

LAKE REGION STATE COLLEGE 1.6 MW WIND TURBINE PROJECT

RAMSEY COUNTY, NORTH DAKOTA



Architecture Engineering Industrial
Wind Energy Interior Design Construction

TELE 701.775.3000 FAX 701.772.3605
3100 DeMers Avenue, Grand Forks ND 58201

Grand Forks ND Fargo ND Bismarck ND
Williston ND Minot ND Norwich VT
Bemidji MN Buenos Aires ARG

www.eapc.net

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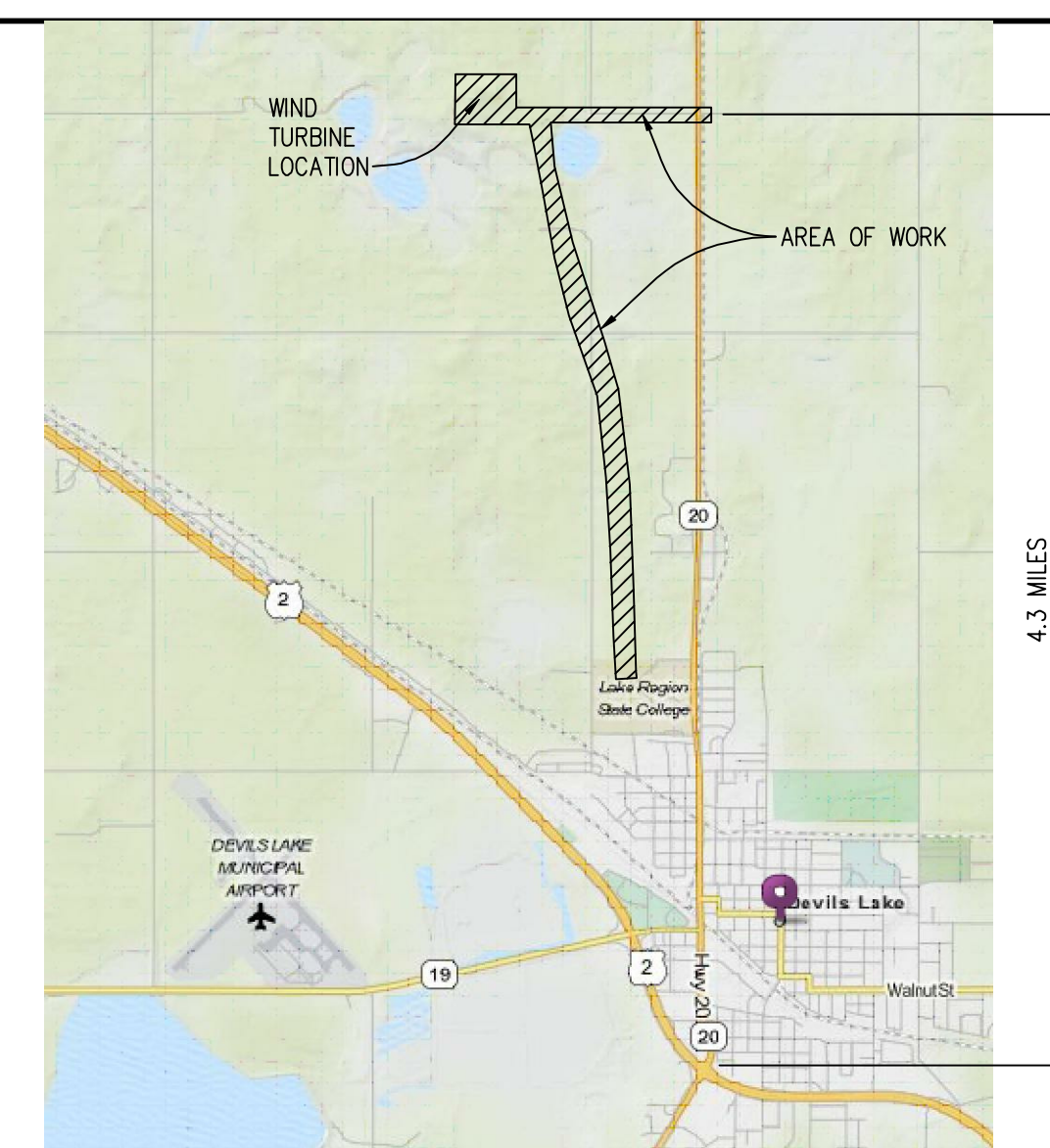
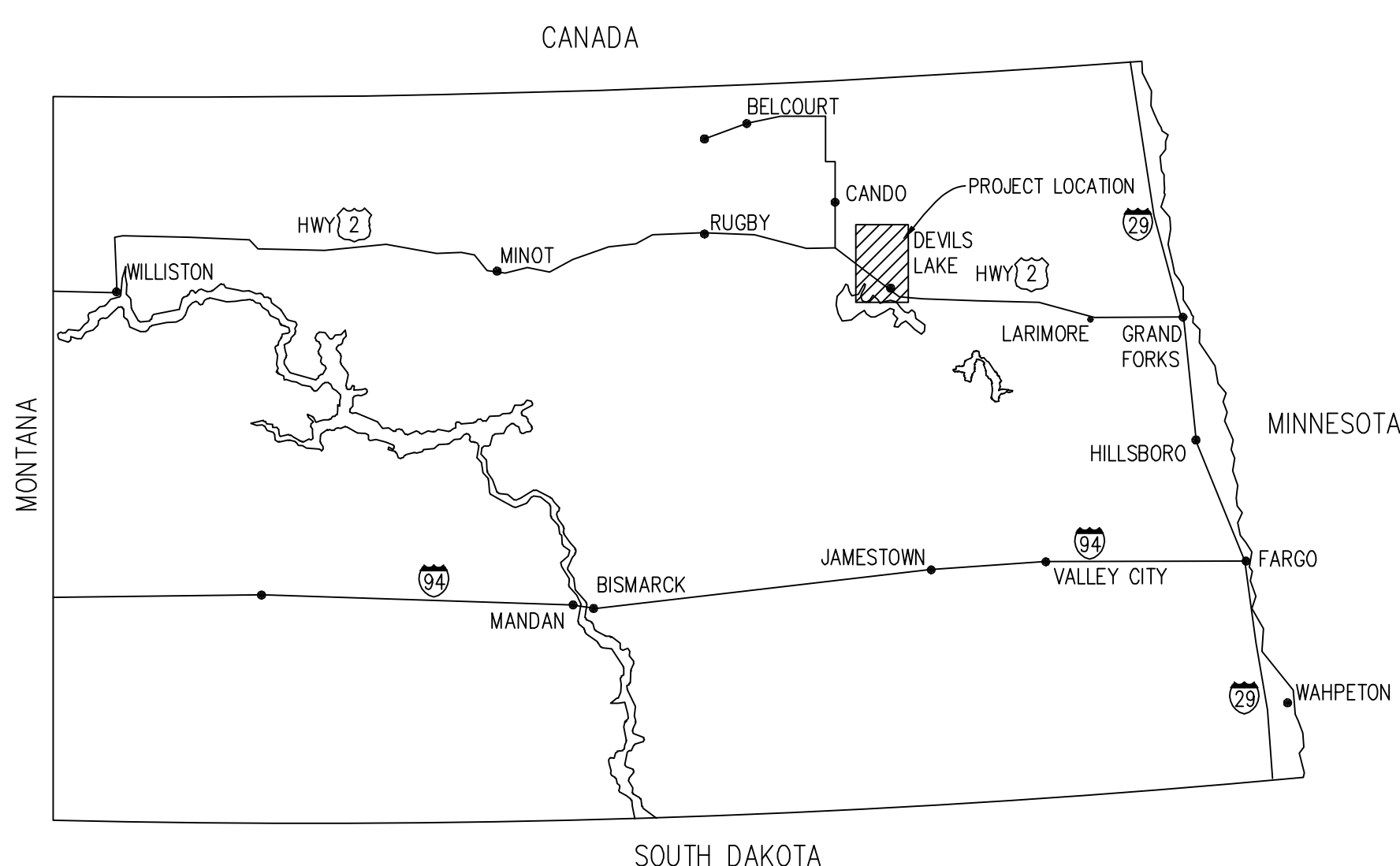
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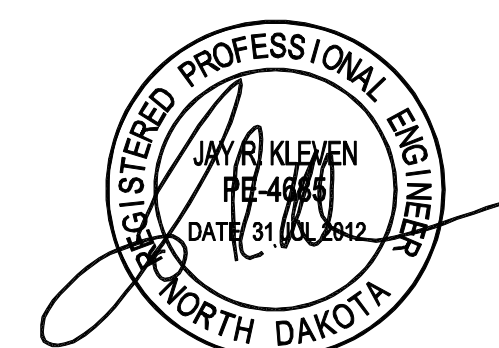
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STAMPS



CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

MARK	DESCRIPTION	DATE
△	ADDED FOUNDATION SHEETS	19 OCT 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

DRAWN BY: JCE

CHECKED BY: JRK

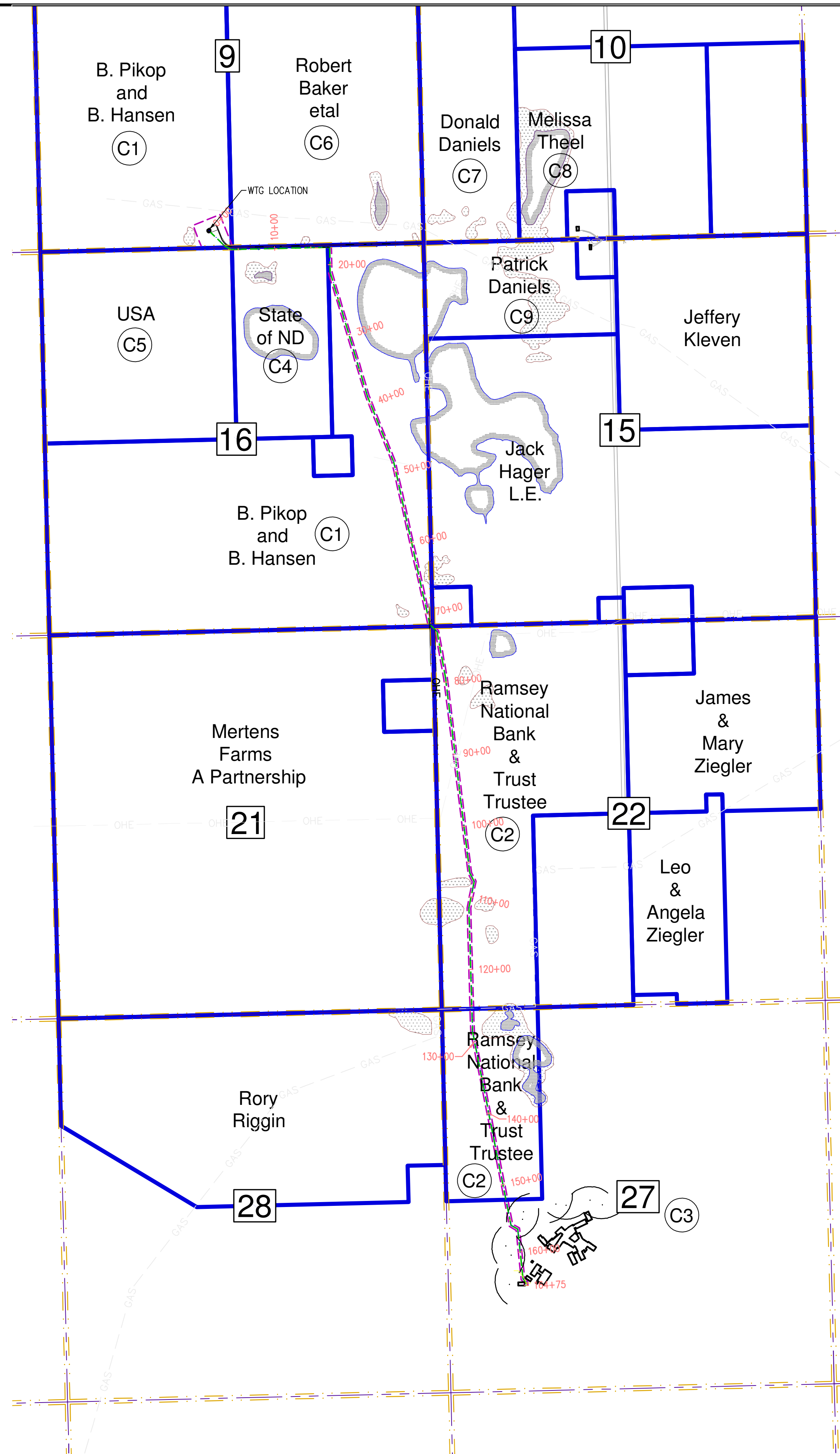
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DRAWING TITLE

COVER SHEET

G001

File Location: P:\2011\20112552 - Devils Lake LRS-C-ESS WTG File - Civil Drawings\20112552-C0-A.dwg
 Plot Date: 31-Jul-12



1 OVERALL PROPERTY PLAN - CLEAR
 CO-A 1" = 1000'-0"

T155N T154N	6	5	4	3	2	1
	7	8	9	10	11	12
	18	17	16	15	14	13
	19	20	21	22	23	24
	30	29	28	27	26	25
T154N T153N	31	32	33	34	35	36

T154N/R64W
 NORTH CREEL TOWNSHIP
 RAMSEY COUNTY
 STATE OF NORTH DAKOTA

LEGEND

- TURBINE
- 50' x 50' TURBINE SITE PROPERTY
- LANDOWNER BOUNDARY
- CONSTRUCTION ACCESS PROPERTY
- 20' ACCESS - RIGHT PROPERTY
- BURIED COLLECTION LINE
- SECTION LINE
- EXISTING UNDERGROUND ELECTRICAL
- EXISTING RURAL WATER LINE
- EXISTING UNDERGROUND FIBER OPTIC
- EXISTING UNDERGROUND TELEPHONE
- PERMANENT ACCESS - RIGHT PROPERTY
- JB1 = ELECTRICAL JUNCTION BOX
- 1000' SETBACK FROM HOMES

SECTION NUMBER

SHEET NUMBER



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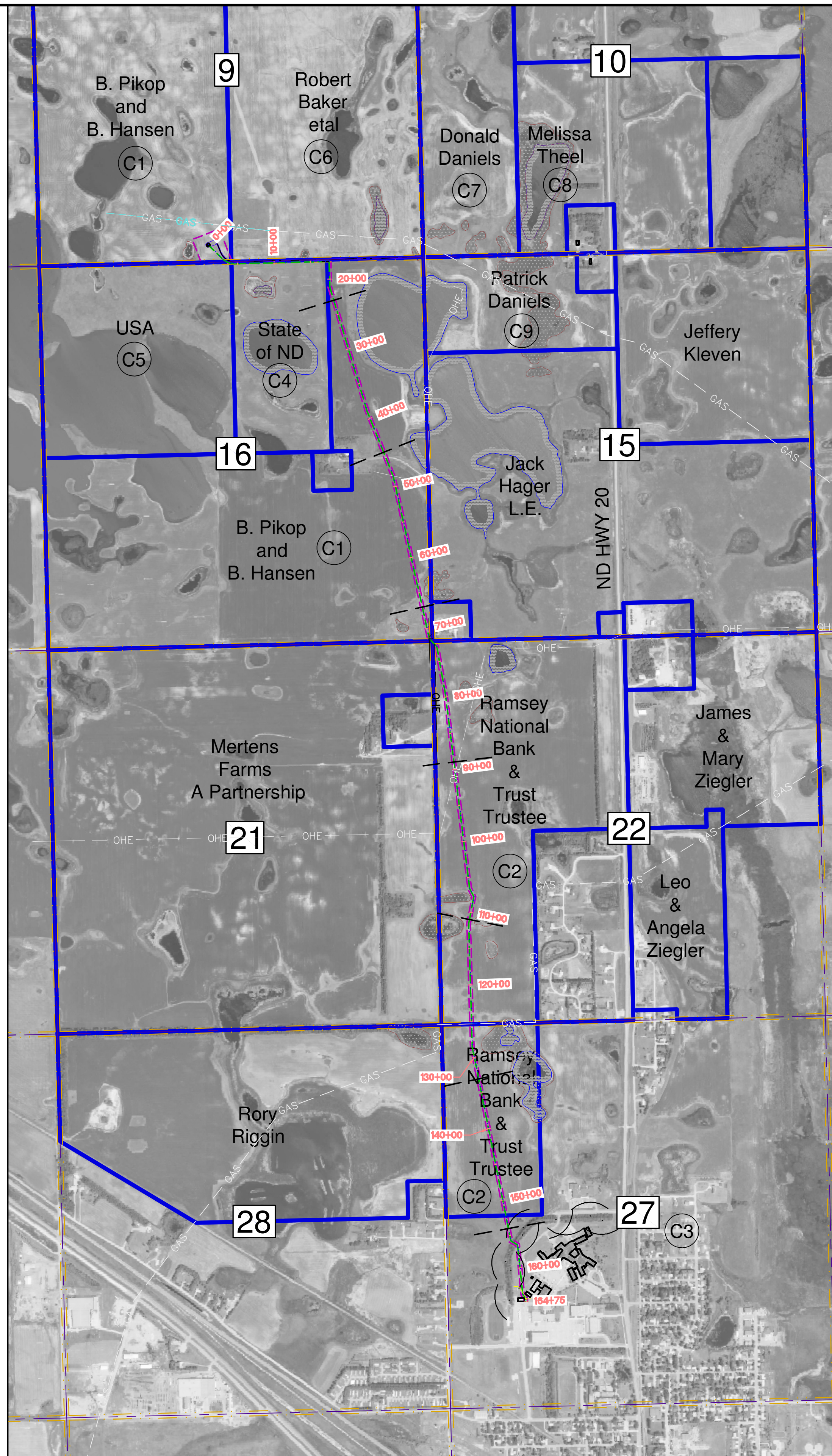
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DRAWING TITLE
OVERALL PROPERTY PLAN - CLEAR

C0-A

File Location: P:\2011\20112552 - DVL US LRSC-ESS WTG Fm - Civil Drawings\20112552-C0-C.dwg
 Plot Date: 31-Jul-12



1 OVERALL PROPERTY PLAN - AERIAL
 1" = 1000'-0"
 N
 0 1000' 2000'

T155N T154N	6	5	4	3	2	1
	7	8	9	10	11	12
	18	17	16	15	14	13
	19	20	21	22	23	24
	30	29	28	27	26	25
T154N T153N	31	32	33	34	35	36

R63W
R64W
R64W
R65W
 T154N/R64W
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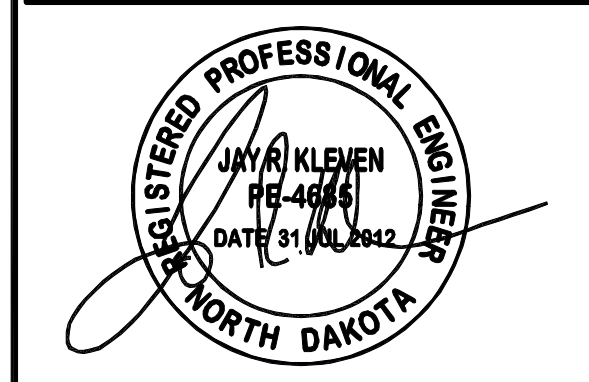
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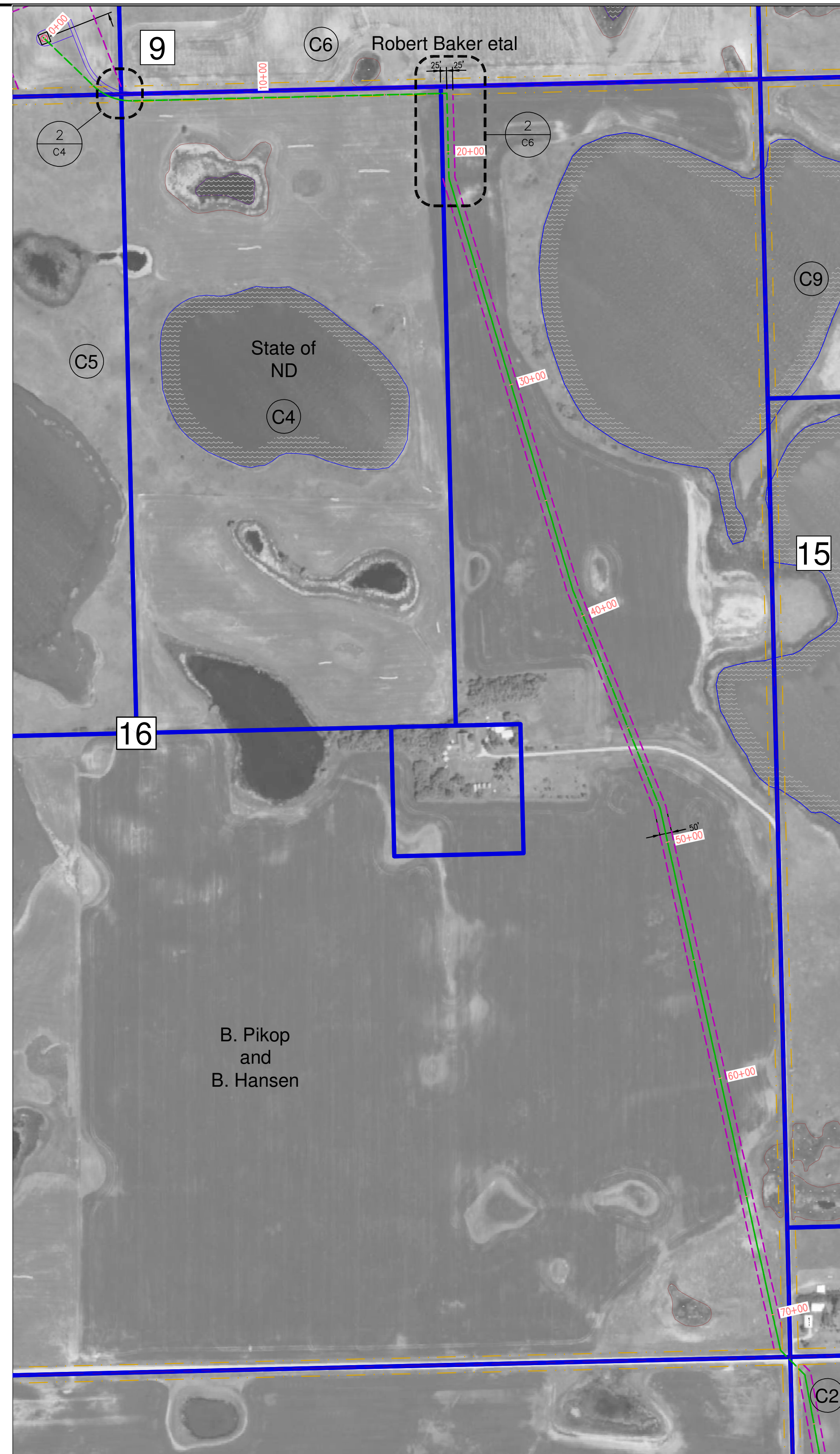
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OVERALL PROPERTY PLAN - AERIAL

C0-C

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 Plot Date: 31-Jul-12



2
C1
B. PIKOP AND B. HANSEN PROPERTY
1" = 300'



1
C1
B.PIKOP AND B. HANSEN PROPERTY
1" = 300'

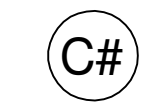
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SECTION NUMBER



SHEET NUMBER

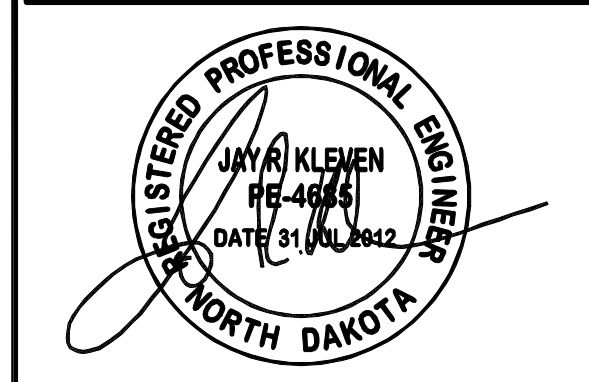


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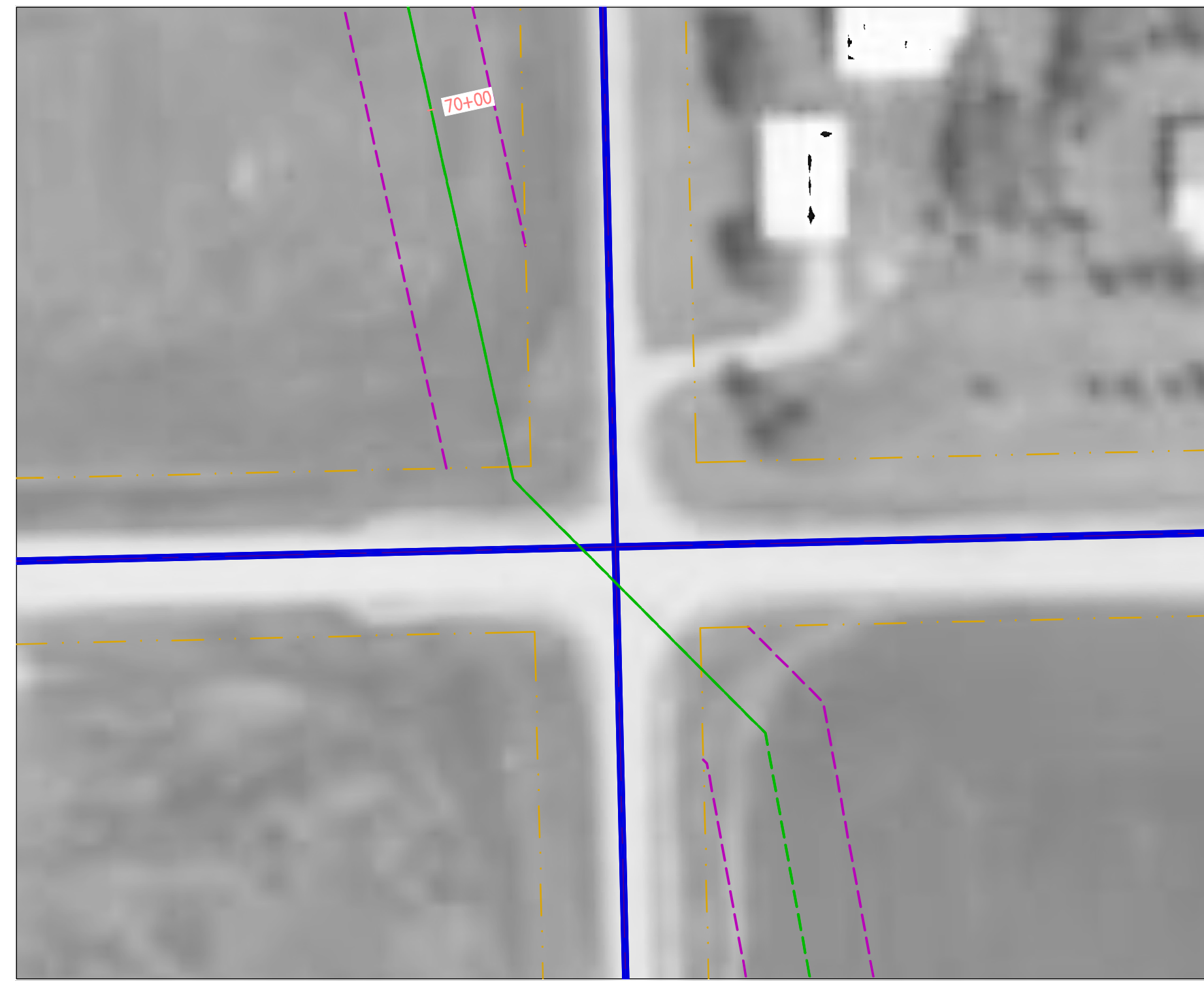
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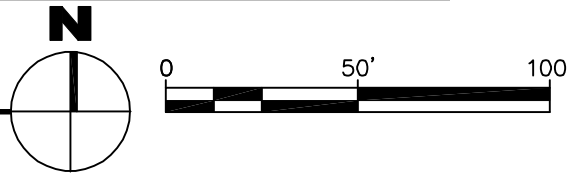
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B. PIKOP AND B. HANSEN PROPERTY - AERIAL

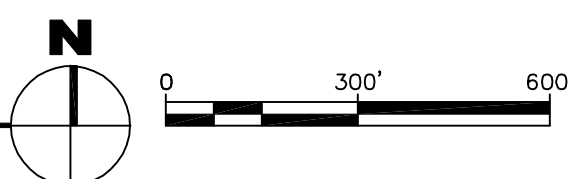
C1



2
C2
DETAIL AT CORNER
1" = 300'



3
C2
RAMSEY NATIONAL BANK & TRUST TRUSTEE PROPERTY
1" = 300'



1
C2
RAMSEY NATIONAL BANK & TRUST TRUSTEE PROPERTY
1" = 300'



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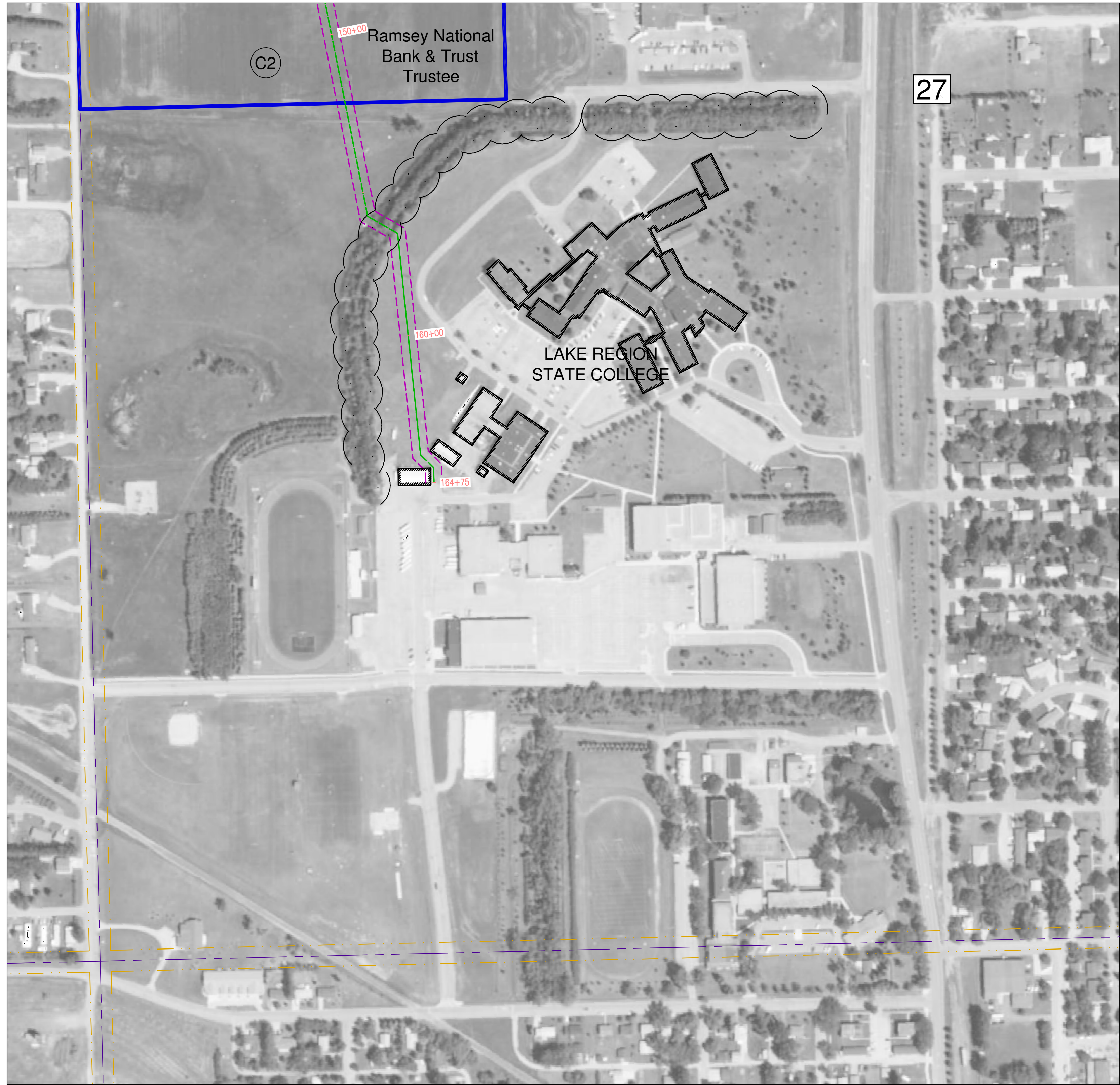
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RAMSEY NATIONAL BANK & TRUST TRUSTEE PROPERTY - AERIAL

C2

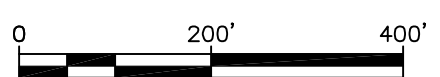
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 Plot Date: 31-Jul-12



1
C3

LAKE REGION STATE COLLEGE PROPERTY

1" = 200'



LEGEND

- TURBINE ⊗
- 50' x 50' TURBINE SITE PROPERTY □
- LANDOWNER BOUNDARY - - - - -
- CONSTRUCTION ACCESS PROPERTY - - - - -
- 20' ACCESS - RIGHT PROPERTY - - - - -
- BURIED COLLECTION LINE - - - - -
- SECTION LINE - - - - -
- EXISTING UNDERGROUND ELECTRICAL - - - - -
- EXISTING RURAL WATER LINE - - - - -
- EXISTING UNDERGROUND FIBER OPTIC - - - - -
- EXISTING UNDERGROUND TELEPHONE - - - - -
- PERMANENT ACCESS - RIGHT PROPERTY - - - - -
- JB1 = ELECTRICAL JUNCTION BOX ○
- 1000' SETBACK FROM HOMES ○

SECTION NUMBER

#

SHEET NUMBER

C#



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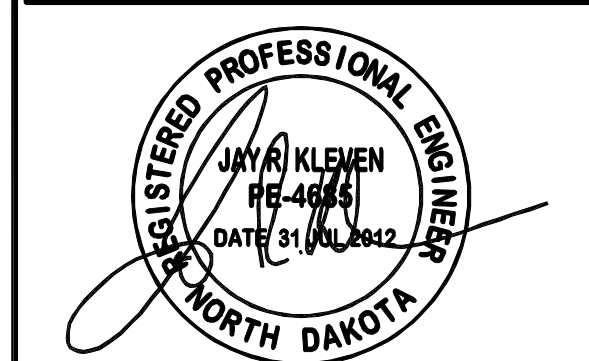
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DRAWING TITLE

LAKE REGION STATE COLLEGE PROPERTY - AERIAL

C3



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LAKE REGION STATE COLLEGE

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LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**
 STATE **NORTH DAKOTA**

ISSUE DATES

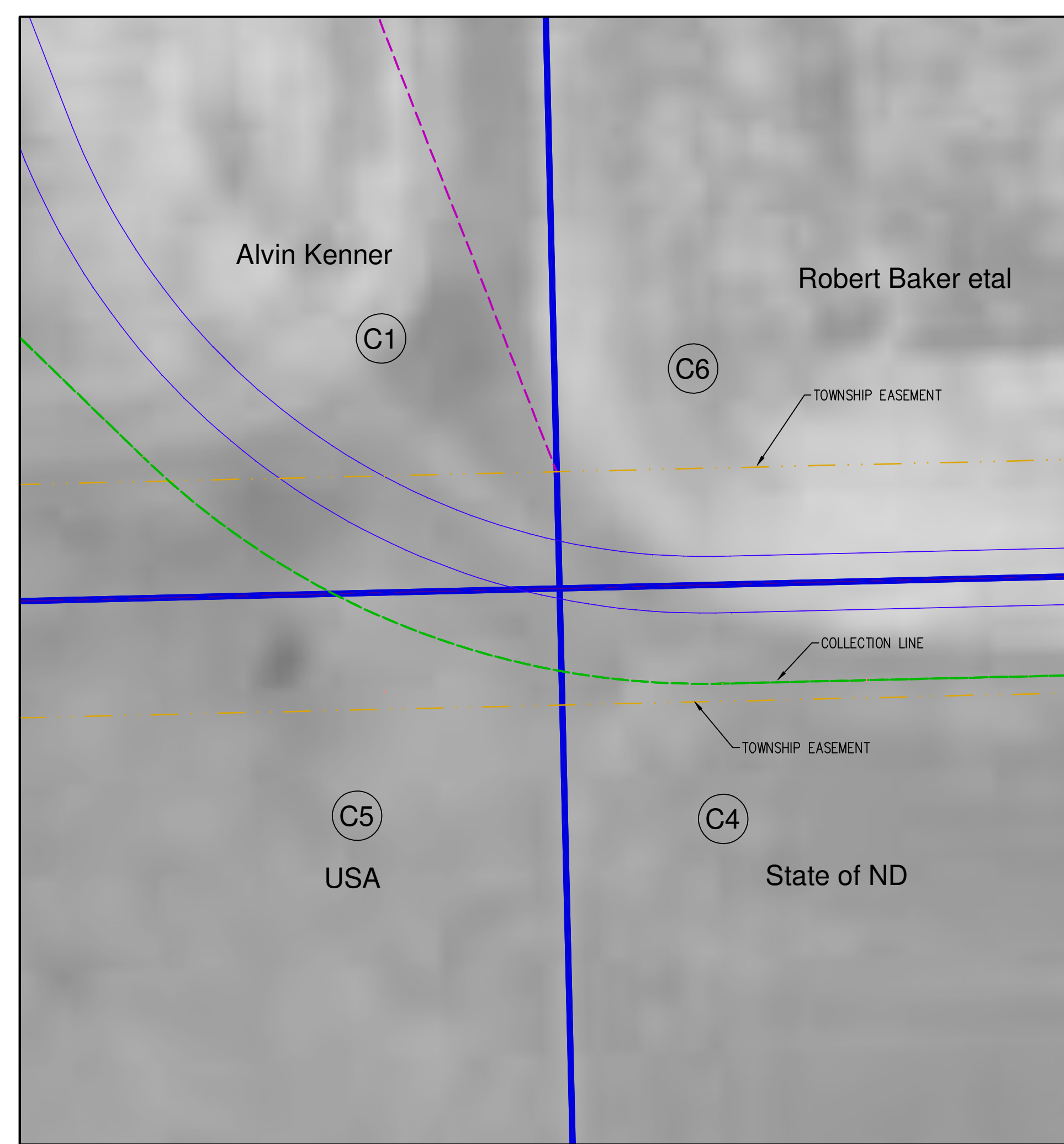
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
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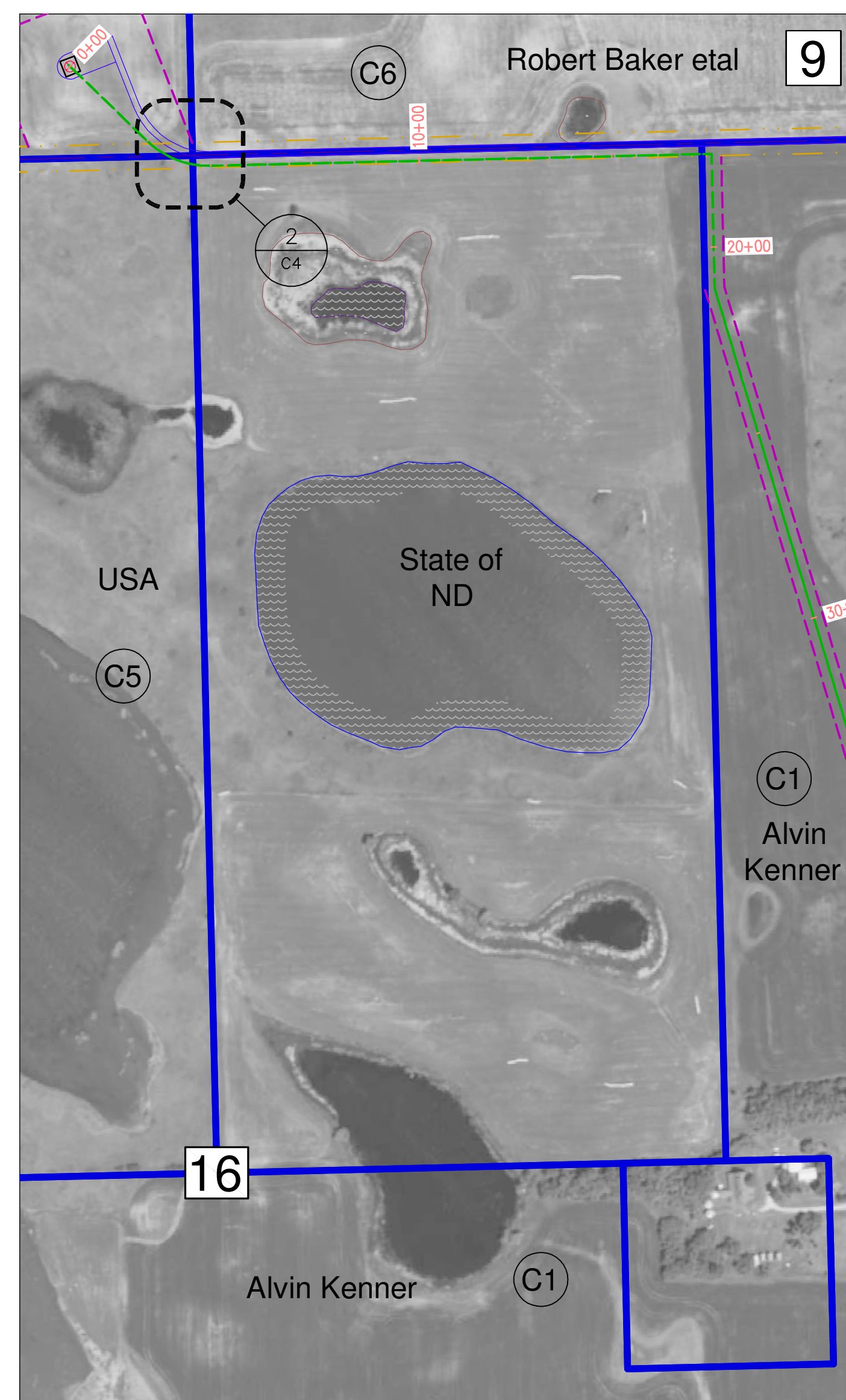
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DRAWING TITLE
STATE OF NORTH DAKOTA PROPERTY - AERIAL

C4



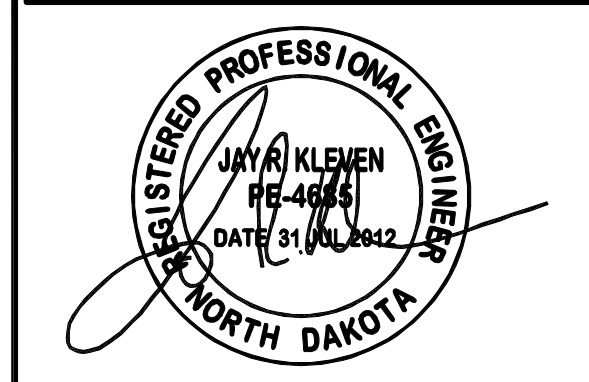
2
C4
 DETAIL AT CORNER
 1" = 30'-0"
 N
 0 30' 60'



1
C4
 STATE OF NORTH DAKOTA PROPERTY
 1" = 300'
 N
 0 300' 600'

LEGEND

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- LANDOWNER BOUNDARY
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- EXISTING UNDERGROUND TELEPHONE
- PERMANENT ACCESS - RIGHT PROPERTY
- JB1 = ELECTRICAL JUNCTION BOX
- 1000' SETBACK FROM HOMES
- SECTION NUMBER
- SHEET NUMBER



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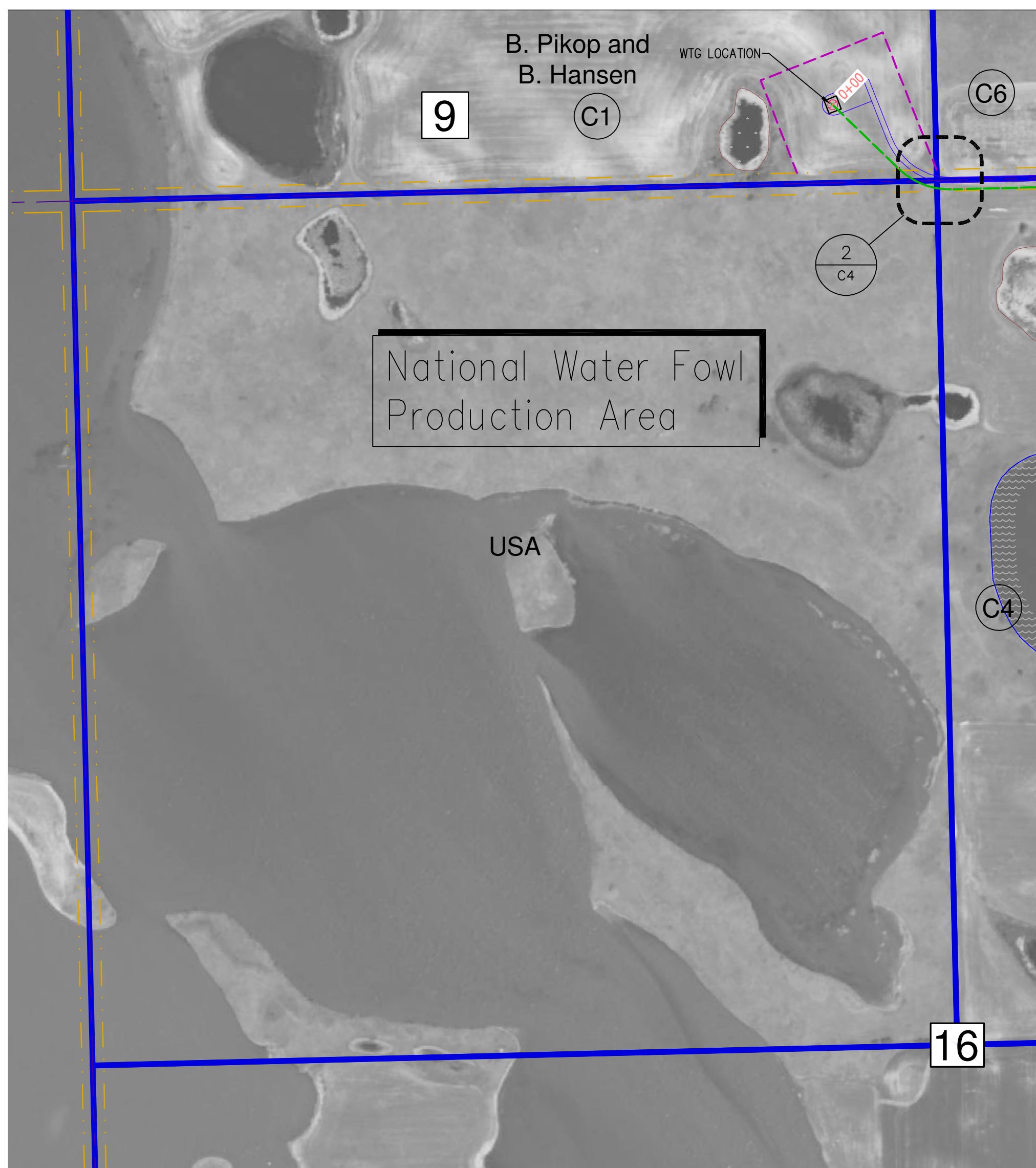
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DRAWING TITLE

USA PROPERTY - AERIAL

C5



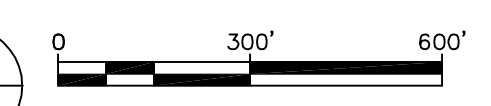
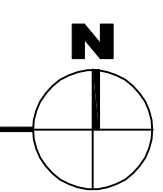
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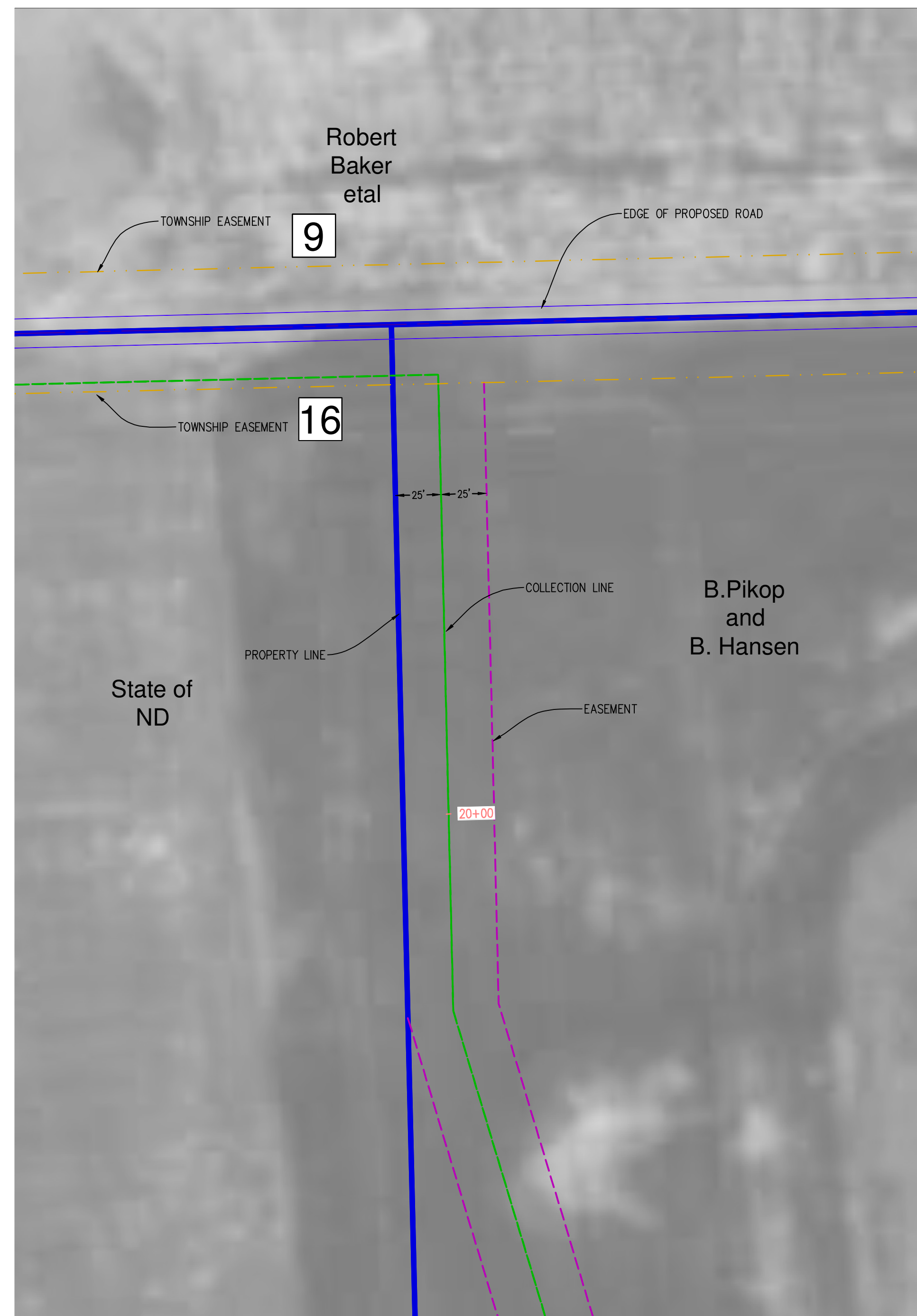
SECTION NUMBER

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USA PROPERTY
 1" = 300'



File Location: P:\2011\20112552 - DVL US LRSC-ESS WTG Fin + Civil Drawings\20112552-06.dwg
 Plot Date: 31-Jul-12



LEGEND

- TURBINE ⊗
- 50' x 50' TURBINE SITE PROPERTY □
- LANDOWNER BOUNDARY ---
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- 20' ACCESS - RIGHT PROPERTY ---
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DRAWING TITLE

ROBERT BAKER PROPERTY - AERIAL

C6



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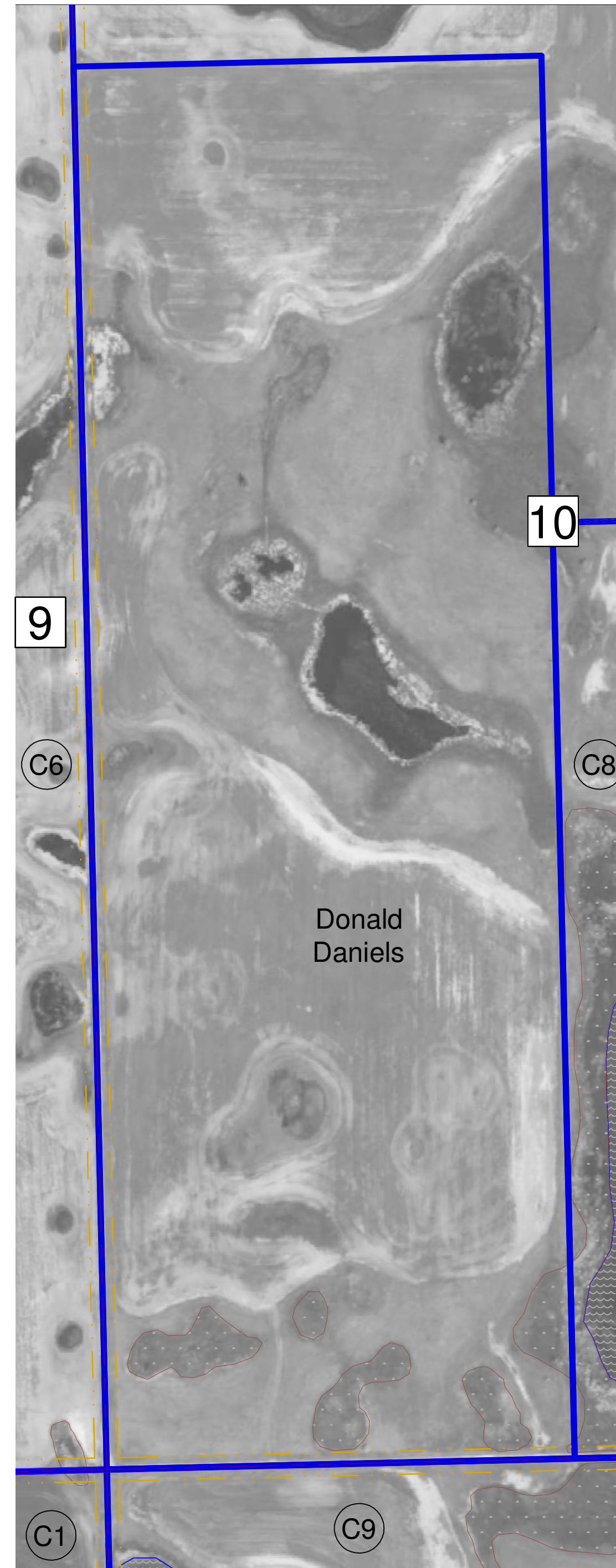
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DRAWING TITLE

DONALD DANIELS PROPERTY - AERIAL

C7



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- EXISTING RURAL WATER LINE
- EXISTING UNDERGROUND FIBER OPTIC
- EXISTING UNDERGROUND TELEPHONE
- PERMANENT ACCESS - RIGHT PROPERTY
- JB1 = ELECTRICAL JUNCTION BOX
- 1000' SETBACK FROM HOMES
- SECTION NUMBER
- SHEET NUMBER





CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: **20112552**

DRAWN BY: **JCE**

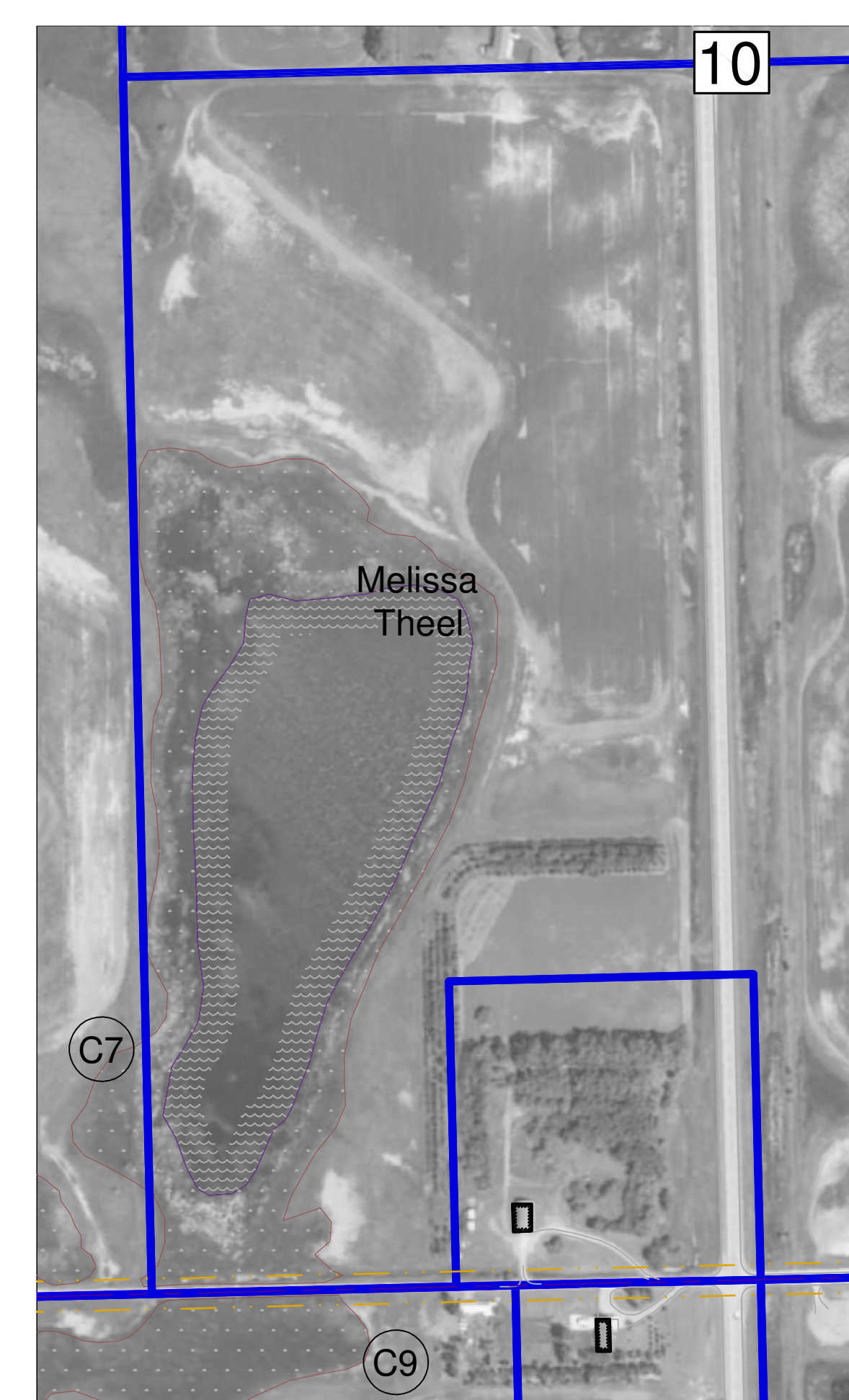
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DRAWING TITLE

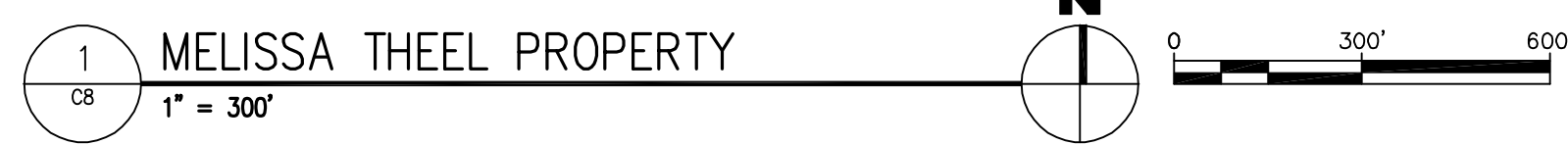
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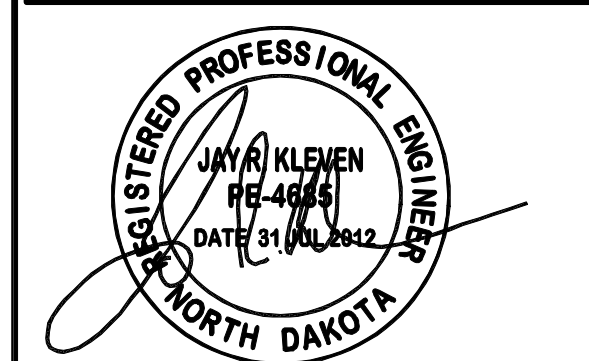
C8



LEGEND

- TURBINE
- 50' x 50' TURBINE SITE PROPERTY
- LANDOWNER BOUNDARY
- CONSTRUCTION ACCESS PROPERTY
- 20' ACCESS - RIGHT PROPERTY
- BURIED COLLECTION LINE
- SECTION LINE
- EXISTING UNDERGROUND ELECTRICAL
- EXISTING RURAL WATER LINE
- EXISTING UNDERGROUND FIBER OPTIC
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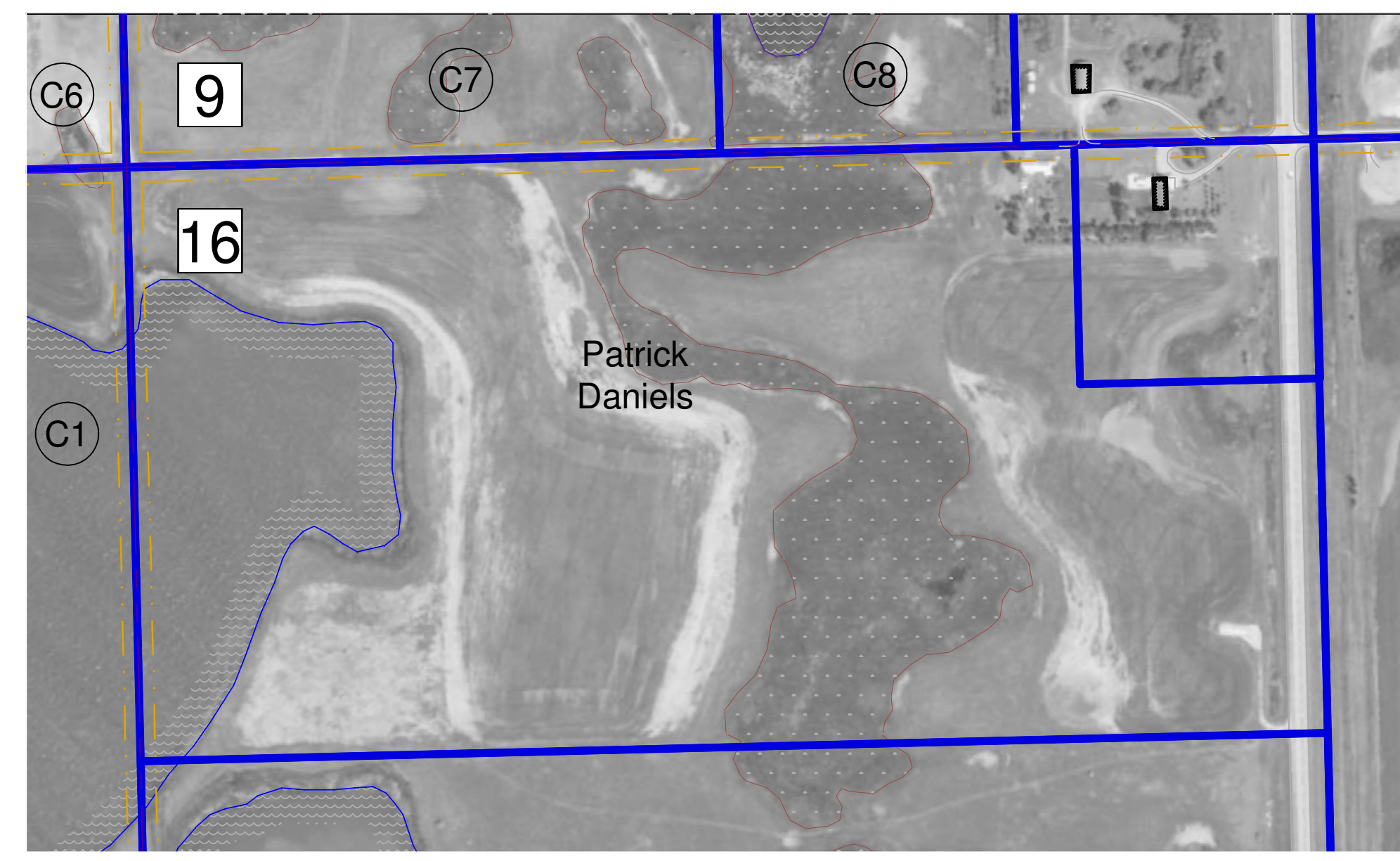
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PATRICK DANIELS PROPERTY - AERIAL

C9



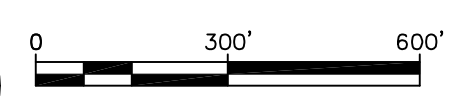
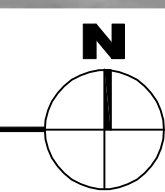
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- EXISTING UNDERGROUND TELEPHONE
- PERMANENT ACCESS - RIGHT PROPERTY
- JB1 = ELECTRICAL JUNCTION BOX
- 1000' SETBACK FROM HOMES

SECTION NUMBER

SHEET NUMBER

1 PATRICK DANIELS PROPERTY
C9 1" = 300'



SITE CLEARING- 02230

PART 1 - GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:

1. PROTECTING EXISTING TREES, SHRUBS, GROUNDCOVERS, PLANTS, AND GRASS TO REMAIN.
2. REMOVING EXISTING TREES, SHRUBS, GROUNDCOVERS, PLANTS, AND GRASS IN NEW CONSTRUCTION AREA.
3. STRIPPING AND STOCKPILING TOPSOIL.
4. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES.

1.2 MATERIAL OWNERSHIP

- A. EXCEPT FOR STRIPPED TOPSOIL OR OTHER MATERIALS INDICATED TO REMAIN OWNER'S PROPERTY, CLEARED MATERIALS SHALL BECOME CONTRACTOR'S PROPERTY AND SHALL BE REMOVED FROM PROJECT SITE.

1.3 PROJECT CONDITIONS

- A. TRAFFIC: MINIMIZE INTERFERENCE WITH ADJOINING ROADS, STREETS, WALKS, AND OTHER ADJACENT OCCUPIED OR USED FACILITIES DURING SITE-CLEARING OPERATIONS.
1. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS, OR OTHER ADJACENT OCCUPIED OR USED FACILITIES WITHOUT PERMISSION FROM OWNER AND AUTHORITIES HAVING JURISDICTION.
 2. PROVIDE ALTERNATE ROUTES AROUND CLOSED OR OBSTRUCTED TRAFFIC WAYS IF REQUIRED BY AUTHORITIES HAVING JURISDICTION.
- B. SALVABLE IMPROVEMENTS: CAREFULLY REMOVE ITEMS INDICATED TO BE SALVAGED AND STORE ON OWNER'S PREMISES WHERE INDICATED.
- C. UTILITY LOCATOR SERVICE: NOTIFY UTILITY LOCATOR SERVICE FOR AREA WHERE PROJECT IS LOCATED BEFORE SITE CLEARING.
- 1.4 DO NOT COMMENCE SITE CLEARING OPERATIONS UNTIL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES ARE IN PLACE.

PART 2 - PRODUCTS (NOT APPLICABLE)

2.1 EROSION CONTROL MATERIALS

A. SILT FENCE

1. GEOTEXTILE FABRIC:
 - a. FLOW RATE OF AT LEAST 8 GPM PER SF AS PER ASTM D4491
 - b. MINIMUM OF 80% UV RESISTANCE AS PER ASTM D4355
 - c. MINIMUM MULLEN BURST OF 300 PSI AS PER ASTM D3786
 - d. FABRIC SHALL BE DESIGNED FOR OPTIMUM USE AS A SILT FENCE FABRIC AND SHALL BE DELIVERED IN CONTINUOUS ROLLS
2. POSTS:
 - a. STEEL FENCE POSTS, NEW OR REUSED, WITH SPADE-TYPE STABILIZER PLATE EMBEDDED A MINIMUM OF 24" BELOW GRADE
 - b. WOOD POSTS: TREATED WOOD FREE FROM CRACKING OR CHECKING

B. STRAW ROLLS

1. WEED-FREE PREFABRICATED ROLLS WITH A MINIMUM 9" OUTSIDE DIAMETER
2. ROLLS SHALL BE FILLED WITH BIODEGRADABLE WHEAT STRAW, RICE STRAW OR COCONUT FIBERS WRAPPED IN A UV OR BIODEGRADABLE PLASTIC NETTING.
3. ROLLS SHALL BE A MINIMUM OF 10'-0" LONG AND SHALL WEIGH NO LESS THAN 1.0 POUNDS PER LINEAR FOOT.
4. ROLLS SHALL BE ANCHORED WITH 2" SQUARE WOOD STAKES OR METAL PINS

C. INLET PROTECTION

1. SILT FENCE AND EROSION CONTROL BLANKETS ASSEMBLIES PLACED AROUND CULVERT INLETS MANHOLES OR GRATING INLETS OF ANY UNDERGROUND STORM OR SANITARY SEWER.
2. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.

D. STABILIZED ENTRANCE ROCK

1. AT LEAST 200 LINEAL FEET OF ROAD CONSTRUCTED ACCORDING TO THE PLANS AND SPECIFICATIONS

E. DEWATERING STRUCTURE

1. PREFABRICATED, COMMERCIALY MANUFACTURED SEDIMENT CONTAINMENT BAG PLACED ON WELL-ESTABLISHED GRASS OR EROSION CONTROL BLANKETS.
2. MINIMUM PLAN DIMENSION OF THE SEDIMENT BAG SHALL BE 6'x6'
3. ALL DEWATERING SUMP PUMPS SHALL DISCHARGE THROUGH A DEWATERING BAG.
4. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.

F. TEMPORARY VEGETATIVE COVER: ND DOT CLASS IV @ MIN 10#/ACRE.

2.2 SOIL MATERIALS

- A. SATISFACTORY SOIL MATERIALS: REQUIREMENTS FOR SATISFACTORY SOIL MATERIALS ARE SPECIFIED IN "EARTHWORK."

PART 3 - EXECUTION

3.1 PREPARATION

- A. PROTECT AND MAINTAIN BENCHMARKS, PROPERTY MONUMENTS, AND SURVEY CONTROL POINTS FROM DISTURBANCE DURING CONSTRUCTION.
- B. LOCATE AND CLEARLY FLAG TREES AND VEGETATION TO REMAIN OR TO BE RELOCATED.
- C. PROTECT EXISTING SITE IMPROVEMENTS TO REMAIN FROM DAMAGE DURING CONSTRUCTION.
1. RESTORE DAMAGED VEGETATION, PAVEMENTS, AND LANDFORMS TO THEIR ORIGINAL CONDITION, AS ACCEPTABLE TO OWNER.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. PROVIDE TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES TO PREVENT SOIL EROSION AND DISCHARGE OF SOIL-BEARING WATER RUNOFF OR AIRBORNE DUST TO ADJACENT PROPERTIES AND WALKWAYS.
- B. INSPECT, REPAIR, AND MAINTAIN EROSION AND SEDIMENTATION CONTROL MEASURES DURING CONSTRUCTION UNTIL PERMANENT VEGETATION HAS BEEN ESTABLISHED.
- C. REMOVE EROSION AND SEDIMENTATION CONTROLS AND RESTORE AND STABILIZE AREAS DISTURBED DURING REMOVAL.
- D. ALL EXCAVATION DEWATERING SHALL BE MADE THROUGH APPROVED DEWATERING STRUCTURES.
- E. ALL CONCRETE WASHOUTS SHALL BE MADE IN A WASHOUT STRUCTURE OF APPROVED CONSTRUCTION. REFER TO THE DRAWINGS FOR ONE SUCH APPROVED CONSTRUCTION.
- F. CONTRACTOR SHALL MAINTAIN EROSION CONTROL FEATURES FOR THE DURATION OF THE PROJECT, AND SHALL LEAVE THEM IN PLACE AT THE CONCLUSION OF THEIR CONTRACT. THE CONTRACTOR IS NOT REQUIRED TO REMOVE THE FEATURES OR PROVIDE FINAL SITE STABILIZATION, THIS WILL BE PROVIDED BY FUTURE CONTRACTS.
- G. THE CONTRACTOR SHALL SHAPE, ROUGHEN, AND PROTECT ALL STOCKPILES TO PREVENT EROSION OFF OF THE PILES.
- H. THE CONTRACTOR SHALL INSPECT THE EROSION CONTROL FEATURES WITHIN 2 HOURS AFTER ANY RAINSTORM THAT EXCEEDS 0.5" OF PRECIPITATION IN ANY 24-HOUR PERIOD, OR ANY PRECIPITATION OF EQUIVALENT INTENSITY REGARDLESS OF ITS ACTUAL DURATION.
1. PRECIPITATION SHALL INCLUDE SNOW MELT, RAIN, SLEET, HAIL, OR ANY OTHER WATER OF ANY FORM THAT IS OF NATURAL OR MAN-MADE IRRIGATION ORIGIN.

1. ALTERNATE EROSION CONTROL DETAILS MAY BE UTILIZED SUBJECT TO APPROVAL BY THE ENGINEER.

- J. THE INDICATED EROSION CONTROL MEASURES SHALL BE CONSIDERED AS THE MINIMUM LEVEL OF PROTECTION. THE CONTRACTOR IS ENCOURAGED TO PROVIDE MORE STRINGENT FEATURES AND CONSTRUCTION PRACTICES.

3.3 TREE PROTECTION

- A. ERECT AND MAINTAIN TEMPORARY FENCING AROUND TREE PROTECTION ZONES BEFORE STARTING SITE CLEARING. REMOVE FENCE WHEN CONSTRUCTION IS COMPLETE.
- B. DO NOT EXCAVATE WITHIN TREE PROTECTION ZONES, UNLESS OTHERWISE INDICATED.
- C. REPAIR OR REPLACE TREES AND VEGETATION INDICATED TO REMAIN THAT ARE DAMAGED BY CONSTRUCTION OPERATIONS, IN A MANNER APPROVED BY ARCHITECT.

3.4 UTILITIES

- A. LOCATE, IDENTIFY, DISCONNECT, AND SEAL OR CAP OFF UTILITIES INDICATED TO BE REMOVED.
1. ARRANGE WITH UTILITY COMPANIES TO SHUT OFF INDICATED UTILITIES.
- B. EXISTING UTILITIES: DO NOT INTERRUPT UTILITIES SERVING FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY UTILITY SERVICES ACCORDING TO REQUIREMENTS INDICATED:
1. NOTIFY ARCHITECT NOT LESS THAN TWO DAYS IN ADVANCE OF PROPOSED UTILITY INTERRUPTIONS.
 2. DO NOT PROCEED WITH UTILITY INTERRUPTIONS WITHOUT ENGINEER'S WRITTEN PERMISSION.
- C. REMOVAL OF UNDERGROUND UTILITIES IS INCLUDED IN DIVISION 2 SECTIONS COVERING SITE UTILITIES.

