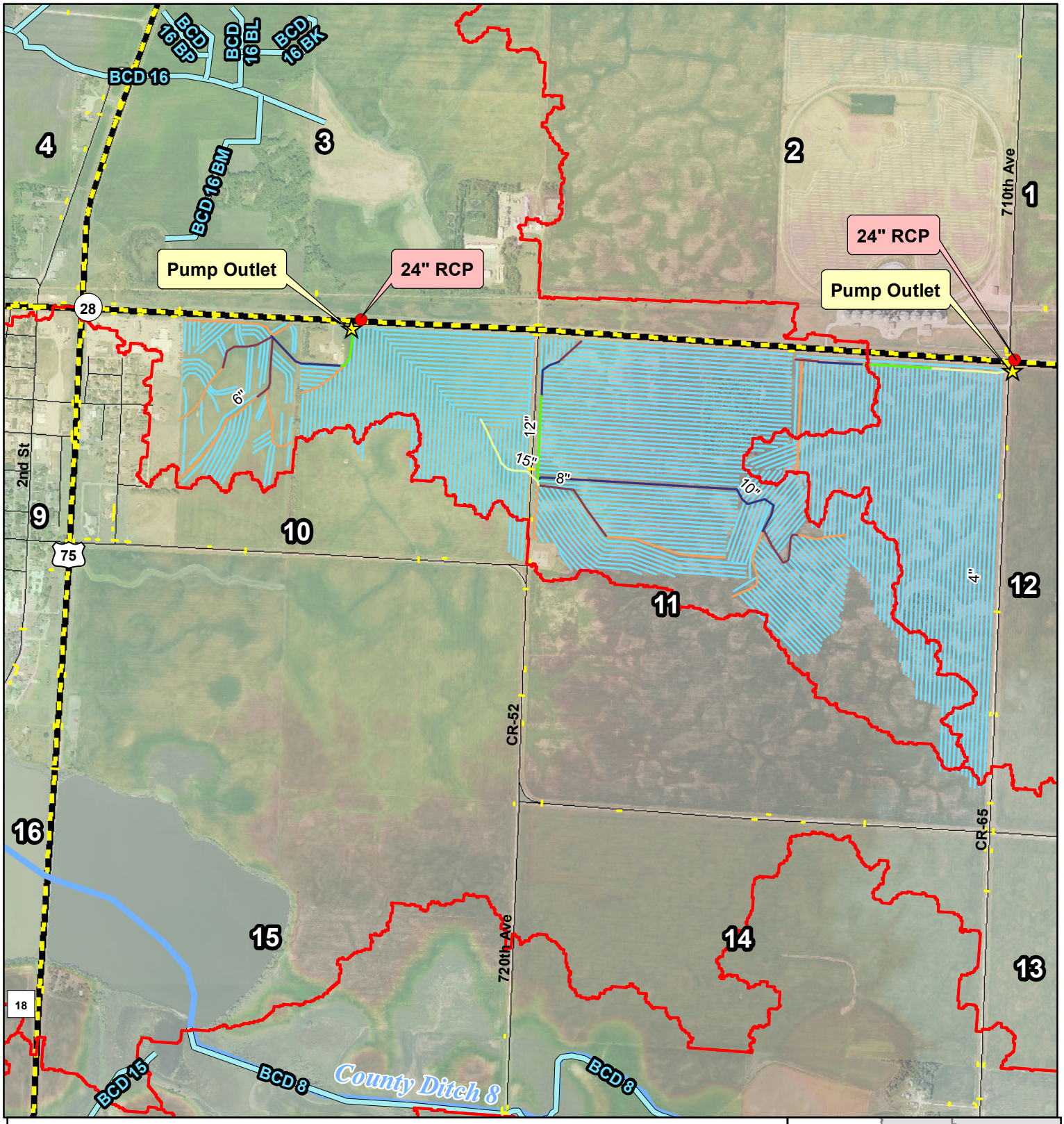


Legend

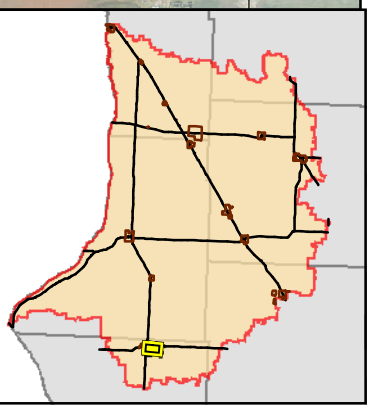
Structure
- Pump/Lift
- Control Structure
- Dike/Embankment
- Subwatersheds
- Inlet/Intake
- Concrete Mat
- Gravity Outlet
- Culvert Inventory

Culvert
- RCP
- RCPA
- RCB
- CSP
- CSPA
- Bridge
- Other

Drain
- 3"
- 4"
- 5"
- 6"
- 8"
- 10"
- 12"
- 15"
- 18"
- 24" & Greater
- (Tile)
- (Dual Wall)
- (Non-Perf.)
- Other - Pipe

- Dike
- Ditch/Waterway
- Other - Misc.
- Road Permits

- N.O. Collection Channels
- MN PWI Streams



PA# 25-002-1 - Lismore Farms
Sec 11 and N 1/2 of Sec 10, Graceville Twp.
Bois de Sioux Watershed District, MN

Created By: CJH Date Saved: 04/01/25 Date Exported: 04/01/25
Plotted By: cole.hendrickson Aerial Image: 2013 County NAIP SIDS Elevation Data: IWI Lidar
Horizontal Datum: NAD 1983 UTM Zone 15N Vertical Datum: NAVD1988
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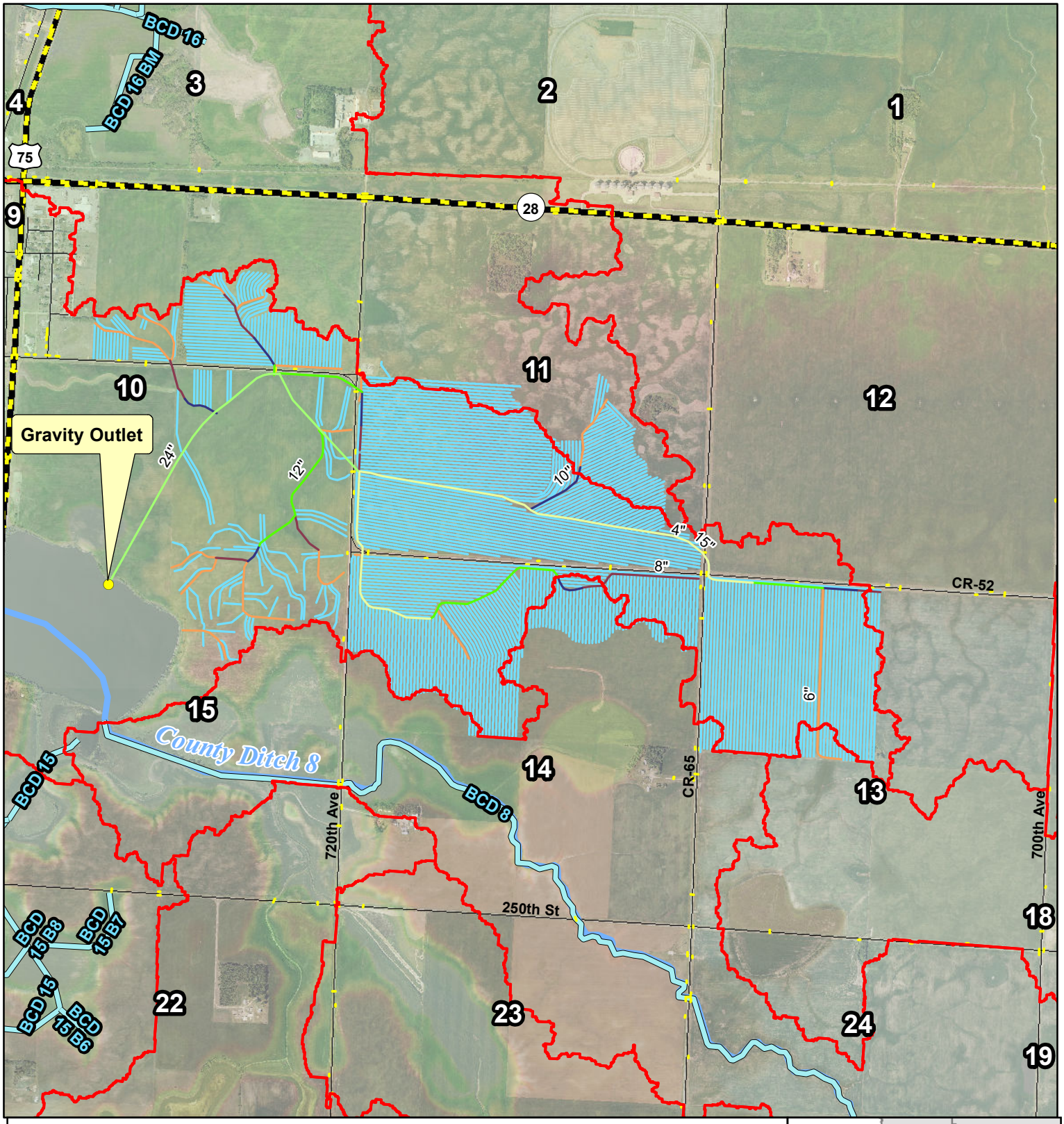

