

1 SITE PLAN – ELECTRICAL
SCALE: 1/4" = 1'-0"

- KEYED NOTES – PLAN
- CUSTOM ENCLOSURE ON CONCRETE PAD. REFER TO ELECTRICAL RISER.
 - NEW ELECTRICAL METER & PANEL. REFER TO SCHEDULE & RISER.
 - INSTALL PARKING LOT SURVEILLANCE AS PER LOCAL CITY ORDINANCE FOR PARKING LOT SECURITY. INSTALL NEW 20 AMP CIRCUIT FOR CAMERA COMMUNICATIONS. INSTALL ALL CAMERA CONTROLLERS & CONDUIT AS REQUIRED PER CITY ORDINANCE. MOUNT CAMERA & JUNCTION BOX WITH CABLE & CONDUIT. ROUTE TO COMMUNICATION BOX/ TERMINATION POINT AS PER CITY ORDINANCE. VERIFY WITH OWNER PRIOR TO BUILDING INSTALLATION.
 - MOUNT POLE ON 24" CONCRETE BASE AS PER DETAIL.
 - ROUTE CIRCUIT THROUGH CONTACTOR/TIMECLOCK AS PER SCHEDULE.
 - REFER TO ELECTRICAL RISER FOR CONTINUATION. FIELD VERIFY ROUTING LOCATION, ROUTE BELOW GROUND.

NOTE:

- ELECTRICAL CONTRACTOR SHALL PROVIDE ALL STRUCTURAL SUPPORTS, BRACING AND UNISTRUT (NOT DIPPED GALVANIZED) NECESSARY TO ATTACH PANELS, METERS, WEATHERHEAD AND EQUIPMENT TO BUILDING WALL. ALL SUCH STRUCTURAL SHALL BE LOCATED AS REQUIRED ON BUILDING.
- ALL ELECTRICAL EQUIPMENT CABINETS TO HAVE SAFETY EARTH ELECTRODE SYSTEM GROUND WITH 2AL-CU RATED CLAMPS OR CROWDELED CONNECTIONS. ALL ELECTRICAL EQUIPMENT CABINETS TO BE GROUNDED TOGETHER.
- ELECTRICAL CONTRACTOR SHALL PAINT ALL STRUCTURAL SUPPORTS, BRACING AND UNISTRUT AND ALL ELECTRICAL DEVICES PANELS, METERS, WEATHERHEAD AND EQUIPMENT COLOR TO MATCH BUILDING COLOR. VERIFY WITH ARCHITECT.
- ELECTRICAL CONTRACTOR COORDINATE ROUTING OF ELECTRICAL SERVICE WITH LOCAL POWER COMPANY PRIOR TO CONSTRUCTION.
- CONTRACTOR SHALL USE FACTORY-PROVIDED ITEMS WHEREVER POSSIBLE. FABRICATED ITEMS SHALL NOT BE USED UNLESS APPROVED PRIOR TO INSTALLATION BY THE ENGINEER/ARCHITECT.

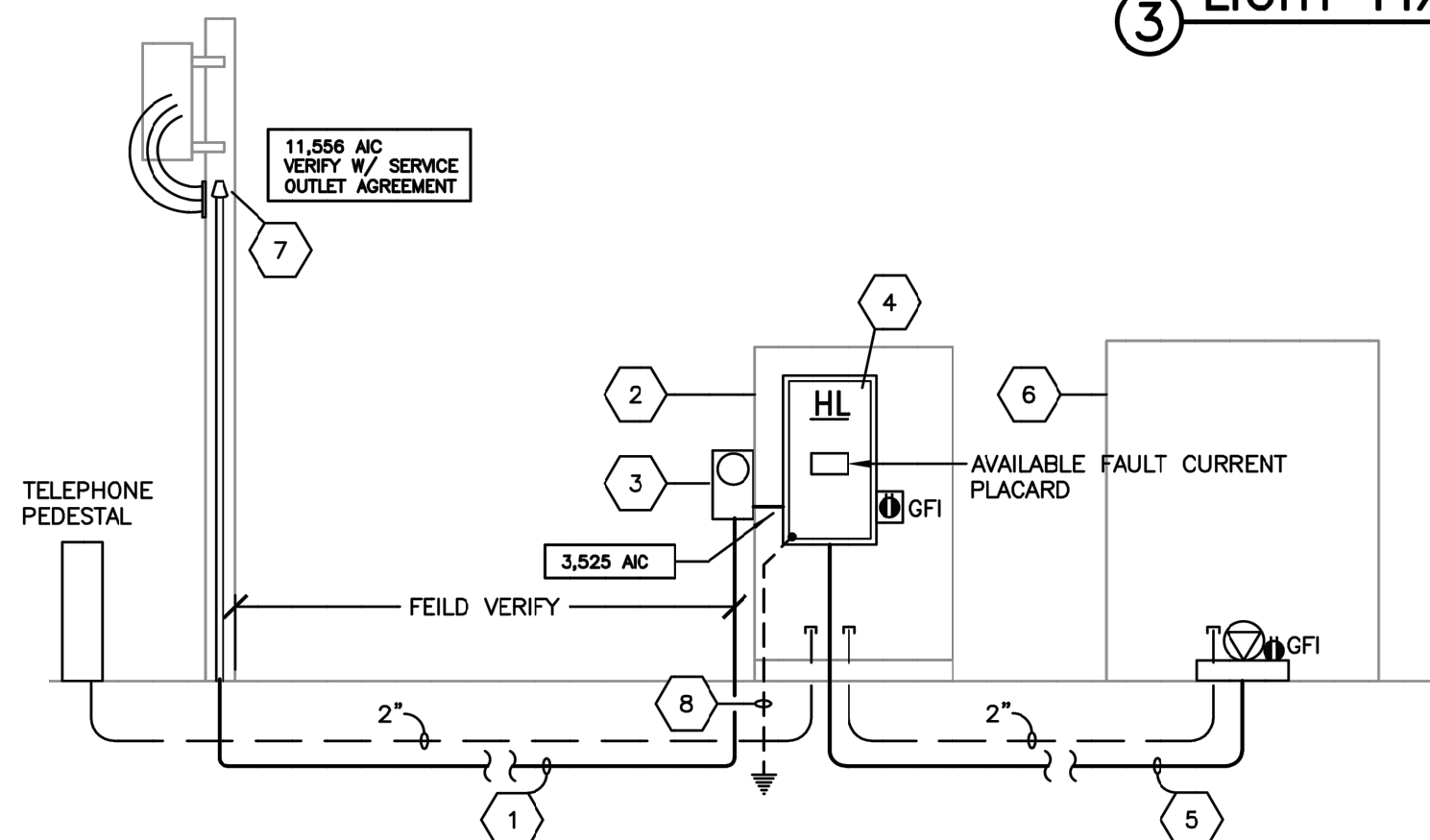
ELECTRICAL CONTRACTOR:
COORDINATE ROUTING OF ELECTRICAL SERVICE WITH LOCAL LIGHTING & POWER PRIOR TO CONSTRUCTION.

ELECTRICAL MATERIAL AND EQUIPMENT NO ELECTRICAL MATERIALS, APPARATUS, DEVICES, APPLIANCES, FIXTURES, OR EQUIPMENT SHALL BE SOLD OR INSTALLED IN THE CITY UNLESS THEY ARE IN CONFORMANCE WITH THE PROVISIONS OF THIS CODE, THE LAWS OF THE STATE OF TEXAS AND ANY APPLICABLE RULES AND REGULATIONS ISSUED UNDER THE AUTHORITY OF THE STATE STATUTES, THE MAKER'S NAME, TRADEMARK, OR OTHER IDENTIFICATION SYMBOL SHALL BE PLACED ON ALL ELECTRICAL MATERIALS, APPARATUS, DEVICES, APPLIANCES, FIXTURES, AND EQUIPMENT USED OR INSTALLED UNDER THE PROVISIONS OF THIS CODE. ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE LISTED AND LABELED FOR THE INTENDED USE AND SHALL BE INCLUDED IN A LIST PUBLISHED BY AN APPROVED AGENCY. SECTION 508 CITY OF HOUSTON ELECTRICAL CODE.

LUMINAIRE SCHEDULE					
Symbol	Label	Qty	Catalog Number	Description	VOLTAGE Watts
	OA	2	LSBW SERIES SABER LED AREA LIGHT. 120V	SINGLE HEAD LED AREA LIGHT MOUNTED ON 25" SQUARE, NON-TAPERED STEEL POLE.	120V 300W
	OB	1	LSBW SERIES SABER LED AREA LIGHT. 120V	DUAL HEAD LED AREA LIGHT MOUNTED ON 25" SQUARE, NON-TAPERED STEEL POLE.	120V 600W
	CANOPY LIGHT NOT SHOWN ON PLAN	3	LPC SERIES LED PETROLEUM CANOPY LIGHT. 120V	12.75"x12.75" SQUARE LED FIXTURE.	120V 1.05 AMP
STRUCTURAL TO WITHSTAND 110 MPH GUSTS OF WIND, AS PER LATEST INTERNATIONAL BUILDING CODE REQUIREMENTS. THIS IS NOT A STRUCTURAL ENGINEER DRAWINGS REFER TO ARCHITECTURAL / STRUCTURAL					

3 LIGHT FIXTURE SCHEDULE

- NEW SERVICE FEEDER & CONDUIT BELOW GRADE. 120/208 VOLT, 1ph, 3wire. 3 #4 AWG IN 2" CONDUIT.
- NEW CUSTOM ORDERED WEATHER RESISTANT LOCKABLE ENCLOSURE MOUNTED ON CONCRETE PAD.
- NEW 100 AMP METER AS PER LOCAL POWER COMPANY SERVICE STANDARDS.
- NEW ELECTRICAL PANEL. NEMA 3R. RE: PANEL SCHEDULE.
- ROUTE NEW CONDUITS FOR BRANCH CIRCUITS BELOW GRADE. RE: PLAN
- NEW OPTOVA 750 ADVANCED FUNCTION DRIVE-UP ATM.
- EXISTING 120/208 VOLT 1ph SERVICE @ ADJACENT POWER POLE. VERIFY LOCATION. ROUTE FEEDERS AND CONDUIT UP EXISTING POLES.
- #6 GROUND BOND AS PER DETAIL.

