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ARE Telecom & Wind

AFS-2000

Above/ Below-Grade Ballasted Foundation Manual



1043 Grand Ave., #213
St. Paul, MN 55105
(651) 330-1263
www.aretelecom.com

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AFS-2000

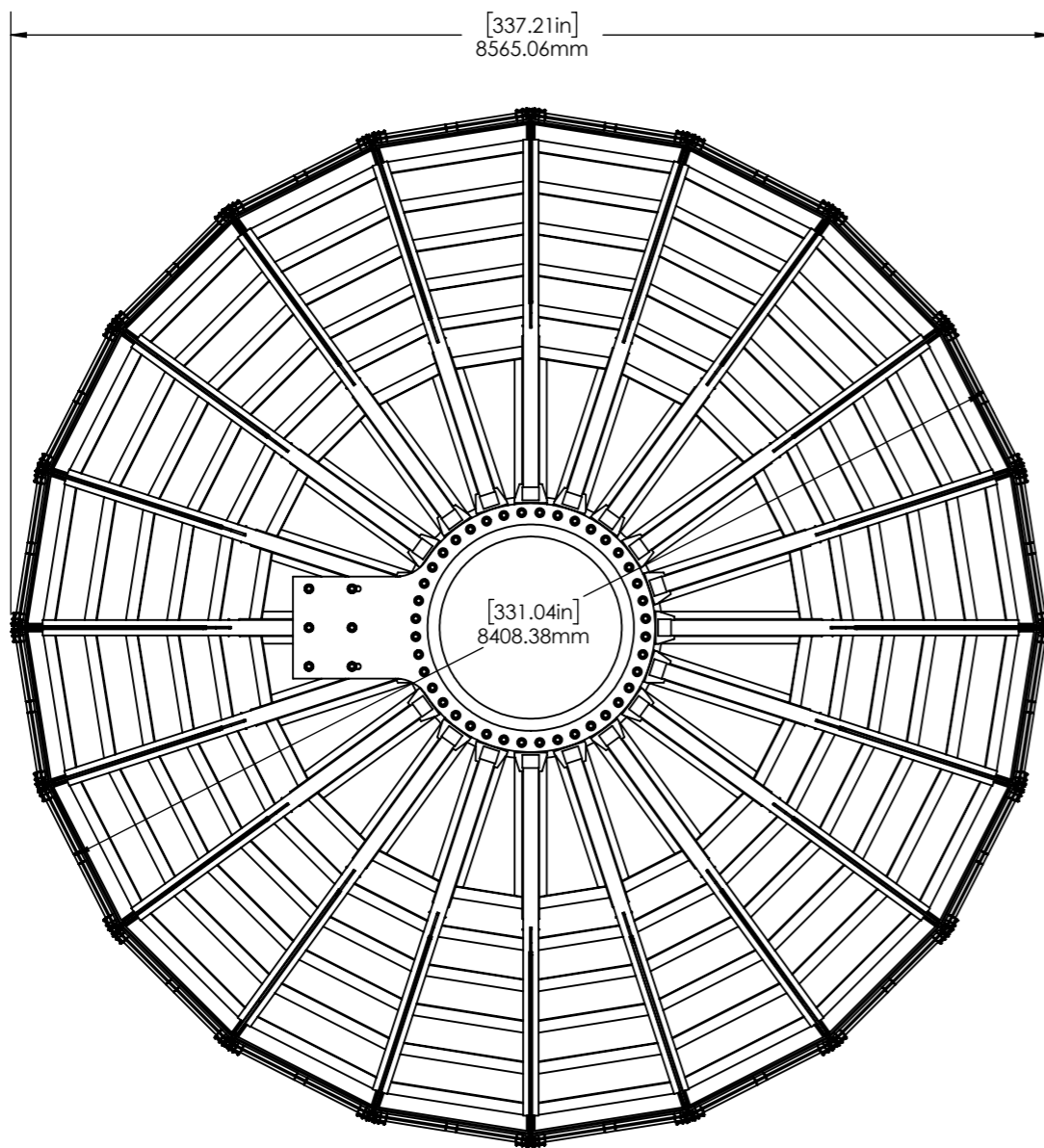
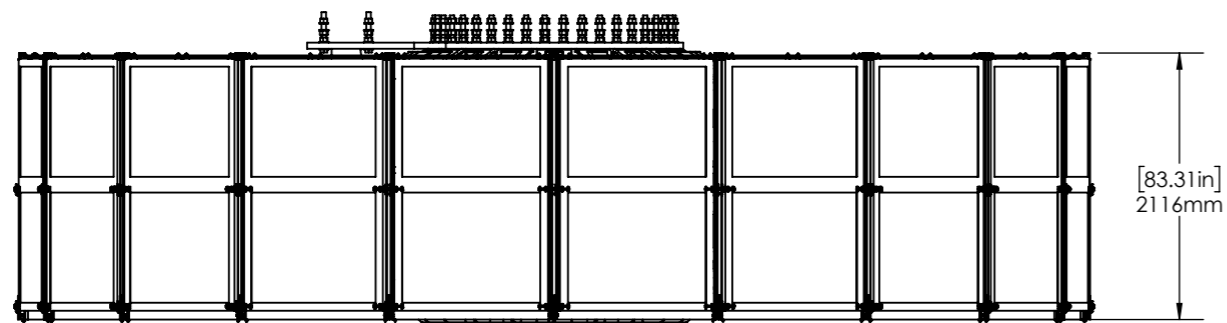
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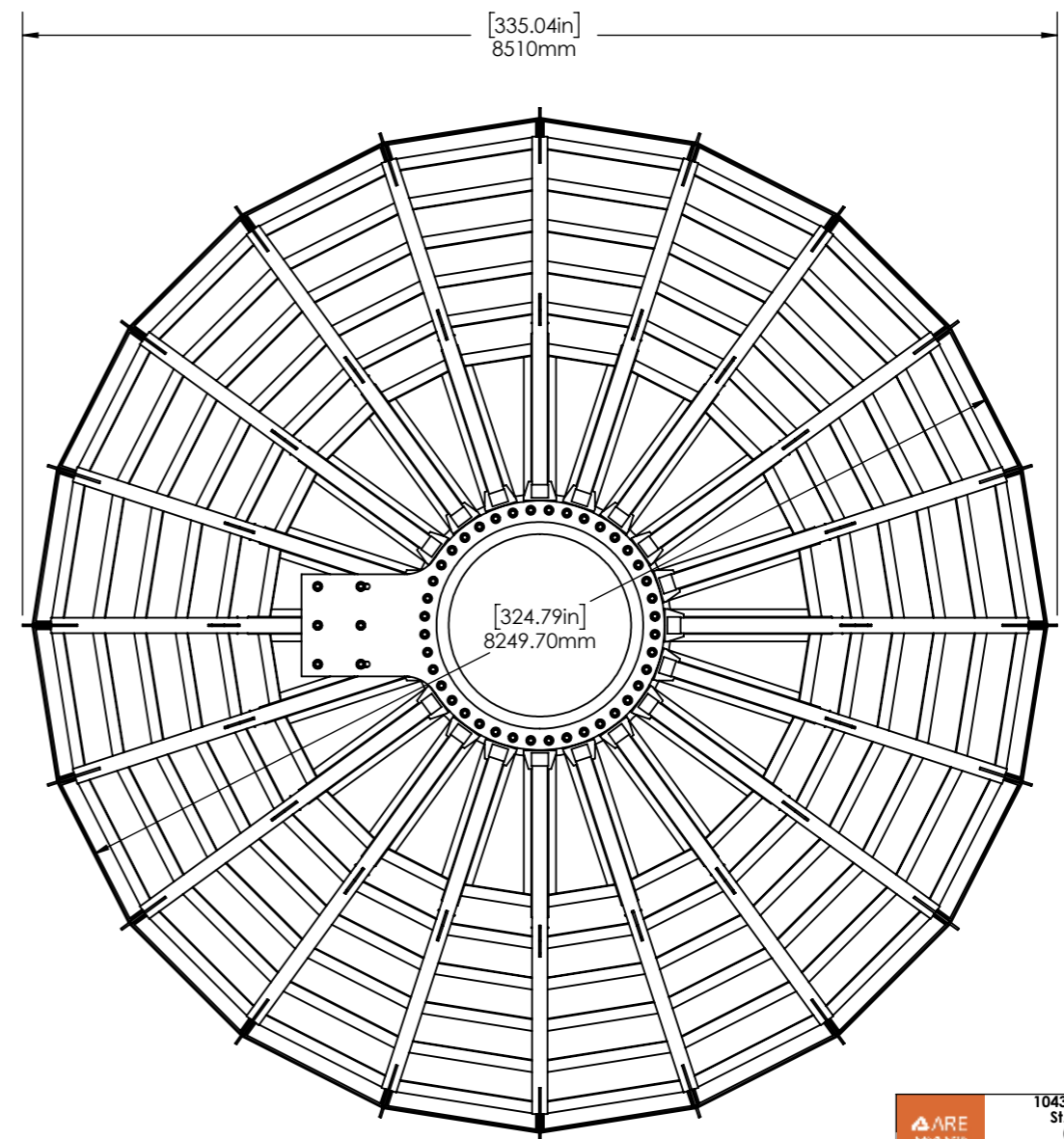
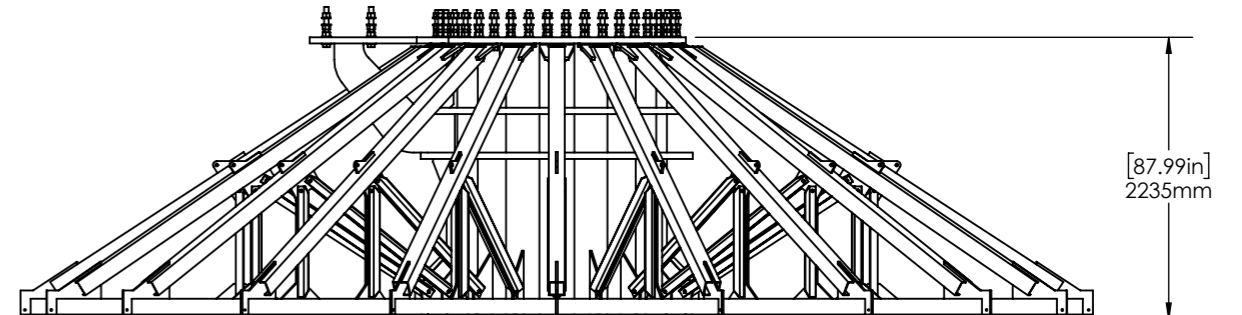
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A	Design Codes <ul style="list-style-type: none">ANSI/ TIA-222-G, Structural Standard for Antenna Supporting Structures and AntennasASCE/ SEI 7-05, Minimum Design Loads for Building and Other StructuresIBC 2009, International Building CodeAISC and RCSC, Specification for Structural Joints using ASTM A325-A490 Bolts or equivalentAWS D1.1IEC 61400-2Eurocode 3, 1-9									A
