DAVIS KANE
ARCHITECTS, PA

ADDENDUM

To the Construction Documents for the:

Project:	Bear Creek Fire Station			Addendum #
Owner:	Onslow County			
Owner ID No.:	Bid No. 102-25C			
DKA Project No.:	2324			
Prepared By:	Alexandre Penegre	Bid Documents Issue Date:	4/22/2025	02

The date of issuance of this addendum is 4/22/2025. All conditions of the addendum are in effect as of this date. Bidders are hereby informed that the following additions, deletions, changes and/or clarifications supersede and supplement the Contract Documents for the above referenced project.

Each bidder shall be responsible for notifying his subcontractors and/or vendors of the contents of this Addendum. The items included in this Addendum are for all Contractors as the items relate to their respective trades.

From:	Davis Kane Architects
Transmitted to:	Plan Rooms; Known Interested Bidders; Ben Warren; Christina Russell
Total Number of Pages:	261

Substitution Requests:

1. Valent Energy Recovery Ventilator Model ERC-E1-H-P is approved as a substitute for the specified ERV model.
2. Summit Lockers HDPE Lockers are approved as a substitute for the specified HDPE lockers in Lockers 108.
3. Elite Storage HDPE Lockers are approved for lockers in Lockers 108. Elite Storage metal grid lockers are rejected for lockers in Gear Locker 121.
4. JUS Doors are rejected as a substitution request for four-fold doors.
5. Northstar Industries KF-100 trench drains are rejected.
6. Generac Generator is approved if it meets all provisions of the specifications. Standard enclosure data provided is not acceptable if it is steel. Aluminum enclosure is acceptable if configured with a peaked or sloped roof. Generac transfer switches are not approved.

RFI's:

1. Where PEB purlins are shown approximately 4' spacing horizontally. We need more detail for applying rigid insulation, sheetrock and exterior sheathing, there does not appear to be any metal framing in these walls.
    a. Sheathing and rigid insulation was removed from where metal panels are located. Studs were added at locations where brick veneer is located for sheathing and insulation to attach to.
2. In lieu of batt insulation in the cavity and R-13 CI with a U-Value of .064, can we use R-25 (0.060 U-Value) fabric liner system?
    a. Proposed system is acceptable provided that it meets or exceeds NC Energy Efficiency Code requirements and provides a continuous air barrier system.
3. Can the below AISC certification for structural steel be deleted. It reduces the number of bidders drastically and increase the cost drastically.
    a. Onslow County will not remove the AISC certification requirements.

4. I am requesting the following clarifications regarding the CO / NO2 Sensing system detailed in 230900-2.1.K
   Location of the Control Panel.
   a. Information requested is shown on Plan 1/M100.
   Location, mounting heights, and Qty of CO sensors.
   a. Information requested is shown on Plan 1/M100 and in specification Section 230900 Article 2.1.K.
   Location, mounting heights, and Qty of NO2 Sensors.
   a. Information requested is shown on Plan 1/M100 and in specification Section 230900 Article 2.1.K.
   Is there a basis of design for the CO/NO2 Sensing system?
   a. There is no basis of design or manufacturers listed for the CO and NO2 sensors. It is a performance specification.
5. Are tap and sewer fees part of contract? Can DKA contact ONWASA and ask for price so all bidders have same price?
   a. Fees are part of contract. ONWASA has cited a $11,003 water fee and a $23,785 sewer fee.
6. Please provide manufacturer and model numbers of the OPCI items on drawing A002. Does the CASADE SCBA System require a stand-alone air compressor system?
   a. At this time, the FD has not determined which SCBA system will be provided. For bidding purposes, do not include a second, stand-alone air compressor system.
7. Who provides and installs the washer extractor listed on drawing A002. If GC, please provide specification.
   a. General Contractor shall provide and install the extractor. Basis-of-design product data has been listed on A002.
8. Please provide a specification for the glass markerboard listed on drawing A002.
   a. Basis-of-design product data has been listed on A002.
9. Please identify what window received blinds and/or roller shades.
   a. See revised Reflected Ceiling Plan sheet A110 with FFE tags showing windows to receive blinds and roller shades.
10. Is a GeoTech report available?
    a. Yes, the Geotechnical Report is included in this Addendum and will be included in the project manual.
11. Sheet A200 shows a "PRECAST SIGN". Is that to be precast concrete or other?
    a. The design intent is for the sign to be a wet-poured cast stone.
12. Sheet A200 also has letters illustrated in Detail G1. The Key Notes call those out as being a Century Gothic font but Spec 2.1 A. 6. calls them out as being Helvetica. Which font is preferred?
    a. Helvetica font is preferred. The keynote on A200 has been revised to match the specification.
13. Spec 101419 2.1 A. 1. Notes that the letters on Sheet A200 are to be cast aluminum. My concern is the length. If I scaled it correctly, the overall length of the sign as illustrated is 205 ½". The font illustrated is a condensed version of a block font that may or may not be a Century Gothic. There are many printed versions available online but the only CAST version that I'm aware of is NOT condensed meaning that it won't fit in that 205 ½" length limitation. To be able to hit that length at the required heights in the font as illustrated, I know of a few options:
    1 – The letters can be custom cast. This option drives up the cost maybe 35% over the standard font cost.
    2 – The letters can be custom cut from plate aluminum but that will run approximately 55% more than a standard cast font cost and will be ½ the thickness (only ½" thick, cast would be 1" and ¾" thick).
    3 – They can be custom formed (sides welded/soldered to the faces) out of stainless steel. The appearance is very similar and the cost is approximately 25% more than a standard cast font.
    Please advise if any of the above are acceptable.
    a. Letters shall be bid in most economical fashion to meet height requirements.
14. Spec 101423 1.4 C. notes that samples are needed for "each type of sign assembly" and Spec D.1. states that these are to be be full size samples. Specifically, which sign types are preferred to be reviewed as samples?
    a. A single signage sample is acceptable. Sign Type "B" will provide DKA adequate information to review signage.
15. Is Interior Sign Type E a "changeable insert sign" with paper inserts? If not, please specify how this one is to be made.
    a. No, Sign Type E is similar in construction to other signage with raised copy. See revised sheet A700 for reference.
16. Detail A on F001 shows a PIV is to be installed after the 6" backflow preventor. No PIV is shown on the utility plan, C501. Please confirm if a PIV is to be installed.
    a. PIV has been removed from plans. See revised F001.
17. P100 shows that the plumbing contractor is responsible for installing the OWS. Typically, this is part of the utility contractor's scope. Please confirm who is responsible for the installation.
    a. The design intent is for the oil separator to be included in the Division 22 scope of work.

18. Trench drain detail on C900 shows 2LF of 8" PVC to flow out of the trench drain and then to be connected to 15" RCP by means of a clean out in the curb as shown on C300. This is not a method to join said pipe together and more information is needed to know what structure should be installed here.
    a. The downstream pipe has been changed to 12" HDPE. The cleanout has also been moved outside the pavement. See detail.
19. Page C400 shows 118' of pipe to be installed from an outlet structure in pond 2. This pipe is not shown to be present in the final grading plans on C300 but there is a line for 118' of 18" RCP on the structure schedule. Please verify if this pipe is supposed to be installed and then removed.
    a. The erosion control has been changed to match the final conditions. C400 shows a 32' of pipe from the outlet structure of pond 2.
20. Please confirm the inlet size of downspouts and color of cast iron downspout boots shown on page A340, detail A1.
    a. Cast iron downspout boots shall match downspouts, gutter, and roof color. Inlet size shall be coordinated with metal building manufacturer. DKA suggests basing bid on 4" x 4" inlets.
21. Per Addenum 1: Detail G7 on 1001 calls out metal cove trim at floor to wall tile transition. The finish legend calls for tile base TB1, and the elevations call for wall tile to run to the floor. Please confirm the metal cove trim is correct, and that TB1 is not used.
    a. TB1 shall not be used. The transition from floor to wall shall be as detailed on G7/1001. See revised sheet 1001 for removal of tile base.
22. Detail A1 on the same sheet (1001) calls for a marble threshold at the non-ADA showers
    a. Non-ADA showers shall have a curb as detailed on A5/A310.
23. Detail A5 on A310, however, calls out for tile at the tops of the curbs. Please clarify which detail is correct.
    a. A5/310 is correct for non-ADA showers. See revised 1001 for removal of marble threshold note in non-ADA showers.
24. Are there specific details for the dumpster enclosure and fence? Is this masonry or does it follow the chain link fence details on C801?
    a. See A1/A401 and A3/A401 for added trash receptacle enclosure details.
25. These plans calls for square duct. However most everything we have been seeing allowed us to us the round equivalent. Is this allowed on this job?
    a. The ductwork shall be bid as rectangular as designed.
26. It "appears" this genset will be used to peak shave in looking at the ATS docs (attached – see last pages).. If that is the case, this will have to be a Tier IV Genset.. Can you please ask the EOR if that is their intent?
    a. Peak shaving is not specified for the generator. The ATS is specified to be closed transition type, but that does not imply peak shaving.
27. There is no mention of what Tier rating is required in the genset specs other that satisfy all of the regulations.
    a. Tier requirements would be to meet current EPA requirements.
28. Do you know if there are any CAD files available for the precast sign? We sure could use it to help us price that thing.
    a. CAD files can be provided to the awarded General Contractor.
29. The FFE Legend on A002 refers to the plumbing drawings for item 18 – Washer Extractor, but there is no further information on the plumbing drawings or schedules. Can you please provide further direction on this?
    a. Basis-of-Design product data has been listed on A002.
30. Do you want LVT or Vinyl Composite Tile(VCT). The main reason is that the project manual states vinyl composite tile, but the drawing manual or finish schedule lists LVT.
    a. LVT shall be provided. Basis-of-design product data is listed on 1001.
31. Per one of our lighting vendors, they would like to know if they need to quote the poles on E012 per key notes 1 &2, or if these are existing poles.
    a. These are new poles that should be accounted for in bidding.
32. Restroom mirrors are scaled at 24" x 36". Specification calls for 18" x 30". Which should we quote?
    a. Mirrors should be quoted as 24" x 36" as shown on drawings.
33. Please advise robe hook locations, as not identified on elevations.
    a. Provide (1) towel hook per bathroom with shower. Location will be determined.
34. Is (1) mop/broom holder to be assumed in HSKP Room?
    a. No, the mop holder shall be supplied in Decon 122 as shown on A1/A400

35. Please advise shower shelf locations, as not identified on elevations.
    a. Refer to A001 for shower shelf locations. Elevations are called out as "Roll-In Shower Locations", but the location, mounting heights, etc. are applicable to all showers.
36. Are boxes in Dorm Rooms intended to be wire mesh lockers, as called for in specs?
    a. No, dorm rooms are to receive wardrobes. Refer to keynote #2 on 100 and detail A7/A401 for additional information.
37. I do not see a lightning protection plan in the drawing set or the 26 41 00 Lightning Protection Systems section in the spec. Are you guys looking to put LPS on this structure?
    a. No lightning protection system is specified for this project.

Specifications:

1. Form of Proposal
    a. Revised to include the new Alternate A-2: Tile in Lieu of Paint in Bathrooms.
2. Geotechincal Report
    a. Geotechincal Engineering Report, dated April 9, 2024, by ECS Southeast, LLC has been added to the Project Manual
3. 012300 – Alternates
    a. Revised to include the new Alternate A-2: Tile in Lieu of Paint in Bathrooms.
4. 083713 – Exterior Four-Fold Doors
    a. Added "B. Performance Requirements" with associated text in Part 2.
5. 105126 – Plastic Lockers
    a. Revised 2.2-B-4 to have depth of 24" inches.
6. 220029 – Fixtures
    a. Revised MR-1 mop receptor from contractor built to precast model.
    b. Revised TD-1 trench drain from end outlet to bottom outlet.
7. 230500 – Heating and Air Conditioning
    a. Section 230514 Fire, Manual, and Motor Operated Dampers. Paragraph A. Deleted Air Balance and added Greenheck and Nailor as damper options.

Drawings:

1. Drawing G001
    a. Revised to include the new Alternate A-2: Tile in Lieu of Paint in Bathrooms.
2. Drawing C100
    a. Pond limits revised
3. Drawing C200
    a. Project limits expanded to accommodate new pond size.
4. Drawing C400
    a. Project limits revised and outlet pipe from TSSB has been updated.
5. Drawing C401
    a. New pond grading and expanded limits
6. Drawing C500
    a. Pond outline revised
    b. Additional notes added at site connection
    c. Force main tap changed
    d. Additional labels and change of tapping on profile sheets
7. Drawing C501
    a. Pond outline revised
    b. Additional notes added at site connection
    c. Force main tap changed
    d. Additional labels and change of tapping on profile sheets

8. Drawing C503
    a. Pond outline revised
    b. Additional notes added at site connection
    c. Force main tap changed
    d. Additional labels and change of tapping on profile sheets
9. Drawing C504
    a. Pond outline revised
    b. Additional notes added at site connection
    c. Force main tap changed
    d. Additional labels and change of tapping on profile sheets
10. Drawing C505
    a. Pond outline revised
    b. Additional notes added at site connection
    c. Force main tap changed
    d. Additional labels and change of tapping on profile sheets
11. Drawing C600
    a. Sod limits near pond revised
    b. Pond outline revised.
    c. Street trees adjusted.
12. Drawing C703
    a. Pond details revised due to new pond grading and expansion.
    b. Pond plantings revised due to new pond grading and expansion.
13. Drawing C704
    a. Pond details revised due to new pond grading and expansion.
    b. Pond plantings revised due to new pond grading and expansion.
14. Drawing C705
    a. Pond details revised due to new pond grading and expansion.
    b. Pond plantings revised due to new pond grading and expansion.
15. Drawing C706
    a. Pond details revised due to new pond grading and expansion.
    b. Pond plantings revised due to new pond grading and expansion.
16. Drawing C902
    a. Revised details
17. Drawing C903
    a. Revised details
18. Drawing A002
    a. Revised to include types D3 and E2 to the Partition Legend.
19. Drawing A100
    a. Revised to include partition type E2 along exterior wall of Business and Dorms.
    b. Revised Equipment Platform walls to be A6 above CMU wall (starting 12'-0" AFF).
20. Drawing A110
    a. Revised to show location of horizontal blinds and combination roller shades.
21. Drawing A200
    a. Revised keynotes 08 and 09 to "Helvetica" font.
22. Drawing A300
    a. Revised to include partition type E2 along exterior wall of Business and Dorms.
    b. Revised Equipment Platform wall above CMU to be type A6.
23. Drawing A301
    a. Details A1, A6, and G7 revised to remove sheathing, rigid insulation, and air barrier where metal panel is called for. Provide PEMB thermal blocks at each girt. 8" metal studs added where brick is called for.
24. Drawing A302

a. Details A1, A3, A5, A7, and G7 revised to remove sheathing, rigid insulation, and air barrier where metal panel is called for. Provide PEMB thermal blocks at each girt. 8" metal studs added where brick is called for.

25. Drawing A310
    a. Detail A1 revised to remove sheathing, rigid insulation, and air barrier where metal panel is called for. Provide PEMB thermal blocks at each girt.
    b. Detail A7 revised to add 2 ½" and 8" metal studs.
    c. Detail C5 Mop Sink with Curb removed from project. Mop sink to be a prefabricated, see Plumbing for additional details.
26. Drawing A330
    a. Details A3, A6, D1, D6 revised to add 2 ½" and 8" metal studs.
27. Drawing A400
    a. Note added in Decon 122 to "PREFABRICATED MOP SINK WITH 20GA STAINLESS STEEL SHEET TO 4'-0" ABOVE, SEE PLUMB DWGS".
28. Drawing A401
    a. Finish Key Notes revised. "Singular Corner Guards" revised to "Corner Guards". "Schulter" revised to "Metal Tile Trim Edge". Note 03 "Window Sill" removed.
    b. Added details A1 and A3 for trash receptacle enclosure.
29. Drawing A410
    a. Finish Key Notes revised. "Singular Corner Guards" revised to "Corner Guards". "Schulter" revised to "Metal Tile Trim Edge". Note 03 "Window Sill" removed.
    b. Full height tile revised to be 3'-4" AFF where noted.
    c. Added alternate notes for all bathroom elevations.
30. Drawing A700
    a. Revised sign type "E".
31. Drawing A701
    a. Details F1, F3, F6, C1, C3, C6 revised to remove sheathing, rigid insulation, and air barrier where metal panel is called for. Provide PEMB thermal blocks at each girt.
32. Drawing A702
    a. Details F3, C3, A3 revised to remove sheathing, rigid insulation, and air barrier where metal panel is called for. Provide PEMB thermal blocks at each girt.
    b. Details F6, C6, A6 revised to show 8" CMU in lieu of 12" CMU addressed in Addendum 01.
    c. Details F1 and C1 revised to add 2 ½" and 8" metal studs.
33. Drawing A703
    a. Details F1, C1 revised to remove sheathing, rigid insulation, and air barrier where metal panel is called for. Provide PEMB thermal blocks at each girt.
    b. Details F3, C3, A3 revised to add 2 ½" and 8" metal studs.
34. Drawing I001
    a. Removed marble threshold note at non-ADA showers (details A1 and F3)
    b. Removed TB1 from finish schedule.
35. Drawing S111
    a. Updated wall footing elevation at east site of Decon.
    b. Revised wall footing step locations on east side of Decon.
    c. Updated grade beam elevation along grid 8.
    d. Added section cut D5/S301.
    e. Removed slab depression at mop sink.
36. Drawing S301
    a. Added section D5/S301
37. Drawing S501
    a. Updated section A2 graphics to show 8" CMU wall.
    b. Updated section A3 with CFMF extending from top of CMU wall.
    c. Updated section A4 graphics to show 8" CMU wall.

38. Drawing S505
    a. Added detail C1, "TYPICAL CONCRETE WALL OPENING DETAILS"
39. Drawing P100
    a. Revised waste oil piping to avoid conflicts with grade beams.
    b. Revised sanitary waste outlet to avoid conflict with structural footing.
    c. Revised invert elevations of piping leaving the building and oil separator outlet.
    d. Revised keyed notes in accordance with the above revisions.
40. Drawing P400
    a. Reworked sanitary waste and vent at SK-1 in Kitchen 109 to avoid conflict with structural footing.
41. Drawing F001
    a. Detail A – Removed the PIV to match what the site plans are currently showing.

42. Drawing M200
    a. Updated installation height of ductwork to match floor plan.
43. Drawing M600
    a. Added note to Power Ventilator Schedule indicating HVLS fans shall be interlocked with fire alarm shutdown per permit comments from the inspector.
44. Drawing E011
    a. Removed Fire alarm Module for the PIV.
45. Drawing E121
    a. Added (2) Fire alarm control modules in Apparatus Bay 127 for Fire alarm shutdown of HVLS fans F-3 and F-4.
    b. Removed Fire alarm surge protector for on site PIV module.
46. Drawing E701
    a. Revised Fire alarm matrix to show shutdown of HVLS fans on fire alarm activation.

END OF ADDENDUM

Attachments:

Revised Specifications: Form of Proposal, Geotechnical Engineering Report, 012300 – Alternates, 083713 – Exterior Four-Fold Doors, 105126 – Plastic Lockers, 220029 – Fixtures, 230500 – Heating and Air Conditioning

Revised Sheets: G001, C100, C200, C300, C400, C401, C500, C501, C503, C504, C505, C600, C703, C704, C705, C706, C902, C903, A002, A100, A110, A200, A300, A301, A302, A310, A330, A400, A401, A410, A700, A701, A702, A703, I001, S111, S301, S501, S505, P100, P400, F001, M200, M600, E011, E121, E701

DAVIS KANE
ARCHITECTS, PA

☑ NO EXCEPTIONS TAKEN ☐ AMEND & RESUBMIT
☐ MAKE CORRECTIONS NOTED ☐ REJECTED

Architect's review neither extends nor alters any contractual obligations of the Architect or Contractor. This is in conformance with responsibilities outlined in the "General Conditions." Contractor shall familiarize himself with same and understand his responsibilities.

By apenegre Date 04/10/2025

DAVIS KANE ARCHITECTS, PA

SUBSTITUTION REQUEST FORM

Project:	Bear Creek Fire Department
Owner:	Onslow County
Owner ID No.:	**Bid No. 102-25C**
DKA Project No.: 2324	
Contractor: TEAM Construction, LLC	Submitted by: Date: 3-31-25
Product Name/Item as listed in specification: Energy Recovery Ventilators	Specification section and paragraph: 230507 para A thru G

Description of Substitution Product:
Valent Energy Recovery Ventilator
Model Number: ERC-E1-H-P

Name, Model Number, other information as required to enumerate product

Proposed cost impact: Y or N	Describe affect, if any on Construction Schedule: None

Supporting Data:
Submittal attached

List attached supporting data including drawings, cut sheets, samples, installation information, etc.

Affected trades:
HVAC

List other trades that are affected by incorporation of this Substitution Product

The Undersigned certifies that the proposed Substitution:

1. Has been fully investigated and determined to provide evidential benefit to the Owner over the specified product. This includes, but is not limited to, durability, appearance and performance.
2. Will have the same or better warranty coverage and duration.
3. Will have the same or better maintenance and service requirements and availability of replacement parts.
4. Will have no adverse effect on other trades and will not negatively affect or delay progress schedule.
5. Will not diminish the effectiveness of any rated assembly or in any way affect any quality or function as it relates to code compliance.

ERC-E1-H-P

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter DB (F)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)			
39	93.0	77.0	24.0	1,100	1,100

Unit Specifications

Qty	Weight (lb)	Unit Installation	Unit ETL Listing
1	365 (+/- 5%)	Indoor	UL 1812

Configuration

Outdoor Air		Exhaust Air	
Intake	Discharge	Intake	Discharge
End	End	End	End

Energy Recovery Performance

Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	93.0	77.0	82.2	70.8	75.0	62.5/50	85.8	70.0	28,710.0
Winter	24.0	20.1	49.8	39.8	72.0	55.8/35	46.1	40.8	30,906.0

Air Performance

Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan		
					Qty	Type	Drive-Type
Supply	1,100	0.75	0.861	1362	1	Forward Curve	Direct
Exhaust	1,100	0.75	0.861	1555	1	Forward Curve	Direct

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	0.92	1	ODP	SE	1750
Exhaust	1	0.93	1	ODP	N/A	1750

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	Fan Power (W/CFM)*	SCCR
Unit	208/60/1	15.8	20.0	1.256	5kA

*Fan Power (W/CFM) = (Supply BHP + Exhaust BHP) / Supply CFM

Construction Features And Accessories

Unit	
UL-1812	Std
Unit Installation - Indoor	Std
Outdoor Air Filters - 2" MERV 8, 2-20x25	Std
Exhaust Air Filters - 2" MERV 8, 2-20x25	Std
Energy Recovery Device - Polymer Membrane Energy Recovery Core	Std
Unit Construction - Single Wall	Std
Insulation - 1 inch R4 foil face	Std
Corrosion Resistant Fasteners	Std
Access - Hinged	X
Factory Wired Non-Fused Disconnect Switch	Std
Unit Finish - Galvanized	Std
Single Point Power	Std
Fan VFDs	
Controls	
Unit Controls - Terminal Strip	X
Sensors	
Unit On/Off Control - By Others	X
Sensor Monitoring Package	
Heating Enable - None	
Cooling Enable - None	
Supply Fan Control	
Exhaust Fan Control	
Network Protocol	
Exhaust Only Operation	
Economizer Control	
Remote Panel	
Control Accessories	
Remote Display	
CO2 Sensor	
Dirty Filter Sensor(s) - Both	X
Airflow Monitoring - None	

Accessories	
Frost Control - Timed Exhaust	X
Spare Filters - Both, Qty: 2 set(s)	X
Shipped Loose Smoke Detectors	
Duct Flange	Std
Outdoor Air Damper	
Return Air Damper	
Service Outlet - 120 VAC GFCI Service Outlet, Shipped Loose	
Spare Fan Belts	
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Core Warranty - 5 Yrs	Std

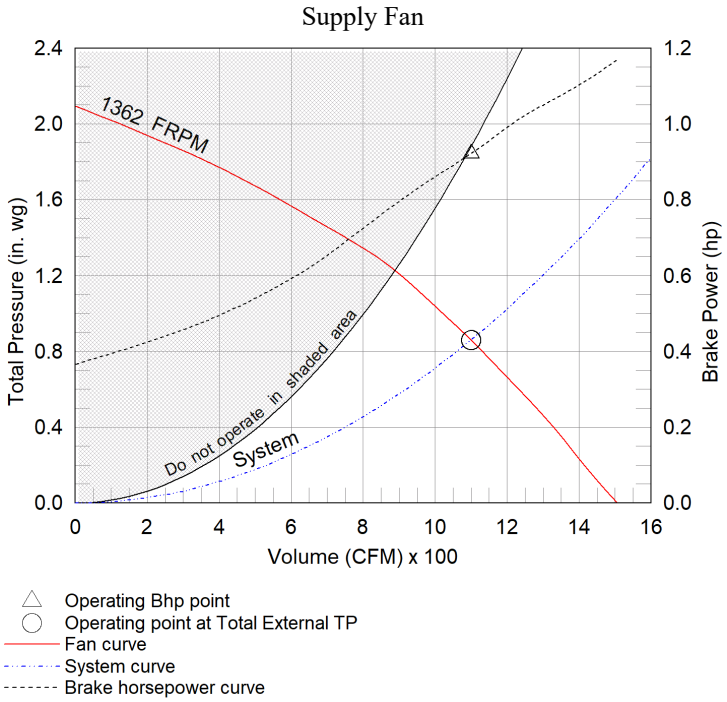
Standard Option	Std
Not Included	
Included	X

Supply Fan Charts And Performance

Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
1,100	0.75	0.861	1362	0.92	1	1	1	Forward Curve	Direct

Pressure Drop (in. wg)				
Weatherhood	Filter	Damper	External	Total
-	0.111	-	0.75	0.861

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
59.9	61.1	57.5	54.5	56.3	54.6	53.3	48.5	61.4	49.9	5.3

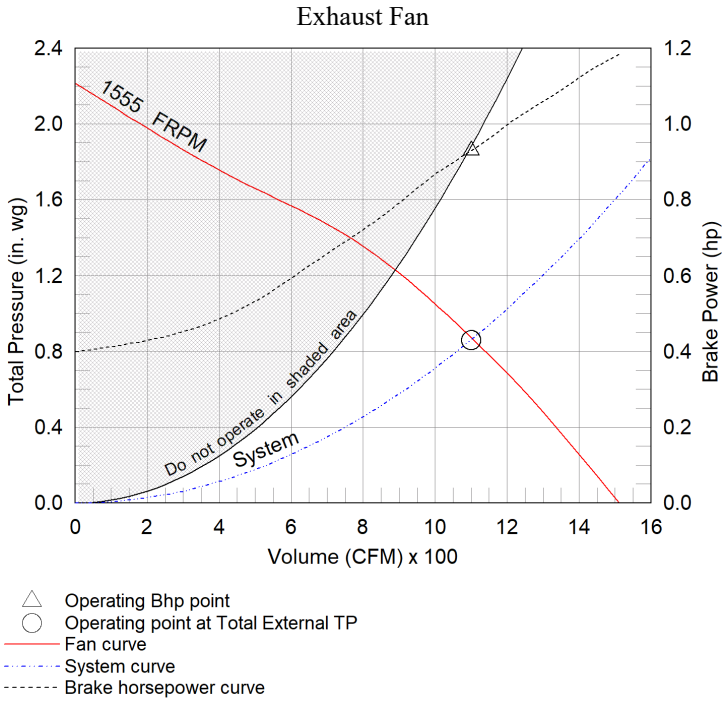


Exhaust Fan Charts And Performance

Exhaust Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
1,100	0.75	0.861	1555	0.93	1	1	1	Forward Curve	Direct

Pressure Drop (in. wg)				
Weatherhood	Filter	Damper	External	Total
-	0.111	-	0.75	0.861

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
61.9	60.5	55.9	51	49.7	48.4	43.1	48.3	56.2	44.7	4.3



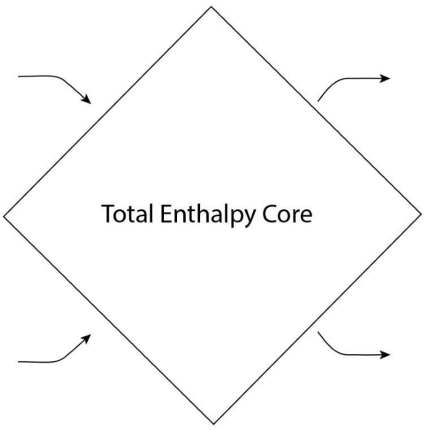
Energy Recovery Summer Performance

Design Air Flow Conditions			
OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Core Effectiveness
1,100	47.2	1,100	46.4

Outdoor Air Cooling Reduction				
OA Load w/o Energy Recovery		OA Load with Energy Recovery		Equipment Reduction (tons)
(BTU/h)	(tons)	(BTU/h)	(tons)	
60,885.0	5.07	32,175.0	2.68	2.39

Outdoor Air Entering	
Dry Bulb (F)	93.0
Wet Bulb (F)	77.0
Specific Humidity (gr/lb)	115
Enthalpy (BTU/lb)	40.4

Indoor Air Entering	
Dry Bulb (F)	75.0
Rel. Humidity (%)	50
Specific Humidity (gr/lb)	65
Enthalpy (BTU/lb)	28.1



Exhaust Air Leaving	
Dry Bulb (F)	85.8
Wet Bulb (F)	70.0
Specific Humidity (gr/lb)	84
Enthalpy (BTU/lb)	33.8

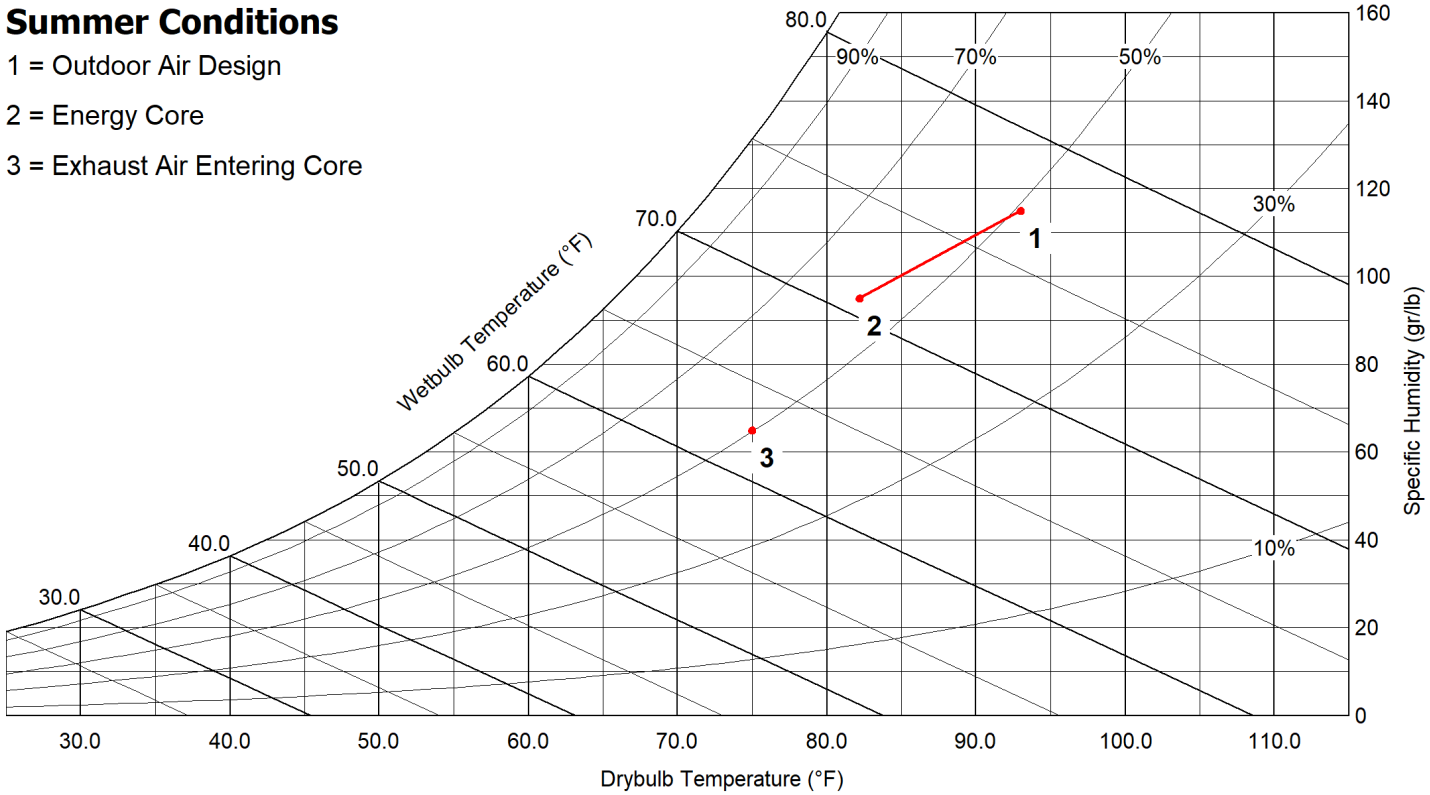
Supply Air Leaving	
Dry Bulb (F)	82.2
Wet Bulb (F)	70.8
Specific Humidity (gr/lb)	95
Enthalpy (BTU/lb)	34.6

Summer Conditions

1 = Outdoor Air Design

2 = Energy Core

3 = Exhaust Air Entering Core



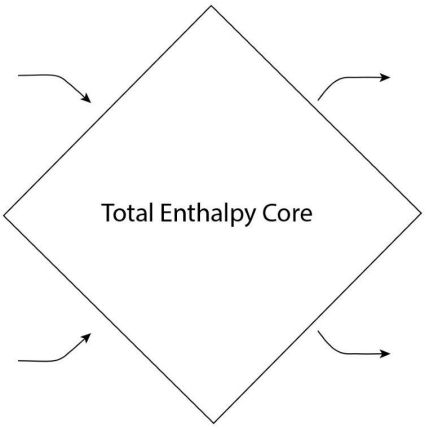
Energy Recovery Winter Performance

Design Air Flow Conditions			
OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Core Effectiveness
1,100	48.2	1,100	48.3

Outdoor Air Heating Reduction			
OA Load w/o Energy Recovery (BTU/h)	OA Load with Energy Recovery (BTU/h)	Equipment Reduction (BTU/h)	Sensible Effectiveness (%)
57,499.0	26,593.0	30,906.0	53.6

Outdoor Air Entering	
Dry Bulb (F)	24.0
Wet Bulb (F)	20.1
Specific Humidity (gr/lb)	9
Enthalpy (BTU/lb)	7.1

Indoor Air Entering	
Dry Bulb (F)	72.0
Rel. Humidity (%)	35
Specific Humidity (gr/lb)	41
Enthalpy (BTU/lb)	23.7



Exhaust Air Leaving	
Dry Bulb (F)	46.1
Wet Bulb (F)	40.8
Specific Humidity (gr/lb)	29
Enthalpy (BTU/lb)	15.6

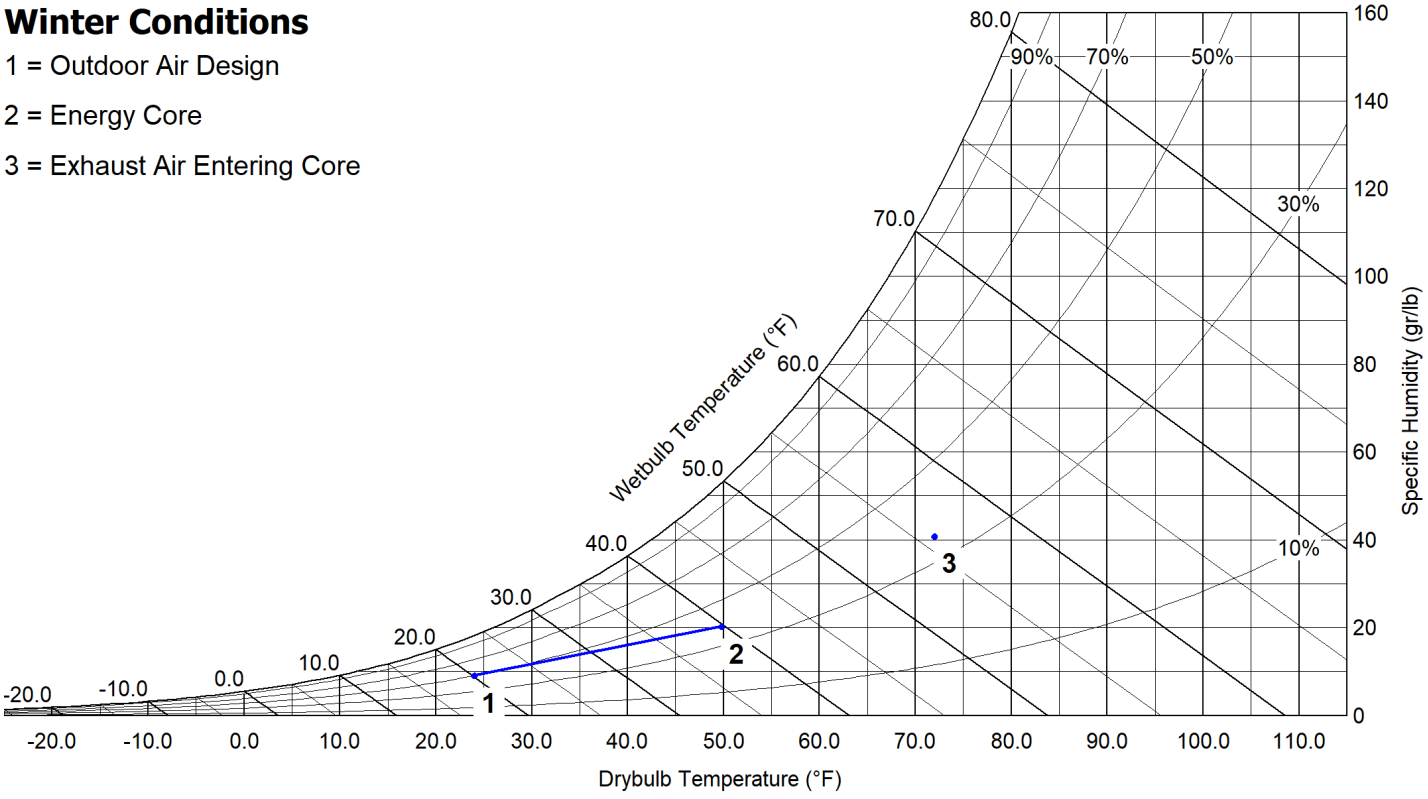
Supply Air Leaving	
Dry Bulb (F)	49.8
Wet Bulb (F)	39.8
Specific Humidity (gr/lb)	20
Enthalpy (BTU/lb)	15.1

Winter Conditions

1 = Outdoor Air Design

2 = Energy Core

3 = Exhaust Air Entering Core



AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)						
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)	
Leaving Supply	Entering Exhaust				Supply	Exhaust
1138	1138	1100	0.4	1.04	1.01	0.99

Thermal Effectiveness Ratings							
Enthalpy Recovery Ratio (%)		Sensible Effectiveness (%)		Latent Effectiveness (%)		Total Effectiveness (%)	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
47.2	48.2	59.8	53.6	38.7	35.5	46.4	48.3

Note(s)

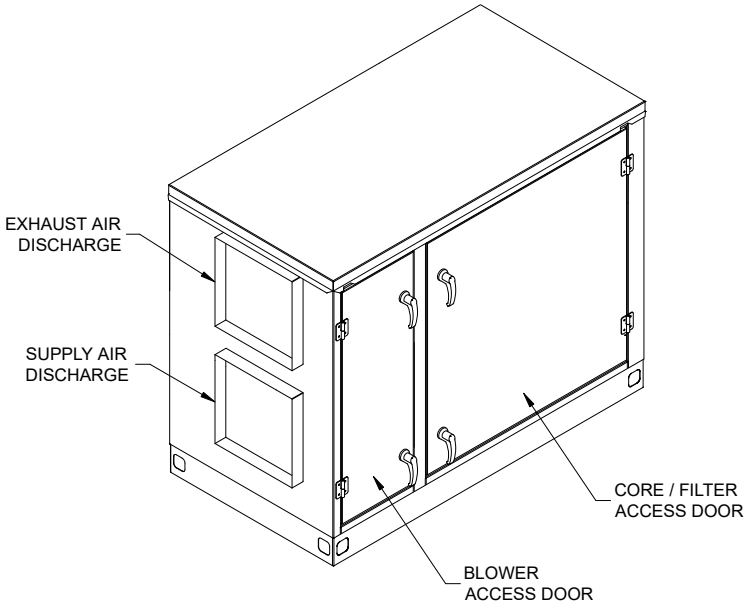
Summer Design Conditions:
Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Winter Design Conditions:
Application Rating is outside the scope of the AHRI ERV certification Program but is rated in accordance with AHRI Standard 1060.

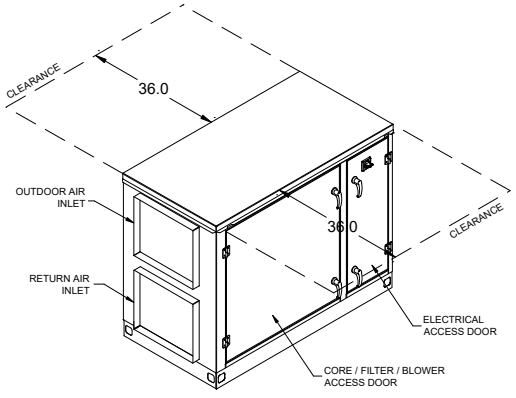
EATR application performance for an indoor mounted unit assumes 85% external static pressure (in. wg.) drop is on the outdoor air discharge.

OACF application performance for an indoor mounted unit assumes 85% external static pressure (in. wg.) drop is on the return air intake.

Isometric Drawings



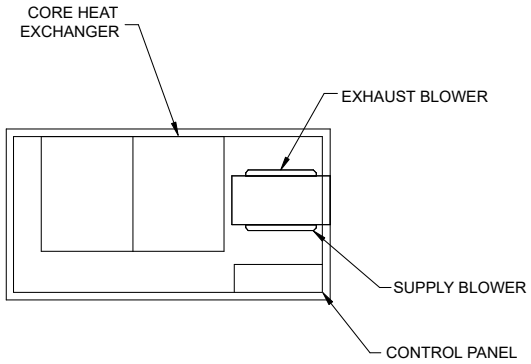
Back Right Isometric



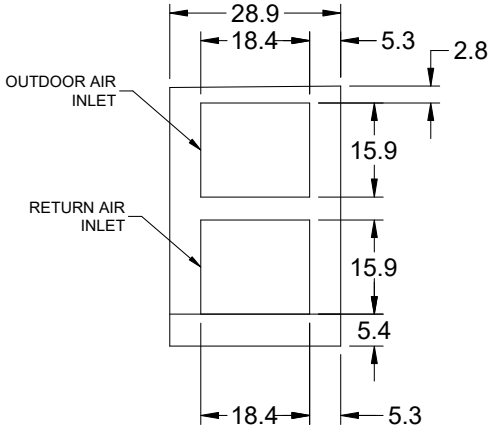
THE NON-ELECTRICAL SIDE CAN BE PLACED AGAINST A WALL. CLEARANCE TO THE ELECTRICAL SIDE IS ESSENTIAL TO PROVIDE ACCESS TO THE CONTROL CENTER AND COMPONENT MAINTENANCE.

Front Left Isometric

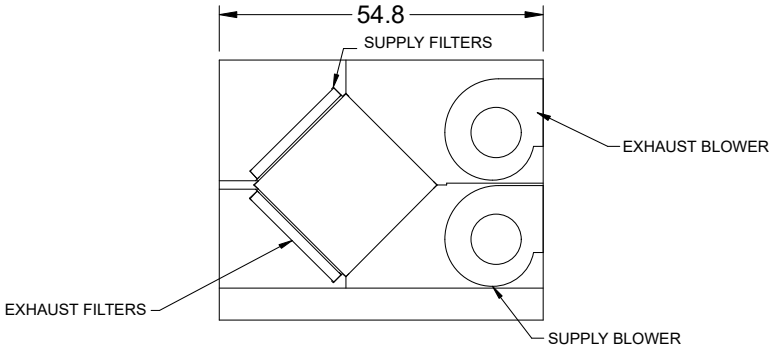
Overview Drawings



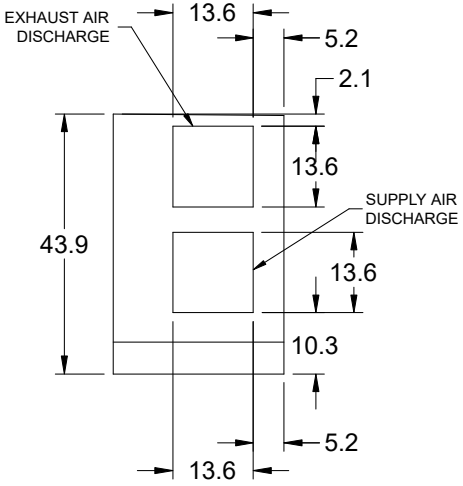
Plan



Left End



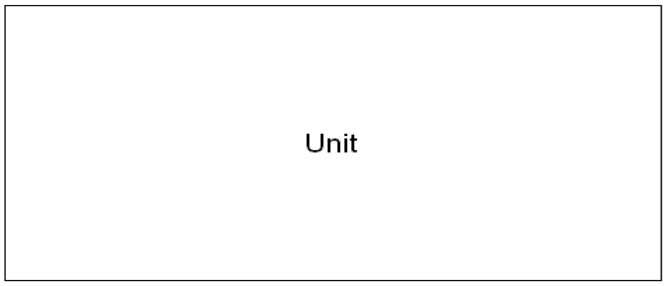
Elevation



Right End

Corner Weights

85 lb 95 lb



87 lb 97 lb

Note

Estimated corner weights are shown looking down on unit and the outside air intake will be on the left. Weights are applied at the base of the unit. Images not drawn to scale.

Terminal Strip Controls

BASIC UNIT CONTROLS:

The Energy Recovery Unit will be provided from the factory with an integral control center including: a single non-fused disconnect, 24 VAC transformer, terminal strip, and fan starters (contactor and overload).

ON/OFF CONTROL:

Within the unit control center, a digital signal must be field wired into the terminal strip (connecting terminals R and G) to control unit startup or shutdown.

This on/off signal is coming from:
By Others: The unit shall be energized by a field supplied and wired digital contact.

Startup (Digital Contact Closes)

- Exhaust fan ON.
- Supply fan ON.

Shutdown (Digital Contact Opens)

- Supply and exhaust fan de-energized.

FROST CONTROL

Frost Control for the core is enabled when air conditions are suitable for frosting to occur; based on the exhaust air temperature. If the exhaust air temperature is below 36 F, 2 F hysteresis frost control will enable.

Timed Exhaust:

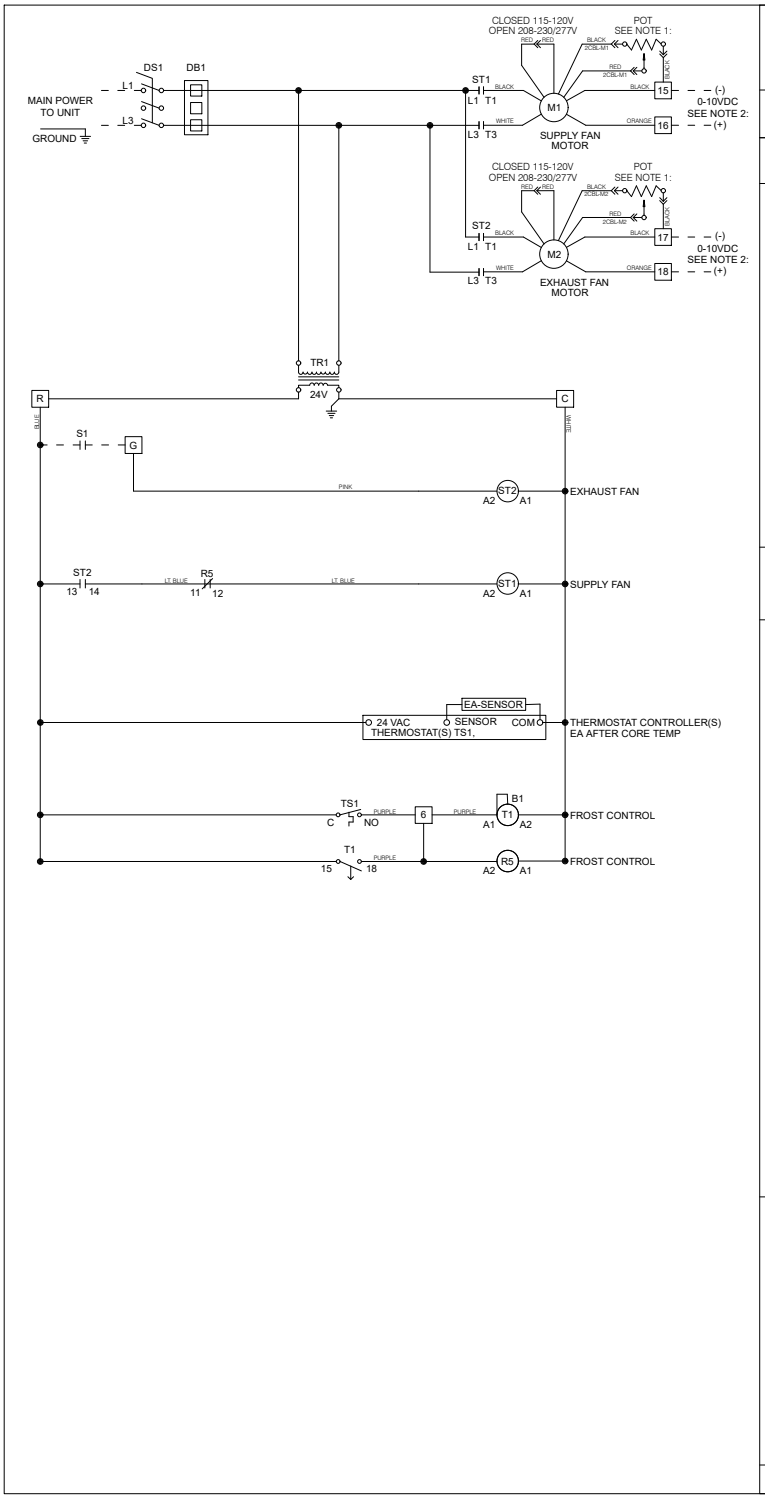
When conditions are suitable for frosting, the supply blower is cycled off for 5 minutes or until the exhaust air temperature is above set point. Any time the exhaust temperature drops below set point the supply blower will be cycled off.

CONTROL ACCESSORIES

Dirty Filter – Outdoor/Exhaust Air:

Factory provided pressure switch that will monitor the pressure drop across the outdoor and exhaust air filters. A digital signal will be provided indicating an increases pressure drop across the outdoor or exhaust air filters (Must be adjusted in field during start up). Field-wiring of a field provided light (or other alarm) will be required to monitor dirty filter alarm.

Wiring Diagram



valent
AIR MANAGEMENT SYSTEMS

Wiring Diagram Code:

V2KAA0503XXXXXXE37

CAUTION

UNIT SHALL BE GROUNDED IN ACCORDANCE WITH N.E.C.
POWER MUST BE OFF WHILE SERVICING.

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.

FIELD CONTROL WIRING RESISTANCE SHOULD
NOT EXCEED 0.75 OHM.

DO NOT INSTALL IN A COOKING AREA
OR DIRECTLY TO ANY APPLIANCE.
NE PAS INSTALLER DANS UNE AIRE DE CUISSON
NI RACCORDER DIRECTEMENT A` UN APPAREIL

FIELD WIRED – – – – –
FACTORY SUPPLIED AND WIRED ————

NOTE 1:
POTENTIOMETER IS MOUNTED IN CONTROL CENTER.
TURN DIAL FOR SPEED ADJUSTMENTS TO MOTOR.

NOTE 2:
0-10 VDC FAN MOTOR CONTROL BY OTHERS.
FOR 0-10 INPUT, POTENTIOMETER MUST BE SET TO 0.
POTENTIOMETER LOCATED IN CONTROL CENTER.

0-1.9 VDC FAN MOTORS ARE OFF
2 VDC - MINIMUM SPEED
ON- THRESHOLD (FROM PREVIOUS OFF) - 2 VDC
OFF- THRESHOLD (FROM PREVIOUS ON) - 1.5 VDC
10 VDC - MAXIMUM SPEED

IF ONE 0-10VDC SIGNAL IS PRESENT FOR BOTH MOTORS
PLACE A JUMPER BETWEEN THE FOLLOWING TERMINALS.

15 — 17 16 — 18

WIRE COLOR CODE

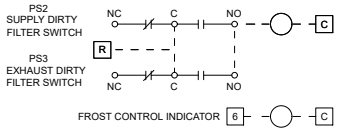
BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

LEGEND

DB#	POWER DISTRIBUTION BLOCK
DS	DISCONNECT SWITCH
M#	MOTOR
OL	OVERLOAD
PS2	SUPPLY DIRTY FILTER PRESSURE SWITCH
PS3	EXHAUST DIRTY FILTER PRESSURE SWITCH
R5	FROST CONTROL RELAY
S1	FAN SWITCH
ST#	MOTOR STARTER
T1	FROST CONTROL TIMER TYPICAL SETTINGS t1-OFF = 5 MIN. t2-ON = 30 MIN.
TR#	TRANSFORMER
TS1	FROST CONTROL THERMOSTAT - JUMPER HEAT CLOSES ON FALLING TEMP. TYPICAL SETTING 35°

USER INTERFACE CONNECTIONS:
USER TO VERIFY THAT TR1 CAN HANDLE THE VA LOAD OF INDICATOR DEVICES.

DIRTY FILTER INDICATOR SHOWN AS 24V POWER FROM UNIT.



Template Drawing: E37 DOC NUMBER: 2815171 REV: 3

Warranty Statement for ERV Preconditioners

Unit Warranty

Valent warrants the equipment to be free from defects in material and workmanship for a period of 18 months from the date of shipment. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to Valent.

Total Energy Core Warranty

The enthalpy core is warranted to be free from defects in material and workmanship for a period of 5 years from the shipment date.

Warranty Notes

Any component which proves defective during the warranty period will be repaired or replaced at Valent's sole option when returned to our factory, transportation prepaid. All warranties do not include labor costs associated with troubleshooting, removal, or installation. Valent will not be liable for any consequential, punitive, or incidental damages resulting from use, repair, or operation of any Valent product. These warranties are exclusive and are in lieu of all other warranties, whether written, oral, or implied, including the warranty of merchantability and the warranty of fitness for a particular purpose. No person (including any agent or salesperson) has authority to expand Seller's obligation beyond the terms of this warranty, or to state that the performance of the product is other than that published by Seller.

As a result of our commitment to continuous improvement, Valent reserves the right to change specifications without notice.

DAVIS KANE
ARCHITECTS, PA

SUBSTITUTION REQUEST FORM

Project:	Bear Creek Fire Station
Owner:	**Onslow County – Christina Russell**
Owner ID No.:	
DKA Project No.:	2324

Contractor:	Submitted by:	Treva Cannon
	Date:	04/11/25

Product Name/Item as listed in specification: Plastic Lockers	Specification section and paragraph: Division 10 Section 105126

Description of Substitution Product: Summit Lockers – HDPE Lockers

Name, Model Number, other information as required to enumerate product

Proposed cost impact: Y or N	Describe affect, if any on Construction Schedule:

Supporting Data: Please see attached Design Guides and Specifications

List attached supporting data including drawings, cut sheets, samples, installation information, etc.

Affected trades: n/a

List other trades that are affected by incorporation of this Substitution Product

The Undersigned certifies that the proposed Substitution:

1. Has been fully investigated and determined to provide evidential benefit to the Owner over the specified product. This includes, but is not limited to, durability, appearance and performance.
2. Will have the same or better warranty coverage and duration.
3. Will have the same or better maintenance and service requirements and availability of replacement parts.
4. Will have no adverse effect on other trades and will not negatively affect or delay progress schedule.
5. Will not diminish the effectiveness of any rated assembly or in any way affect any quality or function as it relates to code compliance.
6. Does not alter the design intent and/or functional requirements.
7. Does not require extensive modifications to the design or require extensive coordination.

The Undersigned certifies that the proposed substitution satisfies all of the requirements set forth in the Contract Documents and in this request.

Requesting Entity:

Submitter Representative Name: Treva Cannon	Company: Summit Lockers
Signature: *Treva Cannon*	Phone: 803.941.7087

Attachments: HDPE Design Guides & Specifications

Architect's or Engineer's Action:

- ☑ Substitution approved as submitted.
- ☐ Substitution approved as noted.
- ☐ Substitution rejected.
- ☐ Pre-Bid Substitution Request not submitted in proper timeframe – Action on request not permitted.
- ☐ Substitution Request not submitted with sufficient documentation to process. Contractor may choose to resubmit with fully-required documentation.

Notes:

Designer Representative: Bradley McClung, AIA NCARB	
Signature:	Date: 04.16.25

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www.lockersmfg.com

Substitution Request

Date: March 28, 2025

Company Submitting Request:

Elite Storage Products, LLC
Mail: PO Box 517, Collierville, TN 38027
Phone: (901) 367-3930 Fax: (901) 367-3931

Project Name: Bear Creek Fire Station

Specified Item: 105126 & 105143 *Section* | 1 *Pages* | Lockers *Description*

The undersigned requests considerations of the following product substitution:

Proposed Substitution: LockersMFG HDPE Lockers and Gear Grid Lockers

(Provide product model name / manufacturer name)

1. Attached data:
   - ☑ Certifications
   - ☑ Product Comparison
   - ☑ Specifications
   - ☑ Performance and Test Data
   - ☑ Photos
2. No changes will be required to the contract documents for the proper installation of the proposed product substitution.

The undersigned verifies that the following, unless modified by attachments, are correct:

1. The proposed substitution does not affect dimensions shown on the drawings.
2. No changes to the building design, engineering design, or detailing are required by the proposed substitution.
3. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
4. No maintenance is required by the proposed substitution other than that required for the originally specified product.
5. Other: _____

The undersigned further states that they have read the corresponding specifications section in the project manual and confirms that the function, appearance, and quality of the proposed substitutions are equivalent or superior to the originally specified product.

Signed: MP Printed Name: Matthew Pate Fax: (901) 367-3931

For Architect's Use:

- ☐ Accepted
- ☐ Not Accepted
- ☑ Accepted as Noted
- ☐ Received Too Late
- ☐ Incomplete Information
- ☐ No Substitutions Accepted For This Project/Product

Reviewed By/Date: Alexandre Penegre

Processed by Addendum No.: 02

Comments:

HDPE lockers are approved for lockers located in Lockers 108.

Metal lockers are rejected for lockers located in Gear Locker 121.

LOCKER PRODUCT COMPARISON

	LockersMFG HDPE Locker Series	Bradley Lennox Plastic Locker
Top	3/8 Inch	3/8 Inch
Back	3/8 Inch	3/8 Inch
Side	3/8 Inch	3/8 Inch
Bottom	3/8 Inch	3/8 Inch
Doors	½ Inch	½ Inch
Latch	Continuous Latch	Continuous Latch
Lock Compatible	Yes	Yes
ADA Compliancy	1T, 2T - Yes	1T, 2T - Yes
Door Frame	½ Inch	½ Inch
Ventilation	meets specs	meets specs
Interior Equip.	3/8 Inch	3/8 Inch
Shelf	3/8 Inch	3/8 Inch
Hinge	16ga Continuous Piano	16 Gauge Steel
End Panels	3/8 Inch	3/8 Inch
Widths	meets specs	4 available widths
Pedestals	10	10
Bench tops	1-¾ Inch	1-¼ Inch thick
Material	HDPE	HDPE
Warranty	Lifetime	10 year
Size	WxDxH meets spec	WxDxH meets spec
Hardware	n/a	n/a
Lead time	12-14 Weeks	26-32 Weeks

Highlights Demonstrate Increase Quality Items

Lockers Manufacturing - PO Box 208 Como, MS

Ph: (662) 338-4340

METAL LOCKER PRODUCT COMPARISON

	Lockers MFG Gear Grid Locker	GearGrid Turnout Gear Lockers
Opening	Meets Spec	Meets Spec
Outer Frame	1.25” O.D. x 16 gauge	1.25” O.D. x 16 gauge
Inner Grid	.25” diameter x 16 gauge	.25” diameter 16 gauge
Shelf	.25" dia, 3" square pattern	.25” dia, 3" square pattern
Hooks	20ga	20ga
Hang bar	1.25”O.D. x 16 gauge	1.25”O.D. x 16 gauge
Coat Hanger	16ga	16ga
Gear Box	25" dia	.25" dia
Material	ASTM 510 cold drawn steel	ASTM 510 cold drawn steel
Warranty	Lifetime	--

Highlights Demonstrate Increase Quality Items

- Lockers Manufacturing -

PO Box 208 Como, MS 38619

Ph: (662) 338-4340

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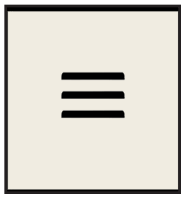
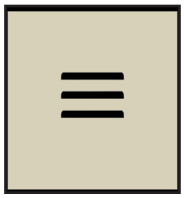
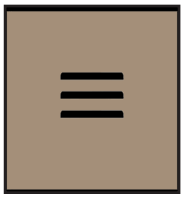
STEEL COLOR CHART 2025

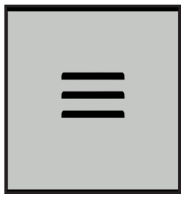

ARTIC WHITE

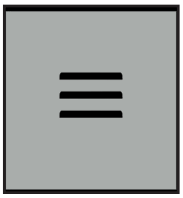

GHOST MIST

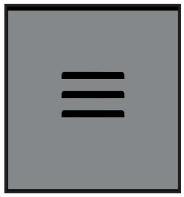

MIDNIGHT BLACK


IVORY

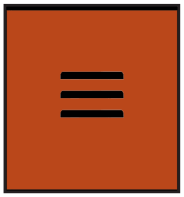

LIGHT MOCHA

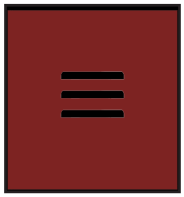

PEARL GRAY

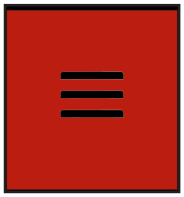

GLACIER GRAY

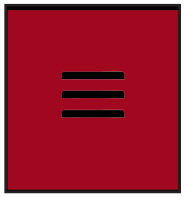

DOLPHIN GRAY

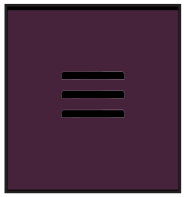

SUNFLOWER YELLOW

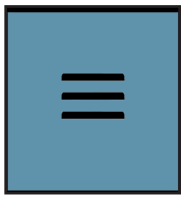

RUSTIC ORANGE

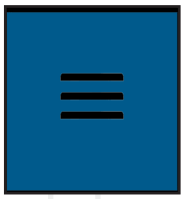

MISSISSIPPI MAROON

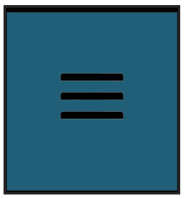

RACER RED

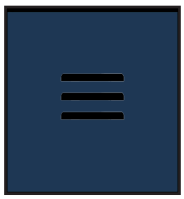

GLORY RED

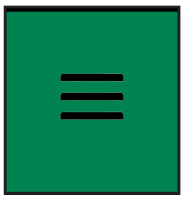

ROYAL PURPLE

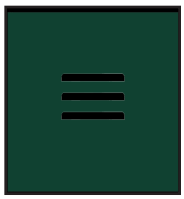

CAROLINA BLUE

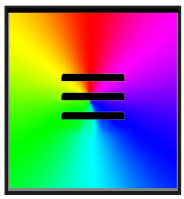

ELECTRIC BLUE


AZURE BLUE


LIBERTY BLUE


ARMY GREEN


WOODLAND GREEN


CUSTOM COLOR

Two-Tone: Two tone finish is available upon request with an additional fee.

Standard Finish: Provides a durable, uniform finish, offering excellent resistance to corrosion, chemicals, and abrasion. Industry leading 2-3 mils standard. Available for all color options

Custom Colors: Custom colors empower a customer to find the exact color that fits their projects needs. This is ideal for matching new lockers to existing lockers, or finding the perfect color to bring a space together.

Hammertone Finish: A textured finish that offers a unique look while adding enhanced durability. Industry leading 2-3 mils standard. Hammertone color chart available upon request.

Antimicrobial Finish: Our antimicrobial powder coating inhibits the growth of bacteria, mold, and other microbes. Industry leading 2-3 mils standard. Available for all color options.

Anti-Graffiti Finish: Provides a protective layer that allows for easy removal of graffiti and stains, preserving the finish of the product. Industry leading 2-3 mils standard. Available for all color options.

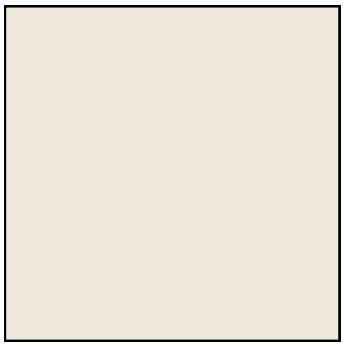
Colors shown are an approximate printed representation of the actual colors and may vary. Actual color samples are available upon request.

Lockers Manufacturing retains the right of reasonable color variation from samples presented.

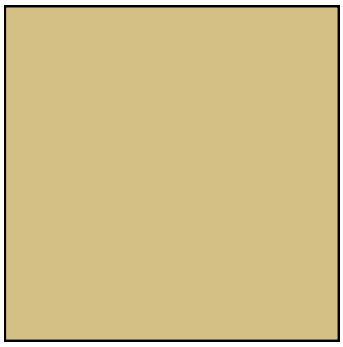
CONTACT US
662-338-4340
WWW.LOCKERSMFG.COM

LOCKERS™
MANUFACTURING any design. any material. any technology.

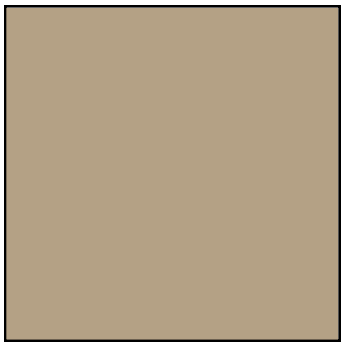
HDPE Color Chart



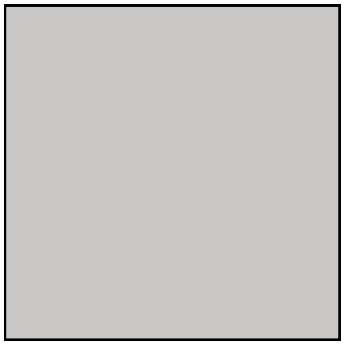
Bone White



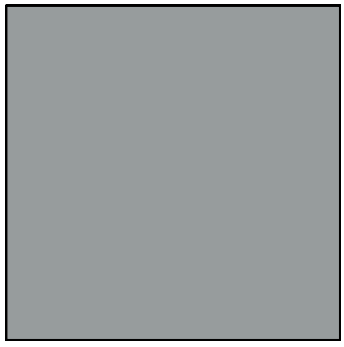
Butterscotch



Tan



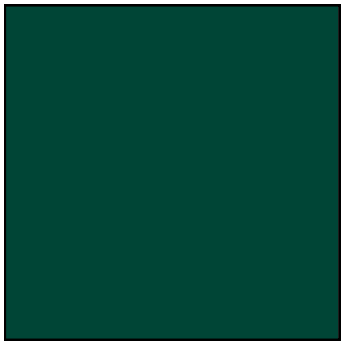
Dove Gray



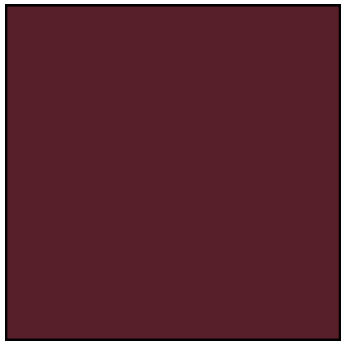
Smoke Gray

Satin Black

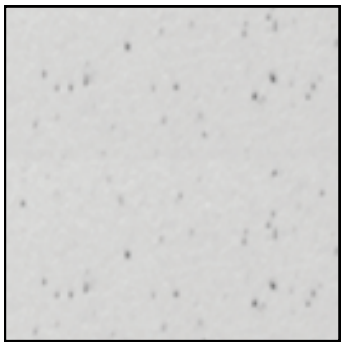
Sapphire Blue



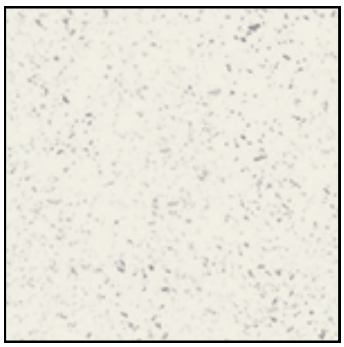
Hunter Green



Wine Red



Gray Speckle



Bone Speckle

Colors shown are an approximate printed representation of the actual colors and may vary. Actual color samples are available upon request.

LockersMFG retains the right of reasonable color variation from samples presented.

Contact Us

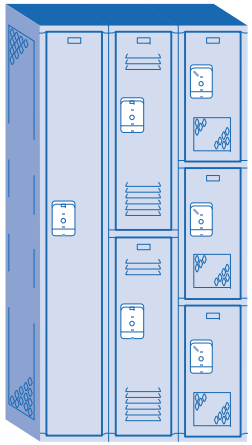
662-338-4340

www.lockersmfg.com

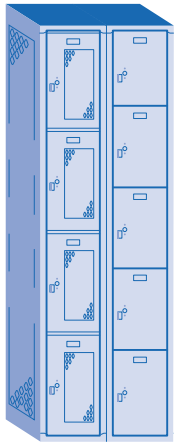
ALL WELDED.

The All Welded locker offers superior durability against hard use and abuse, with all components welded into a single rigid unit for lifelong resilience. Featuring a standard 2 mil thick powder coat in 20 standard colors or custom options, they ensure both strength and aesthetic appeal. Constructed with 16-gauge door frames and sides, as well as 14-gauge steel doors with continuous piano hinges, these lockers are built to last. Available in various ventilation options, including diamond-perforated doors for optimal airflow, they cater to diverse needs. Compatible with built-in locks and padlocks, they also feature rubber bumpers on latch hooks to minimize noise.

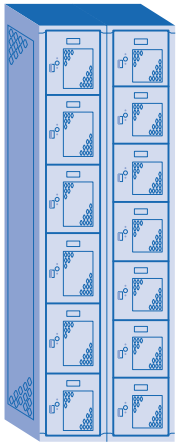
PRODUCT TIERS



1, 2 & 3 TIER



4 & 5 TIER



6 & 8 TIER

9 TIER

HIGH-END FEATURES

- 2 mil thick powder coat baked to cure finish
- All doors come standard with recessed handles for added safety and security
- Standard 16 gauge continuous piano type hinges riveted to frame and welded to door
- Continuous door strike has rubber bumpers to reduce nois
- Standard 14 gauge door with reinforcement hat channel/door stiffener
- Standard 16 gauge bottom
- Heavy duty gauges
- Ships Fully Assembled

VENTILATION OPTIONS

- Diamond Perforations (standard)
- Solid
- Standard Louvers
- Mini Louvers
- Rectangular Perforations

DOOR HANDLE OPTIONS

- Recessed Handle Multi Point Latch
- Recessed Handle Single Point Latc
- Door Pull (standard for box lockers)

GAUGE REFERENCE

Top	Back	Side	Base	Door	Door Frame	Shelf
16	18	16	16	14	16	16

PRODUCT FABRICATION

Material: Steel parts shall be mild cold rolled commercial quality steel, capable of taking a high-grade finish. Steel mandrel rivets, zinc-plated truss, and fin head bolts with hex nuts.

Fabrication: Shall be on the unit principal, each locker with individual door and frame, individual top, bottom, back, and shelves, with common intermediate divisions separating compartments.

Construction: Pre-assemble lockers by welding into one piece structures in groupings most practical for job requirements, welds free of burrs; max width of groups to be 54“.

Door Frames: Shall be 16 gauge formed in a channel shape with continuous vertical door strike.

Doors: 14 gauge steel formations are full channel shape on the lock side adequate depth to fully conceal the lock bar, channel formation on the hinge side, and right angle formations across the top and bottom. the lock bar, channel formation on the hinge side, and right angle formations across the top and bottom.

Ventilation: All lockers sides and doors 20” or higher shall be diamond-shape perforations. Optional solid doors and sides.

Body: Steel specially formed for added strength and rigidity and to ensure tight joints at fastening points.

Box Lockers: Door shall be 14 gauge steel, punched for built in lock or pad lock. Equip doors for use with pad-locks with an 18 gauge combination door pull, staple, and lock hole cover plate with integral friction.

Hinges: Shall be 16 gauge full length continuous piano type riveted to both door and frame. Hinge shall maximize security and enhance resistance to abuse and vandalism.

Handle & Latching: Handles shall be recessed in the door and be finger lift control. Drawn pocket shall be 20 gauge brushed stainless steel securely fastened to the door with two tabs plus a positive tamper resistant decorative fastener. The pocket shall be of sufficient depth to prevent a combination padlock, built in combination lock or key lock from protruding beyond the face of the door.

Interior Equipment: Full width shelf, coat rod, and two single prong hooks.

Number Plates: Provide holes for attaching number plates. Each locker shall have a polished aluminum number plate riveted to door face with black numerals 1/2” high.

Finish: All components shall have a 2mm hybrid epoxy/polyester powder, electrostatically applied to ensure a uniform finished and baked to cure.

Submittals: Submit under provisions of Section 01 33 00. Shop drawing shall show dimensioned plans, elevation, and sections.

Accessories: Available upon request.

Locks: Available upon request.

ADA Compliance: Lockers meet ADA guidelines with recessed handles, single-tier or lower double-tier open-ings, and bottoms at least 15” off the floor. Single-tier lockers have a shelf 48” off the floor. Handicapped doors display an appropriate symbol.

Options: Customizable metal base.

EXECUTION

Installation: Lockers must be installed in accordance with Lockers Manufacturing’s provided instructions, ensuring level, plumb, and flush surfaces with secure attachments to anchoring surfaces.

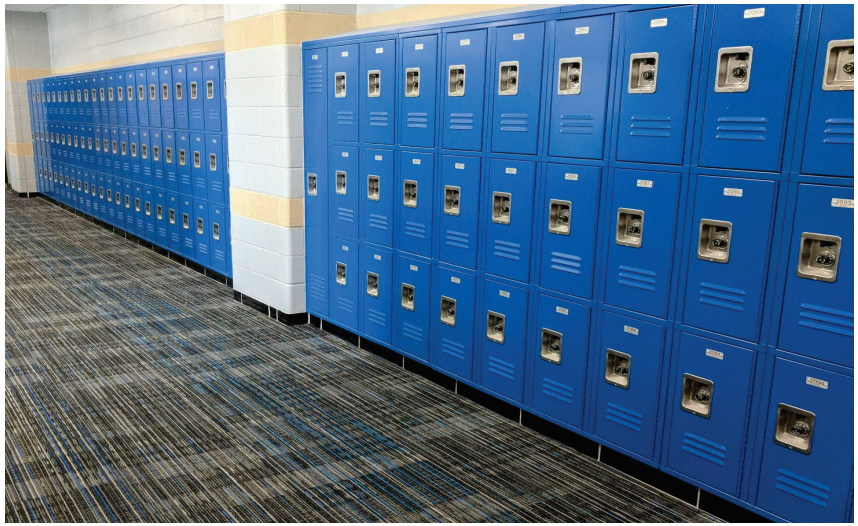
Anchoring: Securely anchor lockers to the floor and wall to maintain stability.