Legend

Structure

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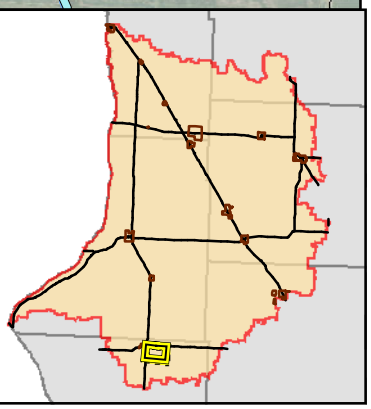
- Road Permits

N.O. Collection Channels

MN PWI Streams



PA# 25-002-2 - Stueve, Mary Jo
Sec 10, 11, 13, 14, and 15, Graceville Twp.
Bois de Sioux Watershed District, MN

Created By: CJH Date Saved: 04/01/25 Date Exported: 04/01/25
Plotted By: cole.hendrickson Aerial Image: 2013 County NAIP SIDS Elevation Data: IWI Lidar
Horizontal Datum: NAD 1983 UTM Zone 15N Vertical Datum: NAVD1988
T:\BaseData\MN\Bois_de_Sioux\Permits_Project_Map_FINAL_10_4.mxd

N
W E
S

From: Bryan Murphy <bryan@h2overviewers.com>
Sent: Tuesday, April 22, 2025 1:04 PM
To: bdswd@runestone.net
Subject: RE: Price Quote Requested

Hi Jamie,

Thank you for reaching out!

The Redetermination of Benefits (ROB), when needed, is fairly straightforward and is priced at **$4.19 per acre**. I'd be happy to send over a proposal that outlines all deliverables included in our standard ROB package.

For **WCD #25**, the **half-rate of $2.10 per acre** would apply following the ROB—this rate only applies to acres directly impacted by the improvement. So, if this system requires both an ROB and a Determination of Benefits (DOB), the total cost would be **$6.29 per acre**. This covers:
Our standard ROB deliverables
A full Determination of Improvement Benefits
A reconciled report to support future repair and maintenance efforts after the improvement is completed

The **JD #11 system** is a bit more complex. Since we did not complete the original ROB, we would need to establish the baseline benefits first—either formally or behind the scenes—before conducting a DOB for the affected acres related to the proposed new lateral.

If you'd like to discuss the details further, feel free to give me a call anytime.

Thanks again, and I hope you have a great day!

Best regards,

Bryan Murphy
President
H2Over Viewers LLC
218-201-0066
https://h2overviewers.com/

From: James Guler <James.Guler@mooreengineeringinc.com>
Sent: Tuesday, April 22, 2025 4:09 PM
To: lcroaker <lcroaker@ohnstadlaw.com>; Bois de Sioux Watershed <bdswd@runestone.net>
Subject: RE: Price Quote Requested

If I understand the email correctly it sounds like it would be this:

JD 11 Full Watershed: 20 square miles = 12,800 acres x 4.19 $ per acre = $53,632
JD 11 Lateral 4 only Watershed – improvement determination only price = 3,168 acres x 2.10 $/ acre = $6,652.80

WCD 25 watershed: 10.7 square miles = 6,848 acres x 6.29 $/acre = $43,074

TCD 8 watershed 15.1 square miles = 9,664 acres x 4.19 $ per acre = $40,492

RESOLUTION OF
THE BOIS DE SIOUX WATERSHED DISTRICT
DORAN CREEK: USE & PROMOTION OF RIM EASEMENTS

BE IT RESOLVED by the Board of Managers of the Bois de Sioux Watershed District:

WHEREAS, the Bois de Sioux Watershed District (the "District") desires to construct the Doran Creek Restoration Project (the "Project") in Wilkin County, Minnesota; and

WHEREAS, the general nature of the Project is a stream restoration of Doran Creek consisting of the removal of sediment and vegetation buildup, broadening of the floodplain, installation of berms and side inlet culverts, and maintenance of meanders when possible; and

WHEREAS, the Red River Watershed Management Board was appropriated $5,119,000 in 2024 from Outdoor Heritage Funds (OHF) to be used to administer the acquisition of easements under the Reinvest in Minnesota (RIM) Program in addition to financially assisting landowners to complete temporary restoration activities; and

WHEREAS, on January 8, 2025, the Red River Watershed Management Board and Board of Water and Soils Resources entered into a Memorandum of Understanding to, "…coordinate on the use of these [RIM] funds and any future funds for similar work to acquire priority lands and will support Project work on RIM lands to restore natural prairie and riparian corridors along designated habitat improvement areas by means including, though not limited to, channel restoration, spoil bank construction, relocation of and construction of levees and associated features, sediment best management practices, and wetland restoration."

WHEREAS, the District, in partnership with the Red River Watershed Management Board and Board of Water and Soil Resources, desires to utilize BWSR's Reinvest in Minnesota ("RIM") reserve easement program in order to acquire right of way necessary to construct, operate, maintain, repair, and improve the Project; and

WHEREAS, the Project's primary construction activities (removal of sediment and vegetation buildup, broadening of the floodplain, installation of berms and side inlet culverts, and maintenance of meanders when possible) require a permit from the Minnesota Department of Natural Resources and the Army Corps of Engineers.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Managers, Bois de Sioux Watershed District:

1. Supporting staff are authorized to collect landowner signatures for Project based easements, as they are granted by the landowner (for activities such as temporary construction and access of the Project, permanent maintenance and access of the Project, and required RIM paperwork), but will delay prioritization certification of these instruments until either: 1) it is determined that it is likely the Project will qualify for/be granted an executable permit by the Minnesota Department of Natural Resources and the Army Corps of Engineers or 2) upon express action by the Bois de Sioux Watershed District Board.
2. The District requests that the Red River Watershed Management Board and staff delay any action on Project landowner documents until which time the District provides periodization certification.

