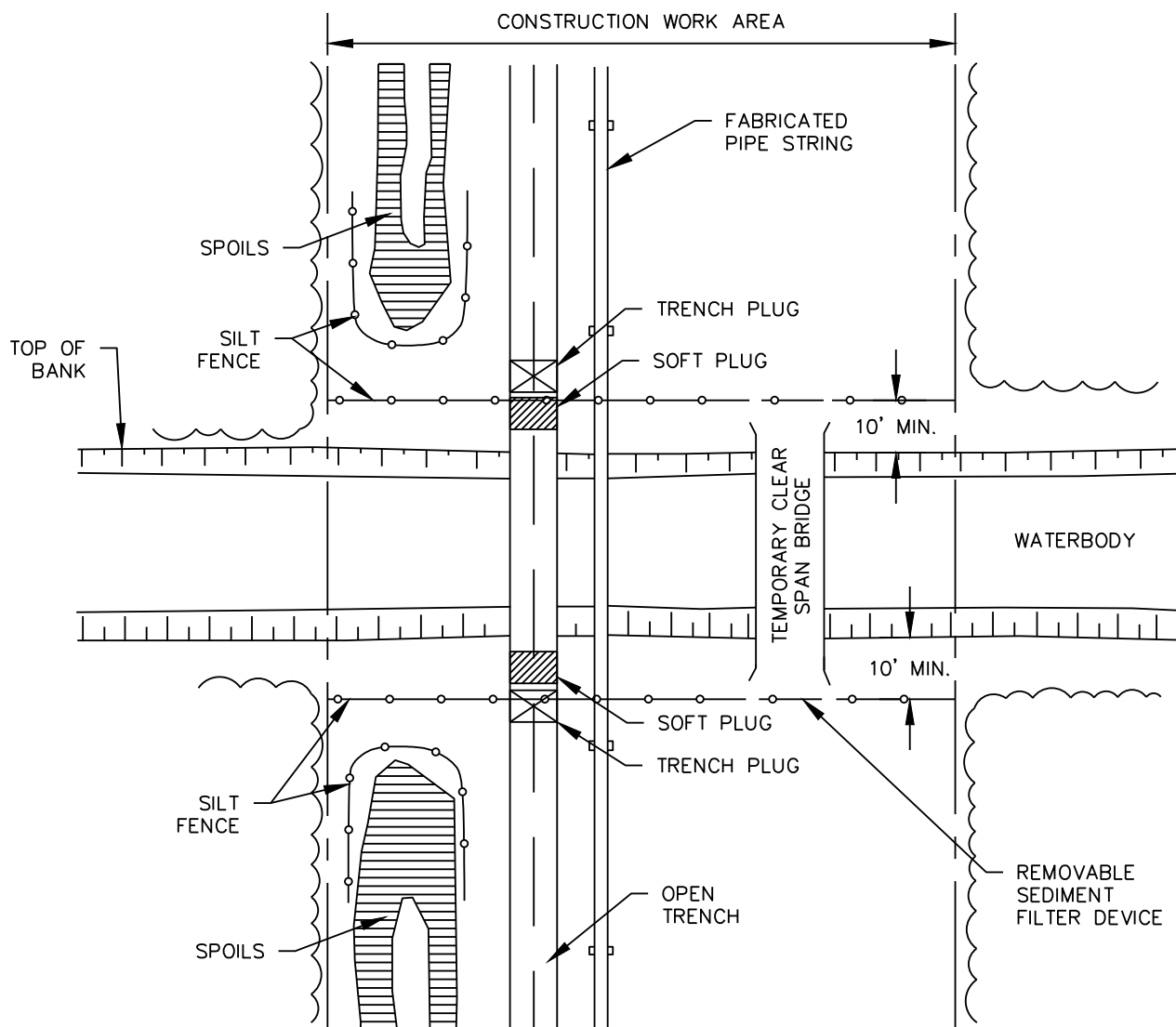
TYPICAL
FLUME CROSSING METHOD

DATE: 11/29/2022

DRAWN BY: JGP

CHECKED BY: TJ

DETAIL 7.2



PLAN VIEW

NOTES:

1. IF FLOWS ARE PRESENT DURING CONSTRUCTION REFER TO DETAILS 6.1/6.2 OR 7.1/7.2.
2. INSTALL SILT FENCE PARALLEL TO DRAINAGE DOWNSLOPE OF RIGHT-OF-WAY TO PREVENT RUNOFF FROM THE RIGHT-OF-WAY TO ADJACENT, UNDISTURBED DRAINAGE.
3. STOCKPILE TOPSOIL AND SPOIL SEPARATELY. TOPSOIL SHALL NOT BE STOCKPILED ACROSS THE DRAINAGE CHANNEL AND SHALL BE PLACED A MINIMUM OF TEN (10) FEET FROM THE ORDINARY HIGH WATER MARK (OHWM) OF THE SITE CONDITIONS AND PROTECT THE DRAINAGE AS DETERMINED.
4. INSTALL TEMPORARY SLOPE BREAKERS ABOVE THE ORDINARY HIGH WATER MARK (OHWM) TO MINIMIZE SEDIMENTATION TO THE DRAINAGE.
5. TRENCH, STRING PIPE, AND BACKFILL USING STANDARD UPLAND CONSTRUCTION PROCEDURES UNLESS OTHERWISE DIRECTED.
6. RESTORE WATERCOURSE CHANNEL AND BANKS (EXCEPT TRAVEL LANE) TO PERMANENT EROSION CONTROLS WHERE DIRECTED.



TC Energy



Merjent

ANR WISCONSIN RELIABILITY PROJECT

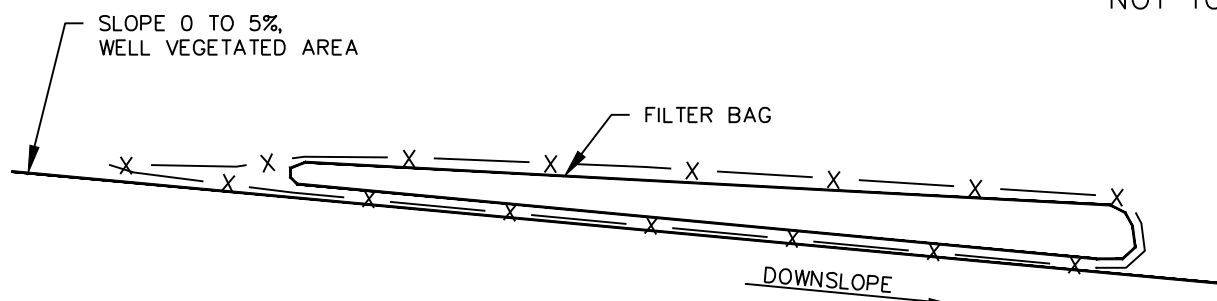
TYPICAL OPEN CUT WET CROSSING
METHOD – NON FLOWING WATERBODY

DATE: 11/29/2022

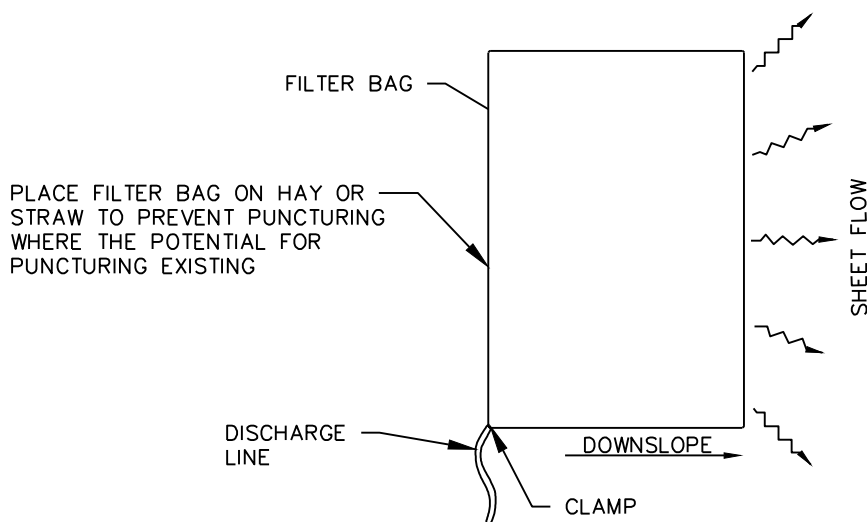
DETAIL 8

DRAWN BY: JGP

CHECKED BY: TJ



SECTION



PLAN VIEW

NOTES:

1. MANUFACTURED NON-WOVEN (FELT) FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. FILTER BAGS SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER.
2. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.
3. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. ONLY ONE PUMP DISCHARGE HOSE SHOULD BE USED PER BAG UNLESS BAG IS SPECIFICALLY MANUFACTURED TO ACCEPT MORE THAN ONE.
4. DO NOT ALTER OR CUT BAGS.
5. BAGS CANNOT BE ACCESSED BY EQUIPMENT UNLESS IT CAN BE REACHED FROM WITHIN THE PERMITTED WORKSPACE.
6. BAGS WILL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT.
7. ADDITIONAL SEDIMENT AND EROSION CONTROLS MAY NEED TO BE INSTALLED AROUND THE FILTER BAG, AS APPROPRIATE, AND APPROVED BY THE ENVIRONMENTAL INSPECTOR.