3.5 TOPSOIL STRIPPING

- A. REMOVE SOO AND GRASS BEFORE STRIPPING TOPSOIL.
- B. STRIP TOPSOIL TO WHATEVER DEPTHS ARE ENCOUNTERED IN A MANNER TO PREVENT INTERMINGLING WITH UNDERLYING SUBSOIL OR OTHER WASTE MATERIALS.
- C. STOCKPILE TOPSOIL MATERIALS AWAY FROM EDGE OF EXCAVATIONS WITHOUT INTERMIXING WITH SUBSOIL. GRADE AND SHAPE STOCKPILES TO DRAIN SURFACE WATER. COVER TO PREVENT WINDBLOWN DUST.
- D. REMOVE ONLY AS MUCH TOPSOIL AND ESTABLISHED VEGETATION AS IS NEEDED TO EXECUTE THE WORK. DISTURBANCE TO VEGETATION BEYOND THE OWNERS PROPERTY SHALL BE RESTORED BY THE CONTRACTOR AT THEIR OWN EXPENSE.

3.6 SITE IMPROVEMENTS

- A. REMOVE EXISTING ABOVE- AND BELOW-GRADE IMPROVEMENTS AS INDICATED AND AS NECESSARY TO FACILITATE NEW CONSTRUCTION.
- B. SHAPE TEMPORARY AND FINAL SUBGRADES TO DRAIN AWAY FROM OPEN EXCAVATIONS AND STRUCTURES.

3.7 DISPOSAL

- A. DISPOSAL: REMOVE SURPLUS SOIL MATERIAL, UNSUITABLE TOPSOIL, OBSTRUCTIONS, DEMOLISHED MATERIALS, AND WASTE MATERIALS INCLUDING TRASH AND DEBRIS, AND LEGALLY DISPOSE OF THEM OFF OWNER'S PROPERTY.
1. SEPARATE RECYCLABLE MATERIALS PRODUCED DURING SITE CLEARING FROM OTHER NONRECYCLABLE MATERIALS. STORE OR STOCKPILE WITHOUT INTERMIXING WITH OTHER MATERIALS AND TRANSPORT THEM TO RECYCLING FACILITIES.

END OF SECTION 02230

GENERAL NOTES

II. SITE DESIGN CRITERIA

- A. GEOTECHNICAL DOCUMENTATION WIND TURBINE GENERATOR SYSTEM 1.5-1.6 PLATFORM AMERICAS UNITS ONLY"
- B. EROSION CONTROL = NPDES, PERMIT ND
- C. ALL TOPOGRAPHY IS RELATIVE TO NAVD 1988
- D. BEARING ORIENTATION AND PLAN ORIENTATION IS RELATIVE TO PARAMETERS FOR RAMSEY COUNTY
- HORIZONTAL DATUM: ND STAT PLANE COORDINATE SYS, NORTH ZONE 3301, NAD 1983 (CORS 96), U.S. SURVEY FEET
- VERTICAL DATUM: NAVD 1988, U.S. SURVEY FEET
- E. ROADBED DESIGN IS BASED ON THE GROUND AND HAN METHODS FOR UNPAVED ROADS, WITH THE FOLLOWING DESIGN PARAMETERS:
- SUBGRADE CBR = 3.0
- AGGREGATE SURFACE CBR = 20
- AXLE LOAD = 20,000# @ 120 PSI
- AXLE LOAD = 18000# FOR PERMANENT ROADS
- MAXIMUM RUT DEPTH = 1.5 IN, FOR PERMANENT ROADS

III. LAND DEVELOPMENT DATA

- A. LEGAL DESCRIPTION: NORTH CREELE TOWNSHIP, T154N R64W, STATE OF NORTH DAKOTA, RAMESY COUNTY.
- B. A LEGAL SURVEY AND EASEMENT MAP WAS PREPARED BY LAND SURVEY AND SERVICES, DEVILS LAKE, ND.
- C. TOTAL PERMANENT AGGREGATE SURFACE =1.00 ACRES
- D. TOTAL CONSTRUCTION PHASE DISTURBANCE =7.32 ACRES

III. SITE ACCESS CRITERIA

- A. THE CONTRACTOR SHALL AT ALL TIMES CONFINE THEIR OPERATIONS WITHIN THE EASEMENT AREAS, AND SHALL REPAIR AND STABILIZE AND DISTURBANCE WITHIN AND BEYOND THE EASEMENT AREA.
- B. THE CONTRACTOR SHALL COORDINATE TRANSPORTATION, INSTALLATION, AND OTHER CONSTRUCTION ACTIVITY TO MINIMIZE THE EXTENT OF TEMPORARY ROAD IMPROVEMENTS.
- C. TYPICAL EXAMPLES OF TURNING RADI IMPROVEMENTS, TURN-AROUND AREAS FOR TRANSPORTATION EQUIPMENT, AND OTHER TEMPORARY SITE FEATURES FOR CONSTRUCTION ACTIVITY SHALL BE THE MINIMUM BASIS OF THE CONTRACTORS SCOPE.
- D. ALL TEMPORARY IMPROVEMENTS SHALL BE VERIFIED BY THE CONTRACTOR DURING THE CALL FOR BID PERIOD. THE SUBMITTED BID SHALL BE THE FULL PRICE FOR ALL TEMPORARY IMPROVEMENTS, AND SHALL BE CONSIDERED TO INCLUDE ALL TEMPORARY CONSTRUCTION SITE FEATURES WHETHER SHOWN ON THE PLANS OR NOT.

IV. GEOTEXTILE FABRIC

- A. WOVEN GEOTEXTILE FABRIC, MANUFACTURED FOR SEPARATION APPLICATIONS, MADE FROM POLYOLEFINS OR POLYPROPYLENE; WITH ELONGATION LESS THAT 50 PERCENT; COMPLYING WITH AASHTO M 288 AND MANUFACTURED FOR SEPARATION AND STABILIZATION USE. ALL PROPERTIES ARE MINIMUM AVERAGE ROLL VALUES IN THE WEAKEST AXIS.
1. SURVIVABILITY: CLASS 2; AASHTO M 288.
 2. GRAB TENSILE STRENGTH: 247 LBF (1100 N); ASTM D 4632.
 3. SEWN SEAM STRENGTH: 222 LBF (990 N) ASTM D 4632.
 4. TEAR STRENGTH: 90 LBF (400 N); ASTM D 4533.
 5. PUNCTURE STRENGTH; 90 LBF (400 N); ASTM D 4833.
 6. APPARENT OPENING SIZE: NO. 60 (0.250-MM) SIEVE, MAXIMUM; ASTM D 4751.
 7. PERMITTIVITY: 0.05 PER SECOND, MINIMUM; ASTM D 4491; FLOW RATE 4 GPM/FT-Ø MIN.
 8. UV STABILITY: 50 PERCENT AFTER 500 HOURS' EXPOSURE; ASTM D 4355.

V. GEOGRID REINFORCEMENT

- A. TENSAR TX160 SHALL BE USED AT ALL AGGREGATE SURFACES.
- B. ROADS, HARD STANDS, OR OTHER SHALL BE REINFORCED WITH GEOGRID.

IV. ELECTRICAL COORDINATION

- A. DETAILS AND SPECIFICATIONS FOR ALL ELECTRICAL WORK ON THE ELECTRICAL PLANS AND SPECIFICATIONS.
- B. CIVIL SHEETS C200A THRU C200H SHALL BE USED TO LOCATE AND STAKE THE UNDERGROUND ELECTRICAL SYSTEM.
- C. ANY DIRECTIONAL BORING ON THE CIVIL PLANS SHALL BE REQUIRED WHETHER OR NOT IT IS INDICATED ON THE ELECTRICAL PLANS.
- D. WHERE DIRECTIONAL DRILLING IS NOT REQUIRED BY THE CIVIL PLANS, THE ELECTRICAL MAY BE PLOWED, TRENCHED, OR BORED. EITHER METHOD SHALL COMPLY WITH THE ELECTRICAL SPECIFICATIONS.
- E. WARNING TAPE IS REQUIRED ALONG THE ENTIRE COLLECTION SYSTEM.
- F. REFER TO TR-04 AND TR-05 FOR INSTALLATION DETAILS.

IV. GENERAL REQUIREMENTS

- A. DETAILS NOT CALLED OUT ON THE PLANS BUT PROVIDED ON ANY SHEET SHALL APPLY AT ALL APPLICABLE LOCATIONS.
- B. GEOTEXTILE SHALL BE USED WHERE INDICATED.
1. PROPEX 315ST HAS PRIOR APPROVAL.

THESE DRAWINGS ARE INTENDED FOR CONSTRUCTION OF THE INDICATED PROJECT. NO OTHER USE OF THESE DRAWINGS IS INTENDED OR AUTHORIZED BY EAPC.

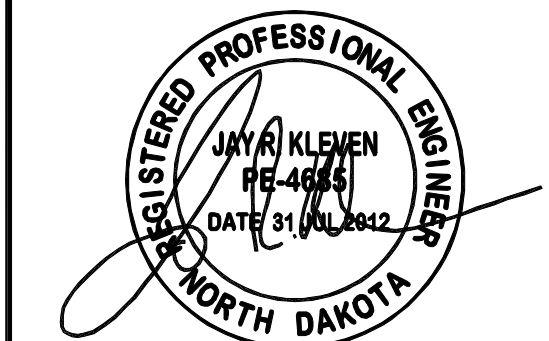


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DRAWING TITLE

GENERAL CIVIL NOTES

C001

EARTHWORK-- 02300
 PART 1 -- GENERAL

1.1 SUMMARY

- A. THIS SECTION INCLUDES THE FOLLOWING:
1. PREPARING SUBGRADES AND EMBANKMENTS FOR FOR VEGETATION RESTORATION.
 2. EXCAVATING AND BACKFILLING FOR STRUCTURES AND EMBANKMENTS.
 3. SUBBASE AND AGGREGATE SURFACING COURSE FOR PERMANENT AND TEMPORARY MAINTENANCE AND TRANSPORTATION ROADS.
 4. EXCAVATING AND BACKFILLING FOR UTILITY TRENCHES.
 5. EARTHWORK, EXCAVATION, AND BACKFILLING REQUIREMENTS LISTED ON SHEETS S001, S002, AND S003.

1.2 DEFINITIONS

- A. BACKFILL: SOIL MATERIAL USED TO FILL AN EXCAVATION.
1. INITIAL BACKFILL: BACKFILL PLACED BESIDE AND OVER PIPE IN A TRENCH, INCLUDING HAUNCHES TO SUPPORT SIDES OF PIPE.
 2. FINAL BACKFILL: BACKFILL PLACED OVER INITIAL BACKFILL TO FILL A TRENCH.
- B. BEDDING COURSE: COURSE PLACED OVER THE EXCAVATED SUBGRADE IN A TRENCH BEFORE LAYING PIPE.
- C. BORROW SOIL: SATISFACTORY SOIL IMPORTED FROM OFF-SITE FOR USE AS FILL OR BACKFILL.
- D. EXCAVATION: REMOVAL OF MATERIAL ENCOUNTERED ABOVE SUBGRADE ELEVATIONS AND TO LINES AND DIMENSIONS INDICATED.
1. AUTHORIZED ADDITIONAL EXCAVATION: EXCAVATION BELOW SUBGRADE ELEVATIONS OR BEYOND INDICATED LINES AND DIMENSIONS AS DIRECTED BY ARCHITECT.
 2. UNAUTHORIZED EXCAVATION: EXCAVATION BELOW SUBGRADE ELEVATIONS OR BEYOND INDICATED LINES AND DIMENSIONS WITHOUT DIRECTION BY ARCHITECT. UNAUTHORIZED EXCAVATION, AS WELL AS REMEDIAL WORK DIRECTED BY ARCHITECT, SHALL BE WITHOUT ADDITIONAL COMPENSATION.
- E. ENGINEERED FILL: MATERIAL ADDED UNDER STRUCTURES BETWEEN BOTTOM OF FILL MATERIAL REMOVED AND STRUCTURES.
- F. STRUCTURES: BUILDINGS, FOOTINGS, FOUNDATIONS, RETAINING WALLS, SLABS, TANKS, CURBS, MECHANICAL AND ELECTRICAL APPURTENANCES, OR OTHER MAN-MADE STATIONARY FEATURES CONSTRUCTED ABOVE OR BELOW THE GROUND SURFACE.
- G. SUBBASE COURSE: COURSE PLACED BETWEEN THE SUBGRADE AND BASE COURSE FOR HOT-MIX ASPHALT PAVEMENT, OR COURSE PLACED BETWEEN THE SUBGRADE AND A CEMENT CONCRETE PAVEMENT OR A CEMENT CONCRETE OR HOT-MIX ASPHALT WALK.
- H. SUBGRADE: SURFACE OR ELEVATION REMAINING AFTER COMPLETING EXCAVATION, OR TOP SURFACE OF A FILL OR BACKFILL IMMEDIATELY BELOW SUBBASE, OR TOPSOIL MATERIALS.
- I. UTILITIES: ON-SITE UNDERGROUND PIPES, CONDUITS, DUCTS, AND CABLES, AS WELL AS UNDERGROUND SERVICES WITHIN BUILDINGS.

1.3 PROJECT CONDITIONS

- A. EXISTING UTILITIES: DO NOT INTERRUPT UTILITIES SERVING FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED IN WRITING BY ARCHITECT AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY UTILITY SERVICES ACCORDING TO REQUIREMENTS INDICATED.

PART 2 -- PRODUCTS

2.1 SOIL MATERIALS

- A. GENERAL: PROVIDE ENGINEERED FILL MATERIAL UNDER STRUCTURES AND USE NATIVE EXCAVATED MATERIAL FOR BACKFILL BEYOND AND ABOVE THE STRUCTURES. CONTRACTOR SHALL OBTAIN OFF-SITE BORROW MATERIALS WHEN SUFFICIENT SATISFACTORY SOIL MATERIALS ARE NOT AVAILABLE FROM EXCAVATIONS.
- B. SATISFACTORY SOILS: ASTM D 2487 SOIL CLASSIFICATION GROUPS GC, GW, GP, GM, SW, SP, CL, AND SM, OR A COMBINATION OF THESE GROUPS; FREE OF ROCK OR GRAVEL LARGER THAN 3 INCHES (75 MM) IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER.
1. NATIVE, ON-SITE MATERIALS EXCEPT TOPSOIL ARE ACCEPTABLE FOR USE AS BACKFILL AND FILL.
- C. UNSATISFACTORY SOILS: SOIL CLASSIFICATION GROUPS SC, ML, OL, CH, MH, OH, AND PT ACCORDING TO ASTM D 2487 OR A COMBINATION OF THESE GROUPS.
1. UNSATISFACTORY SOILS ALSO INCLUDE SATISFACTORY SOILS NOT MAINTAINED WITHIN SPECIFIED SOIL MOISTURE CONTENT AT TIME OF COMPACTION.
- D. SUBBASE MATERIAL: MEETING ENGINEERED FILL REQUIREMENTS
- E. AGGREGATE SURFACING: ND DOT CLASS CLASS 13 OR EQUIVALENT USING SALVAGED AND RECYCLED CRUSHED PORTLAND CEMENT CONCRETE OR BITUMINOUS MATERIALS, AS PER ND DOT SPECIFICATION 816.
- F. ENGINEERED FILL: NATURALLY OR ARTIFICIALLY GRADED MIXTURE OF NATURAL OR CRUSHED GRAVEL, CRUSHED STONE, AND NATURAL OR CRUSHED SAND; WITH A 2" MAX PARTICLE SIZE 35% TO 100% PASSING A #4 (4.75 MM) SIEVE, 0% TO 35% PASSING A #40 SIEVE, AND NOT MORE THAN 10 PERCENT PASSING A NO. 200 (0.075-MM) SIEVE. NDDOT CLASS 5 IS ALSO ACCEPTABLE.

PART 3 -- EXECUTION

3.1 PREPARATION

- A. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENTS, AND OTHER FACILITIES FROM DAMAGE CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT, AND OTHER HAZARDS CREATED BY EARTHWORK OPERATIONS.
- B. PREPARATION OF SUBGRADE FOR EARTHWORK OPERATIONS INCLUDING REMOVAL OF VEGETATION, TOPSOIL, DEBRIS, OBSTRUCTIONS, AND DELETERIOUS MATERIALS FROM GROUND SURFACE IS SPECIFIED IN DIVISION 2 SECTION "SITE CLEARING."
- C. PROTECT AND MAINTAIN EROSION AND SEDIMENTATION CONTROLS, WHICH ARE SPECIFIED IN DIVISION 2 SECTION "SITE CLEARING," DURING EARTHWORK OPERATIONS.

3.2 EXCAVATION FOR STRUCTURES

- A. EXCAVATE TO INDICATED ELEVATIONS AND DIMENSIONS WITHIN A TOLERANCE OF PLUS OR MINUS 1 INCH (25 MM). IF APPLICABLE, EXTEND EXCAVATIONS A SUFFICIENT DISTANCE FROM STRUCTURES FOR PLACING AND REMOVING CONCRETE FORMWORK, FOR INSTALLING SERVICES AND OTHER CONSTRUCTION, AND FOR INSPECTIONS.
- B. REMOVE LOOSE, DISTURBED, SATURATED, OR UNSUITABLE SOILS FROM THE BASE OF ALL EXCAVATIONS. RAISE THE EXCAVATION BACK TO SUBGRADE ELEVATION USING ENGINEERED FILL OR SUITABLE SOIL MATERIALS WITHIN THEIR SPECIFIED LOCATIONS.
1. REFER TO ARTICLE 3.8 FOR ALLOWABLE SOIL FILL TYPES.
 2. EXCAVATIONS FOR FOOTINGS AND FOUNDATIONS: DO NOT DISTURB BOTTOM OF EXCAVATION. EXCAVATE BY HAND TO FINAL GRADE JUST BEFORE PLACING CONCRETE REINFORCEMENT. TRIM BOTTOMS TO REQUIRED LINES AND GRADES TO LEAVE SOLID BASE TO RECEIVE OTHER WORK.

3.3 SUBGRADE INSPECTION

- A. THE CONTRACTOR SHALL COORDINATE EXCAVATION SCHEDULES TO ALLOW THE ENGINEER TO OBSERVE THE EXCAVATION. THE ENGINEER SHALL OBSERVE AND VERIFY THE DEPTH AT WHICH COMPETENT SOIL FOR SUPPORTING THE FOUNDATIONS IS ACHIEVED. EXCAVATIONS SHALL CONTINUE UNTIL THE GEOTECHNICAL ENGINEER GIVES NOTICE TO TERMINATE.
- B. PLACEMENT OF FILL, FOUNDATIONS, OR ANY OTHER PERMANENT CONSTRUCTION OF THE WFG SHALL NOT BE PERFORMED PRIOR TO COMPLETING THE EXCAVATION INSPECTION. ANY PERMANENT CONSTRUCTION PLACED BEFORE THE OBSERVATIONS SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.
- C. RECONSTRUCT SUBGRADES DAMAGED BY FREEZING TEMPERATURES, FROST, RAIN, ACCUMULATED WATER, OR CONSTRUCTION ACTIVITIES, AS DIRECTED BY ARCHITECT, WITHOUT ADDITIONAL COMPENSATION.

3.4 UNAUTHORIZED EXCAVATION.

- A. FILL UNAUTHORIZED EXCAVATION UNDER FOUNDATIONS OR WALL FOOTINGS BY EXTENDING BOTTOM ELEVATION OF CONCRETE FOUNDATION OR FOOTING TO EXCAVATION BOTTOM, WITHOUT ALTERING TOP ELEVATION. LEAN CONCRETE FILL, WITH 28-DAY COMPRESSIVE STRENGTH OF 2500 PSI (17.2 MPA), MAY BE USED WHEN APPROVED BY ARCHITECT.
1. FILL UNAUTHORIZED EXCAVATIONS UNDER OTHER CONSTRUCTION OR UTILITY PIPE AS DIRECTED BY ARCHITECT.

3.5 STORAGE OF SOIL MATERIALS

- A. STOCKPILE ENGINEERED FILL MATERIAL AND EXCAVATED SATISFACTORY SOIL MATERIALS WITHOUT INTERMIXING. PLACE, GRADE, AND SHAPE STOCKPILES TO DRAIN SURFACE WATER. COVER TO PREVENT WINDBLOWN DUST.
1. STOCKPILE SOIL MATERIALS AWAY FROM EDGE OF EXCAVATIONS. DO NOT STORE WITHIN DRIP LINE OF REMAINING TREES.
 2. COORDINATE LOCATION OF STOCKPILES WITH THE OWNER PRIOR TO EXCAVATIONS.
 3. STOCKPILES SHALL NOT BE PLACED WITHIN 100 FEET OF THE EXISTING SLOUGHS OR WATERWAYS.

3.6 UTILITY TRENCH BACKFILL

- A. PLACE BACKFILL ON SUBGRADES FREE OF MUD, FROST, SNOW, OR ICE.
- B. PLACE AND COMPACT BEDDING COURSE ON TRENCH BOTTOMS AND WHERE INDICATED. SHAPE BEDDING COURSE TO PROVIDE CONTINUOUS SUPPORT FOR BELLS, JOINTS, AND BARRELS OF PIPES AND FOR JOINTS, FITTINGS, AND BODIES OF CONDUITS.
- C. BACKFILL TRENCHES EXCAVATED UNDER FOOTINGS AND WITHIN 18 INCHES (450 MM) OF BOTTOM OF FOOTINGS WITH SATISFACTORY SOIL; FILL WITH CONCRETE TO ELEVATION OF BOTTOM OF FOOTINGS. CONCRETE IS SPECIFIED IN DIVISION 3 SECTION "CAST-IN-PLACE CONCRETE."
- D. PROVIDE 4-INCH- (100-MM-) THICK, CONCRETE-BASE SLAB SUPPORT FOR PIPING OR CONDUIT LESS THAN 30 INCHES (750 MM) BELOW SURFACE OF ROADWAYS. AFTER INSTALLING AND TESTING, COMPLETELY ENCASE PIPING OR CONDUIT IN A MINIMUM OF 4 INCHES (100 MM) OF CONCRETE BEFORE BACKFILLING OR PLACING ROADWAY SUBBASE.
- E. PLACE AND COMPACT INITIAL BACKFILL OF PIPE BEDDING, FREE OF PARTICLES LARGER THAN 1 INCH (25 MM) IN ANY DIMENSION, TO A HEIGHT OF 12 INCHES (300 MM) OVER THE UTILITY PIPE OR CONDUIT.
1. CAREFULLY COMPACT INITIAL BACKFILL UNDER PIPE HAUNCHES AND COMPACT EVENLY UP ON BOTH SIDES AND ALONG THE FULL LENGTH OF UTILITY PIPING OR CONDUIT TO AVOID DAMAGE OR DISPLACEMENT OF PIPING OR CONDUIT. COORDINATE BACKFILLING WITH UTILITIES TESTING.
- F. PLACE AND COMPACT FINAL BACKFILL OF SATISFACTORY SOIL TO FINAL SUBGRADE ELEVATION.
- G. INSTALL WARNING TAPE DIRECTLY ABOVE UTILITIES, 12 INCHES (300 MM) BELOW FINISHED GRADE, EXCEPT 6 INCHES (150 MM) BELOW SUBGRADE UNDER PAVEMENTS AND SLABS.
- H. REFER TO ELECTRICAL PLANS FOR PLACEMENT OF WARNING TAPE ON THE COLLECTION LINE TRENCHES.

3.7 SOIL FILL

- A. PLOW, SCARIFY, BENCH, OR BREAK UP SLOPED SURFACES STEEPER THAN 1 VERTICAL TO 4 HORIZONTAL SO FILL MATERIAL WILL BOND WITH EXISTING MATERIAL.
- B. PLACE AND COMPACT FILL MATERIAL TO FINAL SUBGRADE ELEVATION IN LAYERS TO REQUIRED ELEVATIONS AS FOLLOWS:
2. UNDER GRASS AND PLANTED AREAS, USE SATISFACTORY SOIL MATERIAL.
 3. UNDER ROADS, USE SUITABLE SOIL MATERIAL TO WITHIN 12" OF FINAL GRADES, THEN SUB-BASE AND AGGREGATE SURFACING AS PER THE DRAWINGS.
 4. UNDER FOOTINGS AND FOUNDATIONS, USE ENGINEERED FILL.

3.8 SOIL MOISTURE CONTROL

- A. UNIFORMLY MOISTEN OR AERATE SOIL MATERIALS AND EACH SUBSEQUENT FILL OR BACKFILL SOIL LAYER BEFORE COMPACTION TO WITHIN TOLERANCES SPECIFIED ELSEWHERE.
- B. REMOVE AND REPLACE, OR SCARIFY AND AIR DRY OTHERWISE SATISFACTORY SOIL MATERIAL THAT EXCEEDS SPECIFIED TOLERANCES OR IS TOO WET TO COMPACT TO SPECIFIED DRY UNIT WEIGHT.
- C. ADD WATER TO SOILS THAT ARE TOO DRY TO MEET THE SPECIFIED TOLERANCES.

3.9 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. ALL FILL AROUND AND ABOVE THE WFG FOUNDATIONS SHALL HAVE A FINAL, IN-PLACE UNIT WEIGHT OF NO LESS THAN INDICATED ON THE STRUCTURAL PLANS
- B. PLACE BACKFILL AND FILL SOIL MATERIALS IN LAYERS NOT MORE THAN 8 INCHES IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HEAVY COMPACTION EQUIPMENT, AND NOT MORE THAN 4 INCHES (100 MM) IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HAND-OPERATED TAMPERS.
- C. PLACE BACKFILL AND FILL SOIL MATERIALS EVENLY ON ALL SIDES OF STRUCTURES TO REQUIRED ELEVATIONS, AND UNIFORMLY ALONG THE FULL LENGTH OF EACH STRUCTURE.
- D. COMPACT SOIL MATERIALS TO NOT LESS THAN THE FOLLOWING PERCENTAGES OF MAXIMUM DRY UNIT WEIGHT ACCORDING TO ASTM D 698:
5. UNDER STRUCTURES AND ROADS, COMPACT EACH LAYER OF BACKFILL OR FILL SOIL MATERIAL AT 95 PERCENT.
 6. UNDER SUBGRADES AND EMBANKMENTS, COMPACT EACH LAYER OF BACKFILL OR FILL SOIL MATERIAL AT 95 PERCENT.
 7. UNDER LAWN OR UNPAVED AREAS, COMPACT EACH LAYER OF BACKFILL OR FILL SOIL MATERIAL AT 95 PERCENT.
 8. FOR UTILITY TRENCHES, COMPACT EACH LAYER OF INITIAL AND FINAL BACKFILL SOIL MATERIAL AT 90 PERCENT.
- E. SOIL MOISTURE SHALL BE MAINTAINED WITHIN THE FOLLOWING RANGES RELATIVE TO THE OPTIMUM WATER CONTENT DETERMINED BY ASTM D698.
1. COHESIVE SOILS WITH LIQUID LIMIT EQUAL TO OR GREATER THAN 40: -1% TO +3%
 2. COHESIVE SOILS WITH LIQUID LIMIT LESS THAN 40: -2% TO +2%
 3. GRANULAR SOILS: -2% TO +2%
- F. SOIL PLACED BEYOND THE SPECIFIED SOIL MOISTURE TOLERANCES SHALL BE UNACCEPTED AND SHALL BE MOISTENED OR DRIED AS NEEDED TO MEET THE SPECIFIED TOLERANCES.

3.10 GRADING

- A. GENERAL: UNIFORMLY GRADE AREAS TO A SMOOTH SURFACE, FREE OF IRREGULAR SURFACE CHANGES. COMPLY WITH COMPACTION REQUIREMENTS AND GRADE TO CROSS SECTIONS, LINES, AND ELEVATIONS INDICATED.
- B. SITE GRADING: SLOPE GRADES TO DIRECT WATER AWAY FROM BUILDINGS AND TO PREVENT PONDING. FINISH SUBGRADES TO REQUIRED ELEVATIONS WITHIN THE FOLLOWING TOLERANCES:
1. LAWN OR UNPAVED AREAS: PLUS OR MINUS 1 INCH (25 MM).
 2. ROADS: PLUS OR MINUS 1/2 INCH (13 MM) .

3.11 SUBBASE AND BASE COURSES

- A. PLACE SUBBASE [X] COURSE ON SUBGRADES FREE OF MUD, FROST, SNOW, OR ICE.
- B. ON PREPARED SUBGRADE, PLACE SUBBASE[AND BASE] COURSE UNDER ROADS AS FOLLOWS:
1. SHAPE SUBBASE [] COURSE TO REQUIRED CROWN ELEVATIONS AND CROSS-SLOPE GRADES.
 2. COMPACT SUBBASE[] COURSE AT OPTIMUM MOISTURE CONTENT TO REQUIRED GRADES, LINES, CROSS SECTIONS, AND THICKNESS TO NOT LESS THAN [95] > PERCENT OF MAXIMUM DRY UNIT WEIGHT ACCORDING TO ASTM D 698.

3.12 FIELD QUALITY CONTROL

- A. TESTING AGENCY: CONTRACTOR WILL ENGAGE A QUALIFIED INDEPENDENT GEOTECHNICAL ENGINEERING TESTING AGENCY TO PERFORM FIELD QUALITY-CONTROL TESTING.
- B. ALLOW TESTING AGENCY TO INSPECT AND TEST SUBGRADES AND EACH FILL OR BACKFILL LAYER. PROCEED WITH SUBSEQUENT EARTHWORK ONLY AFTER TEST RESULTS FOR PREVIOUSLY COMPLETED WORK COMPLY WITH REQUIREMENTS.
- C. CONTRACTOR SHALL PROVIDE EQUIPMENT NEEDED TO REMOVE TOP 4" OF A COMPACTED LAYER TO PREPARE TEST SITE WHERE DIRECTED BY THE TESTING AGENCY.
- D. TESTING AGENCY WILL TEST UNIT WEIGHT AND MOISTURE CONTENT OF SOILS IN PLACE ACCORDING TO ASTM D 1556, ASTM D 2922, AND ASTM D 2937, AS APPLICABLE. TESTS WILL BE PERFORMED ACCORDING TO THE FOLLOWING SCHEDULE:
1. STRUCTURES: AT EACH COMPACTED FILL AND BACKFILL LAYER, AT LEAST 1 TEST FOR EVERY 2000 SQ. FT. (186 SQ. M) OR LESS OF PAVED AREA OR BUILDING SLAB, BUT IN NO CASE FEWER THAN 8 TESTS, UNLESS MORE STRINGENT A RE INDICATED ON THE STRUCTURAL DRAWINGS.
 2. TRENCH BACKFILL: AT EACH COMPACTED INITIAL AND FINAL BACKFILL LAYER, AT LEAST 1 TEST FOR EACH 150 FEET (46 M) OR LESS OF TRENCH LENGTH, BUT NO FEWER THAN 2 TESTS, PER 2-FOOT COMPACTED DEPTH.
 3. SUBGRADES AND EMBANKMENTS: ONE TEST FOR EACH 12" THICKNESS OF COMPACTED FILL OVER AN AREA OF 3000 SQUARE FEET.
 4. SUB BASE ONE TEST FOR EVERY 200 LINEAR FEET OF ROAD
- E. WHEN TESTING AGENCY REPORTS THAT SUBGRADES, FILLS, OR BACKFILLS HAVE NOT ACHIEVED DEGREE OF COMPACTION SPECIFIED, SCARIFY AND MOISTEN OR AERATE, OR REMOVE AND REPLACE SOIL TO DEPTH REQUIRED; RECOMPACT AND RETEST UNTIL SPECIFIED COMPACTION IS OBTAINED.
- F. OBTAIN AND TEST SAMPLES OF ALL SOIL MATERIALS ACCORDING TO ASTM D2487 AND ASTM D698 ON THE PROJECT AT THE FOLLOWING INTERVALS
1. EMBANKMENT FILL: 1 SAMPLE FOR EVERY 2,000 CY OF HAULED MATERIAL
 2. SUB BASE: 1 SAMPLE FOR EVER 300 CY OF HAULED MATERIAL , OR APPROXIMATELY 1 TEST FOR EACH 400 LF OF ROAD
 3. AGGREGATE SURFACE: 1 SAMPLE FOR EVER 300 CY OF HAULED MATERIAL , OR APPROXIMATELY 1 TEST FOR EACH 400 LF OF ROAD
- 3.13 PROTECTION
- A. PROTECTING GRADED AREAS: PROTECT NEWLY GRADED AREAS FROM TRAFFIC, FREEZING, AND EROSION. KEEP FREE OF TRASH AND DEBRIS.
- B. REPAIR AND REESTABLISH GRADES TO SPECIFIED TOLERANCES WHERE COMPLETED OR PARTIALLY COMPLETED SURFACES BECOME ERODED, RUTTED, SETTLED, OR WHERE THEY LOSE COMPACTION DUE TO SUBSEQUENT CONSTRUCTION OPERATIONS OR WEATHER CONDITIONS.
- C. WHERE SETTLING OCCURS BEFORE PROJECT CORRECTION PERIOD ELAPSES, REMOVE FINISHED SURFACING, BACKFILL WITH ADDITIONAL SOIL MATERIAL, COMPACT, AND RECONSTRUCT SURFACING.
1. RESTORE APPEARANCE, QUALITY, AND CONDITION OF FINISHED SURFACING TO MATCH ADJACENT WORK, AND ELIMINATE EVIDENCE OF RESTORATION TO GREATEST EXTENT POSSIBLE.
- 3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS
- A. DISPOSAL: REMOVE SURPLUS SATISFACTORY SOIL AND WASTE MATERIAL, INCLUDING UNSATISFACTORY SOIL, TRASH, AND DEBRIS, AND LEGALLY DISPOSE OF IT OFF OWNER'S PROPERTY.



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LAKE REGION STATE COLLEGE

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: **20112552**

DRAWN BY: **JCE**

CHECKED BY: **JRK**

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DRAWING TITLE

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C002

STORM WATER POLLUTION PLAN

THE ATTACHED STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IS PREPARED IN ACCORDANCE WITH THE GENERAL PERMIT AUTHORIZATION TO DISCHARGE STORM SEWER WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM PERMIT PROGRAM, AS ADMINISTERED BY NORTH DAKOTA DEPARTMENT OF HEALTH. THE PLAN IS DIVIDED INTO THREE PARTS AS FOLLOWS:

PART 1: TEMPORARY EROSION AND SEDIMENT CONTROL

PART 2: PERMANENT EROSION AND SEDIMENT CONTROL

APPENDIX A: STORM WATER POLLUTION PREVENTION PLAN (SWPPP) EXHIBIT

PLEASE NOTE THAT THE CONTRACTOR MUST SUBMIT AND ACQUIRE A PERMIT PRIOR TO THE START OF CONSTRUCTION FOR ALL PROJECTS THAT DISTURB 1 ACRE OR MORE. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING THE PERMIT ALONG WITH ANY PERMIT FEE.

PART 1 TEMPORARY EROSION AND SEDIMENT CONTROL

1.1 SCOPE OF WORK

- A. THE GOAL OF TEMPORARY EROSION AND SEDIMENT CONTROL IS TO PREVENT SEDIMENT FROM ENTERING WATERS OF THE STATE DURING AND RESULTING FROM THE CONSTRUCTION OPERATIONS.
- B. THE WORK SHALL PROVIDE PREVENTION, CONTROL, AND ABATEMENT OF WATER POLLUTION THROUGH THE USE OF BERMS, DIKES, DAMS, SEDIMENT BASINS, FIBER MATS, NETTING, GRAVEL, MULCHES, GRASSES, SLOPE DRAINS, AND OTHER EROSION CONTROL DEVICES OR METHODS.
- C. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE COORDINATED WITH PERMANENT EROSION CONTROL FEATURES SPECIFIED ELSEWHERE IN THE CONTRACT TO THE EXTENT PRACTICAL TO ASSURE ECONOMICAL, EFFECTIVE, AND CONTINUOUS EROSION CONTROL THROUGHOUT THE CONSTRUCTION AND POST-CONSTRUCTION PERIOD.

1.2 MATERIALS

- A. MULCHES MAY BE HAY, STRAW, FIBER MATS, NETTING, WOOD CELLULOSE, CORN STALKS, BARK, CORN COBS, WOOD CHIPS, OR OTHER SUITABLE MATERIAL ACCEPTABLE TO THE ENGINEER. MULCHES SHALL BE CLEAN AND FREE OF NOXIOUS WEEDS AND DELETERIOUS MATERIAL.
- B. SLOPE DRAINS MAY BE CONSTRUCTED OF PIPE, FIBER MATS, RUBBLE, PORTLAND CEMENT CONCRETE, BITUMINOUS CONCRETE, PLASTIC SHEETS, OR OTHER MATERIAL ACCEPTABLE TO THE ENGINEER THAT ADEQUATELY CONTROLS EROSION.
- C. GRASS SHALL BE QUICK-GROWING SPECIES SUITABLE TO THE AREA AND SHOULD PROVIDE A TEMPORARY COVER WHICH WILL NOT LATER COMPETE WITH GRASSES SOWN FOR PERMANENT COVER.
- D. SEDIMENT BASINS, SEDIMENT TRAPS, BARRIERS, AND FILTERS MAY BE CONSTRUCTED BY USING SILT FENCES, STAKED HAY OR STRAW BALES IN CONJUNCTION WITH NECESSARY EARTHWORK.
- E. OTHER ITEMS PROPOSED BY THE CONTRACTOR FOR EROSION AND SEDIMENT CONTROL MUST BE APPROVED BY THE ENGINEER.
- F. AS SPECIFIED IN "SITE CLEARING" NOTES AND SPECIFICATIONS.
- G. PERMANENT VEGETATION: NDDOT GRASS SEED MIXTURE CLASS II BLEND AND APPLICATION RATE IN NDDOT SECTION 708.02 AND TYPE B SEEDED PREPARATION .
- H. TEMPORARY STABILIZATION VEGETATION: NDDOT CLASS IV OATS @ 10#/ ACRE, ANNUAL RYE-GRASS
 - 1. SUBSTITUTE OATS FOR WINTER WHEAT FOR SPRING PLANTING.
- I. STRAW MULCH IS REQUIRED. CONTRACTOR MAY USE HYDROMULCH AND CLASS III SEED BLEND

1.3 GENERAL EROSION CONTROL

- A. THE EXISTING SOIL TYPES ENCOUNTERED DURING CONSTRUCTION OF THIS PROJECT WILL CONSIST MAINLY OF ORGANIC CLAY TOPSOIL, SILTY AND SANDY LEAN CLAYS, OR LEAN CLAYS WITH SAND. THEY ARE ERODIBLE ON SLOPES OF 4% OR GREATER.
- B. THE CONTRACTOR SHALL USE, WHERE POSSIBLE, HORIZONTAL SLOPE GRADING, CONSTRUCTION PHASING, AND OTHER CONSTRUCTION PRACTICES THAT MINIMIZE EROSION.
- C. EROSION CONTROL FABRIC MEETING ND DOT 856.03 OR STRAW MATS MEETING ND DOT SECTION 856.02 SHALL BE USED ALL SLOPES OF 5:1 SLOPE OR STEEPER.
- D. UNLESS PRECLUDED BY SNOW COVER, ALL EXPOSED SOIL AREAS WITH A CONTINUOUS POSITIVE SLOPE WITHIN 200 LINEAL FEET FROM A WATER OF THE STATE, OR FROM A CURB, CUTTER, STORM SEWER INLET, TEMPORARY OR PERMANENT DRAINAGE DITCH OR OTHER STORM WATER CONVEYANCE SYSTEM, WHICH IS CONNECTED TO A WATER OF THE STATE, SHALL HAVE TEMPORARY PROTECTION OR PERMANENT COVER FOR THE EXPOSED SOIL AREAS WITHIN THE FOLLOWING TIME FRAMES:

TYPE OF SLOPE	TEMPORARY PROTECTION OR PERMANENT COVER WHERE THE AREA HAS NOT BEEN, OR WILL NOT BE, WORKED BY THE CONTRACTOR FOR:
STEEPER THAN 3:1	3 DAYS
10:1 TO 3:1	7 DAYS
FLATTER THAN 10:1	14 DAYS

EXPOSED SOILS EXCLUDED FROM THIS PROVISION ARE STOCKPILES OR SURCHARGE AREAS OF SAND, GRAVEL, AGGREGATE, CONCRETE OR BITUMINOUS.

ALL LAND-DISTURBING ACTIVITIES SHALL BE COORDINATED AND CONDUCTED SO AS TO MINIMIZE THE SIZE OF THE AREA TO BE EXPOSED AT ANY ONE TIME AND TO MINIMIZE THE TIME OF EXPOSURE. ALL LAND-DISTURBING ACTIVITIES SHALL ALSO BE COORDINATED AND CONDUCTED SO AS TO MINIMIZE OFF-SITE SEDIMENTATION DAMAGE.

- E. THE BOTTOM OF ANY TEMPORARY OR PERMANENT DRAINAGE DITCH CONSTRUCTED TO DRAIN WATER FROM A CONSTRUCTION SITE MUST BE STABILIZED WITHIN 200 LINEAL FEET FROM A WATER OF THE STATE. STABILIZATION MUST BE INITIATED WITHIN TIME FRAME STATED IN THE TABLE OF SECTION D ABOVE.
- F. PRIOR TO CONNECTING ANY PIPE TO WATER OF THE STATE, THE PIPES OUTLET MUST BE PROVIDED WITH TEMPORARY OR PERMANENT ENERGY DISPOSITION TO PREVENT EROSION AT LEAST 200 FT LONG DOWNSTREAM OF THE PERMANENT OUTLET.
- G. TEMPORARY EROSION CONTROL DEVICES
 - 1. DURING CONSTRUCTION THE CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE OF TEMPORARY EROSION CONTROL DEVICES.
 - 2. UPON COMPLETION OF PROJECT, THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING:
 - a) MAINTAINING OF TEMPORARY EROSION CONTROL DEVICES UNTIL PERMANENT FACILITIES ARE CONSTRUCTED AND FINAL STABILIZATION HAS OCCURRED.
 - b) REMOVAL OF TEMPORARY EROSION CONTROL DEVICES ONCE PERMANENT FACILITIES ARE CONSTRUCTED AND FINAL STABILIZATION HAS OCCURRED.
- H. A VEGETATED BUFFER MAY BE USED, AS AN ACCEPTABLE CONTROL MEASURE WHERE SUCH VEGETATION PROVIDES 70% COVERAGE

1.4 GENERAL SEDIMENT CONTROL

- A. SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs) ARE THOSE WHICH PREVENT SEDIMENT FROM ENTERING A WATER OF THE STATE, STORM SEWER INLET, DITCH OR OTHER STORM WATER CONVEYANCE SYSTEM. THE SEDIMENT CONTROL DEVICES SHALL BE ESTABLISHED ON ALL DOWN-GRADIENT PERMEABLES BEFORE ANY UP-GRADIENT LAND DISTURBING ACTIVITIES BEGIN, AND SHALL REMAIN IN PLACE UNTIL FINAL STABILIZATION HAS BEEN ESTABLISHED.
- B. THE CONTRACTOR SHALL MINIMIZE VEHICLE TRACKING OF SEDIMENT OR SOIL OFF-SITE AT LOCATIONS WHERE VEHICLES EXIT THE CONSTRUCTION SITE ONTO PAVED SURFACE.
- C. THE CONTRACTOR SHALL CONSTRUCT A STABILIZED ENTRANCE AT EACH ENTRY UNTO A PAVED, PUBLIC ROAD, AS PER "EROSION CONTROL" NOTES ON SHEET C002.
 - 1. THE PERMANENT AGGREGATE SURFACE SHALL BE A SUITABLE SURFACE
- D. SEDIMENT CONTROL DEVICES

- 1. DURING CONSTRUCTION THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING:
 - a) MAINTENANCE OF SEDIMENT CONTROL DEVICES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PERIODICALLY CLEANING OUT AND DISPOSING OF ALL SEDIMENT ONCE THE STORAGE CAPACITY OF THE DRAINAGE FEATURE OR STRUCTURE RECEIVING THE SEDIMENT IS REDUCED BY ONE-HALF.
 - b) REMOVAL OF ANY SEDIMENT RESULTING FROM CONSTRUCTION FROM THE PROJECT LIMITS.
- 2. UPON COMPLETION OF PROJECT THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING:
 - a) CLEANING OUT AND DISPOSING OF ALL SEDIMENT.
 - b) REMOVING THE SEDIMENT CONTROL DEVICES AND VERIFYING THE CLEANING OUT OF ALL STORM DRAINAGE STRUCTURES, INCLUDING FLUMES, PIPES, AND DITCHES ONCE FINAL STABILIZATION HAS OCCURRED.
- 3. ALL SEDIMENT REMOVED SHALL BE DISPOSED OF BY THE CONTRACTOR AT AN OFF-SITE LOCATION IN ACCORDANCE WITH GOVERNING REGULATIONS.

1.5 STANDARD PLATES

- A. THE STANDARD PLATES AS SHOWN ON THE DRAWINGS ARE FURNISHED TO THE CONTRACTOR AS A GUIDE TO ASSIST THE CONTRACTOR WHILE PUTTING TOGETHER A BID FOR TEMPORARY EROSION CONTROL.

1.6 METHOD OF MEASUREMENT AND PAYMENT

- A. ALL EROSION CONTROL SHALL BE INCLUDED IN THE CONSTRUCTION PRICE. THE PRICE SHALL INCLUDE ALL LABOR, TOOLS, MATERIALS AND EQUIPMENT NECESSARY TO FURNISH, AND MAINTAIN THE EROSION CONTROL. IT SHALL FURTHER INCLUDE REMOVAL AND DISPOSAL OF THE SILT FENCE ONCE TURF ESTABLISHMENT HAS BEEN COMPLETED.

PART 2 PERMANENT EROSION AND SEDIMENT CONTROL

2.1 SCOPE OF WORK

- A. THE GOAL OF PERMANENT EROSION AND SEDIMENT CONTROL IS TO PREVENT SEDIMENT FROM ENTERING WATERS OF THE STATE UPON COMPLETION OF THE CONSTRUCTION OPERATION AND TO STABILIZE ALL AREAS DISRUPTED DURING THE PROJECT.

2.2 MATERIALS

- A. MATERIALS USED FOR THE PERMANENT EROSION AND SEDIMENT CONTROL SHALL INCLUDE BUT NOT BE LIMITED TO REPLACEMENT OF BLACK DIRT SEEDBED, SEEDING, RIPRAP AND OTHER EROSION AND SEDIMENT CONTROL DEVICES SPECIFIED IN THE PLANS AND SPECIFICATIONS.

2.3 SEDIMENT AND EROSION CONTROL

- A. ALL AREAS DISTURBED BY THE CONSTRUCTION WILL RECEIVE ND DOT CLASS B SEED BED PREPARATION AND TOPSOIL AND BE RESEDED WITH PERMANENT VEGETATIVE COVER.

2.4 STANDARD PLATES

- A. THE CONTRACTOR SHALL REFER TO THE PLANS WHICH SHOW THE LOCATIONS OF PERMANENT EROSION AND SEDIMENT CONTROL MEASURES AND THE SPECIFICATIONS WHICH OUTLINE MATERIALS AND PROCEDURES.

2.5 METHOD OF MEASUREMENT AS PAYMENT

- A. THE WORK REQUIRED BY THE CONTRACTOR FOR PERMANENT EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PAID AS A LUMP SUM WITHIN THEIR SCHEDULE OF VALUES.

END OF SECTION

STORM WATER POLLUTION PREVENTION PLAN – EXHIBIT

1.0 INTRODUCTION

1.1 GOAL

THE GOAL OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IS TO PROTECT WATER RESOURCES FROM POLLUTANTS GENERATED FROM A PROJECT'S CONSTRUCTION PHASE WORK AND ITS ULTIMATE DEVELOPMENT PHASE ITEMS INCLUDING IMPERVIOUS SURFACES, CHANGE IN LAND USE, OR CHANGED GROUND COVER.

1.2 PROJECT DESCRIPTION

THE PROPOSED PROJECT CONSISTS OF ROADS, UNDERGROUND UTILITIES, AND GRADING. THE WORK IS IN MULTIPLE SECTIONS OF, TOWNSHIP 154W, RANGE 64W, AS INDICATED ON THE PROJECT DRAWINGS.

ALL AREAS DISTURBED DURING CONSTRUCTION WILL RECEIVE TURF ESTABLISHMENT WITHIN THE TIME FRAMES AS OUTLINED IN THE SPECIFICATIONS TO PREVENT EROSION.

2.0 ASSIGNING RESPONSIBILITY

2.1 GENERAL

THE CONTRACTOR MUST MAINTAIN THE WATER QUALITY MANAGEMENT BMP'S UNTIL CONSTRUCTION IS COMPLETE. ALL MAINTENANCE ACTIVITIES REQUIRED IN PART I.E. ARE COMPLETE, THE SITE HAS UNDERGONE FINAL STABILIZATION, AND A NOTICE OF TERMINATION HAS BEEN SUBMITTED TO THE AGENCY.

2.2 SPECIAL CONSIDERATIONS

- A. PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE TO OBTAIN A NPDES STORM WATER PERMIT FROM NORTH DAKOTA DEPARTMENT OF HEALTH AS DEFINED IN SECTION 02100 OF THE SPECIFICATIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR SUBMITTING THE PERMIT APPLICATION AND ANY APPLICATION FEE. UPON RECEIPT OF THE PERMIT, IT SHALL BE POSTED IN A VISIBLE LOCATION ON THE CONSTRUCTION SITE AT THE MAIN ENTRANCE OF HWY 20.
- B. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL AND MAINTAIN EROSION CONTROL FOR THIS PROJECT IN ACCORDANCE WITH THE PERMIT. THE ITEMS IDENTIFIED IN THE PLAN ARE INTENDED TO PROVIDE A METHOD OF EROSION CONTROL. IF THE CONTRACTOR HAS OTHER IDEAS THAT ARE DIFFERENT THAN THAT WHICH IS PROPOSED AND IS IN CONFORMANCE WITH THE GUIDELINES, THEY MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL. ALL REQUESTS MUST BE MADE PRIOR TO THE BIDDING OF THE PROJECT IN ACCORDANCE WITH THE SPECIFICATIONS FOR THIS PROJECT.
- C. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSPECT AND MAINTAIN ALL TEMPORARY EROSION CONTROL DEVICES TO ASSURE THE PROPER OPERATION OF THAT DEVICE. IF THE PROJECT ENGINEER OR SITE INSPECTOR FIND EROSION CONTROL DEVICES FAILING OR IN NEED OF REPAIR, THEY WILL NOTIFY THE CONTRACTOR AND THE ITEM MUST BE REPAIRED TO PREVENT ANY FURTHER EROSION FROM OCCURRING.
- D. DURING CONSTRUCTION, IT WILL BE NECESSARY FOR THE CONTRACTOR TO CLEAN UP ANY AREAS THAT MATERIAL HAS BEEN TRACKED OFF OF THE CONSTRUCTION SITE. THIS MAY REQUIRE THE USE OF EQUIPMENT TO PICK UP THE LARGE QUANTITIES OF MATERIAL AND ALSO THE SWEEPING OF STREETS FOR SMALLER QUANTITIES OF MATERIAL. THE SWEEPING WILL BE COMPLETED WITH A PICK-UP STYLE SWEEPER TO MINIMIZE DUST AND TO PREVENT DEBRIS FROM ENTERING THE STORM SEWER SYSTEMS.
- E. DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE ALL MEASURES NECESSARY TO PREVENT SEDIMENT FROM BEING TRANSPORTED BEYOND THE CONSTRUCTION EASMENT. THIS WILL BE COMPLETED BY THE INSTALLATION OF THE PROPER BEST MANAGEMENT PRACTICE DEVICES FOR THIS APPLICATION. IN THE EVENT OF SEDIMENT ENTERING THE STORM SEWER SYSTEM, THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL OF THIS SEDIMENT TO PREVENT ANY FURTHER CONTAMINATION OF THE RECEIVING WATER BODY. THIS CLEAN UP MAY NOT BE LIMITED TO THE CONSTRUCTION SITE. IT MAY INCLUDE THE CLEANUP OF DITCHES, DRAINAGE SWALES, OR THE RECEIVING WATER BODY.
- F. IN THE EVENT THAT WATER IS TO BE PUMPED FROM THE SUBGRADE OR AN EXCAVATION AREA, IT WILL NOT BE PERMISSIBLE TO DISCHARGE THIS WATER DIRECTLY TO A WATER OF THE STATE, CATCH BASIN, OR DITCH. IT WILL BE NECESSARY FOR THE CONTRACTOR TO PROVIDE A SEDIMENT REMOVAL DEVICE OR SOME METHOD TO REMOVE SEDIMENT THAT MEETS THE APPROVAL OF THE ENGINEER.
- G. IT MAY BE NECESSARY FOR THE CONTRACTOR TO STAGE THE PROPOSED WORK TO MEET THE REQUIREMENTS OF THE STORM WATER POLLUTION PREVENTION PLAN. THIS MAY INCLUDE THE INSTALLATION OF EROSION CONTROL MEASURES ON A TEMPORARY BASIS OR AT TIMES PRIOR TO THE COMPLETION OF THE ENTIRE PROJECT. THIS MAY REQUIRE THE CONTRACTOR TO SCHEDULE SEEDING OR MULCHING AT TIMES OTHER THAN THE VERY END OF THE PROJECT. IF NECESSARY THE PROJECT ENGINEER OR INSPECTOR WILL REQUIRE THE CONTRACTOR TO COMPLETE THE

INTERIM EROSION CONTROL ITEMS.

- H. CONTRACTOR WILL BE PERMITTED TO WASH OUT THE CONCRETE TRUCKS ON THE PROJECT SITE INTO A CONSTRUCTED OR OVEREXCAVATED BASIN AT THEIR DISCRETION. IT WILL BE NECESSARY FOR THE CONTRACTOR TO HAVE THE WASTE FROM THE CONCRETE TRUCKS BE HAULED TO THE POINT OF ORIGINATION.

3.0 STORM WATER POLLUTION PREVENTION PLAN CONTENT

THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) WILL CONTAIN APPROPRIATE BMP'S THAT SATISFY THE ABOVE GOAL, AND CONTAIN STANDARD PLATES AND/OR SPECIFICATIONS OF THESE BMP'S. THESE STANDARD PLATES AND SPECIFICATIONS WILL BE INCORPORATED INTO THE PROJECT'S FINAL PLANS AND SPECIFICATIONS.

3.1 PLAN INFORMATION

A. RESOURCES

THE TABLE PROVIDED BELOW IS INTENDED TO IDENTIFY THE LOCATION WHERE INFORMATION RELATED TO THE SWPPP CAN BE FOUND IN THE PLANS OR SPECIFICATIONS THAT ARE PART OF THIS PROJECT.

ITEM	LOCATION
NPDES PERMIT FORM	FROM ENGINEER
TEMPORARY EROSION CONTROL	C003, PART 1
TEMPORARY EROSION CONTROL DETAILS	C601
SEDIMENT REMOVAL	SWPP
INSPECTION, MAINTENANCE, CLEAN UP	SWPP
TEMPORARY WORK NOT IN PLAN	-
VEHICLE TRACKING	SWPP
CONCRETE TRUCK WASHOUT	ITEM H OF SECTION 2.2

B. LAND FEATURES

THIS INFORMATION IDENTIFIES THE CHANGES IN LAND CHARACTERISTICS FOR BOTH BEFORE AND AFTER CONSTRUCTION.

- 1) TOTAL DISTURBED PROJECT AREA 28.40 ACRES.
- 2) TOTAL IMPERVIOUS SURFACE AREA DURING PROJECT 2.28 ACRES.
- 3) TOTAL PERVIOUS SURFACE AREA DURING PROJECT 26.12 ACRES.
- 4) TOTAL IMPERVIOUS SURFACE AREA (PERMANENT ROADS) 2.24 ACRES.
- 5) TOTAL PERVIOUS SURFACE AREA (DISTURBED AREAS) 26.16 ACRES.

C. STANDARD PLATES AND/OR SPECIFICATIONS

- 1) PERMANENT EROSION CONTROL
 - a. ALL DISTURBED AREA WILL HAVE PERMANENT VEGETATION INSTALLED. REFER TO "LAWN AND GRASSES" NOTES.

3.2 PLAN RETENTION

THE OWNER SHALL KEEP A COPY OF THE SWPPP AND ANY CHANGES TO IT FOR THREE YEARS AFTER COMPLETION OF THE CONSTRUCTION PROJECT.

3.3 CHANGES TO THE SWPPP

THE INFORMATION PROVIDED IN PLANS AND SPECIFICATIONS BY THE ENGINEER ARE CONSIDERED ONE OPTION TO PROVIDE THE NECESSARY SEDIMENT AND EROSION CONTROL FOR THIS PROJECT. IT IS NECESSARY TO PROVIDE THIS AS A GUIDE FOR THE CONTRACTOR. IF THE CONTRACTOR FEELS ANOTHER OPTION IS MORE APPROPRIATE FOR THIS PROJECT THEY CAN PRESENT THEIR OPTION TO THE ENGINEER. SINCE SOME OF THE ITEMS COVERED IN THE SWPPP ARE INCLUDED AS BID ITEMS ANY CHANGES REQUESTED BY THE CONTRACTOR MUST BE COMPLETED IN ACCORDANCE WITH THE SPECIFICATIONS RELATED TO PLAN CHANGES TO ALLOW FOR APPROPRIATE TIME TO COMPLETE ANY ADDENDUM THAT MAY BE NECESSARY.

CHANGES IN THE PLAN MADE DURING CONSTRUCTION TO ACCOMMODATE CHANGED SITE CONDITIONS MUST BE APPROVED BY THE ENGINEER AND MUST BE IN COMPLIANCE WITH THE BMP'S APPROVED BY MPCA.

END OF SECTION

I. GENERAL SWPP NOTES

- A. THE OWNER HAS COMPLETED THE REQUIRED SWPPP FORMS INCLUDING
 - 1. NOTICE OF INTENT
 - 2. NOTICE OF TERMINATION
 - 3. SWPP PLAN TEMPLATE
 - 4. SITE INSPECTION TEMPLATE
- B. THE CONTRACTOR SHALL COMPLETE THE FORMS AND SUBMIT UPDATES TO THE ND DEPARTMENT OF HEALTH AFTER THE CONTRACTS FOR CONSTRUCTION ARE SIGNED
- C. THE CONTRACTOR SHALL BE THE SUPERVISOR AND SHALL HAVE SOLE RESPONSIBILITY TO INSTALL, MAINTAIN, INSPECT, AND ASSUME LIABILITY IN THE EVENT OF A FAILURE.
- D. IN ALL CASES, STRAW ROLLS MAY BE USED IN LIEU OF SILT FENCE.



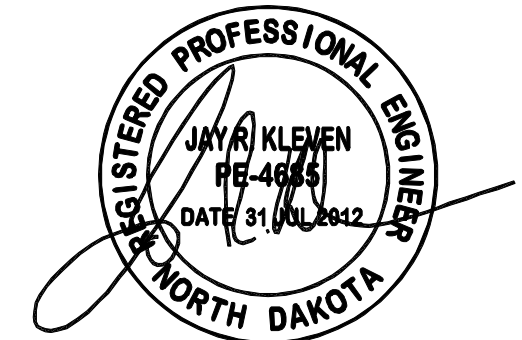
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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

DRAWN BY: JCE

CHECKED BY: JRK

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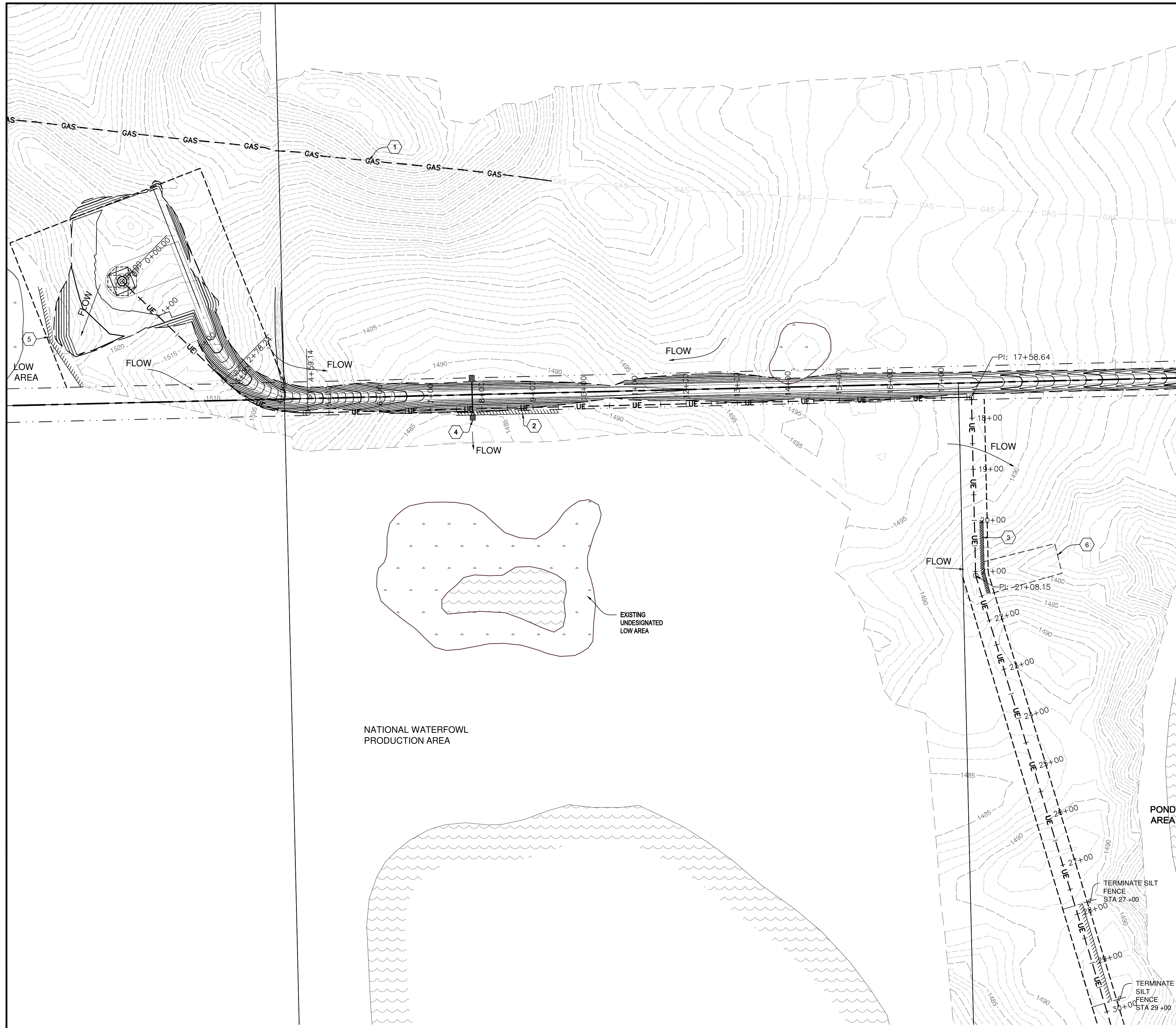
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DRAWING TITLE

GENERAL SWPP NOTES

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C003



REFERENCE NOTES:

- 1 ENBRIDGE UNDERGROUND PIPELINE. DO NOT DISTURB
- 2 400 LF OF SILT FENCE. FIELD VERIFY LOCATION TO PROTECT THE ADJACENT LOW AREA
- 3 PROVIDE CHECK DAM IF OPEN-TRENCHING THE LINE
- 4 INSTALL PERMANENT CULVERT AND ROCK PROTECTION SHEET C201H
- 5 PROVIDE 200 LF SILT FENCE AND STRAW BALE CHECK DAM TO PREVENT SEDIMENTATION INTO LOW AREA.
- 6 PROVIDE 3000 SQ FT OF EROSION CONTROL MAT IF NO VEGETATED BARRIER IS PRESENT.

