414 Nicollet Mall
Minneapolis, MN 55401

July 10, 2020

—Via Electronic Filing—

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: RESPONSE IN OPPOSITION TO AFCL'S MOTION FOR ORDER TO SHOW CAUSE AND HEARING
FREEBORN WIND ENERGY PROJECT
DOCKET NO. IP-6946/WS-17-410

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, submits this Response in Opposition to the June 26, 2020 Motion for Order to Show Cause and Hearing filed by the Association of Freeborn County Landowners (AFCL).

As an initial matter, we note that AFCL is correct; the Company will be moving 17 turbines originally planned to be built in Freeborn County to Worth County, Iowa. Included with this Response as Attachment A is an Amended Site Plan reflecting the layout of the portion of the project the Company will be constructing in Minnesota. This was not the Company's preferred course for the Freeborn Wind Energy project. In order to ensure the project is constructed efficiently and at the lowest cost for our customers, and able to obtain the full value of applicable wind production tax credits (PTCs), however, we believe this shift is necessary and prudent.

We do not believe this decision requires a permit amendment—at least not at this time. The Site Permit "authorize[s]" the Company "to construct and operate an ***up to*** 84 megawatt nameplate capacity Large Wind Energy Conversion System in Freeborn County, Minnesota," (emphasis added) subject to compliance with the conditions of the permit. We still intend to construct a large wind project in Freeborn County that will have no more than 84 megawatts of nameplate capacity, and we still intend to comply with the conditions of the permit. Moving these 17 turbines to Iowa (and removing them from the Site Plan) will have no impact on the rest of the permitted project, and, therefore, AFCL's motion seeking an amended Site Permit should be denied.

A. Background

As noted in the Pre-Construction Meeting Notes, filed in this Docket on May 15, 2020, the Company has had difficulties obtaining agreements with the Townships of Oakland and London for the use of township roads to construct certain turbines we originally had planned to include in the project. These difficulties began with the original developer of the project, Freeborn Wind Energy LLC, who applied for a site permit for the Freeborn Wind Energy Project on June 14, 2017. Among other things, the Site Permit Application noted that the developer would need to obtain "oversize/overweight permits for township roads."

Not coincidentally, shortly thereafter in 2017, London and Oakland townships adopted ordinances requiring environmental review, pursuant to the Minnesota Environmental Policy Act, Minn. Stat. § 116D.01, *et seq.*, in connection with the issuance of any oversize/overweight permit (the Ordinances).[1] Under these substantively identical Ordinances, the township boards are designated as the "Responsible Governmental Units" for conducting the environmental review, and any violation of the Ordinances is subject to punishment by "a fine not exceeding $500 or imprisonment for 90 days or both."

As Freeborn Wind Energy LLC pursued approval of, and amendments to, the Site Permit, it also pursued related approvals from other governmental units, including London and Oakland townships. Although Freeborn Wind Energy LLC believed the Ordinances were preempted by Minn. Stat. 216F.07, and did not apply to the project, it attempted to negotiate for road use agreements with the townships, and even sought a permit from the townships, sending all the environmental information included in the Site Permit Application for the townships' review. Despite these good faith attempts, the townships largely refused to engage in discussions and refused to consider the application for an oversize/overweight permit.

In contrast to this obstructive behavior from London and Oakland townships, Freeborn Wind Energy LLC (and subsequently the Company) entered into an extensive Development Agreement with Freeborn County, as well as Hayward and Shell Rock townships. We filed this Development Agreement with the Commission on March 11, 2020, pursuant to Section 5.2.12 of the Site Permit. Among other things, the Development Agreement includes detailed provisions regarding the use, repair, and restoration of the county and those townships' roads.

[1] The London Township Town Board filed a copy of its Ordinance in this Docket on October 9, 2017.

When the Company acquired the Freeborn Wind Energy project, we reached out to London and Oakland townships in May and June 2019, and attempted to discuss obtaining a similar agreement on use of township roads, including oversize/ overweight vehicle use of the roads. In a letter filed in this Docket on July 22, 2019, however, the townships' attorney accused the Company and Freeborn Wind Energy LLC of "harassment," and stated the Company was required to "abide by" the townships' Ordinances to obtain an oversize/overweight permit, notwithstanding Freeborn Wind Energy LLC's prior attempt to do just that.

Given the tenor of this and other communications, we did not believe we could work constructively to obtain necessary permits or agreements with the townships until after the Company's Site Permit amendment application was approved. Following the Commission's vote on December 19, 2019, to amend the Site Permit, the Company again reached out to the townships in January 2020 to discuss obtaining access point, crossing, and oversize/overweight permits. The townships refused to meet in person to discuss the permits, but requested additional information from the Company, which we supplied. Since providing the requested information at the end of February 2020, however, we have not heard from the townships or their attorney regarding the road use permits. Although we remained hopeful that they would reengage in discussions, including up until the time of our pre-construction meeting with the Department of Commerce—Energy Environmental Review & Analysis division (DOC-EERA) and Commission, it has become clear we will not be able to reach an arrangement regarding road use in time to pursue construction of 17 turbines originally planned to be located in the townships.

Based on the townships' overall reticence regarding road-use discussions, in parallel with our attempts to obtain permits or agreements, we developed an alternate plan to develop the full nameplate capacity of the Freeborn Wind Energy project as economically as possible. Specifically, we obtained options for alternate turbine locations in Worth County, Iowa—where the majority of the project already was slated to be constructed. As we developed this backup plan, over the past few months, we notified DOC-EERA of the alternative, even though we continued to hope we would not need it. Unfortunately, by the end of June, due to the lack of engagement from the townships, we were forced to switch to our alternate plans, and on June 24, 2020, the Company reached out to DOC-EERA, Commission staff, and Freeborn County officials to inform them of our decision. On June 29, 2020, we reached out to affected landowners to discuss the same with them.

In our discussions with DOC-EERA and Commission staff, we agreed that, at this time, the appropriate procedural approach to documenting this change in plans was through a revised Site Plan, which we provide as Attachment A, rather than a Site Permit Amendment.

B. Moving Turbines to Iowa Provides Certainty and Best Preserves Benefits for Our Customers

As noted above, moving the 17 turbines in question to Iowa is not the Company's preferred course of action, but given the circumstances, it is the best path forward for the Company and our customers. Going this direction facilitates the Company securing 100% of the value of the PTCs for the project; it allows the project to be constructed efficiently; it aligns with the conditions of the Site Permit; and it moves turbines from a community that was antagonistic to the project to one that is receptive to the project. For all these reasons, we ultimately determined this shift was in the best interest of all parties.

One of the aspects of the Freeborn Wind Energy project that makes it particularly valuable for customers is that, because work on the project began before 2017, it qualifies for 100% PTCs, the value of which the Company will flow back to customers through the Renewable Energy Standard Rider. The current value of PTCs is 2.5 cents per kWh of energy produced by a wind farm during its first ten years of operation. Until just over one month ago, in order to qualify under the continuity safe harbor to secure 100% of this PTC value, the project needed to be placed into service by December 31, 2020. Missing this deadline could have extreme consequences, potentially including the loss of 20% of the PTCs. For a 200 MW wind farm, like the Freeborn Wind Energy project, that could amount to over $40,000,000 in lost PTCs.

On May 27, 2020, the IRS issued Notice 2020-41, extending the deadline by one year to address supply chain issues related to the COVID-19 pandemic.[2] Although this extension gives the Company some ability to extend construction into 2021, work on the Freeborn Wind Energy project was planned to occur in 2020 well before the extension was contemplated or even the impacts of COVID-19 were realized. The BOP contractor, Wanzek, began civil construction on the project in April 2020, and delaying any portion of that work for a substantial period of time would add notable cost increases to the project. For example, the contractor would be unable to construct foundations and collection lines for those turbines and would need to delay work and return at an uncertain date. This uncertainty with the schedule

[2] https://www.irs.gov/pub/irs-drop/n-20-41.pdf

would expose the project to additional costs for labor efficiency losses, and it also is possible that the contractor could not guarantee labor resources would return in time to support schedule to meet even the extended PTC deadlines. To compound this issue, there likely would be significant cost impacts and additional schedule uncertainty related to crane resources needed to erect the turbines, which could not be used as efficiently as if the entire facility were constructed at the same time. Cranes needed to construct these turbines would need to walk past the turbine locations and then be broken down to reach other portions of the project, resulting in additional labor, time, and uncertainty in crane availability.

Based on these timing and scheduling pressures, even though we do not believe the townships' positions are reasonable, fighting with them over road use permits added too much scheduling uncertainty. Similarly, based on the townships' prior actions, attempting to comply with the Ordinances at best would have added substantial delay to the project. As a result, we chose the only option that provided us with certainty as to our ability to meet the 100% PTC deadline and efficiently construct the entire project: moving the 17 turbines in question to Iowa.

In addition to these benefits, this shift in turbine locations moves them from communities that are openly antagonistic to the project to one that is enthusiastic about it. Wind turbines are a permitted use in Worth County's Agricultural District. Furthermore, we were met with support from both Worth County landowners and the Board of Supervisors upon presentation of the alternate site layout. We believe, therefore, that this move is in the best interest of our customers.

C. Removing Turbines from the Site Plan Does Not Require a Site Permit Amendment

Although we appreciate that this shift in turbine locations is a significant change in the project, we do not believe it requires an amendment to the Site Permit at this time. We have complied, and intend to continue complying, with all terms of the Site Permit as they relate to the remaining turbines we intend to construct in Minnesota. The only difference is that 17 turbines originally planned to be built in Minnesota no longer will be located in the state. As a result, there is no need to amend the Site Permit, which is—as its name implies—a permit authorizing (not an injunction requiring) the construction of up to 84 MW of wind generation.

To the contrary, this shift in turbine locations is consistent with the Site Permit. Section 5.2.12 of the Site Permit requires the Company to "make satisfactory arrangements with the appropriate state, county, or township governmental body

having jurisdiction over roads to be used for construction of the project, for maintenance and repair of roads that may be subject to increased impacts due to transportation of equipment and project components" prior to using such roads. Section 5.5.2 of the Site Permit requires the Company to "obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations" and notes that a "list of the permits known to be required is included in the permit application." Section 11.1-1 of the Site Permit Application, submitted on June 14, 2017, identifies the following "known or potentially required permits and approvals for the Project" to be obtained from London and Oakland townships: ROW permits, crossing permits, driveway permits for access roads, oversize/overweight permits for township roads." Absent satisfactory arrangements with the townships, construction of the 17 turbines was not authorized by the Site Permit.

Additionally, the shift in turbine locations to Iowa is consistent with Section 3.1 of the Site Permit, which states that "[a]ny modification to the location of a wind turbine and associated facility depicted in the preliminary layout shall be done in such a manner to have comparable overall human and environmental impacts and shall be specifically identified in the site plan pursuant to Section 10.3." Because the shift in turbines only removes previously approved turbines from their locations in Minnesota and does not change anything else related to the planned and permitted construction in Minnesota, it effectively minimizes any such impacts. There is, moreover, no need to resubmit "all the information required in an application" under "Minn. R. 7854.0500" for those turbines left in Minnesota because such information would be redundant of what already is in the record.

Once construction of the project is completed, it may be appropriate to amend or modify the Site Permit to reflect the contours of the constructed project. Such a modification would be appropriate under Minn. R. 7854.1300, subp. 1, which states "[o]nce construction of an LWECS is completed, the permittee shall advise the commission of the completion of the project and the commission shall amend the site permit to specifically define the area authorized for the LWECS…" and Section 12.1 of the Site Permit, which allows site boundaries to be modified following completion of construction, "to represent the actual site required by the Permittee to operate the Project authorized by this permit." At this time, however, an amendment is unnecessary, and we therefore request that AFCL's motion be denied.

We have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been served on the parties on the attached service list. Please contact me at (612) 330-6064 or bria.e.shea@xcelenergy.com, or Jennifer

Roesler at (612) 330-1925 or jennifer.roesler@xcelenergy.com, if you have any questions regarding this filing.

Sincerely,

/s/

BRIA SHEA
DIRECTOR, REGULATORY AND STRATEGIC ANALYSIS

c: Service List

Attachment A

Amended Site Plan

Civil Construction Plans

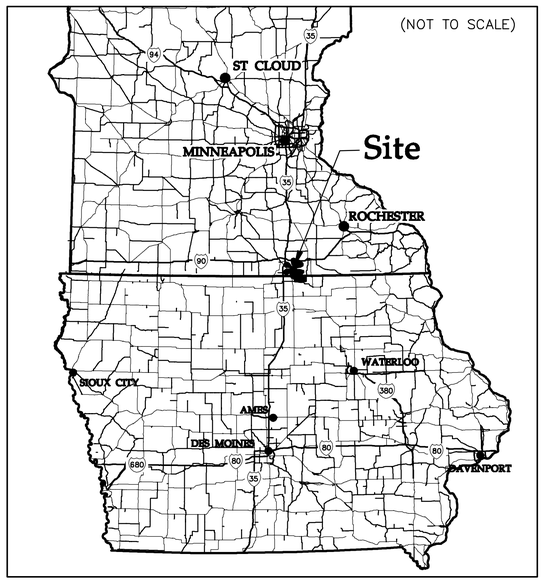
for

Wind Turbines, Access Roads, Drainage, and Erosion Control

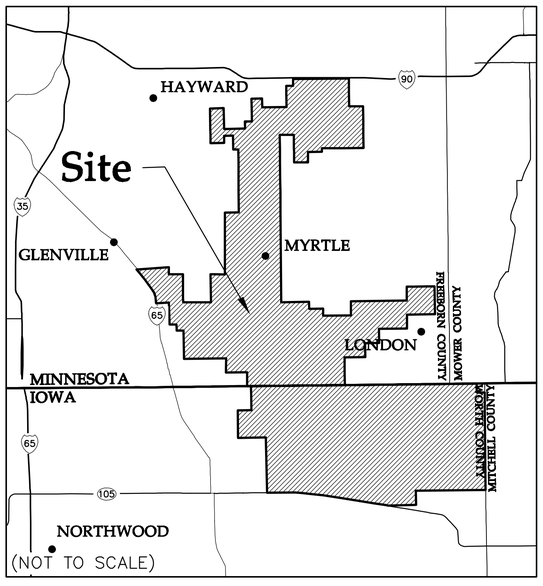
Freeborn Wind Farm

Freeborn County, Minnesota & Worth County, Iowa

State Map



Vicinity Map



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NH-276086-2-1	Turbine Coordinates
NH-276086-2-2	Culvert Schedule
NH-276086-3-1	Overall Plan – MN
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NH-276086-4-1	Delivery Flow Plan – MN
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NH-276086-5-1	Construction Details
NH-276086-5-2	Construction Details
NH-276086-5-3	Construction Details
NH-276086-5-4	Construction Details
NH-276086-6	SWPPP Details
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NH-276086-8-1	Site Plan T-8 T-9
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NH-276086-11-1	O&M Yard Site Plan
NH-276086-11-2	O&M Yard Grading Plan

IOWA PROFESSIONAL ENGINEER SEAL:

SEAL

LICENSED PROFESSIONAL ENGINEER
ROBERT S. COPOULS
20960
IOWA

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

05/04/20

ROBERT S. COPOULS

LICENSE NUMBER: 20960
MY LICENSE RENEWAL DATE IS DECEMBER 31, 2021
SHEETS COVERED BY THIS SEAL: 1, 2-1, 2-2, 3-2, 4-2, 5-1, 5-2, 5-3, 5-4, 6, 7-1, 7-2, 9-1 – 9-28.

MINNESOTA PROFESSIONAL ENGINEER SEAL:
SEE TITLE BLOCK FOR SIGNATURE AND SEAL. ALL SHEETS APPLICABLE TO MINNESOTA HAVE BEEN SEALED.

DATA SET INFORMATION

BASE FILE	FILE NAME / NOTES	PROVIDER	DATE
AERIAL IMAGE	AERIAL-MNCompImgry-GM.jp2	Minnesota Composite Imagery	11/3/2017
LAND CONTROL	Freeborn_Neighbor_Agreements.shp Freeborn_Participating_Wind_Leases.shp Freeborn_Transmission_Agreements.shp	Wanzek	4/1/2020
ALTA SURVEY	V_BNDY_Minnesota_70315.dwg V_BNDY_IOWA_70315	Wanzek	7/18/2019
TOPOGRAPHY	MKP_MNTOPO_IA_LIDAR_dot5_50ft.txt	MNTOPO / IA LIDAR	7/18/2019
TURBINE ARRAY	L083 Final Array (2020-03-26).xlsx	Wanzek	3/30/2020
UNDERGROUND COLLECTION	Freeborn Collection Shp File_Minnesota.shp Freeborn Collection Shp File_Iowa.shp	Wanzek	4/10/2020
STREAMS/WETLANDS	Freeborn_Waterbodies_2018_2019.shp Freeborn_Wetlands_2018_2019.shp	Wanzek/Xcel Energy	12/9/2019
TRANSMISSION LINE	FREEBORN_TRANSMISSION LINE.shp	Wanzek	4/10/2020

Westwood

Phone (952) 937-5150 12701 Whitewater Dr
Fax (952) 937-5822 Minnetonka, MN 55343
Toll Free (888) 937-5150 westwoodps.com

Westwood Professional Services, Inc.

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN and Worth County, IA

DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
PM: DJN	DATE:	PROJ. NO:	22586
APVD:	DATE:	SCALE: NONE	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

UNIT 0
CIVIL ACCESS ROADS

COVER SHEET/DRAWING INDEX

NH-276086-1

REV 0

TURBINE COORDINATES

Freeborn Wind Project - Minnesota					
Turbine Number	Turbine Type	WGS84		FreebornMN-F	
		Longitude	Latitude	Easting	Northing
T-6	V120-STE	-93.19815203	43.62821679	699083.8076	147641.6654
T-7	V120-STE	-93.18453198	43.62723905	702693.4839	147318.2397
T-8	V120	-93.16461615	43.63483885	707940.7467	150137.827
T-9	V120	-93.15817436	43.63473359	709646.6116	150115.6718
T-11	V120-STE	-93.12552854	43.63929874	718273.2174	151863.9668
T-12	V120	-93.11816937	43.63925049	720221.6189	151865.8279
T-13	V120	-93.18073471	43.61957570	703724.8645	144534.0753
T-14	V120-STE	-93.17627629	43.62010390	704903.7583	144737.6
T-18	V110-STE	-93.19192815	43.60261863	700817.0704	138325.5597
T-19	V120-STE	-93.19451205	43.59696308	700151.3768	136257.747
T-20	V120	-93.20331802	43.56671734	697917.7149	125211.4192
T-21	V120-STE	-93.19862950	43.56813924	699155.739	125740.9511
T-22	V110-STE	-93.25468562	43.54736157	684361.5372	118037.4837
T-23	V110-STE	-93.24627045	43.54584956	686597.4296	117505.1387
T-24	V110	-93.20732644	43.55480659	696894.1291	120860.1734
T-25	V120	-93.24152201	43.53461142	687891.4593	113419.3256
T-26	V120-STE	-93.22390163	43.53071603	692576.7719	112039.7861
T-27	V120	-93.21632313	43.53075844	694586.5611	112072.9309
T-37	V120-STE	-93.18696334	43.51882628	702413.1881	107793.6921
T-38	V120-STE	-93.16249503	43.51841174	708905.2182	107703.2479
T-39	V120-STE	-93.15659822	43.51951867	710465.5858	108121.6465
T-45	V120	-93.18690600	43.50116744	702487.6132	101356.8901
T-46	V120	-93.18334371	43.50531518	703418.8692	102877.5254
T-48	V120-STE	-93.16360301	43.50763366	708648.5523	103771.6772