ANR WISCONSIN RELIABILITY PROJECT

NO.	REVISION	APR.	DATE
1	xxxx	xx	xx/xx/xx

TYPICAL DEWATERING
FILTER BAG

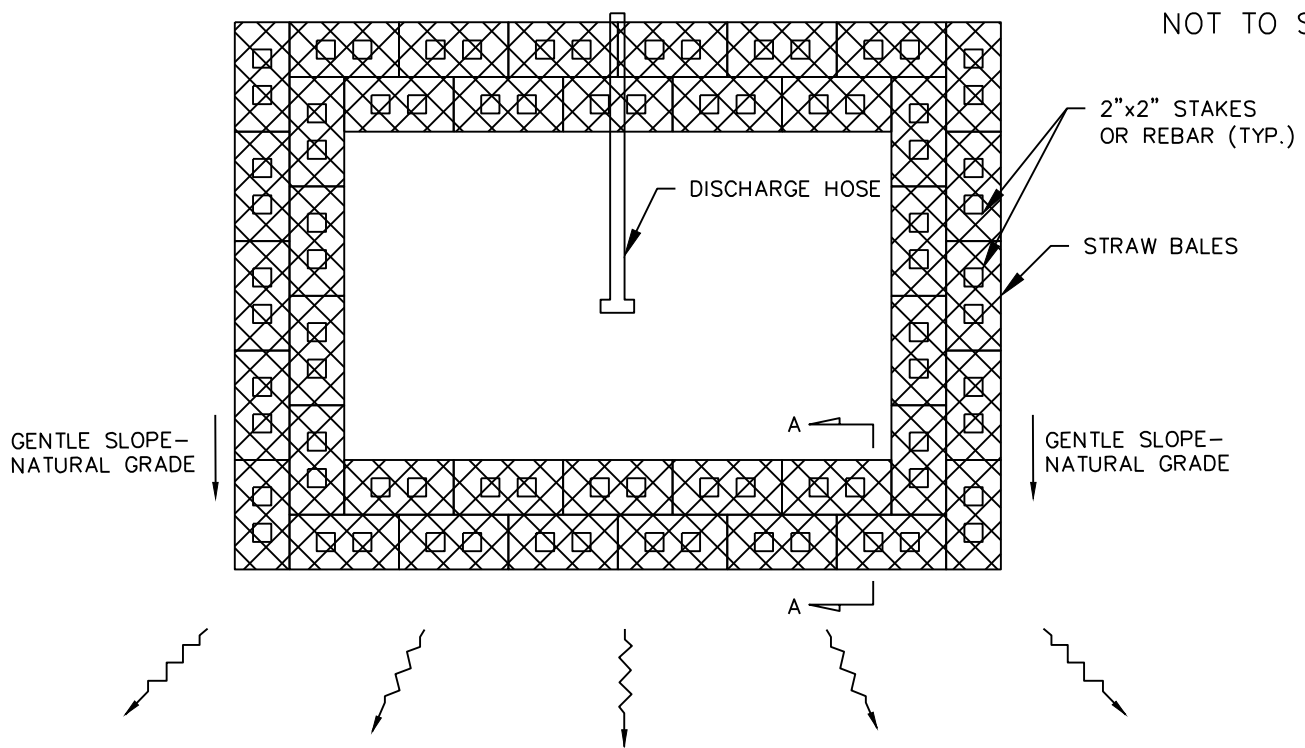
DATE: 3/17/2023

DRAWN BY: MK

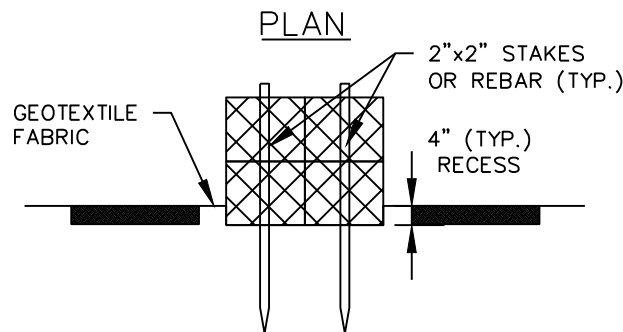
CHECKED BY: JP

DETAIL 9

NOT TO SCALE



PLAN



SECTION A-A

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHENEVER IT IS NECESSARY AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PREVENT THE FLOW OF SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AWAY FROM ANY WATERBODY. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWNSLOPE FROM THE DEWATERING SITE MUST BE REASONABLY FLAT OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. DISCHARGE RATES SHOULD BE SUCH THAT THE CAPACITY OF THE STRUCTURE WILL NOT BE EXCEEDED.
4. DISCHARGE WATER SHALL BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD USING A COMBINATION OF STRAW BALES AND THE NATURAL TOPOGRAPHY. RECESS STRAW BALES. DRIVE TWO (2) STAKES OR REBAR INTO EACH BALE TO ANCHOR THEM IN PLACE.
5. A FILTER BAG MAY ALSO BE UTILIZED INSIDE THE DEWATERING STRUCTURE TO HELP FILTER THE DISCHARGE.
6. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.



ANR WISCONSIN RELIABILITY PROJECT

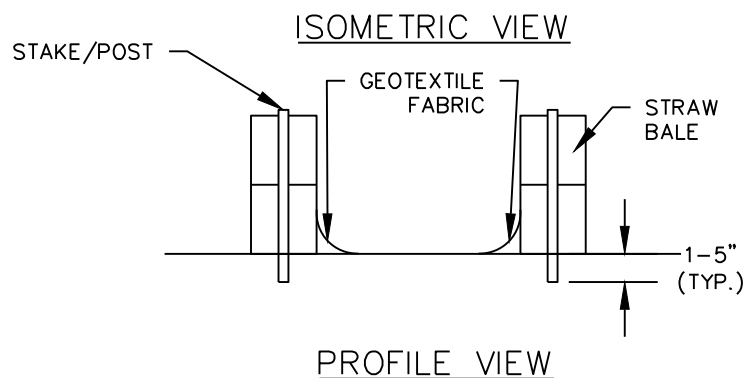
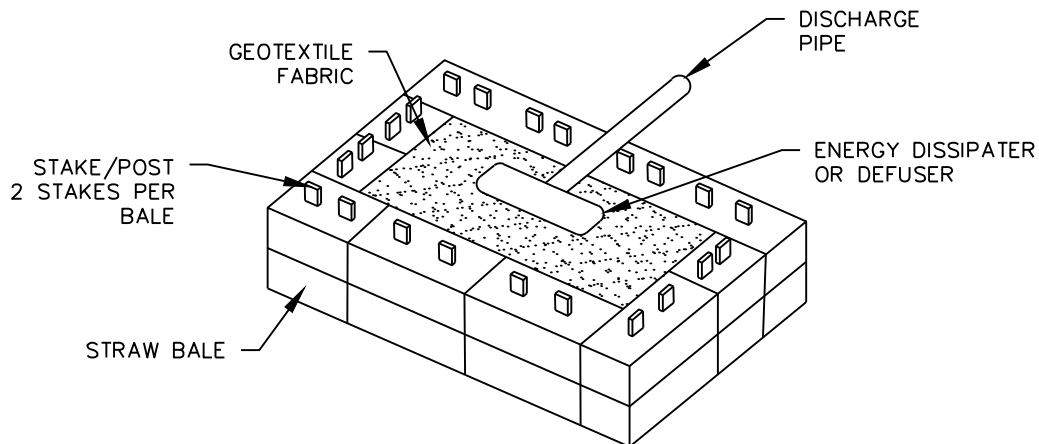
TYPICAL STRAW BALE DEWATERING
STRUCTURE FOR TRENCH DEWATERING

DATE: 3/17/20223

DRAWN BY: MK

CHECKED BY: JP

DETAIL 10

NOTES:

1. ALL DEWATERING ACTIVITIES WILL BE CONDUCTED IN ACCORDANCE WITH PERMIT CONDITIONS
2. DISCHARGE SITE SHOULD BE WELL VEGETATED, WHERE POSSIBLE, AND LOCATED AT LEAST 50FT. FROM ANY WATERBODY. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM THE WORK AREAS.
3. DIRECT THE PUMPED WATER INTO A STABLE SPILL PAD CONSTRUCTED OF STRAW BALES OR GEOTEXTILE FABRIC STAKED TO THE GROUND SURFACE.
4. DISCHARGE RATES SHOULD BE SUCH THAT THE STRUCTURE WILL NOT OVERFLOW.
5. FILTER BAGS ARE SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. STRAW BALES OR FILTER SOCK CAN BE ADDED AROUND THE FILTER BAG TO PROVIDE ADDITIONAL SEDIMENT CONTROL WHERE NEEDED.
6. STAKES OR POSTS SHOULD BE 2X2 WOOD OR SUITABLE ALTERNATIVE.
7. SIZE OF DEWATERING STRUCTURE WILL BE DETERMINED BASED ON VOLUME OF DISCHARGE.