Dated this_____ day of _____, _____.

BOIS DE SIOUX WATERSHED DISTRICT

By: _____
Linda Vavra
President

Motion: _____

Second: _____

For: _____

Against: _____

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
332 MINNESOTA STREET, SUITE E1500
ST. PAUL, MN 55101-1323

05/09/2025

Regulatory File No. MVP-2024-00318-DWW

THIS IS NOT A PERMIT

Meaghan Dietrich
Moore Engineering Inc
2 Carlson Parkway N Suite 110
Plymouth, MN 55447

To Meaghan Dietrich:

We have received your submittal described below. You may contact the Project Manager with questions regarding the evaluation process. The Project Manager may request additional information necessary to evaluate your submittal.

File Number: MVP-2024-00318-DWW

Applicant: Jamie Beyer

Project Name: Bois de Sioux Watershed District Doran Creek Stream Restoration

Project Location: Section 8 of Township 131 N, Range 46 W, Wilkin County, Minnesota (Latitude: 46.2101041666583; Longitude: -96.5316738046296)

Received Date: 03/13/2024

Project Manager: Daryl Wierzbinski
(218) 350-1491
Daryl.W.Wierzbinski@usace.army.mil

Additional information about the St. Paul District Regulatory Program can be found on our web site at http://www.mvp.usace.army.mil/missions/regulatory.

Please note that initiating work in waters of the United States prior to receiving Department of the Army authorization could constitute a violation of Federal law. If you have any questions, please contact the Project Manager.

Thank you.

U.S. Army Corps of Engineers
St. Paul District
Regulatory Branch

Cc: Wilkin County WCA LGU, BWSR Rep

PUBLIC DRAINAGE SYSTEM PROTECTION AGREEMENT

This Public Drainage System Protection Agreement (this "Drainage Agreement") is made and entered into this _____ day of _____, 2025, (the "Effective Date") by and between _____, a Minnesota _____, whose principal address is _____ (the "Developer"); and the Bois de Sioux Watershed District, a Minnesota political subdivision, whose principal address is 704 Highway 75 South, Wheaton, Minnesota 56296 (the "District"); collectively, the Parties.

RECITALS

WHEREAS, the District is a Minnesota watershed district with authority to regulate watershed activities pursuant to Minnesota Statutes Chapter 103D; and

WHEREAS, the District has rule-making authority under Minn. Stat. § 103D.341 and permitting authority under Minn. Stat. § 103D.345; and

WHEREAS, the District requires permits for certain works within the District's boundaries under the 2009 REVISED RULES OF BOIS DE SIOUX WATERSHED DISTRICT; and

WHEREAS, the Developer desires to construct a wind energy conversion system consisting of _____ (the "Project") in _____ County, Minnesota, which is within portions of the District's boundaries; and

WHEREAS, in connection with the development and construction of the Project, it may be necessary for the Developer to perform the following scope of work:

1. Transport heavy equipment and materials over Public Drainage Systems located in the Project area; and

2. Make certain modifications and improvements (both temporary and permanent) to such Public Drainage Systems to allow access road construction or such equipment and materials to pass over existing Public Drainage Systems; and

3. Place collection and transmission systems for the Project adjacent to or under certain Public Drainage Systems for the purposes of carrying electrical current or data from the Project to the Project substation; and

WHEREAS, because of the scope of work, the Developer is required to obtain a permit from the District which includes a condition that the Developer enter into this Drainage Agreement with the District outlining the rights and obligations associated with protecting Public Drainage Systems.

NOW THEREFORE, in consideration of the mutual covenants contained in this Drainage Agreement, and other good and valuable consideration, the receipt and sufficiency of which the Parties acknowledge, the Parties agree as follows:

AGREEMENT

1. **Purpose.** The purpose of this Drainage Agreement is to establish the rights and obligations of the Parties with respect to the protection of Public Drainage Systems within the Bois de Sioux

Watershed District from development activities related to the construction of wind energy conversion systems and related appurtenances. For purposes of this Drainage Agreement, Public Drainage System means those publicly-owned drainage systems established or under the jurisdiction of the District under Minn. Stat. Chs. 103D or 103E, including drainage right-of-way, public drainage tile – artificial subsurface drainage, and related appurtenances.

2. Project Description. The Developer desires and intends to develop an up to ___ megawatt ("MW") large wind energy conversion system ("LWECS") in _____ County, Minnesota (the "Project"). A map of the Project's Area locations and anticipated conflicts with Public Drainage Systems is described in **Exhibit A**, attached to this Drainage Agreement.

2.1. The Project will consist of up to ___ wind turbines and each turbine will generate up to ____ MW.

2.2. The Developer has an approved site permit amendment for a LWECS from the Minnesota Public Utilities Commission pursuant to Minn. Stat. Ch. 216F. The rules to implement the permitting requirement for LWECS are found in Minn. Rules Ch. 7854.

2.3. Electricity from the Project will be transported to a Project substation located at _____ in _____ County where the Project will interconnect via ____ underground transmission lines into the _____ Substation owned by _____. The Project will consist of up to ___ wind turbines and each turbine will generate up to ____ MW.

2.4. The Developer entered into agreements with the owners of the real property within the Project Area, giving it control of this land for the purpose of, and authority to, develop the Project.

3. Construction Practices. The following construction practices will be observed by the Developer in constructing the Project as it affects Public Drainage Systems:

3.1. During construction, all materials and equipment must be stored and parked within the bounds of the staging areas acquired by the Developer so that it will not interfere with Public Drainage Systems.

3.2. Equipment and materials stored adjacent to the public roadway must be stored outside of the channel berm.

4. Repair of Damaged or Adversely Affected Public Drainage Systems.

4.1. Obligation to Repair Public Drainage System. If a Public Drainage System is damaged by the Developer, the Public Drainage System will be restored by the District to the Public Drainage System's pre-existing condition, at the sole expense of the Developer. For the purposes of this Drainage Agreement, "pre-existing condition" means to restore all or a part of a Public Drainage System as nearly as practicable to the same hydraulic capacity as originally constructed and subsequently improved prior to the Developer commencing construction of the Project. If a Public Drainage System on or adjacent to the Project construction area is adversely affected by the Project, the District will take such actions as are reasonably necessary to ensure the proper functioning of the Public Drainage System, based on its pre-existing condition,

including the relocation, reconfiguration, and replacement of the existing tile lines, open drainage ditches/channels, and road ditches. The Developer is responsible for all expenses related to repairs, relocations, reconfigurations, and replacements to the Public Drainage System in accordance with this Drainage Agreement.

4.2. Location of Public Drainage System. At the request of the Developer, the District will locate public drainage tile and drainage channels and determine design elevations from the plans and specifications and will provide said information to the Developer. The coordinates of the information will be _____ County Coordinate System – US Survey Feet.

4.3. Crane Tracking. The Developer will provide GPS map locations for all crane routes to the District.[1] The District will repair public drainage tile or channel berms that are damaged as a result of the crane moves, at the sole expense of the Developer.

4.4. Temporary Public Ditch Crossings. Installation of a temporary public ditch crossing requires a permit from the District. Prior to the start of construction, the District's Drainage Inspector or District's Engineer will review all work plans required by the District's permit application and approve, conditionally approve, or deny (with reasoning) the permit. Once approved or conditionally approved, the Developer will conduct the work and after the temporary crossing is complete, the District's Inspector or District's Engineer will approve the work if it complies with the approved permit. Expenses associated with temporary public ditch crossings will be the responsibility of the Developer.