Freeborn Wind Project - Iowa					
Turbine Number	Turbine Type	WGS84		FreebornMN-F	
		Longitude	Latitude	Easting	Northing
T-100	V120-STE	-93.17874072	43.49196765	704685.3929	98023.45849
T-101	V120-STE	-93.17346107	43.49405929	706079.3858	98798.96458
T-102	V120-STE	-93.16941247	43.49552388	707148.7573	99342.91308
T-103	V120-STE	-93.15812417	43.49408990	710149.2938	98848.59893
T-104	V120	-93.15328298	43.49570034	711428.3781	99447.92927
T-105	V120	-93.14263786	43.49339290	714261.42	98634.14444
T-106	V120	-93.13539883	43.49345491	716182.2644	98675.53127
T-107	V120	-93.11519415	43.49436713	721540.7397	99061.35162
T-108	V120	-93.10755837	43.49389815	723568.7906	98910.88741
T-109	V120	-93.10191488	43.49448590	725064.2284	99140.38914
T-110	V120	-93.09291491	43.49349679	727456.2741	98804.39357
T-111	V120	-93.08657536	43.49356857	729138.3534	98848.00756
T-112	V120	-93.07334536	43.49250640	732653.3342	98497.65749
T-113	V120	-93.06672727	43.49237773	734410.1277	98469.38654
T-114	V120	-93.05742632	43.49428575	736870.9121	99191.2999
T-116	V120	-93.04217956	43.49392916	740918.3537	99105.22509
T-117	V120	-93.03338028	43.49317373	743256.4658	98855.54009
T-119	V120	-93.19208805	43.48529128	701165.4641	95557.1652
T-120	V120	-93.18197057	43.48455192	703853.2704	95312.35361
T-121	V120	-93.16725103	43.48475511	707759.3716	95422.93855
T-122	V120	-93.15871539	43.48422531	710026.6994	95251.31086
T-123	V120	-93.15448569	43.48594120	711143.3352	95887.51601
T-124	V120	-93.13889926	43.48482503	715284.0918	95520.71644
T-125	V120	-93.08963950	43.48624516	728352.8994	96170.08994
T-126	V120	-93.04677505	43.48569653	739731.5214	96091.03786
T-127	V120	-93.03728569	43.48908060	742236.4873	97352.12929
T-132	V120	-93.16380789	43.47848975	708694.8782	93147.76555
T-133	V120	-93.15325979	43.47551980	711505.1866	92091.89021
T-134	V120	-93.14211232	43.47470841	714467.2165	91824.74782
T-135	V120	-93.13375211	43.47741088	716676.8097	92831.55955
T-136	V120	-93.12238491	43.47480011	719703.6805	91909.79708
T-137	V120	-93.11670452	43.47603307	721207.0651	92374.32181
T-138	V120	-93.11237570	43.48037812	722340.1637	93969.72081
T-139	V120	-93.10680303	43.48118872	723816.3263	94280.17919
T-140	V120	-93.09903980	43.48127783	725876.5765	94333.70134
T-141	V120	-93.09374277	43.47617990	727301.7379	92489.9151
T-142	V120	-93.08683083	43.47617041	729136.55	92505.47124
T-143	V120	-93.07862256	43.47977151	731301.6438	93840.89065
T-144	V120	-93.07365550	43.48116670	732614.6978	94363.34348
T-145	V120	-93.06649787	43.48112400	734514.696	94367.92902
T-146	V120	-93.05975017	43.48108846	736305.8587	94374.12486
T-152	V120	-93.16687018	43.46737505	707920.2653	89088.60687
T-153	V120	-93.15225135	43.46030145	711826.2293	86547.16955
T-154	V120 (PTC Tower)	-93.13858641	43.46026940	715454.6786	86570.6763
T-155	V120	-93.13331816	43.46169034	716848.4131	87102.35329
T-156	V120	-93.12910607	43.46372880	717959.4343	87856.43875
T-157	V120	-93.11839593	43.46396748	720802.1674	87971.76396
T-158	V120	-93.10252482	43.46709409	725004.3755	89154.09379
T-159	V120	-93.09604751	43.46718724	726723.6889	89205.68232
T-162	V120	-93.06269673	43.47459620	735549.0731	91999.25069
T-163	V120	-93.05586846	43.47461730	737361.596	92026.40429
T-169	V120	-93.15487581	43.45222497	711157.5939	83596.49506
T-170	V120	-93.14877424	43.45562142	712765.9532	84850.13396
T-179	V120	-93.15025929	43.44736012	712400.6432	81834.98036
T-180	V120	-93.14378448	43.44884156	714114.9649	82391.62925
T-181	V120	-93.13723664	43.44997498	715849.8393	82821.74104
T-182	V120	-93.13098127	43.45038373	717509.5861	82987.07465
T-183	V120	-93.12668731	43.45224320	718643.1815	83676.16128
T-118	V110	-93.02664808	43.49320566	745042.8807	98886.99298
T-147	V110	-93.05048464	43.47942009	738771.7782	93792.51641
T-160	V120	-93.07566962	43.46870624	732127.9679	89815.73149
T-161	V120	-93.06859829	43.47024793	733999.3096	90397.5605
ALT-172	TBD	-93.08217851	43.46144765	730427.6503	87151.75801
T-184	V120	-93.18735209	43.48542718	702421.9932	95618.22334
T-185	V120	-93.18171478	43.47884325	703940.4342	93232.08482
ALT-186	TBD	-93.17432267	43.46993287	705932.9736	90002.38071
T-187	V120	-93.16333117	43.46338235	708873.6416	87642.1036
ALT-188	TBD	-93.15919083	43.46079796	709981.9189	86710.51012
T-189	V120	-93.15574280	43.45630053	710913.1352	85079.8821
T-190	V120	-93.14558127	43.44550826	713649.5693	81171.96421
ALT-191	TBD	-93.14650504	43.46981927	713318.3945	90031.26533
ALT-192	TBD	-93.06992121	43.45902725	733691.5001	86303.78459
T-193	V120	-93.04801472	43.45999321	739504.3778	86718.36368
T-194	V120	-93.03961443	43.45763926	741744.2374	85884.69737
T-195	V120	-93.03043950	43.45765450	744180.3919	85917.12262
T-196	V120	-93.04033311	43.46883332	741508.6608	89962.93113
ALT-197	TBD	-93.02658082	43.46774888	745164.0252	89607.98338
T-198	V110	-93.02672703	43.47443405	745098.0878	92044.34948
T-199	V110	-93.03557421	43.47940852	742729.5652	93831.57169
T-200	V110	-93.03117648	43.48104454	743890.2655	94440.81366
T-201	V110	-93.02736862	43.48599911	744880.8861	96258.01493
T-205	V120	-93.17200000	43.48302800	706504.83	94781.44666

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NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

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Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN and Worth County, IA

DWN: TDD	DATE:	CHK:	DATE:
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ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

UNIT 0

CIVIL ACCESS ROADS

TURBINE COORDINATES

NH-276086-2-1

REV 0

DRAINAGE CROSSING SCHEDULE

Freeborn Wind Project - Minnesota						
Crossing Number	Design Options			Plan Sheet	Access Road	Station
	Low Water Crossing		Culvert Sizing (CMP)			
	Design	Length (LF)				
4	FLEXAMAT	450	1-36", 2-30", 3-24"	8-6	Road 6	01+68
5	FLEXAMAT	160	1-48", 2-30", 3-24"	8-3	Road 8	05+00
7	FLEXAMAT	370	1-54", 2-42", 3-36"	8-5	Road 12	23+87
8	FLEXAMAT	50	1-18"	8-7	Road 14	22+33
9	-	-	1-36", 2-24", 4-18"	8-7	Road 14	30+55
12	-	-	1-48", 2-36", 3-30"	8-10	Road 19	10+85
13	FLEXAMAT	100	1-48", 2-36", 3-30"	8-11	Road 21	07+00
14	FLEXAMAT	50	1-30", 2-24", 3-18"	8-11	Road 21	17+25
15	FLEXAMAT	50	1-18"	8-11	Road 21	24+00
16	FLEXAMAT	120	1-36", 2-24", 4-18"	8-11	Road 21	27+25
17	FLEXAMAT	50	1-48", 2-36", 3-30"	8-11	Road 21	35+83
18	FLEXAMAT	50	1-42", 2-30", 4-24"	8-12	Road 22	08+66
19	FLEXAMAT	50	-	8-12	Road 22	13+43
20	FLEXAMAT	130	-	8-14	Road 24	03+15
21	FLEXAMAT	130	1-48", 2-36", 3-30"	8-16	Road 25	07+13
22	FLEXAMAT	60	1-30", 2-24", 3-18"	8-16	Road 25	10+00
23	FLEXAMAT	50	1-30", 2-24", 4-18"	8-17	Road 26	04+37
27	FLEXAMAT	50	1-36", 2-30", 3-24"	8-23	Road 38	04+50
28	FLEXAMAT	70	1-48", 2-36", 3-30"	8-23	Road 39	08+21
33	FLEXAMAT	50	-	8-26	Road 46	35+00
34	FLEXAMAT	120	1-30", 2-24", 4-18"	8-27	Road 48	09+30

Freeborn Wind Project - Iowa						
Crossing Number	Design Options			Plan Sheet	Access Road	Station
	Low water Crossing		Culvert Sizing (CMP)			
	Design	Length (LF)				
36	FLEXAMAT	110	1-36", 2-30", 3-24"	9-1	Road 102	36+00
37	FLEXAMAT	330	-	9-1	Road 102	05+75
38	FLEXAMAT	50	1-18"	9-2	Road 104	07+07
39	FLEXAMAT	50	1-42", 2-30", 4-24"	9-5	Road 108	30+66
40	FLEXAMAT	250	1-18"	9-5	Road 108	18+87
41	FLEXAMAT	50	1-24", 2-18"	9-5	Road 108	10+00
42	FLEXAMAT	50	1-24", 2-18"	9-5	Road 110	02+85
43	-		1-54", 2-42", 3-36"	9-6	Road 113	12+85
44	FLEXAMAT	50	1-36", 2-30", 3-24"	9-7	Road 114	23+00
45	FLEXAMAT	70	1-36", 2-30", 3-24"	9-8	Road 117	05+71
46	FLEXAMAT	50	1-30", 2-24", 4-18"	9-10	Road 121	07+00
47	FLEXAMAT	50	1-36", 2-30", 3-24"	9-12	Road 124	07+00
48	FLEXAMAT	50	1-24", 2-18"	9-11	Road 133	16+13
49	FLEXAMAT	50	1-36", 2-30", 3-24"	9-12	Road 135	10+00
50	FLEXAMAT	50	1-24", 2-18"	9-13	Road 138	38+00
51	FLEXAMAT	50	-	9-13	Road 138	08+00
52	FLEXAMAT	50	1-42", 2-30", 4-24"	9-14	Road 140	46+40
53	FLEXAMAT	50	1-30", 2-24", 3-18"	9-14	Road 140	38+90
54	FLEXAMAT	50	1-42", 2-30", 3-24"	9-15	Road 146	10+54
55	FLEXAMAT	50	1-30", 2-24", 3-18"	9-15	Road 146	22+50
56	FLEXAMAT	50	1-42", 2-30", 3-24"	9-15	Road 146	25+22
57	FLEXAMAT	50	-	9-19	Road 154	01+70
58	FLEXAMAT	50	-	9-19	Road 156	03+80
59	FLEXAMAT	50	1-30", 2-24", 3-18"	9-21	Road 158	10+75
60	FLEXAMAT	50	1-18"	9-21	Road 158	21+17
61	FLEXAMAT	50	1-30", 2-24", 4-18"	9-24	Road 169	09+43
62	FLEXAMAT	50	1-36", 2-30", 3-24"	9-24	Road 170	04+50
63	FLEXAMAT	50	1-18"	9-24	Road 179	22+53
64	FLEXAMAT	100	1-36", 2-24", 4-18"	9-24	Road 179	16+72
65	FLEXAMAT	50	-	9-25	Road 181	03+50
66	FLEXAMAT	50	-	9-25	Road 182	03+33
67	FLEXAMAT	50	1-24", 2-18"	9-17	Road 152	06+10
100	FLEXAMAT	100	1-36", 2-30", 3-24"	9-9	Road 185	16+00
101	FLEXAMAT	50	1-30", 2-24", 3-18"	9-28	Road 194	13+00
102	FLEXAMAT	100	1-36", 2-30", 3-24"	9-17	Road 199	24+25

NOTES:

1. DRAINAGE CROSSING AND PUBLIC ENTRANCE CULVERT DESIGN IS BASED ON A 2–YEAR HYDRAULIC ANALYSIS, UNLESS OTHERWISE NOTED. CULVERTS WITHIN THE PUBLIC ROW SHALL BE VERIFIED WITH LOCAL JURISDICTION PRIOR TO INSTALLATION.
2. PERMANENT CULVERTS SHALL ONLY BE INSTALLED UPON OWNER APPROVAL. WHERE MULTIPLE DESIGN OPTIONS ARE LISTED, BOTH ARE NOT REQUIRED.
3. FINAL LWC INSTALLATION LOCATIONS SHALL BE AGREED TO BY OWNER AND CONTRACTOR. ANY INCREASES OR DEDUCTIONS SHALL BE TRUED UP PRIOR TO SUBSTANTIAL COMPLETION.
4. MULTIPLE SIZING OPTIONS FOR CULVERTS ARE LISTED FOR FLEXIBILITY. CONTRACTOR SHALL CHOOSE THE BEST FIT DURING INSTALLATION.

PUBLIC ROAD ENTRANCE CULVERTS

Freeborn Wind Project - Minnesota					
Crossing Number	Type	2-Year Size	Plan Sheet	Public/Access Road Intersection	Notes
3	CMP	1-18"	8-6	190th St/Road 6	
4	CMP	1-18"	8-7	840th St/Road 7	
5	Existing	-	8-3	850th St/Road 9	
7	CMP	1-18"	8-5	200th St/Road 11	
8	CMP	1-18"	8-5	200th St/Road 12	
9	CMP	1-18"	8-7	180th St/Road 14	
12	CMP	1-18"	8-9	170th St/Road 18	
13	CMP	1-18"	8-10	170th St/Road 19	
14	CMP	1-18"	8-11	830th St/Road 21	
15	CMP	1-18"	8-12	810h St/Road 22	
16	CMP	1-42"; 2-30"; 4-24"	8-13	810th St/Road 23	
17	CMP	1-18"	8-16	810th St/Road 25	
18	CMP	1-18"	8-17	120th St/Road 26	
67	CMP	1-18"	8-17	120th St/Road 27	
25	CMP	1-18"	8-22	840th St/Road 37	
26	CMP	1-24"; 2-18"	8-23	110th St/Road 39	
29	CMP	1-18"	8-26	510th St/Road 45	
30	CMP	1-24"; 2-18"	8-27	850th St/Road 48	

Freeborn Wind Project - Iowa					
Crossing Number	Type	2-Year Size	Plan Sheet	Public/Access Road Intersection	Notes
31	CMP	1-18"	9-1	500th St/Road 102	
32	CMP	1-18"	9-2	Raven Ave/Road 106	
34	CMP	1-18"	9-4	Thrush Ave/Road 107	
35	CMP	1-18"	9-6	500th St/Road 113	
36	CMP	1-18"	9-7	500th St/Road 114	
37	CMP	1-18"	9-8	Yarrow Ave/Road 116	
38	CMP	1-18"	9-8	Zinnia Ave/Road 117	
40	CMP	1-18"	9-9	500th St/Road 185	
41	CMP	1-18"	9-10	Raven Ave/Road 121	
42	CMP	1-18"	9-11	500th St/Road 122	
43	CMP	1-18"	9-11	500th St/Road 123	
44	CMP	1-18"	9-12	500th St/Road 124	
45	CMP	1-18"	9-14	500th St/Road 125	
46	CMP	1-18"	9-16	500th St/Road 126	
47	CMP	1-18"	9-8	500th St/Road 127	
48	CMP	1-18"	9-10	Raven Ave/Road 132	
49	CMP	1-18"	9-11	Raven Ave/Road 133	
50	CMP	1-18"	9-11	490th St/Road 134	
51	CMP	1-18"	9-12	490th St/Road 135	
52	CMP	1-18"	9-13	490th St/Road 136	
53	CMP	1-18"	9-13	490th St/Road 137	
54	CMP	1-18"	9-13	490th St/Road 138	
55	CMP	1-18"	9-14	Vine Ave/Road 140	
56	CMP	1-18"	9-15	Vine Ave/Road 146	
57	Existing	-	9-17	490th St/Road 152	
58	CMP	1-18"	9-18	480th St/Road 153	
59	CMP	1-36"; 2-24"; 4-18"	9-19	480th St/Road 154	
60	CMP	1-18"	9-19	Thrush Ave/Road 156	
61	CMP	1-18"	9-20	Thrush Ave/Road 157	
62	CMP	1-18"	9-24	Raven Ave/Road 169	
63	CMP	1-18"	9-24	480th St/Road 170	
64	CMP	1-18"	9-24	Spruce Ave/Road 179	
65	CMP	1-18"	9-25	Spruce Ave/Road 181	
66	CMP	1-18"	9-25	Thrush Ave/Road 182	
100	CMP	1-30"; 2-24"; 3-18"	9-26	480th St/Road 189	
102	CMP	1-18"	9-24	Yarrow Ave/Road 193	
103	CMP	1-18"	9-28	Yarrow Ave/Road 194	
104	CMP	1-24", 2-18"	9-28	Zinnia Ave/Road 195	
106	CMP	1-24", 2-18"	9-17	Zinnia Ave/Road 198	
107	CMP	1-24", 2-18"	9-17	Zinnia Ave/Road 199	
108	CMP	1-30"; 2-24"; 3-18"	9-17	500th St/Road 201	
109	CMP	1-18"	9-23	485th St/Road 161	
110	CMP	1-18"	9-9	500th St/Road 184	

TEMPORARY CULVERTS FOR CRANE DITCH CROSSING

Crossing Number	Type	Gage	1-Year Size	Plan Sheet	Location
1	CMP	12	2-54"	8-19	East of T-45
2	CMP	12	2-54"	9-7	West of T-114
3	CMP	12	2-66"	9-27	Between T-155 and T-183
4	CMP	12	1-84"	9-26	Between T-169 and T-179

NOTES:

1. TEMPORARY CULVERTS ARE SIZED TO THE 1 YEAR, 24 HOUR STORM EVENT.
2. FOR CULVERTS 54" AND LARGER, MINIMUM STEEL GAGE IS 12 AND A MINIMUM OF 2' OF COVER IS REQUIRED.
8. CRANE WALK SHOULD BE WIDE ENOUGH FOR A MINIMUM 10 FOOT SETBACK ON BOTH SIDES MEASURED FROM THE TOP OF THE SLOPE TO THE OUTER EDGE OF THE LARGEST CRANE TRACK. A MINIMUM 55FT WIDE CROSSING IS REQUIRED PER THE LR1600 CRANE PROVIDED BY WANZEK.
9. SEE TESTING REQUIREMENTS ON SHEET 7–1.

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0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

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REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

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FREEBORN WIND FARM

Freeborn County, MN and Worth County, IA

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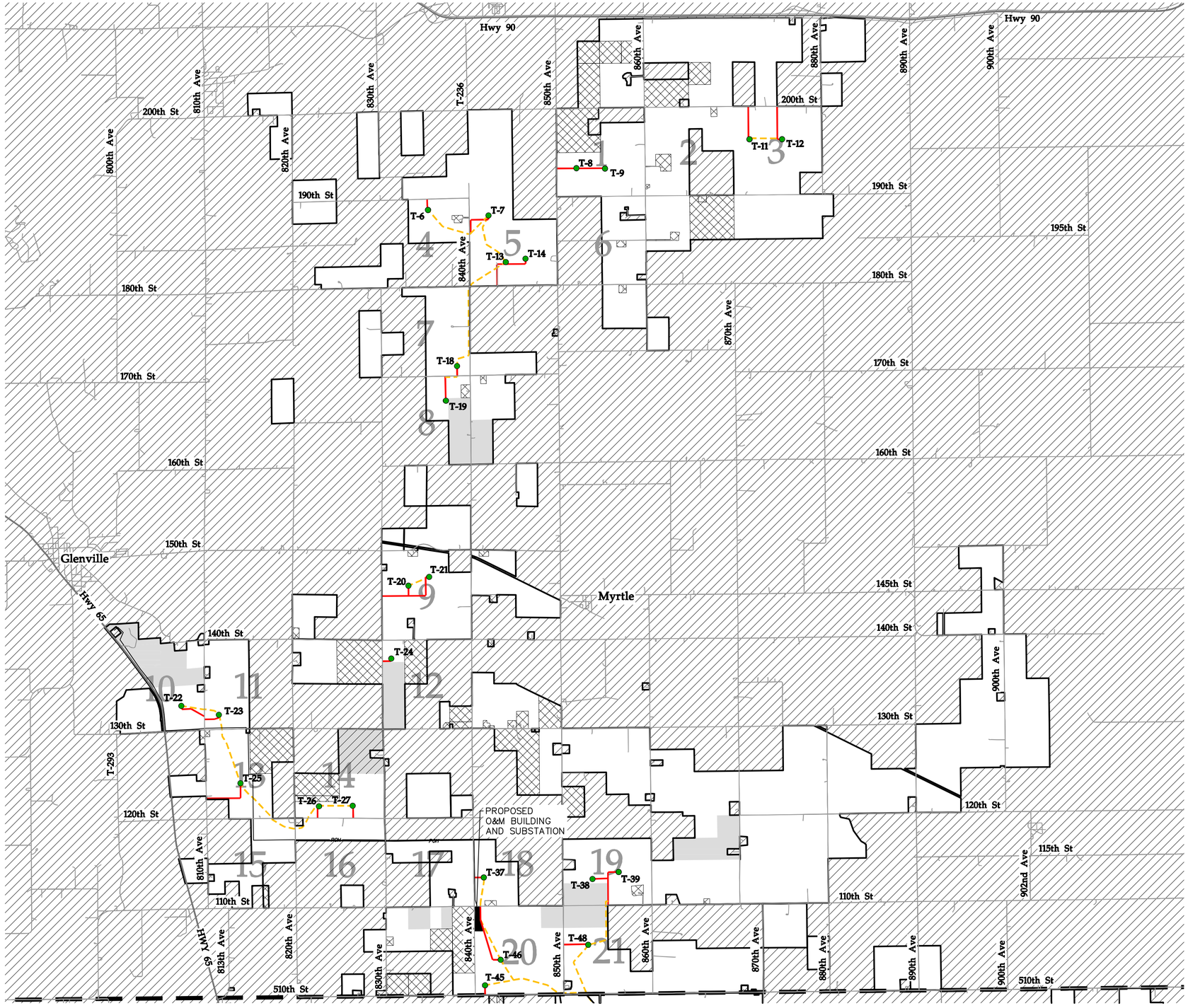
ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