ANR WISCONSIN RELIABILITY PROJECT

HYDROSTATIC TEST
DEWATERING PIT

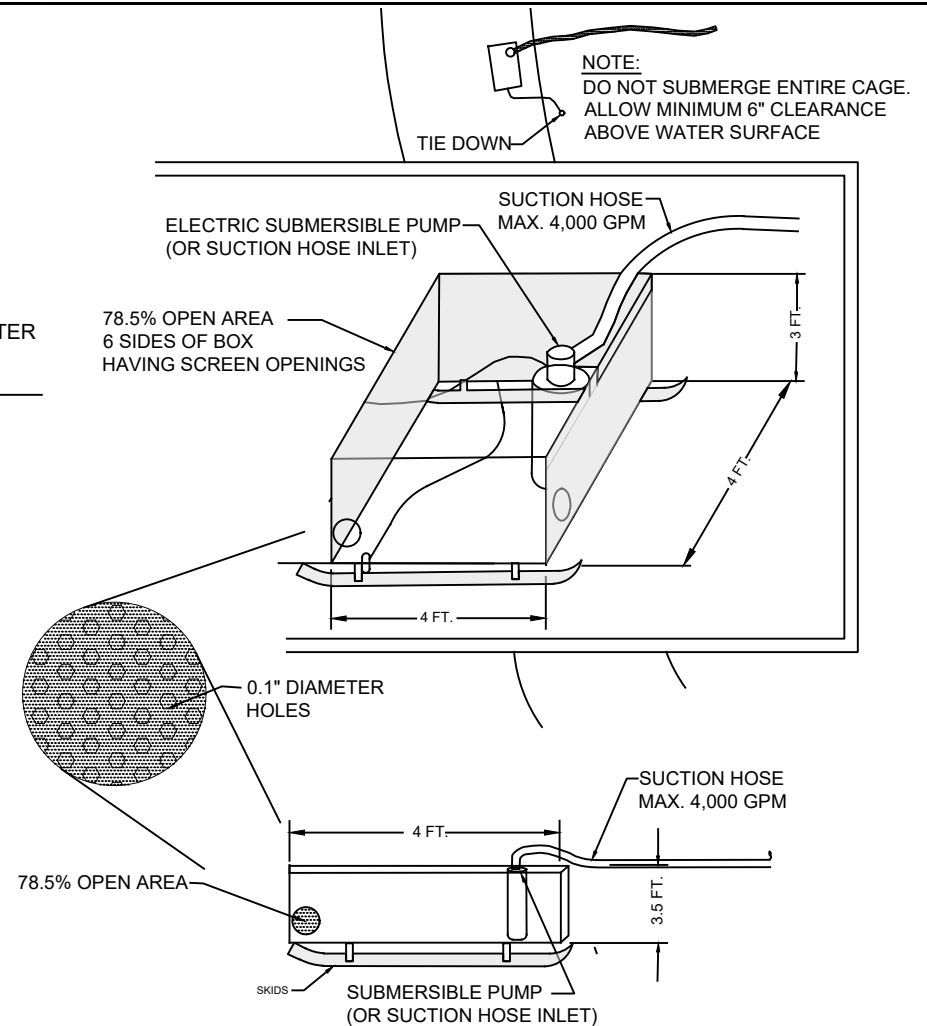
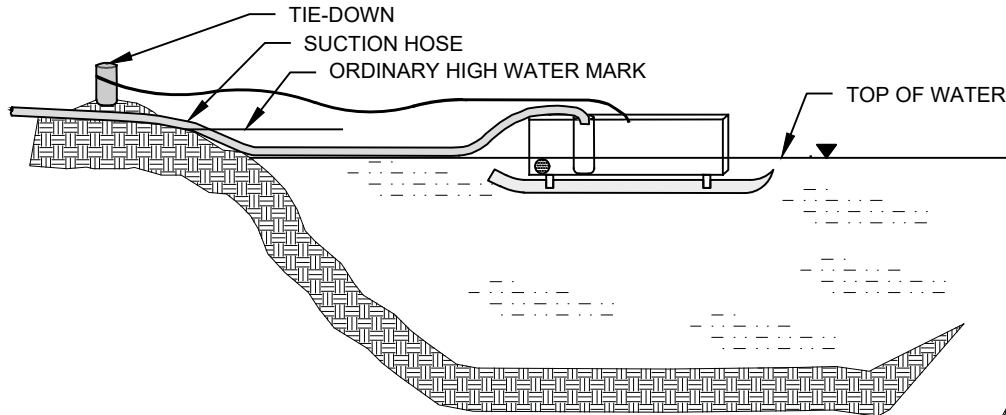
DATE: 5/6/20223

DRAWN BY: JP

CHECKED BY: JP

DETAIL 12

DO NOT SUBMERGE ENTIRE CAGE.
ALLOW MINIMUM 6" CLEARANCE
ABOVE WATER SURFACE

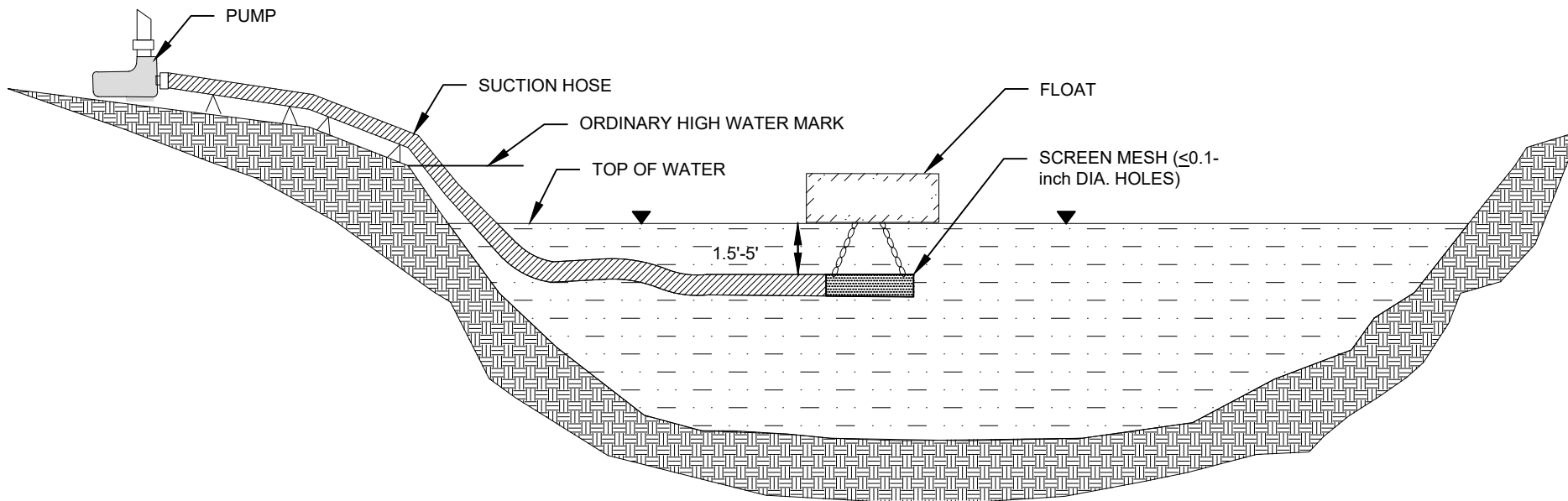


NOTES:

1. WATER WILL BE WITHDRAWN FROM THE APPROPRIATION SOURCE THROUGH A SCREENED FLOATING PUMP AND WILL NOT DISTURB THE STREAMBED OR IMPEDE NAVIGATION
2. THE INTAKE WILL UTILIZE A SCREEN MESH WITH ≤ 0.1 INCH DIAMETER HOLES

				 	
				ANR WISCONSIN RELIABILITY PROJECT	
NO.	REVISION	APR.	DATE	FLOATING PUMP INTAKE	
				DATE: 07/12/2023	
				DRAWN BY: JPC	CHECKED BY: EN
				DETAIL 10	

