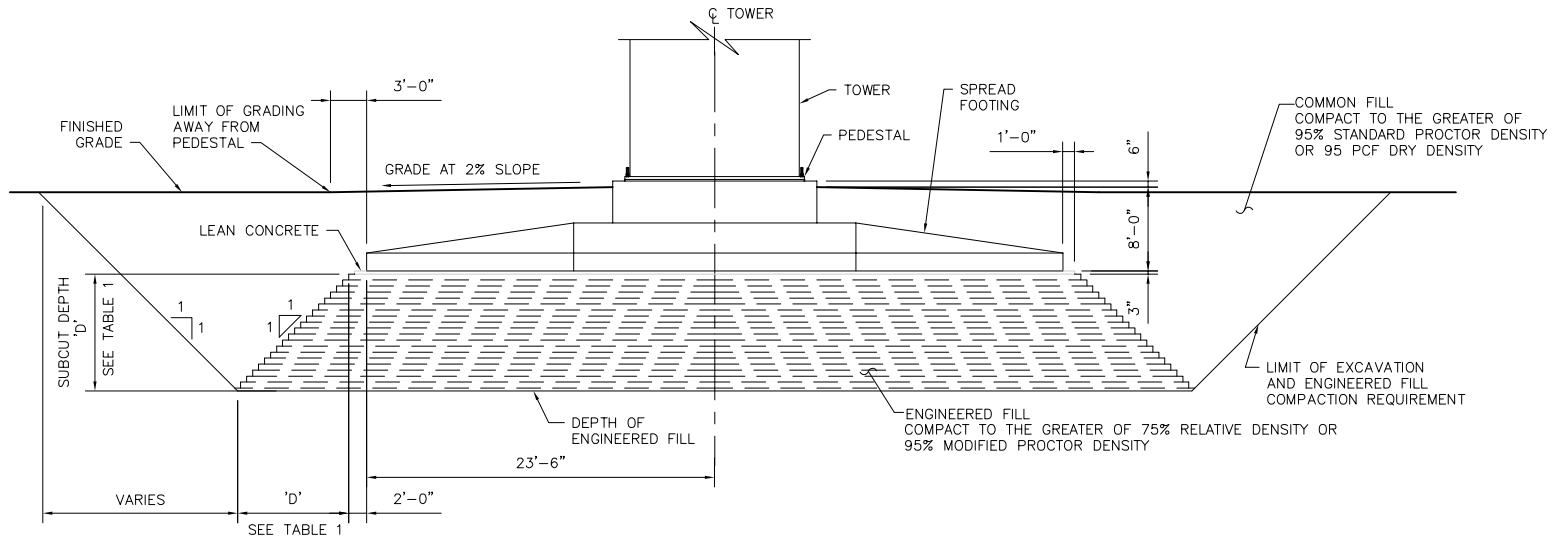
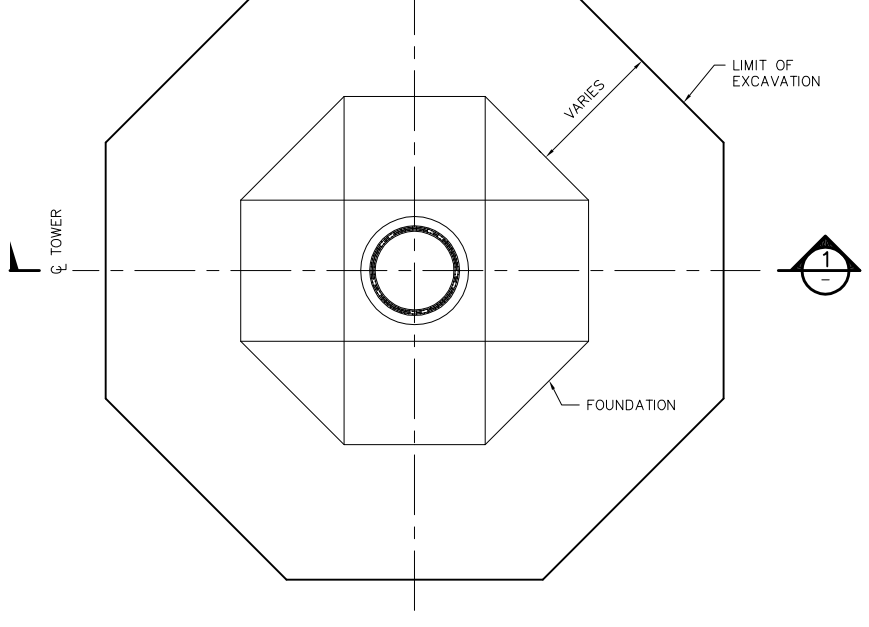


1 – SECTION: SUBCUT SOIL CORRECTION
N.T.S.



2 – PLAN: SUBCUT SOIL CORRECTION
N.T.S.

