



**Stantec Consulting Ltd.**  
100-300 Hagey Boulevard, Waterloo ON N2L 0A4

May 29, 2017  
File: 1609-60595

**Attention: Mr. Sean Fairfield, Director Project Planning and Permitting**  
Algonquin Power Co.  
354 Davis Road  
Oakville, ON L6J 2X1

Dear Mr. Fairfield,

**Reference: Amherst Island Wind Energy Project  
Transmission Line Pole Installation  
Stormwater Management and Erosion and Sediment Control Brief**

In response to the Government of Ontario's recent promotion of renewable energy development, Algonquin Power Co. (Algonquin), on behalf of Windlectric Inc., is proposing to construct and operate the Amherst Island Wind Energy Project located in Loyalist Township, Ontario.

This technical letter brief ("Brief") focuses on the stormwater management and erosion and sediment controls related to the installation of transmission line poles required for the project. Proposed mainland poles are shown on drawing E702 (attached) while island poles are shown on drawing E801 (attached).

## **BACKGROUND INFORMATION**

The following studies have been referenced during the preparation of this Brief:

*Amherst Island Wind Energy Project, Erosion and Sediment Control and Stormwater Management Plan Report, Phase 2 (Stantec, 2017).*

*Amherst Island Wind Energy Project, Design and Operations Report (Stantec, 2013).*

*Amherst Island Wind Energy Project, Construction Plan Report (Stantec, 2013).*

*Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Conservation Authorities (GGHCA), 2006).*

*Stormwater Management Planning and Design Manual (Ministry of the Environment and Climate Change (MOECC), 2003).*

## **POLE INSTALLATION**

Poles supporting the transmission line will be installed using two different support techniques. End poles and corner poles are to be anchored on a concrete foundation, while in-line poles will be installed by direct embedment.

**Design with community in mind**



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*Concrete Foundation (Drawings S700, S701, S800 and S801, attached)*

Mainland concrete foundation anchored poles are supported with a 2134 mm diameter, 3500 mm deep concrete foundation. Island concrete foundation anchored poles are supported with a 2600 mm diameter, 1300 mm deep, concrete foundation on bedrock, with twelve rock anchors drilled a minimum 2200 mm below rock head level. The location of concrete foundation supported poles will be stripped of topsoil and bedrock cleared to the required depths. For mainland pole installation, excavated materials will be stockpiled and disposed of in accordance with the Soil and Groundwater Management Plan. For island pole installation, topsoil stripped from the foundation site will be used to backfill around the poured foundation, while excavated bedrock will be removed and stockpiled at the central laydown area.

*Direct Embedment (Drawing S702 and S802, attached)*

Direct embedment poles are to be installed a minimum of 10% of the pole height (heights ranging from 21-26 m) plus 1220 mm. The diameter of direct embedment installations range from 715 mm to 1117 mm in diameter. Installation includes driving a temporary casing to support excavation, excavation of material, installation of pole, and filling the void space with self-compacting concrete. Excavated materials from mainland pole installation will be stockpiled and disposed of in accordance with the Soil and Groundwater Management Plan while excavated materials from island pole installation will be removed and stockpiled at the central laydown area.

## **STORMWATER MANAGEMENT (SWM)**

Formal stormwater management controls are not recommended, as transmission line pole installation will have a negligible impact on downstream receivers for the following reasons:

- Transmission line pole installations are isolated (maximum 2.6 m diameter foundations with a minimum proposed distance between poles of 56 m and a maximum proposed distance of 132 m)
- Runoff from transmission line poles and foundations is considered clean runoff
- Drainage patterns will remain unchanged from existing conditions

## **EROSION AND SEDIMENT CONTROL (ESC)**

Erosion control during transmission line pole installation will be accomplished by limiting the duration of exposure of disturbed sub-soils. All disturbed areas where construction is not expected for 30 days must be re-vegetated with a minimum 50 mm of topsoil and hydro-seeding or other stabilizing vegetation / erosion protection measures (per OPSS 804). If, given seasonal restriction or



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other revegetation limiting factors, the disturbed area should be stabilized against erosion impacts by non-vegetated means such as erosion control blankets.

As pole and foundation installations are self contained, it can be expected that runoff contacting exposed soils within the excavation, will remain entrained within the excavation and not require any further mitigation measures provided downstream.

Island transmission line poles P1 and P4 are proposed to be installed within the Cataraqui Region Conservation Authority (CRCA) regulated area. Due to the proximity of the poles to the adjacent watercourses, light duty silt fence is proposed to be installed 2 m downstream of the proposed foundation to provide an additional layer of protection against sediment migration (Figure 1, attached).

In the event of inclement weather or unfavourable terrain for construction, construction best practices, such temporary rig-mats may be used to prevent disruption of surface soils and vegetative cover by construction vehicles and equipment.

The ESC measures shall be maintained in good repair during the entire construction period, and removed as contributing drainage areas are restored and stabilized. ESC measures shall not be removed until a qualified inspector determines that the measures are no longer required and the risk of surface water and environmental impacts from construction activities are negligible. In addition, the condition of erosion control works, their overall performance, and any repairs replacement or modifications to the installed item shall be noted in logbooks to be kept on-site.

*Erosion and Sediment Control Monitoring Program*

In order to ensure the effectiveness of the various erosion and sediment control measures, a routine program should be implemented which includes the inspection of the erosion and sediment controls daily and after each significant rainfall event (10mm), and immediate repair of any deficiencies. This program will consist of the following activities:

- Visual inspection of the ESC measures to ensure discharged flows are generally free of sediment and turbidity
- Inspection of vegetation protection and silt fencing to ensure that they are maintained in good repair
- Removal of construction debris that may accumulate
- Implementation of remedial measures including erosion stabilization, repair of damaged fencing and any other remediation, where required (to conform with ESC Guidelines for Urban construction, in consultation with the inspector)



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If the monitoring program outlined above indicates a persistent problem then the following process should be undertaken to determine appropriate mitigative measures:

1. Analysis of the monitoring information and field visits as required, determine the cause of the problem, and develop a mitigation plan to address the issue.
2. Convene a meeting with the appropriate review agencies to discuss the problem.
3. Develop a consensus on a proposed plan of action to resolve the problem in consultation with agency staff.
4. Implement additional mitigation measures and monitor the results.

**POLE FOUNDATION REVISIONS**

Proposed transmission line pole installations as described herein and supporting REA documentation, may require revisions due to unexpected subsurface conditions. Revisions may be required to foundation/pole diameters, foundation type and spacing. Changes to foundation or pole diameter (up to 1.5 m), foundation type (concrete foundation vs direct embedment), and spacing (providing new pole location is not within a regulated area or other drainage feature) will continue to meet the intent of this stormwater management and erosion and sediment control report.



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## CONCLUSION

Based on the preceding brief, the following conclusions can be drawn:

- No formal stormwater management controls providing water quality and water quantity are required
- An erosion and sediment control plan has been developed to mitigate migration of sediments offsite to downstream receivers

Based on the findings of this brief it is recommended that the proposed stormwater management and erosion and sediment control measures be implemented for the proposed transmission line pole installation.

Regards,

**STANTEC CONSULTING LTD.**

David Williams, P. Eng.  
Water Resources Engineer  
Phone: (519) 585-7320  
Fax: (519) 579-8664  
David.Williams@stantec.com



Attachment: Dawing TR-1 – Transmission Line Erosion and Sediment Control Plan  
Drawing E701 – Mainland Transmission Line Plan and Profile  
Drawing S700 – Transmission Line Pole P1, PML 1 and PML 5 Details  
Drawing S701 – Transmission Line PML1 and PML5  
Drawing S702 – Transmission Line Typical Embedment Foundation Design For Pole Structures  
Drawing E801 – Island Transmission Line Plan and Profile  
Drawing S800 – Foundation Details  
Drawing S801 – Anchor Bolt Details  
Drawing S802 – Typical Direct Embedment Foundation

c. Mr. Riley Griffin, Algonquin Power Co.  
Ms. Kerrie Skillen Stantec Consulting Ltd.

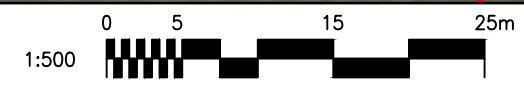
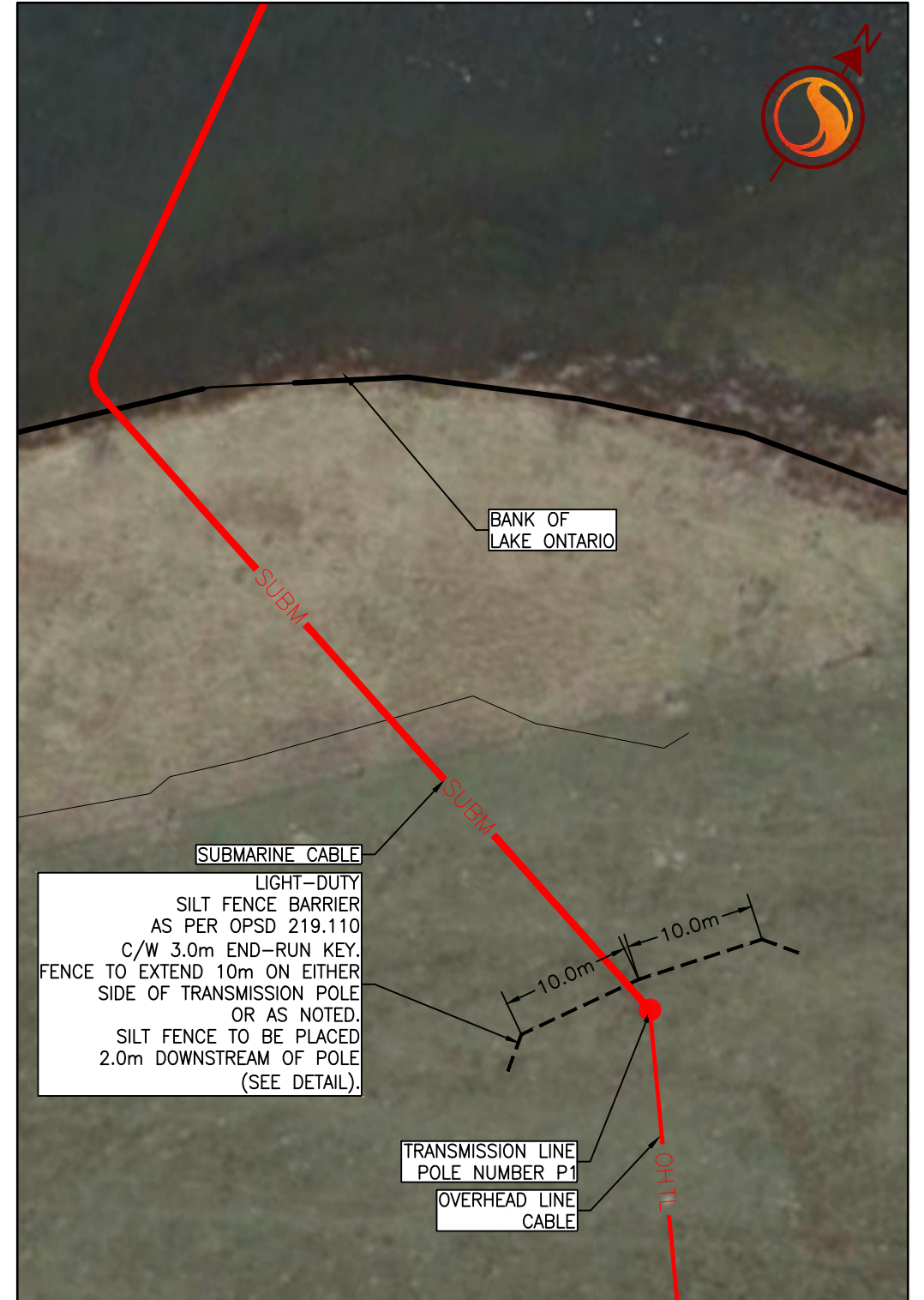
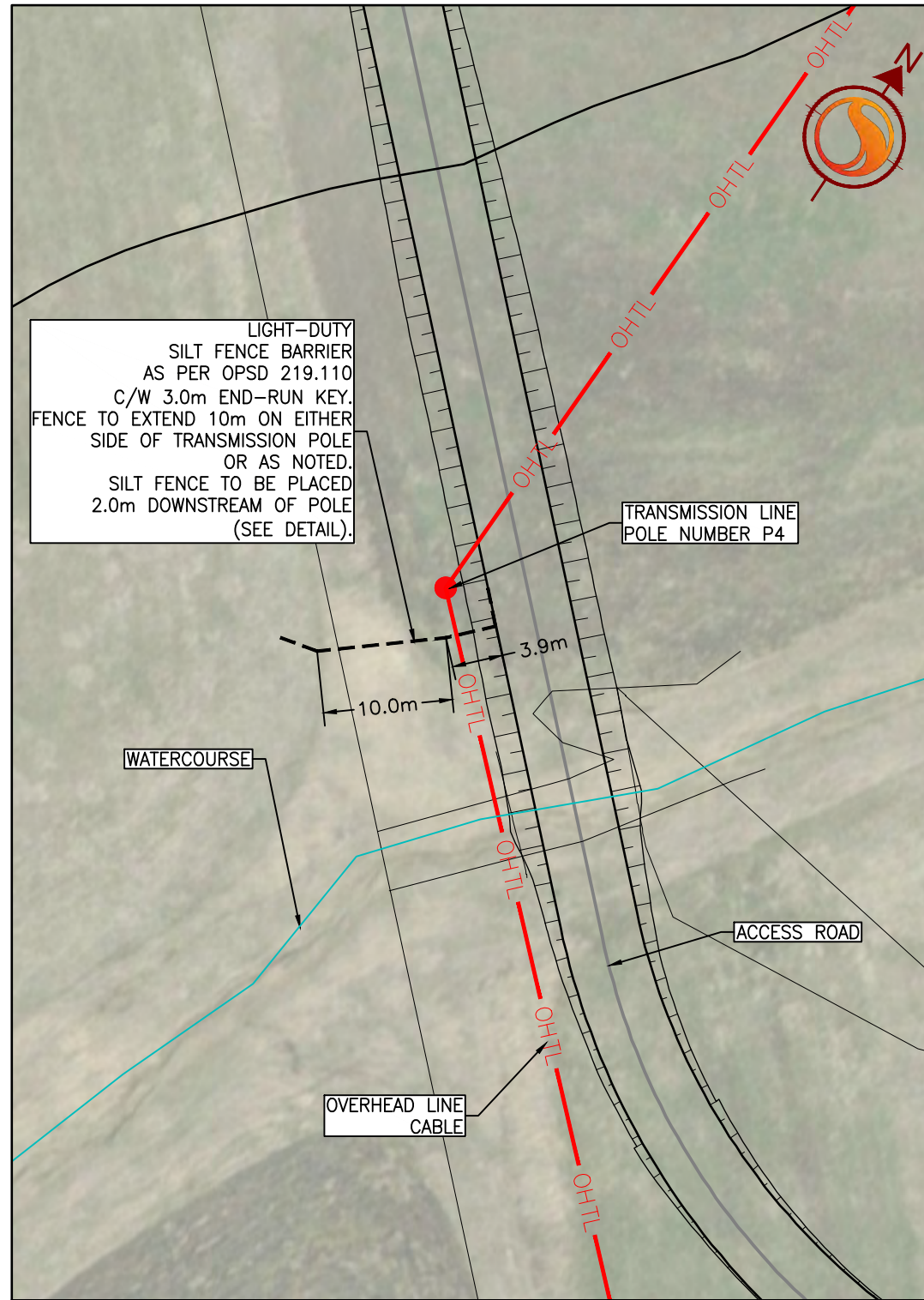
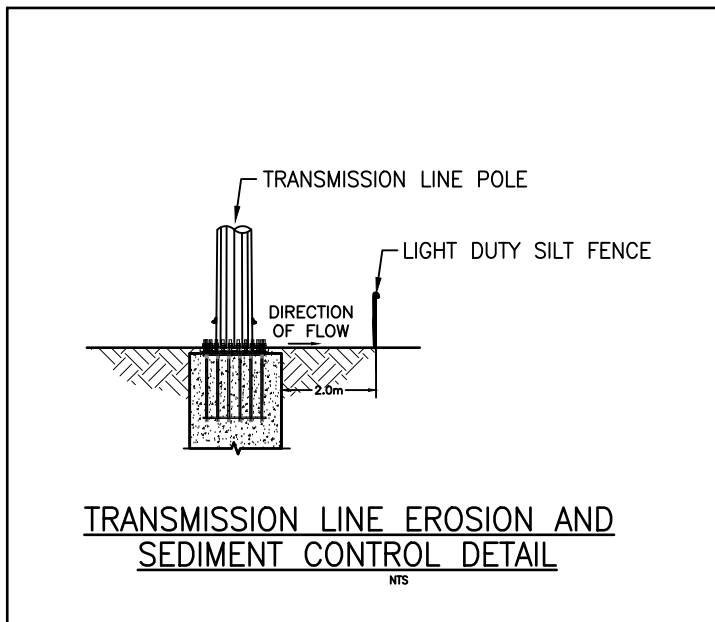
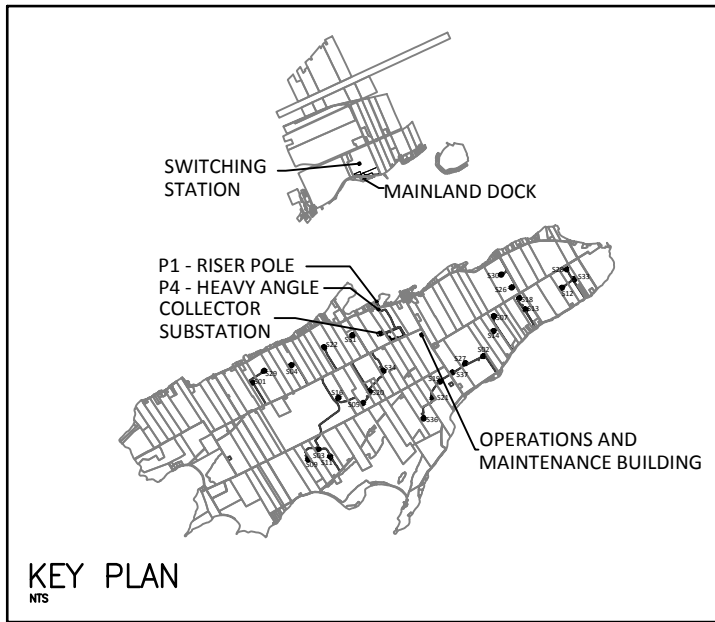
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Design with community in mind