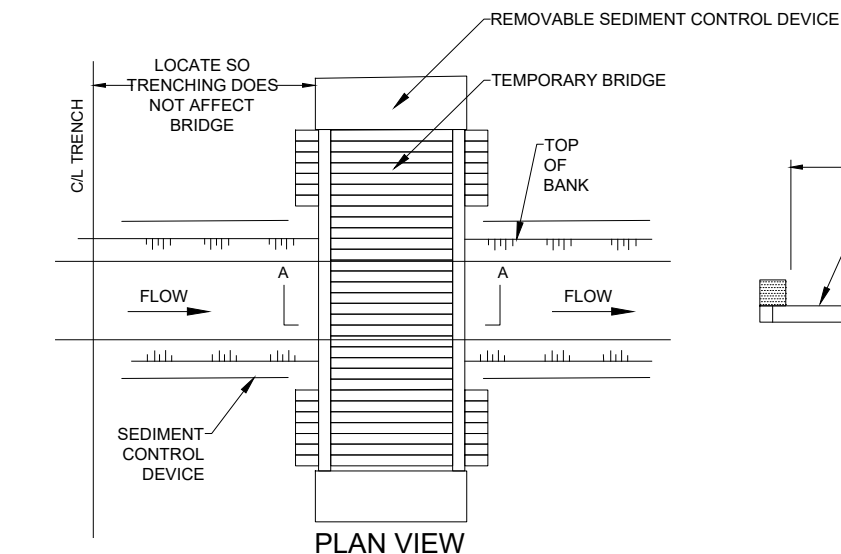
PUMP TO BE PLACED IN A
SECONDARY CONTAINMENT



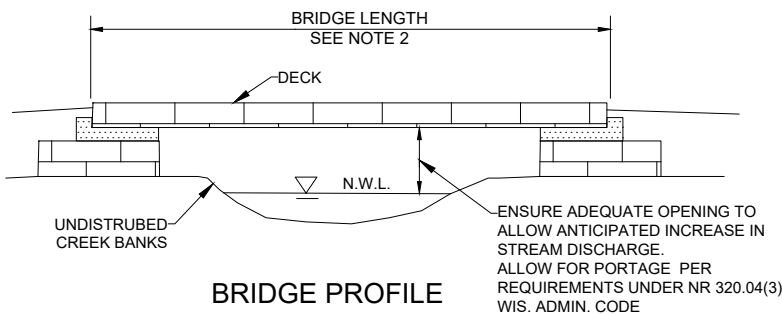
NOTES:

1. WATER WILL BE WITHDRAWN FROM THE APPROPRIATION SOURCE THROUGH A SCREENED FLOAT.
2. INTAKE HOSE FLOATS AND WILL NOT REQUIRE ANY STREAMBED DISTURBANCE AND WILL NOT IMPEDE NAVIGATION.
3. THE INTAKE WILL UTILIZE A SCREEN MESH WITH ≤ 0.1 INCH DIAMETER HOLES.

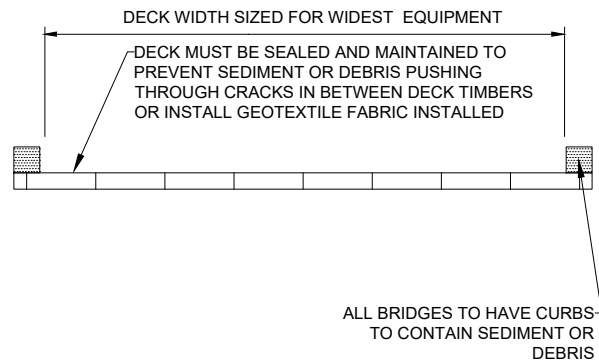
					
				ANR WISCONSIN RELIABILITY PROJECT	
NO.	REVISION	APR.	DATE	INTAKE HOSE WITH FLOAT	
				DATE: 07/12/2023	
				DRAWN BY: JPC	CHECKED BY: EN
				DETAIL 9	



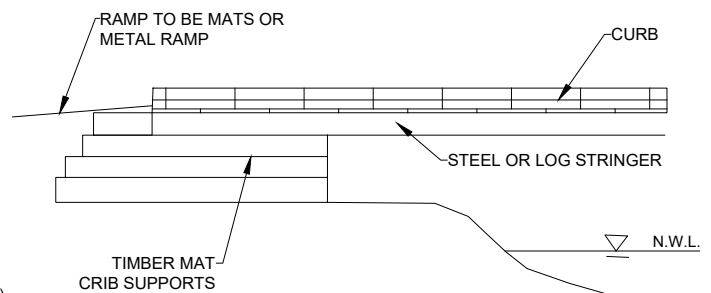
PLAN VIEW



BRIDGE PROFILE



SECTION A -A



TYPICAL TEMPORARY CRIB ABUTMENT

CONSTRUCTION PROCEDURES:

IN GENERAL TERMS, THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION PROCEDURES THAT ARE RECOMMENDED TO BE FOLLOWED FOR TEMPORARY BRIDGE CROSSINGS:

1. TEMPORARY BRIDGES MUST COMPLETELY SPAN THE WATERWAY FROM TOP OF CHANNEL TO TOP OF CHANNEL WITH NO SUPPORT PILINGS IN THE WATERWAY.
2. INSTALL THE BRIDGE FROM THE WATERWAY BANKS AND IN A MANNER THAT WILL PREVENT SEDIMENT ENTERING THE WATER. STRINGERS MUST BE DESIGNED TO SUPPORT THE LOADS EXPECTED ON THE BRIDGE. CURBS MUST BE INSTALLED ALONG THE EDGE OF THE DECK TO CONTAIN SEDIMENT AND DEBRIS ON THE BRIDGE. FASTENERS CONNECTING THE COMPONENTS MUST BE STRONG ENOUGH TO HOLD THEM IN POSITION DURING THE LIFE OF THE BRIDGE.
3. MAINTAIN A SEDIMENT CONTROL DEVICE ON EACH SIDE OF THE WATERBODY EXTENDING A MINIMUM OF 10 FEET BEYOND THE WIDTH OF DISTURBANCE UNTIL VEGETATION HAS BEEN ESTABLISHED IN UPSLOPE AREAS.
4. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE ANY BUILD-UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSAL OF MATERIAL SHALL NOT BE PLACED IN A WETLAND OR FLOODPLAIN
5. BRIDGES SHALL BE ANCHORED TO PRESENT TRANSPORTATION DOWNSTREAM.

				 TC Energy			
				ANR WISCONSIN RELIABILITY PROJECT			
NO.	REVISION	APR.	DATE	TEMPORARY CLEAR SPAN BRIDGE			
				DATE: 07/13/2023		DETAIL 11	
				DRAWN BY:JPC	CHECKED BY:EN		

Appendix F Wisconsin Reliability Project Fugitive Dust Control Plan



ANR PIPELINE COMPANY
Wisconsin Reliability Project

Fugitive Dust Control Plan

Docket No.
PF-5-000

July 2022

TABLE OF CONTENTS

1.0 INTRODUCTION..... 1

1.1 OBJECTIVE 1

1.2 PROJECT DESCRIPTION 1

2.0 FUGITIVE DUST SOURCES 1

3.0 APPLICABLE REGULATORY REQUIREMENTS 2

4.0 FUGITIVE DUST CONTROL MEASURES..... 2

4.1 WATER SOURCES..... 3

5.0 INSPECTION, MONITORING, AND RECORDKEEPING 3

ACRONYMS AND ABBREVIATIONS

ANR	ANR Pipeline Company
EI	Environmental Inspector
Project	Wisconsin Reliability Project
ROW	right-of-way
WDNR	Wisconsin Department of Natural Resources

1.0 INTRODUCTION

1.1 OBJECTIVE

The objective of this fugitive-dust control plan is to identify potential dust-emission sources and provide guidance to construction and field personnel on measures to control the generation of fugitive dust during construction activities associated with the proposed Wisconsin Reinforcement Project (Project). Construction of the proposed facilities will result in fugitive dust. It will be the responsibility of Project contractors, working with designated environmental inspectors (EI), to identify all activities generating fugitive dust, implement feasible control measures, and ensure compliance with applicable fugitive-dust regulations.

1.2 PROJECT DESCRIPTION

ANR Pipeline Company (ANR) is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC or Commission) under Sections 7(b) and 7(c) of the Natural Gas Act, as amended, for its Wisconsin Reliability Project (Project). ANR is proposing to replace existing pipeline at three distinct locations with 51 miles of new pipeline in Illinois and Wisconsin; uprate and/or replace compressor units at two existing compressor stations (CS) in Wisconsin; modify six meter stations (MS) in Wisconsin; and modify mainline valves (MLV), launchers, and receivers at nine existing aboveground facility sites in Illinois and Wisconsin.