B	Design Loadings <ul style="list-style-type: none">Design Wind Speed - 133 mph (59.5 m/s)Deflection based on - 60 mph (27 m/s)Basic wind speed w/ 0.75" (19 mm) ice - 50 mph (22.4 m/s)Classification of Structure - Class IIExposure- CTopographic - Category 1									B
C	Ballast <ul style="list-style-type: none">Backfill / Ballast Material – Bulk Dry Density shall be 2700 lb/ yd3 (16 kN/m3)Ballast Volume - 150 yd3 (115 m3)Allowable soil bearing pressure at max capacity 4000 psf (192 kPa)Minimum allowable soil bearing pressure 1500 psf (72 kPa)Steel Structure Self Weight<ul style="list-style-type: none">Foundation - 28270 lb (12850 kg)Sidewalls - 5200 lb (2360 kg)Aluminum tape works well to fill gaps in sidewall when using fine grain materials for ballast									C
D	Design Load Combinations. <ul style="list-style-type: none">Dead: Tower Self Weight + Steel Structure Self Weight + Backfill Material Self WtWind: Tower Horizontal Reaction + Tower Moment ReactionService: 0.9 Dead + 1.35 WindUltimate: 0.9 Dead +1.35 Wind									D
E	Geotechnical Investigation <ul style="list-style-type: none">It is recommended that a site study be conducted to verify that the soil parameters equal or exceed the requirements shown above.									E
F	Important Note: Please contact ARE directly with questions or concerns, or if just unsure about the aforementioned details and requirements.									F
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Above Grade (Sidewalls Hinged)