# ATTACHMENTS



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2017/05/25 11:52 AM By: Santos, Dan



300 Hagey Blvd, Suite 100  
Waterloo, ON, N2L 0A4  
Tel. 519.579.4410  
www.stantec.com

Client/Project  
WINDLECTRIC INC.  
AMHERST ISLAND WIND  
ENERGY PROJECT

Figure No.  
TR-1

Title  
TRANSMISSION LINE  
EROSION AND SEDIMENTATION CONTROL PLAN

April 2017  
133560100



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Notes

- AERIAL IMAGES ARE PROVIDED BY AND ARE COPYRIGHT OF GOOGLE
- 100mm CONCRETE COVER OVER SUBMARINE CABLE TO PROTECT CABLE FOR THE DURATION OF THE RUN FROM 10m NORTH OF THE SHORELINE TO THE RISER POLE, EXCEPT BELOW HIGHWAY CROSSING. REFER TO DETAIL D.
- PERMANENT ABOVE GROUND MARKERS INDICATING INSTALLATION LOCATION TO BE INSTALLED AT SPECIFIED LOCATIONS.
- RESERVED.
- SUBMARINE CABLE LENGTH FROM RISER POLE, IN THE MAIN LAND, TO RISER POLE, IN THE ISLAND, IS ESTIMATED AND BASED ON THE FOLLOWING MARINE GEOPHYSICAL REPORT: "MARINE GEOPHYSICAL SERVICES - AMHERST ISLAND FARM PROJECT - LAKE ONTARIO" DONE BY ASI GROUP DATED SEPTEMBER 6, 2012. CONTRACTOR TO VERIFY FINAL LENGTH ONCE SUBMARINE CABLE IS INSTALLED.
- RESERVED.
- LOCATION OF OTHER UTILITIES ARE ASSUMED UNLESS OTHERWISE NOTED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
- SUPPLY, PLACE AND COMPACT NATIVE BACKFILL. NATIVE BACKFILL TO BE FREE OF DEBRIS, SHARP OBJECTS, ORGANIC OR FROZEN MATERIAL AND SCREEN WHERE LARGE PARTICLE SIZE MAY CAUSE DAMAGE TO CABLE. NATIVE BACKFILL TO BE INSTALLED IN LIFTS OF 300mm AND COMPACTED TO 95% SPD.
- TRENCH BACKFILL TO BE PER RECOMMENDATIONS FROM STANTEC'S SOIL AND GROUND WATER MANAGEMENT PROGRAM REPORT (SECTION 4): "Soil/Groundwater Management Program and Health & Safety Plan for soil excavation".
- RESERVED.
- RESERVED.
- IF GROUNDWATER IS ENCOUNTERED DURING EXCAVATION, FOLLOW RECOMMENDATIONS AS PER STANTEC'S SOIL AND GROUND WATER MANAGEMENT PROGRAM REPORT "Soil/Groundwater Management Program and Health & Safety Plan for soil excavation" REPORT SECTION 4.3.5 FOR MORE DETAILS.
- CONTRACTOR TO FOLLOW RECOMMENDATION IN THE STANTEC'S "Soil/Groundwater Management Program and Health & Safety Plan for soil excavation" REPORT FOR MANAGEMENT OF GROUNDWATER AND SOIL OFF/SITE.
- BORING PIT OF APPROXIMATELY 15 x 15m WILL BE REQUIRED TO ALLOW BORING UNDER HIGHWAY 33. MAXIMUM DEPTH OF PIT TO BE 1.5m BELOW SURFACE.
- TEMPORARY LAYDOWN OF APPROXIMATELY 250m OF SUBMARINE CABLE WILL BE REQUIRED ON THE SOUTH PARCEL LAND SURFACE. TRACK BASED EQUIPMENT WILL BE USED TO MANEUVER CABLE AS REQUIRED.

Legend

- 115kV UNDERGROUND CABLES IN 14" HDPE
- SUBM 115kV SUBMARINE CABLE
- OHTL 115kV OVERHEAD TRANSMISSION CABLE
- INDICATES CHANGE OF DIRECTION IN PROFILE
- 200mm WATERMAIN
- 115kV OVERHEAD TRANSMISSION POLE
- TRENCHING AND BORING INSTALLATION REFERENCES. REFERS TO 700 SERIES DRAWING DETAILS
- ABOVE GROUND CABLE MARKER. SEE NOTE 3

Revision	By	Appd.	YY.MM.DD
D	JL	JR	17.05.19
C	JL	JR	17.04.06
B	JL	JR	17.03.24
A	JL	JR	17.03.03

File Name	JL	JR	JL	16.09.21
Permit/Seal	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Client/Project



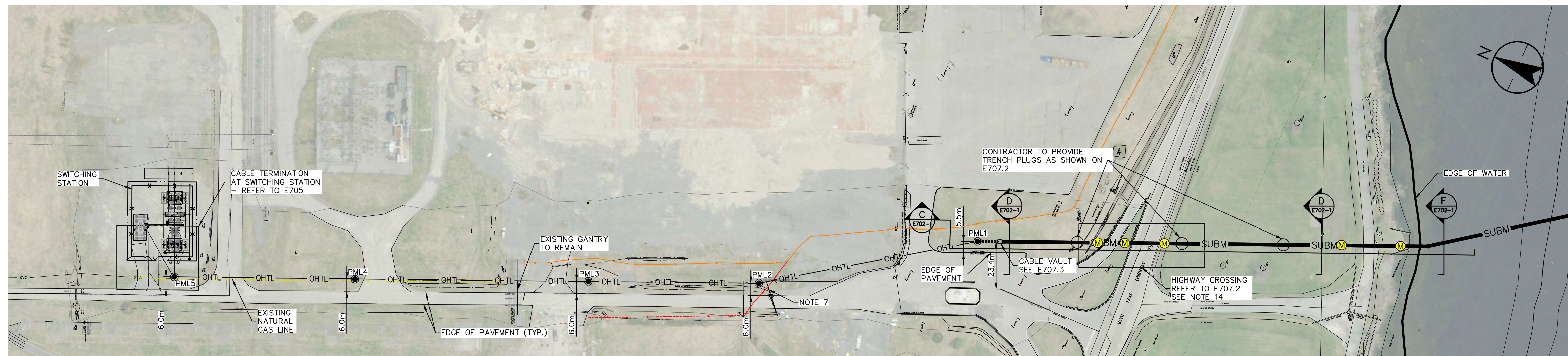
AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