2.0 FUGITIVE DUST SOURCES

Fugitive dust (i.e., dust clouds, plumes, or haze) could be generated directly from pipeline installation and aboveground facility construction. This dust-control plan applies only to fugitive dust generated by construction activities and trips by support equipment and vehicles on unpaved roads. These sources are discussed in more detail in Resource Report 9: Air Quality and Noise.

The following construction activities have been identified as having the potential to generate fugitive dust.

- Vehicle and motorized equipment movement on paved and unpaved access roads;
- Vegetation removal;
- Clearing and grading;
- Topsoil removal;
- Cutting and filling;
- Trenching;
- Backfilling;
- Blasting;

- Track-out onto roads;
- Bulk material loading, hauling and unloading;
- Use of material storage piles; and
- Use of parking, staging, and storage areas.

All areas of pipeline construction will be monitored for fugitive-dust generation. Fugitive-dust control measures, including the use of water trucks, will be used to suppress dust in any particular area of concern. A listing of potential fugitive dust-control measures to be used during construction activities is included in Section 4 of this plan. It is the responsibility of the Project contractor(s) and the designated EI(s) to ensure all sources of dust generation are identified.

3.0 APPLICABLE REGULATORY REQUIREMENTS

The Wisconsin Department of Natural Resources (WDNR) has regulations that apply to particulate matter and visible emissions for stationary source operating emissions in Chapter NR 415, Control of Particulate Matter and Chapter NR 430, Control of Visible Emissions, respectively. Applicable requirements will be included in the applicable stationary source air permits. However, the WDNR does not directly regulate emissions from construction activities as these activities are not included in the stationary source operating permit.

4.0 FUGITIVE DUST CONTROL MEASURES

Abatement measures for dust will be required on the construction ROW or access roads when a visible plume of dust extends more than 300 feet from the source with an estimated opacity exceeding 20 percent (objects partially obscured). The generation of fugitive dust during construction activities will be reduced through the application of appropriate control measures. The contractor will be responsible for controlling dust by implementing the appropriate measures, including reducing travel speed and/or applying dust suppressants (e.g., water). Water trucks will be the primary means of dust abatement during all phases of construction. Where roads are paved, no dust mitigation is necessary. The contractor will supply water trucks for dust abatement to supply water from water source(s) in proximity to the Project area. Water spray will be controlled so that over-spraying and pooling will be avoided to the extent possible.

Based on typical practices for natural-gas pipeline installation and the requirements of the aforementioned agencies, the following specific control measures will be used as needed to control fugitive dust emissions for the Project.

- Take every reasonable precaution to minimize fugitive dust emissions from construction activities.
- Utilize existing public and private roads and pipeline ROW for access during construction wherever possible.
- Apply water one or more times per day to all affected unpaved roads, unpaved haul/access roads, and staging areas (when in use).
- When appropriate, apply a water/magnesium chloride mixture as needed as a dust suppressant.

- Reduce vehicle speeds on all unpaved roads, and unpaved haul and access roads. Speed limits will be set to 20 mph for unpaved roads or in accordance with posted public speed limits.
- Clean up track-out and/or carry-out areas at paved road access points at a minimum of once every 48 hours.
- Gravel pads may be installed adjacent to paved roadways to limit track-out, and clearly established and enforced traffic patterns may be used to route traffic over track-out control devices.
- For bulk transfer operations, spray handling and transfer points with water at least 15 minutes before use.
- Cover all haul truck loads, or maintain at least six inches of freeboard space in each cargo compartment. Ensure that all haul truck cargo compartments are constructed and maintained to minimize spillage and loss of materials, and clean or wash each cargo compartment at the delivery site after removal of the bulk materials.
- Apply water to active construction areas as needed. Areas should be pre-watered and soils maintained in a stabilized condition where support equipment and vehicles will operate. Water disturbed soils to form a crust.
- For temporary surfaces during periods of inactivity, restrict vehicular access by means of either fencing or signage, and apply water to comply with the stabilized surface requirements.

4.1 WATER SOURCES

ANR will use a municipal water source during hydrostatic testing and dust abatement. ANR will acquire the appropriate permits necessary for providing hydrostatic test and dust abatement water.

5.0 INSPECTION, MONITORING, AND RECORDKEEPING

The Project contractors will implement the dust-control measures specified in this plan. The environmental inspector will be primarily responsible for monitoring and enforcing the implementation of needed dust control measures. The EI(s) will also be responsible for making sure that dust control is effective and proper documentation is maintained. All construction-site personnel will be educated on the measures outlined in this plan. The mandatory Employee Environmental Awareness Program will address fugitive dust issues and appropriate measures.

- Field inspection for dust control will occur daily. The Project contractor(s) and the EI(s) will be responsible for recording the following information on a daily basis.
- Weather conditions (temperature, wind speed, and direction);
- Number of water trucks in use;

- Cases where visible dust was of such a concentration that abatement measures were implemented;
- Condition of project soils (crusted, damp, or unstable);
- Condition of project access roads (crusted, damp, or unstable);
- Presence of track-out and when it was cleaned;
- Overall status of dust control compliance.

This information will be incorporated into the EI's daily report.

Appendix G Wisconsin Reliability Project Spill Prevention, Control, and Countermeasure Plan



ANR PIPELINE COMPANY

Wisconsin Reliability Project

Spill Prevention, Control, and Countermeasure Plan

July 2022

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES

General

Spills of any amount of petroleum products or polluting materials are to be prevented. All employees handling fuels and other hazardous materials will be properly trained. All equipment must be in good operating order and inspected on a regular basis. Fuel trucks transporting fuel to on-site equipment must travel on approved access roads. All construction crews should have sufficient supplies of absorbent and barrier materials to allow rapid containment and recovery of spilled materials, sufficient tools and materials to stop leaks, and know TC Energy's spill reporting procedure described in Section IV.B. The following will be followed to help avoid spills and minimize the impact of spills, which accidentally occur:

- Bulk quantities of fuel should be stored in one for the Project. Adequate spill containment measures, such as containment dikes, combined with impervious lining will be installed before fuel storage tanks are filled, and will be maintained throughout the Project. Bulk quantities of hazardous liquids (e.g., solvents and lubricants) will be stored at the fuel depot locations. All fuel storage, regardless of size, shall be in secondary containment. Double-walled tanks should be within secondary containment as well.
- Equipment refueling will not be performed within 100 feet of any body of water or wetland unless the Environmental Inspector determines that there is no reasonable alternative. In such cases, refueling will be conducted using hand-carried cans (5 gallon maximum capacity) and by placing sorbent materials or secondary containment under the area of refueling before refueling begins. Care will be taken during refueling not to overfill or spill fuel onto the housing of equipment. Equipment refueling shall be conducted in accordance with applicable federal, state, and local regulations.
- Lesser quantities of fuel and solvents and lubricants (e.g., motor oils, hydraulic fluid) may be stored along the CWA, as necessary, to service equipment used on the Project (quantities vary depending on the size of the construction spread being used), provided that this storage does not conflict with other parts of this plan. Sorbent booms and clean-up kits will be kept at all storage locations and will be readily available at all times.
- All fuel storage areas will be located at least 100 feet from streams, ponds, or wetlands; at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on TC Energy property. All fuel storage areas will not be located within any designated municipal watershed area (except at locations designated for these purposes by an appropriate governmental authority). Equipment servicing, lubricating, overnight parking, and refueling will also be in accordance with these requirements whenever possible (i.e., except when stationary equipment such as drilling rigs is being used). Where equipment servicing, lubricating, overnight parking or refueling must occur in these areas, sorbent materials or secondary containment, as appropriate, will be placed under the equipment and care will be taken when undertaking servicing, lubricating, and refueling.

- Use of hazardous materials for vehicle maintenance will follow the same requirements mentioned above for equipment refueling. Impervious or sorbent materials will be placed under the work area before the work begins. Additional sorbent materials will also be readily available. Waste materials created during maintenance (e.g., used oil) will be collected for proper disposal. The work site and the vehicle will be checked by a TC Energy inspector after the maintenance work is complete to ensure that all hazardous materials are properly contained. All waste material, including partially used or empty containers, discarded parts, clean up rags, and used sorbent materials, as well as discarded hazardous materials containers (e.g., oil cans, grease tubes), will be collected for proper disposal.
- All motor fuel, lube oil, chemicals, and other polluting substances will be tightly sealed and clearly labeled during transportation and storage.
- Fuel trucks, pumps, mechanics' vehicles, the contractor's foremen's vehicles and TC Energy Inspectors' vehicles, all equipment, and each construction crew will be equipped with appropriately sized spill kits containing absorbent materials approved for petroleum products and have sufficient tools and material to stop leaks.
- Construction equipment will not be washed in any body of water or wetland, nor will runoff resulting from washing operations be permitted to directly enter any body of water or wetland area.
- Construction equipment, vehicles, materials, hazardous materials, chemicals, fuels, lubricating oils, and petroleum products will not be parked, stored, or serviced within 100 feet of all bodies of water and wetlands. These activities can occur closer if the Environmental Inspector determines there are no reasonable alternatives and appropriate steps are taken to prevent spills and provide prompt cleanup in the event of a spill.
- Pumps operating within 100 feet of a waterbody or wetland boundary will utilize appropriate secondary containment systems.
- Concrete coating activities will not be performed within 100 feet of a wetland or waterbody boundary, unless the location is an existing industrial site designated for such use. These activities can occur closer only if the Environmental Inspector determines there is no reasonable alternative and appropriate steps (including secondary containment structures) are used to prevent spills and provide for prompt cleanup in the event of a spill.
- All equipment will be checked, by a TC Energy inspector, daily for leaks prior to beginning work in waterbodies or wetlands. Steps will be taken to repair leaks or remove the equipment from service, as necessary.