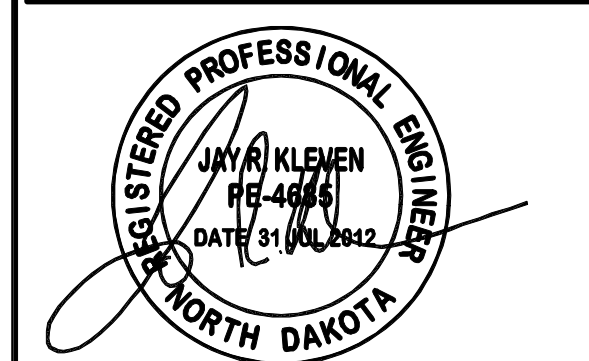


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DRAWING TITLE

SWPP COLLECTION LINE PLANS

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1 SWPP COLLECTION LINE PLAN
C100A 1" = 100'-0"

C100A



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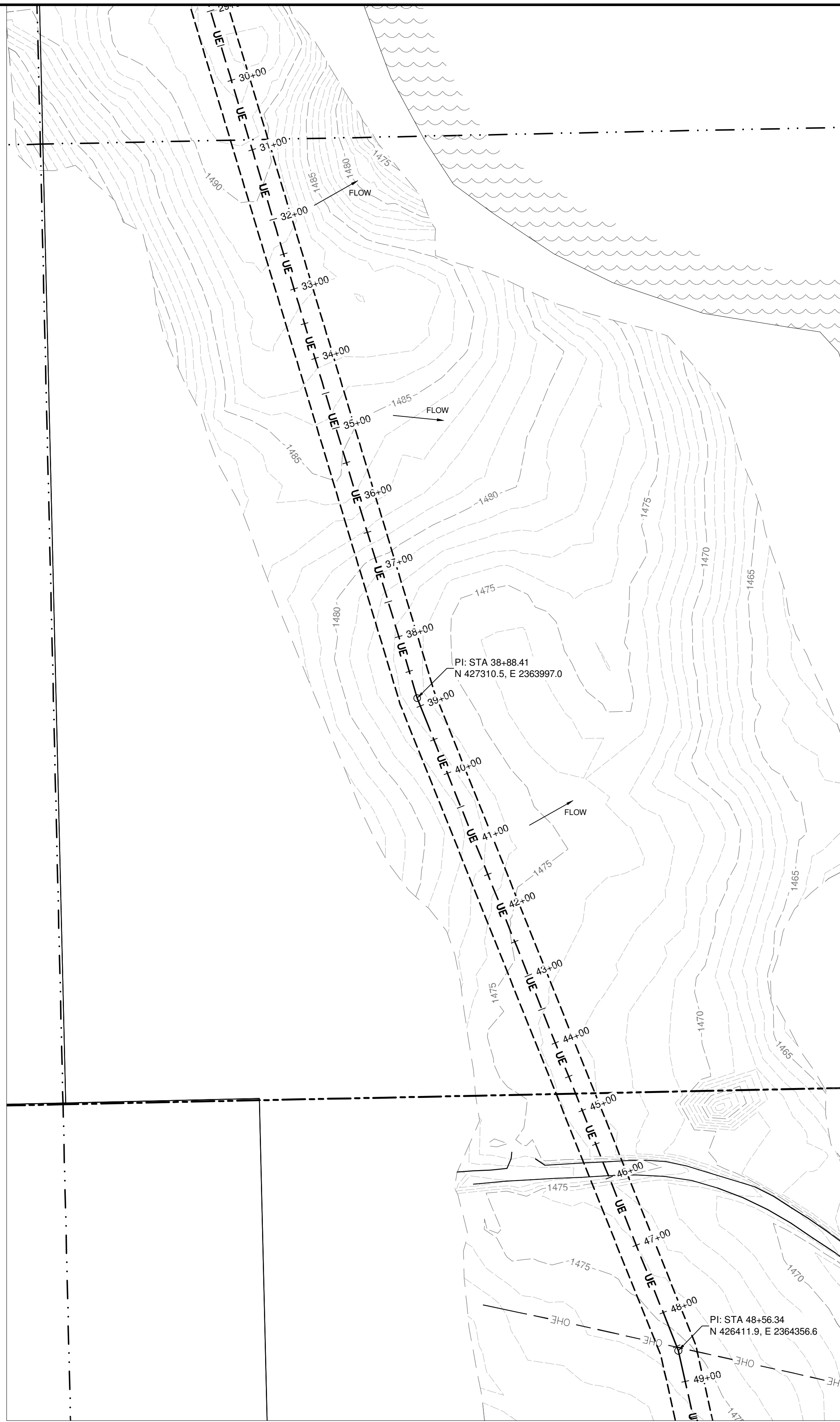
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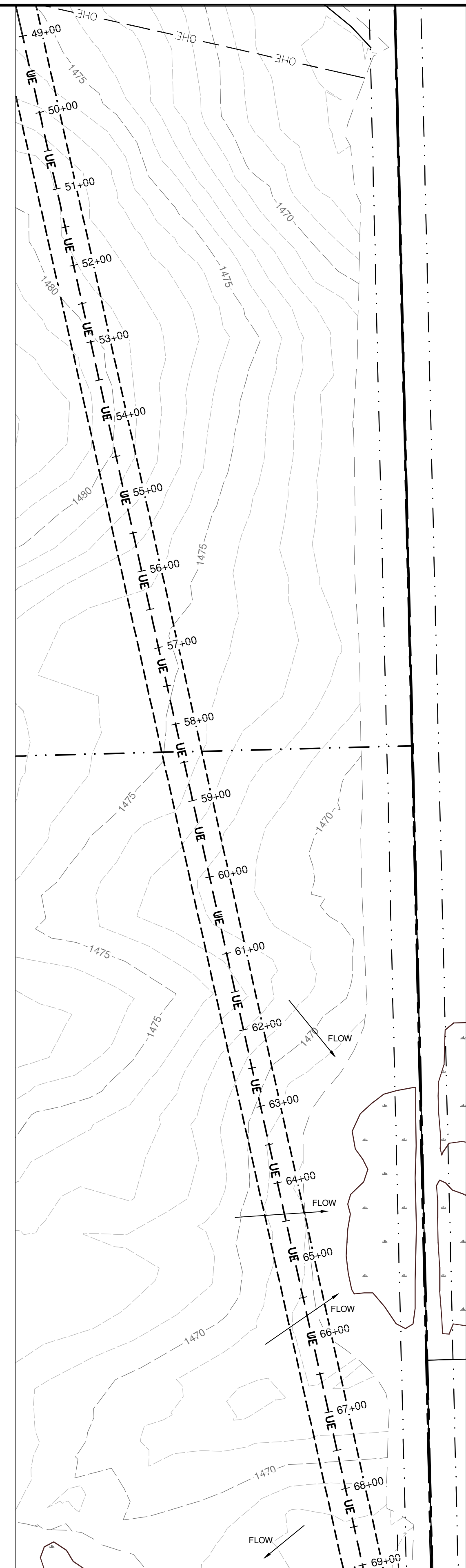
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SWPP COLLECTION LINE PLANS

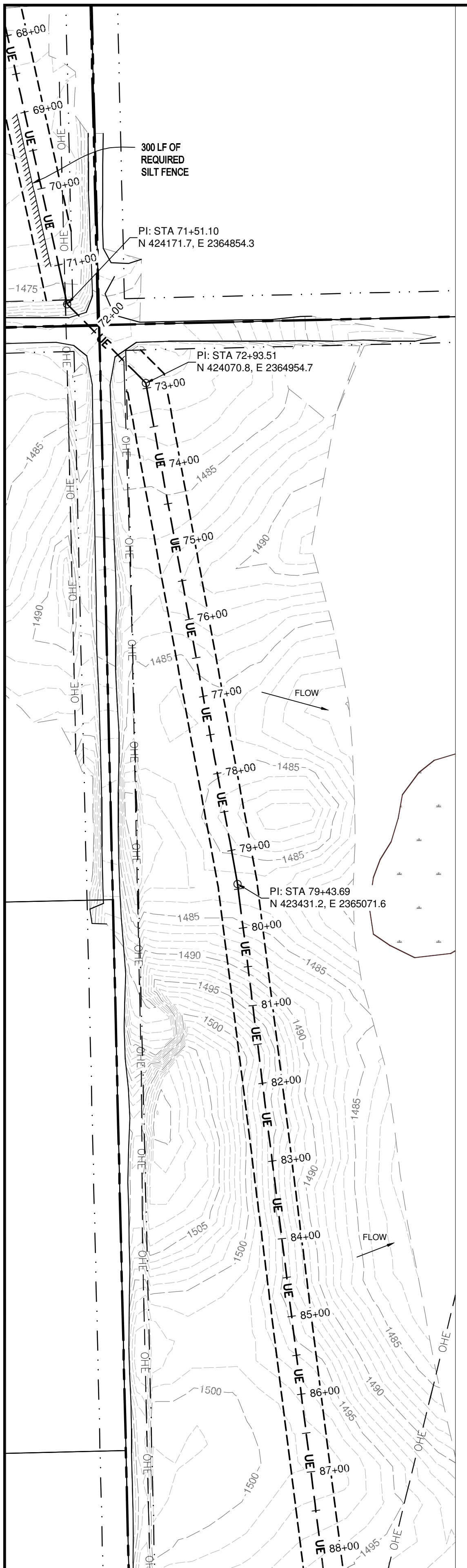
C100B



1 SWPP COLLECTION LINE PLAN
1" = 100'-0"

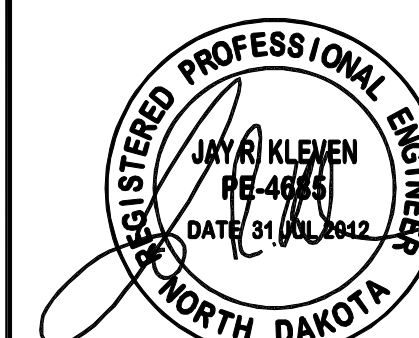


2 SWPP COLLECTION LINE PLAN
1" = 100'-0"



3 SWPP COLLECTION LINE PLAN
1" = 100'-0"

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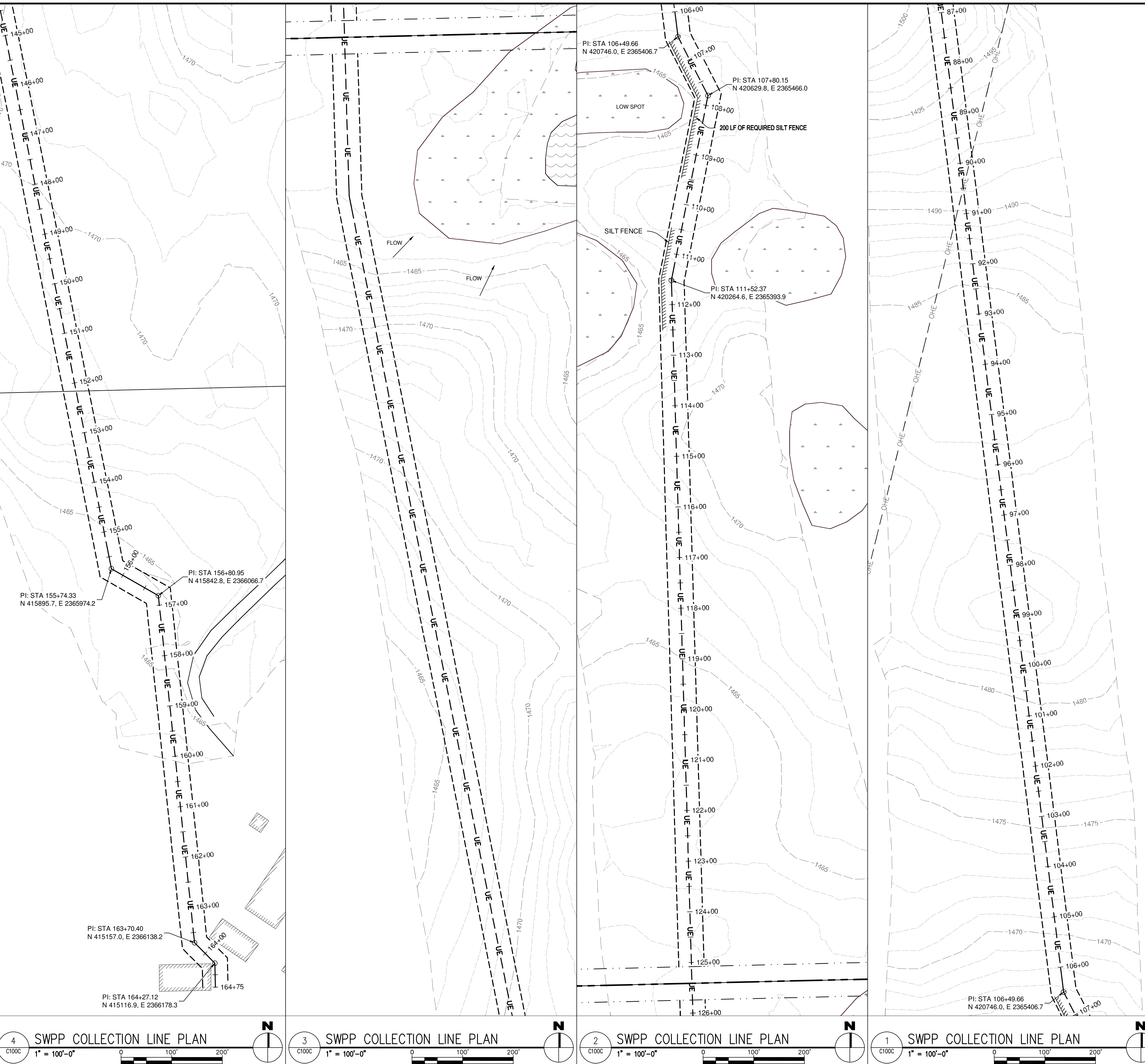
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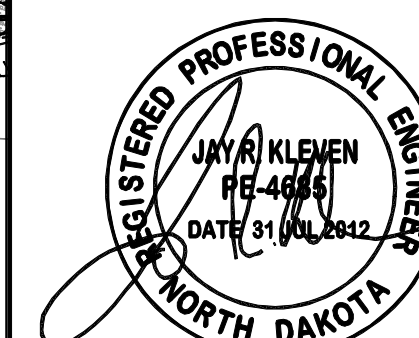
SWPP COLLECTION LINE PLANS

C100C

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4	SWPP COLLECTION LINE PLAN	1" = 100'-0"
3	SWPP COLLECTION LINE PLAN	1" = 100'-0"
2	SWPP COLLECTION LINE PLAN	1" = 100'-0"
1	SWPP COLLECTION LINE PLAN	1" = 100'-0"



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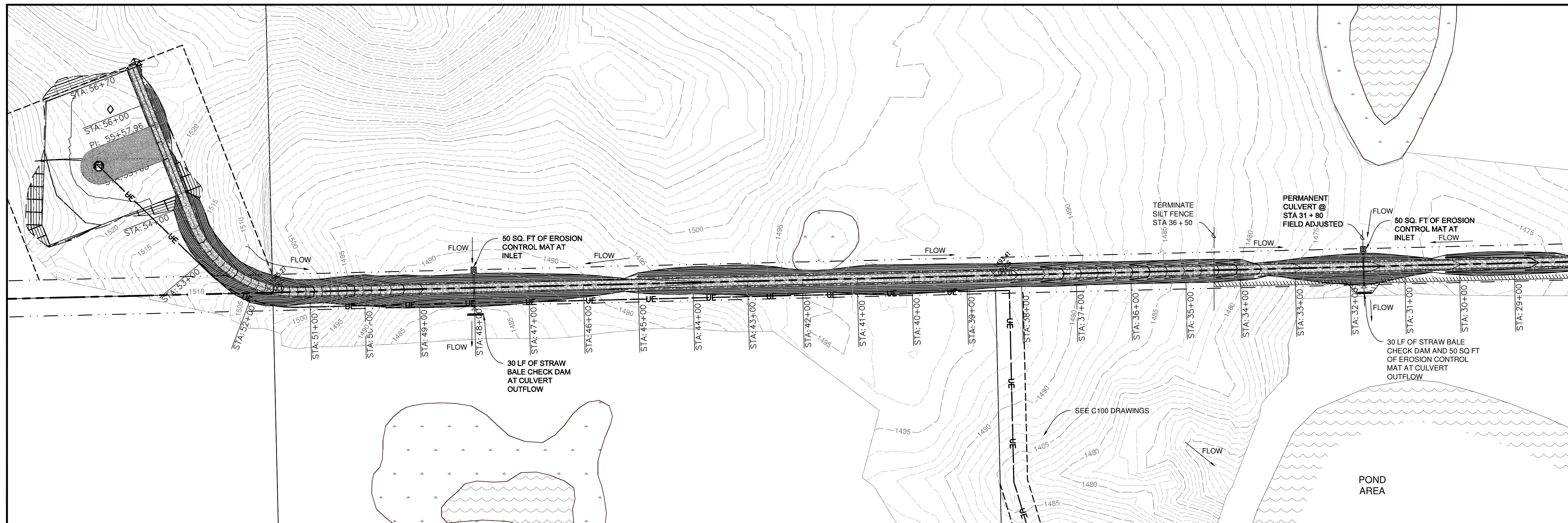
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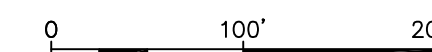
SWPP PROPOSED ACCESS ROAD PLAN

C101



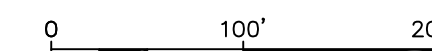
2 SWPP PROPOSED ACCESS ROAD PLAN

1" = 100'-0"

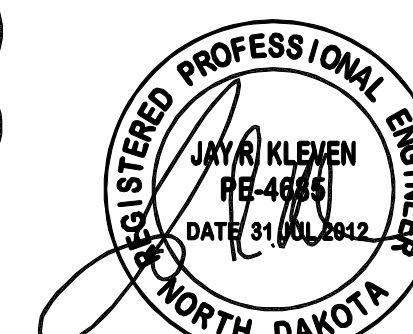


1 SWPP PROPOSED ACCESS ROAD PLAN

1" = 100'-0"



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CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

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CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
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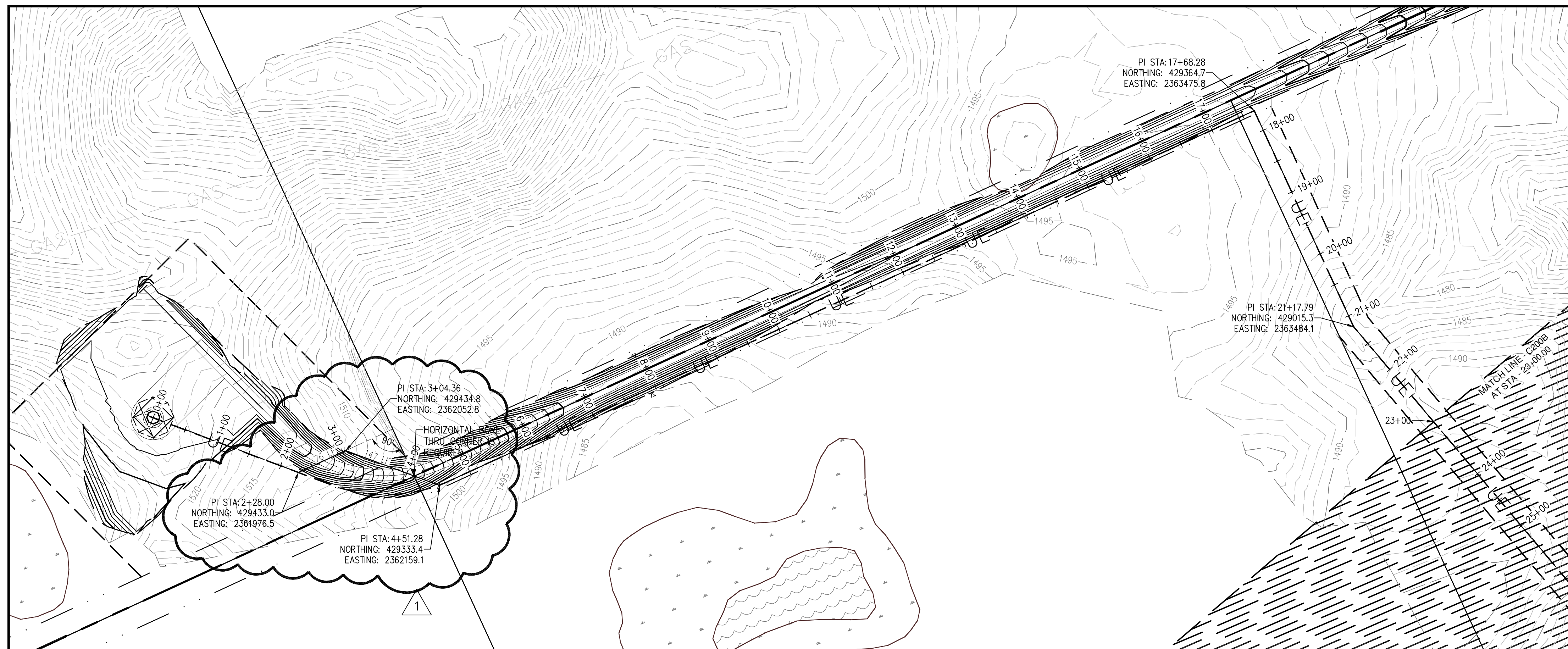
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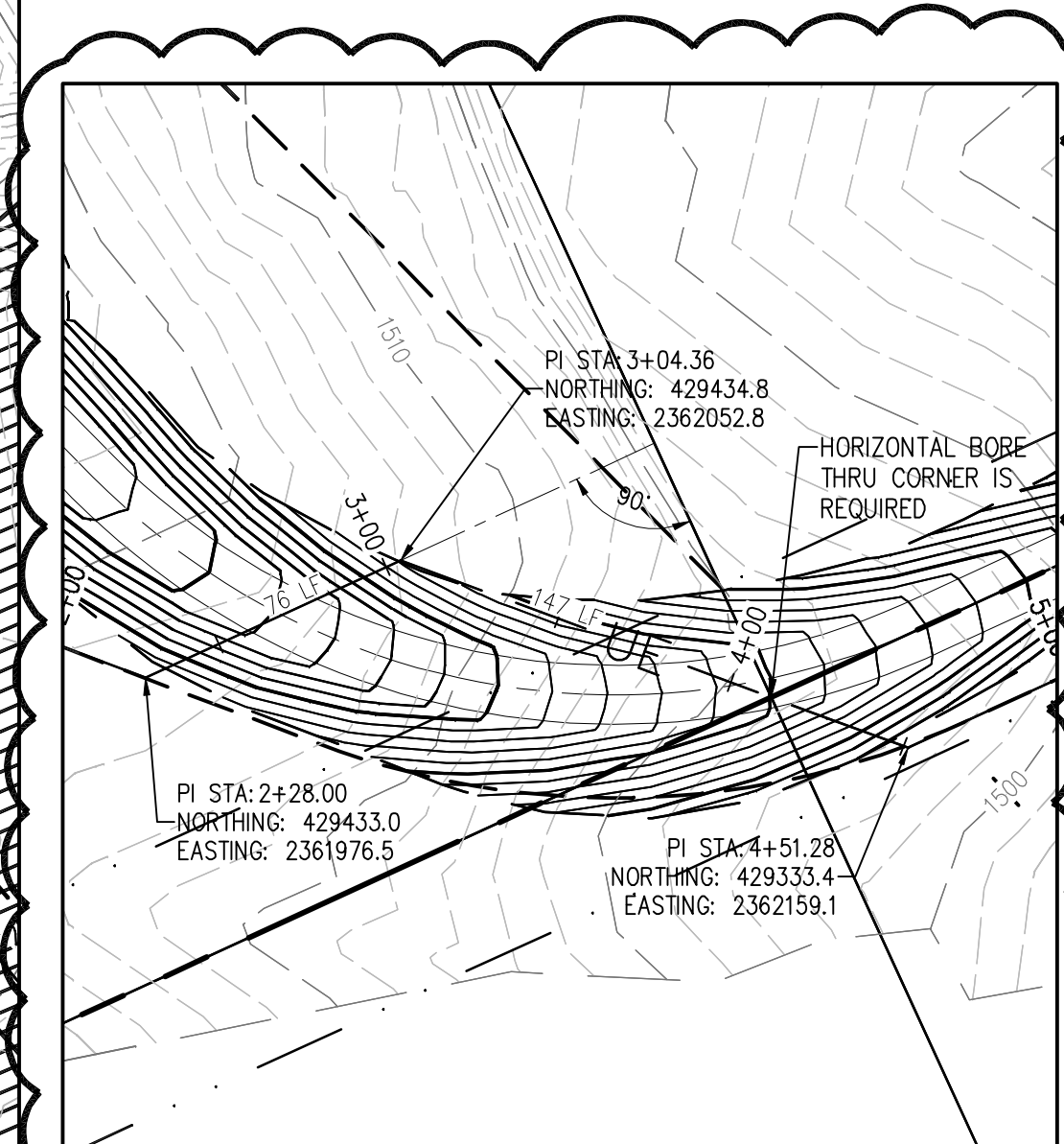
DRAWING TITLE

PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "A"

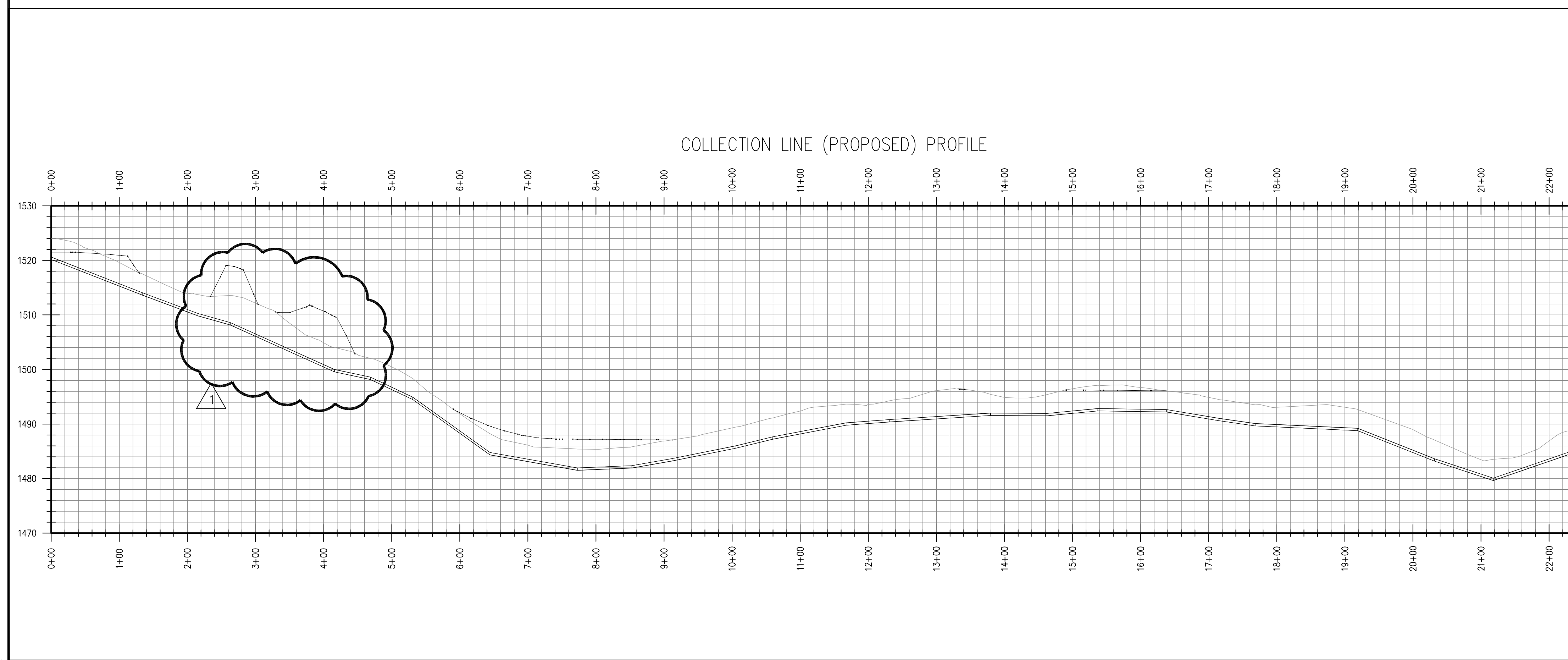
C200A



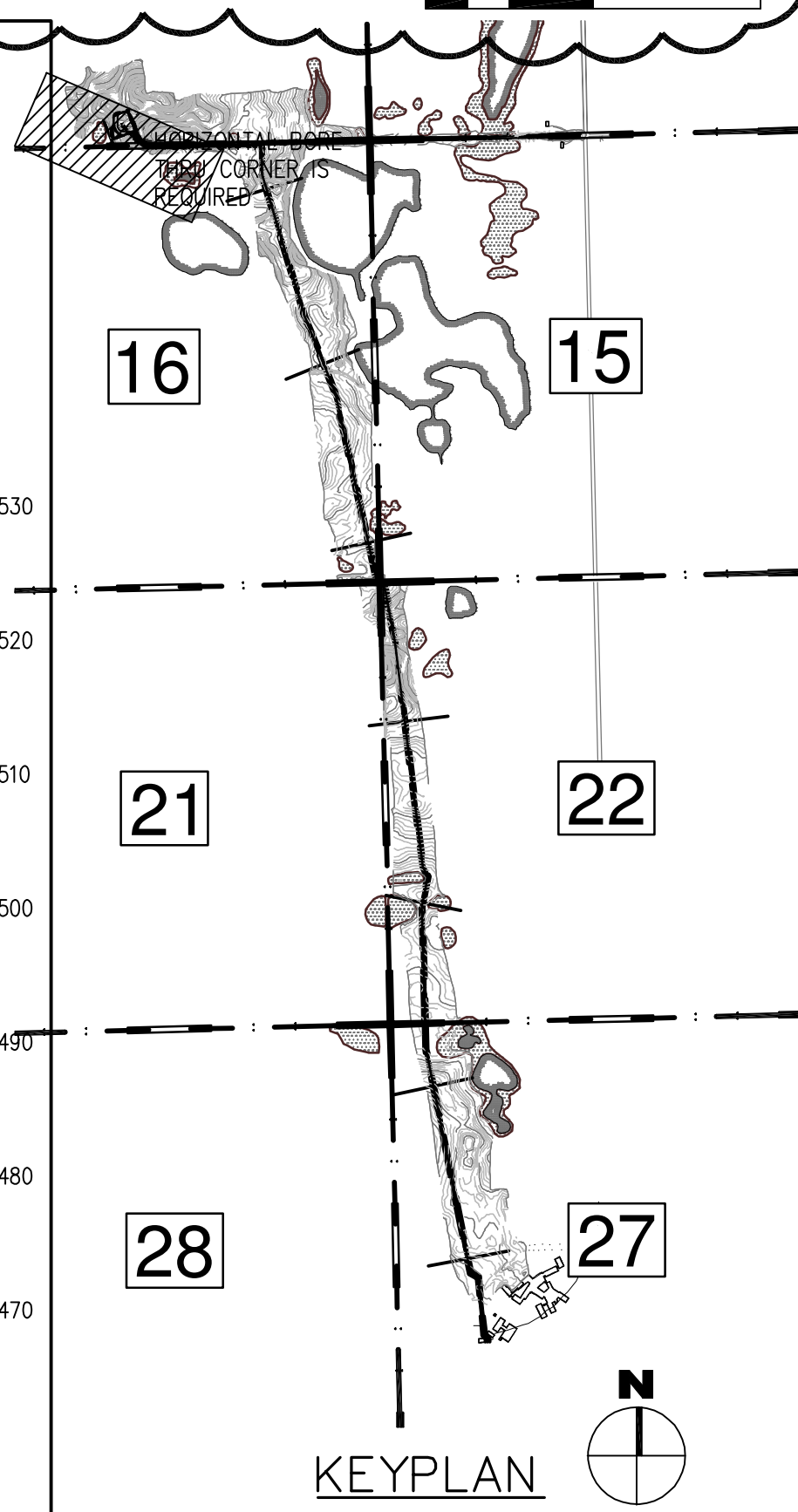
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C200A 1" = 100'-0"



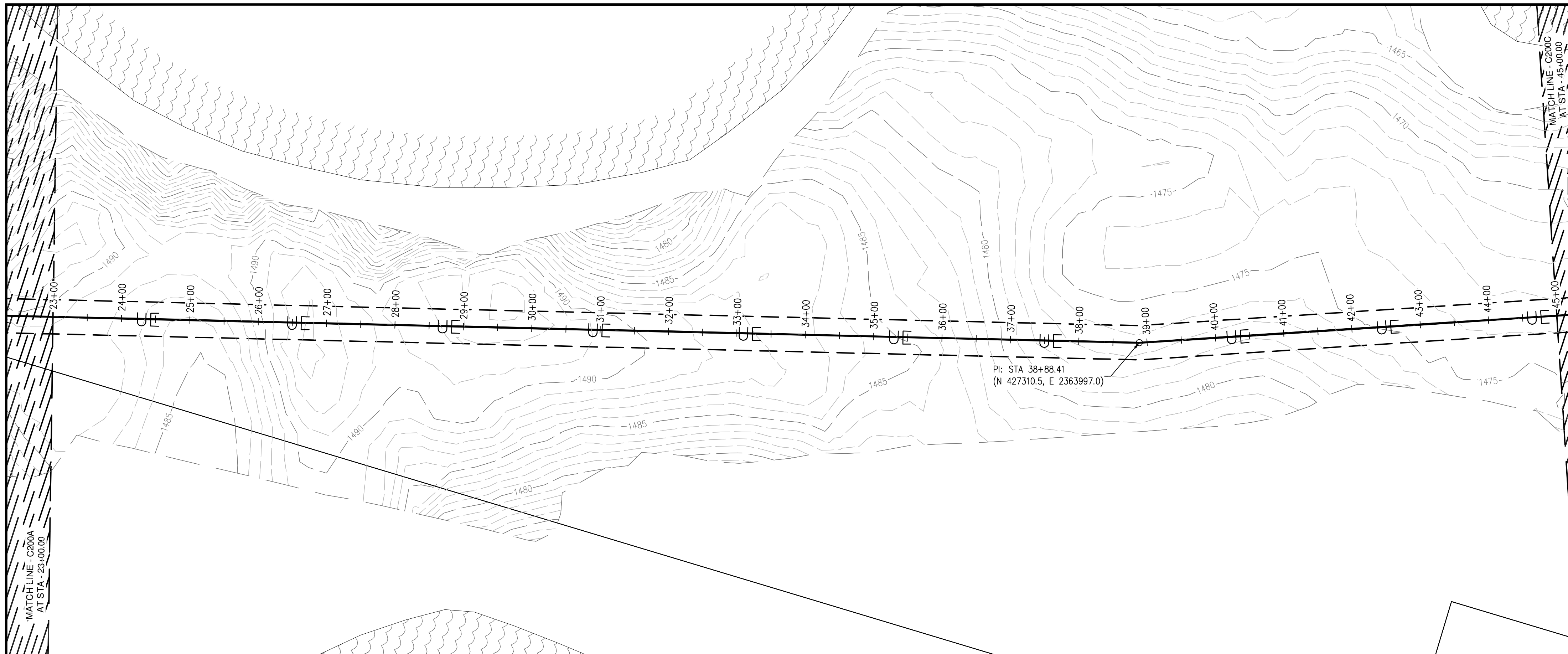
3 ENLARGED PLAN @ ROAD CROSSING
C200A 1" = 50'-0"



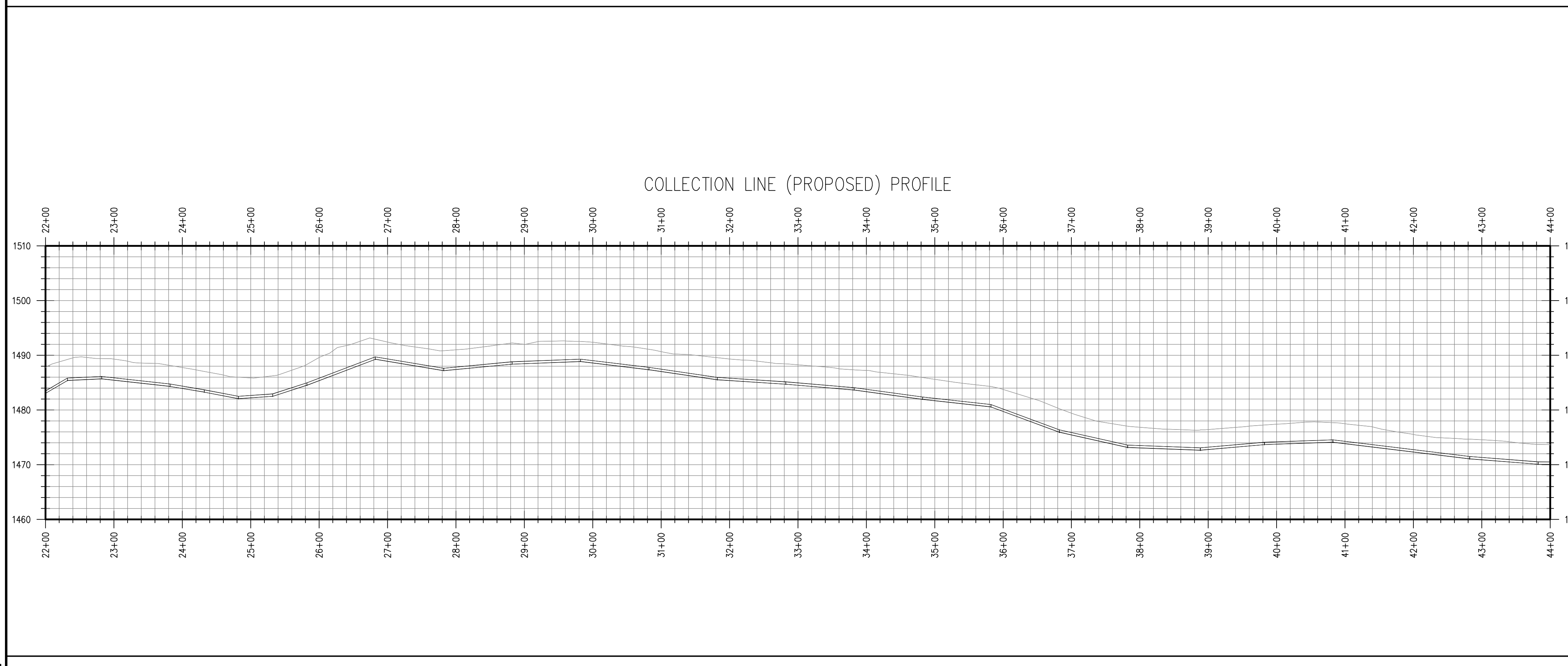
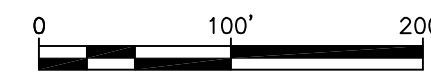
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C200A H: 1" = 100'-0" V: 1" = 10'-0"



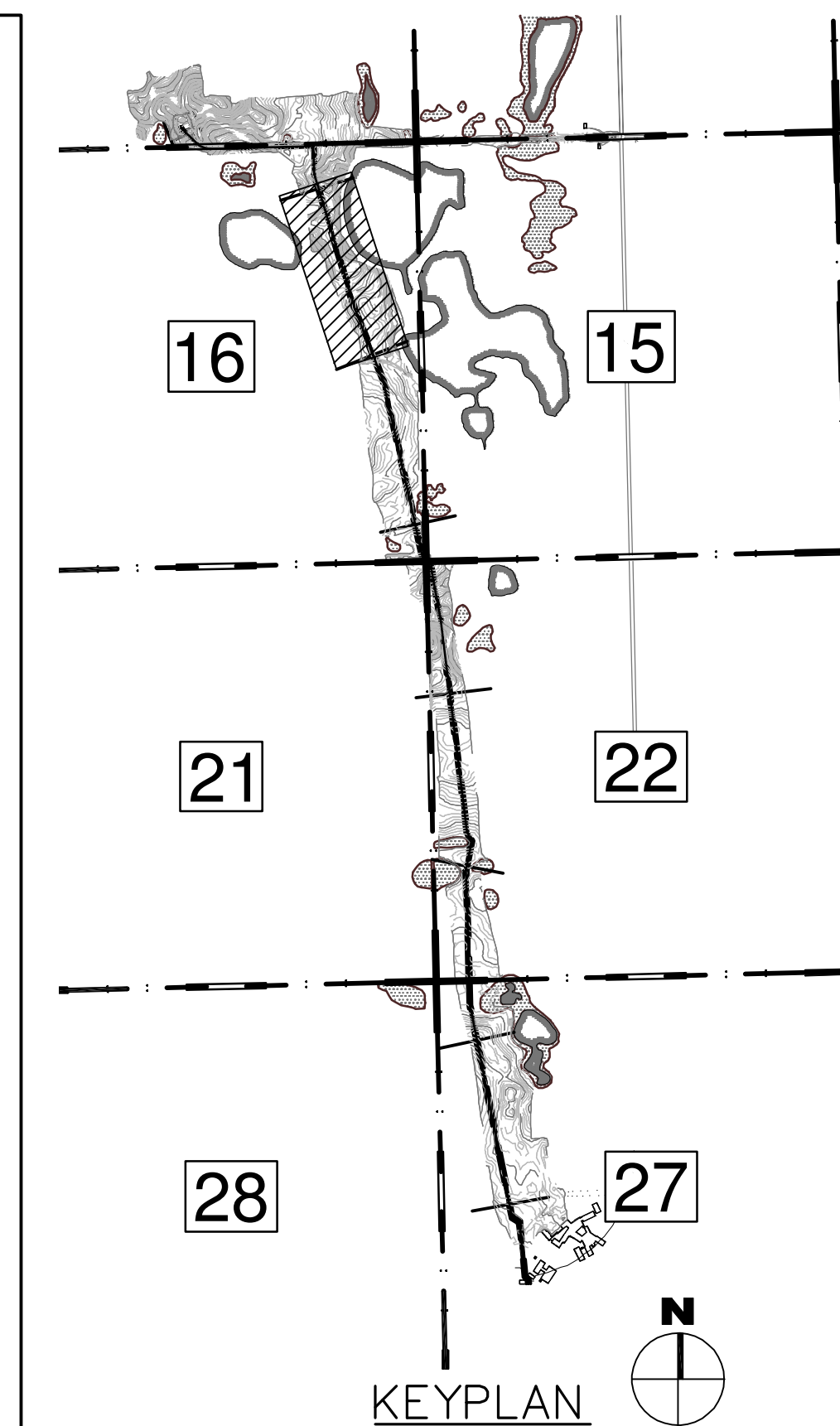
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1 PROPOSED COLLECTION LINE PLAN - AREA "B"
 C200B
 1" = 100'-0"



2 PROPOSED COLLECTION LINE PROFILE - AREA "B"
 C200B
 H: 1" = 100'-0" V: 1" = 10'-0"



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 Plot Date: 31-Jul-12

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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION
LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**
 STATE **NORTH DAKOTA**

ISSUE DATES

MARK	DESCRIPTION	DATE
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

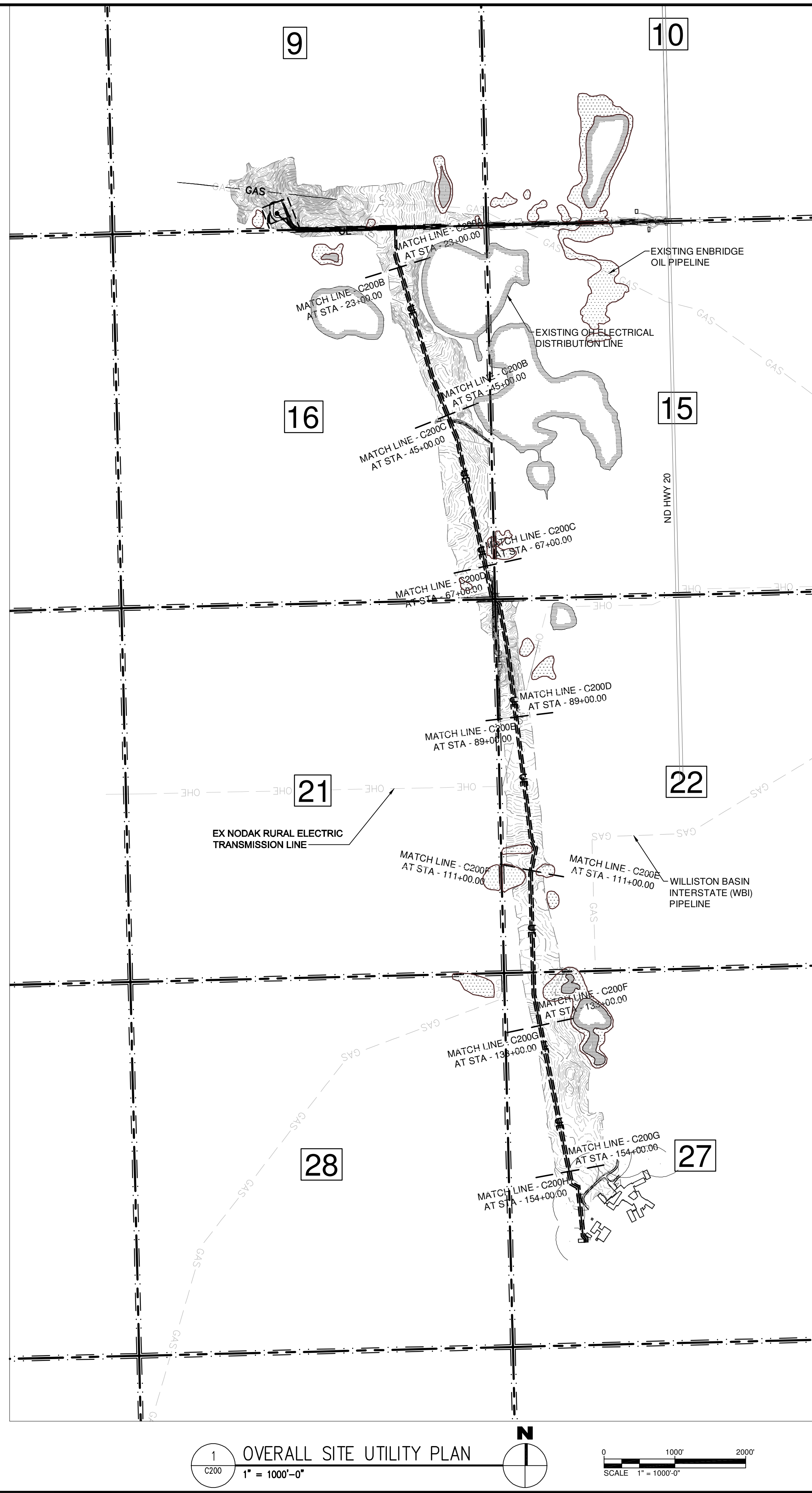
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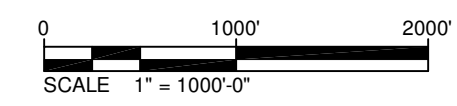
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PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "B"

C200B

File Location: P:\2011\20112552 - DVL US LRSC-ESS VTFG Fin + Civil Drawings\20112552-C200.dwg
 Plot Date: 31-Jul-12



1 OVERALL SITE UTILITY PLAN
 C200 1" = 1000'-0"

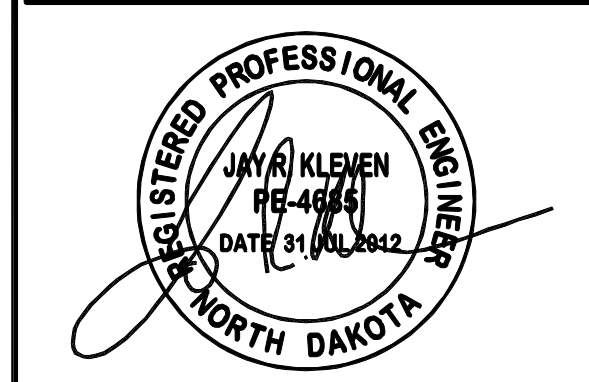


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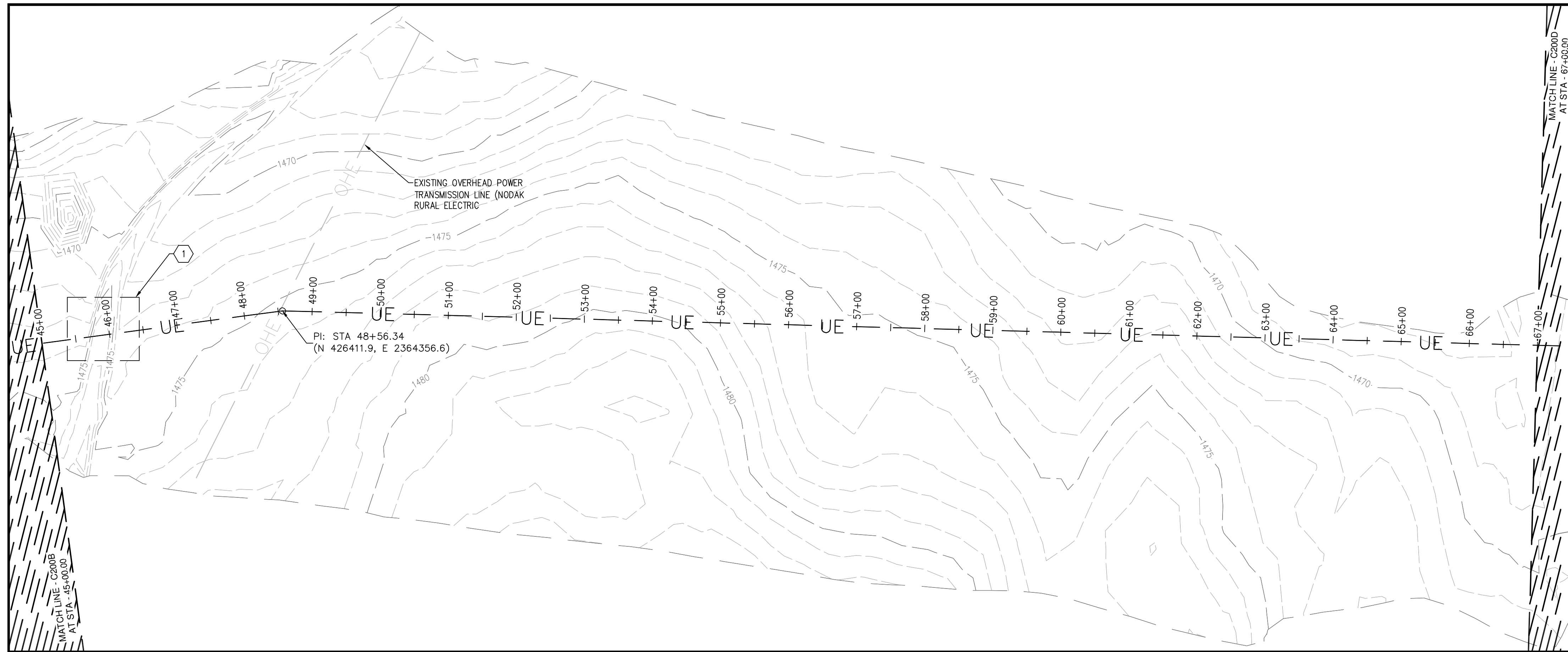
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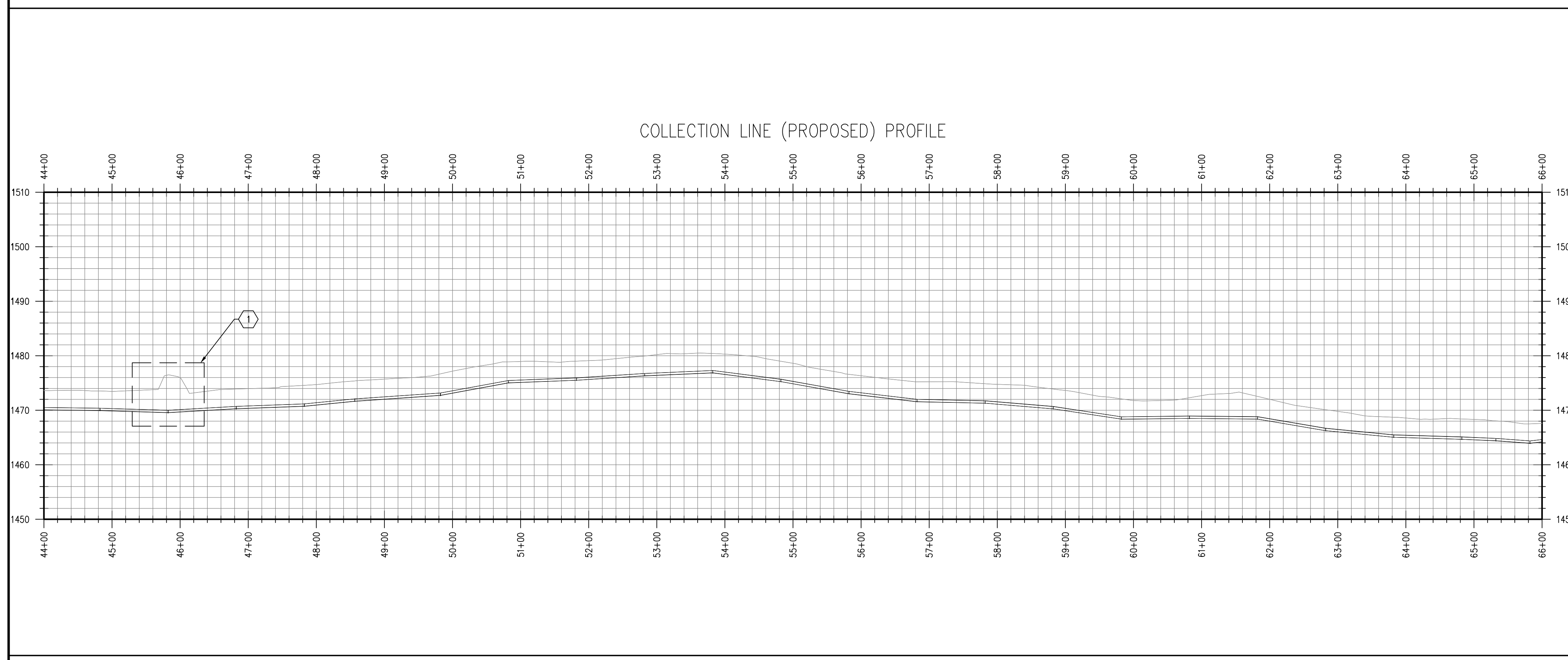
DRAWING TITLE

OVERALL UTILITY PLAN

C200



1 PROPOSED COLLECTION LINE PLAN - AREA "C"
 C200C 1" = 100'-0"



2 PROPOSED COLLECTION LINE PROFILE - AREA "C"
 C200C H: 1" = 100'-0" V: 1" = 10'-0"

REFERENCE NOTES:

1 REQUIRED DIRECTIONAL BORE BELOW ROAD - SEE ELECTRICAL PLANS FOR DETAILS.



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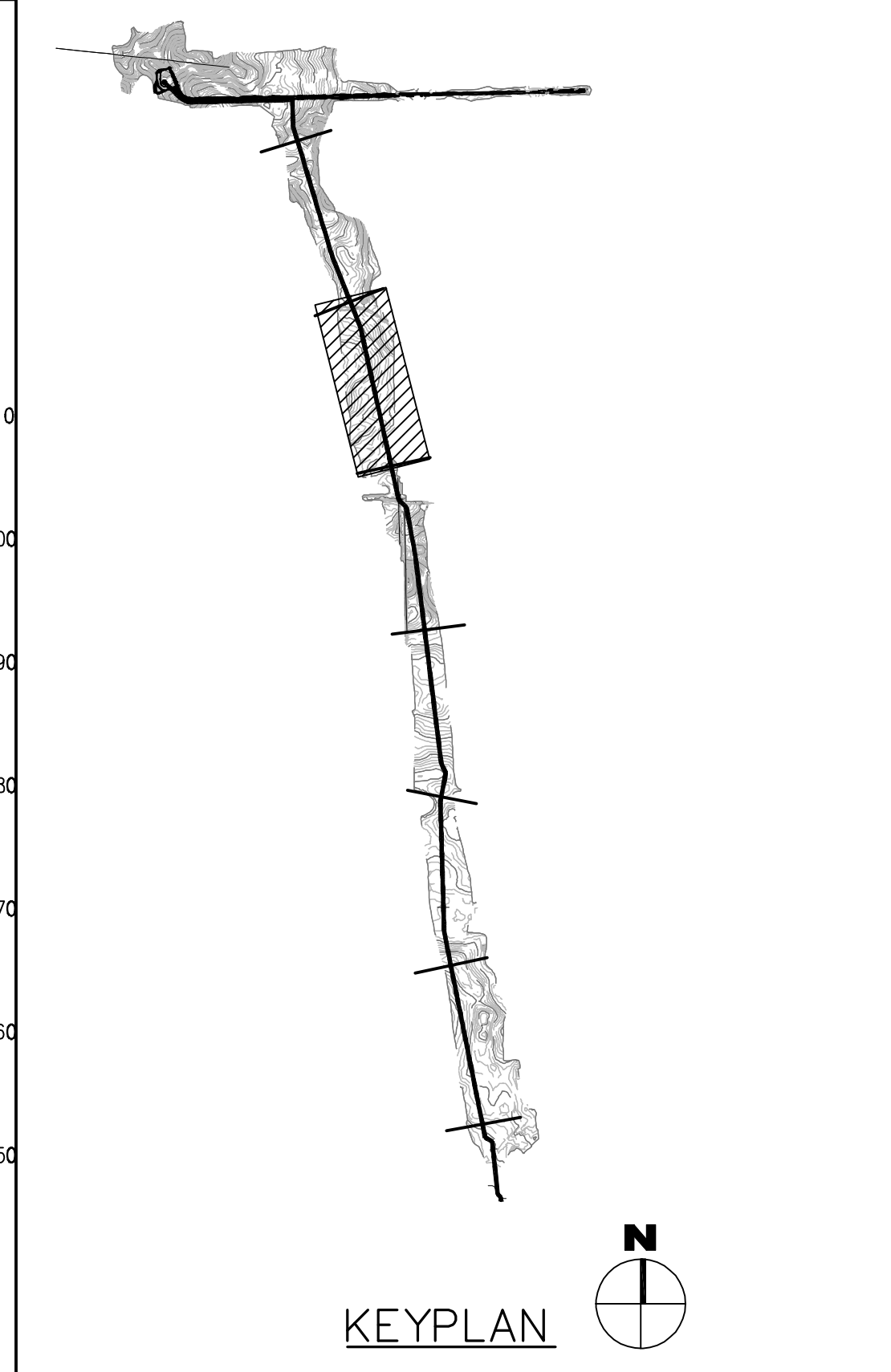
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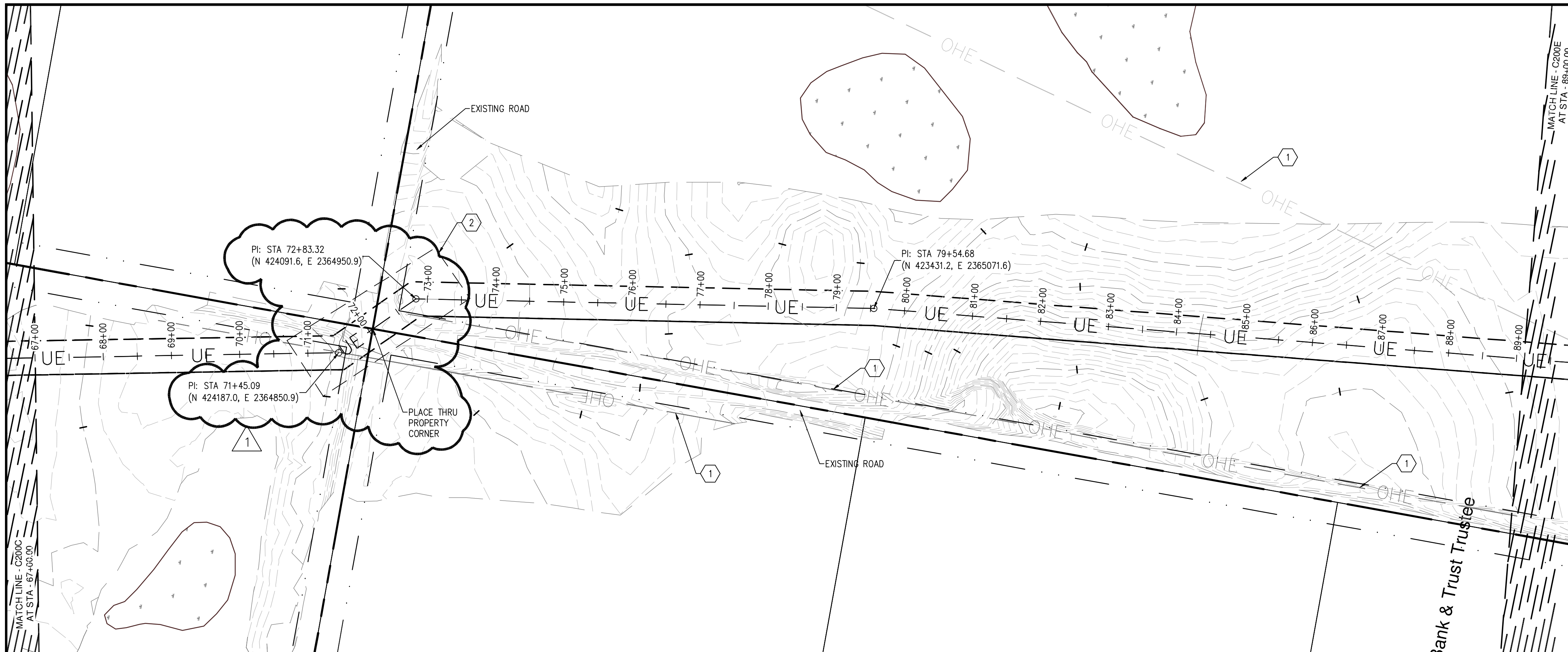
PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "C"



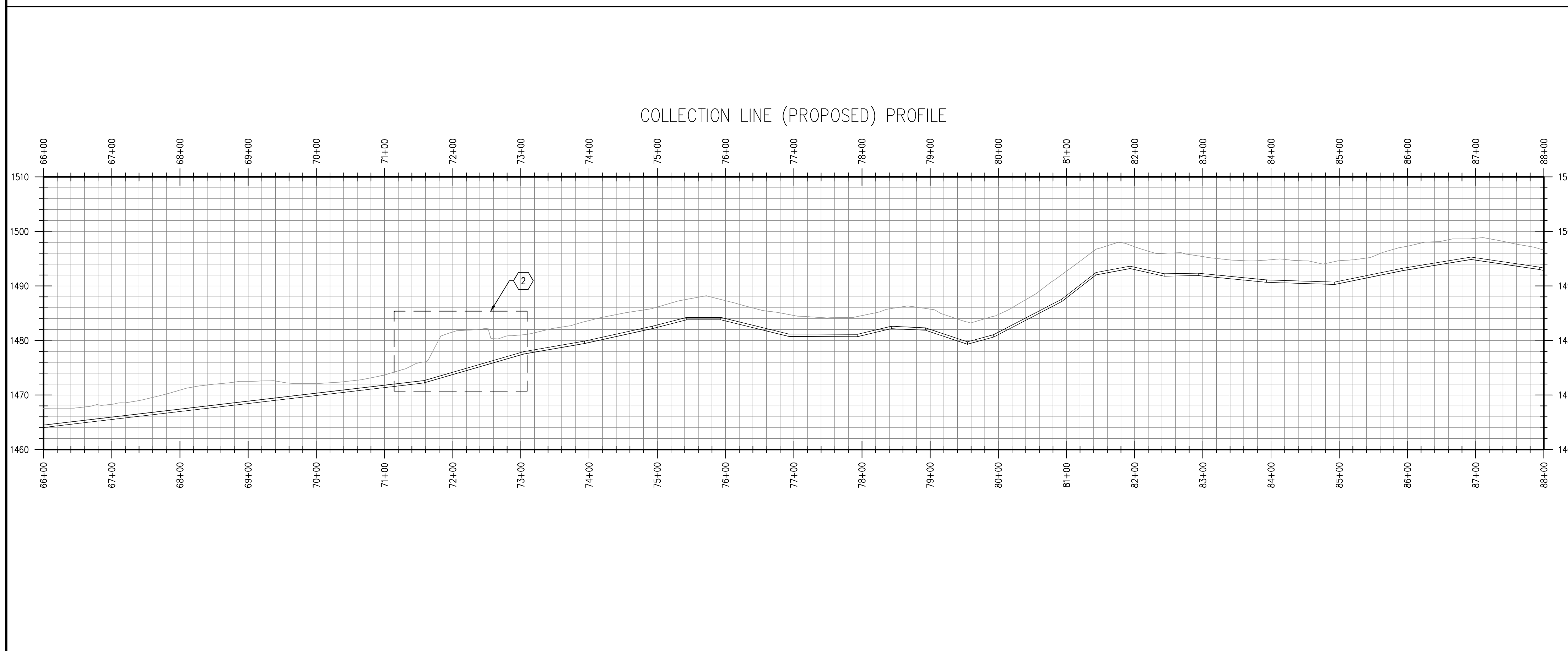
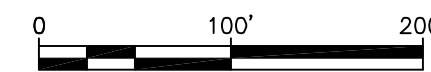
KEYPLAN

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C200C



1 PROPOSED COLLECTION LINE PLAN - AREA "D" N
 1" = 100'-0"



2 PROPOSED COLLECTION LINE PROFILE - AREA "D"
 1" = 100'-0" V: 1" = 10'-0"

REFERENCE NOTES:

- 1 EXISTING OVERHEAD POWER DISTRIBUTION LINE.
- 2 REQUIRED BORING - SEE ELECTRICAL TR04 AND TR05 FOR DETAILS.



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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

MARK	DESCRIPTION	DATE
△	MODIFIED BORING LOCATION	11 OCT 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

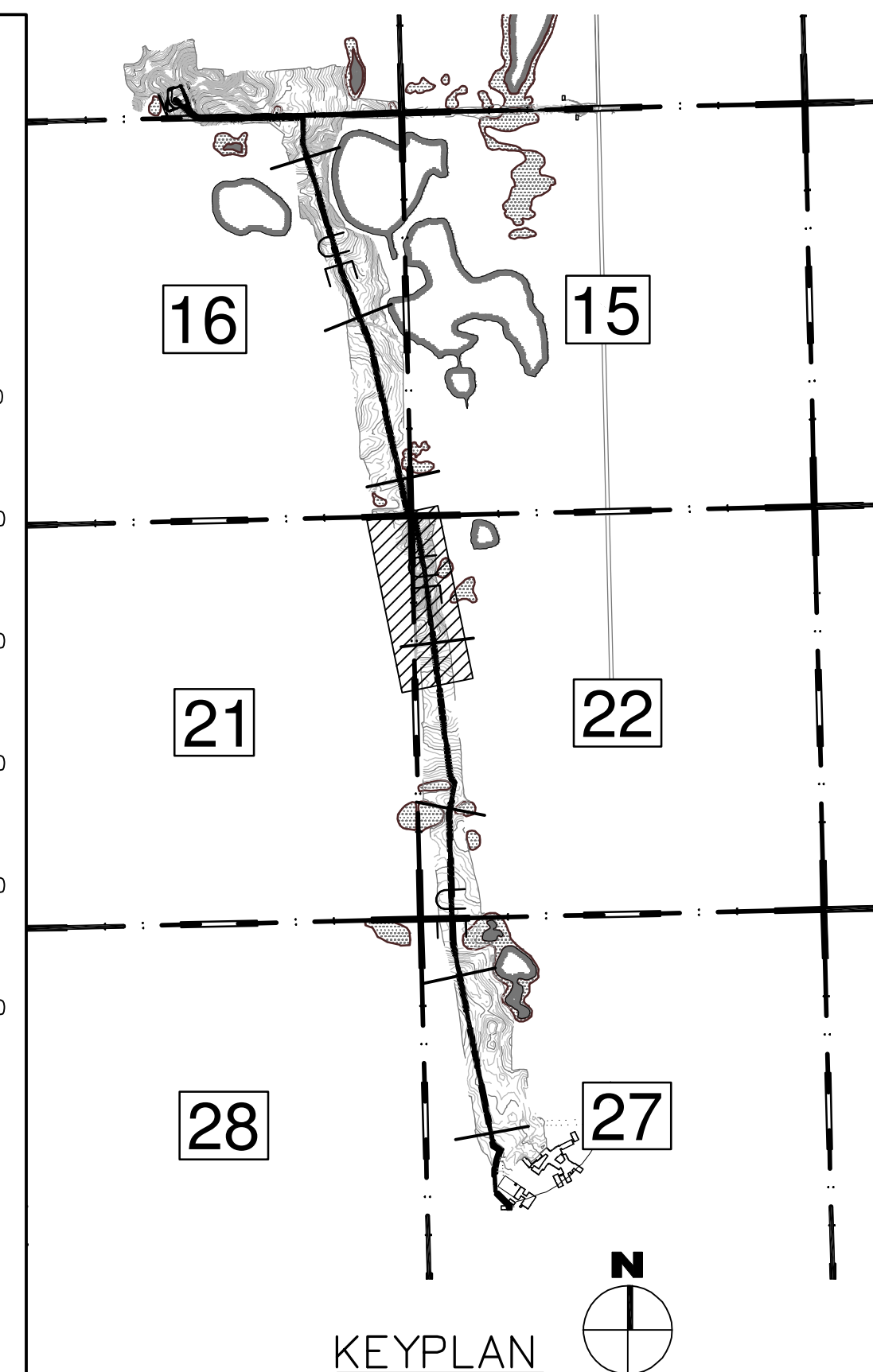
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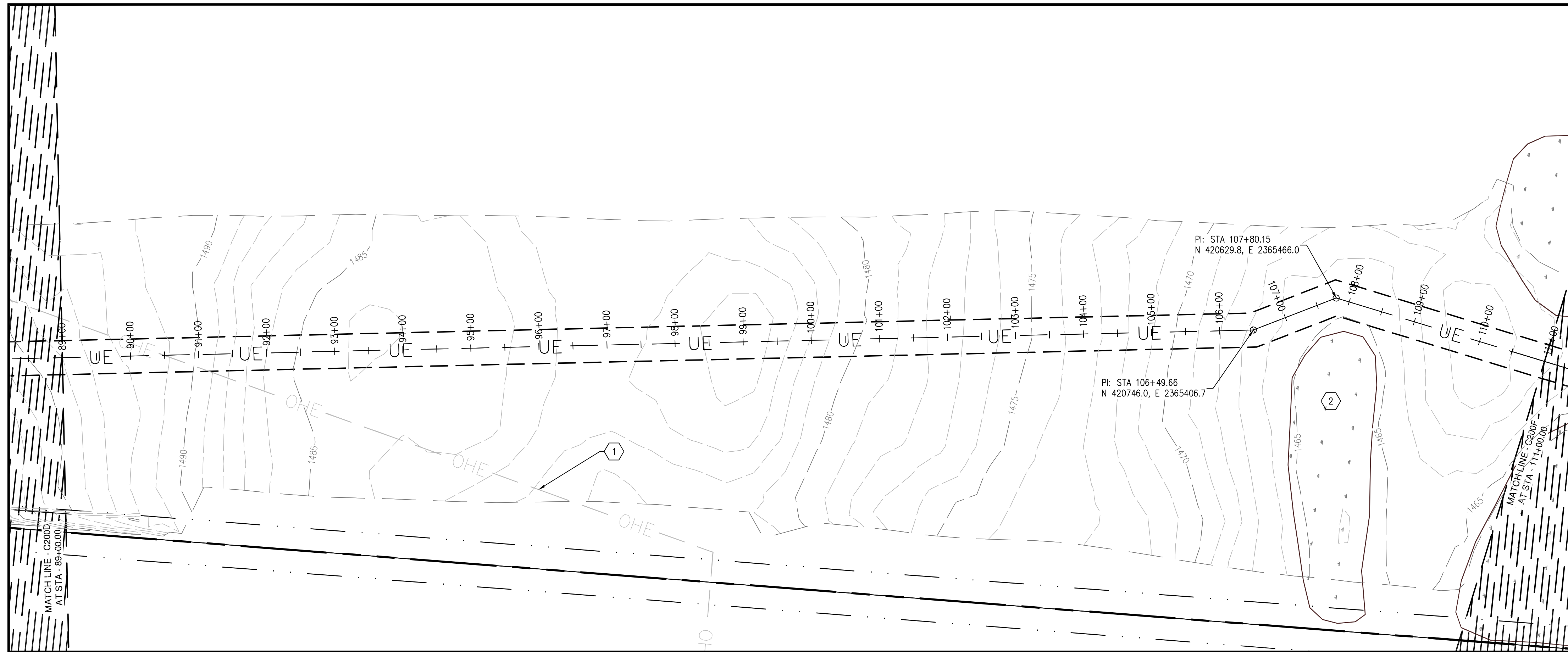
DRAWING TITLE

PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "D"



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C200D



1 PROPOSED COLLECTION LINE PLAN - AREA "E"
 C200E
 1" = 100'-0"



REFERENCE NOTES:
 1 EXISTING OVERHEAD POWER TRANSMISSION LINE (NODAK RURAL ELECTRIC)
 2 EXISTING LOW SPOT, DO NOT DISTURB.

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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION
LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**
 STATE **NORTH DAKOTA**

ISSUE DATES

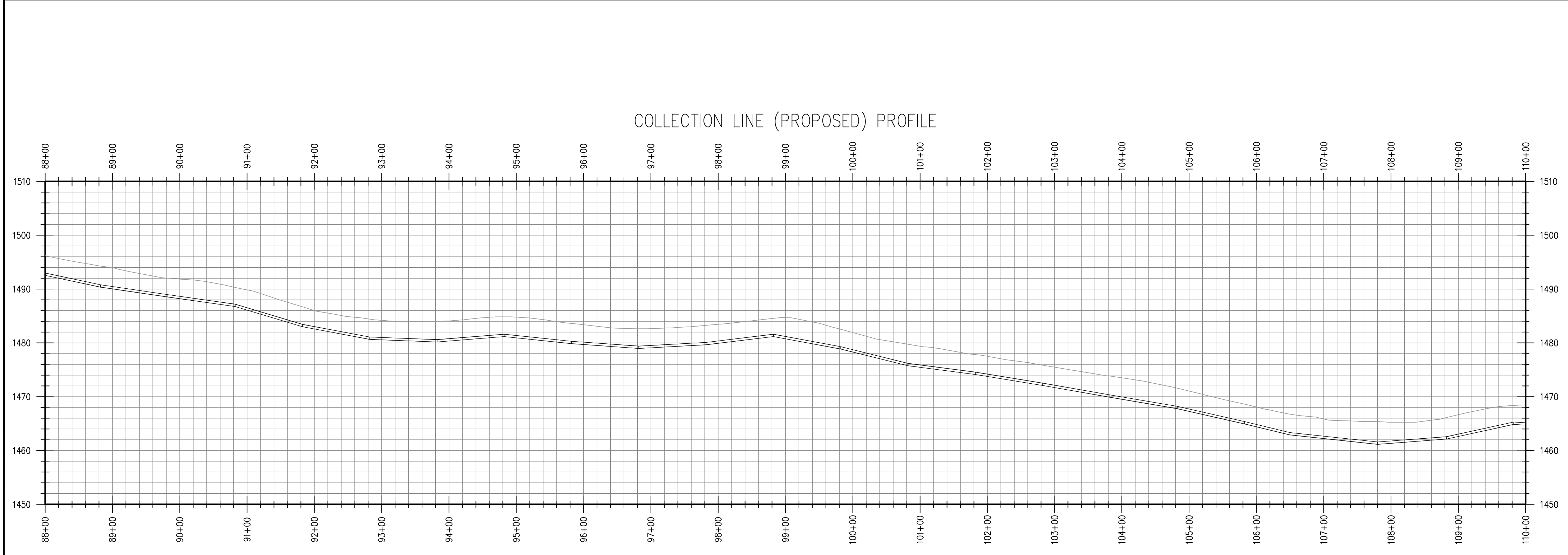
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: **20112552**
 DRAWN BY: **JCE**
 CHECKED BY: **JRK**

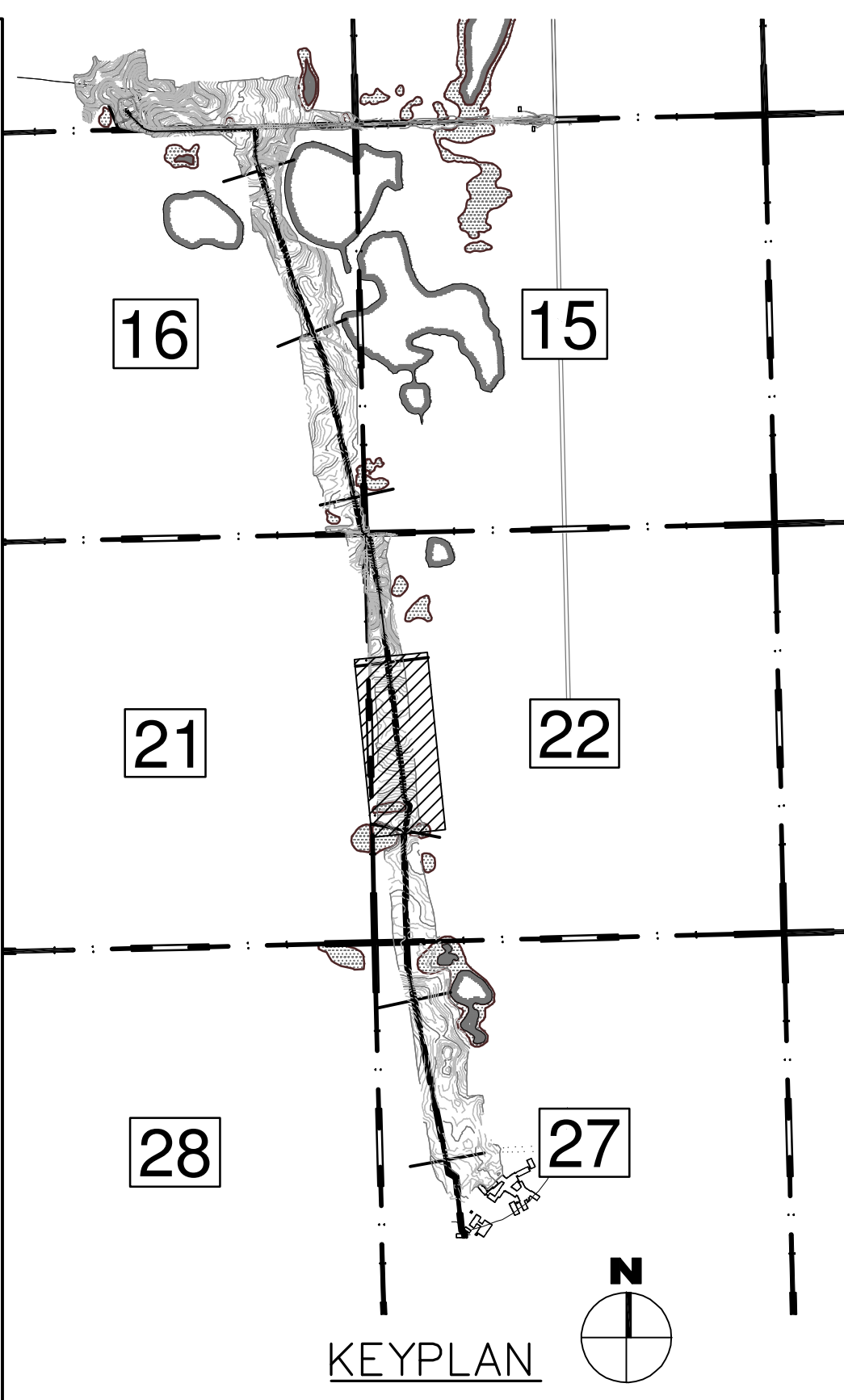
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DRAWING TITLE
PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "E"

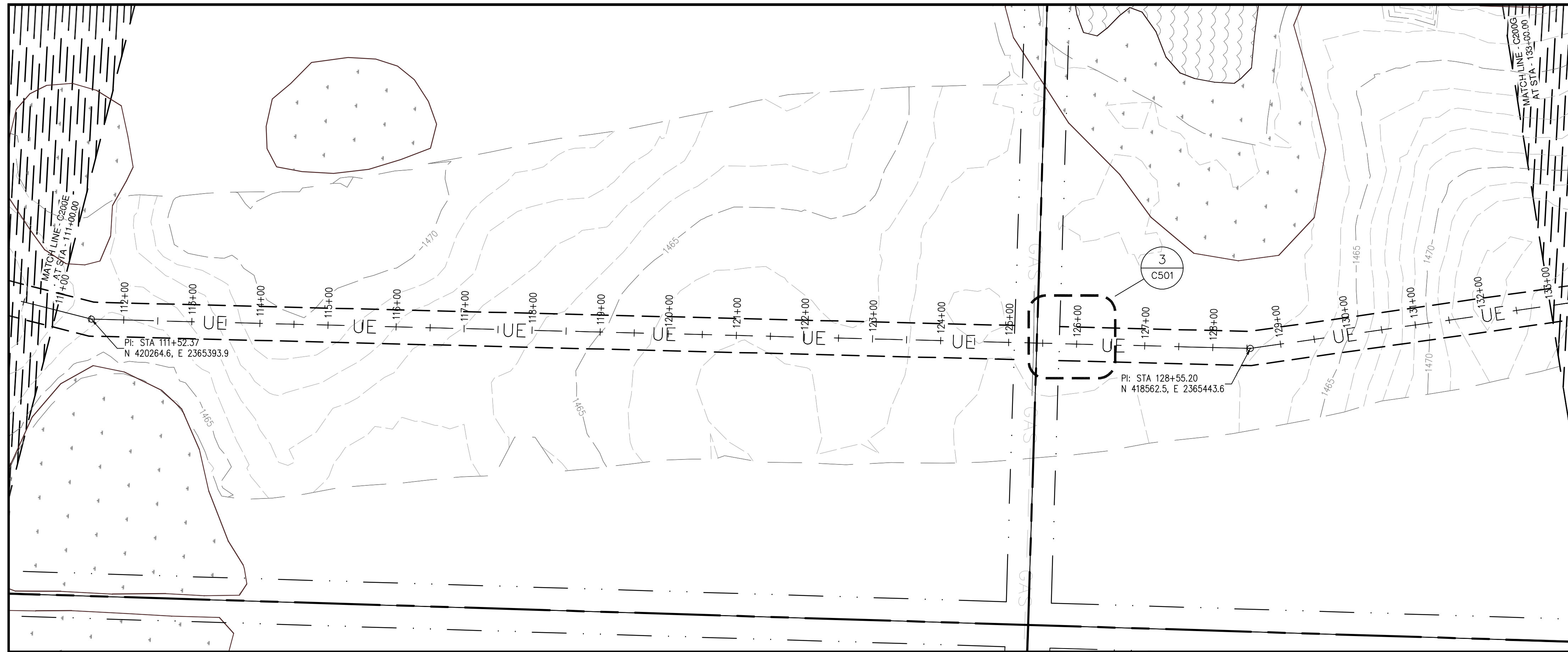
C200E



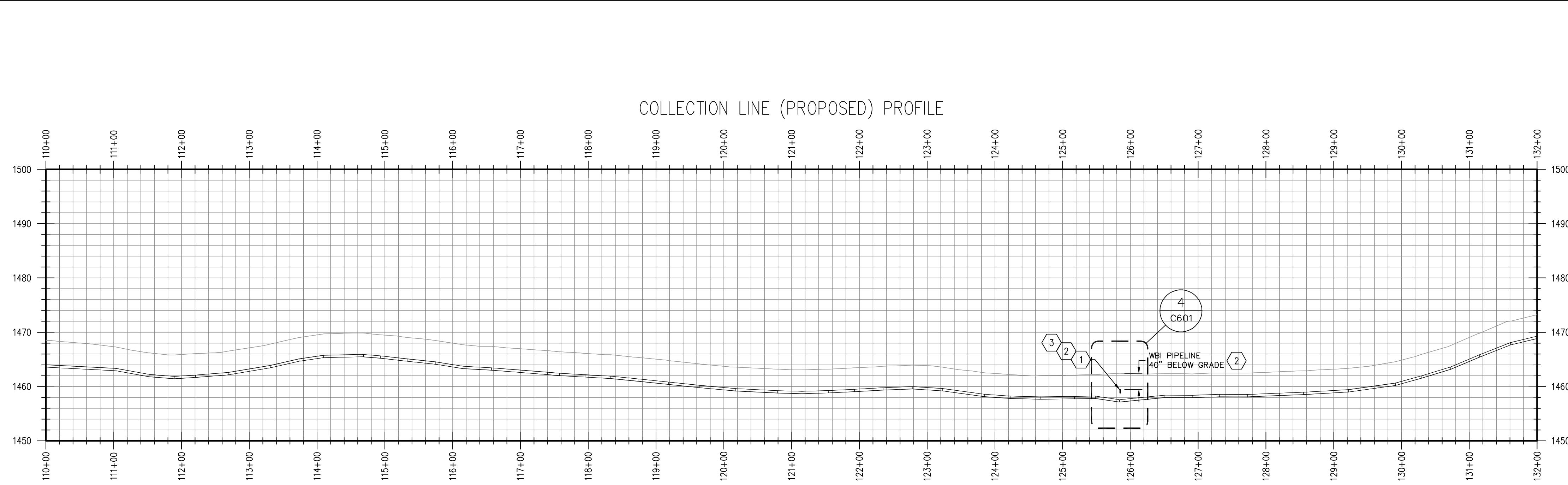
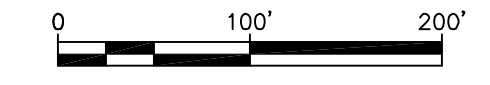
2 PROPOSED COLLECTION LINE PROFILE - AREA "E"
 C200E
 H: 1" = 100'-0" V: 1" = 10'-0"



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1 PROPOSED COLLECTION LINE PLAN - AREA "F"
1" = 100'-0"



2 PROPOSED COLLECTION LINE PROFILE - AREA "F"
H: 1" = 100'-0" V: 1" = 10'-0"

REFERENCE NOTES:

- 1 WBI PIPELINE CROSSING PERMIT REQUIRED. SEE 2/C502 FOR CONSTRUCTION DETAILS.
- 2 VERIFY PIPELINE DEPTH WITH WBI (DOUG VEUM, 1-800-238-8350) 1 WEEK PRIOR TO WORK IS PLANNED.
- 3 FIELD ADJUST THE LAYOUT SO THE CROSSING IS 90° TO THE GAS PIPE LINE.



