



Thunder Spirit Wind, LLC | 30 West Superior St. | Duluth, MN | 55802

May 22, 2018



Mr. Jerry Lein  
North Dakota Public Service Commission  
600 E. Boulevard, Dept. 408  
Bismarck, ND 58505

RE: Submittal of Engineering Drawings  
Construction Thunder Spirit Phase Two  
Case Nos. **PU-11-601, PU-15-592, and PU-17-192**

Dear Mr. Lein,

ALLETE Clean Energy (ACE) is submitting the engineering drawings for the Thunder Spirit Wind Phase Two facility in Adams County, ND. ACE will construct the Thunder Spirit Wind Phase Two project in accordance of the attached drawings.

Thank you for your consideration in this matter. If you have any questions please contact me at 218-355-3249 or [jhollingsworth@alletecleanenergy.com](mailto:jhollingsworth@alletecleanenergy.com).

Sincerely,

*/s/ John Hollingsworth*

John Hollingsworth  
Project Development Manager

JH:sr  
Enc.

**38** **PU-15-592** Filed: 5/22/2018 Pages: 24  
**Engineering Drawings for the Thunder Spirit Wind Phase Two facility**

Allete Clean Energy, Inc.  
John Hollingsworth, Project Devel. Mgr.

**24** **PU-17-192** Filed: 5/22/2018 Pages: 24  
**Engineering Drawings for the Thunder Spirit Wind Phase Two facility**

Allete Clean Energy, Inc.  
John Hollingsworth, Project Devel. Mgr.

**164** **PU-11-601** Filed: 5/22/2018 Pages: 24  
**Engineering Drawings for the Thunder Spirit Wind Phase Two facility**

Allete Clean Energy, Inc.  
John Hollingsworth, Project Devel. Mgr.

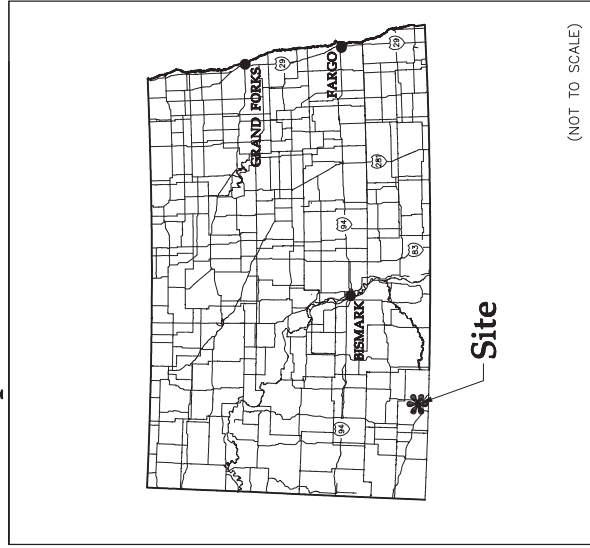
# Civil Construction Plans

for

## Wind Turbines, Access Roads, Drainage, and Erosion Control

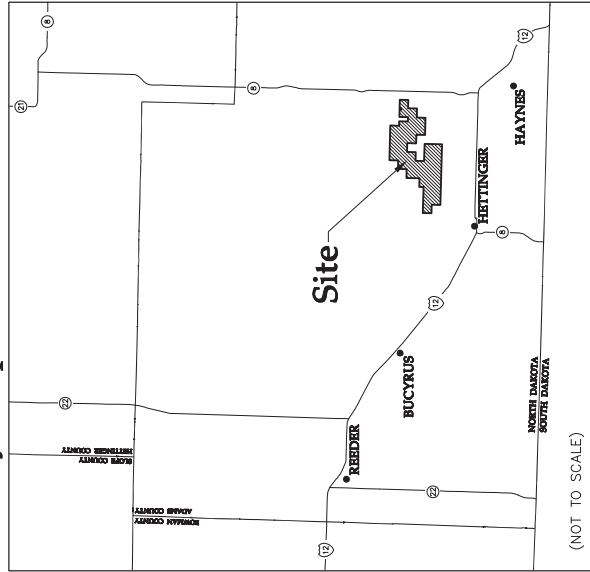
### Thunder Spirit II Wind Project Adams County, North Dakota

State Map



(NOT TO SCALE)

Vicinity Map



(NOT TO SCALE)

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1	Cover
2	Overall Site Plan
3	Delivery Flow Plan
4	Construction Details
5	Construction Details
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20	Profiles - Roads 52, 53, 54
21	Profiles - Road 54
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23	Profiles - Roads 54, 57

Sheet List Table

**Westwood**  
 800.897.5150 17201 Milwaukee Drive, Suite #500  
 888.897.5150 17201 Milwaukee Drive, Suite #500  
 888.897.5150 westwood@westwood.com



**DESIGNED BY:** JEC  
**CHECKED BY:** JEC  
**DATE:** 05/17/18  
**PROJECT NO.:** 1803000001  
**PROJECT NAME:** THUNDER SPIRIT II WIND PROJECT  
**CLIENT:** ADAMS COUNTY, NORTH DAKOTA  
**SCALE:** AS SHOWN  
**DATE:** 05/17/18  
**PROJECT NO.:** 1803000001  
**PROJECT NAME:** THUNDER SPIRIT II WIND PROJECT  
**CLIENT:** ADAMS COUNTY, NORTH DAKOTA  
**SCALE:** AS SHOWN

**WANZEK**  
 A Division of Westwood  
 17201 Milwaukee Drive, Suite #500  
 888.897.5150 westwood@westwood.com

**Thunder Spirit II  
Wind Project**  
 Adams County, North Dakota

Cover

**Issued for Construction**  
 Date: 5/19/18  
 Sheet: 1 of 23  
 004645656.dwg

BASE FILE	FILE NAME / NOTES	PROVIDER	DATE
AERIAL IMAGE	AERIAL_ABPY_GA10Z	NAP	1/11/2018
ALTA SURVEY	SEALAD-Terracing.dwg	Wentzel/ALJ	2/7/2018
TOPOGRAPHY	MNF_Lidar_2018_01_35.dwg	North Dakota State Water Commission	1/25/2018
TURBINE ARRAY	SUTILEE_Thunder_Spirit_II_Coordinates.pdf	Wentzel	11/11/2017
UNDERGROUND COLLECTION	THUNDER_COIL_WANZEK.dwg	Wentzel	5/10/2018
STREAMS/OUTLANDS	SEALAD_Terracing.dwg	Wentzel/ALJ	2/7/2018

DATA SET INFORMATION



Designed: JAC  
 Checked: JAC  
 Drawn: JAC  
 Allocated Drawings:  
 0 05/17/18 IFC CIVIL PLANS  
 1 05/17/18 IFC CIVIL PLANS  
 1 05/17/18 DRAINAGE CROSSING REVISIONS



Prepared for:  
 12201 Milwaukee Drive, Suite #500  
 Minneapolis, MN 55425

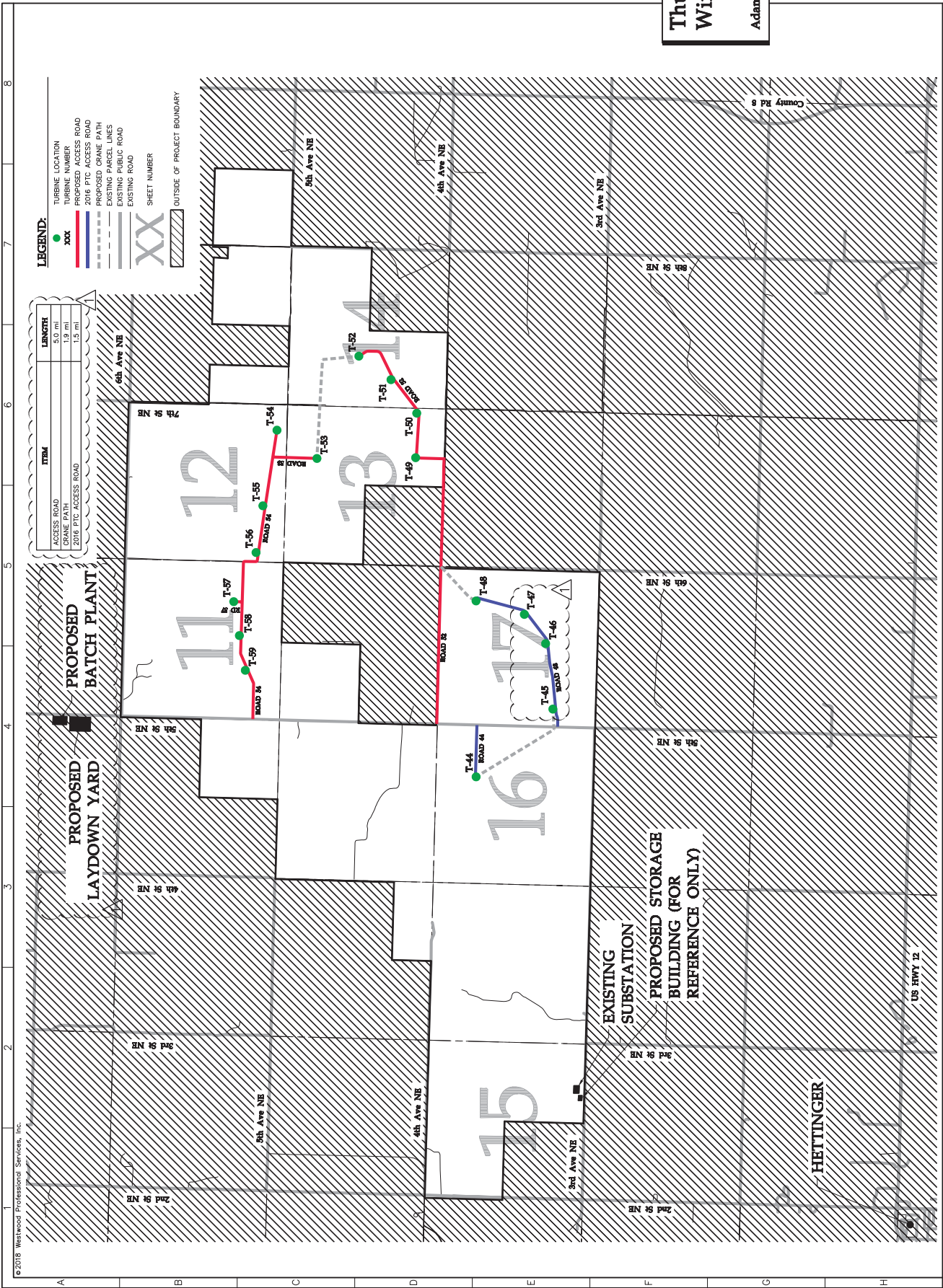
**Thunder Spirit II  
 Wind Project**  
 Adams County, North Dakota