If a temporary ditch crossing is to remain in place for more than two (2) days, the Developer is responsible for meeting the following requirements:

(a) Pipe size will be determined by a hydraulic analysis from a professional engineer and must be approved by the District's Engineer; the necessary pipe will be sized with an equal or larger end area than the immediate downstream structure; or pipe size may be reduced if the crossing will be lowered within twelve (12) hours of crane use, prior to a foreseeable rain event that may exceed the crossings flow capacity, or immediately upon the request by the District.

(b) Riprap must be placed at the outlet end of the pipe, using class III material (as defined in the MnDOT 2005 Standard Specifications, as amended), up to the point where the crossing will be dug out in the event of high water.

(c) The height of riprap will be determined by the District's Inspector at the time of construction.

(d) The culverts will be placed at the correct flow line of ditch grade.

(e) The culverts must be metal or concrete, plastic will not be used.

(f) The crossing side slopes will have a minimum slope of 1:2 (1 foot vertical to 2 feet horizontal).

[1] _____ County Coordinate System – US Survey Feet will be used.

(g) Damage to any portion of the Public Drainage System by the placement of a crossing will be promptly repaired, after informing the District's Inspector.

(h) Material used for construction will be removed from the property after the temporary ditch crossing is removed.

(i) Slopes will be reconstructed to match the slopes existing prior to construction, reseeded, and protected with erosion blankets.

4.5. Access Roads. Thirty (30) days prior to the start of construction on the Project, the Developer will provide access road locations and alignments to the District.[2] Within twenty (20) days after receiving access road locations from the Developer, the District will identify all intersecting points of the Public Drainage System and access roads and provide this information to the Developer.

The Developer is responsible for the following:

(a) Replacing public drainage tile within the access road construction limits prior to the commencement of construction of the access road.

(b) Relocating public drainage tile that runs parallel to and under an access road to a location outside of the construction limits of the access road.

(c) Notifying the District's Inspector immediately upon completion of surveying and staking of an access road but not later than one (1) week prior to the commencement of the construction of said access road.

(d) Replacing tile line in accordance with section 2502 MnDOT 2005 Standard Specifications for Construction, as amended.

(e) Substituting pea-rock for fine filter aggregate.

(f) Utilizing dual wall (Hi Q) plastic.

The District will mark public drainage tile lines with: (1) orange posts with tile markers, or (2) GPS coordinates. The District will install inspection tees or intakes as needed.

4.6. Collector Lines. Thirty (30) days prior to the start of construction on the Project, the Developer will provide a collector line system map, with line depths, to the District. Within twenty (20) days after receiving collection line locations from the Developer, the District will identify all intersecting points of the Public Drainage System and collector lines and provide this information to the Developer. The Developer will notify the District's Inspector at least two (2) days prior to placement of collector lines. The District's Inspector will identify approximate locations of public drainage tile at collector line crossings immediately upon surveying the collection line route.

The Developer will meet the following requirements:

(a) Collector lines will be installed at least one foot (1') above or below public drainage tile.

[2] _____ County Coordinate System – US Survey Feet will be used.

(b) Public drainage tile that exists at or above the collector line depth will be replaced by the District, at the Developer's sole expense, unless the collector line is directionally bored by the Developer.

(c) Public drainage tile that exists more than one foot (1') below proposed collector line depth will not be required to be replaced.

(d) Collector lines will not be energized until all work that is the responsibility of the District is completed.

(e) Collector lines that intersect (i) public drainage tile that are fifteen inches (15") in diameter or larger; (ii) public roadways, or (iii) roadway ditches will be directional bored.

(f) If installation of collector lines damages public drainage tile, the District will replace public tile lines within ten feet (10') (measured perpendicular to centerline) on each side of the collector lines, at the sole expense of the Developer.

4.7. Damaged Public Drainage Tile. If public drainage tile is damaged by the Developer and if water is sufficiently flowing through the damaged tile, the Developer must notify the District's Technician for repairs. If the damaged public drainage tile has impeded water flow, the Developer must excavate and remove the damaged pieces to resume normal flow. The Developer must then notify the District's Inspector of the damaged public drainage tile for repairs.

4.8. Examination of Damaged Public Drainage Tiles. Before completing permanent public drainage tile repairs, the District's Inspector will inspect public drainage tile lines by suitable means on both sides of the trench for its entire length within any work area to check for public drainage tile that might have been damaged by the construction equipment. If public drainage tile lines are found to be damaged, they must be repaired by the District, at the sole expense of the Developer, so they are returned to pre-existing condition.

4.9. Permanent Public Drainage Tile Repair Completion. The District will make all permanent public drainage tile line repairs within thirty (30) days following completion of construction on or across any Public Drainage System, taking into account weather and soil conditions.

4.10. Materials for Repair. Public drainage tiles will be repaired with materials of the same or better quality as that which were damaged and have the same drainage capacity as that which were pre-existing.

4.11. Replacement of Public Drainage Tile. If, at the end of the Project, there is evidence that public drainage tiles under designated roads have been damaged by the Developer, those damaged tiles will be replaced by the Developer at the end of the Project in a manner acceptable to the District's Inspector. Paved roadways shall have the public drainage tiles bored under the roadway; open cuts are not permitted. Should the public drainage tile within the right of way require replacement, inlets shall be placed over the public drainage tile line on both sides of the roadway ditches to allow for future monitoring of the tile flow and to help determine the location of the tile line.

4.12. Protection of Bridges or Structures. The Developer will, at its own expense, hire a qualified structural engineer to structurally assess bridges or structures on public drainage ditch crossings and provide documentation to the reasonable satisfaction of the District's Engineer of acceptable fortification and use of said bridges or structures.

4.13. District to Enforce as Drainage Authority. For purposes of this Drainage Agreement, the Developer and the District agree that the District has the authority to enforce this Drainage Agreement as it relates to the Public Drainage Systems identified pursuant to this Drainage Agreement, as may be amended from time to time.

5. Installation of Additional Tile Lines. The Developer is responsible for installing such additional drainage tile and other drainage measures as are necessary to properly drain wet areas on the permanent and temporary easements caused by the construction and/or existence of the Project, access roadways, or cabling within public roadways and within the right-of-way of Public Drainage Systems, whether open ditch or tile. For the purpose of this section, for a period of five (5) years following the date of certificate of completion, it is presumed that any wet areas located in the permanent and temporary easements are caused by the construction and/or existence of the Project unless the Developer can prove that the construction and/or existence of the Project is not the cause of the wet areas.

6. Compaction, Rutting, and Soil Restoration.

6.1. Compaction. The Developer will alleviate compaction on Public Drainage System right-of-way traversed by the construction equipment. Right-of-way that has been compacted will be plowed with three (3) passes of a v-ripper or chisel plow at least eighteen inches (18") deep. In areas where topsoil has been segregated, the Developer will first plow the subsoil with three (3) passes of a v-ripper or chisel plow at least twelve inches (12") deep before replacing the segregated topsoil.

6.2. Rutting. The Developer will restore rutted land on Public Drainage System right-of-way to smooth contours or as neat as practical to its pre-construction condition.