UNIT 0
CIVIL ACCESS ROADS

CULVERT SCHEDULE

NH-276086-2-2

REV 0



LEGEND:

- PROPOSED TURBINE LOCATION
- T-XX — PROPOSED TURBINE NUMBER
- ALTERNATE TURBINE LOCATION
- ALT-XX — ALTERNATE TURBINE NUMBER
- PROPOSED ACCESS ROADS
- ALTERNATE ACCESS ROADS
- PROPOSED CRANE PATH
- PROPOSED ALTERNATE CRANE PATH
- EXISTING ROAD
- US HIGHWAY
- STATE LINE
- PARTICIPATING PARCELS
- NON–PARTICIPATING PARCELS
- PARTICIPATING – TRANSMISSION EASEMENT
- PARTICIPATING – NEIGHBOR AGREEMENT
- # — SHEET NUMBER (REFERS TO SHEET NH–276086–8–##)

0' 3200' 6400' 9600'

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Danielle J Nygren

Printed Name

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Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN

DWN: TDD	DATE:	CHK:	DATE:
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PM: DJN	DATE:	PROJ. NO: 22586	
APVD:	DATE:	SCALE:1" = 3200'-0"	

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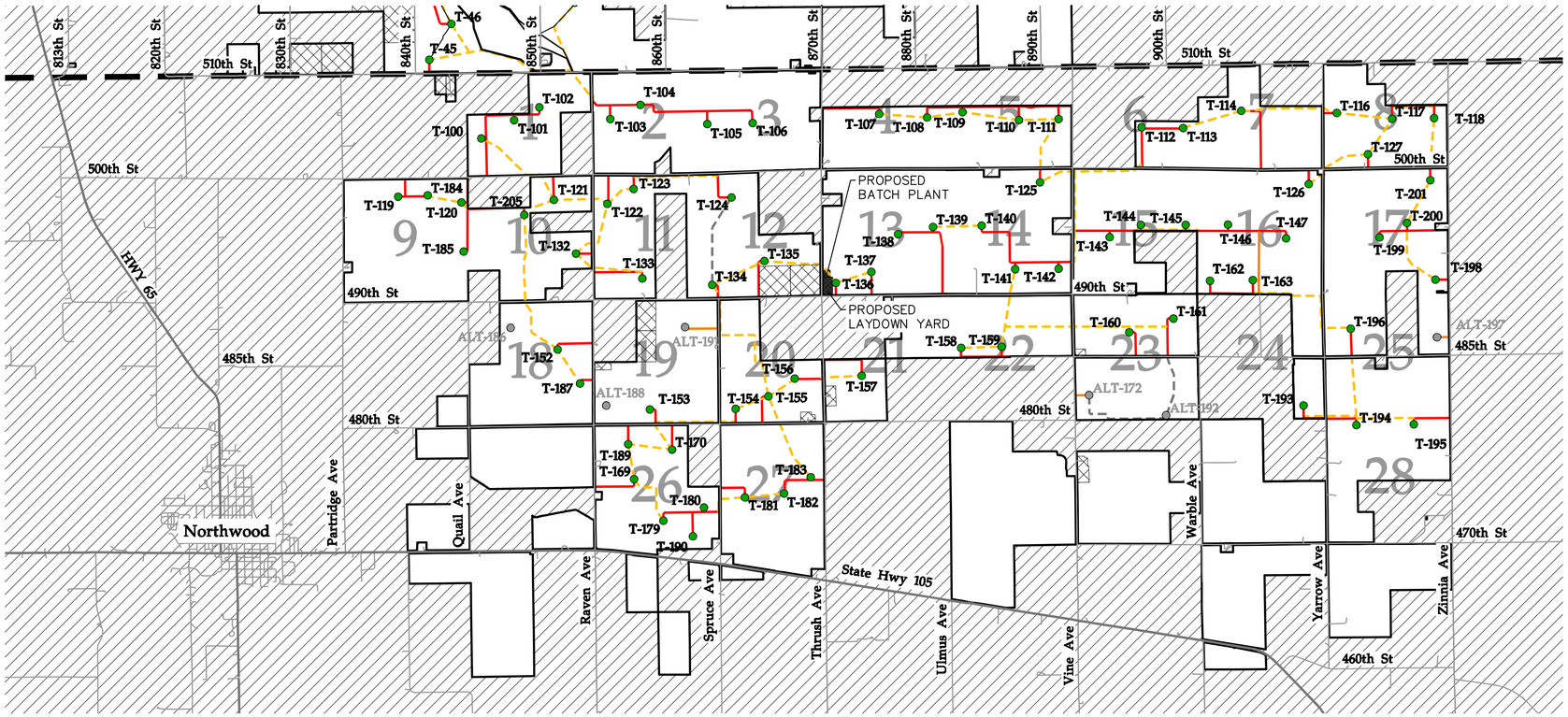
ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

UNIT 0
CIVIL ACCESS ROADS

OVERALL PLAN - MN

NH-276086- 3-1

REV 0



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- PROPOSED ACCESS ROADS
- ALTERNATE ACCESS ROADS
- PROPOSED CRANE PATH
- PROPOSED ALTERNATE CRANE PATH
- EXISTING ROAD
- US HIGHWAY
- STATE LINE
- PARTICIPATING PARCELS
- NON–PARTICIPATING PARCELS
- PARTICIPATING – TRANSMISSION EASEMENT
- PARTICIPATING – NEIGHBOR AGREEMENT
- # — SHEET NUMBER (REFERS TO SHEET NH–276086–9–##)

N

0' 3000' 6000' 9000'

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0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

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FREEBORN WIND FARM
Freeborn County, MN

DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
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ENERGY SUPPLY
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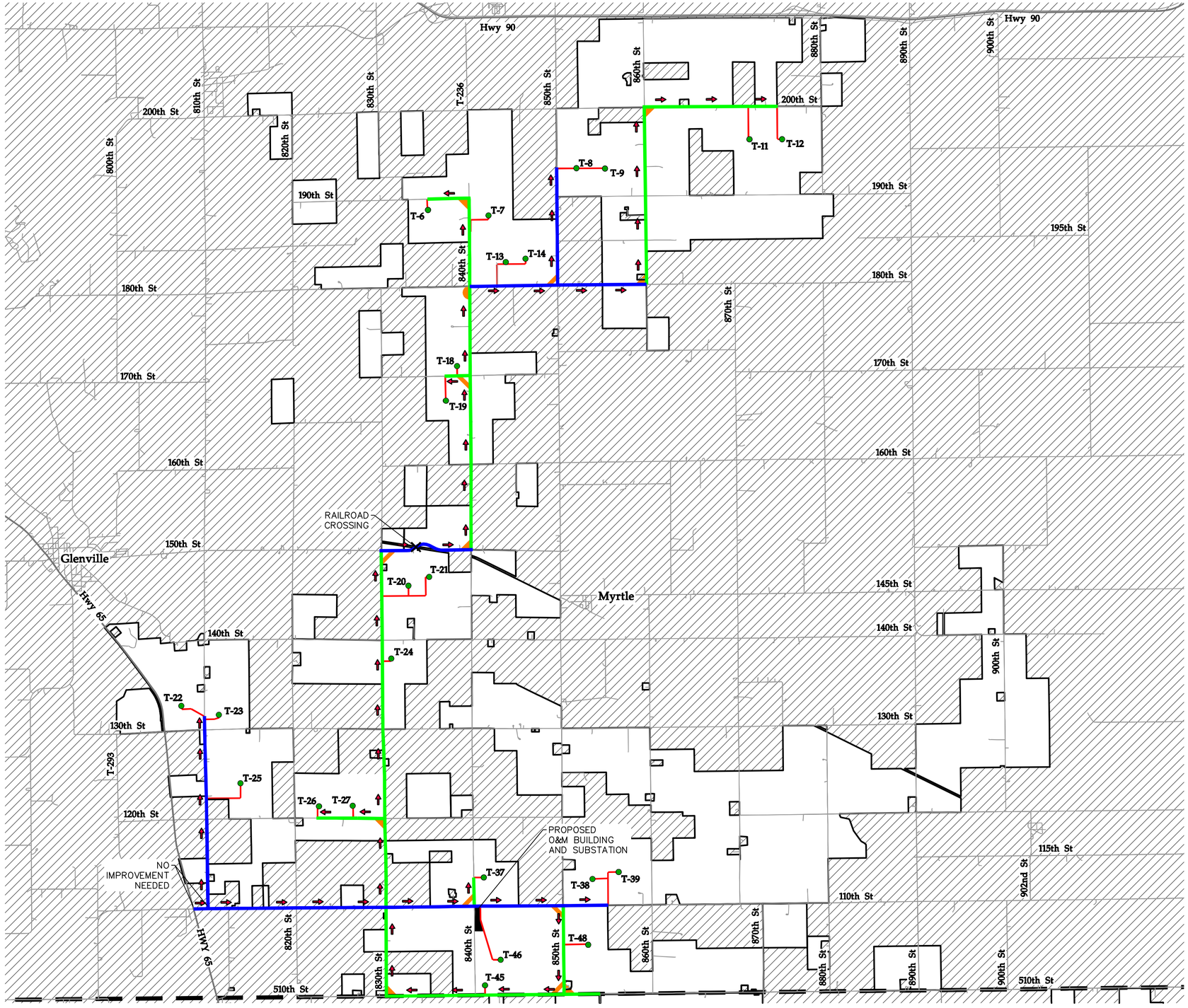
UNIT 0
CIVIL ACCESS ROADS
OVERALL PLAN - IA

NH-276086- 3-2

REV 0



LEGEND:

- PROPOSED TURBINE LOCATION
- T-XX — PROPOSED TURBINE NUMBER
- ALTERNATE TURBINE LOCATION
- ALT-XX — ALTERNATE TURBINE NUMBER
- PROPOSED ACCESS ROADS
- PROPOSED ALTERNATE ACCESS ROADS
- EXISTING ROAD
- US HIGHWAY
- STATE LINE
- BITUMINOUS DELIVERY ROAD
- GRAVEL DELIVERY ROAD
- PARTICIPATING PARCELS
- NON-PARTICIPATING PARCELS
- or or — INTERSECTION IMPROVEMENTS
- DELIVERY ROUTE DIRECTION

ITEM	LENGTH
BITUMINOUS DELIVERY ROUTE	12.30 mi
GRAVEL DELIVERY ROUTE	17.80 mi

N

0' 3200' 6400' 9600'

Westwood

Phone (952) 937-5150 12701 Whitewater Dr
Fax (952) 937-5822 Minnetonka, MN 55343
Toll Free (888) 937-5150 westwoodps.com

Westwood Professional Services, Inc.

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN

DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
PM: DJN	DATE:	PROJ. NO: 22586	
APVD:	DATE:	SCALE:1" = 3200'-0"	

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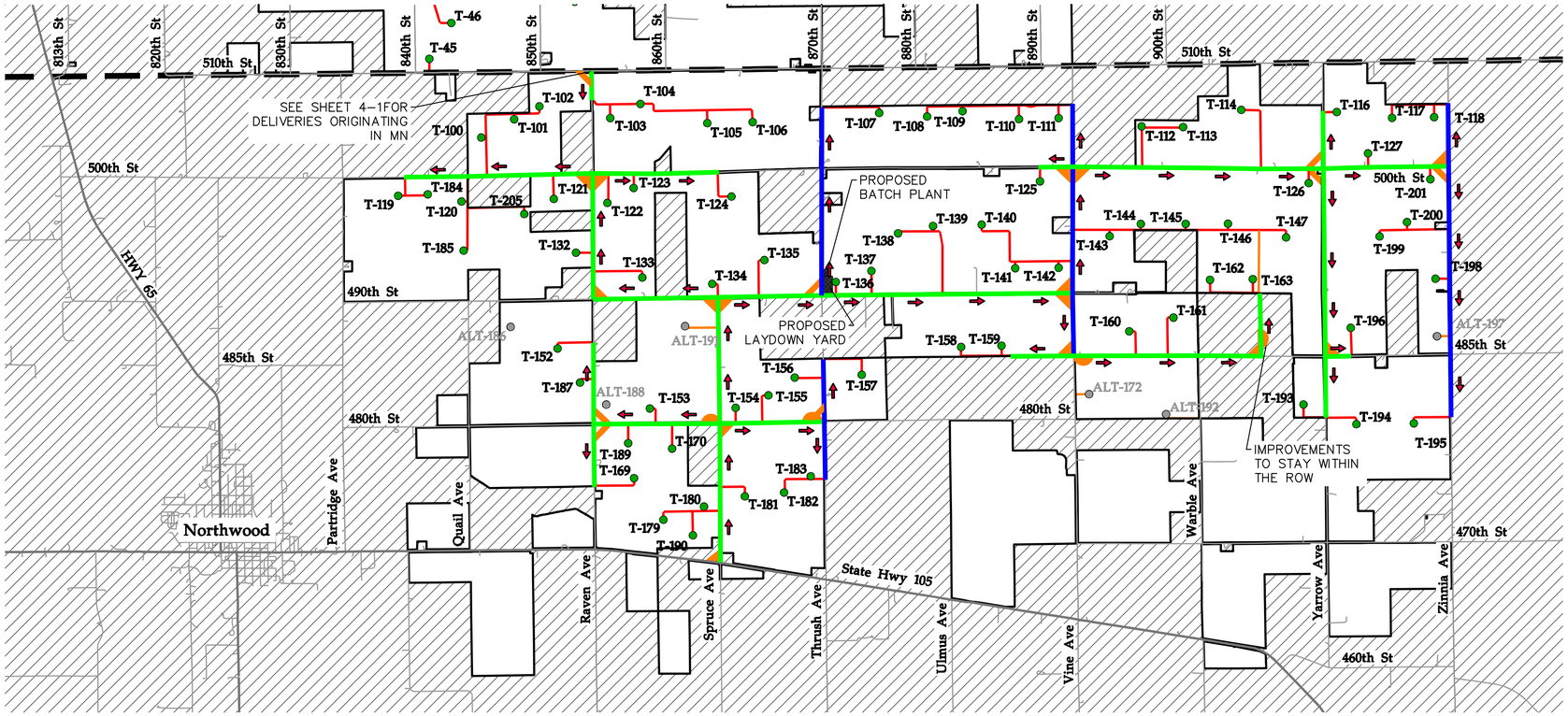
ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

UNIT 0
CIVIL ACCESS ROADS

DELIVERY FLOW PLAN - MN

NH-276086- 4-1

REV 0



LEGEND:

- PROPOSED TURBINE LOCATION
- T-XX — PROPOSED TURBINE NUMBER
- ALTERNATE TURBINE LOCATION
- ALT-XX — ALTERNATE TURBINE NUMBER
- PROPOSED ACCESS ROADS
- PROPOSED ALTERNATE ACCESS ROADS
- EXISTING ROAD
- US HIGHWAY
- STATE LINE
- BITUMINOUS DELIVERY ROAD
- GRAVEL DELIVERY ROAD
- PARTICIPATING PARCELS
- NON-PARTICIPATING PARCELS
- or or — INTERSECTION IMPROVEMENTS
- DELIVERY ROUTE DIRECTION

ITEM	LENGTH
BITUMINOUS DELIVERY ROUTE	7.00 mi
GRAVEL DELIVERY ROUTE	21.20 mi

0' 3000' 6000' 9000'

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Westwood Professional Services, Inc.

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN

DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
PM: DJN	DATE:	PROJ. NO: 22586	
APVD:	DATE:	SCALE: 1" = 3000'-0"	

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ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

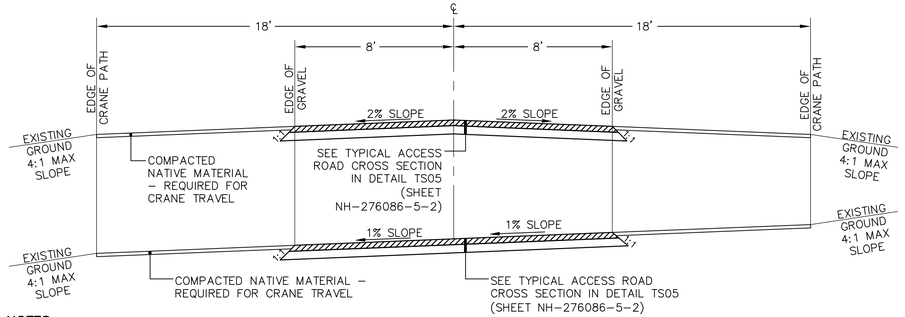
UNIT 0

CIVIL ACCESS ROADS

DELIVERY FLOW PLAN - IA

NH-276086- 4-2

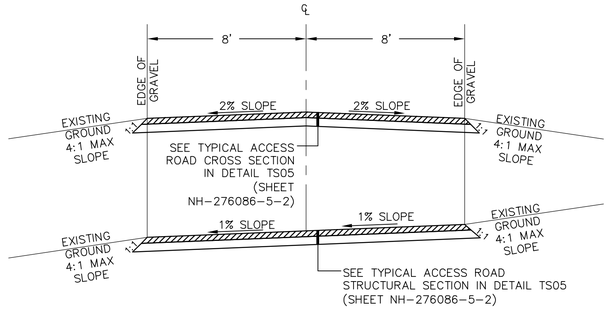
REV 0



NOTES:

1. CONTRACTOR SHALL CONSTRUCT CROSS–SLOPE ROAD SECTION WHERE ACCESS ROADS ARE CONSTRUCTED ON A SIDE SLOPE, AND WHERE OTHERWISE NOTED ON PLANS, TO ENSURE THAT ROADS AND SHOULDERS REMAIN WELL DRAINED AT ALL TIMES.
2. MAXIMUM CROSS SLOPE FOR CRANE TRAVEL IS 1.0%
3. WHEN CRANE PATH IS NOT NEEDED, MATCH THE ACCESS ROAD DIRECTLY INTO EXISTING GROUND SURFACE
4. ROADS TO GENERALLY FOLLOW EXISTING CONTOURS EXCEPT IF GRADES EXCEED TURBINE DELIVERY VEHICLE CAPABILITIES, IF THIS OCCURS GENERAL CONTRACTOR MAY PROVIDE ASSIST VEHICLE OR MODIFY GRADE

Westwood	TYPICAL TURBINE ACCESS ROAD AND CRANE PATH	LAST REVISED: 04/20/11
		RD01–A

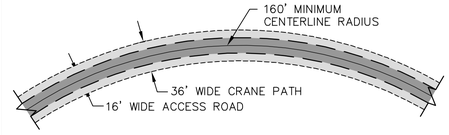


NOTES:

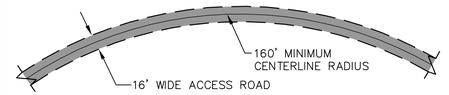
1. CONTRACTOR SHALL CONSTRUCT CROSS–SLOPE ROAD SECTION WHERE ACCESS ROADS ARE CONSTRUCTED ON A SIDE SLOPE, AND WHERE OTHERWISE NOTED ON PLANS, TO ENSURE THAT ROADS AND SHOULDERS REMAIN WELL DRAINED AT ALL TIMES.
2. ROADS TO GENERALLY FOLLOW EXISTING CONTOURS EXCEPT IF GRADES EXCEED TURBINE DELIVERY VEHICLE CAPABILITIES, IF THIS OCCURS GENERAL CONTRACTOR MAY PROVIDE ASSIST VEHICLE OR MODIFY GRADE

Westwood	TYPICAL TURBINE ACCESS ROAD SECTION	LAST REVISED: 3/19/12
		RD01–B

ACCESS ROAD WITH CRANE PATH WHERE APPLICABLE



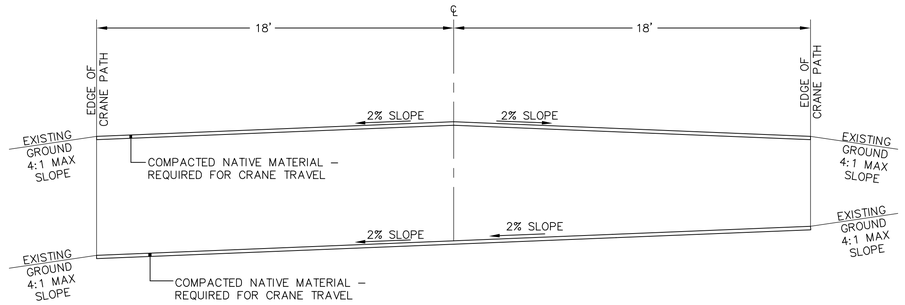
ACCESS ROAD WITHOUT CRANE PATH



NOTE:

1. SOME RADII MAY REQUIRE ADDITIONAL SOIL COMPACTION OR GRAVEL OUTSIDE OF THE WIDTH SHOWN ABOVE TO ACCOMMODATE TRACTORS OR TRAILERS TRACKING OFF THE ACCESS ROAD.