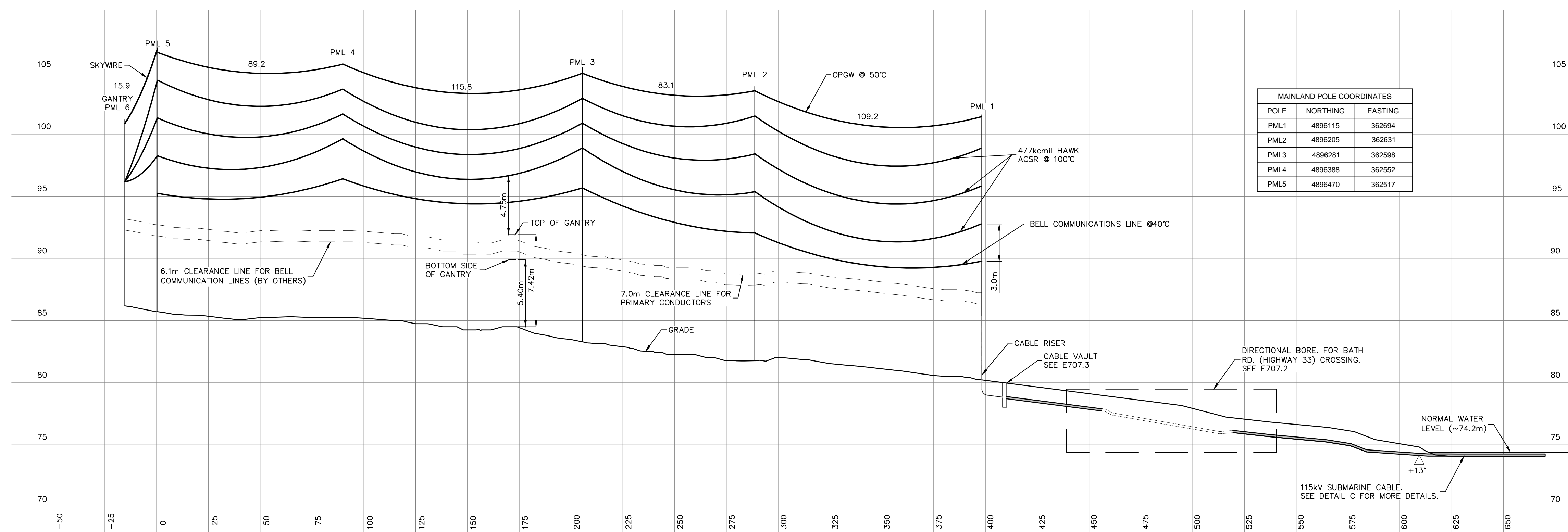
115kV SUBMARINE & OVERHEAD  
MAINLAND TRANSMISSION LINE  
PLAN AND PROFILE

Project No. 133560104	Scale 1:1250	0 12.5 37.5 62.5m
Drawing No.	Sheet	Revision

DESIGNED TO CAN/CSA-C22.3 No. 1-15

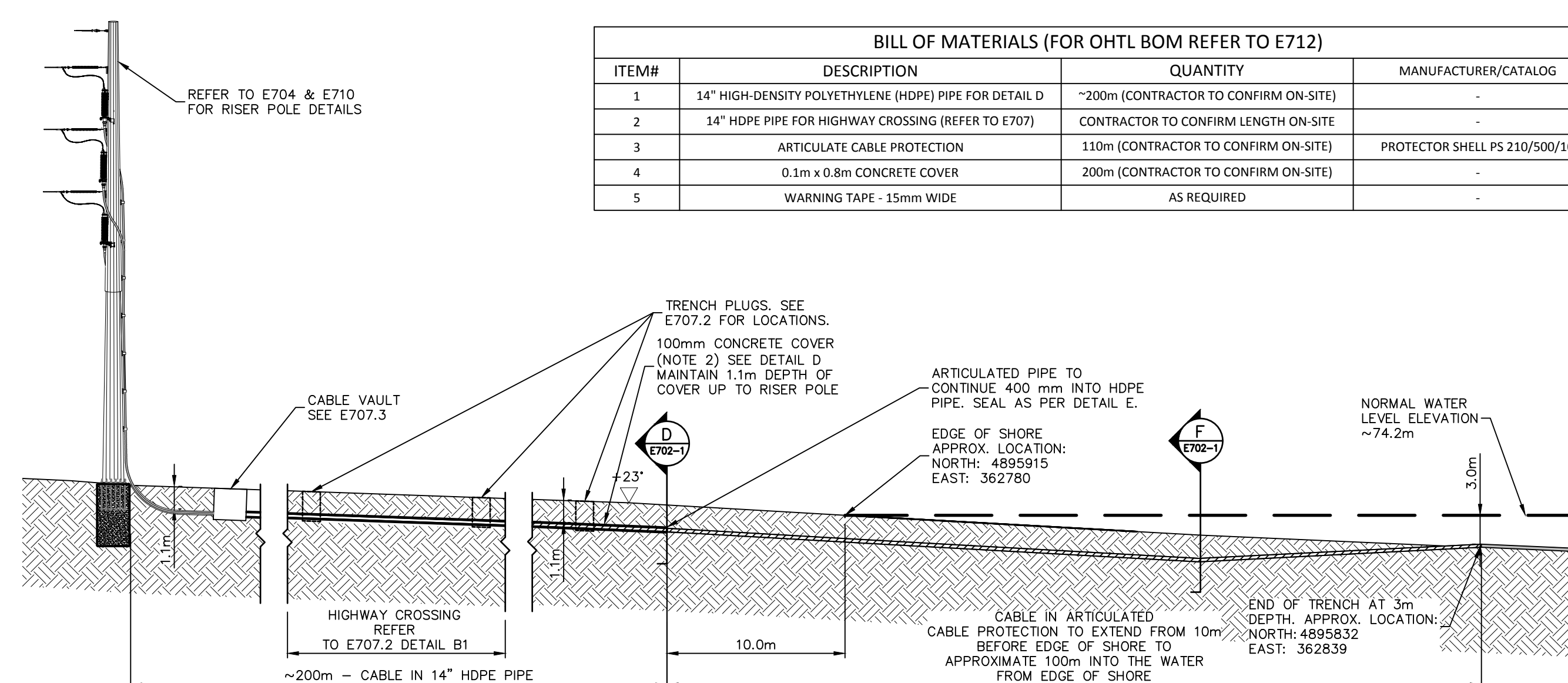


(A) 115kV TRANSMISSION LINE PLAN  
Scale 1:1250

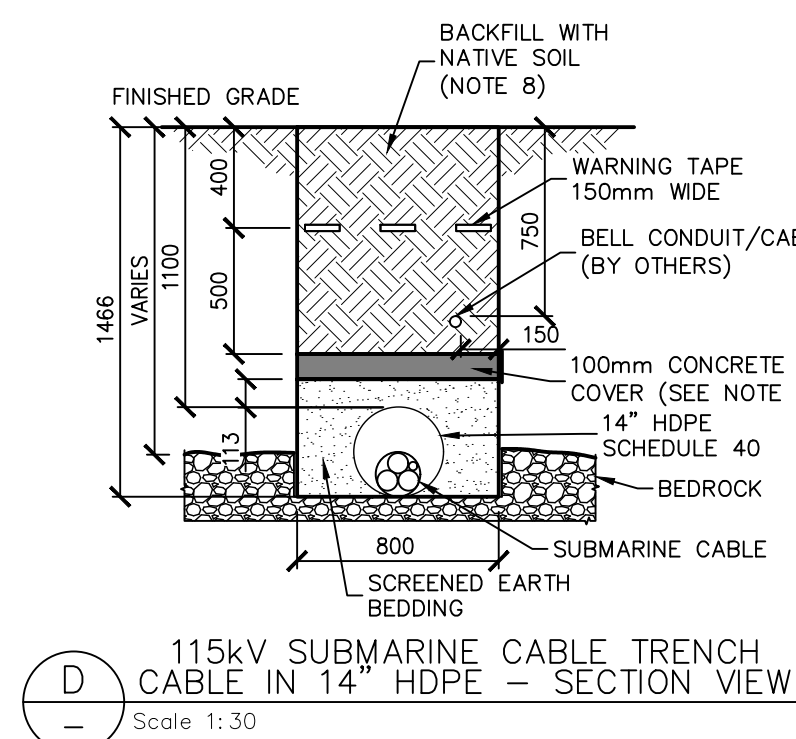


(B) 115kV TRANSMISSION LINE PROFILE  
Scale Horiz=1:1250 Vert=Exaggerated 6X

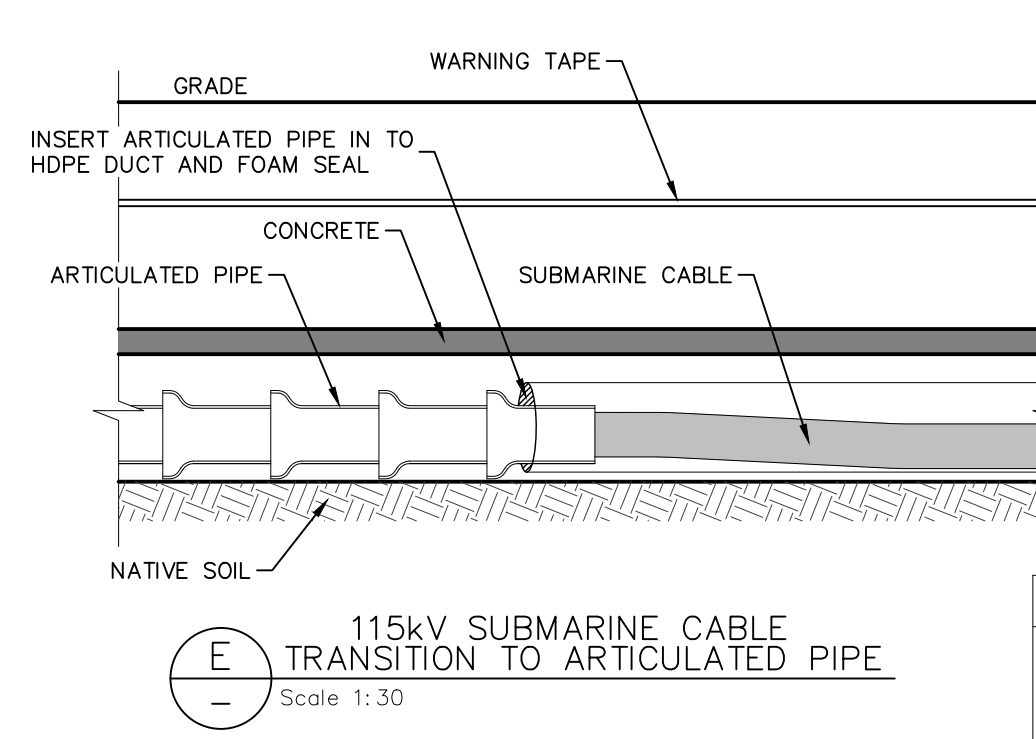
ITEM#	DESCRIPTION	QUANTITY	MANUFACTURER/CATALOG
1	14" HIGH-DENSITY POLYETHYLENE (HDPE) PIPE FOR DETAIL D	~200m (CONTRACTOR TO CONFIRM ON-SITE)	-
2	14" HDPE PIPE FOR HIGHWAY CROSSING (REFER TO E707)	CONTRACTOR TO CONFIRM LENGTH ON-SITE	-
3	ARTICULATE CABLE PROTECTION	110m (CONTRACTOR TO CONFIRM ON-SITE)	PROTECTOR SHELL PS 210/500/10
4	0.1m x 0.8m CONCRETE COVER	200m (CONTRACTOR TO CONFIRM ON-SITE)	-
5	WARNING TAPE - 15mm WIDE	AS REQUIRED	-



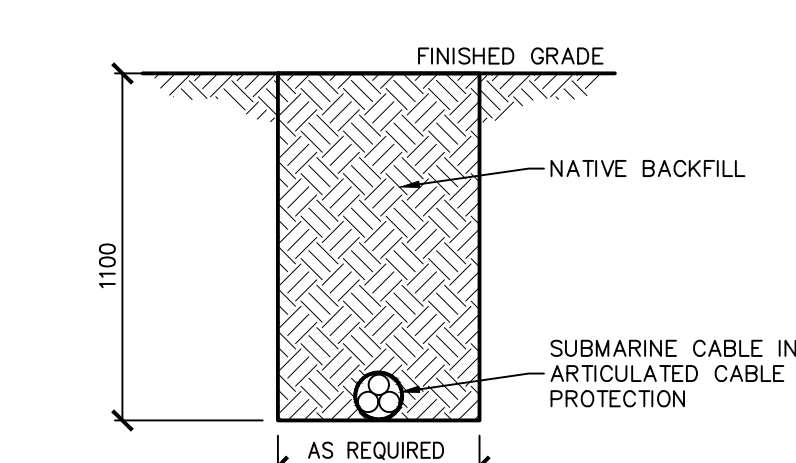
(C) 115kV SUBMARINE CABLE TO RISER POLE - PROFILE  
Scale=1:250



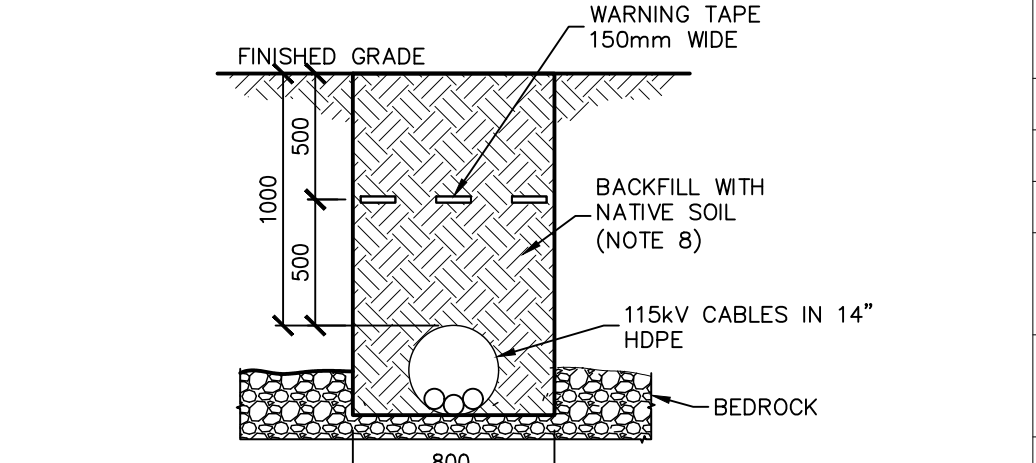
(D) 115kV SUBMARINE CABLE TRENCH  
SCALE 1:30



(E) 115kV SUBMARINE CABLE  
TRANSITION TO ARTICULATED PIPE  
SCALE 1:30



(F) 115kV SUBMARINE CABLE  
IN ARTICULATED CABLE PROTECTION  
SCALE 1:30



(G) 115kV TRANSMISSION CABLES  
IN 14" HDPE PIPE  
SCALE 1:30

\*\*\*\*\*For PHCL and Windlectric Use Only\*\*\*\*\*

Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

<input type="checkbox"/> Reviewed - No comments	Reviewed By	Date (dd-mmm-yyyy)
<input type="checkbox"/> Reviewed - Incorporate comments and resubmit	Project Manager - PHCL	Date (dd-mmm-yyyy)
<input type="checkbox"/> Reviewed - Not accepted	Project Manager - Windlectric	Date (dd-mmm-yyyy)

Owner: Windlectric Inc.

NOT FOR CONSTRUCTION

V:\0133560104\133560104\_01.dwg, design\42\_drawing\02\_Current\Elec\Underground Transmission\dwg\_60104\_AWF\_E702.dwg, 2017/05/19 4:07 PM By: J. Linnell, Linnell



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Notes

Legend

Revision	By	Appd.	YY.MM.DD	
A	ISSUED FOR TENDER	RF	RF	17.03.15

File Name	IC	RF	RF	YY.MM.DD
dwg_60104_AJWF-5700	Dwn.	Chkd.	Dgn.	17.01.04

Permit-Seal

PRELIMINARY  
FOR REVIEW ONLY

Client/Project

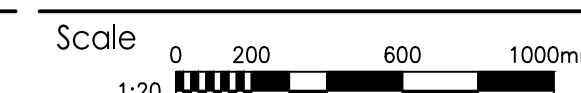


AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

115kV OVERHEAD MAINLAND  
TRANSMISSION LINE POLE P1, PML1 & PML5  
FOUNDATION DETAILS

Project No. 133560104  
Drawing No. 700



Scale 1:20  
Sheet 1 of 1  
Revision

S700

1 of 1

A

GENERAL NOTES

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE PLAN AND PROFILE DRAWINGS, ANCHOR BOLT DRAWINGS AND STAKING INFORMATION.
- FOR POLE FRAMING DETAILS, SEE DWG 60104\_AJWF-E700-E712
- ALL DIMENSIONS AS SHOWN ARE METRIC IN MILLIMETERS U.N.O.