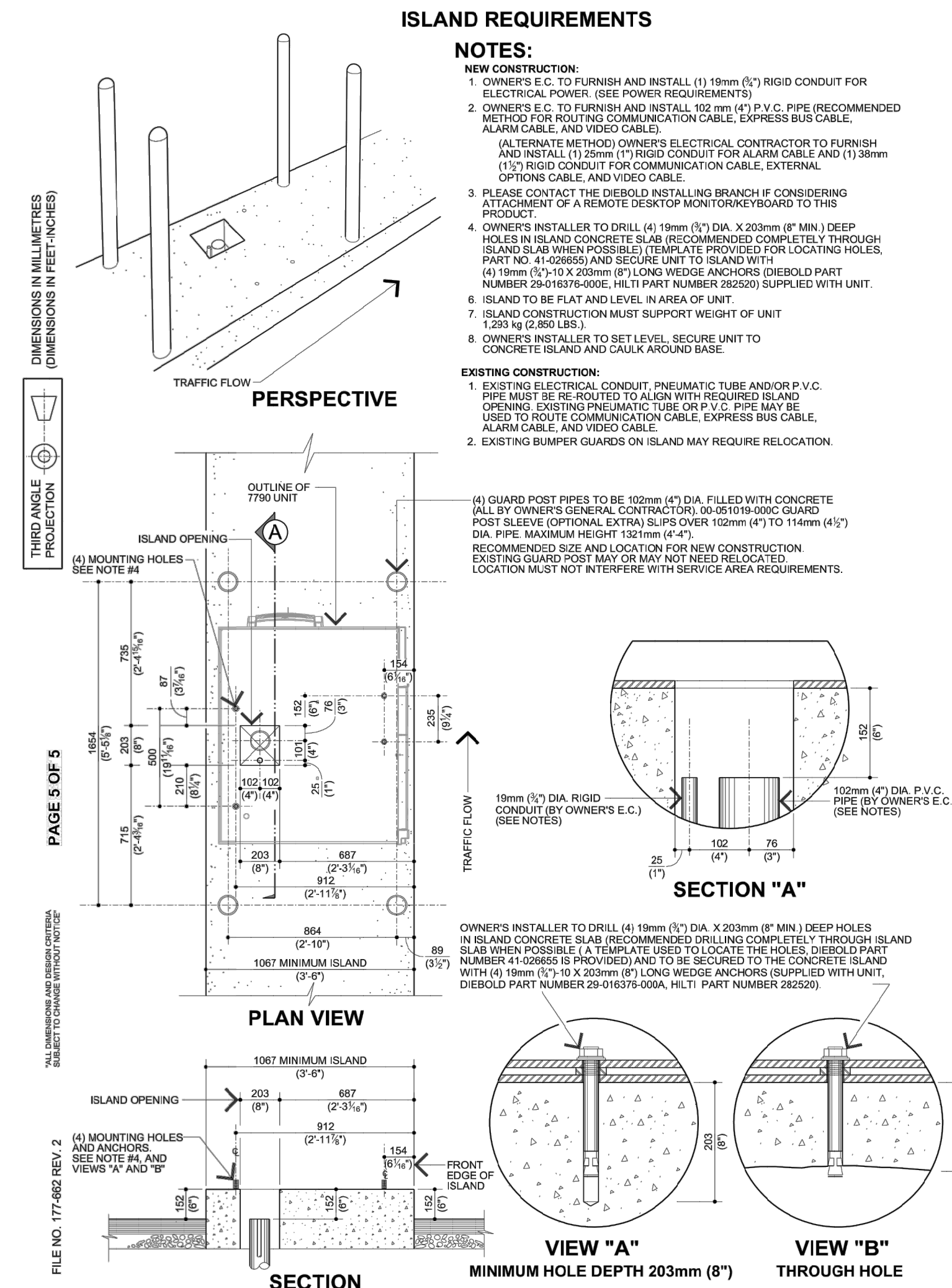


4 KEYED NOTES – ELECTRICAL RISER

5 SITE ELECTRICAL RISER

2"x3" PLACARD WITH BLUE LETTERING ON A CONTRASTING BACKGROUND PLACE ON PANEL WITH CORRECT INFORMATION

AVAILABLE FAULT CURRENT FOR:	
DATE CALCULATED	08/14/2017
FAULT CURRENT TANS./WW	11,556/3,525 AIC
TRANSFORMER SIZE	50 KVA



6 ELECTRICAL ATM PLAN DETAIL



1250 WOOD BRANCH PARK DR
STE 210
HOUSTON, TX 77079
(281) 293-7500
WWW.DVOENG.COM

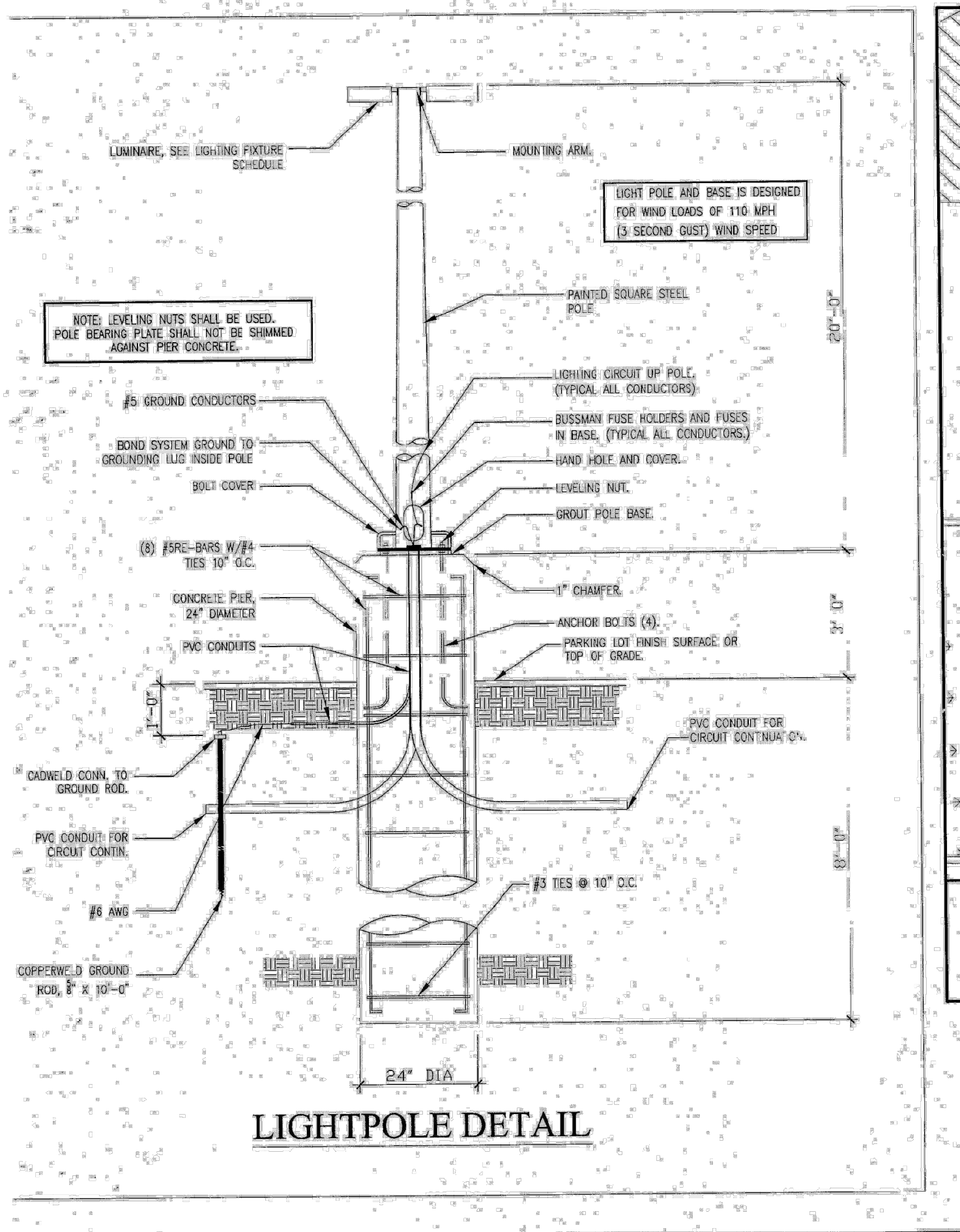
FLITE BANKING CENTERS, LLC
WALMART #1689
5650 South Chambers Road
Aurora, CO. 80015