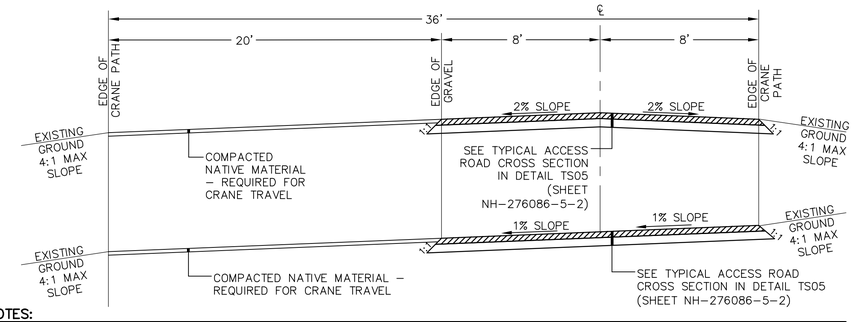
Westwood	MINIMUM RADIUS FOR TURBINE ACCESS ROAD	LAST REVISED: 08/23/18
		RD02



NOTES:

1. CONTRACTOR SHALL CONSTRUCT CROSS–SLOPE WHERE CRANE PATHS ARE CONSTRUCTED ON A SIDE SLOPE, AND WHERE OTHERWISE NOTED ON PLANS, TO ENSURE THAT CRANE PATH REMAINS WELL DRAINED AT ALL TIMES.
2. MAXIMUM CROSS SLOPE FOR CRANE TRAVEL IS 1.0%

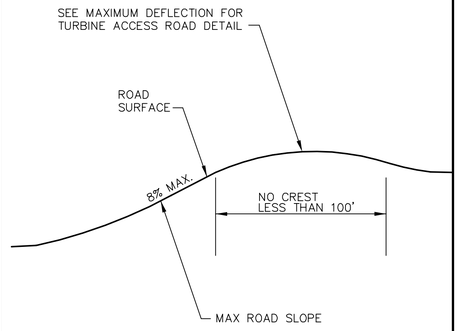
Westwood	TYPICAL CRANE PATH	LAST REVISED: 04/20/11
		RD01–C



NOTES:

1. CONTRACTOR SHALL CONSTRUCT CROSS–SLOPE ROAD SECTION WHERE ACCESS ROADS ARE CONSTRUCTED ON A SIDE SLOPE, AND WHERE OTHERWISE NOTED ON PLANS, TO ENSURE THAT ROADS AND SHOULDERS REMAIN WELL DRAINED AT ALL TIMES.
2. MAXIMUM CROSS SLOPE FOR CRANE TRAVEL IS 1.0%
3. WHEN CRANE PATH IS NOT NEEDED, MATCH THE EDGE OF COMPACTED SHOULDER DIRECTLY INTO EXISTING GROUND SURFACE
4. ROADS TO GENERALLY FOLLOW EXISTING CONTOURS EXCEPT IF GRADES EXCEED TURBINE DELIVERY VEHICLE CAPABILITIES, IF THIS OCCURS GENERAL CONTRACTOR MAY PROVIDE ASSIST VEHICLE OR MODIFY GRADE

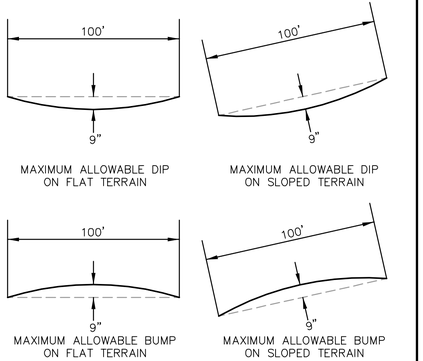
Westwood	TYPICAL TURBINE ACCESS ROAD AND OFFSET CRANE PATH	LAST REVISED: 08/23/18
		RD01–D



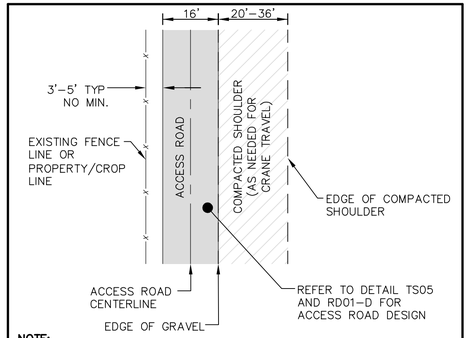
NOTES:

1. ROAD SLOPE SHALL NOT EXCEED 8% WITHOUT OWNER APPROVAL

Westwood	MAXIMUM VERT. SLOPE FOR TURBINE ACCESS ROAD/CRANE TRAVEL PATH	LAST REVISED: 3/19/12
		RD03



Westwood	MAXIMUM DEFLECTION FOR TURBINE ACCESS ROAD	LAST REVISED: 01/02/08
		RD04



NOTE:

1. COMPACTED SHOULDER SHALL BE RETURNED TO NATIVE CONDITION FOLLOWING TURBINE GENERATOR CONSTRUCTION.
2. THE ACCESS ROAD MAY NEED TO BE CONSTRUCTED FARTHER FROM THE PROPERTY LINE IF OBSTRUCTIONS SUCH AS TREES FOLLOW THE PROPERTY LINE.

Westwood	TURBINE ACCESS ROAD ALONG FENCE/PROPERTY/CROP LINE	LAST REVISED: 3/19/12
		RD05

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NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN and Worth County, IA

DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
PM: DJN	DATE:	PROJ. NO: 22586	
APVD:	DATE:	SCALE: NONE	

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ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

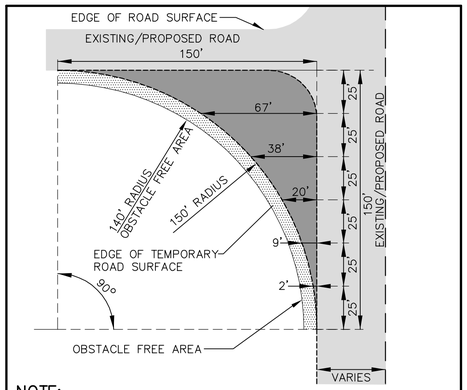
UNIT 0

CIVIL ACCESS ROADS

CONSTRUCTION DETAILS

NH-276086-5-1

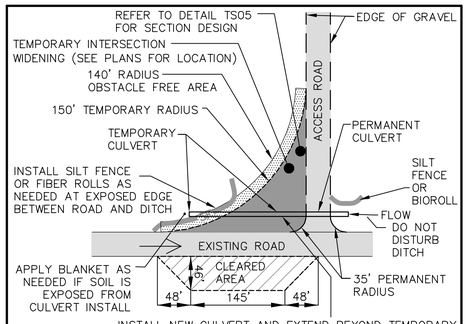
REV 0



NOTE:

1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING TO BE REMOVED AND ALL DISTURBED AREA RESTORED.

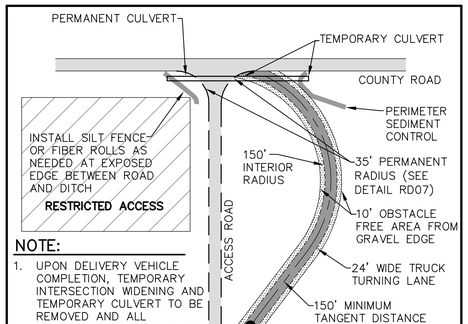
Westwood	INTERSECTION WIDENING DIMENSIONS	LAST REVISED: 3/19/12
		RD06



NOTE:

1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING AND TEMPORARY CULVERT TO BE REMOVED AND ALL DISTURBED AREA RESTORED TO NATIVE CONDITIONS.
2. CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

Westwood	TURBINE ACCESS ROAD TYPICAL INTERSECTION WIDENING	LAST REVISED: 3/19/12
		RD07

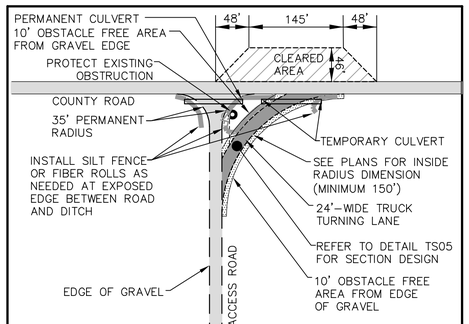


NOTE:

1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING AND TEMPORARY CULVERT TO BE REMOVED AND ALL DISTURBED AREA RESTORED TO NATIVE CONDITIONS.
2. CULVERTS AND PERIMETER SEDIMENT CONTROL SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

NOT TO SCALE

Westwood	TRUCK TRAFFIC TURNING LANE A	LAST REVISED: 11/18/14
		RD08–A

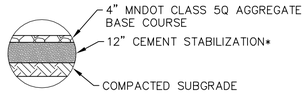


NOTE:

1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING AND TEMPORARY CULVERT TO BE REMOVED AND ALL DISTURBED AREA RESTORED TO NATIVE CONDITIONS.
2. CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

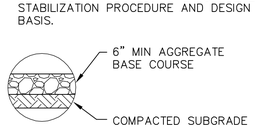
Westwood	TRUCK TRAFFIC TURNING LANE B	LAST REVISED: 3/19/12
		RD08–B

NOTE – THE ACCESS ROAD WIDTH AND RADIUS CONNECTING TO PUBLIC ROADS SHALL BE VERIFIED WITH FREEBORN/WORTH COUNTY BEFORE INSTALLATION.

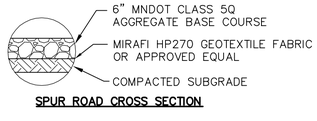


PRIMARY ACCESS ROAD CROSS SECTION*

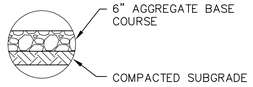
* CEMENT APPLICATION RATE MAY VARY BASED ON TEST STRIPS AND FIELD PERFORMANCE. SEE SHEET NH–276086–7–2 FOR CEMENT STABILIZATION PROCEDURE AND DESIGN BASIS.



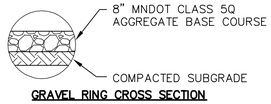
LAYDOWN YARD CROSS SECTION



SPUR ROAD CROSS SECTION



TEMPORARY TURNING IMPROVEMENTS

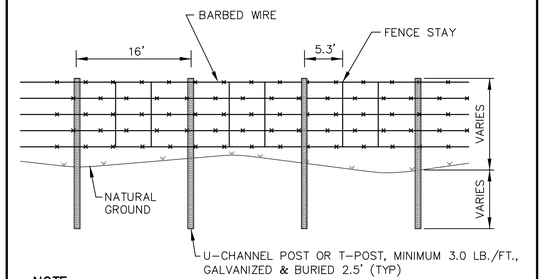


GRAVEL RING CROSS SECTION

NOTE:

STRUCTURAL SECTIONS SHOWN ARE THE MINIMUM THICKNESS REQUIREMENTS DURING NORMAL FIELD CONDITIONS. THE SECTIONS MAY NEED TO BE INCREASED BASED ON ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION. CONDITIONS INCLUDE BUT ARE NOT LIMITED TO CONSTRUCTION DURING THE FREEZE/THAW CYCLE, UNUSUALLY WET PERIODS, OR IN LOW/WET AREAS. SEE SHEET NH–276086–7–1 FOR TESTING REQUIREMENTS AND SPECIFICATIONS.

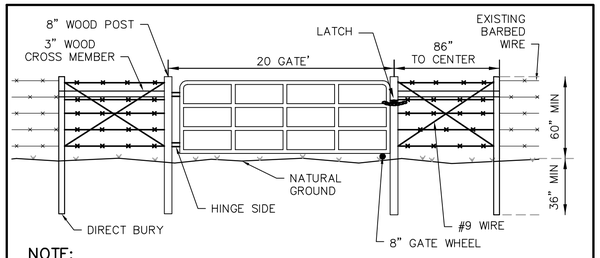
Westwood	TYPICAL STRUCTURAL CROSS SECTIONS	LAST REVISED: 08/23/18
		TS05



NOTE:

1. MATCH EXISTING BARBED WIRE WHICH MAY BE 3, 4, 5 OR 6 STRAND WIRE FENCE.
2. ALL FENCES SHALL BE TIED BACK TO MAINTAIN TENSION ON EXISTING FENCE PRIOR TO CUTTING OF THE EXISTING FENCE.
3. CONTRACTOR SHALL VERIFY ELECTRIC FENCE CROSSING LOCATIONS PRIOR TO CONSTRUCTION AND REPLACE ANY DISTURBED ELECTRIC FENCE TO MATCH EXISTING CONDITIONS.

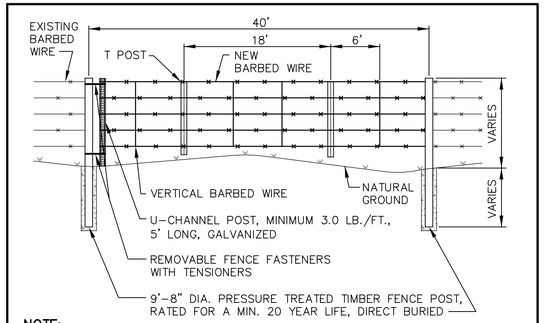
Westwood	PERMANENT FENCE	LAST REVISED: 05/14/09
		FN02



NOTE:

1. H–BRACING SHALL BE CONSTRUCTED ON EACH END OF THE GATE.

Westwood	TYPICAL SINGLE GATE	LAST REVISED: 04/08/09
		GA04



NOTE:

1. TO BE USED AT CROSS COUNTY CRANE PATH AND ELECTRICAL FENCE CROSSINGS.
2. ALL FITTINGS, HARDWARE AND OTHER APPURTENANCES SHALL BE FABRICATED AND FITTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
3. ALL DIRECT BURIED POSTS SHALL BE BACKFILLED WITH TWO BAGS OF UNMIXED, NO WATER ADDED, QUICKRETE®, OR APPROVED EQUAL, FOLLOWED BY NATIVE SOIL.
4. BARBED WIRE SHALL MATCH EXISTING 4, 5, OR 6 WIRE FENCE.

Westwood	TEMPORARY FENCE CROSSING	LAST REVISED: 05/14/09
		FN04

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NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN and Worth County, IA

DWN: TDD	DATE:	CHK:	DATE:
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APVD:	DATE:	SCALE: NONE	

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ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

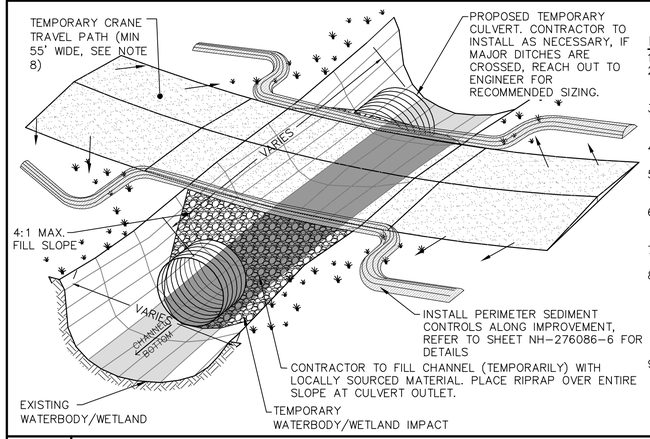
UNIT 0

CIVIL ACCESS ROADS

CONSTRUCTION DETAILS

NH-276086-5-2

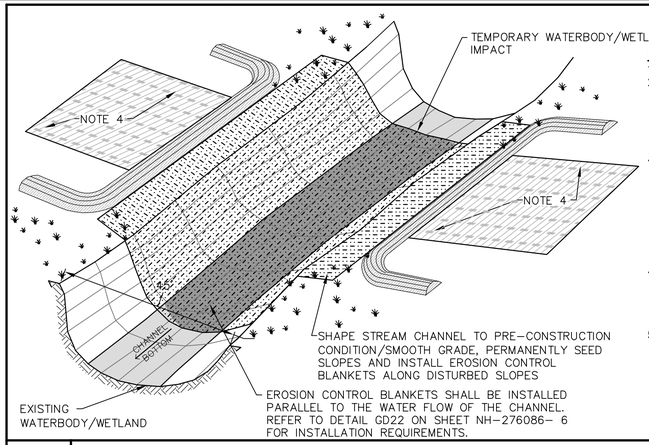
REV 0



NOTES:

1. DRAWING IS NOT TO SCALE.
2. CULVERT INSTALLATION SHALL CONFORM WITH MANUFACTURERS RECOMMENDATION FOR INSTALLATION WITH MINIMUM 24 INCH COVER.
3. TEMPORARY BRIDGING AND MATTING MAY BE SUBSTITUTED IN THE FIELD WITH APPROVAL FROM THE OWNER AND ENGINEER.
4. MINIMIZE DISTURBANCE TO THE STREAM/DITCH DURING CULVERT INSTALLATION/REMOVAL.
5. REFER TO THE PROJECT SWPPP FOR ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES.
6. CROWN TEMPORARY CRANE PATH TO PROMOTE LATERAL DRAINAGE FROM ROADWAY TOWARDS PERIMETER SEDIMENT CONTROLS.
7. SEE DETAIL RD09-2 FOR STREAM RESTORATION.
8. CRANE WALK SHOULD BE WIDE ENOUGH FOR A MINIMUM 10 FOOT SETBACK ON BOTH SIDES MEASURED FROM THE TOP OF THE SLOPE TO THE OUTER EDGE OF THE LARGEST CRANE TRACK. A MINIMUM 55FT WIDE CROSSING IS REQUIRED PER THE LR1600 CRANE PROVIDED BY WANZEK.
9. SEE SHEET 2-2 FOR SIZING REQUIREMENT AND SHEET 7-1 FOR TESTING REQUIREMENTS

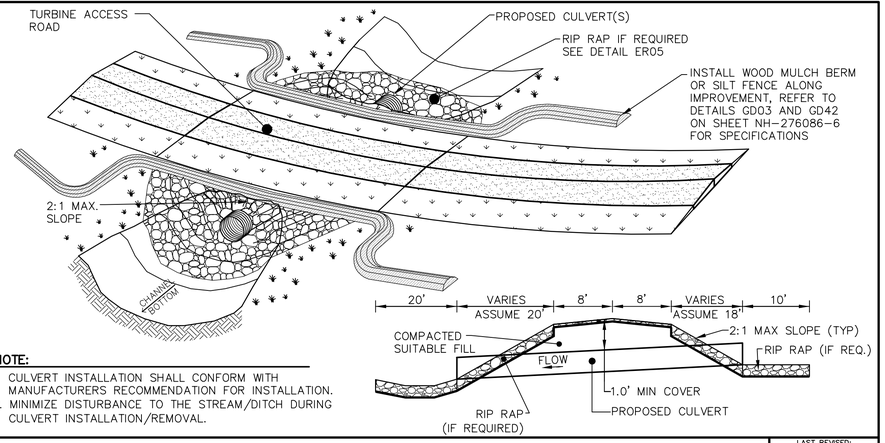
Westwood | TYPICAL TEMPORARY STREAM CROSSING WITH CULVERT – CRANE CROSSING | LAST REVISED: 11/30/17 | RD09-1



NOTES:

1. DRAWING IS NOT TO SCALE.
2. UPON REMOVAL OF TEMPORARY STREAM CROSSING, THE DISTURBED AREA SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS. REFER TO THE FREEBORN WIND PROJECT SWPPP FOR RESTORATION AND SEEDING SPECIFICATIONS.
3. REMOVE RIP RAP, FILL MATERIAL AND SHAPE CHANNEL TO PRE-CONSTRUCTION CONDITION. PERMANENTLY SEED ALL DISTURBED SLOPES IN CONFORMANCE WITH THE FREEBORN WIND PROJECT SWPPP. INSTALL EROSION CONTROL BLANKETS, ADEQUATE FOR FLOW CONDITIONS, ON ALL DISTURBED SLOPES GREATER THAN 4:1, WHERE ANY FLOWS ARE CONCENTRATED AND WITHIN THE DITCHES WETTED PERIMETER.
4. DECOMPACT, REAPPLY TOPSOIL AND TILL DISTURBED AREA TO RESTORE TO PRE-CONSTRUCTION AGRICULTURAL CONDITION AND RESTORE ANY VEGETATED BUFFER THAT EXISTED PRE-CONSTRUCTION.
5. REMOVE WOOD MULCH BERM OR SILT FENCE ONCE FINAL STABILIZATION HAS OCCURRED WITH A MINIMUM OF 70% VEGETATION UPSTREAM OF SILT FENCE.

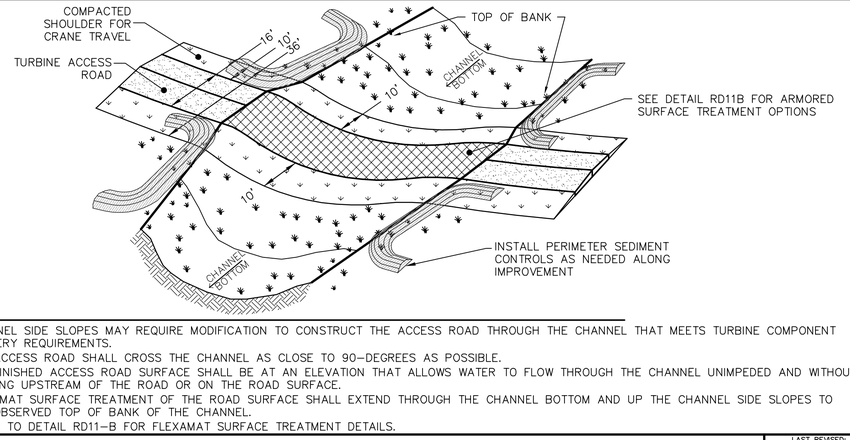
Westwood | TYPICAL TEMPORARY STREAM CROSSING RESTORATION | LAST REVISED: 3/19/12 | RD09-2



NOTE:

1. CULVERT INSTALLATION SHALL CONFORM WITH MANUFACTURERS RECOMMENDATION FOR INSTALLATION.
2. MINIMIZE DISTURBANCE TO THE STREAM/DITCH DURING CULVERT INSTALLATION/REMOVAL.