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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

MARK	DESCRIPTION	DATE
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

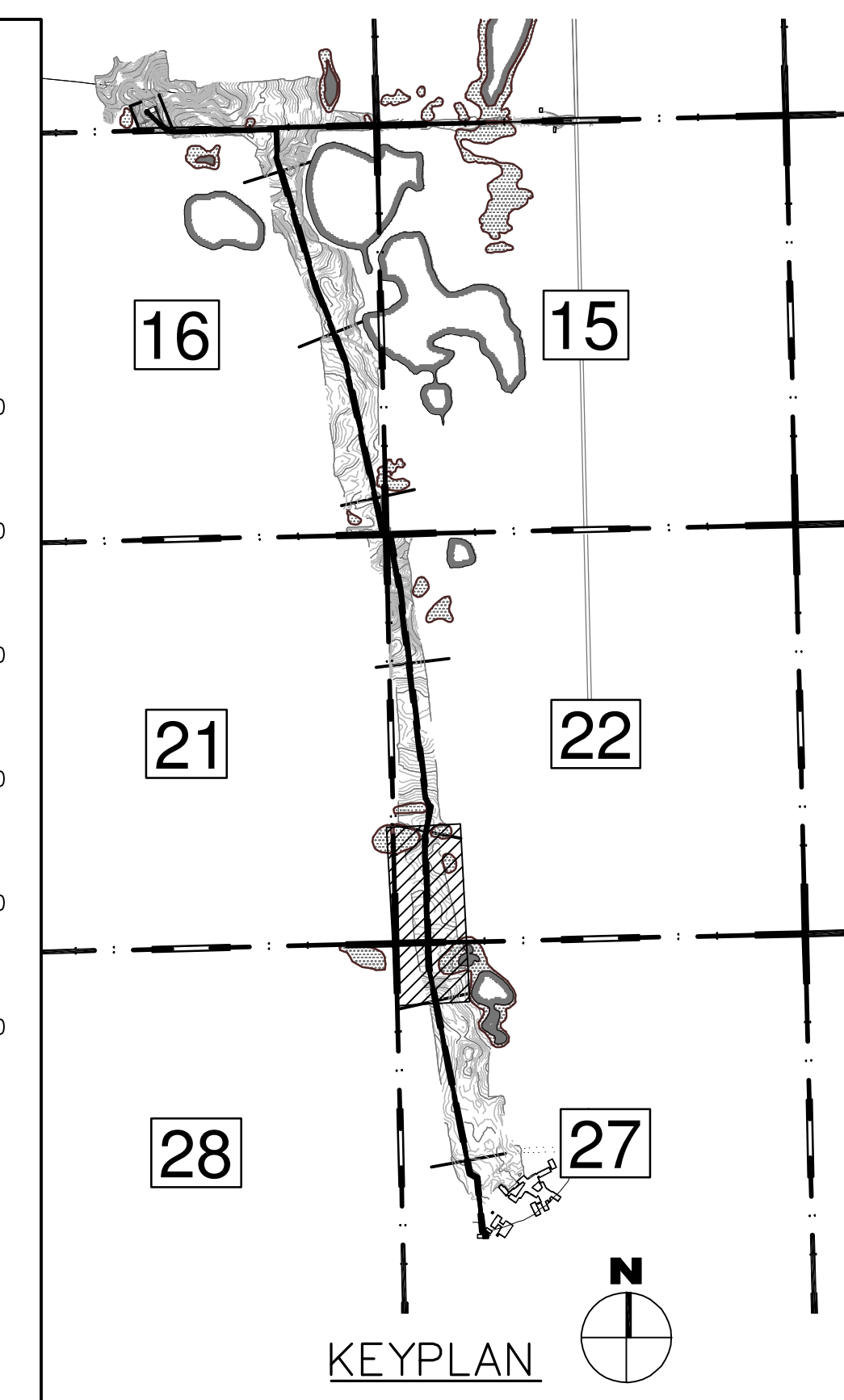
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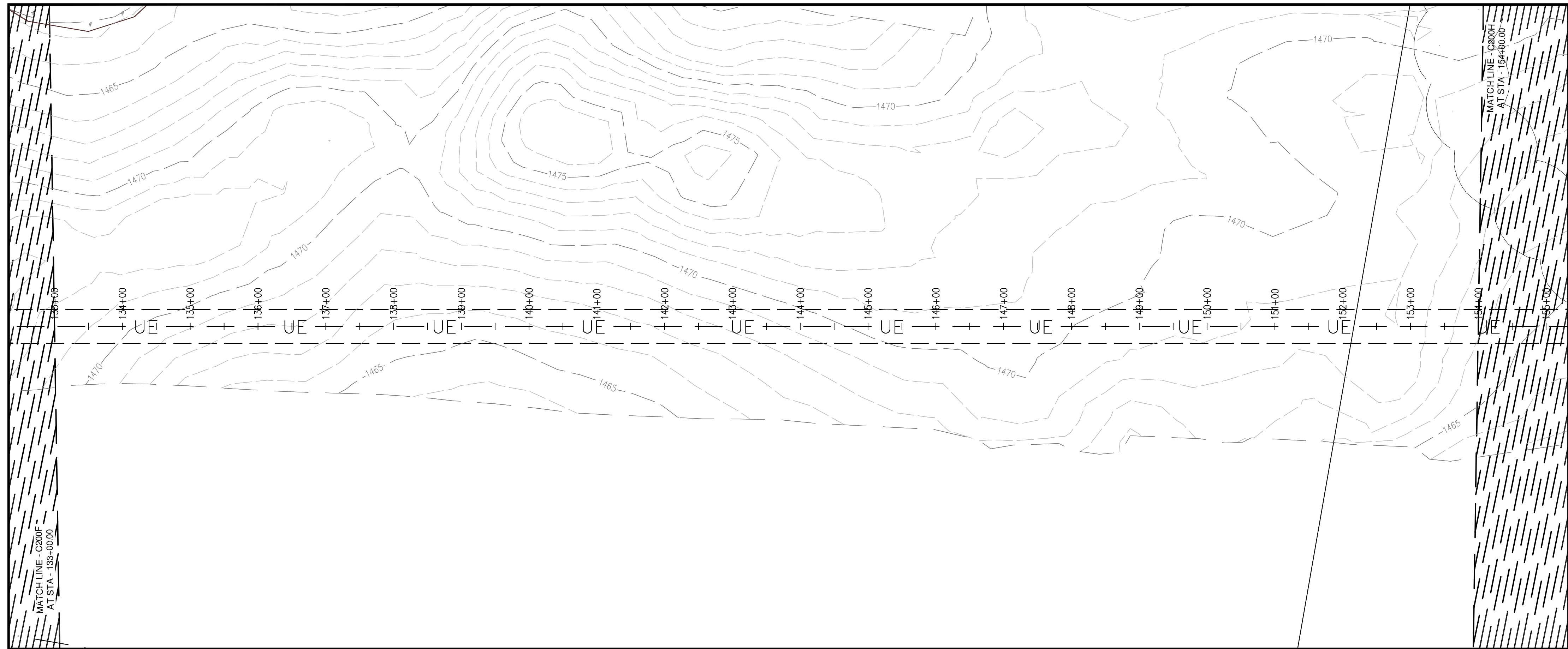
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PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "F"

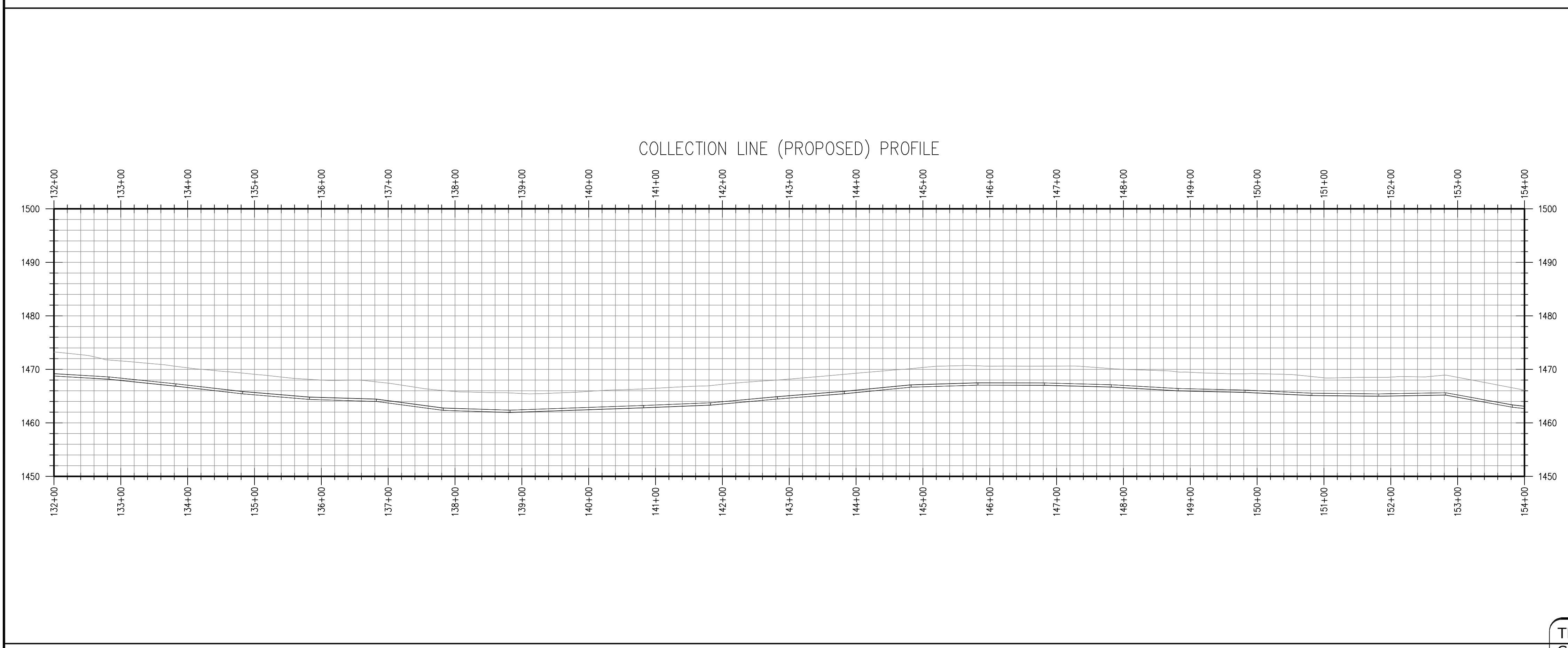
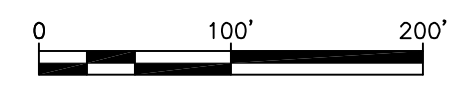


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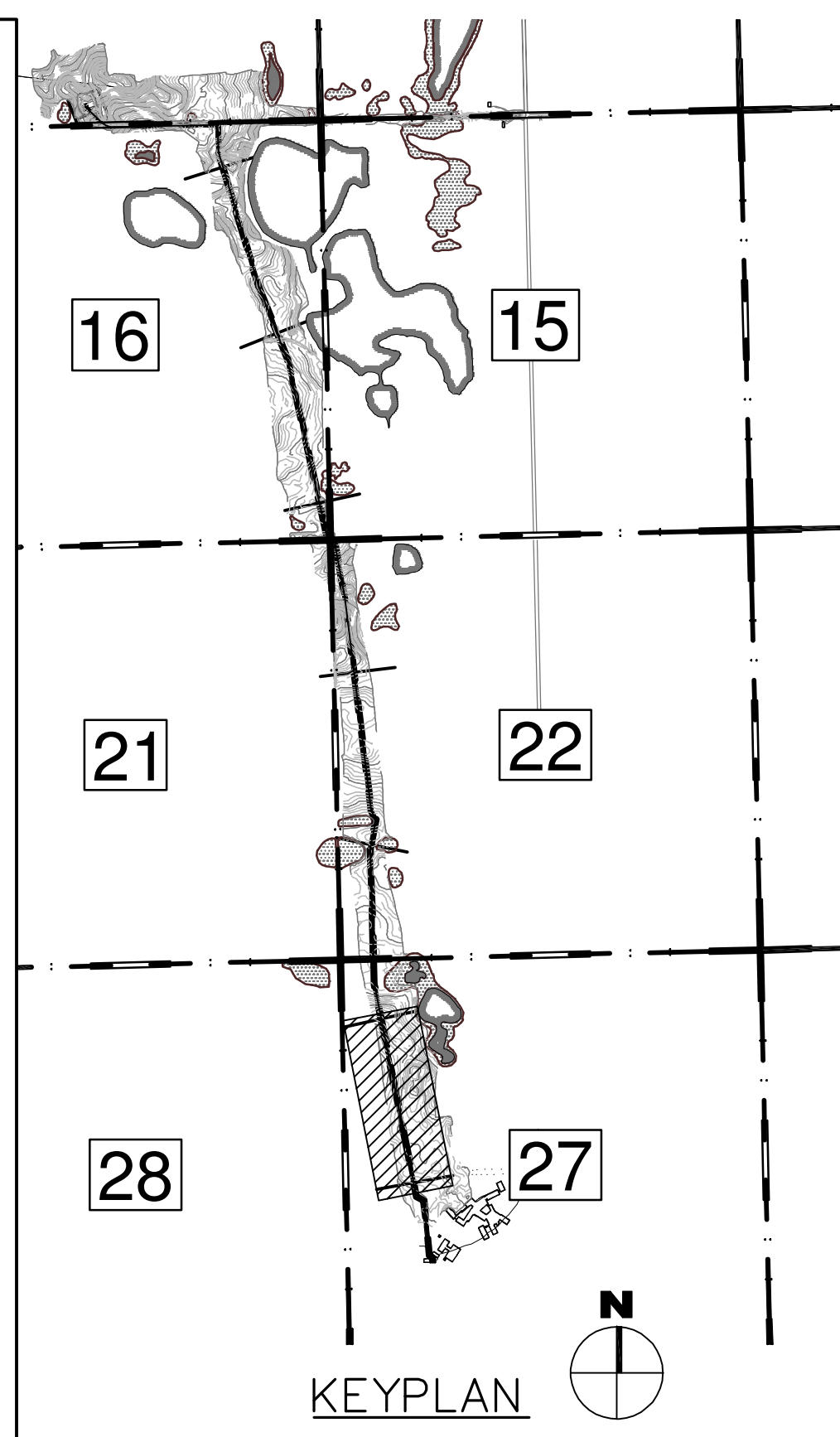
C200F



1 PROPOSED COLLECTION LINE PLAN - AREA "G"
 C200G 1" = 100'-0" N



2 PROPOSED COLLECTION LINE PROFILE - AREA "G"
 C200G H: 1" = 100'-0" V: 1" = 10'-0"



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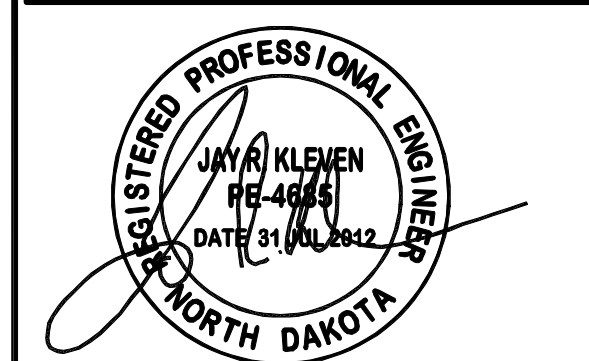


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PROJECT DESCRIPTION
 LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE
 STATE NORTH DAKOTA

ISSUE DATES

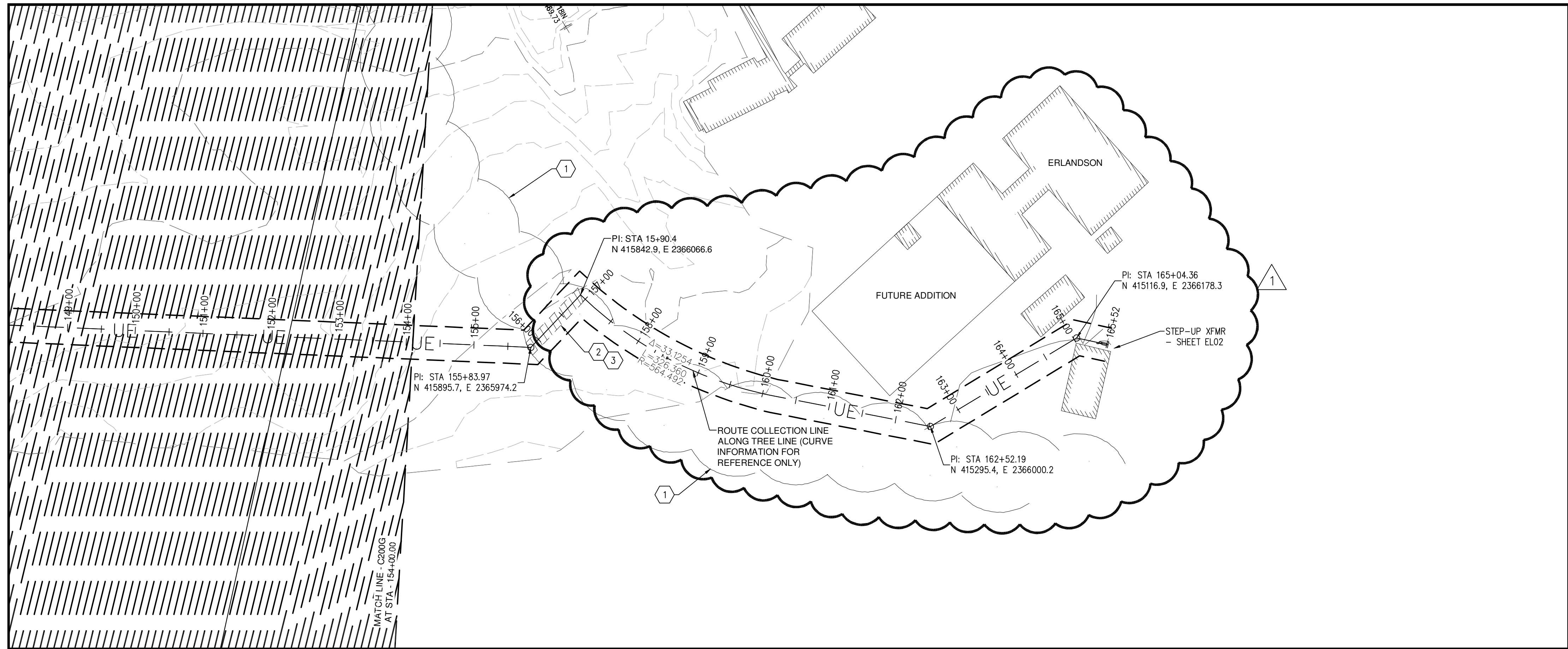
MARK	DESCRIPTION	DATE
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552
 DRAWN BY: JCE
 CHECKED BY: JRK

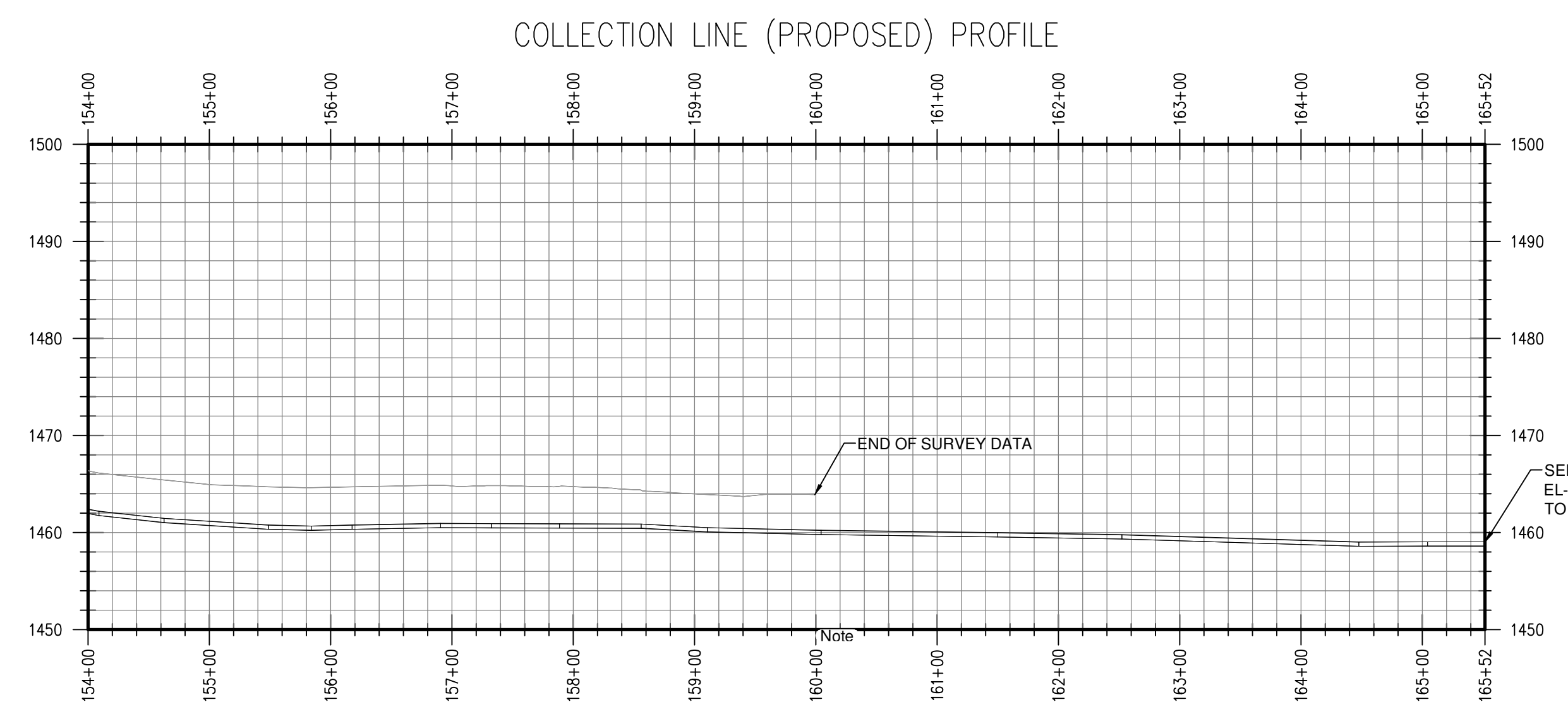
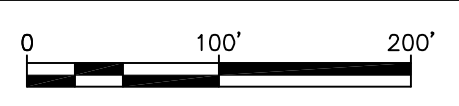
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DRAWING TITLE
 PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "G"

C200G



1 PROPOSED COLLECTION LINE PLAN - AREA "H"
 C200H 1" = 100'-0" N



2 PROPOSED COLLECTION LINE PROFILE - AREA "H"
 C200H H: 1" = 100'-0" V: 1" = 10'-0"

REFERENCE NOTES:

- 1 EXISTING TREE ROW.
- 2 CLEAR A 20'-0" PATH THROUGH EXISTING TREE ROW. REMOVE ALL ROOTS AND TREES ALONG THE ROUTE. REMOVE THE DEBRIS OFF-SITE.
- 3 RESTORE GRADE, REPLACE ALL TOPSOIL, AND PLACE PERMANENT GRASS SURFACE AFTER COMPLETION.



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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

△	REVISED COLLECTION LINE	11 SEP 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: **20112552**

DRAWN BY: **JCE**

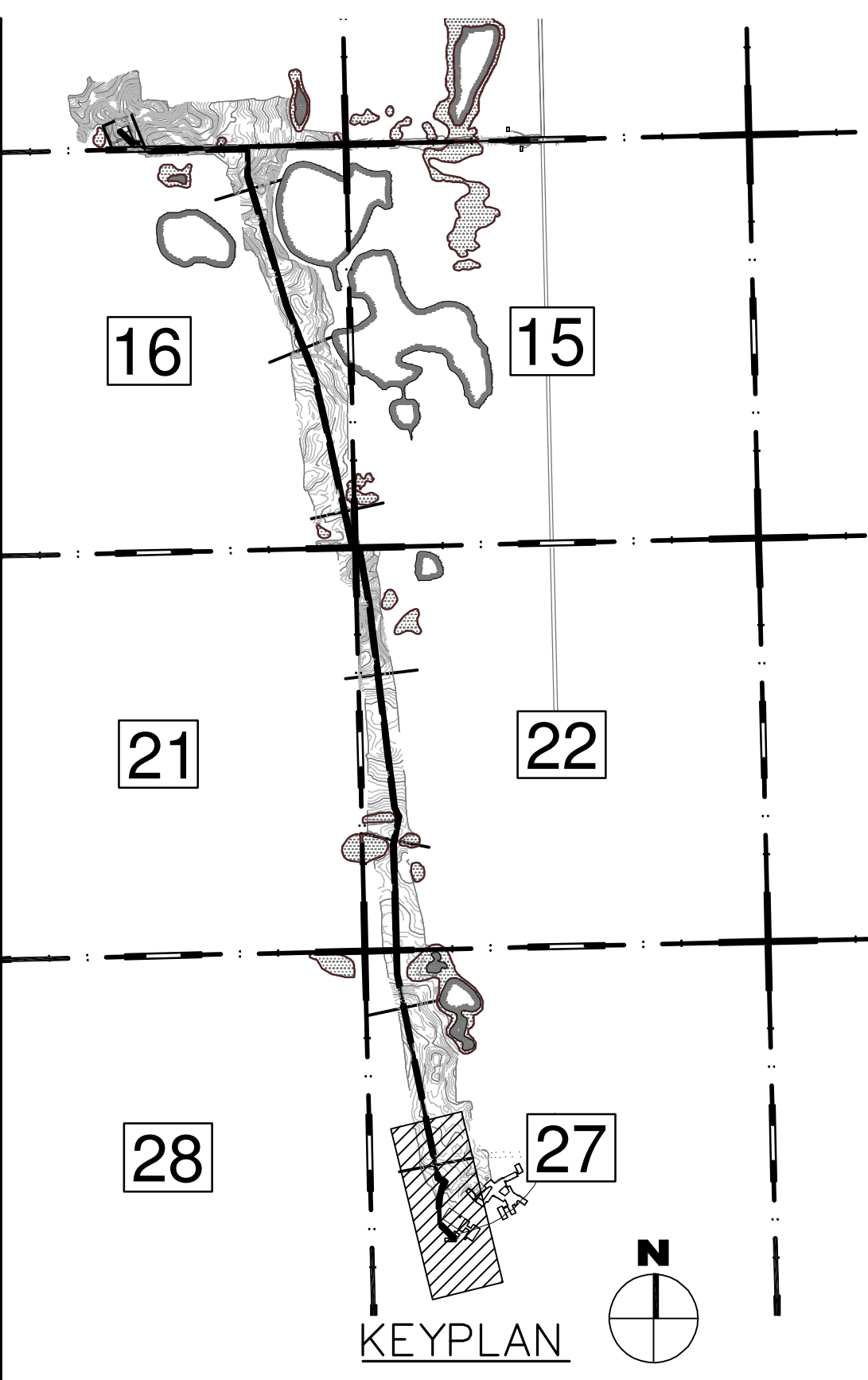
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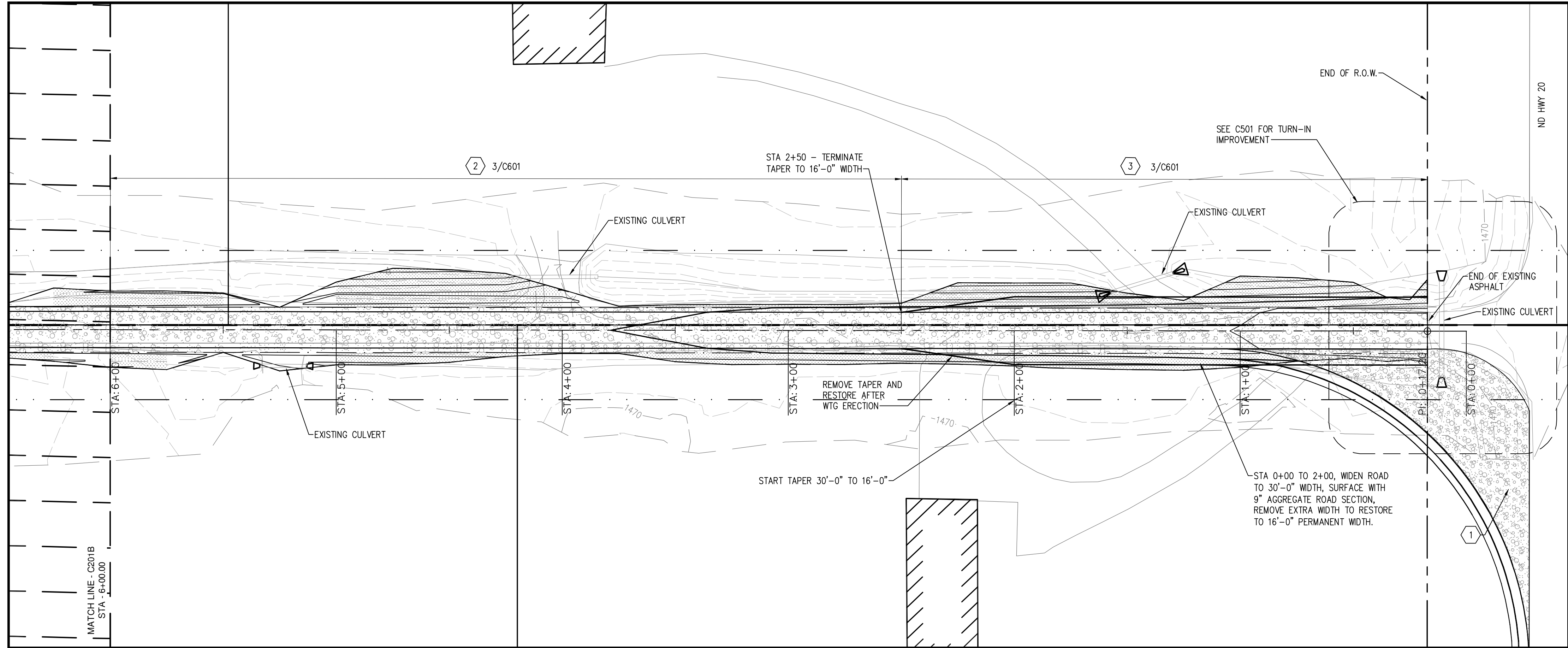
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PROPOSED COLLECTION LINE PLAN AND PROFILE - AREA "H"

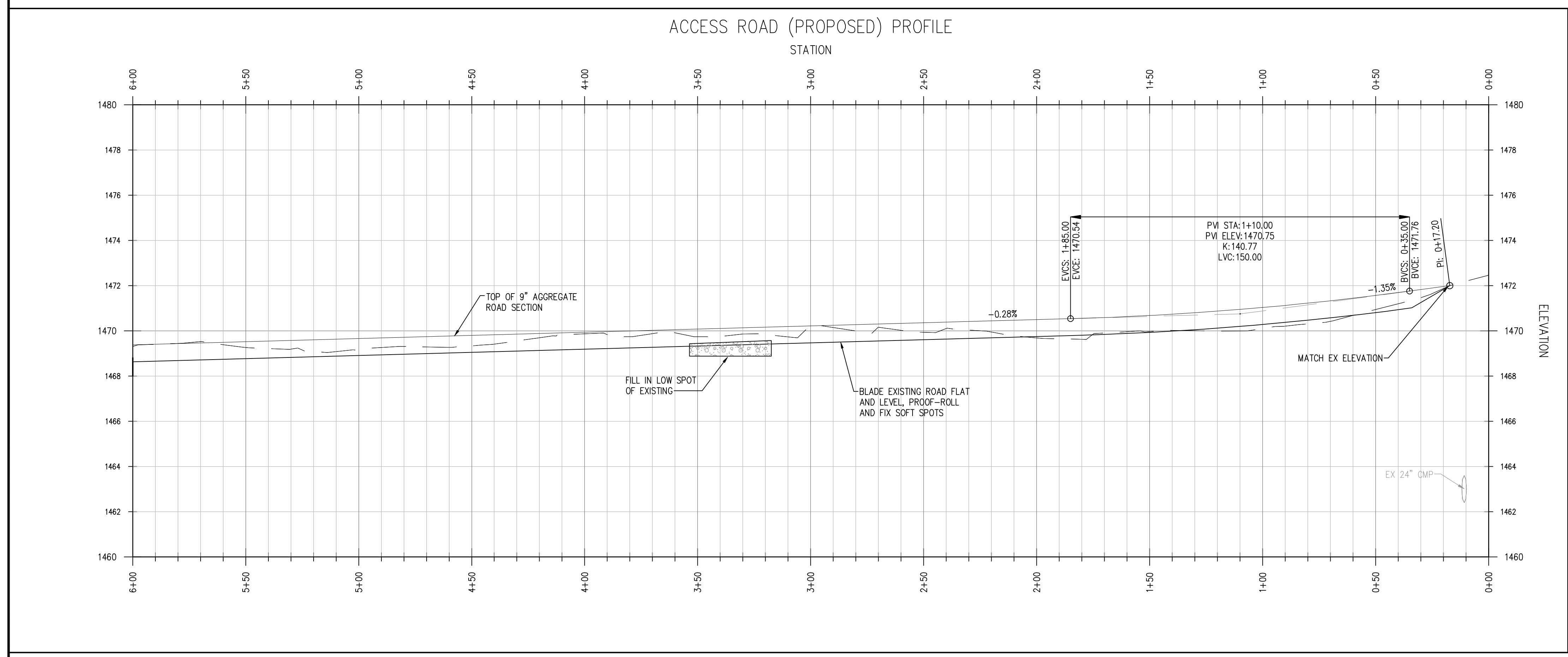
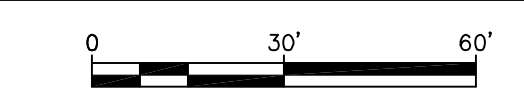


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C200H



1 PROPOSED ACCESS ROAD PLAN - AREA "A"
 C201A
 1" = 30'-0"



2 PROPOSED ACCESS ROAD PROFILE - AREA "A"
 C201A
 H: 1" = 30'-0" V: 1" = 5'-0"

REFERENCE NOTES:

- 1 APPROACH PERMIT REQUIRED BEFORE STARTING THE TURN-IN IMPROVEMENT. CONTACT THE NDDOT DEVILS LAKE AREA OFFICE. SEE EXHIBIT 8 OF CONTRACT.
- 2 BLADE ROAD FLAT, PLACE 9" OF REINFORCED AGGREGATE SURFACE OVER EXISTING.
- 3 BLADE ROAD FLAT, PLACE 9" OF REINFORCED AGGREGATE SURFACE OVER EXISTING. PLACE GEOGRID WITH LAP ARRANGED TO ALLOW REMOVAL OF WIDENED SECTION.



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CLIENT
LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION
LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**
 STATE **NORTH DAKOTA**

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

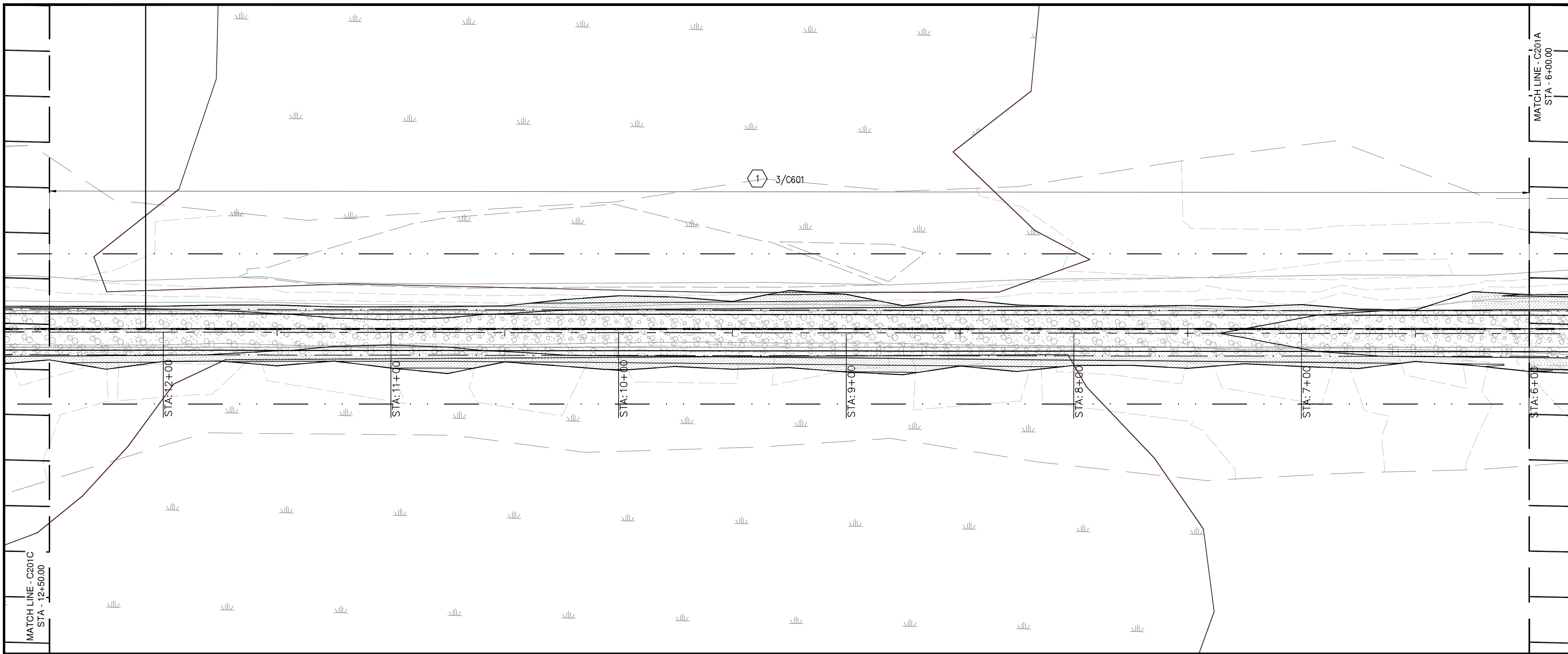
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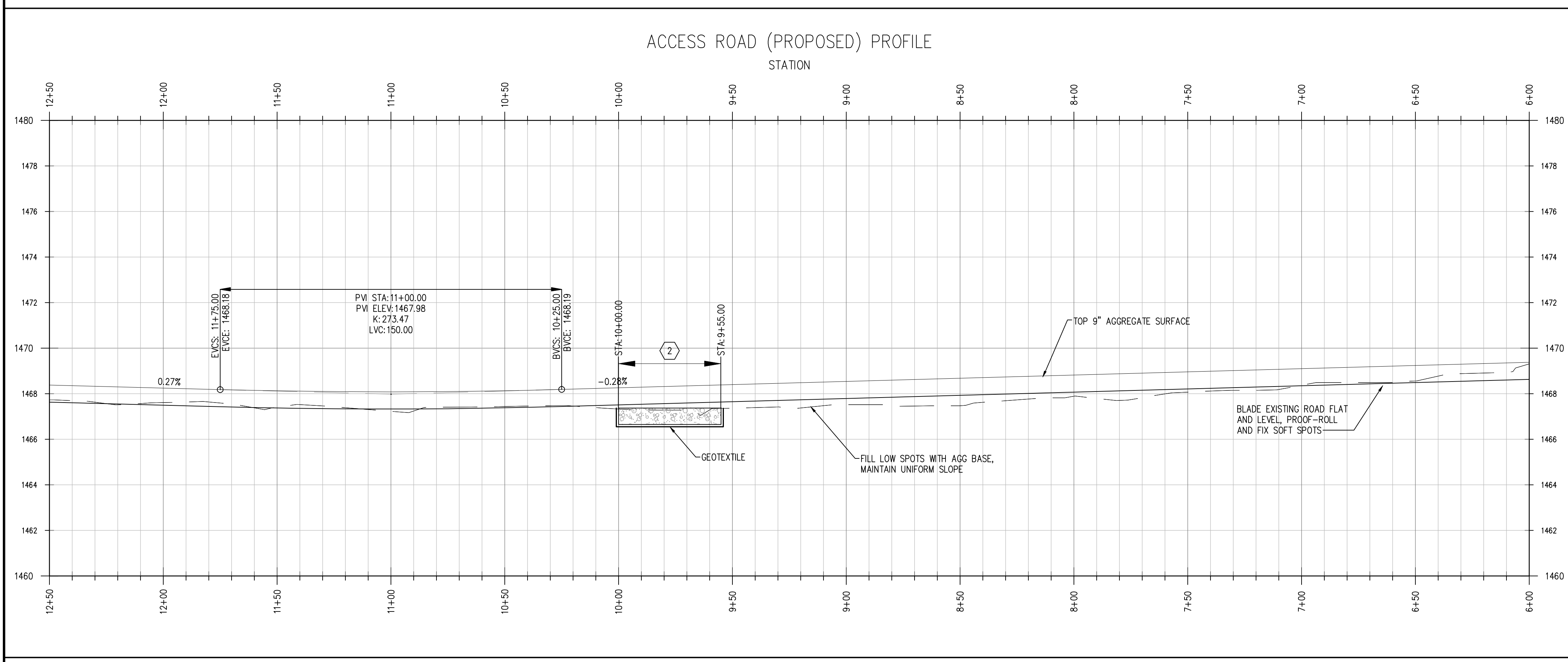
DRAWING TITLE
PROPOSED ACCESS ROAD PLAN AND PROFILE - AREA "A"

C201A

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1 PROPOSED ACCESS ROAD PLAN - AREA "B"
 C201B
 1" = 30'-0"



2 PROPOSED ACCESS ROAD PROFILE - AREA "B"
 C201B
 H: 1" = 30'-0" V: 1" = 5'-0"

REFERENCE NOTES:

- 1 BLADE ROAD FLAT, PLACE 9" OF REINFORCED AGGREGATE SURFACE OVER EXISTING.
- 2 OVEREXCAVATE TO REMOVE EXISTING SOFT SPOT, PLACE GEOTEXTILE, FILL WITH ENGINEERED FILL OR AGGREGATE BASE UP TO FINAL SUBGRADE.



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LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

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PROPOSED ACCESS ROAD PLAN AND PROFILE - AREA "B"

C201B

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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

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DRAWING TITLE

OVERALL PROPOSED ACCESS ROAD PLAN

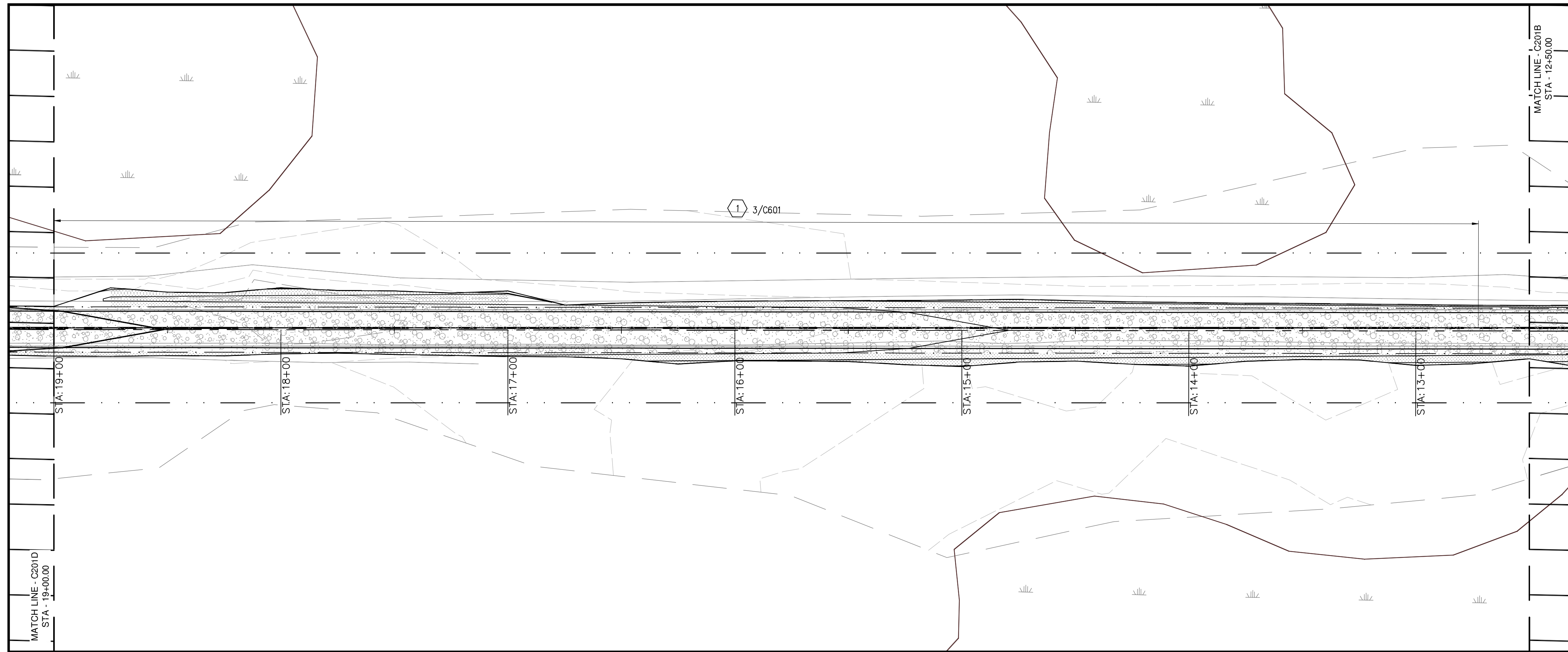
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REFERENCE NOTES:

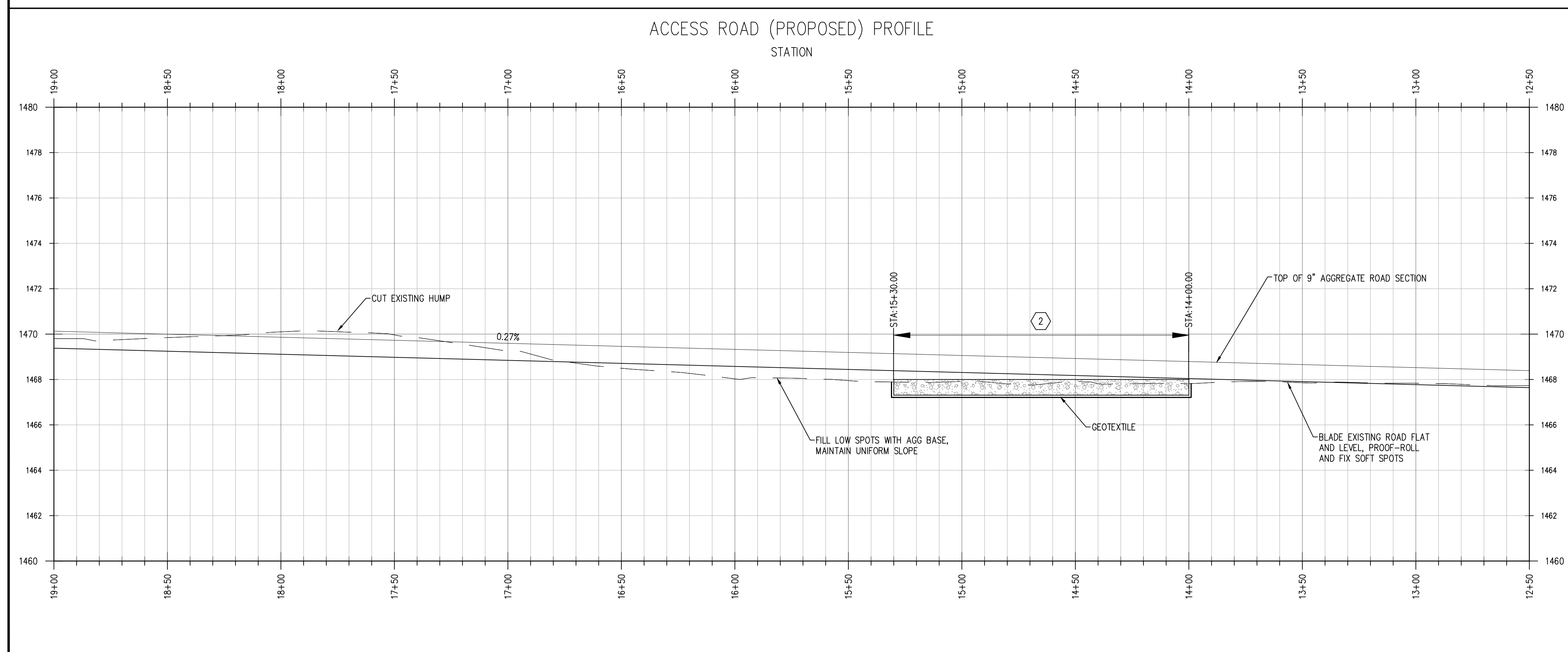
- 1 STA 0+00 TO 2+50: PROVIDE COMPLETION OF WTG 30 FT. ROAD WIDTH, REMOVE AND RESTORE TO 16'-0" WIDTH AFTER TRANSPORTATION AND INSTALLATION. BLADE EXTEND PATH, PROOF-ROLL, AND PLACE 9" AGGREGATE ROAD SECTION.
- 2 STA 2+50 TO STA 25+50: BLADE EXTEND PATH FLAT, WIDEN TO TYPICAL ROAD WIDTH, AND PLACE 9" AGGREGATE ROAD SECTION.
- 3 STA 25+50 TO 54+50: CONSTRUCT NEW ROAD, STRIP EXISTING TOPSOIL, SCARIFY AND RECOMPACT THE SUBGRADE, FILL TO GRADE WITH COMPACTED SOIL, PLACE 9" TYPICAL AGGREGATE ROAD SECTION.
- 4 STA 54+50 TO 56+70: CONSTRUCT TEMPORARY CRANE STANDS AND LAY DOWN AREAS. REMOVE AND RESTORE AREAS OUTSIDE THE PERMANENT SITE WORK.



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1 PROPOSED ACCESS ROAD PLAN - AREA "C"
 C201C 1" = 30'-0"



2 PROPOSED ACCESS ROAD PROFILE - AREA "C"
 C201C H: 1" = 30'-0" V: 1" = 5'-0"

REFERENCE NOTES:

- 1 BLADE ROAD FLAT, PLACE 9" OF REINFORCED AGGREGATE SURFACE OVER EXISTING.
- 2 OVEREXCAVATE TO REMOVE EXISTING SOFT SPOT, PLACE GEOTEXTILE, FILL WITH ENGINEERED FILL OR AGGREGATE BASE UP TO FINAL SUBGRADE.



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LAKE REGION STATE COLLEGE

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LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

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MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

DRAWN BY: JCE

CHECKED BY: JRK

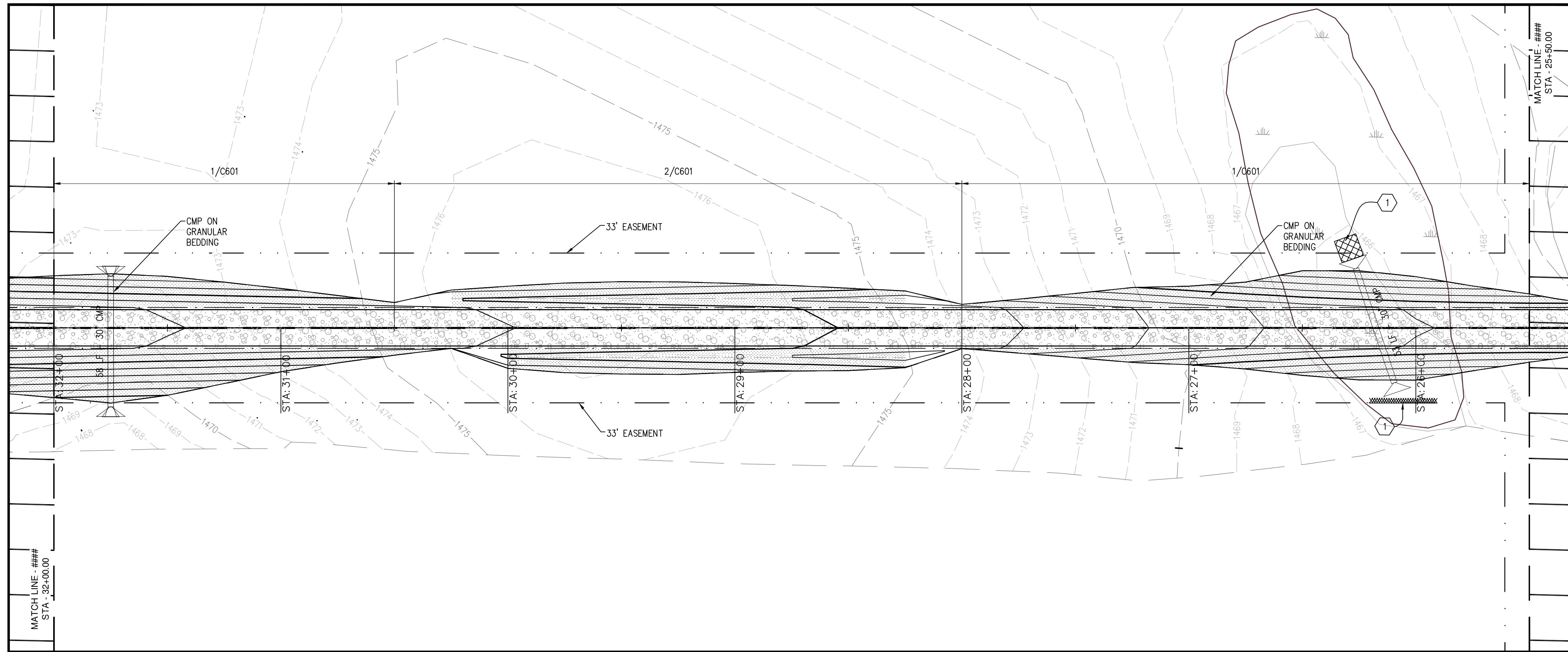
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PROPOSED ACCESS ROAD PLAN AND PROFILE - AREA "C"

C201C

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REFERENCE NOTES:

- 1 INSTALL OUTLET AND INLET PROTECTION WITHIN 24 HOURS OF CULVERT INSTALLATION REFER TO SWPP SHEETS FOR MORE INFORMATION.



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ISSUE DATES

MARK	DESCRIPTION	DATE
△	REMOVED GEOTEXTILE	21 SEP 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

DRAWN BY: JCE

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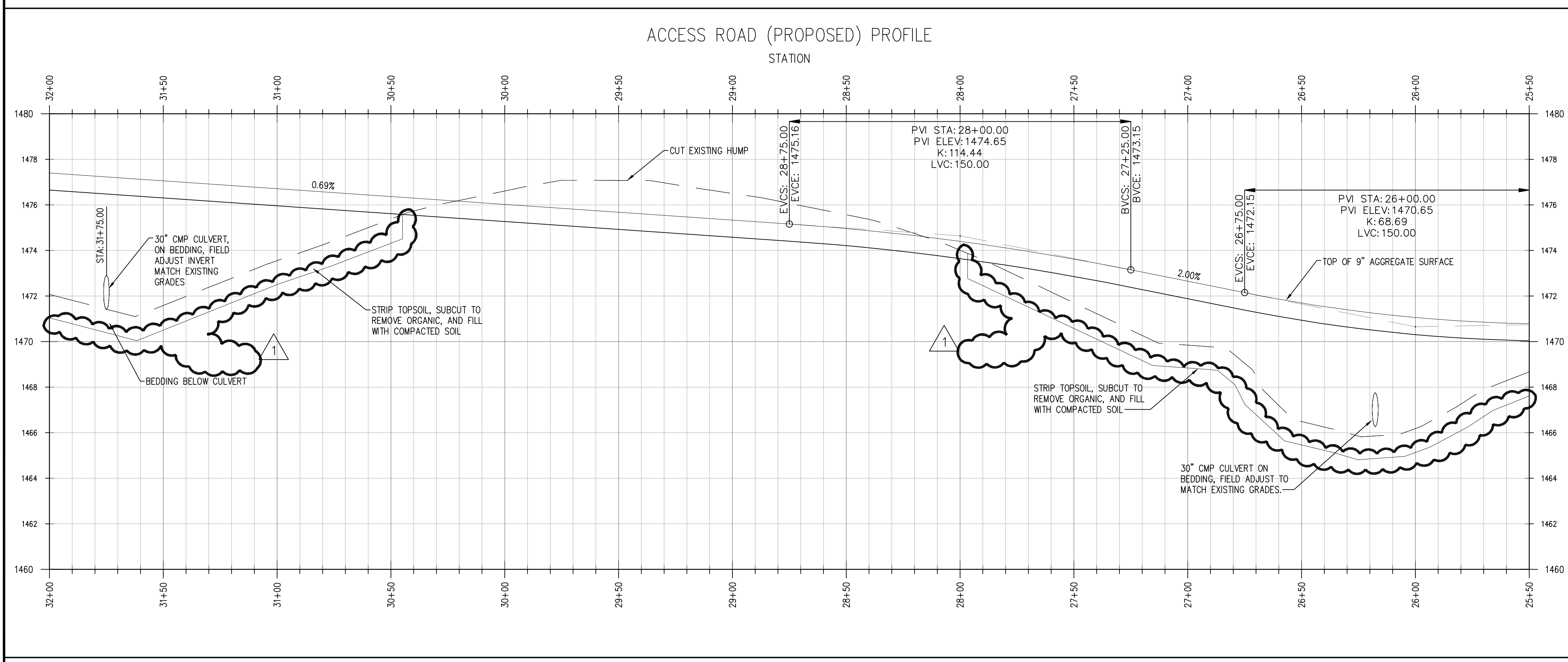
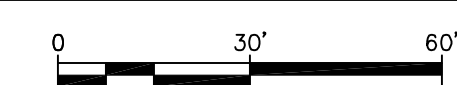
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PROPOSED ACCESS ROAD PLAN AND PROFILE - AREA "E"

C201E

1 PROPOSED ACCESS ROAD PLAN - AREA "E"
1" = 30'-0"



2 PROPOSED ACCESS ROAD PROFILE - AREA "E"
H: 1" = 30'-0" V: 1" = 5'-0"

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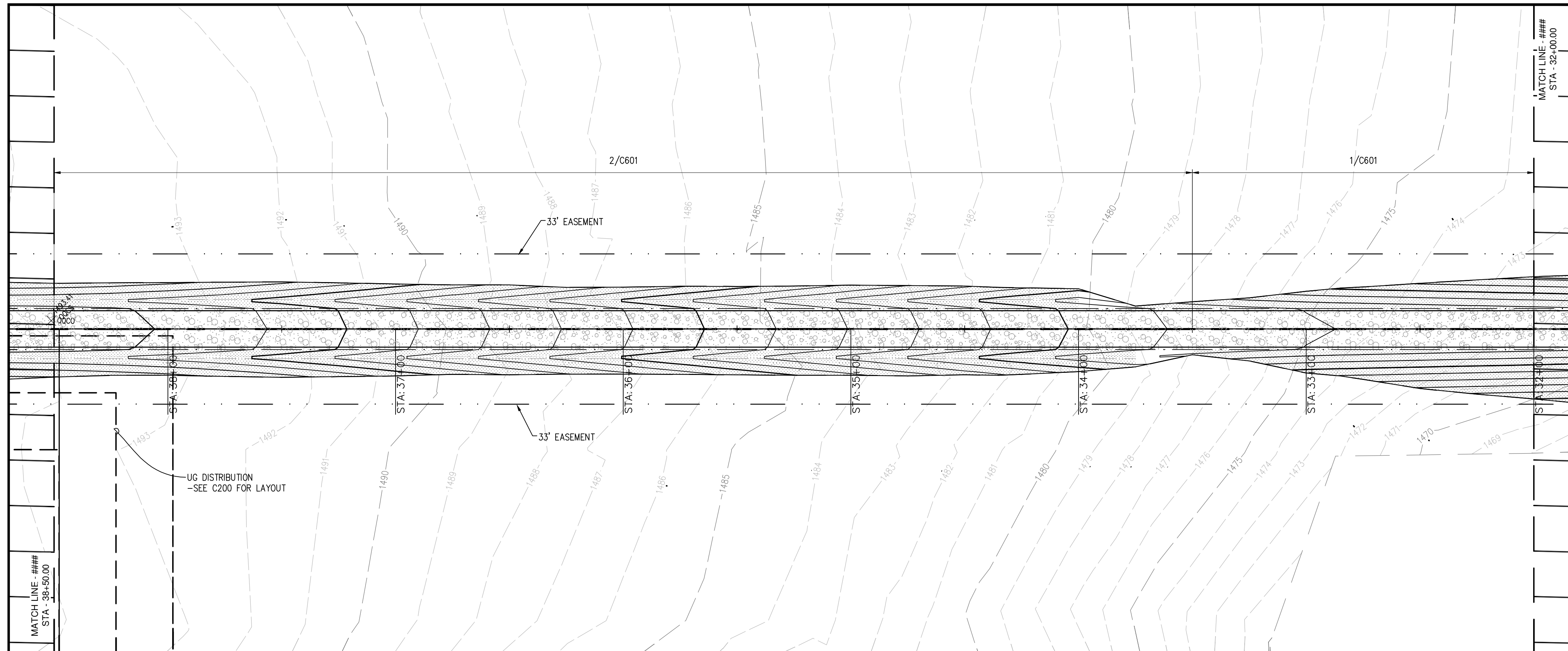
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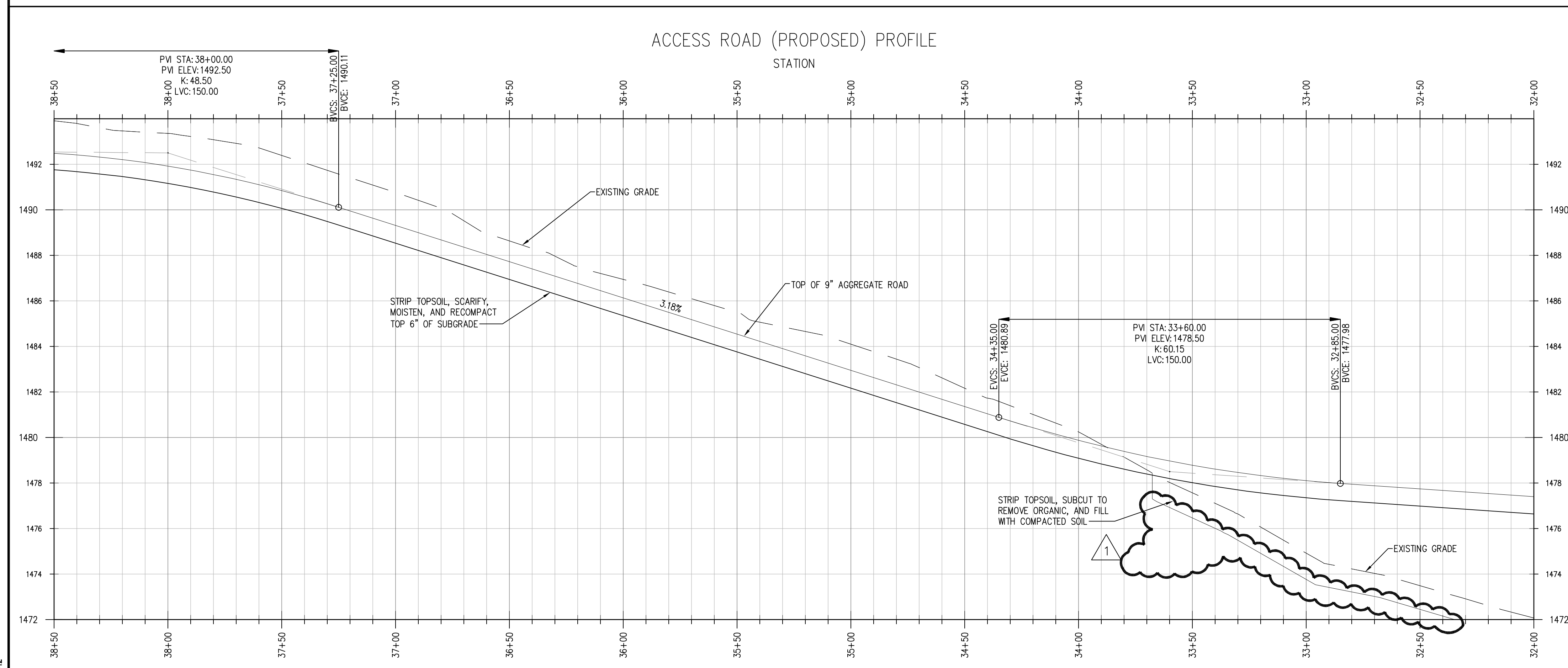
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PROPOSED ACCESS ROAD PLAN AND PROFILE - AREA "F"

C201F

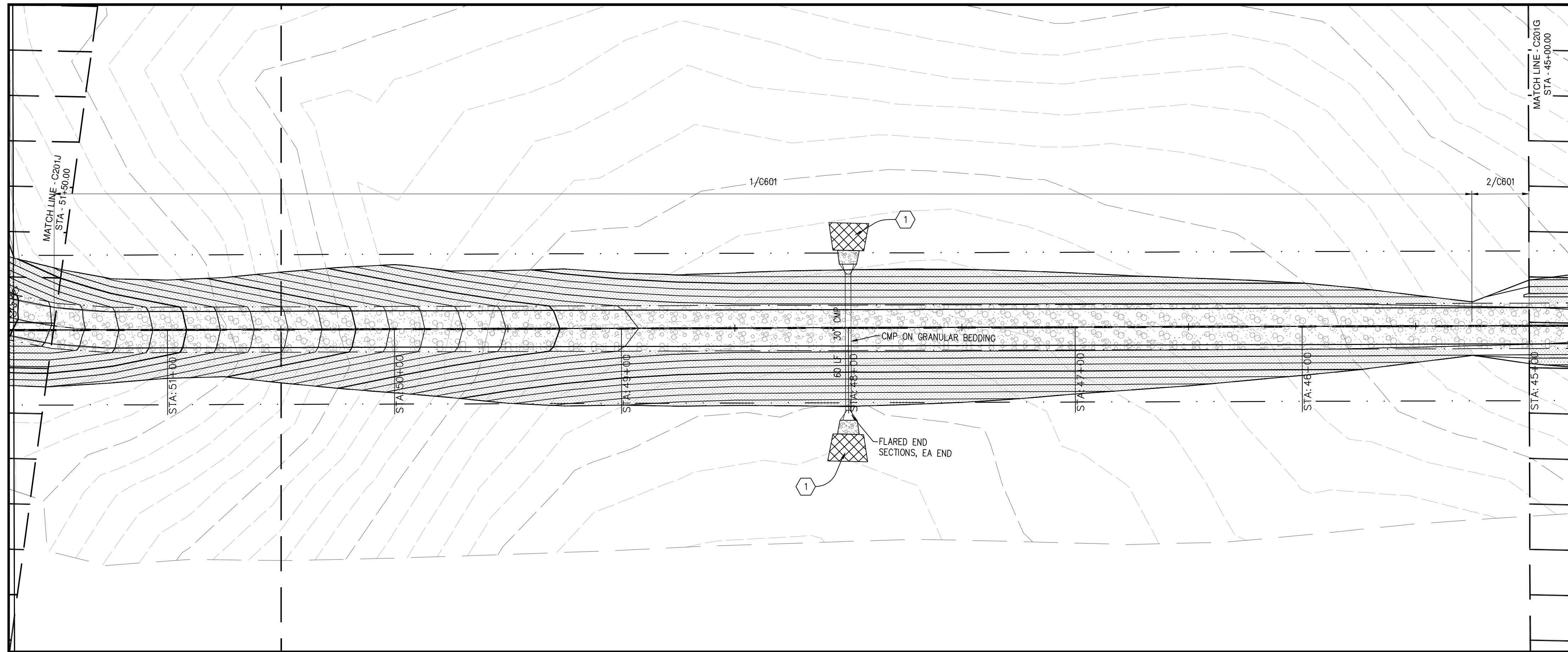


1 PROPOSED ACCESS ROAD PLAN - AREA "F"
C201F 1" = 30'-0"



2 PROPOSED ACCESS ROAD PROFILE - AREA "F"
C201F H: 1" = 30'-0" V: 1" = 5'-0"

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REFERENCE NOTES:

- 1 INSTALL OUTLET AND INLET PROTECTION WITHIN 24 HOURS OF CULVERT INSTALLATION. REFER TO SWPP SHEETS FOR MORE INFORMATION.



Architecture Engineering Industrial
Wind Energy Interior Design Construction

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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: **20112552**

DRAWN BY: **JCE**

CHECKED BY: **JRK**

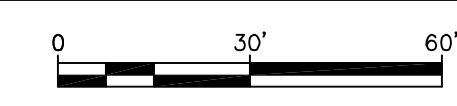
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DRAWING TITLE

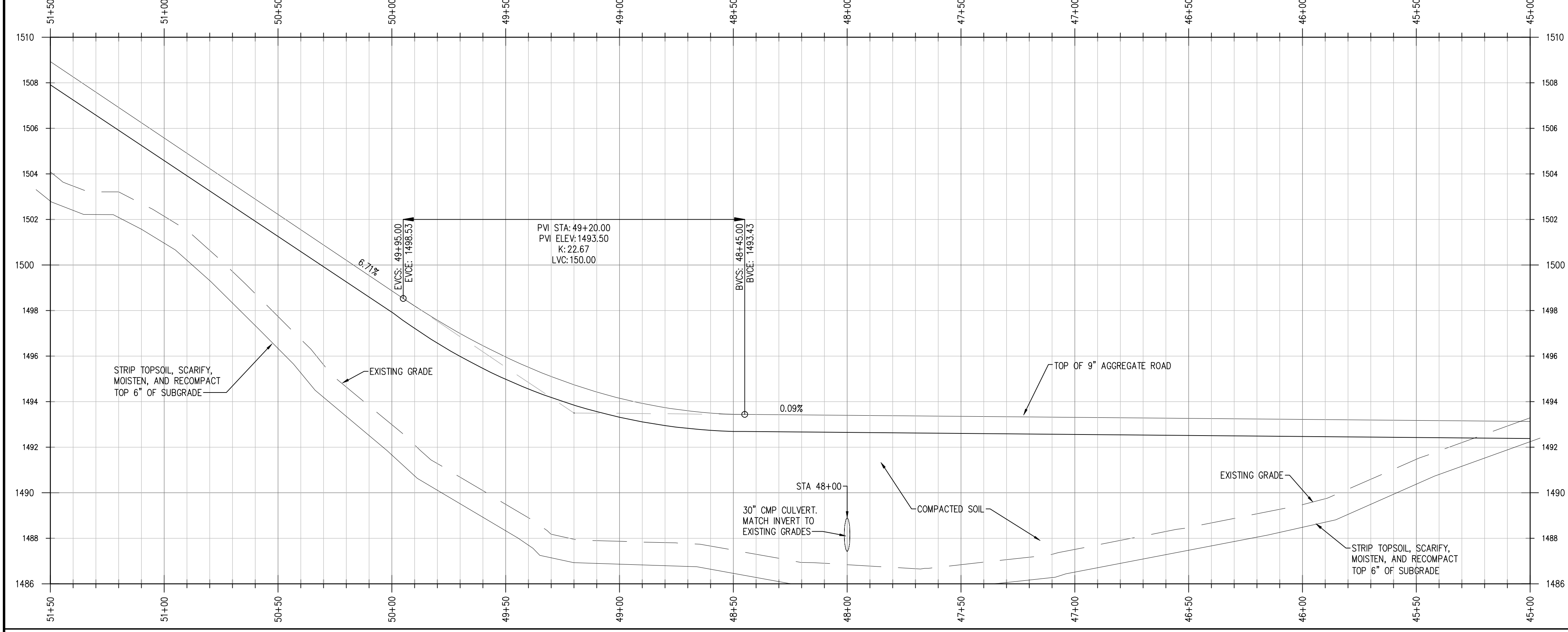
PROPOSED ACCESS ROAD PLAN AND PROFILE - AREA "H"

C201H

1 PROPOSED ACCESS ROAD PLAN - AREA "H"
1" = 30'-0"

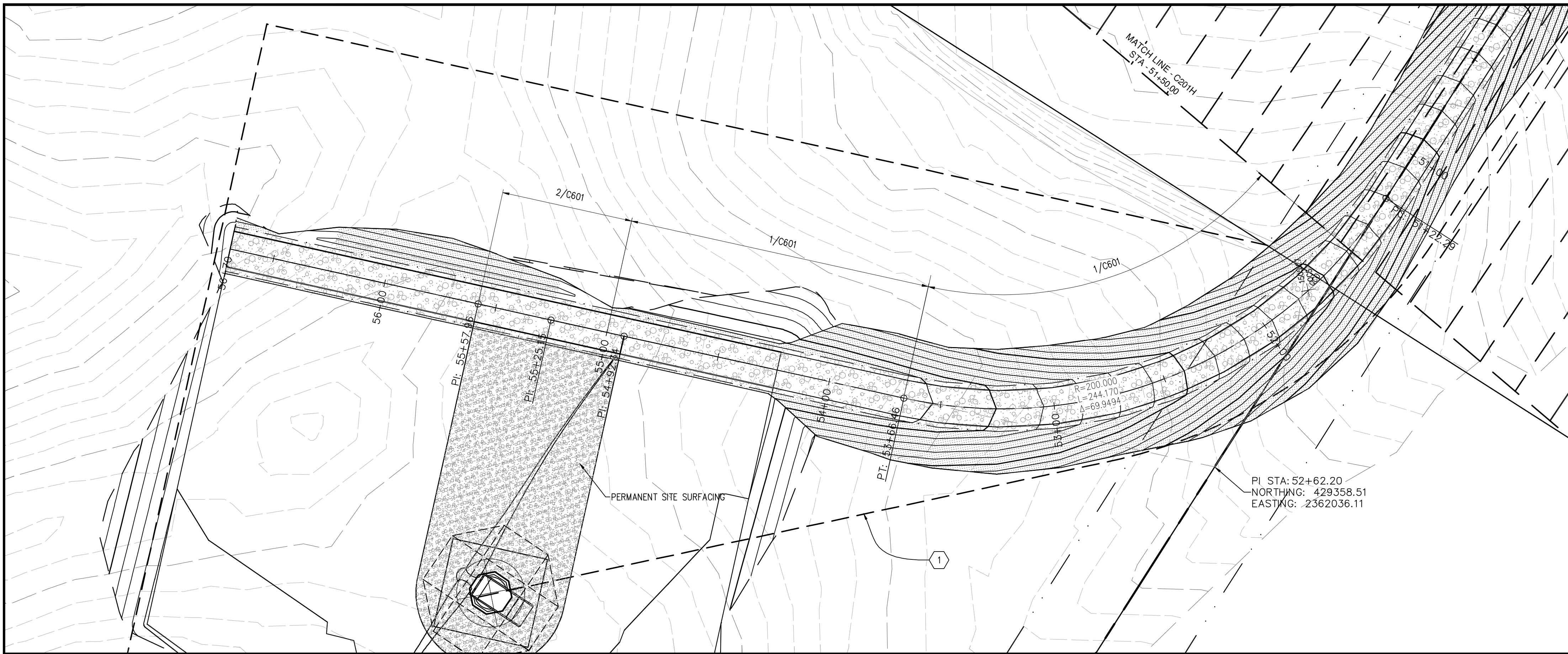


ACCESS ROAD (PROPOSED) PROFILE
STATION

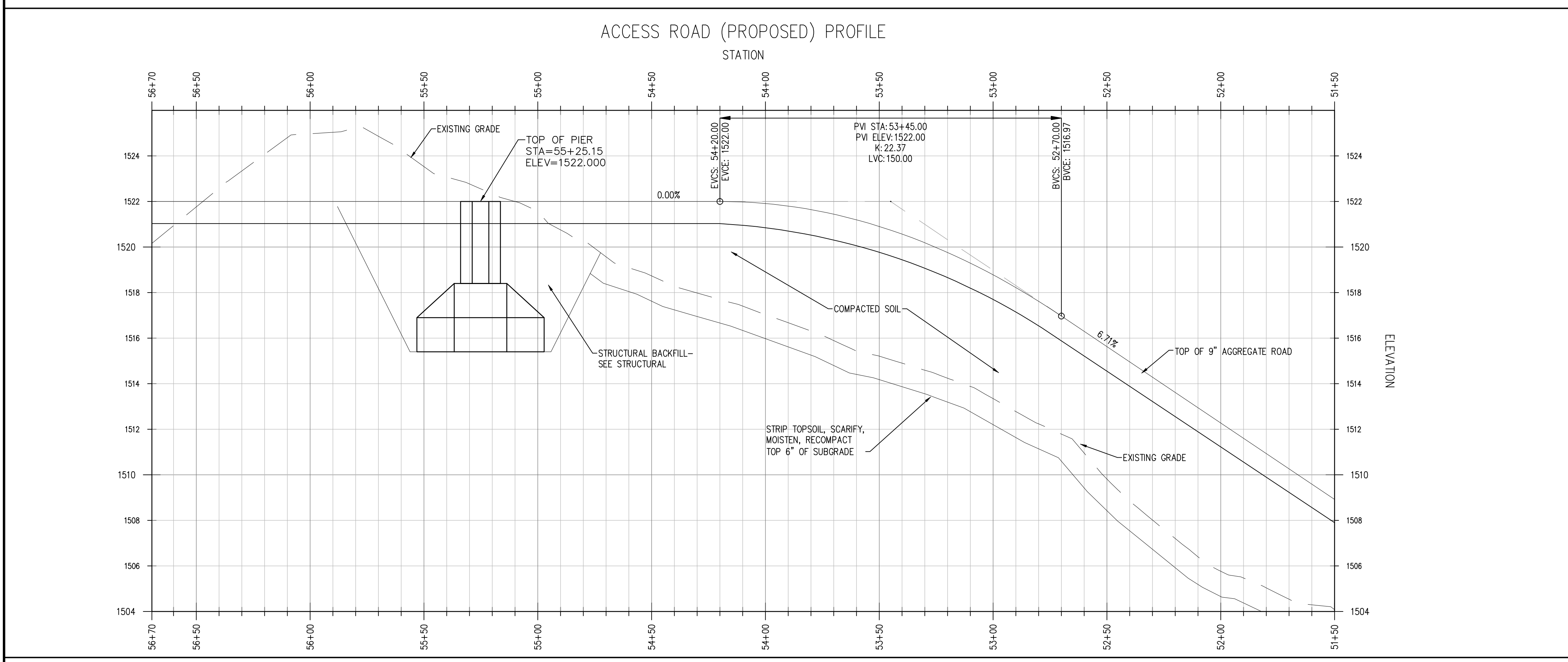


2 PROPOSED ACCESS ROAD PROFILE - AREA "H"
H: 1" = 30'-0" V: 1" = 5'-0"

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1 PROPOSED ACCESS ROAD PLAN - AREA "J"
 C201J 1" = 30'-0"



2 PROPOSED ACCESS ROAD PROFILE - AREA "J"
 C201J H: 1" = 30'-0" V: 1" = 5'-0"

REFERENCE NOTES:
 1 UG DISTRIBUTION LINE - SEE C200 DRAWINGS FOR LAYOUT.