- If barge mounted equipment is to be employed, the contractor will develop specific spill-prevention plans to be reviewed and approved by Environmental Planning and Permitting group.

Spill Cleanup

Spills occurring during construction, operation and maintenance will be reported immediately to the Monitoring Center at 1-800-835-7191 in accordance with TC Energy policies, plans and procedures (Plan Number 120.02.01). If the call to the Monitoring Center is not returned within 30 minutes and the spill has impacted water, the person discovering the spill or release will contact the National Response Center at 1-800-424- 8802 and report the release. That person will continue calling the Monitoring Center until a representative is reached. Within the heritage TC systems, should there be a spill of any amount of petroleum product or hazardous substance, contact the local Environmental Services representative (for Operations spills) of the Environmental Permitting representative (for Construction spills). If a spill should occur, TC Energy will ensure immediate action is taken to minimize the impact of the spill and see that appropriate cleanup.

If a spill should occur, TC Energy will ensure immediate action is taken to minimize the impact of the spill and see that appropriate cleanup action is immediately undertaken.

In the event of a spill into or in the vicinity of a waterbody or wetland, the following will occur immediately:

- the source will be immediately stopped;
- the spill will be contained by placing sorbing booms or constructing dikes;
- the spill will be collected with sorbing materials, skimmed off water surfaces with booms, and/or the contaminated soil will be excavated; and
- the waste materials will be properly stored and disposed in accordance with TC Energy policy.

The affected areas will be restored as closely as possible to their previous condition.

If the spill is such that TC Energy personnel or the on-site contractor cannot immediately and effectively respond, TC Energy's environmental contractor, who specializes in spill cleanup, will be employed.

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: March 6, 2024

PLACEMENT: Action Item

ITEM TITLE: Approval of ANR Pipeline Access Easement and Agreements

SUBMITTED BY: Matthew Mortwedt, Public Works Director

SUMMARY EXPLANATION:

The proposed agreements, easement and payment summary have been reviewed by the Village Attorney and ready for approval. They allow ANR temporary legal access to the property owned by the Village of Germantown.

ATTACHMENT:

1. VGT Parcel 321975
2. WI-WA-106.000 - Temporary Easement
3. WI-WA-106.000 - Calc Sheet
4. WI-WA-106.000 - CRev 1
5. WI-WA-106.000 - Supplemental Agreement

RECOMMENDATION:

Approval of the temporary easement and supplemental agreements.

ACTION BY Committee:



TEMPORARY EASEMENT

THIS TEMPORARY EASEMENT (this “**Agreement**”), is made as of this ____ day of _____, 20____, by and between **Village of Germantown** (whether one or more, the “**Grantor**”), with an address of **N112W17001 Mequon Road, Germantown, Wisconsin 53022**, and **ANR Pipeline Company**, a Delaware corporation, with an address of 700 Louisiana Street, Ste. 700, Houston, Texas 77002 (the “**Grantee**”). Grantor and Grantee are hereinafter sometimes referred to individually as a “**Party**” and collectively as the “**Parties**.”

WHEREAS, Grantor is the present owner of certain real property being described in that certain Certified Survey Map No. 6782, dated September 19, 2017, from MLG Germantown Investments LLC to Public recorded in the Register of Deeds Office for Washington County, Wisconsin as Document No. 1438853, identified as parcel number 321975, being more particularly described as a part of the NW ¼, NE ¼, SW ¼ and SE ¼ of the NE ¼ of Section 32, and part of the SE ¼ of the SE ¼ of Section 29, all in T9N, R20E, Village of Germantown, County of Washington, State of Wisconsin (the “**Property**”); and

WHEREAS, Grantee desires the right to use that certain Temporary Easement Area (as defined below) in connection with the construction of Grantee’s Wisconsin Reliability Project (the “**Project**”) on, over, under, across and/or through Grantor’s Property, in the area more particularly described in Exhibit A attached hereto and incorporated herein.

NOW THEREFORE, in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and in further consideration of the mutual covenants and promises contained herein, the Parties hereto, intending to be legally bound, hereby promise and agree as follows:

1. **Grant of Temporary Easement.** Grantor, for itself, its heirs, executors, administrators, successors and assigns, hereby grants, sells and conveys to Grantee, for itself, its employees, agents, contractors, subcontractors, successors and assigns the exclusive right, liberty, privilege and easement to use that portion of Grantor’s Property described and/or depicted in Exhibit A as “Temporary Workspace”, “Additional Temporary Workspace” and/or “Staging Area” (collectively, the “**Temporary Easement Area**”) for all purposes associated with the original construction of the Project, including, without limitation, preparation for, construction of, and Grantee’s reclamation, mitigation and restoration activities related to, the Project. Grantor hereby agrees that Grantee’s rights hereunder include, without limitation, the right to move, park and store vehicles, materials, supplies, equipment, and construction spoil within the Temporary Easement Area. Grantee shall also have all rights and privileges necessary or convenient for the full use of the rights herein granted, including, without limitation reasonably necessary rights of access, ingress and egress to the Temporary Easement Area over and across the Grantor’s Property and any adjoining land owned by Grantor, and Grantor hereby agrees that Grantee’s rights hereunder include, without limitation, the right to open, construct, improve, repair, maintain and use a new and/or existing road for ingress and egress.

2. **Restoration.** At such time as Grantee no longer requires the use of the Temporary Easement Area for the purposes set forth herein, Grantee shall restore the area disturbed by Grantee’s construction activities as near as practicable to its condition immediately prior to Grantee’s use. In the instance of any claims of damage to Grantor’s land or property, Grantor agrees to provide reasonable access to Grantee so that necessary repair, reclamation, or restoration work can be performed.

3. **Location.** Grantor and Grantee acknowledge that the actual location of the Temporary Easement Area may change because of engineering and/or other site or construction related factors. In such event, Grantor agrees to execute and deliver to Grantee any additional documents needed to correct the

legal description of the Temporary Easement Area to conform to the actual location of the Temporary Easement Area. If such documents are required, they will be prepared by Grantee and Grantee's expense.

4. **Term.** This Temporary Easement shall commence on the date of this Agreement and terminate upon completion of the original construction of the Project, including, without limitation, completion of Grantee's reclamation, mitigation, and/or construction activities for the Project.

5. **Further Assurances.** Grantor shall execute and deliver such further instruments and take such other actions as may be reasonably requested by Grantee from time to time to effectuate, confirm or perfect the terms and intent of this Agreement and the rights granted to Grantee hereunder, including but not limited to joining in the execution of any and all governmental applications, authorizations, licenses, documents and title curative instruments.

6. **Additional Rights.** In addition to the rights granted herein, should restoration be required on the Property outside the easement granted herein, Grantee shall have the right to take all actions necessary to complete such restoration and such actions shall not constitute a trespass. Grantee shall pay Grantor the market rate to rent such property utilized during restoration.

7. **Successors and Assigns.** This Agreement and the covenants and agreements contained herein are covenants running with the land, shall be assignable in whole or in part, and shall be binding on and shall inure to the benefit of the Parties hereto and their respective heirs, successors, assigns, executors, administrators, and legal representatives. In the event Grantor intends to sell or transfer the Property prior to the termination of this Agreement, Grantor shall make any such transaction subject to this Agreement. Grantor agrees that Grantee shall have the right, but not the obligation, to record this Agreement at Grantee's sole cost and expense.

8. **Severability.** In the event any provision or any portion of any provision of this Agreement is held by a court of competent jurisdiction to be invalid or unenforceable by reason of any law or public policy, such provision or portion thereof shall be considered to be deleted, and the remainder of this Agreement shall constitute the agreement between the Parties hereto covering the subject matter hereof.

9. **Entire Agreement; Modification.** This Agreement and any exhibits attached hereto constitutes the full and entire agreement of the Parties regarding the subject matter hereof and supersedes all prior or contemporaneous verbal or written agreements, representations or understandings pertaining thereto. This Agreement may be modified or amended only by a written agreement signed by each of the Parties hereto.