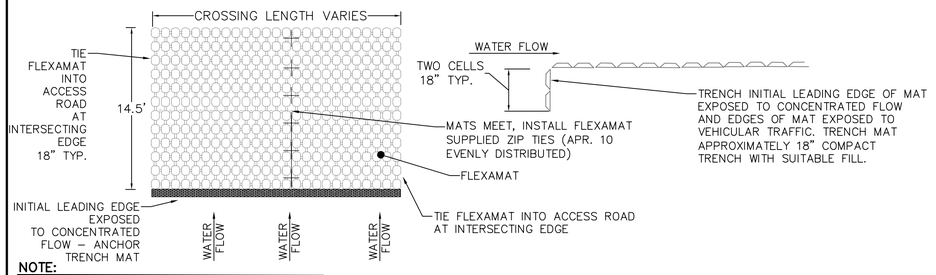
Westwood | TYPICAL PERMANENT TURBINE ACCESS ROAD STREAM CROSSING | LAST REVISED: 3/19/12 | RD10



NOTE:

1. CHANNEL SIDE SLOPES MAY REQUIRE MODIFICATION TO CONSTRUCT THE ACCESS ROAD THROUGH THE CHANNEL THAT MEETS TURBINE COMPONENT DELIVERY REQUIREMENTS.
2. THE ACCESS ROAD SHALL CROSS THE CHANNEL AS CLOSE TO 90-DEGREES AS POSSIBLE.
3. THE FINISHED ACCESS ROAD SURFACE SHALL BE AT AN ELEVATION THAT ALLOWS WATER TO FLOW THROUGH THE CHANNEL UNIMPEDED AND WITHOUT PONDING UPSTREAM OF THE ROAD OR ON THE ROAD SURFACE.
4. FLEXAMAT SURFACE TREATMENT OF THE ROAD SURFACE SHALL EXTEND THROUGH THE CHANNEL BOTTOM AND UP THE CHANNEL SIDE SLOPES TO THE OBSERVED TOP OF BANK OF THE CHANNEL.
5. REFER TO DETAIL RD11-B FOR FLEXAMAT SURFACE TREATMENT DETAILS.

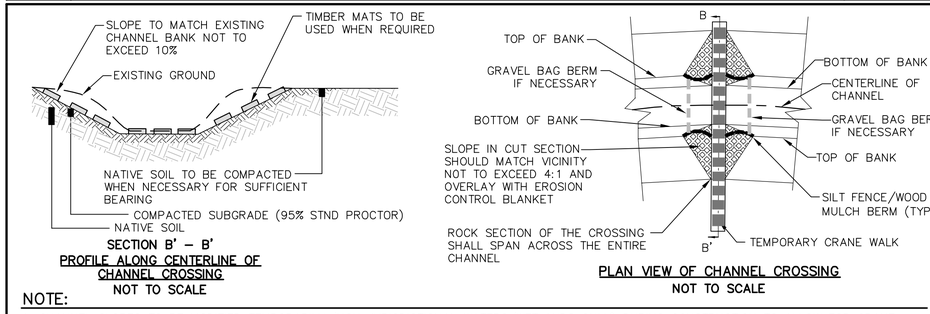
Westwood | PERMANENT TURBINE ACCESS ROAD LOW WATER CROSSING | LAST REVISED: 03/09/17 | RD11-A



NOTE:

1. PREPARE THE SUB GRADE OF THE LOW WATER CROSSING SO THAT FLOW WILL BE DIRECTED TO THE CENTER OF THE CROSSING. ALL SUB GRADE SURFACES PREPARED FOR PLACEMENT OF MATS SHALL BE SMOOTH AND PROVIDE A FIRM UNYIELDING FOUNDATION FOR THE MATS.
2. THE INITIAL LEADING EDGE OF FLEXAMAT EXPOSED TO CONCENTRATED FLOWS AND EDGES OF MAT EXPOSED TO VEHICULAR TRAFFIC SHALL BE EMBEDDED VERTICALLY INTO THE SUB GRADE TO SERVE AS AN ANCHOR TRENCH. THE TRENCH SHALL BE FILLED AND COMPACTED WITH SUITABLE FILL.
3. FOR ADDITIONAL SECTIONS OF MAT, ABUT MATS TIGHTLY.
4. INSTALL FLEXAMAT SUPPLIED ZIP TIES (APPROXIMATELY 10 EVENLY SPACED) ALONG INTERSECTING FLEXAMAT SEAMS.

Westwood | TURBINE ACCESS ROAD LOW WATER CROSSING – FLEXAMAT | LAST REVISED: 03/07/17 | RD11-B



NOTE:

1. CHANNEL SLOPES TO BE MODIFIED TEMPORARILY (NON JURISDICTIONAL WATERS/WETLANDS ONLY) DURING CONSTRUCTION TO ALLOW FOR CRANE CROSSING AND RESTORE TO ORIGINAL CONDITIONS UPON SITE RESTORATION.
2. ALL DISTURBED AREAS SHALL BE RESTORED TO EXISTING CONDITIONS.
2. CROSSINGS SHALL HAVE THE TOP-MOST SURFACE LAYER A MINIMUM OF 2.5 INCHES BELOW THE STREAM CHANNEL BOTTOM.
3. THE CRANE WALK SHALL CROSS THE DITCH AT 90° ANGLE.
4. THE TOP BED OF THE CHANNEL CROSSING SHALL CONFORM TO THE EXISTING DITCH CROSS SECTIONAL SLOPES.
5. COMPACTION MAY BE FIELD ADJUSTED TO ACHIEVE SUFFICIENT BEARING CAPACITIES AS ARE NECESSARY FOR ANTICIPATED ROAD USE AS FIELD DETERMINED BY THE CRANE SUPERINTENDENT.
6. GRAVEL BAG BERMS MAY BE NECESSARY IF FLOWS AND DRAINAGE AREAS REQUIRE. SEE DETAIL RD13 FOR GRAVEL BAG BERM INSTALLATION.

Westwood | STREAM/WATERBODY/DRAINAGE SWALE TIMBER MAT CRANE CROSSING | LAST REVISED: 11/30/17 | RD12

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

Xcel Energy®
NORTHERN STATES POWER COMPANY
FREEBORN WIND FARM
Freeborn County, MN and Worth County, IA

DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
PM: DJN	DATE:	PROJ. NO: 22586	
APVD:	DATE:	SCALE: NONE	

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ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

UNIT 0
CIVIL ACCESS ROADS
CONSTRUCTION DETAILS

NH-276086-5-3 | REV 0

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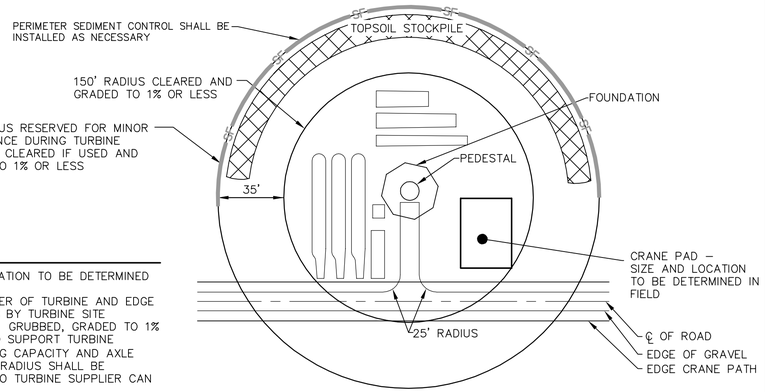
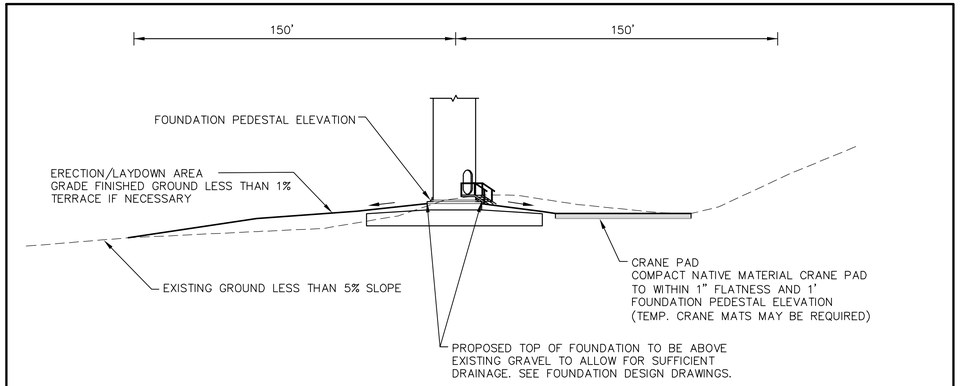
Westwood Professional Services, Inc.



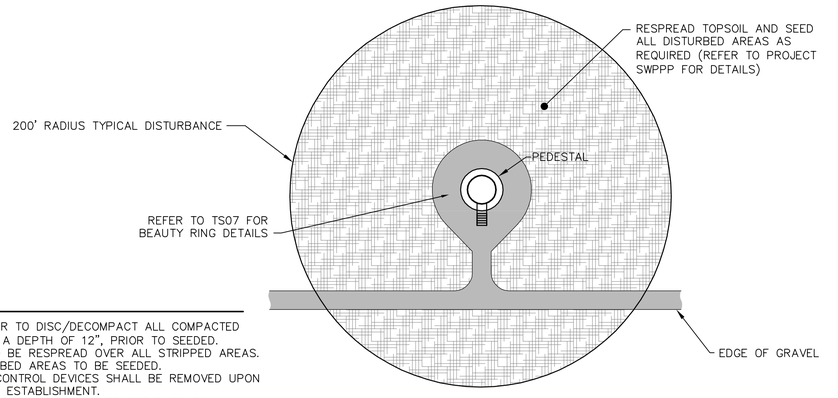
NOTE:

1. ACTUAL CRANE PAD LOCATION TO BE DETERMINED BY CONTRACTOR.
2. DISTANCE BETWEEN CENTER OF TURBINE AND EDGE OF GRAVEL ROAD VARIES BY TURBINE SITE
3. RADIUS TO BE CLEARED, GRUBBED, GRADED TO 1% MAX AND COMPACTED TO SUPPORT TURBINE MANUFACTURER'S BEARING CAPACITY AND AXLE LOADING REQUIREMENTS. RADIUS SHALL BE GRUBBED AND GRADED SO TURBINE SUPPLIER CAN UNLOAD AND DRIVE OUT.
4. CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE AS DETERMINED IN THE FIELD

Westwood | TYPICAL WTG ERECTION AREA – PLAN VIEW | LAST REVISED: 11/30/17 | TS01



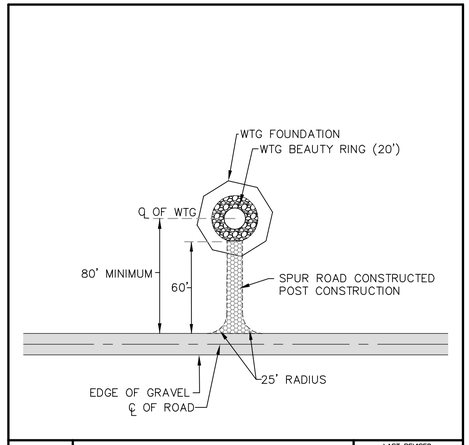
Westwood | TYPICAL WTG ERECTION AREA – PROFILE VIEW | LAST REVISED: 03/15/11 | TS03



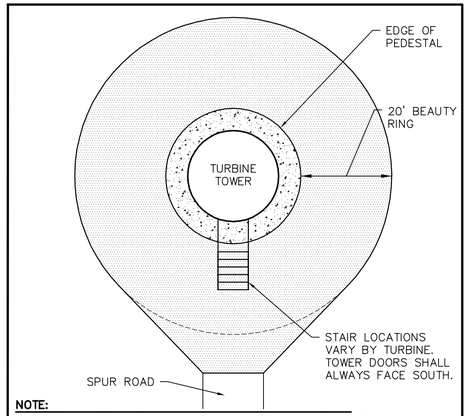
NOTES:

1. CONTRACTOR TO DISC/DECOMPACT ALL COMPACTED AREAS, TO A DEPTH OF 12", PRIOR TO SEEDED.
2. TOPSOIL TO BE RESPREAD OVER ALL STRIPPED AREAS.
3. ALL DISTURBED AREAS TO BE SEEDED.
4. SEDIMENT CONTROL DEVICES SHALL BE REMOVED UPON FINAL TURF ESTABLISHMENT.
5. DISTURBED CROPLAND MUST BE RETURNED TO A FARMABLE CONDITION.

Westwood | POST–CONSTRUCTION WTG ERECTION AREA – RESTORATION | LAST REVISED: 05/23/18 | TS02



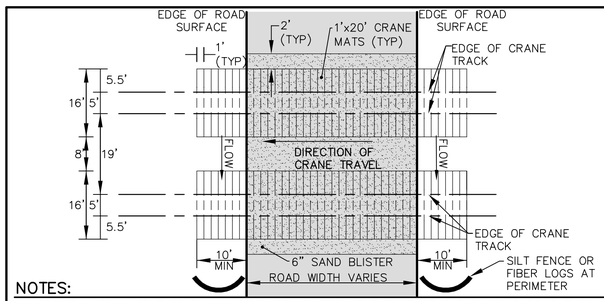
Westwood | TYPICAL SPUR ROAD | LAST REVISED: 11/30/17 | TS06

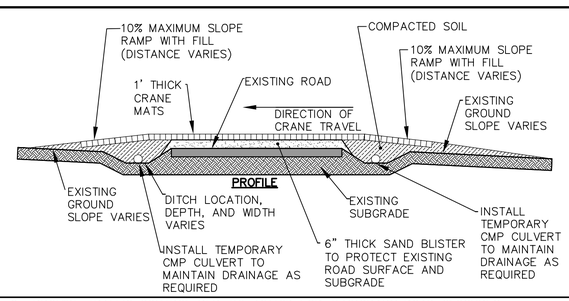


NOTE:

1. REFER TO DETAIL TS05 ON SHEET NH–276086–5–2 FOR MATERIAL TYPE AND THICKNESS.

Westwood | BEAUTY RING DETAIL | LAST REVISED: 06/23/15 | TS07





NOTES:

1. CRANE MATS MUST EXTEND A MINIMUM OF 10' FROM THE EDGE OF THE EXISTING ROAD SURFACE.
2. EARTH BLISTER TO BE CENTERED UNDER THE CRANE'S TRACKS AND EXTEND A MINIMUM OF 2' OUTSIDE OF THE CRANE MAT FOOTPRINT.
3. ALL DISTURBED AREA WITHIN THE PUBLIC ROW TO BE RETURNED TO EXISTING CONDITIONS.
4. ALL DISTURBED AREA TO BE RESTORED ACCORDING TO THE PROJECT SWPPP AND NARRATIVE.
5. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY REPAIRS TO THE ROAD BASED ON DAMAGE CAUSED BY THE CRANE CROSSING.
6. PROVIDE TRAFFIC CONTROL PER THE MUTCD FOR TEMPORARY ROAD CLOSURES.
7. DIMENSIONS SHOWN ARE APPROXIMATE AND MAY CHANGE BASED ON ACTUAL CRANE UTILIZED BY CONTRACTOR.
8. ALTERNATIVE METHODS MAY BE USED FOLLOWING APPROVAL FROM OWNER.
9. CROSSING SHALL BE APPROVED BY THE LOCAL ROAD AND/OR STATE AUTHORITY PRIOR TO USE.
10. UPON REMOVAL OF CROSSING APPLY SEED AND EROSION CONTROL BLANKET TO FINAL GRADE TO RESTORE DITCHES AND SLOPES TO PRECONSTRUCTION CONDITION.

Westwood | TEMPORARY CRANE CROSSING FOR EXISTING ROADS | LAST REVISED: 05/09/18 | EP01

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NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature

Danielle J Nygren

Printed Name

Date 05/04/20 License No. 55542

Xcel Energy®

NORTHERN STATES POWER COMPANY

FREEBORN WIND FARM

Freeborn County, MN and Worth County, IA

DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
PM: DJN	DATE:	PROJ. NO: 22586	
APVD:	DATE:	SCALE: NONE	

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ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

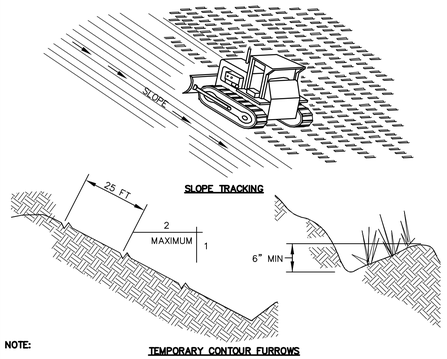
UNIT 0

CIVIL ACCESS ROADS

CONSTRUCTION DETAILS

NH-276086-5-4

REV 0

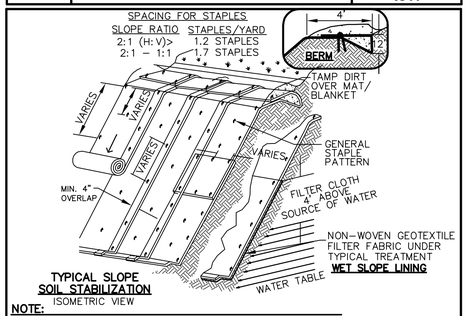


NOTE:

TEMPORARY CONTOUR FURROWS

1. GROOVES WILL CATCH SEED, FERTILIZER, MULCH, RAINFALL AND DECREASE RUNOFF RATE.
2. USE SLOPE TRACKING FOR SLOPES 4:1 AND 50 FEET LONG OR STEEPER/LONGER.
3. USE TEMPORARY CONTOUR FURROWS FOR SLOPES 3:1 AND 75 FEET LONG OR STEEPER/LONGER.

Westwood	SURFACE ROUGHENING FOR ALL SLOPES GREATER THAN 4:1	LAST REVISED: 03/03/08 GD09

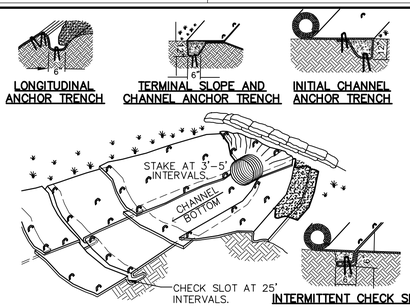


TYPICAL SLOPE SOIL STABILIZATION
ISOMETRIC VIEW

NOTE:

1. REFER TO THE PROJECT SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.
3. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICK AND GRASS.
4. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
5. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL.
6. DO NOT STRETCH.
7. BLANKET TYPE AND WEIGHT MUST BE CHOSEN BASED ON SITE CONDITIONS, MNDOT/IADOT PERFORMANCE FACTORS AND MANUFACTURERS RECOMMENDATIONS.
8. STAPLE LENGTHS SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS.

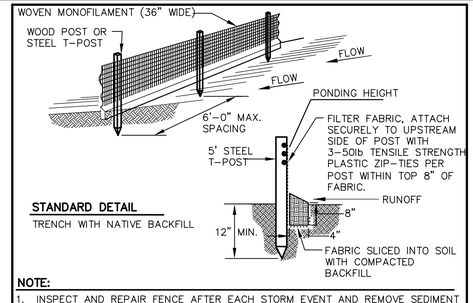
Westwood	TYPICAL SLOPE STABILIZATION – TEMPORARY EROSION BLANKETS TURF REINFORCEMENT MATS FOR SLOPES	LAST REVISED: 5/22/13 GD21



NOTE:

1. REFER TO THE PROJECT SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
3. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.
4. MINIMUM OF 3.5 STAPLES/YARD.
5. BLANKET TYPE AND WEIGHT MUST BE CHOSEN BASED ON SITE CONDITIONS AND MANUFACTURERS RECOMMENDATIONS.
6. STAPLE LENGTHS SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS.
7. EROSION CONTROL BLANKETS SHALL EXTEND TO THE EDGE OF THE DISTURBANCE LIMITS.

Westwood	TEMPORARY EROSION BLANKETS TURF REINFORCEMENT MATS FOR CHANNELS	LAST REVISED: 03/03/08 GD22



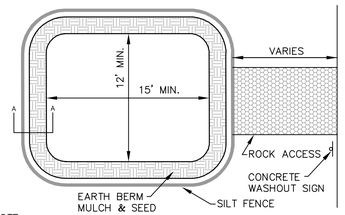
STANDARD DETAIL
TRENCH WITH NATIVE BACKFILL

NOTE:

1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATED TO 1/3 THE HEIGHT OF THE FABRIC OR MORE.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF–SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
4. ALL ENDS OF THE SILT FENCE SHALL BE WRAPPED UPSLOPE SO THE ELEVATION OF THE BOTTOM OF FABRIC IS HIGHER THAN "PONDING HEIGHT".