6.3. Soil Restoration. Disturbed areas will be restored to smooth contours similar to the original condition and reseeded. If there is any dispute as to what areas need to be ripped or chiseled, the depth of which compacted areas should be ripped or chiseled, or whether the necessary reseeding and restoration to original condition has occurred, the District's Inspector's reasonable opinion will be binding on the Developer.

7. Determination of Construction-Related Damages to Public Drainage System. For a period of five (5) years following the date of the certificate of completion, it will be presumed that any damage, failure, wet areas, public drainage tile breakage, or other problems with a Public Drainage System identified on **Exhibit A** beyond normal, expected, ordinary problems, were caused by the construction or activities involved with the construction of the Project. Unless the Developer can prove that damages to a Public Drainage System were not caused by the construction and/or the activities involving the construction, the Developer will repair the Public Drainage System, to the reasonable satisfaction of the District.

8. Expense Reimbursement to Public Drainage System. The District's Inspector will conduct on-site inspections of damaged and repaired Public Drainage Systems. The Developer will reimburse the District for the reasonable costs of the personnel necessary to do the above

inspections. The Developer's obligations under this Drainage Agreement include all expenses incurred by the District to repair, relocate, reconfigure, and replace the Public Drainage System in accordance with this Drainage Agreement.

9. **Security.** The Developer is required to obtain a performance bond, or other financial security, for performance of its obligations under this Drainage Agreement. The performance bond, or other evidence of financial security, must be provided to the District prior to the commencement of construction of the Project. Failure to provide the performance bond, or financial security, prior to the commencement of construction of the Project will result in the District seeking a temporary injunction to stop work on the Project.

10. **Term and Termination.** The term of this Drainage Agreement commences on the Effective Date and expires ten (10) years from the Effective Date. This Drainage Agreement will automatically extend for additional five (5) year terms unless terminated by the Parties sixty (60) days prior to the initial expiration date. Either party may terminate this Agreement, with or without cause, by providing ninety (90) days' advance written notice to the other party. If this Drainage Agreement is terminated early, any rights of the Developer will cease and the Developer will be required to remove any facilities adjacent to, above, or under the Public Drainage Systems or declare the facilities abandoned.

Commented [LC1]: Do we want to record this agreement? What do we want as the term? My concern is what happens if the Owner damages public drainage facilities 5 or 20 years from now?

11. **Notice.** All notices, requests, demands, or other communications required or permitted by the terms of this Agreement will be given personally, via electronic mail, or in writing and delivered to the Parties at the addresses listed on the first page of this Drainage Agreement.

12. **Indemnity.** The Developer agrees to release, defend, and hold the District, its employees, agents, contractors, and designees, harmless from any and all claims, damages, and causes of action to person or property arising out of or related to the Project and work associated therewith, specifically, with the Public Drainage Systems. Said indemnification will include, inter alia, attorney's fees, damages, whether punitive, economic, or compensatory, and costs and disbursements. However, this section will not apply to suits against the District arising out of the District's, or its employees', agents', contractors', or designees' negligence or intentional acts. The Developer specifically agrees and acknowledges that this indemnification provision will survive until six (6) years after the expiration or termination of this Drainage Agreement.

13. **General Provisions.**

13.1. Cooperation. The Parties agree to communicate and cooperate in good faith concerning the safe implementation of the Project and work together to prevent or correct any damaging conditions to Public Drainage Systems that may be caused by the Project.

13.2. Entire Agreement. This Drainage Agreement, and the County's development agreement, and any amendments and exhibits thereto, constitute the entire and complete agreement between the Parties and supersedes any prior oral or written agreements between the Parties with respect to the terms described herein. The terms of the County's development agreement with the Developer, or similar agreement, are hereby incorporated into this Drainage Agreement by reference. It is expressly agreed

that there are no verbal understandings or agreements which in any way change the terms, covenants, and conditions set forth herein.

13.3. Rules of Construction. The Parties acknowledge that they have had the opportunity to review this Drainage Agreement, and that they have an equal bargaining position in this transaction. No rule of construction that would cause any ambiguity in any provision to be construed against the drafter of this document will be operative against any party to this Drainage Agreement.

13.4. Representation. The Parties represent and warrant to the other that the party executing this Drainage Agreement has the authority to do so knowing that the other party to this Drainage Agreement is acting in reliance upon such representation. The provisions of this section will survive the termination of this Drainage Agreement.

13.5. Amendment or Waiver. No waiver and no modification or amendment of any provision of this Drainage Agreement shall be effective unless specifically made in writing and duly agreed to by the Parties. Waiver by either party of any breach or failure to comply with any provision or term of this Drainage Agreement by the other party shall not be construed as, or constitute, a continuing waiver, or a waiver of any breach of, or failure to comply with, any other provision of this Drainage Agreement.

13.6. Governing Law. This Drainage Agreement shall be governed by and interpreted in accordance with the laws of the State of Minnesota and venued in the county in which the Project is located.

13.7. Remedies. In the event the Developer fails to perform its responsibilities under this Drainage Agreement, the District may, upon thirty (30) days' written notice to the Developer to cure, perform those responsibilities in accordance with this Drainage Agreement and submit an invoice to the Developer for the costs associated with the District's performance under this section. If the Developer fails to compensate the District, the District may draw upon the performance bond in accordance with the terms therein. If the Developer disputes the invoice, the Parties will meet to work through the disputed amount. These remedies are in addition to any and all other remedies available to the District under Minnesota law.

13.8. Limitation of Liability. Any and all liability of the District related to the terms of this Drainage Agreement will be limited to the amounts specified by the statutory requirements set forth in Minn. Stat. Ch. 466.

13.9. Assignment. The terms of this Drainage Agreement are hereby made binding upon the Parties hereto, their successors and assigns, and no party under this Drainage Agreement may assign their interest in this Agreement to any other person or entity without the written consent of the other party.

13.10. Counterparts. This Drainage Agreement may be executed in counterparts, meaning that the agreement is valid if signed by both Parties even if the signatures of the Parties appear on separate copies of the same agreement rather than on a single document.

13.11. Effective Date. This Drainage Agreement becomes effective on the date of the last signature appearing below.

13.12. Severability. If any term, part, or provision of this Drainage Agreement is determined to be unenforceable, invalid, or excessive by a court of competent jurisdiction, this Drainage Agreement can thereafter be modified to implement the intent of the Developer and District to the maximum extent allowable under law, and the remainder of this Drainage Agreement shall remain unaffected and in full force and effect.

IN WITNESS WHEREOF, the Parties have caused this Drainage Agreement to be duly executed on the day and year written below.

[Signatures follow on the next page.]

PERMIT APPLICATION FORM

Please submit your **complete** application and supporting material to:
Bois de Sioux Watershed District, 704 Hwy 75 S, Wheaton, MN 56296

Bois de Sioux Watershed District
(320) 563-4185 | www.bdswd.com

GENERAL INFORMATION, CERTIFICATION & SIGNATURE

The Proposed Project includes the following:

- ☐ Section 1: Subsurface Drainage / Tiling
- ☐ Section 2: Surface Drainage / Ditching
- ☐ Section 3: River, Stream, Wetland, Lake, Shoreline Alterations
- ☐ Section 4: Ring Dike or Levee
- ☐ Section 5: Culvert, Bridge, Road Improvements

Applicant Name				Applicant Phone	
Mailing Address					
Mailing City		State		Zip	
Applicant Email					
Landowner Name(s)				Landowner Phone	
Project County		Project Township			
Section(s) & Quarter(s)					

I certify that the information provided on this application and attached map is complete and accurate. I understand that if this information and/or map is found to be incomplete or inaccurate, the permit application may be denied. A permit decision issued based on false information may be rescinded. Starting construction/installation prior to receipt of an approved permit may subject the landowner to "after the fact" fees, which include a $250 administrative fees plus any applicable engineering, legal, or administrative fees incurred to process this application. These fees may be certified to the applicable County Auditor for collection with the parcel's property taxes.