10. **Governing Law.** This Agreement shall be governed by the laws of the State in which the Property is located, without regard to conflicts laws or choice of law rules thereof.

11. **Joint Efforts.** The Parties stipulate and agree that this Agreement shall be deemed and considered for all purposes as prepared through the joint effort of the Parties and shall not be construed against one or the other as a result of the preparation, submittal, recording, or other event of negotiation, drafting or execution hereof.

12. **Authority.** Each Party and signatory to this Agreement represents and warrants to the other Party that it has full power, authority and legal rights, and has obtained all approvals necessary, to execute, deliver and perform this Agreement. Grantor binds itself, its heirs, successors, assigns, executors, administrators, and legal representatives to warrant and forever defend the interests and rights conveyed herein unto Grantee, its successors and assigns, against every person whomsoever lawfully claims the same or any part thereof.

13. **Counterparts.** This Agreement may be executed in any number of counterparts, each of which shall constitute an original, but all of which shall constitute but one and the same instrument.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK;
SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the day and year first above written.

WITNESS:

GRANTOR:

Village of Germantown

By: _____

Name: _____

Title: _____

WITNESS:

GRANTEE:

ANR Pipeline Company,
a Delaware corporation

By: _____

Name: _____

Title: _____

By: _____

Name: _____

Title: _____

LANDOWNER PAYMENT SUMMARY

Tract: WI-WA-106.000

Check No: _____

Landowner Name: Village of Germantown

Project Name: Wisconsin Reliability Project - PL-2

PERMANENT EASEMENT AND TEMPORARY WORKSPACE

	LENGTH	WIDTH	ACREAGE	PRICE/ACRE	EASEMENT TOTAL
Permanent Easement			0.00		\$0.00
Temporary Workspace			0.59	\$5,000.00	\$2,950.00
Additional Temporary Workspace			0.12	\$5,000.00	\$600.00
Staging Area			0.00		\$0.00
Temporary Access Road			0.00		\$0.00
Total Consideration for Permanent and Temporary Workspace Acreage					\$3,550.00

CROP DAMAGES

CROP TYPE	UNIT PRICE	YIELD	ACREAGE	PERCENTAGE	TOTAL
1ST YR					\$0.00
2ND YR					\$0.00
3RD YR					\$0.00
Total Consideration for Crop Damages					\$0.00

GENERAL DAMAGES/OTHER

DAMAGES/OTHER	DAMAGES/OTHER DESCRIPTION	AMOUNT
Total Consideration for General Damages		\$0.00

Total Consideration	\$3,550.00
Percent Ownership	100%
Amount Paid	\$3,550.00
Amount Owed	\$3,550.00

LANDOWNER SIGNATURE:	DATE:
LAND AGENT SIGNATURE:	DATE:

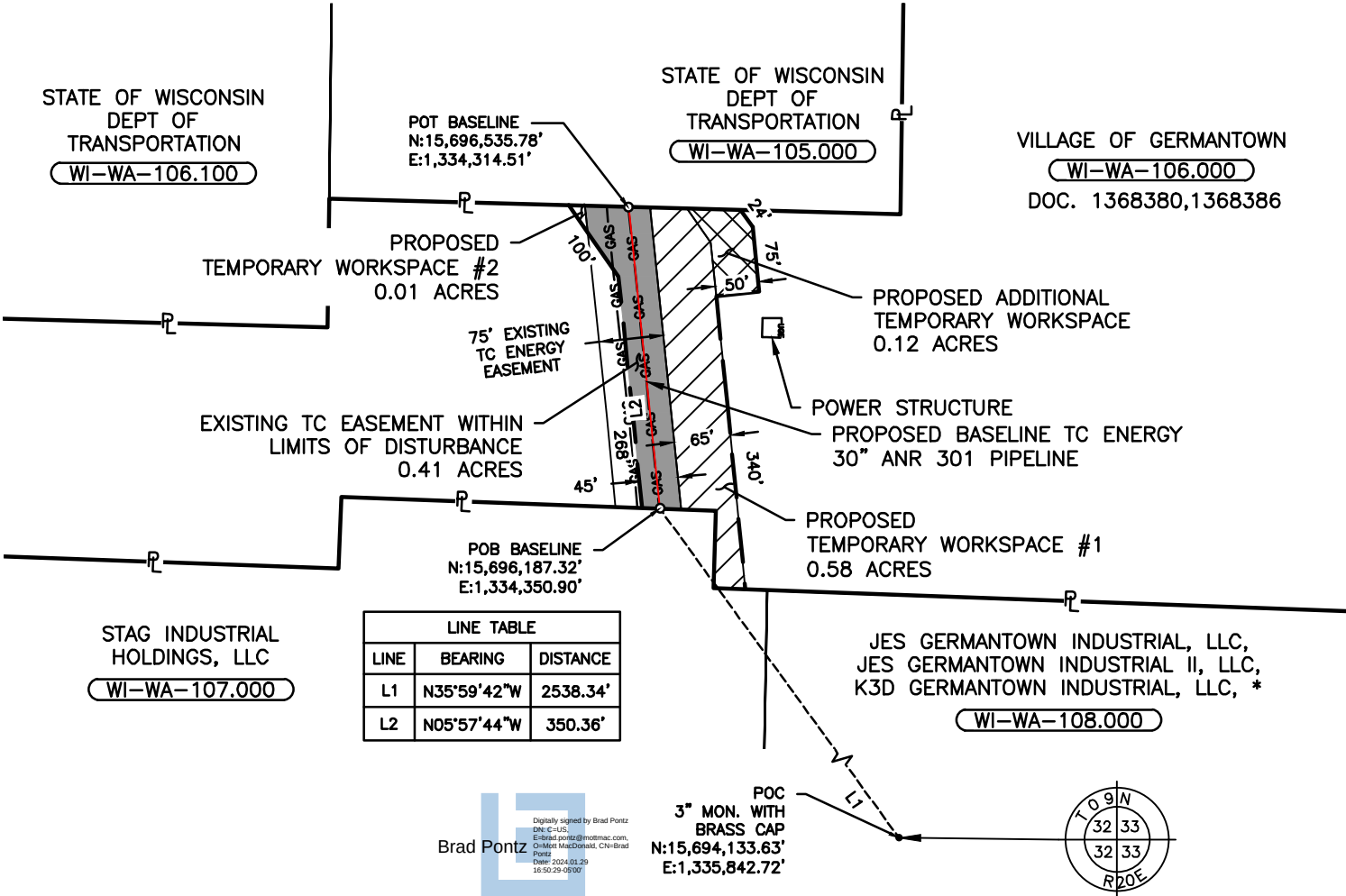
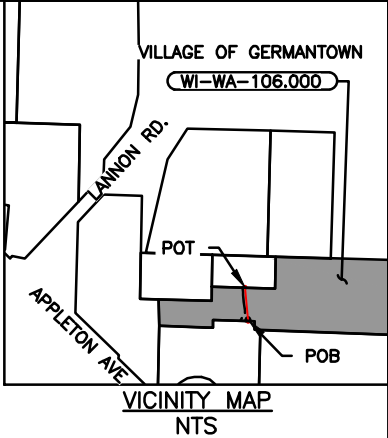
Notes:

CONFIDENTIAL

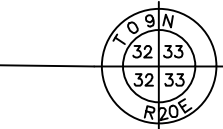
CONFIDENTIAL

EXHIBIT "A"

PROPOSED WORKSPACES ACROSS
THE PROPERTY OF VILLAGE OF GERMANTOWN
PART OF NE 1/4 OF NE 1/4 AND NW 1/4 OF NE 1/4 OF S32, T09N, R20E
WASHINGTON COUNTY, WISCONSIN

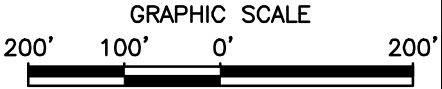


BRAD D. PONTZ
PROFESSIONAL LAND SURVEYOR WI 3243-8
LICENSE EXP. 01/31/2026
MOTT MACDONALD
10 SOUTH LASALLE ST. ~ SUITE 2520
CHICAGO, IL 60603
PHONE: (312) 894-5372



1. THE BASIS OF BEARINGS AND DATUM FOR THIS SURVEY IS UTM NAD83 (2011) ZONE 16, U.S. SURVEY FOOT.
2. INFORMATION DEPICTED HEREON IS BASED ON A FIELD WORK BETWEEN SEP. 2021 AND APR. 2022 TO LOCATE LINES NECESSARY FOR ENGINEERING DESIGN AND EASEMENT ACQUISITION FROM LAND RECORD. INFORMATION SUPPLIED BY CLIENT.
3. THIS IS AN EASEMENT DRAWING AND DOES NOT REPRESENT A BOUNDARY SURVEY PURSUANT TO WISCONSIN ADMINISTRATIVE CODE, WS A-E-7