Below Grade (Sidewalls not required)



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Site Control

(A) - Earth material shall be excavated and prepped to a diameter and depth of **355" x 85" / (9m x 2.15m)**.

Excavation walls shall be properly sloped to avoid cave-in.

(B) - Minimum allowable soil bearing capacity at maximum structural capacity shall meet or exceed **4000 psf / (192 kPa)**

Subsoil layer (bearing strata) shall be leveled prior to placing foundation structure in excavated hole. **A 4" / (100mm)** layer of coarse sand may be used to provide good contact between foundation and compacted subsoil layer.

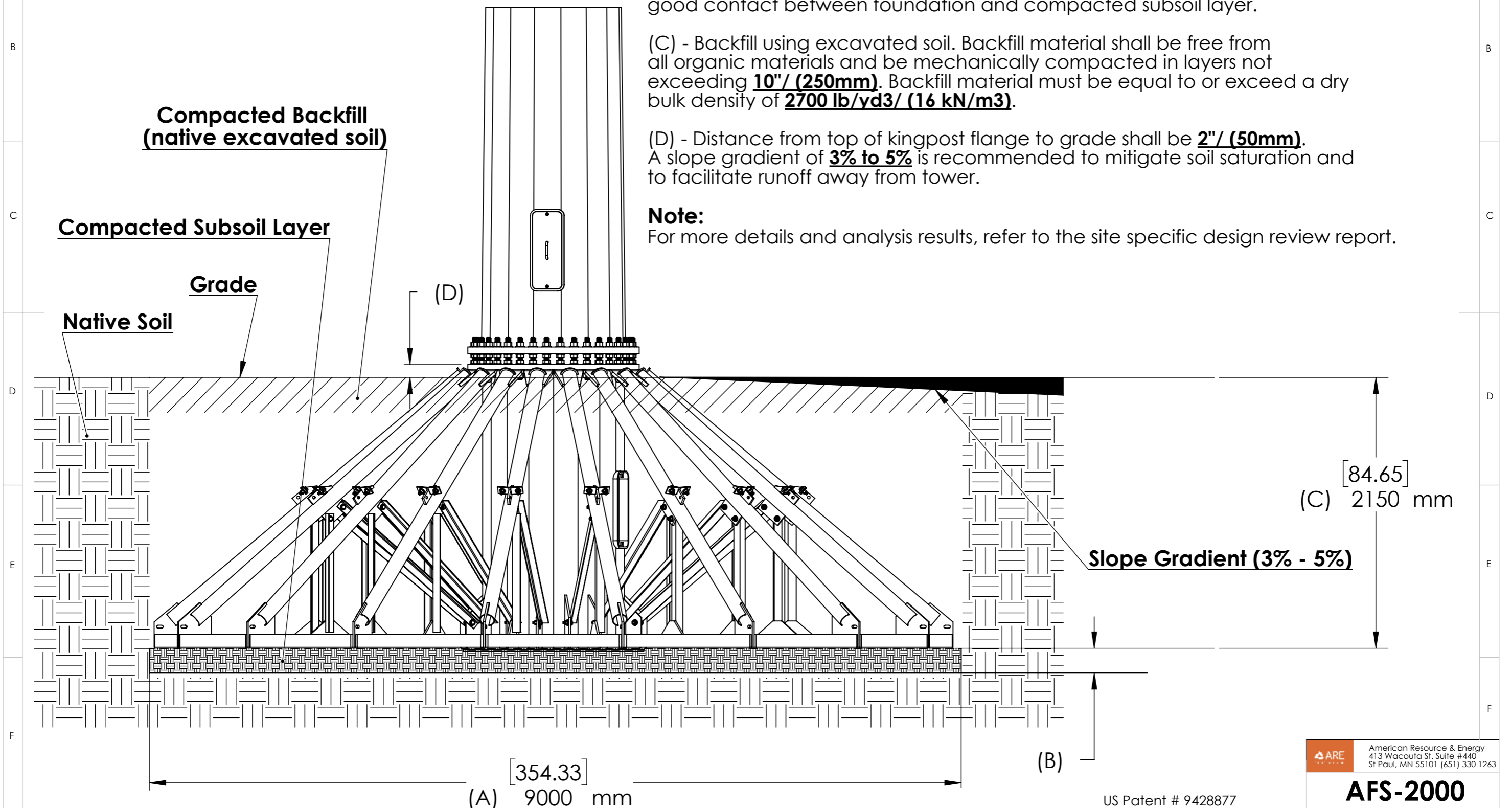
(C) - Backfill using excavated soil. Backfill material shall be free from all organic materials and be mechanically compacted in layers not exceeding **10" / (250mm)**. Backfill material must be equal to or exceed a dry bulk density of **2700 lb/yd3 / (16 kN/m3)**.