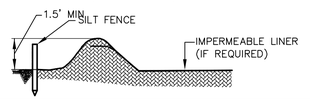
Westwood	SILT FENCE	LAST REVISED: 11/24/08 GD03

"AN APPROVED ALTERNATE MAY BE USED"



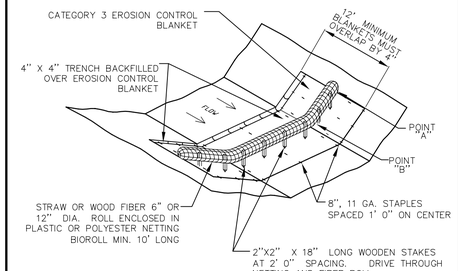
NOTE:
CONCRETE WASHOUT AREAS WILL HAVE AN IMPERMEABLE LINER TO PREVENT CONCRETE WASHOUT WATER FROM INFILTRATING SOIL. IMPERMEABLE LINER INCLUDES 10 MIL POLYLINER OR CLAY LINER (COMPACTED AS NECESSARY). WASHOUT SYSTEMS CAN BE USED AS ALTERNATE WASHOUT AREAS.

SECTION A–A



Westwood	CONCRETE WASHOUT AREA	LAST REVISED: 11/24/08 GD08

NOTE: EROSION AND SEDIMENT CONTROL DETAILS PROVIDED ARE TO BE USED AT CONTRACTOR'S DISCRETION OR AS SPECIFIED IN THE PROJECT SWPPP. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN COMPLIANCE.



NOTE:

1. POINT "A" MUST BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.

Westwood	TEMPORARY BIOROLL BLANKET SYSTEM (DITCH APPLICATION)	LAST REVISED: 03/03/08 GD23

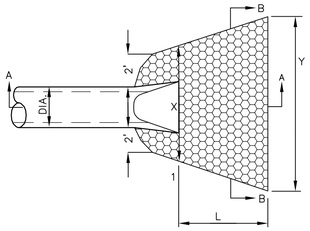
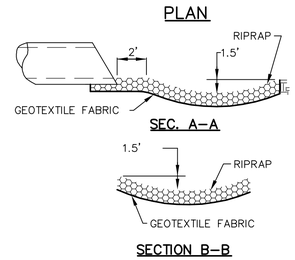


TABLE OF QUANITIES
RIPRAP AT OUTLETS

Dia. Round Pipe (In.)	L (Ft.)	X (Ft.)	Y (Ft.)	D_{50}(in)	Rock Depth (Ft.)
24	8	4.0	11	9	2.0
30	10	4.5	14	9	2.0
36	15	5.0	19	12	2.5
42	18	5.5	22	12	2.5
48	20	6.0	25	12	2.5
54	27	6.5	31.5	12	2.5
60	30	7.0	35	12	2.5



NOTE:

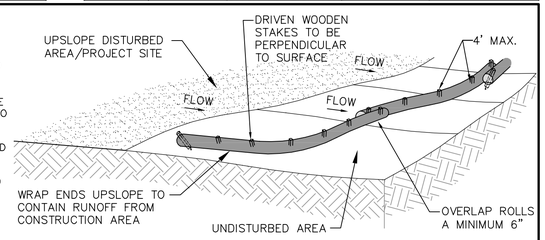
1. THE CONTRACTOR SHALL PLACE RIP RAP, PULVERIZED TOPSOIL, SEED AND WOODFIBER BLANKET IMMEDIATELY AFTER PIPE IS INSTALLED, EXTEND AREA TO MATCH UNDISTURBED SOIL.
2. CULVERTS LARGER THAN 60" SHALL HAVE STILLING BASINS INSTALLED.
3. RIP RAP NOT REQUIRED FOR CULVERTS 24" OR SMALLER IF CULVERTS DRAIN INTO AN UNDISTURBED VEGETATED AREA.
4. CULVERTS WITHIN THE ROW SHALL BE INSTALLED PER THE COUNTY REQUIREMENTS.
5. THE OUTLET PROTECTION SIZING RECOMMENDATION WAS TAKEN FROM HEC–14 CHAPTER 10.2 ISSUED BY THE US DEPARTMENT OF TRANSPORTATION.

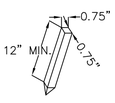
Westwood	PERMANENT RIP RAP OUTLETS	LAST REVISED: 05/01/17 ER05

Potential BMPs	Construction Phase or Activity: Temporary Laydown Yard	Temporary Stretch Yard	Access Roads	Turbine Pads / Foundations	UG Electrical Collection	Crane Walk Paths	Met Towers	Substation	O&M Facility	Application Notes
Silt fence	X	X	X	X			X	X	X	Machine sliced install w/ wood posts at 6' spacing. Install perimeter sf prior to grading
Fiber rolls	X	X	X	X	X	X		X	X	Install on contour, minimum of 6" roll, wood or straw fiber. Secure with 2" posts every 2' on center.
Stockpile	X	X		X				X	X	See SWPPP for Stabilization Requirements
Topsoil Berms	X	X	x	x	x	x	x	x	x	Side slopes of 3:1 with at least 1' height. Use temporary erosion control to stabilize berm.

NOTES:

1. FIBER ROLLS SHALL BE INSTALLED PRIOR TO UPSLOPE DISTURBANCE ACTIVITIES COMMENCE.
2. FIBER ROLLS SHALL BE PREFABRICATED AND MADE FROM WEED FREE RICE STRAW, FLAX, OR A SIMILAR AGRICULTURAL MATERIAL BOUND INTO A TIGHT TUBULAR ROLL BY NETTING. USE A 6" OR 12" DIA. ROLL.
3. TRENCHES SHALL BE CREATED ALONG THE SLOPE OF THE PERIMETER. THE TRENCH DEPTH SHOULD BE 1/4 TO 1/3 OF THE THICKNESS OF THE ROLL, AND THE WIDTH SHOULD EQUAL THE ROLL DIAMETER, IN ORDER TO PROVIDE AREA TO BACKFILL THE TRENCH.
4. STAKE FIBER ROLLS INTO THE TRENCH. DRIVE STAKES AT THE END OF EACH FIBER ROLL AND SPACED 4 FEET MAXIMUM ON CENTER. USE WOOD STAKES WITH NOMINAL CLASSIFICATION OF 0.75 IN BY 0.75 IN. AND A MINIMUM LENGTH OF 24 IN.
5. ROLLS SHALL BE INSTALLED PERPENDICULAR TO WATER MOVEMENT, AND PARALLEL TO THE SLOPE CONTOUR.
6. TURN THE ENDS OF THE FIBER ROLLS UP SLOPE TO PREVENT RUNOFF FROM GOING AROUND THE ROLL. THE UPSLOPE POINT SHOULD BE A MINIMUM 6" HIGHER IN ELEVATION THAN THE LOW POINT.
7. IF MORE THAN ONE FIBER ROLL IS PLACED IN A ROW, THE ROLLS SHOULD BE OVERLAPPED A MINIMUM OF 6 INCHES, NOT ABUTTED.
8. FIBER ROLLS ENCASED WITH PLASTIC NETTING ARE USED FOR A TEMPORARY APPLICATION ONLY AND SHOULD BE REMOVED FOLLOWING STABILIZATION. FIBER ROLLS USED IN A PERMANENT APPLICATION SHALL BE ENCASED WITH A BIODEGRADABLE MATERIAL AND MAY BE LEFT IN.
9. TEMPORARY INSTALLATIONS SHOULD ONLY BE REMOVED WHEN UP GRADIENT AREAS ARE STABILIZED PER GENERAL PERMIT REQUIREMENTS, AND/OR POLLUTANT SOURCES NO LONGER PRESENT A HAZARD. BUT, THEY SHOULD ALSO BE REMOVED BEFORE VEGETATION BECOMES TOO MATURE SO THAT THE REMOVAL PROCESS DOES NOT DISTURB MORE SOIL AND VEGETATION THAN IS NECESSARY
10. FIBER ROLLS MUST BE INSPECTED IN ACCORDANCE WITH GENERAL PERMIT REQUIREMENTS FOR THE ASSOCIATED PROJECT TYPE AND RISK LEVEL. IT IS RECOMMENDED THAT AT A MINIMUM, THE BMPS BE INSPECTED WEEKLY, PRIOR TO FORECASTED RAIN EVENTS, DAILY DURING EXTENDED RAIN EVENTS, AND AFTER THE CONCLUSION OF RAIN EVENTS.



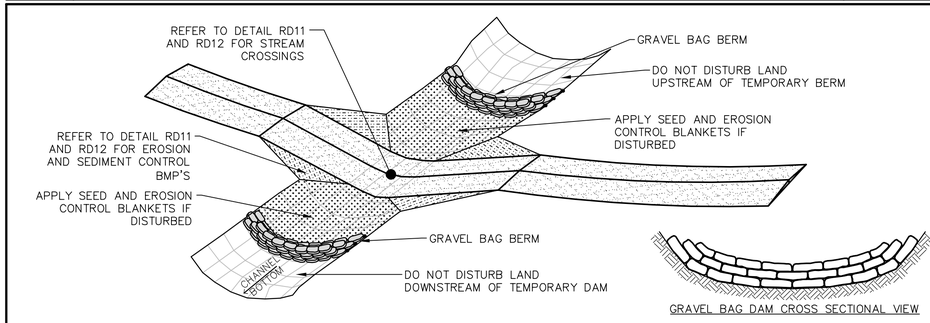


SLOPE (H:V)	MAX SPACING FT.
< 4:1	20
4:1 – 2:1	15
> 2:1	10

* A CLOSER SPACING IS MORE EFFECTIVE

12. REPAIR OR REPLACE SPLIT, TORN, UNRAVELING, OR SLUMPING FIBER ROLLS.
13. SEDIMENT THAT ACCUMULATES UPSLOPE OF THE BMP SHOULD BE PERIODICALLY REMOVED IN ORDER TO MAINTAIN BMP EFFECTIVENESS. SEDIMENT SHOULD BE REMOVED WHEN SEDIMENT ACCUMULATION REACHES ONE–THIRD THE DESIGNATED SEDIMENT STORAGE DEPTH.
14. RILLS OR GULLIES MAY BEGIN TO FORM FOLLOWING MAJOR STORM EVENTS WHERE RUNOFF HAS OVERTOPPED THE FIBER ROLLS. THESE RILLS OR GULLIES SHOULD BE PROMPTLY REPAIRED.

Westwood	TYPICAL FIBER ROLLS FOR PERIMETER CONTROL OF CONSTRUCTION AREA LIMIT	LAST REVISED: 09/09/13 GD42



GRAVEL BAG DAM CROSS SECTIONAL VIEW

NOTE:

1. REFER TO DETAIL RD11 AND RD12 FOR STREAM CROSSINGS.
2. MINIMIZE DISTURBANCE TO THE STREAM/DITCH DURING GRAVEL BAG BERM INSTALLATION.
3. GRAVEL USED WITHIN THE BAGS SHALL BE PEA ROCK.
4. GRAVEL BAG BERMS SHALL SPAN LATERALLY ACROSS THE STREAM FROM TOP OF BANK TO TOP OF BANK.
5. UPON CRANE TRAVEL COMPLETION, REMOVE GRAVEL BAG BERM AND RESTORE TO ORIGINAL CONDITION.
6. GRAVEL BAG BERMS MAY BE NECESSARY IF FLOWS AND DRAINAGE AREAS REQUIRE.

Westwood	TEMPORARY GRAVEL BAG BERM AT DRAINAGE CROSSING LOCATIONS	LAST REVISED: 3/19/12 RD13

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature
Danielle J Nygren
Printed Name
Date 05/04/20 License No. 55542

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DWN: TDD	DATE:	CHK:	DATE:
ENG: DJN	DATE:	CHK:	DATE:
PM: DJN	DATE:	PROJ. NO:	22586
APVD:	DATE:	SCALE: NONE	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

UNIT 0
CIVIL ACCESS ROADS
SWPPP DETAILS

NH-276086-6

REV 0

ROAD DESIGN PARAMETERS

1. ACCESS ROADS HAVE BEEN DESIGNED TO ACCOMMODATE LIGHT DUTY TRUCKS (PICKUP TRUCKS AND MAINTENANCE VEHICLES) FOR LOW VOLUME USE IN NORMAL OPERATING CONDITIONS AS WELL AS HEAVY DUTY CONSTRUCTION TRAFFIC UNDER DRY CONDITIONS. THE ROAD DESIGN SPECIFIED IS NOT INTENDED FOR ALL WEATHER USE FOR HEAVY DUTY CONSTRUCTION LOADS.
2. ROAD MAINTENANCE CAN BE EXPECTED OVER THE LIFE OF THE PERMANENT FACILITY.
3. ACCESS ROADS HAVE BEEN DESIGNED IN ACCORDANCE TO VESTAS CIVIL WORKS SPECIFICATION.

PRODUCTS

1. AGGREGATE BASE FOR PERMANENT APPLICATIONS SHALL CONSIST OF MNDOT CLASS 5Q AGGREGATE BASE COURSE, AGGREGATE FOR TEMPORARY APPLICATIONS SHALL CONSIST OF MNDOT CLASS 5 OR 5Q (AND IN CONFORMANCE WITH THE GRADATION TABLE 1 AND TABLE 2). AGGREGATE GRADATIONS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW.
2. CEMENT STABILIZED SUBGRADE SHALL CONSIST OF TYPE 1 OR TYPE 2 CEMENT MIXED WITH NATIVE MATERIAL.
3. ROAD SHOULDERS AND CRANE PADS SHALL CONSIST OF COMPACTED NATIVE SOILS.
4. CULVERTS: ACCESS ROAD CULVERTS IN MINNESOTA SHALL MEET THE MINIMUM SPECIFICATIONS SET FORTH BY THE MINNESOTA DEPARTMENT OF TRANSPORTATION AND/OR FREEBORN COUNTY. ACCESS ROAD CULVERTS IN IOWA SHALL MEET THE MINIMUM SPECIFICATIONS SET FORTH BY THE IOWA DEPARTMENT OF TRANSPORTATION AND/OR WORTH COUNTY. ALL PERMANENT CULVERTS ARE PLANNED TO BE A MINIMUM 18" DIAMETER AND MANUFACTURED OF 16-GAGE CORRUGATED METAL PIPE WITH NO END TREATMENTS UNLESS NOTED OTHERWISE. TEMPORARY CRANE CROSSING CULVERTS 54" AND LARGER SHALL BE A MINIMUM 12-GAGE CORRUGATED METAL PIPE. SEE SHEET 2-2 FOR CULVERT SIZING.
5. GEOTEXTILE FABRIC: MIRAFI HP270 OR APPROVED EQUAL.
6. FILL PLACEMENT: NATIVE SOIL USED TO CONSTRUCT FILL PLACEMENT BELOW ROADS, CRANE WALKS, LAYDOWN YARD AND WTG ERECTION AREAS.

EXECUTION

1. CLEARING AND GRUBBING
   - A. THE CONTRACTOR SHALL BE REQUIRED TO GRUB ALL TREES, STUMPS, BRUSH, AND DEBRIS WITHIN THE GRADING AREAS SHOWN ON THE PLANS. GRUBBING INCLUDES REMOVAL OF ALL PLANT MATERIAL GREATER THAN 2" INCLUDING STUMPS, BRANCHES, ROOTS, ETC. TO A DEPTH BELOW THE FINAL SUBGRADE. THE CONTRACTOR IS TO REMOVE ONLY THOSE TREES WHICH ARE DESIGNATED BY THE OWNER'S REPRESENTATIVE FOR REMOVAL, AND SHALL EXERCISE EXTREME CARE AROUND EXISTING TREES TO BE SAVED.
2. TOPSOIL STRIPPING
   - A. TOPSOIL, INCLUDING ROOTS LARGER THAN 2" AND LARGE ROOT MASSES, SHALL BE STRIPPED FROM ALL ROADWAY AND FOUNDATION AREAS UP TO 8". TOPSOIL SHALL NOT BE STRIPPED OUTSIDE OF THE DESIGNATED DISTURBANCE AREAS.
   - B. ANY TOPSOIL THAT HAS BEEN STRIPPED SHALL BE STOCKPILED FOR POST CONSTRUCTION REVEGETATION. ALL TOPSOIL SHALL BE REDISTRIBUTED TO THE LAND OWNER'S PROPERTY OF WHERE IT ORIGINATED FROM.
3. FILL PLACEMENT
   - A. FILL PLACEMENT SHALL CONSIST OF THE PLACING OF SUITABLE FILL MATERIAL, AFTER TOPSOIL STRIPPING, ABOVE THE EXISTING GRADE. GENERALLY, SIDE SLOPES SHALL BE CONSTRUCTED AT FOUR FOOT HORIZONTAL TO ONE FOOT VERTICAL, WITH SOME LOCATIONS THROUGHOUT THE PROJECT WITH SLOPES OF TWO FEET HORIZONTAL TO ONE FOOT VERTICAL. THE MATERIAL FOR FILL CONSTRUCTION SHALL BE OBTAINED FROM THE ACCESS ROAD/TURBINE EXCAVATION (SEE GEOTECHNICAL REPORT FOR RESTRICTIONS), OR ANY SUITABLE, APPROVED SOIL OBTAINED ONSITE/OFFSITE BY CONTRACTOR, AS DIRECTED OR APPROVED BY THE ENGINEER. THIS MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 12" AND CONSTRUCTED TO 95% OF THE MAXIMUM DRY DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT, AS DETERMINED BY THE STANDARD PROCTOR (AASHTO T99).
   - B. SIDE SLOPES GREATER THAN 4:1 WILL NOT BE PERMITTED, UNLESS OTHERWISE NOTED ON THE PLAN.
   - C. FILL SLOPES SHALL BE BENCHED INTO THE EXISTING SLOPE TO PREVENT MOVEMENT BETWEEN THE FILL AND NATIVE SOILS. BENCHES SHOULD BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO FILL PLACEMENT. POSITIVE DRAINAGE IS REQUIRED AT BENCHED AREAS AND AT THE TOE OF FILL SLOPES TO REMOVE SURFACE WATER.
4. SUBGRADE
   - A. SUBGRADE PREPARED AT GRADE OR IN CUT REQUIRES SCARIFICATION AND RECOMPACTION TO A DEPTH OF 12" OR MORE.
   - B. ACCESS ROAD CROSS SLOPES SHOWN IN THE PLANS ARE MEANT AS A GUIDE. ACCESS ROAD CROSS SLOPES MAY RANGE FROM 1% – 2%, CHECK WITH THE ENGINEER IF THE CROSS SLOPE FALLS OUTSIDE OF THIS RANGE.ACCESS ROADS BEING UTILIZED FOR CRANE TRAVEL SHOULD HAVE A MAX CROSS SLOPE OF 2%.

STORM WATER DESIGN PARAMETERS

1. SEE SHEET NH-276086-2 FOR CULVERT SIZING AND DESIGN PARAMETERS. CULVERTS SHALL BE MINIMUM 18" CORRUGATED METAL PIPE. ALL TEMPORARY PORTIONS OF THE INSTALLED CULVERTS SHALL BE REMOVED UPON COMPLETION OF THE PROJECT.
2. IT IS EXPECTED THAT CULVERTS WILL BE OVERTOPPED DURING SOME STORMS AND MAINTENANCE WILL BE REQUIRED THROUGH THE LIFE OF THE PROJECT.
3. WHEN INSTALLING DRAINAGE CULVERTS THE CONTRACTOR SHALL USE JUDGMENT IN SETTING THE FLOW LINE ELEVATIONS AND CULVERT LONGITUDINAL SLOPE. TYPICALLY THE FLOW LINE ELEVATIONS AND LONGITUDINAL SLOPE OF THE CULVERT SHOULD MATCH THE NATURAL GROUND ELEVATIONS AND SLOPE TO ENSURE POSITIVE DRAINAGE. WHEN POSSIBLE, ALL CULVERTS SHOULD BE PLACED AT A MINIMUM 0.5% GRADE.
4. ANTICIPATED CULVERT CROSSINGS ARE SHOWN ON THE CONSTRUCTION PLAN, ADDITIONAL CULVERTS MAY NEED TO BE INSTALLED IN AREAS WHERE CONCENTRATED FLOW IS EXPECTED DUE TO CONSTRUCTION ACTIVITIES.
5. CONSTRUCT DRAINAGE CROSSINGS TO MAINTAIN EXISTING FLOW CHARACTERISTICS OF THE FEATURES. FEATURES SHALL BE GRADED TO PRECONSTRUCTION CONTOURS.

TABLE 1: MNDOT CLASS 5 BASE COURSE – LOCALLY SOURCED

SIEVE SIZE	PERCENT PASSING
2"	–
1½"	100
1"	–
3/4"	70–100
3/8"	45–90
NO. 4	35–80
NO. 10	20–65
NO. 40	10–35
NO. 200	3–10

L.A ABRASION (% MAX) = 40%
MAX SHALE, IF NO. 200 ≤ 7% BY MASS = 10%
MAX SHALE, IF NO. 200 > 7% BY MASS = 7%
MINIMUM CRUSHING REQUIREMENT = 10%

GRADATION HAS BEEN OBTAINED FROM THE 2018 MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION BOOK, SECTION 3138.2.