- SECTION CORNER
- BASELINE OF TC ENERGY EASEMENT
- GAS EXISTING TC ENERGY PIPELINE
- EXISTING PROPERTY BOUNDARY
- EXISTING ADJACENT PROPERTY BOUNDARY
- EXISTING TC ENERGY EASEMENT
- PROPOSED TEMPORARY WORKSPACE
- PROPOSED ADDITIONAL TEMPORARY WORKSPACE
- EXISTING TC ENERGY EASEMENT WITHIN LIMITS OF DISTURBANCE
- LIMITS OF DISTURBANCE



REV: 1 DATE: 01/29/2024

DISTANCE ACROSS PROPERTY = 350.36 FEET = 21.23 RODS
TRACT ACREAGE = 30.31 ACRES (CALLED)
TEMPORARY WORKSPACE = 0.59 ACRES
ADDITIONAL TEMPORARY WORKSPACE = 0.12 ACRES
EXISTING TC EASEMENT WITHIN LIMITS OF DISTURBANCE = 0.41 ACRES

PROJECT WISCONSIN RELIABILITY PROJECT			TAX DISTRICT(S)
CONSULTANT	ENGINEER	FIELD BOOK PAGE	COUNTY(IES) WASHINGTON
SURVEY DATE 09/2021 - 04/2022	REFERENCES VILLAGE OF GERMANTOWN WI-WA-106.000		STATE(S) WISCONSIN
MAP DATE 04/2022			SHEET NO. 1 OF 1
DRAWN BY YJ			DRAWING NO. WI-WA-106.000
SCALE 1"= 200'	APN #	321975	

Supplemental Agreement

This Supplemental Agreement (“**Supplemental Agreement**”) is entered into as of the _____ day of _____, 20____, by and between **Village of Germantown**, whose address is **N112W17001 Mequon Road, Germantown, Wisconsin 53022**, whether one or more, and their heirs, successors and assigns (the “**Landowner**”), and ANR Pipeline Company, a Delaware corporation, and its successors and assigns (“**ANR**”), with an address of 700 Louisiana Street, Suite 1300, Houston, Texas 77002.

WHEREAS, Landowner and **ANR** entered into that certain Temporary Easement (the “**Agreement**”), attached hereto as Exhibit “A”;

WHEREAS, Landowner and **ANR** desire to memorialize certain independent and collateral covenants related to the Agreement in this Supplemental Agreement; and

WHEREAS, the Construction Work Area (“**CWA**”) is defined as the entirety of the Workspaces referenced to and defined in the Agreement, including all Temporary, Permanent, and Staging Workspaces in addition to Access Roads more particularly described and defined in Exhibit A.

NOW THEREFORE, in consideration of mutual promises and agreements herein contained and for other good and valuable consideration, the receipt whereof is hereby acknowledged, Landowner and **ANR** do hereby agree as follows:

1. **Miscellaneous.** The terms of the Agreement are incorporated herein by reference and in the event of any conflict between the Agreement and this Supplemental Agreement, the terms of this Supplemental Agreement shall govern and control. Except for purposes of the construction and enforcement of this Supplemental Agreement, the terms and conditions of the Agreement shall remain unmodified. The Agreement, together with this Supplemental Agreement, constitutes the entire agreement between Landowner and **ANR** with respect to the subject matter hereof, and shall inure to the benefit of and be binding on the Landowner’s heirs, successors and assigns and **ANR**’s successors and assigns.

2. **Pre-construction assessments.** Prior to the start of construction, **ANR** may conduct various pre-construction baseline assessments, including but not limited to, pond turbidity baseline assessments, septic system impact assessments, water well quality and/or quantity baseline assessments and foundation baseline inspections. **ANR** agrees to provide advance notice

of its intention to conduct pre-construction assessments and Landowner agrees to permit the access needed.

3. **De-Watering.** In the event water pumping from ditch lines becomes necessary, **ANR** may place, at its sole discretion, any appropriate de-watering structures, including but not limited to filter bags, straw bales, and/or filter sock, outside of but immediately adjacent to the CWA, as defined in the Agreement. De-watering will be completed in a manner that avoids damaging adjacent agricultural land, crops, and/or pasture. In the event **ANR**'s de-watering activities create the need for restoration to Landowner's land, crops, pasture, etc., **ANR** will provide Landowner reasonable compensation to restore such disturbed areas to their pre-construction condition as is nearly practicable.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, intending to be legally bound hereby, the undersigned have duly executed this Supplemental Agreement as of the date set forth above.

WITNESS:

GRANTOR:

Village of Germantown

By: _____

Name: _____

Title: _____

WITNESS:

GRANTEE:

ANR Pipeline Company,
a Delaware corporation

By: _____

Name: _____

Title: _____

By: _____

Name: _____

Title: _____

Director's Report - Mar 2024

Staff Top 3 Projects

Village Engineer

1	2024 Road Program Bid Package	The bid package was completed and posted on Quest 2/28/24. Anticipate approval at 3/18 Special PWHC meeting.
2	Donges Bay Rd Reconstruction - US 145 to Wasaukee	Bid Award anticipated at 3/18 Village Board.
3	Division Rd Concepts and Community Engagement	Anticipate award on 3/18/24 Village Board.

Engineering Tech

1	2024 Road Program Bid Package	The bid package was completed and posted on Quest 2/28/24. Anticipate approval at 3/18 Special PWHC meeting.
2	Sealcoating Program Bid Package	The bid package is being developed and will go live in mid-March
3	2023 Road Program Completion	Coordination is underway for completing the 2023 Road Program.

Water Superintendent

1	Goldendale Rd Booster Station Construction	Construction is progressing. We are anticipating the station coming online this summer.
2	Well 12 Testing	Recent PFAFS testing showed significant reduction in well production. A rehab of well 12 is needed to restore production to anticipated levels.
3	Well 12 and Tower 4 Projects	We are in the award/contracting phase for Well 12. Tower 4 is resuming this spring.

Wastewater Superintendent

1	RFP Development for Main St and Old Farm lift upgrades	raSmith Developing RFP.
2	2023 Cured In Place Sewer Lining	Construction underway. Completion in mid to late March.
3	Residential Lateral Replacement	Resident at W158N9793 Broadleaf Lane claiming damage to basement wall/foundation.

Director's Report - Mar 2024, cont.

Staff Top 3 Projects, Continued

Highway, Parks , Buildings & Grounds Superintendent

1	Road Program and Seal Coating Coordination	Coordinating tar and mastic and ROW clearing in coordination with road and sealcoat programs.
2	Painting Project Bids/Contracts	FD Painting, Senior Center Painting, Fireman's Park Bandshell Painting
3	Tree Plan	Development of comprehensive tree plan.

Director

1	DPW Facility Construction	Construction on schedule. Move coordination meetings to begin in March.
2	Public Safety Building Needs Assessment and Feasibility Study RFP	The RFP will be reviewed by the Public Safety Committee and the Village Board before being released.

Richfield IGA Update

2/20 Coordination Meeting: Discussed aligning scheduled of Truck Country Development with Utility construction. Richfield to continue property acquisition processes.

Work By Other Agencies

WE Energies - Relining in Ashbury Woods - Under construction
WISDOT - 145 & Division Rd Traffic Circle - Summer 2024
WISDOT - US 167 - 1-41 to US 145 - 2028
ANR Pipeline - Reline through Village - Spring/Summer 2024

Compliance Milestones

1	Underground tank certifications - 3/30/24
2	MS4 Annual Report - 3/31/24
3	PSC Audit - 4/30/24
4	DNR Recycling Annual Report - 5/30/24
5	MMSD Annual Report - 7/30/24; CMOM, CMAR - 6/24
6	DNR Storm Water Pollution Prevention Plan (SWPPP) - overdue

Department Update

1	Filling of vacancies in the Engineering Department (2)
2	Filling of vacancies in Wastewater (1), and Highway (1) Depts
3	Filled vacancy in Water Utility with the hire of Keith Williams
4	Tyler Munis training and implementation
5	Discussion of new CDL requirements on DPW recruiting efforts.
6	RFP Development for Public Safety Building, Well 7 & 5 Generators, Well 7 Rehab.

Director's Report - Mar 2024, cont.

February Summary of Calls and Complaints - As of 3/1/24

24	Snow - Mailbox Down/Damaged
10	Snow - Lawn Damage
9	Miscellaneous - Uncategorized
9	Tree - Miscellaneous
7	Garbage - Request New Cart
6	Garbage - Damaged Cart
4	Garbage - General Complaint
4	Street - Miscellaneous
3	Street - Dead Animal
3	Street - Street Light Out
2	Snow - Miscellaneous
1	Garbage - Missed Recycling
1	Snow - Plow Damage (Not mailbox)
1	Tree - Branch Down Not Blocking
1	Water - Low Pressure

85 Total