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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

MARK	DESCRIPTION	DATE
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

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DRAWING TITLE

PROPOSED ACCESS ROAD PLAN AND PROFILE - AREA "J"

C201J

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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

MARK	DESCRIPTION	DATE
▲	ISSUED DRAWING	19 OCT 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: **20112552**

DRAWN BY: **JCE**

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DRAWING TITLE

GE 1.6 MW TURBINE COLLECTION SYSTEM FOUNDATION LAYOUT

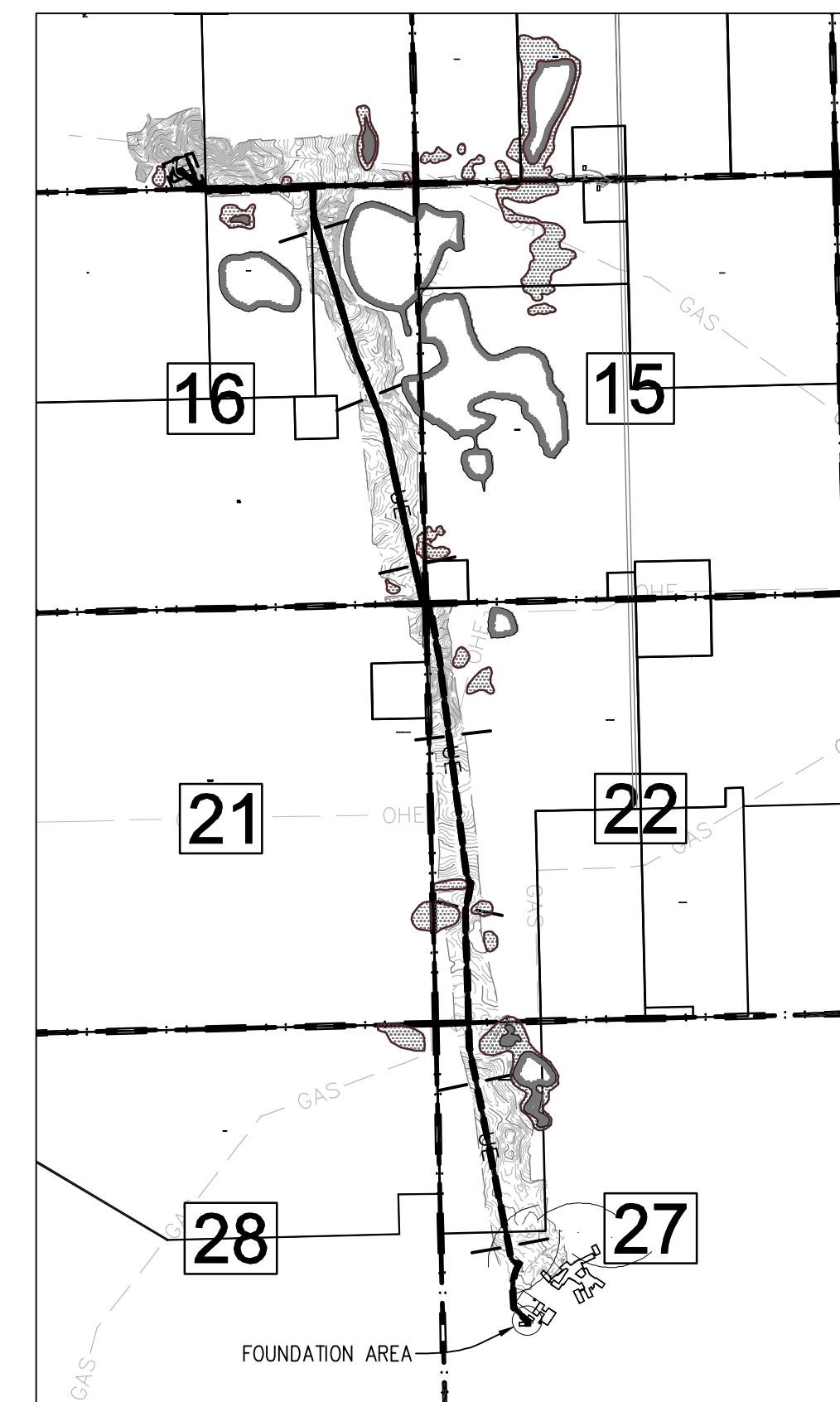
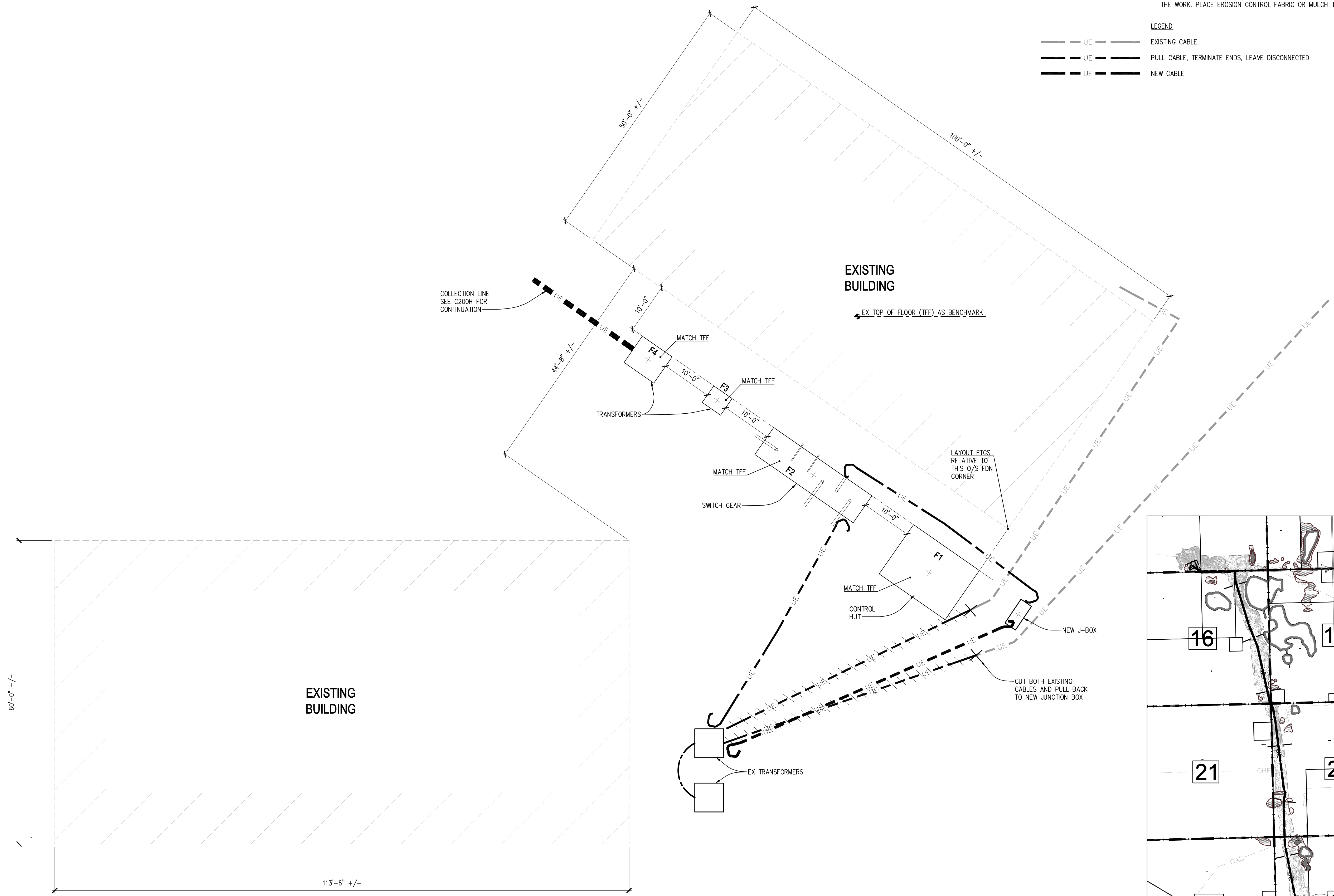


NOTES:

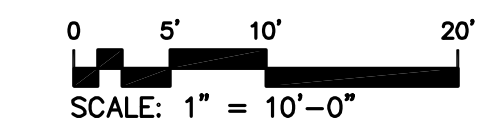
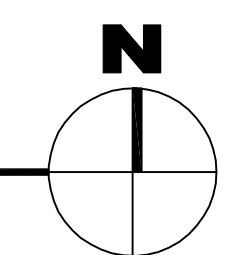
1. ALL EXISTING BUILDING DIMENSIONS ARE APPROXIMATE.
2. SEE ELECTRICAL PLANS FOR ELECTRICAL DETAILS.
3. SEE SHEET C203 FOR FOUNDATION DETAILS.
4. RESTORE TOPSOIL TO SLOPE AND MATCH EXISTING GRADES AFTER COMPLETING THE WORK. PLACE EROSION CONTROL FABRIC OR MULCH TO PREVENT EROSION.

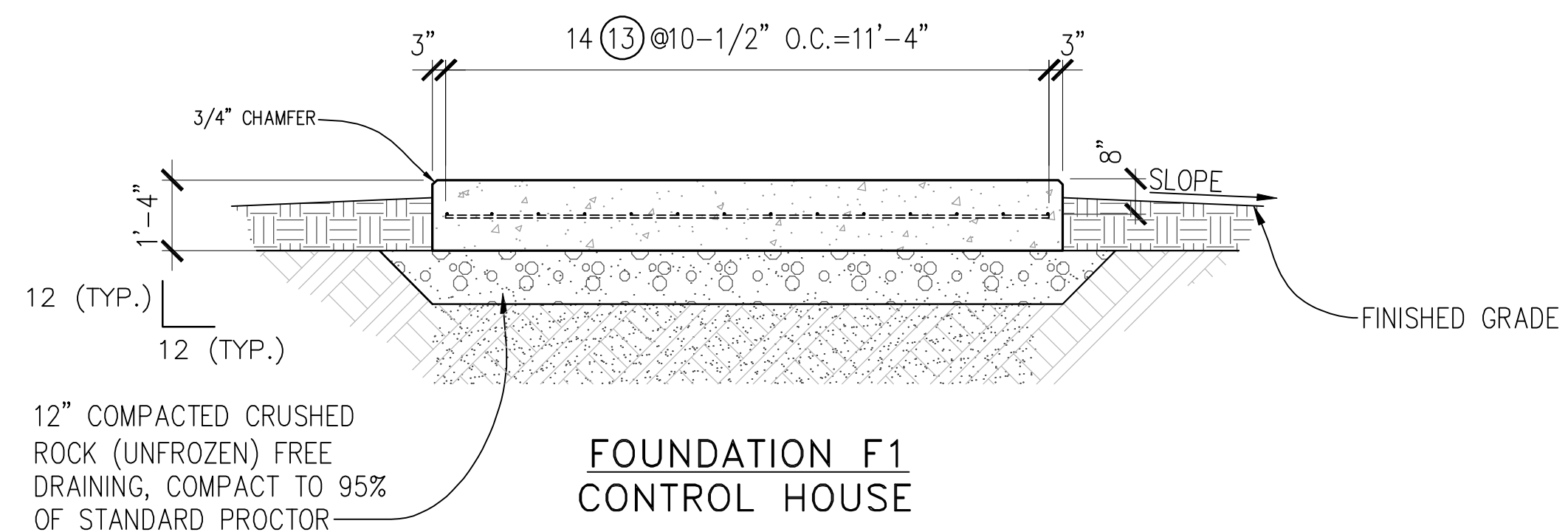
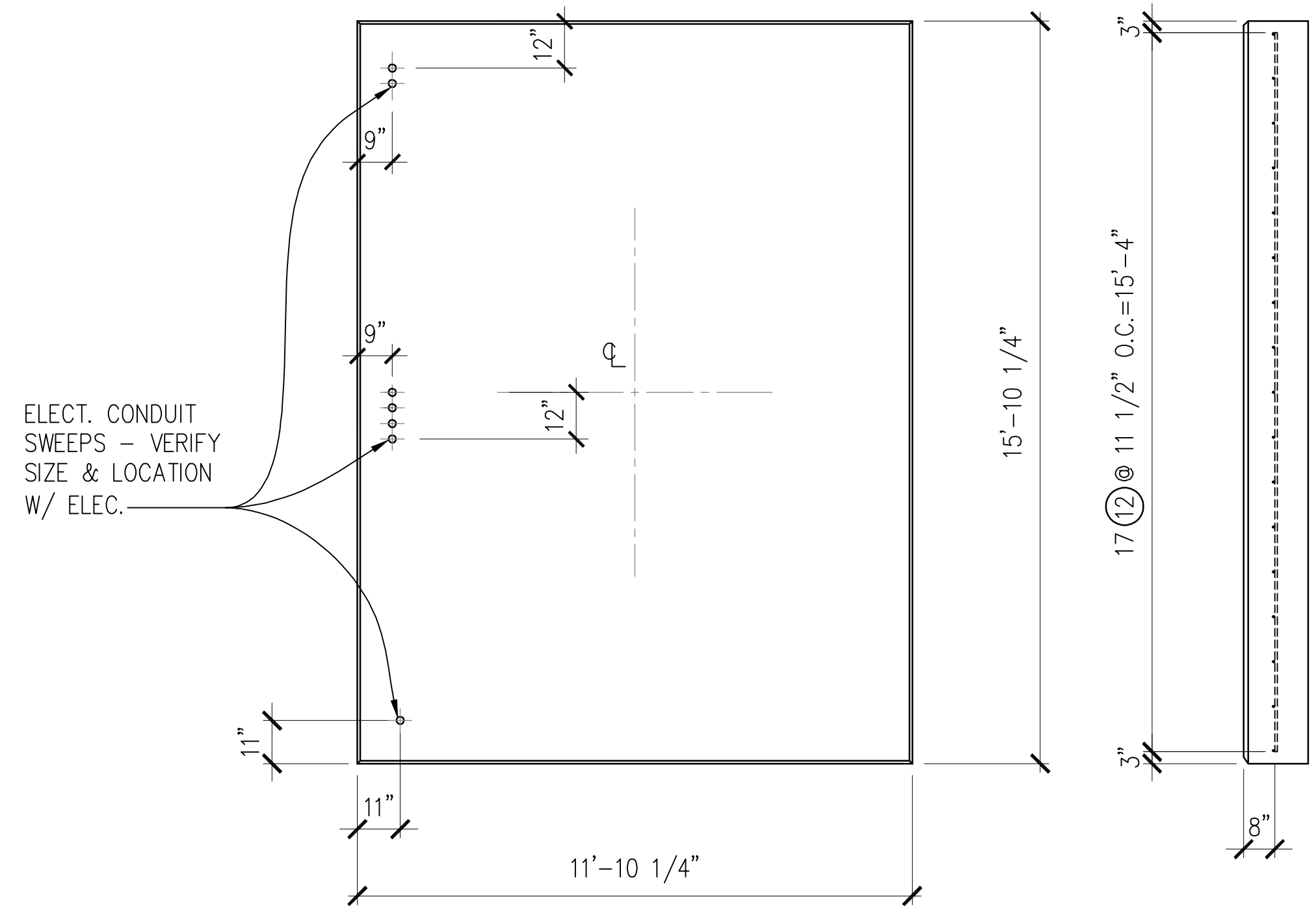
LEGEND

- UE --- EXISTING CABLE
- UE --- PULL CABLE, TERMINATE ENDS, LEAVE DISCONNECTED
- UE --- NEW CABLE



1 FOUNDATION LAYOUT PLAN
 C202 3/32" = 1'-0"





GENERAL NOTES

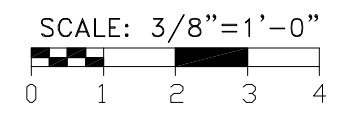
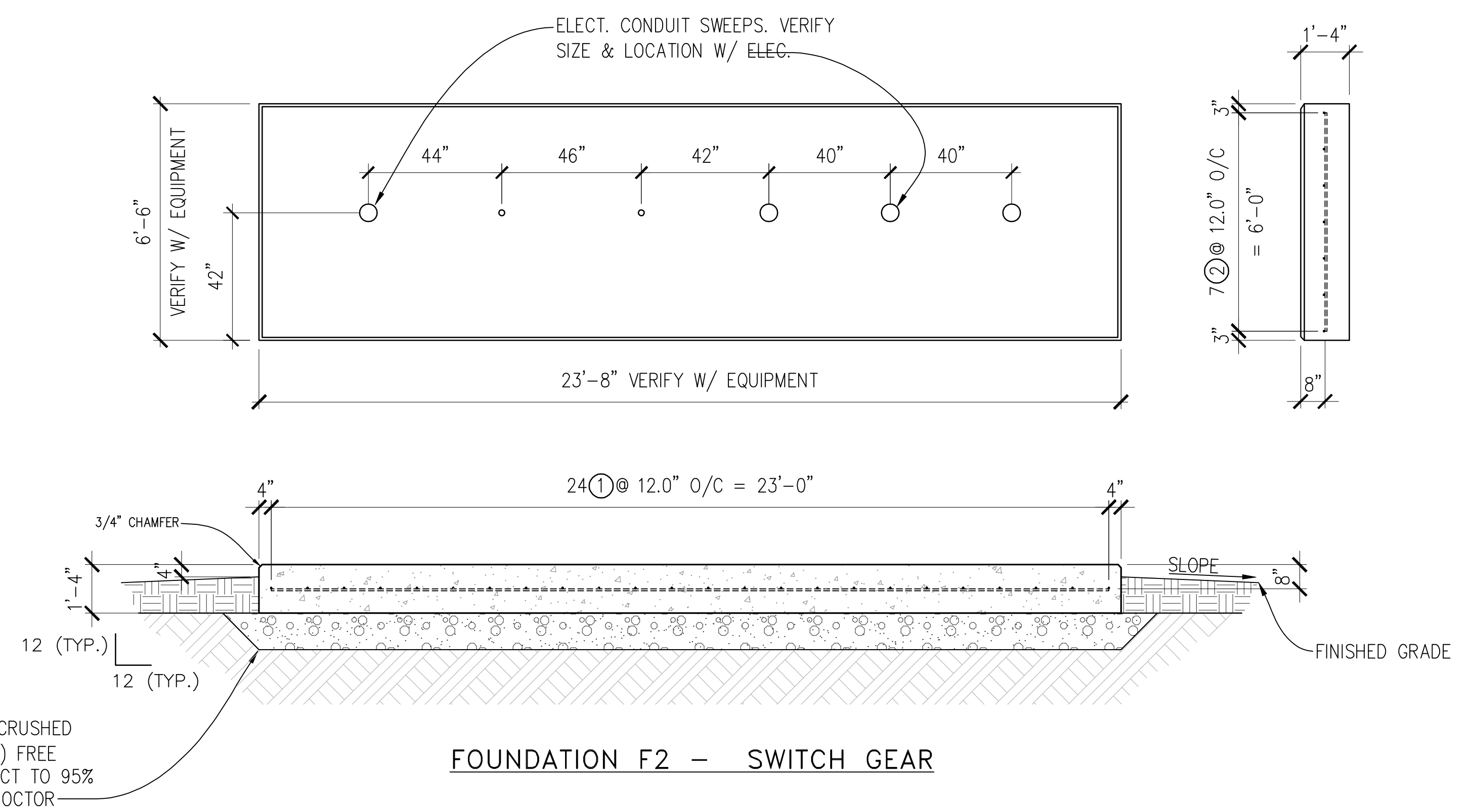
1. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 P.S.I. AT THE END OF 28 DAYS. 6% AIR-ENTRAINED, OR COMPLY WITH STRUCTURAL SHEET S002, PART II, B.
2. SOIL BEARING CAPACITY BENEATH FOOTING OR FOUNDATIONS SHALL BE NOT LESS THAN 1500 PSF.
3. CONCRETE PLACEMENT: NO CONSTRUCTION JOINTS PERMITTED UNLESS NOTED.
4. EDGES OF CONCRETE: ALL EXPOSED EDGES ABOVE GROUND CHAMFERED 3/4 INCH.
5. REINFORCING STEEL: ASTM A615 GRADE 60, DEFORMED, PLAIN FINISH.
6. COVER: THREE INCHES MINIMUM PROTECTIVE CONCRETE COVER OVER REINFORCING STEEL UNLESS NOTED.
7. REFER TO DETAILED SPECIFICATION ON CONCRETE.
8. AFTER ERECTION OF THE STEEL, ALL FOUNDATIONS HAVING LEVELING NUTS SHALL BE GROUTED BETWEEN THE BASE PLATE AND THE TOP OF FOUNDATION TO PROVIDE A UNIFORM BEARING AREA.
9. FINISH: TOP SURFACE OF PIERS TO BE PERFECTLY LEVEL, SCREEDED AND TROWELLED. OUTDOOR EQUIPMENT SLABS WOOD FLOATED, LIGHTLY TROWELLED AND THEN BROOMED.
10. CONCRETE TEMPERATURES DURING COLD WEATHER SHALL COMPLY WITH STRUCTURAL SHEET S002, PART II, A.11.

BAR BENDING DATA

BAR #	SIZE	END HOOKS		STIRRUP & TIE HOOKS	
		180° HOOKS	90° HOOKS	D	A or G
3	2	5"	3"	6"	1-4"
4	3	6"	4"	8"	2-4-1/2"
5	3	7"	5"	10"	2-6"
6	4	8"	6"	1'-0"	
7	5	10"	7"	1'-2"	
8	6	11"	8"	1'-4"	
9	9	1'-3"		1'-7"	
10	10	1'-5"		1'-10"	

NO. REQ'D	CONC. CU. YD.	FDN MARK	BAR MARK	QUAN.	SIZE	NOM. LENGTH	TYPE	A	B	C	D	E	G	J	WT. / BAR	TOTAL WT.
1	9.28	F1	(12)	17	#5	11'-4"	STR								11.8	201
			(13)	14		15'-4"	STR								16.0	224
															WT./FDN	425
1	7.60	F2	(1)	24	#5	23'-2"	STR								7.2	173
			(2)	7	#5	6'-0"	STR								1.9	14
															WT./FDN	187

TOTAL STEEL THIS SHEET = 612#
TOTAL CONCRETE THIS SHEET = 16.88 CU. YARDS



THIS LINE IS ONE INCH WHEN DRAWING IS FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY.

DRAWING REFERENCE
FOUNDATION LAYOUT ——— C202



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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

ISSUE DATES

MARK	DESCRIPTION	DATE
△	ISSUED DRAWING	19 OCT 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

DRAWN BY: JCE

CHECKED BY: JRK

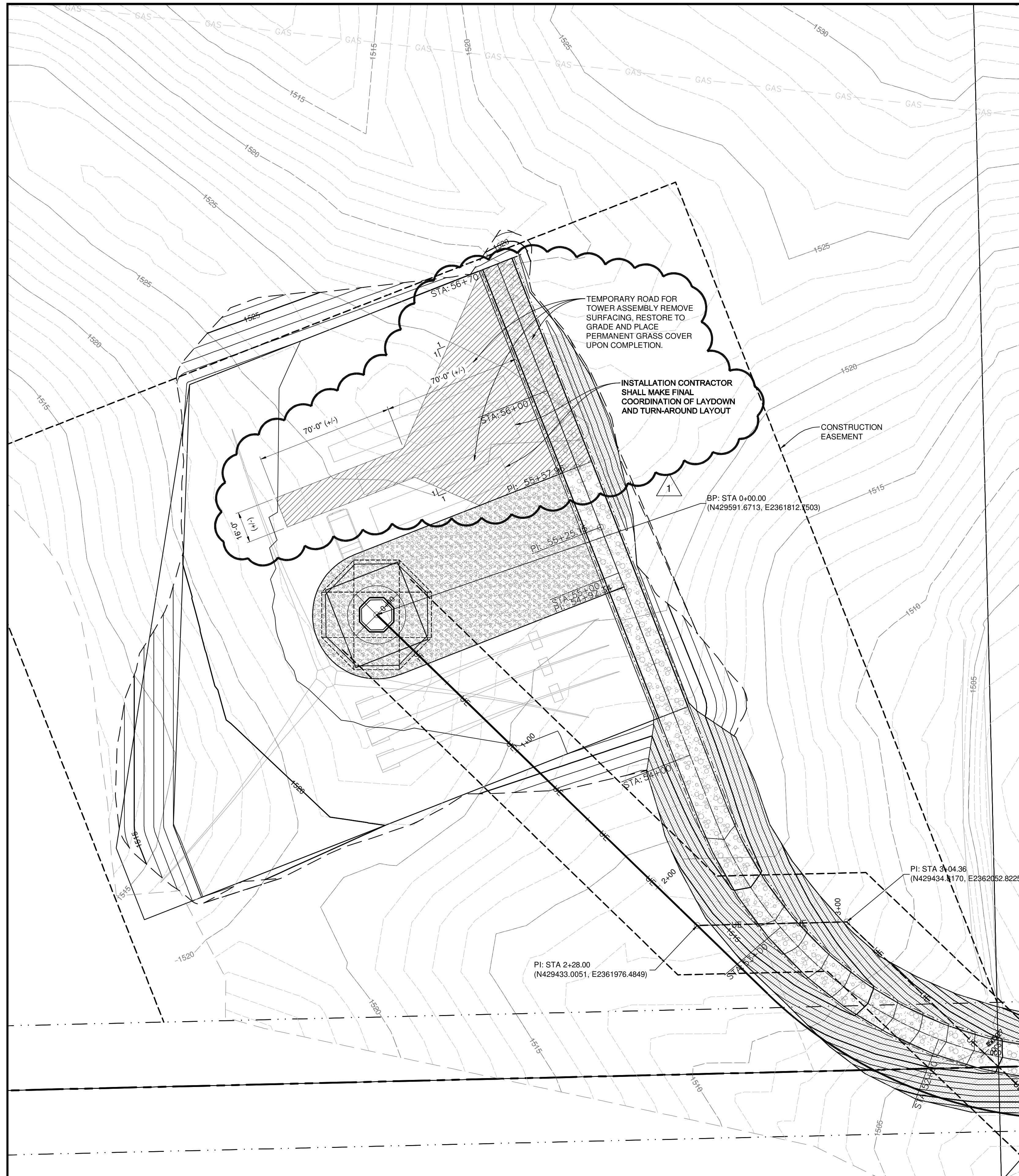
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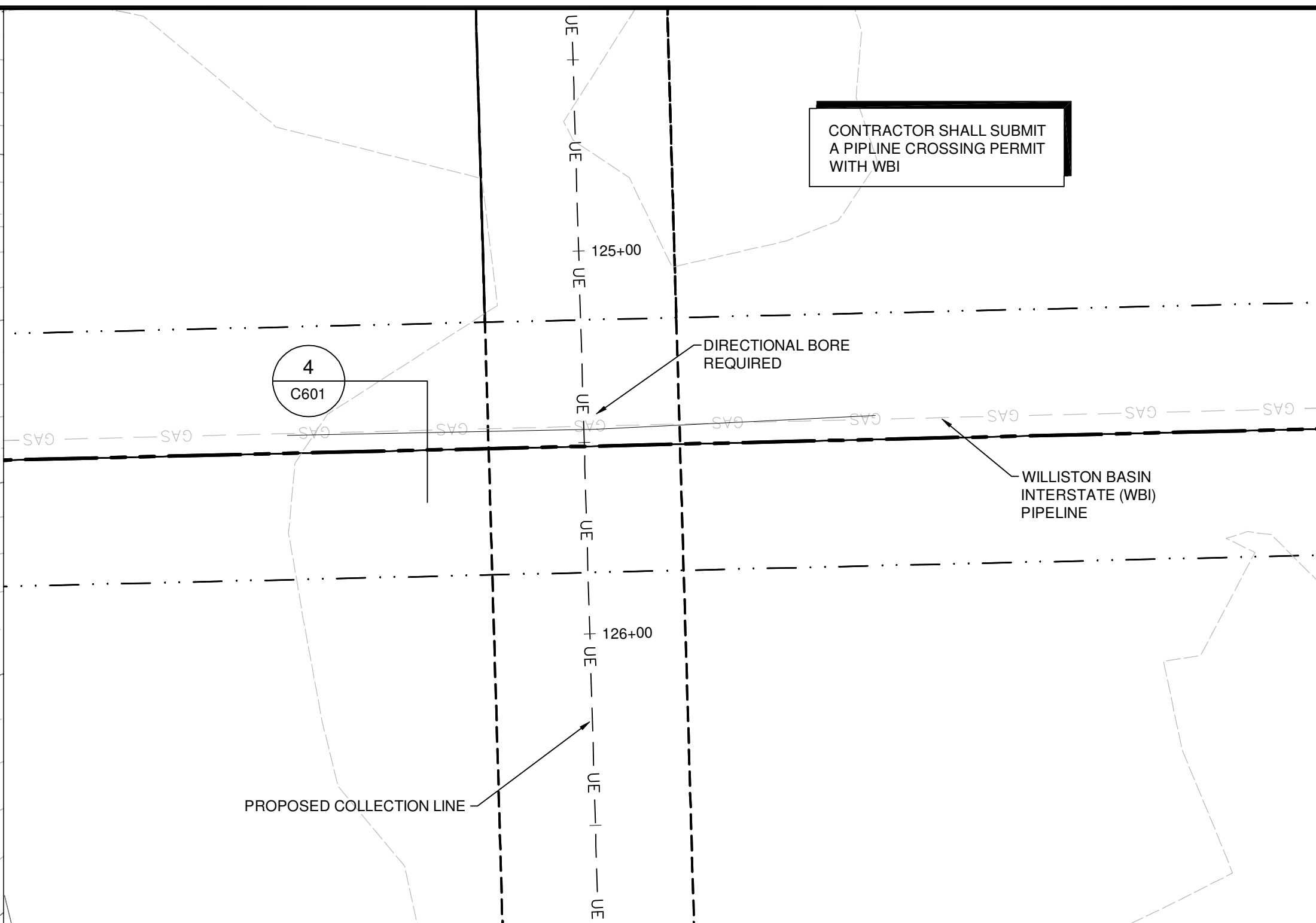
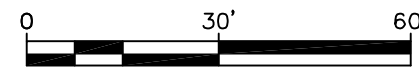
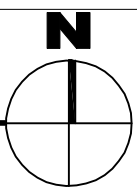
GE 1.6 MW TURBINE COLLECTION SYSTEM FOUNDATION DETAILS



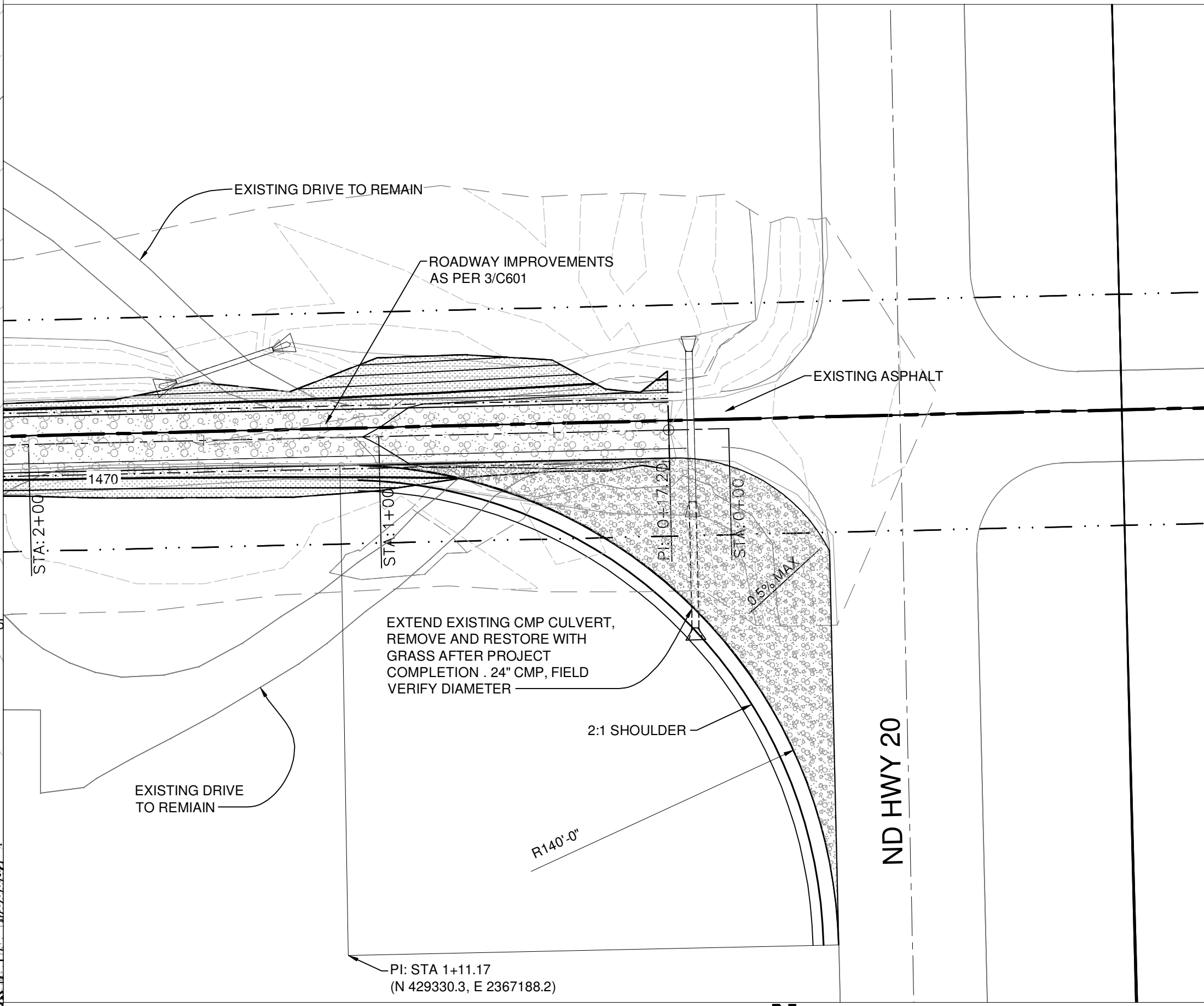
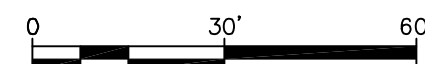
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 Plot Date: 21-Sep-12



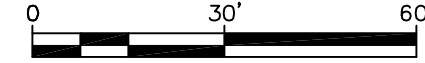
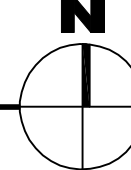
2 SITE LAYOUT PLAN @ TURBINE AREA
 1" = 30'-0"



3 COLLECTION LINE CROSSING AT PIPELINE
 1" = 30'-0"



1 ACCESS ROAD PLAN @ ENTRY LOCATION
 1" = 30'-0"



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 Wind Energy, Interior Design, Construction

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CLIENT
LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION
LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**
 STATE **NORTH DAKOTA**

ISSUE DATES

△	ADDED TURN-AROUND LAYOUT	21 SEP 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

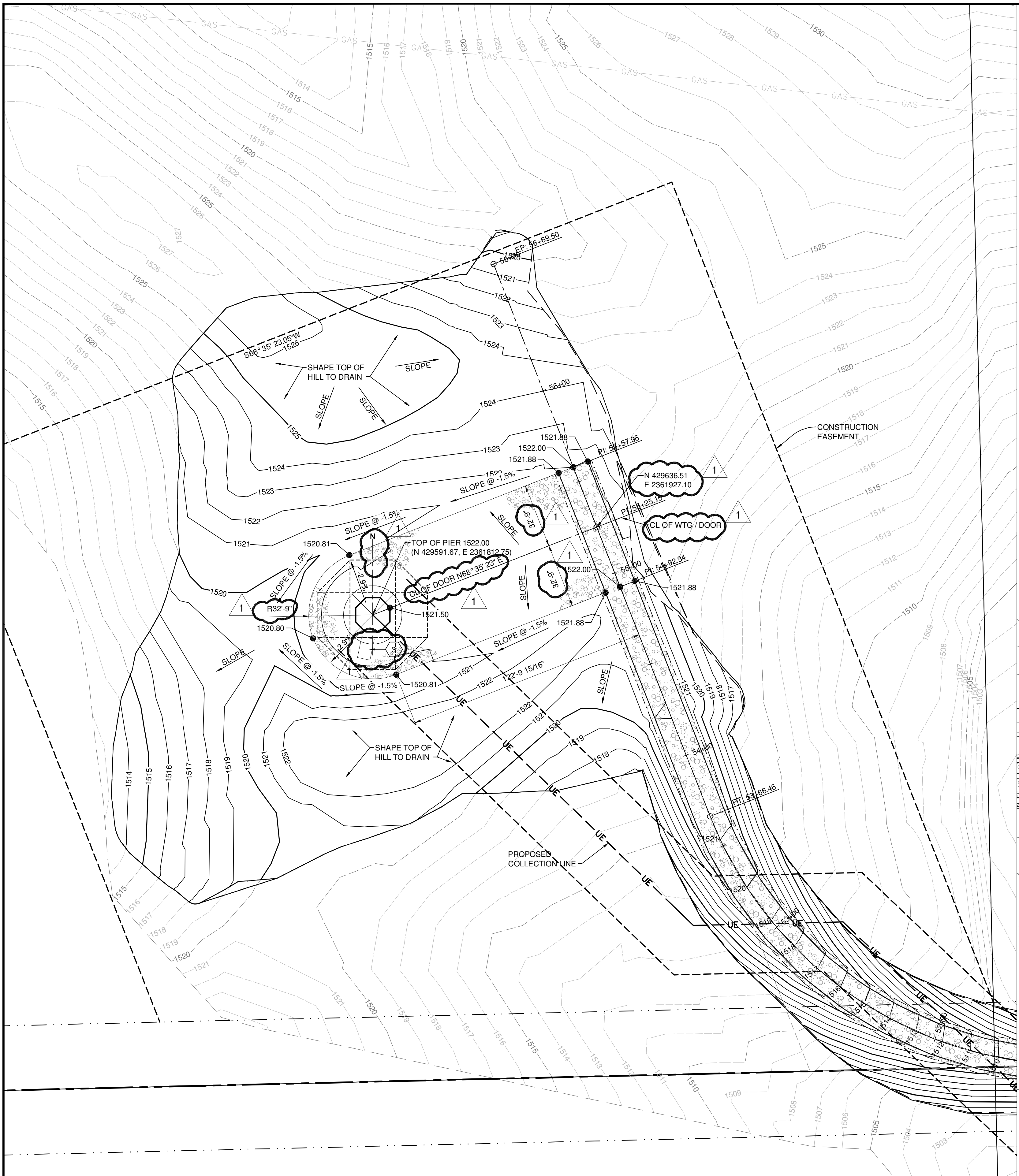
PROJECT NO: **20112552**
 DRAWN BY: **JCE**
 CHECKED BY: **JRK**

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DRAWING TITLE
ENLARGED SITE PLANS

C501

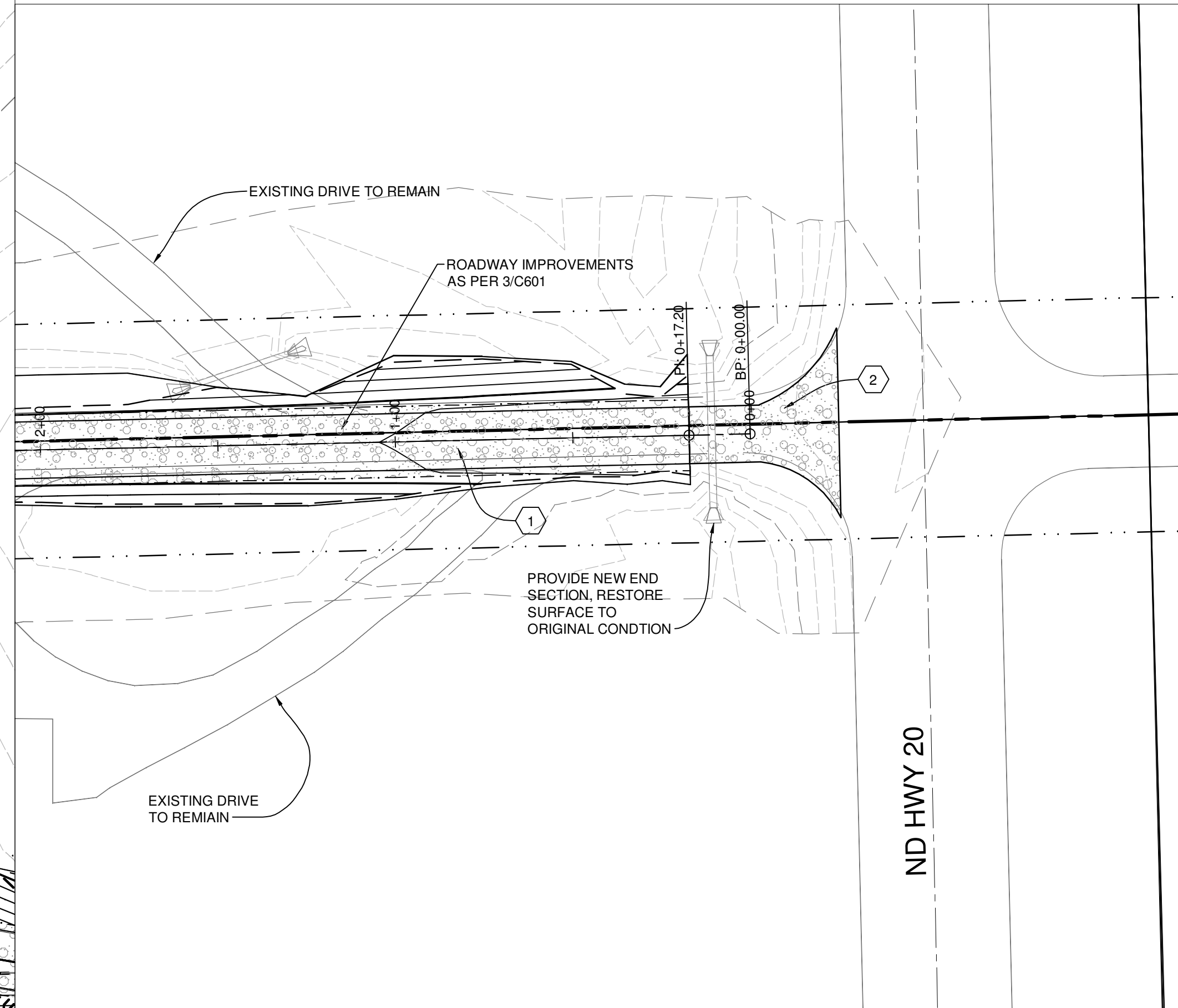
File Location: P:\2011\20112552 - DVL US LRSC-ESS WTG Fm - Civil Drawings\20112552-C502.dwg
 Plot Date: 10-Oct-12



2 SITE LAYOUT PLAN @ TURBINE AREA
 1" = 30'-0"

PLACE EROSION CONTROL MAT AND VEGETATIVE COVER IMMEDIATELY AFTER COMPLETING ALL SLOPE CONSTRUCTION.

- REFERENCE NOTES:**
- 1 RESTORE ORIGINAL AGGREGATE SURFACE DRIVEWAY
 - 2 RESTORE EXISTING ASPHALT STA R.O.W. TO STA 0+50 WITH 5" OF NDDOT CLASS 27 PLACED ON 8" OF AGGREGATE
 - 3 TRANSFORMER PAD - SEE TRC-01, COORDINATE UG ELECTRICAL LAYOUT WITH ELECTRICAL CONTRACTOR.



1 ACCESS ROAD PLAN @ ENTRY LOCATION
 1" = 30'-0"

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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

MARK	DESCRIPTION	DATE
1	DOOR LAYOUT, GENERAL CLARIFICATIONS	10 OCT 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

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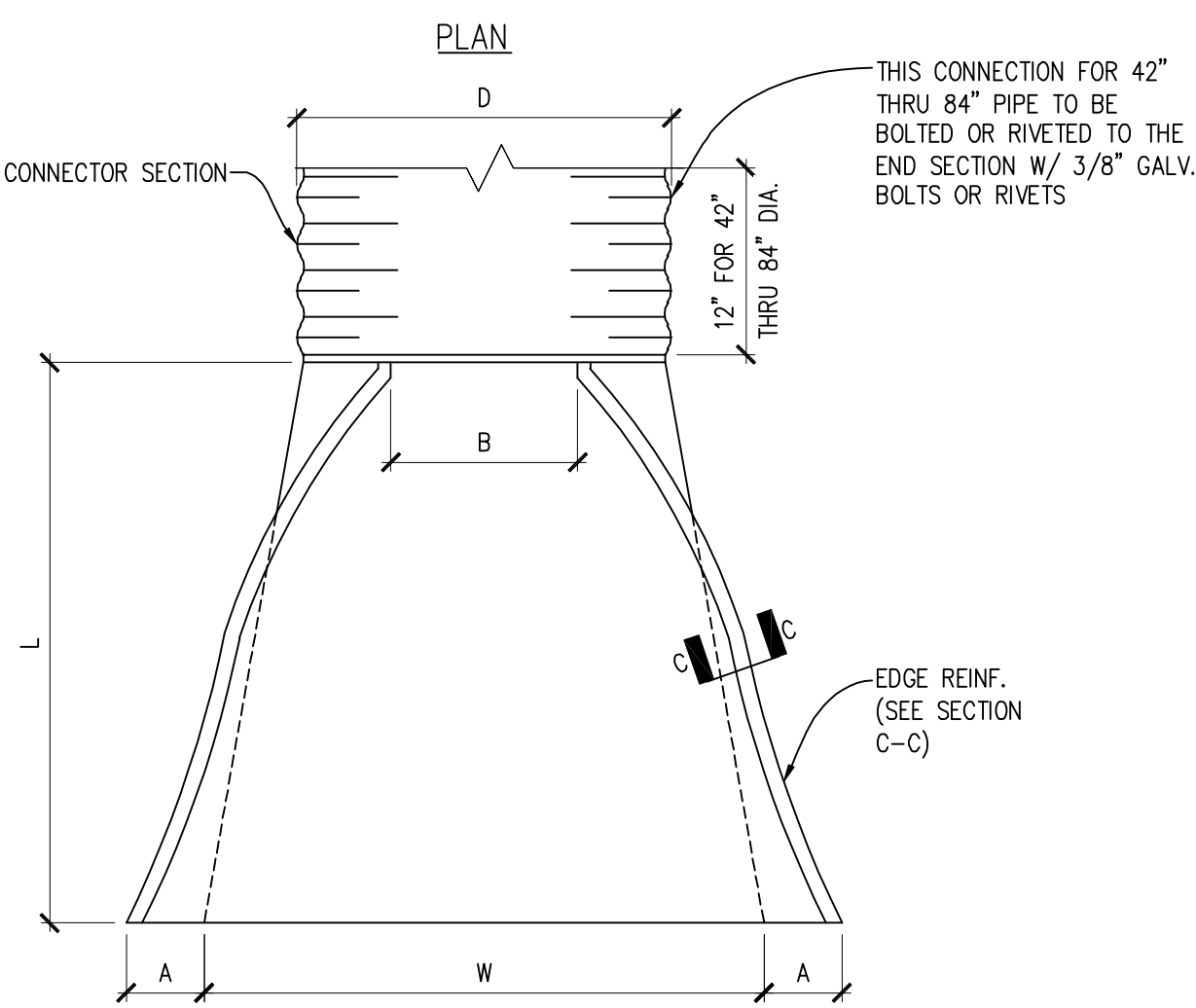
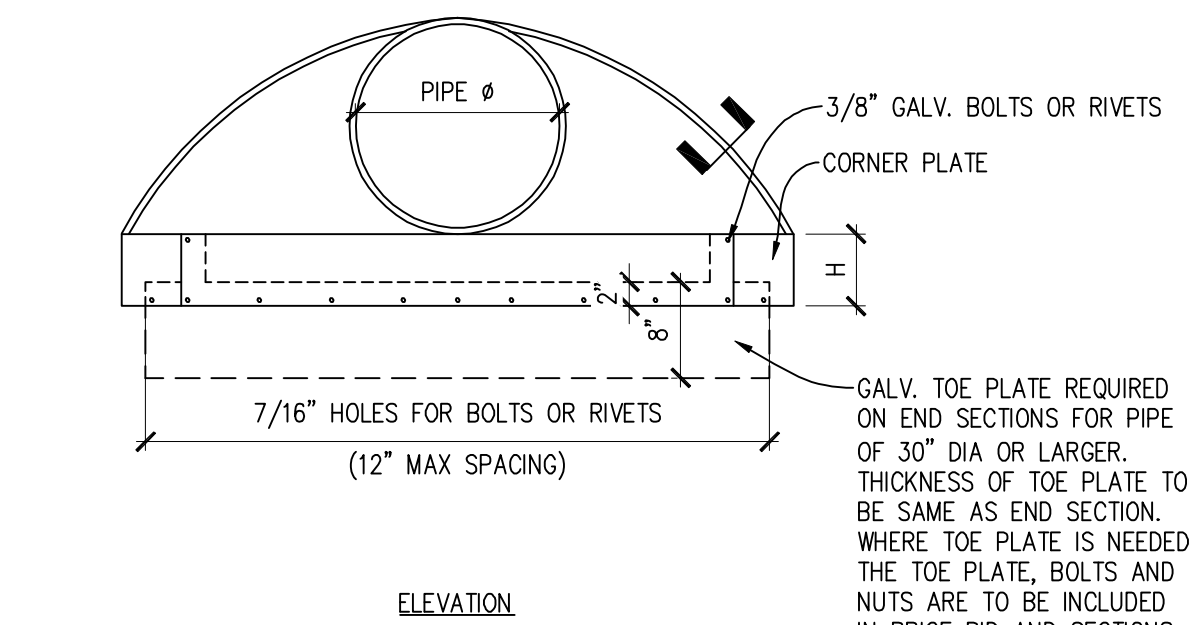
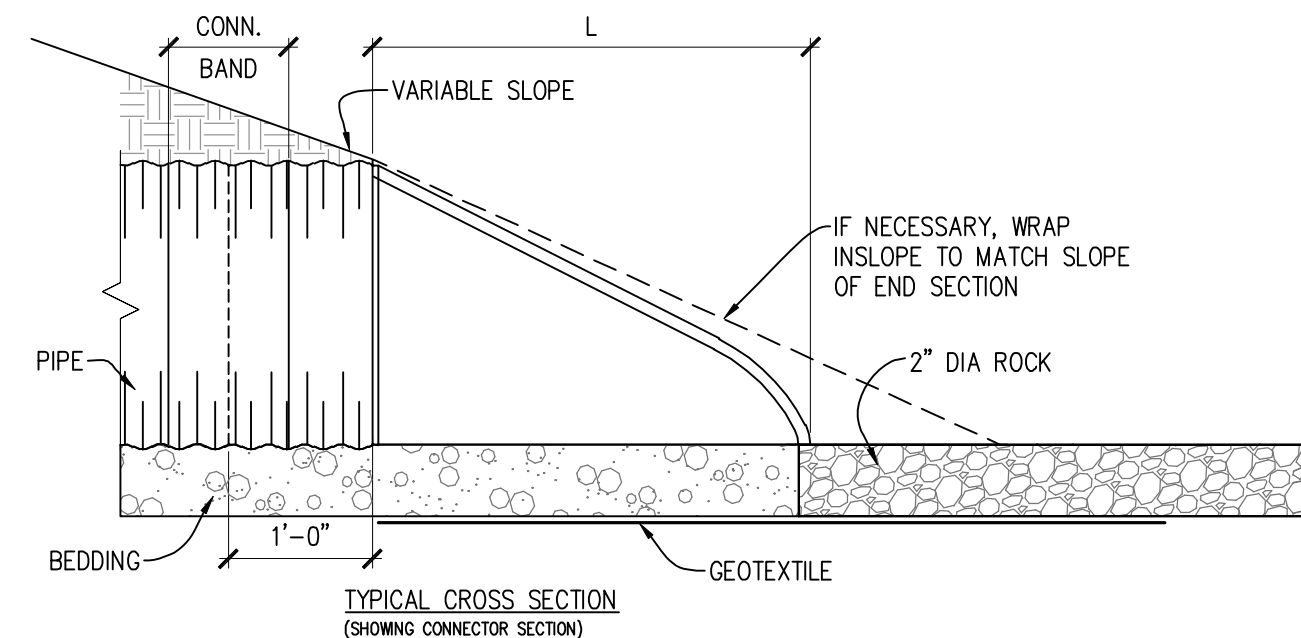
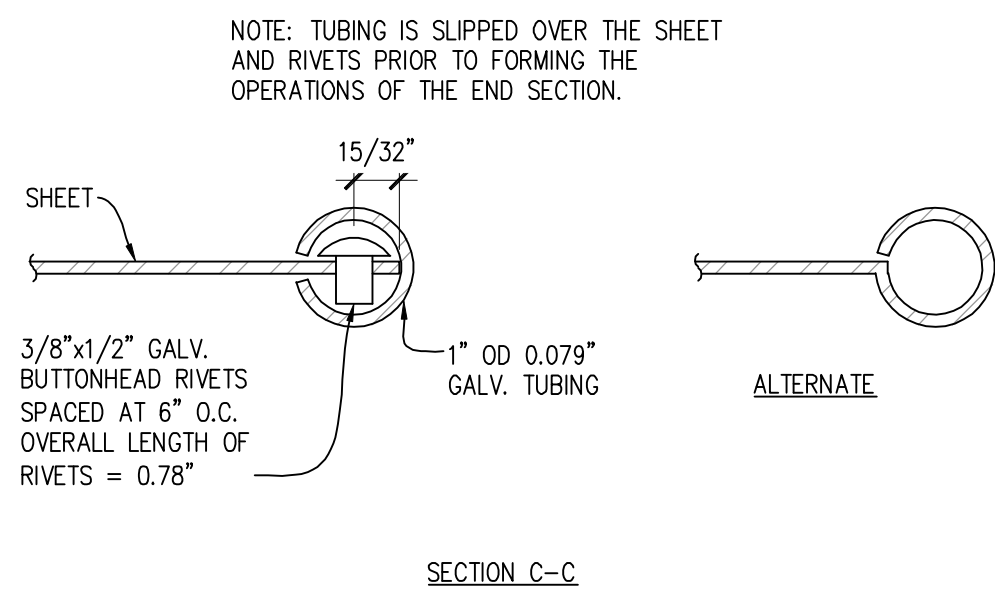
DRAWING TITLE

ENLARGED SITE PLANS

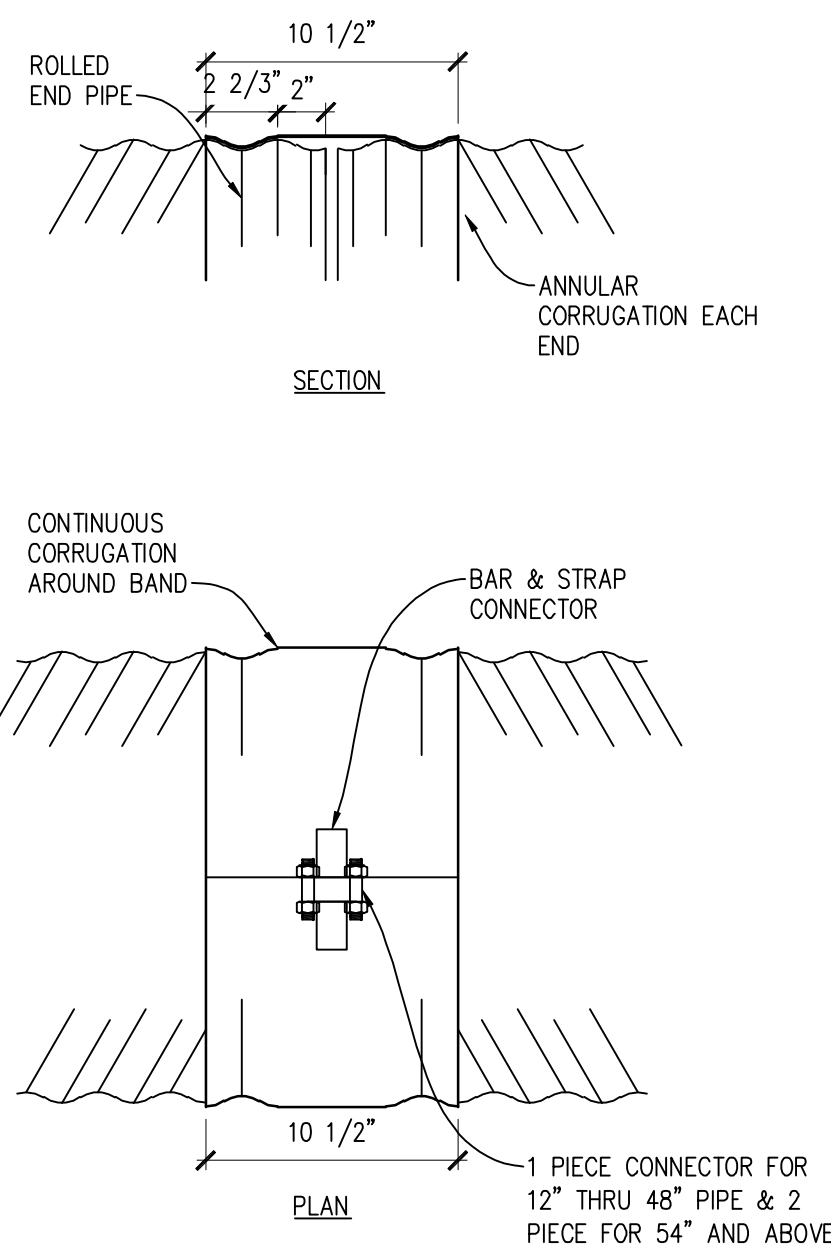
C502

NOTES:

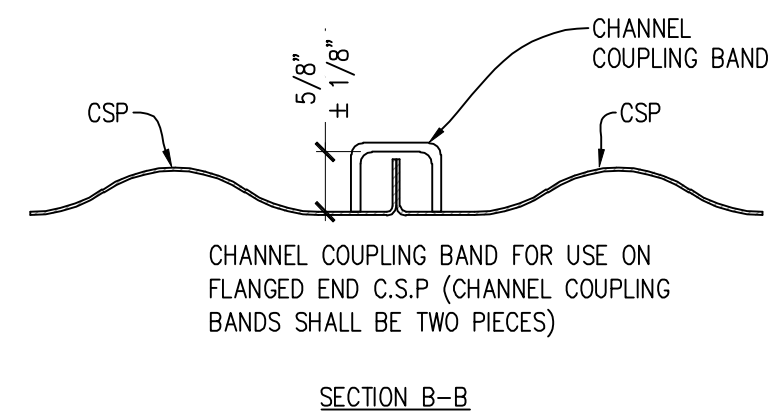
- PIPE AND CONNECTING BANDS SHALL CONFORM TO APPLICABLE SECTIONS OF NDDOT STANDARD SPECIFICATIONS AND TO AASHTO M-36.
- TOP EDGE OF ALL END SECTIONS TO HAVE TUBING REINFORCEMENT OR ROLLED TUBE REINFORCEMENT (SEE SECTION C-C). THE TUBING IS TO BE SUPPLEMENTED WITH 2"x2"x1/4" GALV. ANGLE FOR 60" THROUGH 72" DIA. AND 2 1/2"x2 1/2"x1/4" GALV. ANGLE FOR 78" AND 84" DIA. ANGLES TO BE ATTACHED BY GALV. 3/8" DIA. BOLTS AND NUTS. ANGLES ARE TO EXTEND FROM PIPE TO THE CORNER WING BEND.
- ELONGATED PIPE SHALL BE FACTORY PREFORMED AS THAT THE VERTICAL DIAMETER SHALL BE 5% GREATER AND THE HORIZONTAL DIAMETER 5% LESS THAN A CIRCULAR PIPE.



8 TYPICAL CULVERT DETAIL
C601 NO SCALE

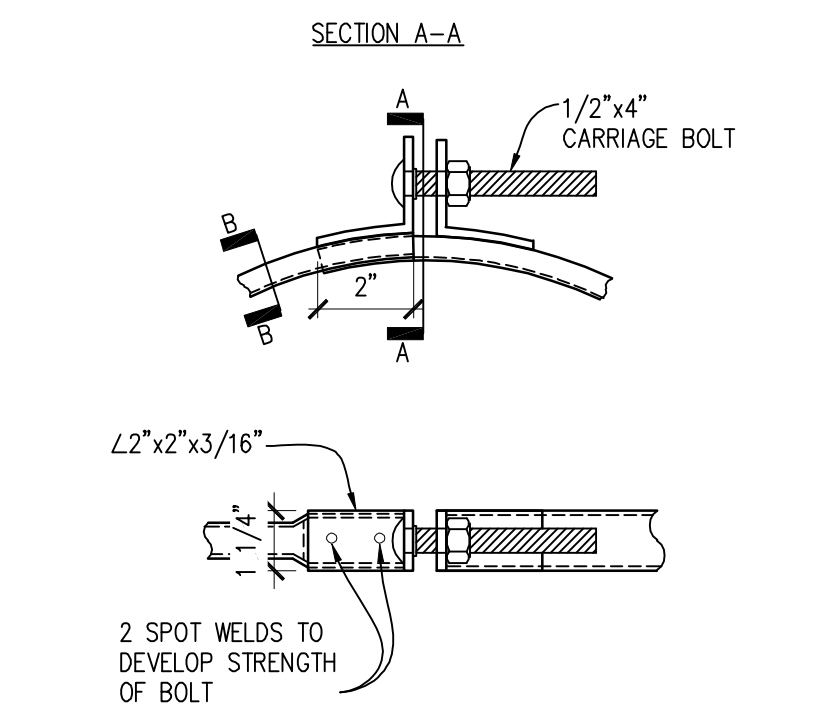
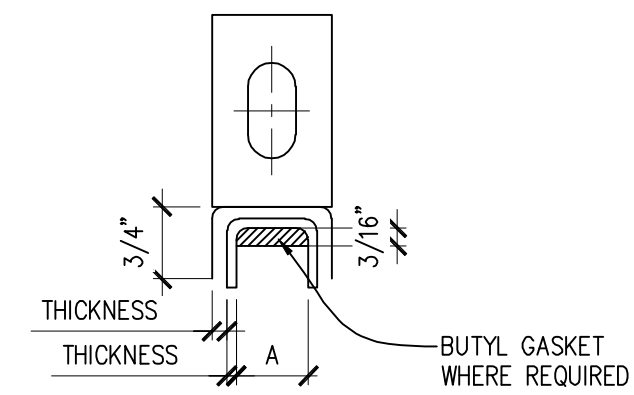


7 CONNECTION BAND FOR CULVERT
C601 1 1/2"=1'-0"

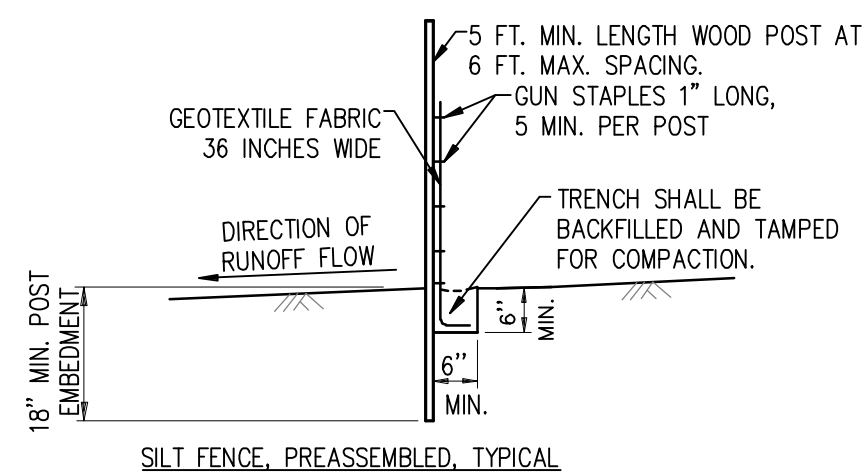


NOMINAL DIMENSIONS

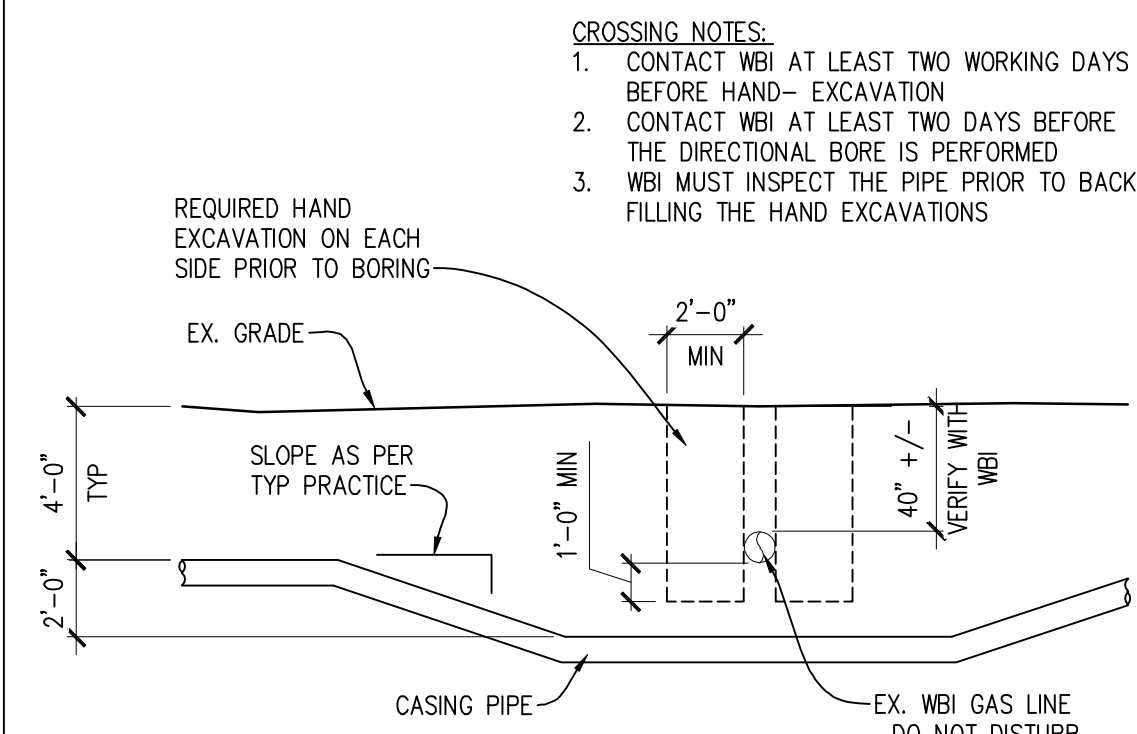
THICKNESS	A	FOR USE WITH C.S.P.
0.079"	3/4"	0.09" THICK OR LIGHTER
0.109"	1"	0.138" THICK OR HEAVIER



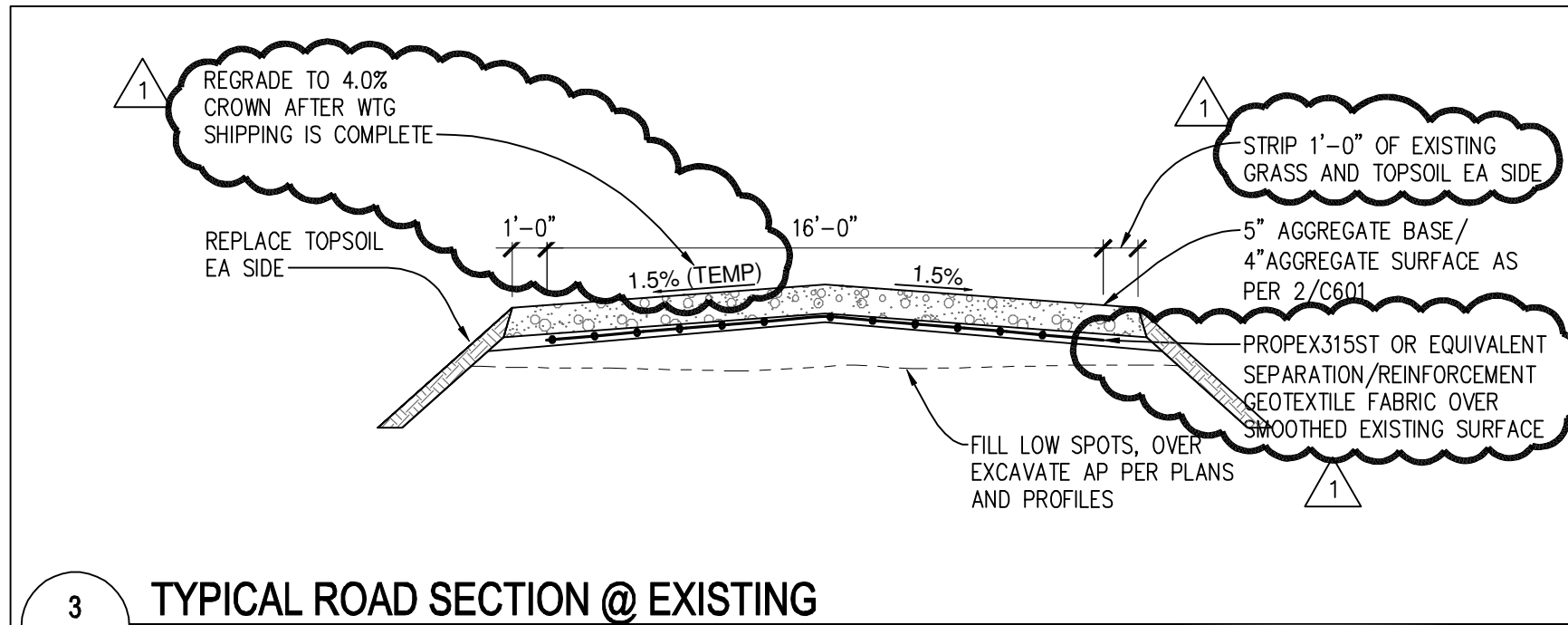
6 CULVERT CONNECTION DETAIL
C601 NO SCALE



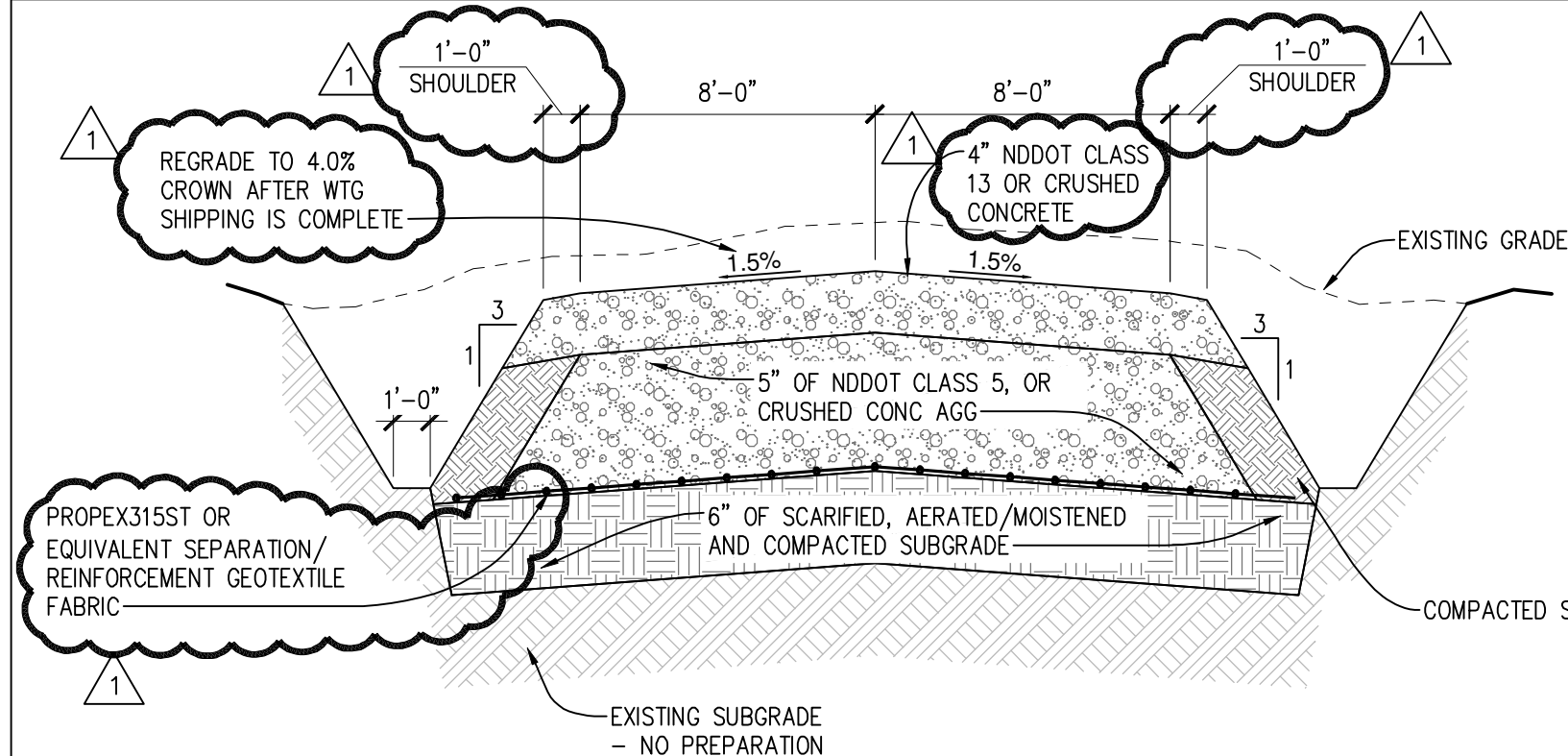
5 SILT FENCE, PREASSEMBLED, TYP
C601 NOT TO SCALE



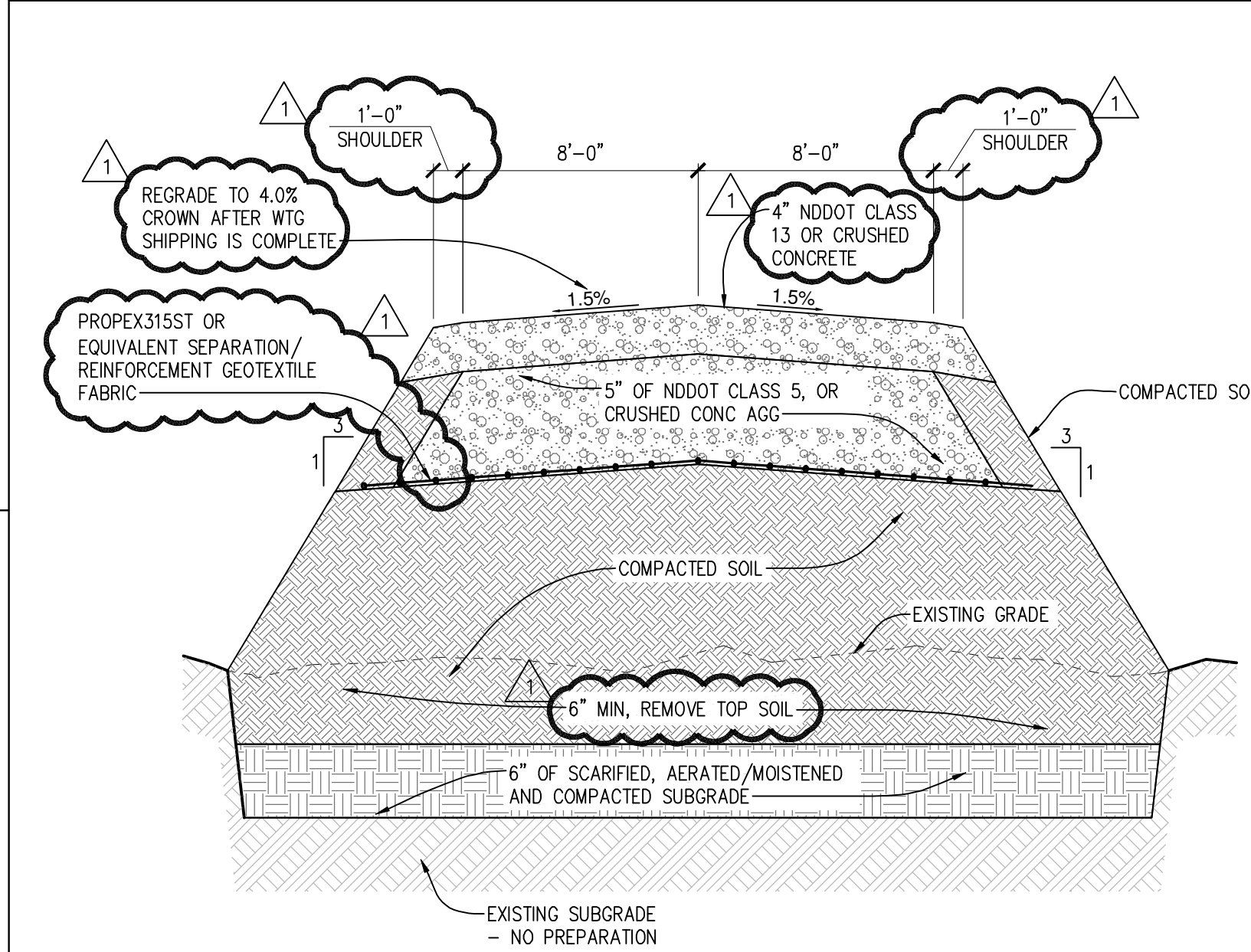
4 WBI PIPELINE CROSSING
C601 SCALE: 1"=5'-0"



3 TYPICAL ROAD SECTION @ EXISTING
C601 SCALE: 1"=5'-0"

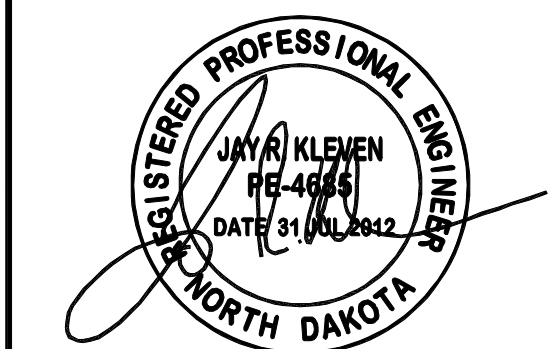


2 TYPICAL ROAD SECTION @ CUT
C601 H: 1"=5'-0", V: 1"=1'-0"



1 TYPICAL ROAD SECTION @ FILL
C601 H: 1"=5'-0", V: 1"=1'-0"

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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

MARK	DESCRIPTION	DATE
△	ROAD CHANGES	21 SEP 2012
CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 2012

PROJECT NO: 20112552

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CHECKED BY: JRK

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DRAWING TITLE

CIVIL DETAILS



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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 12
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

DRAWN BY: SLR

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Drawing Title

NOTES

S001

STABILITY DESIGN CRITERIA

FOUNDATIONS DESIGNED FOR THE LOADS FROM TURBINE TOWER MANUFACTURER, FOR 1.68-82.5 WTG
 STIFFNESS BASED ON STRAIN-CORRECTED SHEAR MODULUS = 960 KSF

DESIGN LOADS

	NON GAPPING OPERATING LOADS	OVERTURNING OPERATING LOADS	FACTORED EXTREME OPERATING LOADS
OVERTURNING MOMENT Mr kN-M/KIP-FT	19,300/14,240	35,600/29,300	39,160/32,230
TORSIONAL MOMENT Mx kN-M/KIP-FT	20/15	1,094/807	1,200/888
HORIZONTAL LOAD Fr kN/KIP	260/59	534/120	587/132
VERTICAL LOAD Fx kN/KIP	1990/448	1,938/436	2,132/480

FACTORS OF SAFETY

	NON GAPPING OPERATING LOADS	OVERTURNING OPERATING LOADS	FACTORED EXTREME OPERATING LOADS
OVERTURNING	3.98	2.23	2.07
SLIDING & TORSIONAL SHEAR	8.2	2.6	1.6
MAX NET BEARING PRESSURE (PSF)	1800	3400	N/A
% CONTACT AREA	99.5%	76.4%	70.7%

FOUNDATION STIFFNESS $\times 10^7$ K-FT/RAD ($\times 10^7$ KN-M/RAD), FOR FACTOR OF SAFETY= 1.48

% CONTACT AREA AT NON-GAPPING LOAD CASE GOVERNS STABILITY DESIGN

LATERAL LOADS

DESIGN REFERENCE:
 ASCE 7-05 "MIN DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES"

OCCUPANCY CATEGORY II
 SITE CLASS D
 LAT 48° 09' 59.14" LONG 98° 53' 17.30"
 MAPPED Ss=0.051g
 MAPPED S1=0.018g
 SDs= 0.054g
 SD1=0.029g

SEISMIC DESIGN CATEGORY A

WIND LOADS FOR THE MANUFACTURERS LOADING REQUIREMENTS EXCEED 90 MPH WIND SPEED AND GOVERN STABILITY DESIGN AND STRUCTURAL DESIGN OF THE FOUNDATION

DESIGN CODES

INTERNATIONAL BUILDING CODE IBC 2009.