Adjust and Clean: Prior to substantial completion, ensure doors and latches operate smoothly without binding. Verify satisfactory operation of built-in locks to prevent any issues, adjusting as necessary for seamless functionality.

Touch-Up: Utilize factory-supplied paint for touch-ups or replacements to address any damage before substantial completion.

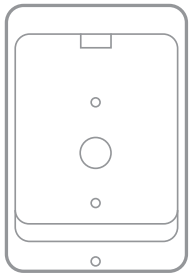
Protection: Take measures to protect installed products until the project is completed to maintain their integrity.

Delivery, Storage, and Handling: Store products in their original, unopened packaging until installation to safeguard the locker finish and adjacent surfaces from potential damage.



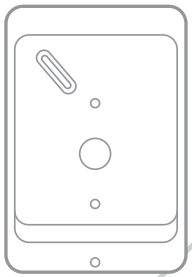
HANDLES & VENTILATION.

MULTI-POINT RECESSED HANDLE



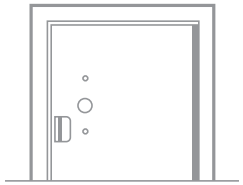
This Stainless Steel recessed cup is designed for safety, eliminating protrusion from front of locker. Can be used with built-in combination lock and portable pad locker.

SINGLE-POINT RECESSED HANDLE



This Stainless Steel handle has no moving parts, which requires low maintenance. Equipped with Anti-Pry Latch for added security.

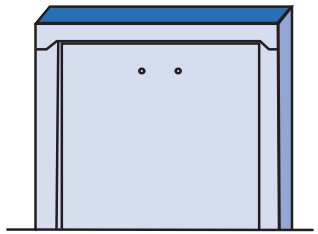
DOOR PULL



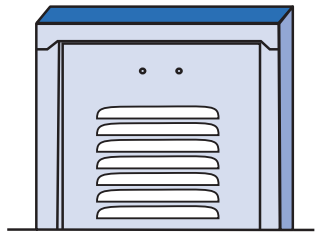
The door pull with a pad-lock hasp is the standard for all box lockers.

CREMONE HANDLE

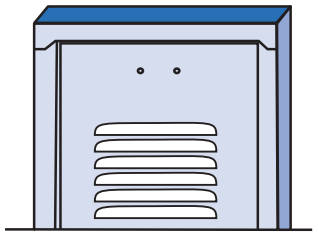
An unbreakable steel handle securely bolted to a three point latching system. 3/8” latching rod engages on top and bottom of door frame. 1/8” thick center latch locks center of door to frame.



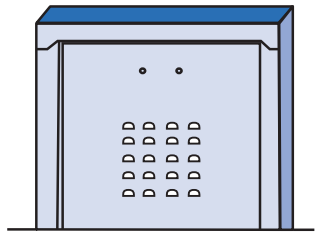
SOLID



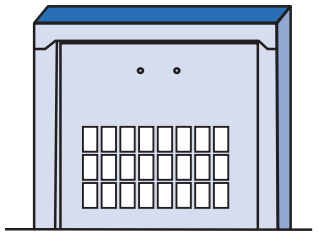
FULL LOUVERS



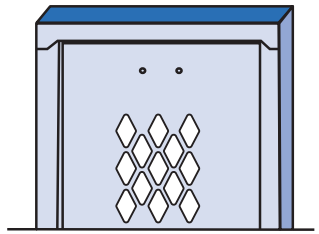
STANDARD LOUVERS



MINI LOUVERS



RECTANGLE PERFORATIONS



DIAMOND PERFORATIONS

LOCKS.

Discover our range of locker ventilation options designed to promote airflow and maintain optimal conditions for stored items. From diamond-perforated doors and sides to louvers and vented backs, our ventilation solutions ensure proper air circulation, preventing moisture buildup and unpleasant odors. Choose the ventilation style that best suits your needs and create a fresh and hygienic environment within your locker spaces.

BUILT-IN KEY LOCK

Available in flat key or grooved key models. Deadbolt construction. ADA Compliant.

PORTABLE COMBINATION LOCK

Available with and without master keying. 3 number dialing. Rust resistant.

DIGI LOCK

Can be locked with any 4 digit code. Electronic bypass key. Tamper guard. Usage indicator.

BUILT-IN COMBINATION LOCK

Master key controlled. Available with 5 combination changes for security year to year.

BLUETOOTH LOCK

Use your smartphone to open and manage your lock with the Master Lock® Vault System. Compatible with Master Lock Vault Home and Master Lock Vault Enterprise, it offers:

- Free apps for iOS and Android
- Monitor access history
- Locker Mode for secure storage
- Ideal for personal or business use
- No keys or combinations
- Backup access with directional code
- Low battery notification
- Easy CR2450 battery replacement

SLOPE TOPS.

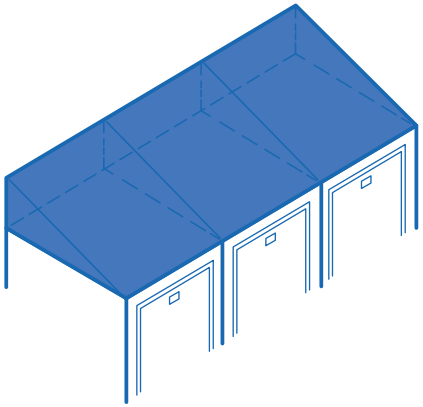
Slope tops are often favored over flat tops as they prevent the accumulation of dust and debris, discouraging the use of locker tops for storage. We offer three slope construction variations: Unit slope tops, Slope hoods, and Slope top kits (Stock converter for Standard Knock Down Series), providing versatile options for your needs.

UNIT SLOPE TOPS

Unit Slope Tops cover the width of one locker frame only. Lockers with Unit Slope Tops have sides with mitered top ends with a rise equal to 1/3 of the locker depth, plus longer backs that meet the rear edge of the slope top, Unit Slope Tops are used in place of the standard flat tops. (Not for use on Heavy Duty Series, Open Front Series or All Welded Series.)

Unit Slop Tops are available in the following width and depth:
9x12, 9x15, 9x18, 12x12, 12x15, 12x18, 12x21, 15x12, 15x15, 15x18, 15x21, 18x18, 18x21, 18x24, 24x18, 24x21 and 24x24.

Slope Top Kits are available in the following width, depth and height:
12x12x4, 12x15x4, 12x18x6, 15x15x5, 15x18x6 and 18x18x6.

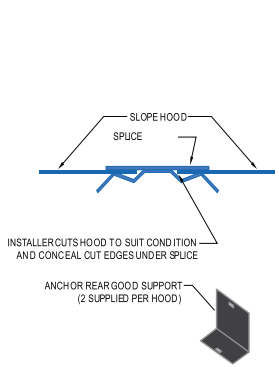


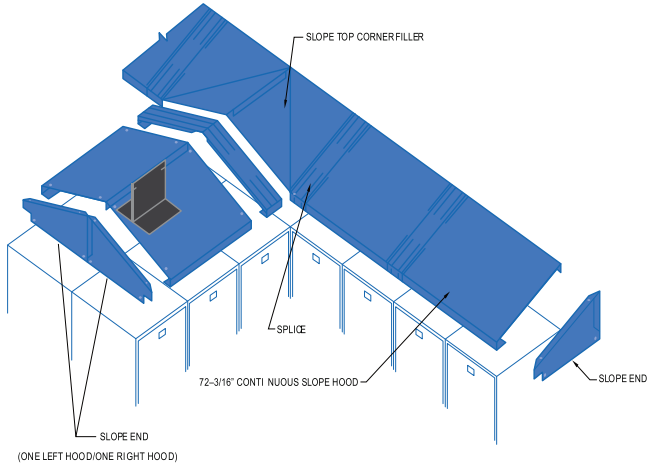
CONTINUSOUS SLOPE HOODS

Continuous Slope Hoods fit on top of flat top lockers. They can be used on new lockers, or on a retrofit basis. All hoods are furnished in 72” lengths and must be cut to length during installation. Intermediate splices, ends and rear supports (2 per hood) complete the installation, and must be ordered separately.

Slope Hoods are available in the following width, depths and heights: 72x12x5, 72x15x6, 72x18x7, 72x21x8, and 72x24x9.

Slope Ends and Hood Splice available in the following depths and heights: 12x5, 15x6, 18x7, 21x8 and 24x9.

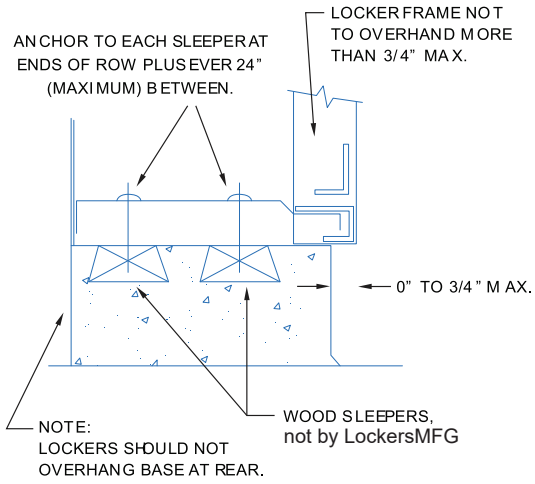




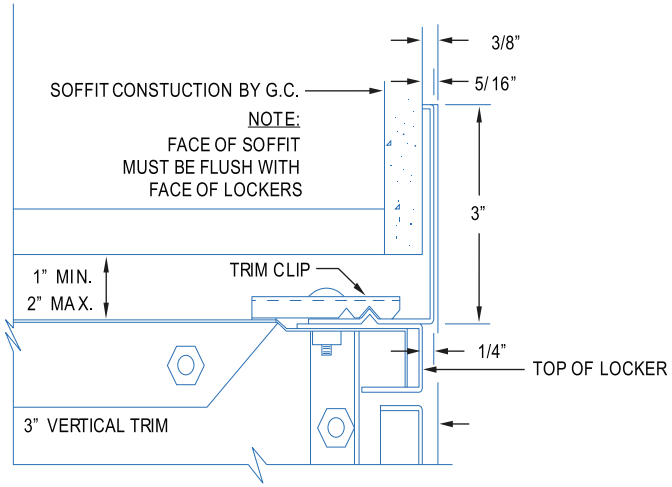
RECESS TRIM.

Recess Trim is 3” wide and bridges the gap between lockers and the wall and/or soffits when the lockers are recessed into a wall. Lockers must be anchored to base (base and wood to be completed by a general contractor.)

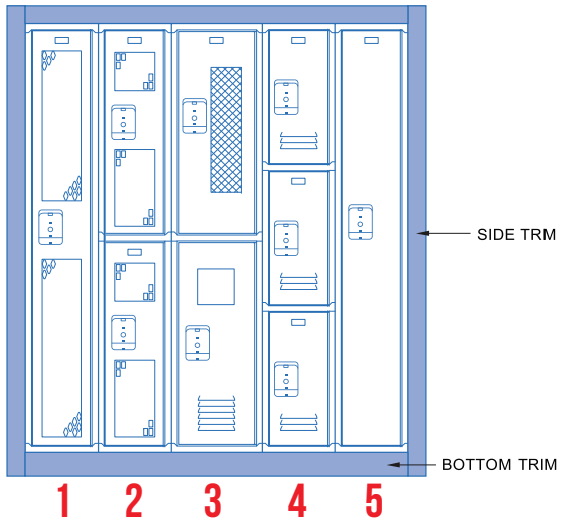
SIDE VIEW OF BASE & ANCHORS



SIDE VIEW OF TOP RECESSED TRIM

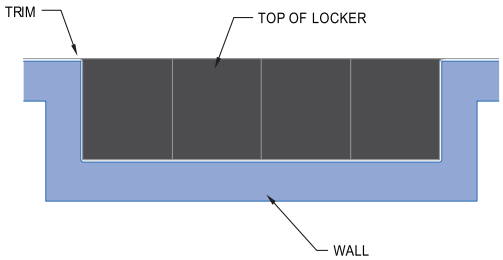


FRONT VIEW OF LOCKER WITH RECESSED TRIM

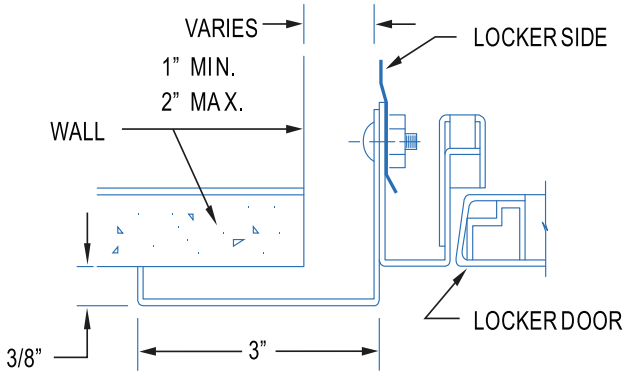


1. Competitive 1 - Tier with Diamond Perforations
2. Durable 2 - Tier with Visual Perforations
3. Fire Extinguisher / Waste Bin
4. Durable 3 - Tier with Louvers
5. Durable Plus 1 - Tier with Solid Doors

TOP VIEW OF A RECESSED LOCKER GROUPING



TOP VIEW OF 3” VERTICAL TRIM R.H.



BASES.

Introducing our locker bases, available in two versatile options: individual closed bases and zee bases. Our individual closed bases offer sturdy support for each locker unit, ensuring stability and durability. Alternatively, our zee bases provide a sleek and modern aesthetic while maximizing airflow and ease of cleaning. Whether you prefer individual closed bases for a traditional look or zee bases for contemporary appeal, our bases are designed to complement any locker setup.

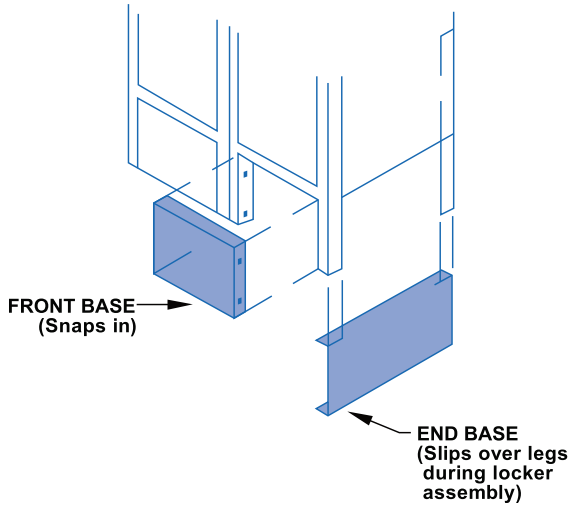
INDIVIDUAL CLOSED BASES

Front and End bases are designed to fit between standard Lockers Manufacturing 6” legs. They present a clean flush appearance and prevent the accumulation of dust and dirt under the lockers. (Not for use on All Welded lockers). Front base snaps in. End base slips over legs during locker assembly.

Closed bases are available in the following widths and heights:
9x6, 12x6, 15x6, 18x6 and 24x6

End bases single row are available in the following depths and heights: 12x6, 15x6, 18x6, 21x6 and 24x6

End bases double row are available in the following depths and heights: 24x6, 30x6 and 36x6



ZEE BASES

Zee bases raise lockers without 4” legs off the floor when there is no concrete or wood base. They provide a toe space in the front and a concealed flange for floor anchoring at the rear. A special 4” high rear leg can be ordered to simplify
installation. Also available for 6” high zee bases.

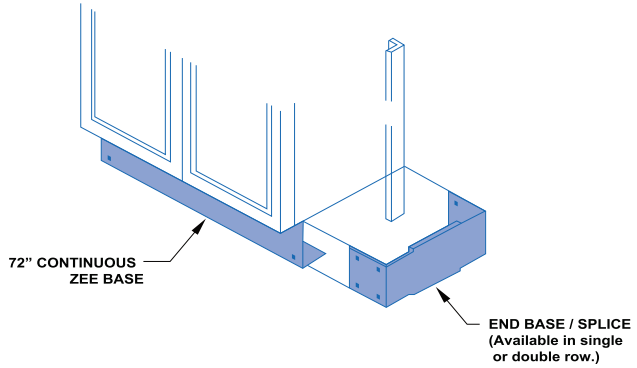
Zee bases are available only in 72” lengths, and may need to be cut to fit at the time of installation. Splices/End Bases are used at end of rows, and where the front sections join. (Not for use on All Welded lockers).

Front zee base is available in 72 x 4.

Splice/End Base Single Row is available in the following depths and heights:
2x4, 25x4, 18x4, 21x4 and 24x4

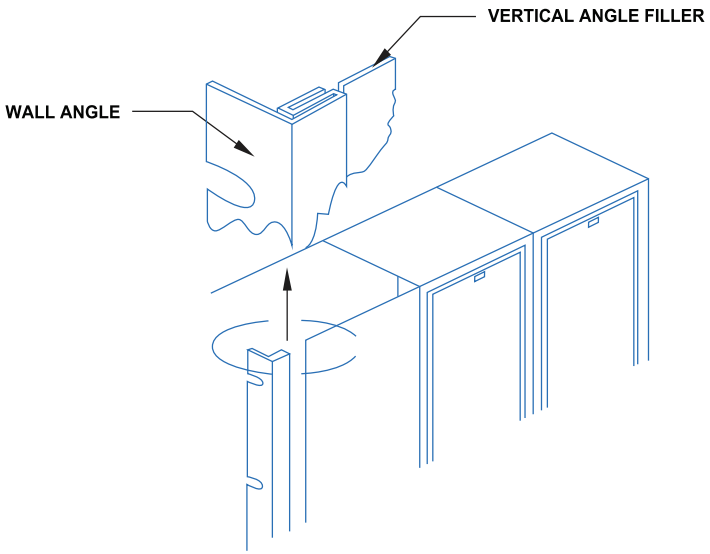
Splice/End Base Double Row is available in the following depths and heights:
30x4, 24x4 and 36x4

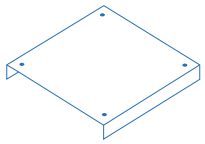
Zee Base Filler is available in a 4” height.
Rear leg for Zee Base is available in a 4” height.



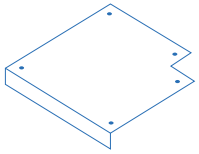
FILLERS.

Lockers Manufacturing provides standard fillers to adapt lockers to a wide range of field conditions and provide a professional, finish appearance. Fillers can be used to cover columns, pipes or other obstacles in a row of lockers, or fill the gap between the lockers and a wall.

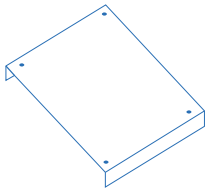




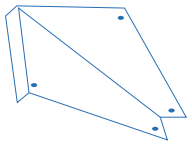
FLAT TOP FILLER



FLAT TOP CORNER FILLER



SLOPE TOP FILLER



SLOPE TOP CORNER FILLER

VERICAL FILLERS

The come in two widths and are designed to be used in conjunction with Wall Angle Slip Joints for a solid fit and smooth finish. The slip joint conceals any raw edges caused by field cutting.

TOP FILLERS

Top filler cover gaps between tops of lockers. They overlap the locker tops and can be field cut to allow for pipes, etc. There are separate designs for flat top vs. slope top, and in-line vs. corner applications.

Vertical Angle Fillers are available in the following widths and heights: 5x60, 5x72, 9x60, 9x72, 9x78, 12x60, 12x72 and 12x78.

Wall Angle Slip Joints are available in the following heights: 60, 72 and 78.

Flat Top Fillers are available in the following widths and depths: 15x12, 15x15 and 15x18.

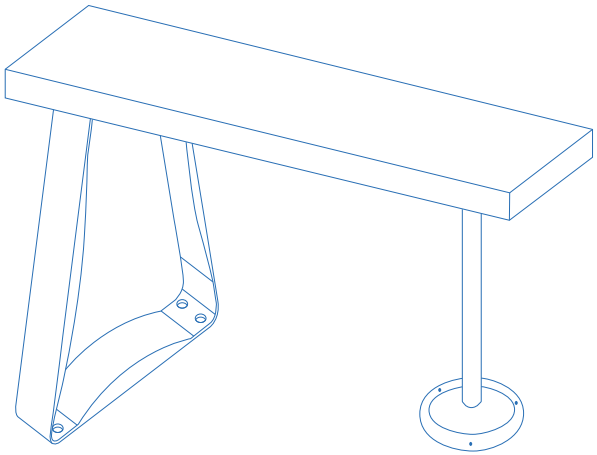
Slope Top Fillers are available in the following widths and depths: 15x12, 15x15 and 15x18

Flat Top Corner Fillers are available in the following widths and depths: 12x12, 15x15 and 18x18

Slope Top Corner Fillers are available in the following widths and depths: 15x12, 15x15 and 15x18

BENCHES.

Elevating both comfort and organization, our locker benches seamlessly integrate into any floor plan. These benches provide the perfect blend of durability and aesthetic appeal. With painted or stainless steel pedestals for sturdy support, they are an essential addition to any locker room.



WOOD TOPS

Our solid butcher block bench seats, made of edge-grain maple, are coated with DURAKRYL 102®, a robust urethane-based finish resistant to sweat and stains. Standard bench tops measure 9-1/2” deep x 1-1/4” thick, while ADA-compliant options are available in depths of 12” or 24”. Pedestals can be ordered separately for your convenience.

HDPE TOPS

Our HDPE bench tops bench tops measure 9-1/2” deep x 1-1/2” thick, while ADA-compliant options are available in depths of 12” or 24”. Pedestals can be ordered separately for your convenience.

ALUMINUM TOPS

Our aluminum bench tops bench tops measure 9-1/2” deep x 1-1/4” thick, while ADA-compliant options are available in depths of 12” or 24”. Pedestals can be ordered separately for your convenience.

STAINLESS STEEL TOPS

Our stainless steel bench tops measure 9-1/2” deep x 1-1/4” thick, while ADA-compliant options are available in depths of 12” or 24”. Pedestals can be ordered separately for your convenience.

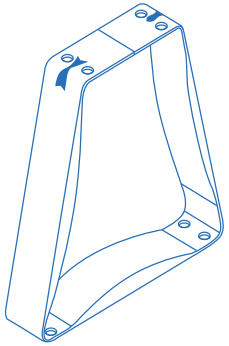
ADA OPTIONS

Benches that meet all ADA guidelines are AVAILABLE ADA BRACKETS DOUBLE REVERSED - contact a Lockers Manufacturing Representative for more information.

PEDESTALS.

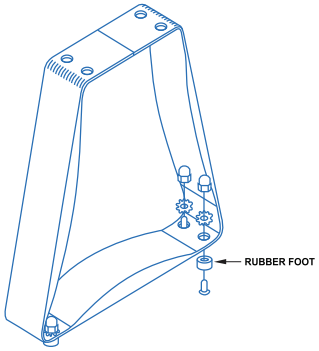
Elevating both comfort and organization, our locker pedestals seamlessly integrate into any floor plan. With high-quality painted or stainless steel options, our pedestals provide sturdy support for our premium hardwood maple benches, making them an essential addition to any locker room.

Select from two distinct pedestal styles: the robust Heavy Duty Pedestal or the sleek Stainless Steel Pedestal. For benches measuring 96” long or less, opt for two pedestals; for those exceeding 96” in length, three pedestals are recommended. Specifically for the 48” x 24” ADA bench, four pedestals are required for optimal support and stability.



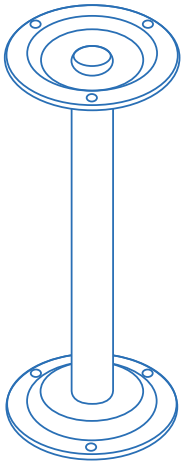
STAINLESS STEEL PEDESTAL

Featuring a 14” wide base, this pedestal offers versatility for freestanding use. Holes at the bottom enable optional floor anchoring or the attachment of non-skid bumpers (refer to the section below for details). Hardware is included for fastening to the bench top. *Stainless steel is typically not painted.



NON-SKID PEDESTAL KIT

Protect your floors with ease using rubber non-skid bumpers, designed to prevent damage. Each kit includes four non-marking rubber feet and the necessary fastening hardware. Ensure to order one kit per pedestal, exclusively for use with Stainless Steel Pedestals.



HEAVY DUTY PEDESTAL

Standing at a height of 16-1/4”, this pedestal is constructed with a durable steel tube welded to top and bottom flanges, ensuring stability and strength. Hardware for securing to the bench is provided for your convenience, and floor anchoring is necessary for stability. Multiple pedestals are recommended per bench. Choose from all 24 available colors to complement your space effortlessly.

ADA OPTIONS

Benches that meet all ADA guidelines are AVAILABLE ADA BRACKETS DOUBLE REVERSED - contact a Lockers Manufacturing Representative for more information.

P.O. Box 208
Como, MS 38619
Phone: (662)-338-4340
Email: sales@lockersmfg.com

Lifetime Warranty

Date:
To:
Re:

The Lockers provided by Lockers Manufacturing for this project have an original purchaser Lifetime Warranty against defects in material and workmanship. This warranty is in effect from the date of substantial completion and excludes locks, or any other product not manufactured by LockersMFG.

Rapid deterioration of the finish will be covered. The warranty will NOT cover the following:

- Finished surfaces exposed to high humidity, chlorine salts, abrasives, acids, or other harmful chemicals.
- Improper use or abuse. Improper use or abuse includes, but is not limited to, damage from mishandling of the product, damage from excessive heat or uneven exposure to weather conditions, physical or chemical abuse and damage from improper care and maintenance.
- Modifications or attachments to the product that are not approved by LockersMFG.
- Products that were not installed, used or maintained in accordance with product instructions and warnings.
- Impact of foreign objects, fire, earthquake, flood, hurricane, tornado or any other casualty.

Any replacement or repair of material under this warranty shall be performed only after written authorization by LockersMFG and will constitute the buyers sole and exclusive remedy. In no event should LockersMFG be held responsible for any special, direct, indirect, incidental or consequential damages.

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MANUFACTURING any design. any material. any technology.

Maintenance and Care

1. Routine Cleaning

- The high-quality powder coat finish of LockersMFG metal lockers is very durable and resistant to most chemicals and cleaners. However, care should be taken to avoid damaging the finish.
    - Acceptable cleaners:
        - Household cleaners such as Lysol, Mr. Clean, Pine Sol.
        - Mild soap and detergents such as Dawn, Palmolive, Gain, Tide
        - Mild solvents such as mineral spirits (no acetone or harsh solvents)
        - Household solvent-based cleaners such as Goof Off or Goo Gone
    - Un-acceptable cleaners:
        - Acidic cleaners such as Lime Away, any acid compound
        - Any cleaner containing hydrogen peroxide.
        - Alkaline cleaners such as toilet bowl cleaners.
        - Strong solvents such as acetone, MEK, xylene, etc.
        - Abrasive cleaners include SOS, Comet, Soft Scrub, and any polishing compound.
- After using a cleaning compound, rinse with water and dry with a soft towel or microfiber towel.
- Touch up any scratches immediately to prevent corrosion. Factory-matched touch-up paints are available from LockersMFG. Contact LockersMFG at 662-338-4340 or info@lockersmfg.com to get information on matching touch-up paints.

2. Annual Maintenance

- Inspect each door for ease of opening and closing
- Note any loose or missing hardware (nuts & bolts, rivets) or accessories (hooks, shelves)
- Ensure latch hooks are centered in latch opening in door and not rubbing. Use pliers to bend into correct position.
- Lubricate latch hooks on door frame.
- Lubricate the latching bar (if applicable) in the door.
- Clean interior and exterior of locker with non-ammonia containing mild cleanser.
- Use a product such as “Goof-Off” or WD-40 to remove any ink or other stains from finish.

3. Replacement Parts

- If damage or missing parts are noted and replacements needed, contact LockersMFG at 662-338-4340 or email info@lockersmfg.com.

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PO Box 208 Como, MS 38619

Build America, Buy America Act Certificate

(a) LockersMFG certifies that each "end product", except those listed in paragraph (b) of this provision, is a domestic "end product" and that for other than COTS items, and has considered components of unknown origin to have been mined, produced, or manufactured outside the United States. LockersMFG lockers are produced domestically and shall list as foreign "end products" those "end products" manufactured in the United States that do not qualify as domestic "end products", i.e., an end product that is not a COTS item and does not meet the component test in paragraph (2) of the definition of "domestic end product." The terms "commercially available off-the-shelf (COTS) item," "component," "domestic end product," "end product," "foreign end product," and "United States" are defined in the clause of this solicitation entitled "Buy American Act—Supplies."

A manufactured product qualifies as a domestic end product if it is manufactured in the US; and the cost of its components mined, produced, or manufactured in the US exceeds 65% of the cost of all of its components (48 C.F.R. § 25.101(a) as amended per Fed.Reg.)

Due to the shortage or non-existent domestic supply, some or all of the following materials may be sourced from international markets when not practicably available domestically.

(b) Foreign End Products:

Line Item	Country of Origin
Combination Locks	Varies
Channel Glides	Varies
Hooks	Varies
Pedestals	Varies

LockersMFG complies with the updated provisions of the Public Law 117-58 (as enacted March 9, 2024) applying graduating levels for the Buy American Act 41 U.S.C.A. 10 (2009) et. seq. and appreciates your interest in our products.

Sincerely, Lockers Manufacturing, LLC

As a bidder or offeror, we hereby certify that we will comply with the requirements of 49 U.S.C. 5323(j)(1), and the applicable regulations in 49 CFR part 661.

Date: _____
Signature: _____
Company: _____
Name: _____
Title: _____

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PO Box 208 Como, MS 38619

LEED® CONTRIBUTION REQUIREMENTS CERTIFICATION

(a) LockersMFG certifies that each "end product", produced in collaboration with our trusted licensing partner has three LEED® Version 2.2 certifications in accordance with the U.S. Green Building Council (USGBC), LEED® Green Building Rating System for New Construction.

(b) LockersMFG gaurantees that each "end product" produced in collaboration with our trusted licensing partner will contribute to the Project s LEED® requirements that are listed below.

LEED® Version 2.2	MR Credit
Construction Waste Management	Credit 2.1 and 2.2
Recycled Content	Credit 4.1 and 4.2
Regional Materials	Credit 5.1 and 5.2

LockersMFG in collaboration with our trusted licensing partner complies with all of the listed U.S. Green Building Council (USGBC), LEED® Green Building Rating System for New Construction (LEED-NC version 2.2) provisions.

Sincerly,
LockersMFG, LLC

Date: _____
Signature: _____
Company: _____
Name: _____
Title: _____

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Manufacturing. any design. any material. any technology.

PO Box 208 Como, MS 38619

Build America, Buy America Act Certificate

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Date: _____
Signature: _____
Company: _____
Name: _____
Title: _____

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Year 2024

Re: ASTM Compliance

This letter serves to certify that Lockers Manufacturing has complies with the ASTM standards for the fabricated cold rolled metal used in its all-welded locker fabrication. Below are the ASTM standards we comply with:

ASTM INTERNATIONAL (ASTM)

- ASTM A1008/A1008M Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened
- ASTM A568/A568M Standard Specifications for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.
- ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Gal annealed) by the Hot-Dip Process.
- ASTM A924/A924M Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- ASTM B456 Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- ASTM D6386 Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.

Should you need additional documentation or information please contact me at any time.

Sincerely,

Keith Dunham
President

QUALITY MANAGEMENT SYSTEM CERTIFICATE

This certifies that the quality system of

Lockers Manufacturing

209 Pearson Street, Batesville, MS 38606, USA

is registered by IAPMO SCB in recognition of a
Quality Management System, which fulfills the requirements of

ISO 9001:2015

Scope of Registration

Design and manufacturer of storage lockers

Certificate No: 1118025

Certificate Decision/Re-Issue Date:	02/02/2024
Certificate Issue Date:	02/02/2024
Certificate Expiry:	02/01/2027
Site Structure:	Single Site

SHIRLEY DEWI, SR. VICE PRESIDENT OF
MANAGEMENT SYSTEM REGISTRATION SERVICES

909.230.5526 | WWW.IAPMOSCB.ORG
5001 E. PHILADELPHIA ST, ONTARIO, CA 91761-2816

CERTIFICATE
OF COMPLIANCE

Lockers Manufacturing

All Welded

142840-420
Certificate Number

11 Oct 2019 - 10 Oct 2025
Certificate Period

Certified
Status

UL 2818 - 2022 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Classroom furniture and furnishings are modeled to the classroom environment with a room volume of 231 m³ and 0.82 air changes per hour (ACH) accommodating 27 students.

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.

UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Gold Certification Criteria for Individual Office Furniture Products

Criteria	CAS Number	Maximum Allowable Emission Factor		Units
		Open Plan	Private Office	
TVOC (A)	-	152	306	µg/m²*hr
Formaldehyde	50-00-0	6.2	12.5	µg/m²*hr
Total Aldehydes (B)	-	1.2	2.4	µmol/m²*hr
4-Phenylcyclohexene	4994-16-5	4.5	9.0	µg/m²*hr
1-Methyl-2-pyrrolidinone (C)	872-50-4	110	223	µg/m²*hr
Individual VOCs (D)	-	1/2 CREL or 1/100th TLV	1/2 CREL or 1/100th TLV	-

(A) Defined to be the total response of measured VOCs falling within the C_6 – C_{16} range, with responses calibrated to a toluene surrogate.

(B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

(C) Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m³/day.

(D) Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.2 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

Lockers Manufacturing

209 Pearson St, Batesville, Mississippi 38606, United States

For the following product(s):

Storage:

All Welded, Angle Iron, Knock Down, Knock Down Heavy Duty, Knock Down Plus, Open Front All Welded, Open Front Knock Down

INDOOR ADVANTAGE GOLD FURNITURE

The product(s) meet(s) all of the necessary qualifications to be certified for the following claim(s):

Indoor Advantage™ Gold

Indoor Air Quality Certified to SCS-105 v4.2

Conforms to the ANSI/BIFMA Furniture Emissions Standard (M7.1/X7.1-2011 R2021 and ANSI/BIFMA e.3-2019 (Credits 7.6.1, 7.6.2, 7.6.3) for the open plan and private office workstation parameters.[1] Also, conforms to the CDPH/EHLB Standard Method (CA 01350) v1.2-2017 for the open plan and school classroom parameters.[1]

[1]Modeled as Individual Furniture Components

ANSI National Accreditation Board ACCREDITED ISO/IEC 17065 PRODUCT CERTIFICATION BODY

Registration # SCS-IAQ-05906
Valid from: January 06, 2025 to January 05, 2026

Diana Kirsanova Phillips, Chief Assurance Officer,
SCS Global Services

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SOUTH REFERENCE LIST

Project: Horace High School Construction
Address: 3010 N 129TH ST TULSA, OK 74166 BUILDING 300
Price: $228,121.66
GC: Gast General Contractors
Contact Information: Brandon Cook 701-730-3000 brandonc@gast-construction.com
Architect: JLG Architect
Contact Information: 605-394-8831
Owner: West Fargo ISD

Project: Page Middle School - Phase II
Address: 6262 Arno Rd, Franklin, TN 37064
Price: $61,804.85
GC: Southland Constructers
Contact Information: Trey Linton 615-982-1470 tlinton@southlandconstructors.com
Architect: Goodwin Mills Cawood
Contact Information: 205-695-9137

Project: Jefferson County Alabama
Address:1901 Hoover Court Birmingham, AL 35226
Price: $33,429.48
GC: Taylor + Miree Construction
Contact Information: John Puckett C. 601-497-3382 john@taylor-miree.com O. 205-879-7770
Architect: Studio 2H Design
Contact Information: 205-264-9988 john@taylor-miree.com O: 205-879-7770

DISCLAIMER* Pictures shown are not representations of the projects listed.

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any design. any material. any technology.

MADE IN AMERICA

HUBZone
Historically Underutilized Business Zone

Capabilities Statement

www.lockersmfg.com

LockersMFG is an American manufacturer of premium built to order custom lockers located in Batesville, MS. All of our products are **Made In America** with all of our material being American sourced as well. We provide storage system solutions to Public School Districts, Fortune 500 Companies, Sports Arenas, Government Agencies and Offices, and many more. LockersMFG exists to deliver reliability in every phase of a national locker program. The very heart of our company reflects reliability through quality, trust, performance, consistency, dependability, accuracy and results.

Core Competencies

Lockers & Storage Systems

- **Custom Metal Lockers**
  - Public School Lockers
  - Bathroom/Gym Lockers
  - Changing Room Lockers
  - Storage Lockers
  - Weapons Lockers
  - Sensitive Materials Lockers
  - Athletic Team Lockers
  - Helmet & Shoulder Pad Racks
  - Locks: Built In, Combination, Coin Operated, Digital Locks
  - Custom Built, Made to Order
  - Top Hoods & Trim
  - 4" or 6" Bases
  - Multiple Sizes, Shapes, Colors, Options, Open Shelving, Seating, Etc…
- **Benches & Pedestals**
  - Stainless Steel
  - Heavy Duty
  - Non Skid

Differentiators

Proudly All-American:
- ✓ All American-made products
- ✓ All materials sourced from America

Environmental Excellence Certification:
- ✓ Greenguard and Global SCS Certified

Innovative Paint Technology Leadership:
- ✓ Exclusive North American Paint Line

Unmatched Customization Capabilities:
- ✓ Any design, any material, any technology
- ✓ Handling custom specifications

Rapid Turnaround Advantage:
- ✓ Short lead times with a base in America

Corporate Data

CAGE: 9KL94 | **UEI:** RP45EUSHTYT7 | **Work Area:** Nationwide

Gov. Business POC: Cole Dunham

Phone: (662) 338-4340 | **Email:** sales@lockersmfg.com

Socio-Economic Status: HUBZone, Small Business

NAICS: 337215: Showcase, Partition, Shelving, and Locker Mfg.

Additional NAICS: 337215, 339999, 332999, 332322

PSC Codes: 7125, 9640, 3426

Past Performance

Honor Health NSCCAZ | Scottsdale, AZ
Date(s): 3/23 - 6/23
Details: Fabricated and Installed a Custom Locker System for Honor Health hospital in Scottsdale, AZ : 6 Frames 24 Openings

SDI Coastal | Sinton, TX
Date(s): 5/23 - 6/23
Details: Fabricated and Installed a Custom Locker System for Steel Dynamics in Sinton, TX: 30 Frames 60 Openings

Flagler Hospital | Jacksonville, FL
Date(s): 6/23 - 9/23
Details: Fabricated and Installed a Custom Locker System for Flagler Hospital in Jacksonville, FL: 11 Frames 44 Openings

SUNY Binghamton | Binghamton, NY
Date(s): 5/23 - 9/23
Details: Fabricated and Installed a Custom Locker System for SUNY College in Binghamton, NY: 20 Frames 32 Openings

Keith Dunham, CEO, launched LockersMFG nine years ago in Batesville, Miss. It's now a highly automated, 60-employee enterprise.

Locking in a stateside manufacturing opportunity

LockersMFG designs with the entire value chain in mind

By Tim Heston

When people talk of reshoring and a U.S. manufacturing renaissance, they usually speak in vague terms, maybe spouting off a few big-dollar numbers from Wall Street banks or California research firms. As CEO of Lockers Manufacturing (LockersMFG), Keith Dunham talks about reshoring differently. He uses down-to-earth terms, describes the real opportunities reshoring brings, and has a 60-employee, nine-year-old manufacturing business to show for it.

Dunham's Batesville, Miss., operation produces lockers that, like cars with good fit and finish, sound solid when the doors close. The frame's C-channel design conceals hardware and strengthens the structure. Tabs behind the locker anchor to the wall to ease installation and secure the locker bank in place. The powder coat seals the surface through a seven-stage (1,000 hour spray test) process. These lockers are designed and produced to last decades.

"If the manufacturing is good, the shipping is good, and the installation is good, the customer is going to have a great experience," Dunham said. "To create that experience, you've got to bring all those elements together."

In Dunham's view, the value that LockersMFG provides isn't just in bent and powder coated sheet metal. It's about customization, product improvement, voice-of-the-customer feedback, and analyzing the entire value chain—from the material quality to cutting, forming, painting, ease of assembly, ease of shipping and installation, ease of use, user safety, cost of maintenance, and everything else that goes into the product life cycle. Purchasing a locker system is anything but transactional.

The company's approach exemplifies the advantages of a shorter, agile, and more responsive supply chain, and shows the opportunities unleashed when people stop assuming the U.S. just isn't in the manufacturing business anymore, especially for something as seemingly simple as a storage locker.

At first glance, a storage locker just looks like a six-sided metal box. When you delve into the details, though, you find that a locker system is not as simple as it looks.

The Domestic Locker Market

Dunham grew up in the locker business. He spent many summers working at his father's wholesale company, packaging and shipping locker components from various manufacturers, some of them domestic and others from overseas. That mix of domestic and imported products remains in today's storage locker market, and LockersMFG is one of the newest domestic players.

"It's a stable, legacy market, and there aren't many people who know how to serve it," Dunham said. "There's a high barrier to entry. We're probably the first competitor to enter the market in 20 to 30 years."

The market is far from monolithic; demands vary depending on the customer and the specific sector they serve. Education buys about half its lockers from overseas providers, half from domestic players. The same goes for lockers used by Fortune 500 companies, including fitness centers. More military lockers are made domestically, while more smart lockers are made offshore. "And we're trying to become one of the premier smart locker players out there," Dunham said.

If you've picked up an order from Amazon at a Whole Foods Market, you've used a smart locker, a market that's expected to grow dramatically in the coming years. Some large apartment towers, instead of employing a full-time concierge, now utilize smart lockers too. They're used by various companies to streamline the last mile of delivery. When someone places a package (or anything else) in them, sensors detect the item inside and signal the system to automatically notify the needed parties.

Precision Fab Meets the Locker Business

Dunham recalled working in his dad's wholesale business, attempting to package lockers that comprised sheet metal likely bottomed on an old press brake or stamped with a dedicated die, assembled around an angle-iron frame. "The angle iron would be cut, and everything on the inside would be exposed. And the angle iron itself was just difficult to work with from an installation standpoint."

From this insight came the seed of LockersMFG, which Dunham launched in 2014 with the aim of enhancing the traditional locker design. He considered not just manufacturability but also installation and, ultimately, the user's experience. Within some locker designs, hardware and metal edges remain exposed, leaving a multitude of pinch points. Bare hardware can protrude beyond the frame surface. Connections between sheet metal and angle iron cause friction and pinch points too. The corners, which likely get less paint coverage, rust first.

Could lockers be designed more robustly without using excess material? Also, could they be customized to the exact dimension a customer needed? Turns out, with some novel thinking and modern equipment, LockersMFG could make it all happen. Today, the company's locker sizes range from 12 by 12 by 36 in. up to 48 by 30 by 108 in.

Dunham pointed again to the C-channel design, formed by air bending a return flange on one of the company's new AMADA press brakes. He then pointed to the corners where, barely visible below the coating, three strategically placed spot welds hid. These, combined with the C-channel, increase the entire structure's strength—no angle iron required.

"We focus on the corners for welding," Dunham said, "where we reinforce the structure with overlapping frame members. And the frame members are tabbed so they can be fitted exactly where they need to be."

The idea during installation and use is to reduce play between assembled components. Locker doors are opened and closed repeatedly, and play between connection points can reduce life significantly. It's

one reason the door hinges are sometimes actually resistance spot welded to the frame, not simply tack welded or screwed on with hardware.

That said, there's a balance. Dunham pointed to some door hinges that were riveted to the frame, a recent design change that came from a voice-of-the-customer exercise. That rivet secures the assembly but still allows users to remove and replace a single door, should it become damaged. The company does still offer welded doors, though.

"We just tell the client that they'll lose that opportunity to lower maintenance cost in the future, should something happen. We're a believer in letting the market choose. Our job is to give the market the best options possible."

Dunham again pointed to the resistance spot welds strategically placed around a locker's C-channel frame—all virtually invisible under a 2-mil-thick layer of powder coating that's double the industry standard.

"The reason we do 2 mil [of coating] is not just to say we do. It's just a baseline for doing it right, to ensure coverage in the corners and prevent the rust from moving in. A lot of these lockers go into heavy-traffic, wear-and-tear environments. Showers can be nearby, and condensation can build up. These lockers can stand up in those environments."

An employee positions a resistance spot welding head to join a locker frame member. Stations also incorporate gas metal arc welding. Note the C-frame return flange around the perimeter. These extra bends add strength to the assembly.

Equipment Strategy

Visit LockersMFG's plant today, and you won't see any brake operator spending excessive time setting up a machine. All bending programs are written and simulated offline. Sheet followers help a single operator wield a long workpiece and increase accuracy, especially considering the narrow return flanges operators create in those large workpieces.

Feeding the forming department is a blanking area consisting of several automated 3-kW fiber lasers with two 15-shelf towers and a collection of AMADA turret punch presses.

For LockersMFG, that mix of technology works. The laser gives LockersMFG design flexibility and quick-response prototyping, which sets the company apart from the competition. And because the laser produces lights-out, operators arrive in the morning with a healthy buffer of work ready to be processed for the day.

The company uses the turret punch presses for special forms like louvers as well as cluster-punch tools designed to create diamond perforations. The turret's rigid cluster punches have proven, high-quality results. If they're well maintained and well sharpened, the tools produce a burr-free edge.

Not every part requires a diamond perforation, and only certain pieces require louvers or other features created by punch form tools. So, having an automated laser cutting process alongside a collection of standalone punches makes sense. In effect, by focusing its automation at the primary laser cutting operation, LockerMFGs utilizes automation where it has the greatest impact.

Getting Granular With Data

Dunham and his team aren't basing operational strategy on hunches or simple observation, either. They're basing it on data—not just based on operators clocking in and out of jobs, but from tapping directly into machines on the floor.

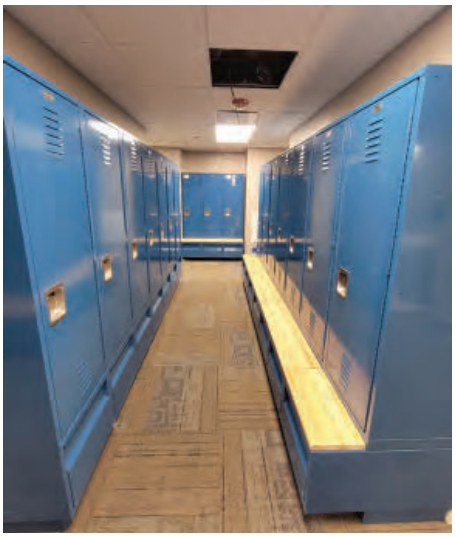
"We're now using AMADA Influent," Dunham said, explaining that the system connects directly with machines on the floor. It tracks uptime, optimization, and provides a variety of real-time indicators. "We can access it to see how well we were using our machines this week. What was the uptime? What was the downtime?"

He added that the system also flags maintenance issues like lens changes, filter changes, even slat cleaning and changes for the cutting tables. After all, a laser can be tuned perfectly in every way, yet as the slats build with laser cutting slag, variability rears its ugly head.

Perhaps even more significant, the system tracks operations as they relate to specific jobs, including setup/changeover and run times, and puts the flow in context with the other jobs on the floor. Because LockersMFG produces a variety of different locker products and customizes them to the nth degree, the operation in many ways resembles a purely custom fab shop, with umpteen job routings flowing through various departments—cutting, bending, resistance spot welding—coming together in the seven-stage powder coating line, then being separated and staged for final assembly.

Today, Influent helps show how well its machines produce a specific part flow at any given moment.

A powder coating technician, standing behind a row of mechanized coating guns, preps for a job.



This locker system, designed by LockersMFG, is installed at a military police facility.

Technicians review the step-by-step view of a brake program.

Consider the forming department. It lacks an automatic tool change brake—and for good reason, at least at this writing. Although the operation resembles a custom fab shop, it's still a locker manufacturer, and it has control over the bend radii it assigns and the forms it creates. Its punches have the necessary reliefs that give clearance for the return flanges (including the channels it creates to strengthen the locker frame), and its die widths account for the variety of material thicknesses it produces. Most are 14- to 20-ga. cold-rolled steel, but the shop also runs a fair amount of 14- to 16-ga. hot-rolled pickled and oiled (HRP&O) material. Every brake cell has staged tooling at the ready. Machines are well maintained, and tool changes aren't too arduous.

Influent did, however, reveal some inconsistent usage of the company's brakes. Again, the platform detects granular data, including exactly when the brake ram is moving up and down. In LockersMFG's case, the software showed the value of longer press brake beds with sheet followers. They could accept a greater variety of parts and they streamlined the forming of some of the company's longest, most challenging pieces.

The longer press brakes complement two small electric brakes, each of which offer fast rams that quickly form small workpieces. But growing a forming department is a bit like baking a cake: Which additional ingredient would yield the best result? According to Dunham, having software track the granular elements of utilization (ram movement, setup versus run time, reasons for idle time) gives a good recipe for future expansion. Today, that's likely to include additional 10-ft. brakes, each of which can accept a variety of parts and offer the right balance of optimal throughput and flexibility.

"You've Got to Care"

When analysts talk about de-globalization, reshoring, and a stateside manufacturing renaissance, they usually bring up a litany of buzzwords like *total landed costs* and *supply chain resiliency.* When you visit LockersMFG, though, you see why stateside manufacturing strikes an emotional chord. No one's throwing work over the wall and letting someone else deal with problems. Work flow is controlled, organized, and (thanks in part to Influent software) and continually scrutinized.

In the office, engineers don't work in a silo, aiming to shave pennies off per-part costs. They're designing with the entire value chain and product life cycle in mind. Every change they make could have far-reaching ripple effects, from tool changes on the plant floor to packaging, delivery, assembly, even locker maintenance years down the road.

How these engineers (and everyone else) interact with others—from shop management to front-line operators, assemblers, and packagers—effectively creates the shop culture. "We have engagement here," Dunham said. "We treat people the right way. There's a family feel here ... We preach unity, not division."

In the early 2010s, Dunham, who hails from Tennessee, worked with the Panola Partnership, which promotes economic development for the Panola County, Mississippi, Chamber of Commerce. "This is a great business climate, and politicians here are rally behind manufacturing. We found the complete package in the Panola County market."

That included an available labor force. Over the 18 months prior to opening its doors in 2014, the fabricator received more than 1,000 resumes. "We started filtering that down, and we ended up hiring between 5% and 10%," Dunham said. "Our HR manager is really good at what he does."

The company employs a mix of experienced people and novices. "We have a blend of people. Some bring the energy, others bring the experience, and we need both. And we have a promote-from-within culture. People know they'll have opportunity here if they apply themselves. For us, keeping options open for upward mobility is key for retention."

Some are cross-trained; others are happy to focus on one process. Most important, "there are no dividing lines here," Dunham said, adding that lines between departments, or between the office and shop floor, fosters inefficiency and ultimately creates a frustrating place to work.

He added that having modern equipment helps, too. Every machine has documented working instructions and a set way of operating, based on the physical principles of cutting, bending, forming, and coating. There are no dinosaur machines that only certain people know how to run.

According to Dunham, every change in manufacturing is considered with worker safety and comfort in mind. The sheet followers are an obvious example, but so is the company's welding department. Much of the joining is performed with a resistant spot welding process, not gas metal arc welding. "By removing the need for that kind of welding, we eliminate the need for grinding. By eliminating the grinding, we don't worry about air pollution, particulate in the air, or scuffs or marks on the steel. At the end of the day, our product is going to be seen. It's almost like a furniture piece."

Dunham reiterated the importance of growth opportunities presented by the company's target markets, especially smart lockers, as well as the market's embrace of customization. After all, if the locker market didn't value those services, the LockersMFG business model really wouldn't work. But the demand is there, even in today's uncertain economy. According to Dunham, the organization plans to double the size of its manufacturing facility over the next 36 months.

Today, potential customers can even work with a locker design portal online (dubbed the "design studio") to get the process started. That sparks the creative process to optimize not just manufacturability and shipping, but installation, use, durability, and maintenance throughout the life cycle.

Operators on the floor might not have all this in mind. But in general terms, they know how their work fits into a larger value-creation puzzle. And because it's not just about the part in front of them, but how their role serves people up and down the value chain, it's work worth caring about. Dunham summed it up this way: "We don't have a hugely complicated statement about our culture. If you work here, you've got to care. If you don't care, you can't work here." **FAB**

Senior Editor Tim Heston can be reached at timh@thefabricator.com.

LockersMFG, www.lockersmfg.com

AMADA AMERICA, www.amada.com/america

Transmittal Coversheet

Note: Highlighted Fields to be Completed prior to Submission

Project Name: Bear Creek Fire Station
Project No: 2325
Project Bid Date: 04/29/2025

Re: **Full Scope Review –**
Basis of Design Door Engineering and Manufacturing _ Spec. 08 37 13 Four Fold Doors

Date: 03/21/2025

Please find the following items enclosed for review:

- Introduction Letter
- Formal RFS
- CSI Spec
- Supporting Docs

Please contact our US offices at **888.510.5331** or via email at **info@jusdoors.us** for additional information or support, if we can provide any further assistance.

Substitution Request is rejected due to company not meeting the 10 year requirement.

☐ NO EXCEPTIONS TAKEN ☐ AMEND & RESUBMIT
☐ MAKE CORRECTIONS NOTED ☑ REJECTED

Architect's review neither extends nor alters any contractual obligations of the Architect or Contractor. This is in conformance with responsibilities outlined in the "General Conditions." Contractor shall familiarize himself with same and understand his responsibilities.

By apenegre Date 04/10/2025

DAVIS KANE ARCHITECTS, PA

JUS Doors
a member of afthonos Holdings, LLC

JUS Doors
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1214 Dorris Ave
High Point, NC 27260

T: 888.510.5331
E: info@jusdoors.us
W: frocent.com/jusdoors

Davis Kane Architects

Attn: Alexandre Penegre

503-300 Oberlin Road
Raleigh, NC 27605

Re: Bear Creek Fire Station
RFS: Spec 08 37 13 – Exterior Four-Fold Doors
BOD Door Engineering and Manufacturing

March 21, 2025

JUS Doors is revolutionizing the way you approach apparatus bay door solutions. We understand the need for reliable, cost-effective options that prioritize safety and performance. That's why we propose JUS Doors as an alternative to the currently specified four-fold apparatus bay doors.

Unmatched Advantages:

- **Reduced Costs:** JUS Doors deliver significant cost savings compared to the specified option, maximizing your project budget.
- **Manufacturing:** Where quality meets code compliance, we manufacture our doors and provide expert guidance on local building regulations.
- **Support:** Our network of authorized dealers and installers provides direct access to experts for installation and ongoing support.
- **Reliability:** Parts and components are manufactured in-house, guaranteeing ready availability and minimizing downtime during maintenance. This ensures your doors stay operational when needed most.
- **Repair Times:** With readily available parts, JUS Doors offer swift repairs, preventing permanent failures and keeping your apparatus bay fully functional.

JUS Doors understands the vital role precision plays in bringing your project vision to life. That's why we meticulously manufacture our doors to perfectly match your design specifications. Our meticulous craftsmanship ensures exceptional quality in every door we build. We stay on top of local building codes, so you can be confident your doors not only meet regulations but often surpass them. Plus, you'll work directly with our network of authorized dealers – experts who can guide you through any challenges and ensure a smooth installation.

Explore our detailed product information and sample plans to see how JUS Doors seamlessly integrate into your four-fold apparatus bay needs. Optimal performance, JUS Doors delivers simplicity, precision, quality, and simplified code compliance. Our network of authorized dealers ensures expert guidance for a smooth installation.

That said, in the following pages, we have included **supporting product data & sample plans for review**; please consider allowing JUS Doors as an alternate product for the materials originally specified.

Please let us know how we may be of further assistance.

Respectfully,
JUS Doors

Michael L. Peters
President & CEO

T: 888.510.5331
E: info@jusdoors.us
W: jusdoors.us

JUS Doors
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Greensboro, NC 27416

JUS Doors
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1214 Dorris Ave
High Point, NC 27260
P. 888.510.5331
www.frocent.com/jusdoors

NOTE: Highlighted Field to be Completed prior to Submission

Request for Material Substitution

TO:	Project Name & Description of Request:
Davis Kane Architects Re: Alexandre Penegre 503-300 Oberlin Road Raleigh, NC. 27605	Bear Creek Fire Station - Project Number 2324 Hubert, NC BOD - Door Engineering and Manufacturing

Please find enclosed product data & literature submitted for consideration of formal request of substitution, for the material described here within, on the above referenced project. Please contact JUS Doors at info@jusdoors.us if additional clarification is required for review.

Specified Material Description

Spec Section	Paragraph	Manufacturer	Description
08 37 13	2.1 A	Door Engineering	FF300 Series Four Fold Door

Proposed Substitution

Manufacturer	Model Number	Description
JUS Doors	Model 93	Four Fold Door

Differences between Specified & Proposed Subsitute

Reason for Substitution:	Equal product with potential cost savings.	
Comparative Data:	(See Attached) Sample Plan, Product Data Sheets, Emg Mgmt Svc Product Brochure	
Does the substitution affect dimensions?	**Yes / No**	NO
	Explain	no dimensional affect
Does the substitution affect other trades?	**Yes / No**	NO
	Explain	no affect on other trades

Affects on Owner

Value:	$ -	Explanation:	
Time for Completion:	No affect on completion timeframe.		

Supporting Documentation Attached

Product Data	X	**Drawings**	X	**Samples**	
Comments about supporting documentation:	Plans attached are **SAMPLES**, thus may not match this specific projects elevation.				

Certification of Equivalent Performance

Based upon the review of the above mentioned specifaction and associated construction documents, JUS Doors hereby certifies that the suggested material(s) submitted in this request for substitution and / or approval will perform in an equivalent manner to that of the basis of design.

Original Submission:		Date Submitted:	
Submitted By:			

For Use by A/E

Approved		Rejected	
Approved as Noted		Received too Late	

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: Bear Creek Fire Station

Substitution Request Number:

From: JUS Doors

To: Alexandre Penegre

Date: 03/21/2025

Davis Kane Architects

A/E Project Number: 2324

Re: Four-Fold Doors

Contract For:

Specification Title: Exterior Four-Fold Dors

Description: Four-Fold Doors

Section: 08 37 13 Page: 2

Article/Paragraph: 2.1 A

Proposed Substitution: Four-Fold Doors

Manufacturer: JUS Doors Address: High Point, NC Phone: 888 510 5331

Trade Name: N/A Model No.: 93

Installer: TBD Address: Phone:

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old X☐ More than 10 years old

Differences between proposed substitution and specified product: See supporting documentation

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: Equal product with potential cost savings.

Similar Installation:

Project: Roanoke Fire Station # 2

Architect: KZF Design & SFCS Architects

Address: Roanoke, VA

Owner: Roanoke Fire Department

Date Installed: 02/28/2021

Proposed substitution affects other parts of Work: X☐ No ☐ Yes; explain

Savings to Owner for accepting substitution: Cost savings determined by price at time of bid. ($).

Proposed substitution changes Contract Time: ☐ X No ☐ Yes [Add] [Deduct] days.

Supporting Data Attached: ☐XDrawings ☐XProduct Data ☐ Samples ☐ Tests ☐ Reports ☐

Form Version: September 2013
CSI Form 13.1A

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Zachary Hagood

Signed by: Zachary Hagood

Firm: JUS Doors

Address: High Point, NC

Telephone: 888 510 5331

Attachments: ☐

A/E's REVIEW AND RECOMMENDATION

☐ Approve Substitution - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.
☐ Approve Substitution as noted - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.
☐ Reject Substitution - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

OWNER'S REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures. Prepare Change Order.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures. Prepare Change Order.
☐ Substitution rejected - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐Contractor ☐Subcontractor ☐Supplier ☐Manufacturer ☐A/E

JUS DOORS

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US Craftsmanship

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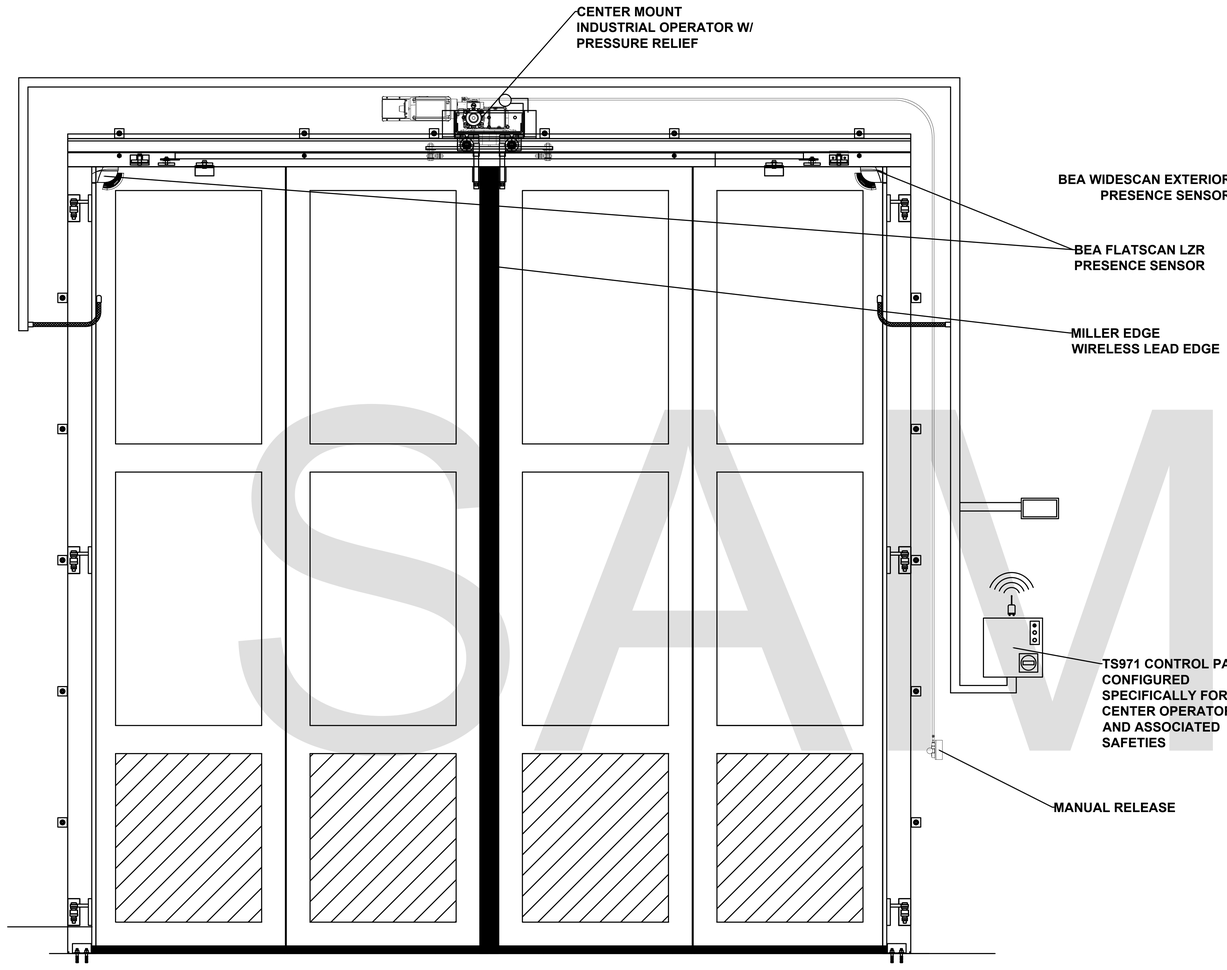
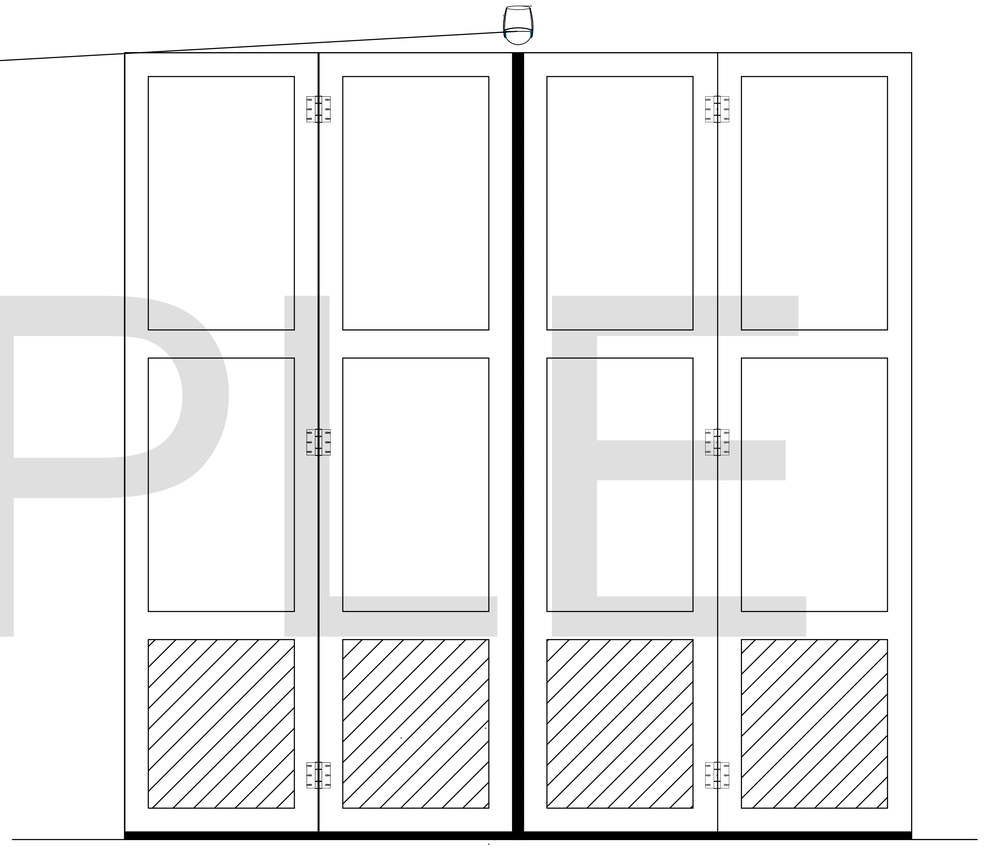
www.frocent.com/jusdoors



INTERIOR ELEVATION



EXTERIOR ELEVATION

NOTES
- STRUCTURE OF OPENING MUST BE SUITABLE FOR WEIGHT OF ASSEMBLY. ASSEMBLY WEIGHT: 2085 LBS.
- OPENING IS BASED UPON 14-0 X 14-0

QUANTITY
- 1 SETS - AS DRAWN

FINISH
- SPECTRACRON 360 2K HS EXTERIOR GRADE URETHANE
- HINGES & HARDWARE TO BE STANDARD BLACK (SW6990).
- PANELS TO BE (COLOR T.B.D.).

WINDOWS

8
- (8) APX 33 3/16" X 54 1/8"
- 1" THICK DOUBLE GLAZED: ¼" CLEAR TEMPERED GLASS X ½" AIR GAP X ¼" CLEAR TEMPERED GLASS.

LOW LEVEL COMPOSITE PANEL

4
- (4) APX 33 3/16" X 36"
- 1" THICK INSULATED TO MATCH DOOR COLOR.

POWER OPERATION/SAFETY FEATURES

INCD	LEAD EDGE OPTICAL SAFETY EDGE
INCD	CONFIGURED FOR MANUAL RELEASE
INCD	EXTERIOR PHOTOCELL
INCD	INTERNAL PRESENCE SENSOR
INCD	RADIO RECEIVER & (1) SINGLE BUTTON TRANSMITTER TO OPERATE ALL DOORS.
INCD	TIMER ACTIVATED LOOP DETECTOR

NOTES:
PAPER SIZE - 36" X 48"

DOOR OPERATION:

THE FOLLOWING TO BE DETERMINED PRIOR TO INSTALLATION.
- PUSH TO OPEN (YES / NO)
- PUSH TO CLOSE (YES / NO)
- AUTO TIME CLOSE (YES / NO TIME: <90 SEC)
- WALL PBS LOCATION (ADJACENT DOOR, BAY WALL, CONTROL ROOM, ETC.)
- ADDITIONAL WALL PBS (YES / NO) LOCATION?
- INTEGRATION WITH OTHER BUILDING SYSTEMS (YES / NO)
- ADDITIONAL COST MAY BE ASSOCIATED WITH ITEMS NOT INCLUDED.

JUS DOORS

DRAWN	MLP	DATE	01/7/2022

JUS Doors
1214 Dorris Ave
High Point, NC 27260

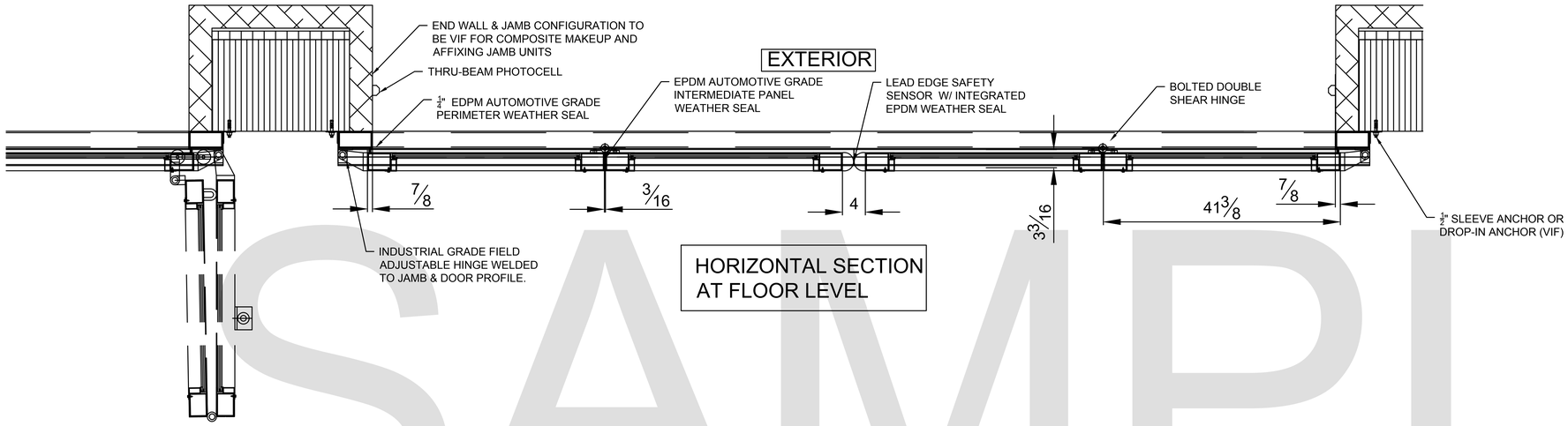
P. 888.510.53
W. www.frocent.com/jusdoors
E. info@jusdoors.

ISSUE	CHECKED	DATE	SIGNED	MODIFICATION
01	SS	01/10/22		FIRST ISSUE (SWT 2.0 _ JUSD)

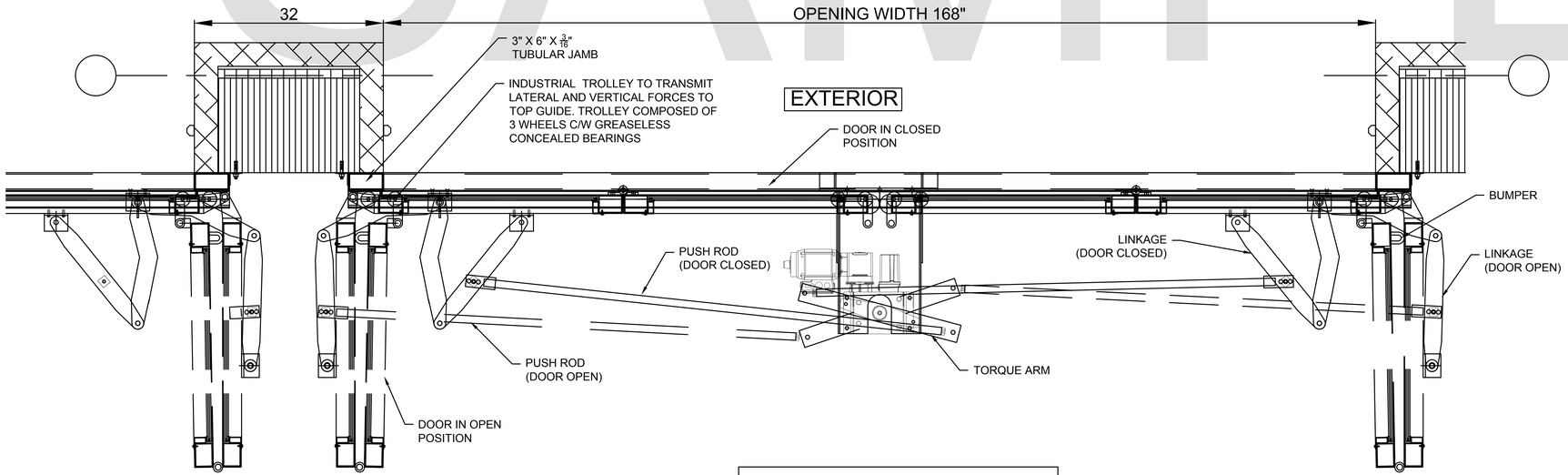
DRG TITLE
General Layout
Interior & Exterior Elevation
JUS Doors _ M87 / 93

PROJECT REF
Address
City, State Zip

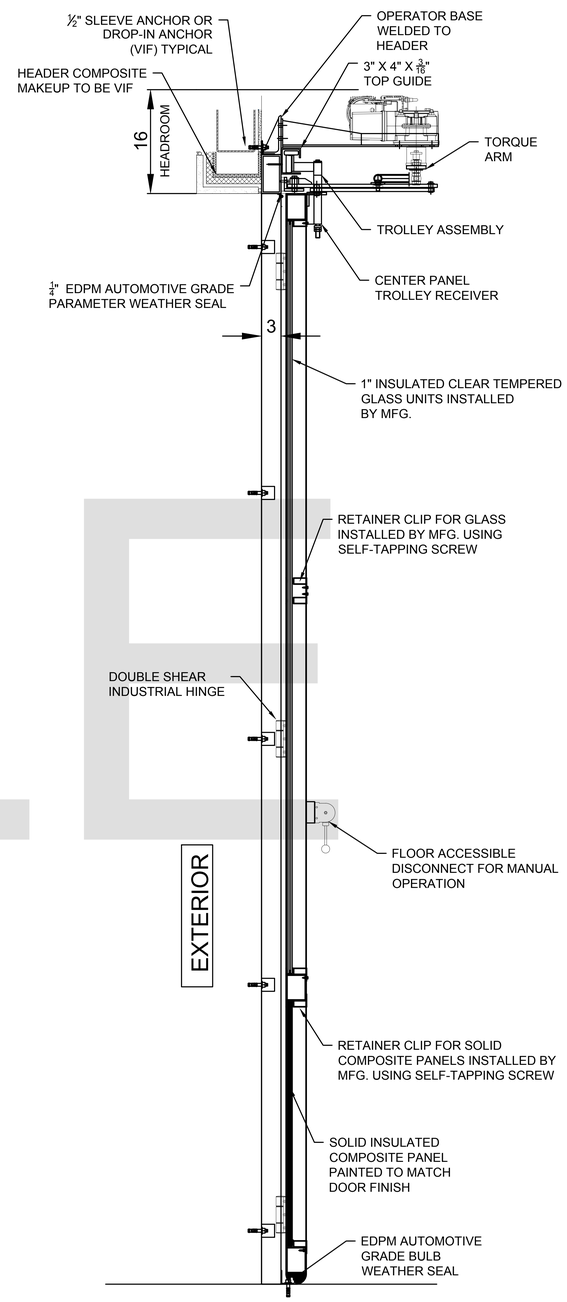
DRAWING NUMBER
Contract Number _ 001



HORIZONTAL SECTION AT FLOOR LEVEL



HORIZONTAL SECTION AT DRIVE MECHANISM LEVEL



VERTICAL SECTION

NOTES
- STRUCTURE OF OPENING MUST BE SUITABLE FOR WEIGHT OF ASSEMBLY. ASSEMBLY WEIGHT: 2085 LBS.
- OPENING IS BASED UPON 14-0 X 14-0

QUANTITY
- 1 SETS - AS DRAWN

FINISH
- SPECTRACRON 360 2K HS EXTERIOR GRADE URETHANE
- HINGES & HARDWARE TO BE STANDARD BLACK (SW6990).
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- 1" THICK INSULATED TO MATCH DOOR COLOR.