ISSUED FOR:	DATE	DESCRIPTION	PERMIT SET
REV. #	08-24-17		

DATE: 08/24/17 DVO JOB NO. 171199
PM: J.FEIT
DRAWN BY: JF CHECKED BY: JF
ISSUE: PERMIT
SCALE: AS NOTED

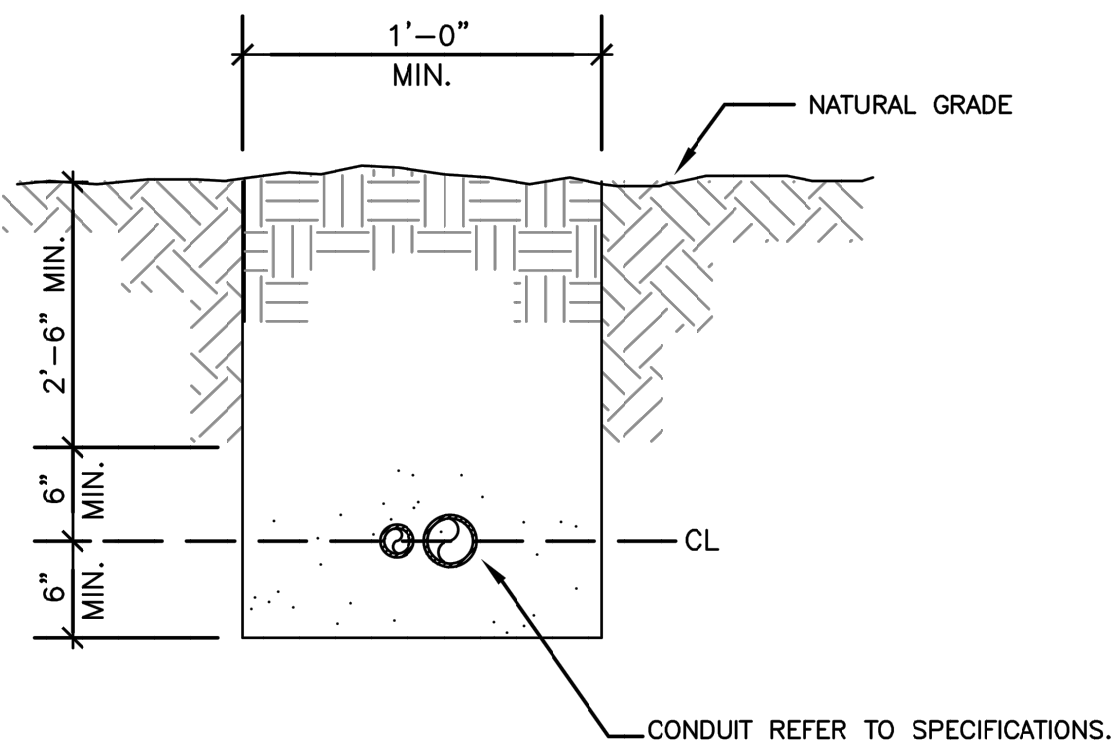
ELECTRICAL
SITE PLAN &
DETAILS

SE-1

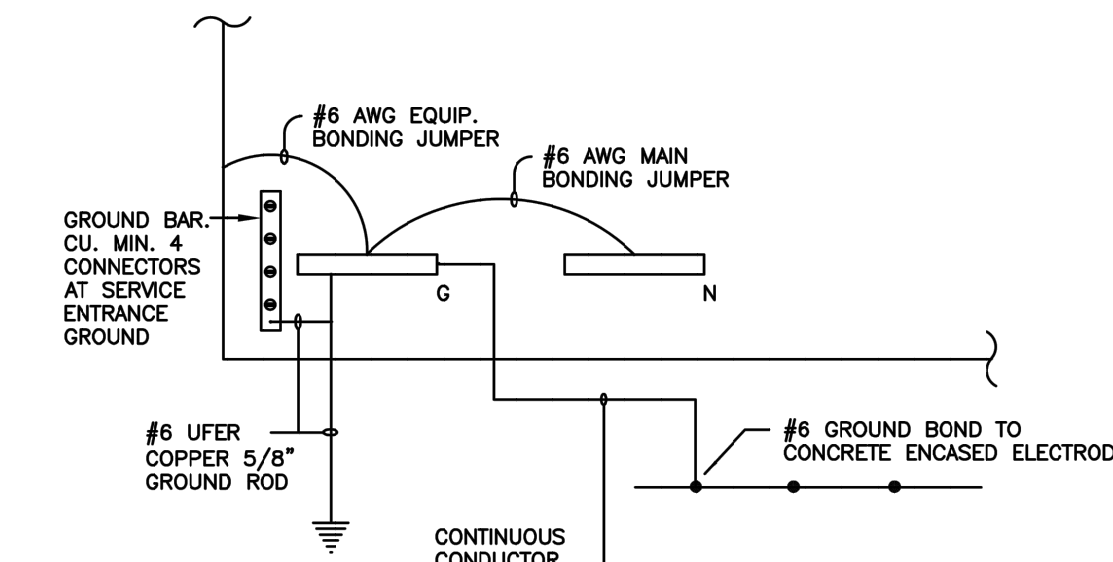


LIGHTPOLE DETAIL

5 LIGHT POLE DETAIL



4 BURIED CONDUIT DETAIL



3 GROUNDING AND BOUNDING DETAIL

Point to Point Method of Short-Circuit Calculation (Single Phase)

Project Name - ATM - service

Starting Point - SERVICE TRANSFORMER

Ending Point - SERVICE DISCONNECT

Step 1

AFC - Assumes Unlimited Primary Short-Circuit Current (Infinite Bus)

Transformer FLA - Formula (50 KVA x 1,000) + (208 SV x 1) = 240 FLA

Transformer Multiplier TM - Formula (100) + (0.9 x 2.0 %Z) = 55.56 TM

Transformer Let-Through Current TLC - Formula (((240 FLA x 55.56 TM) x 1.0 UA) + 0 MC) = 13,334 TLC

Step 2

Conductor Factor CF - Formula (2 x 140 L x 13,334 TLC) + (3,806 C x 1 N x 208 SV) = 4,716 CF

Conductor Multiplier CM - Formula (1) + (1 + 4.716 CF) = 0.175 CM

Conductor Let-Through Current CLC - Formula (13,334 TLC x 0.175 CM) = 2,333 CLC

Start > < AFC - Assumes Unlimited Primary Short-Circuit Current (Infinite Bus)

Transformer < 50 KVA

< 13,334 TLC

verify existing - with local power company transformer will be reused

< Length 140' Steel Conduit

1 Conductor(s) Per Phase

#4 Cable CU

End > < 2,333 CLC

KEY

%Z - Transformer Impedance Value Nameplate %Z

AFC - Available Fault Current

C - Conductor Constant

CF - Conductor Factor

CLC - Conductor Let-Through Current

CM - Conductor Multiplier

FLA - Transformer Full Load Amps

KVA - Kilovolt Amps

L - Length of Conductor

MC - Motor Short-Circuit Contribution

N - Number of Conductors Per Phase

SV - Secondary Voltage

TLC - Transformer Let-Through Current

TM - Transformer Multiplier

UA - Utility Adjustment 1.1 (Voltages May Vary 10%)

Prepared with Short-Circuit 2007 - Copyright Durand & Associates

2 ELECTRICAL SERVICE LOAD

TOTAL SERVICE LOAD

LOAD ANALYSIS SERVICE

DESCRIPTION	208 VOLT P-P 120 VOLT P-N 1 PHASE 3 WIRE						REMARKS ON NEC CALCULATION
	LOAD CON. (KVA)	NEC (KVA)	PHASE A (AMPS)	PHASE B (AMPS)	NEUTRAL (AMPS)		
ELECTRIC HEAT	0.0	0.0	0.0	0.0	0.0	0.0	LESS THAN A/C
A/C REFRIGERATION	0.0	0.0	0.0	0.0	0.0	0.0	100% of CONNECTED
MISCELLANEOUS MOTORS	0.0	0.0	0.0	0.0	0.0	0.0	100% of CONNECTED
WATER HEATING	0.0	0.0	0.0	0.0	0.0	0.0	100% of CONNECTED
OUTDOOR LIGHTING	1.8	2.2	10.6	10.6	0.0	10.6	125% of CONNECTED
INDOOR LIGHTING	0.0	0.0	0.0	0.0	0.0	0.0	125% of the LARGER of CONNECTED OR TABLE 220-3(b)
RECEPTACLES	0.0	0.0	0.0	0.0	0.0	0.0	NEC TABLE 220-13
MISCELLANEOUS CONTINUOUS	3.0	3.7	17.8	17.8	0.0	17.8	125% of CONNECTED
MISCELLANEOUS NON-CONTINUOUS	0.0	0.0	0.0	0.0	0.0	0.0	100% of CONNECTED
KITCHEN EQUIPMENT	0.0	0.0	0.0	0.0	0.0	0.0	100% of CONNECTED
25% LARGEST MOTOR	0.0	0.0	0.0	0.0	0.0	0.0	25% of LARGEST MOTOR ADDED
*** TOTALS ***	4.7	5.9	28.5	28.5	0.0	28.5	
*** CAPACITY ***			60.0	60.0	60.0	60.0	
*** SPARE CAPACITY ***			31.5	31.5	31.5	31.5	