ASCE 7-05 "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES"

ACI 318-08 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".

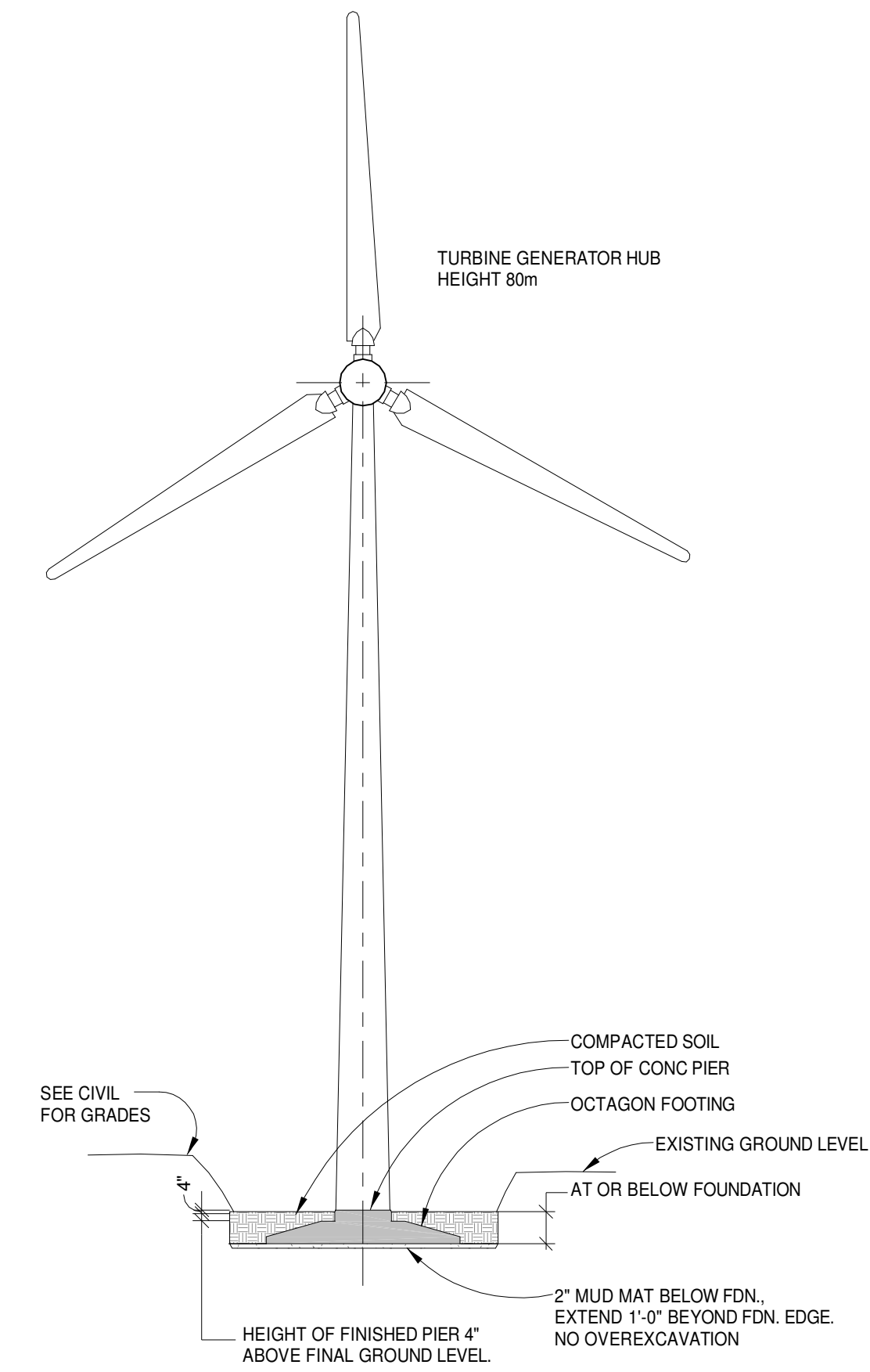
TURBINE MANUFACTURERS SPECIFICATIONS, GE DOCUMENT ID # 108W8455 , DATED 06 JAN 2012.

APPROXIMATE MATERIAL QUANTITIES

CONCRETE	280 yd ³
REINFORCING	SHEET S801
MUD MAT	90 yd ³

APPLICABILITY NOTES

- DESIGN SHALL APPLY TO TURBINE LOCATIONS WHERE GROUND WATER TABLE IS DEEPER THAN THE BASE OF THE FOUNDATION.
- GROUND WATER TABLE REFERS TO WATER LEVELS AT THE SUBJECT SITE, AS PER BRAUN INTERTEC REPORT FA-11-07115 DATED 18 MAY 2012.



1 WIND TURBINE ELEVATION
 5901 12" = 1'-0"

THESE DRAWINGS ARE INTENDED FOR CONSTRUCTION OF THE INDICATED PROJECT ONLY. NO OTHER USE OF THESE DRAWINGS IS INTENDED OR AUTHORIZED BY EAPC.

GENERAL NOTES & SPECIFICATIONS

I. CONDITIONS

- A. FOR INFORMATION ON GROUND CONDITIONS REFER TO FINAL PROJECT GEOTECHNICAL REPORT PREPARED BY BRAUN INTERTEC DATED 18 MAY 2012. A COPY OF THE REPORT IS AVAILBLE UPON REQUEST.
- B. FOUNDATION SHALL BEAR ON NATIVE DECOMPOSED SHALE SUBGRADE TO PROVIDE THE FINAL ALLOWABLE MAXIMUM NET BEARING PRESSURE OF 4000 PSF.
- C. GROUND WATER ELEVATION UP TO THE FOUNDATION BASE ELEVATION GRADE IS ALLOWABLE.
- D. WHERE ALL OR ANY OF THE ABOVE GROUND CONDITIONS CAN'T BE MET OR DIFFER SIGNIFICANTLY FROM INFORMATION CONTAINED IN THE GEOTECHNICAL REPORT, REFER TO ENGINEER BEFORE PROCEEDING OR COMMENCEMENT OF WORK.

II. CAST-IN-PLACE CONCRETE & REINFORCING STEEL

A. GENERAL

1. THE CONCRETE SPECIFICATION SHALL SUIT MODERATELY AGGRESSIVE SOIL CONDITIONS, WHICH HAS BEEN CONFIRMED ON SITE BY APPROPRIATE INSPECTION AND/OR SOIL ANALYSIS.
2. SUBMIT FABRICATION DRAWINGS OF STEEL REINFORCING FOR APPROVAL PRIOR TO PLACING CONCRETE.
3. PREPARE 6 CONCRETE CYLINDERS FROM EACH TEST SAMPLE TO VERIFY CONCRETE STRENGTHS, TEST TWO CONCRETE CYLINDERS AT EACH AGE OF 7, 14, AND 28 DAYS. ALSO TEST FOR SLUMP, UNIT WEIGHT, TEMPERATURE, AND AMBIENT AIR TEMPERATURE WIND SPEED AND RELATED DATA.
4. FOR PROJECTS WITH 3 OR FEWER FOUNDATIONS, CONTRACTOR SHALL OBTAIN MINIMUM OF 3 COMPRESSIVE STRENGTH TESTS CONSISTING OF 6 CYLINDERS FROM EACH OF THE PIER AND FROM THE FOUNDATION.
5. FOR PROJECTS WITH 3 OR MORE FOUNDATIONS, CONTRACTOR SHALL OBTAIN SAMPLES FROM EACH TYPE OF CONCRETE AND PERFORM TEST FROM THE FIRST FULL BATCH DELIVERED DURING A DAY AND EVERY 75 CUBIC YARDS THERE AFTER. PERFORM AND REPORT FIELD TESTS TO VERIFY AIR CONTENT, SLUMP, UNIT WEIGHT, TEMPERATURE, AND AMBIENT AIR TEMPERATURE WIND SPEED AND RELATED DATA.
6. ALL TEST SHALL CONFORM TO APPLICABLE ASTM STANDARDS.
7. SUBMIT REPORT TO THE ENGINEER WITHIN 3 DAYS OF COMPLETION OF THE FIELD TEST AND THE COMPRESSION TESTS.
8. PROVIDE CONTINUOUS VISUAL INSPECTION AND SPECIFIED TESTING BY AN INDEPENDENT TESTING AGENCY DURING THE CONCRETE PLACEMENT. THE STRUCTURAL ENGINEER SHALL ALSO OBSERVE THE REBAR PLACEMENT PRIOR TO PLACING ANY CONCRETE.
9. EXCAVATE AND EXPOSE SUBGRADE ONLY WHEN IT CAN BE IMMEDIATELY PROTECTED BY THE MUD MAT OR AT LEAST 6" OF ENGINEERED FILL
10. MINIMUM CONCRETE TEMPERATURE AT POINT OF PLACEMENT SHALL BE 60 DEGREES FAHRENHEIT.
11. PROVIDE INSULATING BLANKETS TO PREVENT THE SURFACE OF THE CONCRETE FROM FREEZING. EXTEND INSULATION 4'-0" BEYOND EDGE OF FOOTING AND ANCHOR TO PREVENT ACCIDENTAL REMOVAL. MAINTAIN INSULATION UNTIL 3500 PSI CONCRETE COMPRESSIVE STRENGTH IS OBTAINED. MONITOR INTERNAL TEMPERATURE TO VERIFY ADEQUATE TEMPERATURE (ABOVE 40 DEGREES FAHRENHEIT) IS MAINTAINED FOR CONSTRUCTION AND CURING THAT OCCURS WHEN AVERAGE DAILY TEMPERATURES IS BELOW 40 DEGREES FAHRENHEIT.

B. PRODUCTS

1. REINFORCING BAR: ASTM 615, GRADE 60, DEFORMED.
2. CEMENT: ASTM C150, TYPE I/II FOR MODERATE SULFATE RESISTANCE.
3. FINE AND COARSE AGGREGATES: ASTM C33, CLASS 3S OR BETTER. COARSE AGGREGATE GRADATION-SIZE 467 (1 1/2 NOMINAL SIZE).
4. 28 DAY CONCRETE COMPRESSIVE STRENGTH: 4,500 PSI FOR FOOTING AND 4,500 PSI FOR PIER. 3,500 PSI FOR PIER SHALL BE ACHIEVED BEFORE SETTING TURBINE TOWERS, OR APPLYING ANCHOR BOLT PRE TENSION
5. FLY ASH: ASTM C618, TYPE "C" OR COAL CREEK STATION FLY ASH, 25% REPLACEMENT, OMIT FLY ASH WHEN AVERAGE DAILY TEMPERATURE IS BELOW 40 DEGREES FAHRENHEIT.
6. WATER REDUCING ADMIXTURE: ASTM C494 TYPES A OR F
7. PROHIBITED ADMIXTURE- NO CALCIUM CHLORIDE OR ANY ADMIXTURE CONTAINING CALCIUM CHLORIDE OR OTHER ACCELERATING ADMIXTURES.
8. AIR ENTERTAINMENT 5% AIR +/- 1% FOR ALL CONCRETE. AIR ENTRAINING ADMIXTURES SHALL CONFORM TO ASTM C260
9. MAXIMUM SLUMP 3" OR LESS TO SUIT PLACING OF CONCRETE ON SLOPE .CONTRACTOR MAY INCREASE SLUMP AS LONG AS CONCRETE CAN BE FORMED AS SHOWN ON DRAWINGS.
10. BONDING AGENT: ASTM C1059 TYPE II. INSTALL AND CLEAN SURFACES TO BE BONDED ACCORDING MANUFACTURER'S SPECIFICATIONS.
11. CURING COMPOUND: ASTM C 309 TYPE 1, CLASS A: OR MOISTURE RETAINING COVERS.
12. MIXING WATER: POTABLE AND COMPLYING WITH ASTM C94
13. MAXIMUM WATER/CEMENTITIOUS (W/C) RATIO SHALL BE 0.45
14. GROUT: UNISORB V-1 NON SHRINK, NON METALLIC GROUT, EPOXY MODIFIED TO MANUFACTURER'S SPECIFICATION, MAXIMUM MIX RATIO 3.84 QTS WATER PER 48 LB. BAG OR 8.00 QTS. WATER PER 100 LB BAG, TO ACHIEVE A 9,000 PSI 28 DAY COMPRESSIVE STRENGTH. OTHER PRODUCTS SUBJECT TO APPROVAL.

C. EXECUTION

1. PRIOR TO PLACING CONCRETE, INSPECT EXCAVATION TO ENSURE ALL LOOSE ROCK, SOILS AND DEBRIS HAVE BEEN REMOVED FROM THE BOTTOM OF THE EXCAVATION, PROTECT EXPOSED SUBGRADE WITH INSULATING BLANKETS WITH OR WITHOUT GROUND HEATERS. DO NOT PLACE FROZEN SOIL OR PLACE SOIL OR CONCRETE ON FROZEN SUBGRADES.
2. WHEN THE TEMPERATURE OF THE SURROUNDING AIR FALLS BELOW 40 DEGREES FAHRENHEIT DURING PLACING OR 7 DAYS THEREAFTER PROVIDE ADEQUATE MEANS TO PREVENT THE CONCRETE TEMPERATURE AT POINT OF PLACEMENT FROM FALLING BELOW 60 DEGREES FAHRENHEIT FOR THE DURATION OF PLACEMENT, PROTECT AS PER OTHER NOTES ON THIS SHEET.
3. INTENTIONALLY ROUGHEN JOINT SURFACE OR APPLY CURING COMPOUND TO EXPOSED SURFACES IN ACCORDANCE WITH MANUFACTURERS WRITTEN SPECIFICATIONS .
4. INTENTIONALLY ROUGHEN JOINT SURFACE OR APPLY BONDING AGENT TO ALL CONSTRUCTION JOINTS.
5. ALL CONCRETE TO BE CONSOLIDATED AND PROTECTED DURING CURING AS REQUIRED IN ACCORDANCE WITH ACI 318.
6. DURING COLD WEATHER, ALL PRECAUTIONS TO BE CARRIED OUT TO AVOID IMPROPER SETTING AND PROVIDE ADEQUATE PROTECTION OF THE CONCRETE AS PER ACI 306. DURING HOT WEATHER, MIX, DELIVER AND PLACE CONCRETE AS PER ACI 305. MAX. TEMPERATURE OF PLACED CONCRETE SHALL BE NO GREATER THAN 80 DEGREES FAHRENHEIT.
7. THE CONCRETE SHALL BE PROPORTIONED ACCORDING TO ACI 211 AND MIXED, DELIVERED AND PLACED ACCORDING TO ASTM C94.
8. CONTRACTOR TO USE CONSTRUCTION DEWATERING AS REQUIRED TO CONTROL EXPECTED SEEPAGE, DEWATERING SHALL BE ESTABLISHED PRIOR TO COMPLETING THE EXCAVATION. DRAIN TILE, IF PRESENT, SHALL BE ROUTED AWAY FROM THE EXCAVATION.
9. EXISTING SITE DEPOSITS SHALL BE EXCAVATED TO EXPOSE SANDY LEAN CLAY APPROXIMATELY 9 FEET BELOW EXISTING GRADE. EXCAVATION SHALL BE MADE WITH ANY SUITABLE EQUIPMENT. REMOVE ALL DISTURBED LEAN CLAY, ESPECIALLY CLAY THAT BECOMES WET AND MUDDY.
10. FOUNDATION AND PIER SHALL BE COMPLETED AS SEPARATE MONOLITHIC OPERATIONS WITH OUT COLD JOINTS WITHIN THE FOUNDATION OR PIER.
11. OBTAIN AND TEST 6 GROUT CUBES PRIOR TO CONSTRUCTION, AT THE FIRST 2 WTG SITES, AND EVERY 5 WTG THEREAFTER.

D. WORKING BASE CONCRETE

1. CONTRACTOR HAS THE OPTION TO USE MINIMUM OF 2" LEAN CONCRETE MINIMUM- 1500 PSI OR GREATER DIRECTLY UNDER FOOTINGS. LEAN CONCRETE MAY BE OMITTED IF SUBGRADE SOIL IS WELL-DRAINED AND CAN REMAIN LEVEL

E. REINFORCEMENT

1. LAP SPLICES ARE NOT ALLOWED EXCEPT WHERE EXPLICITLY SHOWN ON DRAWINGS.
2. MINIMUM CONCRETE COVER CAST AGAINST WORKING BASE CONCRETE OF FORM WORK 2", OR CAST AGAINST EARTH 3" OR AS SHOWN ON DRAWINGS.
3. BOTTOM OF CONCRETE POUR SHALL BE CLEANED OF ALL LOOSE MATERIAL AND PLACEMENT OF ALL REINFORCING STEEL AND INSPECTED BY ENGINEER OF RECORD.
4. ALL REINFORCING TO BE SUPPORTED OFF PROPRIETARY SPACE AND/OR CHAIRS PROVIDED BY REBAR SUPPLIER. PRECAST BLOCK SPACERS ARE ALLOWED FOR THE BOTTOM MAT ONLY, BUT MUST BE STAGGERED BY 48" ON ADJACENT BARS.
5. ALL REINFORCING BARS ARE CALLED OUT IN U.S. STANDARD SIZES AS #8 (e.g. A #5 BAR IS 5/8" DIAMETER)
 - a. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3 INCHES
 - b. CONCRETE EXPOSED TO EARTH, LIQUID, OR WEATHER:
 1. SLAB AND JOISTS 2 INCHES
 2. BEAMS AND COLUMNS:
 - STIRRUPS, SPIRAL, AND TIES 2 INCHES
 - PRIMARY REINFORCEMENT 2 1/2 INCHES
 3. WALLS 2 INCHES
 4. FOOTINGS AND BASE SLABS:
 - FORMED SURFACES 2 INCHES
 - TOP OF FOOTING AND BASE SLABS 2 INCHES
 - c. CONCRETE NOT EXPOSED TO WEATHER OR CAST AGAINST GROUND:
 1. SLABS, WALLS OR JOISTS:
 - #14 AND #18 BARS 1 1/2 INCHES
 - #11 AND SMALLER BARS 3/4 INCHES
 2. BEAMS AND COLUMNS:
 - TIES, STIRRUPS, SPIRALS 1 1/2 INCHES
 - PRIMARY REINFORCEMENT 2 INCHES

III. ANCHOR BOLTS AND EMBEDMENT PLATE

A. GENERAL

1. SEE SHEET S202 FOR ANCHOR BOLT AND EMBEDMENT PLATE REQUIREMENTS.

B. ANCHOR BOLT INSTALLATION

1. IN ADDITION TO THE DRAWINGS AND DETAILS THE ANCHOR SHALL BE INSTALLED TO THE MANUFACTURER REQUIREMENTS.
2. TACK WELD OR SECURELY FASTEN NUTS TO THE EMBEDMENT PLATE TO PREVENT DISLODGING DURING PLACEMENT, DO NOT WELD ANCHOR BOLTS TO NUTS OR ANY OTHER POINT.

IV. BACKFILLING OVER BASE

A. MATERIALS

1. MATERIAL FROM EXCAVATION OF TURBINE FOUNDATION SHALL BE USED TO BACKFILL AGAINST AND ABOVE FOUNDATION, PROVIDED IT MEETS CRITERIA STATED ELSEWHERE ON THE PLANS.
2. EXCAVATIONS SHALL BE BACKFILLED WITH SELECTED AS-DUG MATERIAL FREE FROM DELETERIOUS MATERIAL AND TOPSOIL WELL COMPACTED IN LAYERS NOT EXCEEDING 8" LOOSE THICKNESS. MAX SIZE OF PARTICLE TO BE NOT MORE THAN 3" NOMINAL SIZE.
3. MIN. OVERALL UNIT WEIGHT OF BACKFILL OVER BASE AND BEYOND ROADS, CRANE STANDS, ETC. TO BE AT LEAST 110 LBS/ft³, MIN 92% OF MAXIMUM DRY UNIT WEIGHT AND WITHIN 4% OF OPTIMUM WATER CONTENT DETERMINED BY ASTM D698.
4. TOP LAYER OF BACKFILL AND BANK TO BE MIN. 4" THICK GRADED TOPSOIL BEYOND THE PERMANENT CRANE PADS OF ACCESS ROADS. NO TOPSOIL TO BE USED AS BACKFILL EXCEPT FOR TOP 4" LAYER.
5. CONTRACTOR SHALL SUBMIT A MECHANICAL ANALYSIS OF ENGINEERED FILL FROM AN INDEPENDENT MATERIALS TESTING LAB PRIOR TO PLACING ANY MATERIAL.
6. SEE THE CIVIL PLANS FOR ALL ADDITIONAL GRADING METHODS AND MATERIALS.

B. EXECUTION

1. EXPOSED SUBGRADE AT CONCLUSION OF EXCAVATION SHALL BE IMMEDIATELY PROTECTED WITH MUD MAT OR AT LEAST 6" OF ENGINEERED FILL.
2. ALL BACKFILL UNDER ROADS, CRANE STANDS OR OTHERS IS TO BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY THE ASTM D698 TEST AND TO AT LEAST 110 lbs/ft³ UNIT WEIGHT. GRANULAR FILL SHOULD BE MOISTURE CONDITIONED TO A WORKABLE SOIL WATER CONTENT WITHOUT EXCESS WATER PRIOR TO COMPACTION. ON-SITE SOIL SHALL BE CONDITIONED TO -1% TO +3% ABOVE ASTM D698 OPTIMUM WATER CONTENT. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER BEFORE COMMENCEMENT OF COMPACTION DETAILS OF HIS PROPOSED METHOD OF COMPACTION. USE A SHEEPS FOOT ROLLER FOR ALL NON-GRANULAR SOIL.
3. CONTRACTOR TO PLACE MATERIAL TO FINISHED LEVEL OF 2" ABOVE LEVELS SHOWN TO ALLOW FOR FUTURE SETTLEMENT OF SOIL. ALL LEVELS TO BE CHECKED AND CONFIRMED WITH THE ENGINEER AT COMPLETION OF THE PROJECT.
4. CAUTION TO BE EXERCISED WHERE BACKFILLING AND COMPACTING AROUND PIPE DUCTS. LOCATIONS, SPECIFICATIONS AND COVER/BEDDING PLUS PROTECTION REQUIREMENTS OF PIPE DUCTS PROVIDED BY OTHERS. A MINIMUM 4" BEDDING AND 6" COVER ALL AROUND SHOULD ALWAYS BE CAREFULLY PLACED AND COMPACTED AROUND PIPE DUCTS PRIOR TO PLACING AND COMPACTION OF MAIN BACKFILL OVER BASE. HEAVY EQUIPMENT MUST BE RESTRICTED FROM THE VICINITY OF PIPE DUCTS UNLESS ADEQUATE COVER (e.g. MORE THAN 2'-0") OR THE USE OF CONCRETE PROTECTION ALLOW OTHERWISE.
5. OVER EXCAVATION BELOW FOOTING IS NOT REQUIRED, UNLESSTHE CONTRACTORELECTS. IF SUCH ELECTION IS MADE, IT SHALL BE CORRECTED WITH ENGINEERED FILL MEETING NORTH DAKOTA STATE DOT, SPECIFICATION 816.038 CLASS 5, OR WITH ENGINEERED FILL WITH GRADATION THAT MEETS 2" MAX AGGREGATE SIZE, MIN 35% GRAVEL AND MAX. 15% TO 30% PASSING THE US STD. #200 SIEVE, OR OTHERWISE MEETING SOIL CLASSES SP, SW, GP, GW, GM OR DUAL SYMBOL CLASSES OF THE SAME PRIMARY CLASSES. THIS OVEREXCAVATION IS STRICTLY AN OPTION FOR THE CONTRACTOR.

V. ADDITIONAL DRAWINGS

- A. ADDITIONAL STANDARD DRAWINGS FOR SEALING, GROUTING, ELECTRICAL, AND CONDUIT SHALL BE OBTAINED FROM THE WTG MANUFACTURER

VI. GEOTECHNICAL ENGINEERING CRITERIA

- A. TOTAL SETTLEMENT UNDER DEAD LOADS SHALL NOT EXCEED 1"
- B. DEAD LOAD GROSS SOIL PRESSURE CAUSED BY GRAVITY DEAD LOADS ARE APPROXIMATELY 1310 PSF AT EACH LOAD CASE.
- C. SHORT TERM SETTLEMENT CAUSED BY WIND OVERTURNING LOADS SHALL NOT EXCEED A 3:1000 ANGULAR ROTATION, OR 1".
- D. GROSS WIND-APPLIED OVERTURNING SOIL PRESSURE AT SERVICE OPERATING LOADING IS APPROXIMATELY 1330 PSF, BUT VARIES. GROSS WIND-APPLIED OVERTURNING SOIL PRESSURE AT MAXIMUM LOADING IS APPROXIMATELY 2460 PSF.

VII. CONDUIT PLACEMENT

- A. MAX CONDUIT SIZE SHALL BE 5 3/4" OUTSIDE DIAMETER TO FIT BETWEEN ANCHOR BOLTS.
- B. CONDUITS SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE LOCATIONS SHOWN ON 1/S801. FIELD- ADJUST LAYOUTS OF CONDUITS AS NEEDED TO PLACE CONDUITS THROUGH THE ANCHOR BOLT GROUP AND TO TERMINATE WITHIN THE AREA SHOWN ON 1/S601.
- C. REFER TO DETAIL 1/S601.

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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL2012
BD	BID DOCUMENTS	17 JUL 12
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

DRAWN BY: JCE/SLR

CHECKED BY: JRK

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Drawing Title

GENERAL NOTES AND SPECS

S002



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CITY DEVILS LAKE

STATE NORTH DAKOTA

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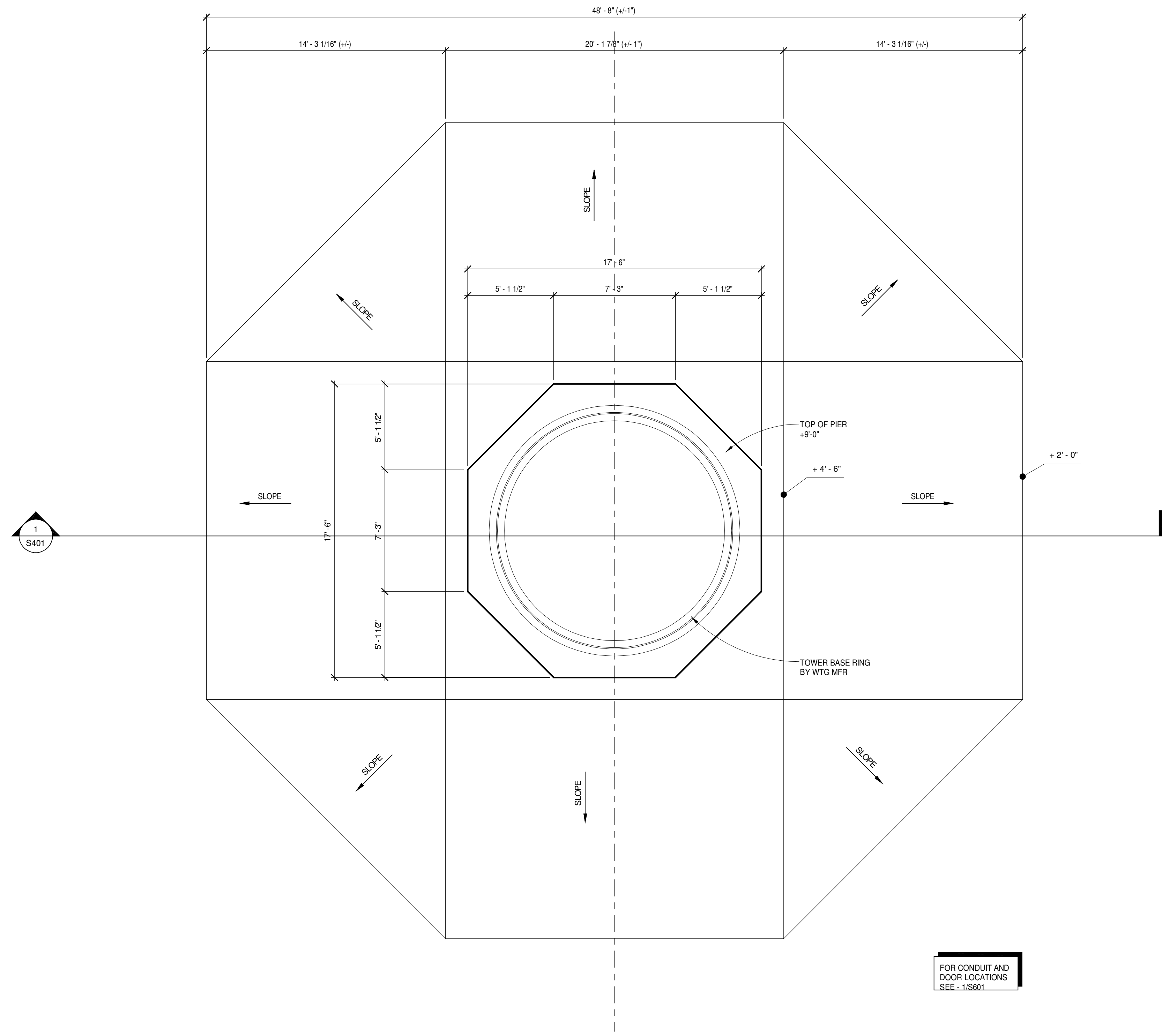
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Drawing Title
FOOTING PLAN

S200



1 FOOTING PLAN
S200 1/4" = 1'-0"

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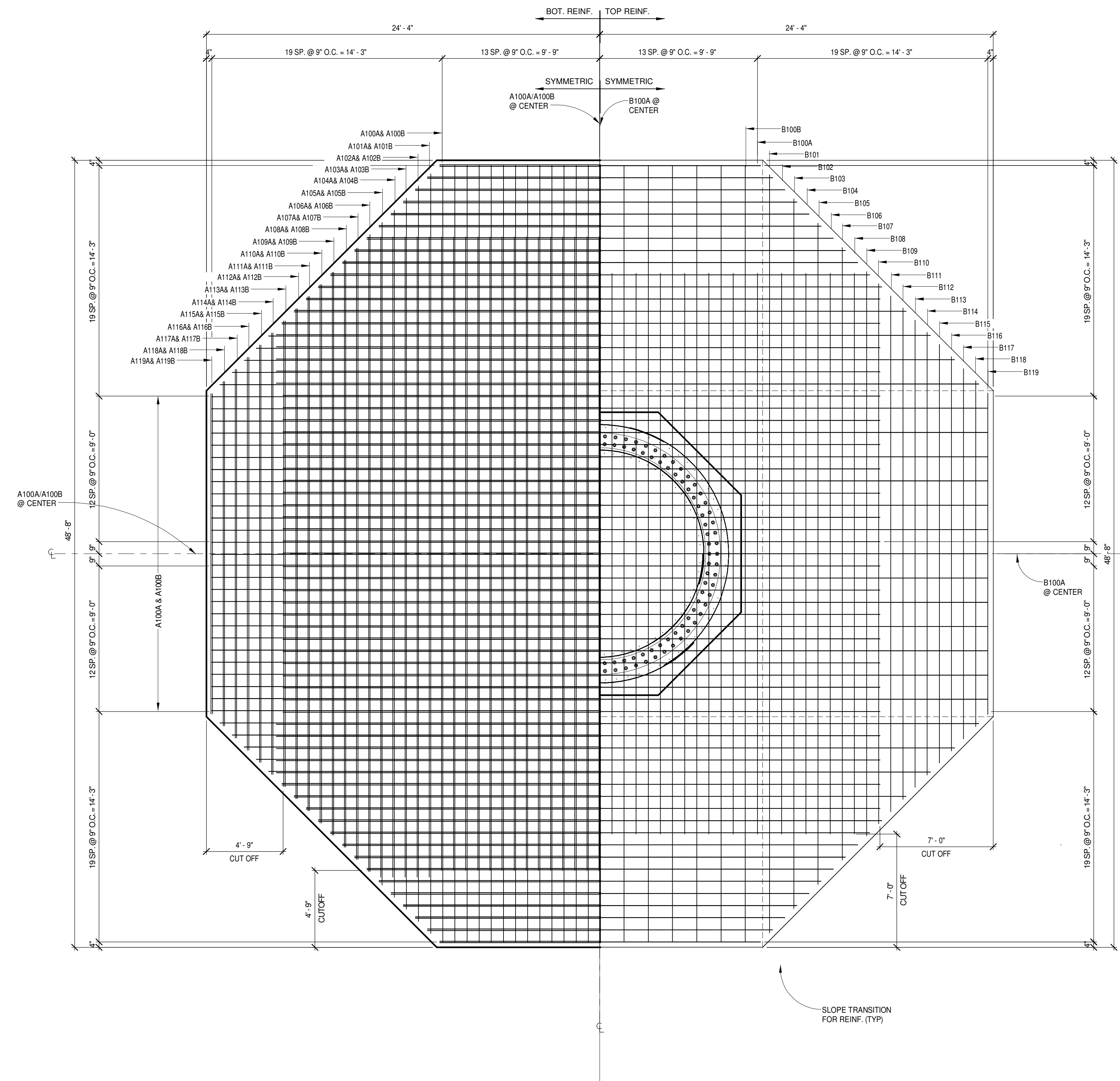
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Drawing Title

FOOTING REINFORCING PLAN

S201



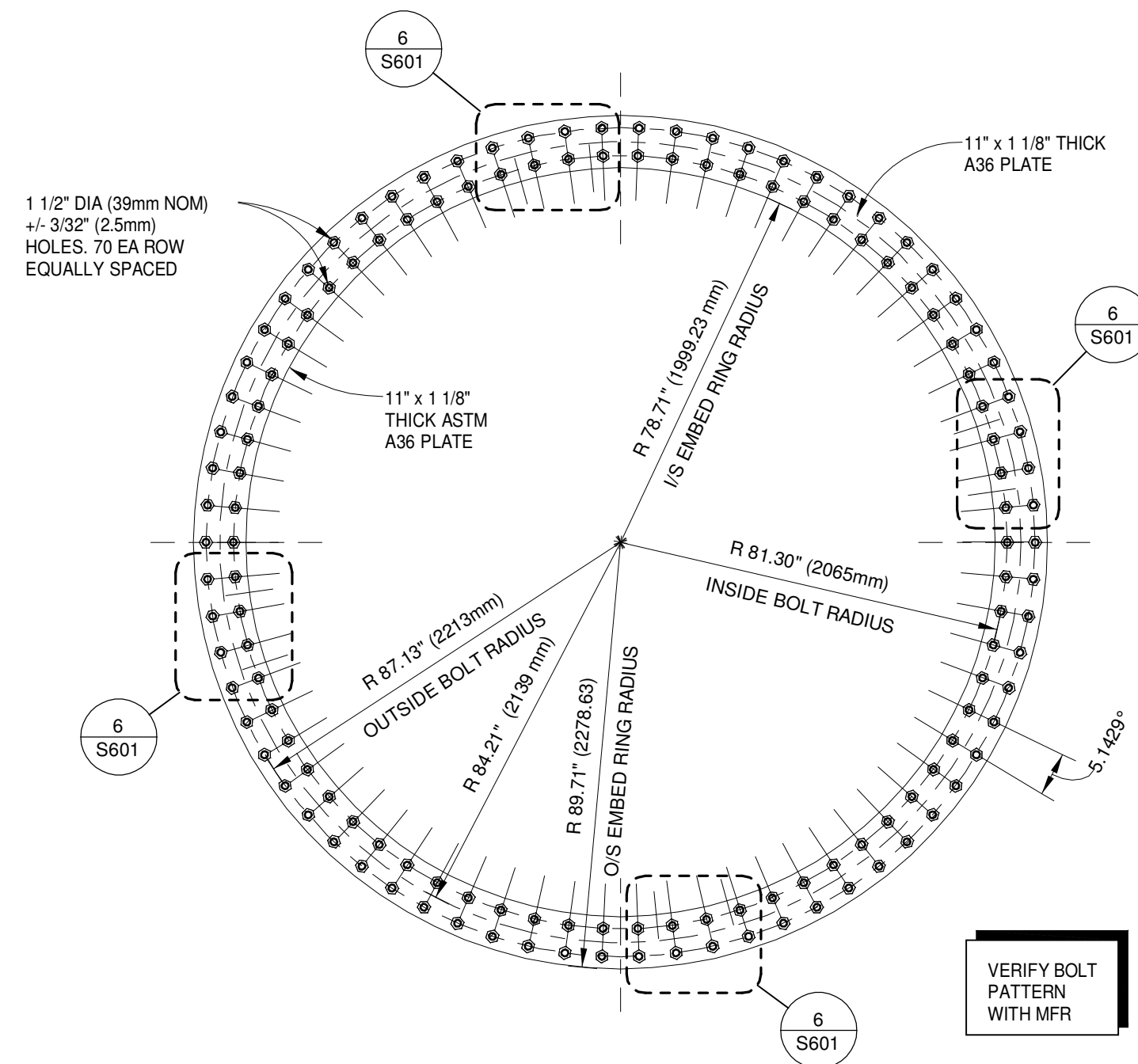
PLACEMENT TOLERANCES
1. STANDARD PLACEMENT TOLERANCES
A. SPACING
a. +/- 1" #9 BARS
b. +/- 1" BETWEEN #7 TOP BARS
c. +/- FOR VERTICAL DOWEL BARS
d. +/- 3/4" FOR #7 HOOP AND TIES
B. COVER
a. +/- 1" FOR BOTTOM AND TOP BARS
FORM EDGE OF CONCRETE
b. 0" TO +/- 1" FOR BOTTOM BARS
FORM BOTTOM OF FOOTING

SHOWING #8/#8 @ 9" O.C. BOTTOM REINFORCING

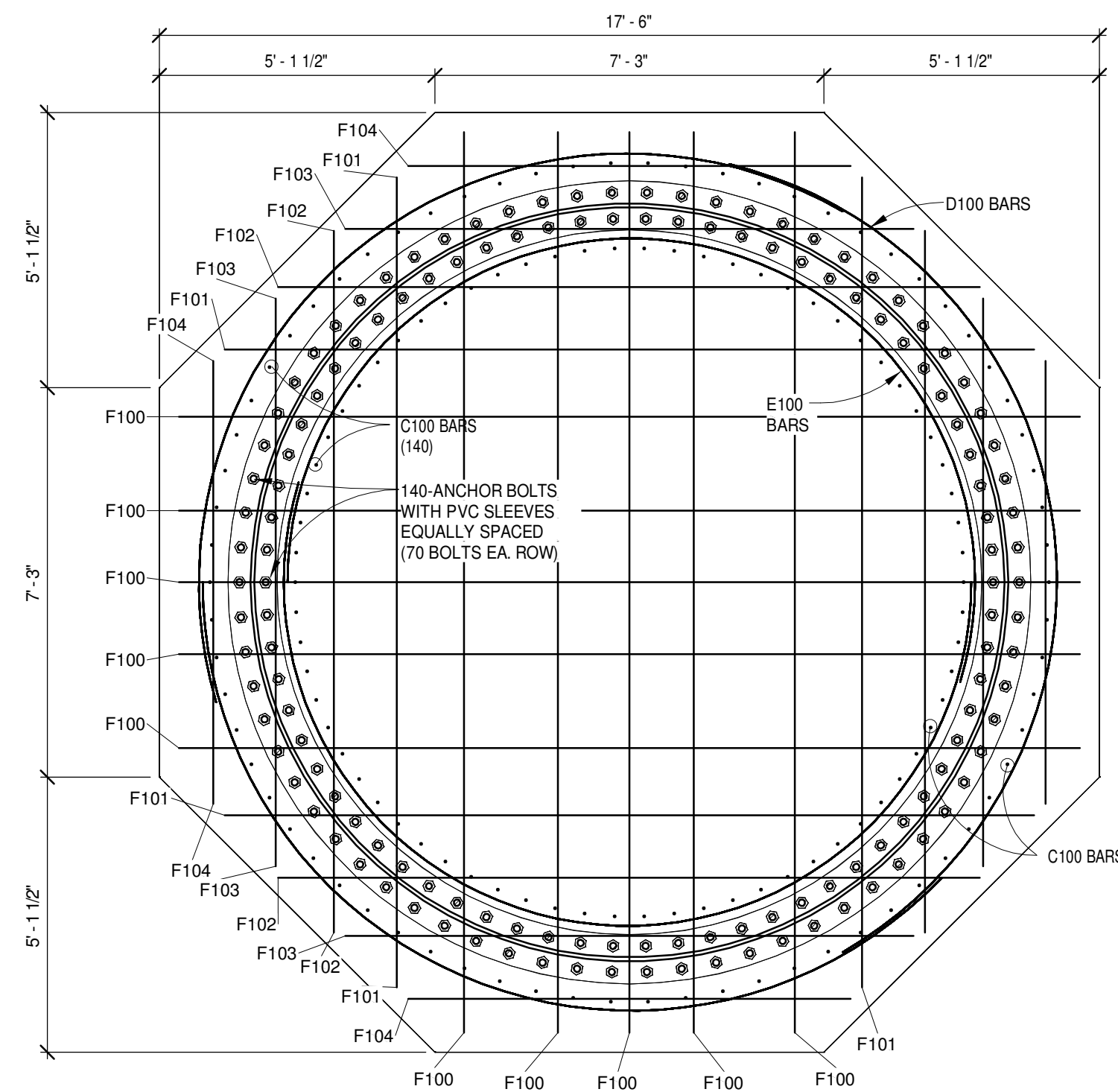
SHOWING #7 @ 9" O.C. TOP REINFORCING

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1 FOOTING REINFORCING PLAN
S201 1/4" = 1'-0"



3 FOUNDATION EMBEDMENT PLATE
S202 3/8" = 1'-0"



- NOTES:**
1. ALL FIXX BARS SHALL BE OFFSET AS NEEDED AROUND ANCHOR BOLTS.
 2. ALL FIXX BAR SHALL TERMINATED WITH 1'-6" LEGS TURNED VERTICALLY DOWNWARD.
 3. CONTRACTOR SHALL PLACE F100 BARS AT EVERY 3RD ANCHOR BOLT SPACING.
 4. CONTRACTOR MAY ADJUST F100 BARS WITHIN THE A.B. SPACE
 5. 140 C100 BARS EQUALLY SPACED PLACE HORIZONTAL LEG ON TOP OF BOTTOM OF REINFORCING

2 TOP PIER REINFORCING PLAN
S202 3/8" = 1'-0"

ANCHOR BOLTS AND EMBEDMENT PLATE

GENERAL

SEE SHEET S202 FOR ANCHOR BOLT AND EMBEDMENT PLATE REQUIREMENTS.

ANCHOR BOLT INSTALLATION SHALL BE PERFORMED WITH PROPERLY CALIBRATED METHODS & PERIODICALLY INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 17 OF THE 2006 INTERNATIONAL BUILDING CODE. SEE DETAIL 1/S202 FOR PRETENSIONING REQUIREMENTS.

COVER EACH ANCHOR BOLT WITH BOLT CAPS, AND ANTI-CORROSION GREASE. FILL PVC SLEEVES WITH GREASE, OR SEAL TOP OF THE SLEEVE TO PREVENT WATER ENTRY INTO THE SLEEVE. ALL WATER SHALL BE REMOVED PRIOR TO INSTALLING THE WTG MAST.

CONTRACTOR SHALL VERIFY FINAL LENGTHS OF ANCHOR BOLTS TO SUIT THEIR TOOLS AND METHODS.

PRODUCT

ANCHOR BOLTS: ASTM A615 GRADE 75 ALL THREADED ROD NOMINAL DIA 1 1/4" (#10 BAR). DO NOT WELD ANCHOR RODS TO EMBED PLATE OR NUTS. IT IS OK TO WELD THE NUTS TO THE EMBED PLATE. REFER TO DETAILS

ANCHOR BOLTS SLEEVE: PVC PIPE CLASS 125. FILL ANCHOR BOLT SLEEVES WITH GREASE PRIOR TO PLACING THE ANCHOR BOLTS. IF WATER IS PRESENT CONTRACTOR MUST REMOVE WATER AND DRY BEFORE PLACING GREASE.

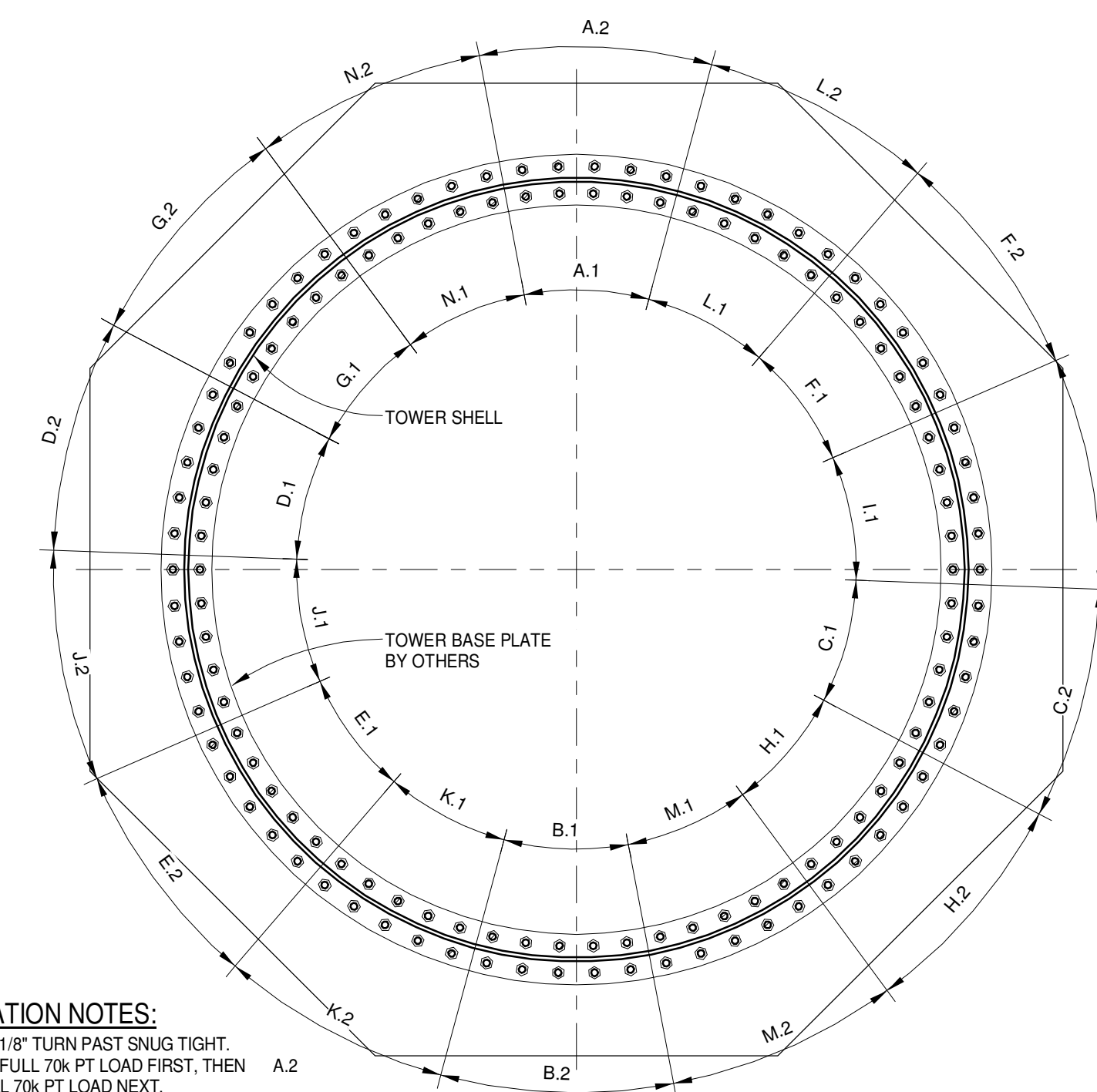
EMBEDMENT PLATE: ASTM A36

HEAVY HEX NUTS: STD HEAVY HEX NUTS, ASTM A106

HARDENED STL WASHERS: ASTM F436

THREADS: UMC CLASS 2A, CUT OR ROLLED, UNIFIED STD SERIES COARSE THREAD, OR WILLIAMS COIL THREAD.

BOLT CAPS: "IRON CLAD" BY NORM TOOMAN CONSTRUCTION, CONSTRUCTED OF UV-RESISTANT POLYPROPYLENE SEALED AGAINST THE TOWER FLANGE.



NOTE:
VERIFY BOLT CIRCLE DIMENSIONS AND BOLT PLACEMENT WITH TOWER SUPPLIER PRIOR TO BOLT PLACEMENT

ANCHOR BOLT INSTALLATION NOTES:

1. SNUG TIGHTEN ALL NUTS TO 1/8" TURN PAST SNUG TIGHT.
2. A.1 SHALL BE TIGHTENED TO FULL 70k PT LOAD FIRST, THEN SHALL BE TIGHTENED TO FULL 70k PT LOAD NEXT.
3. TIGHTEN ALL BOLTS TO 70k IN SECTIONS IN ALPHABETICAL ORDER.
4. TIGHTEN THE MIDDLE BOLTS WITHIN EACH ALPHABETICAL GROUPING FIRST, THEN WORK OUTWARD.
5. APPLY TENSION USING FORCE OR STRAIN CONTROLLED METHODS TO ACHIEVE 70k POST TENSION LOAD.
6. APPROXIMATE TOTAL BOLT STRETCH IS 0.22", NOT INCLUDING "SET" DEFORMATION OF PLATES, FLANGE, GROUT.
7. RECORD AND MARK A REFERENCE MARK ON EACH ANCHOR BOLT AFTER SNUG TIGHTENING.
8. MARK AND RECORD ELONGATION OF EACH BOLT AFTER APPLYING FULL PT LOADS.
9. APPLY FULL PT LOADS ONLY WHEN GROUT IS CURED TO 7000 PSI, PEDESTAL CONCRETE IS CURED TO 3500 PSI, AND GROUT IS PLACED CONTINUOUSLY UNDER THE TOWER FLANGE PLATE.
10. DO NOT PLACE TOP SECTION OF TOWER BEFORE APPLYING PT LOADS TO ALL ANCHOR BOLTS.
11. INSTALL BOLT CAPS.
12. INSPECT 10% OF ANCHORS EVERY YEAR FOR FIRST 5 YEARS, THEN 5% EVERY 2 YEARS BEYOND. INSPECT BY PROOF-TENSIONING THE LIFT-OFF LOADS, RETIGHTEN IF LESS THAN 65k.

1 ANCHOR BOLT INSTALLATION PLAN
S202 3/8" = 1'-0"

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Architecture	Engineering	Industrial
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--	--	---------------------------

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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL2012
BD	BID DOCUMENTS	17 JUL 12
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

DRAWN BY: JCE

CHECKED BY: JRK

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Drawing Title

PIER & ANCHOR BOLT PLANS

S202



CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 12
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

DRAWN BY: SLR

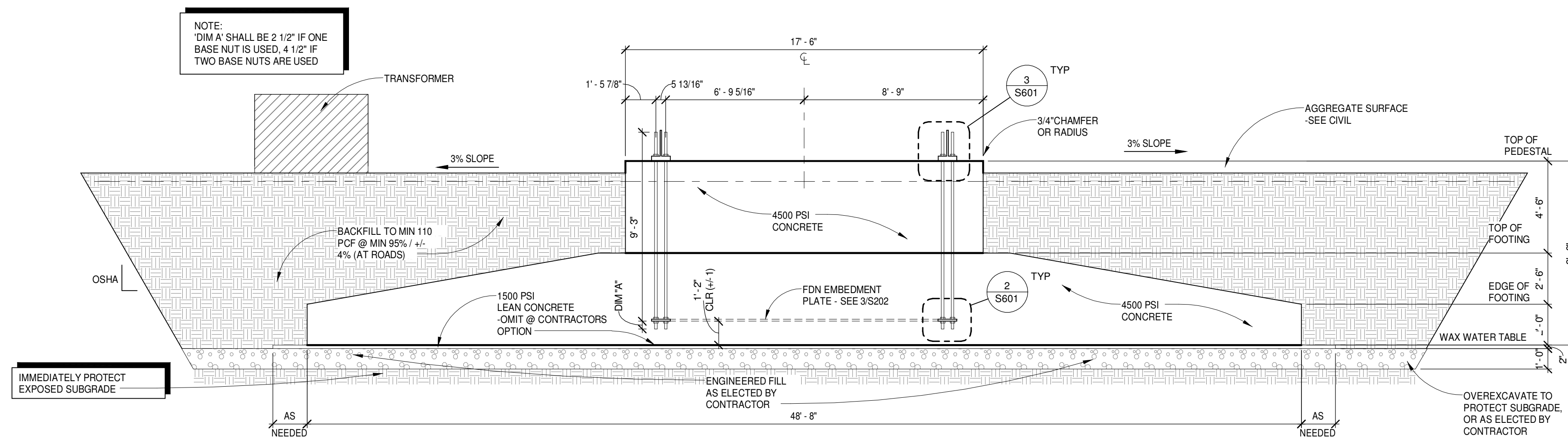
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Drawing Title