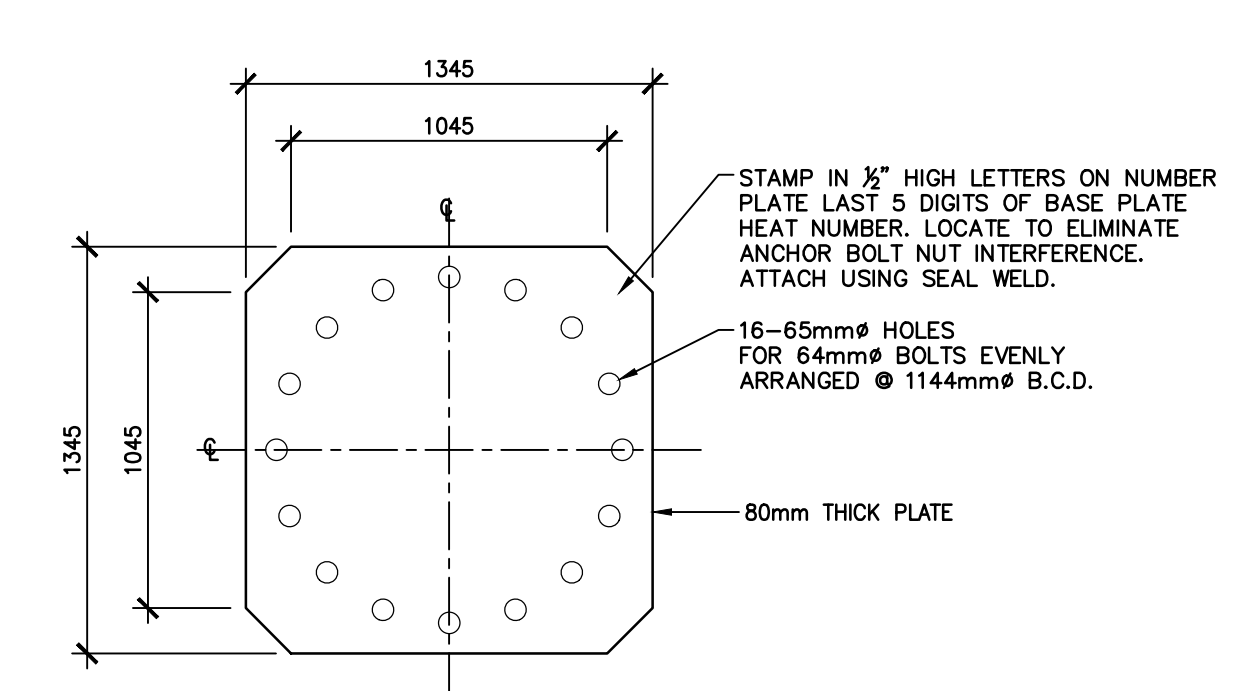
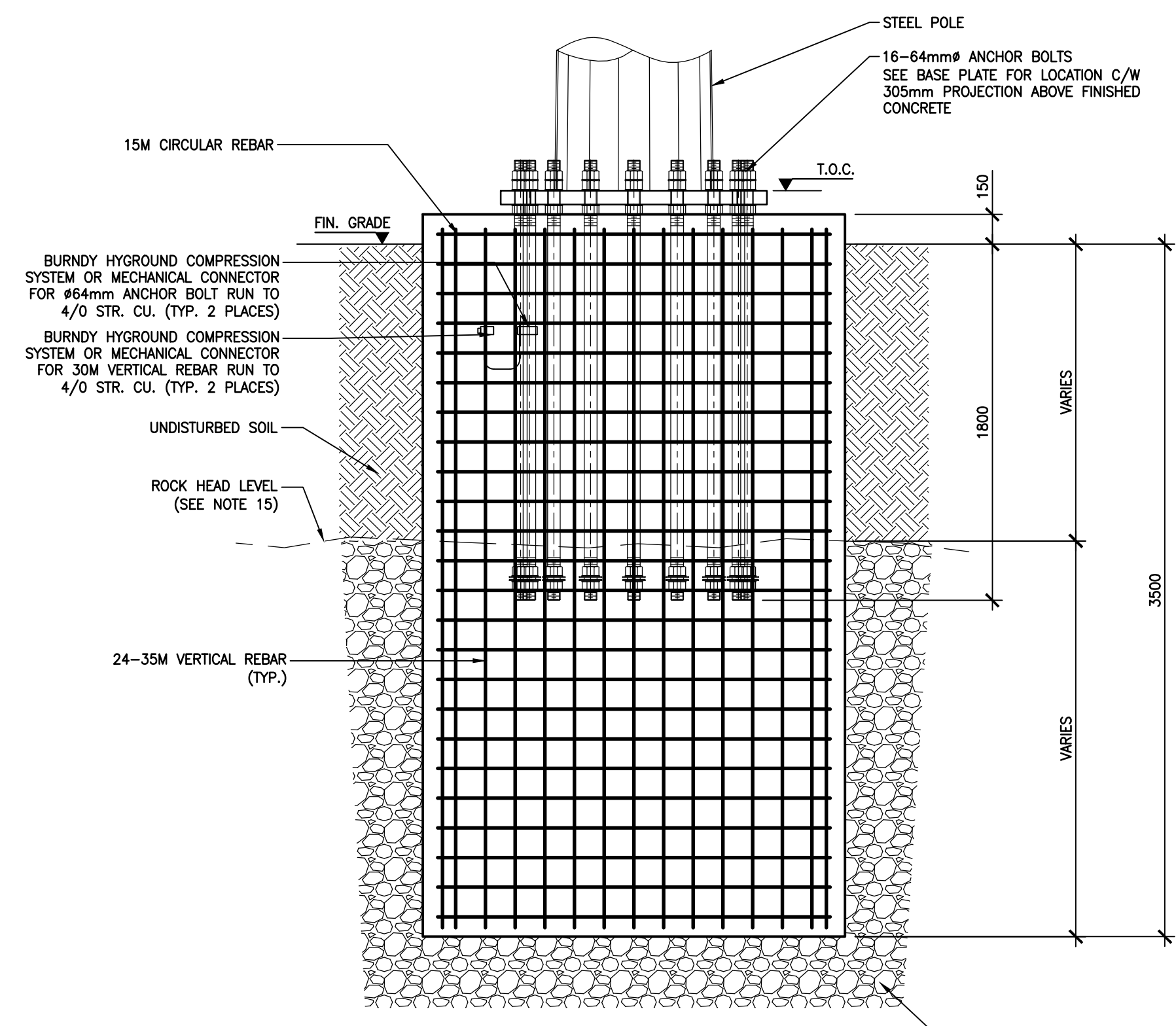
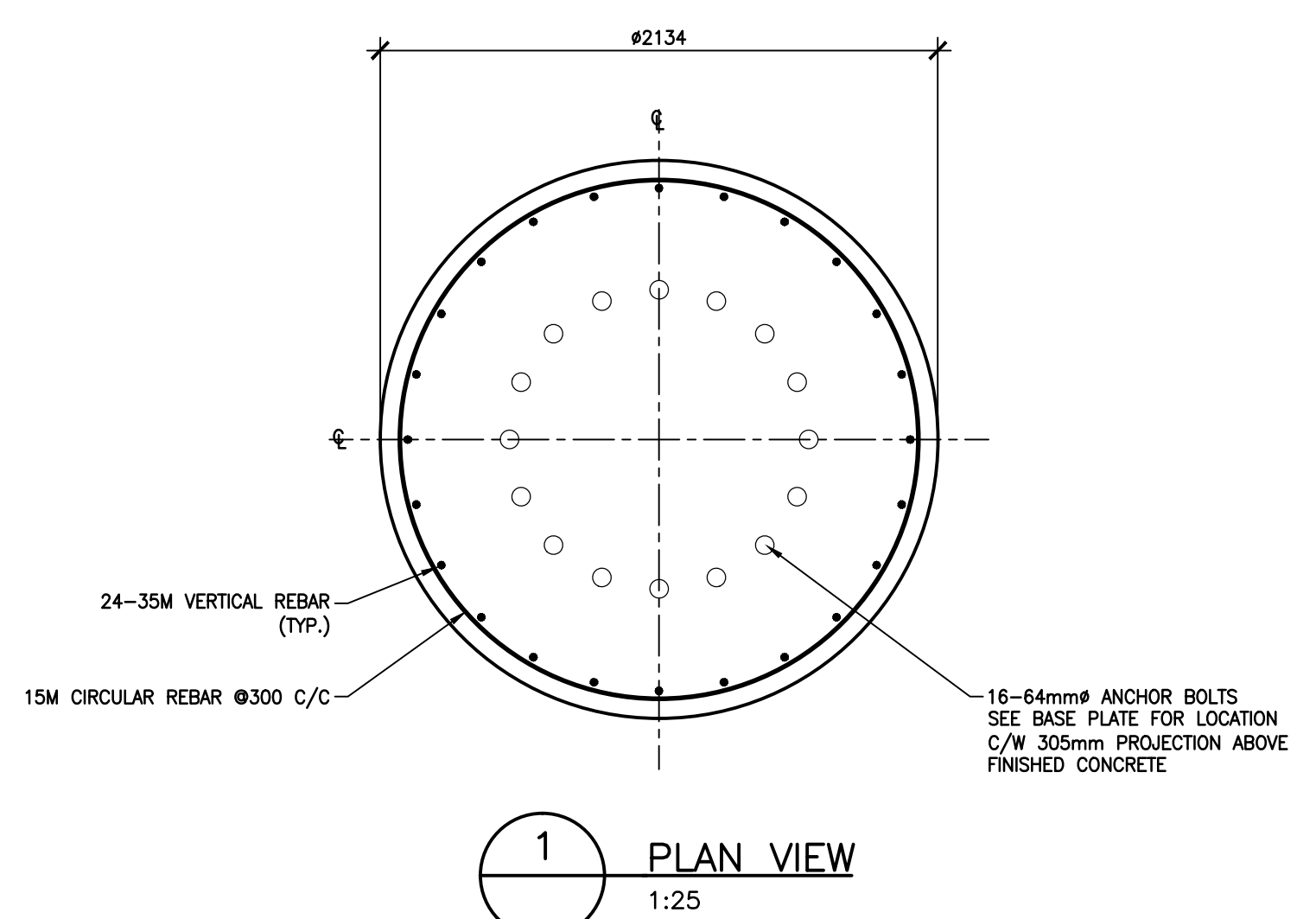
DESIGN PARAMETERS

- FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL BOREHOLE INFORMATION PROVIDED BY STANTEC CONTAINED ON BOREHOLE RECORD N: 4 896 130 E: 362 693 BH17-02 AND N: 4 896 409 E: 362 648 BH17-03
- GROUND WATER LEVEL IS DESIGNED AT GRADE.
- FROST DEPTH IS 1.2m (4') BELOW GRADE
- BASED ON THE INFORMATION ON BOREHOLE RECORD, THE FOLLOWING DESIGN PARAMETER AND ASSUMPTIONS ARE ADOPTED FOR THE FOUNDATION DESIGN:

STRUCTURE	SOIL	WEIGHT kN/m <sup>3</sup>	Ø	UNDRAINED COHESION		UCS		RQD	
				kPa	MPa	MPa	%		
PML1	CLAY	18.5		40					
	SILTY SAND	21.51	32	2					
	WEAK ROCK	25.5				20		25	
PML5	SDUND ROCK	26.5				45		50	
	CLAY	18.5		50					
	CLAY WITH SAND	19	0	80					
	SILTY SAND	21.5	32	2					
	WEAK ROCK	25.5				20		25	
SDUND ROCK	26.5				45		50		

FOUNDATION MATERIAL AND CONSTRUCTION NOTES

- CONCRETE MATERIAL, DESIGN, TESTING AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH CSA STANDARD CAN 2-A23 SERIES.
- CONCRETE SPECIFICATION SUPPLY AND DELIVERY OF CONCRETE SHALL BE AS FOLLOWS:
  - A) MINIMUM COMPRESSIVE STRENGTH: 35 MPa AT 28 DAYS
  - B) SPECIFICATIONS ON PORTLAND CEMENT: TYPE GU NORMAL PORTLAND CEMENT, EXPOSURE CLASS C-1
  - C) 4%-7% AIR CONTENT
  - D) MIN. 3 CYLINDERS TESTING WITH ONE AT 7 DAYS AND TWO AT 28 DAYS ARE REQUIRED
- UNLESS OTHERWISE SPECIFIED, MINIMUM CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS:
  - CONCRETE CAST AGAINST SOIL = 75mm
  - FORMED CONCRETE WITH DIRECT CONTACT TO SOIL = 50mm
  - CONCRETE SURFACE EXPOSED TO WEATHER = 50mm
- REINFORCING STEEL SHALL BE DEFORMED STEEL BAR WITH MINIMUM YIELD STRENGTH OF 400 MPa (60PSI) AND CONFIRMING TO CSA G30.12 GR.400 EXCEPT TIES AND STIRRUPS WHICH SHALL BE GRADE 300.
- MINIMUM SPLICES, LAPS AND HOOKS SHALL BE IN ACCORDANCE WITH CAN 3-A23.1
- ALL OTHER STEEL MATERIAL SHALL BE CSA-G40.21-M300W U.N.O. AND SHALL BE HOT DIP GALVANIZED FINISH ACCORDING TO CSA-G164 U.N.O. WHEN EXPOSED.
- ALL EXCAVATIONS SHALL BE PERFORMED IN A MANNER THAT SHALL ENSURE PROPER DRAINAGE DURING THE COURSE OF WORK. FLOODED EXCAVATIONS SHALL BE DEWATERED AND ALL MUCK SHALL BE REMOVED BEFORE PROCEEDING WITH WORK. ALL EXCAVATIONS SHALL BE SUFFICIENTLY SUPPORTED TO PREVENT COLLAPSE.
- AFTER EXCAVATION, EXPOSED SOIL SURFACES SHALL BE PROTECTED PRIOR TO CONCRETE CASTING.
- PRIOR TO THE PLACEMENT OF CONCRETE, BOTTOM OF FOUNDATIONS SHALL BE INSPECTED BY QUALIFIED GEOTECHNICAL PERSONNEL TO CONFIRM THAT THE SOIL PROPERTIES ARE CONSISTENT WITH THE GEOTECHNICAL INVESTIGATION REPORT AND DESIGN PARAMETERS
- BEFORE PLACING CONCRETE, CONTRACTOR SHALL VERIFY ANCHOR BOLTS AND LOCATIONS OF ALL MECHANICAL, UTILITY SERVICES FOR EMBEDDED ITEMS, HOLES, ETC.
- PROPER VIBRATION METHODS SHALL BE USED DURING CONCRETING.
- CONCRETE SHALL BE ADEQUATELY CURED BY ADDITIONAL MOISTURE AND/OR COVERED BY WATER RETAINING MATERIAL AFTER POURING.
- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 25mm CHAMFER.
- SAFETY MEASURES SHALL BE PROVIDED AFTER EXCAVATION TO ENSURE WORKPLACE SAFETY.
- ROCK HEAD LEVEL SHALL BE IDENTIFIED AS LEVEL WHERE THE ROCK MASS REACHES A ROCK QUALITY DESIGNATION (RQD) INDEX OF 25% OR GREATER, AND SUCH RQD REQUIREMENT SHALL BE MAINTAINED FOR A MINIMUM OF 2.0m FROM THE ROCK HEAD LEVEL.
- THE CONTRACTOR SHALL ENSURE THAT, DURING THE PROCUREMENT PROCESS, ADEQUATE TOLERANCES AND ALLOWANCES ON THE LENGTH OF REBAR CAGES SHALL BE PROVIDED TO MEET DESIGN REQUIREMENT AND SUIT ACTUAL SITE CONDITION.



4 BASE PLATE DETAIL  
1:25  
NOTE: CONFIRM PLATE DIMENSIONS AND PROFILE WITH POLE FABRICATOR

\*\*\*\*\*For PHCL and Windlectric Use Only\*\*\*\*\*

Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

Reviewed - No comments

Reviewed - Incorporate comments and resubmit

Reviewed - Not accepted

Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)

Owner:

V:\013356\013356\04\_40\_Design\42\_Drawing\42\_Drawing\Structural\510 Pole Foundation Mainland\dwg\_60104\_AJWF-5700.dwg 2017/03/15 11:14 PM BJR:SKB



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Notes

- ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS [IMPERIAL] U.N.O.
- FOR FOUNDATION DRAWINGS, SEE S700.
- FOR POLE LINE PLAN AND PROFILE DRAWINGS, SEE E702 TO E712.
- FOR ANCHOR BOLT ORIENTATION, SEE DWG# (TO BE UPDATED)
- ANCHOR BOLT SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 670 MPa (97 ksi) AND A MINIMUM YIELD STRENGTH OF 482 MPa (70 ksi) EQUIVALENT TO AISI B620. ANCHOR BOLT HARDWARE AND ASSEMBLIES SHALL MEET THE EQUIVALENT STRENGTH AND MATERIAL SPECIFICATION REQUIREMENTS.
- ALL OTHER STEEL MATERIAL SHALL BE CSA-G40.21-350W U.N.O.
- TOP PORTION OF ANCHOR BOLT AS SHOWN AND BOLT HARDWARE SHALL BE HOT DIP GALVANIZED FINISH AS IN ACCORDANCE WITH CSA-G164.
- ANCHOR BOLT SHALL BE SET ACCURATELY PLUMB, TRUE, ALIGNED AND RIGID.
- ANCHOR BOLT THREADS SHALL BE PROTECTED FROM DAMAGES DURING CONCRETING.
- NUMBER '3', '6', '9' AND '12' DENOTES FACE ORIENTATION OF POLE STRUCTURE, SEE ANCHOR BOLT ORIENTATION DRAWINGS FOR SETTING DETAILS.

Legend

Revision	By	Appd.	YY.MM.DD

File Name:	IC	RF	RF	17.03.16
dwg_60104_AWFS-701	Dwn.	Chkd.	Dgn.	YY.MM.DD

Permit-Seal

PRELIMINARY  
FOR REVIEW ONLY

Client/Project



AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

115kV OVERHEAD MAINLAND  
TRANSMISSION LINE  
PML1 & PML5

Project No.  
133560104

Scale  
0 200 600 1000mm  
1:20

Drawing No.