NOTES:															HL						
1. LOCKABLE PANEL WITH GROUND BUS NEMA 3R RATED										60 AMP MCB					100 AMP BUS						
2. SURFACE MOUNTED IN NEMA 3R ENCLOSURE MIN. 48" CLEAR IN FRONT										208 VOLT P-P					NEMA 3R						
3. VERIFY WITH OWNER ALL WATTAGES/VOLTAGE OF EQUIPMENT CONNECTED.										120 VOLT P-N					CU. BUS						
4. LABEL ALL PANEL BRANCH CIRCUIT AND PANEL NAME										1 PHASE					GRND BUS						
5. PROVIDE AND INSTALL SERGE PROTECTION FOR PANEL										3 WIRE					12 POLE						
6. ** VIA CIRCUIT CONTROLLED BY PHOTOCELL ON.										14000 AIC SYMMETRICAL					MAIN CB 14K						
C PH (AMP)	B PH (AMP)	A PH (AMP)	N (AMP)	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CKT BKR AMP /P	NO	NO	CKT BKR AMP /P	WIRE	DESCRIPTION	TYPE	LOAD (VA)	N (AMP)	A PH (AMP)	B PH (AMP)	C PH (AMP)		
		12.6	12.6	1306	OL	** PARKING LOT LIGHTING	#12	20 /1	1	2	30 /1	#10	ATM	MC	2010	19.3	19.3				
	5.8		5.8	600	MC	CAMERA/INTERNET	#12	20 /1	3	4	20 /1	#12	CABINET GFI RECPT.	MC	180	1.7			1.7		
0.0		4.4	4.4	460	OL	DIGITAL MEDIA	#12	20 /1	5	6	20 /1	#12	CONTACTOR - AS REQUIRED.	MC	180	1.7	1.7				
	0.0	0.0	0.0	0		SPARE	---	20 /1	7	8	/1	---	SPACE ONLY		0	0.0	0.0	0.0			
	0.0	0.0	0.0	0		SPACE ONLY	---	/1	9	10	/1	---	SPACE ONLY		0	0.0	0.0	0.0			
0.0	0.0	0.0	0.0	0		SPACE ONLY	---	/1	11	12	/1	---	SPACE ONLY		0	0.0		0.0	0.0		
CONNECTED LOADS																					
C PH (AMP)	B PH (AMP)	A PH (AMP)	N (AMP)	LOAD (VA)	TYPE	DESCRIPTION															
0.0	0.0	0.0	0.0	0	HT	ELECTRIC HEAT															
0.0	0.0	0.0	0.0	0	AC	A/C REFRIGERATION															
0.0	0.0	0.0	0.0	0	MM	MISC. MOTORS															
0.0	0.0	0.0	0.0	0	WH	WATER HEATING															
0.0	0.0	17.0	17.0	1766	OL	OUTDOOR LIGHTING	OL	220B							21.2	21.2	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0	LT	INDOOR LIGHTING	LT	0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0	RP	RECEPTACLES	RP	0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0	EX	EXISTING DEMAND	EX	0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		
0.0	7.5	21.1	21.1	2970	MC	MISC. CONTINUOUS	MC	3713							26.3	26.3	9.4	0.0	0.0		
0.0	0.0	0.0	0.0	0	MN	MISC. NON-CONTINUOUS	MN	0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0	KT	KITCHEN EQUIPMENT	KT	0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0	SF	SUB-FEED	SF	0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		
0.0	7.5	38.0	38.0	4736		*** TOTAL ***									0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0		LARGEST MOTOR									0	0.0	0.0	0.0	0.0		
*** TOTAL ***																5920	47.5	47.5	9.4	0.0	

1 ELECTRICAL SCHEDULES



1250 WOOD BRANCH PARK DR
STE 210
HOUSTON, TX 77079
(281) 293-7500
WWW.DVODENG.COM



FLITE BANKING CENTERS, LLC

WALMART #1689

5650 South Chambers Road

Aurora, CO. 80015

ISSUED FOR:	DATE	DESCRIPTION	PERMIT SET
REV. #	08-24-17		

DATE: 08/24/17 DVO JOB NO. 171199
PM: J.FEIT
DRAWN BY: JF CHECKED BY: JF
ISSUE: PERMIT
SCALE: AS NOTED

ELECTRICAL
DETAILS &
SCHEDULES

SE-2



Exterior Lighting Compliance Certificate

Project Information

Energy Code: 2015 IECC
Project Title: FLITE BANKING CENTERS, LLC - WALMART #1689
Project Type: New Construction
Exterior Lighting Zone: 4 (High activity metropolitan commercial district)

Construction Site:
5650 South Chambers Road
AURORA, CO 80015

Owner/Agent:

Designer/Contractor:
Dawson Van Orden Engineering
1250 Wood Branch Park Dr.
Suite 210
Houston, TX 77079
281-293-7500

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
Drive-up ATM (ATM/Night depository location) (c)	1 machines	90	No	270
ATM Drives (Outdoor sales area/lot)	2000 ft2	0.7	Yes	1400
Total Tradable Watts (a) =				1400
Total Allowed Watts =				1670
Total Allowed Supplemental Watts (b) =				1300

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.

(b) A supplemental allowance equal to 1300 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

(c) ATM/Night depository sites have a base allowance of 180 W per site.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
<u>Drive-up ATM (ATM/Night depository location 1 machines): Non-tradable Wattage</u>				
LED 1: OA: SINGLE LSBW LED: Other:	1	2	300	600
<u>ATM Drives (Outdoor sales area/lot 2000 ft2): Tradable Wattage</u>				
LED 2: OB: TWIN LSBW LED: Other:	1	1	600	600
LED 3: Canopy LED Light: Other:	1	3	126	378
Total Tradable Proposed Watts =				978

Exterior Lighting PASSES: Design 59% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2015 IECC requirements in COMcheck Version 4.0.6.2 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

JASON W. DAWSON, P.E.
Name - Title

Signature

Date

9/13/17

Project Title: FLITE BANKING CENTERS, LLC - WALMART #1689
Data filename: O:\Houston\1 ALL PROJECTS Folder\2017\171199 Walmart - Parking ATM\MEP\ENERGY FORM\171199 - Walmart #1689 Parking ATM.cck

Report date: 09/13/17

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Inspection Checklist

Energy Code: 2015 IECC

Requirements: 0.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR8] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)
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Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.5 [EL25] ^{null}	Automatic lighting controls for exterior lighting installed. Controls will be daylight controlled, set based on business operation time-of-day, or reduce connected lighting > 30%.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)
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Project Title: FLITE BANKING CENTERS, LLC - WALMART #1689

Report date: 09/12/17

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Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C405.5.1 [FI19] ¹	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Exterior Lighting fixture schedule for values.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)
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Project Title: FLITE BANKING CENTERS, LLC - WALMART #1689

Report date: 09/12/17

Data filename: O:\Houston\1 ALL PROJECTS Folder\2017\171199 Walmart - Parking ATM\MEP\ENERGY
FORM\171199 - Walmart #1689 Parking ATM.cck

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GENERAL NOTES:

- 1. Do Not Guess. Direct all Questions Concerning This Drawing to Elrod Engineering, LLC.(615-890-9405)
- 2. Do Not Scale This Drawing.
- 3. Graphics are not to be Reproduced From This Drawing.
- 4. Structural Steel Plate & Angle Shall Conform to ASTM A36 (Fy (Yield)= 36 ksi).
- 5. Steel Pipe Fabricated From Plate Shall Conform to ASTM A36 (Fy (YIELD)= 36 ksi min.).
- 6. Steel Pipe not Fabricated From Plate Shall Conform to ASTM A53 Type "E" or "S", Grade "B" or Equivalent. (Fy (Yield)= 35 ksi min.) Do Not Use Mill Reject Pipe. A53 Type "F" is NOT Permitted.
- 7. Structural Steel Tubing Shall Conform to ASTM A500 Grade "B" (Fy = 46 ksi).
- 8. Aluminum Structural Shapes Shall Conform to the Specifications from The Aluminum Association's Aluminum Design Manual 2010 for 6061-T6;
Square/Rectangular Tube & Round Pipe (Fy: 35ksi Unwelded)
Plate and Angle (Fy: 35ksi Unwelded)
All Structural Shapes (Welded Fy: 15ksi ≤ 0.375" Thick, 11ksi > 0.375" Thick)
- 9. For welding aluminum, Use 5356 alloy electrodes for 6061 Base Metal.
- 10. "Legible" Mill Test Certificates, Expressed in "KSI" or "PSI", are Required on all Pipe. All Pipe to Conform to ASTM A36 or ASTM A53 Type "E" or "S", Grade "B". The Yield Stress Limits are in Place to Help Ensure the Sign Structure Performs to the Engineered Design. Used Pipe and Pipe for Which Mill will not Provide Certification will not be Allowed!
- 11. As Pipe Sections are not Perfectly Round, Careful Shop Fit-Up of the Splice Connections Shall be Performed. Line-up Markings are to be Provided to Avoid Costly Labor and Crane Charges.
- 12. Pipe Shall be Considered Ovalled and Unacceptable if the Measured Outside Diameter at any Point Varies by More Than 2% of the Nominal Outside Diameter as Specified on the Design Documents. Large Diameter Pipes Should be Braced to Help Prevent Distortion After Fabrication.
- 13. Pipe with Dimpled Walls, Ovalled Pipe and Bent Connection Elements Shall not be Used.
- 14. Breach Openings of any Size in the Wall of any Pipe Sections are Strictly Prohibited.
- 15. All Metal not Specified as Aluminum Shall be Steel.
- 16. All Welding Shall Conform to Recommendations as Published by The American Welding Society D1.1.
- 17. Workmen Who will Perform Welding Operations Shall be Certified for the Applicable Welding Procedure.
- 18. For welding steel, Use E70 Series Low Hydrogen Electrodes.
- 19. Fabricated Steel Shall be Cleaned of Mill Scale, Oil, & Other Surface Contaminates Prior to Painting.
- 20. All Steel, Pipe Sections(Exposed and Embedded), and Splice Connections Must be Primed, Painted and Allowed to Cure Prior to Shipping to Site.
- 21. Alteration to any Fabricated Part of the Structure by Use of a Cutting Torch or any Other Means is Prohibited Without the Consent of the Engineer.
- 22. The Base Section of Pipe Shall be "Plumb" Before Continuing with the Erection Procedure.
- 23. Any Holes Cut in Pipe for Handling Must be Completely Filled with Weld Material and Ground Smooth.
- 24. Cabinet Mounting Bolts to be ASTM A325. Bolts, Nuts, Flat & Lock Washers to be Zinc Plated or Hot-Dip Galvanized with Threads Excluded From the Shear Plane. Vendor Shall use a Method For Tightening Bolts Such That Proper Pre-load is Obtained as Specified by The American Institute of Steel Construction & The Industrial Fasteners Institute.