POWER OPERATION/SAFETY FEATURES

INCD	LEAD EDGE OPTICAL SAFETY EDGE
INCD	CONFIGURED FOR MANUAL RELEASE
INCD	EXTERIOR PHOTOCELL
INCD	INTERNAL PRESENCE SENSOR
INCD	RADIO RECEIVER & (1) SINGLE BUTTON TRANSMITTER TO OPERATE ALL DOORS.
INCD	TIMER ACTIVATED LOOP DETECTOR

NOTES:
PAPER SIZE - 36" X 48"

DOOR OPERATION:
THE FOLLOWING TO BE DETERMINED PRIOR TO INSTALLATION.
- PUSH TO OPEN (YES / NO)
- PUSH TO CLOSE (YES / NO)
- AUTO TIME CLOSE (YES / NO TIME: <90 SEC)
- WALL PBS LOCATION (ADJACENT DOOR, BAY WALL, CONTROL ROOM, ETC.)
- ADDITIONAL WALL PBS (YES / NO) LOCATION?
- INTEGRATION WITH OTHER BUILDING SYSTEMS (YES / NO)
- ADDITIONAL COST MAY BE ASSOCIATED WITH ITEMS NOT INCLUDED.

JUS DOORS

DRAWN	MLP	DATE	01/7/2022

JUS Doors
1214 Dorris Ave
High Point, NC 27260

P. 888.510.53
W. www.frocent.com/jusdoors
E. info@jusdoors.

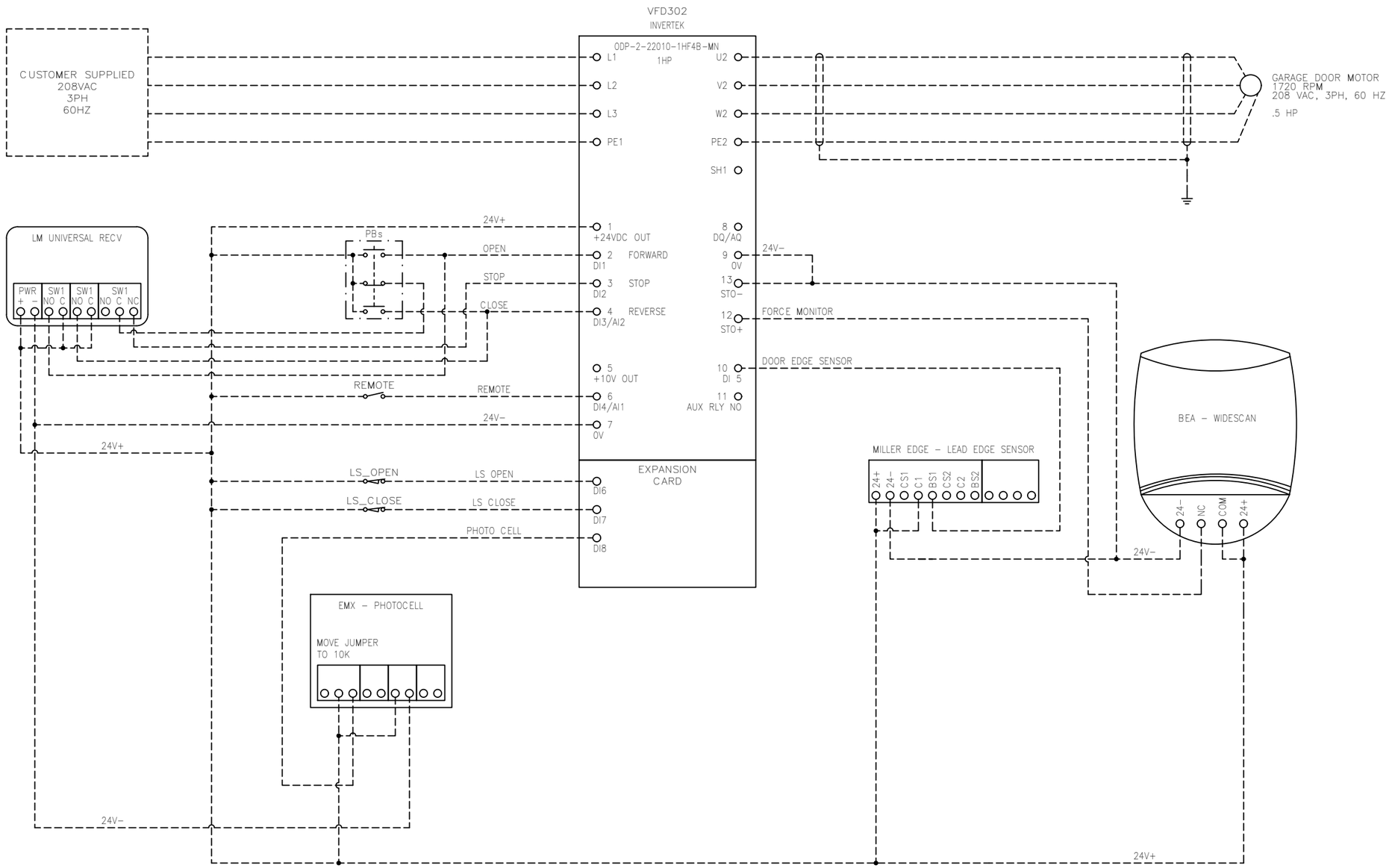
ISSUE	CHECKED	DATE	SIGNED	MODIFICATION
01	SS	01/10/22		FIRST ISSUE (SWT 2.0 _ JUSD)

DRG TITLE
SECTIONS
JUS Doors _ M87 / 93

PROJECT REF
Address
City, State Zip

DRAWING NUMBER

Contract Number _ 002



NOTES	**WINDOWS**	**POWER OPERATION/SAFETY FEATURES**	**NOTES:** PAPER SIZE - 36" X 48"		
QUANTITY	N/R	NA	**DOOR OPERATION:** THE FOLLOWING TO BE DETERMINED PRIOR TO INSTALLATION. - PUSH TO OPEN (YES / NO) - PUSH TO CLOSE (YES / NO) - AUTO TIME CLOSE (YES / NO TIME: <90 SEC) - WALL PBS LOCATION (ADJACENT DOOR, BAY WALL, CONTROL ROOM, ETC.) - ADDITIONAL WALL PBS (YES / NO) LOCATION? - INTEGRATION WITH OTHER BUILDING SYSTEMS (YES / NO) - ADDITIONAL COST MAY BE ASSOCIATED WITH ITEMS NOT INCLUDED.		
FINISH	**LOW LEVEL COMPOSITE PANEL**	NA			
	INC	NA			
		NA			
		NA			
		NA			
		NA			

JUS DOORS

DRAWN	MLP
DATE	2/15/2024

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ISSUE	**CHECKED**	**DATE**	**SIGNED**	**MODIFICATION**
01				FIRST ISSUE (SWT 2.0 _ JUSD)

DRG TITLE
WIRING DIAGRAM
SWT2.0 - JUSD

PROJECT REF

DRAWING NUMBER

Section 083500 – Folding Doors and Grilles

(NOTE: OPTIONS IN RED with SELECTION REQUIREMENTS)

Part 1 – General

1.1 Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. This Section includes four-fold metal doors with surface mounted tube frames and customable fully glazed panels.
2. Operation of four-fold metal doors includes overhead mounted electro-mechanical operators.

1.3 Submittals

1. Submit each item for review, in accordance with Division 1 Specifications.
2. Shop drawings clearly reflecting door assemblies, hardware, operating components including adjacent construction. Drawings to show elevation, sections, details, and clearances required for the door assemblies.
3. Shop drawings shall be of best quality craftsmanship, specifically prepared on standard size drawing sheet.
4. Complete installation instructions for doors and hardware.
5. Manufacturer's technical product data on each product type being utilized.
6. Letter of conformance indicating that the doors are installed in accordance to the drawings and the specifications.
7. Reference list including five (5) successful installations of this type of door within the past two (2) years.

1.4 Quality Assurance:

1. Doors shall be designed to withstand external or internal horizontal wind loads as specified or in accordance with ASCE. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 lbs psi. Sections structural frames shall be designed in accordance with the AISC "Steel Construction Manual".
2. Door manufacturer shall have at least 10 years experience in manufacturing door type specified for applications of similar type.

1.5 Delivery, Storage & Handling

1. Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water; in such way as to permit access for inspection and handling.
2. Handle materials carefully to prevent damage.

1.6 Warranty

1. Door manufacturer shall provide a written standard limited warranty certificate for material and workmanship.

PART 2 - PRODUCTS

2.1 Manufacturer

1. Manufacturer: Four-Fold Industrial Metal Door manufactured by JUS Doors A member of afthonos Holdings, LLC, 1214 Dorris Ave, High Point, NC 27260 (888.510.5331 / www.frocent.com/jusdoors).
2. Product: M87(93) Electrically Operated Four-Fold Door. Model: (Select One: M87SGE or M93SGE / Standard Glazing, M87FGE or M93FGE / Full Glazing, M87SE or M93SE / Solid)
3. Product: M87(93) Manual Operated Four-Fold Door. Model: (Select One: M87SGM or M93SGM / Standard Glazing, M87FGM or M93SGM / Full Glazing, M87SM or M93 SM)

2.2 Materials

1. Steel Tube: ASTM A513 and ASTM A500/A500M
2. Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1011/A1011M hot-rolled steel sheet.
3. Hardware: Manufacturer's standard components.
4. Fasteners: Zinc-coated steel.

2.3 Four-Fold Doors

1. Sections: The door section frames shall be constructed from 3-inch thick tubular steel of minimum 11 ga thick wall, the frames shall be covered on both faces with 14 gauge thick formed steel sheets. Sections shall be true to dimensions and square in both planes. All exposed welds shall be ground smooth and flush and no section shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Sections shall be pre-drilled for assembling the hardware in the field
2. Insulation (Option for M87SGE, M87SE, M93SGE or M93SE): Internal chambers of solid sections shall be pressure injected with CFC-free polyurethane closed cell foam.
3. Surrounding Frame: The surrounding frame shall include jambs and lintel fabricated from 6" x 3" structural tubular steel. The frames shall be factory prepared to receive the jamb hinges and hardware

2.4 Glazing/Paneling

1. Raised Panels (Option for M87FGE or M93FGE): Raised panels shall be installed with silicone base gaskets retained on the interior with extruded clear anodized aluminum retainers snapped over concealed retained clips. Visible fasteners on the door face are not acceptable.
2. Solid Panels (Option for M87SE or M93SE): Internal chambers of solid sections shall be pressure injected with CFC-free polyurethane foam.
3. Vision Panels (Option for M87SGE or M93SGE): Sections shall receive visions panels in shape and location indicated on the architectural drawings. The vision panels shall be made from of two (2) ¼" clear-tempered glass with ½" air space providing 1" over all thickness.

2.5 Hardware:

1. Hardware: Hardware shall include guides, brackets, trolleys, end and center hinges, and necessary fasteners for complete installation and operation. All brackets shall be manufactured from steel not less than 1/4” thick and shall be bolted to the wall structure with minimum 3/8” fasteners.

2. Door Track/Guides: The top guides shall be manufactured from heavy-gauge steel designed to support the leading sections for full travel.

3. Guide Trolleys: Heavy-duty made from aluminum and have three wheels complete with ball bearings.

4. Jamb Hinges: Heavy-duty type, incorporating the radial and thrust bearings designed to transmit the forces to the opening frame. The hinges shall be adjustable and to have removable pins for servicing.

5. Intermediate Hinges: Black powder coated, made from aluminum, have dual shear pin complete with radial and thrust bearings. The hinges shall be of adjustable design to allow uniform gap and effective seal between sections.

6. Weather seal: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weather seal at center shall be 1/16” cloth inserted neoprene and include no exposed fasteners on the exterior face of the panel. Weather seal at sill shall include two 1/16” cloth inserted neoprene sweeps with an aluminum retainer.

   Provide jamb and head weather seal of 1/16” cloth-inserted neoprene bulb (or closed cell neoprene

2.6 Finish:

1. Factory Applied Polyurethane Industrial Finish: After fabrication, all exposed steel shall be finished with manufacturers standard factory applied epoxy primer and polyurethane finish coat. Color as selected by Architect from manufacturers range including but not limited to the RALK7 Index or Sherwin Williams Indexes. All hardware to be standard black finish.
2. Factory Applied Powder Coat (Option): After fabrication, all exposed steel shall be powder-coated to match color from RALK7 Index standard solid color chart. All hardware to be standard black finish.

2.7 Operator

1. Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation consisting of an electric motor with built-on frequency invertor coupled to worm gear reducer with integrated slipping clutch driving second stage worm gear reducer coupled to the torque arm, release mechanism for manual operation and limit switches.
2. Electro-mechanical drive complete shall be located in the middle above the opening. Power

from the torque arm to the jamb sections shall be transmitted through linkage and heavy-duty push rods, all pivot joints shall have permanently lubricated thrust and radial bushings. Mechanism for manual operation shall be designed so that both sides to move simultaneously and the electric operation can be engaged or disengaged at any position and that limits shall remain synchronized with door position. Mechanism with two manual disconnects, without electrical interlock and that requires each side to move separately or does not allow manual/electrical operation from any position is not acceptable. Pulley and belt type drive mechanism is not acceptable.

3. The drive mechanism shall be capable of operating each side at a speed of 12" per second, for a combined speed of 24" per second. The operator shall have electrically interlocked emergency disconnect lever designed to disconnect both sides from floor level.
4. The controls shall be of inverter type with variable frequency drive and shall be housed in a NEMA 4 type control panel with disconnect switch. The electric operator and controls shall be UL listed. The operators shall be prewired and tested at the factory. Momentary type OPEN-CLOSE-STOP push buttons shall be located on the control panel.
5. Electric operator shall be sized to operate doors at 75 percent capacity under normal operating conditions.

2.8 Controls & Safety Devices

1. Controls shall include a programmable logic controller with digital message display or LED indicators. Controller shall include programmable close timers and programmable inputs/outputs.
2. Motor shall be controlled by frequency converter with overload and under voltage protection. Motor shall have integrated brake system. All control components shall be enclosed in motor housing unit with wiring diagram placed on inside panel.
3. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, built in accordance with the latest NEMA standards. **Incoming electrical shall be (Choose One): 120VAC single phase, 208VAC single phase, 208/230VAC 3-phase, 480VAC 3-phase.**
4. Control Panel: Enclosure shall be NEMA 4 with disconnect switch.
5. Push buttons: Momentary pressure type three push buttons to OPEN, CLOSE and STOP the door shall be mounted on the control panel cover.
6. Remote Push Button Station: (Option) Wall mountable NEMA 4, 3 buttons bush button station to OPEN, CLOSE and STOP the door.
7. Keypad Entry: (Option) Single-Entry Multi-Function Access Controller with Integrated Keypad And Card Reader in Vandal-Resistant Metal Enclosure with a Sealed, Weatherproof Keypad.
8. Limit switches shall be provided to stop the travel of the door in its full open and full closed position.

9. Safety edges: Provide electric safety edges on the leading edges designed to reverse the door closing in case it detects an obstruction.

10. Exterior Photo eyes: Provide a jamb mounted, thru-beam type photo eyes, NEMA 4 rated. The photo eyes shall be wired to reverse the door to open position in case it detects an obstruction during the door closing.

11. Interior Photo eyes: (Option) Pedestal or Bollard mountable photo eyes can be wired as secondary opening or safety devise.

12. Interior Presence Sensor: Provide an overhead mounted BEA LZR-Widescan presence sensor with pre-open and pre-close safety fields.

13. Exterior Presence Sensor: (Option) Provide an overhead mounted BEA LZR-Widescan presence sensor.

14. Radio controls: (Option) Provide a radio receiver and SELECT ONE: (X) single button remotes per door or (X) three button remotes per door. Remotes to open and close doors with single button.

15. Timer Activation Loop Detectors: (Option) Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer. G.C. to coordinate installation of preformed loop with installer prior to pouring the concrete.

16. Warning Horn/Strobe: (Option) Provide warning light and strobe. Include outputs PLC to allow for activation while door is in motion both opening and closing, along with activation prior to closing. Include programmable "delay-to-close" timer which activates the warning horn for a set time, prior to the door closing.

17. Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

PART 3 - EXECUTION

3.1 Installation

1. Four-fold door shall be installed in strict accordance with approved drawings by certified installer. Door rough opening shall be prepared by General Contractor prior to installation of door. Rough-in electrical shall be brought to door prior to installation as to avoid installation delays.
2. Slab shall be poured cured and in place prior to installation.
3. Door shall be set plumb, leveled and square with all parts properly fastened and mounted. Door shall be tested and left in good operational order.

3.2 Turnover

1. Door shall be inspected and operated by installer in presence of General Contractor and / or Architect upon completion of installation. Any noted defects shall be corrected and door turned over to General Contractor. Any damage following

turnover to General Contractor prior to final turnover to owner, is the responsibility of the General Contractor.

2. Complete Operation and Maintenance Manual & Warranty Certificate shall be provided by manufacturer at turnover of door.

END OF SECTION

(*1 ALL CONFIGURATIONS ARE CUSTOMIZABLE)

MANUAL DOOR

- M8793M – 0101 (1+1 Leaves)
- M8793M – 0002 (0+2 Leaves)
- M8793M – 0200 (2+0 Leaves)
- M8793M – 0202 (2+2 Leaves)
- M8793M – 0102 (1+2 Leaves)
- M8793M – 0201 (2+1 Leaves)

ELECTRIC DOOR

- M8793E – 0200 (2+0 Leaves)
- M8793E – 0002 (0+2 Leaves)
- M8793E – 0202 (2+2 Leaves)

CONCEPTS	DESCRIPTION	MANUAL	ELECTRIC	MAX. WIDTH	MAX. HEIGHT	MAX. SF
2+0	M8793M0200 M8793E0200 M8793M0002 M8793E0002	✓	✓	8'	20'	162 (Without Customization)
2+2	M8793M0202 M8793E0202	✓	✓	18'	20'	324 (Without Customization)

				MAX. WIDTH FOR ODD LEAF CONFIGURATIONS		
				UP TO 10' HEIGHT	UP TO 12' HEIGHT	UP TO 14' HEIGHT
2+1 1+2	M8793M0201 M8793M0102	✓	*2	12'	10'	9'
0+2 2+0	M8793M0002 M8793M0200	✓	*2	13'	12'	12'
1+1	M8793M0101	✓	✗	16'	15'	14'

M8793 DOOR SIZE CONFIGURATION CHART (TABLE 1)

M 87 & 93 SPEC SHEET

JUS DOORS

Additional Information

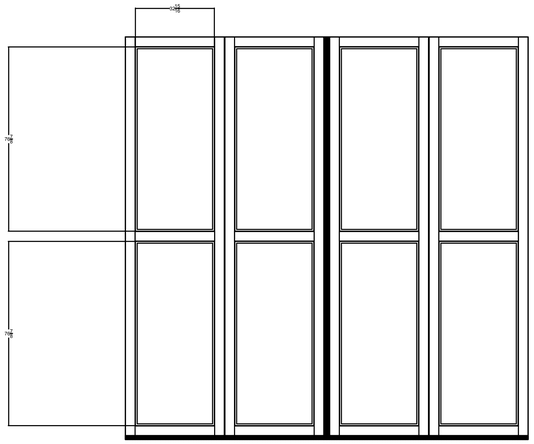
	STANDARD DETAILS	
	MANUALLY DOOR (M8793M)	ELECTRICAL DOOR (M8793E)
TECHNICAL SPECIFICATION	Max width 18' (1) Max height 20' (1) Panel thickness 3" Panel R-Value 2.5 – 12.2 (2) Sideroom required 8" Headroom required 6" Weight 4lb/ft²	Max width 18' (1) Max height 20' (1) Panel thickness 3" Panel R-Value 2.5 – 12.2 (2) Sideroom required 8" Headroom required 16" Weight 4lb/ft2 Power supply 120VAC, 208VAC, 208/230 VAC, 480VAC
PANEL CONSRUCTION	Panels are constructed from 3" thick tubular steel of minimum 11ga thick wall. The frame is covered on both sides with 14g thick galvanized steel sheets.	
SEALS	Flexible rubber seals are fitted to all edges of the door, and between door leaves. All seals are purpose-designed EPDM extrusions, which press into, and blend seamlessly with the door panels. Each seal provides full finger trap safeguarding, and protection against weather, dust and sand.	
TOP TRACL & GUIDE ROLLERS	The top guide track is a galvanized steel channel mounted back to the surround frame with 2g pressed steel brackets. Top guide rollers are nylon guide wheels running on steel shafts. Doors fitted with >40% area of glazing to be fitted with 4-wheel pendant trollies and support track in lieu of top guide rollers and guide track.	
JAMB HINGES	Three pairs of intermediate hinges, (3) left panels 1 & 2 (3) right panels 3 & 4, machined from mild steel and fabricated with dual shear knuckles and a single pin having never oil thrust bearings and painted black in color.	
INTERMEDIATE HINGES	Apex hinge pairs are machined from solid aluminum extrusions, fitted with sealed for life Igus bushes and Ø ⅝" stainless steel hinge pins. A concealed peg ensures that the hinge pins cannot be removed from the outside. Hinges are finished in black polyester powder coat to RAL 9005(M).	

1) Windload is calculated using ATC Hazard by Location based upon applicable risk category.
2) Energy coefficient s variable based upon the glass type, quantity and configuration.

	STANDARD AND AVAILABLE OPTIONS	
	MANUALLY DOOR (M8793M)	ELECTRICAL DOOR (M8793E)
FINISH	Standard Factory applied polyurethane industrial finish, applied after fabrication covering all exposed steel with epoxy primer and polyurethane finish system in color as selected by client from the RALK7 Index or Sherwin Williams Indexes of color options. All hardware is standard black finish. Option 1 Factory applied powder-coat, applied after fabrication covering all exposed steel with baked on industrial powder coat system in color as selected by client from the RALK7 Index or Sherwin Williams Indexes of color options. All hardware is standard black finish.	
WINDOW GLAZING	Standard None fitted. Option 1 Insulated Tempered Safety Glass configured in ¼ x ½ x ¼ to the opening size. LOWE & Tint options available upon request. Option 2 Impact Resistance Glass configured in ½ x ½ x ½ to the opening size. LOWE & Tint options available upon request.	
WICKET DOOR	Standard None fitted. Option 1 Lever fixture. Wicket door opens outwards. Hardware comprise of a 1” low-profile anodized aluminum lever handles, cylinder with internal thumbturn, 1½ pairs of stainless steel butt hinges and a hidden door limiting stay. 3” high step with 1½” wide aluminum threshold strip.	
LOCKING / HANDLES	Standard A drop bolt and a black thermoplastic easy-grip pull handle are fitted internally between each pair of leaves. Option 1 A bottom guide pin engages in a cast aluminum floor shoe fitted to the threshold, holding the leading edge(s) firm. Option 2 A top and bottom espagnolette shoot bolt operated via an internal, non-lockable lever handle is fitted.	Standard A black thermoplastic easy-grip pull handle is fitted internally between each pair of leaves. An electro hydraulic lock within the drive motor automatically holds the door in the closed position. A lever fitting at low level allows for the motor to be disengaged allowing the door to be opened manually. Option 1 A bottom guide pin engages with a cast aluminium floor shoe fitted to the threshold, and holds the leading edge firm. A black thermoplastic easy-grip pull handle is fitted internally. Option 2 A lever operated floor bolt is fitted internally between pairs of leaves and is electrically interlocked.

	STANDARD AND AVAILABLE OPTIONS	
	MANUALLY DOOR (M8793M)	ELECTRICAL DOOR (M8793E)
THRESHOLD PLATE	Standard No threshold supplied. Option A 6” x ¼” thick extruded aluminium plate with 30° chamfered edge and anti-slip grooves fixes directly to the floor to form a water bar, presents a level surface for the door to seal against, minimises bottom seal wear as the door folds, and provides a solid location point for floor bolts.	
SURROUND FRAME	Standard Surface Mounted - 6” x 3” x 7g tubular profile frame for mounting to the surface around the opening. Finished to match panels as specified in finishes section. Option 1 Jamb Mounted – 6” x 3” x 7g tubular profile mounted within the opening. Finished to match panels as specified in finishes section. Option 2 No frame supplied.	
DRIVE SYSTEM	Standard A center mount Helical gear driven operator with control arms connected to panels (1) & (4) and synchronized control panel. A push button control with Open / Stop / Close is supplied. Includes a low-level manual release lever. Option A low-profile, panel affixed, dual operator system mounted internally at the top of each leading edge leaf. A control panel controls both door halves simultaneously. A push button control with Open / Stop / Close is supplied. Includes a low-level manual release lever.	
CONTROL LOGIC	Standard Proprietary PLC designed specifically to work with the center mount gear driven operator. Control panel is mounted within an NEMA(4) enclosure with 12 function logics, and advanced programming for custom tuning. Includes Open, Close and Emergency Stop buttons. The board provides variable speed opening and closing, slow-down on opening and closing, door-status displays, inputs for safety edges, photocells, induction loops, proximity sensors, storm bolts, wicket door and the manual release handle, and outputs for traffic lights and an AV alarm. Several spare 24V DC input and output are also provided for integration with external HVAC, Fire Alarms signals, Turn-out systems and Building Management systems. Option for remote connectivity via Wi-Fi for door status monitoring, fault finding and service counter. Option 1 FAAC E455D control panel mounted within an IP55 plastic enclosure sized 9½“ x 5½“ with 12 function logics, and advanced programming for custom tuning, controls both door halves. Controller is used for Low-Profile Drive System Option.	

	STANDARD AND AVAILABLE OPTIONS	
	MANUALLY DOOR (M8793M)	ELECTRICAL DOOR (M8793E)
ADDITIONAL CONTROLS	**Push Button** Additional Open / Close / Stop push button units. **Keyswitch** Sprung return keyswitch in separate enclosure for operation of the door by keyholders only. For interior or exterior use. **Digi-key** Stainless steel code lock for operation of the door by authorized persons only. For interior or exterior use. **Radio Control** 868MHz radio control system for remote operation of the door from a vehicle or control room. Additional transmitters available for multiple users. **Presence Sensor** Optional additional presence sensors mounted at high level, which will open the door on detection approaching traffic, or close the door on detection of retreating traffic. Use of microwave technology, the sensor is adjustable so as to ignore pedestrians, or parallel traffic.	
SAFETY FEATURES	**Safety Edges** A full height wireless safety edge is mounted within each leading edge seal of the door. An impact on the edge during closing will automatically stop and re-open the door. Safety edges are continuously monitored so the door cannot close automatically in the event of damage or failure of the edge. **Photocells** Commercial send / receive photocell fitted across the opening. The receiver unit is fitted with a long-life battery to avoid hard wiring. Photocells can be fitted for closing safety, opening safety, or a combination of opening and closing. If a closing safety beam is broken during the closing cycle, the door will automatically stop and re-open. If an opening safety beam is broken during the opening cycle, the door will automatically stop. **Presence Sensor** (Standard on All E Series Doors) Infrared presence detection sensors are fitted to the inside face of the trailing edge leaf to each door preventing the door impacting / crushing a person or object during movement. Additional detectors as an option may be fitted externally above the center of the opening to prevent the door impacting / crushing a person or object during movement. In the event of any detection during door movement, the door will stop. **Warning Horn & Strobe** A red and green 24V DC LED traffic light unit is fitted. The unit is sized 14½“ x 7½“ with 24 LEDs to each light, and is intended to be mounted directly on the inside face of the door or onto a traffic light post. Sequence of operation is Red light on when door closed or part closed, Green light on when door fully open. A pair of 24Vdc limit switches is supplied to monitor the fully open position.	



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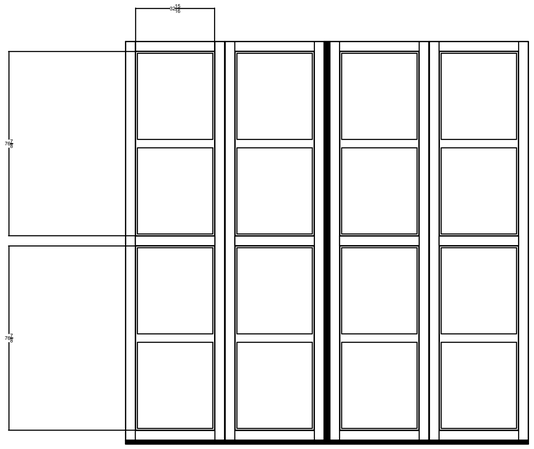

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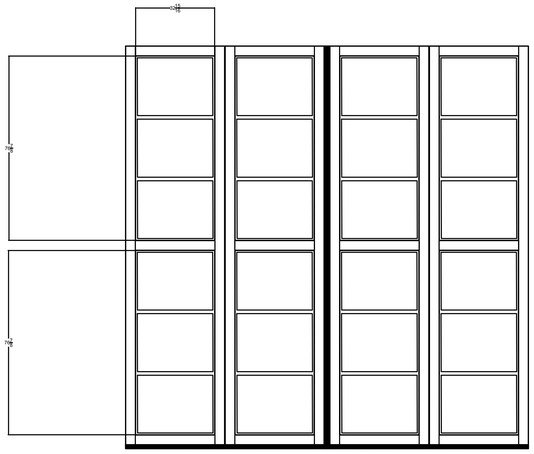

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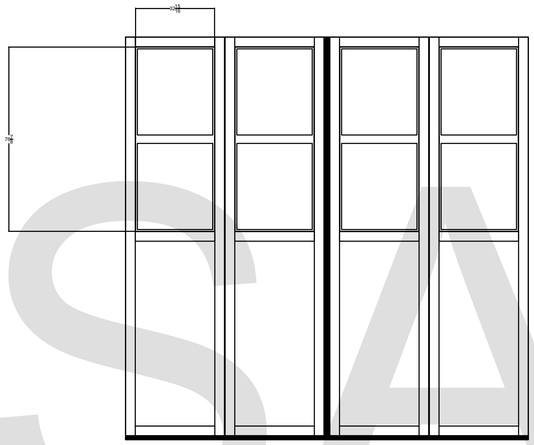

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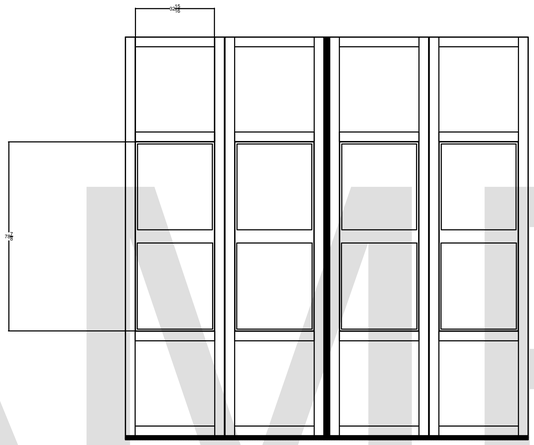

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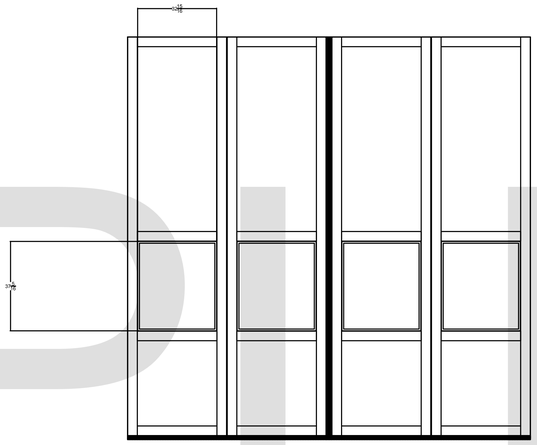

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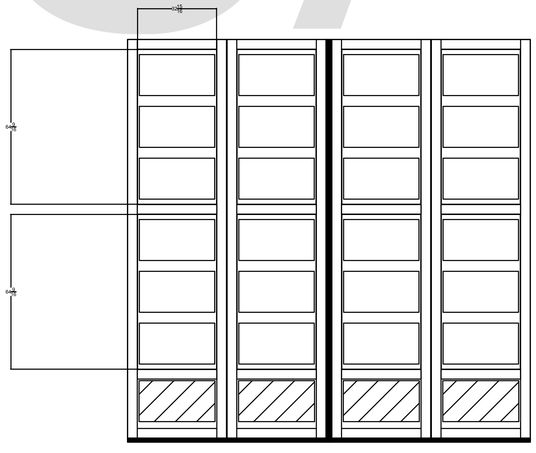

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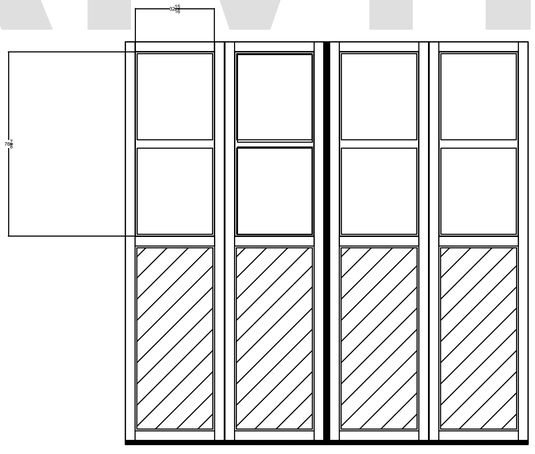

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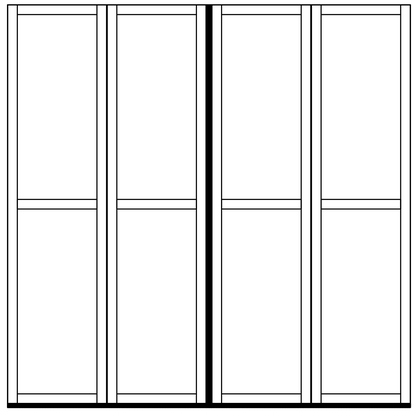

TYPE 9

NOTES

QUANTITY

FINISH

WINDOWS

LOW LEVEL COMPOSITE PANEL

LEADING EDGE FLOOR LOCK

POWER OPERATION/SAFETY FEATURES

- INC — LEAD EDGE OPTICAL SAFETY EDGE
- INC — CONFIGURED FOR MANUAL RELEASE
- INC — EXTERNAL PRESENCE SENSOR
- INC — INTERNAL PRESENCE SENSOR
- INC — KEY FOB: (1) TRANSMITTERS & (1) RECEIVER / DOOR
- INC — EXTERIOR PHOTOCELL
- NA — OPTIONS INCLUDED:

NOTES:

Paper Size 36 x 48

DOOR OPERATION:

THE FOLLOWING TO BE DETERMINED PRIOR TO INSTALLATION.

- PUSH TO OPEN (YES / NO)
- PUSH TO CLOSE (YES / NO)
- AUTO TIME CLOSE (YES / NO TIME: <90 SEC)
- WALL PBS LOCATION (ADJACENT DOOR, BAY WALL, CONTROL ROOM, ETC.)
- ADDITIONAL WALL PBS (YES / NO) LOCATION?
- INTEGRATION WITH OTHER BUILDING SYSTEMS (YES / NO)
- ADDITIONAL COST MAY BE ASSOCIATED WITH ITEMS NOT INCLUDED.

JUS DOORS

DRAWN	MLP	DATE	12/16/21

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ISSUE	CHECKED	DATE	SIGNED	MODIFICATION
01	MLP	12/16/21		FIRST ISSUE

DRG TITLE

JUS DOORS M87 OR 93
STANDARD GLAZING OPTIONS

PROJECT REF

DRAWING NUMBER

GLAZING OPTIONS _ 20211216

RAL COLOR

3026

9010

5019

The following pages provide a sampling of colors available under the RAL indexes. Please inquire for a full index of available colors. Additionally, color matching is available for all major brands (i.e. Sherwin Williams, PPG, and Benjamin Moore Color Charts).

RAL 1000	Green beige
RAL 1001	Beige
RAL 1002	Sand yellow
RAL 1003	Signal yellow
RAL 1004	Golden yellow
RAL 1005	Honey yellow
RAL 1006	Maize yellow
RAL 1007	Daffodil yellow
RAL 1011	Brown beige
RAL 1012	Lemon yellow
RAL 1013	Oyster white
RAL 1014	Ivory
RAL 1015	Light ivory
RAL 1016	Sulfur yellow
RAL 1017	Saffron yellow
RAL 1018	Zinc yellow
RAL 1019	Grey beige
RAL 1020	Olive yellow
RAL 1021	Colza yellow
RAL 1023	Traffic yellow

RAL 1024	Ochre yellow
RAL 1026	Luminous yellow
RAL 1027	Curry
RAL 1028	Melon yellow
RAL 1032	Broom yellow
RAL 1033	Dahlia yellow
RAL 1034	Pastel yellow
RAL 1035	Pearl beige
RAL 1036	Pearl gold
RAL 1037	Sun yellow
RAL 2000	Yellow orange
RAL 2001	Red orange
RAL 2002	Vermilion
RAL 2003	Pastel orange
RAL 2004	Pure orange
RAL 2005	Luminous orange
RAL 2007	Luminous bright orange
RAL 2008	Bright red orange
RAL 2009	Traffic orange
RAL 2010	Signal orange

RAL 2011	Deep orange
RAL 2012	Salmon range
RAL 2013	Pearl orange
RAL 3000	Flame red
RAL 3001	Signal red
RAL 3002	Carmine red
RAL 3003	Ruby red
RAL 3004	Purple red
RAL 3005	Wine red
RAL 3007	Black red
RAL 3009	Oxide red
RAL 3011	Brown red
RAL 3012	Beige red
RAL 3013	Tomato red
RAL 3014	Antique pink
RAL 3015	Light pink
RAL 3016	Coral red
RAL 3017	Rose
RAL 3018	Strawberry red
RAL 3020	Traffic red

RAL 3022	Salmon pink
RAL 3024	Luminous red
RAL 3026	Luminous bright red
RAL 3027	Raspberry red
RAL 3028	Pure red
RAL 3031	Orient red
RAL 3032	Pearl ruby red
RAL 3033	Pearl pink
RAL 4001	Red lilac
RAL 4002	Red violet
RAL 4003	Heather violet
RAL 4004	Claret violet
RAL 4005	Blue lilac
RAL 4006	Traffic purple
RAL 4007	Purple violet
RAL 4008	Signal violet
RAL 4009	Pastel violet
RAL 4010	Telemagenta
RAL 4011	Pearl violet
RAL 4012	Pearl black berry

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RAL 5000	Violet blue	RAL 5022	Night blue	RAL 6015	Black olive	RAL 6038	Luminous green
RAL 5001	Green blue	RAL 5023	Distant blue	RAL 6016	Turquoise green	RAL 7000	Squirrel grey
RAL 5002	Ultramarine blue	RAL 5024	Pastel blue	RAL 6017	May green	RAL 7001	Silver grey
RAL 5003	Sapphire blue	RAL 5025	Pearl gentian blue	RAL 6018	Yellow green	RAL 7002	Olive grey
RAL 5004	Black blue	RAL 5026	Pearl night blue	RAL 6019	Pastel green	RAL 7003	Moss grey
RAL 5005	Signal blue	RAL 6000	Patina green	RAL 6020	Chrome green	RAL 7004	Signal grey
RAL 5007	Brillant blue	RAL 6001	Emerald green	RAL 6021	Pale green	RAL 7005	Mouse grey
RAL 5008	Grey blue	RAL 6002	Leaf green	RAL 6022	Olive drab	RAL 7006	Beige grey
RAL 5009	Azure blue	RAL 6003	Olive green	RAL 6024	Traffic green	RAL 7008	Khaki grey
RAL 5010	Gentian blue	RAL 6004	Blue green	RAL 6025	Fern green	RAL 7009	Green grey
RAL 5011	Steel blue	RAL 6005	Moss green	RAL 6026	Opal green	RAL 7010	Tarpaulin grey
RAL 5012	Light blue	RAL 6006	Grey olive	RAL 6027	Light green	RAL 7011	Iron grey
RAL 5013	Cobalt blue	RAL 6007	Bottle green	RAL 6028	Pine green	RAL 7012	Basalt grey
RAL 5014	Pigeon blue	RAL 6008	Brown green	RAL 6029	Mint green	RAL 7013	Brown grey
RAL 5015	Sky blue	RAL 6009	Fir green	RAL 6032	Signal green	RAL 7015	Slate grey
RAL 5017	Traffic blue	RAL 6010	Grass green	RAL 6033	Mint turquoise	RAL 7016	Anthracite grey
RAL 5018	Turquoise blue	RAL 6011	Reseda green	RAL 6034	Pastel turquoise	RAL 7021	Black grey
RAL 5019	Capri blue	RAL 6012	Black green	RAL 6035	Pearl green	RAL 7022	Umbra grey
RAL 5020	Ocean blue	RAL 6013	Reed green	RAL 6036	Pearl opal green	RAL 7023	Concrete grey
RAL 5021	Water blue	RAL 6014	Yellow olive	RAL 6037	Pure green	RAL 7024	Graphite grey

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RAL 7026	Granite grey
RAL 7030	Stone grey
RAL 7031	Blue grey
RAL 7032	Pebble grey
RAL 7033	Cement grey
RAL 7034	Yellow grey
RAL 7035	Light grey
RAL 7036	Platinum grey
RAL 7037	Dusty grey
RAL 7038	Agate grey
RAL 7039	Quartz grey
RAL 7040	Window grey
RAL 7042	Traffic grey A
RAL 7043	Traffic grey B
RAL 7044	Silk grey
RAL 7045	Telegrey 1
RAL 7046	Telegrey 2
RAL 7047	Telegrey 4
RAL 7048	Pearl mouse grey
RAL 8000	Green brown
RAL 8001	Ochre brown
RAL 8002	Signal brown
RAL 8003	Clay brown
RAL 8004	Copper brown
RAL 8007	Fawn brown
RAL 8008	Olive brown
RAL 8011	Nut brown
RAL 8012	Red brown
RAL 8014	Sepia brown
RAL 8015	Chestnut brown
RAL 8016	Mahogany brown
RAL 8017	Chocolate brown
RAL 8019	Grey brown
RAL 8022	Black brown
RAL 8023	Orange brown
RAL 8024	Beige brown
RAL 8025	Pale brown
RAL 8028	Terra brown
RAL 8029	Pearl copper
RAL 9001	Cream
RAL 9002	Grey white
RAL 9003	Signal white
RAL 9004	Signal black
RAL 9005	Jet black
RAL 9006	White aluminium
RAL 9007	Grey aluminium
RAL 9010	Pure white
RAL 9011	Graphite black
RAL 9016	Traffic white
RAL 9017	Traffic black
RAL 9018	Papyrus white
RAL 9022	Pearl light grey
RAL 9023	Pearl dark grey

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DOOR ENGINEERING (DE) FF300 AND JUS DOORS MODEL 93 COMPARISON SPEC

	FF300	M93
Part 1	GENERAL	
1.1	RELATED DOCUMENTS	
A	Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.	Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
1.2	SUMMARY	
A	This Section includes Four-Fold metal doors with surface mounted tube frames.	This Section includes four-fold metal doors with surface mounted tube frames and customizable fully glazed panels.
B	Operation of Four-Fold metal doors includes overhead mounted electro-mechanical operators.	Operation of four-fold metal doors includes overhead mounted electromechanical operators.
1.3	SUBMITTALS	
A	General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.	Submit each item for review, in accordance with Division 1 Specifications.
B	Product Data for each type of product specified consisting of manufacturer's technical Product Data and installation instructions for each type of door required, including data substantiating that products comply with requirements.	Shop drawings clearly reflecting door assemblies, hardware, operating components including adjacent construction. Drawings to show elevation, sections, details, and clearances required for the door assemblies.
C	Submittal Drawings showing fabrication and installation of Four-Fold metal doors including plans, elevations, sections, details of components, hardware, operating mechanism, and attachments to the other units of Work. Include wiring diagrams for coordination with electrical trade.	Shop drawings shall be of best quality craftsmanship, specifically prepared on standard size drawing sheet.
D	Reference list including (5) successful installations of this type of door within the past two (2) years.	Complete installation instructions for doors and hardware.

COMPARISON CONTINUED ON NEXT PAGE

	FF300	M93
1.4	**QUALITY ASSURANCE**	
A	Doors shall be designed to withstand external or internal horizontal wind loads of 120mph (3 second gust) per ASCE 7-16. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 pounds per square inch. Steel frames shall be designed in accordance with the AISC "Steel Construction Manual".	Doors shall be designed to withstand external or internal horizontal wind loads as specified or in accordance with ASCE. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 lbs psi. Sections structural frames shall be designed in accordance with the AISC "Steel Construction Manual".
B	Door manufacturer shall have at least 10 years experience in manufacturing door type specified.	Door manufacturer shall have at least 10 years experience in manufacturing door type specified for applications of similar type.
1.5	**DELIVERY, STORAGE AND HANDLING**	
A	Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water, and so as to permit access for inspection and handling.	Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water; in such way as to permit access for inspection and handling.
B	Handle materials carefully to prevent damage.	Handle materials carefully to prevent damage.
1.6	**WARRANTY**	
A	The door manufacturer shall provide a written standard limited warranty for material and workmanship.	Door manufacturer shall provide a written standard limited warranty certificate for material and workmanship.

COMPARISON CONTINUED ON NEXT PAGE

FF300		M93	
Part 2	**PRODUCTS**		
2.1	**MANUFACTURES**		
A	Manufacturers: Four-Fold industrial metal doors manufactured by Door Engineering and Manufacturing, 101 Power Dr, Mankato, MN 56001, (800)-959-1352 or equal products by other manufacturers approved in advance. FF300 Series: Glazed	Manufacturer: Four-Fold Industrial Metal Door manufactured by JUS Doors A member of afthonos Holdings, LLC.; 1214 Dorris Ave, High Point, NC 27260 (888.510.5331 / www.frocent.com/jusdoors).	
		B	Product: M87(93) Electrically Operated Four-Fold Door. Model: (Select One: M87SGE or M93SGE / Standard Glazing, M87FGE or M93FGE / Full Glazing, M87SE or M93SE / Solid)
		C	Product: M87(93) Manual Operated Four-Fold Door. Model: (Select One: M87SGM or M93SGM / Standard Glazing, M87FGM or M93SGM / Full Glazing, M87SM or M93 SM)
2.2	**MATERIALS**		
A	Steel Tube: ASTM A513 and ASTM A500/A500M	Steel Tube: ASTM A513 and ASTM A500/A500M	
B	Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1008 cold-rolled steel sheet.	Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1011/ A1011M hot-rolled steel sheet.	
C	Hardware: Manufacturer's standard components.	Hardware: Manufacturer's standard components.	
D	Fasteners: Zinc-coated steel.	Fasteners: Zinc-coated steel.	

COMPARISON CONTINUED ON NEXT PAGE

	FF300	M93
2.3	**FOUR-FOLD DOORS**	
A	Construction: Door framing shall be minimum 11-gauge structural steel tube with 16-gauge steel sheet on the exterior and interior faces. Sheeting shall be formed on the vertical edges with no visible welds on the interior or exterior panel faces. All frames and framing members shall be true to dimension and square in all directions, and no door shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Exposed welds and welds which interfere with the installation of various parts shall be ground smooth and flush.	Sections: The door section frames shall be constructed from 3-inch thick tubular steel of minimum 11 ga thick wall, the frames shall be covered on both faces with 14 gauge thick formed steel sheets. Sections shall be true to dimensions and square in both planes. All exposed welds shall be ground smooth and flush and no section shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Sections shall be pre-drilled for assembling the hardware in the field
B	Surface Mounted Tube Frame: Supply prehung tube frame system constructed of minimum TS6x4x3/16", designed to anchor to masonry wall construction or weld to steel structure. All hinges, track supports and operator supports shall be factory attached.	Insulation (Option for M87SGE, M87SE, M93SGE or M93SE): Internal chambers of solid sections shall be pressure injected with CFC-free polyurethane closed cell foam.
C	Factory finish: Door Panels and Tube Frames shall be finished with manufacturer's standard PPG Spectracron epoxy primer and polyurethane top coat. Customer to select from Manufacturer's standard color chart or furnish sample to match.	Surrounding Frame: The surrounding frame shall include jambs and lintel fabricated from 6" x 3" structural tubular steel. The frames shall be factory prepared to receive the jamb hinges and hardware.
C.1	Operator and operating hardware shall be powder-coated manufacturer's standard gray.	
D	Hardware: Hardware shall include guide tracks and brackets, trolleys, center guides, not less than three pairs of jamb and fold hinges per opening, and all bolts, nuts, fasteners, etc. necessary for complete installation and operation.	
D.1	All hardware, including hinges and trolleys, shall be bolted to the panel for easy removal for service or panel replacement.	
D.2	Doors up to 16' wide and under 30psf windload shall require no floor mounted supports, guides or tracks.	
D.3	Top tracks shall be adjustable on the end track hangers to allow for adjustment of the door panels in the open position and easily replaceable without removal of the door framing or operators.	

COMPARISON CONTINUED ON NEXT PAGE

FF300		M93
E	Hinges: Jamb hinges shall be dual shear and have two thrust bearings and two needle bearings. Fold hinges shall be stainless steel and be dual shear with two thrust bearings. All bearings shall be completely concealed within the hinge barrel and include grease zerks. All hinge pins shall be minimum ¾" diameter hardened steel.	
F	Hinge Guards: Provide plastic guards at jamb hinges to prevent access through hinge space.	
G	Weatherstripping: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weatherstripping at center shall be 1/16" EPDM and include no exposed fasteners on the exterior side of the panel. Weatherstripping at sill shall include two 1/16" EPDM sweeps with an aluminum retainer. The retainer shall be attached to the door with adhesive.	
H	Perimeter Weatherstripping: Provide full perimeter jamb and head weatherstripping.	
I	Vision Panels: Provide 1" insulated, tempered, vision panels of the size, shape and location as noted on the drawings.	
2.3.1	**GLAZING/PANELING**	
	A	A. Raised Panels (Option for M87FGE or M93SE): Raised panels shall be installed with silicone base gaskets retained on the interior with extruded clear anodized aluminum retainers snapped over concealed retained clips. Visible fasteners on the door face are not acceptable.
	B	Solid Panels (Option for M87SE or M93SE): Internal chambers of solid sections shall be pressure injected with CFC-free polyurethane foam.
	C	Vision Panels (Option for M87SGE or M93SGE): Sections shall receive visions panels in shape and location indicated on the architectural drawings. The vision panels shall be made from of two (2) ¼" clear tempered glass with ½" air space providing 1" over all thickness.

COMPARISON CONTINUED ON NEXT PAGE

FF300		M93	
2.3.2	HARDWARE		
		A	Hardware: Hardware shall include guides, brackets, trolleys, end and center hinges, and necessary fasteners for complete installation and operation. All brackets shall be manufactured from steel not less than 1/4" thick and shall be bolted to the wall structure with minimum 3/8" fasteners.
		B	Door Track/Guides: The top guides shall be manufactured from heavy-gauge steel designed to support the leading sections for full travel.
		C	Guide Trolleys: Heavy-duty made from aluminum and have three wheels complete with ball bearings.
		D	Jamb Hinges: Heavy-duty type, incorporating the radial and thrust bearings designed to transmit the forces to the opening frame. The hinges shall be adjustable and to have removable pins for servicing.
		E	Intermediate Hinges: Black powder coated, made from aluminum, have dual shear pin complete with radial and thrust bearings. The hinges shall be of adjustable design to allow uniform gap and effective seal between sections.
		F	Weather seal: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weather seal at center shall be 1/16" cloth inserted neoprene and include no exposed fasteners on the exterior face of the panel. Weather seal at sill shall include two 1/16" cloth inserted neoprene sweeps with an aluminum retainer.
		G	Provide jamb and head weather seal of 1/16" cloth-inserted neoprene bulb (or closed cell neoprene

COMPARISON CONTINUED ON NEXT PAGE

FF300		M93	
2.3.3	FINISH		
		A	Factory Applied Polyurethane Industrial Finish: After fabrication, all exposed steel shall be finished with manufacturers standard factory applied epoxy primer and polyurethane finish coat. Color as selected by Architect from manufacturers range including but not limited to the RALK7 Index or Sherwin Williams Indexes. All hardware to be standard black finish.
		B	Factory Applied Powder Coat (Option): After fabrication, all exposed steel shall be powder-coated to match color from RALK7 Index standard solid color chart. All hardware to be standard black finish.

COMPARISON CONTINUED ON NEXT PAGE

	FF300	M93
2.4	**OPERATOR**	
A	Each Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation. Operator consists of an electric motor, gear reducer, and rotating drive arm. The door shall be operated with connecting rods attached to the rotating drive arm on the operator and to control arms attached to the jamb door section and to the door lintel. The connecting rods shall be positive drive, keeping the door under firm control at all times. The connecting rods shall be fitted with spherical bearings and control arms shall be equipped with oil impregnated bronze bearings on polished shafts.	Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation consisting of an electric motor with built-on frequency inverter coupled to worm gear reducer with integrated slipping clutch driving second stage worm gear reducer coupled to the torque arm, release mechanism for manual operation and limit switches.
B	Operator shall be instantly reversible, open and close rapidly and start and stop gradually. Operator shall be adjustable to allow door to fully clear the opening. Operator shall automatically lock the door in the closed position. Operator shall be equipped with disengaging mechanism to convert to manual operation.	Electro-mechanical drive complete shall be located in the middle above the opening. Power from the torque arm to the jamb sections shall be transmitted through linkage and heavy- duty push rods, all pivot joints shall have permanently lubricated thrust and radial bushings. Mechanism for manual operation shall be designed so that both sides to move simultaneously and the electric operation can be engaged or disengaged at any position and that limits shall remain synchronized with door position. Mechanism with two manual disconnects, without electrical interlock and that requires each side to move separately or does not allow manual/electrical operation from any position is not acceptable. Pulley and belt type drive mechanism is not acceptable.
C	Electric motor shall be of sufficient size to operate doors under normal operating conditions at no more than 75 percent of rated capacity. The motor shall be wound for three phase 208/230/480 VAC, 60 Hertz operation.	The drive mechanism shall be capable of operating each side at a speed of 12" per second, for a combined speed of 24" per second. The operator shall have electrically interlocked emergency disconnect lever designed to disconnect both sides from floor level.
D	Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, and built in accordance with the latest NEMA standards. Incoming electrical shall be (Choose One): 120VAC single phase, 208VAC single phase, 208/230VAC 3-phase, 480VAC 3-phase.	The controls shall be of inverter type with variable frequency drive and shall be housed in a NEMA 4 type control panel with disconnect switch. The electric operator and controls shall be UL listed. The operators shall be prewired and tested at the factory. Momentary type OPEN- CLOSE-STOP push buttons shall be located on the control panel.
		E — Electric operator shall be sized to operate doors at 75 percent capacity under normal operating conditions.

COMPARISON CONTINUED ON NEXT PAGE

	FF300	M93
2.4.1	**CONTROLS & SAFETY DEVICES**	
1	Control panel assemblies shall be UL listed as per NFPA70.	Controls shall include a programmable logic controller with digital message display or LED indicators. Controller shall include programmable close timers and programmable inputs/ outputs.
2	Controls shall include a programmable logic controller with digital message display. Controller shall include programmable close timers and programmable inputs/outputs.	Motor shall be controlled by frequency converter with overload and under voltage protection. Motor shall have integrated brake system. All control components shall be enclosed in motor housing unit with wiring diagram placed on inside panel.
3	Controls shall include a variable frequency drive with independent adjustment of the opening and closing speeds.	Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, built in accordance with the latest NEMA standards. Incoming electrical shall be (Choose One): 120VAC single phase, 208VAC single phase, 208/230VAC 3-phase, 480VAC 3- phase.
4	Enclosures shall be NEMA 4 with disconnect switch.	Control Panel: Enclosure shall be NEMA 4 with disconnect switch.
5	Pushbuttons (interior) for each door shall have one (1) momentary pressure three-button pushbutton station marked “OPEN”, “CLOSE” and “STOP”. Push button enclosure shall be NEMA 4.	Push buttons: Momentary pressure type three push buttons to OPEN, CLOSE and STOP the door shall be mounted on the control panel cover.
6	Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position.	Remote Push Button Station: (Option) Wall mountable NEMA 4, 3 buttons bush button station to OPEN, CLOSE and STOP the door.
7	Safety edges: Provide monitored electric safety edges on leading edge of all doors to reverse door upon contact with obstruction.	Keypad Entry: (Option) Single-Entry Multi-Function Access Controller with Integrated Keypad And Card Reader in Vandal-Resistant Metal Enclosure with a Sealed, Weatherproof Keypad.
8	Photo eyes: Provide (1) exterior, jamb mounted, light Curtain type photo eyes, NEMA 4 rated. Photo eye shall cover from floor level to 72” above floor.	Limit switches shall be provided to stop the travel of the door in its full open and full closed position.
9	Presence Sensor: Provide (1) interior, overhead mounted, presence sensor BEA IS40P or equal. Doors over 16’ tall shall include LZRWidescan or equal.	Safety edges: Provide electric safety edges on the leading edges designed to reverse the door closing in case it detects an obstruction.

COMPARISON CONTINUED ON NEXT PAGE

FF300		M93	
2.4.1	**CONTROLS & SAFETY DEVICES**		
10	Radio controls: Provide one (1) radio receiver and (1) single button remotes per door. Remotes to open and close doors with single button.	Exterior Photo eyes: Provide a jamb mounted, thru-beam type photo eyes, NEMA 4 rated. The photo eyes shall be wired to reverse the door to open position in case it detects an obstruction during the door closing.	
11	(Option) Timer Activation Loop Detectors (fire station applications): Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer. G.C. to coordinate installation of preformed loop with installer prior to exterior apron being poured.	Interior Photo eyes: (Option) Pedestal or Bollard mountable photo eyes can be wired as secondary opening or safety devise.	
12	(Option) Warning Horn/Strobe: Provide warning light and strobe. Include outputs PLC to allow for activation while door is in motion both opening and closing, along with activation prior to closing. Include programmable "delay-to-close" timer which activates the warning horn for a set time, prior to the door closing.	Interior Presence Sensor: Provide an overhead mounted BEA LZR-Widescan presence sensor with pre-open and pre-close safety fields.	
13	Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.	Exterior Presence Sensor: (Option) Provide an overhead mounted BEA LZRWidescan presence sensor.	
		14	Radio controls: (Option) Provide a radio receiver and SELECT ONE: (X) single button remotes per door or (X) three button remotes per door. Remotes to open and close doors with single button.
		15	Timer Activation Loop Detectors: (Option) Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared, include hand/ auto switch to deactivate timer. G.C. to coordinate installation of preformed loop with installer prior to pouring the concrete.
		16	Provide warning light and strobe. Include outputs PLC to allow for activation while door is in motion both opening and closing, along with activation prior to closing. Include programmable "delay-to-close" timer which activates the warning horn for a set time, prior to the door closing.
		17	Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

COMPARISON CONTINUED ON NEXT PAGE

FF300		M93	
Part 3	EXECUTION		
3.1	INSTALLATION		
A	Install Four-Fold metal doors in strict accordance with the approved drawings by qualified door erection crews. All door openings shall be completely prepared by the general contractor prior to the installation of the doors. Permanent or temporary electric wiring shall be brought to the door opening before installation is started and shall be completed so as not to delay the inspection test.	Four-fold door shall be installed in strict accordance with approved drawings by certified installer. Door rough opening shall be prepared by General Contractor prior to installation of door. Rough-in electrical shall be brought to door prior to installation as to avoid installation delays.	
B	Doors shall be set plumb, level, and square, and with all parts properly fastened and mounted. All moving parts shall be tested and adjusted and left in good operating condition.	Slab shall be poured cured and in place prior to installation.	
		C	Door shall be set plumb, leveled and square with all parts properly fastened and mounted. Door shall be tested and left in good operational order.
3.2	ADJUSTING AND CLEANING	TURNOVER	
A	Inspection of the doors and a complete operating test will be made by the installer in the presence of the general contractor or architect as soon as the erection is complete. Any defects noted shall be corrected. After door approval in the above test, the general contractor must assume the responsibility for any damage or rough handling of the doors during construction until the building is turned over to the owner and final inspection is made.	Door shall be inspected and operated by installer in presence of General Contractor and / or Architect upon completion of installation. Any noted defects shall be corrected and door turned over to General Contractor. Any damage following turnover to General Contractor prior to final turnover to owner, is the responsibility of the General Contractor.	
B	Clean surfaces and repaint abraded or damaged finished surfaces to match factoryapplied finish.	Complete Operation and Maintenance Manual & Warranty Certificate shall be provided by manufacturer at turnover of door.	

END OF SECTION

DAVIS KANE
ARCHITECTS, PA

SUBSTITUTION REQUEST FORM

Project: **Bear Creek Fire Station**		
Owner:		**Onslow County**
Owner ID No.:		**102-25C**
DKA Project No.:	2324	
Contractor:	Northstar Industriees (wholesaler – supply of trench drain)	Submitted by: Viviane Brownell
		Date: April 10, 2025

Product Name/Item as listed in specification: *Watts Dead Level D – DI Frame and E-load Galv Slotted Grate*	Specification section and paragraph: *3.5 Trench Drain Installation (TD-1 Trench Drain)*

Description of Substitution Product:
KF-100 with 8mm thk. ductile iron edge rails c/w E-load slotted ductile iron grates with Twistlock mechanism.

Name, Model Number, other information as required to enumerate product

Proposed cost impact: Y or N yes	Describe affect, if any on Construction Schedule: no

Supporting Data:
-Channel Data sheet and CAD
-Grate Data sheet
-Installation Instructions
-Levelling device instructions

List attached supporting data including drawings, cut sheets, samples, installation information, etc.

Affected trades:

List other trades that are affected by incorporation of this Substitution Product

The Undersigned certifies that the proposed Substitution:

1. Has been fully investigated and determined to provide evidential benefit to the Owner over the specified product. This includes, but is not limited to, durability, appearance and performance.
2. Will have the same or better warranty coverage and duration.

3. Will have the same or better maintenance and service requirements and availability of replacement parts.
4. Will have no adverse effect on other trades and will not negatively affect or delay progress schedule.
5. Will not diminish the effectiveness of any rated assembly or in any way affect any quality or function as it relates to code compliance.
6. Does not alter the design intent and/or functional requirements.
7. Does not require extensive modifications to the design or require extensive coordination.

The Undersigned certifies that the proposed substitution satisfies all of the requirements set forth in the Contract Documents and in this request.

Requesting Entity:

Submitter Representative Name: Viviane Brownell	Company: Northstar Industries
Signature:	Phone: 905-260-8175

Attachments:

Supporting Data:
-Channel Data sheet and CAD
-Grate Data sheet
-Installation Instructions
-Levelling device instructions

Architect's or Engineer's Action:

- ☐ Substitution approved as submitted.
- ☐ Substitution approved as noted.
- ☒ Substitution rejected.
- ☐ Pre-Bid Substitution Request not submitted in proper timeframe – Action on request not permitted.
- ☐ Substitution Request not submitted with sufficient documentation to process. Contractor may choose to resubmit with fully-required documentation.

Notes:

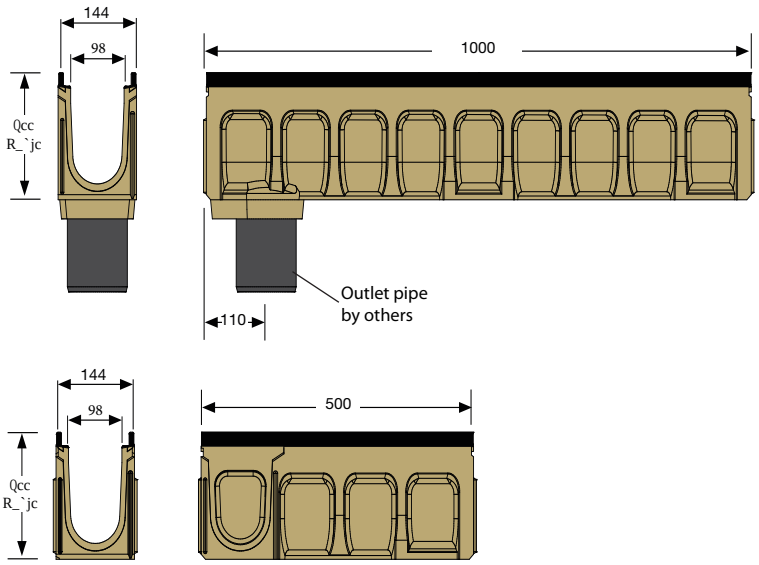
Submitted product is ductile iron grates; specifications call for reinforced galvanized ductile iron grates. Documentation does not indicate H-20 compliance or list an ANSI load rating. The submitted product has 40" lengths whereas the specified product has 48" lengths.

Designer Representative:	Bradley McClung, AIA NCARB
Signature: 	Date: 04.21.25

Technical Data Sheet

ANRIN DRAIN KF-100 Reinforced Edge Channels
with Cast Iron Edge Rail (Loading Class A15 to F900)

Channel Dimensions



Material Properties

Channel Body

- Polymer concrete with polyester resin
- Compression resistance: > 90 N/mm²
- Flexural strength: > 22 N/mm²
- Water absorption: < 0.05%
- Density: 2.1 - 2.3 kg/dm³
- Modulus of elasticity: 25 - 35 kN/mm²
- Water penetration level: 0 mm
- Material structure: Capillary free
- Heat resistance: 100°C (permanent loading)
- Frost resistance: - 50°C
- Water absorption: 0.05%

Edge Rail

- Cast Iron, factory-installed Profile
- Thickness 8 mm

Grating

- Galvanized steel
- 304 stainless steel
- Ductile iron
- Polyamide Plastic
- Iron Age Patterned Profiles
- Custom grates available upon request.

Description and Sizes

- Designed in accordance with DIN 19580 / EN 1433.
- Drainage channel made of polymer concrete.
- Integrated cast iron edge rails.
- Half-meter channel with knockout patterns for T-junctions, elbow joints, cross junctions.
- UNILINK joint system, elements of equal installation heights can be joined in any direction.
- Fall type: Built-in slope (0.5%)
- Loading classes: A15 to F900
- Total height: 150 – 250 mm (see table)
- Total width: 144 mm
- Length: 500 mm and 1000 mm

Toll Free: 877-385-5130
www.northstarindustries.ca

Technical Data Sheet

ANRIN DRAIN KF-100 Reinforced Edge Channels
with Cast Iron Edge Rail (Loading Class A15 to F900)

NORTHSTAR INDUSTRIES

ANRIN

KF-100 Channel Parts List

Designation	Article	Slope %	Length mm (in)	Width mm (in)	Height mm (in)	Weight kg (lbs.)
KF-100-0*	01600000	0	1000 (39.37)	144 (5.67)	150-150 (5.91-5.91)	19.4 (42.78)
KF-100-0R***	01600410	0	1000 (39.37)	144 (5.67)	150-150 (5.91-5.91)	19.6 (43.22)
KF-100-005**/*	01600450	0	500 (19.69)	144 (5.67)	150-150 (5.91-5.91)	10.5 (23.15)
KF-100-1	01600010	0.5	1000 (39.37)	144 (5.67)	150-155 (5.91-6.10)	19.7 (43.44)
KF-100-2	01600020	0.5	1000 (39.37)	144 (5.67)	155-160 (6.10-6.30)	20.0 (44.10)
KF-100-3	01600030	0.5	1000 (39.37)	144 (5.67)	160-165 (6.30-6.50)	20.3 (44.76)
KF-100-4	01600040	0.5	1000 (39.37)	144 (5.67)	165-170 (6.50-6.69)	20.6 (45.42)
KF-100-5*	01600050	0.5	1000 (39.37)	144 (5.67)	170-175 (6.69-6.89)	20.9 (46.08)
KF-100-05*	01600500	0	1000 (39.37)	144 (5.67)	175-175 (6.89-6.89)	21.0 (46.31)
KF-100-05R***	01600510	0	1000 (39.37)	144 (5.67)	175-175 (6.89-6.89)	21.2 (46.75)
KF-100-055**/*	01600550	0	500 (19.69)	144 (5.67)	175-175 (6.89-6.89)	11.5 (23.36)
KF-100-6	01600060	0.5	1000 (39.37)	144 (5.67)	175-180 (6.89-7.09)	21.2 (46.75)
KF-100-7	01600070	0.5	1000 (39.37)	144 (5.67)	180-185 (7.09-7.28)	21.5 (47.41)
KF-100-8	01600080	0.5	1000 (39.37)	144 (5.67)	185-190 (7.28-7.48)	21.8 (48.07)
KF-100-9	01600090	0.5	1000 (39.37)	144 (5.67)	190-195 (7.48-7.68)	22.1 (48.73)
KF-100-10*	01600100	0.5	1000 (39.37)	144 (5.67)	195-200 (7.68-7.87)	22.2 (48.95)
KF-100-010*	01601000	0	1000 (39.37)	144 (5.67)	200-200 (7.87-7.87)	22.2 (48.95)
KF-100-010R***	01601010	0	1000 (39.37)	144 (5.67)	200-200 (7.87-7.87)	23.0 (50.72)
KF-100-0105**/*	01601050	0	500 (19.69)	144 (5.67)	200-200 (7.87-7.87)	12.4 (27.34)
KF-100-11	01600110	0.5	1000 (39.37)	144 (5.67)	200-205 (7.87-8.07)	22.5 (49.61)
KF-100-12	01600120	0.5	1000 (39.37)	144 (5.67)	205-210 (8.07-8.27)	23.0 (50.72)
KF-100-13	01600130	0.5	1000 (39.37)	144 (5.67)	210-215 (8.27-8.46)	23.5 (51.82)
KF-100-14	01600140	0.5	1000 (39.37)	144 (5.67)	215-220 (8.46-8.66)	23.5 (51.82)
KF-100-15*	01600150	0.5	1000 (39.37)	144 (5.67)	220-225 (8.66-8.86)	24.5 (54.02)
KF-100-16	01600160	0.5	1000 (39.37)	144 (5.67)	225-230 (8.86-9.06)	25.0 (55.13)
KF-100-17	01600170	0.5	1000 (39.37)	144 (5.67)	230-235 (9.06-9.25)	25.0 (55.13)
KF-100-18	01600180	0.5	1000 (39.37)	144 (5.67)	235-240 (9.25-9.45)	25.5 (56.23)
KF-100-19	01600190	0.5	1000 (39.37)	144 (5.67)	240-245 (9.45-9.65)	26.0 (57.33)
KF-100-20*	01600200	0.5	1000 (39.37)	144 (5.67)	245-250 (9.65-9.84)	26.5 (58.43)
KF-100-020*	01602000	0	1000 (39.37)	144 (5.67)	250-250 (9.84-9.84)	27.5 (60.64)
KF-100-020R***	01602010	0	1000 (39.37)	144 (5.67)	250-250 (9.84-9.84)	27.5 (60.64)
KF-100-0205**/*	01602050	0	500 (19.69)	144 (5.67)	250-250 (9.84-9.84)	13.2 (29.11)

* Channel with mouldings for vertical outlet DA/OD 110
** Channel with side knockouts for the connection of t-junctions, elbow joints and cross- over joints and vertical outlet
*** Channel with vertical pipe socket DA/OD 110

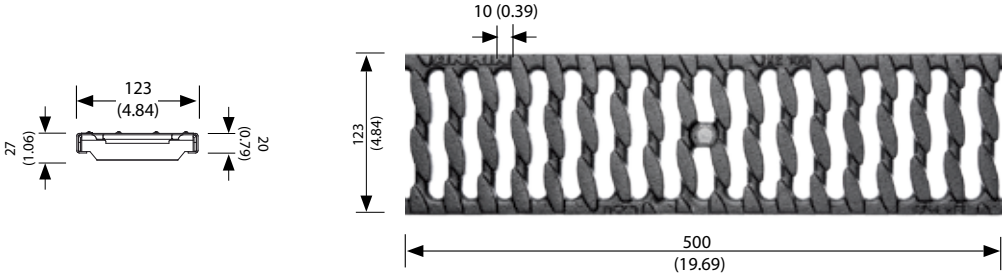
Toll Free: 877-385-5130
www.northstarindustries.ca

Technical Data Sheet

ANRIN DRAIN Cover Grating for KE/KF-100 Series

Slotted Ductile Iron Grating with OvalGrip Design (Load Class E600)

Grating Dimensions



Grating Specifications

Designation	Article	Length mm (in)	Width mm (in)	Intake Area cm^2/m (in^2/ft)	Weight kg (lbs.)
Slotted Ductile Iron Grating with OvalGrip Design (E600*)	01005120	500 (19.69)	123 (4.84)	420 (22.68)	5.0 (11.02)

*Exception: Cross-road drainage of busy roads

TwistLock Fastening

The TwistLock fastening system is used for grating types of channels with a nominal width of 100 mm (3.93 in).

Toll Free: 877-385-5130
www.northstarindustries.ca

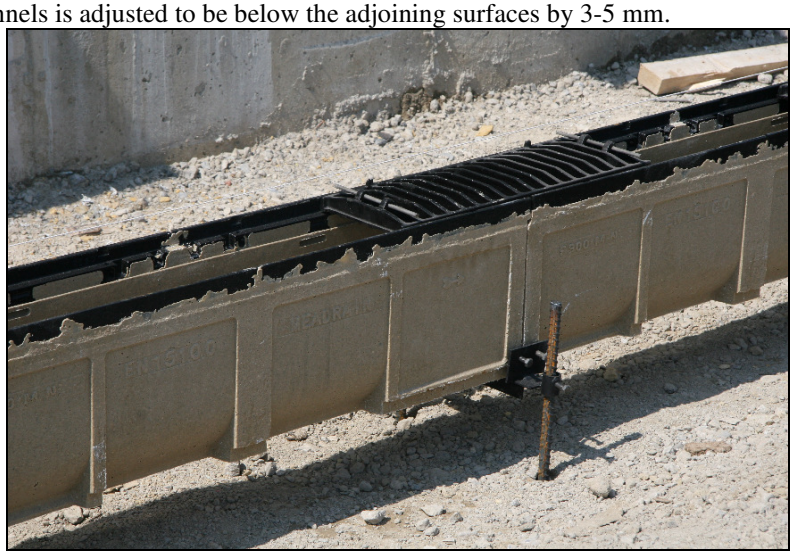
Toll Free 1-877-385-5130
www.northstarindustries.ca

Leveling Devices

Northstar Industries leveling devices provide additional trench channel support during installation, reducing labour and easing the process of channel alignment prior to the first pour of concrete.

Northstar Industries leveling devices do not replace the requirement to follow ANRIN installation instructions as provided with your shipping documents, included in your ANRIN binder and available on our website at http://northstarindustries.ca

Per the ANRIN Installation Instructions, a string line and/or laser level is used to align the channels lengthwise and the height of the channels is adjusted to be below the adjoining surfaces by 3-5 mm.



Installation devices are used at every channel section joint to support the channels on vertical rebar supports (not included) as shown.

Per ANRIN installation instructions, all joints must be sealed progressively during the installation using a one part polyurethane sealant. The channel bodies must be braced against compression by outside lateral forces during the concrete pour using wood or the channel grates.

Below is an installation showing specified additional rebar reinforcement and Northstar Industries leveling devices.

After completion of first pour.

SUBSTITUTION REQUEST
(During the Bidding Phase)

Project: Bear Creek Fire Station

Substitution Request Number:

From: National Power

To: General Contractor

Date: 4/14/2025

A/E Project Number:

Re: J.E. Hibbs - Robert Hibbs

Bid Package: Onslow County Bid No. 102-25-C

Specification Title Packaged Engine Generator

Description:

Section: 26 32 13 Page: 725-743

Article/Paragraph: Drawing:

Proposed Substitution: Generac SD200

Manufacturer: Generac Address: P.O. Box 8 Waukesha WI 53189 Phone: 262-544-4811

Trade Name: Packaged Engine Generator Model No.: SD200

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all aspects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution must have no adverse effect on other trades and must not affect or delay progress schedule.
- Proposed substitution must not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Duncan Leach, National Power
Signed by:
Firm:
Address: 4541 Preslyn Dr. Raleigh NC 27616

Telephone: 919.815.4252

Generac generator is acceptable as long as they meet all provisions of the specifications.