Overall Site Plan

Issued for Construction

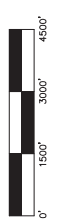
Date: 5/16/18  
 Sheet: 2 OF 23

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Designed:	JAC
Checked:	JAC
Drawn:	JAC
As-built Drawing:	
Project No.:	1803000001
Date:	05/17/18
Revision:	1.05/17/18 IFC CIVIL PLANS
Revision:	1.05/17/18 DRAINAGE CROSSING REVISIONS



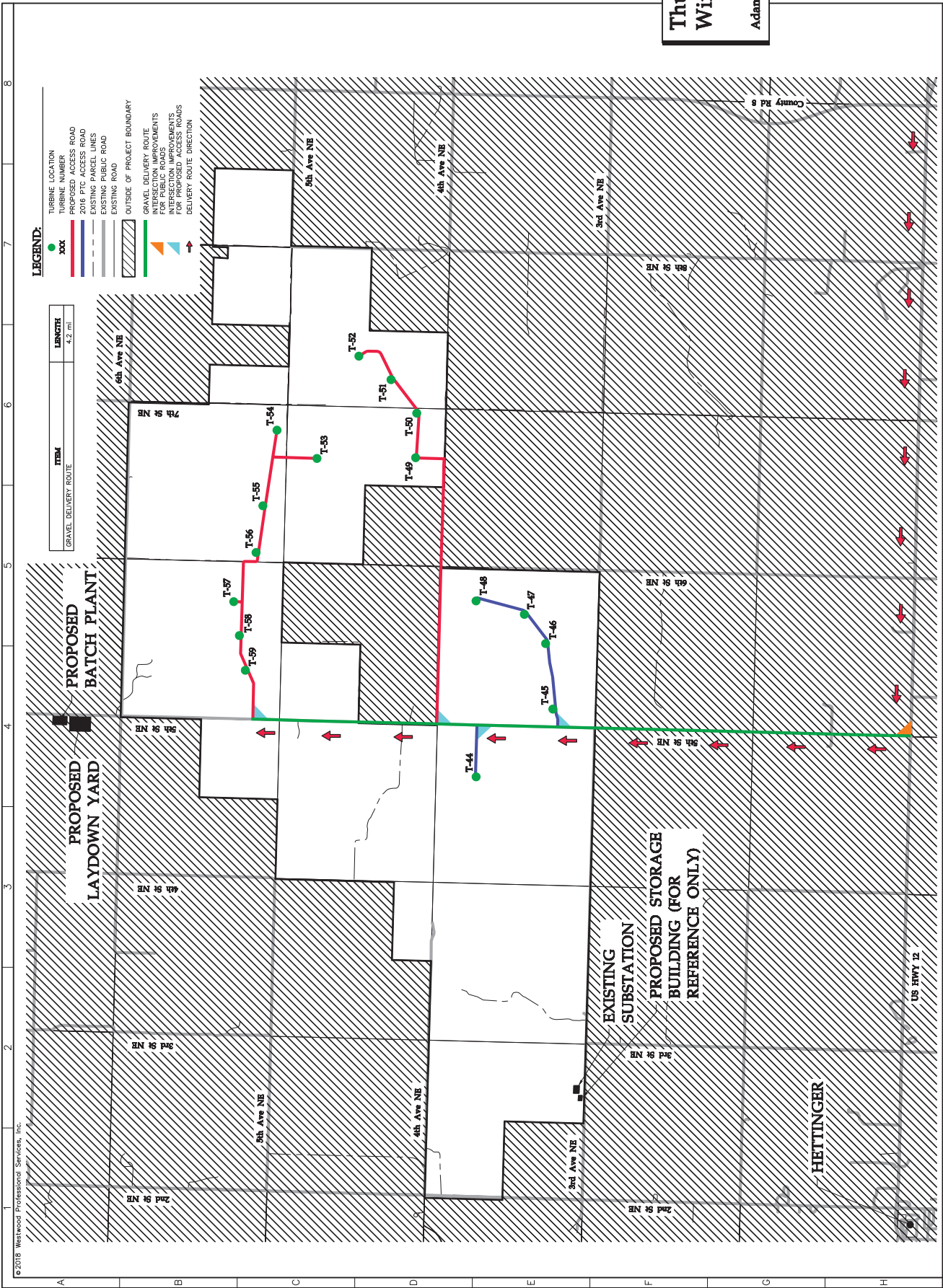
# Thunder Spirit II Wind Project

Adams County, North Dakota

Delivery Flow Plan

Issued for Construction

Date: 5/16/18  
 Sheet: 3 OF 23













Design:	10/17/18
Check:	10/17/18
Date:	10/17/18
As-built Drawing:	
Project:	UNASSIGNED
Drawn:	05/17/18
Checked:	05/17/18
Date:	05/17/18
As-built Drawing:	



# Thunder Spirit II Wind Project

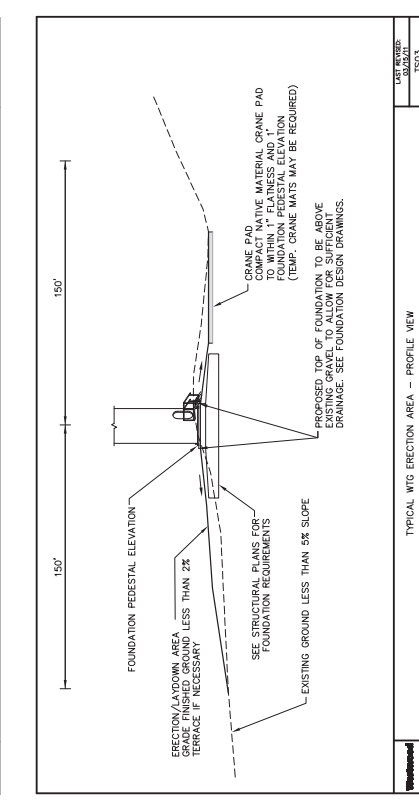
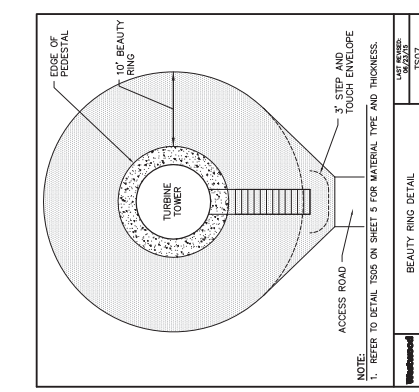
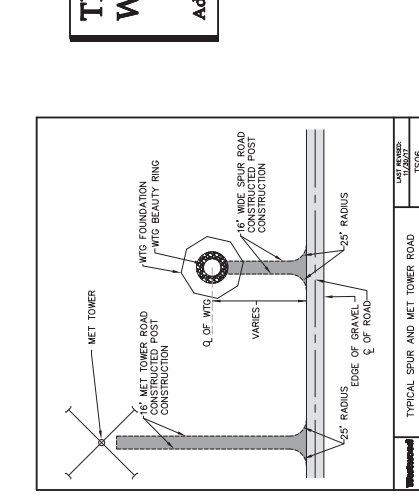
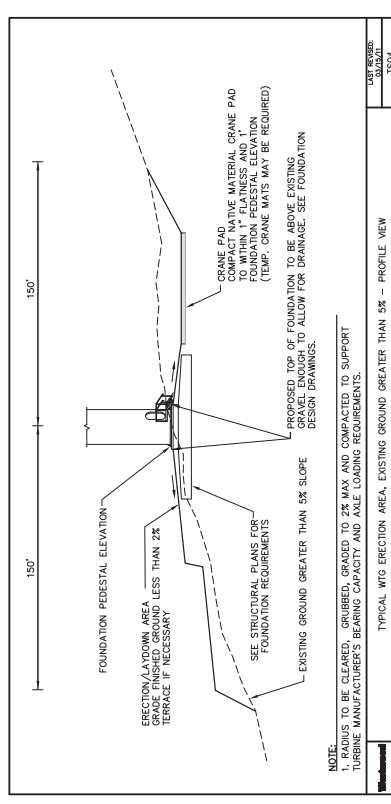
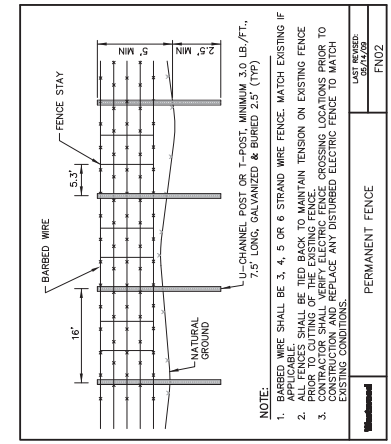
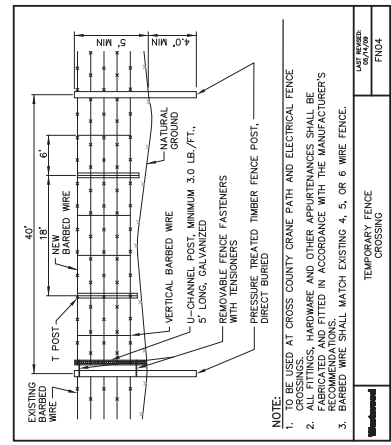
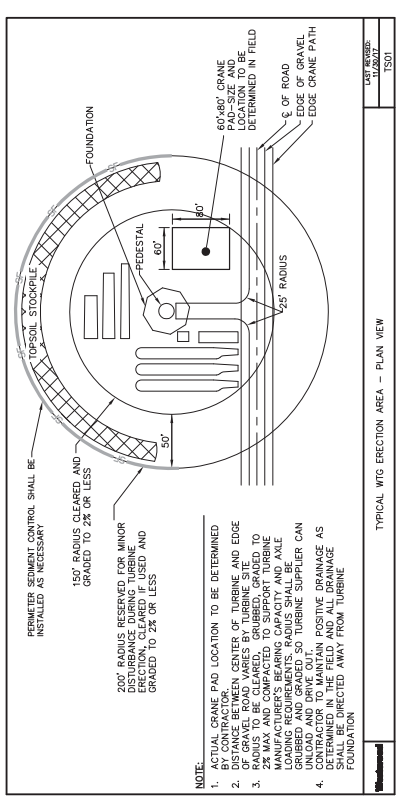
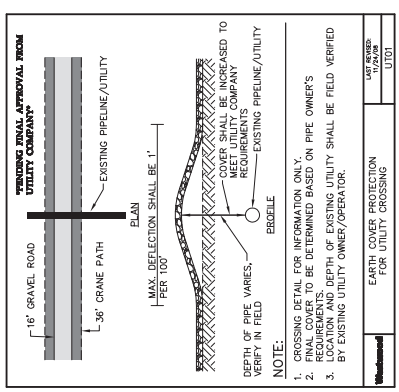
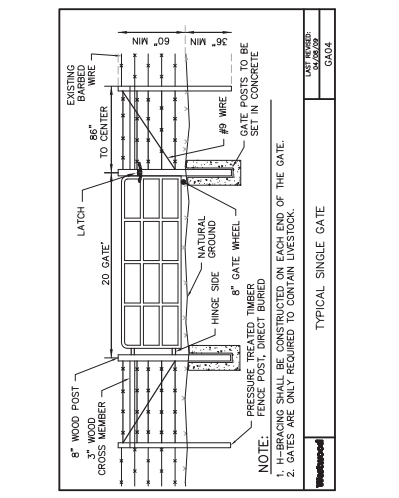
## Adams County, North Dakota