TABLE 2: MNDOT CLASS 5Q BASE COURSE – LOCALLY SOURCED

SIEVE SIZE	PERCENT PASSING
2"	100
1½"	–
1"	65–95
3/4"	45–85
3/8"	35–70
NO. 4	15–45
NO. 10	10–30
NO. 40	5–25
NO. 200	0–10

L.A ABRASION (% MAX) = 40%
MAX SHALE, IF NO. 200 ≤ 7% BY MASS = 10%
MAX SHALE, IF NO. 200 > 7% BY MASS = 7%
MINIMUM CRUSHING REQUIREMENT = 10%

GRADATION HAS BEEN OBTAINED FROM THE 2018 MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION BOOK, SECTION 3138.2.

TESTING:

1. TESTING SHALL BE PERFORMED BY A DESIGNATED INDEPENDENT TESTING AGENCY.
2. SUBMIT ONE SET OF TESTING AND INSPECTION RECORDS SPECIFIED TO THE CIVIL ENGINEER OF RECORD.

DEFINITIONS:

1. PROOF ROLLING:
   SHALL BE PERFORMED IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER OR QUALIFIED GEOTECHNICAL REPRESENTATIVE USING A FULLY LOADED TANDEM AXLE DUMP TRUCK OR WATER TRUCK WITH A MINIMUM GROSS WEIGHT OF 25 TONS OR A FULLY LOADED BELLY DUMP WITH AN EQUIVALENT AXLE LOADING. PROOF-ROLLING ACCEPTANCE STANDARDS INCLUDE NO RUTTING GREATER THAN 1.5 INCHES FOR NON-STABILIZED SUBGRADE AND 0.75" FOR CEMENT STABILIZED SUBGRADES, AND NO "PUMPING" OF THE SOIL BEHIND THE LOADED TRUCK.
2. SIEVE ANALYSIS:
   SHALL BE CONDUCTED IN ACCORDANCE WITH ASTM C-136
3. STANDARD PROCTOR:
   SHALL BE DETERMINED IN ACCORDANCE WITH ASTM D-698
4. ATTERBERG LIMITS:
   SHALL BE DETERMINED IN ACCORDANCE WITH ASTM D-4318 T
5. MOISTURE DENSITY (NUCLEAR DENSITY):
   SHALL BE DONE IN ACCORDANCE WITH ASTM D-6938
6. DYNAMIC CONE PENETROMETER (DCP) TESTING:
   SHALL BE DONE IN ACCORDANCE WITH ASTM D6951-18
7. DIRECT SHEAR TEST:
   SHALL BE DONE IN ACCORDANCE WITH ASTM D3080

REQUIREMENTS:

1. FILL PLACEMENT:
   - A. SOILS USED AS FILL MATERIAL SHALL BE TESTED FOR MOISTURE CONTENT AND PROCTOR TESTS.
   - B. WHERE FILL CONSTRUCTION REQUIRES MORE THAN 12 INCHES OF FILL PLACEMENT, COMPACT EACH LIFT TO A MINIMUM OF 95 PERCENT OF THE MATERIAL'S MAXIMUM STANDARD PROCTOR DRY DENSITY.
2. COMPACTED SUBGRADE (CEMENT STABILIZED):
   - A. SEE SHEET NH-276086-7-2 FOR TESTING REQUIREMENTS AND PROCEDURE.
3. COMPACTED SUBGRADE (NON-CEMENT STABILIZED):
   - A. THE ENTIRE SUBGRADE SHALL BE PROOF-ROLLED PRIOR TO THE PLACEMENT OF THE AGGREGATE BASE TO IDENTIFY AREAS OF UNSTABLE SUBGRADE.
   - B. IF A PASSING PROOF-ROLL CANNOT BE ACHIEVED THE FOLLOWING ALTERNATIVES MAY BE IMPLEMENTED:
     a. SCARIFY, DRY, AND RECOMPACT SUBGRADE
     b. REMOVE UNSUITABLE MATERIAL AND REPLACE WITH SUITABLE MATERIAL
     c. INCREASE AGGREGATE BASE THICKNESS
     d. USE AN APPROVED GEOTEXTILE FABRIC
4. AGGREGATE BASE:
   - A. AGGREGATE BASE SHALL BE PROOF-ROLLED OVER THE ENTIRE LENGTH. IF PROOF ROLLING DETERMINES THAT THE ROAD IS UNSTABLE, ADDITIONAL AGGREGATE SHALL BE ADDED UNTIL THE UNSTABLE SECTION IS ABLE TO PASS A PROOF ROLL.
   - B. PROVIDE 1 SIEVE ANALYSIS PER 2500 CY OF ROAD BASE PLACED.
5. CRANE PADS AND CRANE PATHS:
   - A. CRANE PAD TESTING REQUIREMENTS ARE PENDING BASED ON CRANE PICK PLANS PROVIDED BY THE CONTRACTOR.
   - B. CRANE PATH TESTING SHALL BE THE CONTRACTORS MEANS AND METHODS.
8. TEMPORARY CRANE DITCH CROSSINGS (NATIVE SUBGRADE):
   - A. THE NATIVE SUBGRADE AT OR NEAR THE BOTTOM OF EACH WATERWAY SHOULD BE TESTED PRIOR TO CONSTRUCTION WITH A DYNAMIC CONE PENETROMETER (DCP)
     a. DCP TESTING SHOULD BE PERFORMED AT A MINIMUM OF FOUR (4) LOCATIONS PER CROSSING, WITH 2 TESTS PER SIDE OF THE CROSSING
     b. TESTING SHOULD EXTEND TO A DEPTH OF 3 FEET BELOW THE GROUND SURFACE
     c. THE MINIMUM REQUIRED DCP READING IS 1.5 INCHES/BLOW AVERAGED THROUGHOUT THE ENTIRE 3 FOOT DEPTH. THIS CORRESPONDS TO AN UNDRAINED SHEAR STRENGTH OF 650 PSF.
     d. CONTACT WESTWOOD IF THE NATIVE SUBGRADE DOES NOT MEET THE REQUIRED SUBGRADE DCP CRITERIA.
9. TEMPORARY CRANE DITCH CROSSINGS (FILL MATERIAL):
   - A. THE BACKFILL MATERIAL PROVIDED IN SUBMITTAL #WESTWOOD 002 SHOULD BE COMPACTED TO 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. COMPACTED LIFTS SHALL NOT EXCEED 12".
   - B. LABORATORY DIRECT SHEAR TESTING SHALL BE PERFORMED ON THE BACKFILL MATERIAL TO CONFIRM AN INTERNAL FRICTION ANGLE OF 38 DEGREES OR GREATER.

TABLE 3: TESTING SCHEDULE SUMMARY

LOCATION	TEST	FREQUENCY
FILL PLACEMENT	PROCTOR	1 PER MAJOR SOIL TYPE
	MOISTURE DENSITY TEST (NUCLEAR DENSITY)	1 PER LIFT PER 5000 SF OF FILL PLACED OR 1 PER 500 LF OF ROAD
COMPACTED SUBGRADE (CEMENT STABILIZED):	SEE SHEET NH-276086-7-2	SEE SHEET NH-276086-7-2
COMPACTED SUBGRADE (NON-CEMENT STABILIZED):	PROOF-ROLL	ENTIRE AREA
AGGREGATE BASE	PROOF-ROLL	ENTIRE AREA
	SIEVE ANALYSIS, LL, PL, AND L.A ABRASION	1 PER 2,500 CY
TEMP CRANE DITCH CROSSING (NATIVE SUBGRADE):	DCP	4 TESTING LOCATIONS PER CROSSING, WITH 2 TESTS PER SIDE OF THE CROSSING (TESTS TAKEN AT BOTTOM OF WATERWAY)
TEMP CRANE DITCH CROSSING (FILL MATERIAL):	MOISTURE DENSITY TEST (NUCLEAR DENSITY)	1 PER LIFT
	DIRECT SHEAR TEST	1 PER FILL MATERIAL TYPE

GENERAL NOTES:

1. THE GROUND SURFACE CONTOURS (AT TWO-FOOT VERTICAL INTERVALS) AND ELEVATIONS ARE BASED ON LIDAR DATA OBTAINED FROM THE PUBLIC DATA SETS FROM THE STATES OF MN AND IA. THE ELEVATIONS AND CONTOURS BASED ON THE LIDAR DATA WERE PREPARED FROM AERIAL PHOTOGRAPHY DATA, AND NOT ACTUAL FIELD SURVEYING. AS SUCH, THE ACCURACY OF THE ELEVATIONS AND CONTOURS IS NOT AS HIGH AS INFORMATION GATHERED USING CONVENTIONAL FIELD SURVEYING PROCEDURES. THE CONTRACTOR MAY FIND THAT GROUND ELEVATIONS DETERMINED DURING FIELD STAKING WILL VARY FROM THE GROUND ELEVATIONS SHOWN ON THE DRAWINGS. IF MAJOR DISCREPANCIES ARE FOUND, THE OWNER AND ENGINEER SHALL BE NOTIFIED.
2. WHERE SECTION OR SUBSECTION MONUMENTS ARE ENCOUNTERED, THE OWNER SHALL BE NOTIFIED BEFORE SUCH MONUMENTS ARE REMOVED. THE CONTRACTOR SHALL PROTECT AND CAREFULLY PRESERVE ALL PROPERTY MARKERS AND MONUMENTS UNTIL THE OWNER, AN AUTHORIZED SURVEYOR OR AGENT HAS WITNESSED OR OTHERWISE REFERENCED THEIR LOCATION.
3. EFFORTS SHALL BE MADE TO MINIMIZE SOIL DISTURBANCE TO AREAS OUTSIDE OF THE ROAD GRADING LIMITS, CRANE PATHS, AND TURBINE SITES.
4. FINALIZE GRADING AROUND THE BASE OF TURBINES IN ACCORDANCE WITH DETAIL TS-02 AND TS-03.
5. GRADE ALL PROPOSED ROADS TO A MAXIMUM SLOPE OF 8%. IF 8% SLOPE CANNOT BE ACHIEVED, THE CONTRACTOR MAY UTILIZE ASSIST VEHICLES FOR THE PURPOSE OF DELIVERIES. GRADE ALL PROPOSED CRANE PATHS TO A MAXIMUM OF 8% UNLESS OTHERWISE NOTED IN PLAN SHEETS.
6. ANY FACILITIES REMOVED TO ALLOW FOR CONSTRUCTION (MAILBOXES, SIGNS, FENCES, ETC.) SHALL BE REPLACED BY THE CONTRACTOR IN A CONDITION AS GOOD AS EXISTING.
7. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING DRAINAGE THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONSTRUCTION ACTIVITIES SHALL NOT BLOCK THE NATURAL OR MANMADE CREEKS OR DRAINAGE SWALES CAUSING RAINWATER TO POND. DEPENDING ON FIELD CONDITIONS, ADDITIONAL CULVERTS IN EXCESS OF THOSE ON THE PLANS MAY BE REQUIRED.
8. WHILE BUILDING THE ROADS AND EXCAVATING THE TURBINE FOUNDATIONS, EXCESS SOIL WILL RESULT. THE CONTRACTOR SHALL DISPOSE OF THIS EXCESS SOIL IN AN APPROVED MANNER. EXCESS TOPSOIL SHALL BE DISTRIBUTED INTO A THIN LAYER ON LAND IMMEDIATELY ADJACENT TO WHERE THE TOPSOIL ORIGINATED. ALL EXCESS TOPSOIL TO BE WASTED ONSITE. WHILE DOING SO THE CONTRACTOR SHALL AVOID CAUSING RIDGES OR MOUNDS THAT WOULD MAKE IT DIFFICULT FOR STORM WATER RUNOFF TO DRAIN. THE FINAL SURFACE OF THE DISTURBED TOPSOIL SHALL BE SMOOTH AND FOLLOW THE NATURAL CONTOUR OF THE LAND.
9. THE CONTRACTOR SHALL NOTIFY MINNESOTA/IOWA 811 AT LEAST 48 HOURS BEFORE EXCAVATION ACTIVITIES COMMENCE.
10. TEMPORARY INTERSECTION WIDENING SHALL, UPON COMPLETION OF ALL PROJECT CONSTRUCTION OR UPON NOTIFICATION OF THE ENGINEER, BE REMOVED AND THE AREA RESTORED TO ITS ORIGINAL LINES AND GRADES WITH TOPSOIL REPLACED, EXCEPT WHERE REQUESTED BY THE TOWNSHIP OR COUNTY TO PERMANENTLY REMAIN. DISTURBED AREAS OUTSIDE OF THE FINAL ROADWAY SHALL BE SEEDED AND MULCHED.
11. TURBINE SETBACKS ARE NOT IDENTIFIED ON THE CONSTRUCTION PLANS. IT SHALL BE THE RESPONSIBILITY OF THE OWNER AND CONTRACTOR TO ENSURE THAT ALL TURBINE SETBACKS MEET PROJECT REQUIREMENTS.
12. GEOTECHNICAL REPORTS WITH RECOMMENDATIONS HAVE BEEN PREPARED BY THE OWNER. ALL GRADING SHALL CONFORM TO THE GEOTECHNICAL ENGINEERING REPORT AND RECOMMENDATIONS.
13. FIELD SURVEY WETLAND INFORMATION HAS BEEN PROVIDED BY THE OWNER. ALL WETLAND DELINEATIONS AND PERMITTING SHALL BE THE RESPONSIBILITY OF OTHERS AND BE COMPLETED PRIOR TO CONSTRUCTION COMMENCING. THE OWNER AND GENERAL CONTRACTOR SHALL VERIFY THAT ALL WETLAND PERMITS HAVE BEEN SUBMITTED AND APPROVED PRIOR TO CONSTRUCTION COMMENCING.
14. CULTURAL RESOURCE REPORTS HAVE NOT BEEN PROVIDED BY THE OWNER. CULTURAL RESOURCE LOCATIONS ARE NOT SHOWN ON THE PLANS. INFORMATION WILL BE THE RESPONSIBILITY OF THE OWNER AND GENERAL CONTRACTOR. THE LOCATIONS OF CULTURAL RESOURCE SITES MAY BE CONFIDENTIAL AND PROTECTED BY STATE OR FEDERAL LAW. PUBLIC RELEASE OF SPECIFIC INFORMATION REGARDING THESE RESOURCES MAY BE RESTRICTED.
15. AN ENVIRONMENTAL ASSESSMENT HAS NOT BEEN PROVIDED. THE CONTRACTOR SHALL BE FAMILIAR WITH THE REPORT AND REVIEW ALL RECOMMENDATIONS.
16. ELECTRICAL INFORMATION SHOWN ON THE PLANS IS FOR REFERENCE ONLY. REFER TO ELECTRICAL CONSULTANT'S PLANS FOR SPECIFIC LOCATIONS AND CONSTRUCTION DETAILS FOR THE UNDERGROUND POWER COLLECTION SYSTEM AND SUBSTATION.
17. CRANE PATHS ARE SHOWN ON THE CONSTRUCTION PLANS. IF THE CONTRACTOR PROPOSES ALTERNATE CRANE PATHS, THEY SHALL ENSURE THAT WETLAND AND CULTURAL RESOURCE CORRIDORS ARE NOT DISTURBED. FINAL CRANE PATH ALIGNMENTS SHALL BE DETERMINED BY THE CONTRACTOR BASED ON FIELD CONDITIONS WITHIN THE WETLAND AND CULTURAL RESOURCE CORRIDORS, SPECIAL LANDOWNER AGREEMENTS AND THE PROJECT BOUNDARY.
18. EFFORTS SHALL BE MADE TO MINIMIZE SOIL DISTURBANCE. CONSTRUCTION DISTURBANCE MUST STAY WITHIN THE CLEARED CONSTRUCTION CORRIDOR. OWNER MUST APPROVE ANY DISTURBANCE BEYOND THE CLEARED CORRIDOR. THE TYPICAL CLEARED CORRIDOR IS 100 LF WIDTH FOR PROPOSED ACCESS ROADS, 100 LF FOR CRANE PATHS, AND 250 LF FOR TURBINES. DURING ERECTION OF THE ROTOR, TRUCKS AND/OR FORKLIFTS MAY EXTEND BEYOND THE LIMITS WITH APPROVAL. SEE DETAIL TS01 FOR TYPICAL ERECTION AREAS.
19. TRUCK TURNAROUNDS ARE NOT SHOWN ON THE PLANS. GENERAL CONTRACTOR TO COORDINATE AND ASSIST WITH TRUCK TURNAROUNDS WHERE NECESSARY.
20. AN ALTA SURVEY HAS NOT BEEN PROVIDED BY THE OWNER. CONTRACTOR AND OWNER ARE RESPONSIBLE FOR LOCATING ALL UTILITIES AND VERIFYING LOCATION OF CONSTRUCTION ACTIVITIES PRIOR TO COMMENCING WORK. ALL UTILITIES MAY NOT BE SHOWN.
21. OFF SITE TEMPORARY INTERSECTION IMPROVEMENTS ARE NOT SHOWN ON THE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATIONS AND CONSTRUCTION REQUIREMENTS.
22. IMPACTS TO PUBLIC AND PRIVATE DRAIN TILE ARE EXPECTED. CONTRACTOR AND OWNER TO AGREE UPON DRAIN TILE REPAIR PRIOR TO REPAIRS.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP):

1. THE CONTRACTOR SHALL PROVIDE EROSION CONTROL MEASURES AS PLANNED AND SPECIFIED FOLLOWING BEST MANAGEMENT PRACTICES AS OUTLINED BY THE MINNESOTA DEPARTMENT OF HEALTH, THE IOWA DEPARTMENT OF NATURAL RESOURCES, AND BEING IN CONFORMANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL STORMWATER PERMIT.
2. REFER TO THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR THE FREEBORN WIND PROJECT, PREPARED BY WESTWOOD PROFESSIONAL SERVICES, FOR EROSION CONTROL AND RESTORATION SPECIFICATIONS, SEDIMENT AND EROSION CONTROL PROCEDURES, LOCATIONS OF BMPs, DETAILS, AND INSPECTION INFORMATION.
3. ALL PASTURES AND DRAINAGE SWALES DISTURBED DURING CONSTRUCTION ACTIVITIES AND NOT COVERED BY ROAD SURFACING MATERIALS, SHALL BE SEEDED IN ACCORDANCE WITH THE SWPP PLAN.
4. TEMPORARY EROSION CONTROL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE TEMPORARY EROSION CONTROL PLAN SHALL BE IN ACCORDANCE WITH THE MINNESOTA DEPARTMENT OF HEALTH, THE IOWA DEPARTMENT OF NATURAL RESOURCES, AND THE FREEBORN WIND PROJECT STORMWATER POLLUTION PREVENTION PLAN ON FILE.

PROJECT CONTACT INFORMATION:

TITLE	COMPANY	NAME	CONTACT NUMBER
OWNER	XCEL ENERGY		
PROJECT MANAGER & ENGINEER OF RECORD – MN	WESTWOOD PROFESSIONAL SERVICES	DANI NYGREN	952-906-7493
ENGINEER OF RECORD – IA	WESTWOOD PROFESSIONAL SERVICES	ROB COPOULS	952-906-7470
CONTRACTOR	WANZEK	CRAIG MOSENG	701-893-3654

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NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	90% CIVIL PLANS L083		04/17/20	TDD	DJN	DJN
0	IFC CIVIL PLANS L083		05/04/20	TDD	DJN	DJN

REFERENCE DRAWINGS

DWG NO.	MANUFACTURER	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.
Signature
Danielle J Nygren
Printed Name
Date 05/04/20 License No. 55542

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NORTHERN STATES POWER COMPANY
FREEBORN WIND FARM
Freeborn County, MN and Worth County, IA

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PM: DJN	DATE:	PROJ. NO: 22586	
APVD:	DATE:	SCALE: NONE	

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CONSTRUCTION NOTES

NH-276086-7-1

REV 0

CEMENT STABILIZATION - PROCEDURE

THE SPECIFICATIONS BELOW ARE GENERAL RECOMMENDATIONS/GUIDELINES FOR CEMENT STABILIZATION OF SUBGRADES FOR THE PROJECT. ACTUAL FIELD CONDITIONS MAY ALTER APPLICATION RATE. CONSULT WESTWOOD FOR FURTHER RECOMMENDATIONS .