TABLE 1: POSSIBLE TURBINE LOCATIONS REQUIRING OVER–EXCAVATION

BOREHOLE LOCATION	ESTIMATED EXCAVATION DEPTH (FT)	ESTIMATED SUBCUT DEPTH (FT)
T–01A	14	6
T–16	15	7
T–31	13.5	5.5
T–37	13.5	5.5

1.0 SUBGRADE SOIL CORRECTION

A. GENERAL

1. ENSURE FOUNDATION SITE IS EXCAVATED, BACKFILLED AND GRADED IN ACCORDANCE WITH THIS DRAWING AND DRAWING S–02.

2. SUBCUT AND REPLACE WITH ENGINEERED FILL AS REQUIRED BASED ON PROOF ROLL TEST AS DESCRIBED IN SECTION 1.0.D.6 OF DRAWING S–02.

3. THE MAXIMUM AND MINIMUM INDEX DENSITIES OF SOILS TO BE USED AS ENGINEERED FILLS SHALL BE MEASURED ACCORDING TO ASTM D4253 AND D4254 PRIOR TO THE MATERIALS BEING PLACED.

4. THE MODIFIED PROCTOR DENSITY OF SOILS TO BE USED AS ENGINEERED FILL SHALL BE MEASURED ACCORDING TO ASTM D1557 PRIOR TO THE MATERIALS BEING PLACED.

B. SUBMITTALS

1. SUBMIT GRAIN SIZE ANALYSIS, NATURAL MOISTURE CONTENT, MAXIMUM AND MINIMUM INDEX DENSITY, AND MODIFIED PROCTOR DENSITY TEST RESULTS FOR SOILS TO BE USED AS ENGINEERED FILL.

2. SUBMIT COMPACTION TEST RESULTS FOR ENGINEERED FILL PLACED BENEATH THE FOUNDATION INDICATING LOCATION OF TEST, DRY DENSITY AND MOISTURE CONTENT OF PLACED ENGINEERED FILL.

3. SUBMIT COMPACTION TEST RESULTS FOR COMMON FILL PLACED OVER FOUNDATION IN ACCORDANCE WITH DRAWING S–02.

4. SUBMIT SUBGRADE INSPECTION REPORT FOR EACH FOUNDATION COMPLETED BY A GEOTECHNICAL ENGINEER.

C. PRODUCTS

1. **ENGINEERED FILL:** NON–EXPANSIVE GRANULAR SOIL CONSISTING OF GRAVEL, SAND OR CRUSHED STONE HAVING A MAXIMUM PARTICLE SIZE OF 1½" AND LESS THAN 10% PASSING THE NO. 200 SIEVE.

2. **LEAN CONCRETE:** CONTAINING ASTM C150, TYPE II CEMENT, 28 DAY COMPRESSIVE STRENGTH GREATER THAN 1000 PSI.

3. **COMMON FILL:** SHALL CONSIST OF SUITABLE MATERIALS EXCAVATED FROM THE FOUNDATION SITE. ELASTIC SILT IS NOT CONSIDERED A SUITABLE MATERIAL. MATERIALS BACKFILLED WITHIN 1 FOOT OF THE PEDESTAL SHALL BE FINE MATERIAL WITH A PARTICLE SIZE NO GREATER THAN 3". MATERIALS BACKFILLED OUTSIDE THIS AREA MAY CONSIST OF ALL OTHER EXCAVATED MATERIALS PROVIDED THEY CAN MEET THE COMPACTION REQUIREMENTS. ALL BACKFILL MUST BE PLACED USING METHODS THAT WILL PREVENT VOIDS FROM OCCURRING.

D. EXECUTION

1. SCRAPE TOPSOIL FROM THE PLAN AREA AND STORE IN AN OWNER DESIGNATED AREA. THE TOPSOIL WILL BE RE–USED FOR SITE RESTORATION.

2. WHERE SOFT SOILS ARE ENCOUNTERED, PERFORM SUBGRADE CORRECTION BY SUBCUTTING DEFICIENT SOILS AND REPLACING WITH COMPACTED ENGINEERED FILL.

3. FOR TURBINE SITES WHERE SOFT SOILS ARE ENCOUNTERED, SUBCUT THE DEFICIENT SOIL ACCORDING TO THE LIMITS SHOWN IN SECTION 1. POSSIBLE TURBINE SITES REQUIRING OVER–EXCAVATION ARE SHOWN IN TABLE 1. HAVE THE PROJECT GEOTECHNICAL ENGINEER VERIFY THE DEPTH OF SUBCUT AT THE TIME OF EXCAVATION AND PREPARE A LETTER REPORT INDICATING THE APPROVED DEPTH OF SUBCUT.