Construction Details

Issued for Construction

Date: 5/19/18  
 Sheet: 8 OF 23

1 2 3 4 5 6 7 8



**TURBINE COORDINATES**  
**GAAR/NORTH DAKOTA STATE PLANS - INTERNATIONAL ROOF**

Turbine Number	Eastings	Northing
T-44	1443791.1440	144040.9455
T-45	1446059.1420	141473.3690
T-46	1448253.1120	141714.5860
T-47	1449229.7290	142426.6420
T-48	1449681.4362	144043.3827
T-49	1454477.0661	146065.0199
T-50	1455966.8858	146027.7015
T-51	1457089.6357	146889.2116
T-52	1457877.3722	147964.5190
T-53	1454452.3398	149368.0102
T-54	1455398.5180	150705.6786
T-55	1452866.6061	151178.0587
T-56	1451302.1193	151406.4583
T-57	1449656.9591	152153.7221
T-58	1448521.3630	151964.1322
T-59	1447357.8235	151764.5478

**CULVERT AND LOW WATER CROSSING SCHEDULE**

Crossing Number	Proposed Type	Proposed 10-year Sizing	Plan Sheet	Access Road	Station	25-year LWC Design	
						Type	Length (ft) Depth (ft)
1	CMP or HDPE	3 - 42"	11	Road 54	9+50	Flexamat	450 2.76
2	CMP or HDPE	3 - 18"	11	Road 54	23+00	Flexamat	50 1.28
3	CMP or HDPE	2 - 30"	11	Road 54	46+40	Flexamat	300 2.89
4	CMP or HDPE	2 - 18"	13	Road 52	92+90	Flexamat	50 0.25
5	CMP or HDPE	3 - 18"	13	Road 52	103+70	Flexamat	50 1.02
6	CMP or HDPE	2 - 18"	13	Road 52	110+60	Flexamat	50 0.85
7	CMP or HDPE	3 - 18"	13	Road 52	113+70	Flexamat	50 0.91
8	CMP or HDPE	2 - 18"	14	Road 52	124+30	Flexamat	50 0.99
9	CMP or HDPE	2 - 30"	17	Road 48	6+10	Flexamat	50 0.65
10	CMP or HDPE	3 - 30"	17	Road 48	12+55	Flexamat	50 1.54
11	CMP or HDPE	2 - 18"	17	Road 48	17+90	Flexamat	50 0.43
12	CMP or HDPE	1 - 18"	17	Road 48	33+60	Flexamat	50 0.5
13	CMP or HDPE	3 - 18"	17	Road 48	47+40	Flexamat	50 0.72

**PUBLIC ROAD ENTRANCE CULVERTS SCHEDULE**

Type	Size	Plan Sheet	Public/Access Road Intersection	Notes
CMP or HDPE	3 - 24"	16	5th St. NE/Road 44	Culvert design to be verified with Adams County



Designed: JPC  
 Drawn: JPC  
 Checked: JPC  
 Allocated Drawings:  
 0 05/17/18 IFC CIVIL PLANS  
 1 05/18/18 DRAINAGE CROSSING REVISIONS



**Thunder Spirit II**  
**Wind Project**  
 Adams County, North Dakota

Construction Details

Issued for Construction

Date: 5/19/18  
 Sheet: 9 OF 25







Designed:	JPC
Checked:	JPC
DRAWN:	BCZ
Alcibiades Drainage	
0 05/17/18 IFC CIVIL PLANS	
1 05/18/18 DRAINAGE CROSSING REVISIONS	
Prepared for:	



1100 1st Ave. NE  
 Grand Forks, ND 58201  
 701.775.2000



# Thunder Spirit II Wind Project

Adams County, North Dakota

Site Plan T-54 T-55  
T-56

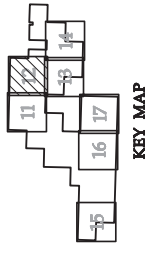
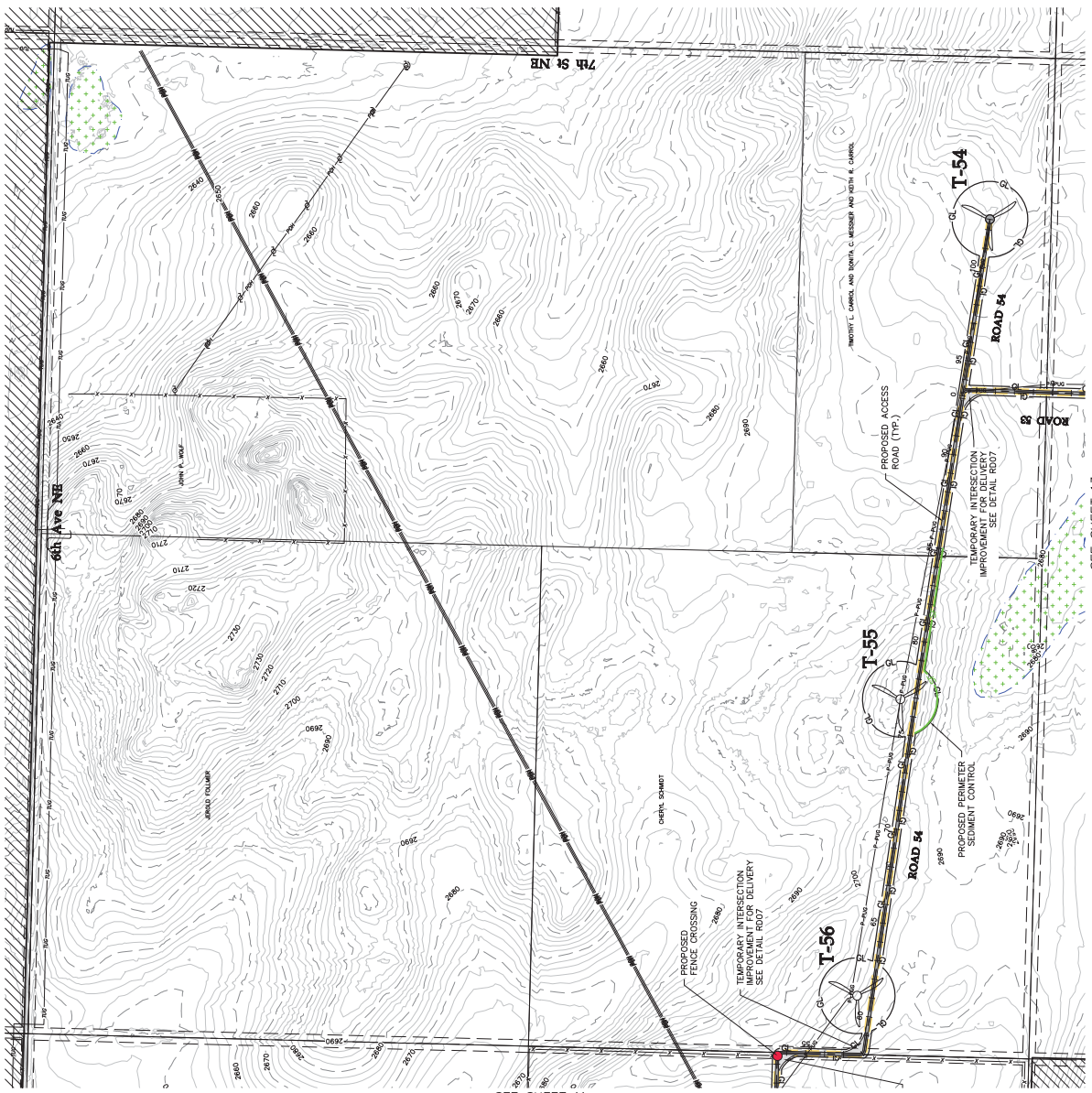
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Date: 5/19/18  
 Sheet: 12 OF 23

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- LEGEND:**
- PROPOSED TURBINE LOCATION
  - T-XX**
  - PROPOSED TURBINE NUMBER
  - PROPOSED ACCESS ROAD
  - 2016 PTC ACCESS ROAD
  - PROPOSED CRANE PATH
  - PROPOSED DISTURBANCE LIMITS
  - PROPOSED PERIMETER SEDIMENT CONTROL
  - PROPOSED DRAINAGE DITCH
  - PROPOSED UNDERGROUND COLLECTION\*
  - EXISTING OVERHEAD POWER
  - EXISTING WATER LINE
  - EXISTING TELEPHONE UNDERGROUND
  - EXISTING FENCE
  - EXISTING 10' CONTOURS
  - EXISTING 2' CONTOURS
  - EXISTING SECTION LINES
  - EXISTING PARCEL LINES
  - EXISTING ROW
  - EXISTING WETLAND
  - EXISTING WATERWAY - NHD
  - EXISTING ARCHAEOLOGICAL SITE
  - PROJECT BOUNDARY
  - PROPOSED CULVERT
  - PROPOSED DRAINAGE CROSSING\*\*
  - PROPOSED TEMPORARY DRAINAGE CROSSING\*\*
  - PROPOSED FENCE CROSSING
  - PROPOSED UTILITY CROSSING
  - UNDERGROUND COLLECTION LINES ARE SHOWN FOR INFORMATION ONLY. CONSULTANT PLANS FOR CONSTRUCTION DETAILS.
  - ANTICIPATED DRAINAGE CROSSINGS ARE SHOWN ON THE CONSTRUCTION PLANS BASED LARGELY ON OBSERVATION OF DRAINAGE CHANNELS/DRAINAGE EROSION FROM THE AERIAL EXISTING CONTOUR DATA AVAILABLE. ADDITIONAL CROSSINGS WILL BE IDENTIFIED AND MARKED WITH STAKES INSTALLED IN AREAS WHERE CONCENTRATED FLOW IS EXPECTED DUE TO CONSTRUCTION ACTIVITIES.