FOUNDATION NOTES:

- 1. Concrete shall be Ready Mixed; Designed to develop a minimum compressive strength as stated in foundation criteria below. Water is NOT to be added to concrete at job site.
- 2. Reinforcing steel shall conform to ASTM A615 Grade 60 w/Deformations conforming to ASTM A-305.
- 3. Excavation is to be in compliance with OSHA regulations and shall have a level bottom free of loose soil, water and debris.
- 4. Where Extreme Frost Depth is below bottom of foundation, excavate to 6 inches below frost depth and increase concrete quantity.
- 5. Bearing Surfaces for foundations should not be disturbed or left exposed during Inclement Weather; Saturation of the on-site soils can cause a loss of strength and increased compressibility. If construction occurs during inclement weather, and placement of the foundation is not possible at time excavated, a layer of lean concrete should be placed on the bearing surface for protection.
- 6. If rain is expected within 24 hours of completing the concrete pour, the concrete must be covered. If temperatures are expected to drop below 40 degrees within the next 24 hours of completing the concrete pour, then concrete is to be covered and protected to prevent heat loss and freezing.
- 7. The base of pipe section shall be "Plumb" and "Adequately Braced" to prevent movement before, during, and after concrete pour and left in place until concrete has set.
- 8. Reinforcing steel shall be free from mud, oil or other nonmetallic coatings that decrease bond.
- 9. Maintain a minimum of 3" clear distance from face of concrete to all reinforcing steel, unless otherwise noted on drawing.
- 10. Bottom reinforcement to be supported w/ concrete block solids no larger than 4"x4".
- 11. Do not weld reinforcing steel. Reinforcement shall be placed as detailed on the design drawings & "Tied" securely to prevent movement during concrete pour.
- 12. Concrete shall not be placed on frozen ground.
- 13. Do not cold joint concrete. Foundation must be poured continuously until all concrete has been placed. Concrete must be poured as a workable mixture with a Slump between 4"-6". All concrete mixing trucks must thoroughly and completely mix the concrete prior to pouring.
- 14. Additional water is not to be added to concrete on site. Additional water decreases the strength of the concrete mixture. Concrete should be rejected in lieu of changing concrete mixture on site.
- 15. Vendor should work the top of the concrete to ensure all rock has been covered by cement and top of concrete foundation is level. Top of concrete may be broom finished.
- 16. Anchors Shall be Securely Mounted Using an Anchor Setting Template to Avoid Movement During Concrete Pour. Extreme Caution Should be Exercised to Insure Orientation, Alignment, and Projection of Threads, and to Avoid Fouling Threads with Concrete During Pour.
- 17. Sign Contractor Shall Pack the Space Between the Base Plate and the Top of Concrete Solid with High Strength Non-Shrink Non-Metallic Grout. Do Not use Concrete Mix For Grout. Workmen Experienced in the Use of Non-Shrink Grout shall Perform Grouting.
- 18. Where Anchor Bolts are Required, Anchor Bolts Shall be Cut From Round Rod and Shall Conform to A.S.T.M. A36 Steel. Exposed Surfaces Shall be Hot-Dip Galvanized or Coated to Prevent Corrosion.
- 19. Note Overall Length of Anchors and Amount of Threading Required on each end of Anchor Rod Per Details on Each Drawing. Threading Shall be Carefully Controlled to Avoid Over-Cutting or Under-Cutting of Threads. Nut Shall Move Freely by Hand Without "Wobble".
- 20. Mechanical Vibrators Shall be Used to Consolidate Concrete Around Support and/or Reinforcement.
- 21. Concrete must be allowed to cure for 14 days prior to installing remaining stages of structure or sign cabinet(s).



Drawn	DBP
Checked	WML
EAC Job#	100z2616
Filename	100x2616.dwg
Created	9/19/2017



ELROD
ENGINEERING
871 Seven Oaks Blvd., Suite 220
Smyrna, TN 37167
800-553-5111

CLIENT:	Accent Sign & Awning 6015 Skyline Drive Houston, TX 77057
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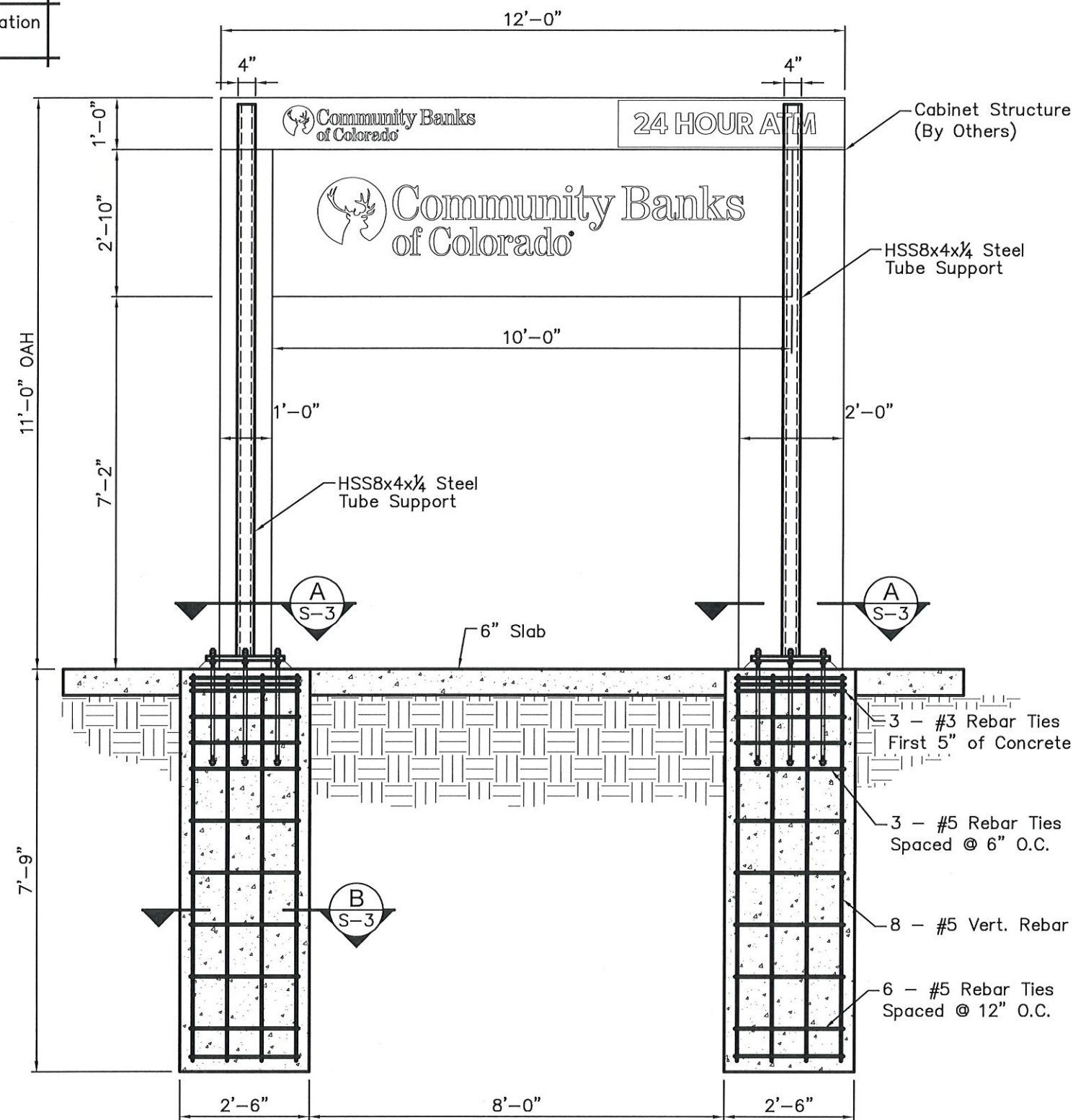
GENERAL NOTES
Comm. Banks of Colorado #1689 5980 S. Chambers Rd. Aurora, CO 80015

Revisions

Sheet No.
S-1

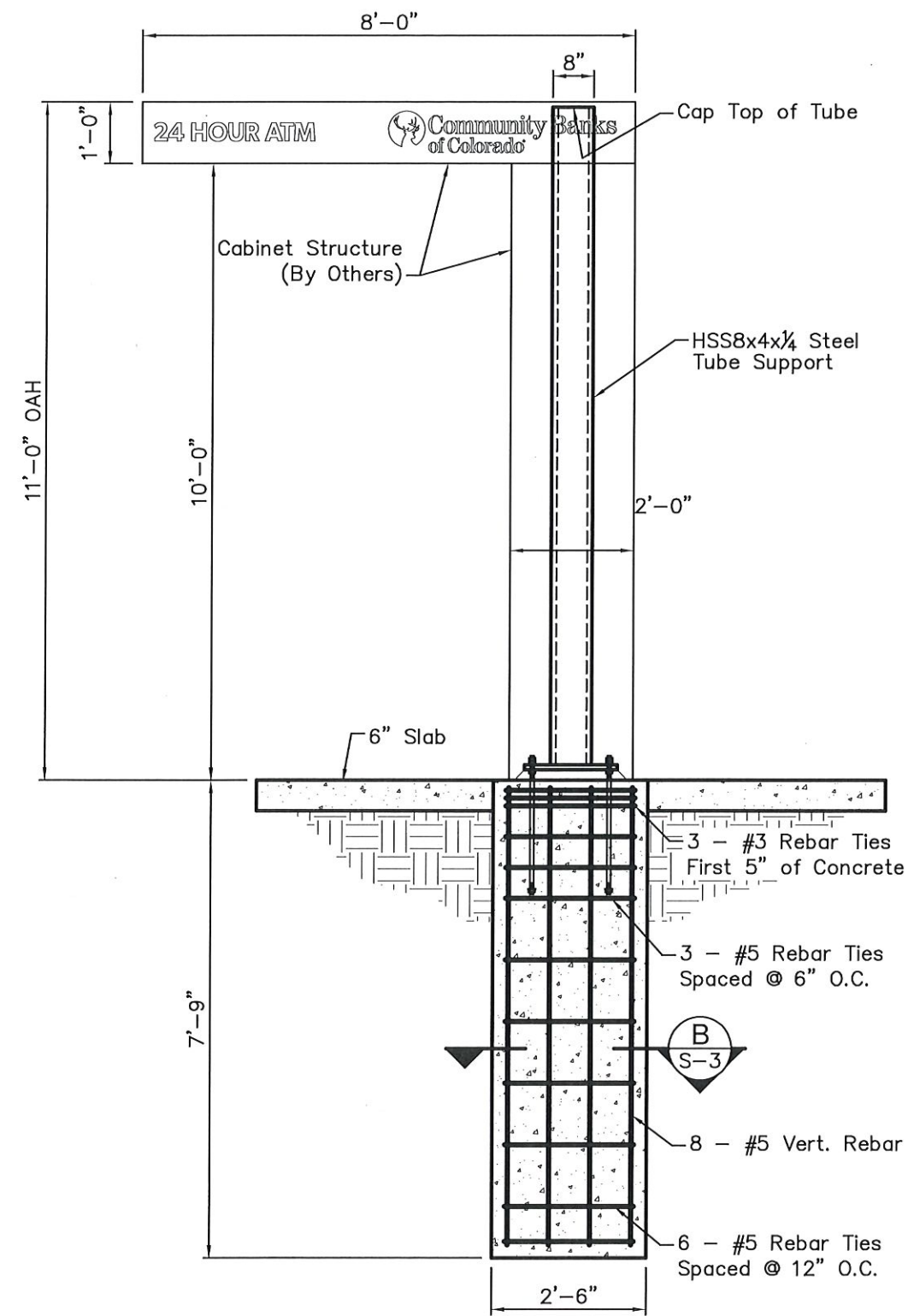
Sign Company to Use Experienced Excavation Crew to Perform Foundation Excavation.