I understand that this application satisfies only the Bois de Sioux Watershed District permitting requirements, and that I may need to acquire additional permits from Municipal, Township, County, State, Federal government units, or other agencies.

REQUIRED: Applicant Printed Name & Signature — Date

_____ _____

REQUIRED: Project Area Landowner(s) Printed Name(s) & Signature(s) — Date

_____ _____

_____ _____

_____ _____

Please note the Bois de Sioux Watershed District is subject to Minnesota Statute 13.03 that states, "All government data collected, created, received, maintained or disseminated by a government entity shall be public unless classified by statute….". The Bois de Sioux Watershed District must provide inspection and/or copies of public data upon request.

SECTION 1: SUBSURFACE DRAINAGE / TILING

Tile projects that include controls to allow for the tile system to be "shutoff" when necessary are not restricted by drainage coefficient (Dc) limitations. Tile projects that do not include controls are restricted to a ¼" per day drainage coefficient. The drainage coefficient limitation applies to the design of the project outlet only.
- Required for all tile projects: erosion control is required at the project outlet.
- Recommend for tile projects: gate(s), pump controls.

The Drainage Coefficient is calculated by the formula:

design flow at the outlet in cubic feet per second ÷ acres drained ÷ 0.042

Indicate New Features or Changes to Existing Conditions:

- ☐ Surface Inlet(s). Types:
- ☐ Control Structure(s) like gates, lift stations, stop logs, etc.
- ☐ Pumped outlet(s)
- ☐ Culvert(s)
- ☐ Ditches/Ditching Activities
- ☐ Dike(s)/Levee(s)
- ☐ Other:

ALSO REQUIRED: Submit a Project Map that shows the features described above and include:

- Existing surface inlets and types
- Existing man-made dikes or diversions
- Existing and proposed tile outlets
- Existing control structures (gates, lift stations, stop logs, etc.)
- Existing culverts and proposed alterations to culverts

SECTION 2: SURFACE DRAINAGE / DITCHING

If the project is located within a road authority's right-of-way, the applicant must comply with all appropriate road authority requirements. The applicant is responsible for erosion monitoring, control, and remediation surrounding the proposed project area(s). Replacement of the first culvert downstream of the project may be required as a condition of the project permit; culvert sizing will be determined by the District Engineer.

Channel bottom width		Channel profile grade, % (vertical feet / horizontal feet x 100)	
Average channel depth from field elevation		Channel side slopes, horizontal : vertical	

ALSO REQUIRED: Submit a Project Map that shows the features described above, and describe what you will do with the excavated material/spoil.

SECTION 3: RIVER, STREAM, WETLAND, LAKE, AND SHORELINE ALTERATIONS

In addition to approval of this permit application, the applicant may need to notify Federal, State, and/or County officials when planning work in and/or adjacent to rivers, streams, wetlands, lakes, and shorelines.

1. Describe the project

ALSO REQUIRED: Submit a Project Map that shows the features described above, and please include any available project profiles, survey drawings, cross-sections, and plan views.

SECTION 4: RING DIKE AND LEVEES

The District supports ring dike and levee projects that reduce flood risks to developed properties. Projects designed to protect undeveloped lands from flooding tend to cause adverse flood impacts in other areas, and therefore will generally not be permitted. Levees placed along channels or river banks are susceptible to failure. The District strongly recommends that applicants consult with a geotechnical engineer for the design and testing of their ring dike or levee. Floodplain regulations administered by the local County Zoning office and/or Minnesota Department of Natural Resources may apply separately to the proposed project; applicants are strongly encouraged to contact these entities.

1. Length of project, in feet
2. Proposed top elevation, NAVD 88 datum
3. Proposed top width, in feet
4. Proposed side slopes, horizontal : vertical
5. 100-year flood elevation (if known), NAVD 88 datum
6. Source for determining 100-year flood elevation (USGS gage, FIRM, etc)
7. Approx. flood of record elevation (if known), NAVD 88 datum
8. Are you using any public roads are part of your levee/ring dike?
   If yes, permission from the respective road authority is required.
9. Have you determined if a Flood Insurance Rate Map (FIRM) exists for the project area?
10. Was a geotechnical engineer utilized for the design of the ring dike/levee?

ALSO REQUIRED: Submit a Project Map that shows the features described above, and please include any available project profiles, survey drawings, cross-sections, and plan views.

SECTION 5: CULVERT, BRIDGE, AND ROAD IMPROVEMENTS

New installation or changes to existing culverts, bridge, and roads can significantly impact flooding. The District may require the applicant to submit additional technical information in order to assess impacts. If construction will take place in the public road right-of-way, the applicant must receive prior approval from the regulating authorities (for example, township, county, MnDOT). Culvert Sizing: Must conform to the District's surface water management goals. Cost share may be available for private crossings when culverts are larger than 24" in diameter if they are located along the course of a legal drainage system, as defined by Minnesota Statutes Chapter 103E. Contact the District for further information.

Culvert Design Information

1. Watershed upstream of proposed culvert in acres
2. Size of proposed culvert
3. Proposed upstream culvert invert elevation, if known, NAVD 88 datum
4. Proposed downstream culvert invert elevation, if known, NAVD 88 datum

Road Improvement Design Information

1. Describe the road project (start and stop locations, re-grade, overlay, complete reconstruction, new road, etc)
2. Length of road project, in feet
3. Does the road project include re-grading or reconstruction of ditches?
4. Existing road centerline elevation at the lowest point, NAVD 88 datum
5. Proposed road centerline elevation at the lowest point, NAVD 88 datum
6. Size of proposed culvert