Sheet

Revision

S701

1 of 1

A

\*\*\*\*\*For PHCL and Windlectric Use Only\*\*\*\*\*

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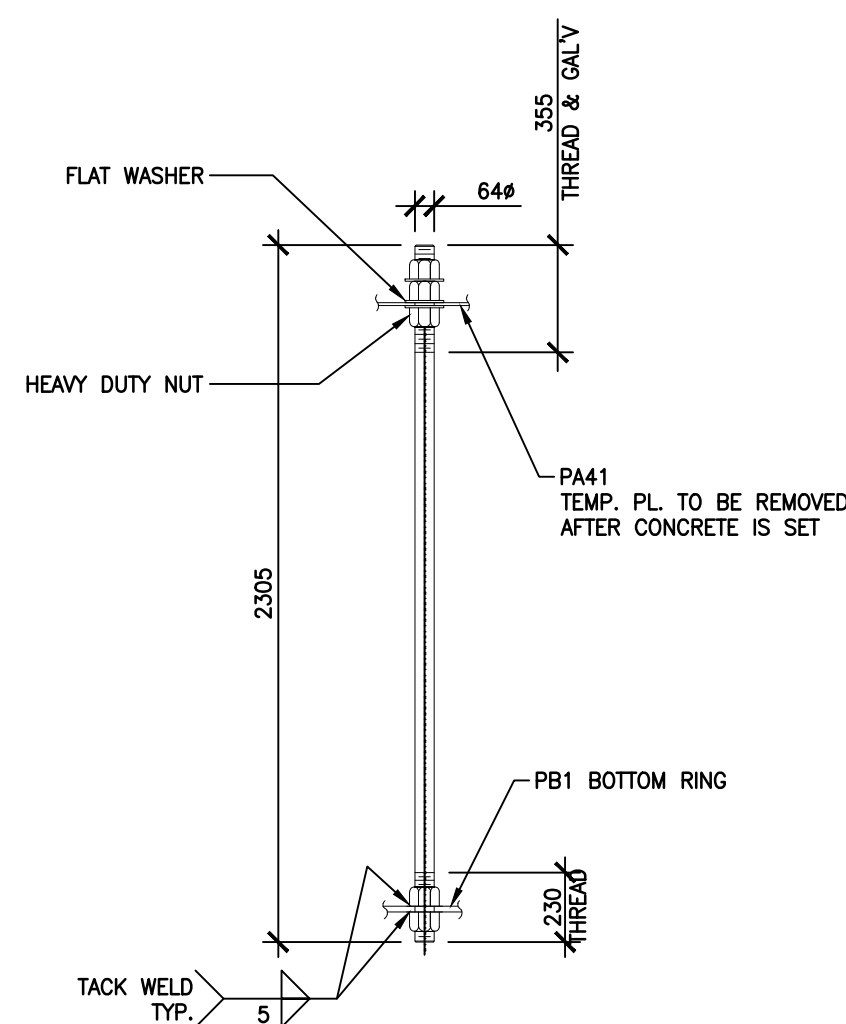
Reviewed - No comments

Reviewed - Incorporate comments and resubmit

Reviewed - Not accepted

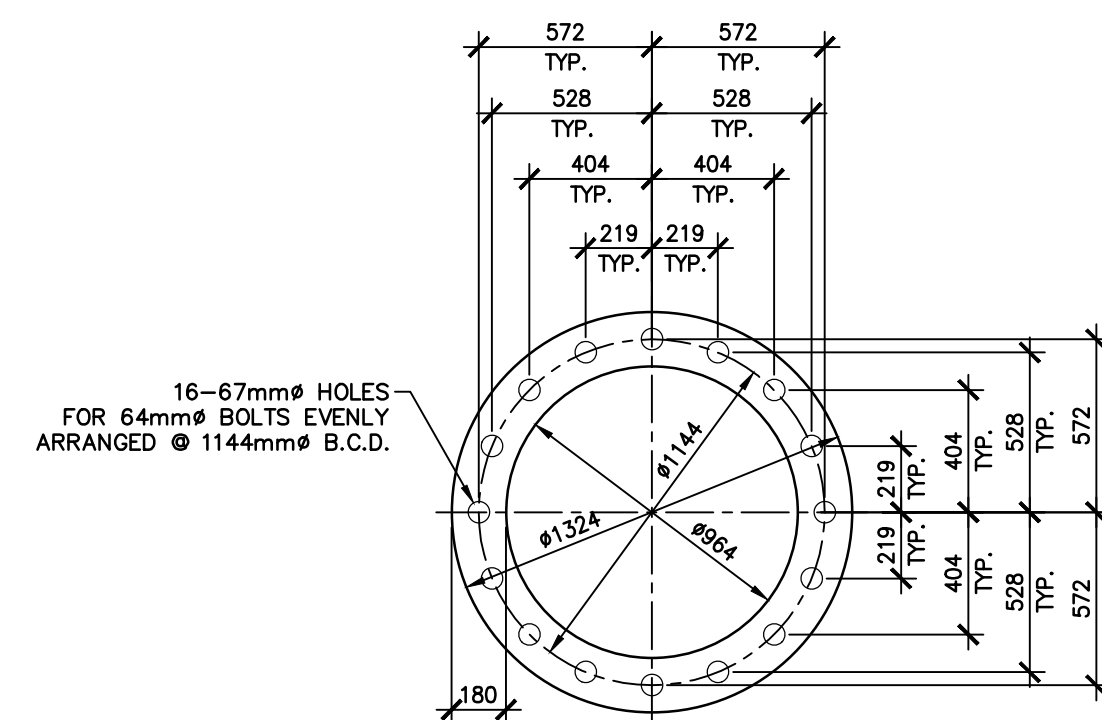
Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)

Owner:



**1** 64mm x 2305mm GALV. ANCHOR BOLT  
S204 1:25

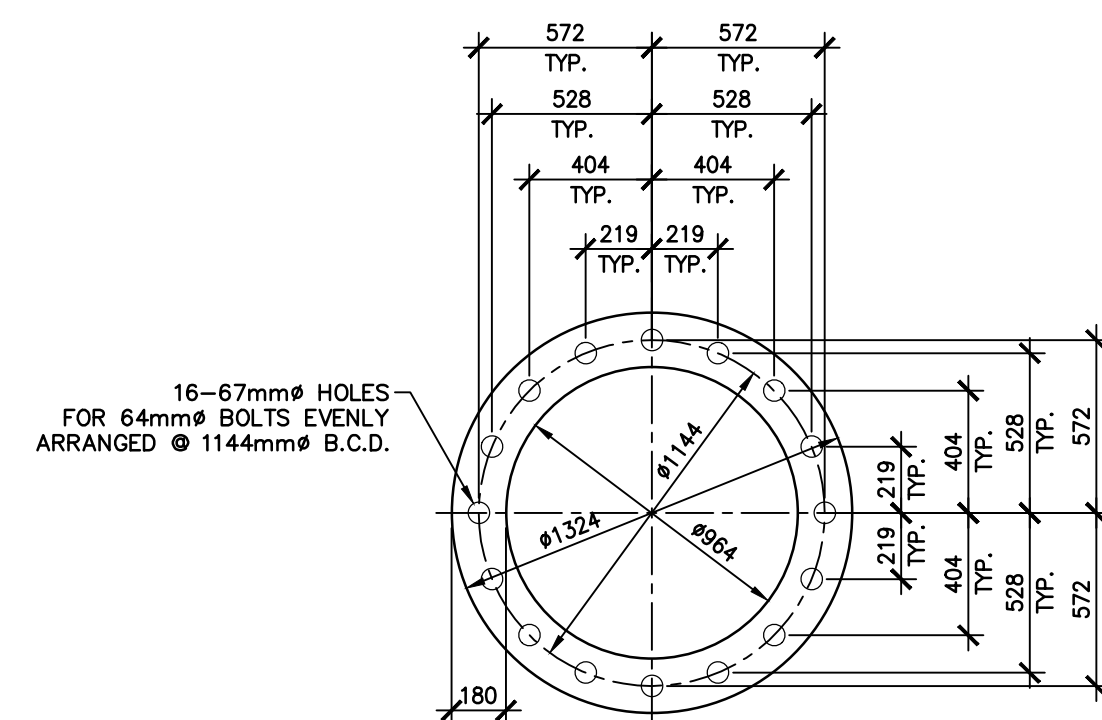
TOP THREAD & GALV'D LENGTH = 355mm  
BOTTOM THREAD LENGTH = 230mm  
C/W 5 HEAVY DUTY HEX NUTS & 2 FLAT WASHERS (GALV.)



**3** PA1-PL9x1324x1324 TEMP. (NOT GALV'D) FOR ANCHOR BOLT  
S204 1:25



**2** ANCHOR BOLT ARRANGEMENT  
S204 1:25



**4** PB1-PL16x1324x1324 TEMP. (NOT GALV'D) FOR ANCHOR BOLT  
S204 1:25



Notes

Legend

A	ISSUED FOR TENDER	RF	RF	17.03.15
Revision		By	Appd.	YY.MM.DD

File Name:	dwg_60104_AJWF-5702	IC	RF	RF	17.01.04
		Dwn.	Chkd.	Dgn.	YY.MM.DD

Permit-Seal

PRELIMINARY  
FOR REVIEW ONLY

Client/Project



AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

115kV OVERHEAD MAINLAND  
TRANSMISSION LINE - TYP. EMBEDMENT  
FOUNDATION DESIGN FOR POLE STRUCT.

Project No.	133560104	Scale	0 200 600 1000mm
Drawing No.	Sheet	Revision	

S702

1 of 1

A

GENERAL NOTES

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE PLAN AND PROFILE DRAWINGS, ANCHOR BOLT DRAWINGS AND STAKING INFORMATION.
- FOR POLE FRAMING DETAILS, SEE DWG\_60104\_AJWF-E700-E712
- ALL DIMENSIONS AS SHOWN ARE METRIC IN MILLIMETERS U.N.O.

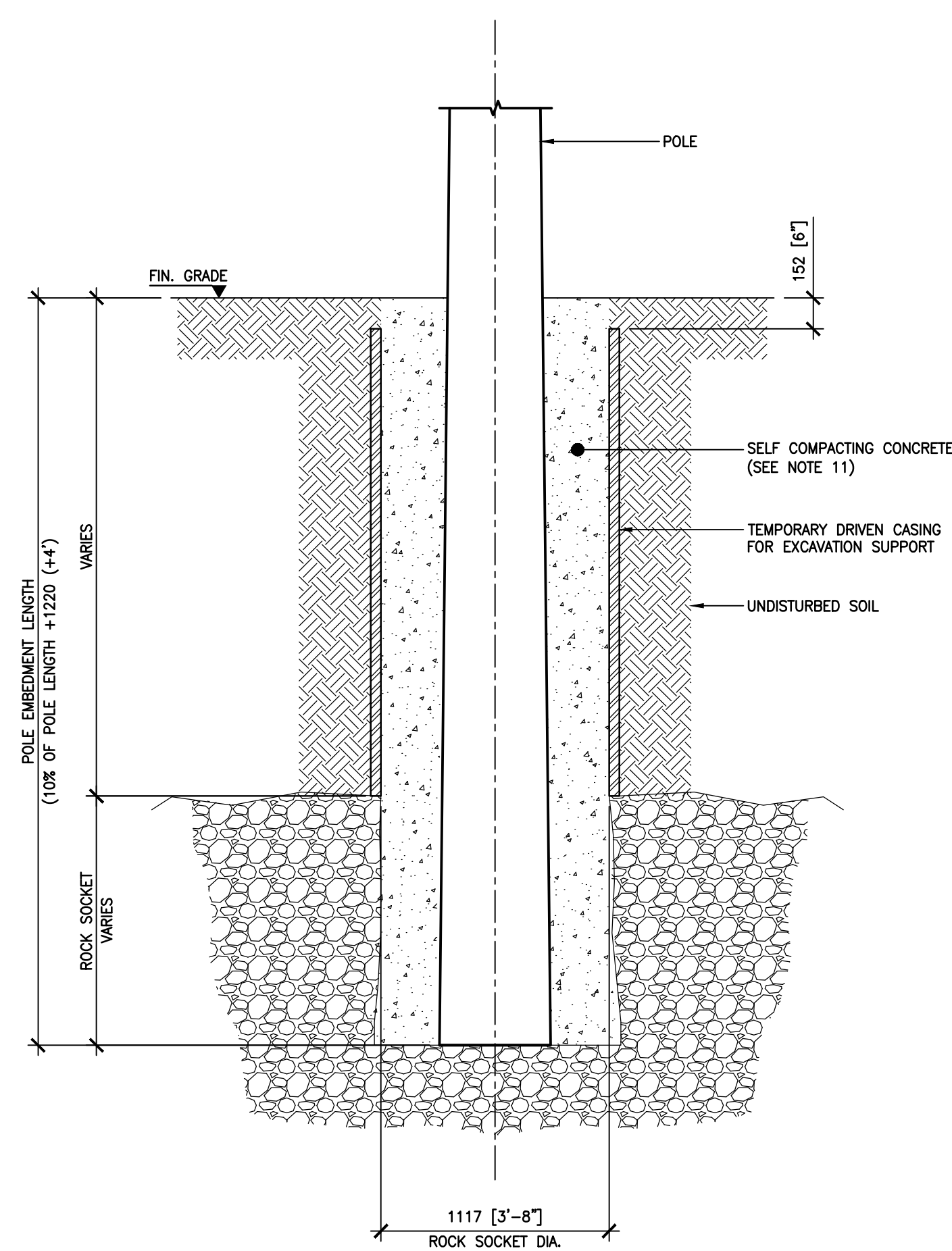
DESIGN PARAMETERS

- FOUNDATION IS BASED ON THE GEOTECHNICAL BOREHOLE INFORMATION PROVIDED BY STANTEC CONTAINED ON BOREHOLE RECORD N: 4 896 130 E: 362 693 BH17-02 AND N: 4 896 409 E: 362 548 BH17-03
- GROUND WATER LEVEL IS DESIGNED AT GRADE.
- FROST DEPTH IS 1.2m (4') BELOW GRADE
- BASED ON THE INFORMATION ON BOREHOLE RECORD, THE FOLLOWING DESIGN PARAMETER AND ASSUMPTIONS ARE ADOPTED FOR THE FOUNDATION DESIGN:

ZONE	STRUCTURE	SCENARIO
ZONE 1	DWG E700-E712	SHALLOW/DEEP ROCK SCENARIO

FOUNDATION MATERIAL AND CONSTRUCTION NOTES

- MIN. DIAMETER OF TEMP CASING SHALL BE POLE BUTT DIAMETER ±300mm (12").
- DEPTH OF HOLE IN SLOPING GROUND SHALL BE MEASURED FROM THE LOWER SIDE OF HOLE.
- ALL EXCAVATIONS SHALL BE PERFORMED IN A MANNER THAT SHALL ENSURE PROPER DRAINAGE DURING THE COURSE OF WORK. FLOODED EXCAVATIONS SHALL BE DEWATERED AND ALL MUCK SHALL BE REMOVED BEFORE PROCEEDING WITH WORK. ALL EXCAVATIONS SHALL BE SUFFICIENTLY SUPPORTED TO PREVENT COLLAPSE.
- AFTER EXCAVATION, EXPOSED SOIL SURFACES SHALL BE PROTECTED PRIOR TO POLE PLACEMENT.
- ALL EXCAVATION, CONCRETE WORK AND INSTALLATION SHALL BE INSPECTED BY A QUALIFIED PERSONNEL.
- PRIOR TO THE PLACEMENT OF POLE, EXCAVATION SHALL BE INSPECTED BY QUALIFIED GEOTECHNICAL PERSONNEL TO CONFIRM THAT THE SOIL PROPERTIES ARE CONSISTENT WITH THE GEOTECHNICAL REPORT AND DESIGN PARAMETERS.
- BACKFILL SHALL BE WELL GRADED PIT RUN GRAVEL THAT CONFORMS TO RECOMMENDED SPECIFICATIONS FOR GRANULAR MATERIALS IN THE GEOTECHNICAL REPORT AND SHALL BE COMPACTED TO 95% SPMD WITH MAX LIFT OF 300mm.
- SAFETY MEASURES SHALL BE PROVIDED AFTER EXCAVATION TO ENSURE WORKPLACE SAFETY.
- BACKFILLING FOR GAP BETWEEN TEMPORARY CASING AND POLE STRUCTURE SHALL BE SELF-COMPACTED SCREENING OR WELL GRADED CRUSH STONE WITH THE SIZE BETWEEN 1/2" (12mm) SCREEN AND 3/4" (19mm) SCREEN. BACKFILL SHALL BE WELL TAMPED TO ENSURE COMPACT STATE.
- IT IS THE RESPONSIBILITY OF THE CONSTRUCTOR TO ENSURE ALL VOIDS BETWEEN THE EXCAVATED ROCK SURFACES AND PERMANENT STEEL CASING TO PROPERLY FILLED BY APPROVED SCREENING MATERIAL OR GROUT. THE FILLING MATERIAL SHALL BE PROPERLY COMPACTED TO ENSURE THAT LATERAL RESISTANCE SUPPORTING THE CASING SHALL BE AT LEAST EQUIVALENT TO SOIL WITH SPT-N VALUE EQUAL TO 25.
- SELF COMPACTING CONCRETE WITH A STRENGTH OF 25MPa AT 28 DAYS.