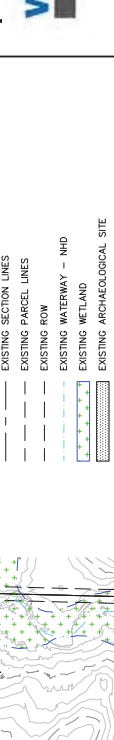


SEE SHEET 11

SEE SHEET 13



Design:	T-53
Checked:	T-53
Drawn:	T-53
Alphabet:	Drainage
Project No.:	180300000
Revision:	0 05/17/18 IFC CIVIL PLANS
	1 05/18/18 DRAINAGE CROSSING REVISIONS
Prepared for:	



180300000  
 180300000  
 180300000



# Thunder Spirit II Wind Project

Adams County, North Dakota

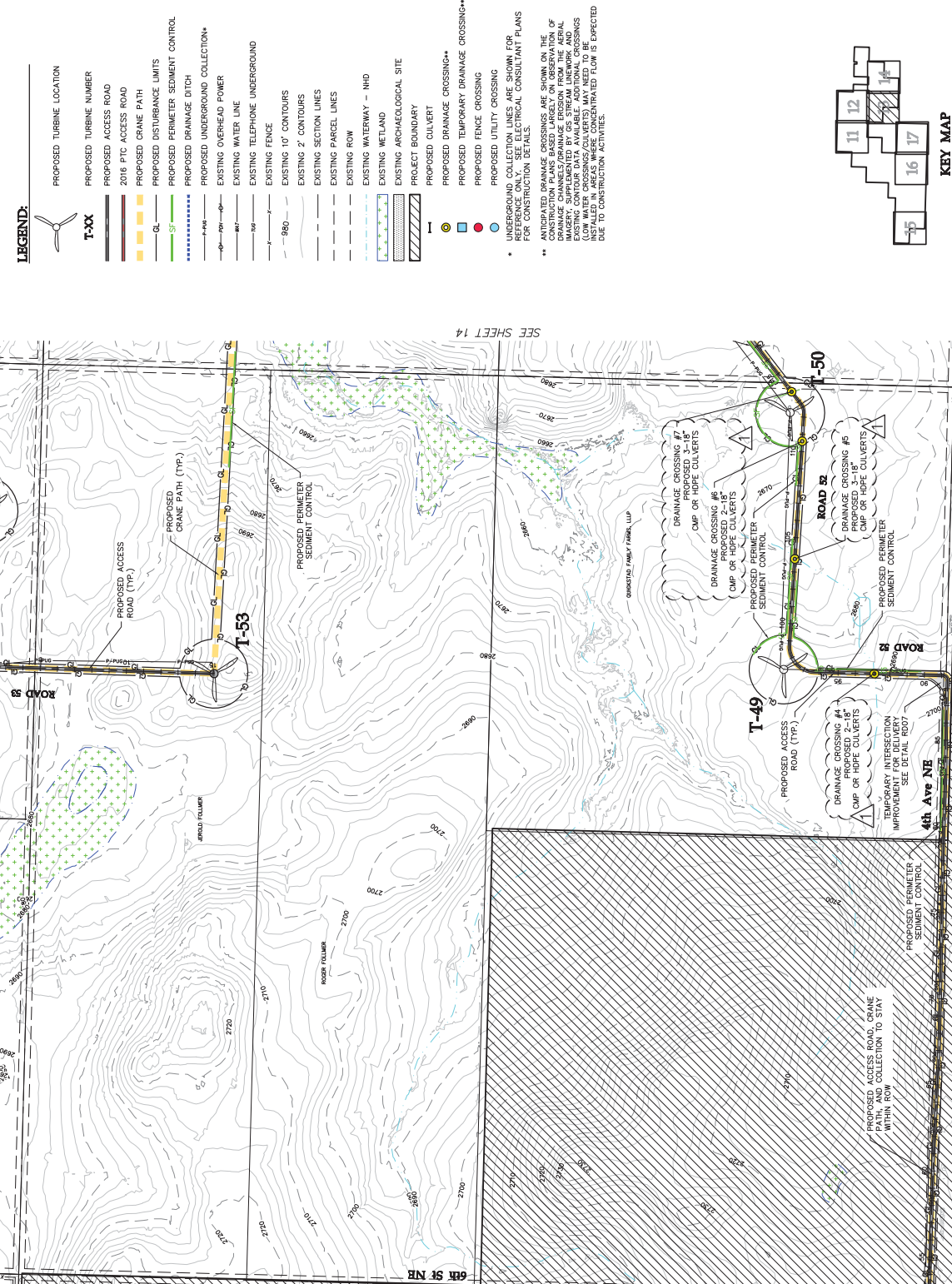
Site Plan T-49 T-50  
 T-53

Issued for Construction

Date: 5/19/18  
 Sheet: 13 OF 23

**LEGEND:**

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<b>T-XX</b>	PROPOSED TURBINE NUMBER
	PROPOSED ACCESS ROAD
	2016 PTC ACCESS ROAD
	PROPOSED CRANE PATH
	PROPOSED DISTURBANCE LIMITS
	PROPOSED PERIMETER SEDIMENT CONTROL
	PROPOSED DRAINAGE DITCH
	PROPOSED UNDERGROUND COLLECTION*
	EXISTING OVERHEAD POWER
	EXISTING WATER LINE
	EXISTING TELEPHONE UNDERGROUND
	EXISTING FENCE
	EXISTING 10' CONTOURS
	EXISTING 2' CONTOURS
	EXISTING SECTION LINES
	EXISTING PARCEL LINES
	EXISTING ROW
	EXISTING WATERWAY - NHD
	EXISTING WETLAND
	EXISTING ARCHAEOLOGICAL SITE
	PROJECT BOUNDARY
	PROPOSED CULVERT
	PROPOSED DRAINAGE CROSSING**
	PROPOSED TEMPORARY DRAINAGE CROSSING**
	PROPOSED FENCE CROSSING
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SEE SHEET 12  
 SEE SHEET 14  
 SEE SHEET 17



Drawn:	TPP
Checked:	TPP
Designed:	TPP
Client:	Wanzek
Project:	Thunder Spirit II
Scale:	AS SHOWN
Revision:	0 05/17/18 IFC CIVIL PLANS
Revision:	1 05/18/18 DRAINAGE CROSSING REVISIONS



1118 1st Ave NE  
 Grand Forks, ND 58201  
 Phone: 701.781.2000  
 Fax: 701.781.2001



# Thunder Spirit II Wind Project

Adams County, North Dakota

Site Plan T-51 T-52

Issued for Construction

Date: 5/19/18  
 Sheet: 14 OF 23

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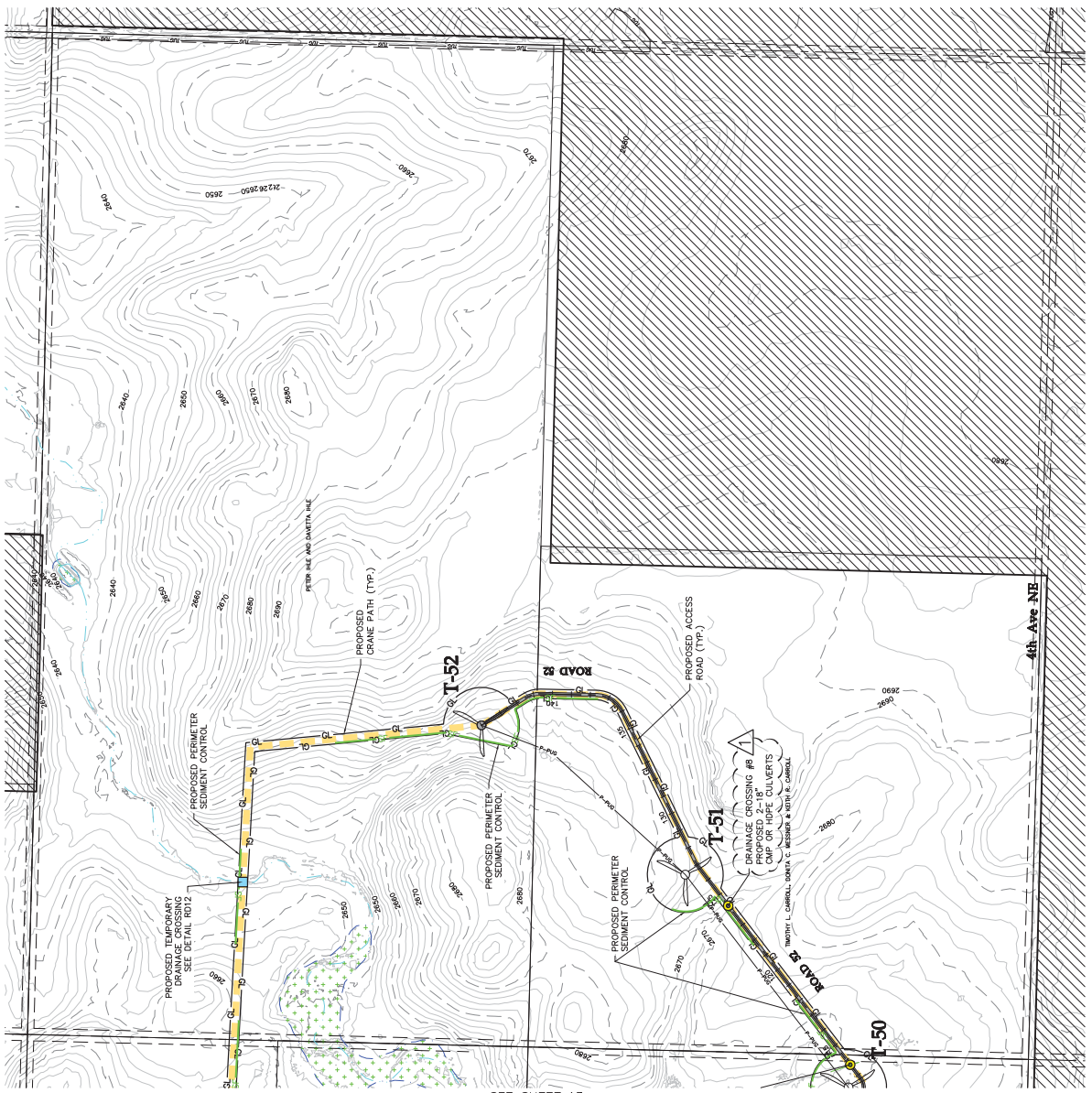
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  - 2016 PTC ACCESS ROAD
  - PROPOSED CRANE PATH
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KEY MAP



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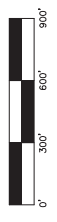
SEE SHEET 13



Designed:	JAW
Checked:	JAW
Drafted:	JAW
Alphabet:	None
Scale:	As Shown
Project No.:	18-0000000
Date:	05/17/18 IFC CIVIL PLANS
Revision:	1 05/18/18 DRAINAGE CROSSING REVISIONS