•Generac transfer switches are not approved.

•Standard enclosure data provided would not be acceptable if steel. Aluminum enclosure is acceptable if configured with peaked or sloped roof.

Supporting Data Attached:

- ☐ Change Orders
- ☐ Drawings
- ☒ Product Data
- ☐ Samples
- ☐ Tests
- ☐ Reports
- ☒ Other

A/E's REVIEW AND ACTION

- ☐ Substitution approved – Make submittals in accordance with Specification Section 01 60 00
- ☑ Substitution approved as noted – Make submittals in accordance with Specification Section 01 60 00
- ☐ Substitution rejected – Use specified materials.
- ☐ Substitution Request received too late – Use specified materials.

Signed by: _____ Date: 04.21.25

NATIONAL POWER

Smarter, nonstop power.

April 14, 2025

Cheatham and Associates, P.A.
Attn: Mark A. Ciarrocca
3412 Enterprise Drive
Wilmington, NC 28405

Re: Onslow County Bear Creek Fire Station

Dear Mr. Ciarrocca:

This letter is regarding the inclusion of Generac as a substitute for the Bear Creek Fire Station in Onslow County

The National Power Sales Team request that you consider allowing Generac as an acceptable substitute for the manufacturers listed on Generator Specifications (Section 263213). Please see below for details regarding National Power and Generac Corporation.

As a brief background:

National Power and Generac:

- National Power was incorporated in 1989 and is an LLC with headquarters in Raleigh NC and a South Carolina office/warehouse located at 7733 Park Place Rd York, SC. As of year-end inventory in December we had over $1,200,000 worth of parts and equipment in our York Warehouse / Service Center.
- National Power has over 500 employees and has over 16,000 generators currently under PM service contracts.
- National Power is the Exclusive Industrial Distributor for Generac Industrial Power Systems for NC and SC.
- National Power currently has over 60 factory certified generator technicians in the Carolinas, including 9 master certified technicians, for technical support in NC and SC. These resident technicians are dispersed throughout the territory to maximize service coverage and minimize travel time to work sites.
- www.natpow.com

Below are a few bullet points about Generac:

- Generac Industrial Power Systems has been in business since 1959 and focused primarily on power systems.
- Generac Industrial Power Systems is a publicly traded company with a Market Capital value of ~$8B.
- All US sold equipment is manufactured in Wisconsin and 'Buy America' and 'Buy American' certified.
- ISO9001 Certified Manufacturer.
- Generac manufacturers generators from 10kW -3,250kW.
- Generac manufactures open transition, closed transition, bypass isolation and service rated automatic transfer switches up to 5000A.
- Generac fully manufacturers and private labels generator sets for one of the approved manufacturers.
- Generac is an over $8 Billion market cap company
- Generac is the 2nd largest manufacturer of industrial generators in North America.

Our South Carolina office & warehouse is located at 7733 Park Place Road in York, SC. This is where we currently maintain over $1.2M in parts and equipment. We also have many service and sales representatives who work out of this location.

Regards,

Duncan Leach

Duncan Leach
Senior Power Consultant
National Power
919-815-4252

SD200 | 8.7L | 200 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC INDUSTRIAL ENERGY

Standby Power Rating
200 kW, 250 kVA, 60 Hz

Prime Power Rating*
180 kW, 225 kVA, 60 Hz

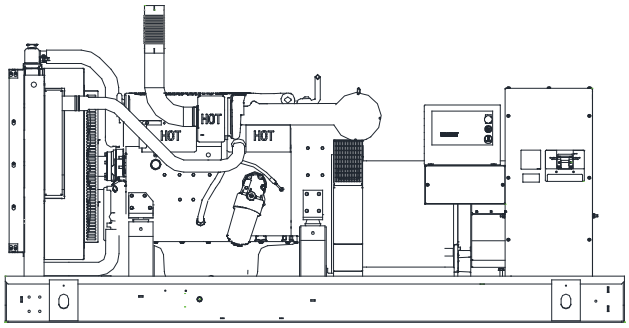


Image used for illustration purposes only

USA ENGINEERED & BUILT*

*Assembled in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the US or its Territories.

Codes and Standards

Generac products are designed to the following standards:.

UL2200, UL6200, UL1236, UL489, UL142

CSA C22.2, ULC S601, 1-1/4

BS5514 and DIN 6271

SAE J1349

NFPA 37, 70, 99, 110

NEC700, 701, 702, 708

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

Powering Ahead

For over 60 years, Generac has provided innovative design and superior manufacturing.

Generac provides superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally for the most reliable engines to power our generators. We choose only engines that have already been proven in heavy-duty industrial applications under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

SD200 | 8.7L | 200 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC INDUSTRIAL ENERGY

STANDARD FEATURES

ENGINE SYSTEM
- Oil Drain Extension
- Air Cleaner
- Stainless Steel Flexible Exhaust Connection
- Factory Filled Oil
- Radiator Duct Adapter (Open Set Only)
- Critical Silencer (Enclosed Only)

FUEL SYSTEM
- Fuel Lockoff Solenoid
- Primary Fuel Filter

COOLING SYSTEM
- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene Glycol Antifreeze
- 120 VAC Coolant Heater

ELECTRICAL SYSTEM
- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ALTERNATOR SYSTEM
- GENprotect™
- 12 Leads (3-Phase, Non 600V)
- Class H Insulation Material
- Vented Rotor
- 2/3 Pitch
- Skewed Stator
- Auxiliary Voltage Regulator Power Winding
- Permanent Magnet Excitation
- Sealed Bearings
- Automated Manufacturing (Winding, Insertion, Lacing, Varnishing)
- Rotor Dynamically Spin Balanced
- Amortisseur Winding
- Full Load Capacity Alternator
- Protective Thermal Switch

GENERATOR SET
- Internal Genset Vibration Isolation
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Wrapped Exhaust Piping
- Standard Factory Testing
- 2 Year Extended Limited Warranty (Standby Rated Units)
- 1 Year Extended Limited Warranty (Prime Rated Units)
- Silencer Mounted in the Discharge Hood (Enclosed Only)

ENCLOSURE (IF SELECTED)
- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (Sound Attenuated Enclosures)
- Gasketed Doors
- Stamped Air-Intake Louvers
- Upward Facing Discharge Hoods (Radiator and Exhaust)
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- RhinoCoat™ - Textured Polyester Powder Coat Paint

TANKS (IF SELECTED)
- UL 142
- Double Wall
- Vents
- Sloped Top
- Sloped Bottom
- Factory Pressure Tested - 2 psi
- Rupture Basin Alarm
- Fuel Level
- Check Valve In Supply and Return Lines
- RhinoCoat™ - Textured Polyester Powder Coat Paint
- Stainless Steel Hardware

CONTROL SYSTEM

Digital H Control Panel- Dual 4x20 Display

Program Functions
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable Logic Controller
- RS-232/485 Communications
- All Phase Sensing Digital Voltage Regulator
- 2-Wire Start Capability
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/Sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus® Protocol
- Predictive Maintenance Algorithm
- Sealed Boards
- Password Parameter Adjustment Protection
- Single Point Ground
- 16 Channel Remote Trending
- 0.2 msec High Speed Remote Trending
- Alarm Information Automatically Annunciated on the Display

Full System Status Display
- Power Output (kW)
- Power Factor
- kW Hours, Total, and Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency

Alarms and Warnings
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Overspeed
- Battery Voltage
- Alarms and Warnings Time and Date Stamped
- Snap Shots of Key Operation Parameters During
- Alarms and Warnings
- Alarms and Warnings Spelled Out (No Alarm Codes)

SD200 | 8.7L | 200 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC INDUSTRIAL ENERGY

CONFIGURABLE OPTIONS

ENGINE SYSTEM
- Oil Make-Up System
- Oil Heater
- Industrial Exhaust Silencer (Open Set Only)

FUEL SYSTEM
- Flexible Fuel Lines
- Primary Fuel Filter

ELECTRICAL SYSTEM
- 10A UL Battery Charger
- 2.5 A Battery Charger
- Battery Warmer

ALTERNATOR SYSTEM
- Alternator Upsizing
- Anti-Condensation Heater
- Tropical Coating

CIRCUIT BREAKER OPTIONS
- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breakers

GENERATOR SET
- Gen-Link Communications Software (English Only)
- Extended Factory Testing
- IBC Seismic Certification
- 12 Position Load Center

ENCLOSURE
- Standard Enclosure
- Level 1 Sound Attenuation
- Level 2 Sound Attenuation
- Level 2 Sound Attenuation with Motorized Dampers
- Steel Enclosure
- Aluminum Enclosure
- Up to 200 MPH Wind Load Rating (Contact Factory for Availability)
- AC/DC Enclosure Lighting Kit

TANKS (Sizes On Last Page)
- Electric Fuel Level
- Mechanical Fuel Level
- 8 in (203.2 mm) Fill Extension
- 13 in (330.2 mm) Fill Extension
- 19 in (482.2 mm) Fill Extension

CONTROL SYSTEM
- 21-Light Remote Annunciator
- Remote Relay Assembly (8 or 16)
- Oil Temperature Sender with Indication Alarm
- Remote E-Stop (Break Glass-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Flush Mount)
- 10A Engine Run Relay
- Ground Fault Indication and Protection Functions

WARRANTY (Standby Gensets Only)
- 2 Year Extended Limited Warranty
- 5 Year Extended Limited Warranty
- 7 Year Extended Limited Warranty
- 10 Year Extended Limited Warranty

ENGINEERED OPTIONS

ENGINE SYSTEM
- Coolant Heater Ball Valves
- Fluid Containment Pans
- Block Heater

CONTROL SYSTEM
- Spare Inputs (x4)/Outputs (x4)
- Battery Disconnect Switch

ALTERNATOR SYSTEM
- 3rd Breaker System

GENERATOR SET
- Special Testing

ENCLOSURE
- Door Switch for Intrusion Alarm
- Enclosure Ambient Heaters

TANKS
- Overfill Protection Valve
- UL2085 Tank
- ULC S-601 Tank
- Special Fuel Tanks
- Vent Extensions

SD200 | 8.7L | 200 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC INDUSTRIAL ENERGY

APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Iveco/FPT
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Reference	See Emission Data Sheet
Cylinder #	6
Type	In-line
Displacement - L (in^3)	8.7 (530.91)
Bore - mm (in)	117 (4.61)
Stroke - mm (in)	135 (5.31)
Compression Ratio	16.5:1
Intake Air Method	Turbocharged/Aftercooled
Cylinder Head	4–Valve
Piston Type	Aluminum
Crankshaft Type	Dropped Forged Steel

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full-Flow
Crankcase Oil Capacity - L(qts)	28.0 (29.6)

Cooling System

Cooling System Type	Closed
Water Pump Type	Pre-Lubed, Self Sealing
Fan Type	Pusher
Fan Speed - RPM	2,538
Fan Diameter - mm (in)	762 (30)

Fuel System

Fuel Type	Ultra Low Sulfur Diesel Fuel #2
Fuel Specifications	ASTM
Fuel Filtering (Microns)	5
Fuel Inject Pump Make	Electronic
Fuel Pump Type	Engine Driven Gear
Injector Type	Common Rail
Engine Type	Direct Injection
Fuel Supply Line - mm (in)	12.7 (0.5) NPT
Fuel Return Line - mm (in)	12.7 (0.5) NPT

Engine Electrical System

System Voltage	24 VDC
Battery Charger Alternator	Standard
Battery Size	See Battery Index 0161970SBY
Battery Voltage	(2) -12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	Generac 520 mm
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5% (3-Phase)
Telephone Interference Factor (TIF)	<50
Standard Excitation	Permanent Magnet Excitation
Bearings	Single Sealed Cartridge
Coupling	Direct via Flexible Disc
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

SD200 | 8.7L | 200 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC INDUSTRIAL ENERGY

OPERATING DATA

POWER RATINGS - DIESEL

		Standby
Three-Phase 120/208 VAC @0.8p	200 kW	Amps: 833
Three-Phase 120/208 VAC @0.8pf	200 kW	Amps: 694
Three-Phase 120/240 VAC @0.8pf	200 kW	Amps: 601
Three-Phase 277/480 VAC @0.8pf	200 kW	Amps: 301
Three-Phase 346/600 VAC @0.8pf	200 kW	Amps:241

MOTOR STARTING CAPABILITIES (SKVA)

skVA vs. Voltage Dip

	277/480 VAC								208/240 VAC							
Alternator	kW	10%	15%	20%	25%	30%	35%	Alternator	kW	10%	15%	20%	25%	30%	35%
Standard	200	187	280	373	467	560	653	Standard	200	140	210	280	350	420	490
Upsize 1	300	303	454	605	757	908	1,059	Upsize 1	300	277	277	454	568	681	794
Upsize 2	350	383	575	767	958	1,150	1,342	Upsize 2	350	280	410	535	640	770	900

FUEL CONSUMPTION RATES*

Fuel Pump Lift - ft (m)
3 (1)

Total Fuel Pump Flow (Combustion + Return) - gph (Lph)
26 (98)

Diesel - gph (Lph)

Percent Load	Standby
25%	4.4 (16.7)
50%	8.3 (31.4)
75%	11.9 (45)
100%	14.8 (56)

*Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby
Coolant Flow	gpm (Lpm)	63.3 (240.0)
Coolant System Capacity	gal (L)	12.7 (49.2)
Heat Rejection to Coolant	BTU/hr	545,646
Inlet Air	cfm (m^3/hr)	8,872 (251)
Maximum Operating Ambient Temperature	°F (°C)	120 (50)
Maximum Operating Ambient Temperature (Before Derate)	See Bulletin No. 0199280SSD	
Maximum Radiator Backpressure	in H2O (kPa)	0.5 (0.12)

COMBUSTION AIR REQUIREMENTS

	Standby
Flow at Rated Power - cfm (m^3/min)	595 (16.8)

ENGINE

		Standby
Rated Engine Speed	RPM	1,800
Horsepower at Rated kW**	hp	320
Piston Speed	ft/min	1,593
BMEP	psi	265

**Refer to “Emissions Data Sheet” for maximu)m bHP for EPA and SCAQMD permitting purposes.

EXHAUST

		Standby
Exhaust Flow (Rated Output)	cfm (m^3/min)	1,345 (38.1)
Maximum Allowable Backpressure (Post Silencer)	inHg (kPa)	1.5 (5.1)
Exhaust Temperature (Rated Output Post Silencer)	°F (°C)	920 (493)

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.
Please contact a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with BS5514 and DIN6271 standards.
Standby - See Bulletin 0187500SSB
Prime - See Bulletin 0187510SSB

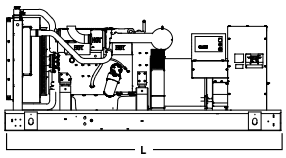
SD200 | 8.7L | 200 kW

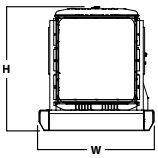
INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC INDUSTRIAL ENERGY

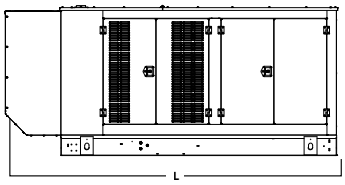
DIMENSIONS AND WEIGHTS*

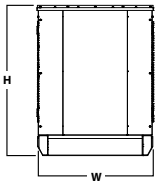




OPEN SET (Includes Exhaust Flex)

Run Time - Hours	Usable Capacity - gal (L)	L x W x H - in (mm)	Weight - lbs (kg)
No Tank	-	128 (3,251) x 54 (1,372) x 58 (1,473)	4,465 (2,025))
10	153 (579)	128 (3,251) x 54 (1,372) x 71 (1,803)	5,470 (2,481)
25	372 (1,408)	128 (3,251) x 54 (1,372) x 83 (2,108))	5,892 (2,673)
40	589 (2,230)	128 (3,251) x 54 (1,372) x 95 (2,413)	6,309 (2,862)
47	693 (2,623)	136 (3,454) x 54 (1,372) x 95 (2,413)	6,060 (2,749)
64	946 (3,581)	208 (5,283) x 54 (1,372) x 99 (2,515)	7,490 (3,397)
90	1,325 (5,016)	278 (7,061) x 54 (1,372) x 99 (2,515)	8,505 (3,858)





LEVEL 0 SOUND ATTENUATED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	155 (3,937) x 54 (1,372) x 70 (1,778)	941 (427)	474 (215)
10	153 (579)	155 (3,937) x 54 (1,372) x 83 (2,108)		
25	372 (1,408)	155 (3,937) x 54 (1,372) x 95 (2,413)		
40	589 (2,230)	155 (3,937) x 54 (1,372) x 107 (2,718)		
47	693 (2,623)	155 (3,937) x 54 (1,372) x 107 (2,718)		
64	946 (3,581)	208 (5,283) x 54 (1,372) x 111 (2,819)		
90	1,325 (5,016)	278 (7,061) x 54 (1,372) x 111 (2,819)		

* All measurements are approximate and for estimation purposes only. Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings. Extended and not extended tank offerings vary. Contact dealer for options.

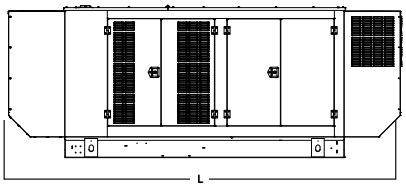
SD200 | 8.7L | 200 kW

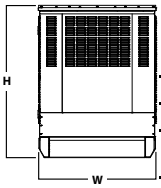
INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC INDUSTRIAL ENERGY

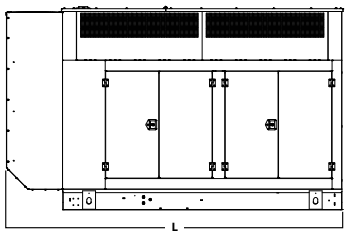
DIMENSIONS AND WEIGHTS*

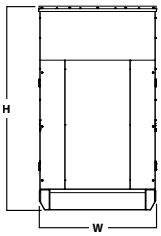




LEVEL 1 SOUND ATTENUATED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	180 (4,572) x 54 (1,372) x 70 (1,778)	1,246 (565)	606 (275)
10	153 (579)	180 (4,572) x 54 (1,372) x 83 (2,108)		
25	372 (1,408)	180 (4,572) x 54 (1,372) x 95 (2,413)		
40	589 (2,230)	180 (4,572) x 54 (1,372) x 107 (2,718)		
47	693 (2,623)	180 (4,572) x 54 (1,372) x 107 (2,718)		
64	946 (3,581)	234 (5,944) x 54 (1,372) x 111 (2,819)		
90	1,325 (5,016)	304 (7,722) x 54 (1,372) x 111 (2,819)		





LEVEL 2 SOUND ATTENUATED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	155 (3,937) x 54 (1,372) x 93 (2,362)	1,482 (672)	708 (321)
10	153 (579)	155 (3,937) x 54 (1,372) x 106 (2,692)		
25	372 (1,408)	155 (3,937) x 54 (1,372) x 118 (2,997)		
40	589 (2,230)	155 (3,937) x 54 (1,372) x 130 (3,302)		
47	693 (2,623)	155 (3,937) x 54 (1,372) x 130 (3,302)		
64	946 (3,581)	208 (5,283) x 54 (1,372) x 132 (3,353)		
90	1,325 (5,016)	278 (7,061) x 54 (1,372) x 132 (3,353)		

* All measurements are approximate and for estimation purposes only. Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings. Extended and not extended tank offerings vary. Contact dealer for options.

SPEC SHEET

Part No. 0K5097
Rev. D 03/24/2025

F O R M OF P R O P O S A L

Bear Creek Fire Station

Onslow County

Contract:_____

Bidder: _____

Date:_____

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The bidder further declares that he has examined the site of the work and the contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed. The bidder further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

The Bidder proposes and agrees if this proposal is accepted to contract with ***Onslow County*** in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of Bear Creek Fire Station in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of Onslow County and Davis Kane Architects PA, with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the contract documents. The low Bidder will be determined by the total cost of the Contract with the lump sum prices if the alternates accepted being added to or deducted from the Base Bid to give the total cost of the Contract. Bidders are required to be licensed and in good standing with their respective North Carolina Licensing Board.

SINGLE PRIME CONTRACT:

Base Bid:

_____Dollars($)_____

General Subcontractor:

_____Lic_____

Plumbing Subcontractor:

_____Lic_____

Mechanical Subcontractor:

_____Lic_____

Electrical Subcontractor:

_____Lic_____

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor.

GENERAL CONSTRUCTION CONTRACT:

Base Bid:

_____ Dollars($)

PLUMBING CONTRACT:

Base Bid:

_____ Dollars($)

HEATING, VENTILATION AND AIR CONDITIONING CONTRACT:

Base Bid:

_____ Dollars($)

ELECTRICAL CONTRACT:

Base Bid:

_____ Dollars($)

ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (Strike out "Add" or "Deduct" as appropriate.)

GENERAL CONTRACT:

Alternate A-1:

(Add) _____ Dollars($)

Alternate A-2:

(Add) _____ Dollars($)

Alternate C-1:

(Add) _____ Dollars($)

Alternate C-2:

(Add) _____ Dollars($)

Alternate G-1:

(Add) _____ Dollars($)

Alternate G-2:

(Add) _____ Dollars($)

Alternate M-1:

(Add) _____ Dollars($)

UNIT PRICES

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the base bid and quantity of the work all in accordance with the contract documents.

GENERAL CONTRACT:

No. C1	Rock removal and disposal off site	cubic yard	Unit Price ($)
No. C2	Unsuitable soils removal and disposal on-site	cubic yard	Unit Price ($)
No. C3	Unsuitable soils removal and disposal off-site	cubic yard	Unit Price ($)
No. C4	Replacement of removed rock or unsuitable soils with on-site suitable soil in-place	cubic yard	Unit Price ($)
No. C5	Replacement of removed rock or unsuitable soils with off-site suitable soil in-place	cubic yard	Unit Price ($)
No. C6	Replacement of removed rock or unsuitable soils with Aggregate Base Course in-place.	cubic yard	Unit Price ($)
No. C7	Replacement of removed rock or unsuitable soils with No. 57 washed stone in-place	cubic yard	Unit Price ($)
No. C8	Woven Geo-Textile Fabric in-place	square yard	Unit Price ($)
No. C9	Biaxial Geo-Grid in-place	square yard	Unit Price ($)
No. A1	Duplex receptacle	each	Unit Price ($)
No. A2	Communication outlet	each	Unit Price ($)
No. A3	Exit sign	each	Unit Price ($)
No. A4	Fire alarm annunciating device	each	Unit Price ($)
No. A5	Fire alarm initiating device	each	Unit Price ($)

The bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order of the designer and shall fully complete all work thereunder within the time specified in the Supplementary General Conditions Article 23. Applicable liquidated damages amount is also stated in the Supplementary General Conditions Article 23.

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit minority participation in the bid effort.

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (**B)** to that effect in lieu of Affidavit (**A)** required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

*** OR ***

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

Note: Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit A **or** Affidavit B, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid.

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned. No proposal may be withdrawn after the scheduled closing time for the receipt of Bids for a period of sixty (60) days.

Respectfully submitted this day of _____

_____
(Name of firm or corporation making bid)

WITNESS:

_____
(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

_____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5 _____ Addendum No. 6 _____

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 7 _____

ECS Southeast, LLC

Geotechnical Engineering Report

Onslow County Bear Creek Fire Station

Old Sand Ridge Road
Hubert, Onslow County, North Carolina

ECS Project No. 22:34438

April 9, 2024

April 9, 2024

Mr. Alexandre Penegre, AIA
Davis Kane Architects, PA
503 Oberlin Road, Suite 300
Raleigh, North Carolina 27605

ECS Project No. 22:34438

Reference: Geotechnical Engineering Report
Onslow County Bear Creek Fire Station
Old Sand Ridge Road
Hubert, Onslow County, North Carolina

Dear Mr. Penegre:

ECS Southeast, LLC (ECS) has finished the subsurface exploration and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and our design and construction recommendations.

It has been our pleasure to be of service during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions encountered in the exploration for this report. Should you have questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Southeast, LLC
NC Firm No. F-1519

Caitlin M Cerza

Caitlin Cerza
Geotechnical Project Manager
CCerza@ecslimited.com

DocuSigned by:
Winslow Goins
2D745DA276044AF...

Winslow Goins, PE
Principal Engineer
WGoins@ecslimited.com

DocuSigned by:

NORTH CAROLINA PROFESSIONAL SEAL 033751 ENGINEER WINSLOW E. GOINS

4/9/2024

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the executive summary should not be utilized in lieu of reading the geotechnical report.

- The geotechnical exploration performed for the site included eight (8) electronic cone penetration test (CPT) soundings drilled to termination depths of approximately 30 to 50 feet. Additionally, eight (8) hand augers with Kessler DCPs were performed in the proposed pavement areas.

- Provided subgrades are prepared as discussed herein, the proposed building foundations can be supported by conventional shallow foundations. The allowable bearing capacity for the soil on site is 1,500 psf.

- Due to the near surface loose SANDS (SC) encountered in the soundings and borings, ECS recommends in-place densification with a vibratory roller prior to construction of pavements and foundations on site.

- Due to the loose and soft soils encountered in the soundings, we anticipate undercutting between 2 and 4 feet and backfilling in the vicinity of the apparatus bay side of the structure, prior to the construction of foundations.

- If site earthwork is performed during the typically cooler, wetter months of the year, additional undercutting is anticipated due to excessively wet unstable soils.

- Groundwater was encountered in the sounding at depths ranging from approximately 4.9 to 6.33 feet below existing grade. Groundwater was not encountered in hand auger borings to the depths explored.

Please note this Executive Summary is an important part of this report and should be considered a ***"summary"*** only. The subsequent sections of this report constitute our findings, conclusions, and recommendations in their entirety.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design of foundations and pavements for the proposed fire station along Old Sand Ridge Road in Hubert, North Carolina. The recommendations developed for this report are based on project information supplied by Mr. Alexandre Penegre of Davis Kane Architects, PA.

Our services were provided in accordance with our Proposal No. 22:28136, dated December 21, 2023, as authorized by Ms. Kim Conrad on February 23, 2024.

This report contains the procedures and results of our subsurface exploration programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items.

- A brief review and description of our field test procedures and the results of testing conducted;
- A review of surface topographical features and site conditions;
- A review of subsurface soil stratigraphy with pertinent available physical properties;
- Suitability of soils for use as fill material;
- Site development recommendations;
- Discussion of groundwater impact;
- Site vicinity map;
- Exploration location plan;
- Hand auger boring logs;
- Kessler DCP logs; and
- CPT sounding logs.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The proposed site is located off Old Sand Ridge Road in Hubert, Onslow County, North Carolina. The site is bounded on the north by Sand Ridge Elementary School, on the east by Old Sand Ridge Road, on the south and west by undeveloped wooded land. Figure 2.1.1 below shows an image of where the site is located.

Figure 2.1.1 Site Location

At the time of our exploration, the site currently consisted of undeveloped wooded land. Based on our site visit and approximate elevations from Google Earth, the site is relatively level with typical elevations on site ranging from approximately 32 to 35 feet.

2.2 PROPOSED CONSTRUCTION

The following information explains our understanding and estimations of the planned development including proposed buildings and related infrastructure.

SUBJECT	DESIGN INFORMATION / ESTIMATIONS
Usage	Fire Station
Column Loads	Up to 150 kips
Wall Loads	Up to 8 kips per linear foot (klf)
Finish Floor Elevation	within +/- 3 feet of existing grades

ECS understands the project consists of construction of a new approximately 14,600 square-foot fire station and its associated pavements.

3.0 FIELD EXPLORATION TESTING

Our exploration procedures are explained in greater detail in Appendix B including the Reference Notes for Cone Penetration Soundings. Our scope of work included performing eight (8) CPT soundings and eight (8) hand augers with Kessler DCP tests. Our approximate CPT sounding and hand auger boring locations are shown on the Exploration Location Diagram in Appendix A.

3.1 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil. Please refer to the CPT sounding logs in Appendix B.

The site is located in the Coastal Plain Physiographic Province of North Carolina. The Coastal Plain is composed of seven terraces, each representing a former level of the Atlantic Ocean. Soils in this area generally consist of sedimentary materials transported from other areas by the ocean or rivers. These deposits vary in thickness from a thin veneer along the western edge of the region to more than 10,000 feet near the coast. The sedimentary deposits of the Coastal Plain rest upon consolidated rocks similar to those underlying the Piedmont and Mountain Physiographic Provinces. In general, shallow unconfined groundwater movement within the overlying soils is largely controlled by topographic gradients. Recharge occurs primarily by infiltration along higher elevations and typically discharges into streams or other surface water bodies. The elevation of the shallow water table is transient and can vary greatly with seasonal fluctuations in precipitation.

Table 3.1.1 Subsurface Stratigraphy

Approximate Depth Range	Stratum	Description	Ranges of N*-Values(1) blows per foot (bpf)
0 to 0.5 (Surface cover)	N/A	Topsoil was encountered on-site with an observed thickness of approximately 1 to 6 inches. Deeper topsoil or organic laden soils are likely present in wet, poorly drained areas and potentially unexplored areas of the site.	N/A
0.5 to 7	I	Very Soft to Very Stiff Silty CLAY (ML-CL) and Lean CLAY (CL) with interbedded Loose to Medium Dense Silty and Clean SAND (SP, SM, SC).	1 to 26
7 to 50	II	Loose to Very Dense Clean and Silty SAND (SP, SM) with interbedded Soft to Stiff Silty Lean CLAY (ML-CL) and Lean CLAY (CL).	4 to 67

Notes: (1) Equivalent Corrected Standard Penetration Test Resistances

3.2 GROUNDWATER OBSERVATIONS

Water levels were measured in our CPT soundings are shown in Appendix B. Groundwater depth measured at the time of drilling ranged from approximately 4.9 to 6.3 feet below the ground surface. Groundwater was not encountered in the pavement hand auger borings to the depths explored. Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

4.0 DESIGN RECOMMENDATIONS

4.1 FOUNDATIONS

Provided subgrades and structural fills are prepared as recommended in this report, the proposed structures can be supported by shallow foundations including column footings and continuous wall footings. We recommend the foundation design use the following parameters*:*

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure(1)	1,500 psf	1,500 psf
Recommended Bearing Soil Material	Stratum I Soils or Structural Fill	Stratum I Soils or Structural Fill
Minimum Width	30 inches	24 inches
Minimum Footing Embedment Depth (below slab or finished grade) (2)	12 inches	12 inches
Minimum Exterior Frost Depth (below final exterior grade)	6 inches	6 inches
Estimated Total Settlement (3)	Less than 1- inch	Less than 1- inch
Estimated Differential Settlement (4)	Less than ½ inches between columns	Less than ½ inches

Notes:

(1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
(2) For bearing considerations and frost penetration requirements.
(3) Based on estimated structural loads. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.
(4) Based on maximum column/wall loads and variability in borings. Differential settlement can be re-evaluated once the foundation plans are finished.

Potential Undercuts: A majority of the soils at the estimated foundation bearing elevation are anticipated to be adequate for support of the proposed structures. Due to the soft soils encountered in the soundings, we anticipate undercutting approximately 2 feet in the vicinity of S-5 through S-7, undercutting approximately 3.5 feet in the vicinity of S-4, and undercutting approximately 4 feet in the vicinity of S-8 and backfilling with approved structural fill. If site earthwork is performed during the typically cooler, wetter months of the year, additional undercutting is anticipated due to excessively wet unstable soils. If soft or loose soils are observed at the footing bearing elevations, the soils should be undercut and removed. Undercut should be backfilled with structural fill up to the original design bottom of footing elevation; the original footing may be constructed on top of the structural fill.

4.2 SLABS ON GRADE

The on-site natural soils are generally considered adequate for support of the slab-on-grade floor slabs. Based on the estimation that the finished floor elevation is around current grades; it appears that the slabs for the structure will likely bear on the Stratum I soils or Structural Fill. The following graphic depicts our soil-supported slab recommendations:

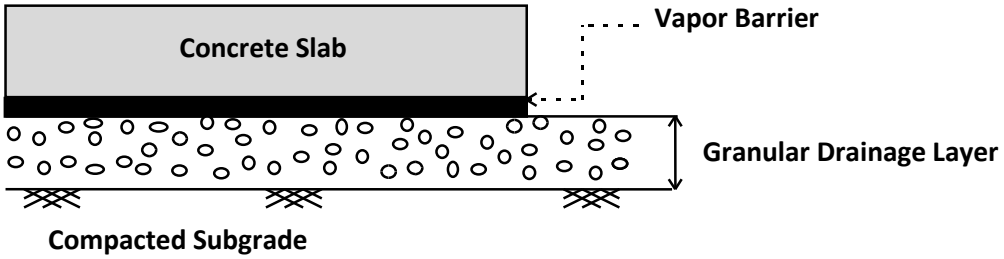


Figure 4.2.1

1. Drainage Layer Thickness: 6 inches
2. Drainage Layer Material: GRAVEL (GP) or SAND containing <5% fines passing #200 sieve (SP, SW)

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted Structural Fill in accordance with the recommendations included in this report.

Subgrade Modulus: Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed estimating a modulus of subgrade reaction, k_1 of 125 pci (lbs./cu. inch). The modulus of subgrade reaction value is based on a 1 ft by 1 ft plate load test basis.

Vapor Barrier: Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture vapor penetration through the floor slab. Curing of the slab should be performed in accordance with ACI specifications to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to do away with the vapor barrier.

Slab Isolation: Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration inhibits the use of a free-floating slab such as in a drop down footing/monolithic slab configuration, slab isolation from the perimeter footing is not required.

4.3 SEISMIC DESIGN CONSIDERATIONS

Seismic Site Classification: The ASCE7-16 standard requires site classification for seismic design based on the upper 100 feet of a soil profile. At least two methods are utilized in classifying sites, namely the shear wave velocity (v_s) method and the Standard Penetration Resistance (N-value) method. The first method (shear wave velocity) was used in classifying this site.

Based upon our interpretation of the subsurface conditions, the appropriate Seismic Site Classification is "D."

Liquefaction: When a saturated soil with little to approximately no cohesion liquefies during a major earthquake, it experiences a temporary loss of shear strength as a result of a transient rise in excess pore water pressure generated by strong ground motion. Flow failure, lateral spreading, differential settlement, loss of bearing, ground fissures, and sand boils are evidence of excess pore pressure generation and liquefaction.

The potential for liquefaction at the site is considered low based upon the CPT results and the liquefaction index procedure developed by Iwasaki (1982). Based on our CPT results and our evaluation using a site peak ground acceleration of 0.08 (PGA_m) per ASCE7-16, an earthquake event with a magnitude of 7.3 and procedures developed by Robertson (2009), Moss et al. (2006), and Boulanger & Idriss (2014), the liquefaction induced settlement at the subject site is estimated to be approximately 0.6 inches or less. The max differential settlement is estimated to be 0.18 inches over a distance of 60 feet.

Ground Motion Parameters: In addition to the seismic site classification, ECS has evaluated the design spectral response acceleration parameters following the ASCE7-16 methodology. The Mapped Reponses were estimated from the ATC Hazards by Location Tool available from the USGS website (https://hazards.atcouncil.org). The design responses for the short (0.2 sec, S_{DS}) and 1-second period (S_{D1}) are noted in bold at the far right end of the following table.

GROUND MOTION PARAMETERS – SITE CLASS D [ASCE7-16 Method]								
Period (sec)	**Mapped Spectral Response Accelerations (g)**		**Values of Site Coefficient for Site Class**		**Maximum Spectral Response Acceleration Adjusted for Site Class (g)**		**Design Spectral Response Acceleration (g)**	
Reference	Figures 1613.3.1 (1) & (2)		Tables 1613.3.3 (1) & (2)		Eqs. 16-37 & 16-38		Eqs. 16-39 & 16-40	
0.2	S_S	0.107	F_a	1.6	$S_{MS}=F_aS_s$	0.171	$S_{DS}=2/3\ S_{MS}$	**0.114**
1.0	S_1	0.052	F_v	2.4	$S_{M1}=F_vS_1$	0.126	$S_{D1}=2/3\ S_{M1}$	**0.084**

The Site Class definition should not be confused with the Seismic Design Category designation which the Structural Engineer typically assesses.

4.2 PAVEMENTS

Subgrade Characteristics: Based on the results of our borings, it appears that the pavement subgrades will likely consist mainly of Clayey SAND (SC) or Structural Fill. Due to the loose soils encountered in the hand auger borings, we recommend in-place densification prior to the construction of pavements. Depending on final sit grades, we anticipate undercutting 18 to 24 inches and backfilling with approved structural fill in the vicinity of K-03, K-04, K-06, K-07, and K-08. If site earthwork is performed during the typically cooler, wetter months of the year, additional undercutting is anticipated due to excessively wet unstable soils.

For design purposes, provided in-place densification and undercutting recommendations are followed, we recommend estimating a CBR value of 6.

We were not provided traffic loading information so we have estimated loadings typical of this type of project. Our recommended pavement sections are based on up to 30,000 ESALs over a 20-year design life for light duty and up to 200,000 ESALs over a 20-year design life for heavy duty.

The preliminary pavement sections below are guidelines that may or may not comply with local jurisdictional minimums.

	PROPOSED PAVEMENT SECTIONS			
	FLEXIBLE PAVEMENT		RIGID PAVEMENT	
MATERIAL	Heavy Duty	Light Duty	Heavy Duty	Light Duty
Portland Cement Concrete (f'_c = 4,500 psi)	-	-	7 in	6.5 in
Asphalt Surface Course	1.5 in	2 in	-	-
Asphalt Intermediate Course	2.5 in	-	-	-
Aggregate Base Course	8 in	8 in	4 in	4 in

In general, heavy duty sections are areas that will likely be subjected to trucks or other similar vehicles including main drive lanes of the development. Light duty sections are appropriate for vehicular traffic and parking areas.

Large, front loading trash dumpsters frequently impose concentrated front wheel loads on pavements during loading. This type of loading typically results in rutting of asphalt pavement and ultimately pavement failures. For preliminary design purposes, we recommend that the pavement in trash pickup areas consist of a 7-inch thick, 4,500 psi, reinforced concrete slab underlain by 4-inches of aggregate base course. When traffic loading becomes available, ECS or the Civil Engineer can design the pavements.

Prior to subbase placement and paving, CBR testing of the subgrade soils (both natural and fill soils) should be performed to evaluate the soil engineering properties for final pavement design. A minimum distance of 18 inches should be maintained between the bottom of the pavement section and the groundwater table.

The soil subgrade should be smooth-rolled and proofrolled prior to ABC placement. Areas that pump, rut, or are otherwise unstable should be re-compacted or undercut and replaced.

To confirm that the specified degree of compaction is being obtained, field compaction testing should be performed in each ABC lift by the geotechnical engineer's representative. We recommend that compaction tests be performed at a minimum frequency of one test per 5,000 square feet per lift in pavement areas.

The Portland cement concrete pavement section should consist of air-entrained Portland cement concrete having a minimum 28-day compressive strength of 4,500 psi. The rigid pavement section should be provided with construction joints and saw-cut control joints at appropriate intervals per Portland Cement Association (PCA) requirements. The construction joints should be reinforced with dowels to transfer loads across the joints. Wire mesh should be included to control shrinkage cracking of the concrete.

We used a Load Transfer Coefficient, J, of 4.2 to evaluate the recommended concrete pavement thickness given in the preceding table. The concrete pavement section thickness is for plain jointed concrete pavement with reinforcement dowels only at construction joints.

Drainage: An important consideration with the design and construction of pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the aggregate base course layer, softening of the subgrades and other problems related to the deterioration of the pavement can be expected. This is particularly important at the site due to the moisture sensitive near-surface soils. Furthermore, good drainage should help reduce the possibility of the subgrade materials becoming saturated during the normal service period of the pavement.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of stripping vegetation, rootmat, topsoil, existing fill, existing foundations, existing pavements, and soft or loose materials from the 10-foot expanded building and 5-foot expanded pavement limits. The soundings and borings encountered approximately 1 to 6 inches of topsoil. Deeper topsoil or organic laden soils may be present in wet, low-lying, and poorly drained areas. ECS should be retained to verify that topsoil, existing foundations and pavements, construction debris, and substandard surficial materials have been removed prior to the placement of structural fill or construction of structures.

5.1.2 Proofrolling

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be proofrolled with construction equipment having a minimum axle load of 10 tons [e.g., tandem-axle dump truck loaded to capacity]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying localized yielding materials.

Where proofrolling identifies areas that are unsteady or “pumping” subgrade those areas should be repaired prior to the placement of subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting and moisture conditioning. The situation should be discussed with ECS to evaluate the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in evaluating the cause of the observed unsteady materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade. Depending on final sit grades, we anticipate undercutting 18 to 24 inches and backfilling with approved structural fill in the vicinity of S-4 through S-8, K-03, K-04, K-06, K-07, and K-08. If site earthwork is performed during the typically cooler, wetter months of the year, additional undercutting is anticipated due to excessively wet unstable soils.

5.1.3 Site Temporary Dewatering

Temporary Dewatering: Temporary dewatering operations can be managed by the use of conventional submersible pumps directly in the excavation or temporary trenches to direct the flow of water and to remove water from the excavation. If temporary sump pits are used, we recommend they be established at an elevation 3 to 5 feet below the bottom of the excavation subgrade or bottom of footing. A perforated 55-gallon drum or other temporary structure could be used to house the pump. We recommend continuous dewatering of the excavations using pumps during construction.

If dewater operations are performed at the site, ECS recommends that the dewatering operations be performed in accordance with Local, State and Federal Government regulatory requirements for surface water discharges. ECS would be pleased to be consulted by the client on those requirements, if requested.

5.2 EARTHWORK OPERATIONS

5.2.1 Structural Fill

Prior to placement of Structural Fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to evaluate if they meet project specifications. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the last 90 days.

Structural Fill Materials: Materials for use as structural fill should consist of inorganic soils with the following engineering properties and compaction requirements.

STRUCTURAL FILL INDEX PROPERTIES	
Subject	**Property**
Building and Pavement Areas	LL < 40, PI<20
Max. Particle Size	4 inches
Fines Content	Max. 20 %
Max. organic content	5% by dry weight

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	**Subject**
Compaction Standard	ASTM D-698
Required Compaction	98%
(Upper 1 foot)	(Upper 1 foot)
Required Compaction	95%
(Depths greater than 1 foot)	(Depths greater than 1 foot)
Dry Unit Weight	100 pcf

On-Site Borrow Suitability: Natural deposits of suitable soils are present on the site. The onsite sands (SP, SM) with fines contents less than 20 percent and free of detritus material should be fine for re-use as structural fill.

Fill Placement: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and frozen or frost-heaved soils should be removed prior to placement of structural fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick "mud mat" of "lean" concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: A majority of the soils encountered on site at the foundation bearing elevation are anticipated to be adequate for support of the proposed structure. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are what has been specified.

Slab Subgrade Verification: Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in **Section 5.1.2 Proofrolling**.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally adequate for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Loose or unsteady materials encountered should be removed and replaced with compacted Structural Fill, or pipe stone bedding material.

Utility Backfilling: The granular bedding material (AASHTO #57 stone) should be 4 inches thick, but not less than that specified by the civil engineer's project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should meet the requirements for Structural Fill and fill placement.

Excavation Safety: Excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor's Responsible Person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. The slope height, slope inclination, and excavation depth, including utility trench excavation depth, should not exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not responsible for construction site safety or the contractor's activities; such responsibility by ECS is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Mr. Alexandre Penegre with Davis Kane Architects. If this information is untrue or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

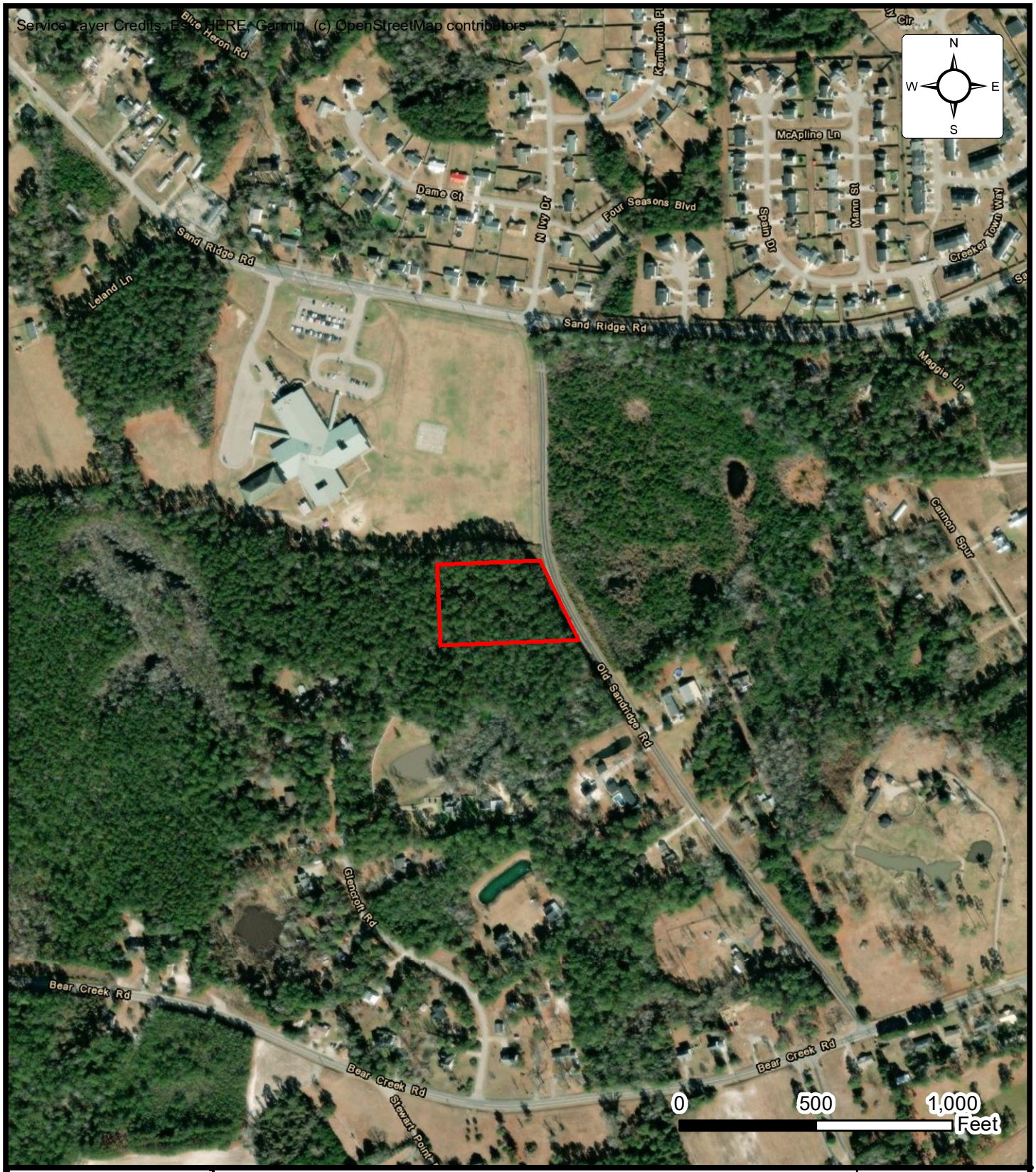
We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Diagrams & Reports

Site Location Diagram
Exploration Location Diagram

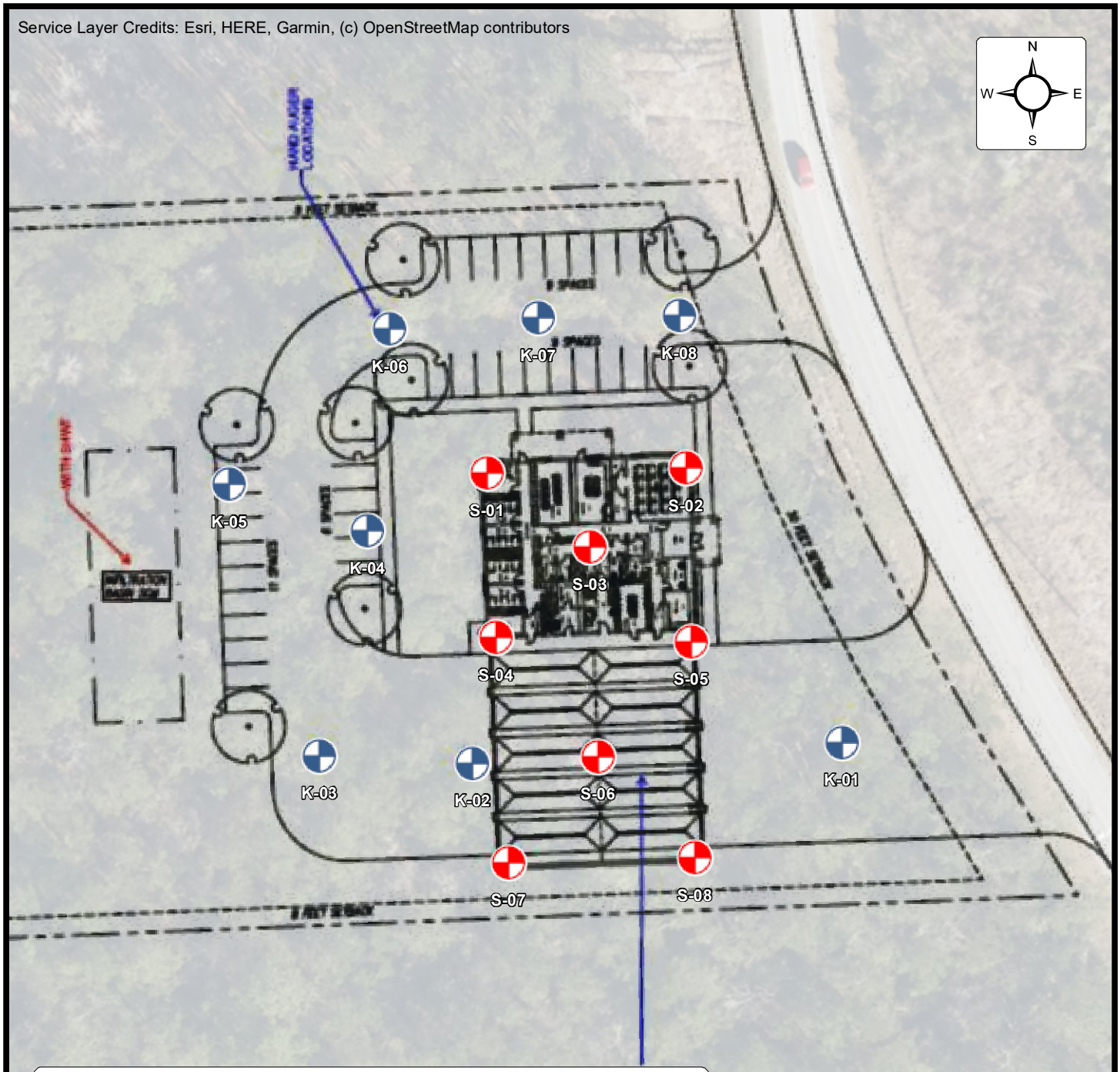


SITE LOCATION DIAGRAM
ONSLOW COUNTY BEAR CREEK FIRE

OLD SAND RIDGE RD, HUBERT, NC

DAVIS KANE ARCHITECTS, PA

ENGINEER	WEG
SCALE	AS NOTED
PROJECT NO.	22:34438
FIGURE	1 OF 2
DATE	3/6/2024



BORING LOCATION DIAGRAM
ONSLOW COUNTY BEAR CREEK FIRE

OLD SAND RIDGE RD, HUBERT, NC

DAVIS KANE ARCHITECTS, PA

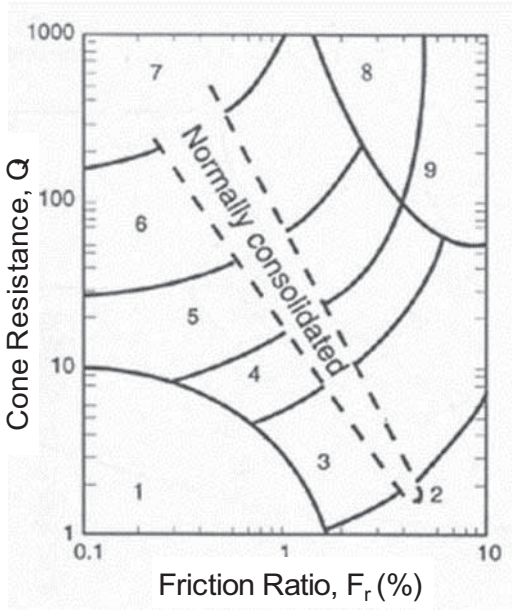
ENGINEER	WEG
SCALE	AS NOTED
PROJECT NO.	22:34438
FIGURE	2 OF 2
DATE	3/6/2024

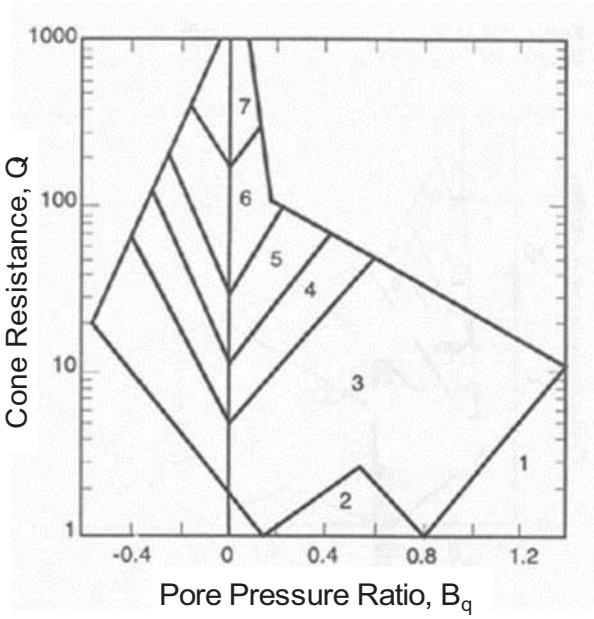
APPENDIX B – Field Operations

Reference Notes for CPT Sounding Logs
Cone Penetration Test Sounding Logs (S-1 through S-8)
Reference Notes for Boring Logs
Hand Auger Boring Logs (K-01 through K-08)
Kessler Dynamic Cone Penetrometer (DCP) Test Results (K-01 through K-08)

REFERENCE NOTES FOR CONE PENETRATION TEST (CPT) SOUNDINGS

In the CPT sounding procedure (ASTM-D-5778), an electronically instrumented cone penetrometer is hydraulically advanced through soil to measure point resistance (q_c), pore water pressure (u_2), and sleeve friction (f_s). These values are recorded continuously as the cone is pushed to the desired depth. CPT data is corrected for depth and used to estimate soil classifications and intrinsic soil parameters such as angle of internal friction, preconsolidation pressure, and undrained shear strength. The graphs below represent one of the accepted methods of CPT soil behavior classification (Robertson, 1990).





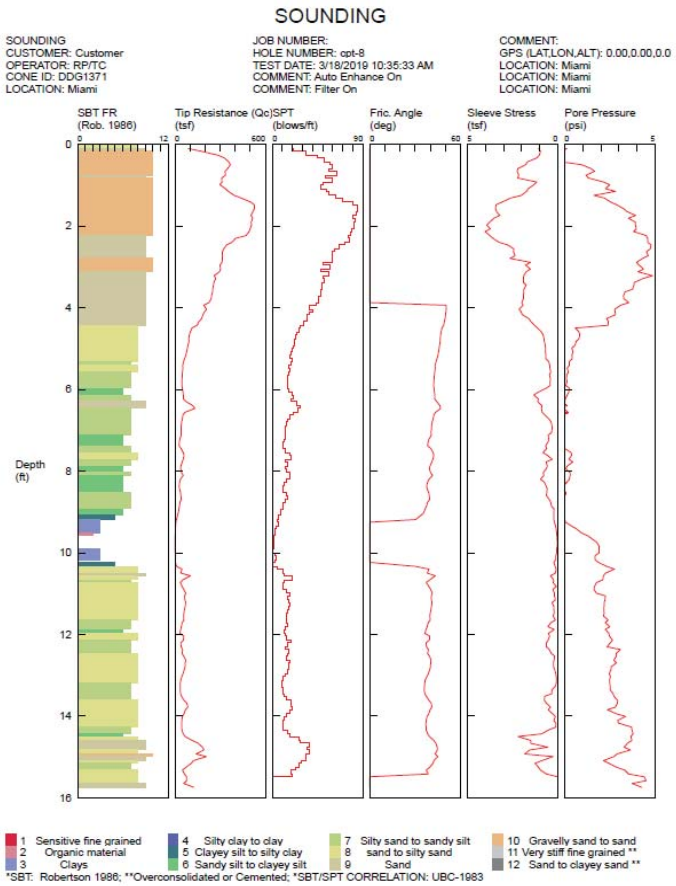
1. Sensitive, Fine Grained
2. Organic Soils-Peats
3. Clays; Clay to Silty Clay
4. Clayey Silt to Silty Clay
5. Silty Sand to Sandy Silt
6. Clean Sands to Silty Sands
7. Gravelly Sand to Sand
8. Very Stiff Sand to Clayey Sand
9. Very Stiff Fine Grained

The following table presents a correlation of corrected cone tip resistance (q_t) to soil consistency or relative density:

SAND		SILT/CLAY	
Corrected Cone Tip Resistance (q_t) (tsf)	**Relative Density**	**Corrected Cone Tip Resistance (q_t) (tsf)**	**Relative Density**
<20	Very Loose	<5	Very Soft
20-40	Loose	5-10	Soft
40-120	Medium Dense	10-15	Firm
		15-30	Stiff
120-200	Dense	30-45	Very Stiff
>200	Very Dense	45-60	Hard
		>60	Very Hard

SUBSURFACE EXPLORATION PROCEDURE: CONE PENETRATION TESTING (CPT) ASTM D 5778

In the CPT sounding procedure, an electronically instrumented cone penetrometer is hydraulically advanced through soil to measure point resistance (qc), pore water pressure (U2), and sleeve friction (fs). These values are recorded continuously as the cone is pushed to the desired depth. CPT data is corrected for depth and used to estimate soil classifications and intrinsic soil parameters such as angle of internal friction, pre-consolidation pressure, and undrained shear strength.



CPT Procedure:

- Involves the direct push of an electronically instrumented cone penetrometer* through the soil
- Values are recorded continuously
- CPT data is corrected and correlated to soil parameters