Where Required, Place Electrical Conduit in Foundation Prior to Concrete Pour.



CANOPY STRUCTURE ELEVATION

SCALE: 3/8" = 1'-0"



CANOPY STRUCTURE PROFILE

SCALE: 3/8" = 1'-0"

DESIGN CRITERIA

Building Code: IBC 2012/ASCE 7-10
Analysis: LRFD-AISC 14th
Chapter 16: Section 1609.3.1
Ultimate Wind Speed $V_{ult} = 140$ mph
Nominal Wind Speed $V_{asd} = 108.4$ mph
Risk Category: II $V_{asd} = V_{ult} \sqrt{0.6}$
Exposure: C

FOUNDATION DESIGN CRITERIA

This concrete foundation has been designed in accordance with ACI 318-11. Allowable lateral soil pressure = 100psf/ft with 2x increase applied. Concrete Shall Develop a Minimum Compressive Strength of 2500psi in 28 Days. Verify Site Conditions Prior to Construction.



Drawn	DBP
Checked	WML
EAC Job#	100z2616
Filename	100x2616.dwg
Created	9/19/2017



CLIENT:

Accent Sign & Awning
6015 Skyline Drive
Houston, TX 77057

11'-0" OAH ATM CANOPY

Comm. Banks of Colorado #1689
5980 S. Chambers Rd.
Aurora, CO 80015

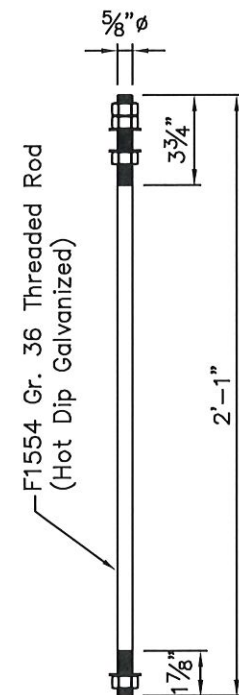
Revisions		

Sheet No.

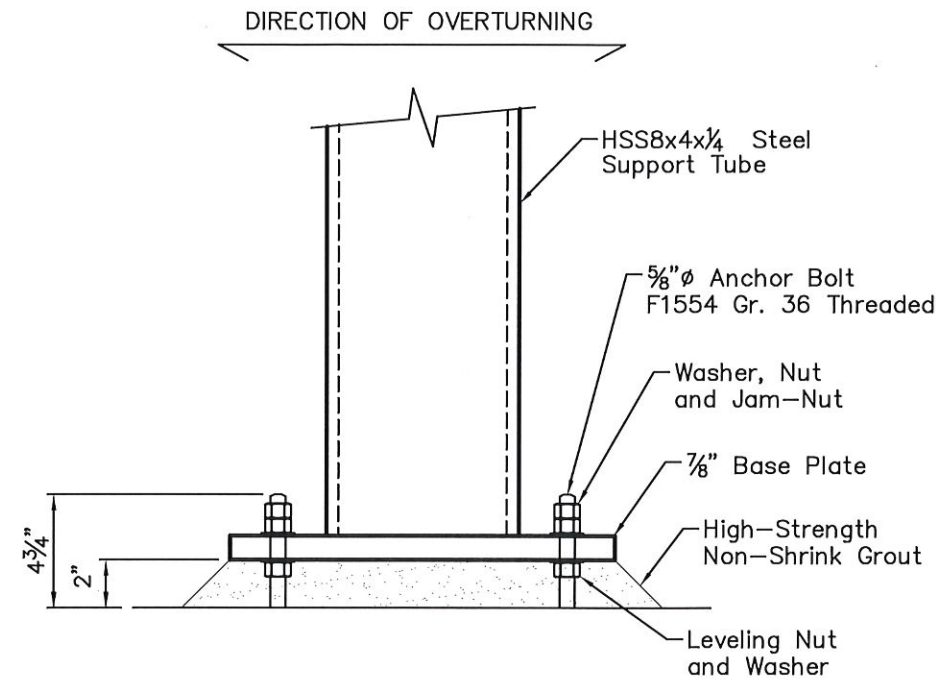
S-2

Sign Company to Use Experienced Excavation Crew to Perform Foundation Excavation.

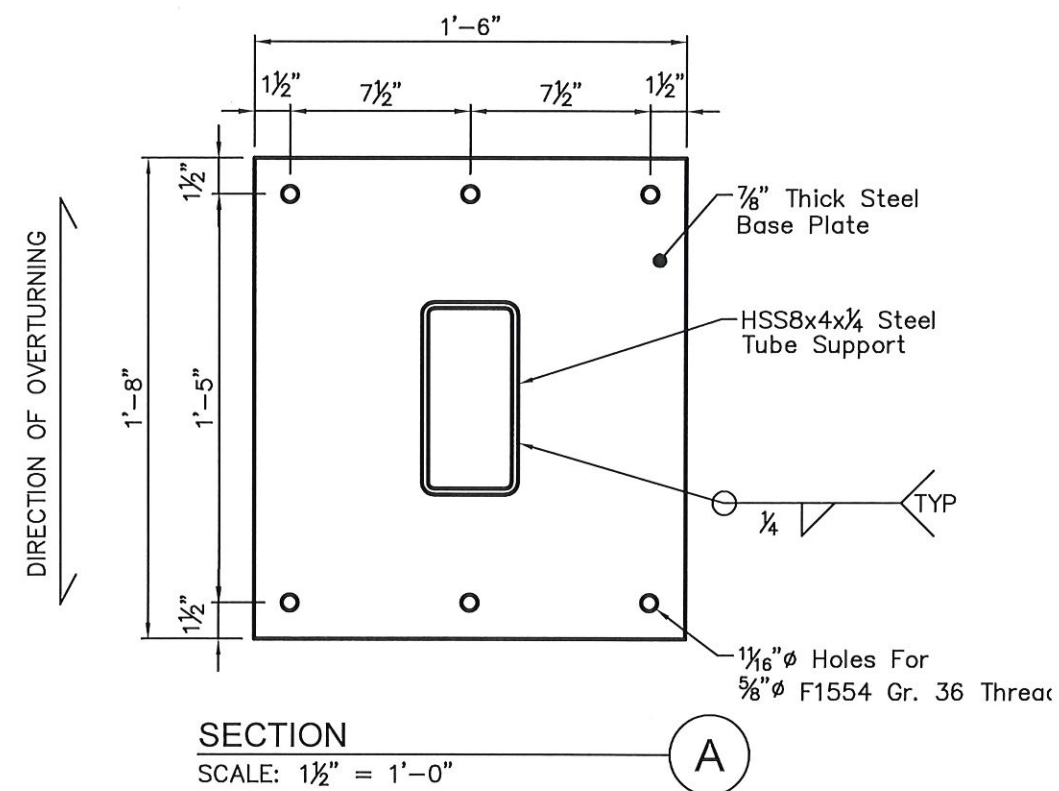
Where Required, Place Electrical Conduit in Foundation Prior to Concrete Pour.