4. CONTROL SURFACE WATER OR GROUNDWATER FLOWS INTO THE EXCAVATION USING MEANS DETERMINED BY THE CONTRACTOR. IF SUCH MEANS ARE EMPLOYED, RECORD THE MEANS UNDERTAKEN, SOURCE OF WATER (GROUND OR SURFACE), AND VOLUME OF WATER CONTROLLED. SUBMIT A DEWATERING RECORD TO THE FOUNDATION ENGINEER.

5. **ENGINEERED FILL PLACEMENT AND COMPACTION.** PLACE AND COMPACT ENGINEERED FILL TO THE LIMITS, DEPTH AND DENSITY INDICATED IN SECTION 1. PLACE AN INITIAL LIFT OF ENGINEERED FILL IMMEDIATELY AFTER COMPLETION OF THE EXCAVATION AND APPROVAL BY THE GEOTECHNICAL ENGINEER. PLACE ENGINEERED FILL IN LOOSE LIFTS OF 8 INCHES OR LESS TO ACHIEVE THE SPECIFIED DENSITY.

6. FOR PROTECTION OF THE SUBGRADE SOILS AND ESTABLISHMENT OF A WORKING SURFACE, PLACE LEAN CONCRETE FILL TO THE LINES AND LEVELS INDICATED ON THE DRAWING.

7. **COMMON FILL PLACEMENT AND COMPACTION.** PLACE AND COMPACT COMMON FILL TO THE LIMITS, DEPTH AND DRY DENSITY INDICATED IN SECTION 1. PLACE FILL IN LOOSE LIFTS OF 12 INCHES OR LESS TO ACHIEVE THE SPECIFIED MINIMUM DENSITY. BACKFILL MAY BE PLACED WHEN THE FOOTING AND PEDESTAL HAVE REACHED A COMPRESSIVE STRENGTH OF 2000 PSI.

8. GRADE THE SITE IN ACCORDANCE WITH DRAWINGS TO PREVENT WATER FROM PONDING OVER THE FOUNDATION WHILE MAINTAINING AT LEAST THE MINIMUM DEPTH OF FILL SPECIFIED ON THE DRAWINGS.

9. RESTORE THE SITE IN ACCORDANCE WITH OWNER REQUIREMENTS.

E. TESTING AND INSPECTION

1. **FOR EVERY 2,500 CUBIC YARDS OF ENGINEERED FILL PLACED,** OBTAIN SAMPLES OF ENGINEERED FILL MATERIALS AND PERFORM GRAIN SIZE ANALYSIS, MOISTURE CONTENT, AND RELATIVE AND PROCTOR DENSITY TESTS.

2. **FOR EVERY 1000 CUBIC YARDS OF COMMON FILL PLACED,** OBTAIN SAMPLES OF COMMON FILL MATERIALS AND PERFORM GRAIN SIZE ANALYSIS, MOISTURE CONTENT, AND PROCTOR DENSITY TESTS.

3. FOR ENGINEERED FILL PROVIDE TWO DENSITY TESTS PER LIFT INDICATING TEST LOCATION, DRY DENSITY AND MOISTURE CONTENT. IN THE EVENT THAT THE DENSITY REQUIREMENT IS NOT ACHIEVED, RECOMPACT AND RETEST THE ENGINEERED FILL.
4. FOR COMMON FILL, PROVIDE ONE DENSITY TEST PER LIFT INDICATING TEST LOCATION, DRY DENSITY AND MOISTURE CONTENT.
5. PROVIDE A SUBGRADE INSPECTION REPORT COMPLETED BY A GEOTECHNICAL ENGINEER.

JOEL E. BAHMA REGISTERED PROFESSIONAL PE 4904 ENGINEER NORTH DAKOTA

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FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	JAD2	JXB	CAK	31–JULY–07	INITIAL RELEASE FOR CONSTRUCTION
1	JAD2	JXB	CAK	9–AUG–07	GENERAL LAYOUT REVISION
2	JAD2	JAD2	CAK	22–AUG–07	SECTION 1 DIMENSION REVISIONS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NORTH DAKOTA.
SIGNATURE Joel E Bahma
PRINTED NAME JOEL E. BAHMA
DATE 31–JULY–07 REG. NO. 4904

	–	07/31/07	08/09/07	08/22/07			
CLIENT							
BID							
CONSTRUCTION							
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DATE RELEASED							

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Scale	AS SHOWN
Date	10–JULY–07
Drawn	JAD2
Checked	JXB
Designed	JXB
Approved	CAK

D.H. BLATTNER & SONS, INC.
AVON, MINNESOTA

LANGDON WIND ENERGY CENTER
CAVALIER COUNTY, NORTH DAKOTA

SPREAD FOOTING FOUNDATION
ENGINEERED FILL SECTION AND SPECIFICATIONS

BARR PROJECT No. 34/10–001
CLIENT PROJECT No. –
DWG. No. S–03
REV. No. 2

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