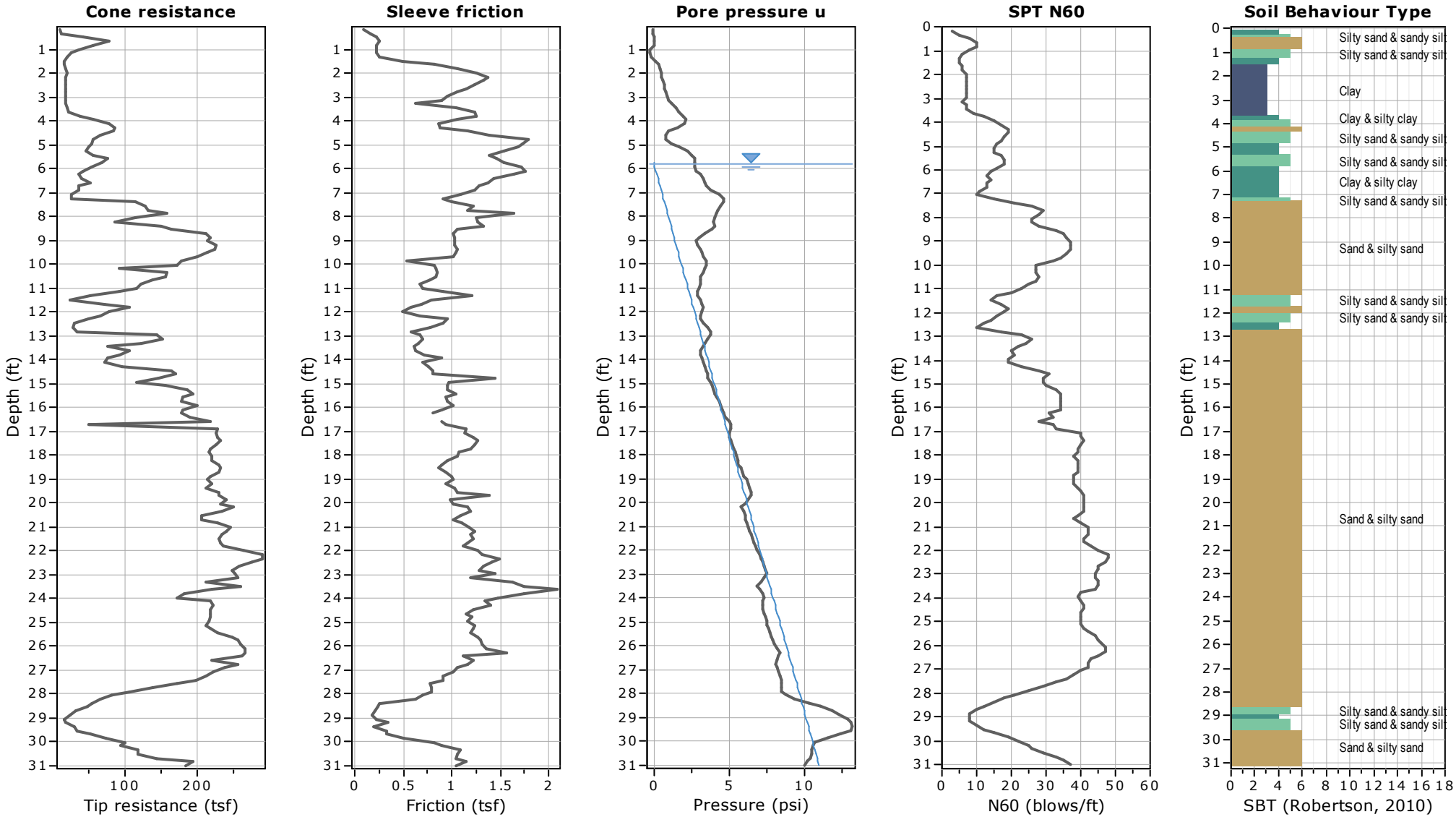
**CPT Penetrometer Size May Vary*

ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-1

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

Total depth: 31.00 ft, Date: 3/7/2024
Cone Operator: Cory Robison

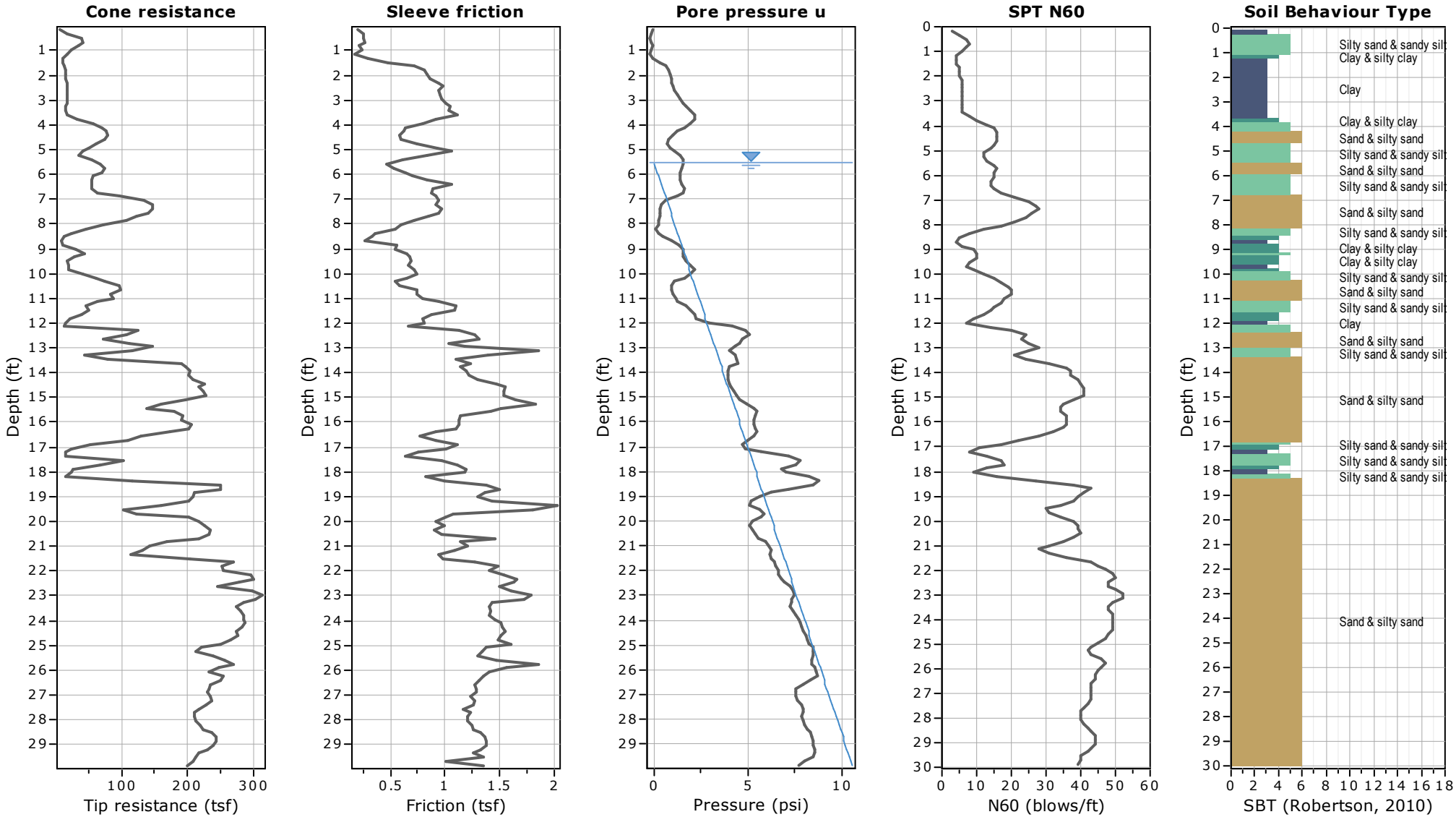


ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-2

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

Total depth: 29.86 ft, Date: 3/7/2024
Cone Operator: Cory Robison

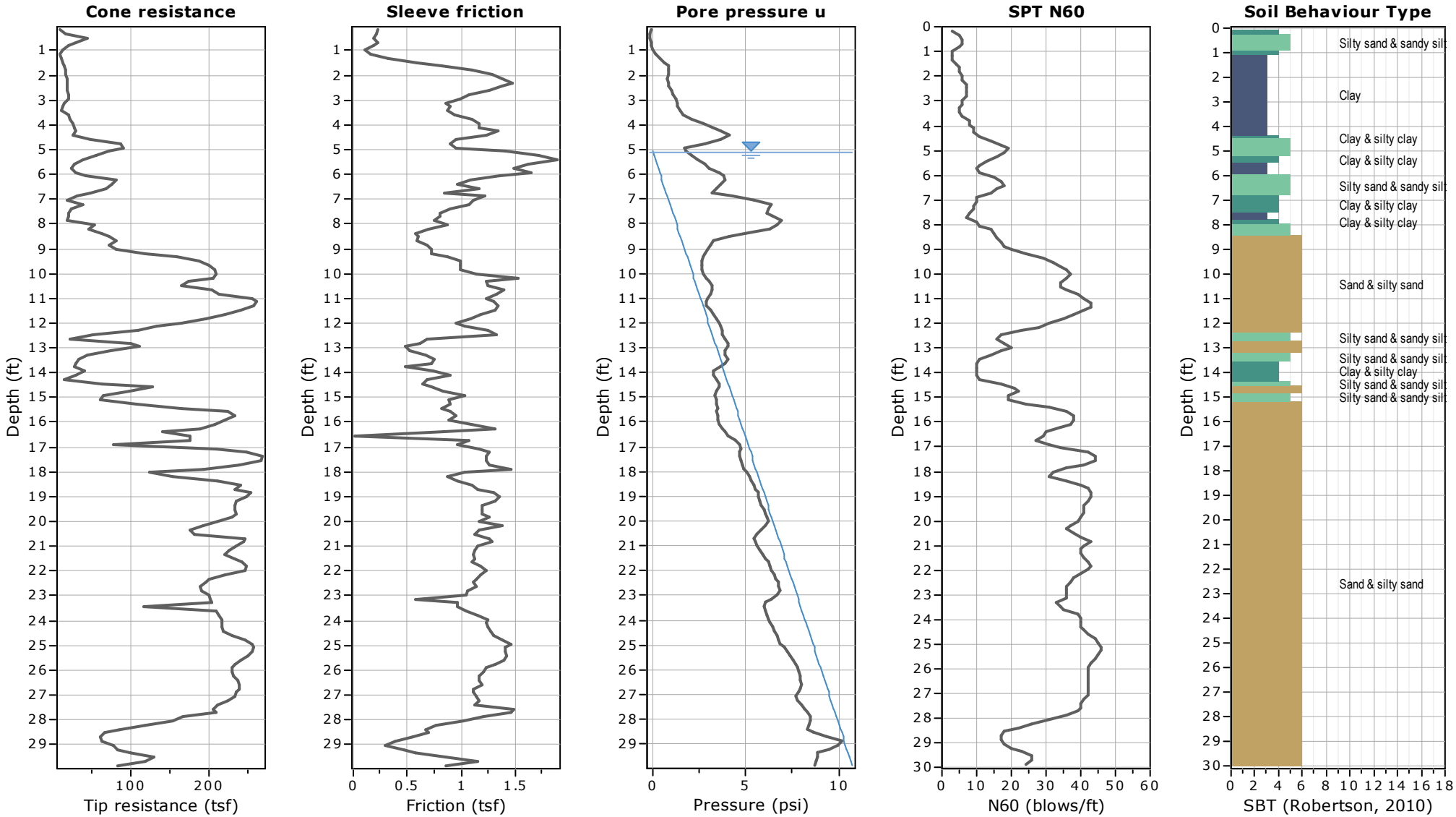


ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-3

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

Total depth: 29.86 ft, Date: 3/7/2024
Cone Operator: Cory Robison

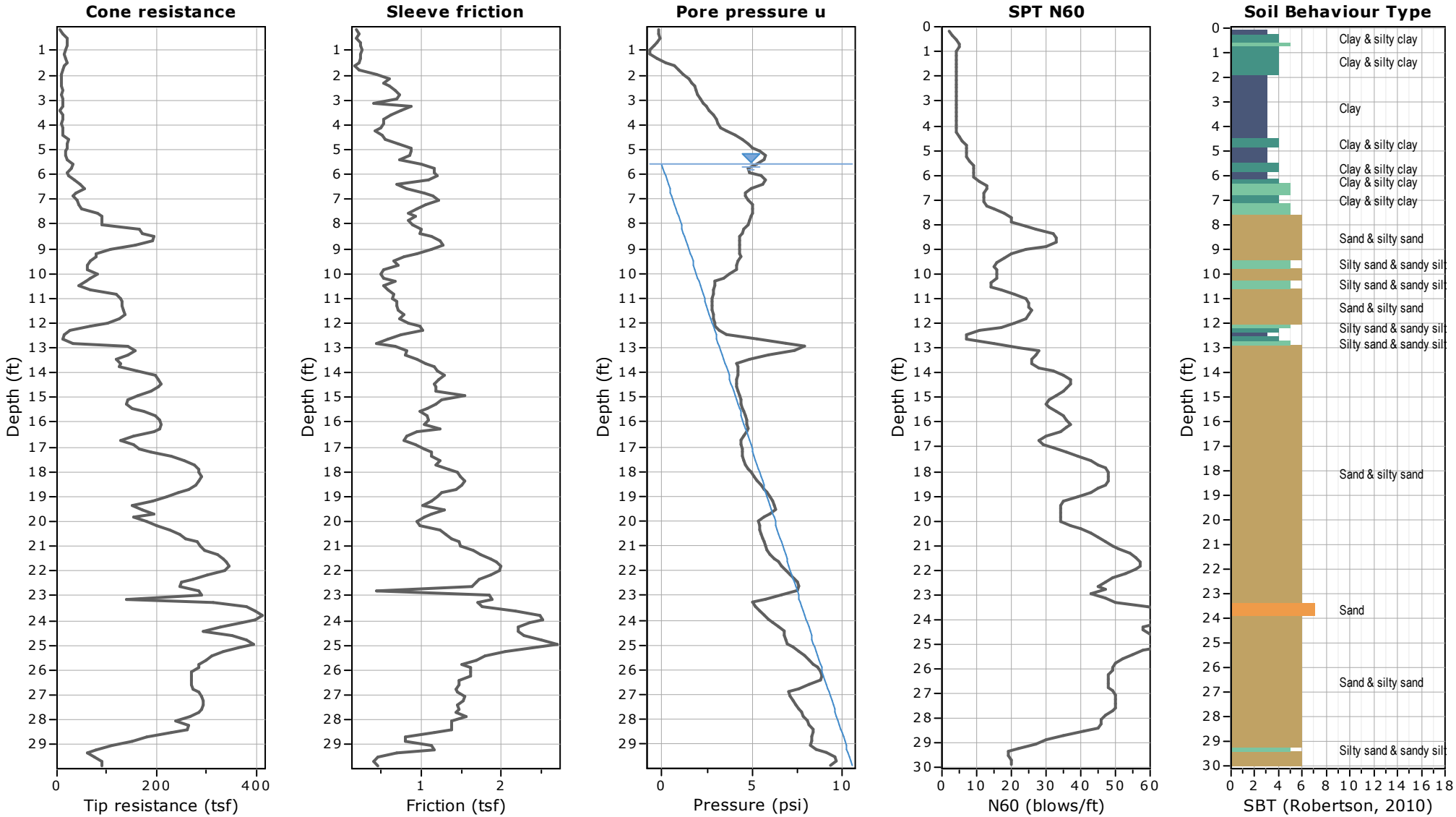


ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-4

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

Total depth: 29.86 ft, Date: 3/7/2024
Cone Operator: Cory Robison

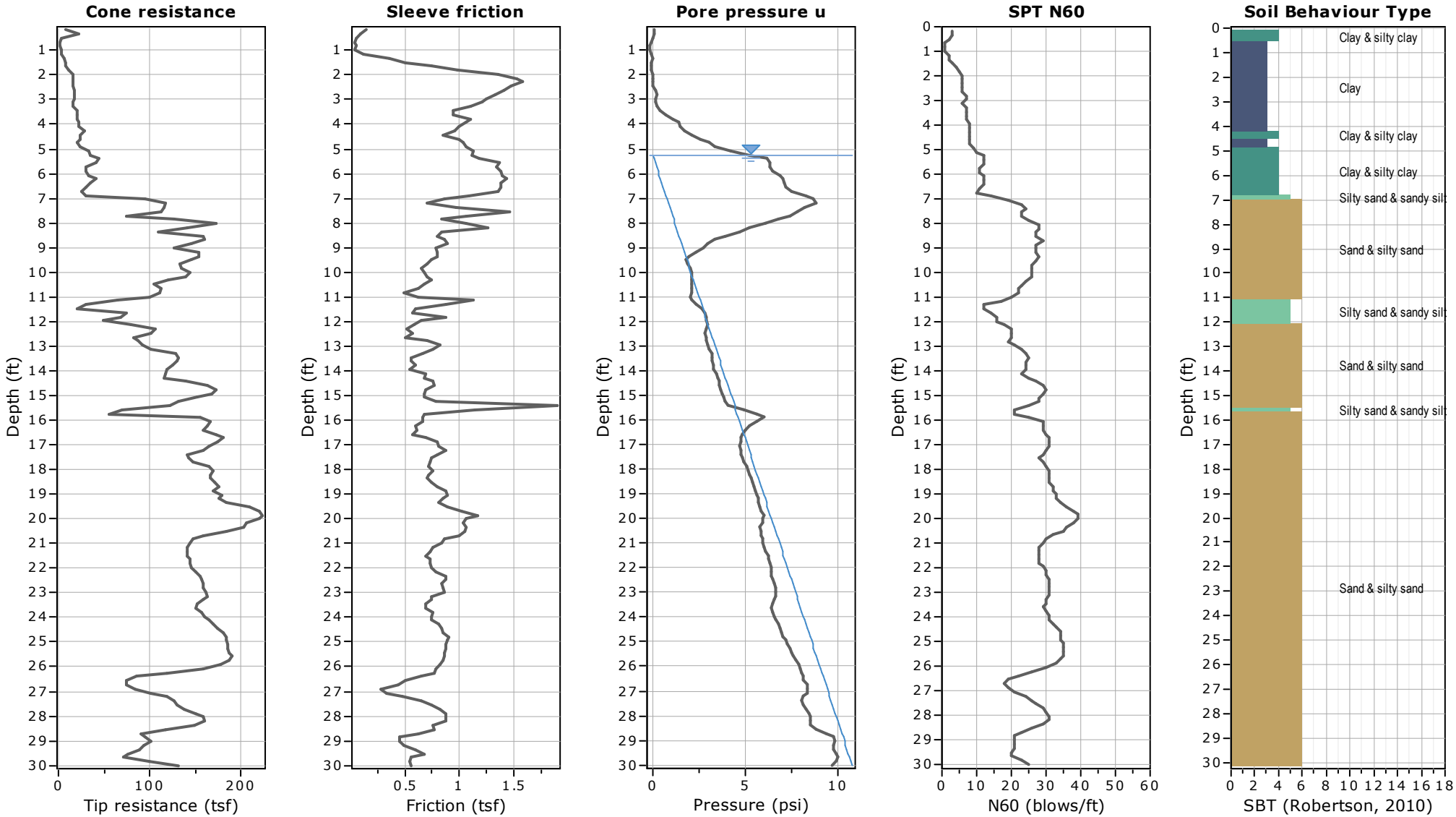


ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-5

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

Total depth: 30.02 ft, Date: 3/7/2024
Cone Operator: Cory Robison

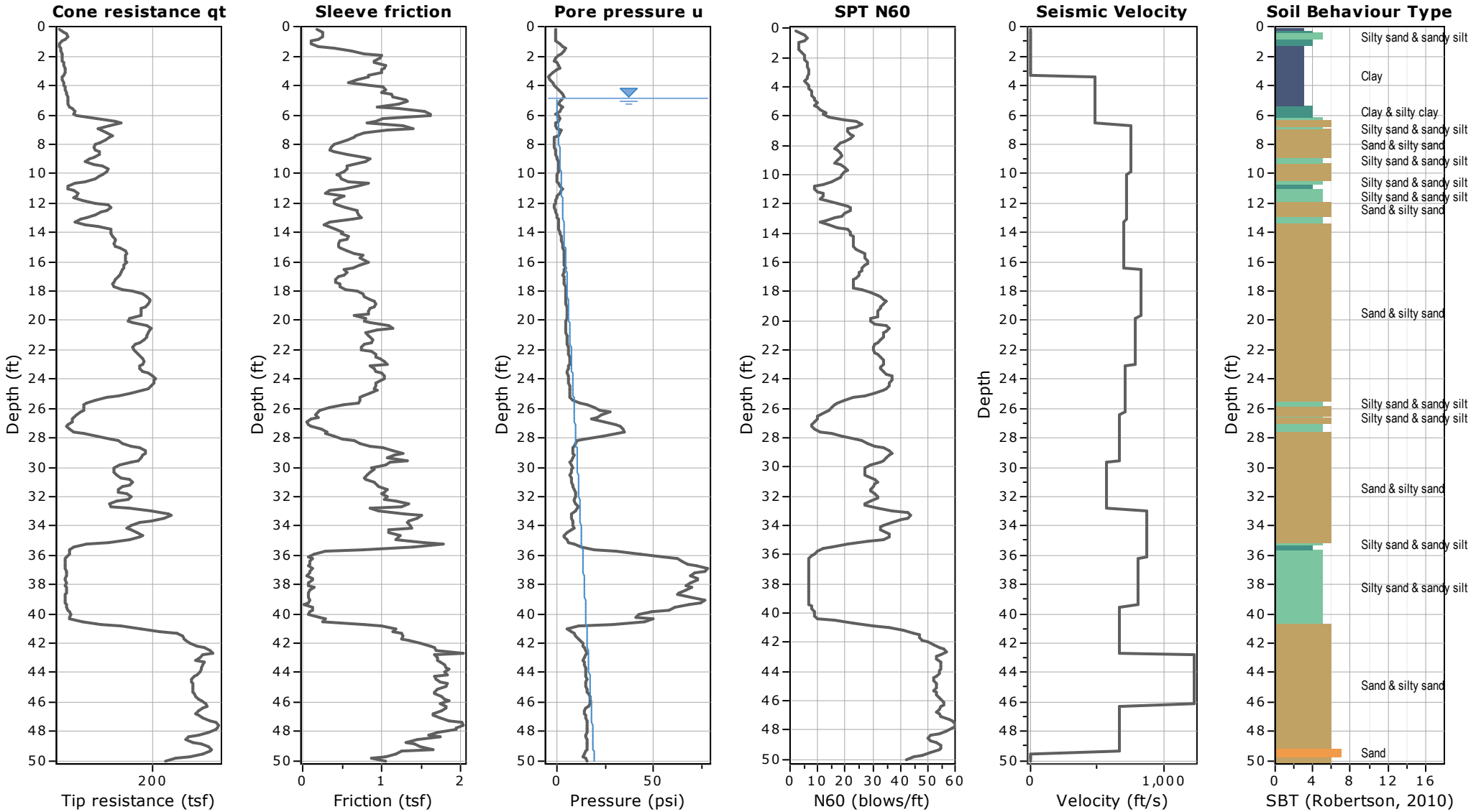


ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-6

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

Total depth: 50.03 ft, Date: 3/7/2024
Cone Operator: Cory Robison

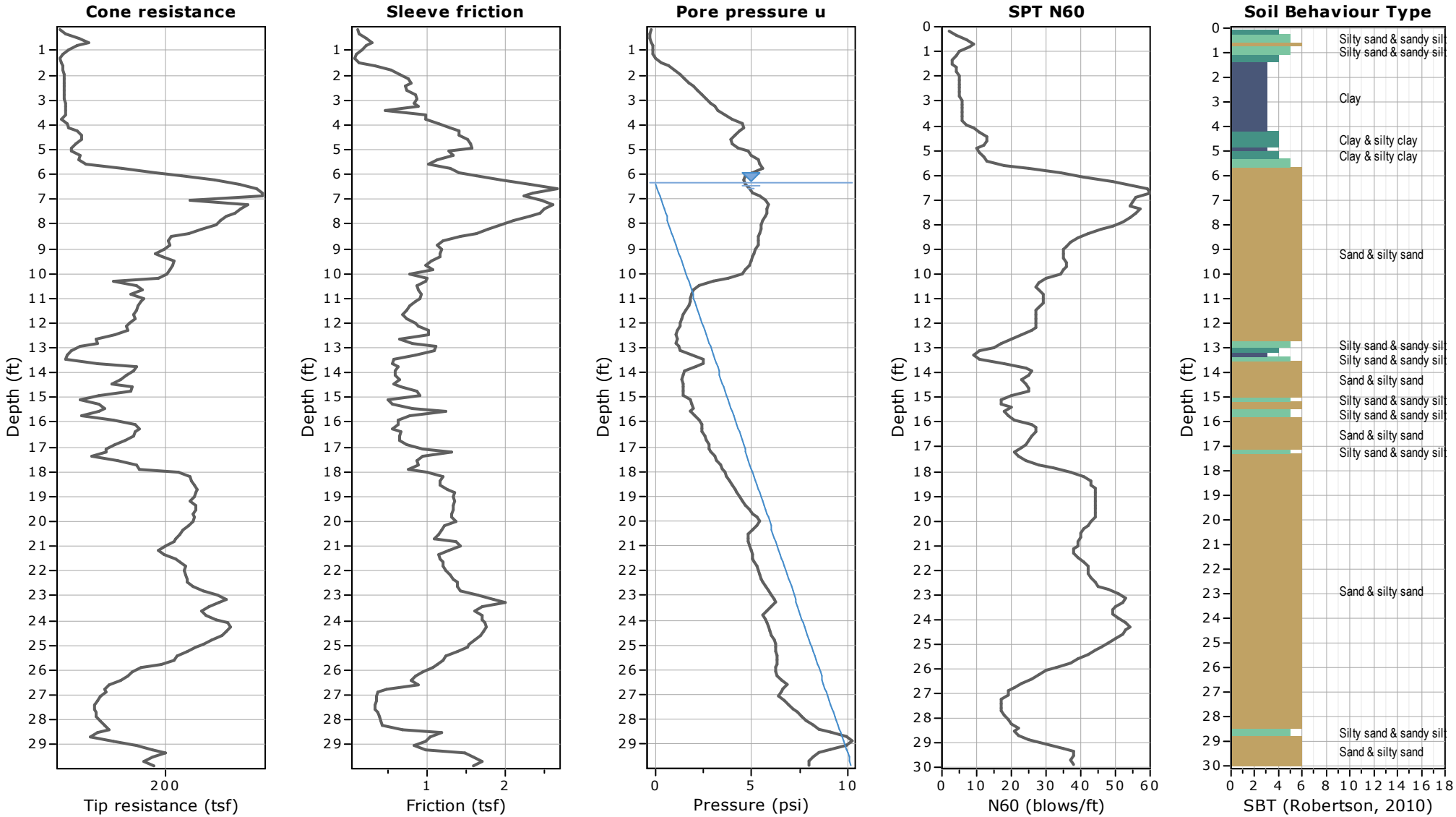


ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-7

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

Total depth: 29.86 ft, Date: 3/7/2024
Cone Operator: Cory Robison

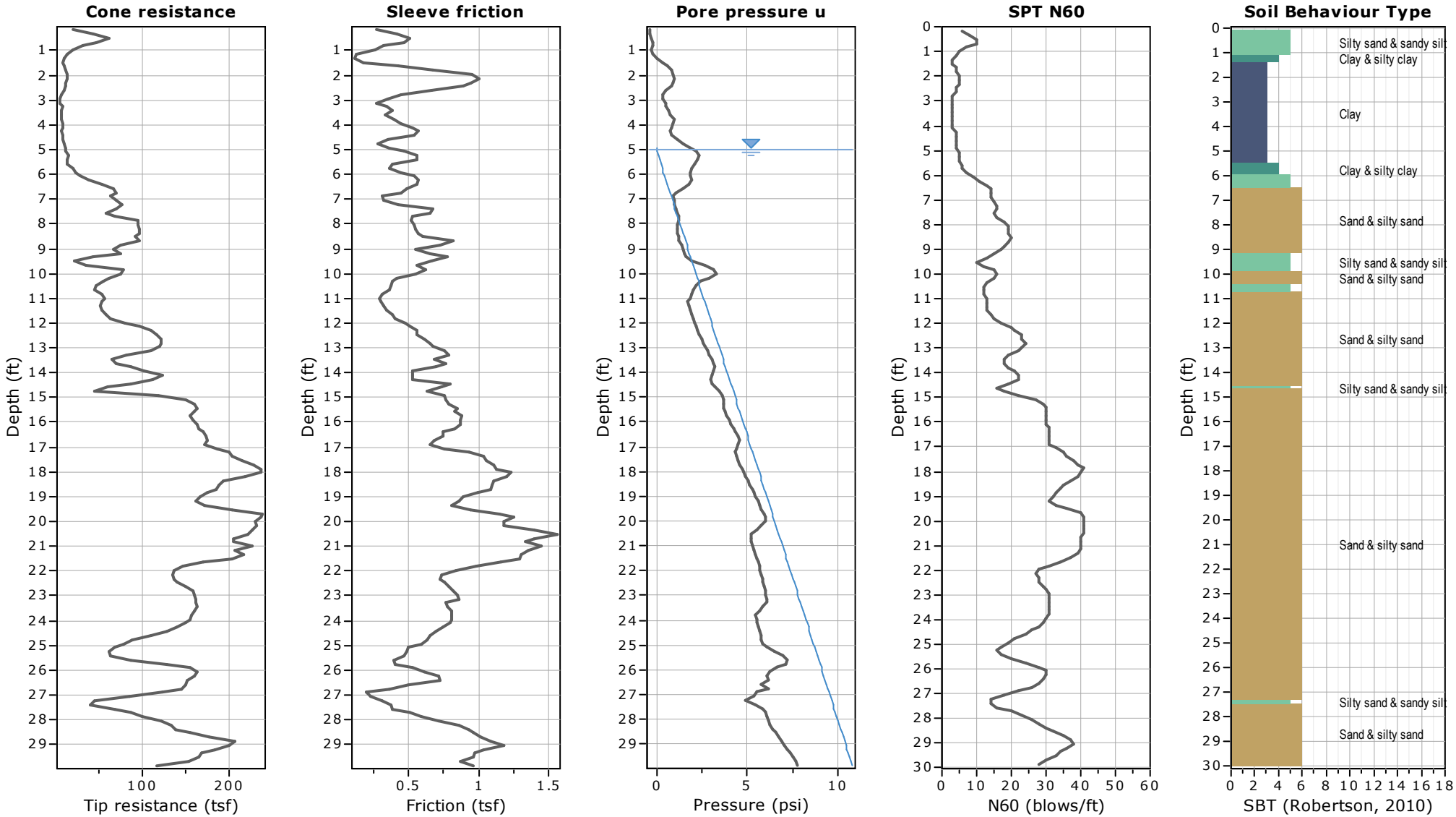


ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34438

CPT: S-8

Project: **Onslow County Bear Creek Fire Station**
Location: **Hubert, Onslow County, North Carolina**

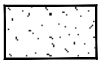
Total depth: 29.86 ft, Date: 3/7/2024
Cone Operator: Cory Robison

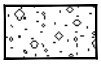


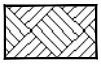
REFERENCE NOTES FOR BORING LOGS

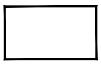
MATERIAL[1,2]

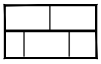

ASPHALT


CONCRETE


GRAVEL

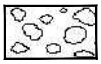

TOPSOIL

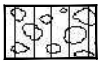

VOID


BRICK

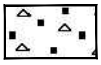

AGGREGATE BASE COURSE

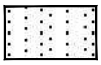

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

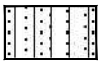

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


GM **SILTY GRAVEL**
gravel-sand-silt mixtures

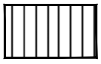

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

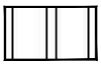

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

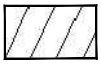

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

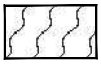

SC **CLAYEY SAND**
sand-clay mixtures

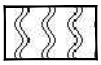

ML **SILT**
non-plastic to medium plasticity

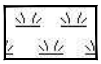

MH **ELASTIC SILT**
high plasticity


CL **LEAN CLAY**
low to medium plasticity


CH **FAT CLAY**
high plasticity


OL **ORGANIC SILT or CLAY**
non-plastic to low plasticity


OH **ORGANIC SILT or CLAY**
high plasticity


PT **PEAT**
highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]

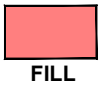

WL (First Encountered)


WL (Completion)


WL (Seasonal High Water)


WL (Stabilized)

FILL AND ROCK


FILL


POSSIBLE FILL


PROBABLE FILL


ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-01**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[1.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station*
Date: 5-Mar-24
Location: *K-1*
Soil Type(s): SAND (SC) CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	200.66	1
5	495.3	1
5	591.82	1
5	665.48	1
5	726.44	1
5	779.78	1
5	825.5	1
5	868.68	1
5	924.56	1
		1
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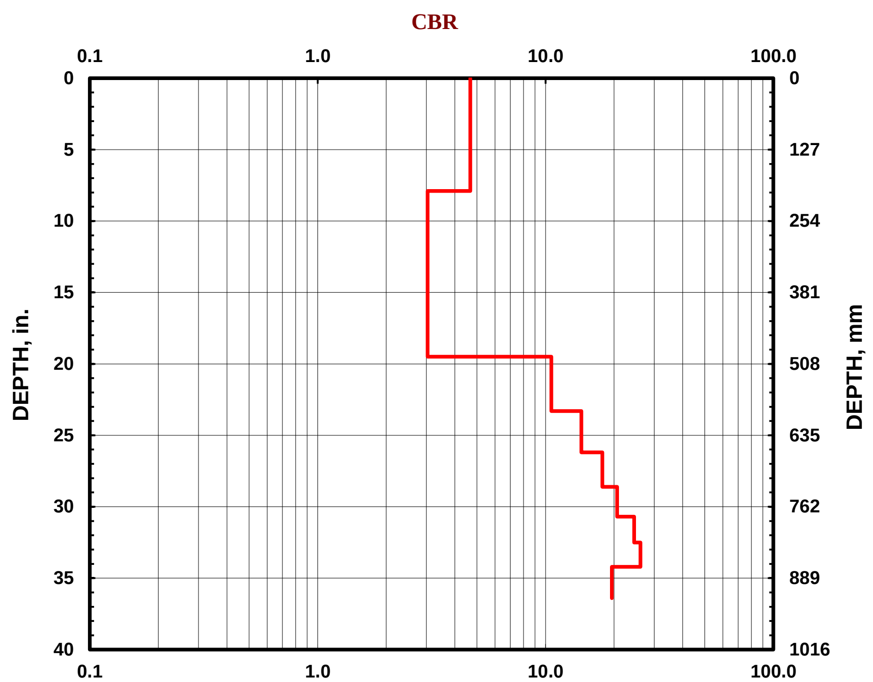

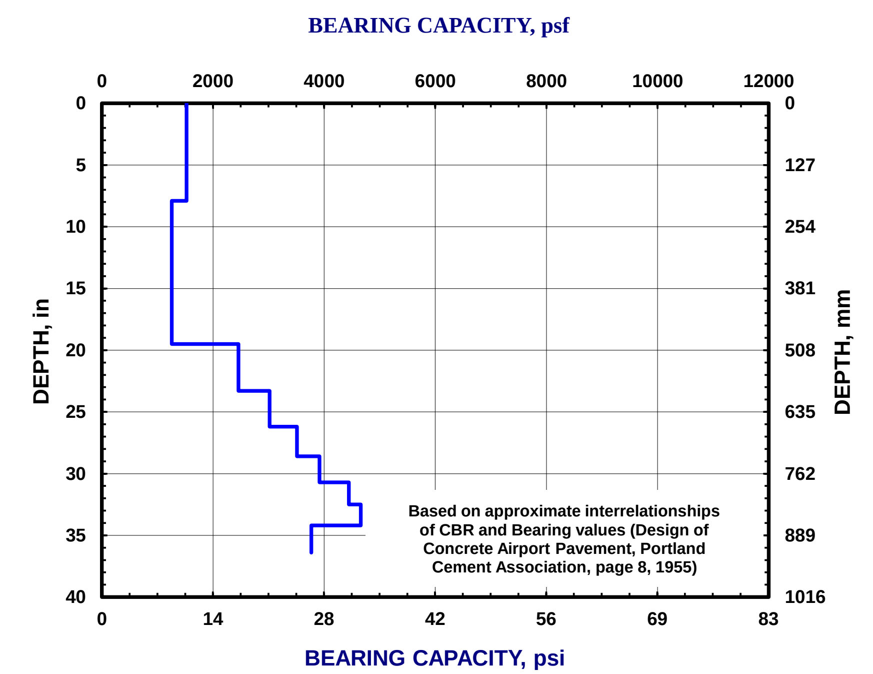

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-02**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[6.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station*
Location: *K-2*
Date: 5-Mar-24
Soil Type(s): SAND (SC) CLAY (CL)

Hammer
○ 10.1 lbs.
● 17.6 lbs.
○ Both hammers used

Soil Type
○ CH
○ CL
● All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	154.94	1
5	259.08	1
5	452.12	1
5	594.36	1
5	685.8	1
5	762	1
5	817.88	1
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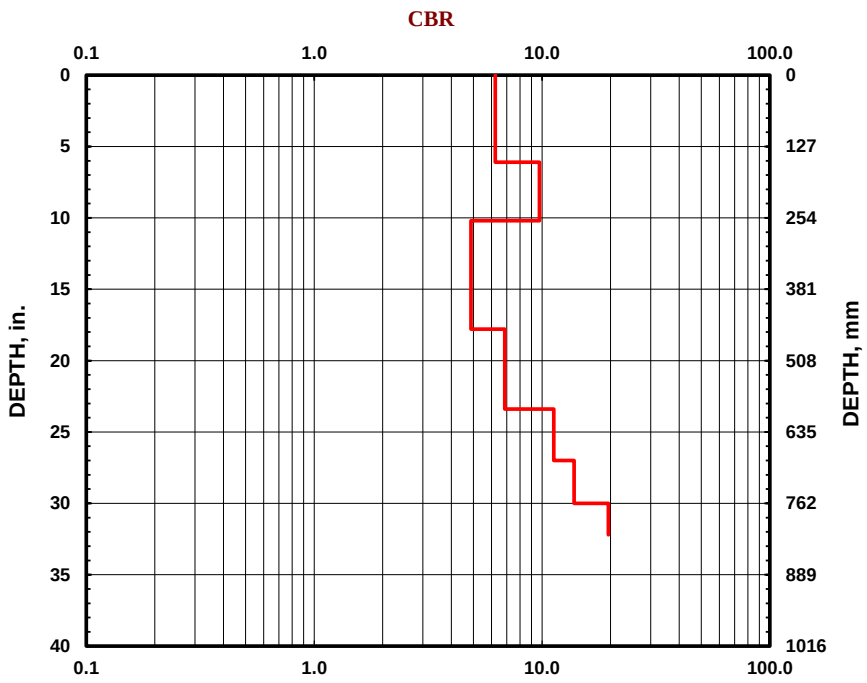

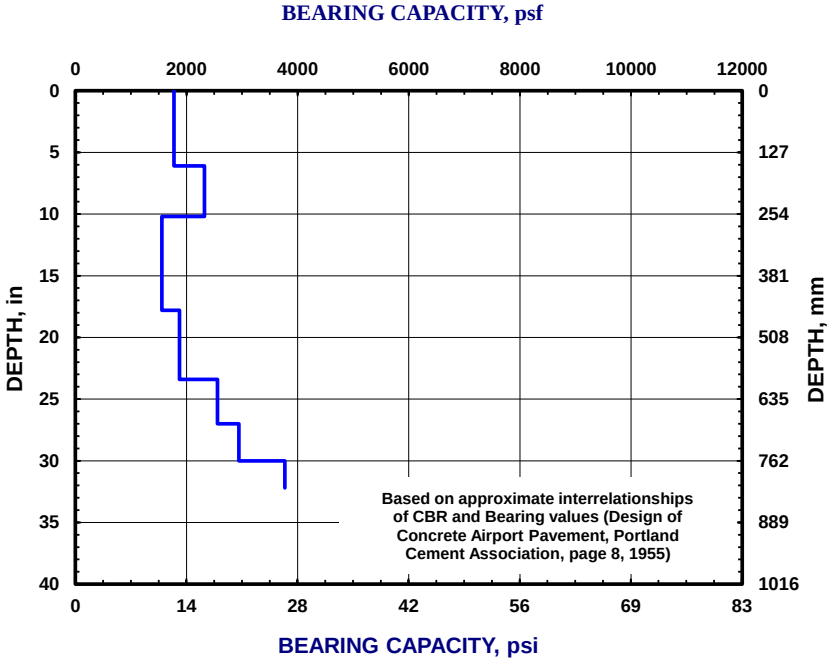

Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-03**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[3.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station* **Date:** 5-Mar-24
Location: *K-3* **Soil Type(s):** SAND (SC) CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	292.1	1
5	591.82	1
5	772.16	1
5	904.24	1
		1
		1
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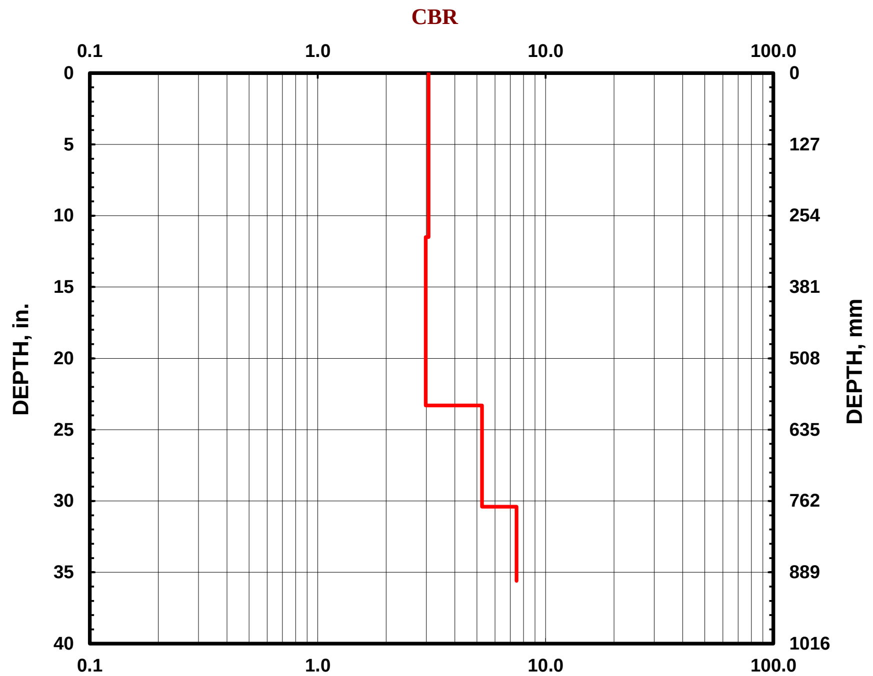

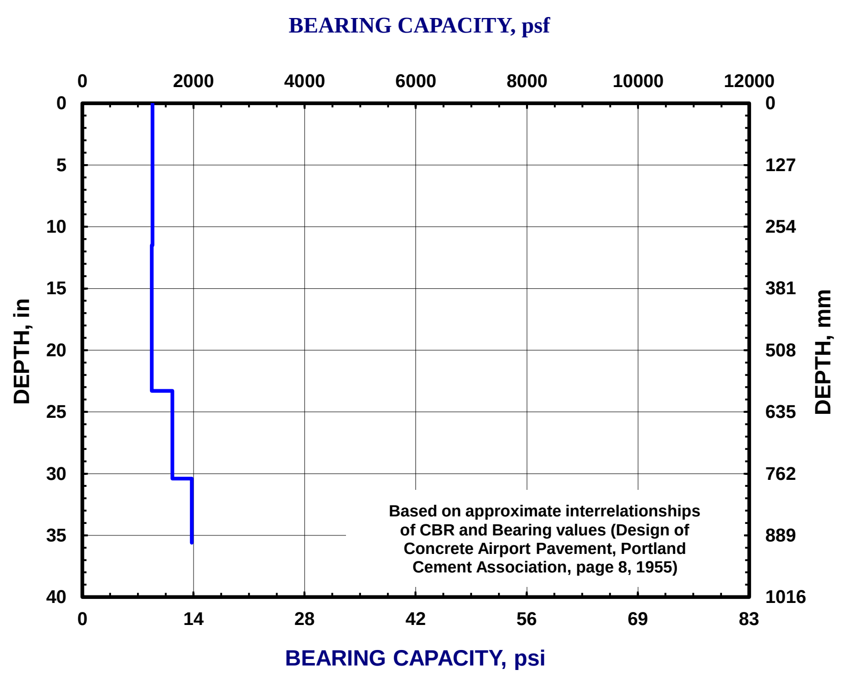

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-04**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[6.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station*
Location: *K-4*
Date: 5-Mar-24
Soil Type(s): SAND (SC) CLAY (CL)

Hammer
○ 10.1 lbs.
◉ 17.6 lbs.
○ Both hammers used

Soil Type
○ CH
○ CL
◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	213.36	1
5	314.96	1
5	708.66	1
5	855.98	1
		1
		1
		1
		1
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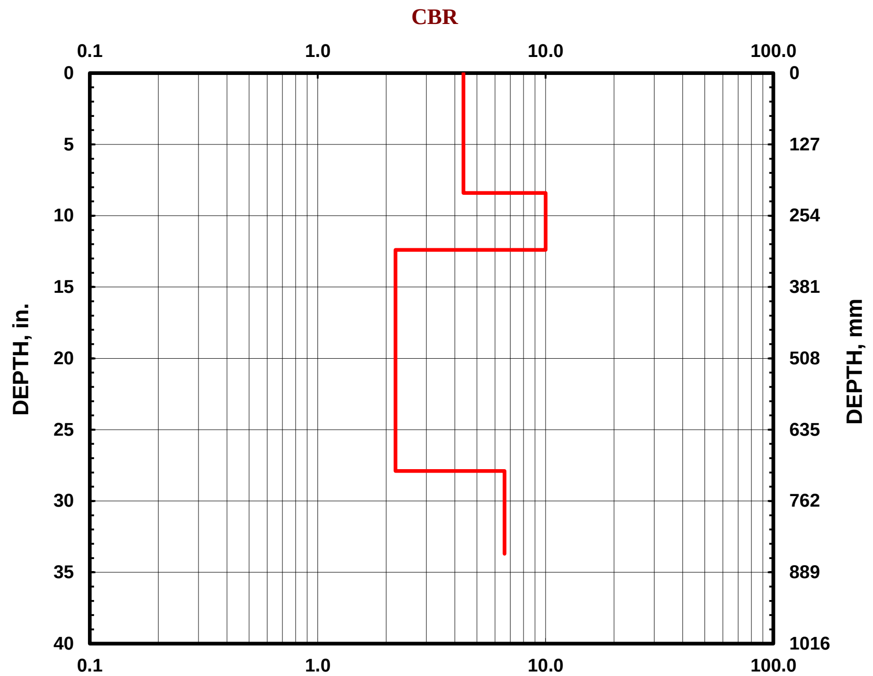

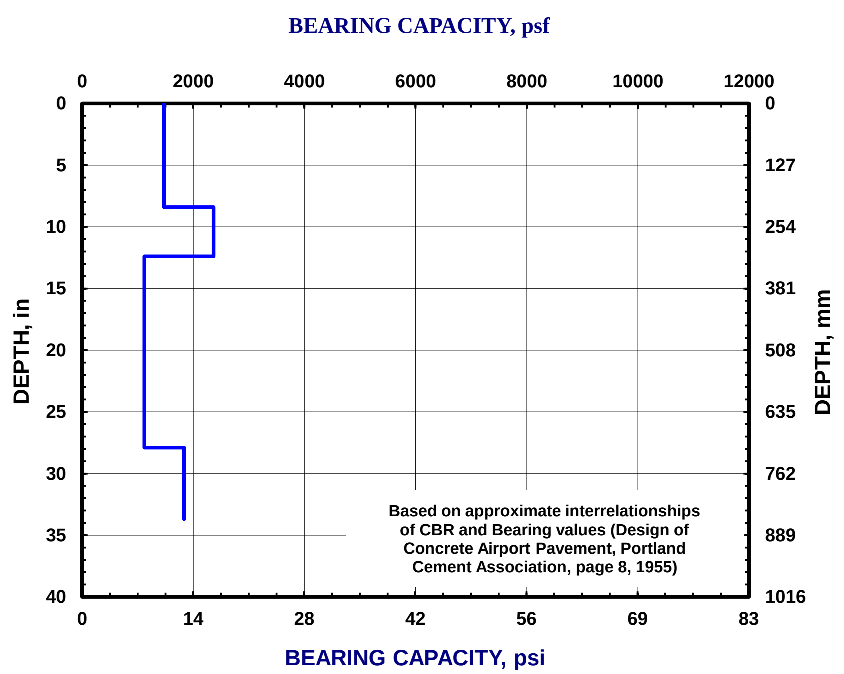

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-05**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[3.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station* **Date:** 5-Mar-24
Location: *K-5* **Soil Type(s):** SAND (SC) CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	162.56	1
5	459.74	1
5	650.24	1
5	769.62	1
5	876.3	1
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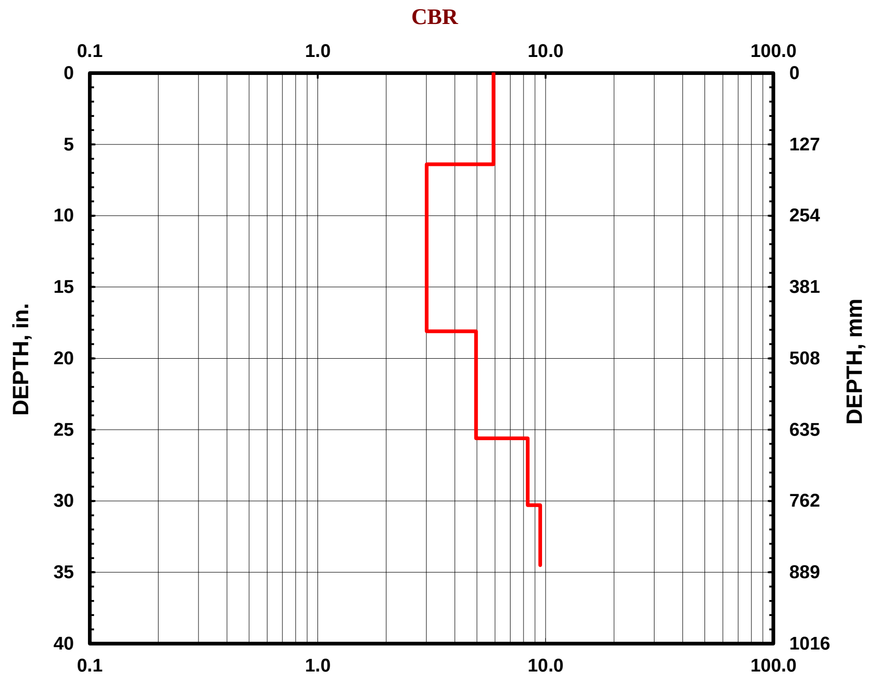

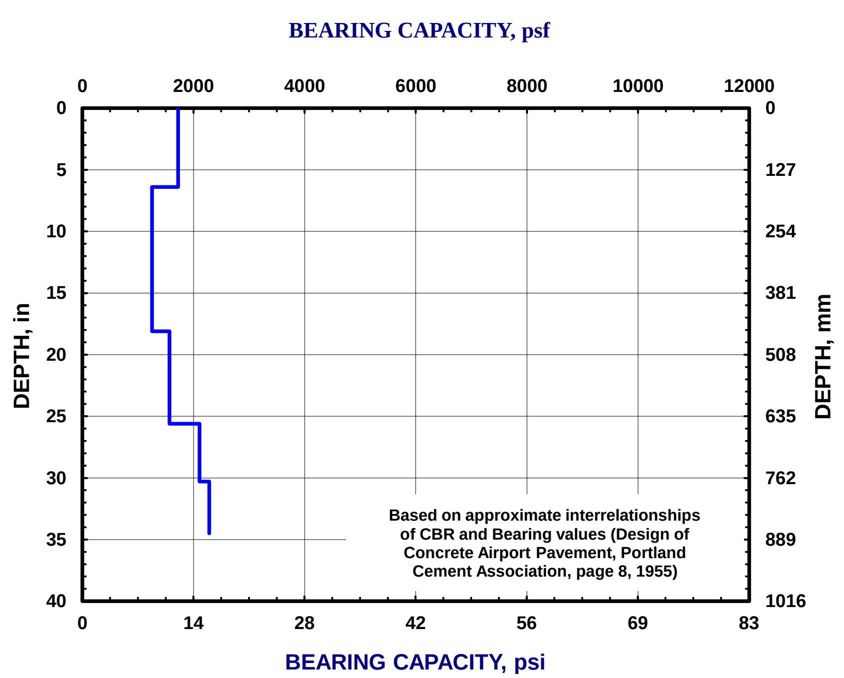

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-06**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[4.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station* **Date:** 5-Mar-24
Location: *K-6* **Soil Type(s):** SAND (SC) CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	388.62	1
5	601.98	1
5	703.58	1
5	777.24	1
4	843.28	1
		1
		1
		1
		1
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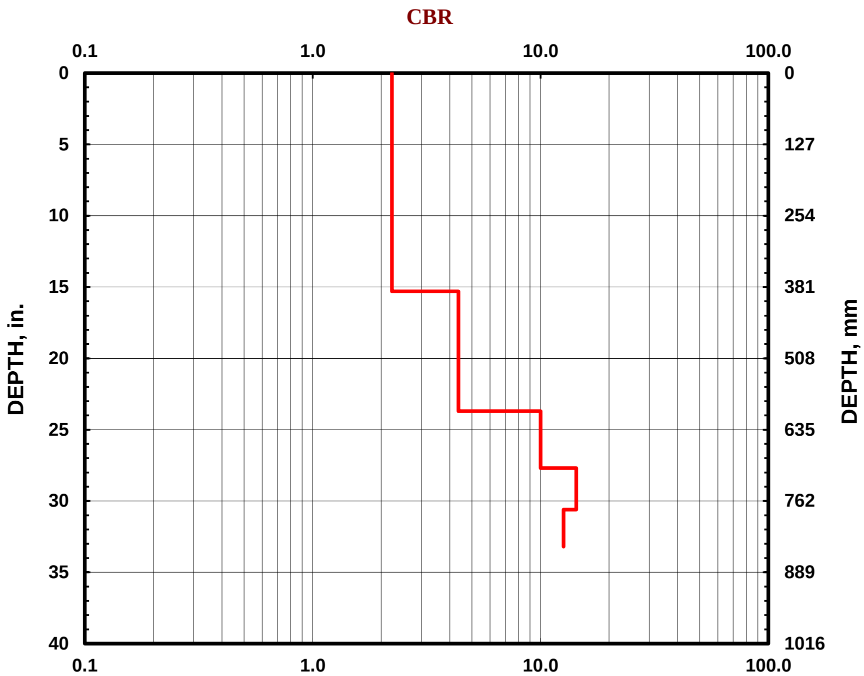

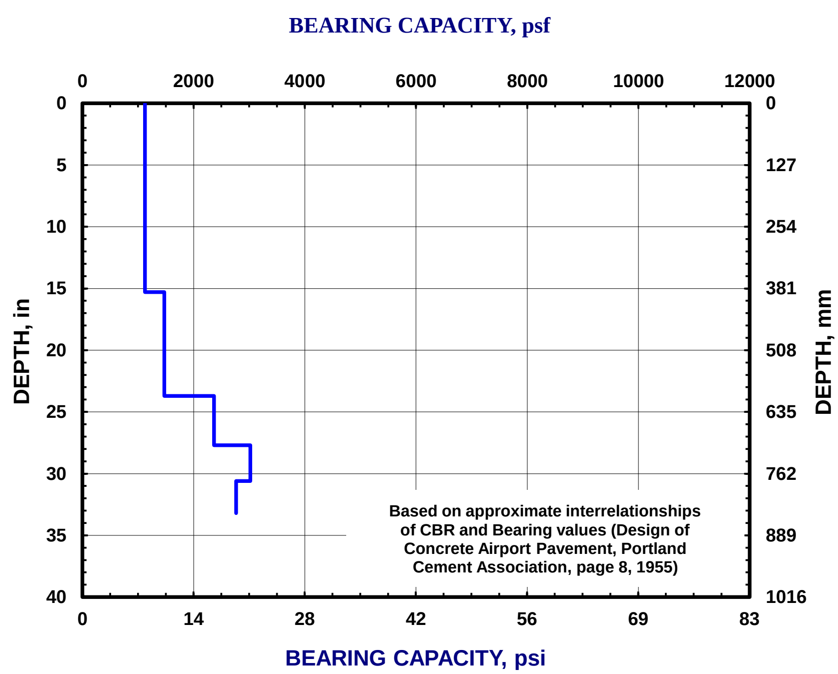

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-07**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[3.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station*
Date: 5-Mar-24
Location: *K-7*
Soil Type(s): SAND (SC) CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	429.26	1
5	624.84	1
5	754.38	1
5	848.36	1
2	891.54	1
		1
		1
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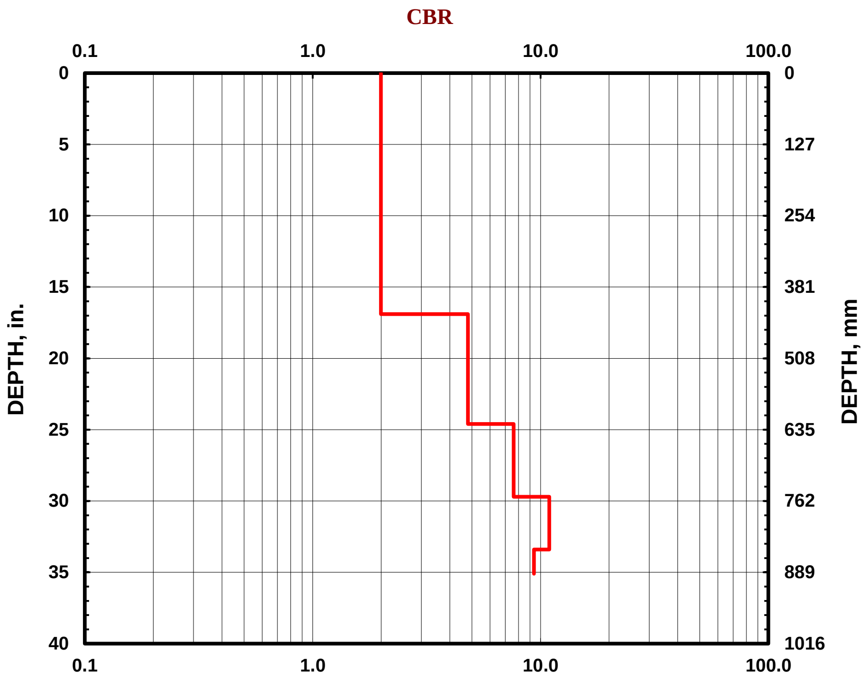

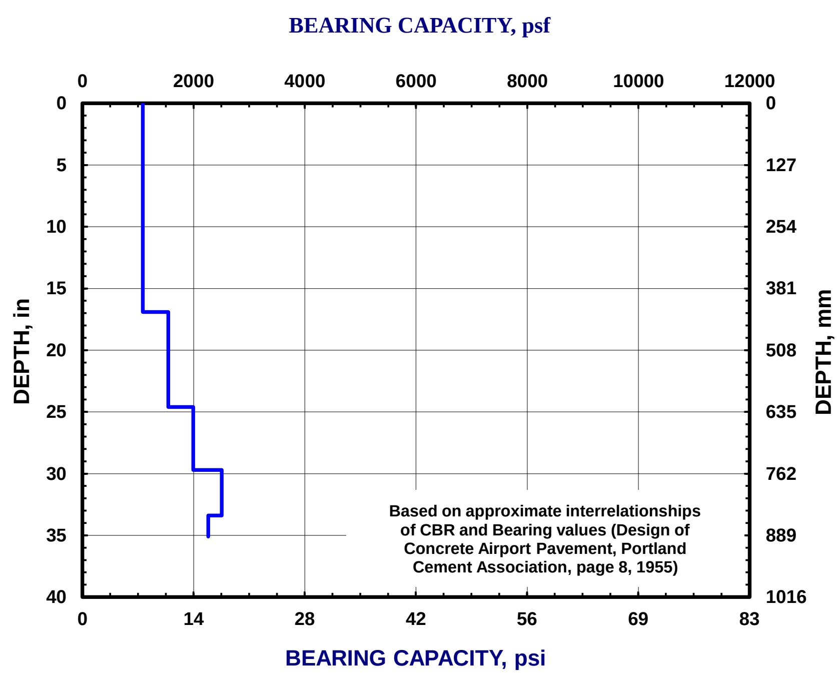

CLIENT:	PROJECT NO.:	SHEET:
Davis Kane Architects, PA	**22:34438**	**1 of 1**
PROJECT NAME:	HAND AUGER NO.:	SURFACE ELEVATION:
Onslow County Bear Creek Fire Station	**K-08**	
SITE LOCATION:		STATION:
Old Sand Ridge Rd, Hubert, North Carolina, 28539		
LATITUDE:	LONGITUDE:	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[3.00"]					
			(SC) CLAYEY FINE SAND, tan/ orange, moist					
			(CL) SANDY LEAN CLAY, tan/ gray/ orange, moist					
			END OF DRILLING AT 4.0 FT					
5		-5						

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		**REG**	**Mar 05 2024**	**English**	

HAND AUGER LOG

DCP TEST DATA

Project: *Onslow County Bear Creek Fire Station*
Date: 5-Mar-24
Location: *K-8*
Soil Type(s): SAND (SC) CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	513.08	1
5	759.46	1
3	878.84	1
		1
		1
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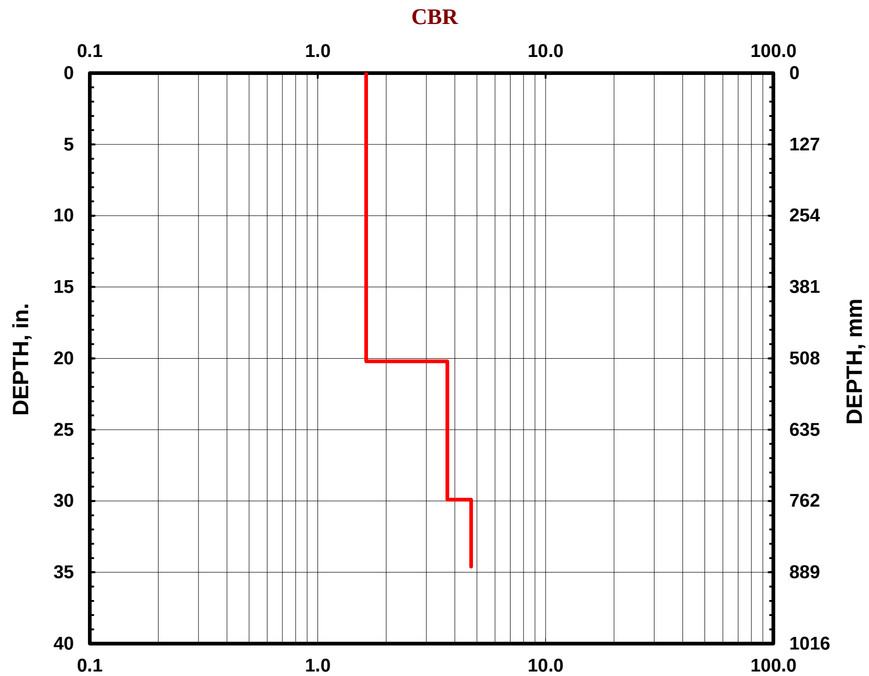

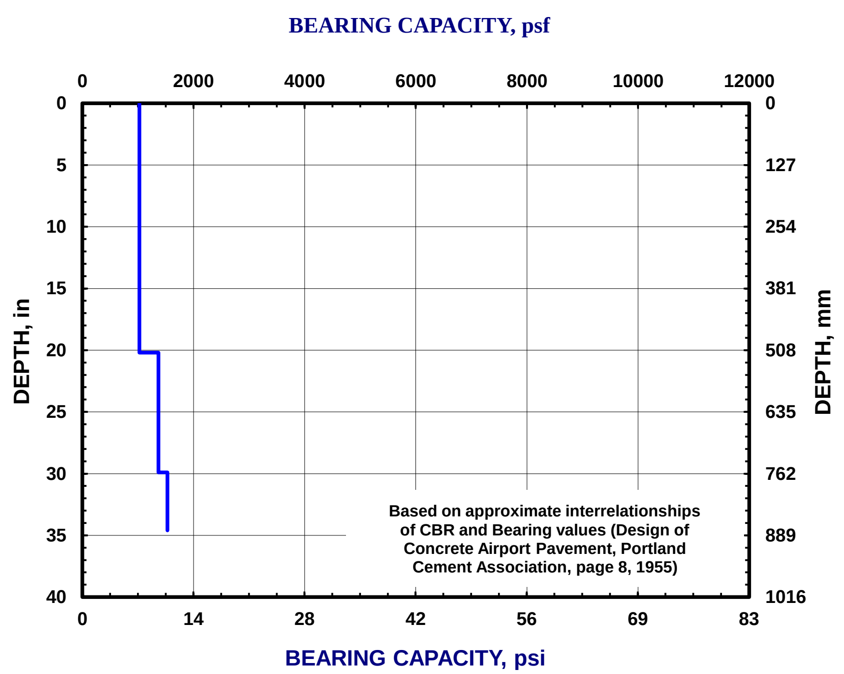

APPENDIX C – Supplemental Report Documents

GBA Document

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other Work of the Contract.

C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate A-1: Four-Fold Doors in Lieu of Sectional Doors.
   1. Base Bid: Doors 127.8, 127.9, 127.10, 127.11, 127.12 to be Type G as indicated on Sheet A700 and as specified in Section 083613 “Sectional Doors”.
   2. Alternate: Doors 127.8, 127.9, 127.10, 127.11, 127.12 to be Type F as indicated on Sheet A700 and as specified in Section 083713 “Exterior Four-Fold Doors”.

B. Alternate A-2: Tile in Lieu of Paint in Bathrooms
   1. Base Bid: Non-shower walls or wall behind toilet to have tile up to 3’-4” with metal trim edge then paint remaining wall. See Sheet A410.
   2. Alternate: All bathroom walls, not including TOILET 102, to have tile up to 8’-0” with metal trim edge then paint remaining wall. See Sheet A410.

C. Alternate C-1: Concrete Pavement in Lieu of Heavy Duty Asphalt Pavement Drive.
   1. Base Bid: Heavy duty asphalt pavement with extents as shown on Sheet C100 and as specified in Section 321216 “Asphalt Paving”.
   2. Alternate: Concrete pavement with extents as shown on Sheet C100 and as specified in Section 321313 “Concrete Paving”.

D. Alternate C-2: Concrete Pavement in Lieu of Light Duty Asphalt Pavement at Parking.
   1. Base Bid: Light duty asphalt pavement with extents as shown on Sheet C100 and as specified in Section 321216 “Asphalt Paving”.
   2. Alternate: Concrete pavement with extents as shown on Sheet C100 and as specified in Section 321313 “Concrete Paving”.

E. Alternate G-1: Door Hardware Lock Cylinders (preferred brand alternate)
   1. Base Bid: Provide Door Lock Cylinders as specified in Section 087100 “Door Hardware”.
   2. Alternate: Provide Door Lock Cylinders by Best, dormakaba Group in lieu of door closers by other acceptable manufacturers.

F. Alternate G-2: Provide Door Hardware Door Keying and Cylinders
   1. Base Bid: Provide Door Hardware Keying and Cores as specified in Section 087100 “Door Hardware”.
   2. Alternate: Provide Door Hardware Keying and Cores by Best, dormakaba Group in lieu of door keying and cores by other acceptable manufacturers.

G. Alternate M-1: Provide and install ten air scrubbers to Apparatus Bay.
   1. Base Bid: No air scrubbers.
   2. Alternate: Provide and install ten air scrubbers as shown on Sheets M100 and M701.

END OF SECTION 012300

SECTION 083713 – EXTERIOR FOUR-FOLD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior swinging Four-Fold metal doors with surface mounted angle frames.

B. Operation of Four-Fold metal doors includes overhead mounted electro-mechanical operator(s) located on the interior side of the wall.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified consisting of manufacturer's technical Product Data and installation instructions for each type of door required, including data substantiating that products comply with requirements.

C. Submittal Drawings showing fabrication and installation of Four-Fold metal doors including plans, elevations, sections, details of components, hardware, operating mechanism, and attachments to the other units of Work. Include wiring diagrams for coordination with electrical trade.

D. Reference list including (5) successful installations of this type of door within the past two (2) years.

1.4 QUALITY ASSURANCE

A. Doors shall be designed to withstand external or internal horizontal wind loads of 23 pounds minimum per square foot. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 pounds per square inch. Steel frames shall be designed in accordance with the AISC "Steel Construction Manual".

B. Door manufacturer shall have at least 10 years experience in manufacturing door type specified for emergency vehicle applications.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water, and so as to permit access for inspection and handling.

B. Handle materials carefully to prevent damage.

1.6 WARRANTY

A. Provide to the Owner a written guarantee, warranting the doors against any defects or materials and/or workmanship for the new door for a period of 2 years. With proper maintenance, commencing from the date of final acceptance of the project. Motors shall be guaranteed for a period of 2 years. State that all door and control work that becomes defective during the guarantee period shall be repaired promptly, to the requirements of these Specifications and at no cost to the Owner.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Four-Fold industrial metal doors manufactured by Door Engineering and Manufacturing; FF300Series: Interior Swinging Four-Fold Doors with interior mounted operators or comparable product by one of the following:

a. Interior Tech

b. EPD Electric Power Door

B. PERFORMANCE REQUIREMENTS

a. General Performance: Provide four-fold doors that comply with performance requirements specified without failure from defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.

b. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

i. Design Wind Load: As indicated on Drawings.
ii. Testing: In accordance with ASTM E330/E330M.
iii. Deflection Limits: Design four-fold doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.

iv. Operability under Wind Load: Design four-fold doors to remain operable under design wind load, acting inward and outward.

c. Windborne-Debris Impact Resistance: Provide four-fold doors complying with the following requirements:

i. Glazed Openings: Pass ASTM E1886 Large Missile Test and cyclic-pressure tests in accordance with ASTM E1996 for enhanced protection and Wind Zone applicable to basic design wind speed indicated on Drawings.

d. Seismic Performance: Provide sectional doors that withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

i. Component Importance Factor: As indicated on drawings.

2.2 MATERIALS

A. Steel Tube: ASTM A513 and ASTM A500/A500M

B. Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1011/A1011M hot-rolled steel sheet.

C. Hardware: Manufacturer's standard components.

D. Fasteners: Zinc-coated steel.

2.3 FOUR-FOLD DOORS

A. Construction: Door framing shall be minimum 11-gauge structural steel tube with 14-gauge steel sheet on the exterior and interior faces. Sheeting shall be formed on the vertical edges with no visible welds on the interior or exterior panel faces. All frames and framing members shall be true to dimension and square in all directions, and no door shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Exposed welds and welds which interfere with the installation of various parts shall be ground smooth and flush.

B. Angle Frame: Supply pre-hung tube frame system constructed of minimum L6x6x0.25, designed to anchor to masonry wall construction or weld to steel structure. All hinges, track supports and operator supports shall be factory attached.

C. Factory finish: Operator and operating hardware shall be powdercoated manufacturer's standard finish. Architect to select from Manufacturer's standard color chart or furnish color to match Panels, frame and all other hardware shall be finished as follows:

a. All exposed steel shall be finished with manufacturer's standard epoxy primer and polyurethane top coat, PPG Spectracron or equal. Architect to select from Manufacturer's standard color chart or furnish color to match.

D. Operating Hardware: Hardware shall include guide tracks and brackets, trolleys, center guides, not less than three pairs of jamb and fold hinges per opening, and all bolts, nuts, fasteners, etc. necessary for complete installation and operation. Jamb hinges shall be dual shear and have two thrust bearings and two needle bearings. Jamb hinges shall be gusseted. Fold hinges shall be dual shear with two thrust bearings. Fold hinges shall be stainless steel. All bearings shall be completely concealed within the hinge barrel and include grease zerks. All hinge pins shall be minimum ¾" diameter hardened steel.

E. Weatherstripping: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weatherstripping at center shall be 1/16" cloth inserted neoprene and include no exposed fasteners on the exterior face of the panel. Weatherstripping at sill shall include two 1/16" cloth inserted neoprene sweeps with an aluminum retainer. The retainer shall be attached to the door with adhesive.

F. Perimeter Weatherstripping: Provide jamb and head weatherstipping of 1/16" cloth-inserted neoprene bulb (or closed cell neoprene).

G. Vision Panels: Provide 1" insulated vision panels or grilles of the size, shape and location as noted on the drawings.

2.4 OPERATOR

A. Each Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation. Each Operator consists of an electric motor, gear reducer, and rotating drive arm. The door shall be operated with connecting rods attached to the rotating drive arm on the operator and to control arms attached to the jamb door section and to the door lintel. The connecting rods shall be positive drive, keeping the door under firm control at all times. The connecting rods shall be fitted with spherical bearings and control arms shall be equipped with oil impregnated bronze bearings on polished shafts.

B. Operator shall be instantly reversible, open and close rapidly and start and stop gradually. Operator shall be adjustable to allow door to fully clear the opening. Operator shall automatically lock the door in the closed position. Operator shall be equipped with disengaging mechanism to convert to free wheeling mode for manual operation.

C. Electric motor shall be of sufficient size to operate doors under normal operating conditions at no more than 75 percent of rated capacity. The motor shall be wound for single phase 120 VAC, 60 Hertz operation.

D. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, and built in accordance with the latest NEMA standards. **Incoming electrical shall be: three phase.**

1. Controls shall include a programmable logic controller with digital message display or LED indicators. Controller shall include programmable close timers and programmable inputs/outputs.

2. All control components shall be enclosed in one enclosure with a wiring diagram placed on the inside of the cover.

3. Controls shall include a Variable Frequency Drive (VFD) with adjustable open and closed speed capability.

4. Enclosures shall be NEMA 4 with disconnect switch.

5. Pushbuttons (interior) for each door shall have one (1) momentary pressure three-button push-button station marked "OPEN", "CLOSE" and "STOP". Push button enclosure shall be NEMA 4. Location by Architect.

6. Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position.

7. Safety edges: Provide electric safety edges on leading edge of all doors to reverse door upon contact with obstruction.

8. Photo eyes: Provide (1) interior, jamb mounted, thru-beam type photo eyes, NEMA 4 rated.

9. Radio controls: Provide one (1) radio receiver and (1) single button remotes per door. Remotes to open and close doors with single button.

10. Timer Activation Loop Detectors (fire station applications): Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer. G.C. to coordinate installation of preformed loop with installer prior to exterior apron being poured.

11. Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install Four-Fold metal doors in strict accordance with the approved drawings by qualified door erection crews. All door openings shall be completely prepared by the general contractor prior to the installation of the doors. Permanent or temporary electric wiring shall be brought to the door opening before installation is started and shall be completed so as not to delay the inspection test.

B. Doors shall be set plumb, level, and square, and with all parts properly fastened and mounted. All moving parts shall be tested and adjusted and left in good operating condition.

3.2 ADJUSTING AND CLEANING

A. Inspection of the doors and a complete operating test will be made by the installer in the presence of the general contractor or architect as soon as the erection is complete. Any defects noted shall be corrected. After door approval in the above test, the general contractor must assume the responsibility for any damage or rough handling of the doors during construction until the building is turned over to the owner and final inspection is made.

B. Clean surfaces and repaint abraded or damaged finished surfaces to match factory-applied finish.

END OF SECTION

SECTION 105126 – PLASTIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. HDPE lockers.

B. Related Requirements:

1. Section 061000 – Rough Carpentry: Wood blocking and nailers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Indicate locker plan and elevation layout including minimum required dimensions for installation.

C. Samples: Two, 3 by 3 inches in size, indicating finish of locker material.

D. QUALITY ASSURANCE

1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility: Comply with 2010 ADA Standards, Accessibility Guidelines.

2.2 HDPE LOCKERS

A. Manufacturer’s

1. Basis of Design Product: Subject to compliance with requirements, provide Bradley Corporation Lenox Z-Locker 12”W x 24”D x 72”H or comparable product by one of the following:

    a. ASI

    b. Scranton Products

B. HDPE Z-Lockers

1. Locker Configuration: Two-person Z style.

2. Accessible Units: Lockers constructed to comply with referenced accessibility standards.

3. Width: 12 inches.

4. Depth: 24 inches.

5. Enclosed Locker Height: 72 inches.

6. Interior Color: Manufacturer’s standard, homogeneous, natural color throughout.

7. Exterior Color: As selected by Architect from Manufacturer's full range.

8. Ventilation Type: Horizontal slotted door.

C. Attributes:

1. Locker Body Components: Made of solid plastic panels of the following type and minimum thicknesses:

    a. Solid, High-Density Polyethylene (HDPE): Tested in accordance with ASTM E84, Class B; homogenous color throughout.

    b. Smoke Developed Index: Not to exceed 450.

    c. Flame Spread Index: Not to exceed 75.

2. HDPE Component Thickness:

    a. Body: 3/8 inch.

    b. Door and Door Frame: ½ inch.

3. Door Frame: Manufactured from single sheet of HDPE. Separate horizontal and vertical frame members will not be approved.

4. Door Latching: Multipoint with a full height, spring loaded latch bar securely mounted on interior face of locker door. Latch bar engages door frame at a minimum of two locations per door.

5. Hinges: Full height, continuous type, 16 gauge, A-coated steel, black finish.

6. Handle: One piece, recessed cup formed from black HDPE and securely mounted to interior of each door for smooth operation with integral latch bard. Capable of accepting various locking mechanisms.

7. Latching Type: Positive, automatic-type locking device allowing locker door to be locked when open, then closed without unlocking.

8. Locking Type: Hasps for combination type provided by owner.

9. Number Plates: Polished aluminum number plate with black numerals 3/8 inch high. Attached to door with rivets.

10. Accessories:

    a. Base 4 inch high, 1 inch thick, HDPE base.

    b. Top: Integral, natural flat top only.

    c. Trim: Manufacturer’s standard, color to match lockers.

    d. Coat hook.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions and field dimensions meet manufacturer’s requirements before starting work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's written instructions.
B. Place and secure on prepared base.
C. Install lockers plumb and square.
D. Secure lockers with anchor devices to suit substrate materials.
E. Bolt adjoining locker units together to provide rigid installation.

3.3 ADJUSTING

A. Adjust moving parts for smooth operation.
   1. Adjust doors and latches to operate without binding.
   2. Verify latches are operating properly.

3.4 CLEANING

A. Clean interior and exterior surfaces or lockers.

3.5 PROTECTION

A. Protect finishes until completion of project.

END OF SECTION 105126

SECTION 220000 – PLUMBING

220001 GENERAL

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Contractor shall provide coordination drawings per Division 1.

C. Plumbing work shall be performed as outlined in "Information for Bidders".

D. These specifications and the accompanying plumbing drawings are intended to provide for all labor, materials and equipment necessary for the installation complete of all

1. Plumbing Fixtures
2. Equipment
3. Rough-Ins
4. Waste And Vent System
5. Oil Separator
6. Condensate Drainage System
7. Cold Water System
8. Hot Water System
9. Compressed Air System

and accessories including necessary apparatus, valves and fittings hereinafter described or called for on the plumbing drawings accompanying these specifications.

E. All plumbing work shall be installed in accordance with the following Codes and all Local Ordinances. Materials, equipment and workmanship shall be as hereinafter specified.

1. North Carolina State Plumbing Code
2. ICC A117.1
3. NSF Standard # 61

F. This contractor shall secure all required permits and inspection fees necessary for this work. Permits may be secured from the Building Inspections Department.

G. The accompanying drawings are schematic only and are not intended to show all fittings, bolts, connections, offsets, etc., unless specifically dimensioned. Follow drawings as closely as possible, provide all adjustments as necessary to conform to the structural conditions, machinery, equipment, work of other contractors and the intent of the drawings, without additional cost to the Owner. Plumbing drawings should not be scaled. Secure dimensions from Architectural drawings. Refer to drawings of other trades and coordinate with other contractors. All items of equipment shall be installed in accordance with the manufacturer's published installation instructions and diagrams.

H. The Contractor shall coordinate water and sewer taps and pay all fees in conjunction to provide services as required, for this project.

220002 SCOPE OF WORK

A. The Contractor shall be required to perform all the following work, in general and provide a complete plumbing system as shown on the plans. The items in general are to be as follows:

1. Furnish and install complete waste and vent system with connections to services as shown on the plumbing drawings and here-in specified.
2. Furnish and install cold water system complete with connections to point as shown on the plumbing drawings and here-in specified.
3. Furnish and install hot water system complete with connections to equipment as shown on the plumbing drawings and here-in specified.
4. Furnish and install compressed air piping system as shown on the plumbing drawings and here-in specified.
5. Furnish and install condensate drainage system as shown on the plumbing drawings and here-in specified.
6. Provide plumbing fixtures and connections to plumbing systems as shown on the plumbing drawings and here-in specified.
7. Provide connections to equipment furnished and installed by General Contractor or Owner as shown on the plumbing drawings and here-in specified.

220003 LIST OF MATERIALS, FIXTURES AND EQUIPMENT

A. The Plumbing Contractor shall obtain written approval from the Engineer/Architect for the use of substitute materials claimed as equal to those specified. Such approvals must be obtained as soon after contract awards as possible and before any materials are ordered. Applications for approvals shall be made by the Plumbing Contractor and not by subcontractors or manufacturer's representative. The Plumbing Contractor shall submit within ten days following award of contract and written notice to begin the work a complete list of materials proposed for the job. All like items shall be by the same manufacturer. When this list is approved, no further substitutions will be permitted except in unusual or extenuating circumstances. If no list is submitted, the Contractor shall supply materials specified. *Contractor should note that all items specified in section 220000 shall be submitted independently of other 220000 series sections.* The Plumbing Contractor shall review and stamp the submittals as being in accordance with his bid and these specifications. **Private labeled materials are not acceptable.**

B. The Plumbing Contractor shall submit shop drawings to the Architect after award of the contract, and before any materials, fixtures, and equipment to be incorporated in the work has been ordered. Shop drawings shall include the name and address of the manufacturer and their catalog numbers and trade names clearly marked. All items shall be referenced to the plans and specifications by **fixture designation or specification paragraph number on an index tab**. One complete set of submittal data shall be manufacturer's original published material. **FAXED COPIES WILL NOT BE ACCEPTABLE**. Approval of materials will be based upon the manufacturer's published ratings. Submit shop drawings and/or catalog data for the following material and equipment:

1. Waste Piping, Fittings and Couplings
2. Condensate Piping, Fittings and Couplings
3. Water Piping, Fittings and Equipment
4. Compressed air piping, Fittings and Equipment
5. Circulator Pumps

6. Cleanouts and Access Doors
7. Valves
8. Insulation
9. Hangers
10. U. L. penetration systems
11. Pipe Markers
12. Fixtures
13. Air Admittance Valves
14. Coordination Drawings per Division 1.

C. Approval of shop drawings and/or submittal data shall not relieve the Plumbing Contractor of the responsibility to comply with the requirements and intent of the plans and specifications with regard to dimensions, capacities, quality, quantity, performance characteristics, etc. If data submitted deviates from the contract documents, the Plumbing Contractor shall point out such deviations in writing and also state reasons for same. All similar items shall insofar as possible be one make and manufacturer.

D. Where any special make, fixture or materials are specified by plate number, trademark or name, deliver to the building with original labels or other identification marks placed thereon by the manufacturer and do not remove until inspected and approved by the Architect. Similar and equal materials and equipment by other manufacturers will be acceptable, subject to approval.

E. Failure to submit materials, equipment, fixtures, etc., in the time period specified above, the Architect shall assume that all items shall be installed as specified.

220004 WORKMANSHIP

A. Layout:

1. Drawings indicate general locations of fixtures. Secure exact location from Architectural plans before proceeding with work.
2. Furnish and install all necessary sleeves, inserts, bolts, etc., for concrete floor slabs, roof, walls, and partitions. Failure to install such items in time to avoid delaying the general contractor shall result in the Contractor doing all cutting and repairing at his own expense.
3. Sleeves as here-in-after specified shall be installed on all through the floor piping above slab on grade except water closet rough-ins. Water closet rough-ins shall be cast in place. Core drilling of slabs shall be sealed with approved fire retardant caulking and sealed watertight.
4. All equipment shall be installed in accordance with manufacturer’s written installation instructions.

B. Drainage, Waste and Vent Piping:

1. Grade all sanitary waste lines 2" and smaller 1/4" per foot.
2. Grade all sanitary waste lines 3" and larger 1/4" per foot, where possible, 1/8" per foot minimum.
3. Grade all condensate drain lines 1/8" per foot.
4. All underground piping shall be graded by the use of a laser beam alignment system.
5. All floor drains shall be set ½ inch below the room finished floor perimeter and the entire floor sloped to the floor drain.

6. Run all piping as directly as possible, avoiding unnecessary bends and turns so as not to interfere with proper installation of work of other contractors.
7. All PVC-DWV piping shall be protected by a cast iron sleeve under the following condition with a sleeve as follows:

    a. Piping passing thru foundation walls: Sleeve shall extend 6 inches beyond wall footing on both sides.
    b. Piping passing below a footing: Per Contract Drawings.

8. Provide removable caps for cleanouts with at least six threads engaged. Provide cleanouts at foot of waste and drainage stacks, all changes in direction of horizontal lines more than 135 degrees, in straight lines at intervals not exceeding 100-feet and anywhere additionally noted on the drawings.
9. Run all horizontal and vertical piping true and plumb to building structure and connect all piping with 'Y' branches and 1/8 or 1/16 bends.
10. Tapped tees and crosses will not be permitted. Tapped sanitary tees and crosses shall be used.
11. No soil, waste, or vent piping shall be covered or concealed, until tested and approved by the Architect.
12. Conceal all soil and vent piping. Vents shall be tied together as shown with minimum number of vents extending through roof. All vents extended through the roof shall be a minimum of 12" above roof level.
13. All PVC-DWV and PVC drainage lines shall be bedded per the manufacturer's recommendations and shall be maintained under a continuous head of 10-feet until after all concrete slabs are poured and/or all heavy equipment has been removed from the site. Contractor shall be responsible for the protection of the piping system at all times including freezing weather.

C. Water System:

1. Conceal water supply piping in walls, below floor or above ceiling except where exposed for connections to fixtures. Install and secure all piping as walls are built. Wedging of piping will not be permitted. <u>All piping shall be isolated from mortar.</u>
2. All water piping shall be routed with a minimum clearance of ten (10) feet from any electrical switchboards, electrical panels, panel boards, telephone backboards, or any other energized equipment.
3. Arrange all pipes to freely drain through a ball valve when water is cut off. All branch valves shall be installed adjacent to the water piping main.
4. All supplies to fixtures shall have individual stop valves.
5. Provide water hammer shock arrestors as required to prevent water hammer. Arresters shall be A.S.S.E. Standards Number 1010 certified. Arresters shall be installed in accordance with manufacturer's published recommendations. Air chambers are not acceptable. Water hammer shock arrestors shall be as manufactured by Precision Plumbing Products, Inc. or approved equal by Zurn, Josam, J.R. Smith, or Sioux Chief.
6. All exposed piping to fixtures shall be chrome plated installed true and plumb.
7. Insulate all water piping inside the building as hereinafter specified.
8. All tees shall be installed such that the flow shall be straight thru the tee and/or out the side. Tees **<u>shall not</u>** be installed where the flow is into the side and out of both ends of the tee (bullhead tee). Bullhead tees installations are not acceptable and shall not be used.
9. Terminate cold water line 5-feet outside building. Connection at this point will be by the General Contractor.

D. Compressed Air Piping:

1. Compressed air piping shall be graded 1/4" per 10 foot toward drip legs in direction of airflow.
2. Compressed air piping shall be installed true and plumb to the building structure.
3. Support for compressed air piping shall be at a maximum of 12-foot centers.

E. Insulation:

1. Pipe insulation joints shall be sealed to maintain integrity of the vapor jacket and shall pass thru all sleeves unbroken except for fire stops.
2. Pipe insulation at all fire separations shall be butted tightly to the firewall or to the floor after fire stop material has been installed.

220005 CUTTING, PATCHING AND CHASING

A. All cutting and patching shall be in accordance with the “General Conditions” of these specifications.

220006 EXCAVATION, TRENCHING AND BACKFILLING

A. All excavation, trenching and backfilling shall be in accordance with Division 31 of these specifications.

220007 SEISMIC RESTRAINTS

A. The Contractor shall be responsible for providing restraints to resist the earthquake effects on the plumbing system. The requirements for these restraints are found in Section 1613 of the North Carolina Building Code. All tables and references shall conform to the building’s location. Restraints shall be per Seismic Design Category C.

B. The Contractor shall refer to the latest edition of the “Seismic Restraints Manual Guidelines for Mechanical Systems” published by SMACNA for guidelines to determine the correct restraints for piping and conduit, etc. This manual refers to Seismic Hazard Level (SHL).

C. The anchorage of the equipment and machinery for this project shall be an integral part of the design and specification of such equipment and machinery. Manufacturers of all equipment including pumps, hot water heaters, tanks, etc. shall provide anchorage details, isolators, seismic mounts and restraints, etc. necessary to comply with Section 1613 to the Contractor for installation. It shall be the Contractor's responsibility to provide and install the equipment, machinery, systems, and assemblies, etc. For this project that satisfies these requirements.

D. Where seismic restraints are required, the Contractor shall provide restraints per details and instructions included in SMACNA's Seismic Restraints Manual. Contractor shall include shop drawings of the specific methods of seismic restraint to be used for this project before installation of piping and equipment.

E. The Contractor shall retain the services of a Professional Engineer registered in the State of North Carolina to design seismic restraint elements required for this project. The engineer's

computations, bearing his professional seal, shall accompany shop drawings that show Code compliance. Computations and shop drawings shall be submitted for review prior to the purchasing of materials, equipment, systems and assemblies.

F. Internal seismic restraint elements of manufactured equipment shall be certified by a Professional Engineer retained by the manufacturer. Such certificate applies only to internal elements of the equipment. All equipment anchorage requirements shall be coordinated with the building structure and shall be compatible thereto. All such anchorage shall be reviewed by the project's structural engineer.

G. The Professional Engineer retained by the Contractor for seismic restraint calculations, shall visit the job site upon completion of the seismic restraint installation. This engineer shall provide in writing verification of compliance with the approved seismic submittal. This verification shall bear the Engineer's professional seal. Job site inspections by other than this engineer are not acceptable.

H. Review of the seismic design and shop drawings by the Engineer/Architect or his agent shall not relieve the Contractor of his responsibility to comply with the seismic or any other requirements of the North Carolina State Building Code.

220008 WASTE & VENT SYSTEMS

A. Piping:

1. Waste and vent piping shall be schedule 40 PVC-DWV solid wall, conforming to ASTM D-2665 and C.S. 272 with NSF seal.

B. Fittings:

1. Fittings for PVC-DWV piping shall be PVC-DWV fittings conforming to piping specifications.

C. Joints:

1. Joints for PVC-DWV piping shall be made using the piping manufacturer’s approved solvent cement.
2. Threaded piping shall be made up using pipe joint compound or Teflon Tape applied to the male thread of the pipe.
3. Flashing of plumbing vents will be provided by the General Contractor.

220009 CONDENSATE DRAINAGE

A. Piping:

1. Condensate piping shall be Schedule 40 PVC-DWV solid wall, conforming to ASTM D-2665 and C.S. 272.

B. Fittings:

1. Fittings for PVC-DWV piping shall be PVC-DWV fittings conforming to piping specifications.

C. Joints:

1. Joints for PVC-DWV piping shall be made using manufacturer's approved solvent cement.

220010 WASTE OIL & WASTE OIL VENT SYSTEMS

A. Piping:

1. Waste oil and waste oil vent piping shall be schedule 40 PVC-DWV solid wall, conforming to ASTM D-2665 and C.S. 272 with NSF seal.

B. Fittings:

1. Fittings for PVC-DWV piping shall be PVC-DWV fittings conforming to piping specifications.

C. Joints:

1. Joints for PVC-DWV piping shall be made using the piping manufacturer's approved solvent cement.
2. Threaded piping shall be made up using pipe joint compound or Teflon Tape applied to the male thread of the pipe.
3. Flashing of plumbing vents will be provided by the General Contractor.

D. Oil Separator:

1. Oil Separator shall be high density polypropylene constructed, furnished for below grade installation, three way access, with compartment baffles, field adjustable riser system, minimum capacity as noted on the Contract Drawings, suitable for H20 loading, with lifetime guarantee. Provide relieving slab and high water anti-float kit. Oil Separator shall be Striem OT-750 or approved equal by Zurn. Provide hard-wired oil level sensor in inlet side of Oil Separator, complete with alarm panel, by same manufacturer as Oil Separator.

220011 HOT AND COLD WATER SYSTEMS

A. Water Piping:

1. Water piping 2-1/2" and smaller, below grade, shall be type 'K' soft copper conforming to ASTM B-88.
2. Water piping 3" and larger, below grade, shall be type 'K' hard copper conforming to ASTM B-88.
3. Water piping 4" and smaller above grade inside the building shall be Type 'L' hard copper conforming to ASTM B-88.