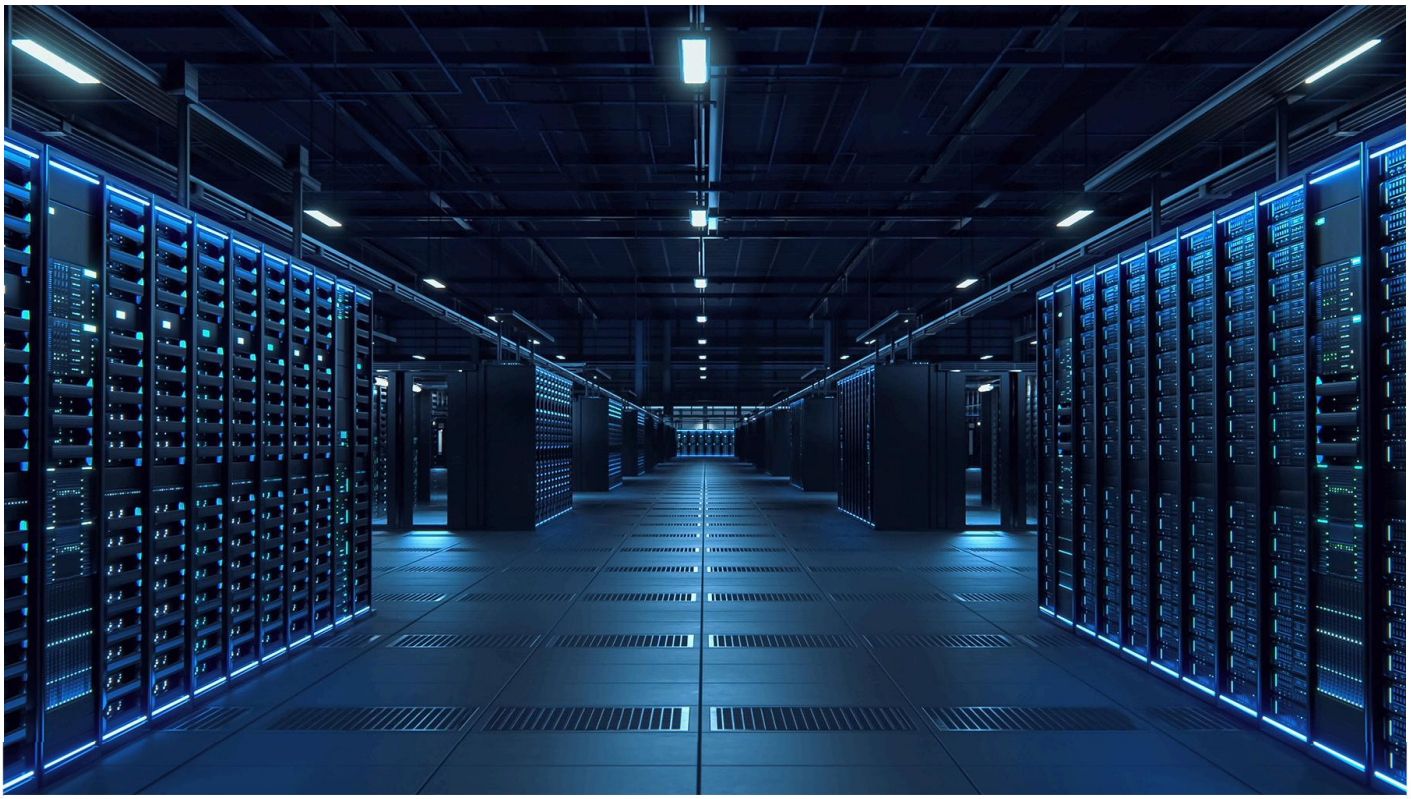
ALSO REQUIRED: Submit a Project Map that shows the features described above, and please include any available project profiles, survey drawings, cross-sections, and plan views.

BOIS DE SIOUX WATERSHED DISTRICT

2025 BILLING RATES

(based on 2024 Audit and BWSR Calculator)

	District Administrator	District Office Manager	District Engineer Tech
Salary + Benefits	$ 45.00	$ 31.35	$ 60.07
Salary + Benefits + Facilities	$ 77.65	$ 61.02	$ 89.74
Salary + Benefits + Facilities + Administration	$ 82.12	$ 68.47	$ 97.19
Historical Rates			
2024 Salary + Benefits + Facilities + Administration	$ 86.28	$ 69.65	$ 98.37
2023 Salary + Benefits + Facilities + Administration	$ 85.75	$ 68.24	$ 95.97
2022 Salary + Benefits + Facilities + Administration	$ 81.81	$ 60.75	$ 87.69
2021 Salary + Benefits + Facilities + Administration	$ 74.49	$ 56.45	$ 82.46
2020 Salary + Benefits + Facilities + Administration	$ 74.79	$ 56.18	$ 81.75
2019 Salary + Benefits + Facilities + Administration	$ 74.52	$ 55.78	$ 80.05
2018 Salary + Benefits + Facilities + Administration	$ 140.51	$ -	$ 130.30



Little information is publicly available about how much water data centers consume. (Rendering courtesy of Shutterstock.com/Gorodenkoff)

By Rasheed Ahmad, Ph.D., P.E., M.ASCE

Data centers are increasing in number and in their environmental footprint — especially in terms of water demand. This primer explores how such facilities present new opportunities and challenges for civil engineers.

The enormous growth of digital data worldwide — which by 2025 is expected to increase 146-fold compared to 2010, according to the United States International Trade Commission's May 2021 report "Data Centers Around the World: A Quick Look" — has likewise led to an urgent need for more data centers. These facilities contain the servers, routers, switches, storage systems, and other equipment that run continuously to meet what seems to be an ever-expanding demand for cloud-based computing, digital storage, artificial intelligence, digital gaming, streaming music and movies, data analytics, and other services.

The U.S. is a global leader in the data center industry, with more than 5,300 facilities, according to information from Statista.com, a global data and business intelligence platform. Although the 24/7 operation of these data centers, which are often housed in massive buildings, makes the digital world possible, the industry also consumes enormous amounts of resources, especially water. That water is used in two primary ways: indirectly, to generate the electricity that the data centers need to operate, and directly, as a liquid coolant to dissipate the heat generated by the servers and other data center equipment.

The exact amount of water consumed by individual data centers is difficult to determine because there is very little data publicly available for research and analysis. Moreover, that water demand can be controversial, especially because of the negative impact that data centers can have on the communities in which they are built. In The Dalles, Oregon, for example, a lengthy legal battle ultimately revealed that Google data centers in the region consumed more than 355 million gal. of water in 2021 — an amount that had tripled since 2016 — representing more than one-quarter of the town's annual water consumption, according to the February 22, 2023, article "Google's water use is soaring in The Dalles, records show, with two more data centers to come" on *The Oregonian*'s OregonLive website.

Collectively, data centers rank in the top 10 of "water-consuming industrial or commercial industries" in the U.S., according to a study led by Landon Marston, Ph.D., P.E., M.ASCE, an assistant professor of civil and environmental engineering at Virginia Tech. That study — "The environmental footprint of data centers in the United States," published in May 2021 in the journal *Environmental Research Letters* — also noted that the data center industry "directly or indirectly draws water from 90% of U.S. watersheds."

Moreover, Marston estimates that 20% of those data centers "draw water from moderately to highly stressed watersheds in the western U.S.," according to a February 2022 Virginia Tech media advisory titled "Researcher explores how proliferating data centers affect water supply in the United States."

Consequently, it is critical for data centers to use water as efficiently and productively as possible — a fact that data center operators often do not

acknowledge.

Opportunities and challenges

For civil engineers, helping data centers manage their water consumption represents a relatively new field that offers various opportunities and challenges. The article "Water Efficiency Opportunities for Data Centers," by Mikeal Vincent, P.E., a water sustainability lead at Black & Veatch, states that data center operators need to monitor their use of water but often do not. Vincent cited a 2021 survey by the New York City-based Uptime Institute that found that only 51% of data center operators track their water usage, and even those that do monitor it, do so mostly at individual sites. Only 10% track water use across all their facilities. Uptime is an advisory organization that certifies digital infrastructure performance standards for data centers around the world.

A water balance study is key to planning a new or expanded data center operation. (Image courtesy of Shutterstock.com/Kubais)

Why don't more data center operators monitor water usage? More than 60% say there is no "business justification" to collect that information, according to the Uptime survey. The situation may be changing, however, as a "growing number of municipalities will permit new data center developments" only if they are designed to minimize direct water consumption, Uptime explains.

Toward that goal, whether the data center operator is evaluating a new site or expanding an existing facility, one of the first steps should involve a water balance study. As Black & Veatch explains on its website document, "Water Management for Data Centers," such a study would evaluate the data center's water demand, assessing all possible sources, including surface water, groundwater, brackish water, seawater, reclaimed water, and other types. The study should also consider climate, data center design, the possible cooling systems, the use of reclaimed or recycled water, and treating or using reclaimed effluent or discharge water.

In addition to water issues, the selection of the site for a new data center would involve other critical concerns (see "Finding the Right Site," below).