1800 2nd Ave NW  
 Grand Rapids, MN 55743



# Thunder Spirit II Wind Project

Adams County, North Dakota

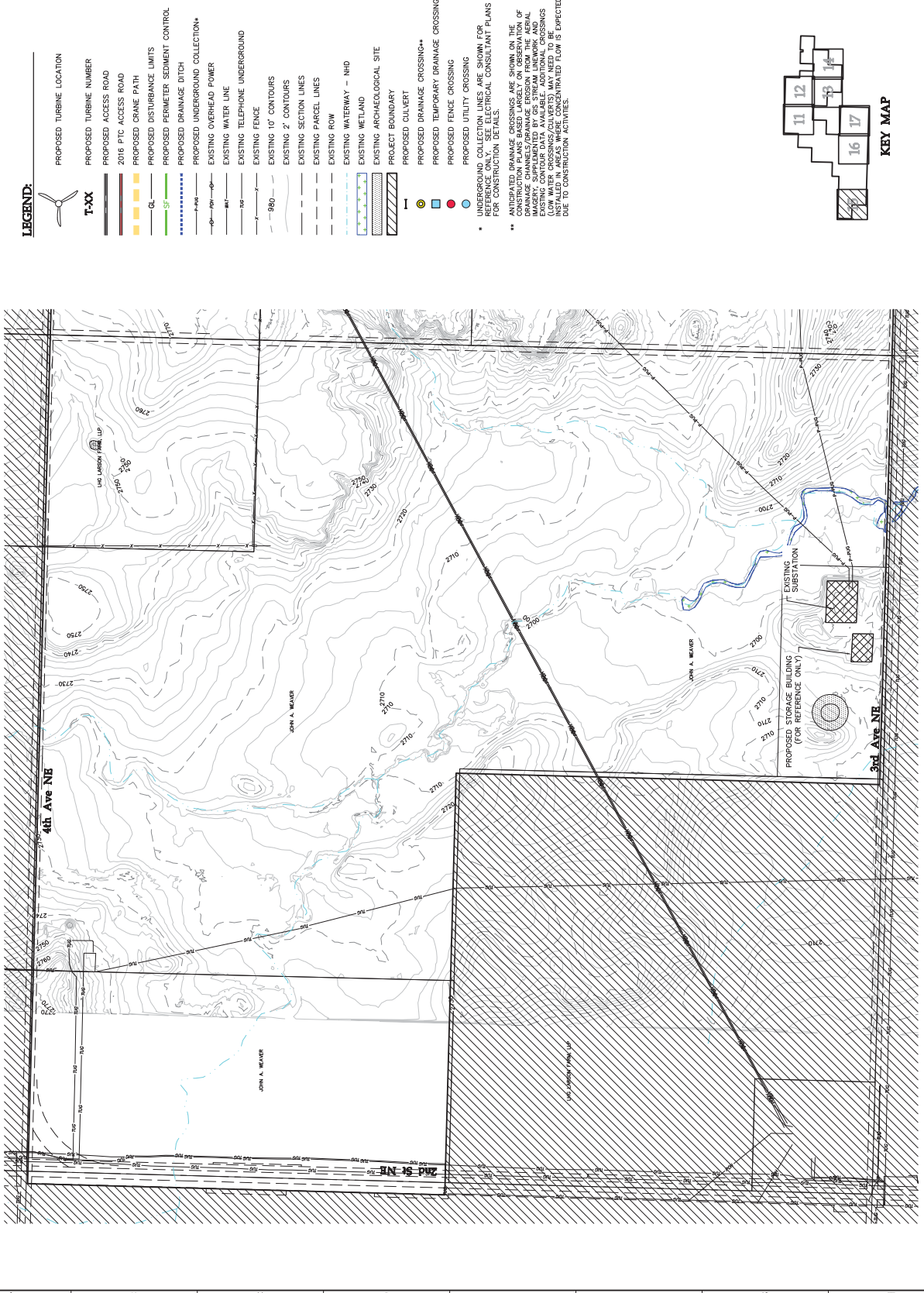
Site Plan

Issued for Construction

Date: 5/19/18  
 Sheet: 15 OF 23

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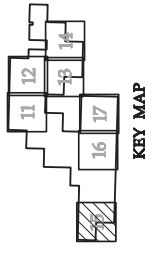


**LEGEND:**

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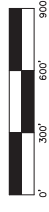




Designed:	JAC
Checked:	JAC
Drawn:	JAC
As-built:	None
Approval:	None
Project No.:	1000000000
Date:	05/17/18 IFC CIVIL PLANS
Revision:	1 05/18/18 DRAINAGE CROSSING REVISIONS



17201 Milwaukee Drive, Suite #500  
 802.937.5150  
 888.937.5150



# Thunder Spirit II Wind Project

Adams County, North Dakota

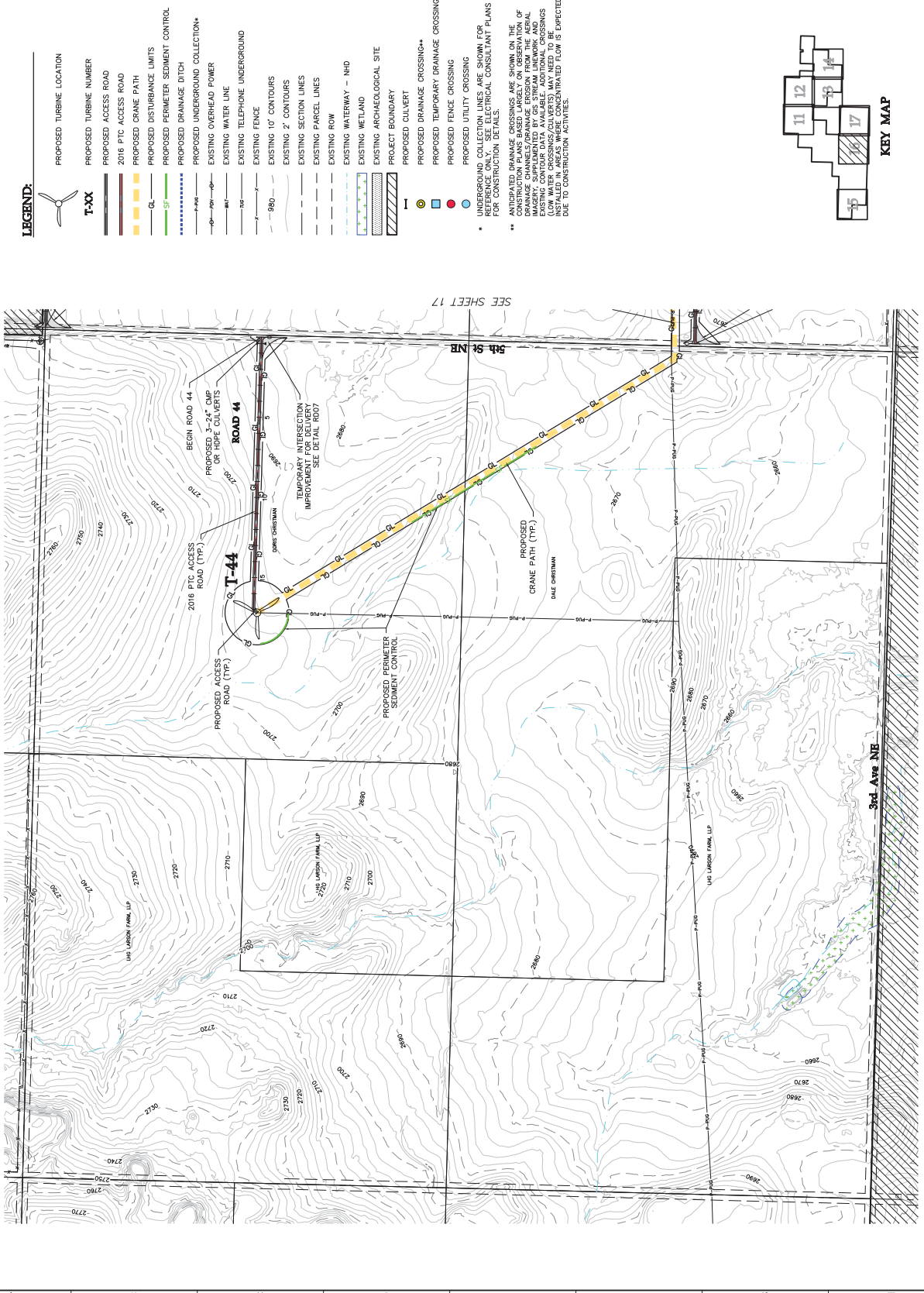
Site Plan T-44

Issued for Construction

Date: 5/19/18  
 Sheet: 16 OF 23

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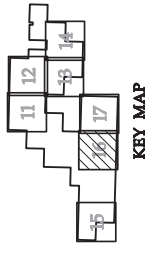


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- PROPOSED UTILITY CROSSING

\* UNDERGROUND COLLECTION LINES ARE SHOWN FOR INFORMATION ONLY. CRITICAL CONSULTANT PLANS FOR CONSTRUCTION DETAILS.

\*\* ANTICIPATED DRAINAGE CROSSINGS ARE SHOWN ON THE CONSTRUCTION PLANS BASED LARGELY ON OBSERVATION OF DRAINAGE CHANNELS/DRAINAGE EROSION FROM THE AERIAL EXISTING CONTOUR DATA AVAILABLE. ADDITIONAL CROSSINGS WILL BE IDENTIFIED AND CONSTRUCTION DETAILS INSTALLED IN AREAS WHERE CONCENTRATED FLOW IS EXPECTED DUE TO CONSTRUCTION ACTIVITIES.