B. Fittings:

1. Fittings for copper piping shall be wrought copper, solder joint fittings conforming to ANSI B 16.22.
2. Fittings for copper piping 2" and smaller may be press fittings conforming to ASME B16.51 and performance criteria of IAPMO PS 117.

C. Joints:

1. All copper piping joints, 1-1/4" and smaller shall be made using lead free solder with a minimum melting point of 410 degrees Fahrenheit.
2. All copper piping joints, 1-1/2" and larger shall be made using Phos-copper silver alloy material with a minimum melting point of 1000 degrees Fahrenheit.
3. Press fitting joints shall be made using the press fitting manufacturer's tools and per manufacturer's instructions.

D. Backflow Preventer:

1. Backflow preventer shall be lead-free double check valve design, non-health hazard, with strainer, test valves, gate valve on inlet and discharge, inlet and outlet pressure gauges, designed to meet AWWA C-510, ASSE 1015. Unit shall be size as shown on the drawings and be manufactured by Watts LF007S or approved equal by Wilkins, Febco, or Conbraco.

E. Expansion Tank:

1. Expansion tank shall be diaphragm design constructed of welded steel and shall bear the ASME and National Board Stamp for 150 pounds working pressure and 200° F. operating temperature. Fittings shall include test cocks, hose bibb drain and air control fitting. Tank and fittings shall be as manufactured by Amtrol, Bell and Gossett, Thrush or Taco.

F. Thermometers and Gauges:

1. Thermometers shall be metallic element type with 3" dial, Type 304 stainless steel case, accuracy range of 1%, black markings on white face, and designed for variable angle mounting. Thermometers range shall be such that the operating temperature shall be in the middle range for the dial. Thermometers shall be installed in a thermometer well and shall be Weiss Model 3VBM Series or approved equal by Omega or Tel-Tru Mfg. Co.
2. Pressure gauges shall be non-filled with 4" face, 1/4" NPT lower connection with operating range in middle portion of the dial, accuracy range of 1%, and black markings on white face. Pressure gauges shall be installed with lever handle gauge cocks. Pressure gauges shall be Weiss Model 4PG-1 or approve equal by Omega or Tel-Tru Mfg. Co.

220012 COMPRESSED AIR SYSTEM

A. Piping:

1. All compressed air piping shall be schedule 40 black steel conforming to ASTM A-53.

B. Fittings:

1. Fittings for black steel piping shall be malleable iron threaded fittings conforming to ASME B16.3 with threads conforming to ASME B1.20.1.

C. Joints:

1. Joints for threaded piping shall be made using pipe dope applied sparingly to the male thread of pipe.

D. Compressor:

1. Air compressor shall be two-stage cylinder air cooled, tank mounted, belt driven complete with tank pressure gauge, outlet valve, automatic tank drain, intake muffler, intake silencer, unloaders, automatic pressure switch, lubrication oil pressure switch, ASME stamped receiver, disconnect switch, magnetic starter with auxiliary contacts and overload running current protection on all three phases, and belt guard. Compressor shall have a tank size and capacity as indicated on the contract drawings. Ingersoll Rand 45465234 or approved equal by Champion or FS Curtis.

E. Hose Reel:

1. Hose reel shall be heavy duty designed, galvanized industrial steel retractable air compressor hose reel, dual arm, powder coated, full flow solid swivel joint, uninterrupted flow, fully enclosed multi-position release ratchet, adjustable hose stop, four non-snag guide rollers, with 50’ length ½” styrene-butadiene polymer hose, Goodyear L820154G or approved equal.

220013 HOT WATER CIRCULATOR

A. Circulator shall have capacity as shown on drawings and shall be specifically designed for domestic hot water service.

B. Circulator shall have lead-free bronze body and flanges with lead-free impeller; circulator motor shall be rubber mounted and shall be equipped with overload protection. Circulator shall be direct connected to motor. Circulator shall be Taco, B&G, or Grundfos with capacity as noted on the drawings.

C. Circulator shall be supported by appropriate hangers to avoid piping strain. Circulators shall be mounted horizontally.

220014 CLEANOUTS AND ACCESS DOORS

A. Cleanouts shall be the same diameter as the pipe they are connected to. If the pipe is greater than 4” in diameter, the cleanout shall be 4”.

B. Cleanouts installed in walls or pipe chases shall be installed using PVC-DWV cleanout tee with slotted plug, stainless steel cover with vandalproof securing screw. Cleanouts shall be Zurn ZS-1468, Josam 58600-PLG, or J. R. Smith 4472.

C. Cleanouts installed in floors and walks shall have adjustable cast iron body with cast brass plug, lead seal and round nickel bronze top with watertight gasketed cover. Cleanouts shall be Zurn ZN-1400, or approved equal by Josam or J. R. Smith.

D. Cleanouts installed in Apparatus Bay floor, or indicated elsewhere on the Contract Drawings as "HDFCO", shall have adjustable cast iron body with cast brass plug, lead seal and heavy-duty veneer nickel bronze top with watertight gasketed cover. Cleanouts shall be installed flush with finished floor. Cleanouts shall be Zurn ZN-1400-HD, or approved equal by Josam or J. R. Smith.

E. Cleanouts installed outside the building and flush with grade shall be installed flush with 24" x 24" x 6" thick concrete pad. Cleanouts plugs shall be ABS with recessed head. Cleanouts shall be Josam 57000-X-LT, Zurn Z-1403-BP-NL, or J. R. Smith 4293 Series.

F. Access doors shall be provided for all valves and shock arrestors located behind hard ceilings and in walls to provide access. Ceiling access doors shall be a minimum of 24" x 24".

G. Provide owner with tool(s) to allow for cleanout caps to be removed.

220015 VALVES

A. Valves shall be installed at all points noted on the plans by standard symbols or as required by best general practice for proper control and operation of the system. All valves shall be identified with 1" diameter, 19 gauge, polished brass identification tags with a number and valve service indicated. Provide a valve chart listing all valves with size and service framed and mounted under glass in the main mechanical room. Provide a self-sticking 1/2" diameter dot on lay-in ceiling grid at all valve locations. Red dot for domestic hot water supply and return, Blue for cold water.

B. Check valves 2 inch and small shall be Class 125, lead free design cast bronze body with threaded ends.

C. Domestic cold and hot water system valves 1-1/4 inch and smaller shall be lead free design cast bronze body, full ported, soldered end ball valves rated for Class 150, 200 WOG service.

D. Domestic cold and hot water system valves 1-1/2 inch and 2 inch shall be lead free design cast bronze body, full ported, threaded end ball valves rated for Class 150, 200 WOG service. Valves shall be provided with stem extensions for insulation thickness specified.

E. Domestic cold and hot water system valves 2-1/2 inch and larger shall be flanged end, iron body ball valves rated for Class 150, 200 WOG service. Valves shall be provided with stem extensions for insulation thickness specified.

F. Compressed air system valves shall be two-piece, full ported, bronze body valves with threaded ends rated for 400 WOG.

220016 PIPE INSULATION

A. All plumbing pipe insulation systems shall be installed as a subcontract to the Plumbing contract. All plumbing pipe insulation systems, including jacketing, coverings, adhesives when used, shall have a flame spread rating not exceeding twenty-five (25) and a smoke development rating not

exceeding fifty (50) when the insulation assembly is tested as a composite. Fibrous glass pipe insulation shall be pre-molded with a thermal conductivity of 0.24BTU/in/hr/ft^2 at 100°F.

1. Insulate all cold water piping above grade with 1" thick pre-molded fibrous glass pipe insulation with self-sealing fire retardant vapor barrier jacket.
2. Insulate all hot water piping, 1-1/2" and smaller, above grade with 1" thick pre-molded fibrous glass pipe insulation with self-sealing fire retardant jacket.
3. Insulate all hot water piping, 2" and larger, above grade with 1-1/2" thick pre-molded fibrous glass pipe insulation with self-sealing fire retardant jacket.
4. Insulate all copper water piping below grade or slab on grade with 1/2" thick pre-molded closed cellular plastic foam pipe insulation.
5. Insulate all hot water return piping with 1" thick fibrous pre-molded glass pipe insulation with self-sealing fire retardant jacket.
6. Rigid pipe insulation inserts shall be provided for all insulated piping 2" and larger.
7. All condensate drainage piping, horizontal and vertical, above slab on grade serving air conditioning condensate shall be insulated with 1" thick pre-molded fibrous glass pipe insulation with self-sealing fire retardant vapor barrier. Condensate P-traps shall be insulated with 1" thick insulating cement insulation.

B. Exposed pre-molded pipe insulation in finished areas and mechanical rooms shall be finished with factory jacket neatly pasted in place and left ready for painting as specified hereinafter.

C. All pipe insulation for pipe fittings shall be pre-molded to fit fittings and shall be enclosed under pre-molded PVC fitting jacket.

D. All insulated piping exposed to the weather shall be protected with color coded 30 mil PVC jacket cemented in place with PVC fitting covers. Color coding shall be in accordance with ANSI standards.

E. Plumbing piping located in CMU walls shall be insulated with closed cellular foam insulation with thicknesses as specified above. Foam insulation thermal properties shall match or exceed the specified thermal insulation properties for the intended usage. Insulation shall be secured with insulation manufacturer's approved tape. All copper piping penetrating CMU walls, shall have continuous insulation through penetration. Copper piping shall not come into direct contact with CMU or mortar.

F. Contractor **may request** that closed cellular foam insulation be used on insulated piping when the building structure is not "dried in" to protect fibrous glass insulation from getting wet. Foam insulation thermal properties shall match or exceed the specified thermal insulation properties for the intended usage. Insulation shall be secured with 16 gauge copper wire at 16 inch centers.

220017 HANGERS

A. Hangers for vertical piping shall be the Riser Clamp design and shall conform to MSS SP-58, Types 1 through 58.

B. Hangers for horizontal piping shall be the Clevis type and shall conform to MSS SP-58, Types 1 through 58.

C. **Hangers for insulated piping shall extend around the insulation.** Provide 16 gage galvanized steel insulation protection saddles 12" long at each hanger on all insulated lines. At the contractor's option, hangers for insulated piping may be Michigan Hangers Model 4031 or 4041. Insulation Shields shall cover lower 180 degrees of pipe in the case of clevis hangers, and entire circumference of pipe in the case of trapeze hangers or clamps.

D. Hangers shall be spaced per the NC State Plumbing Code in accordance with the piping material.

E. A hanger shall be provided within one (1) foot of each bend in horizontal piping. Vertical piping shall be supported at each floor or at intervals not exceeding ten (10) feet. Support cast iron soil pipe to each joint.

F. For piping 4" in diameter and larger, rigid support sway bracing shall be provided at changes in direction greater than 45 degrees.

G. Hangers shall be fastened by means of threaded rods to steel beam clamps, center of bar joist, center of trusses, etc. All hangers shall permit adequate adjustment after erection while still supporting the load. All hanger rods attached to bar joist and trusses shall be install between bottom or top cords of the structural member. Structural members to span from building structure to structure shall be provided by the Contractor.

H. Hangers SHALL NOT be fastened to joist bridging or roof deck.

I. Hangers shall only be hung with drilling into the slab with "drop-in" hangers with the approval of the Structural Engineer of record and the Mechanical Engineer of record with complete dead and operating load information provided for each location. Loading information shall be provided by the Plumbing Contractor.

J. Piping supported on a trapeze hanger shall be secured to the trapeze hanger by means of a pipe clamp around the pipe insulation and insulation saddle. Bare piping shall be secured by a pipe clamp and isolated by an isolation cushion.

K. Piping supported from the floor shall be supported using a base plate securely anchored to the floor and be equipped with a pipe riser. Riser shall be a minimum size of one inch. Horizontal piping above the floor shall be anchored and rest on a manufactured saddle. Piping shall be secured to each saddle as approved by the Engineer.

220018 PIPE SLEEVES, PLATES, ESCUTCHEONS, ETC.

A. Pipe sleeves shall be standard weight schedule 40 black steel above slab on grade or cast iron below slab on grade. All sleeves shall be equal to construction thickness except that pipe sleeves passing through floors, other than slab on grade, shall extend 3/4" above the finished floor. Pipe sleeve sizes shall be sized two pipe sizes larger than piping passing thru the sleeve.

B. Piping thru non-fire rated walls, floors above slab on grade or ceilings, piping passing through foundation walls, and piping installed below structural footings shall have sleeves installed concentric and centered on pipe. Ream all sleeves to prevent cutting of piping. The Contractor shall furnish shop drawings to the general contractor and the Architect showing location, dimensions, and sizes of holes required. Sleeves on piping passing through foundation walls shall extend 6" beyond wall footing on both sides. Sleeves on piping installed below structural footings shall extend beyond footing as indicated on contract drawings.

C. Install escutcheons snug against room finish on all exposed pipe passing through walls, floors above slab on grade or ceilings. Use cup type escutcheons at floors where sleeves extend above finished floors. Escutcheons shall be chrome plated steel with spring clip.

D. Sleeves for insulated piping shall be large enough to allow the insulation to pass thru sleeve unbroken.

E. Core drill openings for all floor openings may be utilized in lieu of sleeved openings. All openings shall be sized two pipe sizes larger than pipe passing thru the opening. All cored openings shall be fireproofed as required and shall be made water tight.

F. All penetrations in rated floors, firewalls and any other rated separations shall be protected using a through-penetration firestopping method with an "F" rating equivalent to the rating of the membrane being penetrated for particular piping materials used and membrane construction type. Floor penetrations shall additionally have a "T" rating equivalent to the rating of the floor being penetrated. Through–penetration firestop systems shall be installed and tested in accordance with ASTM E814 or UL 1479 with a minimum positive pressure differential 0.01 inch w.g. All openings through horizontal fire separations shall be protected by Metacaulk U.L. Systems or approved U.L. listed system by other manufacturers.

G. All openings through floors and vertical fire separations shall be protected by combination water seal and fire stops as manufactured by HoldRite, or approved equal by Proset, Metacaulk, or 3M.

220019 PLUMBING SYSTEM IDENTIFICATION

A. All piping in the building shall be identified by snap-on pipe markers or secured with two zip ties. Markers shall have ANSI colored letters at ANSI height on ANSI colored background with flow arrows and shall be located at 10' on center along pipeline, at each tee branch and at each floor/wall penetration, both sides. A pipe marker shall be located adjacent to each valve. Pipe identification markers shall comply with ANSI A13.1 and be Custom MS-790 as manufactured by Marketing Service Incorporated or approved equal Steton, Emed or DuraLabel. Stenciling of piping and/or insulation is not acceptable. Wording on markers shall be as follows where more stringent than ANSI Standards:

1. Cold Water
2. Hot Water
3. Hot Water Return
4. Waste
5. Vent
6. Compressed Air
7. Condensate

B. Engraved plastic laminate signs for listed plumbing equipment shall be 1/16 inch thick and be secured with self-tapping stainless steel screws. Plastic laminate face color shall be red for all emergency applications and black for all other uses. Letter color shall be white. Signage for all equipment, etc., shall show equipment or service identification, capacity, final date of acceptance for equipment item and warranty information. Signage shall be provided for the following items:

1. Water heaters
2. Circulator pumps

3. Air compressor

220020 PROTECTION OF WORK AND EQUIPMENT

A. It is imperative that waste and vent lines not be filled with concrete, concrete grindings, sand, gravel, or other foreign matter. Under no circumstances shall any line be left open while the Contractor's workers are not on the job site.

B. Plug each opening of waste and vent lines the same day it is installed with test plug securely held in place.

C. All floor drains and hub drains shall be covered immediately after installation.

D. The Contractor shall be responsible for all work damaged by him/her. Any plumbing work damaged by any other contractor shall be replaced by the Contractor and placed in perfect working condition without extra cost to the Owner. All fixtures and fittings shall be adequately protected before, during and after installation.

E. The Contractor shall be responsible for all plumbing fixtures at time of final inspection. Any broken fixtures will be replaced by the Contractor at no cost to the owner regardless of by whom the fixture was broken.

220021 TESTING

A. The Contractor shall notify the Engineer forty-eight (48) hours in advance of all tests. The Contractor shall make all necessary preliminary tests to insure a tight system. Any joint found to leak under test shall be broken, cleaned and remade.

B. All tests shall be applied before any work is concealed or covered in any manner.

C. All sanitary waste, vent and condensate drainage piping shall be tested in the following manner: Plug all openings and fill entire waste and vent system to overflow with water and sustain a constant level for a minimum period of three hours. All portions of the each floor system shall be tested under a minimum of a 10-foot head including roof vent terminal. Air admittance valves shall be installed after testing is complete.

D. All water piping, hot and cold shall be made tight under a hydrostatic test pressure of 150-lbs. per square inch and maintained without pressure loss for a minimum of four (4) hours. No caulking of joints will be permitted. Any joint found to leak under this test shall be broken, remade and a new test applied.

E. All backflow preventers shall be tested and certified by an approved and licensed backflow prevention company.

F. All compressed air piping shall be tested by applying an air pressure of 200-lbs. per square inch and checking all joints with a soap and water solution. System shall maintain pressure for minimum of three (3) hours.

G. The Contractor shall furnish all necessary equipment, materials and labor to perform the above-specified tests.

220022 STERILIZATION

A. All new water piping shall be charged with a chlorine solution containing not less than 50-ppm available chlorine. The solution shall remain in the piping for a minimum period of 6 hours, during which time valves shall be opened and closed to permit a small flow of the solution. At the end of the six (6) hours, the solution shall be tested and must contain a residual of at least 5 to 10 ppm chlorine. The system shall then be drained and flushed to provide satisfactory potable water before final connection is made to the existing distribution system.

B. The Contractor shall contract with an independent Testing Laboratory for a certification letter that the system sterilization meets or exceed standards for potable water.

220023 PLACING IN SERVICE

A. Upon completion of the entire system installation, the entire system and all equipment shall be tested by actual operation to provide that it will function as intended.

B. The Contractor shall flush all waste piping prior to final connection to existing system, to ensure that no foreign materials are in these lines, and that a continuous flow of water and waste can be affected.

C. The Contractor shall flush all water piping prior to the connection of flush valves, mixing valves, and faucet aerators to provide a clean and operational water system.

D. The Contractor shall place the entire system in a satisfactory operating condition and shall furnish all assistance and instructions required by the Owner's representative during initial operating period. The Contractor shall acquaint the Owner's representative with the special parts required for the operation of the flush valves furnished and installed on the project.

E. It is the Contractor's responsibility to turn over to the owner all fixtures and floor drains in a clean condition.

220024 PAINTING

A. The Contractor should note that plumbing piping may be exposed in various areas. The contractor should specifically note that all exposed cast iron piping be uncoated.

B. All exposed plumbing pipe and plumbing pipe insulation in areas other than mechanical rooms shall be left clean and free from oil ready for painting by the General Contractor. All finished painting will be by the General Contractor with colors to match the surrounding areas.

C. All plumbing equipment pads shall be painted yellow.

220025 ELECTRICAL WIRING

A. The Electrical Contractor shall furnish and install all disconnects and motor starters and circuitry. Plumbing Contractor shall make all final electrical connections to equipment provided under Division 22. See Electrical Drawings.

1. EXCEPTION: Plumbing Contractor shall provide Aquastat(s) as indicated on Contract Drawings and in "CONTROLS" section of Division 22 specifications. The Plumbing Contractor shall be responsible for Aquastat wiring connections.

220026 CONTROLS

A. General:

1. Furnish and install an electric control system to fulfill the intent of the drawings and specifications. The system shall include all necessary labor, materials, electrical wiring and devices for a complete installed control system.
2. The Plumbing Contractor shall provide a 120-volt, 24-hour, 7-day programmable time clock, and wire the time clock to the hot water circulation pump. Time clock shall be located in the same room as the circulation pump.
3. All electric wiring in connection with the temperature controls and all interlock wiring shall be furnished under this section of the specifications. The wiring shall be installed by licensed electricians employed by Contractor in strict accordance with all local, State, and National Codes. All control and interlock wiring whether line or low voltage shall be run in EMT conduit or as specified under the electrical section of these specifications. Installation of all concealed conduit shall be coordinated with contractor for general construction so it may be installed before slabs are poured or walls are erected.
4. The control diagrams indicated on the drawings and specified herein show the intended sequences of operation of the various control systems and shall be followed as closely as practicable.

B. Temperature Sensing Devices:

1. Strap-on Aquastat shall have an adjustable range and be mounted directly on the building hot water recirculating line. Aquastat shall be set to 135°F.
2. Each water heater shall be equipped with an integral adjustable thermostat.

C. Sequence of Operation:

1. The aquastat shall energize the circulator pump when temperature reaches set point.

D. Instructions and Diagrams:

1. The Contractor shall provide to the owner a complete instruction manual covering the function and operation of all control components. The manual shall also contain a schematic drawing of each control system properly marked and keyed with the equipment list to identify each item of control equipment.
2. The Contractor shall also provide a complete schematic control diagram framed under glass and mounted on the wall in the equipment room.

220027 OPERATING AND MAINTENANCE MANUAL

A. All operation and maintenance manuals **shall** be delivered by the Contractor to the Owner thru the Architect. The manuals **shall** be installed in 3-ring hard cover heavy duty notebooks with the name of the project and the words "**Operation and Maintenance Manual**" permanently affixed

to the **cover** and **spine**. All items for the project shall be separated by identification tabs correlated to the index. The manuals **shall** contain the following items as a minimum:

1. Index and page number.
2. Certificate of final acceptance.
3. A summary sheet of warranties with dates noted and a copy of all warranties.
4. List of subcontractors and suppliers with names, addresses, and phone numbers.
5. Water Line test data for sterilization.
6. Backflow preventer certificate of operation.
7. Complete start-up, operation, and shutdown procedures for each system including sequence of events, locations of switches, emergency procedures, and any other critical items
8. Lubrication schedules and types of lubricants.
9. Complete set of current shop drawings and equipment description showing all capacities and other operation conditions.
10. Equipment summary showing all capacities and ratings (HP, KW, etc.).
11. Operation manuals, installation manuals, and parts list for all installed equipment.
12. All submittal data indexed with tabs and shop drawings.

B. One copy shall be manufacturer's original published literature with manufacturer's name on all items. ***FAXED COPIES WILL NOT BE ACCEPTABLE***.

220028 AS BUILT DRAWINGS

A. The General Contractor and Plumbing Contractor, shall maintain a set of drawings marked up to show the work as installed, including dimensions to and elevations of buried work. Both Contractors shall initial and date all changes to the contract drawings. The Architectural Observer may check this set of documents monthly for compliance. Upon completion of the work, return this set of drawings to the Architect.

220029 FIXTURES

A. All exposed piping and metal parts shall be chrome plated. Slip joints will not be permitted except on fixture side of trap. Connections for water closets shall be made by use of flanges compatible to waste piping materials and verminproofed wax gaskets.

B. **MANUFACTURER'S MODEL NUMBERS ARE PROVIDED FOR GENERAL INFORMATION ONLY.** Description of product shall take precedence over model numbers.

C. All water closets shall flush properly when flushing with 25 PSIG at the flush valve.

D. All floors drains, floor sinks, shower drains, and mop receptors shall have a deep seal cast iron P-trap installed below floor as a separate item. Joint connection shall be compatible to piping system.

E. All floor-mounted water closets shall be set and grouted with white grout between floor and closet base.

F. All wall-hung lavatories shall be sealed between wall and fixture with white or clear "G.E. Silicone Seal" caulking.

G. All electric water coolers shall be sealed between wall and fixture with clear "G.E. Silicone Seal" caulking.

H. All mop receptor basins shall be sealed between wall and fixture with clear "G.E. Silicone Seal" caulking.

I. All counter mounted fixture rims shall be sealed with clear "G.E. Silicone Seal" caulking.

WC-1 WATER CLOSET: (Adult ADA) 17" high, floor mounted, vitreous china, elongated siphon jet water saver 1.28 GPF bowl with 1-1/2" top spud, china caps, paired with manual flush valve with 1" screwdriver angle check stop, vandal resistant stop cap, ADA flush handle, vacuum breaker, 1" chrome plated wall supply cover pipe, chrome plated cast brass escutcheon with set screw, 1-1/2" chrome plated flush pipe, Sloan WETS-2020.1001 or approved equal by Zurn or American Standard. White moltex open front seat with concealed stainless steel check hinge, less cover, American Standard 5901.100, Church No. 9500CT, Centoco 1500CCSS Bemis 1955SSCT,or Benekee 527. Contractor should note flush valve rough-in height as shown on the drawings. Flush valve handle shall be roughed in and mounted to the wide side of the toilet stall.

WC-2 WATER CLOSET: (Adult Standard) Floor mounted, 15" high vitreous china, elongated siphon jet water saver 1.28 GPF bowl with 1-1/2" top spud, china caps paired with manual flush valve with 1" screwdriver angle check stop, vandal resistant stop cap, ADA flush handle, vacuum breaker, 1" chrome plated wall supply cover pipe, chrome plated cast brass escutcheon with set screw, 1-1/2" chrome plated flush pipe, Sloan WETS-2000.1001 or approved equal by Zurn or American Standard. White moltex open front seat with concealed stainless steel check hinge, less cover, American Standard 5901.100, Church No. 9500CT, Centoco 1500CCSS, Bemis 1955SSCT, or Benekee 527. Contractor should note flush valve rough-in height as shown on the drawings.

L-1 COUNTERTOP LAVATORY: Nominal 19" by 16" vitreous china undermount bowl with front overflow and unglazed rim with mounting hardware shall be American Standard No. 0497.221, or approved equal by Kohler or Kallista. Single lever, chrome plated cast brass, lead free supply faucet with ceramic cartridges, 0.5 GPM vandal resistant aerator and braided stainless steel flex connectors shall be Zurn Z82200-XL-3M, Chicago 2200-E2805ABCP, or T&S Brass B-2701-VF05. Thermostatic lead free mixing valve with locking set point, 3/8" inlet check stops, 3/8" outlet, shall be installed under the lavatory to supply 110 F tempered water to the faucet. Mixing valve shall conform to ASSE 1070 or CSA B125.3 and shall be Watts Model LFUSG-B or approved equal by Combraco or Heatguard. Chrome plated lead free angle stops with loose key handle and 1/2" chrome plated nipple to wall and escutcheon with set screw shall be McGuire or approved equal by Zurn or Brasscraft. Stainless steel braided flexible supplies shall be as manufactured by McGuire or approved equal by Brass Craft, Watts. Chrome plated cast brass strainer with open grid, overflow openings, cast brass locknut and 1-1/4" 17 gauge tailpiece shall be McGuire, Zurn, or Engineered Brass Company. 1-1/4" by 1-1/2" chrome plated adjustable cast brass P-trap with 1-1/4" slip in inlet, cleanout, ground joint, 1-1/2" I.P.S. outlet, shall be McGuire, Zurn, or Engineered Brass Company. 1-1/2" chrome plated nipple to wall with escutcheon and setscrew shall be McGuire, Zurn, or Engineered Brass Company. Lavatory supplies and trap shall be

protected by A.D.A. approved premolded insulation assembly as manufactured by Truebro, McGuire or Mainline.

SK-1 KITCHEN SINK: (Standard) 30-3/4" x 18-1/2" x 10" deep double compartment (13-1/2" x 16" x 10" deep bowl dimensions), 18-gauge, type 304 (18-8) nickel bearing stainless steel undermount sink with sound deadening applied to side and under side shall be Elkay ELUHAD311810 customized with front overflow or approved equal by Just or Advance Tabco. Stainless steel crumbcup strainer with 1-1/2" tailpiece shall be Elkay LK99 or approved equal by Just or Advance Tabco. Center Waste Continuous Outlet: McGuire 113C16G17, or approved equal by Elkay, or Zurn. Lead-free hot and cold water supply spring faucet with pull down wand and faucet mount, multi-function wand, single ADA-compliant side handle, metal construction, renewable ceramic cartridge, minimum 8" swing spout, 1.75 GPM soft flow aerator, shall be Symmons SPR-3510-PD-1.75 or approved equal by Moen or Elkay. Thermostatic lead free mixing valve with locking set point, 1/2" inlet check stops, 1/2" outlet, shall be installed under the sink to supply 110 F tempered water to the faucet. Mixing valve shall be ASSE 1070 approved and shall be Watts Model LFMMV or approved equal by Combraco or Heatguard. Chrome plated lead free angle stops with loose key handle and 1/2" chrome plated nipple to wall and escutcheon with set screw shall be McGuire or approved equal by Zurn or Brasscraft. Stainless steel braided flexible supplies shall be supplied with faucet or be manufactured by McGuire, Brass Craft, or Watts. 1-1/2" x 1-1/2" chrome plated adjustable cast brass P-trap with 1-1/2" slip joint inlet, cleanout, and 1-1/2" 17-gauge tube outlet shall be McGuire, Zurn, or Kohler. Install cast brass escutcheons with setscrew on all piping entering base cabinet.

SK-2 KITCHEN SINK-ADA: (Adult ADA) 30-3/4" x 18-1/2" x 4-3/8" deep double bowl compartment (13-1/2" x 16" x 4-3/8" deep bowl dimensions), 18-gauge, type 304 (18-8) nickel bearing stainless steel undermount sink with sound deadening applied to under side shall be Elkay ELUHAD311845 customized with front overflow or approved equal by Just or Advance Tabco. Stainless steel crumbcup strainer with 1-1/2" offset tailpiece shall be Elkay LKAD35 or Just J-ADA-35 GR or approved equal by Advance Tabco. Center Waste Continuous Outlet: McGuire 113C16G17, or approved equal by Elkay, or Zurn. Lead free hot and cold water supply faucet, single hole, with replaceable ceramic disk cartridges, 8" tubular brass swing spout, 1.5 GPM vandal resistant pressure compensating laminar flow outlet, single lever, lead content equal to 0.25% by weighted average, Chicago No. 430-ABCP, or approved equal by Symmons or Zurn. Thermostatic lead free mixing valve with locking set point, 1/2" inlet check stops, 1/2" outlet, shall be installed under the sink to supply 110 F tempered water to the faucet. Mixing valve shall be ASSE 1070 approved and shall be Watts Model LFMMV or approved equal by Combraco or Heatguard. Chrome plated lead free angle stops with loose key handle and 1/2" chrome plated nipple to wall and escutcheon with set screw shall be McGuire or approved equal by Zurn or Brasscraft. Stainless steel braided flexible supplies shall be manufactured by McGuire, Brass Craft, or Watts. 1-1/2" x 1-1/2" chrome plated adjustable cast brass P-trap with 1-1/2" slip joint inlet, cleanout, and 1-1/2" 17-gauge tube outlet shall be McGuire, Zurn, or Kohler. Install cast brass escutcheons with setscrew on all piping entering base cabinet. Supplies and trap shall be protected by A.D.A. approved premolded insulation assembly as manufactured by Truebro, McGuire or Mainline.

SK-3 DECON SINK: Free standing, double compartment, 16 gauge stainless steel sink with 18" by 24" by 14" deep compartments, left and right 18" drain boards, coved corners,

sloping top rim, 9" high backsplash, center drain outlets, stainless steel legs, adjustable bullet shaped feet, 8" center faucet openings, Elkay 14-2C18X24-2-18X or approved equal by Just or Amtekco. Sink compartments shall be equipped with roto-handle waste fitting with overflow, 1-1/2" outlet, stainless steel strainer, Elkay LK86RT. Sink faucet with renewable seats, lever handles, 12" swing spout, 2.2 gpm aerator, back mounted, Chicago No. 540-LDL12ABCP. Thermostatic lead free mixing valve with locking set point, 3/4" inlet check stops, 3/4" outlet, shall be installed under the sink to supply 120 F tempered water to the faucet. Mixing valve shall be ASSE 1070 approved and shall be Watts Model LFMMV or approved equal by Conbraco or Heatguard. 1-1/2" x 1-1/2" chrome plated adjustable cast brass P-trap with 1-1/2" slip joint inlet, cleanout, ground joint, 1-1/2" I.P.S. outlet shall be McGuire No. 8089C, Zurn Z8712-PC-B, or K-8996. Sink supplies shall be installed using 1/2" type 'L' hard copper equipped with ball valve stops. Install chrome plated cast brass escutcheons on all piping leaving the wall.

SK-4 SERVICE SINK: One piece, single compartment, 20" by 24" by 14" deep molded white structural thermal plastic free standing sink with steel legs, filler panels, molded-in 1-1/2" drain, overflow tube, Fiat SF-1-F, Mustee model 19F, or approved equal by Tehila. 1-1/2" x 2" chrome plated adjustable cast brass P-trap with 1-1/2" slip joint inlet, cleanout, ground joint, 2" I.P.S. outlet, McGuire No. 1207 or approved equal by Zurn or Engineered Brass Company. Polished chrome plated supply faucet with 4" center set, swing spout, Chicago No. 1891-CP or approved equal by Delta or Zurn. Sink supplies shall be installed using 1/2" type 'L' hard copper equipped with ball valve stops.

SH-1 SHOWER-ADA: (Adult ADA) ADA shower stall will be constructed by the General Contractor. Shower drain with cast iron body, 2" hub outlet, 5" square nickel bronze heelproof top, Zurn ZN-415S-Y, or approved equal by Josam or J. R. Smith. Complete shower valve and shower head package shall include single-handle, pressure balanced, chrome-plated bronze shower valve with hot and cold water indicators and check stops on both the hot and the cold, set point of 110 F max with anti-scald feature, chrome-plated bronze diverter valve, chrome-plated ABS, 1.5 gpm, heavy chrome plated ABS construction brass arm, stainless steel wall flange and adjustable spray pattern shower head, and 1.5 gpm fixed spray pattern hand spray with non-positive push button shut-off, vacuum breaker, 60" braided stainless steel flexible hose, 24" glide rail, supply elbow and flange. Package shall be Bradley 1C-HD-ST-SF-B24-DV, or approved equal by Leonard or Symmons. Showerheads and controls shall be mounted as shown on the drawings.

SH-2 SHOWER: (Adult Standard) Shower unit shall be constructed by General Contractor. Shower drain with cast iron body, 2" hub outlet, 5" square nickel bronze heelproof top, Zurn ZN-415S-Y, or approved equal by Josam or J. R. Smith. Complete shower valve and shower head package shall include single-handle, pressure-balance, chrome-plated bronze shower valve with hot and cold water indicators and check stops, set point of 110 F max with anti-scald feature and heavy chrome plated ABS construction brass arm, stainless steel wall flange and 1.5 gpm adjustable spray pattern shower head. Package shall be Bradley 1C-HD-ST-SF or approved equal by Leonard or Symmons. Showerheads and controls shall be mounted as shown on the drawings.

EWC-1 ELECTRIC WATER COOLER: (Dual Height) Wall mounted, dual height, vandal resistant, air cooled type cooler with stainless steel anti-splash receptor, stainless steel cabinet, in line 'Y' strainer, anti-squirt dual stream bubbler, automatic stream regulator, push controls on front, hands free water bottle filler, wall hanger, sealed hermetic

compressor with capacity of 8-GPH of 50ºF drinking water at 90ºF room temperature and 80º F inlet water temperature, Elkay LVRCGRNTL8WSK, or approved equal by Halsey Taylor or Oasis, factory wired for 115 volt, single phase electrical service. Chair carrier with steel upright support legs, backing plates shall be Zurn Z-1225-BL, or approved equal by J.R. Smith or Watts. The Plumbing Contractor shall furnish the electrical receptacle rough-in dimensions to the Electrical Contractor to provide for a concealed electrical service to the unit. Plumbing Contractor shall provide PVC P-trap the same size as the electric water cooler drain. Wheel handle lead free stop valve shall be McGuire LF175 or approved equal. Plumbing Contractor should note that spout should be set at height as shown on the drawings.

MR-1 **MOP RECEPTOR**: ~~**Mop receptor basin will be constructed by the General Contractor. Basin drain with cast iron body, 3" hub outlet, 5" square nickel bronze heelproof top, Zurn ZN-415S-Y, or approved equal by Josam or J. R. Smith..**~~ **32" x 32" x 12" deep precast terrazzo receptor with 3" inside caulked drain, stainless steel strainer, stainless steel caps on all curbs, Fiat Model TSB3001, or approved equal by Williams or Mustee.** Wall mounted, polished chrome plated supply faucet with top brace, vacuum breaker, integral screwdriver shank check stops, 3/4" hose end, Chicago 540-LD897SWXFXKCAB, T&S B-0665-BSTP or approved equal by Moen. Heavy duty, cloth reinforced rubber hose and hose hook, Fiat Model 832-AA, Williams Model T-35, or Mustee Model 65.700. Wall mounted, 24" long, 3 mop spring clip hanger, Fiat Model 889-CC, Williams Model T-40, or Mustee Model 65.600. Supply faucet outlet shall be mounted a minimum of 24" above receptor floor. Contractor should note that joint between receptor, wall and floor should be sealed with clear silicone sealant.

FD-1 FLOOR DRAIN: Cast iron body drain with 2" outlet to match piping system, 6" square nickel bronze heelproof top, with flashing device, Zurn ZN415S, or approved equal by Josam, J. R. Smith, Wade, or Watts.

FD-2 FLOOR DRAIN: Cast iron body drain with 4" outlet to match piping system, 6" square nickel bronze heelproof top, with flashing device, Zurn ZN415S, or approved equal by Josam, J. R. Smith, Wade, or Watts.

TD-1 TRENCH DRAIN: 6” wide pre-sloped trench drain, length as needed. Ductile iron frame and channels, 4” no-hub ~~**end**~~ **bottom** outlet, reinforced galvanized slotted grate shall be DIN 19580/EN 1433 load classification E and H-20 compliant. Watts Dead Level D or approved equal by Zurn or J. R. Smith. Contractor shall install deep seal P-trap below floor as a separate item.

TD-2 TROUGH DRAIN: Trough shall be constructed of 3/4” polyethylene, with removable corrosion-resistant primary filter screen and secondary filter basket, furnished with nested cover, internally sloped floor, internal supports, removable access lid, rebar anchor gussets, and suitable for below-grade installation, 4” outlet, field fabricated inlet connections with a load rating of 450 lbs. Trough shall be Striem TT-4

FS-1 FLOOR SINK: 12" x 12" x 8" deep cast iron body floor sink with 3" outlet to match piping system, anchor flange, white acid resistant enameled interior, white acid resistant dome strainer, half nickel bronze grate, Zurn Z-1901-K-2-33, or approved equal by Josam or J. R. Smith.

FS-2 FLOOR SINK: 12" x 12" x 8" deep cast iron body floor sink with 4" outlet to match piping system, anchor flange, white acid resistant enameled interior, white acid resistant dome strainer, half nickel bronze grate, Zurn Z-1901-K-2-33, or approved equal by Josam or J. R. Smith.

HD-1 HUB DRAIN: Provide minimum 3" I.D. hub drain for condensate collection from HVAC equipment. Hub drain shall extend to 1" above finished floor. Pipe material shall be per condensate drainage section of these specifications. Support shall be per hangers section of these specifications.

HB-1 HOSE BIBB: Wall mounted, polished chrome plated brass with 3/4" vacuum breaker hose end, locking shield, tee handle, 1/2" inlet wall flange, Woodford Model 26P-1/2, Mifab MHY-9240, T & S Brass B-0702/B-972 or Preir C-257CP.50.

HB-2 WALL HYDRANT: Non-freeze type with 3/4" copper inlet, 3/4" double check backflow preventer hose end, removable key handle, self draining, for wall thickness as required, Woodford Model 67, Zurn Model Z-1310 or Josam Model 71050-12.

CB-1 ICE MAKER CONNECTION BOX: Fully recessed unit with lead free cold water shut-off valve, compression nut and ferrule as shall be LSP Products Group model OB-801-LL, IPS Corporation model AB9700 or approved equal Oatey Company.

CB-2 WASHER CONNECTION BOX: Fully recessed washing machine outlet box with hot and cold water hose connections, 2" drain outlet and overflow guard. Unit shall be Guy Gray Model FB-200 or approved equal by Oatey or LSP.

ESH-1 EMERGENCY SHOWER/EYE WASH: Floor mounted, galvanized steel, free standing emergency shower-eyewash unit with stay-open shower valve, pull down rod, handle, 3.1" diameter drench ABS shower head, soft-flow angle eye wash heads with covers, spray ring, stainless steel bowl, push to open stay-open valve, 6" high drain, capable of 20 gpm tepid water flow at 30 psi, Bradley Model S19314, or approved equal by Guardian, or Speakman. Anchor vertical column to wall with standoff brackets at 45º angle. Plumbing Contractor shall install 1-1/4" schedule 40 PVC drain pipe to drain outlet with (2) 90-degree bends, to direct drainage to front of unit. Plumbing Contractor shall furnish and install thermostatic mixing valve with inlet screwdriver check stops, outlet thermometer and low temperature adjustment range. Valve shall be designed to provide a minimum of 15 minutes of cold-water flow should hot water supply fail. Valve shall be Bradley Model S19-2100-RS EFX25 or approved equal by Guardian or Speakman, surface mounted in stainless steel cabinet. Plumbing Contractor shall furnish the Owner one drench shower tester for testing of Emergency Shower. Floor drain with cast iron body with 4" outlet to match piping system, 8" square nickel bronze heelproof top, vandal resistant securing screws less flashing device, Zurn ZN-415S-VP, or approved equal by Josam or J. R. Smith. Contractor shall pipe drain outlet at base with two 90 degree elbows to direct discharge to floor drain.

DW-1 DISHWASHER: Unit provided by others. Plumbing Contractor shall provide dishwasher sink drain tailpiece (to match drainage system) and connect 3/4" drain to adjacent sink tailpiece using 3/4" fiber reinforced hose and hose clamps. Hot water supply shall be installed using 1/2" type 'L' soft copper equipped with lead free ball valve stop. Provide sufficient coil of piping to facilitate removal of unit for servicing

WH-1 WATER HEATER: Factory assembled electric 80-gallon storage type heaters shall be equipped with glass lined steel tanks, ASME pressure temperature relief valve, magnesium anode rod, tank drain with hose connection, ASHRAE/IESNA 90.1 insulated factory applied baked enamel finish jacket, three bolt-in, 4,500-watt immersion elements set to run simultaneously (13.5 kw total) and control box. Heater shall be controlled by immersed bulb thermostat and be equipped with high limit temperature control, control box, transformer, contactors and junction box. Control circuits shall be a maximum of 120-volts. Heaters shall be ASME constructed and labeled. Heaters shall be U.L. listed and shall carry 3-year factory warranty. Heater shall be factory wired for 208-volt, three-phase electrical service as shown on the plans and shall be A.O. Smith DRE-80-13.5, or approved equal by State, Bradford White, or Rheem. Water heater shall be started by the manufacturer's factory representative.

220030 GUARANTEE

A. Guarantee: The Contractor shall guarantee the entire plumbing system subject to the General Conditions of these specifications.

220031 BIDDING PROCEDURE

A. The Contractor shall provide bidding for Alternate Bids in accordance with Division 1. Contractor shall refer to Division 1 for any required unit prices and allowances.

END OF SECTION 220000

SECTION 230500 - HEATING AND AIR CONDITIONING SPECIFICATIONS

230501 GENERAL

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. The Heating and Air Conditioning Contractor shall co-operate with the contractors of other trades and shall install his work as fast as the progress of the balance of the work will permit.

C. The Heating and Air Conditioning Contractor shall install all work in accordance with the requirements of the latest edition of the North Carolina State Building Code. Codes to be a part of these specifications include the North Carolina State Building Code, National Fire Protection Association Codes Section 70, 90A, 91, and other applicable sections.

D. Inspection by local authorities will be required.

E. The drawings accompanying these specifications indicate diagrammatically the general location of the ducts, piping, and equipment and do not show all offsets, fittings, bolts, connections, supports, etc., required for a complete system. While the drawings are to be followed as closely as possible, if it is found necessary to change the location of same to accommodate the conditions at the building, such changes shall be made without additional cost to the Owner, and as directed by the Engineer. Any detail which is omitted, and which is necessary for the proper operation of any system included under the contract, shall be supplied and installed by the Heating and Air Conditioning Contractor without extra cost to the Owner. All pipes and ducts shall be run as high as possible to maintain ceiling and head clearance. All equipment shall be installed in such a manner as to allow proper maintenance access.

F. Equipment and Materials shall be delivered to the site and stored in original containers, suitably sheltered from the elements, but readily accessible for inspection by the Engineer until installed. All items subject to moisture damage shall be stored in dry spaces.

G. Conditions shall be checked at the building before fabricating or placing orders for apparatus and such apparatus shall be of such dimensions as to fit the spaces allotted. The Heating and Air Conditioning Contractor shall not scale mechanical plans, but rather refer to architectural plans for dimensions.

H. All debris resulting from heating and air conditioning work shall be removed from the premises daily or as directed by the Architect/Engineer. Trash and rubbish shall not be allowed to accumulate either within or outside the building. Materials and debris that in the opinion of the Engineer cannot practicably be removed from the site the same day may be temporarily stacked or stored in a designated location on the site as directed by the Architect/Engineer.

I. Guards shall be provided for all moving equipment, motor couplings, pump shafts, belt drives and similar exposed reciprocating or rotating components.

J. All new HVAC and refrigeration equipment shall be labeled in accordance with Section 301 of the North Carolina State Building Code and as required by the Authority having jurisdiction. Labeling shall be a permanent factory-applied nameplate affixed to the equipment on which shall

appear in legible lettering, the manufacturer's name or trademark, the model, serial number, and the seal or mark of the testing agency.

230502 SCOPE

A. The Heating and Air Conditioning Contractor shall provide labor and materials required for a complete system ready for operation as shown on the drawings and hereinafter specified. This includes all equipment, ductwork, piping and all other services necessary whether they are specifically mentioned herein or not. The entire installation shall be installed in a first-class, neat, professional manner to the satisfaction of the Engineer and shall conform to all applicable codes and laws.

230503 SHOP DRAWINGS AND SUBMITTAL DATA

A. The Heating and Air Conditioning Contractor shall submit within 10 days after award of the contract a list of materials and the manufacturer to be used on this project. They shall submit within thirty days after award of the contract at least five copies of submittal data in written form for the Engineers' use in approving materials and equipment. One copy will be returned. If the Heating and Air Conditioning Contractor desires the return of more than one copy, additional copies shall be provided to the Engineer at the time of the original submission. It is requested that all submittal data be sent to the Architect at one time. Unless special consideration is given, none of the submittal data will be checked until it has all been received by the Architect. Where called for, the Heating and Air Conditioning Contractor shall submit five sets of shop drawings showing the detailed arrangement or connections that are shown schematically on the drawings. Data certified for the specified project and indicated manufacturer, type, or size, capacity, etc., shall be submitted for the following equipment items:

1. Split System Heat Pumps
2. Split System Ductless Heat Pumps
3. Energy Recovery Ventilators
4. Air Scrubbers
5. Power Ventilators and Gravity Ventilators
6. Diffusers, Grilles, and Registers
7. Heaters
8. Controls with Complete Diagram
9. Fire, Manual, and Motor operated Dampers
10. Access Doors
11. Dryer Vent Box Shop Drawing
12. Insulation
13. Seismic Restraints
14. Testing and Balancing

230504 APPROVED EQUAL EQUIPMENT, ETC.

A. Manufacturers listed are to establish a standard of quality and not intended to limit the selection to these manufacturers. All materials and equipment which are essential and have not been specified or shown shall be new and of the highest grade and quality, free from defect or other imperfections. It should be understood that where the word provide is used, it is intended that the

Heating and Air Conditioning Contractor shall purchase and install all materials required. Approval of equipment will not relieve the Contractor of compliance with the specifications even if such approval is made in writing, unless the attention of the Engineer is called to the non-complying features by letter accompanying the submittal data. Approval of submittal data by the Engineer shall not be construed as a complete check or approval of detailed dimensions, weights, gauges, and similar details with the proposed articles. The conformance with the necessary coordination between the various other contractors and suppliers shall be solely the responsibility of the Heating and Air Conditioning Contractor.

230505 SPLIT SYSTEM HEAT PUMPS

A. Air handling unit section shall be UL or ETL labeled draw-thru design complete with centrifugal fans, condensate drain pan, refrigerant coil, insulated cabinet, electric resistance auxiliary heaters, and filters. Coil shall be dual circuit where indicated with non-ferrous tubes mechanically bonded to plate fins. The fan section shall have direct driven forward-curved fans with variable speed adjustment. The cabinets shall be internally insulated and shall be constructed of 16-gauge galvanized steel with baked enamel finish with bushings or plugs at cabinet penetrations or connections for electrical and piping. Drain pans shall be double sloped, removable, cleanable, and composite material. Auxiliary electric strip heaters shall be by the heat pump manufacturer and shall be UL or ETL approved to be installed in the unit in the reheat position or at the unit's discharge. Unit shall rest on pad-type vibration isolators.

B. Filters shall be 2" thick UL Class 1 pleated panels with Minimum Efficiency Reporting Value/MERV 8 per ASHRAE Standard 52.2-2012. Contractor shall supply complete sets of filters to protect the equipment during construction, another change of filters at completion, and leave one additional complete set of filters at the building for the next change. Provide factory supplied fixed filter blockoffs to prevent air bypass around filters.

C. Outdoor section shall be UL labeled and AHRI rated and certified with its air handling unit and bear the AHRI seal. The fans shall be permanently lubricated, direct drive, propeller type. The compressors shall be hermetic using refrigerant with suction and discharge stop valves, crankcase heaters, automatically reversible oil pump, oil filter, internal thermostat, and controls for low ambient temperature operation. The unit controls shall include compressor staging, a high and low pressurestat of the automatic reset type, a positive acting five minute timer to prevent short cycling and a motor starting and protecting equipment. Units shall be furnished with coil guards.

D. Systems using A2L refrigerant shall be listed to UL Standard 60335-2-40, current edition.

E. Per EPA SNAP 23, systems using A2L refrigerant shall have permanently affixed markings and labeling to indicate refrigerant installed in the system and Notice of leak detection system installed, and shall have service ports, pipes, hoses and other devices through which refrigerant flows to be marked in red.

F. Systems using A2L with refrigerant charge > 4.0 lbs in largest independent circuit shall have integral factory installed refrigerant leak detection system mounted in the air handling unit section downstream of the evaporator coil with internal controls to automatically upon refrigerant detected, unit commands compressors and electric heat (if present) off, and commands air handling unit's fan to maximum airflow for air circulation. Once refrigerant has not been detected for a minimum of 5 minutes, unit shall return to normal operation.

G. For systems using A2L refrigerant, if releasable refrigerant charge in the system exceeds the levels allowed in ANSI/ASHRAE Standard 15 – 2022 or newer for the effective dispersal volume, provide safety isolation valves in both refrigerant lines as release mitigation controls. Valves shall automatically close upon signal from the unit integral refrigerant leak detector. Valve locations shall be as such for releasable refrigerant charge to be less than the levels allowed in ANSI/ASHRAE Standard 15 – 2022 or newer for the effective dispersal volume.

H. As part of submittals, provide calculated releasable refrigerant charge in largest independent circuit for each system, including connecting piping.

I. Refrigerant piping systems shall be sized, pitched, and furnished with all specialties as recommended by the unit manufacturer to accommodate refrigerant piping lengths. Specialties shall include suction line accumulators, liquid line solenoid valves, thermal expansion valves, refrigerant sight glass, removable core filter drier, and any other item deemed necessary or recommended by the unit manufacturer.

J. See GUARANTEE 230534 for description of unit and compressor warranty requirements.

K. Indoor and outdoor sections shall be by the same manufacturer and shall be Trane, Carrier, Daikin, JCI/York, or approved equal.

230506 SPLIT SYSTEM DUCTLESS HEAT PUMPS

A. Indoor section shall be vertical wall mounted ductless type split heat pump unit. Unit cabinet shall be 20 gauge galvanized steel with rounded corners and finished with an undercoat and topcoat of hard finish polyurethane paint. Unit shall be internally insulated and be furnished with auxiliary heater and 1" thick pre-cut washable polyester filter media. Unit fan shall be dual tangential blower type. Unit shall have hardwired wall mounted thermostat with high-medium-low fan control and remote mounted condensate pump.

B. Outdoor section shall be by the same manufacturer as the indoor section. Units shall be compact low profile type with inverter driven compressor, refrigerant, crankcase heaters, and controls for low ambient temperature operation in cooling mode down to 0ºF. The fans shall be permanently lubricated, direct drive type with horizontal air discharge. Safety controls shall include loss of charge and low and high-pressure switch.

C. Systems using A2L refrigerant shall be listed to UL Standard 60335-2-40, current edition.

D. Per EPA SNAP 23, systems using A2L refrigerant shall have permanently affixed markings and labeling to indicate refrigerant installed in the system and Notice of leak detection system installed, and shall have service ports, pipes, hoses and other devices through which refrigerant flows to be marked in red.

E. Systems using A2L with refrigerant charge > 4.0 lbs in largest independent circuit shall have integral factory installed refrigerant leak detection system mounted in the air handling unit section downstream of the evaporator coil with internal controls to automatically upon refrigerant detected, unit commands compressors and electric heat (if present) off, and commands air handling unit's fan to maximum airflow for air circulation. Once refrigerant has not been detected for a minimum of 5 minutes, unit shall return to normal operation.

F. For systems using A2L refrigerant, if releasable refrigerant charge in the system exceeds the levels allowed in ANSI/ASHRAE Standard 15 – 2022 or newer for the effective dispersal volume, provide safety isolation valves in both refrigerant lines as release mitigation controls. Valves shall automatically close upon signal from the unit integral refrigerant leak detector. Valve locations shall be as such for releasable refrigerant charge to be less than the levels allowed in ANSI/ASHRAE Standard 15 – 2022 or newer for the effective dispersal volume.

G. As part of submittals, provide calculated releasable refrigerant charge in largest independent circuit for each system, including connecting piping.

H. Refrigerant piping systems shall be sized, pitched, and furnished with all specialties as recommended by the unit manufacturer to accommodate refrigerant piping lengths. Specialties shall include suction line accumulators, liquid line solenoid valves, thermal expansion valves, refrigerant sight glass, removable core filter drier, and any other item deemed necessary or recommended by the unit manufacturer.

I. See GUARANTEE 230534 for description of unit and compressor warranty requirements.

J. Units shall be UL or ETL labeled and shall be commercial type by Trane, Daikin, LG, Mitsubishi, Samsung, or approved equal.

230507 ENERGY RECOVERY VENTILATORS

A. Energy Recovery Ventilator (ERV) shall include intake and exhaust fans, filters, and energy recovery core heat exchanger all in a single cabinet. ERV shall be UL 1812 listed and labeled.

B. The energy recovery device shall be a static core heat exchanger rated in accordance with AHRI Standard 1060-2000 with ratings certified by AHRI. Core shall be built into an aluminum frame. Core shall be coated with a polymer membrane without the use of binders or adhesives which may plug the desiccant aperture. Desiccant shall not dissolve or deliquesce in the presence of water or high humidity. The core shall be easily cleanable with a standard cleaning solution or mild soap and water solution. The core shall have a crossover exhaust air transfer ration < 0.5% and shall accommodate a low-pressure drop of 0.35 in w.g @ 100% rated CFM. The air transfer shall happen without virus transfer and shall be compliant with ASTM F-1671 for zero penetration. The core also shall be mold and bacteria resistant (ISO 846 – Rating 0).

C. ERV cabinet shall be fully insulated 20 gauge galvanized steel construction with a powder coat paint finish electrostatically bonded to the metal. Cabinet shall have top access doors and movable duct flanges for intake air and exhaust air duct connections. All airstreams shall be horizontal. Knockouts shall be provided for power connections. Hanging or pad mount installation capability shall be standard. Test ports shall be provided so airflow can be measured across the energy recovery device.

D. Intake and exhaust air fans shall be centrifugal forward curved blowers with ball bearings and three-speed direct drive permanent split capacitor motors. Provide speed controller for each fan motor.

E. Filters shall be 2” thick UL Class 1 pleated panels with Minimum Efficiency Reporting Value/MERV 8 per ASHRAE Standard 52.2-2012. Contractor shall supply complete sets of filters to protect the equipment during construction, another change of filters at completion, and

leave one additional complete set of filters at the building for the next change. Provide factory supplied fixed filter blockoffs to prevent air bypass around filters.

F. ERV's shall be complete with low ambient kit for frost control, controller for economizer mode, rotation sensor utilizing dry contact switch that closes upon failure, differential pressure sensors for airflow status monitoring, dirty filter sensors, and contacts for connection to controls.

G. Units shall be UL or ETL labeled and shall be Ruskin MCV series, Greenheck ECV, or approved equal.

230508 AIR SCRUBBERS

A. Air scrubbers shall be self-contained, fully automatic, recirculating, hoseless system with vertical intake and 360 degree horizontal clean air output; designed to remove hazardous gases and particulate from indoor vehicle parking bays and eliminate exhaust backwash in accordance with ANSI/ASHRAE 52.2, UL 508A, UL 900, ULC/CAN S111 and NFPA 1500.

B. Cabinet body shall be 16 or 18 gauge steel with gray powder coat finish with (4) pre-drilled mounting holes and mounting angles for threaded-rod hanger support from roof structure above, (4) adjustable output airflow grilles, (2) hinged access panels with one panel on top for access to motor blower unit and one panel on bottom for access to filter compartment, and electrical connection box.

C. Motor-Blower unit shall be dual voltage, ball bearing, resilient mounted, capacitor start, thermally protected, UL approved electric motor with plastic chemical resistant, back curved centrifugal impeller and airflow funnel cone.

D. Power connection shall be via 8-feet long 3-prong, 14 gauge, pre-molded electrical cord.

E. Accessories shall include cabinet mounted automated filter replacement gauge.

F. Filters:

1. Stage 1 Pre-Filter shall be 24 inch × 24 inch × 1 inch 3-ply polyester construction, self-sealing, meeting requirements for Class 2 in accordance with UL 900 and ULC/CAN S111 with certified efficiency of 30 to 35 percent based on ASHRAE 52.2 test method.
2. Stage 2 Main Media Filter shall be 24 inch × 24 inch × 6 inch HEPA MAX 3000 high efficiency particulate air filter, with ultra-fine pleated fiberglass media pack constructed with 24 gauge galvanized metal frame and corrugated aluminum dividers between pleats meeting requirements for Class 2 in accordance with UL 900 and MERV 16 with certified efficiency of 95 to 99.97 percent based on dioctyl phthalate (DOP) testing with 0.3 micrometer particles.
3. Stage 3 and 4 Gas-Phase Extractor shall be 24 inch × 24 inch × 4 inch deep 2-part gas phase extractor with activated carbon filter for removal of heavy weight gases and potassium permanganate filter for removal of light weight gases. Heavy and light weight filters shall be each constructed with 24 gauge galvanized metal frame and honeycomb containment structure.
4. Contractor shall supply complete sets of filters for all stages to protect the equipment during construction, another change of filters at completion, and leave one additional complete set of filters at the building for the next change.

G. Controls shall be multi-circuit automatic reset timer control system of 120 V electrical controller in NEMA 4 cabinet to operate and sequentially activate air scrubber units in groups of two, after 15 second delays, until all units are activated, including adjustable low voltage time delay relay, LED "System Activated" indication light, ON-OFF-AUTO selector switch, "System Test" switch to activate system for a timed cycle, 120 V to 24 V, 2A low voltage transformer to power system activation devices, and meeting UL 508 for industrial enclosed control panels. Once activated, elapsed time for scrubber operation shall be user-determined with timing range of 1 minute to 120 minutes.

Air scrubber activation shall be via the following, all in parallel:

1. Magnetic door switch (one per vehicle door) as part of air scrubber system.
2. Photoelectric eyes (to detect vehicle movement) as part of air scrubber system.
3. Manual ON-OFF-AUTO selector switch with label.
4. Input signal from Carbon Monoxide (CO)/Nitrogen Dioxide (NO2) Sensing System in space, sensing system as specified in Section 230900 by Control Contractor.

H. Air scrubbers shall be Air Vacuum Corporation AIRVAC 911 series or approved equal.

230509 POWER VENTILATORS AND GRAVITY VENTILATORS

A. Power ventilators shall be tested and rated in accordance with the standards of AMCA 210 and shall carry the AMCA seal. All fans shall be UL labeled. Fans shall be Cook, Greenheck, Carnes, Twin City, PennBarry, or approved equal.

B. Ceiling exhaust fans shall have plug disconnect switch, interior fiberglass insulation, forward curved centrifugal blower wheel, back draft dampers, permanently lubricated motor, and white steel grille. Units shall have solid-state motor speed controller with an "OFF" position. Furnish wall cap with birdscreen where shown on drawings. Caps shall have baked enamel finish of color selected by the Architect.

C. Inline fans shall be centrifugal in-line ventilator with variable speed belt drive or direct drive as indicated on the drawings. Housing shall be constructed of steel with removable drive door and access panel. Wheel shall be dynamically and statically balanced. Motor base shall be adjustable and have locking screws and guides to provide positive belt tension and correct alignment. Ball bearings shall be heavy-duty self-aligning, relubricable flange type with locking collars. Bearings must be selected for 125,000 hours average service life at maximum cataloged operating speed. Drives shall be cast iron and have a minimum of 1.25 service factor. Drives shall be isolated from the airstream. Motors shall be EISA 2007 NEMA premium efficiency with efficiency rating stamped on motor nameplate. All units shall be provided with backdraft dampers, hanging vibration isolators, motor/drive guards, and disconnect switches. Direct drive units shall have solid-state motor speed controllers with an "OFF" position.

D. Wall mounted fan shall be heavy duty belt driven with steel propeller, exhaust or supply as indicated on the drawings. Fan shall be manufactured at an ISO 9001 certified facility, shall be UL listed and bear the AMCA certified rating for sound and air performance. The fan shall be bolted and welded construction with the motor, bearings and drive mounted on a tubular steel power assembly. All steel components shall have an electrostatically applied baked polyester powder coating. Propeller shall be steel and shall be balanced in accordance with AMCA Standard 204-96. Motor shall be heavy duty permanently lubricated sealed ball bearings in a cast

iron pillowblock housing for a minimum L 50 life in excess of 200,000 hours. Drives shall be variable pitch and sized for 150% of installed motor horse power. Fan shall be complete with OSHA wire guard, heavy duty galvanized motor operated shutter in a wall collar ready for connection to the wall louver.

E. High Volume Low Speed (HVLS) Air Movement Fans shall be four blade minimum of diameter indicated on the drawings. Formed aluminum blades and hub shall have polished finish with powder coated finish of color selected by Architect on motor frame and gear reducer cover. Each fan shall have three-way motor-to-hub safety connection. Entire assembly shall be rotationally balanced. Fan's sound shall be less than 50 dBA measured 20 feet below and 20 feet from fan's center. Full CFM performance shall be tested to ANSI/AMCA 230. Fan shall include factory structure mounting kit and fan variable speed, on/off, forward/reverse remote mounted controller. Fan's factory warranty shall be 3-year parts, 1-year labor, 10-year structural, and lifetime on blades and hub workmanship. Fans shall be installed by manufacturer trained technician. Basis of design fans are Rite Hite Revolution.

F. Gravity ventilators shall be heavy gauge aluminum. Mounting base shall be prepunched and include an integral spun venturi. The internal structure shall be constructed of galvanized steel for rigid support and includes a windband and birdscreen. Bird screen shall be 1/2" x 1/2" PVC coated wire.

G. Roof curbs for roof-mounted equipment shall be provided by the Heating and Air Conditioning Contractor. It shall be the responsibility of the Heating and Air Conditioning Contractor to give the proper locations and sizes required for all roof openings. Opening will be framed and cut by not the Heating and Air Conditioning Contractor. Roof curbs shall be insulated. Equipment shall be attached to roof curbs with a minimum of two stainless steel fasteners and EPDM washers on each side of roof curb.

H. Gravity ventilators and roof curbs shall be finished with factory applied finish of color selected by the Architect.

230510 DIFFUSERS, GRILLES, AND REGISTERS

A. Diffusers, Grilles and Registers shall be as manufactured by Carnes, Metal Aire, Titus, Price, Krueger, or approved equal unless otherwise noted.

B. All diffusers, grilles, and registers shall be painted off-white unless otherwise noted. Where indicated on drawings to be field painted, white factory finish shall be as necessary to receive field finish painting.

C. All diffusers, grilles, and registers shall have a maximum NC level of 25 in the space for the specified airflow.

D. Lay-in Supply Air Diffusers: Shall be aluminum construction, fixed square louvered face, 4-way blow, panel type to drop in 24" x 24" "T" bar ceiling grid, with individual adjustable vertical pattern and opposed blade dampers. Vertical air adjustment shall be made by adjusting four perimeter blades to force air down in the vertical position.

E. Regular Ceiling Supply Air Diffusers: Shall be aluminum construction square, fixed square louvered face, 4-way blow, panel border, adjustable vertical pattern, and opposed blade damper.

F. Sidewall Supply Air Registers: Shall be aluminum with adjustable front vertical and back horizontal airfoil vanes on 2/3" centers and opposed blade dampers

G. Lay-in Ceiling Return Air Grilles: Shall be aluminum 1/2" x 1/2" egg crate with aluminum frame and designed to lay in an inverted "T" bar ceiling grid. Grilles shall be full flow across the entire face of grille and tapered up to neck size.

H. Ceiling Return Air Registers: Shall be aluminum 1/2" x 1/2" egg crate with aluminum frame and opposed blade dampers. Registers shall be full flow across the entire face of register and tapered up to neck size.

I. Ceiling/Sidewall Exhaust Registers and Sidewall Return Air/Transfer Air Registers and Grilles: Shall be aluminum construction with fixed blades on ½" centers set at 35-degree angles. Registers shall include opposed blade dampers.

230511 HEATERS

A. Electric baseboard heaters shall be commercial-grade furnished and installed complete with all necessary heating elements, brackets, and closures, splice plates, interior and exterior corners, and accessible wiring compartment. Maximum leaving air temperature at the outlet and enclosure surface temperature, under continuous operation, shall not exceed 200°F. Heaters shall be Markel Series 2900C, Q-Mark, Raywall, Indeeco, or approved equal complete with UL label.

Heating elements shall consist of stainless steel element rod with aluminum fins. Maximum watt density per linear foot of element shall not exceed 250 watts. Enclosures shall be steel with thicknesses not less than 18 gauge front and 22 gauge back and shall be rigidly reinforced. Enclosures shall be wall hung with bottom at elevation above the finished floor as shown on the drawings, and shall be suitable for the space available. End plates and corner pieces shall be die formed with round edges, fit flush with enclosure surface, and be neat in appearance. No direct contact between enclosure and heating element will be permitted. Enclosure shall be painted with rust-inhibiting paint at the factory and shall have baked enamel finish of color selected by Architect. Connection box shall be designed to permit power supply and control wiring from bottom, rear, right or left side as required. Thermostat shall be built-in double pole double throw adjustable with extra sensitive bulb and capillary. Thermostat shall have positive off position and be within unit enclosure or junction box. Limit controls shall be continuous end-to-end automatic reset thermal overheat; line voltage protection shall be provided with each individual baseboard heater to protect from overheating due to any cause. Baseboard unit shall be furnished complete, factory prewired and ready to receive branch circuit and connections. Each heater shall be provided with a factory-installed safety disconnect switch or circuit breaker installed in the housing or in an auxiliary matching control section or have thermostat with positive off position.

B. Electric unit heaters shall be listed by Underwriters Laboratories, Inc., and shall bear the appropriate UL label. Heaters shall be furnished and installed in accordance with the manufacturers' published recommendations. The elements shall be metal sheath fin tube type. Heaters shall be complete with adjustable discharge louvers, ceiling or wall mounting bracket, built-in contactors with 24 volt control circuit, built-in fuses, 18 gauge steel cabinet, built-in thermal overload protection, combination fan guard and motor mount, continuous duty motor, wall mounted thermostat, and separate field installed-unit mounted power disconnect switch. Unit heaters shall be Markel Series 5100, Raywall, Indeeco, or approved equal.

230512 CONTROLS – See Section 230900 Instrumentation and Control for HVAC.

230513 ELECTRICAL

A. Electrical circuit sizes are based on capacities of the drawings and it shall be the responsibility of Heating and Air Conditioning Contractor to change any and all electrical work in order to fit mechanical equipment. Heating and Air Conditioning Contractor shall coordinate with Electrical Contractor to assure that all units are properly connected and shall check wiring prior to starting units. Any damage to units resulting from improper wiring or connections shall be the responsibility of Heating and Air Conditioning Contractor. Flexible electrical conduits shall be 18 inches in length maximum.

B. All electrical work shall be installed in accordance with codes having jurisdiction and the Electrical Division, Division 26, of these specifications.

C. Starters shall have integral 120V Control power transformer. Starters shall have holding coil for 120V control with hand-off-auto switch. The starters shall be inoperative if the thermal unit is removed. All magnetic starters shall be NEMA sized with applicable melting alloy overload relays and applicable enclosure.

D. All three phase motors shall be provided with phase loss protection.

E. Fused disconnect switches shall be heavy duty industrial type, NEMA 3R where on exterior. Switches shall be fusible type mounted so handle is approximately 4 feet 0 inches above floor or grade. Switches shall have a factory applied standard finish. Labeling shall be as indicated in the Electrical Division, Division 26, of these specifications. Each switch for motor circuits shall have a complete set of time delay fuses.

F. Motor Starters and Fused Disconnect Switches shall be neatly arranged, and securely fastened to walls with expansion bolts, lead shields, etc. Each starter or switch shall have its usage or letter designation indicated on its cover per the Electrical Division, Division 26, of these specifications.

230514 FIRE, MANUAL, AND MOTOR OPERATED DAMPERS

A. Fire dampers shall be provided in the duct systems in accordance with NFPA Standard No. 90A and shall conform to NFPA Standard No. 90A for materials and workmanship. The dampers shall be spring loaded dynamic rated multi-leaf type UL approved and labeled for installation into the rated assembly (a 1-1/2 hour damper for a 2 hour rated assembly and two 3 hour dampers for a 4 hour rated assembly) and shall be installed according to the manufacturer's recommendations. Dampers shall be Ruskin, Pottorff, Prefco, ~~Air Balance~~, United Enertech, **Greenheck, Nailor** or approved equal.

B. Manual and Motor operated dampers including Zone and Bypass dampers shall be low leakage type provided in the duct systems as indicated on the drawings in accordance with NFPA Standard No. 90A and shall conform to NFPA Standard No. 90A for materials and workmanship. Blades shall have extruded vinyl double edge seals. Jambs shall have flexible metal compression type seals. To facilitate service access and insulation installation, manual damper handles shall be on

2" stand-off brackets. Handles shall be spray painted red. Dampers shall be installed according to the manufacturer's recommendations. Dampers shall be Ruskin, Pottorff, Prefco, Air Balance, United Enertech, or approved equal.

1. Maximum damper leakage at 1.0 in w.g. shall be 10 cfm/sf of damper area for motor operated dampers.
2. For manual dampers, maximum damper leakage at 1.0 in w.g. shall be 40 cfm/sf of damper area for dampers smaller than 24 inches in either dimension or shall be 20 cfm/sf for larger manual dampers.
3. Leakage ratings shall be when tested in accordance with AMCA Standard 500.
4. When damper face velocity exceeds 1500 FPM or system pressure exceeds 2.5" WC, but no more than 4000 FPM or 6" WC, dampers shall be airfoil blade type of double skin construction with linkage out of the air stream.
5. Motor operated dampers including zone and bypass dampers shall have electric actuators and shall be normally closed. See Section 230900 Instrumentation and Control for HVAC for actuators. Wiring to actuators shall be by the Heating and Air Conditioning Contractor.

C. Manufacturer's installation instructions for all dampers shall be furnished at time of final inspection. Installation instructions shall be affixed to damper access doors.

230515 ACCESS DOORS

A. Access doors shall be provided for access to all fire and motor operated dampers and duct smoke detectors.

B. Duct mounted access doors shall be constructed of No. 22 US gauge zinc-coated sheet steel and shall be gasketed, air tight and provided with not less than two (2) cam-type latches. Doors shall be square and shall be 12" x 12" or two inches less than the height of the duct. Doors shall be two-piece with 1" rigid insulation between the metal sides. Doors shall have engraved plastic laminated labels with 1/2" tall letters indicating item accessed through door.

C. Wall and ceiling access doors shall be provided as specified in Division 08.

D. Provide 3/4" diameter red dot on ceiling grid below all duct access doors.

230516 DUCTWORK

A. Mechanical drawings are schematic only and do not show all offsets, supports, etc. required. Heating and Air Conditioning Contractor shall familiarize himself with the complete contract documents and site conditions before fabricating ductwork. Any changes to ductwork found necessary to accommodate the conditions at the building shall be made without additional cost to the Owner, and as directed by the Engineer.

B. During construction, interior of ductwork, fans, etc. shall be protected. All openings and open ends of ductwork shall be covered with self-adhesive 3 mil polyethylene film.

C. All dimensions on the drawings are free inside dimensions.

D. All duct joints shall be sealed in accordance with SMACNA Seal Class A before insulation is applied. All sealants shall meet the provisions of UL181.

E. Ductwork shall be of galvanized steel with standard gauges and construction in accordance with the recommendations of SMACNA HVAC Duct Construction Standards, Metal and Flexible, Third Addition, 2005 for appropriate pressure class. Airfoil turning vanes with 1-1/8" spacing and rail support system shall be installed in all 90º elbows. Ductwork shall be cross broken on all sides and shall be supported at both ends of each joint and at 10'-0" intervals maximum with galvanized angles supported by galvanized threaded rods of sizes and spacing in accordance with SMACNA. Ductwork to be exposed shall be constructed in a first class, neat, professional manner and exposed ductwork with excessive hammer marks shall be replaced. Round supply takeoffs from trunk ducts shall be made with factory 45º entry branch rectangular to round type fittings. Provide dampers in takeoff fittings where indicated on drawings. Damper handles shall be on 2" stand-off brackets. Handles shall be spray painted red. Splitter dampers shall be provided where indicated with adjustment quadrant locking device and shall be constructed of two thicknesses of 24-gauge-galvanized steel. All components of the air distribution system shall be mechanically fastened with at least three equally spaced sheet metal screws with screws not more than on 12" centers.

F. Final 8'–0" of the runout to the air outlet may be factory fabricated flexible ducts complying with NFPA Standard No. 90A, UL 181, and shall be UL Class 1 R-6 insulated type with foil vapor barrier. The flexible duct shall be air tight for factory test when bent to full recommended radius and under not less than 10" water gauge internal pressure and shall be limited to 8'-0" maximum length. Flexible ducts shall be supported by galvanized steel straps in accordance with SMACNA at intervals not exceeding 4'-0" and at each change of direction. Flexible ducts shall have a minimum of one support.

G. Dryer Vent Box shall be fully recessed unit with 4" duct connection, flexible duct and frame as detailed on drawings. Unit shall be modified as necessary for installation in a masonry or stud wall. Dryer ductwork shall be round 30 gauge galvanized steel with substantially airtight joints and shall connect to box outlet. Sheetmetal screws shall not be used at joint connections. Joints shall run in direction of airflow. Outlet shall be non-screened aluminum with backdraft damper.

230517 PIPING

A. The Heating and Air Conditioning Contractor shall furnish all piping and supports necessary to provide a complete system as shown or intended by the plans and specifications. All piping shall be inspected, tested, and approved before being insulated or concealed. Pipe shall be clean, run generously parallel to the building and have all open ends closed with iron caps at all times. Eccentric reducers shall be used in horizontal runs and concentric reducers in vertical runs. All piping and fittings shall have manufacturer's identification and ASTM designation incorporated thereon.

B. Drain pan and pumped condensate piping shall be Type "L" copper with all joints soldered with 95-5 solder. Piping shall have dielectric union at connection to ferrous pipe. Drain pan condensate piping shall have a minimum slope of ¼" per linear foot and shall be at least as large as unit condensate connection.

C. Refrigerant piping shall be capped and dehydrated Type “L” hard drawn copper with wrought fittings. All joints shall be brazed with silver brazing alloys according to manufacturer’s published recommendations.