1 TYPICAL DIRECT EMBEDMENT PML2, PML3, PML4  
1:25

POLE HEIGHT  
BETWEEN 21m AND 22.7m (70' AND 75')

V:\013356\013356\0104\_00\_Design\42\_Drawing\Structural\310 Pole Foundation Mainland.dwg, 6/10/14, AJWF-S702.dwg, 2017/03/15 9:45 AM By: Ben



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Notes

- REFER TO E800 FOR PHASING DIAGRAM
- NORTHING AND EASTING COORDINATES PROVIDED IN NAD83 (CSRS) UTM ZONE 18N COORDINATE SYSTEM
- ALL DIMENSIONS PROVIDED IN METERS UNLESS OTHERWISE NOTED

Legend

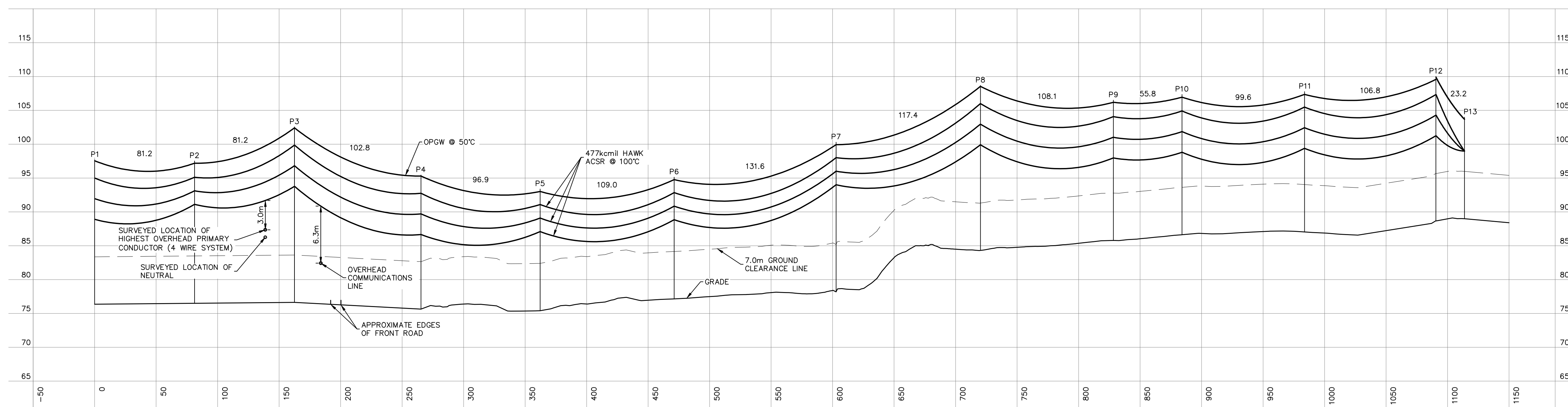
- 115kV SUBMARINE CABLE
- 115kV OVERHEAD TRANSMISSION LINE
- PROPOSED POLE



**A** OVERHEAD TRANSMISSION LINE – PLAN VIEW  
Scale: 1:2000

10.0 m Vert. Scale 55.0 m Horiz. Scale

DESIGNED TO CAN/CSA-C22.3 No. 1-15, CSA 60826



**B** OVERHEAD TRANSMISSION LINE – PROFILE VIEW  
Scale: Horiz = 1:2000 Vert = EXAGGERATED 5.5x

POLE	HEIGHT	TYPE	INSTALLATION	REFERENCE DRAWING NO.	NORTHING	EASTING
P1	21.34m (70')	RISER POLE	CONCRETE FOUNDATION	E806	4892083	363119.70
P2	24.38m (80')	TANGENT	DIRECT EMBEDMENT	E802	4892010.5	363156.40
P3	24.38m (80')	HEAVY ANGLE	CONCRETE FOUNDATION	E805	4891938	363193.00
P4	19.82m (65')	HEAVY ANGLE	CONCRETE FOUNDATION	E805	4891837.02	363173.50
P5	21.34m (70')	TANGENT	DIRECT EMBEDMENT	E802	4891756.054	363226.72
P6	21.34m (70')	TANGENT	DIRECT EMBEDMENT	E802	4891665	363286.60
P7	25.91m (85')	TANGENT	DIRECT EMBEDMENT	E802	4891555	363358.90
P8	24.38m (80')	HEAVY ANGLE	CONCRETE FOUNDATION	E805	4891457	363423.50
P9	24.39m (80')	SMALL ANGLE	DIRECT EMBEDMENT	E804	4891353.012	363393.92
P10	24.39m (80')	SMALL ANGLE	DIRECT EMBEDMENT	E804	4891303.416	363368.39
P11	24.39m (80')	SMALL ANGLE	DIRECT EMBEDMENT	E804	4891218.749	363315.90
P12	21.34m (70')	STATION ANGLE	CONCRETE FOUNDATION	E803	4891132.797	363252.49
P13	SEE S211	TERMINATION GANTRY	CONCRETE FOUNDATION	S211	4891112	363262

\*\*\*\*\*For PHCL and Windlectric Use Only\*\*\*\*\*

Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

Reviewed - No comments  
 Reviewed - Incorporate comments and resubmit  
 Reviewed - Not accepted

Reviewed By: \_\_\_\_\_ Date (dd-mmm-yyyy): \_\_\_\_\_

Project Manager - PHCL: \_\_\_\_\_ Date (dd-mmm-yyyy): \_\_\_\_\_

Project Manager - Windlectric: \_\_\_\_\_ Date (dd-mmm-yyyy): \_\_\_\_\_

Owner:

Client/Project



AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

115 KV OVERHEAD TRANSMISSION  
LINE PLAN & PROFILE  
ISLAND

Project No. 133561014 Scale AS NOTED  
Drawing No. \_\_\_\_\_ Sheet \_\_\_\_\_ Revision \_\_\_\_\_

E801 1 of 2 C

NOT FOR CONSTRUCTION



C	UPDATED POLES	RF	RF	17.04.06
B	FOR CLIENT REVIEW	DT	RF	17.01.17
A	FOR CLIENT REVIEW	RF	RF	17.01.04

Revision By Appd. YY.MM.DD

File Name:	dwg_60104_A1WF-S800	IC	RF	RF	17.01.04
		Dwn.	Chkd.	Dgn.	YY.MM.DD

Permit-Seal

PRELIMINARY  
FOR REVIEW ONLY

Client/Project



AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

115kV OH LINE  
FOUNDATION DETAILS  
POLE P1, P3, P4, P8 AND P12

Project No.

133560104

Drawing No.

S800

Scale

0 200 600 1000mm  
1:20

Sheet

1 of 1

Revision

C

GENERAL NOTES

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE PLAN AND PROFILE DRAWINGS, ANCHOR BOLT DRAWINGS AND STAKING INFORMATION.
- FOR POLE FRAMING DETAILS, SEE DWG\_60104\_A1WF-E805-E806 AND E807.
- ALL DIMENSIONS AS SHOWN ARE METRIC IN MILLIMETERS U.N.O.

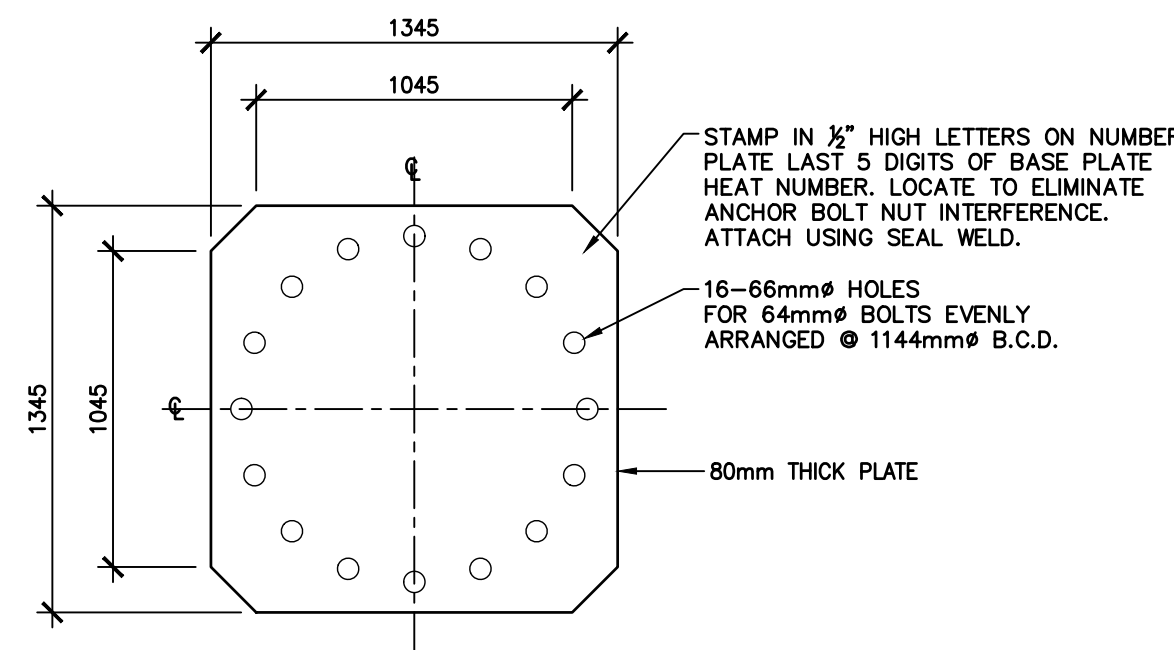
DESIGN PARAMETERS

- FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL INVESTIGATION REPORT "STANTEC DRAFT REPORT SUPPLEMENTARY GEOTECHNICAL INVESTIGATION DATED SEPTEMBER 25, 2015 AND ELECTRICAL INFRASTRUCTURE AMHERST ISLAND WIND FARM DATED SEPTEMBER 20, 2016 HAS BEEN USED FOR THE FOUNDATION DESIGN.
- GROUND WATER LEVEL IS DESIGNED AT GRADE.
- FROST DEPTH IS 1.2m (4') BELOW GRADE.
- BASED ON THE INFORMATION ON BORHOLE RECORD, THE FOLLOWING DESIGN PARAMETER AND ASSUMPTIONS ARE ADOPTED FOR THE FOUNDATION DESIGN:

STRUCTURE	DESIGN PARAMETERS	
P1, P3, P4, P8, P12	ROCK BEARING RESISTANCE	
	1500 kPa ULS	750 kPa SLS

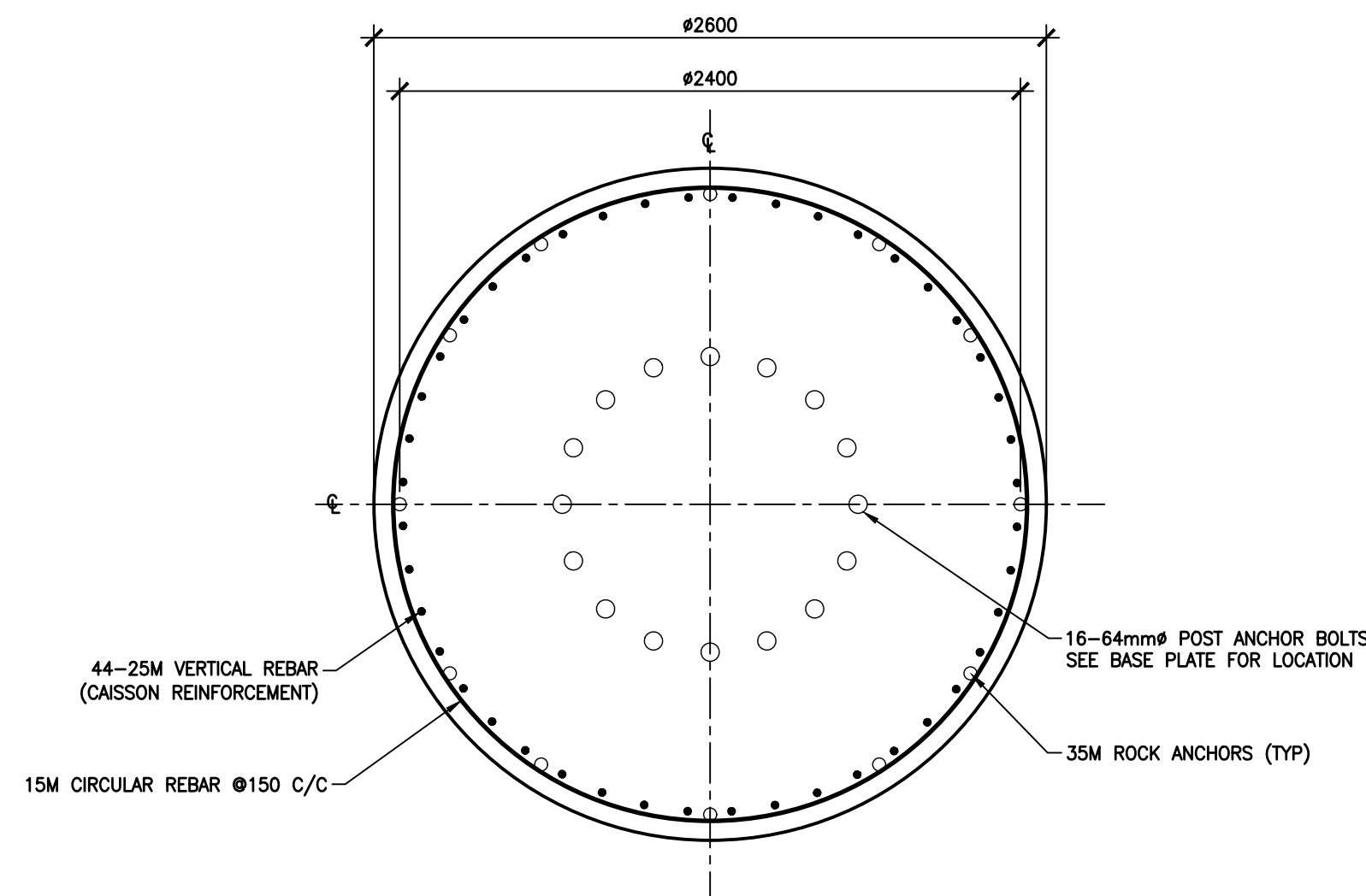
FOUNDATION MATERIAL AND CONSTRUCTION NOTES

- CONCRETE MATERIAL, DESIGN, TESTING AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH CSA STANDARD CAN 2-A23 SERIES.
- CONCRETE SPECIFICATION SUPPLY AND DELIVERY OF CONCRETE SHALL BE AS FOLLOWS:
  - MINIMUM COMPRESSIVE STRENGTH: 35 MPa AT 28 DAYS
  - GROUT 70MPa AT 28 DAYS; 30MPa AT 3 DAYS
  - SPECIFICATIONS ON PORTLAND CEMENT: TYPE GU NORMAL PORTLAND CEMENT, EXPOSURE CLASS C-1
  - 4%-7% AIR CONTENT
  - MIN. 3 CYLINDERS TESTING WITH ONE AT 7 DAYS AND TWO AT 28 DAYS ARE REQUIRED
- UNLESS OTHERWISE SPECIFIED, MINIMUM CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS:
  - CONCRETE CAST AGAINST SOL = 75mm
  - FORMED CONCRETE WITH DIRECT CONTACT TO SOIL = 50mm
  - CONCRETE SURFACE EXPOSED TO WEATHER = 50mm
- REINFORCING STEEL SHALL BE DEFORMED STEEL BAR WITH MINIMUM YIELD STRENGTH OF 400 MPa (60PSI) AND CONFORMING TO CSA G30.12 GR.400 EXCEPT TIES AND STIRRUPS WHICH SHALL BE GRADE 300.
- MINIMUM SPLICES, LAPS AND HOOKS SHALL BE IN ACCORDANCE WITH CAN 3-A23.1
- ALL OTHER STEEL MATERIAL SHALL BE CSA-G40.21-M300W U.N.O. AND SHALL BE HOT DIP GALVANIZED FINISH ACCORDING TO CSA-G164 U.N.O. WHEN EXPOSED.
- ALL EXCAVATIONS SHALL BE PERFORMED IN A MANNER THAT SHALL ENSURE PROPER DRAINAGE DURING THE COURSE OF WORK. FLOODED EXCAVATIONS SHALL BE Dewatered AND ALL MUCK SHALL BE REMOVED BEFORE PROCEEDING WITH WORK. ALL EXCAVATIONS SHALL BE SUFFICIENTLY SUPPORTED TO PREVENT COLLAPSE.
- AFTER EXCAVATION, EXPOSED SOIL SURFACES SHALL BE PROTECTED PRIOR TO CONCRETE CASTING.
- PRIOR TO THE PLACEMENT OF CONCRETE, BOTTOM OF FOUNDATIONS SHALL BE INSPECTED BY QUALIFIED GEOTECHNICAL PERSONNEL TO CONFIRM THAT THE SOIL PROPERTIES ARE CONSISTENT WITH THE GEOTECHNICAL INVESTIGATION REPORT AND DESIGN PARAMETERS
- BEFORE PLACING CONCRETE/GROUT, CONTRACTOR SHALL VERIFY ANCHOR BOLTS AND LOCATIONS OF ALL MECHANICAL, UTILITY SERVICES FOR EMBEDDED ITEMS, HOLES, ETC.
- PROPER VIBRATION METHODS SHALL BE USED DURING CONCRETING.
- CONCRETE SHALL BE ADEQUATELY CURED BY ADDITIONAL MOISTURE AND/OR COVERED BY WATER RETAINING MATERIAL AFTER POURING.
- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 25mm CHAMFER.
- SAFETY MEASURES SHALL BE PROVIDED AFTER EXCAVATION TO ENSURE WORKPLACE SAFETY.
- ROCK HEAD LEVEL SHALL BE IDENTIFIED AS LEVEL WHERE THE ROCK MASS REACHES A ROCK QUALITY DESIGNATION (RQD) INDEX OF 50% OR GREATER, AND SUCH RQD REQUIREMENT SHALL BE MAINTAINED FOR A MINIMUM OF 2.2m FROM THE ROCK HEAD LEVEL
- THE CONTRACTOR SHALL ENSURE THAT, DURING THE PROCUREMENT PROCESS, ADEQUATE TOLERANCES AND ALLOWANCES ON THE LENGTH OF REBAR CAGES SHALL BE PROVIDED TO MEET DESIGN REQUIREMENT AND SUIT ACTUAL SITE CONDITION.
- PULL TEST ONE ROCK ANCHOR PER FOUNDATION TO A SERVICE LOAD (DL) OF 285kN. FOLLOW FHWA-IF-99-015 PERFORMANCE TEST AS PER 7.4.2.2 TO A MAXIMUM OF 1.2DL. IF TEST IS FAILED ROCK ANCHOR MUST BE REMOVED AND REINSTALLED AND A PERFORMANCE TEST TO 1.2DL MUST BE PERFORMED IN OTHER OF THE REMAINING ANCHORS.



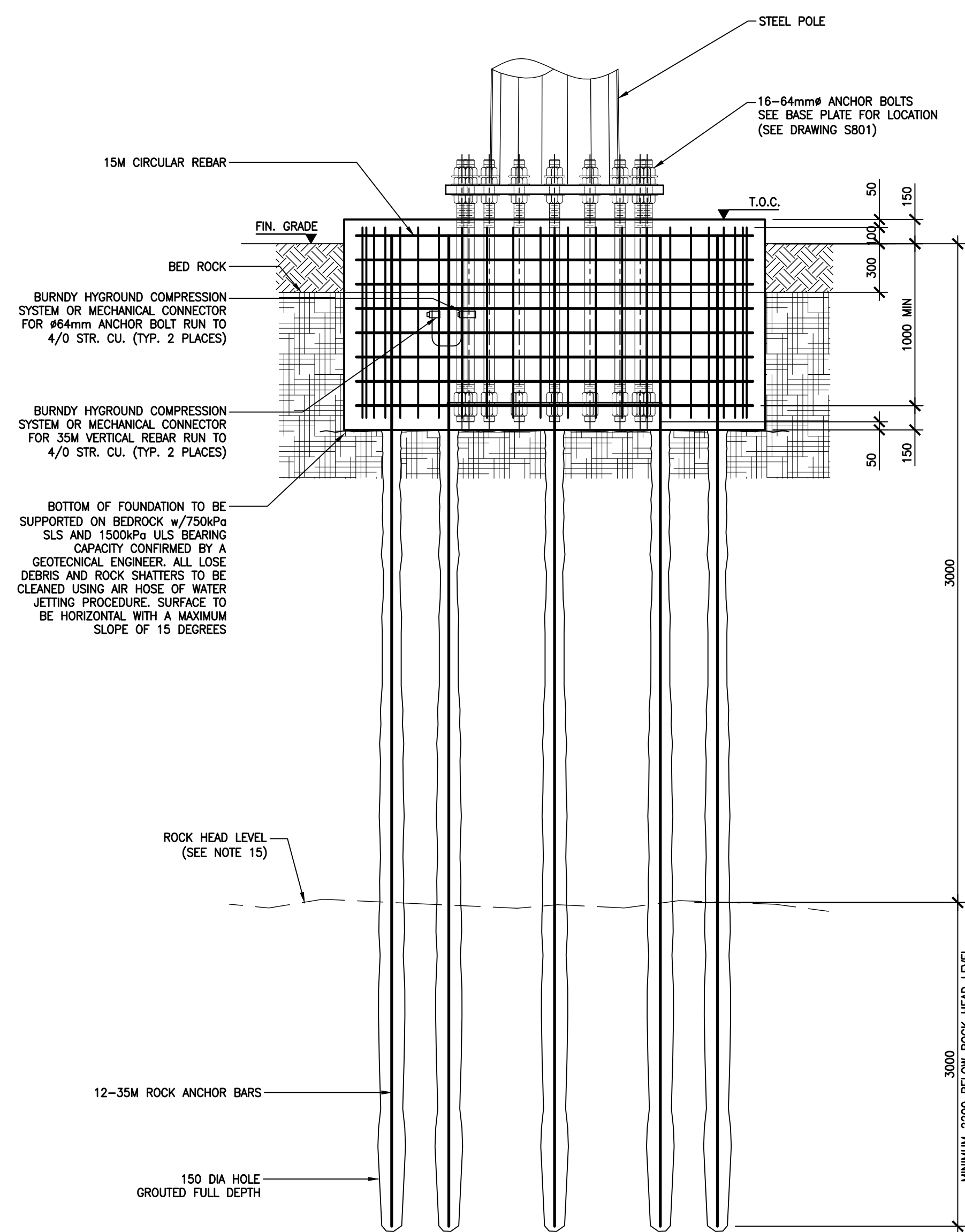
4 BASE PLATE DETAIL

1:25  
NOTE: CONFIRM PLATE DIMENSIONS AND PROFILE WITH POLE FABRICATOR



1 PLAN VIEW

1:25



3 SECTION VIEW FOR POLE FOUNDATION P1, P3, P4, P8 AND P12

1:25



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Notes

- ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS [IMPERIAL] U.N.O.
- FOR FOUNDATION DRAWINGS, SEE S800.
- FOR POLE LINE PLAN AND PROFILE DRAWINGS, SEE E801.
- FOR ANCHOR BOLT ORIENTATION, SEE DWG# (TO BE UPDATED)
- ANCHOR BOLT SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 670 MPa (97 ksi) AND A MINIMUM YIELD STRENGTH OF 482 MPa (70 ksi) EQUIVALENT TO AISI 8620. ANCHOR BOLT HARDWARE AND ASSEMBLIES SHALL MEET THE EQUIVALENT STRENGTH AND MATERIAL SPECIFICATION REQUIREMENTS.
- ALL OTHER STEEL MATERIAL SHALL BE CSA-G40.21-350W U.N.O.
- TOP PORTION OF ANCHOR BOLT AS SHOWN AND BOLT HARDWARE SHALL BE HOT DIP GALVANIZED FINISH AS IN ACCORDANCE WITH CSA-G164.
- ANCHOR BOLT SHALL BE SET ACCURATELY PLUMB, TRUE, ALIGNED AND RIGID.
- ANCHOR BOLT THREADS SHALL BE PROTECTED FROM DAMAGES DURING CONCRETING.
- NUMBER '3', '6', '9' AND '12' DENOTES FACE ORIENTATION OF POLE STRUCTURE, SEE ANCHOR BOLT ORIENTATION DRAWINGS FOR SETTING DETAILS.

Legend

C	UPDATED POLES	RF	RF	17.04.06
B	FOR CLIENT REVIEW	DT	RF	17.01.17
A	FOR CLIENT REVIEW	RF	RF	17.01.04

Revision By Appd. YY.MM.DD

File Name:	dwg_60104_AWP-S801	IC	RF	RF	17.01.04
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

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PRELIMINARY  
FOR REVIEW ONLY

Client/Project



AMHERST ISLAND WIND PROJECT  
75MW WIND FARM

Amherst Island, Loyalist Township, Ontario

Title

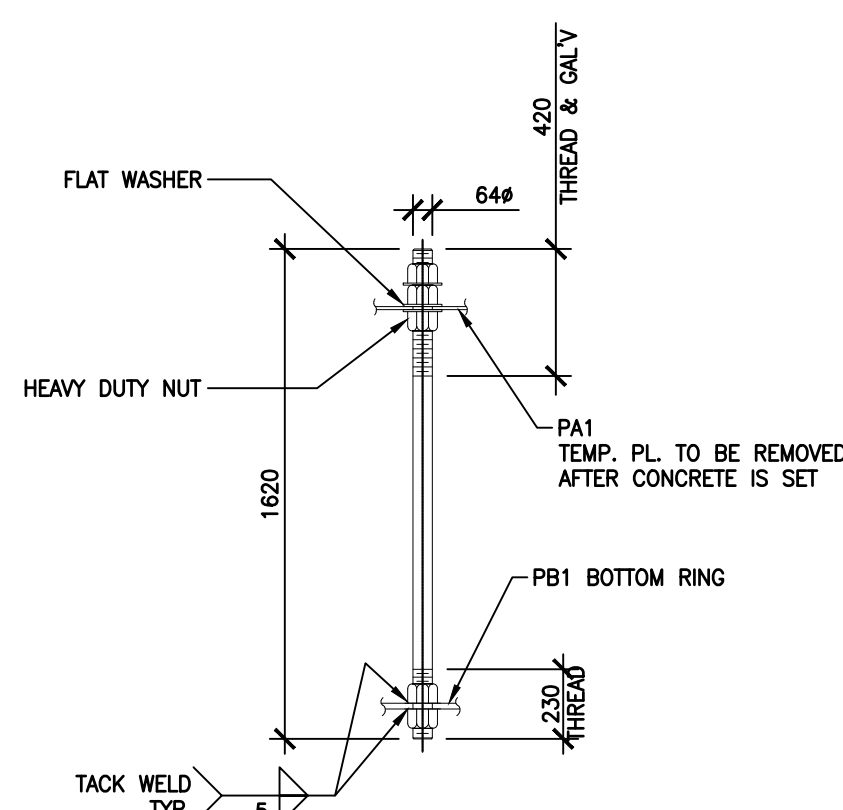
115KV OH LINE  
ANCHOR BOLT DETAILS  
POLE P1, P3, P4 AND P12

Project No. 133560104  
Scale 1:20  
Drawing No. Sheet Revision

S801

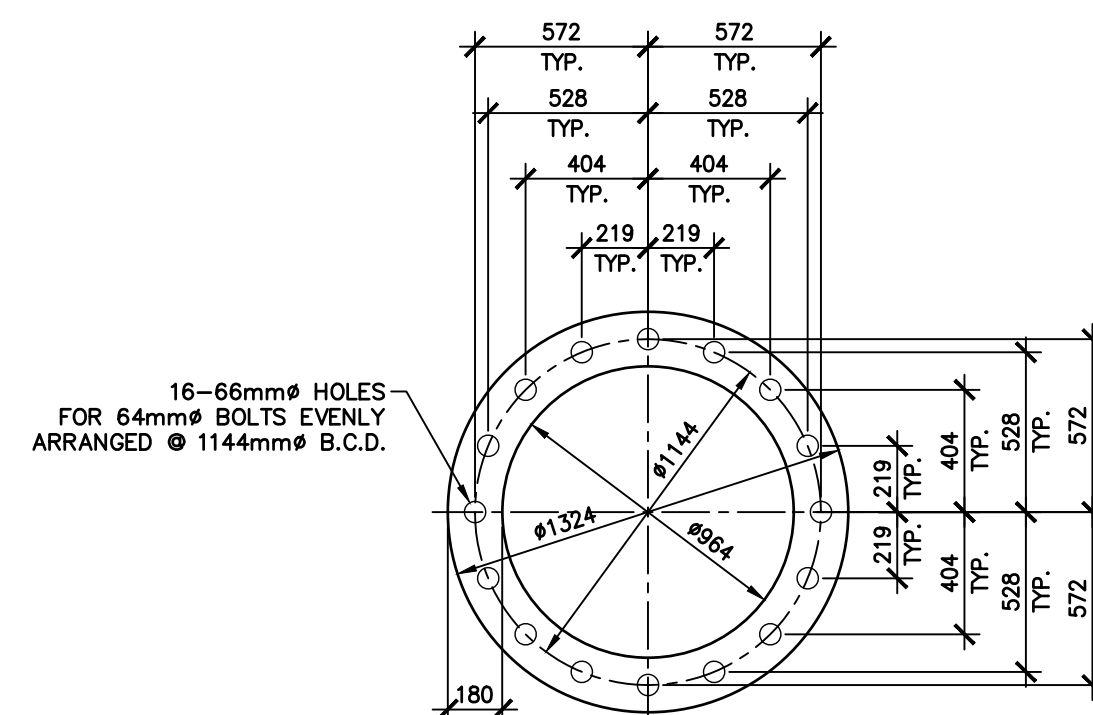
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C