ELEVATION & EXCAVATION REQUIREMENTS

S401



1 ELEVATION
S401 1/4" = 1'-0"

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LAKE REGION STATE COLLEGE

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PROJECT NO: 20112552

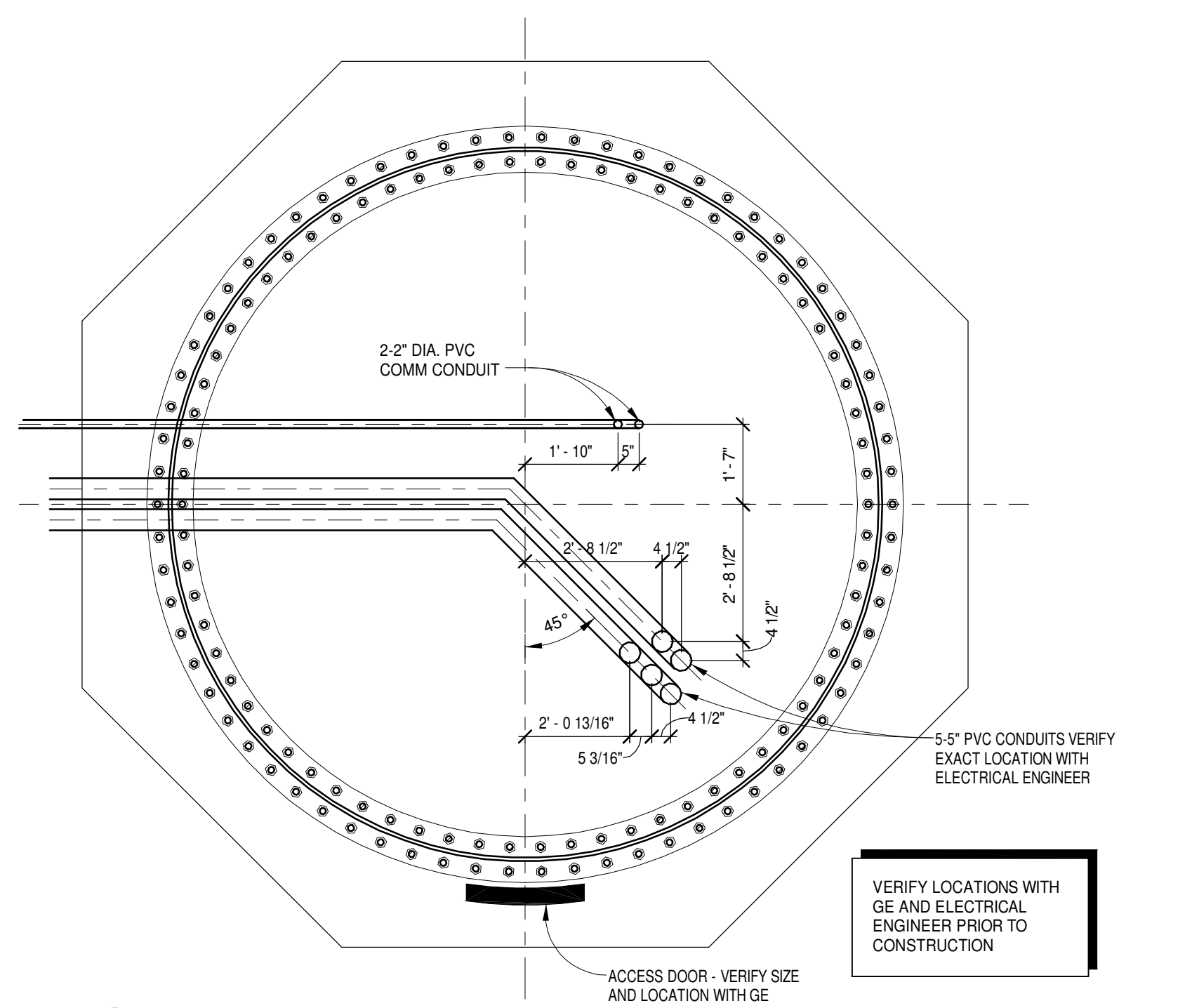
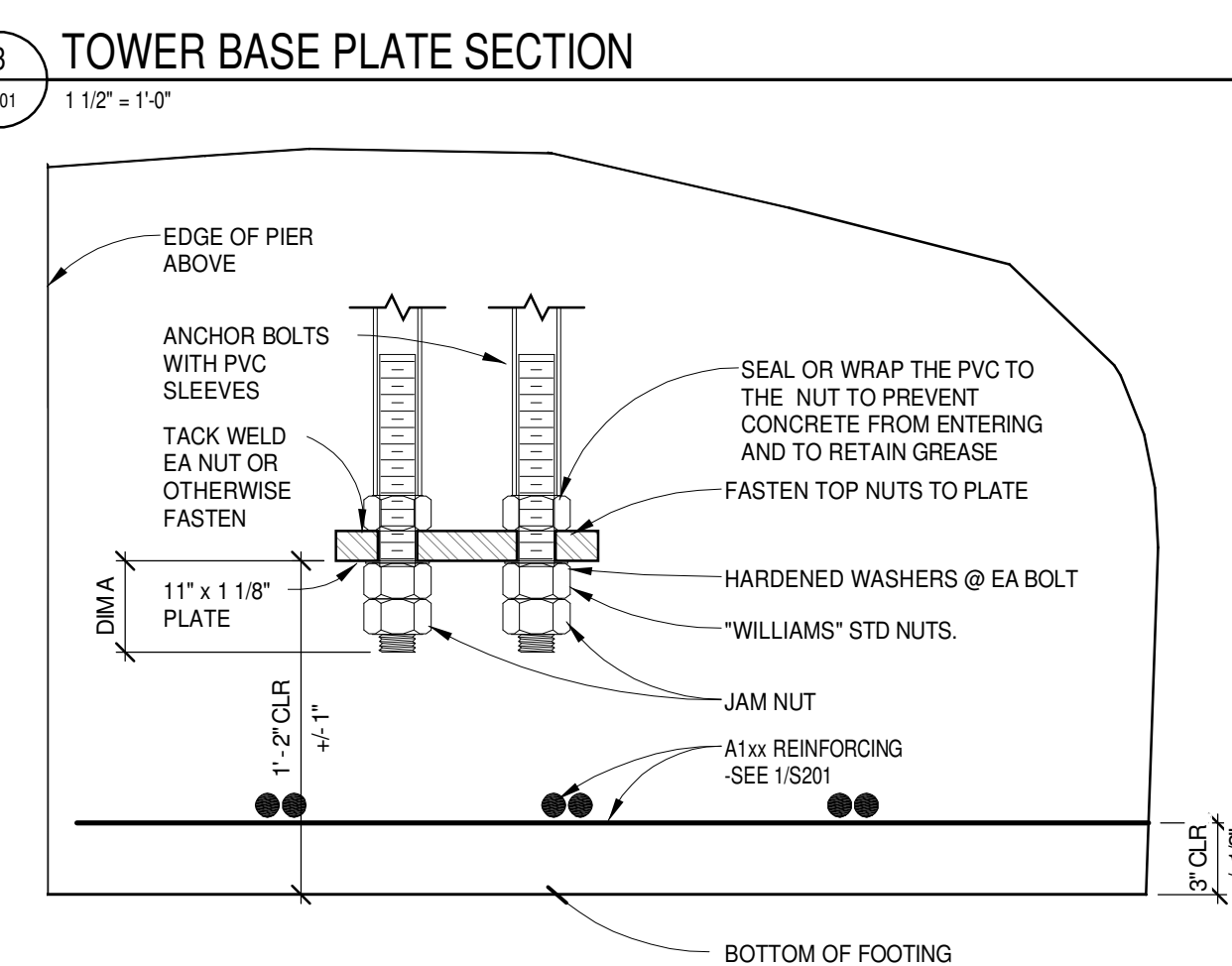
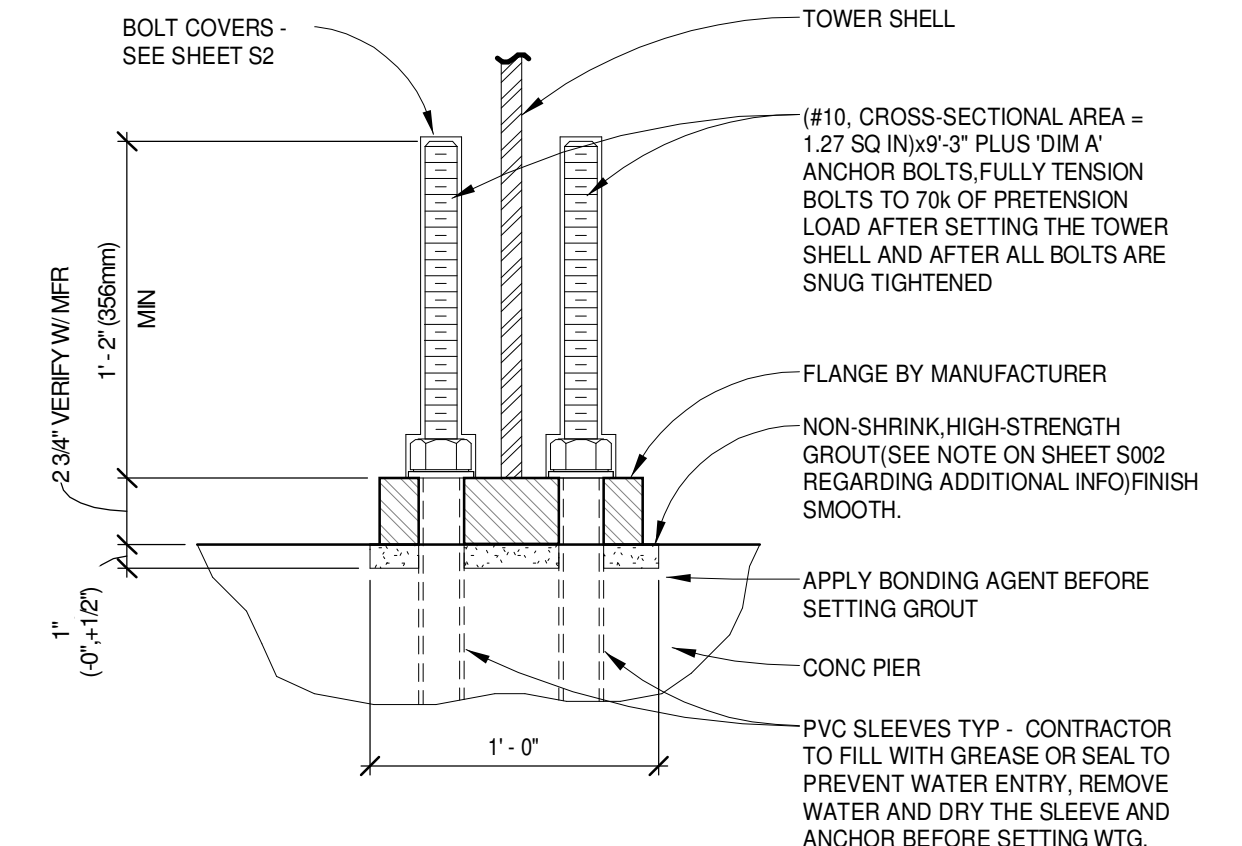
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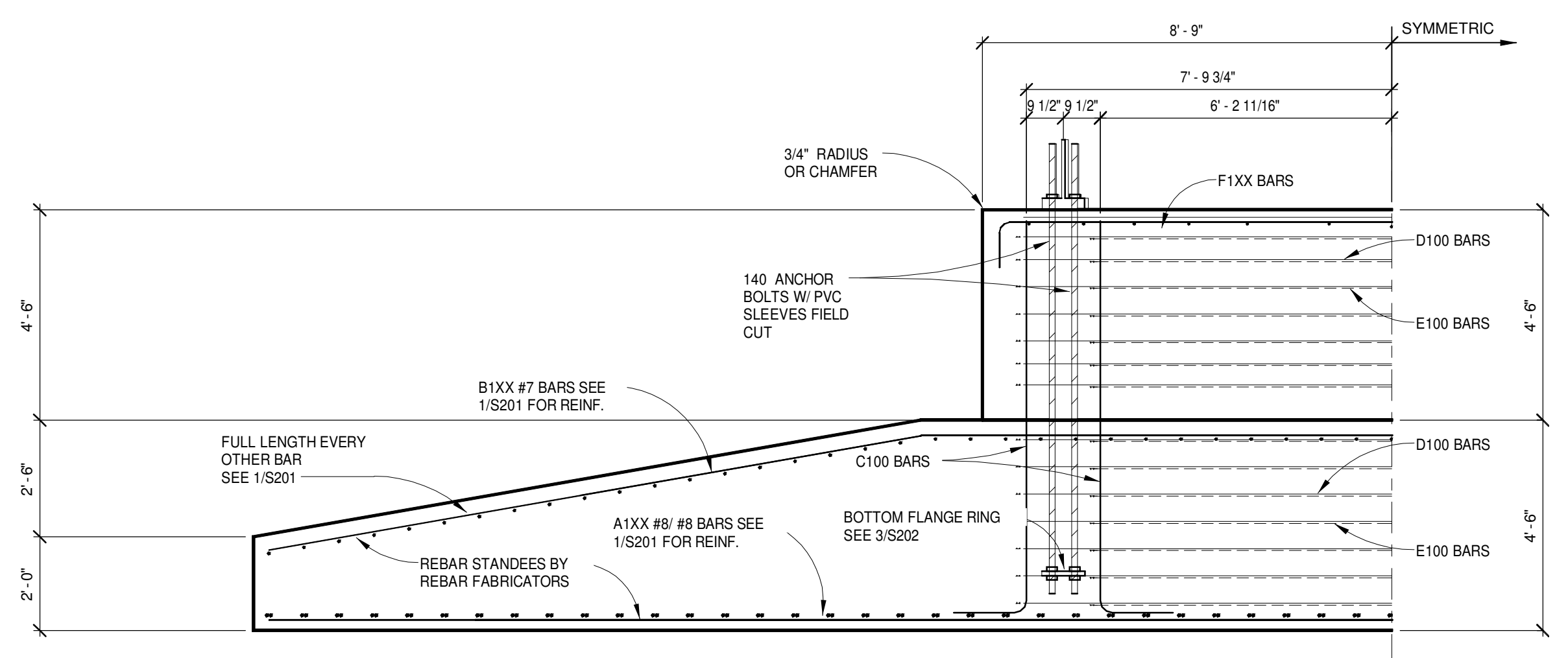
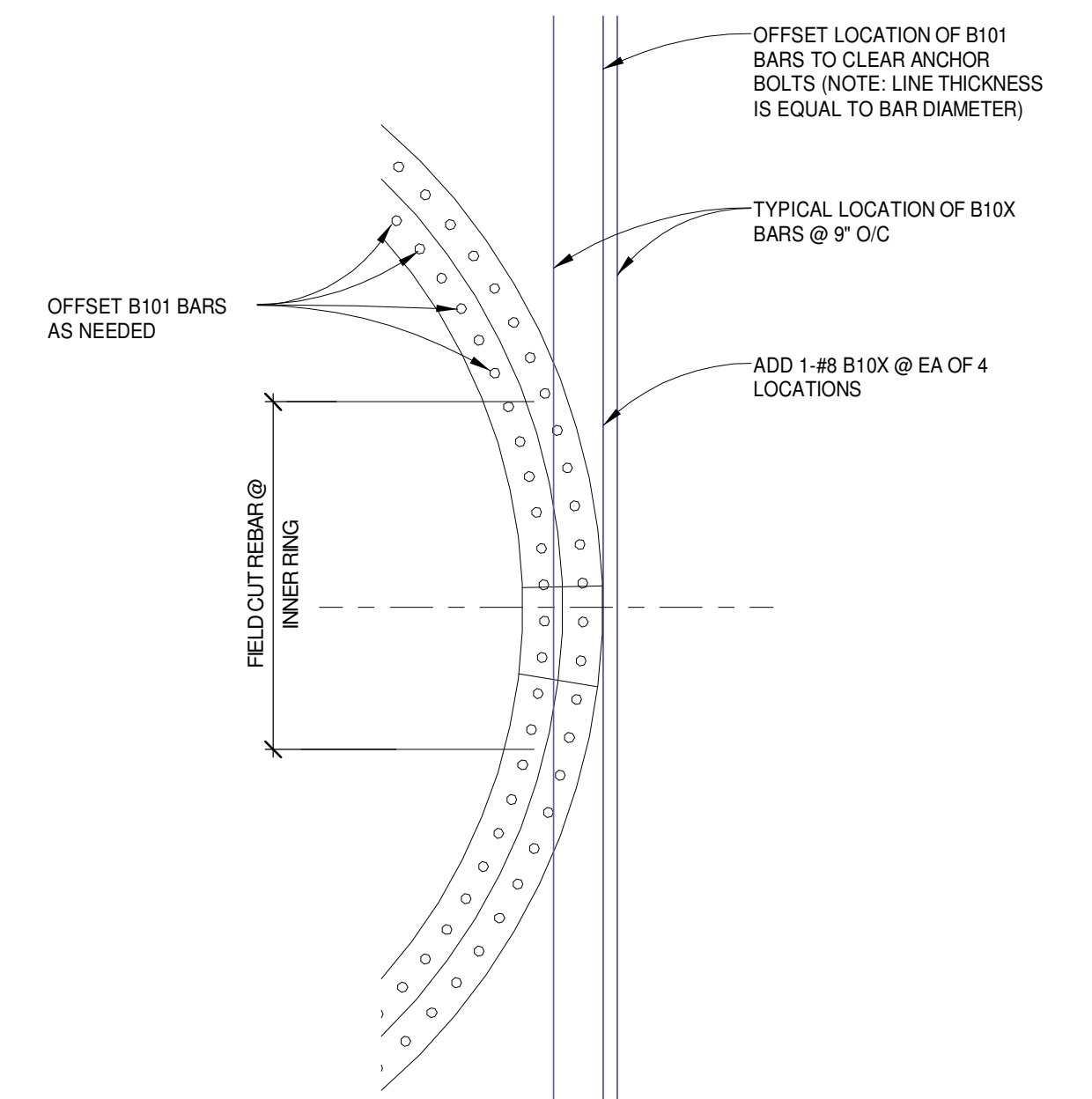
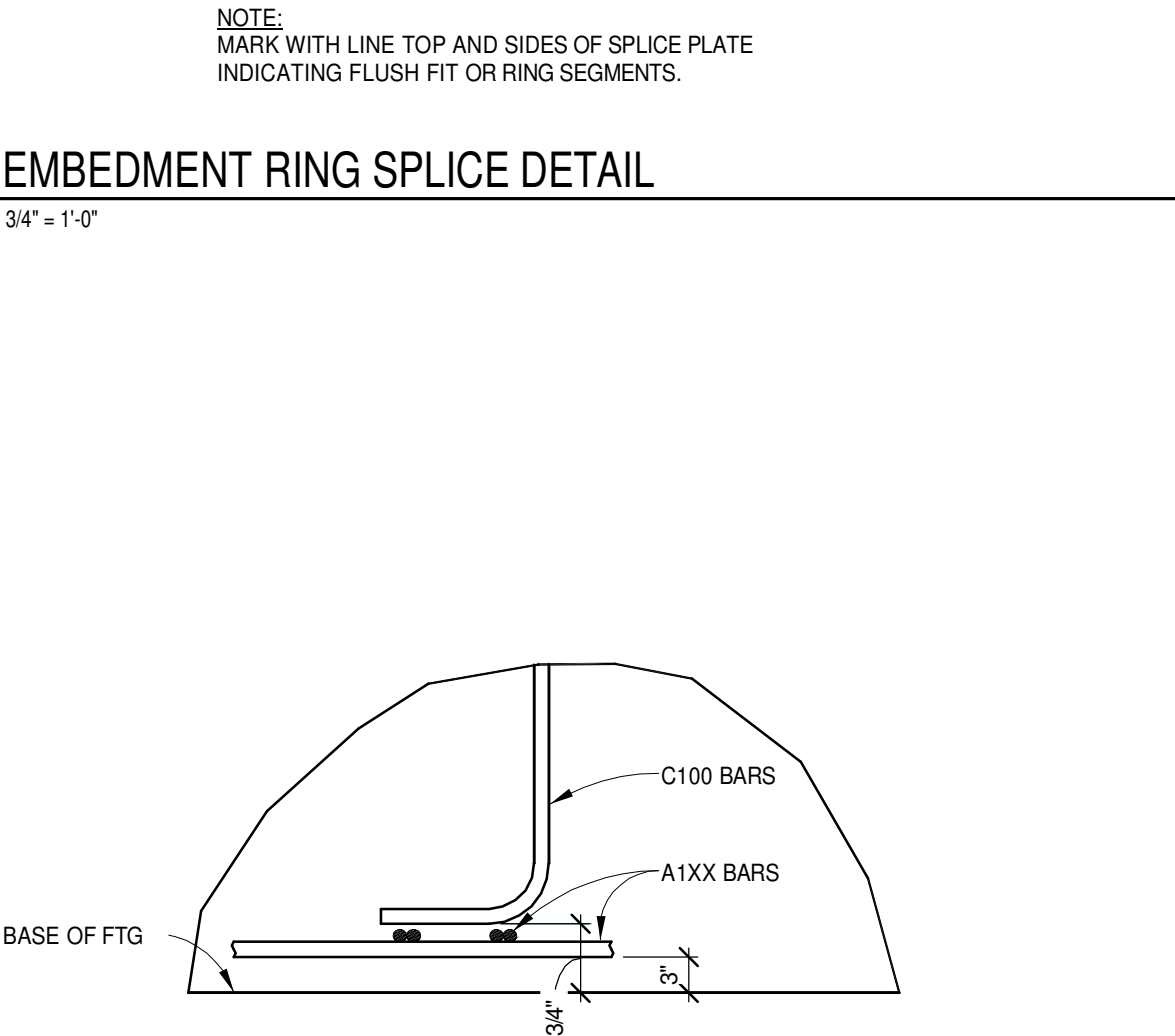
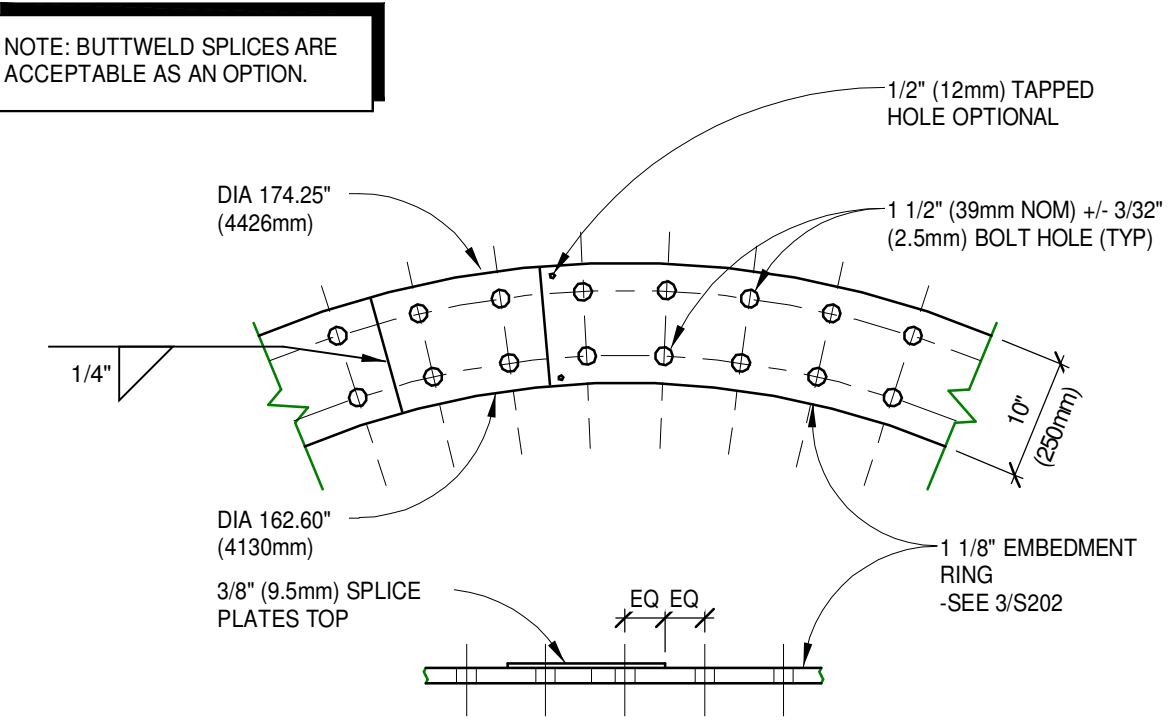
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Drawing Title
CONDUIT PLAN & DETAILS

S601



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4 FOOTING/PIER SECTION
S601 3/8" = 1'-0"



CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BID DOCUMENTS	17 JUL 12
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

DRAWN BY: JCE/SLR

CHECKED BY: JRK

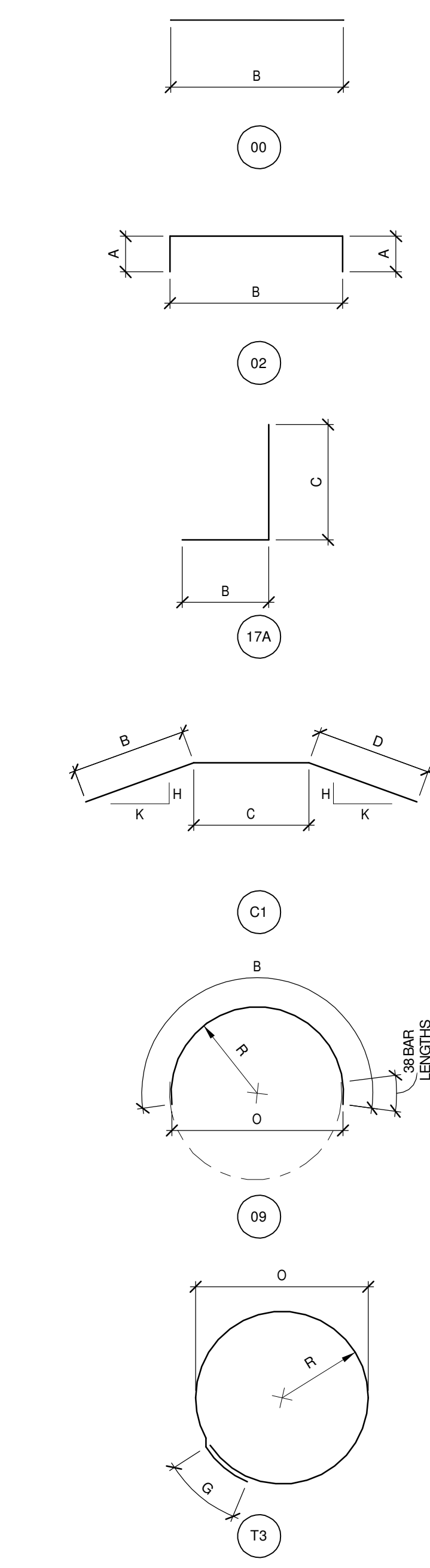
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Drawing Title

REBAR SCHEDULE

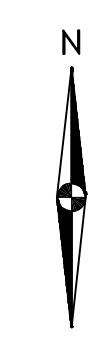
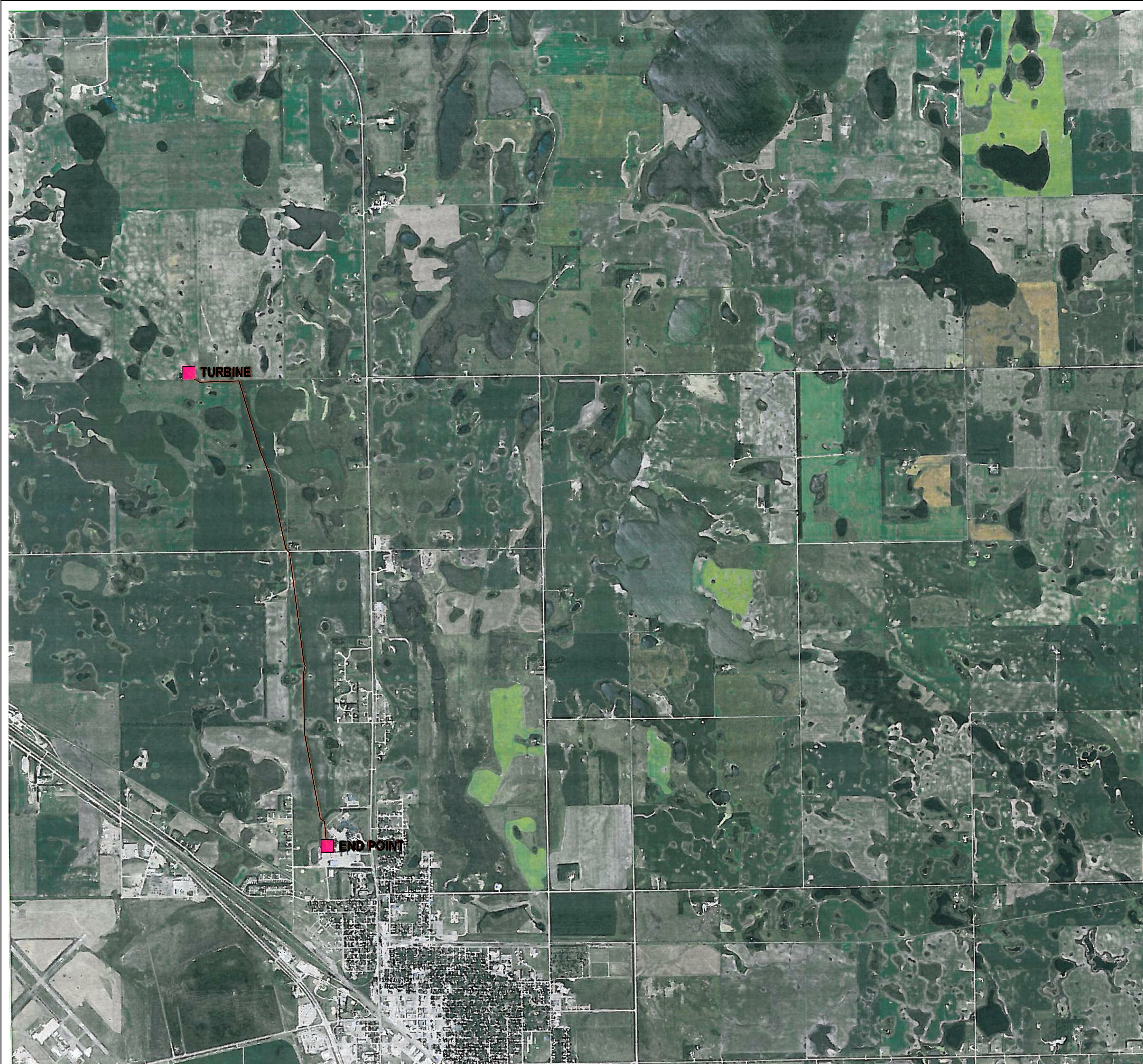
S801

BILL OF REINFORCING STEEL - DESIGN 1																	
Mark	Shape	BAR SIZE	NO. REQ'D	A	B	C	D	E	F	G	H	J	K	O	R	Bar Length	WEIGHT (lbs)
A100A	00	#8	54	0'-0"	48'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	48'-0"	6,927
A100B	00	#8	54	0'-0"	39'-2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-2"	5,652
A101A	00	#8	4	0'-0"	46'-11 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	46'-11 1/2"	502
A101B	00	#8	4	0'-0"	39'-7"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-7"	423
A102A	00	#8	4	0'-0"	45'-5 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	45'-5 1/2"	486
A102B	00	#8	4	0'-0"	39'-7"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-7"	423
A103A	00	#8	4	0'-0"	43'-11 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	43'-11 1/2"	470
A103B	00	#8	4	0'-0"	39'-7"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-7"	423
A104A	00	#8	4	0'-0"	42'-5 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	42'-5 1/2"	454
A104B	00	#8	4	0'-0"	39'-7"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-7"	423
A105A	00	#8	4	0'-0"	40'-11 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	40'-11 1/2"	438
A105B	00	#8	4	0'-0"	39'-7"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-7"	423
A106A	00	#8	4	0'-0"	39'-4 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-4 1/2"	421
A106B	00	#8	4	0'-0"	39'-3"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	39'-3"	419
A107A	00	#8	4	0'-0"	37'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	37'-9 1/2"	404
A107B	00	#8	4	0'-0"	37'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	37'-9 1/2"	404
A108A	00	#8	4	0'-0"	36'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	36'-3 1/2"	388
A108B	00	#8	4	0'-0"	36'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	36'-3 1/2"	388
A109A	00	#8	4	0'-0"	34'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	34'-9 1/2"	372
A109B	00	#8	4	0'-0"	34'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	34'-9 1/2"	372
A110A	00	#8	4	0'-0"	33'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	33'-3 1/2"	356
A110B	00	#8	4	0'-0"	33'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	33'-3 1/2"	356
A111A	00	#8	4	0'-0"	31'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	31'-9 1/2"	340
A111B	00	#8	4	0'-0"	31'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	31'-9 1/2"	340
A112A	00	#8	4	0'-0"	30'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	30'-3 1/2"	324
A112B	00	#8	4	0'-0"	30'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	30'-3 1/2"	324
A113A	00	#8	4	0'-0"	28'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	28'-9 1/2"	308
A113B	00	#8	4	0'-0"	28'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	28'-9 1/2"	308
A114A	00	#8	4	0'-0"	27'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	27'-3 1/2"	292
A114B	00	#8	4	0'-0"	27'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	27'-3 1/2"	292
A115A	00	#8	4	0'-0"	25'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	25'-9 1/2"	276
A115B	00	#8	4	0'-0"	25'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	25'-9 1/2"	276
A116A	00	#8	4	0'-0"	24'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	24'-3 1/2"	260
A116B	00	#8	4	0'-0"	24'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	24'-3 1/2"	260
A117A	00	#8	4	0'-0"	22'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	22'-9 1/2"	244
A117B	00	#8	4	0'-0"	22'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	22'-9 1/2"	244
A118A	00	#8	4	0'-0"	21'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	21'-3 1/2"	228
A118B	00	#8	4	0'-0"	21'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	21'-3 1/2"	228
A119A	00	#8	4	0'-0"	19'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	19'-9 1/2"	212
A119B	00	#8	4	0'-0"	19'-9 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	19'-9 1/2"	212
B100A	C1	#7	26	0'-0"	14'-2"	20'-1 1/2"	14'-2"	0'-0"	0'-0"	0'-0"	2'-5 1/2"	0'-0"	13'-11 1/2"	0'-0"	0'-0"	48'-5"	2,576
B100B	C1	#7	28	0'-0"	7'-5"	20'-1 1/2"	7'-5"	0'-0"	0'-0"	0'-0"	1'-3 1/2"	0'-0"	7'-3 1/2"	0'-0"	0'-0"	34'-10 1/2"	1,999
B101	C1	#7	4	0'-0"	13'-7"	20'-1 1/2"	13'-7"	0'-0"	0'-0"	0'-0"	2'-4"	0'-0"	13'-4 1/2"	0'-0"	0'-0"	47'-3 1/2"	387
B102	C1	#7	4	0'-0"	7'-5"	20'-1 1/2"	7'-5"	0'-0"	0'-0"	0'-0"	1'-3 1/2"	0'-0"	7'-3 1/2"	0'-0"	0'-0"	34'-10 1/2"	286
B103	C1	#7	4	0'-0"	12'-1"	20'-1 1/2"	12'-1"	0'-0"	0'-0"	0'-0"	2'-1"	0'-0"	11'-10 1/2"	0'-0"	0'-0"	44'-3"	362
B104	C1	#7	4	0'-0"	7'-5"	20'-1 1/2"	7'-5"	0'-0"	0'-0"	0'-0"	1'-3 1/2"	0'-0"	7'-3 1/2"	0'-0"	0'-0"	34'-10 1/2"	286
B105	C1	#7	4	0'-0"	10'-6 1/2"	20'-1 1/2"	10'-6 1/2"	0'-0"	0'-0"	0'-0"	1'-10"	0'-0"	10'-4 1/2"	0'-0"	0'-0"	41'-2 1/2"	337
B106	C1	#7	4	0'-0"	7'-5"	20'-1 1/2"	7'-5"	0'-0"	0'-0"	0'-0"	1'-3 1/2"	0'-0"	7'-3 1/2"	0'-0"	0'-0"	34'-10 1/2"	286
B107	C1	#7	4	0'-0"	9'-0 1/2"	20'-1 1/2"	9'-0 1/2"	0'-0"	0'-0"	0'-0"	1'-6 1/2"	0'-0"	8'-10 1/2"	0'-0"	0'-0"	38'-2"	312
B108	C1	#7	4	0'-0"	7'-5"	20'-1 1/2"	7'-5"	0'-0"	0'-0"	0'-0"	1'-3 1/2"	0'-0"	7'-3 1/2"	0'-0"	0'-0"	34'-10 1/2"	286
B109	C1	#7	4	0'-0"	7'-6"	20'-1 1/2"	7'-6"	0'-0"	0'-0"	0'-0"	1'-3 1/2"	0'-0"	7'-4 1/2"	0'-0"	0'-0"	35'-1 1/2"	287
B110	C1	#7	4	0'-0"	6'-9"	20'-1 1/2"	6'-9"	0'-0"	0'-0"	0'-0"	1'-2"	0'-0"	6'-7 1/2"	0'-0"	0'-0"	33'-7"	275
B111	C1	#7	4	0'-0"	6'-0"	20'-1 1/2"	6'-0"	0'-0"	0'-0"	0'-0"	1'-0 1/2"	0'-0"	5'-10 1/2"	0'-0"	0'-0"	32'-0 1/2"	262
B112	C1	#7	4	0'-0"	5'-2 1/2"	20'-1 1/2"	5'-2 1/2"	0'-0"	0'-0"	0'-0"	0'-11"	0'-0"	5'-1 1/2"	0'-0"	0'-0"	30'-6 1/2"	250
B113	C1	#7	4	0'-0"	4'-5 1/2"	20'-1 1/2"	4'-5 1/2"	0'-0"	0'-0"	0'-0"	0'-9"	0'-0"	4'-4 1/2"	0'-0"	0'-0"	29'-0"	237
B114	C1	#7	4	0'-0"	3'-8 1/2"	20'-1 1/2"	3'-8 1/2"	0'-0"	0'-0"	0'-0"	0'-7 1/2"	0'-0"	3'-7 1/2"	0'-0"	0'-0"	27'-6"	225
B115	C1	#7	4	0'-0"	2'-11 1/2"	20'-1 1/2"	2'-11 1/2"	0'-0"	0'-0"	0'-0"	0'-6"	0'-0"	2'-10 1/2"	0'-0"	0'-0"	25'-11 1/2"	213
B116	C1	#7	4	0'-0"	2'-2"	20'-1 1/2"	2'-2"	0'-0"	0'-0"	0'-0"	0'-4 1/2"	0'-0"	2'-1 1/2"	0'-0"	0'-0"	24'-5 1/2"	200
B117	C1	#7	4	0'-0"	1'-5"	20'-1 1/2"	1'-5"	0'-0"	0'-0"	0'-0"	0'-3"	0'-0"	1'-4 1/2"	0'-0"	0'-0"	22'-11"	188
B118	C1	#7	4	0'-0"	0'-8"	20'-1 1/2"	0'-8"	0'-0"	0'-0"	0'-0"	0'-1 1/2"	0'-0"	0'-7 1/2"	0'-0"	0'-0"	21'-5"	175
B119	00	#7	4	0'-0"	19'-10 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	19'-10 1/2"	163
C100	17A	#7	140	0'-0"	1'-7"	8'-5"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	9'-10"	2,812
D100	09	#3	42	0'-0"	19'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	14'-10"	8'-0"	19'-0"	300
E100	09	#3	28	0'-0"	22'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	12'-8"	6'-5"	22'-0"	232
F100	02	#6	10	1'-0"	16'-10"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	1'-0"	0'-0"	0'-0"	0'-0"	0'-0"	18'-6"	278
F101	02	#6	4	1'-0"	15'-1 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	1'-0"	0'-0"	0'-0"	0'-0"	0'-0"	16'-10"	101
F102	02	#6	4	1'-0"	13'-1 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	1'-0"	0'-0"	0'-0"	0'-0"	0'-0"	14'-9 1/2"	89
F103	02	#6	4	1'-0"	10'-7 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	1'-0"	0'-0"	0'-0"	0'-0"	0'-0"	12'-4"	74
F104	02	#6	4	1'-0"	8'-3 1/2"	0'-0"	0'-0"	0'-0"	0'-0"	0'-0"	1'-0"	0'-0"	0'-0"	0'-0"	0'-0"	10'-0"	60
TOTAL																	39,428



1 BAR BENDING AND CUTTING DIAGRAMS
3/4" = 1'-0"

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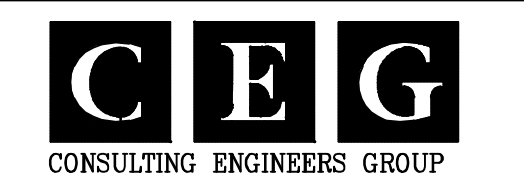


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LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
BD	BIDDING DOCUMENTS	17 JUL 2012
MARK	DESCRIPTION	DATE

PROJECT NO: 20112552

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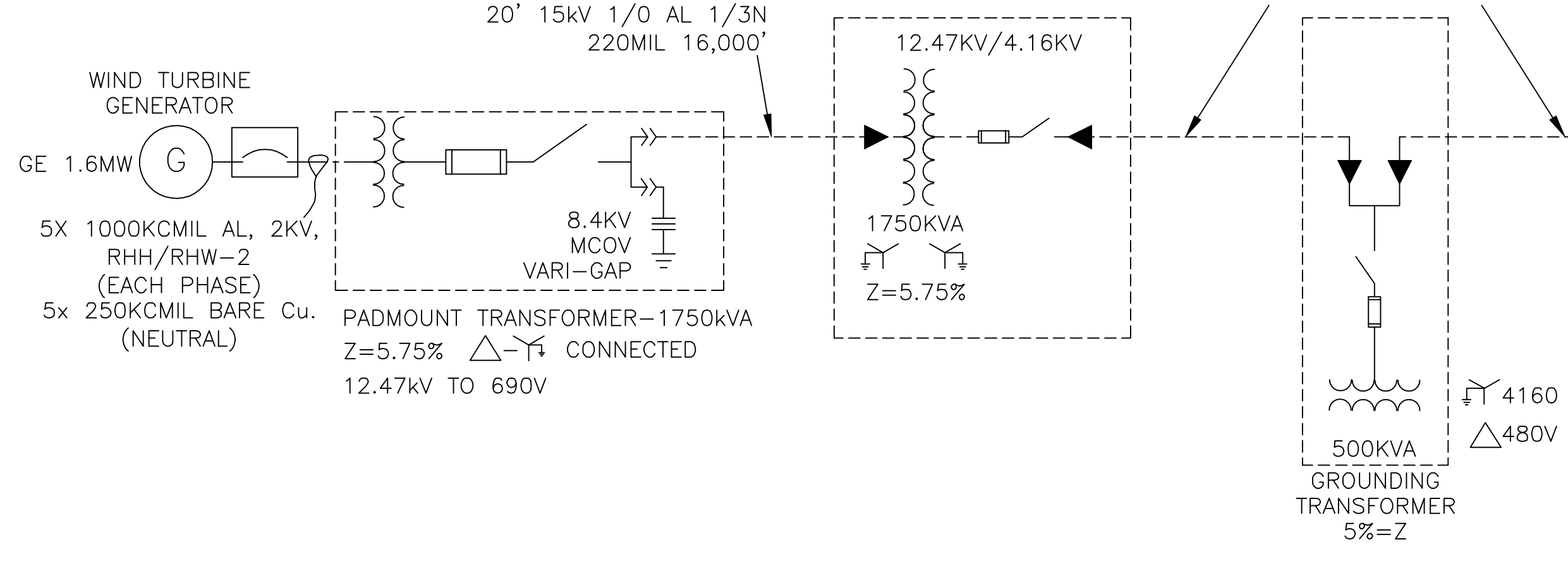
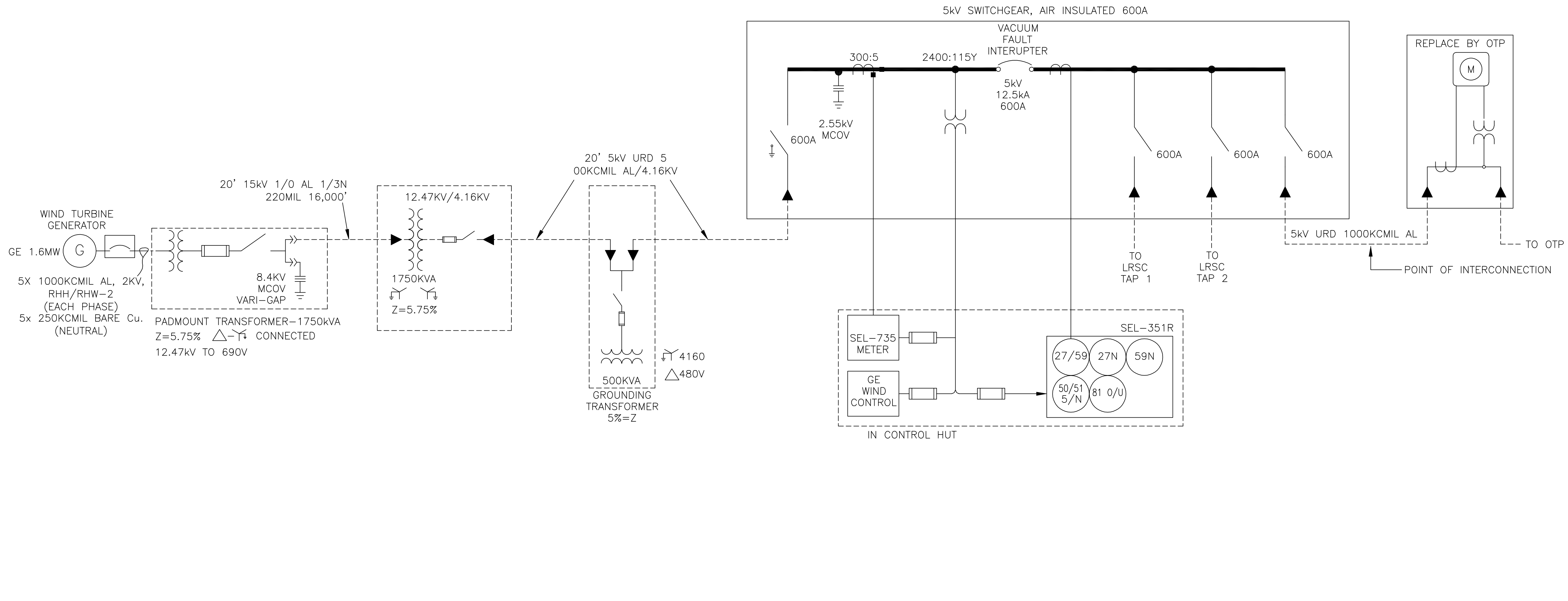
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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM AERIAL VIEW

PP-01

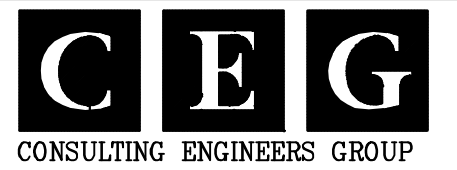


LEGEND

- WIND TURBINE GENERATOR
 - PADMOUNT TRANSFORMER - 1750kVA Z=5.75% Δ-Y CONNECTED 12.47kV TO 690V
 - 8.4kV MCOV ARRESTER
 - FAULT INDICATOR
 - 5kV 1000 kCMIL AL WITH 1/6 NEUTRAL TRXLPE CABLE, 90°C
 - 5kV 500 kCMIL AL WITH 1/3 NEUTRAL TRXLPE CABLE, 90°C
 - 15kV 1/0 AWG AL WITH 2/3 NEUTRAL TRXLPE CABLE, 90°C
- CABLE LOADING BASED ON RHO VALUE OF 150°C-cm/W. IN CONDUIT
 SOIL TEMP 20°C
 48" NOMINAL DEPTH
 MULTI POINT GROUNDED
 100% LOAD FACTOR
 DISTANCE SHOWN IS POINT TO POINT (NO TAILS)



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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM ONE LINE DIAGRAM

CLIENT

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PROJECT DESCRIPTION

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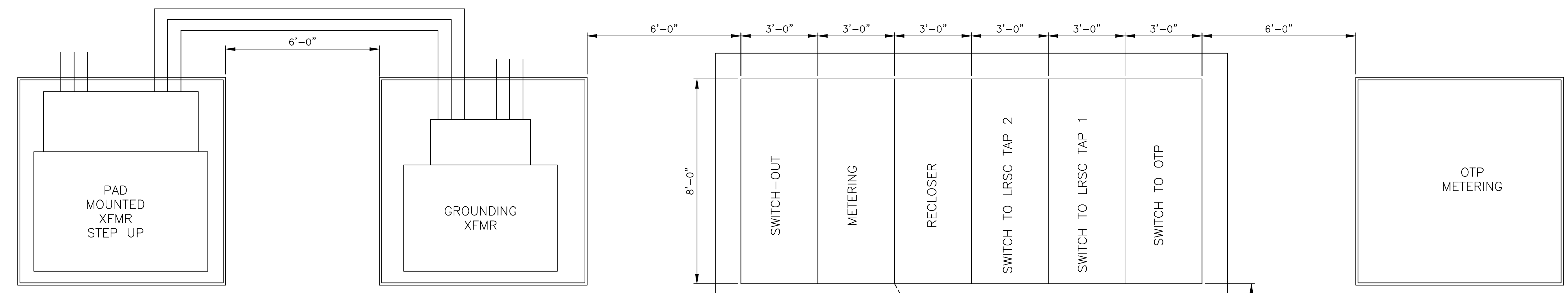
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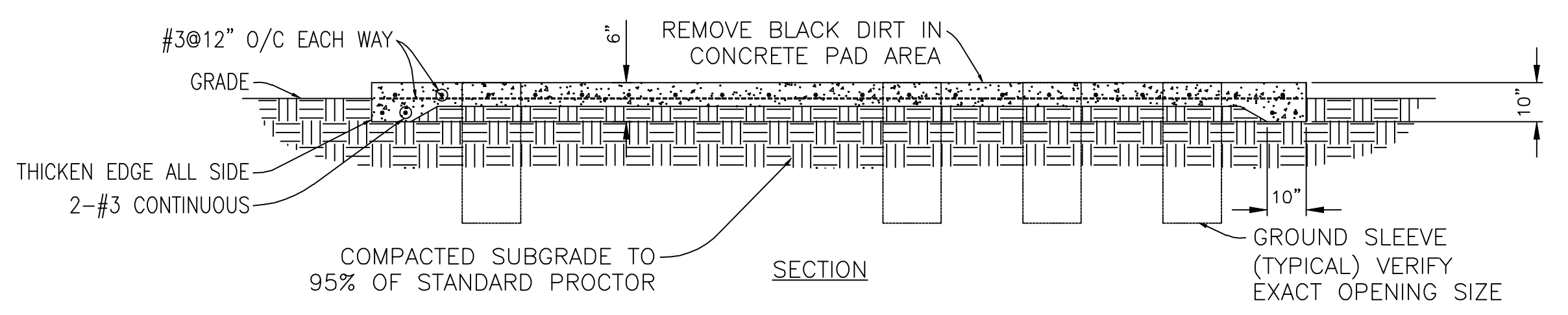
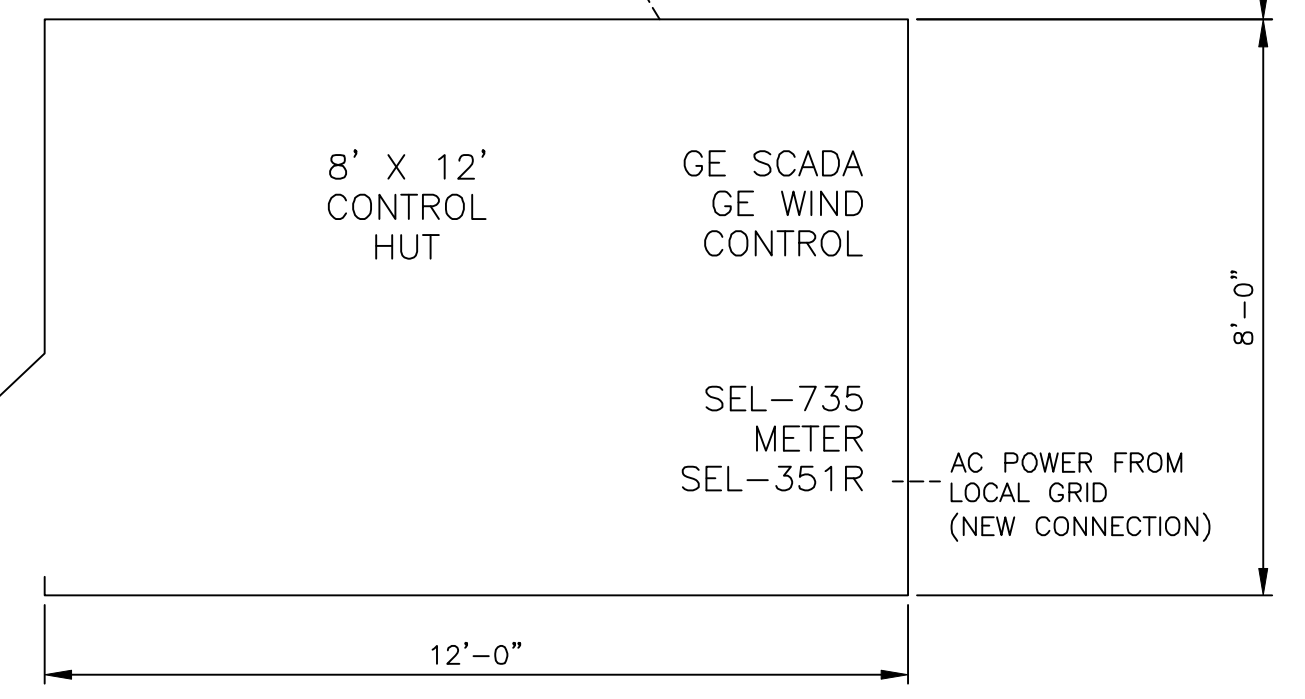
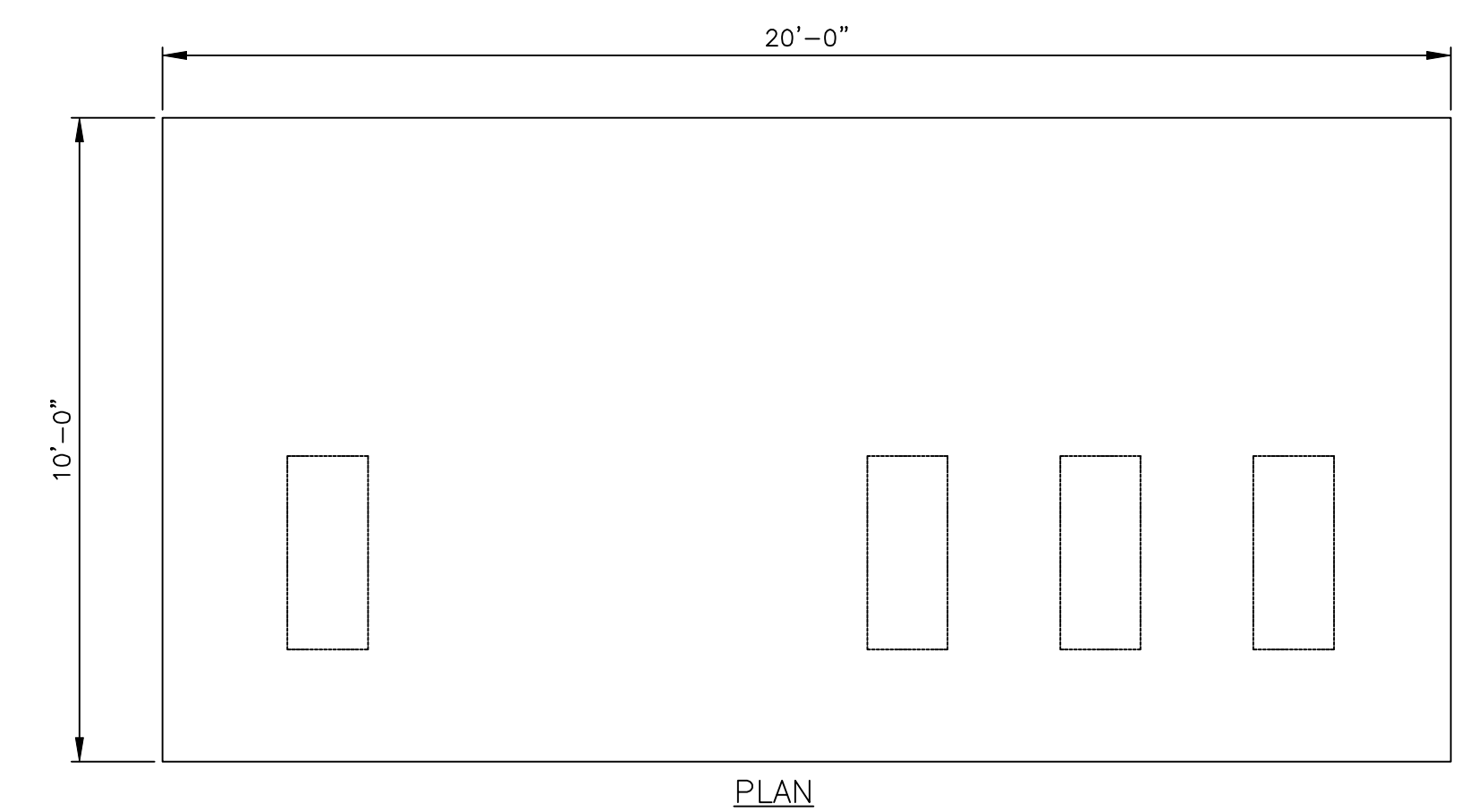
GE 1.6MW TURBINE COLLECTION SYSTEM SWITCHGEAR SIGN LOCATION

EL-01

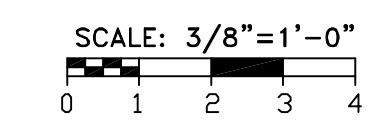


NOTES:

- GROUND EACH PIECE OF EQUIPMENT IN TWO LOCATIONS WITH 5/8" x 10' GROUND RODS. TIE ALL GROUNDING TOGETHER WITH BARE 4/0 Cu.
- CONTROL CABLES TO SWITCHGEAR:
2 x 4C#10, METERING CT/PT
1 x 12C#12, CONTROL
1 x 3C#8 W/GND, POWER
- FINAL WIRING DRAWINGS TO BE PROVIDED AFTER SWITCHGEAR SUBMITTAL DRAWINGS.
- SETTINGS FOR SEL-351R AND SEL-735 TO BE PROVIDED TO CONTRACTOR BY ENGINEER AS TEXT/DATABASE FILES AND INSTALLED AND TESTED IN FIELD BY QUALIFIED FIRM.

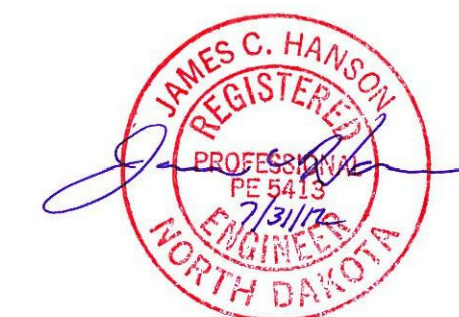


A CONCRETE PAD DETAIL



THIS LINE IS ONE INCH WHEN DRAWING IS FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY.

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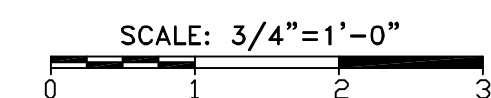
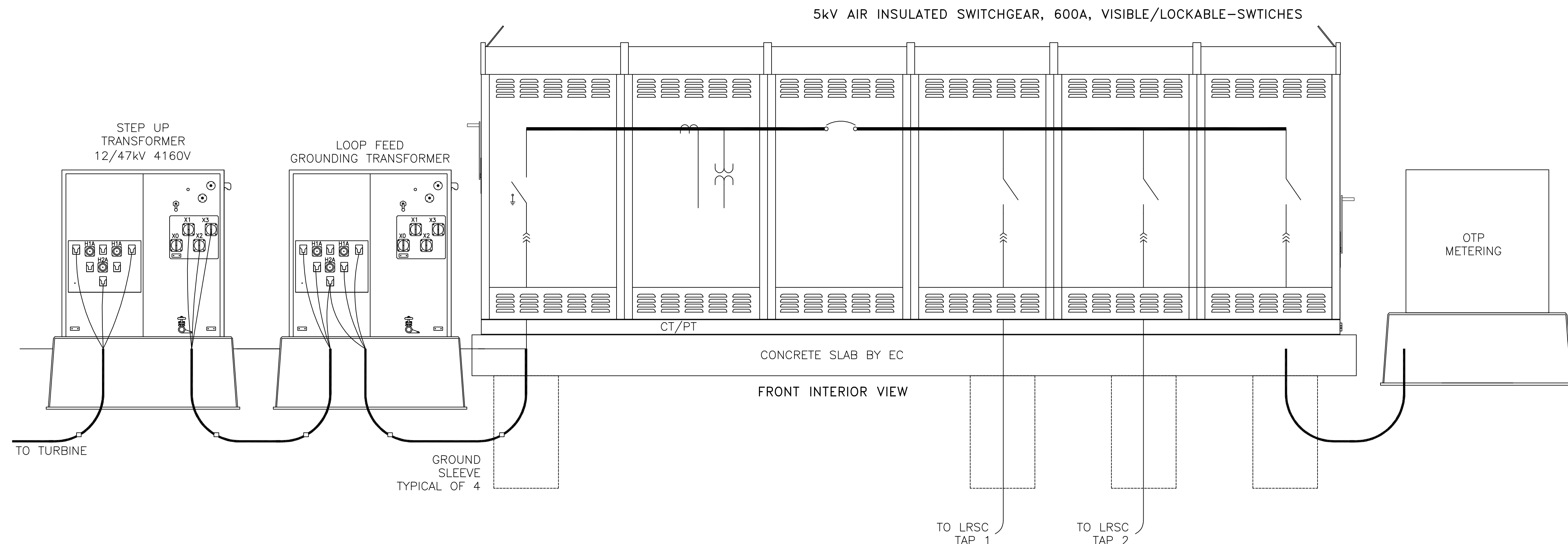
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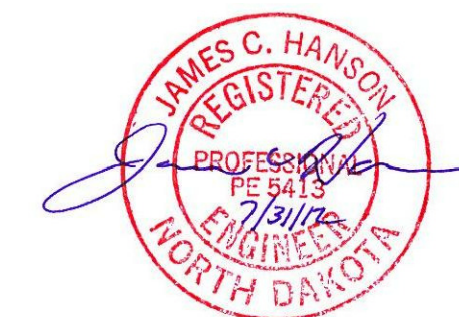
DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM EQUIPMENT PROFILE VIEW

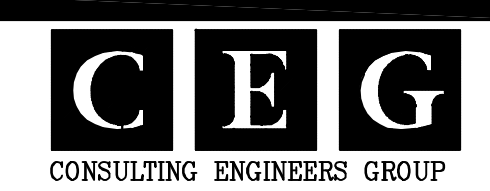
EL-02



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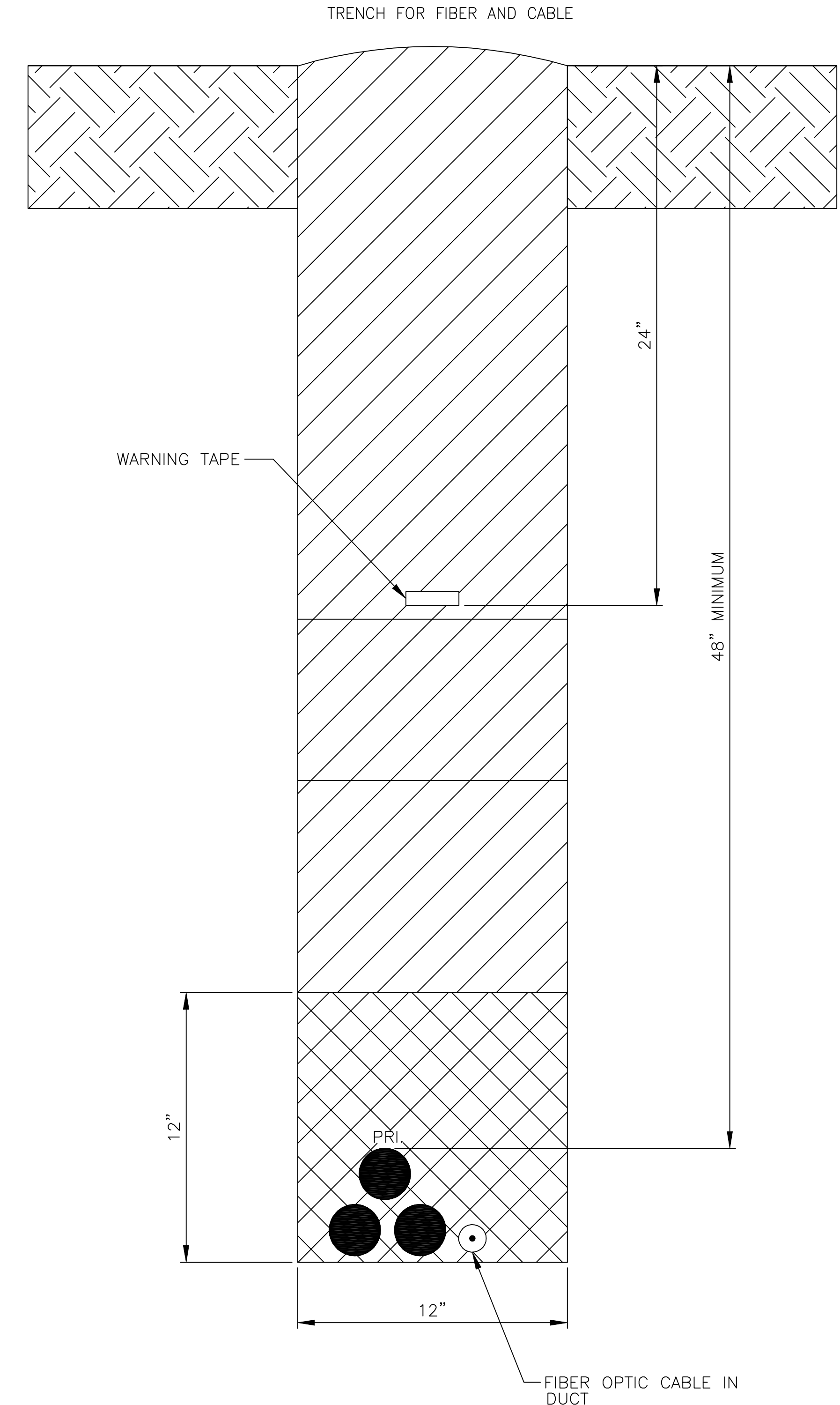
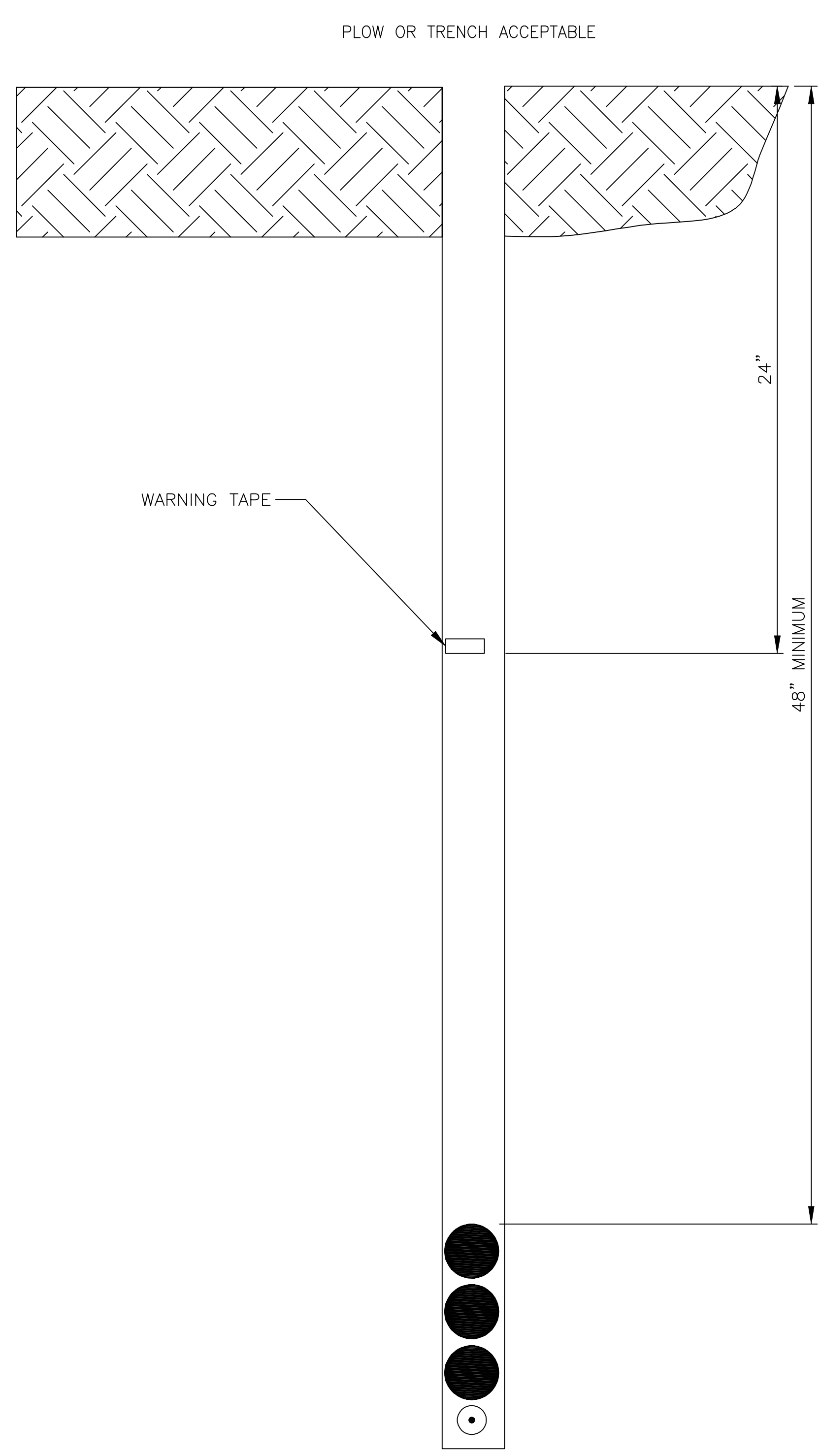
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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM MEDIUM VOLTAGE CABLE INSTALLATION (PLOWING)

TR-01



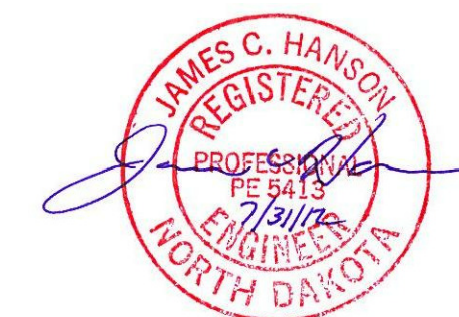
CABLE PLACEMENT IN TRENCH

- TREFOIL (ALL SIZES)
SECURE CABLE EVERY 100' OR DEMONSTRATE CONSISTENT PLACEMENT.
- UNDISTURBED EARTH
- COMPACTED BACKFILL UNLESS OTHERWISE SPECIFIED
- CLEAN SOIL (NO ROCKS)

NOTES:

1. EXACT TRENCH WIDTH DETERMINED BY EQUIPMENT REQUIRED FOR TERRAIN.
2. DEPTHS SPECIFIED ARE TO EXISTING GRADE. MINIMUM DEPTHS TO BE FOLLOWED AT ALL TIMES. DEVIATION FROM NOMINAL DEPTHS AT THE DISCRETION OF THE DESIGN ENGINEER AND OWNER BASED ON FIELD CONDITION.
3. BACK FILLING IS PART OF ALL TRENCHING UNITS. BACK FILL WITH SELECT FILL FROM TRENCH. NO ROCKS > 1/2" WITHIN 12" OF CABLE. (SCREEN BACKFILL IF NEEDED.) BED CABLES ON 3" OF SELECT FILL IF BOTTOM OF TRENCH IS ROCK OR SHALE. SELECT FILL MAY BE TRENCHED SOILS OR SIMILAR SOILS FROM TURBINE EXCAVATION. COMPACT TO 85% PER SPECIFICATIONS. FILL/COMPACT IN TWO LIFTS AND WHEEL COMPACT TOP AFTER RESTORING TOPSOIL. RE-SEED AND RESTORE AS REQUIRED BY OWNER. BACKFILL MAY REQUIRE 3" SAND BEDDING BELOW AND ABOVE CABLE IF TRENCHED SOILS CONTAIN ROCK THAT CANNOT BE SCREENED OUT.
4. WARNING TAPE AT 24" TO BE SPECIFIED ON ALL CIRCUITS. FURNISHED BY TRENCHING CONTRACTOR.

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ITEM	QTY.	MATERIAL
1	3	CONNECTORS, COMPRESSION (BURNDY YGHC29C26)
2	2	GROUND ROD, 5/8" X 10'-0"
3	2	CLAMP, GROUND ROD, YGHC29C29
4	1	LOCATOR BALL (3M 1402-XR)
5	50'	GROUND WIRE (SEE NOTE 1)
6	3	SPLICE KIT
7	10'	250 KCMIL BARE Cu.

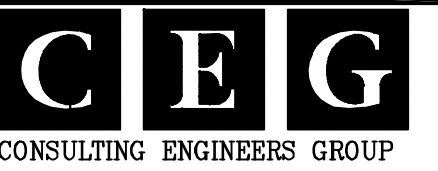


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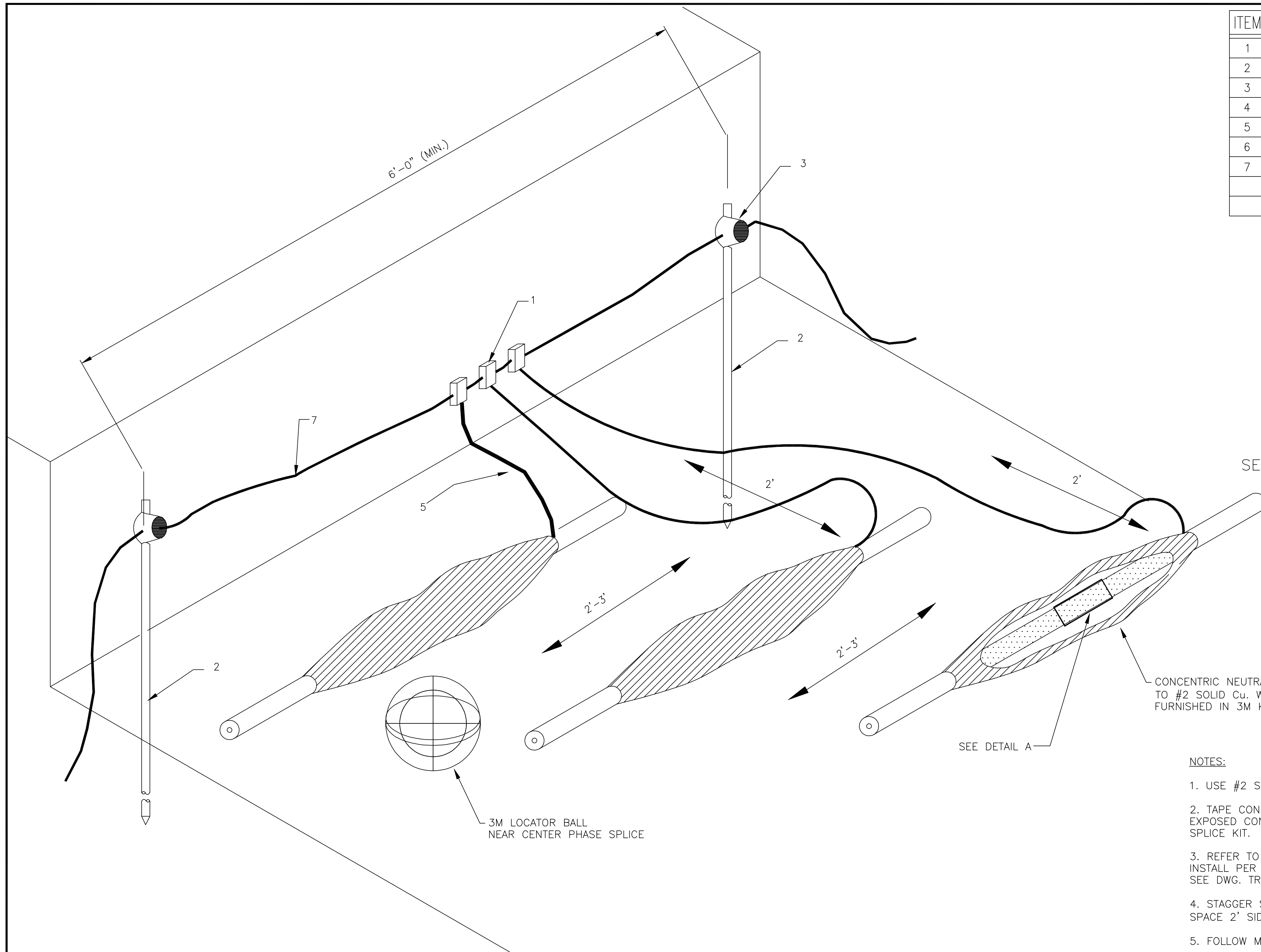
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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM
PRIMARY CABLE SPLICE

TR-02



SEE NOTE 5

CONCENTRIC NEUTRALS CONNECT TO #2 SOLID Cu. WITH CRIMP FURNISHED IN 3M KIT.

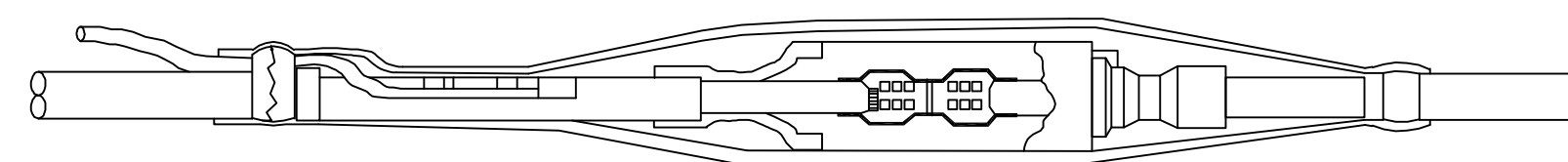
SEE DETAIL A

NOTES:

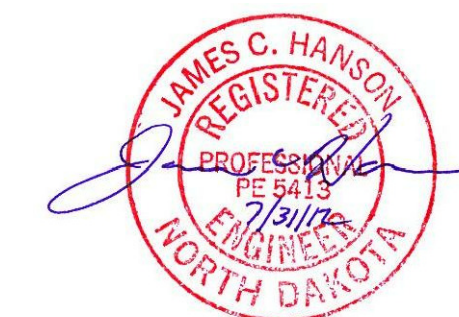
1. USE #2 SOLID COPPER GROUND WIRE.
2. TAPE CONNECTORS TO COVER SHARP EDGES. MOISTURE SEAL EXPOSED CONCENTRIC NEUTRAL AND SOLID COPPER WIRES WITH 3M SPLICE KIT.
3. REFER TO MASTER MATERIAL LIST FOR MFR. AND PART NUMBER. INSTALL PER MANUFACTURER INSTRUCTIONS. SEE DWG. TR-07.
4. STAGGER SPLICES 2-3' APART. LONGITUDINAL SPACE 2' SIDE TO SIDE.
5. FOLLOW MANUFACTURER INSTRUCTIONS FOR SPLICE KIT INSTALLATION.

3M LOCATOR BALL NEAR CENTER PHASE SPLICE

SEE 3M INSTRUCTIONS



DETAIL A
IN LINE SPLICE



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ITEM	QTY.	MATERIAL
1	3	CONNECTORS, COMPRESSION (BURNDY YGHC29C26)
2	1	GROUND ROD, 5/8" X 10'-0"
3	1	CLAMP, GROUND ROD, YGHC29C29
4	1	LOCATOR BALL (3M 1402-XR)
5	10'	GROUND WIRE (SEE NOTE 1)
6	3	GROUNDING KIT

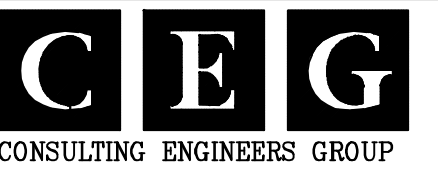


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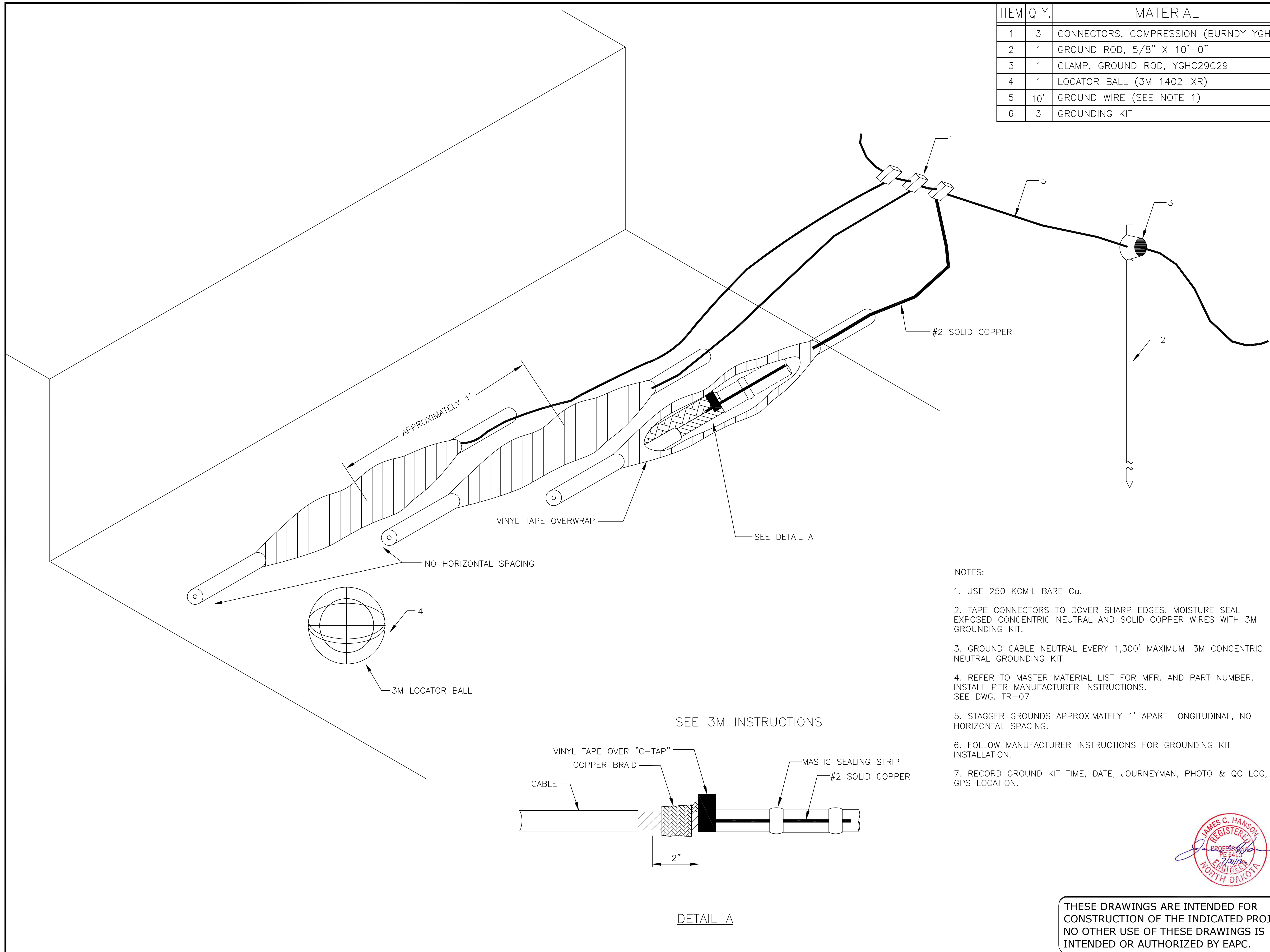
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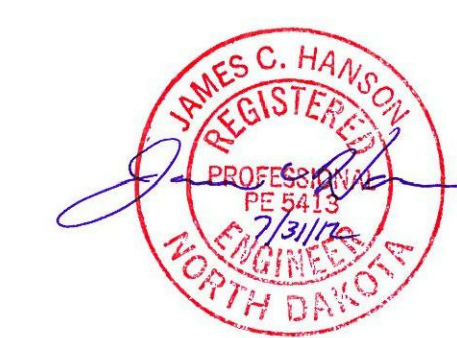
GE 1.6MW TURBINE COLLECTION SYSTEM
CONCENTRIC NEUTRAL GROUNDING,
UNDERGROUND CABLE

TR-03

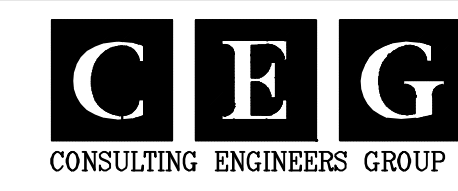


NOTES:

- USE 250 KCMIL BARE Cu.
- TAPE CONNECTORS TO COVER SHARP EDGES. MOISTURE SEAL EXPOSED CONCENTRIC NEUTRAL AND SOLID COPPER WIRES WITH 3M GROUNDING KIT.
- GROUND CABLE NEUTRAL EVERY 1,300' MAXIMUM. 3M CONCENTRIC NEUTRAL GROUNDING KIT.
- REFER TO MASTER MATERIAL LIST FOR MFR. AND PART NUMBER. INSTALL PER MANUFACTURER INSTRUCTIONS. SEE DWG. TR-07.
- STAGGER GROUNDS APPROXIMATELY 1' APART LONGITUDINAL, NO HORIZONTAL SPACING.
- FOLLOW MANUFACTURER INSTRUCTIONS FOR GROUNDING KIT INSTALLATION.
- RECORD GROUND KIT TIME, DATE, JOURNEYMAN, PHOTO & QC LOG, GPS LOCATION.