Data center sizes vary significantly, from as small as 1,000 sq ft to more than 1 million sq ft, but the average size is about 100,000 sq ft. The interior layout of data centers, and the piping or other infrastructure for the cooling system therein, are generally the purview of mechanical engineers and experts in heating, ventilation, and air-conditioning systems. The water-focused work of civil engineers typically involves calculating the site's potential water consumption and designing the infrastructure to bring water into the data center and discharge that water after it has been used.

Water consumption calculations rely on multiple factors, including the data center's location, the number and arrangement of server racks, the fire suppression system, the quality of the water available, and the number of staff members in the building and what their water needs might be for bathrooms, emergency showers, and other uses. Computer models also help the engineers determine the sizes of pipes coming into and going out of the data center building, as well as the optimal water pressure.

What sort of water?

The location of the data center is critical because facilities in especially hot regions, such as Arizona, will obviously require more cooling than data centers in cooler places, such as Maine. In terms of server arrangements, if the back sides of the racks — where the heat is exhausted — face each other, it is easier to collect and expel the resulting hot air. In some designs, the ceilings are higher above the backside aisles so that the hot air will rise and move away from the servers. Likewise, the floors on which the servers sit can feature openings to help cooler air circulate around the equipment.

Data centers can use numerous water supply sources, including potable water, treated effluent, or reclaimed/recycled water. The quality of the cooling water, however, can affect the equipment's useful life. Reclaimed water, for example, can cause more corrosion, scaling, and microbiological growth in the equipment than does potable water. To better understand the available water supply, engineers must communicate with the local water utility regarding the results of seasonal sampling, pH levels, conductivity, total dissolved solids, chlorides, silicon, hardness, alkalinity, and microbial counts, among other factors. Depending on those results, engineers might ask the utility company if it can treat the water further or recommend to the data center operator that it consider a different source. In some situations, the data center might source from two utilities and thus have the option of drawing water from each or both systems.

At the very least, the data center should install a loop system that features at least two waterlines that connect to the building — in the front and back, for instance — so that the cooling water supply can continue to flow into the facility even if one of the lines malfunctions. Emergency water tanks, combined with on-site generators, can also guarantee a dual supply of water in the event of a power outage or problem with the utility's water supply.

Such emergency tanks are often large and underground. One data center project in the American Southeast that the author worked on prior to joining Black & Veatch — for which he helped construct a hydraulic model of the pipe network and performed hydraulic modeling scenarios, among other efforts — wanted to install a two-day supply of water for emergencies. Since that facility generally consumed 2 million gal.

a day, it required at least 4 million gal. of storage on-site. For context, facilities with at least 10 million gal. of stored emergency water are not uncommon.

Effluent engineering

What goes into the data center as cooling water must then come out — which provides civil engineers the opportunity to design wastewater systems for these facilities. Data centers generate two main types of wastewater effluents: domestic wastewater and cooling effluent, which are discharged to the water utility's sewer system. The domestic wastewater represents a relatively limited flow, as it comes from an on-site area.

Cooling effluents are the largest share of this wastewater, representing primarily the condensates from the cooling system. And because the water is used cyclically, in the cooling process, effluent often concentrates certain pollutants such as total dissolved solids and chloride, which are not normally targeted for removal by municipal wastewater treatment plants.

Utility companies are also increasingly requiring data centers to pretreat their wastewater before discharge. This means data centers will likely require the equivalent of a mini water treatment plant on-site. The design of such filtration systems provides civil engineers with another opportunity to help data centers manage their water systems. At the data center in the American Southeast mentioned earlier, the roughly 10,000 sq ft facility features a water-cooled system with a looped design that can be fed from two directions. The system relies on potable water from the local drinking water treatment plant but also has a separate water supply line for its fire hydrants and fire suppression system. The cooling effluent is conveyed through a wastewater gravity pipe connected to the municipal sewers.

Since it was difficult to predict exactly how much cooling effluent volume would be produced, the system was designed initially to accommodate roughly 20%-30% of the total water supplied. A flowmeter was installed to monitor the actual wastewater flows.

Civil engineers can help water utilities plan for future data center development. (Image courtesy of Shutterstock.com/John_T)

At a roughly 1.3 million sq ft Google data center in Douglas County, Georgia, the facility relies on recycled treated wastewater for cooling. Using its own purpose-built system, the Google data center takes treated effluent from the local water and sewer authority's treatment plant and further treats the effluent to make it reusable. This recycled water is then pumped to the data center through a few miles of pipeline. The data center also has on-site water storage and can switch to the county's potable water supply for short-term periods in case of emergency.

This data center also has a National Pollutant Discharge Elimination System permit to treat its own wastewater on-site instead of discharging it to the municipal sewer. The technology has adequately served the cooling needs of this data center for several years and reportedly has been used as a prototype for other Google facilities around the world.

Working with utilities

Civil engineers can also help water utilities create master plans that consider future data center development. Master plans have historically focused primarily on expected population growth and often exclude water needs of the data center industry. However, acting as a liaison between the utilities and the data centers, civil engineers can help project current water demands while also anticipating needs that will arise years or decades in the future.

On the data center side, resilience and redundancy are also growing concerns. Some data center operators are asking their water utilities to provide information on water reliability, asset management plans, and resilience plans. Although large water utilities usually have developed such plans, smaller utilities could find such requests a challenge because of a lack of resources. With the growth of data centers, utilities now must work to implement and update their plans — another area in which civil engineers can assist.

Although the designs of data center water systems are somewhat similar to other critical users like airports, hospitals, and public health facilities, the design parameters for data centers are yet to be fully developed. But opportunities exist for civil engineers to help bring meaningful change, minimizing water consumption, waste, and energy usage for cooling.

SIDEBAR: Finding the right site

Selecting a site for a data center is challenging on many levels, taking into account a host of factors, from financing to engineering to community relations issues. In addition to the water supply challenges, these other factors are critical to site selection:

- Environmental conditions: The region's climate and history of natural hazards are important considerations. For example, incidences of high temperatures, record precipitation, and damaging wind can impact the operations of data centers, making it critical for the site selection process to consider such conditions and put appropriate backups and redundancies in place.

- Seismicity: Seismic events can cause power losses, water main breaks, and damage to buildings, roads, and bridges. Site selection will need to incorporate risk analyses and appropriate mitigation strategies to minimize the impact of seismic events.
- Network connectivity: Traditionally, data centers were far from their clients. But now, providers are constructing data centers closer to where their businesses are. Thus, the availability and cost of fiber and communications infrastructure have become key factors in deciding site, speed, and reliability.
- Land and accessibility: The cost and availability of land and the possibility of future expansions are key considerations. Building and equipping a data center involves moving significant amounts of heavy-duty equipment. The condition of nearby roads and highways can be a significant factor in ensuring safe and efficient transportation. The facility should be safely accessible by road, rail, and air.
- Talent: Although most data centers are remotely managed and operated, there is still a need for core staff in the building. Therefore, the site decision should consider the availability of people with the right skills in the area. Proximity to academic institutions can provide the best access to such technical talent.
- Power: The core operations of data centers require considerable amounts of electricity. Consequently, the site selected must have unencumbered access to reliable and sufficient power sources, whether from the existing grid or new renewable sources.

Rasheed Ahmad, Ph.D., P.E., M.ASCE, is a technical leader in distribution and collection system planning in the Atlanta office of Black & Veatch.

This article first appeared in the March/April 2024 print issue of Civil Engineering *as "Keeping Data Centers Cool."*