D. Welding material and labor shall be in accordance with welding procedures of the American Standards Code for Pressure Piping ASA B31.9. Welders shall be fully qualified in above specified procedure, tested, and so certified by an approved Welding Bureau of Locally Recognized Testing Authority. Welding shall be electric arc or oxyacetylene welding method as approved using electrodes and rods that comply with ASTM specifications.

E. Swing joints or loops shall be provided wherever necessary to allow for expansion of piping. Broken piping or fittings shall be removed and replaced at the Heating and Air Conditioning Contractor’s expense.

230518 PIPE HANGERS

A. All piping shall be neatly and securely supported by hangers from fire resistance rated structural elements of the building spaced in the following manner:

1. Copper Piping 1-1/4" and smaller - 6'-0" O.C.
2. Copper Piping 1-1/2" and larger - 10'-0" O.C.
3. Provide 2 hangers at each change in direction.

B. Hangers shall be the Clevis type as manufactured by Modern Fig. 590, B-Line Fig. B 3100, or Grinnell Fig. 260 complete with hanger rods of size to conform to the type of hanger and pipe supported. Hangers shall be attached to the building by beam clamps or bolted to bar joist. At hangers provide 16" long 16 gauge galvanized sheet metal protection saddle three times the nominal pipe diameter. Under no condition shall hangers be connected directly to insulated pipe. Saddles shall be Modern Type A, B-Line Fig. B 3151, or Grinnell Fig. 167.

C. Hangers for vertical piping shall be riser clamp design as manufactured by Modern Fig. 500, B-Line Fig. B3373 or Grinnell Fig. 261. Riser clamps shall be installed on top of each floor penetration.

230519 INSULATION

A. All piping and ductwork shall be inspected and tested before insulation is applied. All insulation shall meet UL 723 and ASTM-E84 flame spread and smoke developed requirements of 25/50 and shall comply with NFPA 90A and the latest edition of the NC Building Code. Insulation shall be Certainteed, Owen Corning, Knauf, and Johns-Manville.

B. All air conditioning supply, return, ERV relief, and outside air ducts and the back of all diffusers and grilles shall be externally insulated with 2" thick 1 lb. density foil scrim kraft jacketed insulation. Adhere insulation to duct with fire retardant adhesive in sufficient quantities to prevent sagging. Ducts with a width over 30" shall be further secured on all sides with mechanical fasteners on 18" maximum centers. Insulation shall be butted with facing overlapping all joints at least 2" and sealed with fire retardant vapor barrier adhesive. Tape all joints, breaks, punctures, and any penetrations with SMACNA foil faced kraft duct tape.

C. Where externally insulated ductwork is supported by angles, provide 6” long x duct width x 1-1/2” thick 6.0 pound density board insulation on bottom of duct at hanger support. External duct insulation shall be continuous around ductwork and board insulation at duct hanger. On round ducts, duct hanger shall be outside duct insulation.

D. Refrigerant piping shall be insulated with tubular closed cell elastomeric insulation with all joints butted and cemented tight. Insulation shall be 1-1/2” thick for the entire length of gas line. Liquid line shall be minimum insulated 1” thick inside the thermal envelope and 1-1/2” where outside the thermal envelope or on exterior of the building. Insulation on refrigerant piping exposed on the building’s exterior shall have aluminum jacket as hereinafter specified.

E. Air handling unit drain pan condensate piping on interior and pumped condensate piping shall be insulated with tubular closed cell elastomeric insulation with all joints butted and cemented tight. Insulation on interior condensate piping shall be 1” thick.

F. All refrigerant piping within 8’-0” of the floor or exposed on the exterior shall be provided with a protective aluminum jacket with a factory-applied poly backing moisture barrier over piping insulation. Aluminum jackets shall be cross-crimped (longitudinally corrugated) for strength. Aluminum jackets shall be not less than 0.016" thick and shall be secured with aluminum or stainless-steel screw; not more than 8" apart. Each jacket shall be applied by turning a 1" hem inward on one longitudinal edge and then lapping the hemmed edge over the unhemmed edge. The jacket may be machine cut to produce a straight smooth edge and the hem omitted. The longitudinal and circumferential seams shall be lapped not less than 2". Jackets on horizontal lines shall be so installed that the longitudinal seams are on the bottom half of the pipe with the seam of each jacket slightly offset from the seam of the adjacent jackets; top edge shall overlap bottom edge. The jackets on vertical lines and lines pitched from the horizontal shall be installed from low point to high point so that the lower circumferential edge of each jacket overlaps the jacket below it. Special fitting jackets conforming to the above with the exception of longitudinal lapping dimensions and location of seams shall be used for fittings, valves, and flanges. Jackets for fittings, valves, and flanges shall be properly overlapped and secured. Equivalent aluminum jacketing system, when approved, will be acceptable.

230520 SPECIALTIES

A. Floor, wall and ceiling plates or escutcheons of size to fit pipe covering shall be installed where pipes pass thru finished areas and shall be chromium plated spring type as manufactured by Kenney, Connecticut Stamping and Bending Company, Dearborne or approved equal.

B. Unions or flanges shall be provided throughout the piping system to facilitate the removal and servicing of all valves, equipment, items, etc.

230521 FOUNDATIONS

A. All concrete and reinforcing steel for foundation slabs under equipment shall be provided by the Heating and Air Conditioning Contractor. Foundations shall extend beyond all equipment by 4" in all directions and shall be made from 3,000 PSI concrete reinforced with 10/10 x 6/6 wire mesh. Foundation surfaces shall be troweled smooth and edges shall be tooled. Interior equipment pads shall be painted OSHA approved yellow.

230522 VIBRATION ISOLATION

A. Pad type isolators shall be 3/4" thick bridge bearing quality neoprene ribbed or waffled on both sides. Pads shall be selected for a maximum durometer of 50 and designed for 15% deflection. Where required, steel load-spreading plates shall be incorporated between the equipment and the neoprene pad.

B. Flexible duct connections, both at inlet and discharge of furnaces shall be made of 30 oz workinglass fiber coated with neoprene, sewn together at edges and joints. These flexible connections shall withstand the operating air-pressure, shall not permit air leakage, and shall not transmit vibration.

230523 PAINTING

A. All exposed mechanical equipment in finished areas including ductwork, pipe hangers, etc., shall be painted the same color as the adjacent ceiling and walls by the General Contractor. Heating and Air Conditioning Contractor shall treat and prepare all items as necessary to receive paint.

230524 PIPE MARKERS

A. Markers shall have wording, wording colors, and wording background in accordance with ANSI A13.1. Markers shall have letters approximately 1" high on appropriate background, flow arrows, and shall be located on the pipe at intervals not exceeding 10'-0" where in mechanical spaces and 25'-0" intervals where above ceilings. Markers shall be plastic with markers on piping completely encircling the pipe with overlap and permanent tension in the marker to grip the pipe firmly with the need of adhesives. Provide markers on all piping in the building. Wording of markers shall be as follows:

1. Refrigerant Piping
2. Condensate Piping

230525 NAMEPLATES

A. All packaged units, split systems, ERVs, air scrubbers, heaters, and power ventilators shall be furnished with engraved plastic laminated labels permanently attached to the equipment. Lettering shall be 3/8" tall. Label shall include equipment number, area served, substantial completion date, number and size of filters, number and size of belts, and capacities. Substantial completion date shall be on a separate label so as to allow equipment nameplates to be installed prior to final acceptance.

230526 OPENINGS

A. The Heating and Air Conditioning Contractor shall furnish all blockouts, sleeves and openings required for their work. Pipe sleeves, where firestop penetration system allows, shall be schedule 40 black steel pipe and shall be provided where pipes pass through walls and floor. Sleeves through walls shall butt flush with the wall finish and shall be of sufficient size to permit passage of pipe covering through the area where pipe is installed. Sleeves through floors shall extend 3/4"

above the finished floor. Specifically inform the General Contractor as to the correct size and location of openings and sleeves to ensure that they shall be cast in their proper location. Sleeves and duct opening frames shall be furnished and installed by the Heating and Air Conditioning Contractor. Failure to indicate such openings in time to avoid delaying the General Contractor shall result in the Heating and Air Conditioning Contractor providing all cutting and repairing at his own expense. Repairing shall include sealing tight around pipe sleeves and duct frames in a neat and professional manner and in accordance with the "Cutting and Patching" section of this specification.

B. All penetrations in rated floors, firewalls and any other rated separations shall be protected using a through-penetration firestopping method with an "F" rating equivalent to the rating of the membrane being penetrated for particular piping materials used and membrane construction type. Floor penetrations shall additionally have a "T" rating equivalent to the rating of the floor being penetrated. Through-penetration firestop systems shall be installed and tested in accordance with ASTM E814 or UL 1479.

230527 CUTTING AND PATCHING

A. The Heating and Air Conditioning Contractor shall do all cutting and patching necessary to install all equipment as required under his contract, and shall re-establish all finishes to their original condition where cutting and patching occur. All cutting of the structure, where unavoidable, must be approved by the Engineer and be done by the General Contractor, but shall be paid for by the Heating and Air Conditioning Contractor.

230528 PIPING PRESSURE TESTING

A. The Heating and Air Conditioning Contractor shall make the following tests before the systems are insulated or covered by construction. The systems shall have no decrease in pressure during the test periods. All system components shall be protected from test pressures that exceed manufacturer's design limits.

B. Notify Architect and Engineer 48 hours in advance of all tests.

C. Heating and Air Conditioning Contractor shall provide written report of each test.

D. Refrigerant piping shall be tested in accordance with Chapter 11 of the North Carolina Mechanical Code and unit manufacturer's recommendations.

E. Condensate piping shall be tested by applying a hydrostatic pressure of 100-psig for a period of two hours.

F. No caulking of joints shall be permitted. Any joint found to leak under this test shall be broken, remade, and a new test applied. Welded joint pinhole leaks shall be repaired by welding; however, welds that show numerous pinholes shall be replaced.

230529 SEISMIC RESTRAINTS

A. The Heating and Air Conditioning Contractor shall be responsible for providing restraints to resist the earthquake effects on **all** mechanical system components within the building. The requirements for these restraints are found in Section 1613 of the North Carolina Building Code. All tables and references shall conform to building's location. Restraints shall be per Seismic Design Category C for an Occupancy Category IV building.

B. The Heating and Air Conditioning Contractor shall refer to the latest edition of the "Seismic Restraints Manual Guidelines for Mechanical Systems" published by SMACNA for guidelines to determine the correct restraints for sheet metal ducts, piping and conduit, etc. This manual refers to Seismic Hazard Level (SHL).

C. The anchorage of the equipment and machinery for this project shall be an integral part of the design and specification of such equipment and machinery. Manufacturers of all equipment including unit ventilators, chiller, air handling units, pumps, boilers, tanks, compressors, etc. shall provide anchorage details, isolators, seismic mounts and restraints, etc. necessary to comply with Section 1613 to the Heating and Air Conditioning Contractor for installation. It shall be the Heating and Air Conditioning Contractor's responsibility to provide and install the equipment, machinery, systems, and assemblies, etc. for this project that satisfy these requirements. Where seismic restraints are required, the Heating and Air Conditioning Contractor shall provide restraints per details and instructions included in SMACNA's Seismic Restraints Manual. The Heating and Air Conditioning Contractor shall include shop drawings of the specific methods of seismic restraint to be used for this project before installation of piping, ductwork, and equipment.

D. The Heating and Air Conditioning Contractor shall retain the services of a Professional Engineer registered in the State of North Carolina to design seismic restraint elements required for this project. The Engineer's computations, bearing his professional seal, shall accompany shop drawings that show Code compliance including certification that the seismic system components comply with the testing requirements of Section 1707. Computations and shop drawings shall be submitted for review prior to the purchasing of materials, equipment, systems, and assemblies.

E. Internal seismic restraint elements of manufactured equipment shall be certified by a professional engineer retained by the manufacturer. Such certificate applies only to internal elements of the equipment. All equipment anchorage requirements shall be coordinated with the building structure and shall be compatible thereto. All such anchorage shall be reviewed by the project's structural engineer.

F. The Professional Engineer retained by the Heating and Air Conditioning Contractor for seismic restraint calculations shall visit the job site as necessary to comply with the Special Inspections requirement of the Code. This engineer shall provide in writing verification of compliance of the installation with the approved seismic submittal. This verification shall be submitted as a Special Inspections Report and shall bear the Engineer's professional seal. Job site inspections by other than this engineer are not acceptable.

G. Review of the seismic design and shop drawings by the Engineer/Architect or his agent shall not relieve the Heating and Air Conditioning Contractor of his responsibility to comply with the seismic or any other requirements of the North Carolina Building Code.

230530 TESTING AND BALANCING

A. Testing and balancing of heating, ventilating, and air conditioning systems shall be performed and certified by an AABC or NEBB certified Test and Balance Contractor as a subcontractor to the Heating and Air Conditioning Contractor. All instruments used shall be accurately calibrated and in good working order. The Test and Balance Contractor shall test in strict accordance to the Standards of AABC or NEBB.

B. Air balance and testing shall not begin until the systems have been installed in full working order and shown to be operating satisfactory on both heating and cooling. The Contractor shall place all heating, ventilating, and air conditioning systems into full operation and shall continue the operation until balancing is completed. All operational cost shall be borne by the Heating and Air Conditioning Contractor. The Architect and Engineer shall be given one week advance notice of when tests are to be made.

C. Upon completion of the heating, ventilating, and air conditioning systems, the Test and Balance Contractor shall compile the test data and submit three copies of the completed test data to the Engineer for evaluation and approval. At final inspection, the Test and Balance Contractor and Heating and Air Conditioning Contractor shall have a copy of test and balance report and all necessary personnel and equipment to facilitate spot-checking of test and balance data. Final payment to the Contractor shall be withheld until the test and balance data has been approved.

D. Testing Procedure (AIR):

1. Test and adjust air handling unit fan's RPM and CFM to design requirements. Record all data.
2. Test and record motor full load amperes on all motors.
3. Check and record coil leaving air temperatures from coils when in full cooling, full heating, and from full hot gas reheat coil.
4. Adjust all main supply, exhaust, return, relief, and outside air ducts to proper design CFM when air handling systems are in normal operating mode and in outside air economizer mode. Record supply, return, exhaust, relief, and outside air data.
5. Test and adjust each diffuser, grille and register for supply, exhaust, or return systems to within 10% of design requirements. Record all data.
6. All adjustments to air diffusing devices where possible shall be made in trunk or run out dampers, not at diffuser volume control.
7. Exhaust fans shall be tested and balanced for the requirement as shown on the plans. Record all data.
8. The Heating and Air Conditioning Contractor shall make any changes in the pulleys, belts, filters, dampers, or valves necessary or as recommended by the Engineer for correct balance at no additional cost to the Owner.

230531 INSTRUCTIONS

A. The Heating and Air Conditioning Contractor shall give an instruction and training period in the operation of the apparatus to the persons who will be in charge of the system. See Division 1 specifications for listing and training requirements.

230532 MAINTENANCE DATA

A. For all items requiring maintenance, the Heating and Air Conditioning Contractor shall furnish two weeks prior to Final Acceptance and deliver to the Owner's representative on the job multiple copies of complete data as prepared by the manufacturer covering the details of operation and maintenance and complete parts list for all equipment specified. Each copy of the maintenance data shall be assembled into a 3-ring hardback binder with indexing and label on cover and spine. Data shall include:

1. Index with page numbers.
2. List of all subcontractors and suppliers with names, addresses, and phone numbers.
3. Contractor's certificate of Final Acceptance.
4. Copy of all warranties.
5. Equipment model numbers, etc. indicated and referenced with the same mark as shown on equipment on the drawings.
6. Filter schedules of sizes and quantities for all equipment requiring filters referenced by mark on the drawings.
7. Equipment summary showing all capacities and ratings.
8. Certified test and balance report.
9. Start-up and test reports for equipment.
10. Complete start-up, operation, and shut-down procedures for each system.
11. Lubrication schedules and types of lubricates.
12. All submittal data and shop drawings, unless included in a separate manual.
13. See Division 1 specifications for additional requirements.

230533 AS BUILT DRAWINGS

A. The Heating and Air Conditioning Contractor shall maintain "during the course of the work" a set of specifications and drawings marked up to show the work as installed, including a minimum of two dimensions to indicate locations and elevations of buried work. Upon completion of the work, return this set of drawings to the Architect.

230534 GUARANTEE

A. The Heating and Air Conditioning Contractor shall guarantee the entire heating and air conditioning system subject to the General Conditions of these specifications, except:

1. Refrigeration compressors for split system heat pump units shall have a four-year extended warranty for the compressors only. Refrigerant, labor, freight, and other required parts shall be provided or paid for by the Owner.

END OF SECTION 230500

BEAR CREEK FIRE STATION

ONSLOW COUNTY

BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

VICINITY MAP

IMAGE REPRINTED FROM GOOGLE MAPS
NTS

DESIGN TEAM

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CIVIL/LANDSCAPE

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DRAWING INDEX

TITLE

CIVIL

ARCHITECTURE

INTERIORS

STRUCTURAL

FIRE PROTECTION

PLUMBING

MECHANICAL

ELECTRICAL

ALTERNATES

ALTERNATE A-1: FOUR-FOLD DOORS IN LIEU OF SECTIONAL DOORS.
1. BASE BID: DOORS 127.8, 127.9, 127.10, 127.11, 127.12 TO BE TYPE G AS INDICATED ON SHEET A700 AND AS SPECIFIED IN SECTION 083613 "SECTIONAL DOORS".
2. ALTERNATE: DOORS 127.8, 127.9, 127.10, 127.11, 127.12 TO BE TYPE F AS INDICATED ON SHEET A700 AND AS SPECIFIED IN SECTION 083713 "EXTERIOR FOUR-FOLD DOORS".

ALTERNATE A-2: TILE IN LIEU OF PAINT IN BATHROOMS
1. BASE BID: NON-SHOWER WALLS OR WALL BEHIND TOILET TO HAVE TILE UP TO 3'-4" WITH METAL TRIM EDGE THEN PAINT REMAINING WALL. SEE SHEET A410.
2. ALTERNATE: ALL BATHROOM WALLS, NOT INCLUDING TOILET 102, TO HAVE TILE UP TO 8'-0" WITH METAL TRIM EDGE THEN PAINT REMAINING WALL. SEE SHEET A410.

ALTERNATE C-1: CONCRETE PAVEMENT DRIVE IN LIEU OF HEAVY DUTY ASPHALT PAVEMENT DRIVE.
1. BASE BID: HEAVY DUTY ASPHALT PAVEMENT WITH EXTENTS AS SHOWN ON SHEET C100 AND AS SPECIFIED IN SECTION 321216 "ASPHALT PAVING".
2. ALTERNATE: CONCRETE PAVMENT WITH EXTENTS AS SHOWN ON SHEET C100 AND AS SPECIFIED IN SECTION 321313 "CONCRETE PAVING".

ALTERNATE C-2: CONCRETE PAVEMENT IN LIEU OF LIGHT DUTY ASPHALT PAVEMENT AT PARKING.
1. BASE BID: LIGHT DUTY ASPHALT PAVEMENT WITH EXTENTS AS SHOWN ON SHEET C100 AND AS SPECIFIED IN SECTION 321216 "ASPHALT PAVING".
2. ALTERNATE: CONCRETE PAVMENT WITH EXTENTS AS SHOWN ON SHEET C100 AND AS SPECIFIED IN SECTION 321313 "CONCRETE PAVING".

ALTERNATE M-1: ADD TEN AIR SCRUBBERS TO APPARATUS BAY.
1. BASE BID: NO AIR SCRUBBERS.
2. ALTERNATIVE: TEN AIR SCRUBBERS AS SHOWN ON SHEET M100 AND M701.

BID DOCUMENTS

DAVIS KANE ARCHITECTS, PA
503 OBERLIN ROAD | SUITE 300
RALEIGH, NC 27605
919.833.3737
www.daviskane.com

PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION
ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. — REGISTERED ARCHITECTURAL CORPORATION — 50304 — NORTH CAROLINA — RALEIGH, N.C.

JIMMY ARDEL EDWARDS — REGISTERED LANDSCAPE ARCHITECT — 3823 — 05.12.25 — NORTH CAROLINA — RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

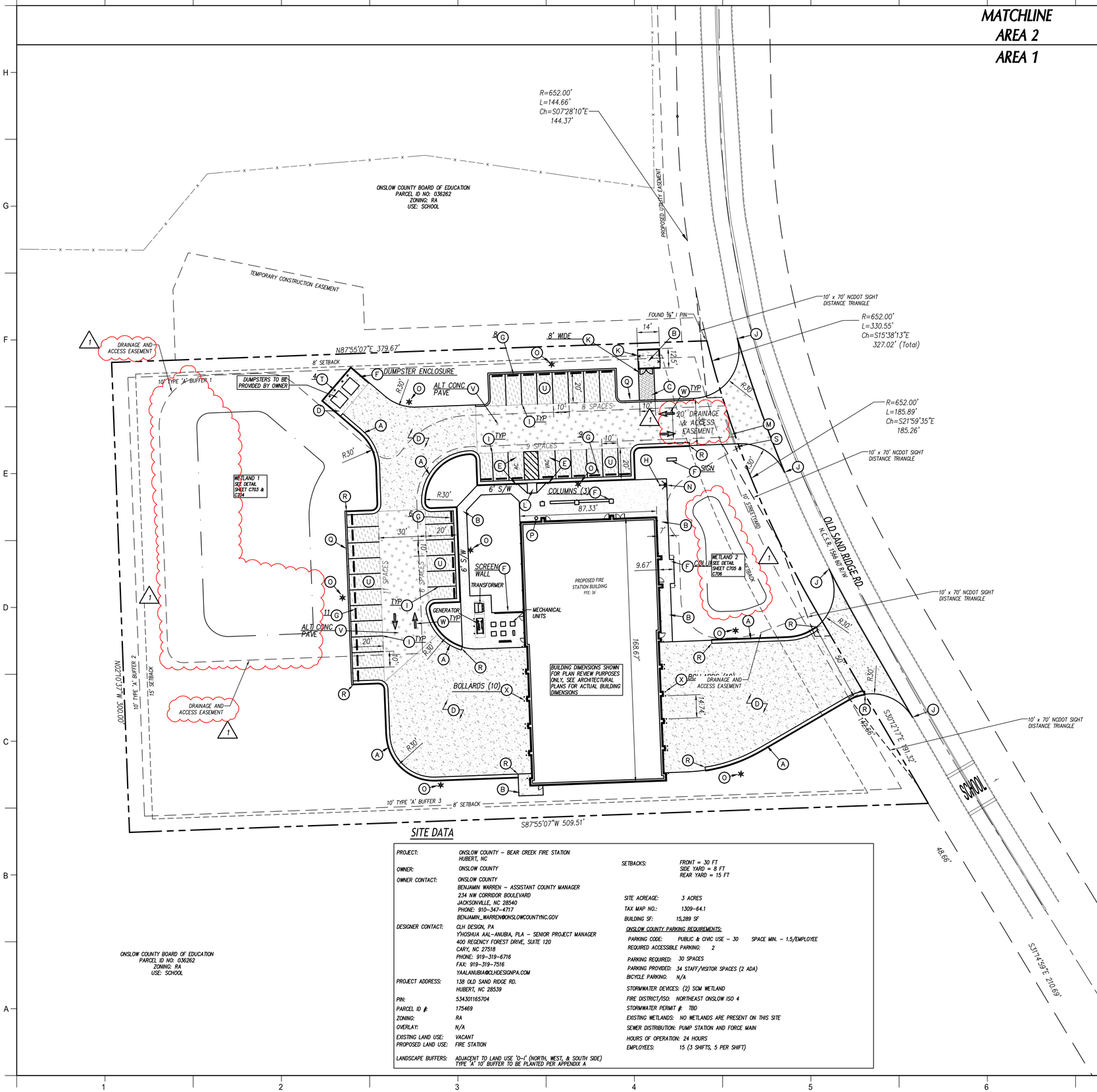
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: AP
Plot Date: 4/21/2025 10:03:40 AM

DATE ISSUED

BID DOCUMENTS
03/12/2025

SHEET TITLE
COVER SHEET

G001



SITE DATA

PROJECT:	ONSLOW COUNTY – BEAR CREEK FIRE STATION HUBERT, NC
OWNER:	ONSLOW COUNTY
OWNER CONTACT:	ONSLOW COUNTY BENJAMIN WARREN – ASSISTANT COUNTY MANAGER 234 NW CORRIDOR BOULEVARD JACKSONVILLE, NC 28540 PHONE: 910-347-4717 BENJAMIN_WARREN@ONSLOWCOUNTYNC.GOV
DESIGNER CONTACT:	CLH DESIGN, PA YHOSHUA AAL-ANUBIA, PLA – SENIOR PROJECT MANAGER 400 REGENCY FOREST DRIVE, SUITE 120 CARY, NC 27518 PHONE: 919-319-6716 FAX: 919-319-7516 YAALANUBIA@CLHDESIGNPA.COM
PROJECT ADDRESS:	138 OLD SAND RIDGE RD. HUBERT, NC 28539
PIN:	534301165704
PARCEL ID #:	175469
ZONING:	RA
OVERLAY:	N/A
EXISTING LAND USE:	VACANT
PROPOSED LAND USE:	FIRE STATION
LANDSCAPE BUFFERS:	ADJACENT TO LAND USE 'O-I' (NORTH, WEST, & SOUTH SIDE) TYPE 'A' 10' BUFFER TO BE PLANTED PER APPENDIX A

SETBACKS:	FRONT = 30 FT SIDE YARD = 0 FT REAR YARD = 15 FT
SITE ACREAGE:	3 ACRES
TAX MAP NO.:	1309-64.1
BUILDING SF:	15,289 SF
ONSLOW COUNTY PARKING REQUIREMENTS:	
PARKING CODE:	PUBLIC & CIVIC USE – 30 SPACE MIN. – 1.5/EMPLOYEE
REQUIRED ACCESSIBLE PARKING:	2
PARKING REQUIRED:	30 SPACES
PARKING PROVIDED:	34 STAFF/MISITOR SPACES (2 ADA)
BICYCLE PARKING:	N/A
STORMWATER DEVICES:	(2) SCM WETLAND
FIRE DISTRICT/ISO:	NORTHEAST ONSLOW ISO 4
STORMWATER PERMIT #:	TBD
EXISTING WETLANDS:	NO WETLANDS ARE PRESENT ON THIS SITE
SEWER DISTRIBUTION:	PUMP STATION AND FORCE MAIN
HOURS OF OPERATION:	24 HOURS
EMPLOYEES:	15 (3 SHIFTS, 5 PER SHIFT)

KEY NOTES

- (A) 24" CURB & GUTTER, SEE DETAIL SHEET C800.
- (B) CONCRETE SIDEWALK, SEE DETAIL SHEET C800.
- (C) GRAVEL DRIVE, SEE DETAIL SHEET C800.
- (D) CONCRETE PAVEMENT, SEE DETAIL SHEET C800.
- (E) ACCESSIBLE PARKING & SIGNAGE, SEE DETAIL SHEET C800.
- (F) SEE ARCHITECTURAL PLANS FOR BUILDING, CANOPY, STRUCTURAL WALLS, BUILDING COLUMNS, MONUMENT SIGNS, BOLLARDS, MECHANICAL YARD AND SCREEN WALLS.
- (G) PRECAST CONCRETE WHEELSTOP, SEE DETAIL SHEET C800.
- (H) FLAG POLE, SEE DETAIL SHEET C800.
- (I) PARKING SPACE STRIPING, SEE TRAFFIC CONTROL NOTES ON THIS SHEET.
- (J) TIE IN TO EXISTING ROAD.
- (K) 4' BLACK VINYL CHAIN LINK FENCE AND GATES, SEE DETAIL SHEET C801.
- (L) ACCESSIBLE PARKING CURB RAMP, SEE DETAIL SHEET C800.
- (M) STOP BAR, SEE TRAFIC CONTROL NOTES ON THIS SHEET.
- (N) UPLIGHTS, SEE ELECTRICAL PLANS.
- (O) 25' TALL LIGHT POLE, SEE DRAWING NUMBER C010 SITE ELECTRICAL.
- (P) TRASH RECEPTACLE, SEE SPECIFICATIONS.
- (Q) CONCRETE BAND, SEE DETAIL SHEET C800.
- (R) STANDARD METHOD OF ENDING CURB & GUTTER, SEE DETAIL SHEET C800.
- (S) STOP SIGN.
- (T) BOLLARDS, SEE DETAIL SHEET C801.
- (U) LIGHT DUTY ASPHALT, SEE DETAIL SHEET C800.
- (V) HEAVY DUTY ASPHALT, SEE DETAIL SHEET C800.
- (W) DIRECTIONAL ARROW, SEE TRAFFIC CONTROL NOTES THIS SHEET.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL ONSLOW COUNTY AND NCDOT STANDARDS AND SPECIFICATIONS.
2. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB AND FACE OF BUILDING WALL, UNLESS OTHERWISE SHOWN.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS SHOWN AND CONTACT THE ARCHITECT IF ANY DISCREPANCIES OCCUR.
4. CONSTRUCTION STAKE OUT IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
6. ALL FACE OF RADIUS' ARE 4 FT UNLESS OTHERWISE SHOWN.
7. ALL PARKING SPACES SHALL BE 10' WIDE X 20' DEEP MIN.
8. (AC) DENOTES ACCESSIBLE PARKING SPACE.
9. (VAC) DENOTES VAN ACCESSIBLE PARKING SPACE.
10. ANY AND ALL LANDSCAPING, EXISTING TREES OR SHRUBS TO REMAIN WHICH ARE DAMAGED DURING DEMOLITION OR CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR UTILIZING A LICENSED LANDSCAPE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
11. CONTRACTOR SHALL SUBMIT SCALED PLANS OF ALL SCORING/JOINTS FOR APPROVAL BY ARCHITECT 30 DAYS MINIMUM PRIOR TO INSTALLATION.
12. THE CROSS-SLOPE ON ALL SIDEWALKS SHALL BE A MAXIMUM OF 2.0%
13. NO WORK SHALL BE PERFORMED ON RIGHT-OF-WAYS OR ADJACENT PROPERTIES UNTIL THE OWNER NOTIFIES CONTRACTOR IN WRITING OF PROCUREMENT OF APPROPRIATE PERMITS, EASEMENTS, AGREEMENTS, OR RIGHTS-OF-WAY.

TRAFFIC CONTROL NOTES

1. ALL SITE SIGNAGE SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND NCDOT STANDARDS.

SIGN	MUTCD STD.	SIZE
STOP	R1-1	30"x30"
ONE WAY	R6-2	24"x30"
DO NOT ENTER (DNE)	R5-1	30"x30"
YIELD	R2-1 WITH R1-2aP	30"x30"
NO PARKING ANY TIME FIRE LANE –		12"x18"
LEFT TURN ONLY	R3-5L	30"x36"

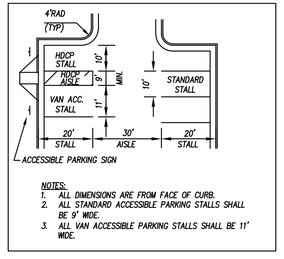
2. ALL SIGNS SHALL BE MOUNTED WITH 7-FT MIN. VERTICAL CLEARANCE TO THE BOTTOM OF THE SIGN ON 3-LB. GALV. STEEL U-CHANNEL POST SET IN 3-FT DEEP x 12-IN DIA. CONCRETE FOOTING.
3. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MUTCD AND NCDOT STANDARDS AND THE PROJECT SPECIFICATIONS.

MARKING	NCDOT STD.	SIZE	COLOR
PARKING SPACES		4-IN	WHT.
CROSSWALK	1205.07(HI-MS)	24-IN	WHT.
CROSSWALK	1205.07(STANDARD)	8-IN	WHT.
DIRECTIONAL ARROWS	1205.08	STD.	WHT.
NO PARKING – FIRE LANE *	–	4-IN	YEL.
SKIP	1205.01	4-IN	WHT.
MINI-SKIP (3'-9' TYPE)	1205.01	4-IN	WHT.
SOLID	1205.01	4-IN	WHT.
DIAGONAL	1205.09	8-IN	YEL.
STOP BAR	–	24-IN	WHT.
DOUBLE YELLOW	1205.01	4-IN	YEL.

* NO PARKING – FIRE LANE MARKING SHALL BE THERMOPLASTIC AND CONFORM TO ONSLOW COUNTY STANDARD SPECIFICATION 03050.D FIRE LANE STRIPING AND CONSIST OF A 4" SOLID YELLOW STRIPE AND 8" HIGH YELLOW TEXT "NO PARKING – FIRE LANE" AT 40' INTERVALS.

4. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC TYPE EXCEPT FOR PARKING SPACE LINES WHICH SHALL BE ALKYD-RESIN TYPE PAINT.
5. ALL SIGNAGE SHALL BE FIELD STAKED AND THE LOCATIONS APPROVED BY CLH DESIGN PRIOR TO SIGN INSTALLATION.
6. CENTER ALL DIRECTIONAL ARROWS WITHIN TRAVEL LANE.
7. COORDINATE FIRE LANE MARKINGS WITH ONSLOW COUNTY FIRE MARSHAL.
8. ALL SIGNS SHALL USE PRISMATIC SHEETING THAT MEETS MINIMUM REFLECTIVITY STANDARDS FOUND IN THE LATEST EDITION OF THE MUTCD.

TYP. PARKING DIMENSIONS



NOTES:
1. ALL DIMENSIONS ARE FROM FACE OF CURB.
2. ALL STANDARD ACCESSIBLE PARKING STALLS SHALL BE 9' WIDE.
3. ALL VAN ACCESSIBLE PARKING STALLS SHALL BE 11' WIDE.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

MAGNETIC

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SEALS

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 1699 ZACHARY R. PIERCE 04/17/25

DKA JOB NUMBER
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REVISIONS

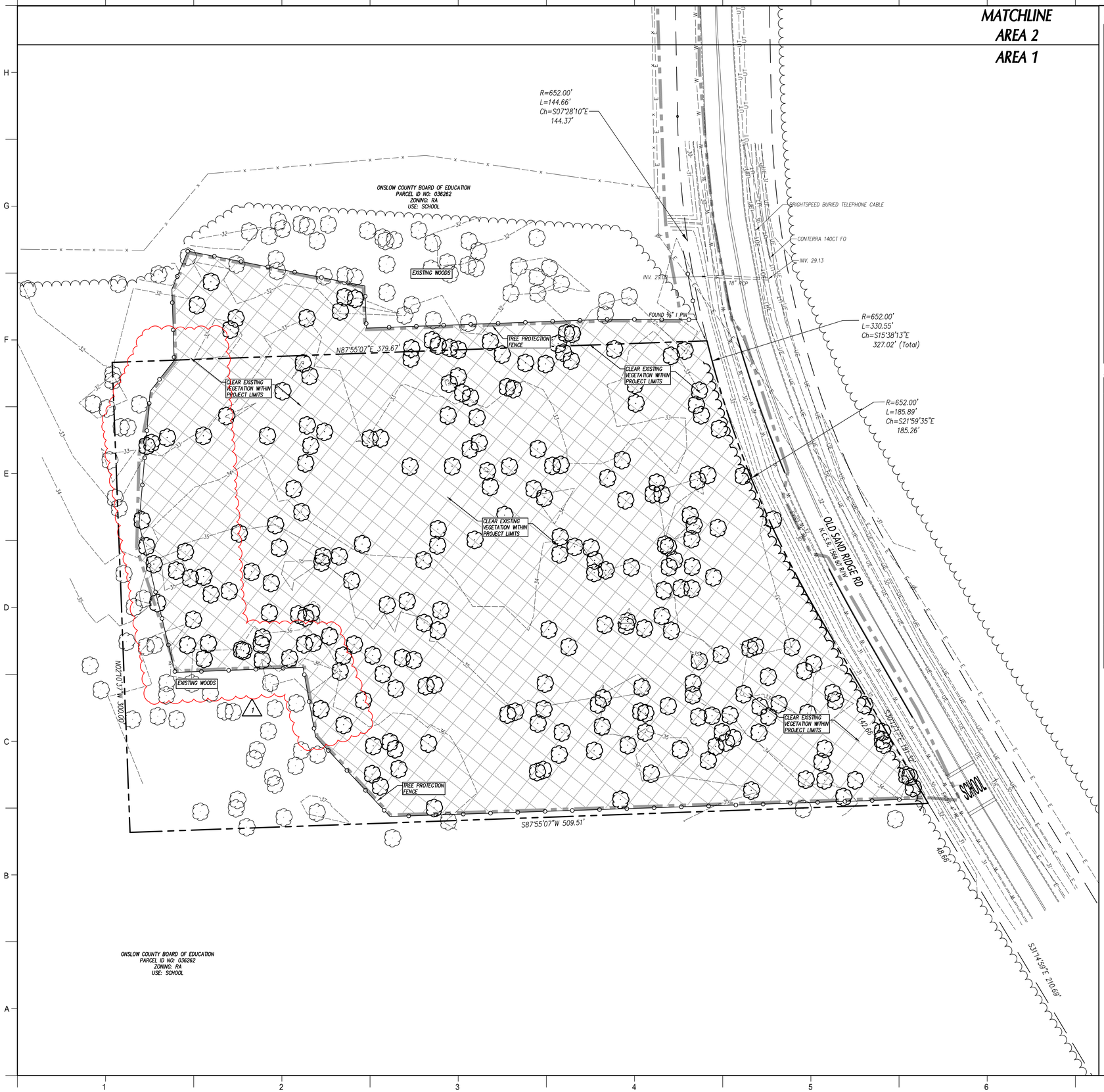
1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED
BID DOCUMENTS
04/17/2025

SHEET TITLE
STAKING PLAN

C100



GENERAL NOTES

1. ALL EXISTING STRUCTURES AND UTILITIES SHALL BE REMOVED AS NEEDED TO ALLOW NEW CONSTRUCTION. IN GENERAL, FEATURES INDICATED IN BOLD ON THIS PLAN SHALL BE REMOVED.
2. ALL PAVEMENT OR CONCRETE TO BE REMOVED SHALL BE SAW CUT TO PROVIDE A STRAIGHT AND UNIFORM JOINT FOR NEW PAVEMENT, SIDEWALK, OR CURB AND GUTTER, ETC. ANY EXISTING PAVEMENT, SIDEWALK, CURB AND GUTTER, ETC. THAT MUST BE REMOVED TO ALLOW NEW CONSTRUCTION SHALL BE REMOVED AND REPAIRED PER THE SPECIFICATIONS AND DETAILS OR TO MATCH PRE-CONSTRUCTION CONDITIONS (WHETHER OR NOT SHOWN ON THE DRAWINGS TO BE REMOVED).
3. ALL UTILITIES OR STRUCTURES NOT INDICATED FOR REMOVAL OR MODIFICATION ARE TO REMAIN AND BE PROTECTED FROM DAMAGE.
4. ALL WASTE MATERIAL GENERATED FROM DEMOLITION ACTIVITIES SHALL BE DISPOSED OF OFF-SITE IN ACCORDANCE WITH ALL APPLICABLE RULES AND REGULATIONS.
5. EXISTING SITE BOUNDARY AND TOPOGRAPHIC SURVEY INFORMATION WAS TAKEN FROM SURVEY BY STACY L. BATCHELOR FROM TIDEWATER ASSOCIATES, INC, SIGNED 09/12/2024. THESE PLANS DO NOT ASSUME ANY LIABILITY FOR ANY EXISTING INFORMATION BOTH SHOWN AND NOT SHOWN ON THE SURVEY AND ANY CHANGES TO THE EXISTING CONDITIONS THAT MAY HAVE OCCURRED AFTER THE SURVEY WAS ISSUED. CONTRACTOR SHALL VERIFY ALL EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION.
6. INSTALL TREE PROTECTION FENCING PRIOR TO BEGINNING CLEARING OPERATIONS. CLEAR AND GRUB ALL AREAS AS SHOWN AND REQUIRED TO PERMIT INSTALLATION OF NEW CONSTRUCTION PER SPECIFICATIONS AND DRAWINGS. EXISTING TREES, SHRUBS OR OTHER LANDSCAPE MATERIAL WHICH WILL CONFLICT WITH NEW CONSTRUCTION SHALL BE REMOVED (WHETHER OR NOT SHOWN ON THE DRAWINGS). ALL CONTRACTORS SHALL VISIT THE SITE AND OBSERVE EXISTING CONDITIONS PRIOR TO BIDDING.
7. TO MINIMIZE DAMAGE TO EXISTING TREES NEAR THE INTERIOR EDGE OF CLEARING LIMITS, THE CONTRACTOR SHALL CUT 2-FT DEEP TRENCHES ALONG THE LIMITS OF DISTURBANCE, SO AS TO CUT, RATHER THAN TEAR ROOTS.
8. PRIOR TO DEMOLISHING EXISTING STRUCTURES, MAKE AN INSPECTION FOR ANY HAZARDOUS MATERIALS. CONTACT ARCHITECT IMMEDIATELY IF ANY HAZARDOUS MATERIALS ARE DISCOVERED. CAP AND REMOVE UTILITY SERVICES, FUEL TANKS AND SEPTIC SYSTEMS. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
9. VERIFY ALL ILLUSTRATED UNDERGROUND ELEMENTS/UTILITIES. EXERCISE REASONABLE EFFORTS TO PROTECT ANY UNKNOWN UNDERGROUND ELEMENTS/UTILITIES. NOTIFY THE ARCHITECT IMMEDIATELY IF UNKNOWN ELEMENTS/UTILITIES ARE DISCOVERED THAT WOULD NECESSITATE MODIFICATION TO THE PROPOSED DESIGN.
10. CONTACT UTILITY LOCATING SERVICE AT LEAST 48-HRS PRIOR TO EXCAVATION.
11. PROTECT ALL ADJACENT PROPERTIES, THE GENERAL PUBLIC AND ALL OF THE OWNER'S FACILITIES. SHOULD DAMAGES OCCUR, REPAIR IMMEDIATELY AS DIRECTED BY THE ARCHITECT. AREAS TO BE PROTECTED, REPAIRED AND CLEANED SHALL ALSO INCLUDE ANY STAGING AREAS, ACCESS ROUTES AND OTHER EXISTING IMPROVEMENTS WITHIN THE CONSTRUCTION LIMITS THAT ARE TO REMAIN.
12. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL ONSLOW COUNTY AND/OR NCDOT STANDARDS AND SPECIFICATIONS.
13. ALL EXISTING VAULTS, MANHOLES, STORM DRAIN STRUCTURES, CLEANOUTS, ETC. SHALL BE ADJUSTED AS NEEDED TO MATCH FINISH GRADE.
14. DEMOLITION AND PATCHING OF PAVEMENT, SIDEWALK, CURB AND GUTTER AND OTHER EXISTING PAVED SURFACES IN ADDITION TO THAT INDICATED ON THIS PLAN SHALL BE PERFORMED AS REQUIRED TO CONSTRUCT AND INSTALL NEW UTILITIES. ALL SUCH DEMOLITION AND PATCHING SHALL BE INCLUDED IN THE BASE BID SCOPE OF WORK. SEE SHEET C900 FOR PAVEMENT REPAIR DETAILS.
15. THIS SITE IS NOT LOCATED WITHIN SPECIAL FLOOD HAZARD AREAS AS DETERMINED BY FEMA AND DEPICTED ON F.I.R.M. MAP: 3720534300K, DATED JUNE 19, 2020 AS BEING WITHIN ZONE "X-OTHER AREA".
16. NO WORK SHALL BE PERFORMED ON RIGHT-OF-WAYS OR ADJACENT PROPERTIES UNTIL THE OWNER NOTIFIES CONTRACTOR IN WRITING OF PROCUREMENT OF APPROPRIATE PERMITS, EASEMENTS, AGREEMENTS, OR RIGHTS-OF-WAY.

LEGEND

STRUCTURES/UTILITIES TO BE REMOVED		STRUCTURES/UTILITIES TO REMAIN	
OVERHEAD ELECTRICAL	------- E -------	OVERHEAD ELECTRICAL	------ E ------
UNDERGROUND ELECTRICAL	-------UE-------	UNDERGROUND ELECTRICAL	------UE------
FIRE PROTECTION	-------FP-------	FIRE PROTECTION	------FP------
GAS	------- G -------	GAS	------ G ------
SANITARY SEWER	-------SS-------	SANITARY SEWER	------SS------
TELEPHONE	------- T -------	TELEPHONE	------ T ------
UNDERGROUND TELEPHONE	-------UT-------	UNDERGROUND TELEPHONE	------UT------
FIBER OPTIC	-------FO-------	FIBER OPTIC	------FO------
WATER	------- W -------	WATER	------ W ------
FORCE MAIN	-------FM-------	FORCE MAIN	------FM------
STORM DRAIN	═══════	STORM DRAIN	═══════
INDIVIDUAL TREE TO BE REMOVED.		INDIVIDUAL TREE TO REMAIN.	
LIGHT POLE	LP	LIGHT POLE	LP
UTILITY POLE	PP	UTILITY POLE	PP
MANHOLE	MH	MANHOLE	MH
CLEAN OUT	CO	CLEAN OUT	CO
DROP INLET,CATCH BASIN	DI, CB	DROP INLET,CATCH BASIN	DI, CB
FIRE HYDRANT	FH	FIRE HYDRANT	FH
WATER VALVE	WV	WATER VALVE	WV
CONSTR./CLEARING LIMITS		CLEAR AND GRUB EXISTING VEGETATION	
TREE PROTECTION FENCE SEE DETAIL C701			

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

NORTH

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SEALS

NORTH CAROLINA LANDSCAPE ARCHITECT 1699 ZACHARY R PIERCE 04/17/25

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

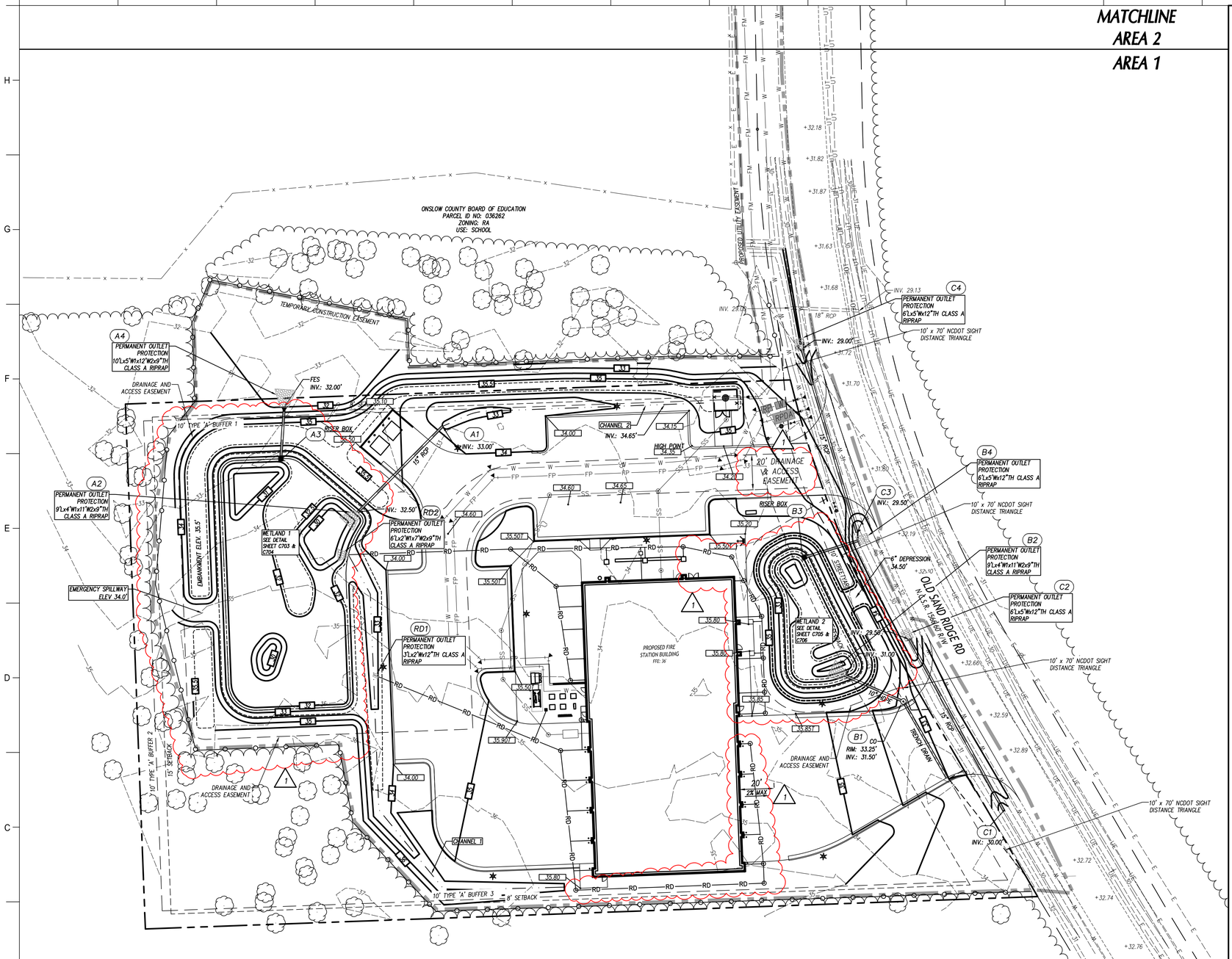
BID DOCUMENTS

04/17/2025

SHEET TITLE

EXISTING CONDITIONS & DEMO PLAN

C200



DRAINAGE STRUCTURE SCHEDULE

STRUCTURE NO.		PIPE	PIPE	PIPE	PIPE	UPPER	LOWER	UPSTREAM STRUCTURE DATA			
UP STRM	DN STRM	SLOPE	DIA. (IN)	LENGTH (LF)	MATRL	INV. (FT)	INV. (FT)	TOP ELEV. (FT) (1)	DEPTH (FT)	TYPE	NOTES
A1	A2	0.72%	15	69	RCP	33.00	32.50	35.00	2.00	OPEN END	
A3	A4	1.67%	18	30	RCP	32.50	32.00	36.00	3.50	RISER BOX	5
B1	B2	1.39%	15	36	RCP	31.50	31.00	35.00	3.50	CO	
B3	B4	1.69%	18	118	RCP	32.00	30.00	35.00	3.00	RISER BOX	
C1	C2	0.45%	15	111	RCP	30.00	29.50	33.00	3.00	OPEN END	
C3	C4	0.46%	15	109	RCP	29.50	29.00	33.00	3.50	OPEN END	

LEGEND

- CO — CLEAN OUT, SEE DETAIL SHEET C900.
- FES — PRECAST FLARED END SECTION
- (A2) — STRUCTURE I.D. NUMBER

NOTES

1. TOP ELEVATION IS TOP OF BACK OF CURB FOR CATCH BASINS, TOP OF RIM DROP INLETS, AND FINISH GRADE FOR CLEANOUTS.
2. ALL FES INLETS & OUTLETS SHALL BE RCP.
3. DUCTILE IRON PIPE(DIP) SHALL HAVE WATERTIGHT JOINTS.
4. ADA GRATE.
5. DOWNSTREAM STRUCTURE IS A FES.

GRADING LEGEND

- EXISTING CONTOURS
- FINAL CONTOURS
- 270.4 + 270.50 — EXISTING SURVEY SPOT ELEVATION
- 270.50 — PROPOSED TOP OF CURB SPOT ELEVATION
- 270.50 — PROPOSED GROUND/PAVEMENT ELEVATION
- (A4) — STORM STRUCTURE NUMBER
- EXISTING STORM DRAIN PIPE
- PROPOSED STORM DRAIN PIPE
- FD — PROPOSED FOUNDATION DRAIN DISCHARGE LINE. SEE ARCH. PLANS FOR DRAIN PIPE LOCATIONS ALONG BUILDING WALLS.
- RD — PROPOSED ROOF DRAIN
- LIMITS OF GRADING

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL ONSLOW COUNTY AND NCDOT STANDARDS AND SPECIFICATIONS.
2. ALL SPOT ELEVATIONS INDICATED AT CURB AND GUTTER AND ARE DENOTED TO TOP OF CURB, UNLESS OTHERWISE SHOWN.
3. TOTAL DENUDED AREA = 4 AC
4. CONTRACTOR SHALL ADJUST ALL EXISTING VAULTS, MANHOLES, STORM DRAIN STRUCTURES, CLEANOUTS, ETC. AS NEEDED TO MATCH FINISH GRADE.
5. ALL BACKFILL, COMPACTION, SOILS TESTING, ETC. SHALL BE PERFORMED BY THE OWNER'S INDEPENDENT TESTING LABORATORY. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
6. ALL STORM DRAIN PIPES SHALL BE PROTECTED WITH STONE FILTER PROTECTION AFTER STOPPAGE OF WORK EACH DAY. SEE DETAIL ON SHEET C701.
7. EXISTING VEGETATION WITHIN TREE PROTECTION AREAS SHALL REMAIN UNDISTURBED. UNLESS NOTED OTHERMISE.
8. ANY AND ALL LANDSCAPING AND EXISTING TREES & SHRUBS TO REMAIN WHICH ARE DAMAGED DURING DEMOLITION OR CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR UTILIZING A LICENSED LANDSCAPE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
9. THE GRADING CONTRACTOR SHALL COMPLY WITH ALL STATE CODES IN OBSERVING EROSION CONTROL MEASURES BOTH ON AND OFF-SITE.
10. THE GRADING CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL DEVICES AFTER EACH RAINFALL EVENT OR AS DIRECTED BY STATE AUTHORITIES OR THE ARCHITECT.
11. THE GRADING CONTRACTOR SHALL BE RESPONSIBLE FOR OFF-SITE DISPOSAL OF ALL CLEARING AND GRADING WASTE MATERIALS GENERATED DURING CONSTRUCTION AND FOR OBTAINING ALL APPLICABLE PERMITS FOR OFF-SITE STOCKPILES AND/OR WASTE AREAS.
12. THE CROSS-SLOPE ON ALL SIDEWALKS SHALL BE A MAXIMUM OF 2.0%
13. CONTRACTOR SHALL VERIFY ALL EXISTING ELEVATIONS WHERE NEW CONSTRUCTION JOIN OR CONNECT TO EXISTING PAVEMENT, CURB AND OTHER RIGID STRUCTURES. NOTIFY ARCHITECT IF DISCREPANCIES OCCUR.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

MAGNETIC

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1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

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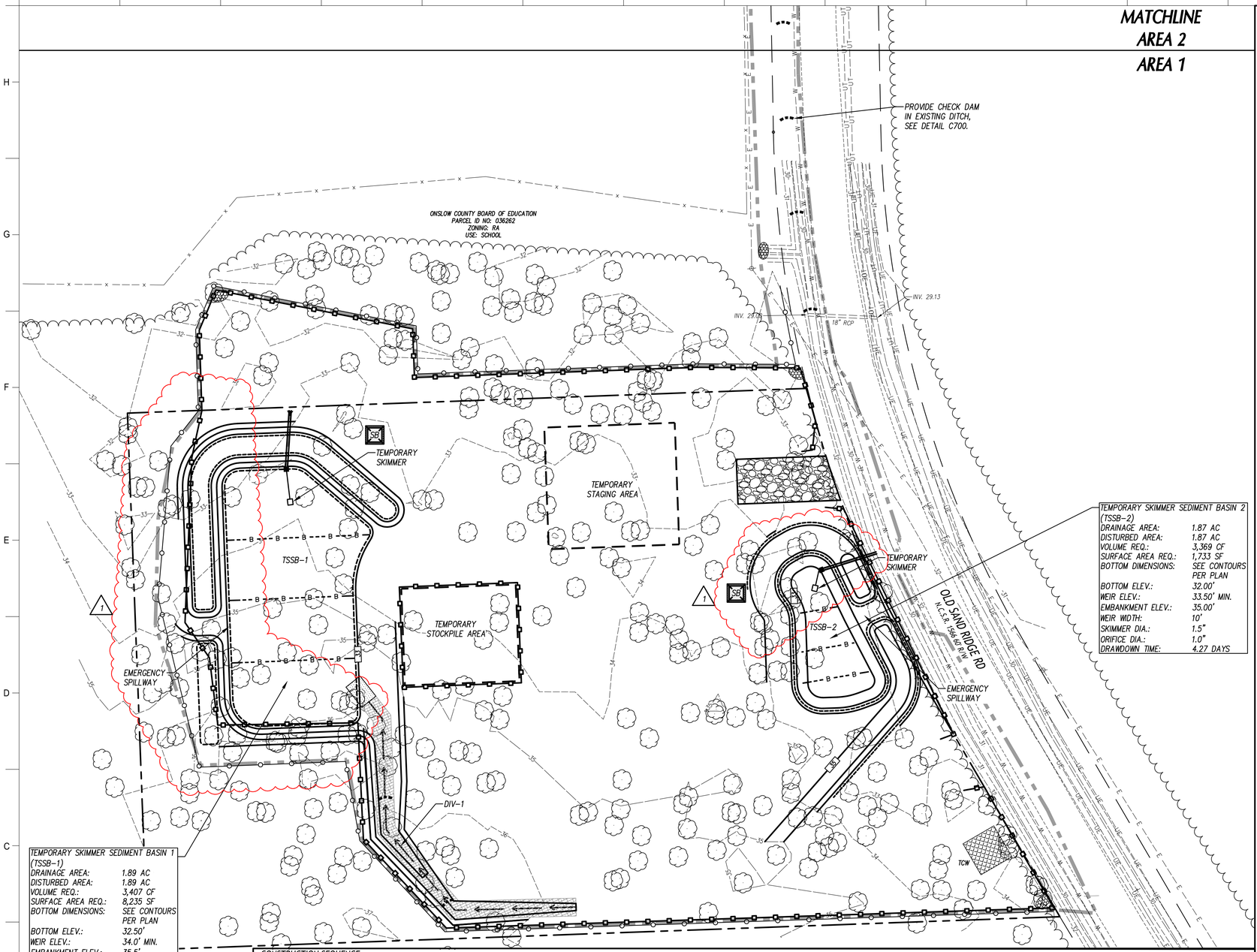
04/17/2025

SHEET TITLE

GRADING PLAN

C300



TEMPORARY SKIMMER SEDIMENT BASIN 1 (TSSB-1)	
DRAINAGE AREA:	1.89 AC
DISTURBED AREA:	1.89 AC
VOLUME REQ.:	3,407 CF
SURFACE AREA REQ.:	8,235 SF
BOTTOM DIMENSIONS:	SEE CONTOURS PER PLAN
BOTTOM ELEV.:	32.50'
WEIR ELEV.:	34.0' MIN.
EMBANKMENT ELEV.:	35.5'
WEIR WIDTH:	10'
SKIMMER DIA.:	1.5"
ORIFICE DIA.:	1.0"
DRAWDOWN TIME:	4.32 DAYS

TEMPORARY SKIMMER SEDIMENT BASIN 2 (TSSB-2)	
DRAINAGE AREA:	1.87 AC
DISTURBED AREA:	1.87 AC
VOLUME REQ.:	3,369 CF
SURFACE AREA REQ.:	1,733 SF
BOTTOM DIMENSIONS:	SEE CONTOURS PER PLAN
BOTTOM ELEV.:	32.00'
WEIR ELEV.:	33.50' MIN.
EMBANKMENT ELEV.:	35.00'
WEIR WIDTH:	10'
SKIMMER DIA.:	1.5"
ORIFICE DIA.:	1.0"
DRAWDOWN TIME:	4.27 DAYS

LEGEND

- TEMP. GRAVEL CONSTR. ENTRANCE SEE DETAIL SHEET C700
- TEMP. DIVERSION DITCH / BERM SEE DETAIL SHEET C701.
- TEMP. SILT FENCE SEE DETAIL SHEET C701.
- TEMP. REINFORCED SILT FENCE OUTLET, SEE DETAIL SHEET C700
- PERMANENT OUTLET PROTECTION SEE DETAIL SHEET C701.
- TCW TEMP. CONCRETE WASHOUT AREA SEE DETAIL SHEET C700
- PROPOSED STORM SEWER PIPES
- EXISTING STORM SEWER PIPES
- CONSTRUCTION LIMITS UNLESS OTHERWISE NOTED.
- TEMP. ROCK PIPE INLET PROTECTION SEE DETAIL SHEET C702.
- TSSB TEMP. SKIMMER SEDIMENT BASIN SEE DETAIL SHEET C702.
- EXISTING CONTOUR
- FINISHED CONTOUR
- TEMP. CONTOUR (TEMP. GRADES DURING CONSTR.)
- CHANNEL LINING SEE DETAIL SHEET C701.
- SB TEMP. DEWATERING SILT BAG SEE DETAIL SHEET C700
- TREE PROTECTION FENCE SEE DETAIL SHEET C701
- TCS TEMP. COMPOST SOCK SEE DETAIL SHEET C701.
- TCS TEMP. COMPOST SOCK IN CHANNEL SEE DETAIL SHEET C700.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL ONSLOW COUNTY, NCDEQ, AND NCDOT STANDARDS, SPECIFICATIONS AND DETAILS.
2. THE CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL CODES IN OBSERVING EROSION CONTROL MEASURES BOTH ON AND OFF SITE. ALL OFF-SITE SOIL BORROW AND WASTE SITES SHALL BE PROPERLY PERMITTED FOR SUCH ACTIVITIES. CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION OF SEDIMENT & EROSION CONTROL PERMIT FOR ANY OFF-SITE SITES TO OWNER PRIOR TO RELOCATING ANY STOCKPILE MATERIALS.
3. THE CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL DEVICES AFTER EACH RAINFALL EVENT OR AS DIRECTED BY LOCAL AUTHORITIES OR ARCHITECT.
4. TOTAL DISTURBED AREA: 4.0 AC.
5. ALL OPEN STORM PIPES SHALL BE PROTECTED WITH STONE FILTER PROTECTION AFTER WORK STOPPAGE EACH DAY. SEE DETAIL SHEET C700.
6. ALL STORM DRAINAGE PIPES SHALL BE THOROUGHLY FLUSHED OF ALL SEDIMENT FOLLOWING SITE STABILIZATION. INTERIOR FLUSHING OF SYSTEM SHALL BE PERFORMED AS NEEDED TO MAINTAIN PROPER FUNCTIONING OF THE DRAINAGE SYSTEM. CLEANING SHALL BE PERFORMED IN A MANNER WHICH PREVENTS SEDIMENT FROM BEING FLUSHED THROUGH PIPES TO THE EXISTING DRAINAGE SYSTEM.
7. THE INDICATED STAGING AREA IS INTENDED FOR VEHICLES AND NON-ERODIBLE MATERIALS ONLY. NO SOIL, SAND OR OTHER ERODIBLE, FINE GRAINED MATERIAL SHALL BE STORED OUTSIDE OF THE LIMITS OF THE SITE PROTECTED BY SEDIMENT AND EROSION CONTROL DEVICES AND MEASURES.
8. SOIL AND OTHER MATERIALS SHALL ONLY BE TEMPORARILY STOCKPILED WITHIN THE CONSTRUCTION LIMITS PROTECTED BY SEDIMENT AND EROSION CONTROL DEVICES AND MEASURES. STOCKPILES SHALL BE STABILIZED AS REQUIRED AS INDICATED IN THE SLOPE & SURFACE STABILIZATION NOTES ON THIS PLAN.
9. THE TREE PROTECTION FENCE SHALL BE MAINTAINED ON THE SITE UNTIL ALL SITE WORK IS COMPLETED AND THE FINAL SITE INSPECTION IS SCHEDULED PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY (CO). THE FENCING SHALL BE REMOVED IMMEDIATELY PRIOR TO THE FINAL SITE INSPECTION FOR THE SITE.
10. TREE PROTECTION FENCING SHALL NOT BE MOVED AND THERE SHALL BE NO ENCROACHMENT INTO SUCH PROTECTED AREA(S) WITHOUT WRITTEN AUTHORIZATION OF THE COUNTY ZONING COMPLIANCE STAFF. ANY ACTIVITY (LANDSCAPING, FENCING, OR UTILITY INSTALLATION) SHOWN ON THE APPROVED PLANS IN A TREE PROTECTION AREA SHALL ALSO NOT OCCUR WITHOUT WRITTEN AUTHORIZATION FROM THE COUNTY ZONING COMPLIANCE STAFF. ANY UNAUTHORIZED ENCROACHMENT OR DISTURBANCE WITHIN THE BOUNDARIES OF A TREE PROTECTION AREA SHALL AUTOMATICALLY RESULT IN FINES AND THE REPLACEMENT OF ANY DAMAGED VEGETATION IN ACCORDANCE WITH THE LAND DEVELOPMENT ORDINANCE.
11. ROADSIDE DITCHES AND CHANNELS SHALL BE STABILIZED DAILY UNTIL PERMANENT GROUND COVER IS ESTABLISHED.
12. INSTALL TEMPORARY MATTING TO TOP OF ALL SIDE SLOPES ON CHANNELS, DIVERSION DITCHES AND TEMPORARY SEDIMENT BASINS. SEE DETAIL SHEET C702 (PERMANENT CHANNEL) AND C702 (TEMPORARY DIVERSION DITCH) FOR TYPE OF MATTING TO USE.
13. ANY DEWATERING OF SEDIMENT CONTAINMENT DEVICES FOR MAINTENANCE, REMOVAL OR CONVERSION PURPOSES IS TO BE DONE THROUGH A SILT BAG.
14. ANY DEWATERING OF STORM/UTILITY TRENCHES IS TO BE DONE THROUGH A SILT BAG.
15. GROUND COVER IS TO BE APPLIED PER CONDITIONS OF THE NPDES PERMIT OR AT THE END OF THE DAY IN CRITICAL AREAS.
16. CONTRACTOR SHALL USE TIRE WASH STATION TO PREVENT SEDIMENT FROM TRACKING ONTO THE ROAD IF CONSTRUCTION ENTRANCE IS FOUND INSUFFICIENT AT NO ADDITIONAL COST TO OWNER.
17. CONTRACTOR SHALL UTILIZE PAM FLOCCULANTS TO REDUCE RUN-OFF TURBIDITY. SEE SPECS.

MAINTENANCE PLAN

1. DURING ALL PHASES OF CONSTRUCTION, GROUNDCOVER ON EXPOSED SLOPES SHALL BE PROVIDED ACCORDING TO GROUND STABILIZATION TABLE (SHEET C700) FOLLOWING COMPLETION OF ANY PHASE OF GRADING.
2. FINAL PERMANENT GROUNDCOVER FOR ALL DISTURBED AREAS SHALL BE PROVIDED ON ALL DISTURBED AREAS ACCORDING TO GROUND STABILIZATION TABLE (SHEET C700) FOLLOWING COMPLETION OF CONSTRUCTION OR DEVELOPMENT.
3. THE ABOVE REQUIREMENTS ARE THE MINIMUM NECESSARY TO MEET EROSION AND SEDIMENT CONTROL REGULATIONS. THE CONTRACT DOCUMENTS INCLUDE ADDITIONAL SEEDING AND STABILIZATION REQUIREMENTS AND SCHEDULES WHICH MAY EXCEED THOSE ABOVE.
4. SLOPE EROSION CONTROL MATTING SHALL BE INSTALLED FOR TEMPORARY STABILIZATION DURING THE ESTABLISHMENT OF VEGETATIVE COVER ON ALL STEEP SLOPES (6:1 OR STEEPER). REFER TO MATERIAL SPECIFICATIONS. INSTALL MATTING PER MANUFACTURER'S INSTRUCTIONS.
5. ALL OTHER SEEDED AREAS SHALL BE MULCHED WITH STRAW AND TACKED WITH ASPHALT.

SELF-INSPECTION RULES

SEE SHEET C706 FOR SELF-INSPECTION REQUIREMENTS.

THE CONTRACTOR (ACTING AS AN AGENT OF THE FINANCIAL RESPONSIBLE PERSON) SHALL PERFORM SELF INSPECTIONS OF THE EROSION AND SEDIMENT CONTROL MEASURES USING NCDEMLR'S SELF INSPECTION REPORT (WORKSHEET) AND SHALL KEEP COPIES OF ALL REPORTS ON-SITE.

SLOPE & SURFACE STABILIZATION

GROUND STABILIZATION SHALL BE PROVIDED ON ALL DISTURBED AREAS ACCORDING TO GROUND STABILIZATION NOTES. SEE SHEET C705.

EXTENSIONS OF TIME MAY BE APPROVED BY THE PERMITTING AUTHORITY BASED ON WEATHER OR OTHER SITE-SPECIFIC CONDITIONS THAT MAKE COMPLIANCE IMPRACTICABLE (SECTION II.B(2) (b))

THE REQUIREMENTS ON SHEET C705 ARE THE MINIMUM NECESSARY TO MEET EROSION AND SEDIMENT CONTROL REGULATIONS. THE CONTRACT DOCUMENTS INCLUDE ADDITIONAL SEEDING AND STABILIZATION REQUIREMENTS AND SCHEDULES WHICH MAY EXCEED MINIMUM REQUIREMENTS.

INSTALL TEMPORARY EXCELSIOR MATTING FOR STABILIZATION DURING THE ESTABLISHMENT OF VEGETATIVE COVER ON ALL STEEP SLOPES (6:1 OR STEEPER) AND AREAS OF CONCENTRATED FLOW (CHANNELS, DITCHES, SWALES, ETC.). UTILIZE TEMPORARY COCONUT MAT IN AREAS IDENTIFIED ON PLAN. REFER TO SPECIFICATION SECTION 312500 FOR MATERIAL SPECIFICATIONS. INSTALL MATTING PER MANUFACTURER'S INSTRUCTIONS.

SEE SHEET C400 & C401 FOR EROSION CONTROL CONSTRUCTION SEQUENCE.

SEE SHEET C700 FOR EROSION CONTROL GROUND COVER PLAN FOR MORE INFORMATION

CONSTRUCTION SEQUENCE

INITIAL EROSION CONTROL INSTALLATION

1. OBTAIN APPROVED PLAN AND APPROVAL PLACARD. A COPY OF THE APPROVED PLAN MUST BE ON FILE AT THE JOB SITE. NOTIFY EROSION CONTROL AUTHORITIES OF PROPOSED STARTING DATE OF LAND DISTURBING ACTIVITIES.
2. EROSION AND SEDIMENT CONTROL (E&SC) PERMIT AND A CERTIFICATE OF COVERAGE (COC) MUST BE OBTAINED BEFORE ANY LAND DISTURBING ACTIVITIES (INCLUDING TIMBERING AND DEMOLITION) OCCUR.
3. INSTALL TREE PROTECTION FENCING.
4. CONTACT NC DEQ WILMINGTON REGIONAL OFFICE AT 919-791-4200 TO SCHEDULE PRE-CONSTRUCTION MEETING AT LEAST 72 HOURS PRIOR TO PROJECT ACTIVATION.
5. CONDUCT PRE-CONSTRUCTION CONFERENCE.
6. THE FOLLOWING MUST BE KEPT ON SITE UNTIL THE E&SC PLAN HAS BEEN CLOSED OUT BY LAND QUALITY: RAIN GAUGE, A COPY OF APPROVED E&SC PLAN WITH APPROVAL CERTIFICATE/LETTER,COC, AND NPDES PERMIT WITH A MINIMUM OF MOST RECENT 30 DAYS OF SELF-INSPECTION RECORDS (SEE SELF-INSPECTION REQUIREMENTS BELOW). THESE ITEMS SHOULD BE LOCATED NEAR THE MAIN CONSTRUCTION ENTRANCE. FAILURE TO MAINTAIN THESE ON-SITE VIOLATES THE NPDES PERMIT.
7. CONTACT THE NC DEQ WILMINGTON OFFICE AT LEAST 48 HOURS PRIOR TO COMMENCING THE LAND-DISTURBING ACTIVITIES.
8. INSTALL CONSTRUCTION ENTRANCE, AND PERIMETER SILT FENCES. TEMPORARY SEDIMENT SKIMMER BASINS, TEMPORARY CHECK DAMS, DIVERSION DITCHES AND TEMPORARY COMPOST SOCKS. ALL TEMPORARY BASINS AND DIVERSIONS SHALL BE SEEDED, MULCHED/LINED AND ANCHORED UPON INSTALLATION. ALL DIVERSION DITCHES WILL BE LINED TO THE TOP OF BANK. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
9. INSTALL STORMWATER WETLAND BARREL, FOLLOWED BY EMBANKMENTS, AND THEN OUTLET STRUCTURES IN DRY CONDITIONS. KEEP ALL ORIFICES BLOCKED UP TO THE REQUIRED SEDIMENT BASIN POOL ELEVATION. INSTALL TEMPORARY SKIMMERS ON WETLAND DRAIN, KEEP WETLAND DRAIN VALVE OPEN WHILE TEMPORARY SKIMMER IS OPERATIONAL. SEE WETLAND DETAIL SHEETS. INSTALL PERMANENT OUTLET PROTECTION. EXCAVATE BASINS AND INSTALL TEMPORARY SLOPE DRAIN AND TEMPORARY OUTLET PROTECTION. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
10. ESTABLISH TEMPORARY CONSTRUCTION TRAILERS WITHIN STAGING AREA.
11. INSTALL TEMPORARY DIVERSIONS, TEMPORARY SLOPE DRAINS AND TEMPORARY OUTLET PROTECTION. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
12. INSTALL SILT FENCE FOR TEMPORARY STOCKPILE LOCATION. ALL BARE SOILS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
13. PERIMETER MEASURES MUST BE LEFT IN PLACE UNTIL ALL UPLAND AREAS ARE PERMANENTLY STABILIZED. AFTER SITE IS PERMANENTLY STABILIZED, REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND PROVIDED PERMANENT SEEDING WHERE TEMPORARY MEASURES HAVE BEEN REMOVED AND GROUND COVER IS NOT ADEQUATE. SEDIMENT BASINS MAY NOT BE REMOVED OR CONVERTED TO PERMANENT SCMS UNTIL ALL UPLAND AREAS ARE PERMANENTLY STABILIZED.
14. AFTER REMOVAL OF TEMPORARY DIVERSIONS, INSTALL SECOND CONSTRUCTION ENTRANCE PER THE PLANS.
15. CLEAR AND GRUB AREAS ONLY AS REQUIRED FOR INSTALLATION OF INITIAL SEDIMENT CONTROL MEASURES.
16. CALL FOR INSPECTION OF INSTALLED DEVICES.

CONSTRUCTION EROSION CONTROL & MAINTENANCE

1. CLEAR AND GRUB WITHIN CONSTRUCTION LIMITS. HOWEVER, WITHIN BUFFERED STREAMS AND STREAM BANKS, MANUALLY CUT VEGETATION AND DO NOT REMOVE ROOT MASSES. REMOVE ROOT MASSES JUST PRIOR TO INSTALLING PERMANENT IMPROVEMENTS.
2. STRIP TOPSOIL, STOCKPILE TOPSOIL WITHIN TEMPORARY STOCKPILE LIMITS. MAINTAIN ALL SILT FENCE AROUND TEMPORARY STOCKPILES. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
3. BEGIN ROUGH GRADING OPERATIONS.
4. AT THE END OF EACH DAY, INSTALL AND ADJUST DIVERSION DITCHES, TEMPORARY CHANNEL CHECK DAMS/COMPOST SOCKS AND TEMPORARY SLOPE DRAINS AT THE EDGE OF THE FILL SLOPES TO CONTINUE TO DIRECT RUN-OFF TO TEMPORARY BASINS.
5. INSTALL STORM DRAINAGE SYSTEM AS GRADING OPERATIONS PROGRESS. INSTALL INLET AND OUTLET PROTECTION DEVICES AT NEW STRUCTURES AS THEY ARE CONSTRUCTED. PROTECT ALL OPEN STORM DRAIN LINES UNDER CONSTRUCTION WITH STONE FILTER AFTER STOPPAGE OF WORK EACH DAY. STORM DRAINAGE SYSTEM SHALL BE INSTALLED IN DRY CONDITIONS. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
6. INSTALL INLET AND OUTLET PROTECTION DEVICES AT NEW STRUCTURES AS THEY ARE CONSTRUCTED. PROTECT ALL OPEN STORM DRAIN LINES UNDER CONSTRUCTION WITH STONE FILTER AFTER STOPPAGE OF WORK EACH DAY.
7. INSTALL SLOPE PROTECTION BLANKETS AND TEMPORARILY SEED STEEP SLOPES AS THEY ARE ESTABLISHED AT FINISH GRADE. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
8. RESPREAD TOPSOIL, INSTALL SLOPE PROTECTION BLANKETS AND VEGETATE STEEP SLOPES AS THE ARE ESTABLISHED. STABILIZE ROADSIDE DITCHES AND CHANNELS DAILY UNTIL PERMANENT GROUND COVER IS ESTABLISHED. INSTALL TEMPORARY CHANNEL WATTLES. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
9. VEGETATE (OR OTHERWISE STABILIZE WITH PAVEMENT, BUILDING PAD ETC.) IMMEDIATELY TO ALL DISTURBED AREAS AS SHOWN IN SLOPE AND STABILIZATION NOTES. MAINTAIN THROUGHOUT THE DURATION OF THE PROJECT. SEED STABILIZATION NOTES AND NPDES TIME TABLE.
10. INSTALL SILT BAG INLET PROTECTION ONCE CURB & GUTTER IS INSTALLED. PROVIDE TEMPORARY SAND BAGS TO DIRECT RUN-OFF INTO INLETS.
11. MAINTAIN ALL EROSION & SEDIMENT CONTROL MEASURES THROUGHOUT CONSTRUCTION.
12. ANY DEWATERING IS TO BE DONE THROUGH A SILT BAG WITH A FLOATING INTAKE THAT IS CONSTANTLY MONITORED WHILE IN USE.