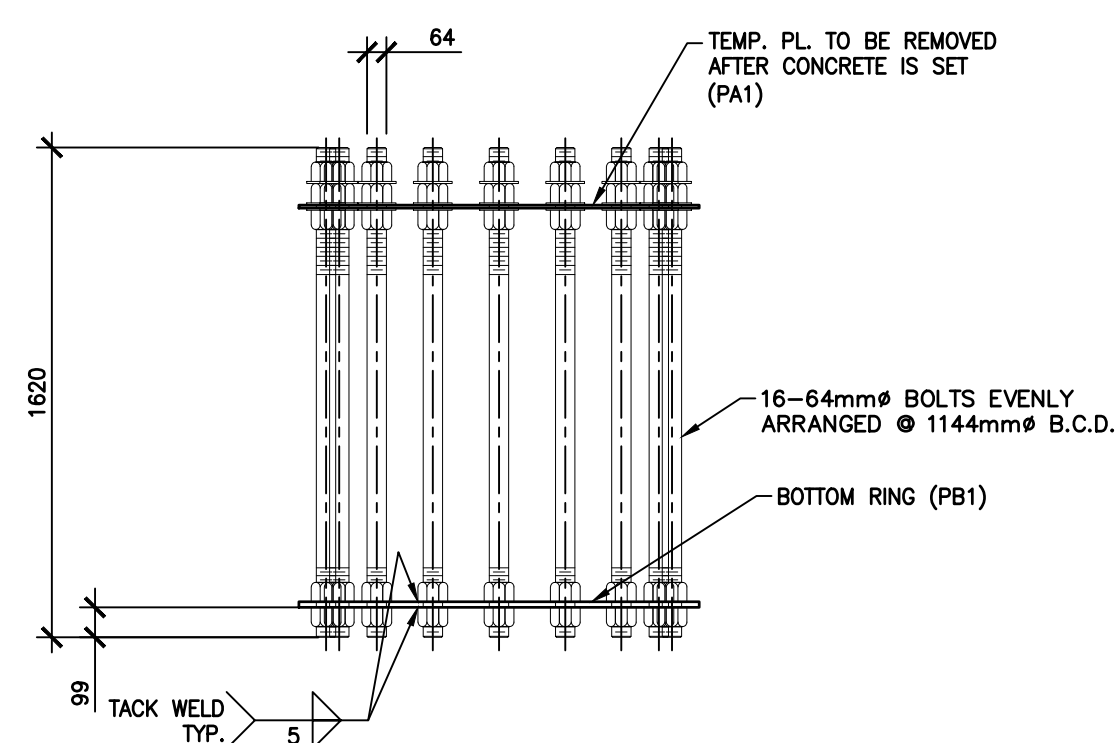


1 64mmØ x 1620mm GALV. ANCHOR BOLT  
S801 1:25

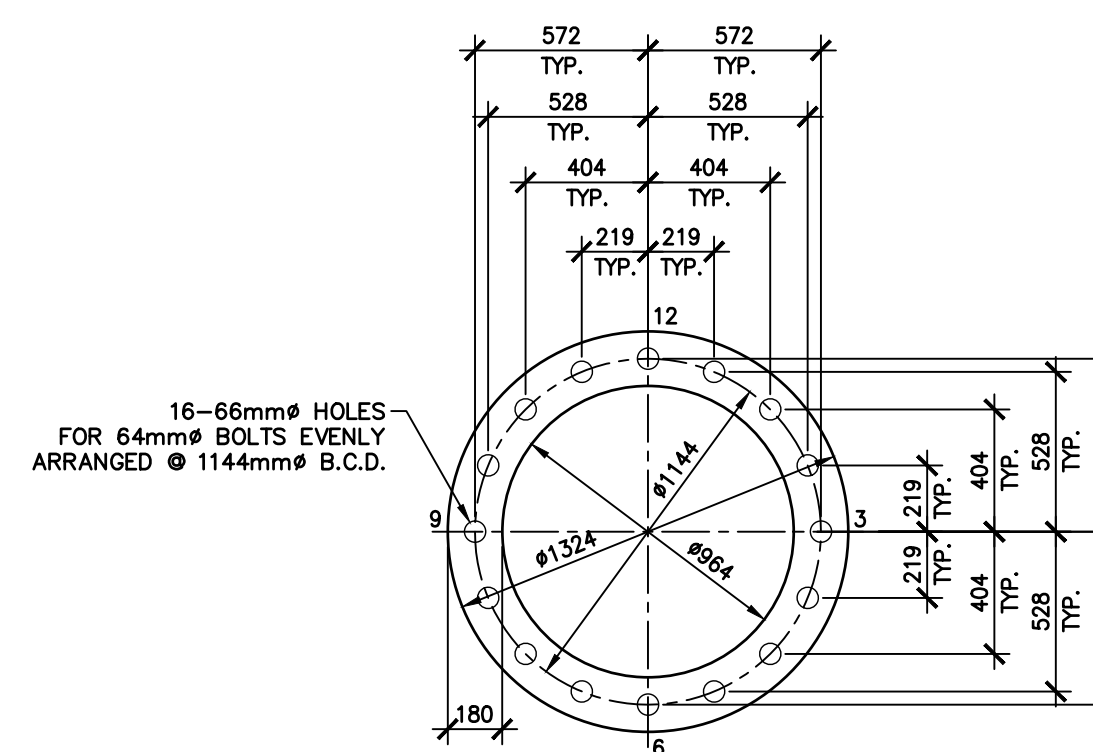
TOP THREAD & GALV'D LENGTH = 356mm  
BOTTOM THREAD LENGTH = 230mm  
C/W 5 HEAVY DUTY HEX NUTS & 2 FLAT WASHERS (GALV.)



3 PA1-PL9x1324x1324 TEMP. (NOT GALV'D) FOR ANCHOR BOLT  
S801 1:25



2 ANCHOR BOLT ARRANGEMENT  
S801 1:25



4 PB1-PL16x1324x1324 TEMP. (NOT GALV'D) FOR ANCHOR BOLT  
S801 1:25

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Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

- Reviewed - No comments
- Reviewed - Incorporate comments and resubmit
- Reviewed - Not accepted

Reviewed By \_\_\_\_\_ Date (dd-mmm-yyyy)

Project Manager - PHCL \_\_\_\_\_ Date (dd-mmm-yyyy)

Project Manager - Windlectric \_\_\_\_\_ Date (dd-mmm-yyyy)

Owner: Windlectric Inc.



Notes

Legend

C	UPDATED POLES	RF	RF	17.04.06
B	FOR CLIENT REVIEW	DT	RF	17.01.17
A	FOR CLIENT REVIEW	RF	RF	17.01.04

Revision By Appd. YY.MM.DD

File Name:	dwg_60104_AWF-S802	IC	RF	RF	17.01.04
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

PRELIMINARY  
FOR REVIEW ONLY

Client/Project



AMHERST ISLAND WIND PROJECT  
75MW WIND FARM  
Amherst Island, Loyalist Township, Ontario

Title

115kV OH LINE  
TYP. DIRECT EMBEDMENT FOUNDATION  
DESIGN FOR POLE STR.-POLES P2, P5, P6, P7, P9, P10 AND P11

Project No. 133560104  
Scale 1:20  
Drawing No. Sheet Revision

S802

1 of 1

C

GENERAL NOTES

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE PLAN AND PROFILE DRAWINGS, ANCHOR BOLT DRAWINGS AND STAKING INFORMATION.
- FOR POLE FRAMING DETAILS, SEE dwg\_60104\_AWF-E802-E804 AND E807.
- ALL DIMENSIONS AS SHOWN ARE METRIC IN MILLIMETERS U.N.O.

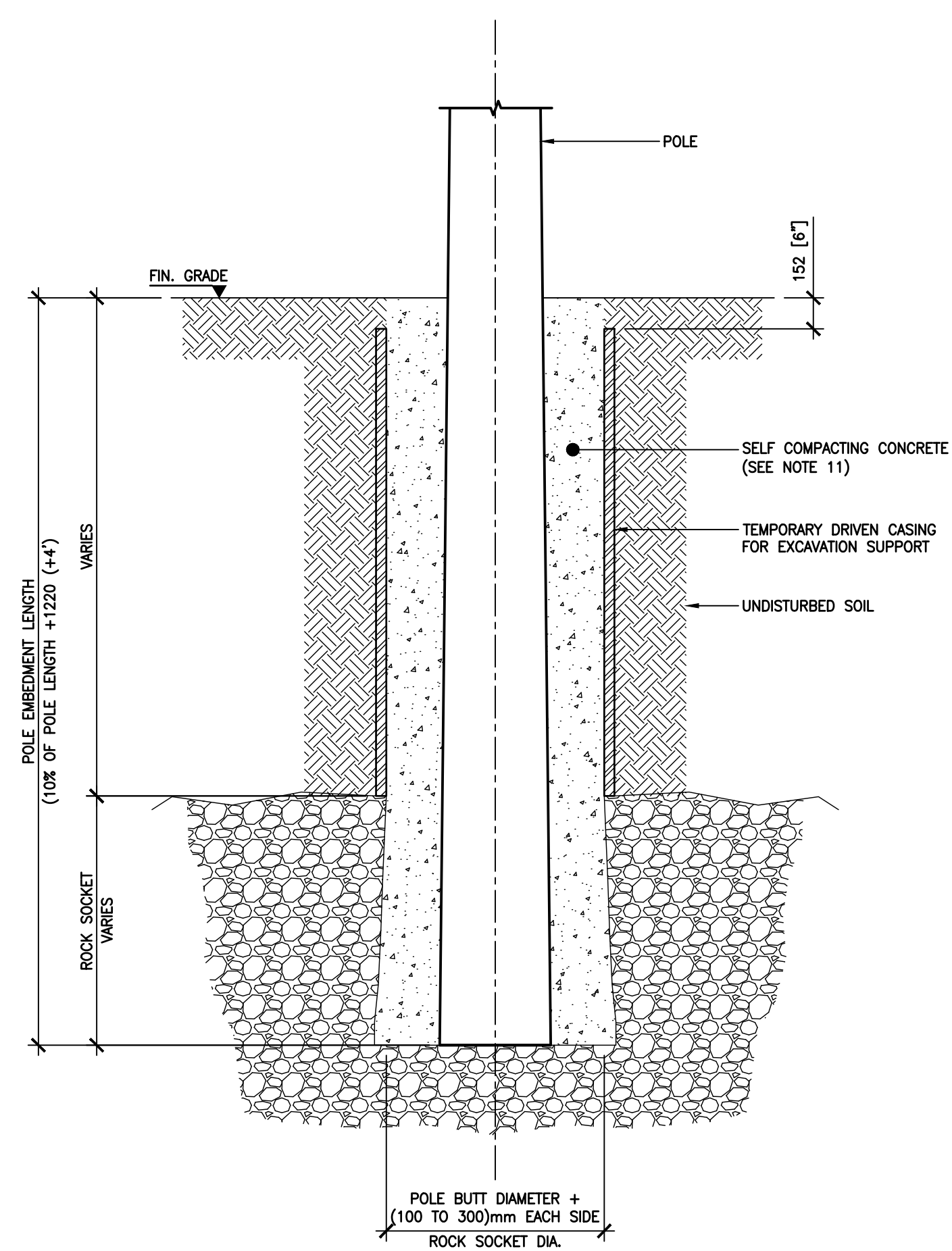
DESIGN PARAMETERS

- FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL INVESTIGATION REPORT "ISLAND HYDRO POLES REPORT GEOTECHNICAL INVESTIGATION DATED FEBRUARY 10, 2017 AND ELECTRICAL INFRASTRUCTURE AMHERST ISLAND WIND FARM DATED SEPTEMBER 20, 2016 HAS BEEN USED FOR THE FOUNDATION DESIGN.
- GROUND WATER LEVEL IS DESIGNED AT GRADE.
- FROST DEPTH IS 1.2m (4') BELOW GRADE.
- BASED ON THE INFORMATION ON BORCHOLE RECORD, THE FOLLOWING DESIGN PARAMETER AND ASSUMPTIONS ARE ADOPTED FOR THE FOUNDATION DESIGN:

STRUCTURE	DESIGN PARAMETERS		
	SOIL	UNDRAINED SHEAR	ANGLE OF FRICTION
P2, P5, P6, P7, P9, P10, P11	VERY HARD SANDY CLAY	c = 40 kPa	$\phi = 20^\circ$

FOUNDATION MATERIAL AND CONSTRUCTION NOTES

- MIN. DIAMETER OF TEMP CASING SHALL BE POLE BUTT DIAMETER PLUS 100mm TO 300mm EACH SIDE.
- DEPTH OF HOLE IN SLOPING GROUND SHALL BE MEASURED FROM THE LOWER SIDE OF HOLE.
- ALL EXCAVATIONS SHALL BE PERFORMED IN A MANNER THAT SHALL ENSURE PROPER DRAINAGE DURING THE COURSE OF WORK. FLOODED EXCAVATIONS SHALL BE DEWATERED AND ALL MUCK SHALL BE REMOVED BEFORE PROCEEDING WITH WORK. ALL EXCAVATIONS SHALL BE SUFFICIENTLY SUPPORTED TO PREVENT COLLAPSE.
- AFTER EXCAVATION, EXPOSED SOIL SURFACES SHALL BE PROTECTED PRIOR TO POLE PLACEMENT.
- ALL EXCAVATION, CONCRETE WORK AND INSTALLATION SHALL BE INSPECTED BY A QUALIFIED PERSONNEL.
- PRIOR TO THE PLACEMENT OF POLE, EXCAVATION SHALL BE INSPECTED BY QUALIFIED GEOTECHNICAL PERSONNEL TO CONFIRM THAT THE SOIL PROPERTIES ARE CONSISTENT WITH THE GEOTECHNICAL REPORT AND DESIGN PARAMETERS.
- BACKFILL SHALL BE WELL GRADED PIT RUN GRAVEL THAT CONFORMS TO RECOMMENDED SPECIFICATIONS FOR GRANULAR MATERIALS IN THE GEOTECHNICAL REPORT AND SHALL BE COMPACTED TO 95% SPDD WITH MAX LIFT OF 300mm.
- SAFETY MEASURES SHALL BE PROVIDED AFTER EXCAVATION TO ENSURE WORKPLACE SAFETY.
- BACKFILLING FOR GAP BETWEEN TEMPORARY CASING AND POLE STRUCTURE SHALL BE SELF-COMPACTED SCREENING OR WELL GRADED CRUSH STONE WITH THE SIZE BETWEEN #2 (12mm) SCREEN AND #4 (10mm) SCREEN. BACKFILL SHALL BE WELL TAMPED TO ENSURE COMPACT STATE.
- IT IS THE RESPONSIBILITY OF THE CONSTRUCTOR TO ENSURE ALL VOIDS BETWEEN THE EXCAVATED ROCK SURFACES AND PERMANENT STEEL CASING TO PROPERLY FILLED BY APPROVED SCREENING MATERIAL OR GROUT. THE FILLING MATERIAL SHALL BE PROPERLY COMPACTED TO ENSURE THAT LATERAL RESISTANCE SUPPORTING THE CASING SHALL BE AT LEAST EQUIVALENT TO SOIL WITH SPT-N VALUE EQUAL TO 25.
- SELF COMPACTING CONCRETE WITH A STRENGTH OF 25MPa AT 28 DAYS.



1 TYPICAL DIRECT EMBEDMENT  
1:25  
POLE HEIGHT  
BETWEEN 21m AND 26m (70' AND 85')

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