1. STRIP THE TOP 4± INCHES OF TOPSOIL (THROUGH THE ROOT ZONE) FROM THE AREA TO BE STABILIZED. ROOTS SMALLER THAN 1/4" DIAMETER ARE CONSIDERED INSIGNIFICANT.
2. PERFORM A PROCTOR (ASTM D 698) TEST TO DETERMINE THE OPTIMUM MOISTURE CONTENT IF THE MATERIAL TO BE STABILIZED DOES NOT MATCH A PREVIOUSLY PERFORMED PROCTOR. PREVIOUSLY PERFORMED PROCTOR INCLUDES PROCTORS FROM THE GEOTECH REPORT.
3. DETERMINE THE IN-SITU MOISTURE CONTENT USING A NUCLEAR DENSITY GAUGE (OR EQUIVALENT MOISTURE CONTENT TEST) DAILY, PRIOR TO INCORPORATION OF THE CEMENT. PROVIDE ADDITIONAL MOISTURE CONTENT TESTING AS NEEDED BASED ON WEATHER CONDITIONS.
   - 3.1. THE CONTRACTOR WILL BE ADVISED OF IN-SITU MOISTURE CONTENT, AND MOISTURE ADJUSTMENTS SHOULD BE MADE IF IN-SITU MOISTURE IS LESS THAN OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE PROCTOR (ASTM D 698).
4. SOIL AND CEMENT BLENDING:
   - 4.1. COMPLETELY BLEND SUBGRADE SOIL EVENLY ACROSS THE SECTION WITH THE APPROPRIATE AMOUNT OF CEMENT BY WEIGHT. FIELD RESULTS FROM TEST STRIPS WILL DICTATE THE CEMENT APPLICATION RATE.
   - 4.2. IN AREAS OF HIGH MOISTURE OR POOR SOILS, THE CONTRACTOR MAY INCREASE THE PERCENT OF CEMENT IN ORDER TO MEET THE MINIMUM SUBGRADE STRENGTH REQUIREMENTS.
   - 4.3. THE USE OF A RECLAIMER IS AN ADEQUATE BLENDING METHOD. DISKING IS NOT AN ADEQUATE BLENDING METHOD.
   - 4.4. A STABILIZATION DEPTH OF 12" WAS USED FOR DESIGN PURPOSES. STABILIZATION DEPTH MAY NEED TO INCREASE TO 16" IN AREAS OF EXTREME MOISTURE OR POOR SOILS IN ORDER TO MEET THE STRENGTH AND PROOF ROLL REQUIREMENTS.
   - 4.5. THE AIR TEMPERATURE SHALL BE ABOVE 40 DEGREES (F) DURING THE CEMENT STABILIZATION PROCESS. MIXING CEMENT INTO FROZEN GROUND IS NOT ACCEPTABLE. NO SOIL AND CEMENT BLENDING SHOULD BE PERFORMED IF TEMPERATURES ARE BELOW 40 DEGREES FOR THE NEXT THREE DAYS OR EXPECTED TO FALL BELOW FREEZING WITHIN THE NEXT SEVEN DAYS.
   - 4.6. CEMENT STABILIZATION SHALL NOT BE PERFORMED WHEN RAINFALL WILL DISTURB CHEMICAL SPREADING OR COMPROMISE STABILITY OF THE TREATED MATERIAL.
5. COMPACTION:
   - 5.1. COMPACTION SHOULD BEGIN AS SOON AS POSSIBLE, AND GENERALLY COMPLETED WITHIN 2 HOURS OF INITIAL MIXING.
   - 5.2. A ROLLING PATTERN WILL BE ESTABLISHED USING A NUCLEAR DENSITY GAUGE DURING COMPACTION.
     - 5.2.1. COMPACTION WILL BE PERFORMED UNTIL THE STABILIZED MATERIAL REACHES A MINIMUM OF 95% OF MAXIMUM DRY DENSITY (ASTM D698).
     - 5.2.2. THE NUMBER OF PASSES AND EQUIPMENT USED TO REACH A MINIMUM OF 95% OF MAXIMUM DRY DENSITY IS CONSIDERED THE ROLLING PATTERN.
     - 5.2.3. DENSITY TESTS SHALL BE TAKEN AT THE RATE OF 1 TEST PER 500 LF IN EACH PASS OF THE RECLAIMER TO CONFIRM THE DENSITY MEETS THE MINIMUM REQUIREMENT. ONCE A CONSISTENT ROLLING PATTERN HAS BEEN CONFIRMED IT IS RECOMMENDED THAT TESTING CONTINUE AT 1 TEST PER 1,000 LF IN EACH PASS OF THE RECLAIMER.
     - 5.2.4. A NEW ROLLING PATTERN MAY NEED TO BE ESTABLISHED IF THE PERFORMANCE REQUIREMENTS ARE NOT BEING MET. THIS MAY BE DUE TO CHANGES IN THE MOISTURE CONTENT, THE SOIL TYPE, OR THE CEMENT RATE
   - 5.3. COMPACTION IS TYPICALLY ACHIEVED BY MULTIPLE PASSES OF A PAD FOOT ROLLER. A SMOOTH DRUM OR RUBBER TIRE ROLLERS ARE THEN USED TO FINISH ROLLING. FINAL ROLLING WILL REMOVE HIGH AND LOW POINTS AND SET THE FINAL PROFILE.
6. THE STABILIZED MATERIAL SHALL BE CONTINUOUSLY WET CURED FOR A MINIMUM OF 24 HOURS (WET CURED IS IDENTIFIED VISUALLY AS DAMP SURFACE). THE STABILIZED MATERIAL SHALL BE PROTECTED FROM FREEZING FOR 7 DAYS.
7. SUBRGRAGE DCP TESTING AND ACCEPTANCE:
   - 7.1. PERFORM SUBGRADE STRENGTH TESTING BY DYNAMIC CONE PENETROMETER (DCP) PER ASTM D 6951-18 NO SOONER THAN 24 HOURS AFTER FINAL COMPACTION.
   - 7.2. DCP TESTING FREQUENCY SHALL BE WITH A RANDOM SPACING AND A MINIMUM OF 1 TEST PER 500 LF IN EACH PASS OF THE RECLAIMER. A MINIMUM OF 3 TESTS PER ROAD IS REQUIRED.
   - 7.3. THE CBR OF THE STABILIZED SUBGRADE SHOULD BE CALCULATED IN 6" INCREMENTS THROUGH THE ENTIRE DEPTH OF THE STABILIZED LAYER.
   - 7.4. THE MINIMUM REQUIRED CBR PRIOR TO PROOF-ROLLING IS PROVIDED IN TABLE 3 BELOW:

TABLE 3: FINAL CEMENT STABILIZED CBR/DCP REQUIREMENTS TABLE

TIME ELAPSED BETWEEN FINAL COMPACTION AND DCP TEST	REQUIRED MINIMUM CBR	MINIMUM DCP (BLOWS PER 6")	BEARING CAPACITY (PSF)
24 – 48 HOURS	20	14	14,700
3 – 7 DAYS	25	17	17,500
28 DAYS	50	32	31,400

NOTE: UNDRAINED SHEAR STRENGTH WAS CALCULATED USING THE BLACK (1961) EQUATION. BEARING CAPACITY WAS CALCULATED USING THE VESIC EQUATION MODIFIED FOR TWO LAYERS (12" CEMENT STABILIZED SUBGRADE OVER A NATURAL SUBGRADE WITH A CBR OF 2.5 AMD 4" OF AGGREGATE)

   - 7.5. ONCE THE MINIMUM REQUIRED CBR IS ACHIEVED AT ANY CORRESPONDING TIME PERIOD, THE SUBGRADE IS CONSIDERED ADEQUATE AND THE CONTRACTOR MAY PROCEED WITH PROOF-ROLL TESTING. FUTURE DCP TESTING ON THAT SEGMENT OF SUBGRADE IS NOT REQUIRED.
   - 7.6. IF TESTING DOES NOT INDICATE A CBR OF 25 WITHIN 7 DAYS, ADDITIONAL GRAVEL SURFACING AND/OR THE ADDITION OF GEOTEXTILE FABRIC MAY BE REQUIRED. SEE TABLE 4.
8. SUBGRADE PROOF-ROLL TESTING AND ACCEPTANCE:
   - 8.1. ONCE THE REQUIRED DCP VALUE HAS BEEN OBTAINED BUT PRIOR TO PLACING AGGREGATE, THE SUBGRADE SHALL BE PROOF-ROLLED. REFER TO THE PROJECT TESTING REQUIREMENTS FOR PROOF-ROLL DEFINITION.
   - 8.2. PROOF-ROLLING SHOULD BE PERFORMED WITH ONE PASS DOWN THE CENTER AND NOT BE PERFORMED WITHIN 12 INCHES OF THE EDGE OF THE STABILIZED SECTION.
   - 8.3. IF PROOF-ROLLING FAILS, RE-STABILIZATION MAY BE REQUIRED AND A NEW ROLLING PATTERN OR ADDITIONAL CEMENT MAY BE REQUIRED FOR FUTURE SUBGRADE STABILIZATION AREAS. CONTACT THE ENGINEER FOR RECOMMENDATIONS.
9. AGGREGATE PLACEMENT:
   - 9.1. SURFACE AGGREGATE SHALL BE PLACED OVER THE STABILIZED SUBGRADE FOLLOWING PASSING DCP AND PROOF-ROLL TESTS AND WITHIN 30 DAYS OF STABILIZATION.
   - 9.2. THE AGGREGATE SURFACING IS INTENDED TO PROTECT THE SUBGRADE FROM WATER BEING PUMPED INTO THE SUBGRADE AND TO PROVIDE A TRACTION COURSE. WESTWOOD RECOMMENDS A MINIMUM OF 4 INCHES OF AGGREGATE INITIALLY PLACED OVER STABILIZED SUBGRADE. MAINTENANCE IS REQUIRED THROUGHOUT CONSTRUCTION AND MAY REQUIRE THE PLACEMENT OF ADDITIONAL AGGREGATE.
   - 9.3. REFER TO THE TESTING SCHEDULE ON SHEET NH-276086-7-1 FOR AGGREGATE PLACEMENT CRITERIA.

CEMENT STABILIZATION - DESIGN BASIS

1. DURING INITIAL CONSTRUCTION, CONTRACTOR SHALL CONSTRUCT MINIMUM 300 LF TEST STRIPS CONTAINING 5%, 6%, AND 7% CEMENT IN ACCORDANCE WITH CEMENT STABILIZATION PROCEDURES.
2. SUBGRADE DCP TESTING AND ACCEPTANCE (SEE TABLE 3):
   - 2.1. PERFORM DCP TESTING AT 24 AND 48 HOURS AFTER FINAL COMPACTION.
   - 2.2. PERFORM SUBSEQUENT DCP TESTS AT 7 DAYS AFTER FINAL COMPACTION AS VERIFICATION OF STRENGTH CURVE.
   - 2.3. A MINIMUM OF 3 TESTS PER TEST SECTION PER TIMEFRAME IS REQUIRED. TESTS SHALL BE TAKEN AT THE CENTERLINE AND 2' FROM EACH SHOULDER.
   - 2.4. RECORD DCP TEST RESULTS EVERY 6 INCHES TO TOTAL DEPTH OF 12 INCHES.
   - 2.5. IF THE MINIMUM DCP REQUIREMENTS ARE NOT OBTAINED, CONTACT ENGINEER FOR RECOMMENDATIONS MOVING FORWARD.

CEMENT STABILIZATION - REPAIR

SPECIFICATION BELOW ARE FOR THE REPAIR OF CEMENT STABILIZED SUBGRADE DAMAGED BY EQUIPMENT SUCH AS CRANES OR TRENCHING:

1. REMOVE FULL DEPTH OF CEMENT-TREATED MATERIAL.
2. PLACE AND COMPACT NATIVE MATERIAL TO 95% OF THE MAXIMUM DRY DENSITY. THE COMPACTED SUBGRADE ELEVATION SHALL BE 6 INCHES BELOW TOP OF FINAL GRADE.
3. PLACE MIRAFI HP270 ON SUBGRADE, IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. PLACE AND COMPACT 6 INCHES OF AGGREGATE BASE FOR CONSTRUCTION TRAFFIC. NOTE LOCATION OF REPAIR ON RED-LINE DRAWINGS.

TABLE 4: ALTERNATIVE ACCESS ROAD SECTIONS (AFTER 7 DAYS)

DCP (BLOWS/6")	7 DAY CBR (FROM DCP)	GRAVEL THICKNESS (IN)
4	5-10	12*
8	10-15	8*
11	15-20	6
14	20-25	5
17	>25	4

*ALTERNATE SECTION IS 6" GRAVEL OVER MIRAFI HP270 OR APPROVED EQUAL.

TABLE 5: CEMENT STABILIZATION PRODUCTION TESTING SCHEDULE SUMMARY

LOCATION	TEST		FREQUENCY
COMPACTED SUBGRADE (CEMENT STABILIZED)	PROCTOR		MINIMUM 1 PER MAJOR SOIL TYPE (PREVIOUS PROCTORS MAY BE USED)
	MOISTURE DENSITY TEST (NUCLEAR DENSITY)-		
		BEFORE ADDING CEMENT	MIN 1 PER ROAD (DAILY). ADJUST AS NEEDED BASED ON FIELD CONDITIONS.
		DURING COMPACTION	1 PER 500 LF IN EACH PASS OF THE RECLAIMER UNTIL CONSISTENT, THEN 1 PER 1000 LF IN EACH PASS OF THE RECLAIMER, A MIN. 3 PER ROAD
	DCP TEST		1 PER 500 LF IN EACH PASS OF THE RECLAIMER, A MIN. 3 PER ROAD
	PROOF-ROLL (AFTER PASSING DCP TESTS)		ENTIRE LENGTH

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REFERENCE DRAWINGS

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I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed PROFESSIONAL ENGINEER under the laws of the State of Minnesota.

Signature
Danielle J Nygren
Printed Name
Date 05/04/20 License No. 55542

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NORTHERN STATES POWER COMPANY
FREEBORN WIND FARM
Freeborn County, MN and Worth County, IA

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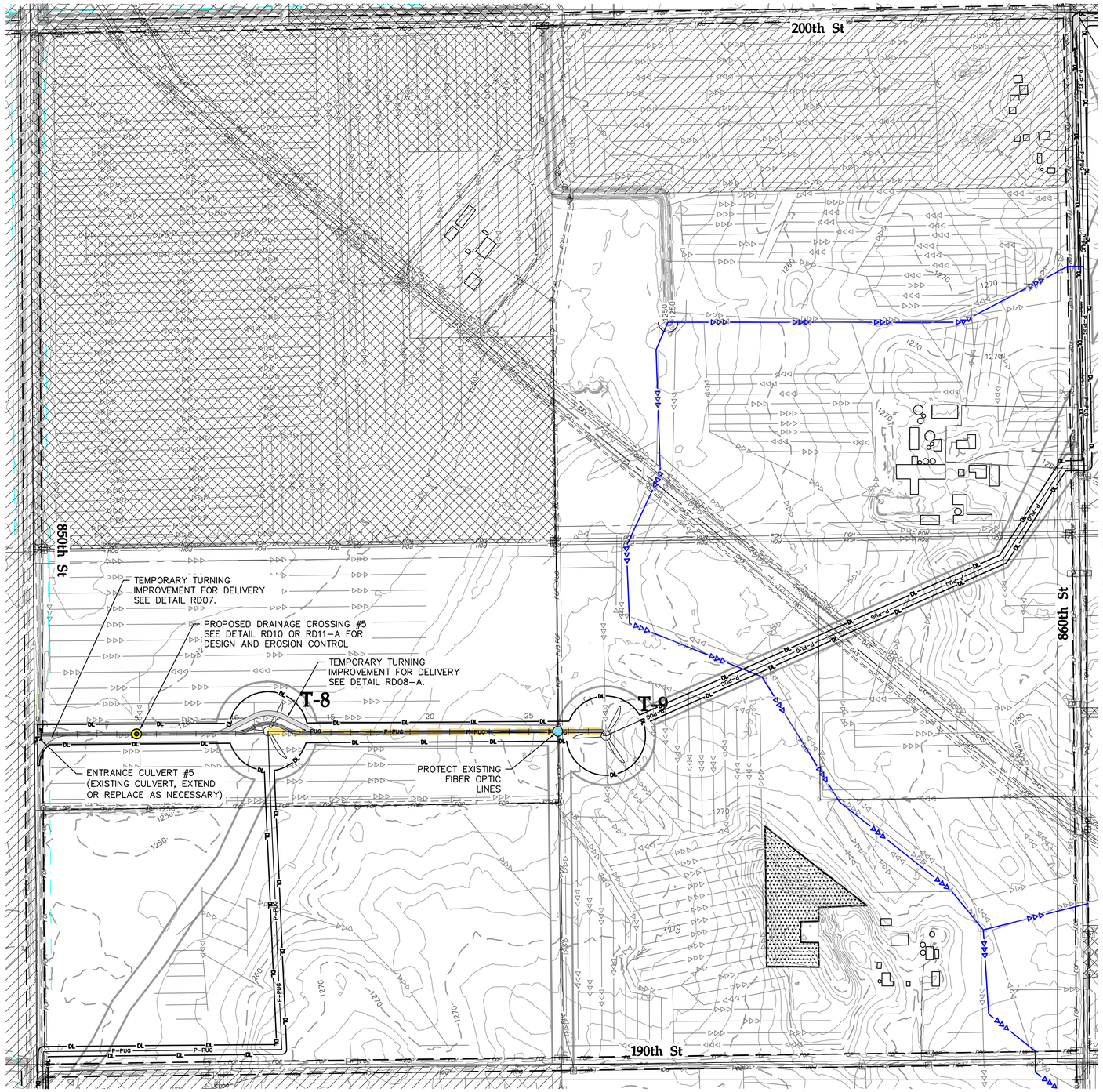
UNIT 0
CIVIL ACCESS ROADS
CONSTRUCTION NOTES

NH-276086-7-2

REV 0



* THE SURVEYED CONSTRUCTION CORRIDOR WAS PROVIDED BY OTHERS AND IS BASED ON THE CLEARED ENVIRONMENTAL AND CULTURAL CORRIDORS.

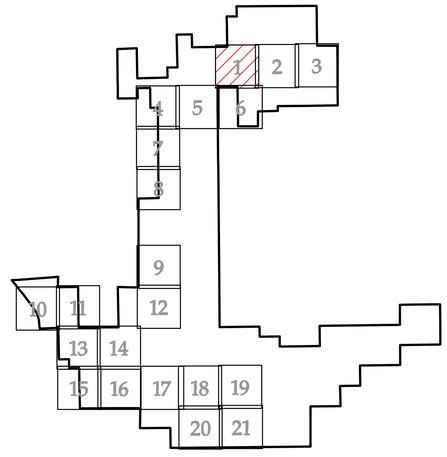
** PROVIDED BY OTHERS AND SHOWN FOR REFERENCE ONLY. REFER TO ELECTRICAL CONSTRUCTION PLANS FOR DETAILS.

*** REDUNDANT SEDIMENT CONTROL SHALL BE IMPLEMENTED WHERE A 50 FT BUFFER ZONE FROM WATERBODIES IS INFEASIBLE. REDUNDANT SEDIMENT CONTROLS SHALL BE IMPLEMENTED AT LEAST 5 FT APART.

**** DRAINAGE CROSSINGS SHALL CONSIST OF LOW WATER CROSSING OR CULVERT. FOR LOW WATER CROSSING TYPE AND/OR CULVERT SIZING REFER TO SHEET NH–276086–2. DRAINAGE CROSSINGS ALONG CRANE PATH SHALL CONSIST OF CRANE MATS OR TEMPORARY CULVERT. CONTRACTOR TO FIELD FIT TEMPORARY DRAINAGE CROSSING AS NEEDED.

LEGEND:

- PROPOSED TURBINE LOCATION
- T-XX — PROPOSED TURBINE NUMBER
- ALTERNATE TURBINE LOCATION
- ALT-XX — ALTERNATE TURBINE NUMBER
- PROPOSED ACCESS ROAD
- ALTERNATE ACCESS ROAD
- PROPOSED CRANE PATH
- PROPOSED ALTERNATE CRANE PATH
- SURVEYED CONSTRUCTION CORRIDOR*
- DL — PROPOSED DISTURBANCE LIMITS
- P–PUG — PROPOSED COLLECTION LINE**
- P–POH — PROPOSED OVERHEAD POWER
- SF — PROPOSED PERIMETER SEDIMENT CONTROL
- SF — PROPOSED REDUNDANT SEDIMENT CONTROL***
- 980 — EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING ROAD
- EXISTING RIGHT–OF–WAY
- EXISTING PRIVATE DRAIN TILE
- POH — EXISTING OVERHEAD POWER
- FOP — EXISTING FIBER OPTIC LINE
- WAT — EXISTING WATER LINE
- GAS — EXISTING GAS LINE
- EXISTING WATERWAY – NHD
- EXISTING DELINEATED WATERWAY
- EXISTING PUBLIC DRAIN TILE
- EXISTING DELINEATED WETLANDS
- EXISTING GRASSLANDS
- EXISTING CRP PARCELS
- PARTICIPATING PARCELS
- NON–PARTICIPATING PARCELS
- PARTICIPATING – TRANSMISSION EASEMENT
- PARTICIPATING – NEIGHBOR AGREEMENT
- PROPOSED DRAINAGE CROSSING****
- PROPOSED TEMPORARY DRAINAGE CROSSING****
- PROPOSED FENCE CROSSING
- PROPOSED UTILITY CROSSING
- PROPOSED CULVERT



KEY MAP
(REFERS TO SHEET NH–276086–8–##)

0' 300' 600' 900'

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Signature: Danielle J Nygren
Printed Name: Danielle J Nygren
Date: 05/04/20 License No. 55542

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