KEY MAP

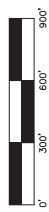
SEE SHEET 17



Designed:	TJP
Checked:	TJP
Drawn:	BJC
Alphabet:	Drainage
Project No.:	160400000
Date:	05/17/18 IFC CIVIL PLANS
Revision:	1 05/18/18 DRAINAGE CROSSING REVISIONS



1800 2nd Avenue, Suite 200  
 Fargo, ND 58103-1000  
 Phone: 701.785.2200  
 Fax: 701.785.2201



# Thunder Spirit II Wind Project

Adams County, North Dakota

Site Plan T-45 T-46 T-47  
T-48

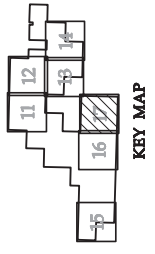
Issued for Construction

Date: 5/19/18  
 Sheet: 17 of 23

00046559.dwg

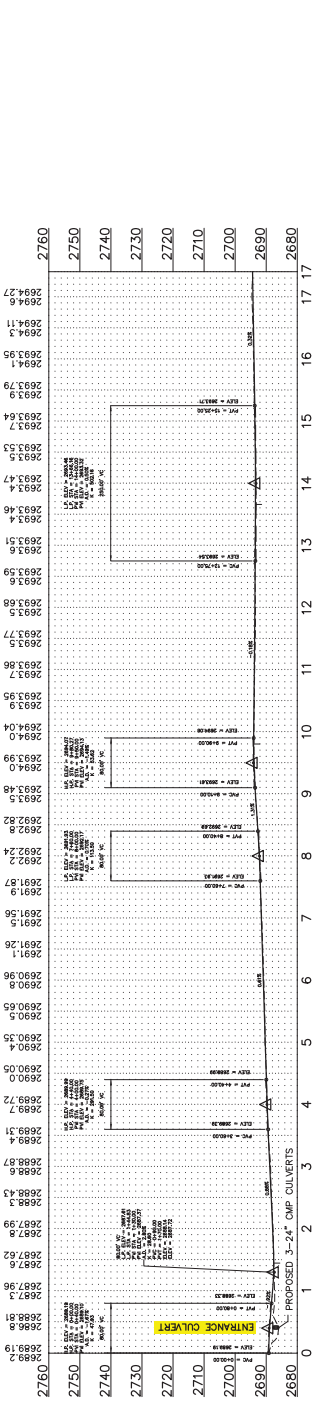
1 2 3 4 5 6 7 8

- LEGEND:**
- PROPOSED TURBINE LOCATION
  - T-XX PROPOSED TURBINE NUMBER
  - PROPOSED ACCESS ROAD
  - 2016 PTC ACCESS ROAD
  - PROPOSED CRANE PATH
  - PROPOSED DISTURBANCE LIMITS
  - PROPOSED PERIMETER SEDIMENT CONTROL
  - PROPOSED DRAINAGE DITCH
  - PROPOSED DRAINAGE COLLECTION\*
  - EXISTING UNDERGROUND POWER
  - EXISTING WATER LINE
  - EXISTING TELEPHONE UNDERGROUND
  - EXISTING 10' CONTOURS
  - EXISTING 2' CONTOURS
  - EXISTING SECTION LINES
  - EXISTING PARCEL LINES
  - EXISTING ROW
  - EXISTING WATERWAY - MHD
  - EXISTING WETLAND
  - EXISTING ARCHAEOLOGICAL SITE
  - PROJECT BOUNDARY
  - PROPOSED CULVERT
  - PROPOSED DRAINAGE CROSSING\*\*
  - PROPOSED TEMPORARY DRAINAGE CROSSING\*\*
  - PROPOSED FENCE CROSSING
  - PROPOSED UTILITY CROSSING
  - UNDERGROUND COLLECTION LINES ARE SHOWN FOR INFORMATION ONLY. SEE ELECTRICAL PLANS FOR CONSTRUCTION DETAILS.
  - \* ANTICIPATED DRAINAGE CROSSINGS ARE SHOWN ON THE DRAINAGE CHANNELS/DRAINAGE EROSION FROM THE AERIAL EXISTING CONTOUR DATA AVAILABLE. ADDITIONAL CROSSINGS WILL BE INSTALLED IN AREAS WHERE CONCENTRATED FLOW IS EXPECTED DUE TO CONSTRUCTION ACTIVITIES.

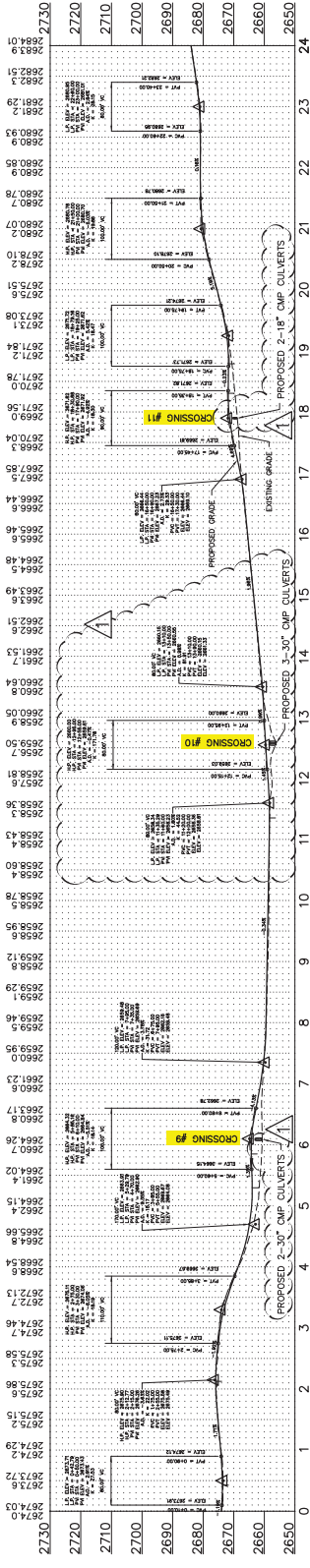


SEE SHEET 13

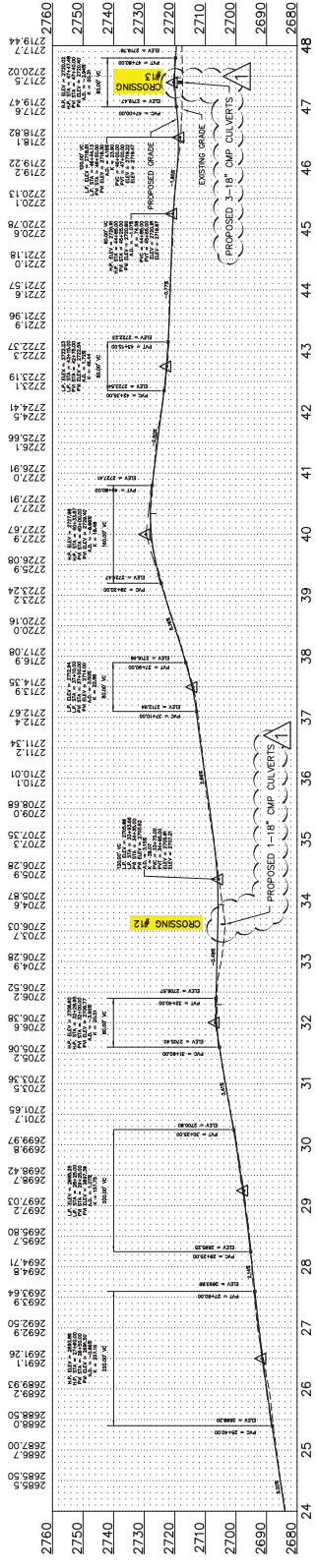
**Road 44 Sta. 0+00 - End**



**Road 48 Sta. 0+00 - 24+00**



**Road 48 Sta. 24+00 - 48+00**



**Thunder Spirit II  
 Wind Project**

Adams County, North Dakota

Profiles - Roads 44, 48

Issued for Construction

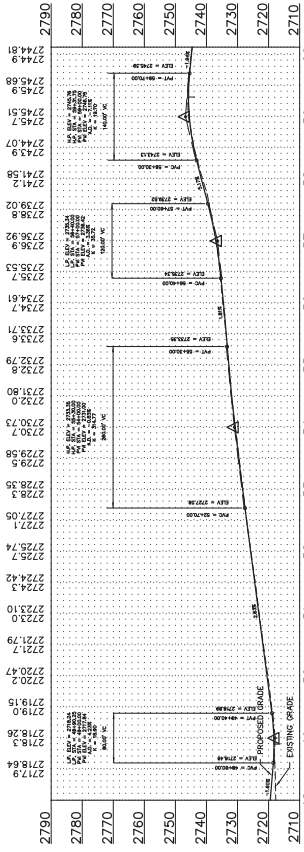
Date: 5/19/18  
 Sheet: 18 OF 23

Design:	18P
Checked:	18P
Drawn:	80C
As-built Drawing:	
Project No.:	180000000
Scale:	AS SHOWN
Date:	05/17/18
By:	JFC
Check:	JFC
Appr.:	JFC
Disc.:	JFC
Proj. No.:	180000000
Proj. Name:	THUNDER SPIRIT II WIND PROJECT
Proj. Location:	ADAMS COUNTY, NORTH DAKOTA
Proj. Description:	WIND TOWER FOUNDATION
Proj. Status:	ISSUED FOR CONSTRUCTION

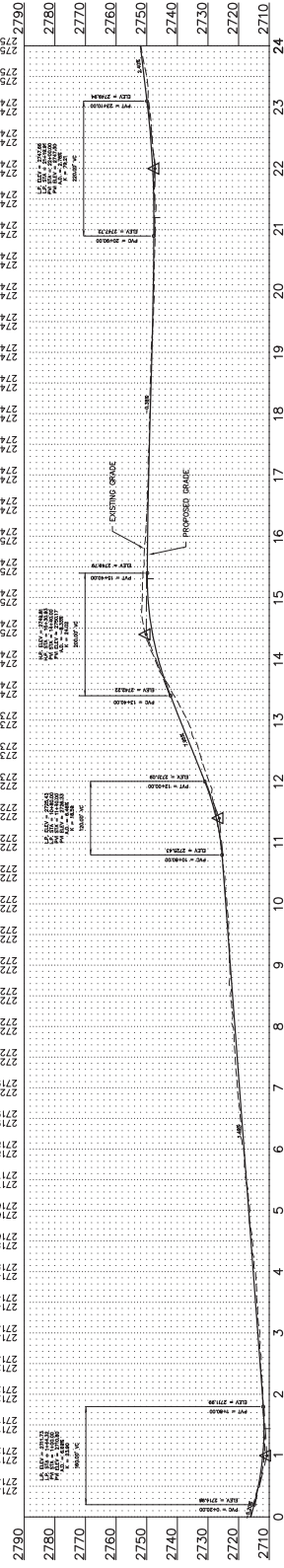


1800 488-3333  
 1800 488-3333

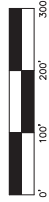
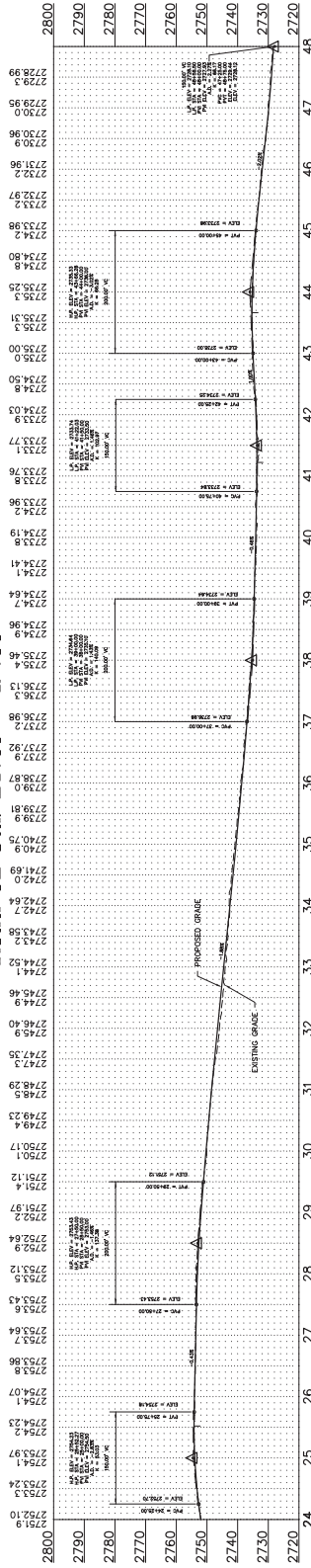
### Road 48 Sta. 48+00 - End