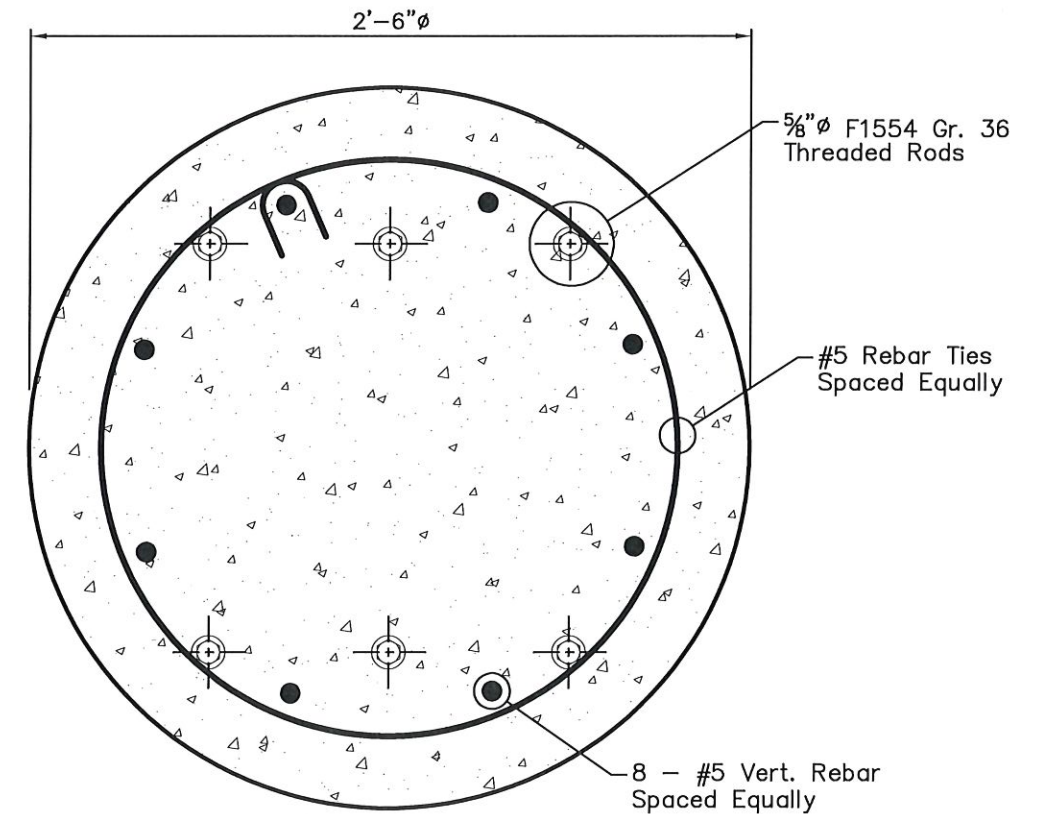
Anchor Bolt Detail
SCALE: 1 1/2" = 1'-0"



Anchor Bolt Projection Detail
SCALE: 1 1/2" = 1'-0"



SECTION A
SCALE: 1 1/2" = 1'-0"



SECTION B
SCALE: 1 1/2" = 1'-0"

DESIGN CRITERIA

Building Code: IBC 2012/ASCE 7-10
Analysis: LRFD-AISC 14th
Chapter 16: Section 1609.3.1
Ultimate Wind Speed $V_{ult} = 140$ mph
Nominal Wind Speed $V_{asd} = 108.4$ mph
Risk Category: II $V_{asd} = V_{ult} \sqrt{0.6}$
Exposure: C

Drawn	DBP
Checked	WML
EAC Job#	100z2616
Filename	100x2616.dwg
Created	9/19/2017



CLIENT:
Accent Sign & Awning
6015 Skyline Drive
Houston, TX 77057

DETAILS

Comm. Banks of Colorado #1689
5680 S. Chambers Rd.
Aurora, CO 80015

Revisions		

Sheet No.
S-3



C1

Design Code:	IBC 2012/ASCE 7-10
Wind Speed:	140mph
Exposure:	C
Risk Category:	I
Wind load:	57.9 PSF

Project #:	100z2616
Date:	9/19/2017
Facility Ref:	CBC # 1689
Address:	5680 S. Chambers Rd Aurora, CO

1st Stage						
Area (sf)	% of Load	Load (psf)	Shape factor	Shear (k)	Base Stage Centroid (ft)	Base Stage Moment (k-ft)
63.75	70%	57.9	1	2.58	9.08	23.47
14.33	100%	57.9	1	0.83	3.58	2.97
0.00	100%	57.9	1	0.00	0.00	0.00
0.00	100%	57.9	1	0.00	0.00	0.00
0.00	100%	57.9	1	0.00	0.00	0.00
0.00	100%	57.9	1	0.00	0.00	0.00
0.00	100%	57.9	1	0.00	0.00	0.00
0.00	100%	57.9	1	0.00	0.00	0.00
base $V_X =$				3.41	base $M_X =$	
					26.44	

nominal $h = 8.0000$

nominal $b = 4.0000$

nominal $t = 0.2500$

outside radius $r = 0.4650$

inside radius $r_i = 0.2325$

design $t = 0.2325$

Half Radiused Corners

$A_{RC} = 0.2547$

$\bar{y}_{RC} = 0.2302$

$I_{RC} = 0.0037$

Half Total

$A_T = 2.6123$

$\bar{y}_T = 2.5405$

$Z = 13.273$

$A = 5.225$

$I = 42.463$

$S = 10.616$

$Z =$	13.27		
$F_y =$	46	$F_y = 46$ (HSS Square or HSS Rectangular)	
$\phi =$	0.9		
$M_n = F_y Z =$	50.9	Load Factor (LF) = 1	
$\phi M_n =$	45.79	$M_u = LF(M_n) = 26.44$	
8.00" Tall	x	4.00" Wide	x
		0.250" Wall	
		57.7%	OK

Flange in Flexural Compression $b/t = 13.2$

Compact Flange b/t Limit: $1.12(E/F_y)^{0.5} = 28.1$

Non-Compact Flange b/t Limit: $1.40(E/F_y)^{0.5} = 35.2$

$b = 3.070$

Is Flange Compact? Yes. Yielding Controls (F7-1)

Is Section Non-Compact? Yes. Use Lesser of (F7-1) AND (F7-2)

Flange Is Not Slender

Yielding Check

$$(F7-1) M_n = M_p = F_y Z = 50.9$$

(GOVERNING EQUATION)

Compression Flange Local Buckling

Non-Compact Flanges

$$(F7-2) M_n = M_p - (M_p - F_y S_x) (3.57 b/t (F_y/E)^{0.5} - 4.0) = 72.5$$

Slender Walled Flanges

$$b_e = 1.92 t (E/F_y)^{0.5} [1 - (0.38 / (b/t)) (E/F_y)^{0.5}] = 3.109$$

$$I_e = 42.739$$

$$S_e = 10.685$$

$$(F7-3) M_n = F_y S_e = 41.0$$

If Compact=(F7-1) OR If Non-Compact=(F7-2) OR If Slender=(F7-3) 50.9

Yielding and Flange Local Buckling Result: $M_n = 50.9$

Web in Flexure

$h/t = 30.4$

$h = 7.070$

Compact Web h/t Limit: $2.42(E/F_y)^{0.5} = 60.8$

Is Web Compact? Yes. Web Buckling N/A. Use Yield & Flange Result

Non-Compact Web h/t Limit: $5.70(E/F_y)^{0.5} = 143.1$

Is Web Non-Compact? Yes. Use Lesser of (F7-5) AND Yield & Flange Result

$$(F7-5) M_n = M_p - (M_p - F_y S_x) (0.305 h/t_w (F_y/E)^{0.5} - 0.738) = 54.6$$

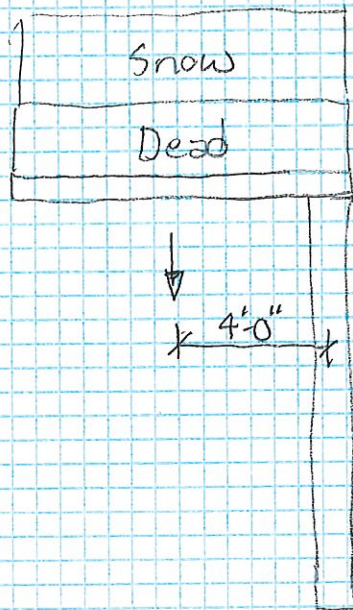
Overall Result $M_n = 50.9$



Sheets C1 → C7

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871 Seven Oaks Blvd.
Suite #220
Smayna, TN 37167

C2



$$\underline{\underline{M_D = .015(6)8(4) = 2.88 \text{ k-ft}}}$$

$$\underline{\underline{M_S = .032(6)8(4) = 6.14 \text{ k-ft}}}$$

$$\begin{aligned} \underline{\underline{M_W}} &= .0579(3.833)12(.7)9.083 + \\ &\quad .0579(2)7.17(3.585) \\ &= \underline{\underline{19.91 \text{ k-ft}}} \end{aligned}$$

$$p_f = 0.7C_e C_t I_s p_g = 0.7(1.2)1.2(0.8)40 = 32.2 \text{ psf}$$

$$\textcircled{3} M = 1.2D + 1.6S + 0.5W = 1.2(2.88) + 1.6(6.14) + 0.5(19.91) = 23.24 \text{ k-ft}$$

$$\textcircled{4} M = 1.2D + 1.0W + 0.5S = 1.2(2.88) + 1.0(19.91) + 0.5(6.14) = \underline{\underline{26.44 \text{ k-ft}}}$$

Analysis of Steel Base Plate w/ Steel Anchor Bolts

(AISC Steel Construction Manual - 14th Edition - LRFD)

ASCE 7- 10	Enter "05" or "10"
$PL_{th} = 0.875$	(in.) Plate Thickness
$PL_{bl} = 18$	(in.) Plate Bend Line Length (See Sketches for Examples)
$L_c = 4.5$	(in.) Cantilever Length of Plate (See Sketches for Examples)
$PL_{Fy} = 36$	(ksi) Plate Material Yield Stress $F_y = 36(A36)$
$PL_{Fu} = 58$	(ksi) Plate Material Ultimate Tensile Stress $F_u = 58(A36)$
$B_{dia} = 0.625$	(in.) Anchor Bolt Diameter
$n_b = 6$	(Qty) Total Number of Anchor Bolts in the Base Plate (Symmetrical)
$d = 17$	(in.) Distance Between Bolts (In Direction of Overturning)
$F_u = 58$	(ksi) Bolt Material Ultimate Tensile Stress $F_u = 58(F1554 \text{ Gr } 36), =75(Gr55), =125(Gr105), \text{ or } =60(A307)$
Threads Excluded? N	(Yes or No) Are Threads Excluded From the Shear Plane?
$M = 26.44$	(kip-ft) Bending Moment at Match Plate (Unfactored Load Effects)
$V = 3.41$	(kip) Shear Force at Match Plate (Unfactored Load Effects)
$A_b = 0.3068$	(in ²) Nominal Area of Anchor Bolt = $\pi r^2 = \pi(B_{dia}/2)^2$
$F_{nv} = 26.1$	(ksi) Bolt Nominal Shear Stress $F_{nv} = 0.45F_u(\text{Threads Excluded}) \text{ or } 0.563F_u(\text{Threads Not Excluded})$
$F_{nt} = 43.5$	(ksi) Bolt Nominal Tensile Stress $F_{nt} = 0.75F_u(F1554 \text{ Gr } 36 \text{ or } A307)$