(D) - Distance from top of kingpost flange to grade shall be **2" / (50mm)**. A slope gradient of **3% to 5%** is recommended to mitigate soil saturation and to facilitate runoff away from tower.

Note:

For more details and analysis results, refer to the site specific design review report.

Direct Burial AFS-2000



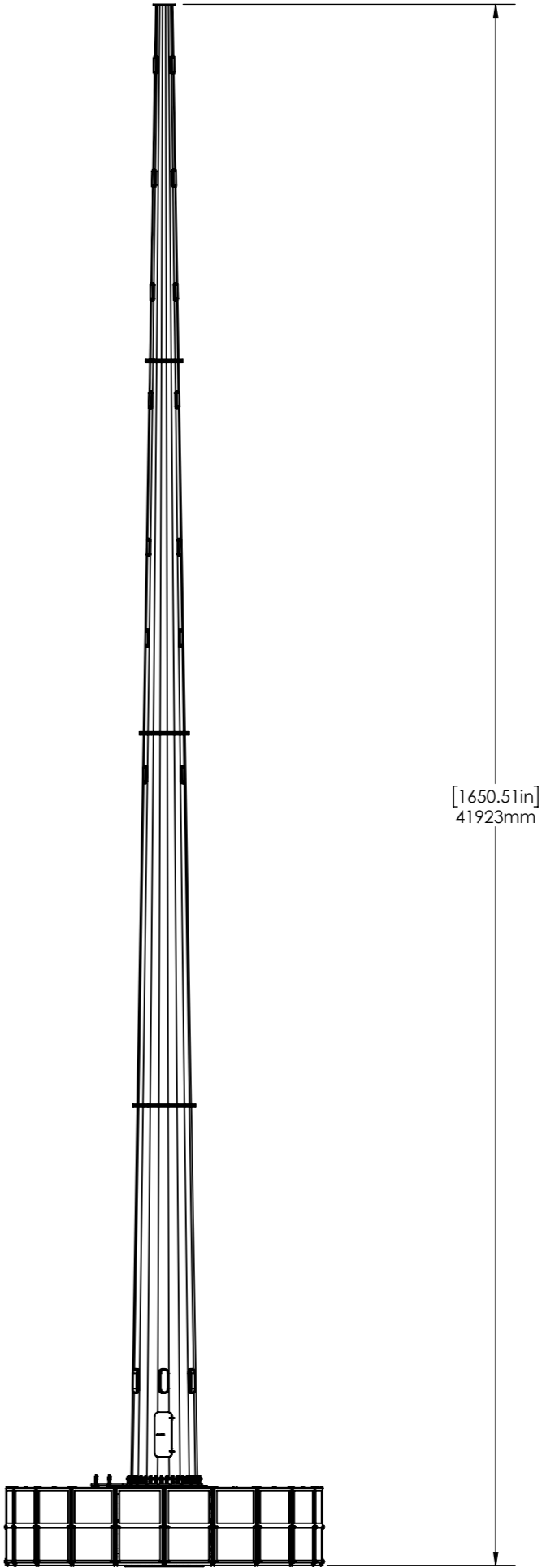
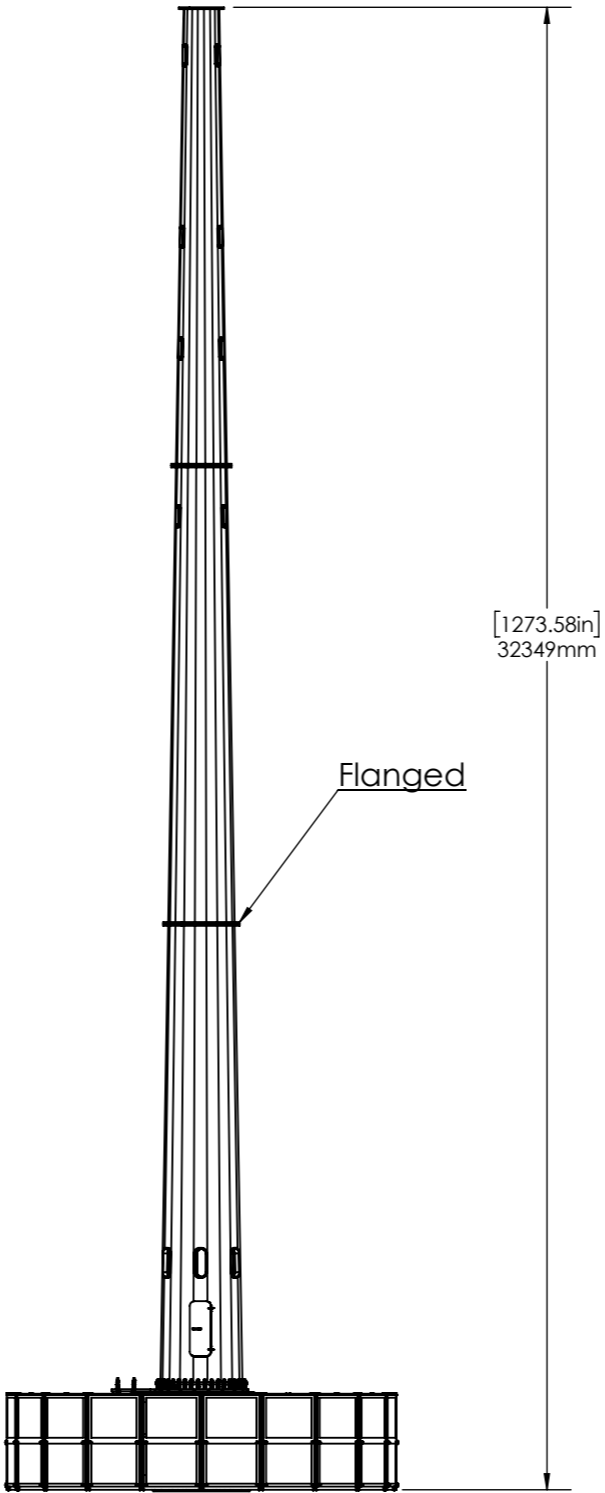
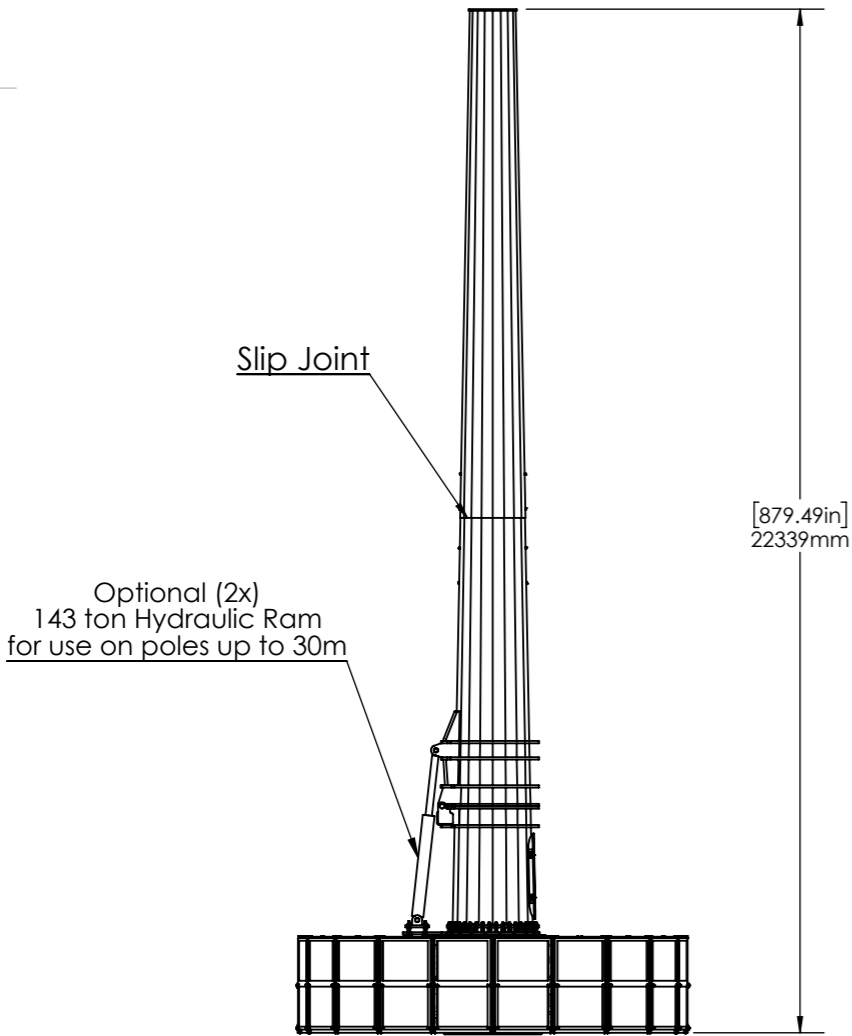
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Monopole Options