### Road 52 Sta. 0+00 - 24+00



### Road 52 Sta. 24+00 - 47+50



# Thunder Spirit II Wind Project

Adams County, North Dakota

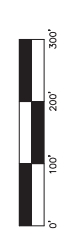
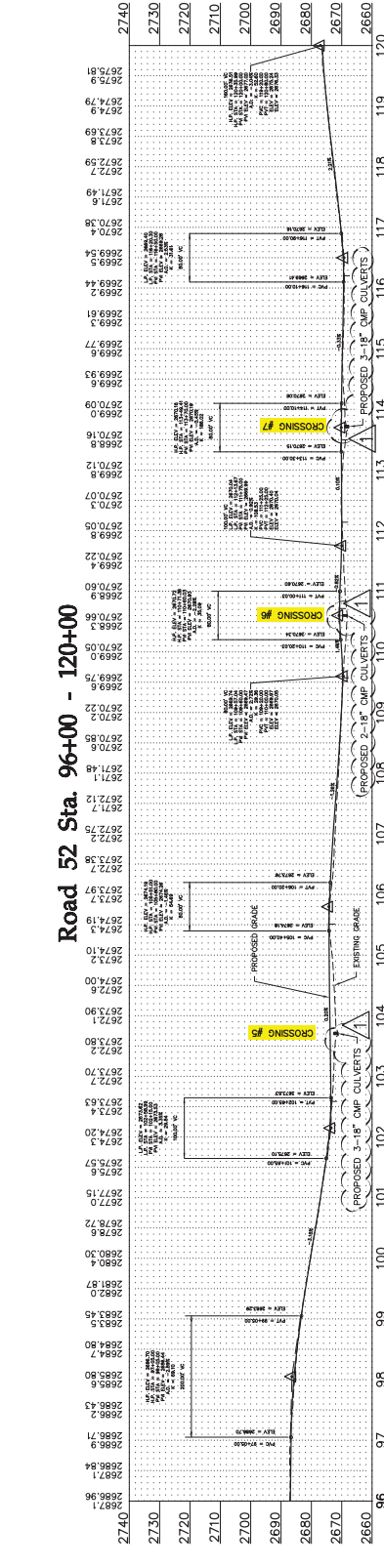
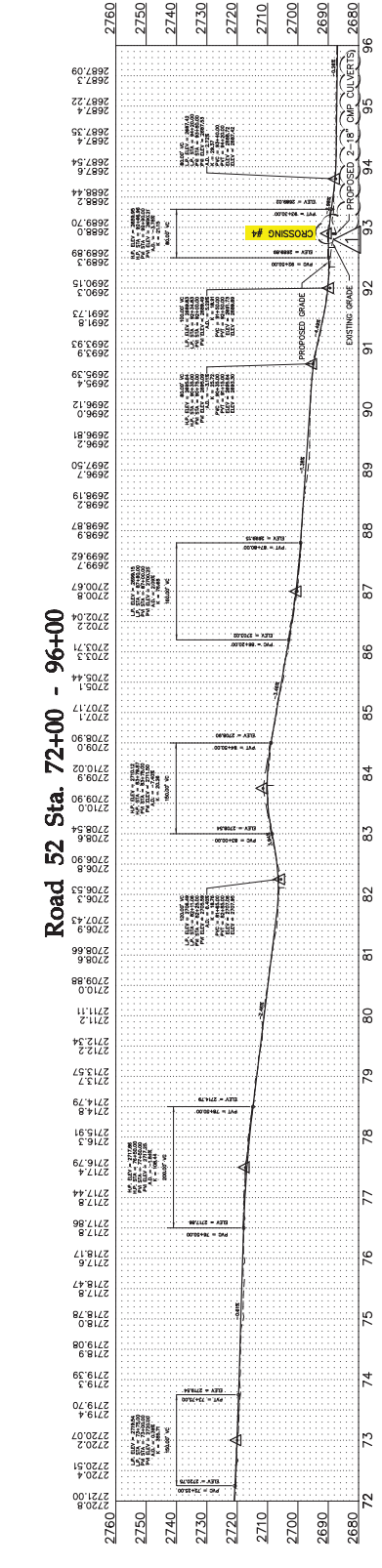
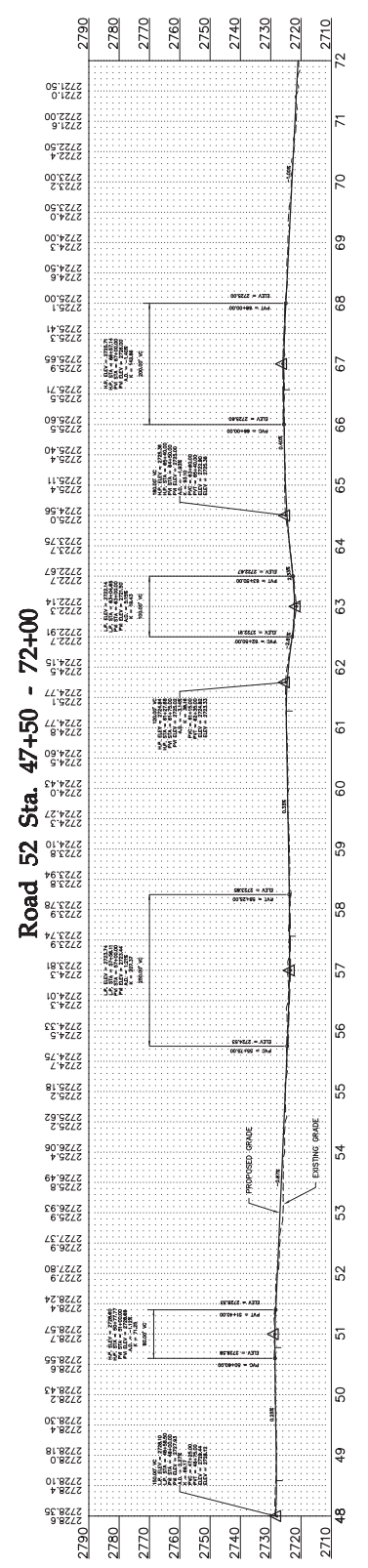
Profiles - Roads 48, 52

Issued for Construction

Date: 5/19/18  
Sheet: 19 OF 23

**Westwood**  
12101 Westwood Drive, Suite #100  
Westwood, North Dakota 58074  
Tel: 701.837.5150  
Fax: 701.837.5151  
www.westwoodinc.com