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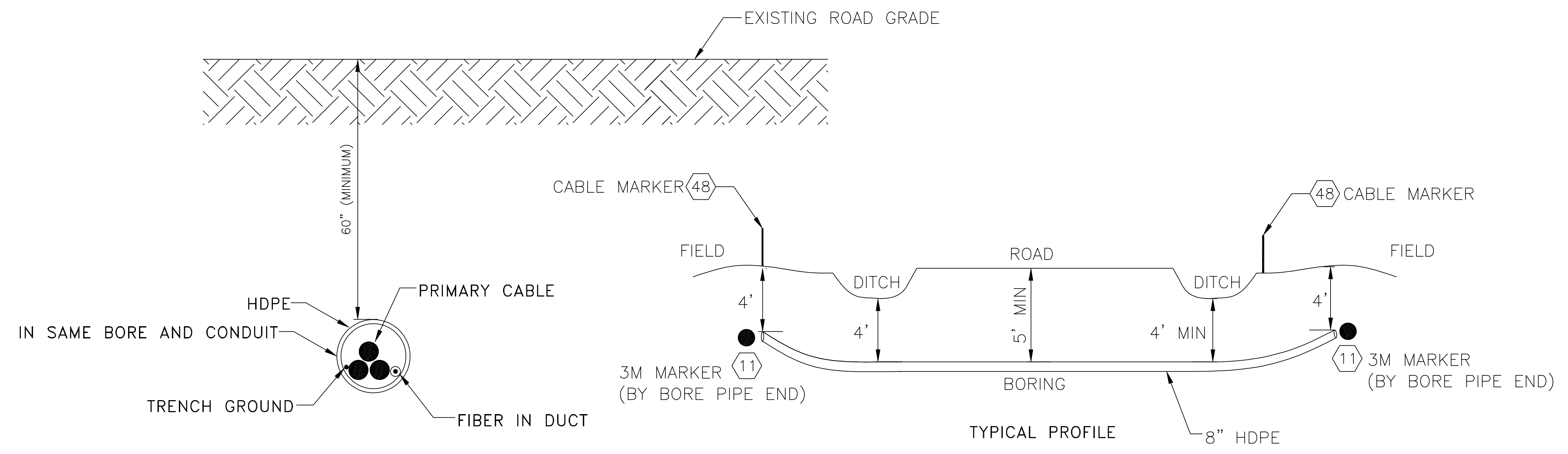
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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM HORIZONTAL DIRECTIONAL DRILLING

TR-04



BORING WITH CONDUIT
500 KCMIL OR LARGER = 8" HDPE SDR 17
4/0 OR SMALLER = 6" HDPE SDR 17

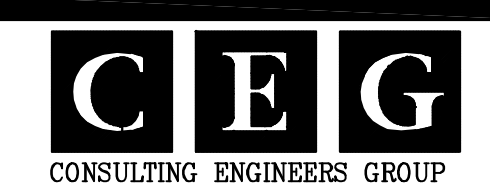
NOTES:

- BURIAL DEPTH UNDER ROADS, TO MEET THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. FURNISH AS BUILT LOCATIONS AND DRAWING, FOR AUTHORITY HAVING JURISDICTION, FOR EACH CROSSING.
- MINIMUM DEPTH DETERMINED 4'-0" BELOW BOTTOM OF DITCH.
- FIBER AND PRIMARY ARE PULLED IN THE SAME BORE HOLE UNLESS OTHERWISE INSTRUCTED.
- MATERIAL QUANTITY (CONDUIT) DETERMINED IN FIELD. HDPE OR AS APPROVED BY OWNER.
- BORE FROM OUTSIDE R.O.W. EDGE TO OUTSIDE R.O.W. EDGE UNLESS DIRECTED BY PERMIT TO ALLOW BORE PITS IN R.O.W.
- SILT FENCING IF REQUIRED TO CONTAIN BORING FLUIDS.
- RECORD GPS LOCATION OF START AND END OF BORING PIPE. MARK WITH 3M MARKER BALL. INSTALL BURIED CONDUIT MARKER AT R.O.W. EDGE/FENCE OR AS DIRECTED.
- OBSERVE CABLE HANDLING REQUIREMENTS FOR PULLING CABLE IN BORES. (SEE SPECIFICATION AND/OR MANUFACTURER RECOMMENDATIONS.
- REVIEW ROAD USE/CROSSING OR PERMIT AGREEMENTS PRIOR TO START OF WORK.

⊗ INDICATES ITEM # ON ELECTRICAL MATERIAL LIST.
SEE DWG. TR-07.



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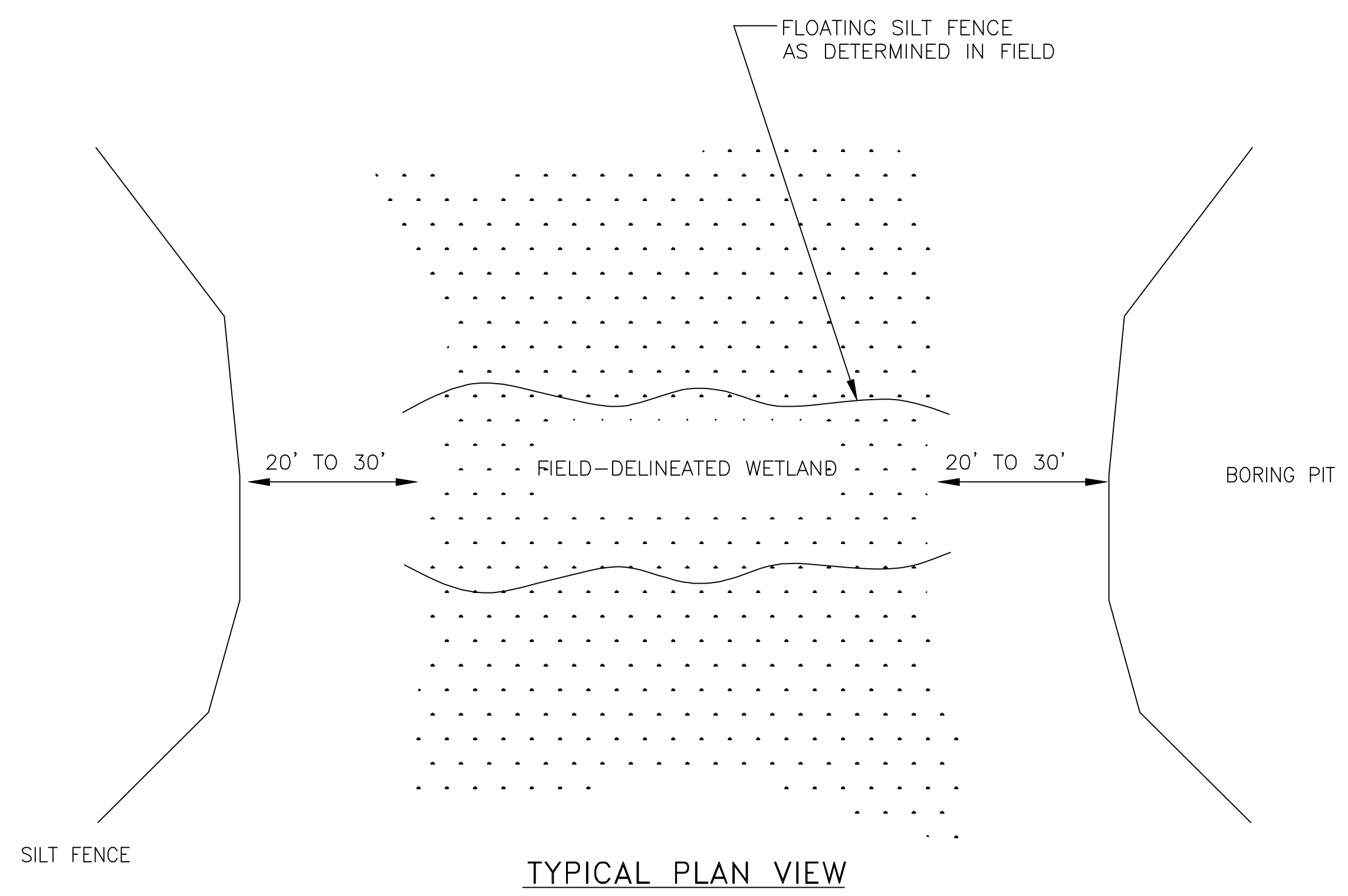
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GE 1.6MW TURBINE COLLECTION SYSTEM HORIZONTAL DIRECTIONAL DRILLING

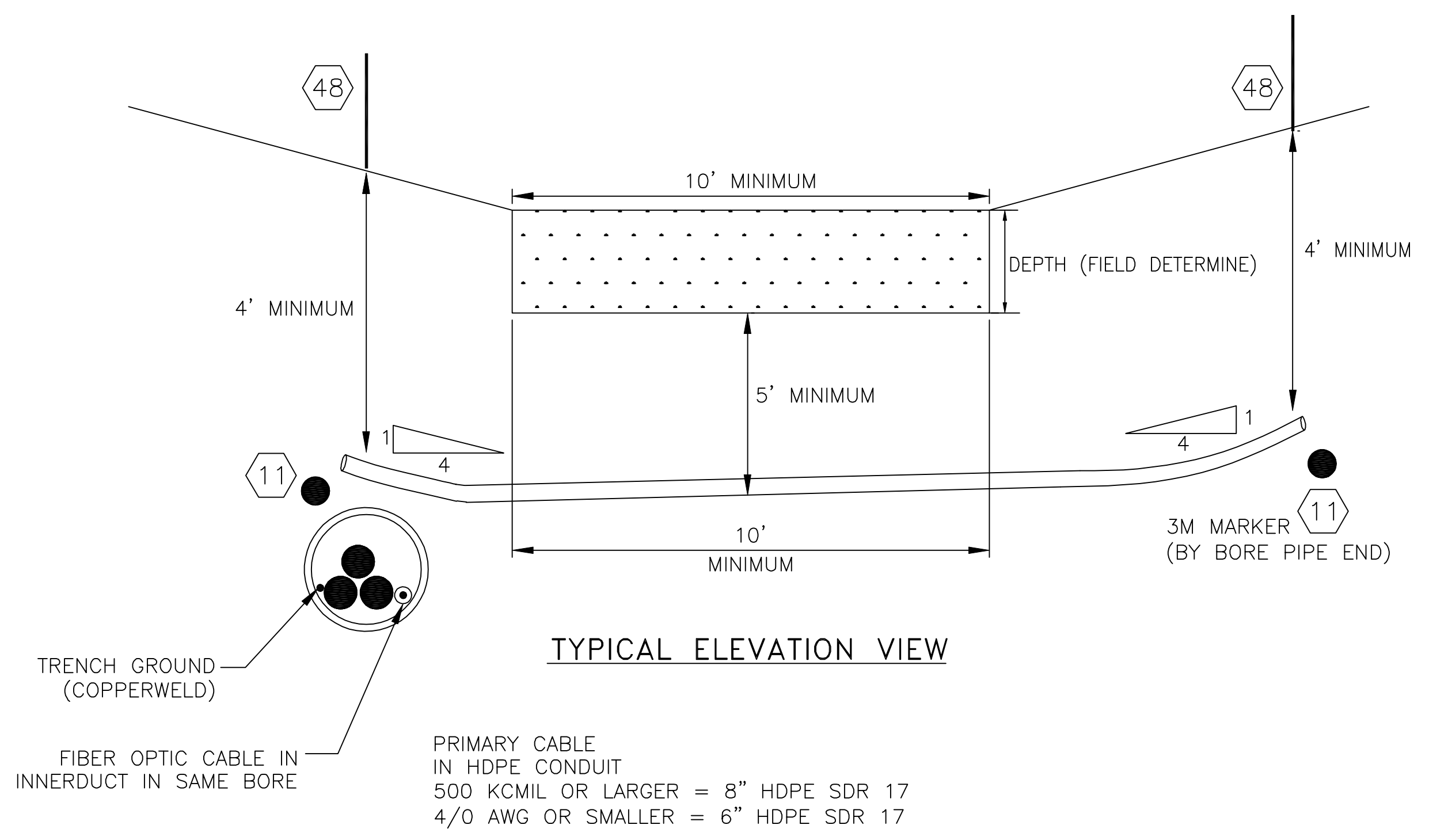
TR-05



TYPICAL PLAN VIEW

NOTES:

1. SOIL/RUN OFF CONTAMINATION OF WETLAND IS NOT ALLOWED.
2. RESTORE AND RE-SEED BORING PIT WITH APPROVED SEED MIX.
3. MAINTAIN SILT FENCE.
4. EXACT DEPTH OF BORE TBD BY OWNER/ENGINEER/ENVIRONMENTAL PERSONNEL ON SITE.
5. CONDUIT TO EXTEND LENGTH OF BORE.
6. FIBER AND PRIMARY CABLE ARE IN SAME BORE AND CONDUIT.
7. MATERIAL QUANTITY (CONDUIT) DETERMINED IN FIELD. HDPE OR AS APPROVED BY OWNER.
8. REFER TO CONTRACTOR FURNISHED FRAC-OUT PLAN FOR ADDITIONAL DETAILS.
9. RECORD GPS LOCATION OF START AND END OF BORING PIPE. MARK WITH 3M MARKER BALL. INSTALL BURIED CONDUIT MARKER AT R.O.W. EDGE/FENCE OR AS DIRECTED.
10. OBSERVE CABLE HANDLING REQUIREMENTS FOR PULLING CABLE IN BORES. (SEE SPECIFICATION AND/OR MANUFACTURER RECOMMENDATIONS.
11. REVIEW ROAD USE/CROSSING OR PERMIT AGREEMENTS PRIOR TO START OF WORK.
12. REFER TO DRAINAGE DITCH CROSSING AGREEMENT DOCUMENT FOR FURTHER INFORMATION.



TYPICAL ELEVATION VIEW

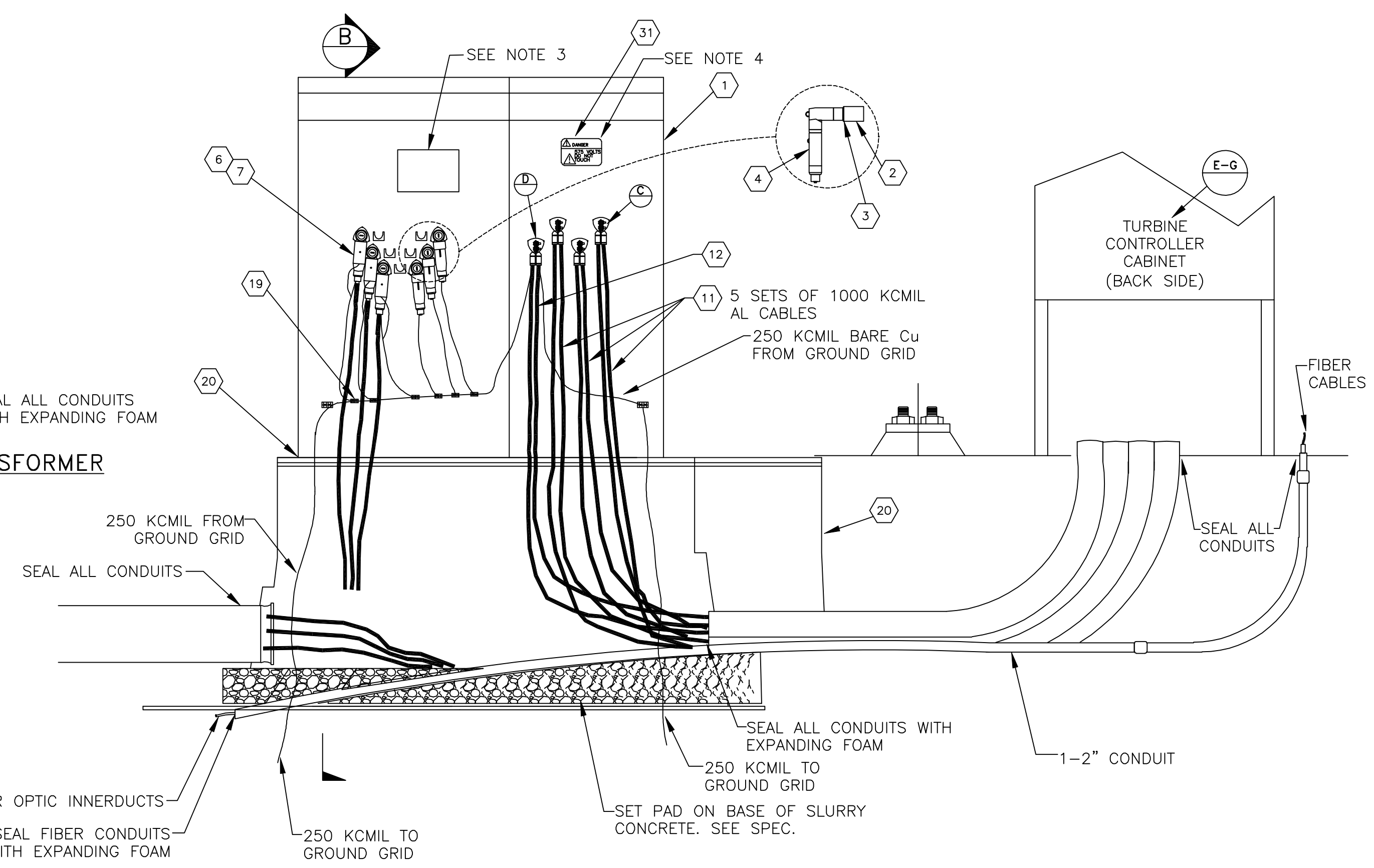
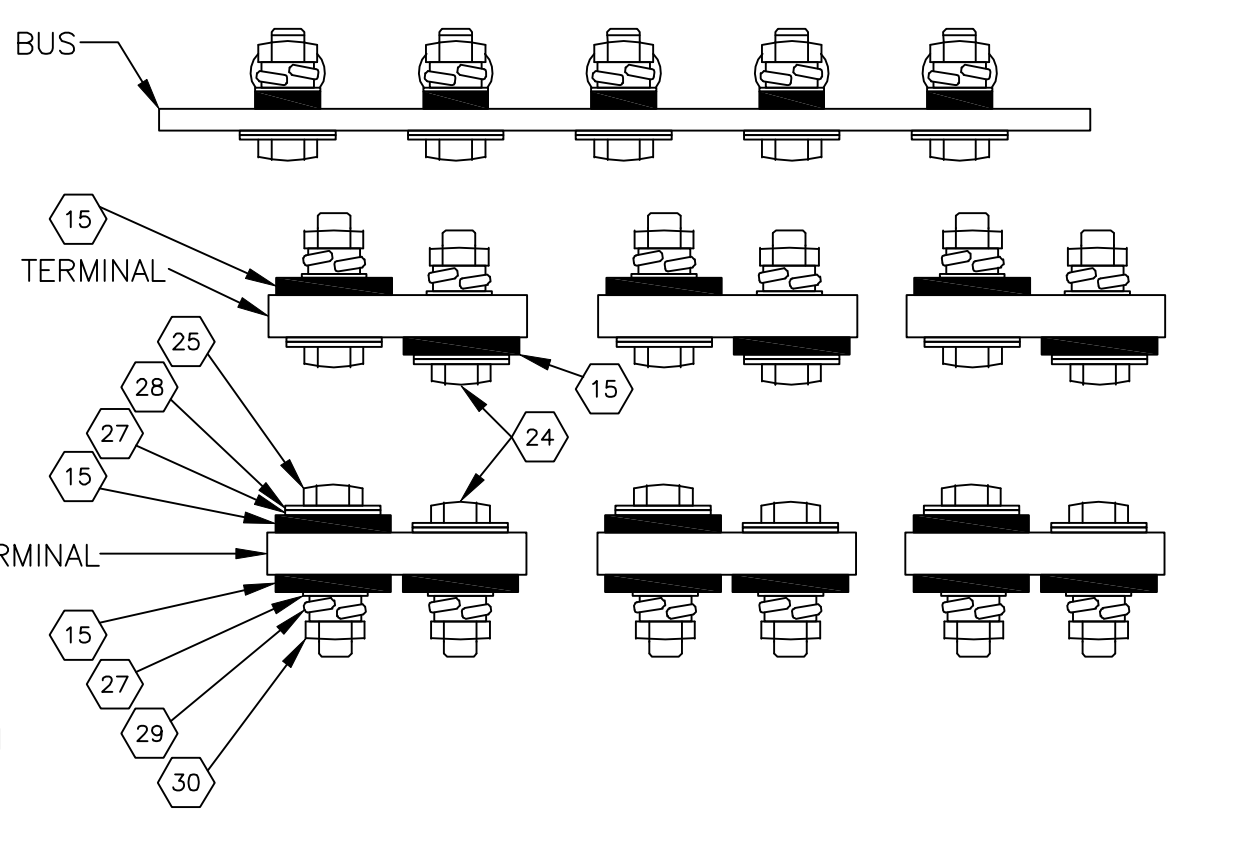
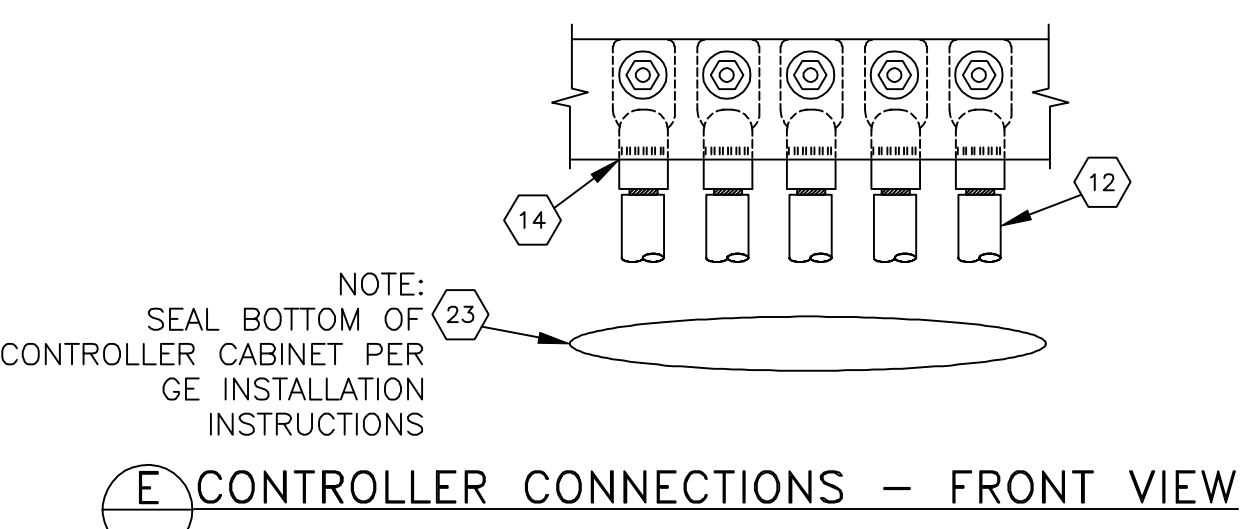
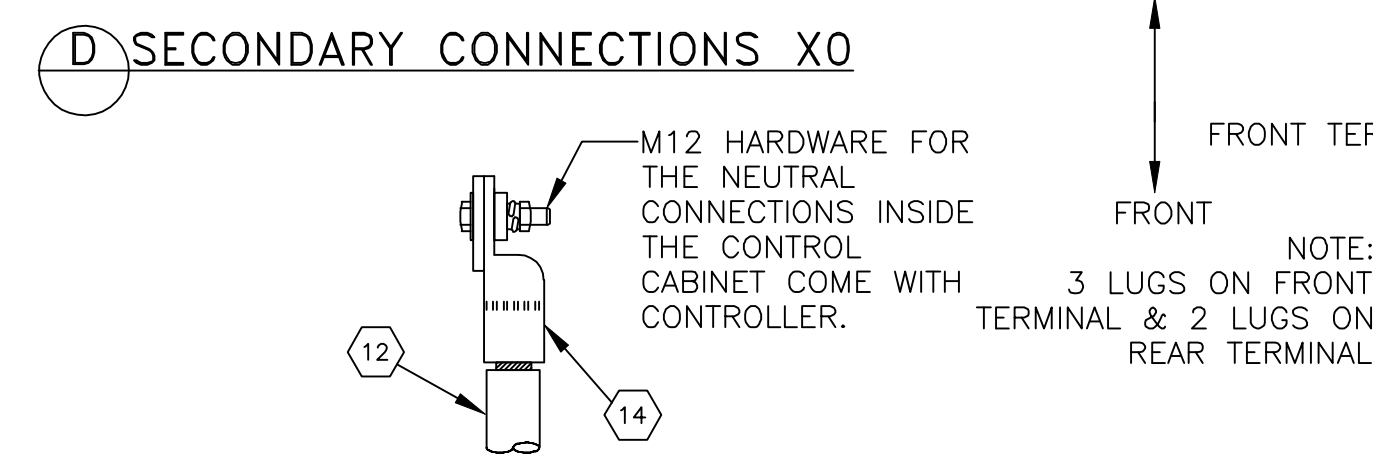
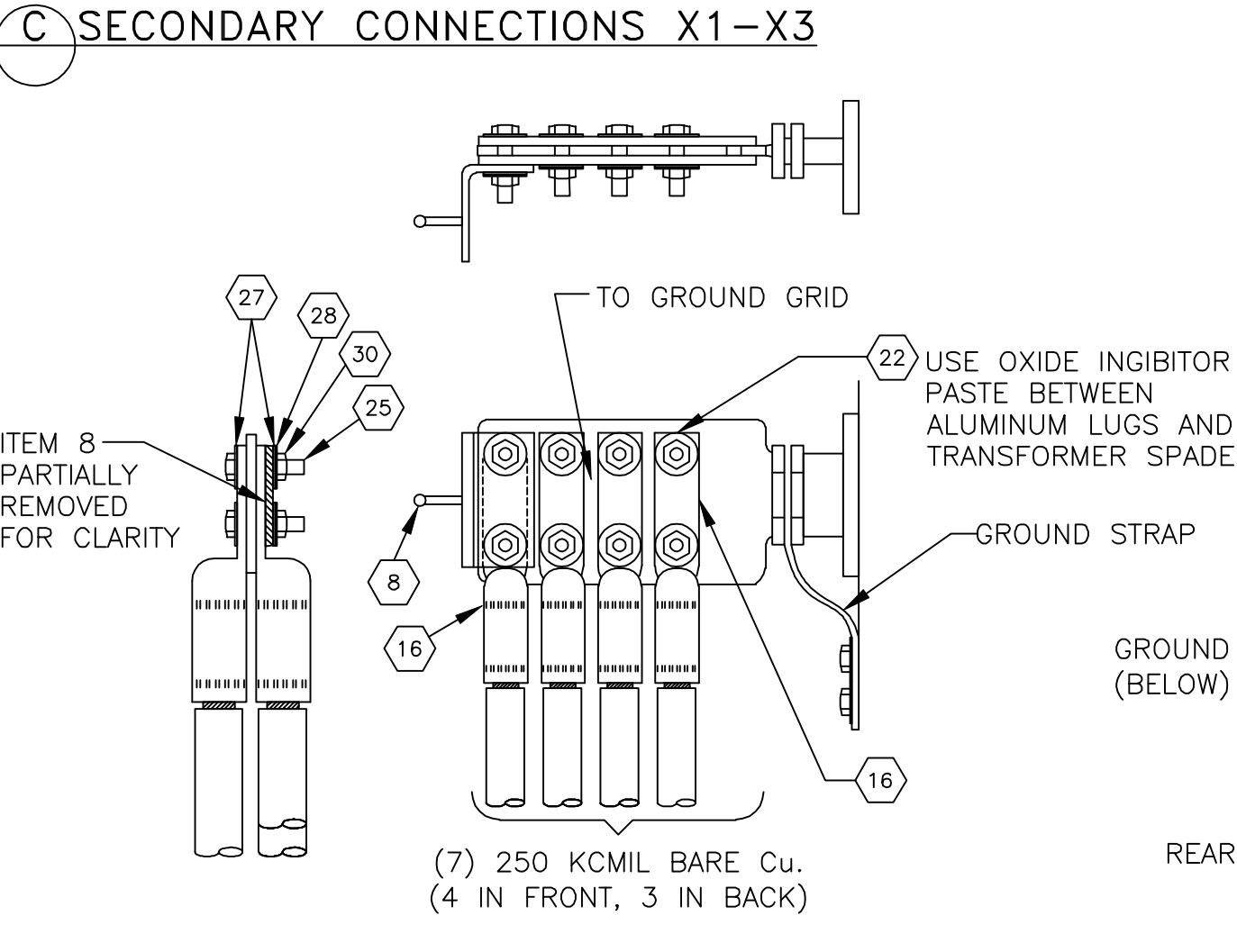
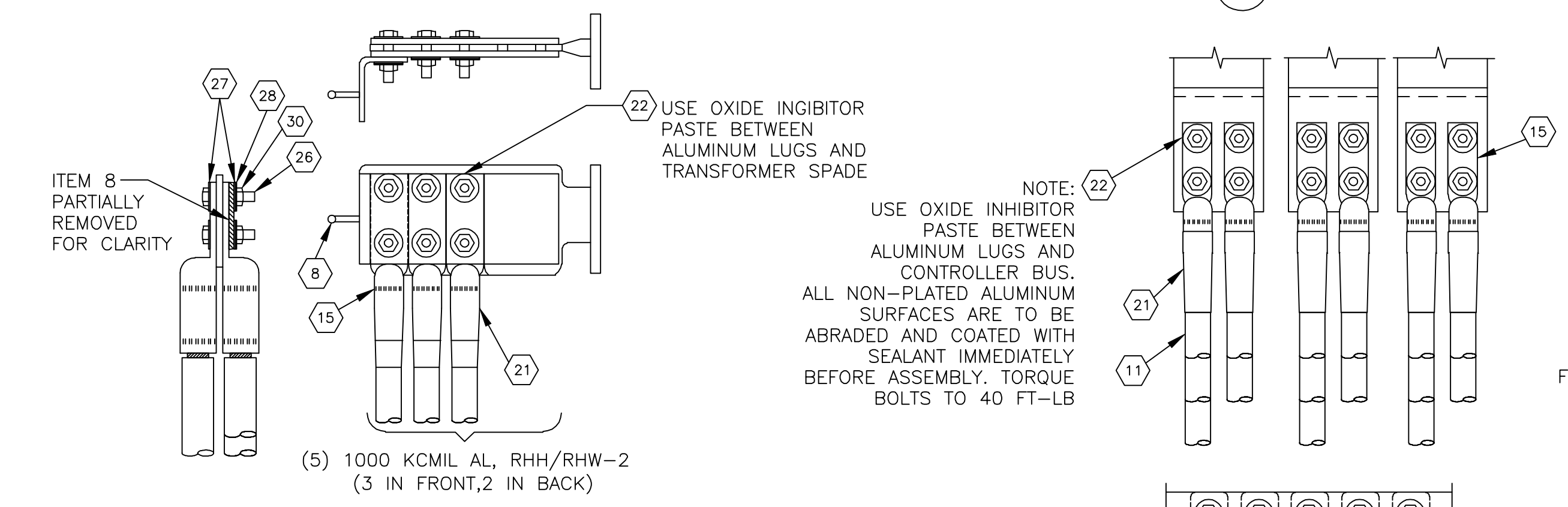
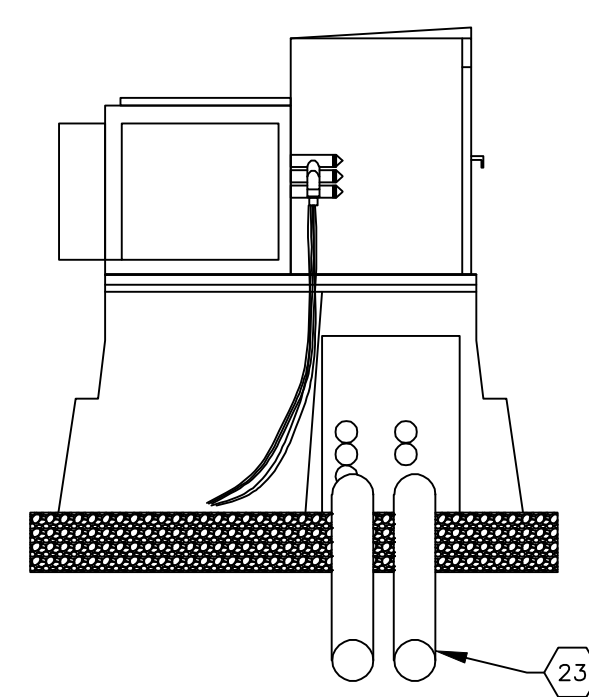
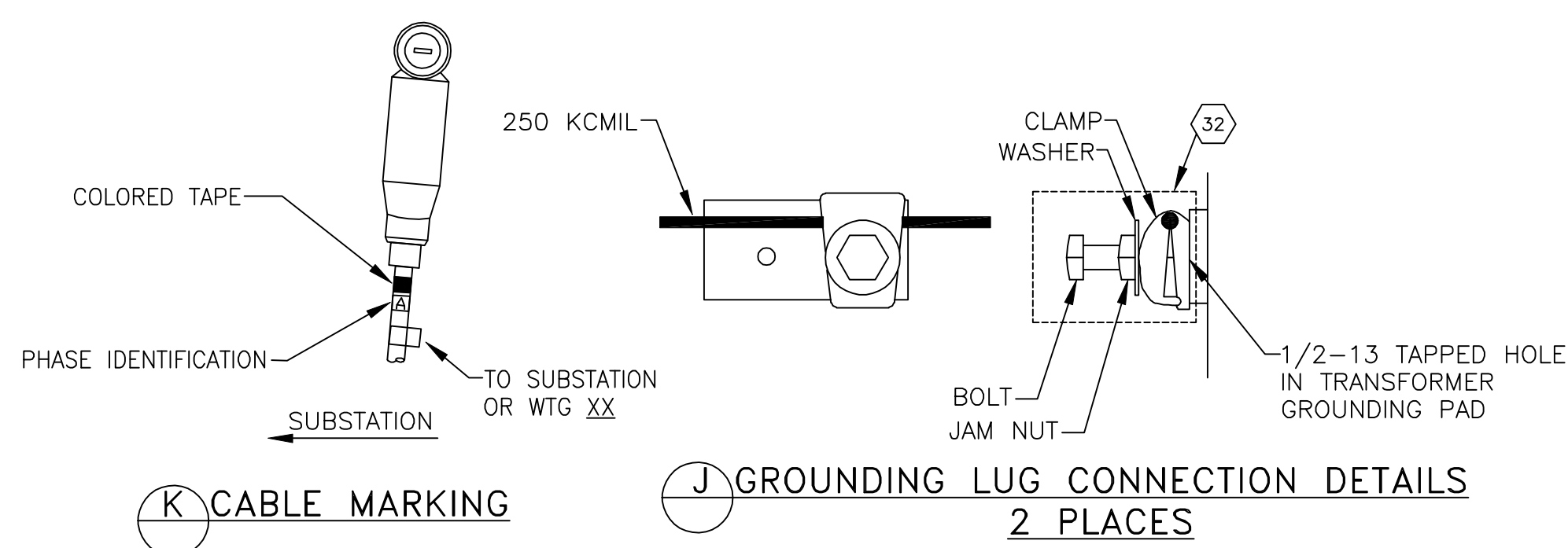
⊗ INDICATES ITEM # ON ELECTRICAL MATERIAL LIST. SEE DWG. TR-07.

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ITEM	QTY	UNIT	DESCRIPTION
1	1	EA	TRANSFORMER, 3PH PAD MTD, 12.47KV-690V, 1750 KVA
2			NOT USED
3			NOT USED
4	3	EA	ARRESTER, SURGE, 8.4 KV MCOV, ELBOW
5			NOT USED
6	3	EA	ELBOW, 200 AMP, 15KV, 220 MILS, WITH CABLE SEAL
7			NOT USED
8	4	EA	BALL STUD, GROUNDING, 25 MM BALL, WITH 90° 2 HOLE PAD
9			NOT USED
10	1	EA	CABLE CLEANING KIT
11	450	FT	WIRE, 1000 KCMIL AL, TYPE RHH RHW-2, 2 KV
12	150	FT	WIRE, 250 KCMIL BARE Cu.
13			NOT USED
14	5	EA	LUG, COMPRESSION, Cu, 1 HOLE, 250 KCMIL
15	30	EA	LUG, COMPRESSION, AL, 2 HOLE, 1000 KCMIL COMPACT
16	7	EA	LUG, COMPRESSION, Cu, 2 HOLE, 250 KCMIL
17			NOT USED
18			NOT USED
19	6	EA	CONNECTOR, COMP GND, 3/0-250 KCMIL TO #6-2/0
20	1	EA	CAULK, POLYURETHANE, 10 OZ CARTRIDGE
21	30	EA	LUG COVER, SECONDARY, COLD SHRINK, 0.95"-1.94" x 6"
22	0.25	EA	COMPOUND, OXIDE INHIBITOR, NO GRIT
23	1	EA	FOAM, DUCT SEALING, FIRE BLOCK, 24 OZ. CAN, 1800 CU. IN.
24	6	EA	BOLT, 18-8 OR 316 STAINLESS, 1/2"-13 x 2"
25	14	EA	BOLT, 18-8 OR 316 STAINLESS, 1/2"-13 x 2-1/2"
26	18	EA	BOLT, 18-8 OR 316 STAINLESS, 1/2"-13 x 3"
27	100	EA	WASHER, STAINLESS, FLAT, ROUND, 1/2", 1.375" OD, 0.125" TK
28	50	EA	WASHER, BELLEVILLE, STAINLESS, 1/2", 1.142" OD, 4700 LB
29	15	EA	WASHER, HELICAL SPRING LOCK, 18-8 OR 316 STAINLESS, 1/2" REGULAR, PER ASME B18.21.1
30	50	EA	NUT, 1/2" ALLOY 650 SILICON BRONZE
31	1	EA	LABEL, DANGER-690 VOLTS, PER SPECIFICATIONS
32	2	EA	LUG, TRANSFORMER GROUNDING, 2/0-250 KCMIL Cu. CLAMP WITH 3" BOLT, NUT, FLAT, AND LOCK WASHER.

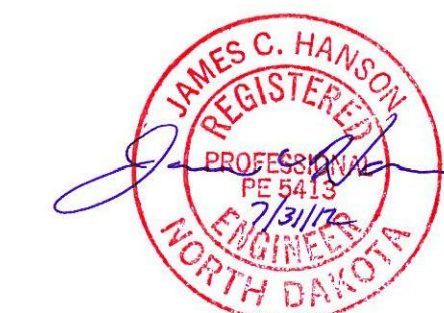
NOTES:

- MARK EACH CIRCUIT WITH DESTINATION.
 - MARK EACH CABLE WITH BOTH PHASE IDENTIFICATION AND COLOR. (SEE DETAIL K)
- | PHASE | PRIMARY | SECONDARY |
|-------|---------|-----------|
| A | BLACK | BROWN |
| B | RED | ORANGE |
| C | BLUE | YELLOW |
- WARNING LABEL WILL BE INSTALLED ON TRANSFORMER BY SUPPLIER. DO NOT ADD ANY LABELS UNLESS SPECIFICALLY DIRECTED BY OWNER'S SITE ELECTRICAL SUPERINTENDENT.
 - INSTALL DANGER LABEL PER SPECIFICATIONS ON BACK WALL OF SECONDARY COMPARTMENT.
 - ADD PIPE BOLLARDS (QTY 2) ON FIN/EXPOSED SIDE. BOLLARDS TO BE #4" RGS STEEL X 10'. SET 48" DEEP IN #12" CONCRETE. PAINT STEEL YELLOW.
 - GE 1.6 MW @ 0.95PF, 690V = 1409 AMPS, 281 AMPS PER CONVERTOR



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ITEM #	QTY	DESCRIPTION	MFG. & PART #	ITEM #	QTY	Description	MFG. & PART #
1	6	1/0 15 kV ELBOW WITH CABLE SEAL	COOPER LE215C09-SA2	24	18	1/2" - 13 X 3" STAINLESS STEEL BOLT, (FULLY THREADED)	
2	48,000'	1/0 (19X FS AL 15KV 0.220" EPR),6#14(LLDPE 1C CTO ICEA 1/3 NEUTRAL)	GENERAL CABLE	25	14	1/2" - 13 x 2 1/2" STAINLESS STEEL BOLT	
3	16,000'	WARNING TAPE		26	6	1/2" - 13 X 2" STAINLESS STEEL BOLT	
4	450'	1000 KCMIL AL RHH/RHW-2 2KV BLK 305M	GENERAL CABLE	27	50	1/2" STAINLESS STEEL BELLEVILLE WASHER	
5	750'	250KCMIL STR. COPPER, BARE, GROUNDING CONDUCTOR, 19 STRAND (600' FOR TURBINE GROUND GRID, 150' FOR TURBINE CONNECTION)	MISC	28	100	1/2" STAINLESS STEEL FLATWASHER	
6	3	8.4KV MCOV VARI-GAP ELBOW ARRESTER , 200A	COOPER 3238118C10M	29	50	1/2" STAINLESS STEEL LOCKWASHER	
7	0	4/0 15 KV COLD SHRINK TERMINATION KIT	3M 7642-S-2	30	50	1/2" SILICON BRONZE NUT	
8	9	1/0-AL SIL RUB SPLICE KIT	3M 5415A-1/0-AL	31	30	COLD SHRINK FOR 1000kcmil 2KV CABLE (0.95" - 1.94")	3M 8428-6
9	12	GROUNDING KIT,COLD SHRINK, CONCENTRIC NEUTRAL, #2-4/0 AL	3M 2252	32	1	WARNING/NOTICE SIGN - DANGER HIGH VOLTAGE	
10	12	5/8" x 10' COPPER WELD GROUND ROD	CHANGE C615803	33	2	BRONZE GROUND CLAMP, CABLE TO TRANSFORMER TANK (WITH 3" BRONZE HEX CAP SCREW)	
11	5	LOCATOR BALLS FOR CABLE SPLICE LOCATIONS	3M 1402-XR	34	5	COPPER COMPRESSION TERMINAL, 250 KCMIL Cu. TO 1-HOLE PAD	BURNDY YA29
12	1	PADMOUNT TRANSFORMER, 1750kVA, 12.47kV/690V		35	30	ALUMINUM COMPRESSION TERMINAL, 1000 kcmil AL TO 2-HOLE PAD	BURNDY YA44A3
13	1	NORDIC FIBERGLASS BOX PAD WITH CHUTE (82X80X36)	NORDIC FIBERGLASS GS-82-80-36RTCU1-MG-66x30	36	7	COPPER COMPRESSION TERMINAL, 250 kcmil CU TO 2-HOLE PAD	BURNDY YA29-2N
14				37	4	GROUNDING BALL STUD, WITH 90° OFFSET NEMA PAD	SALISBURY 21846
15	80'	1" PVC, SCHEDULE 40 CONDUIT (8-10' PIECES)	CARLON 49008-010	38	3	CABLE CLEANING KIT	3M CC-2
16	6	1" CONDUIT, 90° SWEEP,SCH 40 PVC,18" RADIUS	CARLON UA9CF	39	4	U-BOLT GROUND CLAMP CONNECTOR, 250 KCMIL Cu. TO #6 - #8 REBAR	BURNDY GAR1429
17	12	1" CONDUIT, SCH 40 PVC, COUPLING	CARLON E940F	40	25	COMPRESSION GROUND TAP "C" CONNECTORS 250 KCMIL TO 250 KCMIL	BURNDY YGHC29C29
18	60'	2" PVC, SCHEDULE 40 CONDUIT, (6-10' PIECES)	CARLON 49011-010	41	27	COMPRESSION GROUND TAP "C" CONNECTOR 250 KCMIL, Cu. TO CABLE NEUTRALS	BURNDY YGHC29C26
19	1	2" CONDUIT, 90° SWEEP,SCH 40 PVC,18" RADIUS	CARLON UA9CJ	42	4	M12-1.75 X 20mm, STAINLESS STEEL BOLT, DIN933	
20	4	2" CONDUIT, SCH 40 PVC, COUPLING	CARLON E940J	43	4	M12 STAINLESS STEEL LOCK WASHER DIN933	
21	50'	4" PVC, SCHEDULE 40 CONDUIT, (5-10' PIECES)	CARLON 49015-010	44	350'	#2 SOLID Cu. GROUND WIRE	
22	5	4" CONDUIT, 90° SWEEP,SCH 40 PVC,36" RADIUS	CARLON UA9FN	45	15	GROUND ROD CLAMP FOR 250 BARE Cu. TO 5/8" GROUND ROD	BURNDY YGHC29C29
23	12	4" CONDUIT, SCH 40 PVC, BELL END	CARLON E997N	46	1	10 OZ. CARTRIDGE POLYURETHANE CAULK	SIKAFLEX 1A
				47	1	24 OZ. CAN DUCT SEALING FOAM	
				48		AS REQ'D CABLE MARKER 66" LONG TRVIEW WITH DECALS	RHINO TVF66RB



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CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY DEVILS LAKE

STATE NORTH DAKOTA

ISSUE DATES

CD	CONSTRUCTION DOCUMENTS	31 JUL 2012
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PROJECT NO: 20112552

DRAWN BY: CEG

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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM MATERIAL LIST

TR-07

CLIENT

LAKE REGION STATE COLLEGE

PROJECT DESCRIPTION

LRSC 1.6 MW WIND TURBINE PROJECT

CITY **DEVILS LAKE**

STATE **NORTH DAKOTA**

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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM SPREAD FOOTING CONDUIT DETAILS

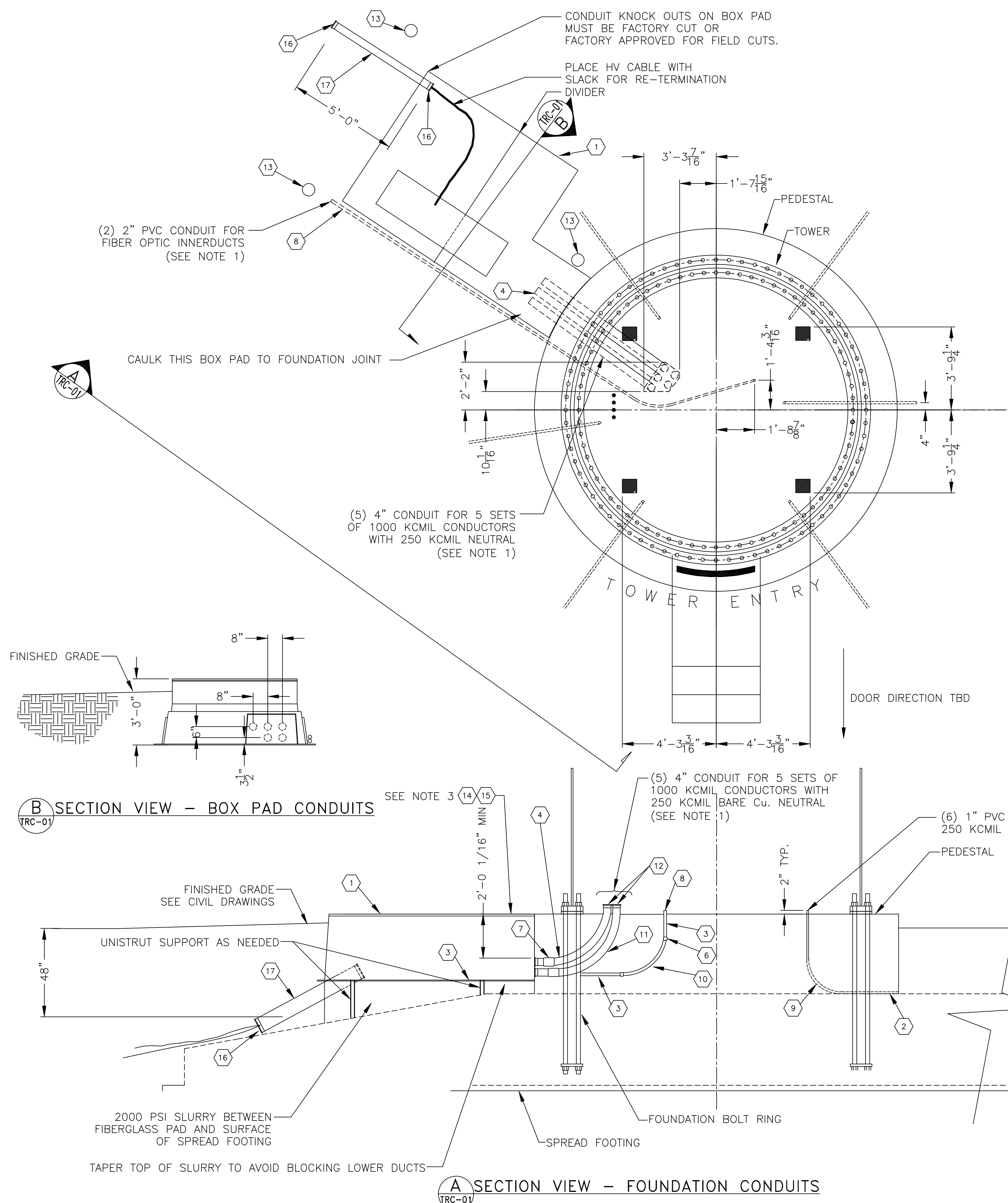
TRC-01

MATERIAL LIST

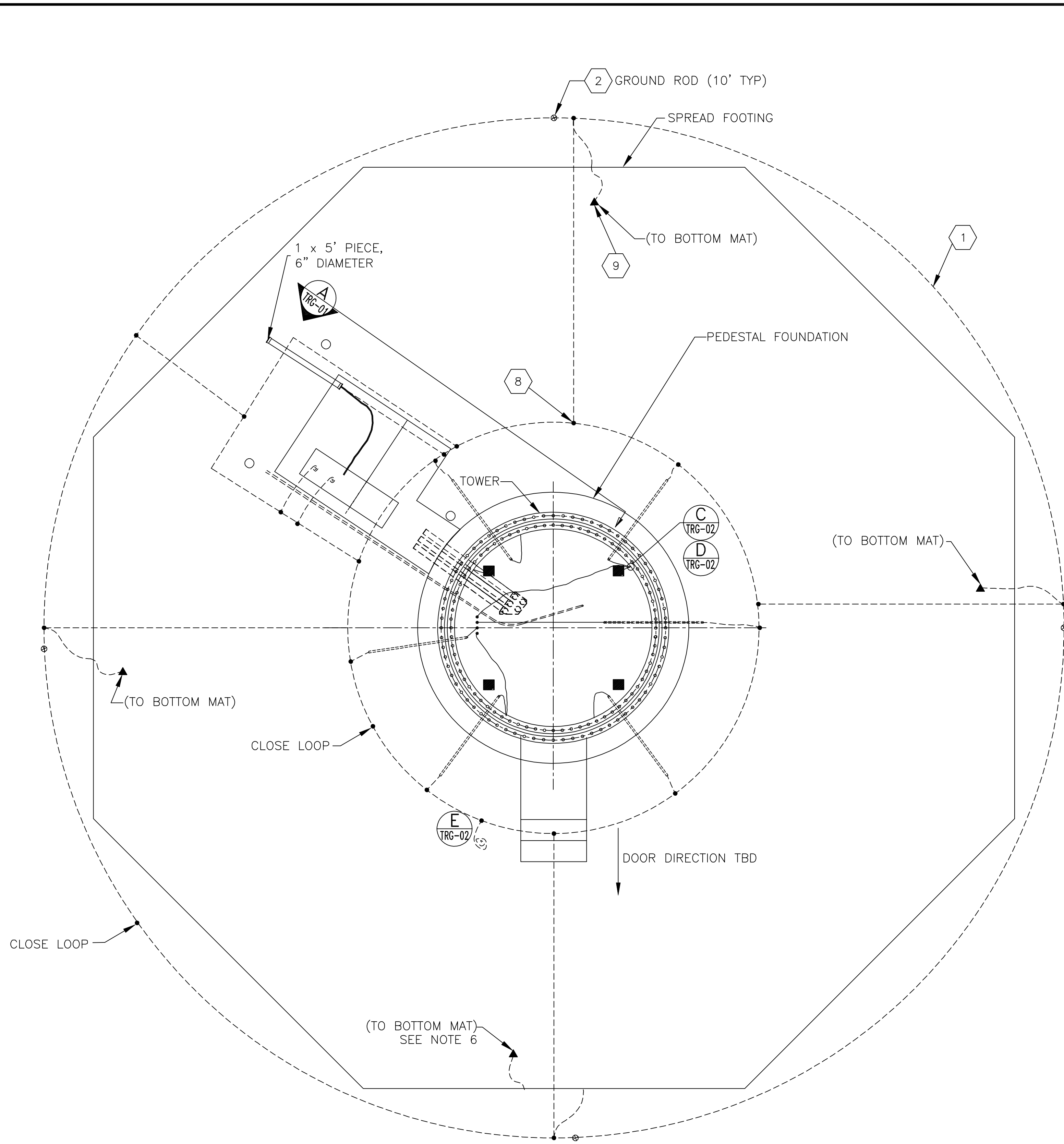
ITEM	QTY	UNIT	DESCRIPTION
1	1	EA	PAD, BOX, PREFORMED, FOR 1750 KVA TRANSFORMER CONCAST AS REQUIRED FOR TRANSFORMER WEIGHT, DIMENSION
2	6	EA	CONDUIT, PVC, SCH. 40, 1" x 10' LENGTH
3	4	EA	CONDUIT, PVC, SCH. 40, 2" x 10' LENGTH
4	5	EA	CONDUIT, PVC, SCH. 40, 4" x 10' LENGTH
5	12	EA	COUPLING, 1" PVC, SCH. 40
6	3	EA	COUPLING, 2" PVC, SCH. 40
7	7	EA	COUPLING, 4" PVC, SCH. 40
8	2	EA	BELL END, PVC, SCH. 40, 2"
9	6	EA	SWEEP, 90°, PVC, SCH. 40, 1", 18" R.
10	1	EA	SWEEP, 90°, PVC, SCH. 40, 2", 18" R.
11	5	EA	SWEEP, 90°, PVC, SCH. 40, 4", 36" R.
12	10	EA	BELL END, PVC, SCH. 40, 4"
13	2	EA	7" x 72" BOLLARD, SCH 40 PVC, COVER WITH YELLOW, INNOPLAST B53-35H-011 HDPE POST COVER OR EQUAL
14	0.25	EA	FOAM, DUCT SEALING FIRE BLOCK, 24OZ. CAN, 1800 Cu. IN
15	0.5	EA	CAULK, POLYURETHANE, 10 OZ. CARTRIDGE
16	2	EA	BELL END PVC SCH 40, 6"
17	1	EA	CONDUIT, PVC, SCH 40, 6" X 5' LENGTH (USE 1-10' PIECE CUT IN HALF)

NOTES:

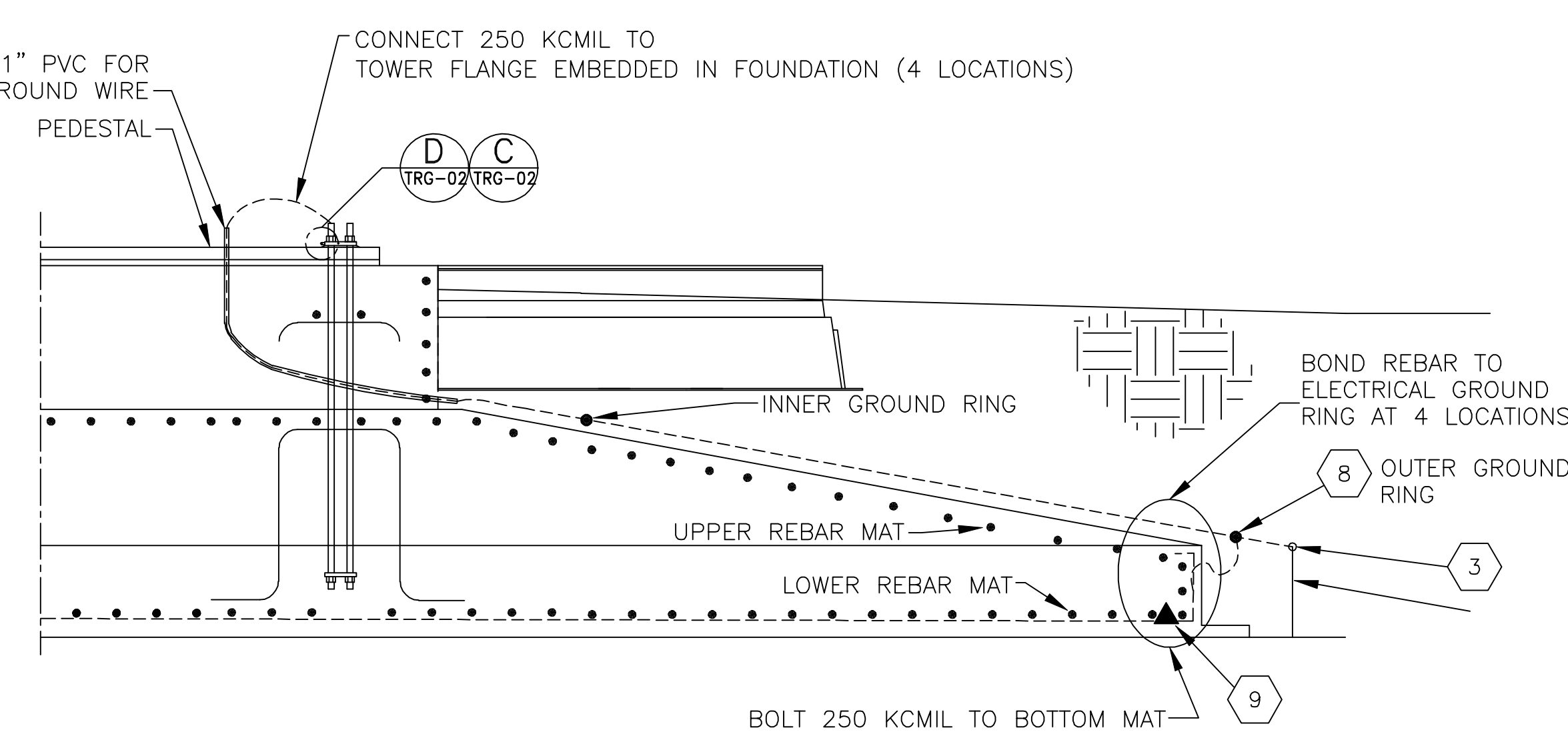
- INSTALL END CAPS ON ALL CONDUITS BEFORE CONCRETE POURS. USE CARLON E958N OR EQUAL FOR 4" CONDUIT. USE CARLON E985J OR EQUAL FOR 2" CONDUIT. REPLACE WITH END BELLS, ITEM #12 ON 4" CONDUITS, BEFORE INSTALLING CABLES.
- ENT CONDUIT FOR CONTROLLER LEG GROUNDS.
- SEAL BETWEEN PAD AND TURBINE. ABOVE GRADE USE ITEM #15-CAULK. BELOW GRADE USE ITEM #14-FOAM.
- (X) INDICATES ITEM # ON MATERIAL LIST THIS SHEET.
- LOCATION PER GE TECH SPEC. FOUNDATIONS, PART IV OF V, ELECTRICAL GROUNDING AND CONDUIT, REV F, FIG. 13.



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MATERIAL LIST			
ITEM	QTY	UNIT	DESCRIPTION
1	525	FT	WIRE, 250 KCMIL STR COPPER, SD, BARE
2	4	EA	ROD, GROUND, 5/8" x 10', COPPERWELD
3	4	EA	5/8" GROUND ROD TO 250 KCMIL CONNECTOR
4			NOT USED
5	4	EA	BOLT, 18-8 OR 316 STAINLESS, M12-1.75 x 20mm, DIN 933
6	6	EA	CONNECTOR, 250 KCMIL Cu. TO 1-HOLE PAD
7	4	EA	WASHER, SPLIT LOCK, 18-8 STAINLESS, M12, DIN 933
8	25	EA	CONNECTOR, COMP GND, 250KCMIL TO 250KCMIL
9	4	EA	CONNECTOR, BOLTED GND, #2/0-250 KCMIL TO #8 REBAR



A SECTION VIEW – FOUNDATION GROUNDING

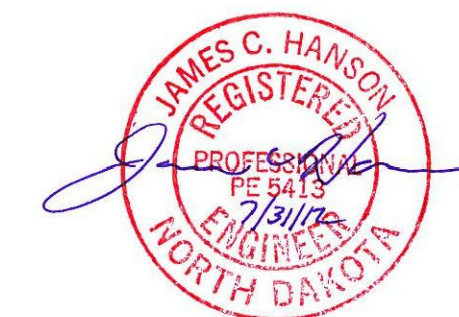
- NOTES:**
1. ALL GROUNDING CONDUCTOR SHALL BE 250 KCMIL BARE STRANDED COPPER WIRE UNLESS SPECIFIED OTHERWISE.
 2. GROUND RODS SHALL BE COPPER CLAD STEEL 5/8" DIAMETER BY 10'.
 3. ALL BELOW AND ABOVE GRADE CONNECTIONS SHALL BE COMPRESSION UNLESS SPECIFIED OTHERWISE.
 4. GROUND GRID RESISTANCE SHALL BE MEASURED AND RECORDED. RESISTANCE SHALL BE MEASURED USING THE FALL-OF-POTENTIAL METHOD BEFORE CONNECTING CABLE NEUTRALS. (SEE SPECIFICATIONS)
 5. LEAVE TRANSFORMER GROUND TAILS LONG ENOUGH TO CONNECT CONCENTRIC NEUTRALS. SEE TRANSFORMER DRAWING (TR-06).
 6. ON BOTTOM CONNECTION USE 4 DIFFERENT PIECES OF REBAR WHICH EXTEND OVER ENTIRE BASE.

- LEGEND**
- ⊗ GROUND ROD
 - COMP GND CONNECTOR
 - ▲ BOLTED GROUND CONNECTOR

SCALE: 1/4"=1'-0"

THIS LINE IS ONE INCH WHEN DRAWING IS FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY.

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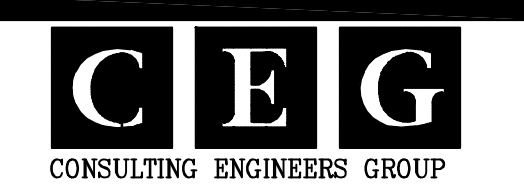


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DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM SPREAD FOOTING WTG GROUNDING DETAILS

TRG-01

CLIENT

LAKE REGION STATE COLLEGE

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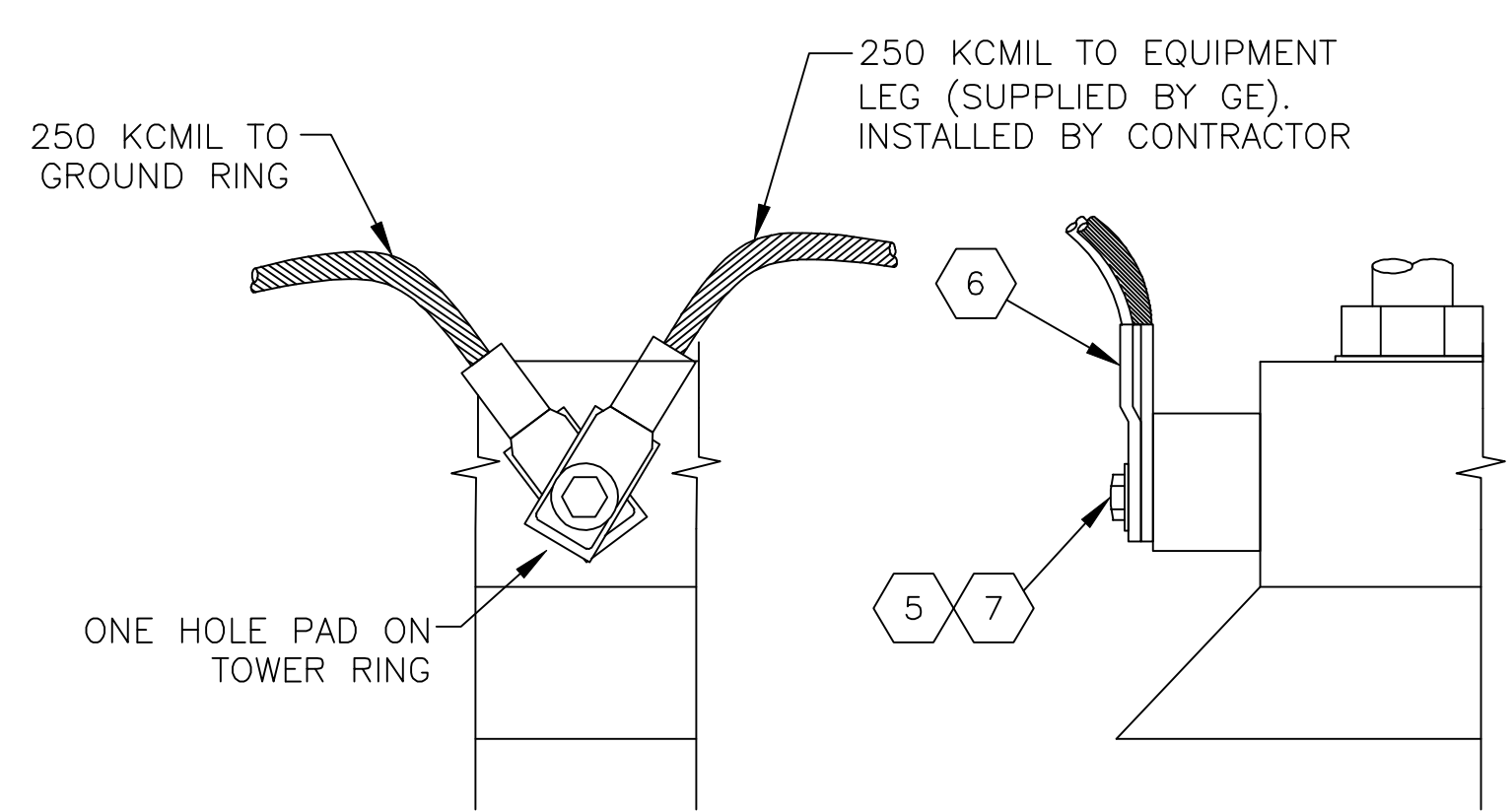
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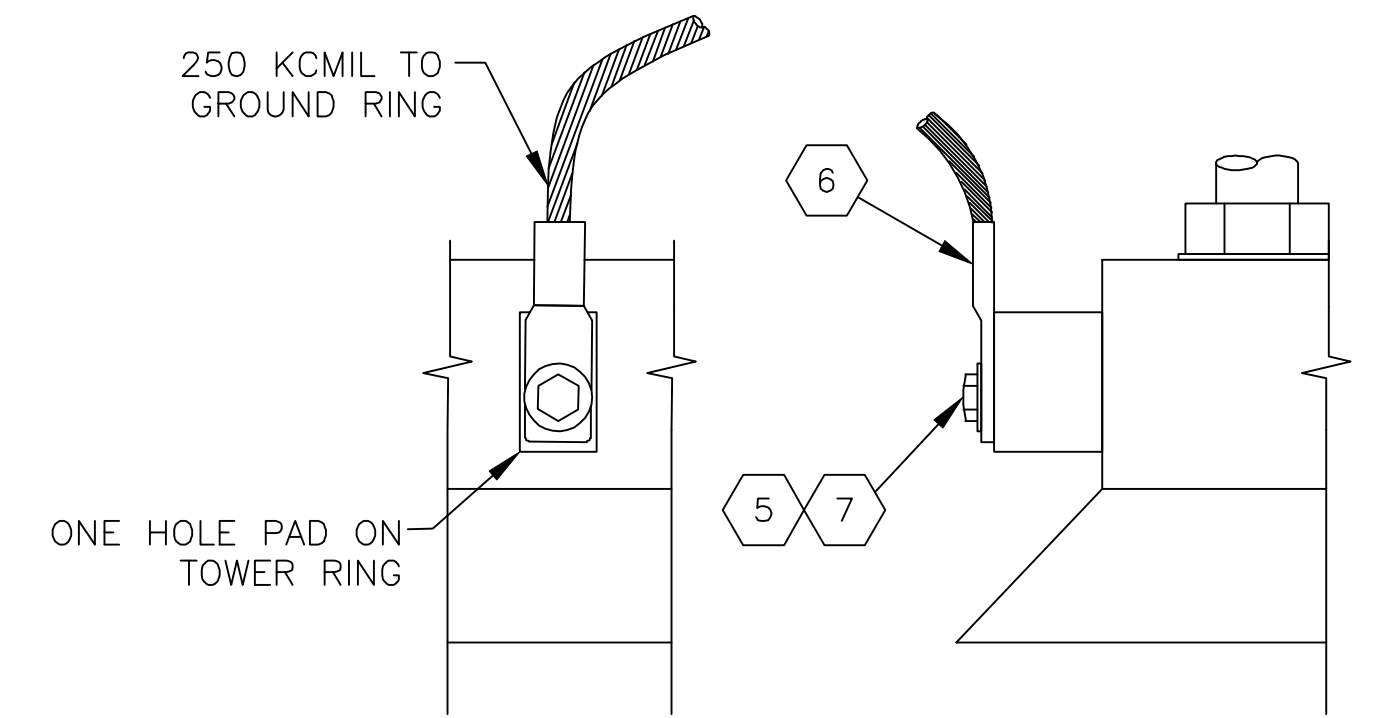
DRAWING TITLE

GE 1.6MW TURBINE COLLECTION SYSTEM WTG GROUNDING DETAILS

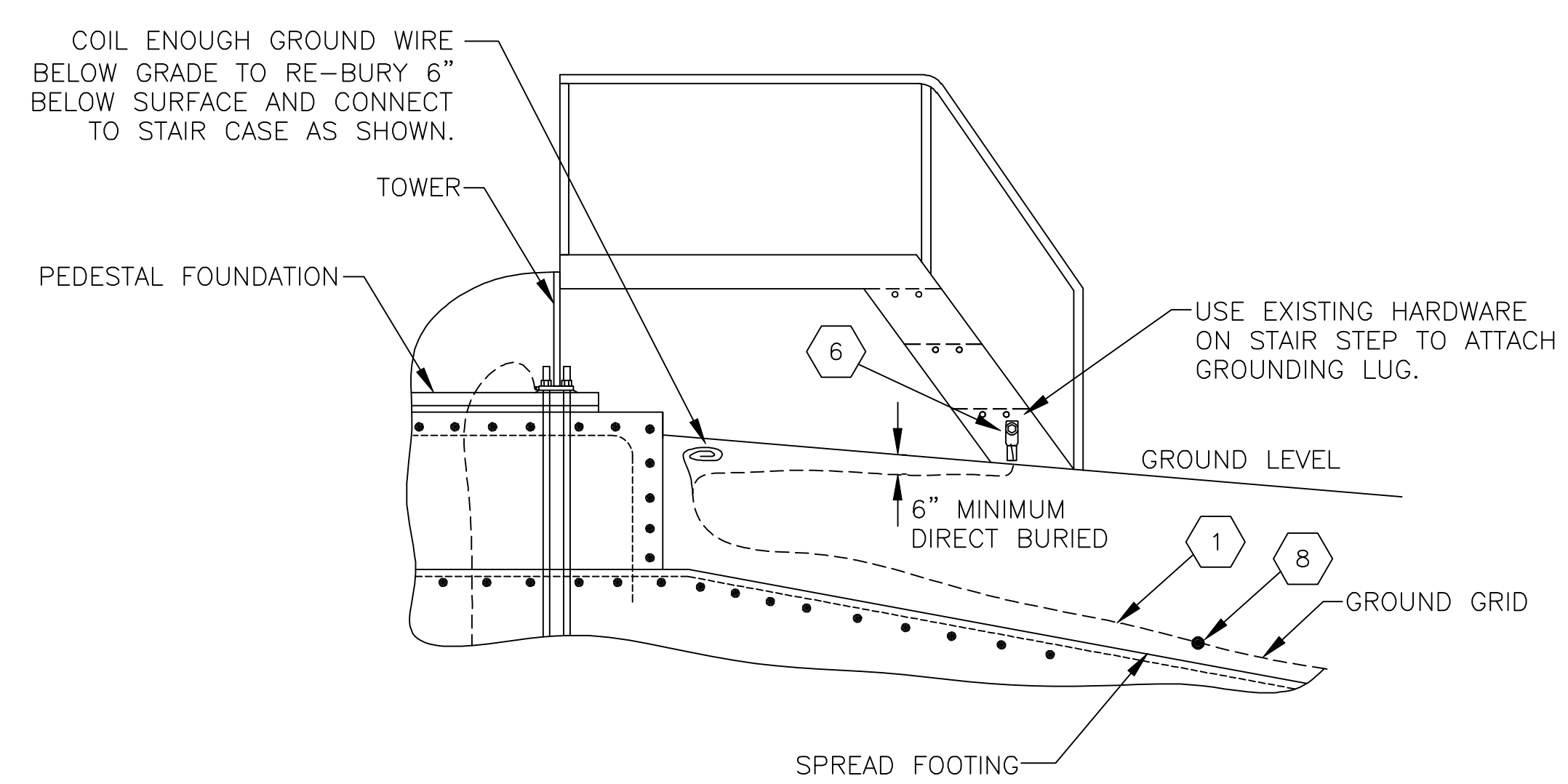
TRG-02



C TOWER & EQUIPMENT GROUNDING DETAIL
TRG-01 TYPICAL 2 PLACES



D TOWER GROUNDING DETAIL
TRG-01 TYPICAL 2 PLACES



E STAIR GROUNDING DETAIL
TRG-01

NOTES:

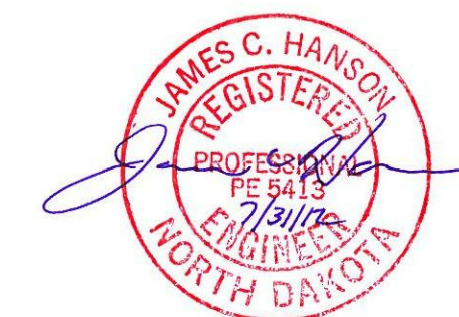
1. ALL GROUNDING CONDUCTOR SHALL BE 250 KC MIL AWG BARE STRANDED COPPER WIRE UNLESS SPECIFIED OTHERWISE.
2. GROUND RODS SHALL BE COPPER CLAD STEEL 5/8" DIAMETER BY 10'.
3. ALL BELOW AND ABOVE GRADE CONNECTIONS SHALL BE COMPRESSION UNLESS SPECIFIED OTHERWISE.
4. GROUND GRID RESISTANCE SHALL BE MEASURED. RESISTANCE SHALL BE MEASURED USING THE FALL-OF-POTENTIAL METHOD BEFORE CONNECTING CABLE NEUTRALS. (SEE SPECIFICATIONS)
5. LEAVE TRANSFORMER GROUND TAILS LONG ENOUGH TO CONNECT CONCENTRIC NEUTRALS. SEE TRANSFORMER DRAWING.

LEGEND

- ⊗ GROUND ROD
- COMP GND CROSS CONNECTOR
- ▲ BOLTED GND CONNECTOR
- COMP GND CONNECTOR
- + EXOTHERMIC WELD
- # PART # ON TRG-01

SCALE: 1/4"=1'-0"

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