- Hydraulic Tilt-Up
- Conventional Slip-Joint
- Conventional Flanged

NOTE: Max Monopole Height based on individual pole weight, base moment and soil bearing capacity

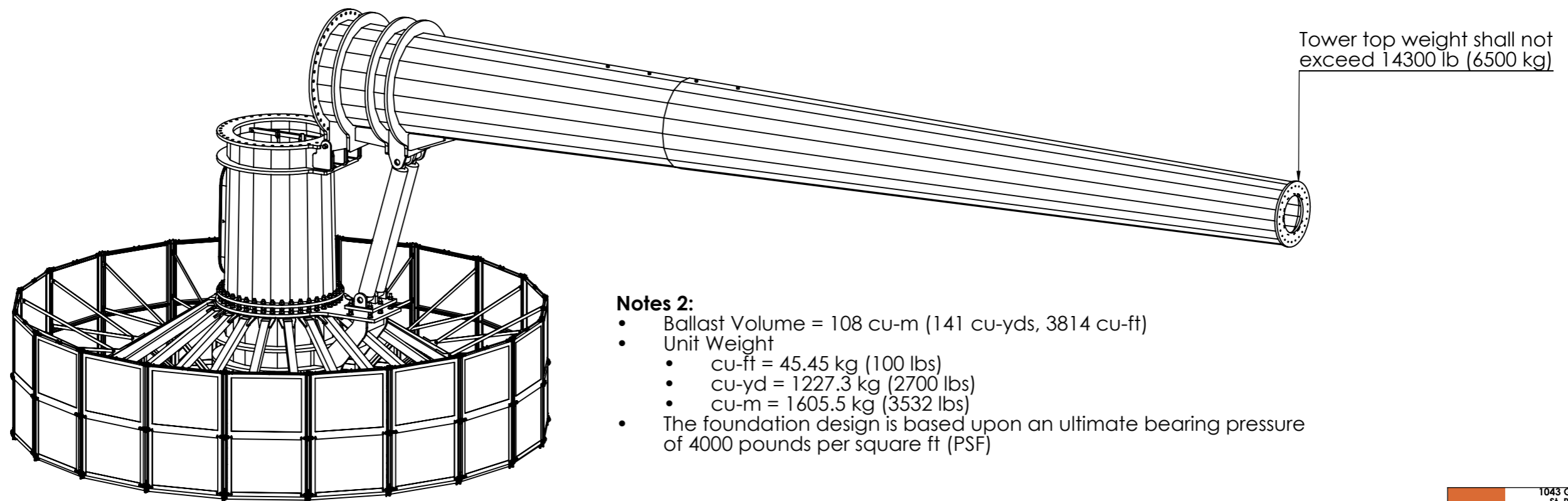
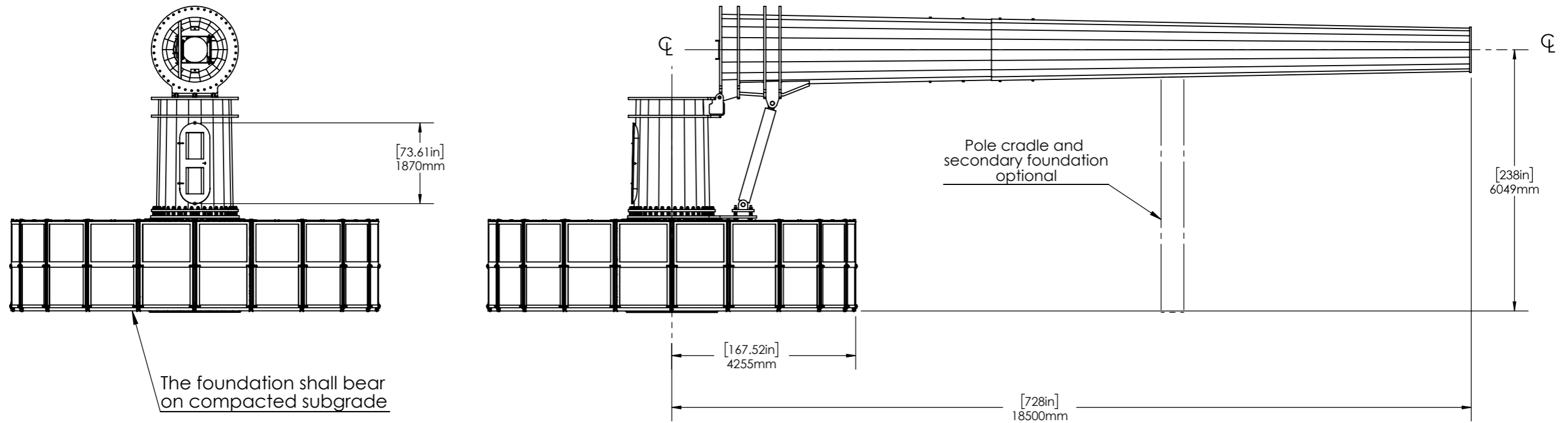


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Hydraulic Tilt-Up Pole

(20m Shown Taller poles designed to suit up to 36m approx.



Notes 2:

- Ballast Volume = 108 cu-m (141 cu-yds, 3814 cu-ft)
- Unit Weight
 - cu-ft = 45.45 kg (100 lbs)
 - cu-yd = 1227.3 kg (2700 lbs)
 - cu-m = 1605.5 kg (3532 lbs)
- The foundation design is based upon an ultimate bearing pressure of 4000 pounds per square ft (PSF)

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