# Thunder Spirit II Wind Project

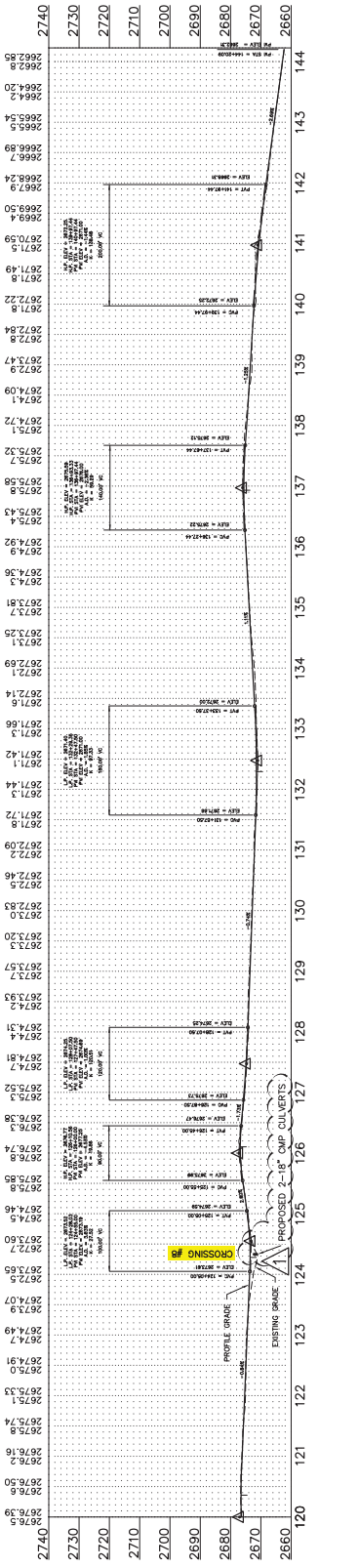
Adams County, North Dakota

Profiles - Road 52

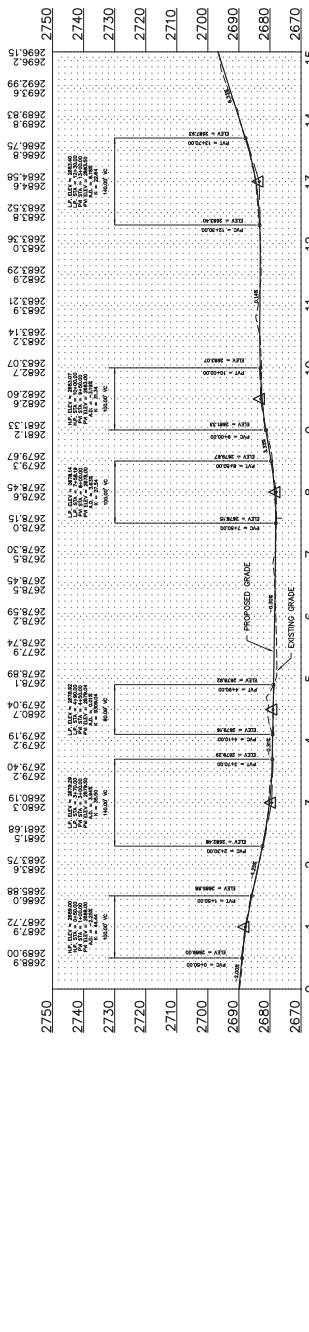
Issued for Construction

Date: 5/16/18  
 Sheet: 20 OF 23

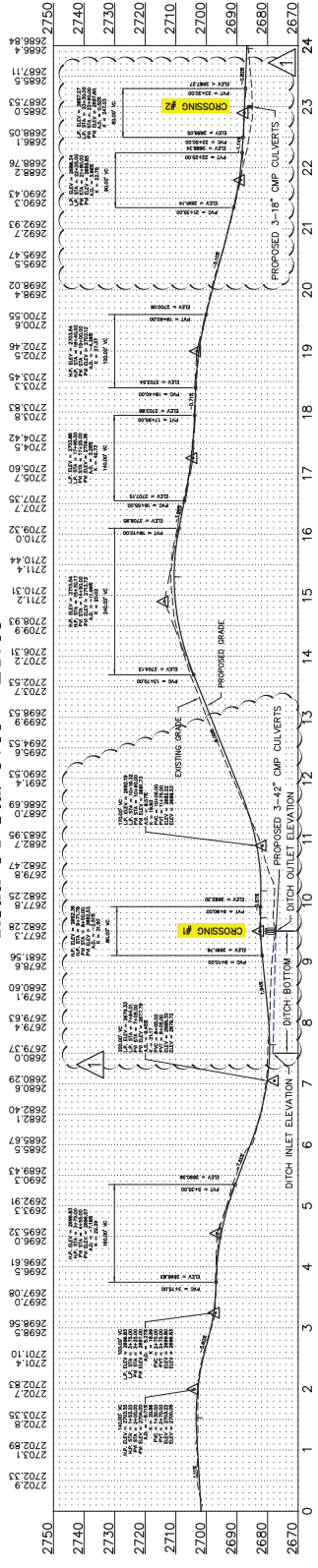
### Road 52 Sta. 120+00 - End



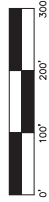
### Road 53 Sta. 0+00 - End



### Road 54 Sta. 0+00 - 24+00



Design:	10/17/18
Check:	10/17/18
Drawn:	10/17/18
As-built Drawing:	10/17/18
Project No.:	2025017-010
Client:	ADAMS COUNTY
Location:	ADAMS COUNTY, NORTH DAKOTA
Project Description:	IMPROVEMENTS TO ROAD 52, 53, AND 54
Scale:	AS SHOWN
Sheet No.:	54
Sheet Total:	21 OF 23



# Thunder Spirit II Wind Project

Adams County, North Dakota

Profiles - Roads 52, 53,  
54

Issued for Construction

Date: 5/19/18  
 Sheet: 21 OF 23



Design:	10/1/18	IFC CIVIL PLANS
Checked:	10/1/18	UNCORRECTED
Date:	10/1/18	IFC CIVIL PLANS
Project:	05/17/18	IFC CIVIL PLANS
Revision:	05/17/18	IFC CIVIL PLANS
Notes:	05/17/18	IFC CIVIL PLANS
Drawn:	05/17/18	IFC CIVIL PLANS
Checked:	05/17/18	IFC CIVIL PLANS
Date:	05/17/18	IFC CIVIL PLANS



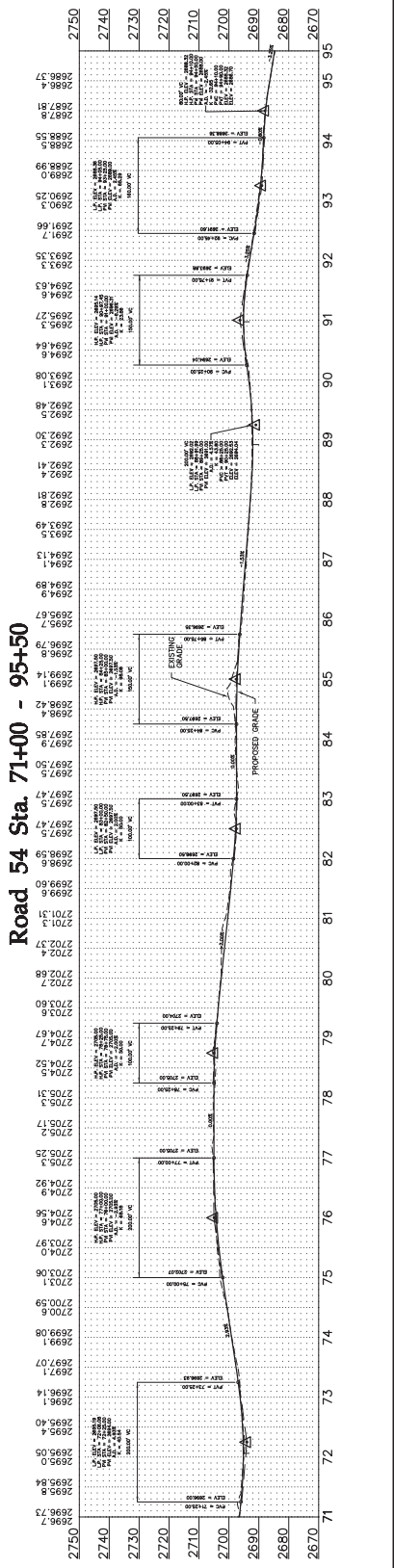
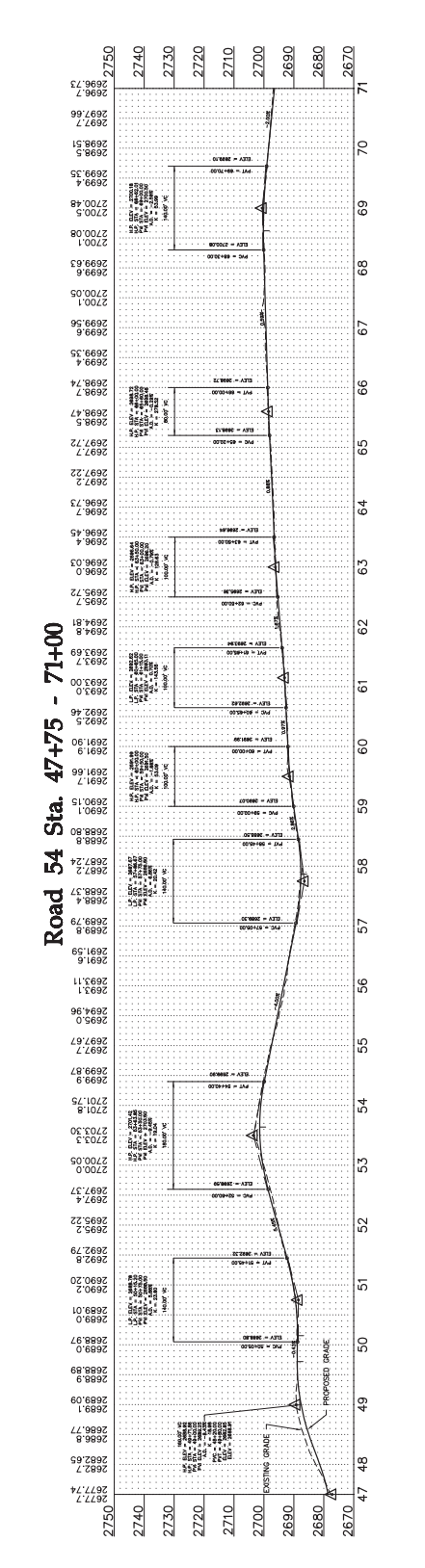
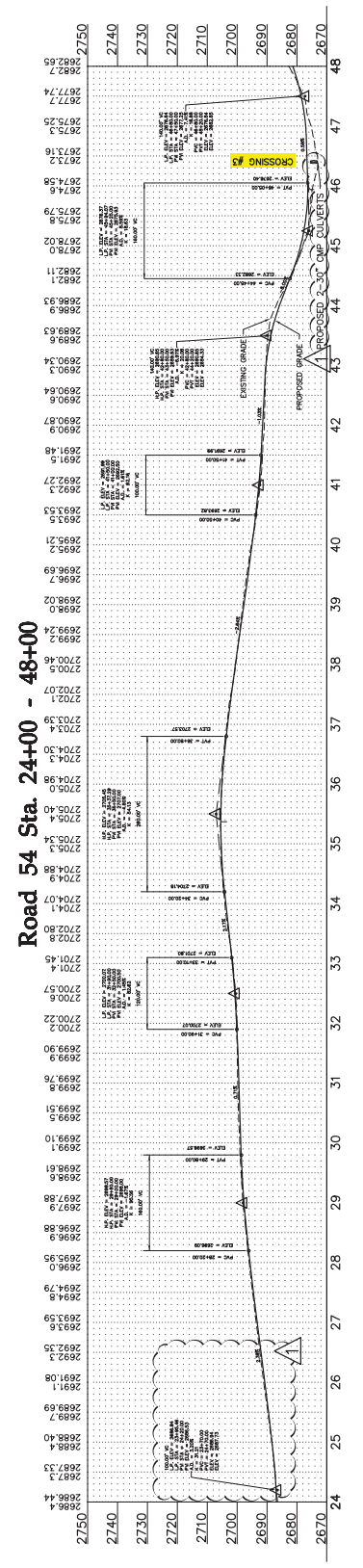
Scale: 1" = 100'  
 1" = 200'  
 1" = 300'

# Thunder Spirit II Wind Project

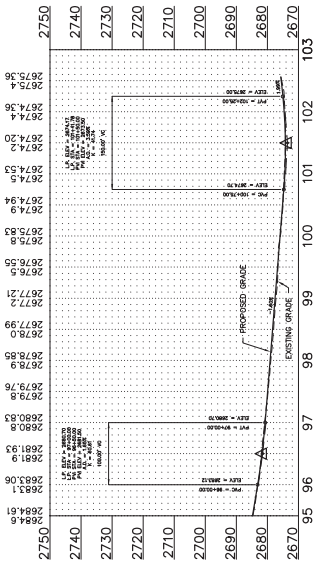
Adams County, North Dakota

Profiles - Road 54  
 Issued for Construction

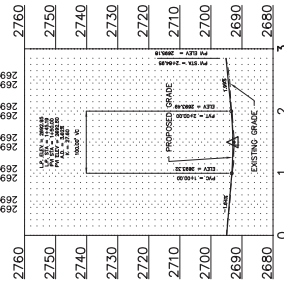
Date: 5/19/18  
 Sheet: 22 OF 23



**Road 54 Sta. 95+50 - End**



**Road 57 Sta. 0+00 - End**



Designed:	TPP
Checked:	TPP
Drawn:	BCR
Alphabet:	Design
Project No.:	180300001
Date:	05/17/18 IFC CIVIL PLANS
Revision:	1 05/18/18 DRAINAGE CROSSING REVISIONS



**Thunder Spirit II  
 Wind Project**  
 Adams County, North Dakota

Profiles - Roads 54, 57

Issued for Construction  
 Date: 5/19/18  
 Sheet: 23 OF 23