ANCHOR BOLT			
Shear			
Single Bolt Available Shear Capacity = $\Phi R_n = \Phi(F_{nv})A_b =$		6.01	kip
Single Bolt Actual Shear Force = $V_u/n_b =$		0.57	kip
Shear Check		OK	9%
Tension (Modified for Shear)			
Single Bolt Required Shear Stress = $f_{rv} = (V_u/n_b)/A_b =$		1.9	ksi
Modified Bolt Nominal Tension Stress = $F'_{nt} = 1.3F_{nt} - (F_{nt}/\Phi F_{nv})f_{rv} =$		43.5	ksi
Single Bolt Available Tension Capacity = $\Phi R_n = \Phi(F'_{nt})A_b =$		10.01	kip
Single Bolt Actual Tension Force = $T_u = (M_u/d)/(0.5n_b) =$		6.22	kip
Tension Check		OK	62%
USE: 0.625 Inch Diameter Anchor Bolts			

BASE PLATE			
Flexure			
Plate Plastic Section Modulus = $Z = PL_w(PL_{th})^2/4 =$		3.445	in ³
Plate Available Flexural Strength = $\Phi M_n = \Phi(PL_{Fy})Z =$		111.6	in-kip
Cumulative Bolt Tension Force = $T_{uc} =$		18.7	kip
Plate Actual Bending Moment = $M_{pl} =$		84.0	in-kip
Flexure Check		OK	75%
Bearing			
Plate Available Bearing Strength at Bolt = $\Phi R_n = \Phi(3.0)B_{dia}(PL_{th})PL_{Fu} =$		71.4	kip
Plate Actual Bearing Stress = $(V_u/n_b)/(B_{dia}(PL_{th})) =$		1.0	kip
Bearing Check		OK	1%
USE: 0.875 Inch Thick Base Plate			

C4

(ROUND) PIER FOUNDATION ANALYSIS

Date:	9/19/2017
Project #:	100z2616

Section 1807.3.2.1 (Unconstrained) --> $d = 0.5A \{1 + [1 + (4.36h/A)]^{1/2}\}$

Store:

P = Applied Lateral Force - kips	3.41	<-
M = Moment @ Base - k-ft	26.44	<-
S_o = Lateral Bearing Pressure (psf/ft of Depth) (Table 1819.6)	100.00	<-
Diameter of Support Embedded into Concrete - in.	0.000	<-
b = Diameter of Footing - ft.	2.50	<-
d = Depth of Footing - ft.	7.750	<-
Dmin	7.749	
Load Combination Factor For (W)=	ASCE 7-05 = 1.0 ASCE 7-10 = .6	0.60
Factored Shear	2046.00	
Factored Moment	15864.00	
TEST	1500.00 516.67 516.67	
$S_1 = 2 \times (d/3) \times (S_o)$	516.67	
$A = (2.34P) / (S_1 \times b)$	3.707	
h = Centroid of Moment	7.754	

Reinforcement Design (Use w/Anchor Bolts)

If Support is Direct Embed into Concrete Disregard Reinforcement

$d=$	15.3333	
$b=$	29.4524	
$M_u = (Moment * Load Factor) =$	26440	
Load Factor =	1.00	<-
$f_y =$	60000	<-
$f'_c =$	2500	<-
$\alpha =$	1	<-
$\alpha = A_s f_y / (0.85 f'_c b) =$	0.759	
Req'd Flexural Steel = $A_s = ((M_u * 12) / (.9 * 60,000 (d - \alpha/2))) * 2 =$	0.792	$\rho = (\#_{bars} * Area_{bar}) / (\pi * r^2)$
Req'd Temp & Shrinkage Steel = $A_s = 0.0018 (A_g) =$	1.272	
DEPTH:	7.75 ft.	
DIAMETER:	2.5 ft.	
(support filled) CONC. VOL:	1.409 cy.	
(support not filled) CONC. VOL:	1.409 cy.	

C5

Elrod Engineering, LLC

Project : 100x2616 Comm. Banks of Colorado
 Subject : 11'-0" ATM Canopy
 Location : Multiple Location, CO

File : 100x2161
 Date : 9/18/2017
 Eng : DBP

Design Wind Pressure, p, Equation 29.4-1 (ASCE 7-10)

System Type	Structure Type	Equation
Other Structures (Directional Procedure)	Rigid Structures of all Heights Solid Freestanding Walls & Solid Freestanding Signs	$p = qh G C_f$ qh : velocity pressure at h G : Section 26.9.4 C_f : Figure 29.4-1 $F = p A_s$ A_s : gross area of wall or sign

Velocity Pressure Calculations:

Velocity pressure qh is calculated in accordance with section 29.3.2.

qh = Velocity pressure @ height (h)

$$qh = \text{Constant} \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 \quad (\text{Eq 29.3-1})$$

Where : Constant = Numerical Constant (Section C27.3.2)

$$= \frac{1}{2} \cdot \left[\left(\text{Air density lb/cu ft} \right) / \left(32.2 \text{ ft/s}^2 \right) \right] \cdot \left[\left(\text{mi/h} \right) \left(5280 \text{ ft/mi} \right) \cdot \left(1 \text{ hr/3600 s} \right) \right]^2$$

$$= 0.00256$$

Mean Sea Level = 0.00 ft

Air Density @ MSL = 0.0765 lb/cu ft (Table C27.3-2)

Occupancy Category = II (Table 1.5-1)

Exposure Category = C (Section 26.7.3)

α = 9.50 (Table 26.9-1)

Z_g = 900.00 ft (Table 26.9-1)

Basic Wind Speed = 140.00 mph (Figure 26.5-1 A-C)

Structure Height = 11.00 ft

Width = 12.00 ft

Depth = 2.00 ft

Where : K_h = Velocity pressure coefficient @ height h

$$= 2.01 \cdot \left(Z/Z_g \right)^{2/\alpha} \text{ for } 15 \text{ ft} \leq Z \leq Z_g \quad (\text{Table 29.3-1})$$

$$= 2.01 \cdot \left(15/Z_g \right)^{2/\alpha} \text{ for } Z < 15 \text{ ft}$$

$$= 0.85$$

K_{zt} = Topographic factor (Figure 26.8-1)

$$= \left(1 + K_1 \cdot K_2 \cdot K_3 \right)^2$$

Topography = None

$K_{zt} @ h$ = 1.00

K_d = Wind directionality factor (Table 26.6-1)

$$= 0.85$$

C6

Elrod Engineering, LLC

Project : 100x2616 Comm. Banks of Colorado
 Subject : 11'-0" ATM Canopy
 Location : Multiple Location, CO

File : 100x2161
 Date : 9/18/2017
 Eng : DBP

Gust Effect Factor, G_f , Obtained by Rational Analysis

The gust effect factor G_f obtained by rational analysis uses the dynamic properties of the system.

Values Obtained from Table 26.9-1

Z_{min} = 15 ft
 e = 0.2
 ℓ = 500 ft
 c = 0.2

Calculated Values

Analysis = Category II : Rigid Structure-Complete Analysis
 $z(\sim)$ = 15 ft
 I_z = $c \cdot (33/z(\sim))^{1/6}$ (Eq. 26.9-7)
 = 0.2280869
 L_z = $\ell \cdot (z(\sim)/33)^{1/6}$ (Eq. 26.9-9)
 = 427.0566 ft
 Q = $Sqr [1 / (1 + 0.63 \cdot [(b+h)/L_z]^{0.63})]$ (Eq. 26.9-8)
 = 0.953
 g_q = 3.4
 g_v = 3.4
 Gust Factor (G) = $0.925 \cdot [(1 + 1.7 \cdot g_q \cdot I_z \cdot Q) / (1 + 1.7 \cdot g_v \cdot I_z)]$ (Eq. 26.9-6)
 G = 0.901

Elrod Engineering, LLC

Project : 100x2616 Comm. Banks of Colorado
 Subject : 11'-0" ATM Canopy
 Location : Multiple Location, CO

File : 100x2161
 Date : 9/18/2017
 Eng : DBP

Design Wind Pressure, p, Equation 29.4-1

Figure 29.4-1 (Solid Freestanding Walls & Freestanding Solid Signs)

Horizontal dimension of sign (B) = 12.00 ft
 Height of sign from ground surface to top (h) = 11.00 ft
 Vertical dimension of sign (s) = 3.83 ft
 Ratio of solid area to gross area (epsilon) = 1.00
 Horizontal dimension of return corner (Lr) = 2.00 ft
 Aspect Ratio (B/s) = 3.13
 Clearance Ratio (s/h) = 0.35
 Depth Ratio (Lr/s) = 0.52

Case	kz	K3	Kzt	Kd	qh (psf)	Cf	p (psf)	F (lbs)
A&B	0.85	1.00	1.00	0.85	36.20	1.78	57.90	2,662.96

Case C

Region	kz	K3	Kzt	Kd	qh (psf)	Cf	p (psf)	F (lbs)
0 to s	0.85	1.00	1.00	0.85	36.20	2.64	86.05	1,264.18
s to 2s	0.85	1.00	1.00	0.85	36.20	1.73	56.28	826.82
2s to 3s	0.85	1.00	1.00	0.85	36.20	1.17	38.13	560.24
3s to 4s	0.85	1.00	1.00	0.85	36.20	0.14	4.69	9.00

Sum = 2,660.24