REMOVAL OF EROSION CONTROL DEVICES

1. CALL FOR INSPECTION OF STABILIZED SITE. IF APPROVED, PUMP SEDIMENT LADEN WATER THROUGH SILT BAGS AND REMOVE TEMPORARY SEDIMENT SKIMMER BASINS. INSTALL REMAINING PORTIONS OF PERMANENT CHANNELS AND SEED AND MULCH SLOPE OF ALL DISTURBED AREAS REMAINING ON SITE. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
2. CONVERT TEMPORARY SEDIMENT BASINS INTO PERMANENT STORMWATER WETLANDS. PUMP/DEWATER BASIN THROUGH SILT BAG. CLOSE DRAIN VALVE, REMOVE TEMPORARY SKIMMERS, BAFFLES AND OTHER TEMPORARY COMPONENTS. EXCAVATE SEDIMENT AND GRADE TO FINISH WETLAND CONTOURS. SEE STORMWATER WETLAND DETAILS FOR ADDITIONAL CONSTRUCTION SEQUENCING. INSTALL WETLAND PLANTINGS. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
3. REMOVE TEMPORARY CONSTRUCTION ENTRANCES, CONTRACTOR STAGING AREA AND ANY REMAINING TEMPORARY MATERIAL STOCKPILES. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
4. CALL FOR INSPECTION OF STABILIZED SITE. IF APPROVED, REMOVE ALL REMAINING TEMPORARY EROSION CONTROL MEASURES. SEED AND MULCH ANY REMAINING DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
5. PERFORM AS-BUILT TOPOGRAPHIC SURVEYS OF POND AND SITE UTILITIES AS REQUIRED FOR CERTIFICATE OF OCCUPANCY CERTIFICATIONS.
7. WHEN THE PROJECT IS COMPLETE, THE PERMITEE SHALL CONTACT DEMLR TO CLOSE OUT THE E&SC PLAN. AFTER DEMLR INFORMS THE PERMITTEE OF THE PROJECT CLOSE OUT, WA INSPECTION REPORT, THE PERMITTEE SHALL VISIT deq.nc.gov/NOI01 TO SUBMIT AN ELECTRONIC NOTICE OF TERMINATION (e-NOT). A $100 ANNUAL GENERAL PERMIT FEE WILL BE CHARGED UNTIL THE e-NOT HAS BEEN FILLED OUT.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

MAGNETIC

DAVIS KANE ARCHITECTS, PA
503 OBERLIN ROAD | SUITE 300
RALEIGH, NC 27605
919.833.3737
www.daviskane.com

CLH DESIGN, P.A.
400 Regency Forest Drive
Suite 120
Cary, North Carolina 27518
Phone: (919) 319-8716
Fax: (919) 319-7516
LA: C-106
PE: C-1595

PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA REGISTERED SEAL 22625 ENGINEER STEVEN J. MILLER

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

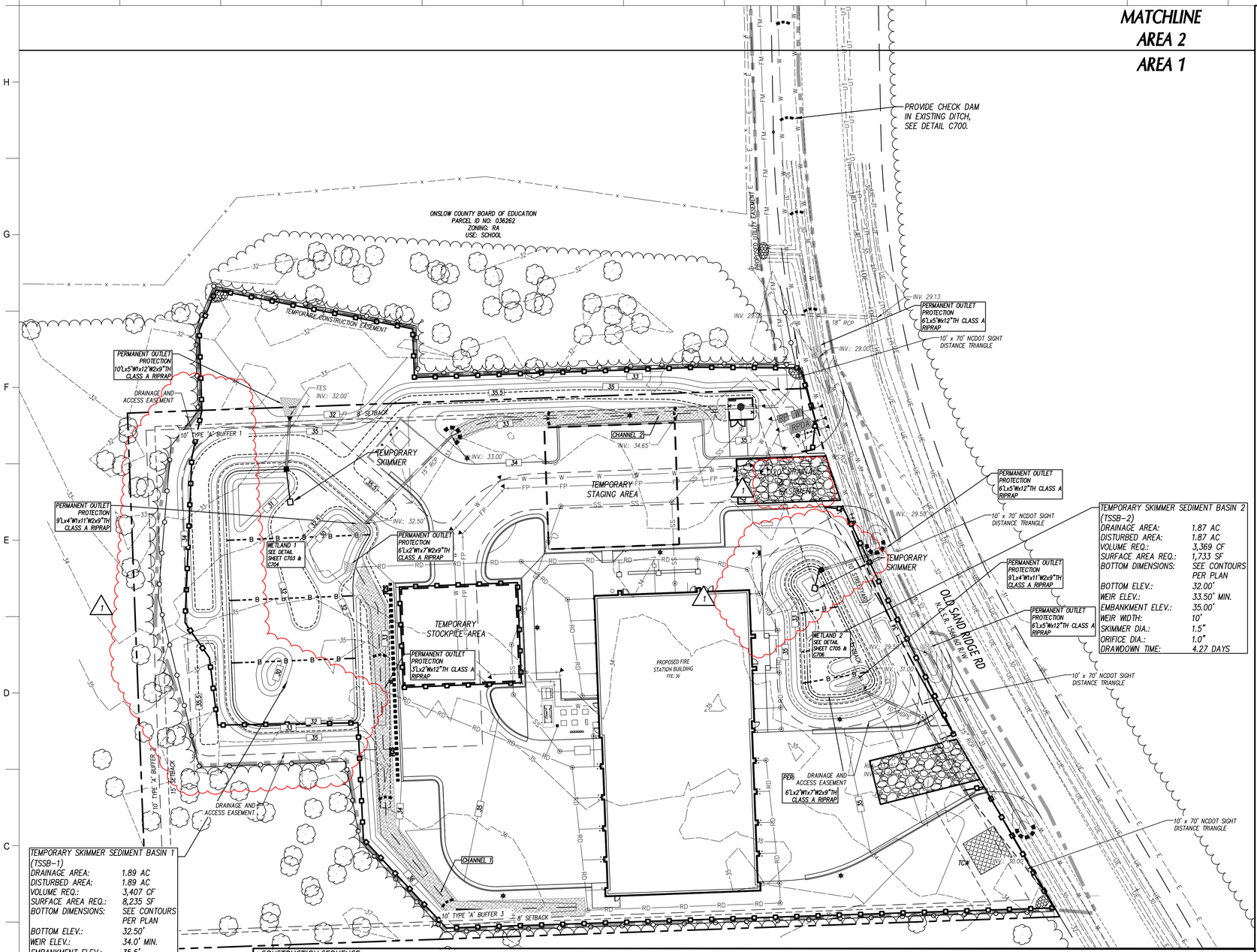
BID DOCUMENTS

04/17/2025

SHEET TITLE

INITIAL EROSION CONTROL PLAN

C400



TEMPORARY SKIMMER SEDIMENT BASIN 1 (TSSB–1)	
DRAINAGE AREA:	1.89 AC
DISTURBED AREA:	1.89 AC
VOLUME REQ.:	3,407 CF
SURFACE AREA REQ.:	8,235 SF
BOTTOM DIMENSIONS:	SEE CONTOURS PER PLAN
BOTTOM ELEV.:	32.50'
WEIR ELEV.:	34.0' MIN.
EMBANKMENT ELEV.:	35.5'
WEIR WIDTH:	10'
SKIMMER DIA.:	1.5"
ORIFICE DIA.:	1.0"
DRAWDOWN TIME:	4.32 DAYS

TEMPORARY SKIMMER SEDIMENT BASIN 2 (TSSB–2)	
DRAINAGE AREA:	1.87 AC
DISTURBED AREA:	1.87 AC
VOLUME REQ.:	3,369 CF
SURFACE AREA REQ.:	1,733 SF
BOTTOM DIMENSIONS:	SEE CONTOURS PER PLAN
BOTTOM ELEV.:	32.00'
WEIR ELEV.:	33.50' MIN.
EMBANKMENT ELEV.:	35.00'
WEIR WIDTH:	10'
SKIMMER DIA.:	1.5"
ORIFICE DIA.:	1.0"
DRAWDOWN TIME:	4.27 DAYS

LEGEND

- TEMP. GRAVEL CONSTR. ENTRANCE SEE DETAIL SHEET C700
- TEMP. DIVERSION DITCH / BERM SEE DETAIL SHEET C701.
- TEMP. SILT FENCE SEE DETAIL SHEET C701.
- TEMP. REINFORCED SILT FENCE OUTLET, SEE DETAIL SHEET C700
- PERMANENT OUTLET PROTECTION SEE DETAIL SHEET C701.
- TCW TEMP. CONCRETE WASHOUT AREA SEE DETAIL SHEET C700
- PROPOSED STORM SEWER PIPES
- EXISTING STORM SEWER PIPES
- CONSTRUCTION LIMITS UNLESS OTHERWISE NOTED.
- TEMP. ROCK PIPE INLET PROTECTION SEE DETAIL SHEET C702.
- TSSB TEMP. SKIMMER SEDIMENT BASIN SEE DETAIL SHEET C702.
- EXISTING CONTOUR
- FINISHED CONTOUR
- TEMP. CONTOUR (TEMP. GRADES DURING CONSTR.)
- CHANNEL LINING SEE DETAIL SHEET C701.
- TEMP. DEWATERING SILT BAG SEE DETAIL SHEET C700
- TREE PROTECTION FENCE SEE DETAIL SHEET C701
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4. TOTAL DISTURBED AREA: 4.0 AC.
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6. ALL STORM DRAINAGE PIPES SHALL BE THOROUGHLY FLUSHED OF ALL SEDIMENT FOLLOWING SITE STABILIZATION. INTERIOR FLUSHING OF SYSTEM SHALL BE PERFORMED AS NEEDED TO MAINTAIN PROPER FUNCTIONING OF THE DRAINAGE SYSTEM. CLEANING SHALL BE PERFORMED IN A MANNER WHICH PREVENTS SEDIMENT FROM BEING FLUSHED THROUGH PIPES TO THE EXISTING DRAINAGE SYSTEM.
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8. SOIL AND OTHER MATERIALS SHALL ONLY BE TEMPORARILY STOCKPILED WITHIN THE CONSTRUCTION LIMITS PROTECTED BY SEDIMENT AND EROSION CONTROL DEVICES AND MEASURES. STOCKPILES SHALL BE STABILIZED AS REQUIRED AS INDICATED IN THE SLOPE & SURFACE STABILIZATION NOTES ON THIS PLAN.
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11. ROADSIDE DITCHES AND CHANNELS SHALL BE STABILIZED DAILY UNTIL PERMANENT GROUND COVER IS ESTABLISHED.
12. INSTALL TEMPORARY MATTING TO TOP OF ALL SIDE SLOPES ON CHANNELS, DIVERSION DITCHES AND TEMPORARY SEDIMENT BASINS. SEE DETAIL SHEET C702 (PERMANENT CHANNEL) AND C702 (TEMPORARY DIVERSION DITCH) FOR TYPE OF MATTING TO USE.
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EXTENSIONS OF TIME MAY BE APPROVED BY THE PERMITTING AUTHORITY BASED ON WEATHER OR OTHER SITE–SPECIFIC CONDITIONS THAT MAKE COMPLIANCE IMPRACTICABLE (SECTION II.B(2) (b))

THE REQUIREMENTS ON SHEET C705 ARE THE MINIMUM NECESSARY TO MEET EROSION AND SEDIMENT CONTROL REGULATIONS. THE CONTRACT DOCUMENTS INCLUDE ADDITIONAL SEEDING AND STABILIZATION REQUIREMENTS AND SCHEDULES WHICH MAY EXCEED MINIMUM REQUIREMENTS.

INSTALL TEMPORARY EXCELSIOR MATTING FOR STABILIZATION DURING THE ESTABLISHMENT OF VEGETATIVE COVER ON ALL STEEP SLOPES (6:1 OR STEEPER) AND AREAS OF CONCENTRATED FLOW (CHANNELS, DITCHES, SWALES, ETC.). UTILIZE TEMPORARY COCONUT MAT IN AREAS IDENTIFIED ON PLAN. REFER TO SPECIFICATION SECTION 31.2200 FOR MATERIAL SPECIFICATIONS. INSTALL MATTING PER MANUFACTURER'S INSTRUCTIONS.

SEE SHEET C400 & C401 FOR EROSION CONTROL CONSTRUCTION SEQUENCE.

SEE SHEET C700 FOR EROSION CONTROL GROUND COVER PLAN FOR MORE INFORMATION

CONSTRUCTION SEQUENCE

INITIAL EROSION CONTROL INSTALLATION

1. OBTAIN APPROVED PLAN AND APPROVAL PLACARD. A COPY OF THE APPROVED PLAN MUST BE ON FILE AT THE JOB SITE. NOTIFY EROSION CONTROL AUTHORITIES OF PROPOSED STARTING DATE OF LAND DISTURBING ACTIVITIES.
2. EROSION AND SEDIMENT CONTROL (E&SC) PERMIT AND A CERTIFICATE OF COVERAGE (COC) MUST BE OBTAINED BEFORE ANY LAND DISTURBING ACTIVITIES (INCLUDING TIMBERING AND DEMOLITION) OCCUR.
3. INSTALL TREE PROTECTION FENCING.
4. CONTACT NC DEQ WILMINGTON REGIONAL OFFICE AT 919–791–4200 TO SCHEDULE PRE–CONSTRUCTION MEETING AT LEAST 72 HOURS PRIOR TO PROJECT ACTIVATION.
5. CONDUCT PRE–CONSTRUCTION CONFERENCE.
6. THE FOLLOWING MUST BE KEPT ON SITE UNTIL THE E&SC PLAN HAS BEEN CLOSED OUT BY LAND QUALITY: RAIN GAUGE, A COPY OF APPROVED E&SC PLAN WITH APPROVAL CERTIFICATE/LETTER,COC, AND NPDES PERMIT WITH A MINIMUM OF MOST RECENT 30 DAYS OF SELF–INSPECTION RECORDS (SEE SELF–INSPECTION REQUIREMENTS BELOW). THESE ITEMS SHOULD BE LOCATED NEAR THE MAIN CONSTRUCTION ENTRANCE. FAILURE TO MAINTAIN THESE ON–SITE VIOLATES THE NPDES PERMIT.
7. CONTACT THE NC DEQ WILMINGTON OFFICE AT LEAST 48 HOURS PRIOR TO COMMENCING THE LAND–DISTURBING ACTIVITIES.
8. INSTALL CONSTRUCTION ENTRANCE, AND PERIMETER SILT FENCES. TEMPORARY SEDIMENT SKIMMER BASINS, TEMPORARY CHECK DAMS, DIVERSION DITCHES AND TEMPORARY COMPOST SOCKS. ALL TEMPORARY BASINS AND DIVERSIONS SHALL BE SEEDED, MULCHED/LINED AND ANCHORED UPON INSTALLATION. ALL DIVERSION DITCHES WILL BE LINED TO THE TOP OF BANK. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
9. INSTALL STORMWATER WETLAND BARREL, FOLLOWED BY EMBANKMENTS, AND THEN OUTLET STRUCTURES IN DRY CONDITIONS. KEEP ALL ORIFICES BLOCKED UP TO THE REQUIRED SEDIMENT BASIN POOL ELEVATION. INSTALL TEMPORARY SKIMMERS ON WETLAND DRAIN, KEEP WETLAND DRAIN VALVE OPEN WHILE TEMPORARY SKIMMER IS OPERATIONAL. SEE WETLAND DETAIL SHEETS. INSTALL PERMANENT OUTLET PROTECTION. EXCAVATE BASINS AND INSTALL TEMPORARY SLOPE DRAIN AND TEMPORARY OUTLET PROTECTION. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
10. ESTABLISH TEMPORARY CONSTRUCTION TRAILERS WITHIN STAGING AREA.
11. INSTALL TEMPORARY DIVERSIONS, TEMPORARY SLOPE DRAINS AND TEMPORARY OUTLET PROTECTION. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
12. INSTALL SILT FENCE FOR TEMPORARY STOCKPILE LOCATION. ALL BARE SOILS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
13. PERIMETER MEASURES MUST BE LEFT IN PLACE UNTIL ALL UPLAND AREAS ARE PERMANENTLY STABILIZED. AFTER SITE IS PERMANENTLY STABILIZED, REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND PROVIDED PERMANENT SEEDING WHERE TEMPORARY MEASURES HAVE BEEN REMOVED AND GROUND COVER IS NOT ADEQUATE. SEDIMENT BASINS MAY NOT BE REMOVED OR CONVERTED TO PERMANENT SCMS UNTIL ALL UPLAND AREAS ARE PERMANENTLY STABILIZED.
14. AFTER REMOVAL OF TEMPORARY DIVERSIONS, INSTALL SECOND CONSTRUCTION ENTRANCE PER THE PLANS.
15. CLEAR AND GRUB AREAS ONLY AS REQUIRED FOR INSTALLATION OF INITIAL SEDIMENT CONTROL MEASURES.
16. CALL FOR INSPECTION OF INSTALLED DEVICES.

CONSTRUCTION EROSION CONTROL & MAINTENANCE

1. CLEAR AND GRUB WITHIN CONSTRUCTION LIMITS. HOWEVER, WITHIN BUFFERED STREAMS AND STREAM BANKS, MANUALLY CUT VEGETATION AND DO NOT REMOVE ROOT MASSES. REMOVE ROOT MASSES JUST PRIOR TO INSTALLING PERMANENT IMPROVEMENTS.
2. STRIP TOPSOIL, STOCKPILE TOPSOIL WITHIN TEMPORARY STOCKPILE LIMITS. MAINTAIN ALL SILT FENCE AROUND TEMPORARY STOCKPILES. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
3. BEGIN ROUGH GRADING OPERATIONS.
4. AT THE END OF EACH DAY, INSTALL AND ADJUST DIVERSION DITCHES, TEMPORARY CHANNEL CHECK DAMS/COMPOST SOCKS AND TEMPORARY SLOPE DRAINS AT THE EDGE OF THE FILL SLOPES TO CONTINUE TO DIRECT RUN–OFF TO TEMPORARY BASINS.
5. INSTALL STORM DRAINAGE SYSTEM AS GRADING OPERATIONS PROGRESS. INSTALL INLET AND OUTLET PROTECTION DEVICES AT NEW STRUCTURES AS THEY ARE CONSTRUCTED. PROTECT ALL OPEN STORM DRAIN LINES UNDER CONSTRUCTION WITH STONE FILTER AFTER STOPPAGE OF WORK EACH DAY. STORM DRAINAGE SYSTEM SHALL BE INSTALLED IN DRY CONDITIONS. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
6. INSTALL INLET AND OUTLET PROTECTION DEVICES AT NEW STRUCTURES AS THEY ARE CONSTRUCTED. PROTECT ALL OPEN STORM DRAIN LINES UNDER CONSTRUCTION WITH STONE FILTER AFTER STOPPAGE OF WORK EACH DAY.
7. INSTALL SLOPE PROTECTION BLANKETS AND TEMPORARILY SEED STEEP SLOPES AS THEY ARE ESTABLISHED AT FINISH GRADE. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
8. RESPREAD TOPSOIL, INSTALL SLOPE PROTECTION BLANKETS AND VEGETATE STEEP SLOPES AS THE ARE ESTABLISHED. STABILIZE ROADSIDE DITCHES AND CHANNELS DAILY UNTIL PERMANENT GROUND COVER IS ESTABLISHED. INSTALL TEMPORARY CHANNEL WATTLES. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
9. VEGETATE (OR OTHERWISE STABILIZE WITH PAVEMENT, BUILDING PAD ETC.) IMMEDIATELY TO ALL DISTURBED AREAS AS SHOWN IN SLOPE AND STABILIZATION NOTES. MAINTAIN THROUGHOUT THE DURATION OF THE PROJECT. SEED STABILIZATION NOTES AND NPDES TIME TABLE.
10. INSTALL SILT BAG INLET PROTECTION ONCE CURB & GUTTER IS INSTALLED. PROVIDE TEMPORARY SAND BAGS TO DIRECT RUN–OFF INTO INLETS.
11. MAINTAIN ALL EROSION & SEDIMENT CONTROL MEASURES THROUGHOUT CONSTRUCTION.
12. ANY DEWATERING IS TO BE DONE THROUGH A SILT BAG WITH A FLOATING INTAKE THAT IS CONSTANTLY MONITORED WHILE IN USE.

REMOVAL OF EROSION CONTROL DEVICES

1. CALL FOR INSPECTION OF STABILIZED SITE. IF APPROVED, PUMP SEDIMENT LADEN WATER THROUGH SILT BAGS AND REMOVE TEMPORARY SEDIMENT SKIMMER BASINS. INSTALL REMAINING PORTIONS OF PERMANENT CHANNELS AND SEED AND MULCH SLOPE OF ALL DISTURBED AREAS REMAINING ON SITE. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
2. CONVERT TEMPORARY SEDIMENT BASINS INTO PERMANENT STORMWATER WETLANDS. PUMP/DEWATER BASIN THROUGH SILT BAG. CLOSE DRAIN VALVE, REMOVE TEMPORARY SKIMMERS, BAFFLES AND OTHER TEMPORARY COMPONENTS. EXCAVATE SEDIMENT AND GRADE TO FINISH WETLAND CONTOURS. SEE STORMWATER WETLAND DETAILS FOR ADDITIONAL CONSTRUCTION SEQUENCING. INSTALL WETLAND PLANTINGS. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
3. REMOVE TEMPORARY CONSTRUCTION ENTRANCES, CONTRACTOR STAGING AREA AND ANY REMAINING TEMPORARY MATERIAL STOCKPILES. SEED AND MULCH ALL DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
4. CALL FOR INSPECTION OF STABILIZED SITE. IF APPROVED, REMOVE ALL REMAINING TEMPORARY EROSION CONTROL MEASURES. SEED AND MULCH ANY REMAINING DISTURBED AREAS. ALL DISTURBED AREAS ARE TO BE STABILIZED UNDER CONDITIONS OUTLINED IN THE CURRENT NPDES PERMIT.
6. PERFORM AS–BUILT TOPOGRAPHIC SURVEYS OF POND AND SITE UTILITIES AS REQUIRED FOR CERTIFICATE OF OCCUPANCY CERTIFICATIONS.
7. WHEN THE PROJECT IS COMPLETE, THE PERMITTEE SHALL CONTACT DEMLR TO CLOSE OUT THE E&SC PLAN. AFTER DEMLR INFORMS THE PERMITTEE OF THE PROJECT CLOSE OUT, HA INSPECTION REPORT, THE PERMITTEE SHALL VISIT deq.nc.gov/NCG01 TO SUBMIT AN ELECTRONIC NOTICE OF TERMINATION (e–NOT). A $100 ANNUAL GENERAL PERMIT FEE WILL BE CHARGED UNTIL THE e–NOT HAS BEEN FILLED OUT.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 22625 ENGINEER STEVEN J. MILLER

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

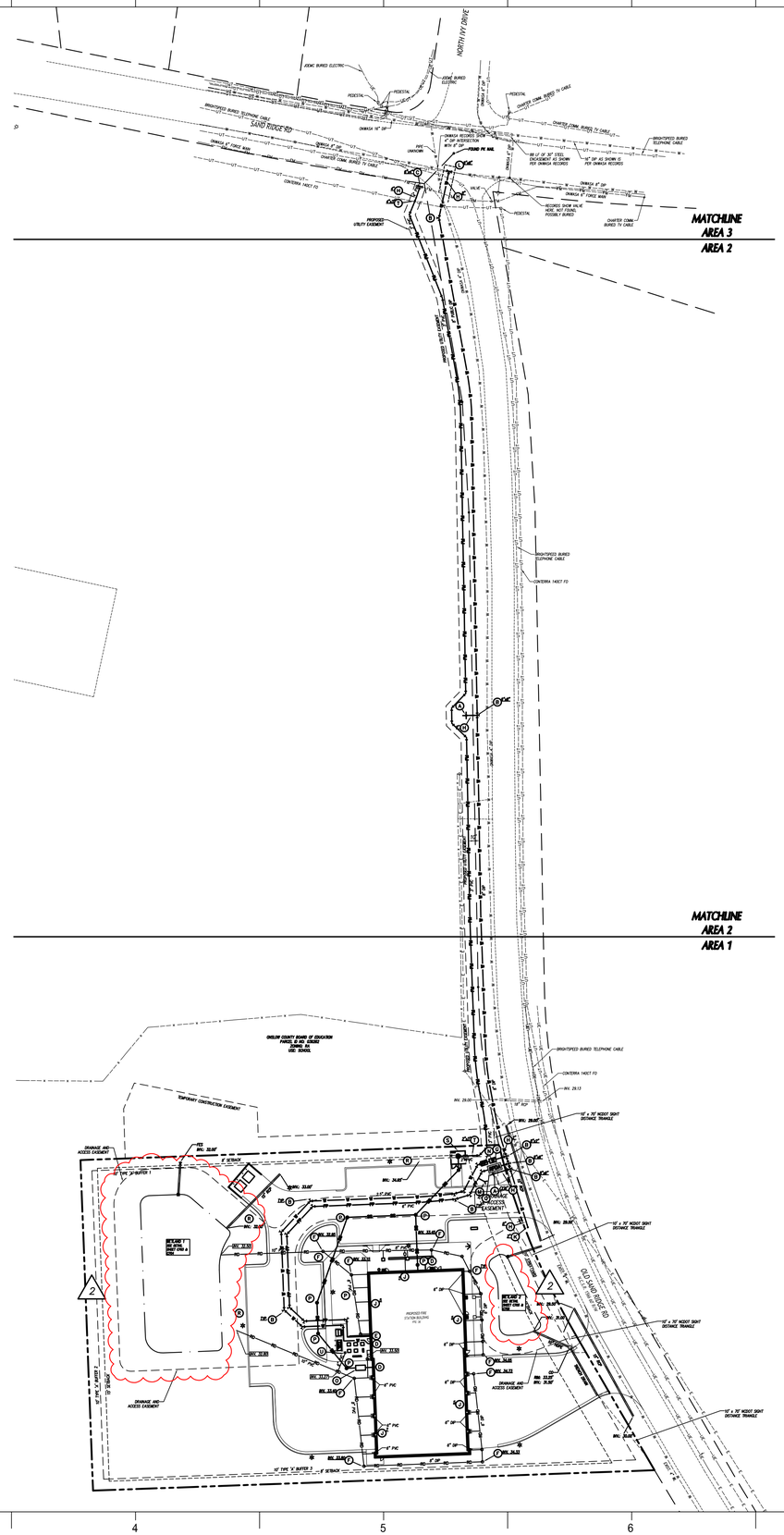
BID DOCUMENTS

04/17/2025

SHEET TITLE

FINAL EROSION CONTROL PLAN

C401



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ONSLOW COUNTY

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SEALS

NORTH CAROLINA REGISTERED SEAL 22625 ENGINEER STEVEN J. MILLER

DKA JOB NUMBER

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2	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

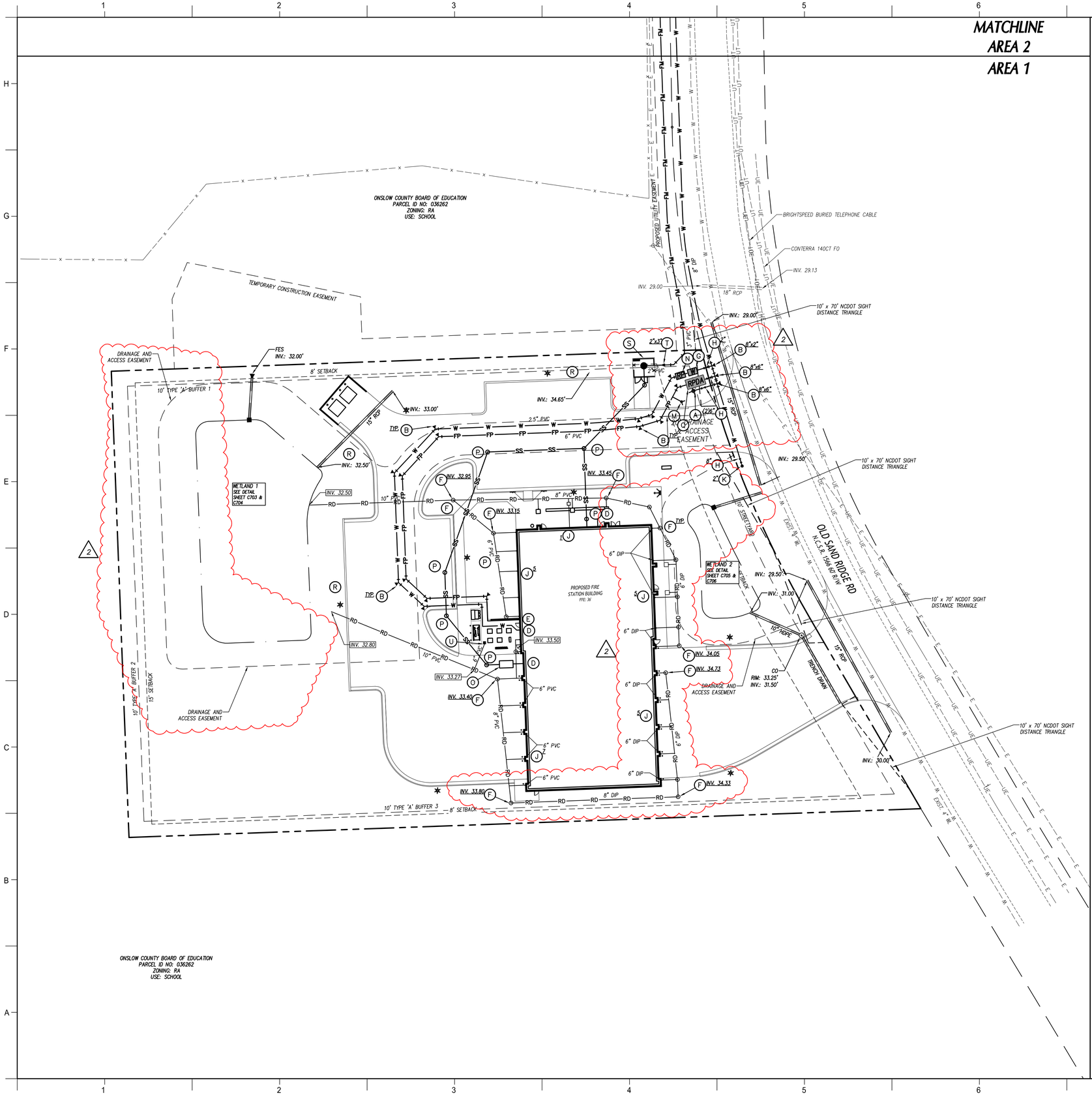
BID DOCUMENTS

04/17/2025

SHEET TITLE

OVERALL UTILITY PLAN

C500



UTILITY LEGEND

	EXISTING	PROPOSED
CHILLED WATER	------CW------	CW
ELECTRICAL (OVERHEAD)	------ E ------	E
ELECTRICAL (UNDERGROUND)	------UE------	UE
FOUNDATION DRAIN	------FD------	FD
GAS	------ G ------	G
SANITARY SEWER	------SS------	SS
TELEPHONE (OVERHEAD)	------ T ------	T
TELEPHONE (UNDERGROUND)	------UT------	UT
WATER	------ W ------	W
ROOF DRAIN	------RD------	RD
FIRE PROTECTION	------FP------	FP
STORM DRAIN	═══════	═══════
TREE PROTECTION FENCING, SEE EROSION CONTROL PLANS		
LIGHT POLE	LP	
UTILITY POLE	PP	
MANHOLE	MH	
CLEAN OUT	CO	
DROP INLET,CATCH BASIN	DI, CB	
FIRE HYDRANT	FH	
WATER VALVE	WV	
POST INDICATOR VALVE (PIV)		
FIRE DEPARTMENT CONNECTION (FDC)		
THRUST BLOCKING		
SANITARY SEWER STRUCTURE IDENTIFICATION		1

GENERAL NOTES-UTILITY

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL ONWASA AND NCDOT STANDARDS, SPECIFICATIONS AND DETAILS.
2. INSTALL WATERMAINS WITH A COVER OF NO LESS THAN 3-FT.
3. INSTALL SEWER MAINS WITH A COVER OF NO LESS THAN 3-FT TO FINISH GRADE IN NON-TRAFFIC AREAS, 4-FT TO FINISH GRADE IN TRAFFIC AREAS.
4. INSTALL ALL UTILITIES TO PROVIDE REQUIRED CLEARANCES AS INDICATED IN THE SPECIFICATIONS.
5. WATERLINES AND SEWER MAINS SHALL BE INSTALLED WITH A MINIMUM HORIZONTAL CLEARANCE OF 10-FT.
6. SEWER MAINS SHALL BE INSTALLED WITH A MINIMUM VERTICAL CLEARANCE OF 24-IN TO STORM DRAINAGE PIPES.
7. COORDINATE AND SCHEDULE INSTALLATION OF ALL UTILITIES WITH OTHER PRIME CONTRACTORS, UTILITY COMPANIES AND OTHER TRADES INCLUDING BUT NOT LIMITED TO: NATURAL GAS, ELECTRICITY, TELEPHONE AND CATV.
8. VERIFY EXISTING CONDITIONS AND CONNECTIONS TO EXISTING UTILITIES PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT IF ANY DISCREPANCIES ARE DISCOVERED.
9. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGES DURING CONSTRUCTION AND SHALL MAKE REPAIRS AT NO EXPENSE TO THE OWNER.
10. ALL CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE NCSBC AND OSHA REQUIREMENTS.
11. THE CONTRACTOR SHALL PROVIDE AN AS-BUILT SURVEY OF ALL UTILITY AND STORM DRAINAGE IMPROVEMENTS FOLLOWING CONSTRUCTION.
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13. SEE GENERAL NOTES ON EXISTING CONDITIONS AND DEMOLITION PLAN FOR REQUIREMENTS FOR REMOVAL AND PATCHING OF PAVEMENT FOR UTILITY INSTALLATION.
14. ALL ROOF DRAINS SHALL BE 6" PVC (SCH 40) @ 1.04% MIN. SLOPE UNLESS INDICATED OTHERWISE. USE DUCTILE IRON WHEN COVER IS LESS THAN 24-IN.
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18. NO VALVES, METERS OR HYDRANTS SHALL BE IN THE SLOPES OR BOTTOM OF THE DITCHES.

UTILITY KEY NOTES

- (A) FIRE HYDRANT ASSEMBLY WITH GATE VALVE, SEE DETAIL SHEET C901.
- (B) THRUST BLOCKING, TYP, SEE DETAIL SHEET C901.
- (C) 6-IN x 4-IN FORCE MAIN SERVICE SADDLE TAP WITH GATE VALVE AND CHECK VALVE ASSEMBLY PER ONWASA REQUIREMENTS.
- (D) EXTEND UTILITY TO WITHIN 5'-0" OF BUILDING WALL OR AS INDICATED ON PLUMBING PLANS. REFER TO PLUMBING PLANS FOR LOCATION AND INVERTS.
- (E) EXTEND WATER MAIN TO 12-IN ABOVE FINISH FLOOR FOR FIRE PROTECTION/PLUMBING CONNECTION, SEE DETAIL SHEET C902. REFER TO TO FIRE PROTECTION/PLUMBING PLANS FOR EXACT LOCATION.
- (F) ROOFDRAIN CLEANOUT, SEE DETAIL SHEET C900.
- (G) 2" DOMESTIC WATER METER, SEE DETAIL SHEET C902.
- (H) GATE VALVE AND VALVE BOX, SEE DETAIL SHEET C901.
- (J) DOWNSPOUT CONNECTION, SEE ARCHITECTURE PLANS.
- (K) 2-IN BLOW-OFF ASSEMBLY, SEE DETAIL SHEET C902.
- (L) STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY, SEE DETAIL SHEET C902 AND SPECIFICATIONS.
- (M) FIRE DEPARTMENT CONNECTION, SEE DETAIL SHEET C902.
- (N) 2-IN ZURN-WILKINS MODEL 975XL2 REDUCED PRESSURE BACKFLOW ASSEMBLY (RPA) WITHIN HEATED ENCLOSURE. SEE ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
- (O) OIL/WATER SEPERATOR BY PC, SEE PME PLANS.
- (P) NEW SANITARY SEWER CLEANOUT, TYP. SEE DETAIL SHEET C900.
- (Q) 6-IN ZURN-WILKINS MODEL 475DA REDUCED PRESSURE BACKFLOW DETECTOR ASSEMBLY (RPDA) WITHIN HEATED ENCLOSURE. SEE ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
- (R) 25' TALL LIGHT POLE, SEE DRAWING NUMBER C010 SITE ELECTRICAL.
- (S) PRIVATE PUMP STATION, SEE DETAIL SHEET C903.
- (T) INCREASER/ REDUCER.
- (U) IN-LINE DRAIN, SEE DETAIL SHEET C900.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

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2	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

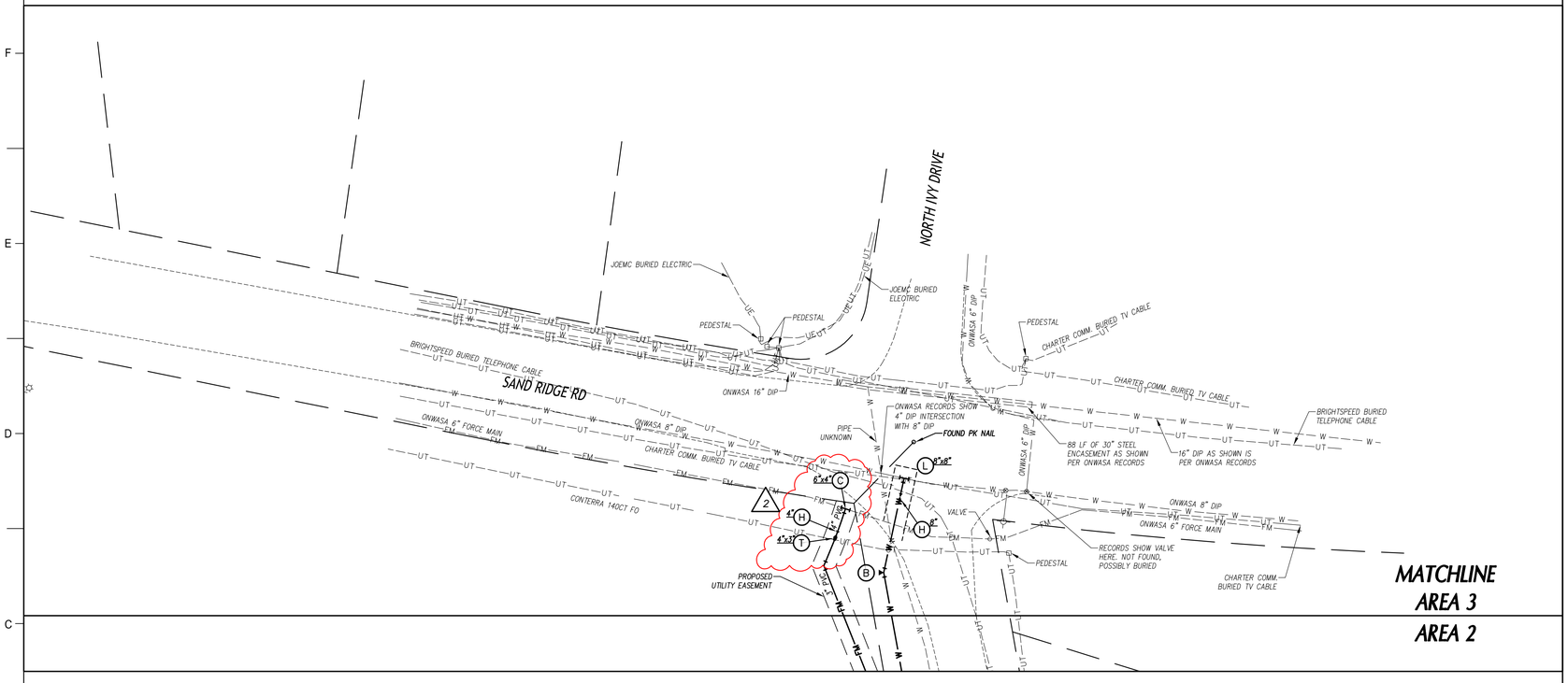
BID DOCUMENTS

04/17/2025

SHEET TITLE

UTILITY PLAN - AREA 1

C501



UTILITY LEGEND

	EXISTING	PROPOSED
CHILLED WATER	------CW------	CW
ELECTRICAL (OVERHEAD)	------ E ------	E
ELECTRICAL (UNDERGROUND)	------UE------	UE
FOUNDATION DRAIN	------FD------	FD
GAS	------ G ------	G
SANITARY SEWER	------SS------	SS
TELEPHONE (OVERHEAD)	------ T ------	T
TELEPHONE (UNDERGROUND)	------UT------	UT
WATER	------ W ------	W
ROOF DRAIN	------RD------	RD
FIRE PROTECTION	------FP------	FP
STORM DRAIN	═══════	
TREE PROTECTION FENCING, SEE EROSION CONTROL PLANS		
LIGHT POLE	LP	
UTILITY POLE	PP	
MANHOLE	MH	
CLEAN OUT	CO	
DROP INLET,CATCH BASIN	DI, CB	
FIRE HYDRANT	FH	
WATER VALVE	WV	
POST INDICATOR VALVE (PIV)		
FIRE DEPARTMENT CONNECTION (FDC)		
THRUST BLOCKING		
SANITARY SEWER STRUCTURE IDENTIFICATION		1

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4. INSTALL ALL UTILITIES TO PROVIDE REQUIRED CLEARANCES AS INDICATED IN THE SPECIFICATIONS.
5. WATERLINES AND SEWER MAINS SHALL BE INSTALLED WITH A MINIMUM HORIZONTAL CLEARANCE OF 10-FT.
6. SEWER MAINS SHALL BE INSTALLED WITH A MINIMUM VERTICAL CLEARANCE OF 24-IN TO STORM DRAINAGE PIPES.
7. COORDINATE AND SCHEDULE INSTALLATION OF ALL UTILITIES WITH OTHER PRIME CONTRACTORS, UTILITY COMPANIES AND OTHER TRADES INCLUDING BUT NOT LIMITED TO: NATURAL GAS, ELECTRICITY, TELEPHONE AND CATV.
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13. SEE GENERAL NOTES ON EXISTING CONDITIONS AND DEMOLITION PLAN FOR REQUIREMENTS FOR REMOVAL AND PATCHING OF PAVEMENT FOR UTILITY INSTALLATION.
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- (A) FIRE HYDRANT ASSEMBLY WITH GATE VALVE, SEE DETAIL SHEET C901.
- (B) THRUST BLOCKING, TYP, SEE DETAIL SHEET C901.
- (C) 6-IN x 4-IN FORCE MAIN SERVICE SADDLE TAP WITH GATE VALVE AND CHECK VALVE ASSEMBLY PER ONWASA REQUIREMENTS.
- (D) EXTEND UTILITY TO WITHIN 5'-0" OF BUILDING WALL OR AS INDICATED ON PLUMBING PLANS. REFER TO PLUMBING PLANS FOR LOCATION AND INVERTS.
- (E) EXTEND WATER MAIN TO 12-IN ABOVE FINISH FLOOR FOR FIRE PROTECTION/PLUMBING CONNECTION, SEE DETAIL SHEET C902. REFER TO TO FIRE PROTECTION/PLUMBING PLANS FOR EXACT LOCATION.
- (F) ROOFDRAIN CLEANOUT, SEE DETAIL SHEET C900.
- (G) 2" DOMESTIC WATER METER, SEE DETAIL SHEET C902.
- (H) GATE VALVE AND VALVE BOX, SEE DETAIL SHEET C901.
- (J) DOWNSPOUT CONNECTION, SEE ARCHITECTURE PLANS.
- (K) 2-IN BLOW-OFF ASSEMBLY, SEE DETAIL SHEET C902.
- (L) STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY, SEE DETAIL SHEET C902 AND SPECIFICATIONS.
- (M) FIRE DEPARTMENT CONNECTION, SEE DETAIL SHEET C902.
- (N) 2-IN ZURN-WILKINS MODEL 975XL2 REDUCED PRESSURE BACKFLOW ASSEMBLY (RPA) WITHIN HEATED ENCLOSURE. SEE ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
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- (P) NEW SANITARY SEWER CLEANOUT, TYP. SEE DETAIL SHEET C900.
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA PROFESSIONAL SEAL 22625 ENGINEER STEVEN J. MILLER

DKA JOB NUMBER
2324

REVISIONS		
1	04/01/25	ADDENDUM #1
2	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

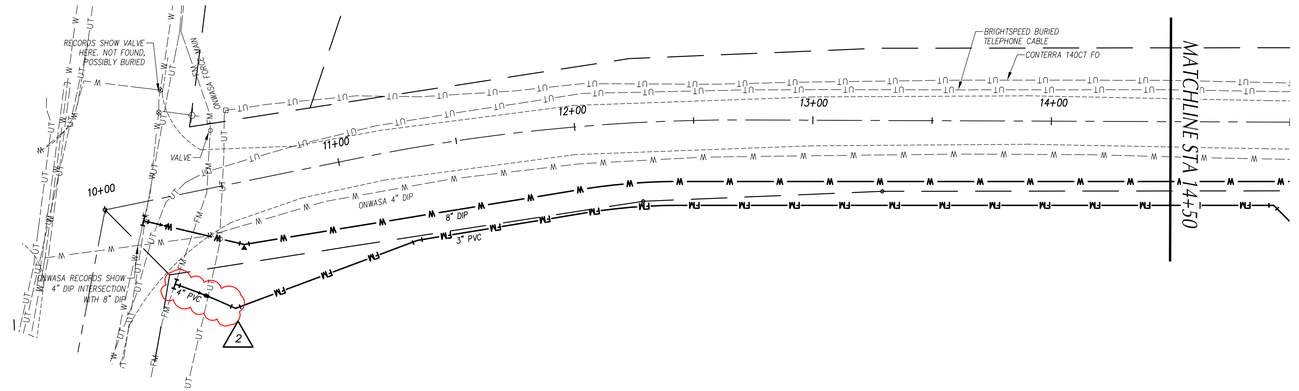
BID DOCUMENTS

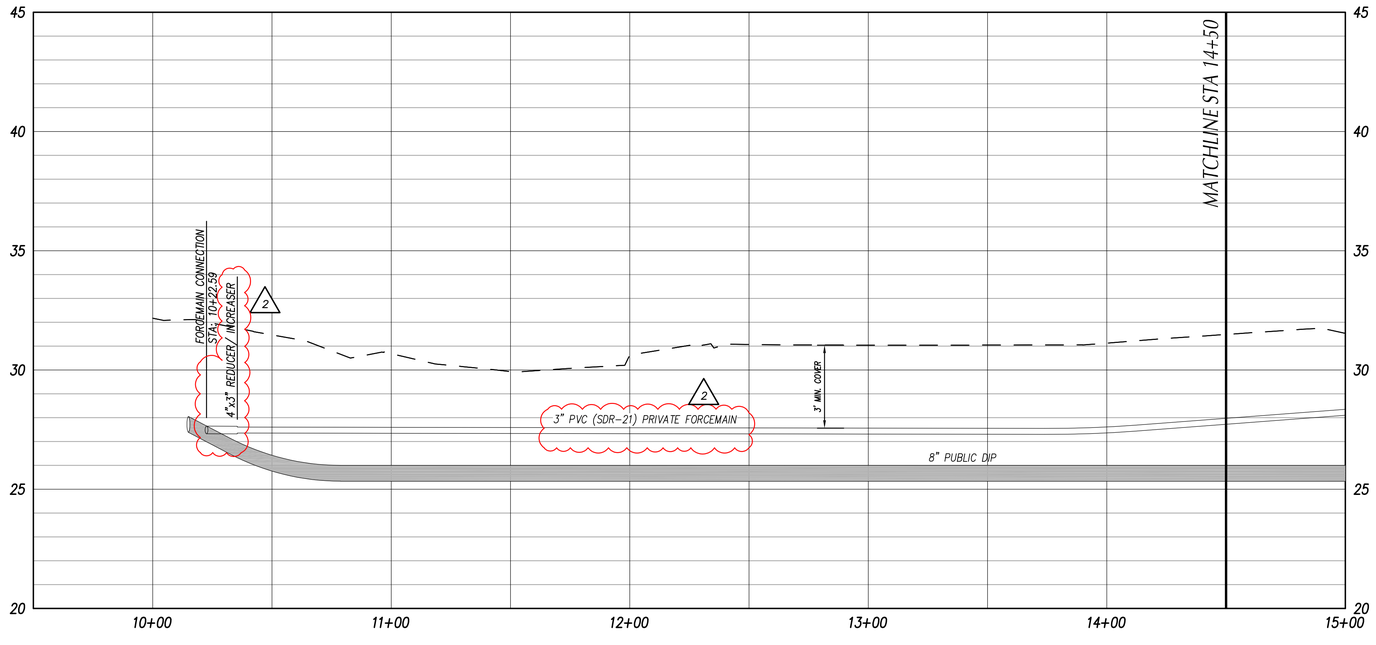
04/17/2025

SHEET TITLE

UTILITY PLAN - AREA 3

C503





GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.
HORIZONTAL: 1"=30'
VERTICAL: 1"=3'

DAVIS KANE ARCHITECTS, PA
503 OBERLIN ROAD | SUITE 300
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919.833.3737
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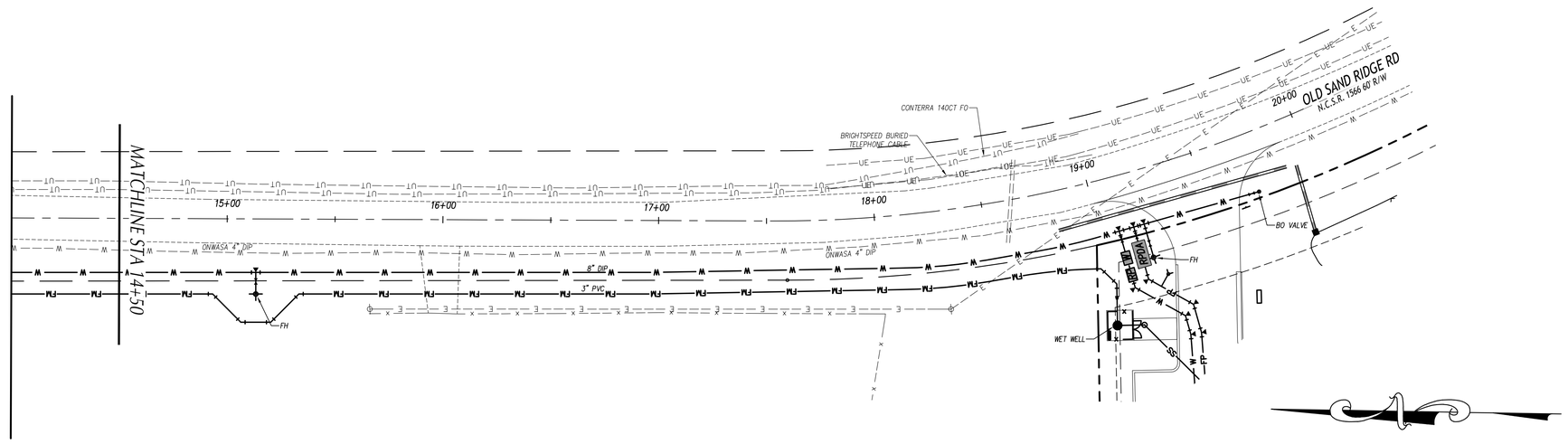
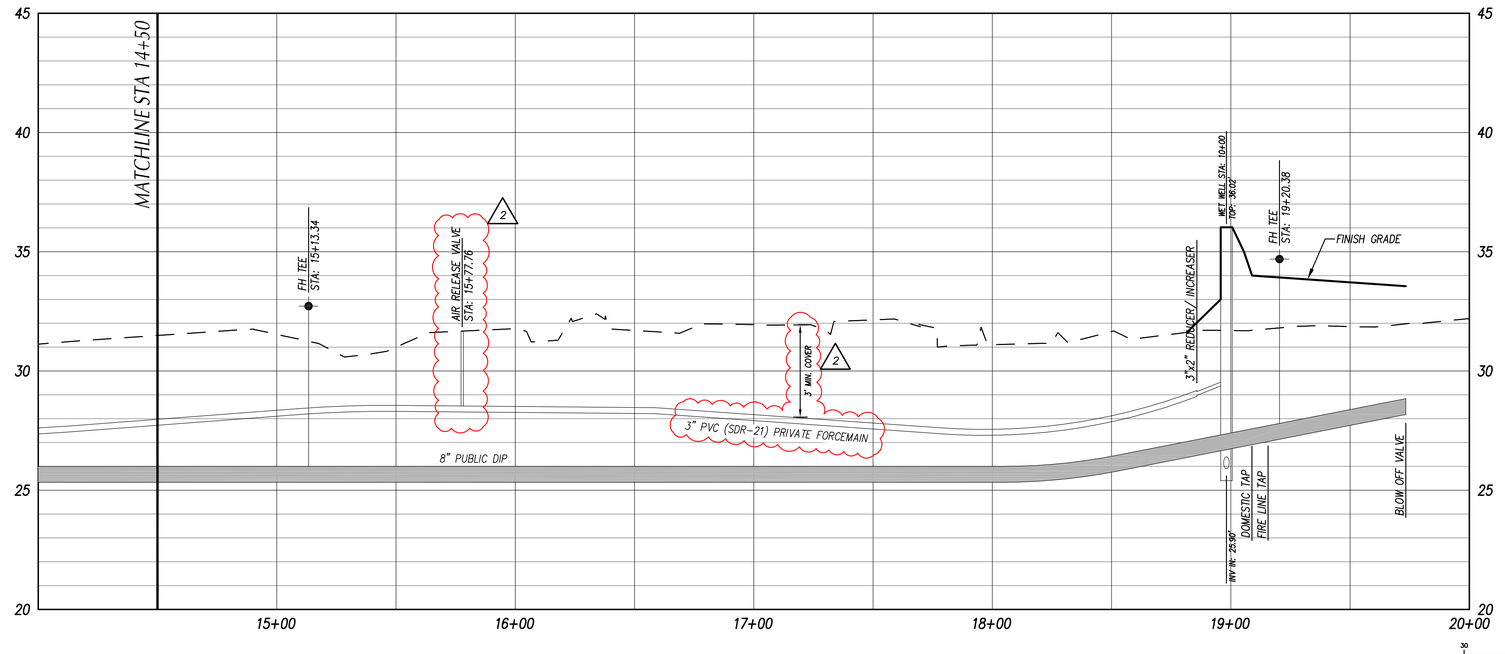
04/17/2025

SHEET TITLE

FORCEMAIN & WATERLINE PLAN AND PROFILE

C504





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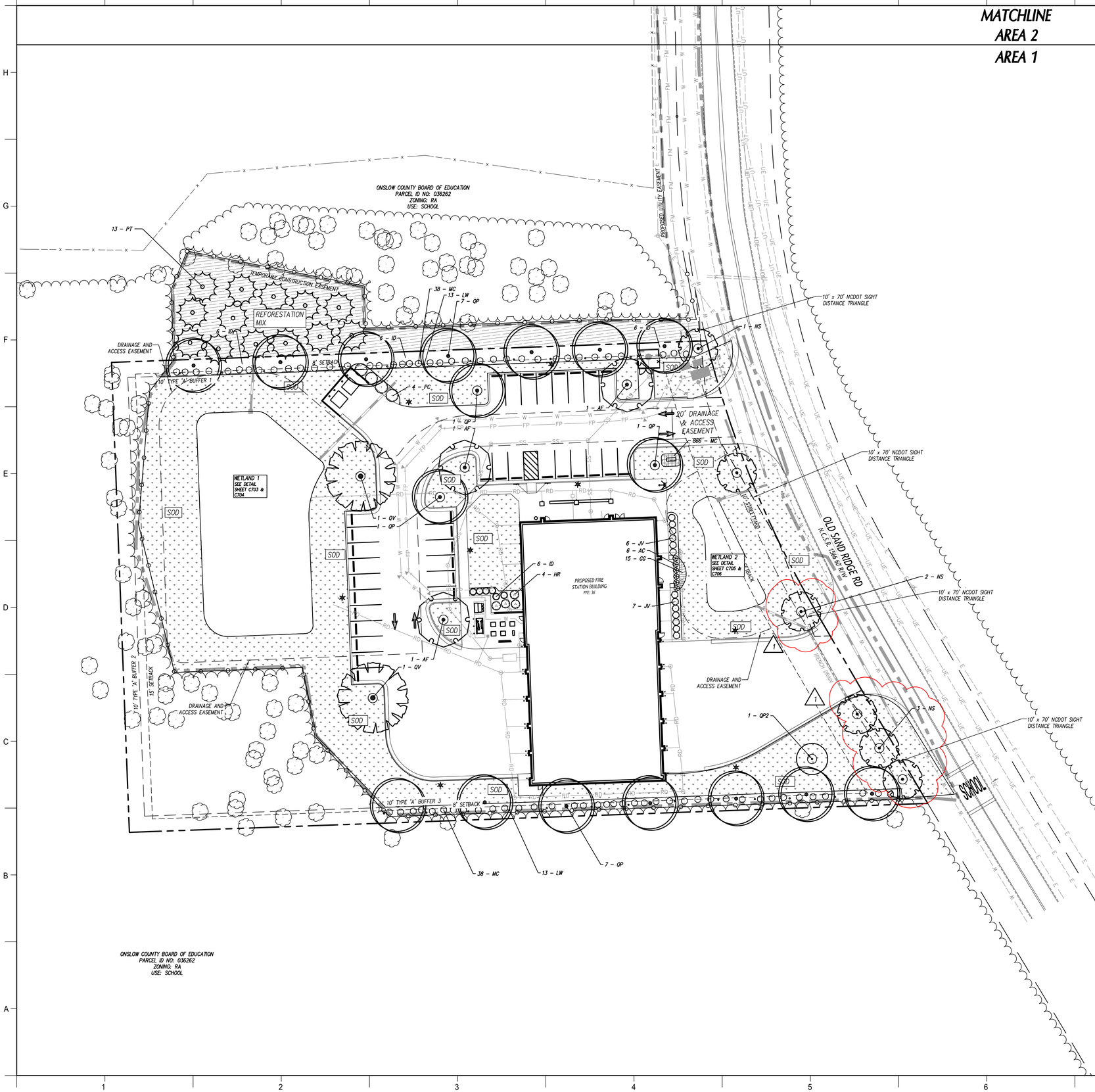
04/17/2025

SHEET TITLE

FORCEMAIN & WATERLINE PLAN AND PROFILE

C505



GENERAL NOTES-LANDSCAPING

1. LOCATE ALL EXISTING UTILITIES PRIOR TO INSTALLATION OF PLANT MATERIAL. NOTIFY OWNER OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THOSE SHOWN ON THE PLAN.
2. VERIFICATION OF TOTAL QUANTITIES AS SHOWN ON THE PLANT LIST SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND THE TOTAL QUANTITIES SHALL BE AS SHOWN ON THE PLAN.
3. ALL PLANT MATERIAL SHALL CONFORM WITH THE STANDARDS SET FORTH BY THE AMERICAN ASSOCIATION OF NURSERYMEN AND THE WRITTEN SPECIFICATIONS.
4. ALL PLANT MATERIAL (SHRUBS/TREES) SHALL BE A MINIMUM DISTANCE OF 4-1/2 FEET FROM BACK OF CURB, EXCEPT ALONG ANY NEW WALLS ADJACENT TO PARKING WHERE CURB STOPS WILL BE USED.
5. ALL PLANT GROUPINGS SHALL BE MULCHED AS ONE BED. 3-IN DEPTH OF TRIPLE SHREDDED HARDWOOD MULCH SHALL BE USED AROUND ALL PLANTINGS, CONFIRM WITH LANDSCAPE ARCHITECT AND OWNER FOR APPROVAL PRIOR TO INSTALLATION.
6. APPLY PRE-EMERGENT HERBICIDE TO ALL NEW PLANTING BEDS AT MANUFACTURER'S RECOMMENDED RATE PRIOR TO INSTALLATION OF MULCH.
7. ESTABLISH POSITIVE DRAINAGE IN ALL PLANTING BEDS AND AWAY FROM BUILDINGS.
8. DO NOT INSTALL PLANT MATERIAL IN IMPERVIOUS SOILS, (i.e. HOLES WHICH, WHEN FILLED WITH WATER, DO NOT COMPLETELY DRAIN WITHIN TWO HOURS). SEE SPECIFICATIONS FOR TOPSOIL REQUIREMENTS.
9. CONTACT THE LANDSCAPE ARCHITECT FOR INSPECTION 48 HOURS IN ADVANCE OF THE SCHEDULED SITE VISIT AND AT THE FOLLOWING INTERVALS:
   - 9.1. REVIEW OF GRADING PRIOR TO PLANT AND LAWN INSTALLATION.
   - 9.2. REVIEW OF PLANT MATERIAL PRIOR TO INSTALLATION.
   - 9.3. ONE SUBSTANTIAL COMPLETION MEETING FOR PLANT INSTALLATION.
   - 9.4. ONE FINAL INSPECTION FOR ALL SEEDING/PLANTING OPERATIONS.
10. THE TREE PROTECTION FENCE SHALL BE MAINTAINED ON THE SITE UNTIL ALL SITE WORK IS COMPLETED AND THE FINAL SITE INSPECTION PRIOR TO THE CERTIFICATE OF OCCUPANCY (CO) IS SCHEDULED. THE FENCING SHALL BE REMOVED PRIOR TO FINAL SITE INSPECTION FOR THE CO.
11. LANDSCAPE SUB-CONTRACTOR (UNDER GC CONTRACT) SHALL BE RESPONSIBLE FOR WATERING ALL PLANTS AND LAWN/SOD AREAS AT HIS COST FROM HIS OWN WATER SOURCE INCLUDING DURING PERIODS OF DROUGHT UNTIL THE PLANTS AND LAWN MEET FINAL COMPLETION. PLANT MATERIALS OR AREAS OF GRASS WHICH PERISH SHALL BE RE-ESTABLISHED BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER. REFER TO SPECIFICATIONS FOR ADDITIONAL WATERING INFORMATION.
12. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ALL EQUIPMENT & SUBCONTRACTORS AWAY FROM SEEDED/SOD AREAS. IF DAMAGE OCCURS, THROUGH NO FAULT OF THE OWNER, AREAS SHALL BE RE-GRADED AND RE-SEEDED IMMEDIATELY AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL WATER AND MAINTAIN THOSE AREAS UNTIL THEY ARE AT 95% COVERAGE AT FINAL COMPLETION.
13. SUBSTITUTIONS OF PLANT MATERIAL SHALL ONLY BE ACCEPTED 60 DAYS PRIOR TO COMMENCEMENT OF PLANTING OPERATIONS. SUBSTITUTION REQUESTS MUST BE IN WRITING AND WILL ONLY BE ACCEPTED FOR LACK OF AVAILABILITY REASONS WHICH CAN BE SUBSTANTIATED OR FOR SUPERIOR STOCK SUBSTITUTIONS.
14. LANDSCAPE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT TO REVIEW GRADING ONE WEEK PRIOR TO SEEDING, IF THE LANDSCAPE CONTRACTOR AND LANDSCAPE ARCHITECT FIND GRADING UNACCEPTABLE FOR FINAL SEEDING, LANDSCAPE CONTRACTOR SHALL BRING IT TO THE ATTENTION OF THE GENERAL CONTRACTOR. LANDSCAPE CONTRACTOR SHALL NOT PROCEED WITHOUT APPROVAL BY LANDSCAPE ARCHITECT.
15. IF CONFLICTS OCCUR BETWEEN WRITTEN SPECIFICATIONS AND THE DRAWINGS, THE WRITTEN SPECIFICATIONS SHALL PREVAIL.
16. GENERAL LAWN AREAS SHALL BE SEEDED WITH RIVIERA OR SUNSTAR BERMUDA SEED. SOD AREAS SHALL BE TIF-TUF BERMUDA. 95% COVERAGE (BASED ON A PER SQUARE YARD SAMPLE) SHALL BE ATTAINED PRIOR TO FINAL INSPECTION. SEE DETAIL SHEET FOR RATES AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
17. SEE PLANTING PLAN FOR LIMITS.
18. ALL 3:1 SLOPES OR GREATER SHALL RECEIVE EROSION CONTROL MATTING. REFER TO PLANTING PLANS FOR STABILIZATION REQUIREMENTS.
19. ALL FOUNDATION SHRUBS TO BE PLANTED A MINIMUM OF 5-FT FROM BUILDING WALL. ALL SHADE TREES SHALL BE A MINIMUM DISTANCE OF 15-FT FROM BUILDING ROOF EDGE TO CENTER OF TREE. NOTIFY LANDSCAPE ARCHITECT FOR ANY DISCREPANCIES.
20. INSTALL PERMANENT SEEDING ALONG ALL ROADSIDE DITCHES AND CHANNELS WITHIN CONSTRUCTION LIMITS OF PROJECT. SEE EROSION CONTROL PLANS AND PERMANENT SEEDING SCHEDULE FOR ADDITIONAL INFORMATION.

PLANT SCHEDULE

	CODE	QTY	BOTANICAL / COMMON NAME	CONT	CAL	SIZE	
TREES							
	AF	3	Acer floridanum Southern Sugar Maple	CONT.	2.5" MIN.	8' HT. MIN.	
	LW	26	Lagerstroemia indica x fauriei 'Natchez' Natchez Crape Myrtle Multi-Trunk	CONT.	1.5" MIN.	6' HT. MIN.	
	NS	6	Nyssa sylvatica Tupelo	CONT.	2.5" MIN.	8' HT. MIN.	
	PT	13	Pinus taeda Loblolly Pine	CONT.	2" MIN.	8' HT. MIN.	
	QP	17	Quercus palustris Pin Oak	CONT.	2.5" MIN.	8' HT. MIN.	
	QP2	1	Quercus phellos Willow Oak	CONT.	2.5" MIN.	12' HT. MIN.	
	QV	2	Quercus virginiana Southern Live Oak	CONT.	2.5" MIN.	8' HT. MIN.	
	CODE	QTY	BOTANICAL / COMMON NAME	CONT	–	SIZE	
SHRUBS							
	AC	6	Azalea x 'Conlec' Autumn Royalty® Encore® Azalea	CONT.		36" HT. MIN.	
	HR	4	Hydrangea quercifolia 'Ruby Slippers' Ruby Slippers Oakleaf Hydrangea	CONT.		36" HT. MIN.	
	ID	6	Ilex vomitoria 'Schillings Dwarf' Schillings Dwarf Yaupon Holly	CONT.		18"-24" HT.	
	JV	13	Juniperus virginiana 'Grey Owl' Grey Owl Eastern Redcedar	CONT.		18"-24" HT.	
	MC	76	Myrica cerifera Wax Myrtle	CONT.		36" HT. MIN.	
	PC	4	Prunus caroliniana 'Monus' Bright 'N Tight Carolina Cherry Laurel	CONT.		36" HT. MIN.	
	SM	1	Sabal minor Dwarf Palmetto	CONT.		24" HT. MIN.	
SYMBOL	CODE	QTY	BOTANICAL / COMMON NAME	CONT	–	SIZE	SPACING
GROUND COVERS							
	GG	15	Gaillardia x grandiflora Blanketflower	1 GAL.			24" o.c.

LANDSCAPE REQUIREMENTS

BUFFER YARD REQUIREMENTS

ADJACENT TO PARCEL LAND USE "O-I" (NORTH, WEST, & SOUTH SIDE)
- NO BUFFER REQUIRED

STREET YARD REQUIREMENTS

OLD SAND RIDGE RD.
- 328 LF STREET YARD
- 10' WIDE
- 1 CANOPY TREE PER 40 LF
- 190 LF STREET FRONTAGE (328 – 95 LF DRIVEWAY)
- (233/40) 5.82 CANOPY TREES REQUIRED / 6 PROVIDED

PARKING LOT YARDS

- 34 PARKING SPACES
- PLANTING ISLAND EVERY 110 FT
- 1 CANOPY TREE PER PLANTING ISLAND

BUFFER YARDS

TYPE 'A' BUFFER YARD REQUIRED

TYPE 'A' BUFFER YARD 1 (UNDISTURBED) 24.75 LF (315.93) PLANTED
- 2 SHADE TREES, 4 ORNAMENTAL TREES, 12 LARGE EVERGREEN SHRUBS PER 100 LINEAR FEET
- PLANTINGS REQUIRED: 7 SHADE TREES, 13 ORNAMENTAL TREES, 38 SHRUBS
- PLANTINGS PROVIDED: 7 SHADE TREES, 13 ORNAMENTAL TREES, 38 SHRUBS

TYPE 'A' BUFFER YARD 2 (UNDISTURBED) 300 LF
- EXISTING VEGETATION TO BE UNDISTURBED IN THIS BUFFER

TYPE 'A' BUFFER YARD 3 (UNDISTURBED) 147.71 LF (PLANTED 311.95) LF
- 2 SHADE TREES, 4 ORNAMENTAL TREES, 12 LARGE EVERGREEN SHRUBS PER 100 LINEAR FEET
- PLANTINGS REQUIRED: 7 SHADE TREES, 13 ORNAMENTAL TREES, 38 SHRUBS
- PLANTINGS PROVIDED:7 SHADE TREES, 13 ORNAMENTAL TREES, 38 SHRUBS

REFORESTATION MIX WITH PINE STRAW MULCH, SEE DETAIL SHEET C801

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

MAGNETIC

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 1699 ZACHARY R. PIERCE 04/17/25

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA:	ZP
PM:	YA
Drawn By:	SL/SH
Plot Date:	04/17/2025

DATE ISSUED

BID DOCUMENTS

04/17/2025

SHEET TITLE
LANDSCAPE PLAN

C600

CONSTRUCTED WETLAND GENERAL NOTES:

1. CONSTRUCTED WETLAND SHALL CONFIRM PER SPEC SECTION 31-20-00 EARTH MOVING. ANY DISCREPANCIES NOTED ON DETAIL PERTAINING TO EARTH MOVING SHALL BE BROUGHT TO THE DESIGN TEAMS ATTENTION PRIOR TO CONSTRUCTION.
2. CONSTRUCTED WETLAND SHALL CONFIRM PER SPEC SECTION 31-25-00 EROSION & SEDIMENT CONTROL. ANY DISCREPANCIES NOTED ON DETAIL PERTAINING TO EROSION & SEDIMENT CONTROL SHALL BE BROUGHT TO THE DESIGN TEAMS ATTENTION PRIOR TO CONSTRUCTION.
3. CONSTRUCTED WETLAND SHALL CONFIRM PER SPEC SECTION 33-40-00 STORM DRAINAGE. ANY DISCREPANCIES NOTED ON DETAIL PERTAINING TO STORM DRAINAGE SHALL BE BROUGHT TO THE DESIGN TEAMS ATTENTION PRIOR TO CONSTRUCTION.
4. **CLAY LINERS (PROVIDE UNLESS NOTED BELOW)**

   CONTRACTOR SHALL FURNISH AND INSTALL A 6-IN THICK LAYER OF COMPACTED CLAY BENEATH THE WETLAND TOPSOIL.

   SUBGRADE OF WETLAND MUST BE OVER-EXCAVATED TO ACCOMMODATE CLAY LAYER.

   COMPACTED CLAY SHALL BE TESTED IN PLACE AND SHALL HAVE A PERMEABILITY NO GREATER THAN 0.01 IN/HR PRIOR TO INSTALLING TOPSOIL AND PLANTS
5. **WETLAND SOIL (SEE 32-90-00 PLANTING SPECIFICATION FOR ADDITIONAL INFO.**

PROVIDE 12-18" OF TOPSOIL THROUGHOUT STORMWATER WETLAND AREA. TOPSOIL SHALL BE PLACED WITHIN THE SHALLOW LAND, SHALLOW WATER AND DEEP POOL AREAS AND ADHERE TO THE FOLLOWING REQUIREMENTS:

THE SOIL MUST BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES.

SOIL TEXTURE SHALL BE A LOAMY SAND, WITH NO MORE THAN 10% CLAY (USDA SOIL TEXTURAL CLASSIFICATION).

A MINIMUM ORGANIC CONTENT OF 4% BY DRY WEIGHT.

THE pH SHALL BE BETWEEN 5.5 AND 7.0. MUST PROVIDE TEST REPORT TO DESIGN TEAM PRIOR TO INSTALLATION.

6. **AS-BUILT REQUIREMENT (SEE 33-40-00 STORM DRAINAGE FOR ADDITIONAL INFO)**

   CONTRACTOR SHALL PROVIDE AS-BUILT TOPOGRAPHIC SURVEY PERFORMED BY A PROFESSIONAL LAND SURVEYOR CERTIFYING WETLAND AREA DIMENSIONS AND ELEVATIONS OF THE FOLLOWING:

   6.1.1. OUTLET STRUCTURE TOPS AND INVERTS, ORIFICE DIAMETERS, BARREL PIPE SIZES AND INVERTS AND STRUCTURE DIMENSIONS.
   6.1.2. EMERGENCY SPILLWAY ELEVATION AND DIMENSIONS.
   6.1.3. TOPOGRAPHY THAT EXTENDS 20 FEET OUTSIDE LIMITS OF POND WATER SURFACE AND EMBANKMENT.
   6.1.4. VERIFY THAT SLOPES ARE 3:1 MAXIMUM.
7. **EMBANKMENT REQUIREMENTS (SEE 31-20-00 EARTH MOVING FOR ADDITIONAL INFO)**

EMBANKMENT SHALL BE CONSTRUCTED OF CLEAN STRUCTURAL IMPERVIOUS SOIL, FREE OF ROOTS, VEGETATION, ROCKS & OTHER OBJECTIONABLE MATERIAL. SCARIFY SURFACES BEFORE PLACING FILL. PLACE FILL IN 6-8 INCH LOOSE LIFTS. COMPACT TO AT LEAST 95% OF THE STANDARD PROCTOR DENSITY.

EMBANKMENT STRUCTURE SHALL BE TIFTUF BERMUDA GRASS SOD AND PERIMETER FILL SLOPES, WITH NON-CLUMPING TURF GRASS SOD, AND TREES AND WOODY SHRUBS SHALL NOT BE PERMITTED.

ALL GRADING SHALL BE IN ACCORDANCE WITH APPENDIX J OF THE CURRENT NORTH CAROLINA BUILDING CODE.

GEO-TECH CONSULTANT MUST PROVIDE COMPACTION TESTING PER 31-20-00 FOR ALL EMBANKMENTS DURING CONSTRUCTION. THESE MUST BE SUBMITTED TO THE DESIGN TEAM BEFORE THE PROJECTS COMPLETION OR AS DIRECTED BY THE OWNER.

CONSTRUCTION SEQUENCE

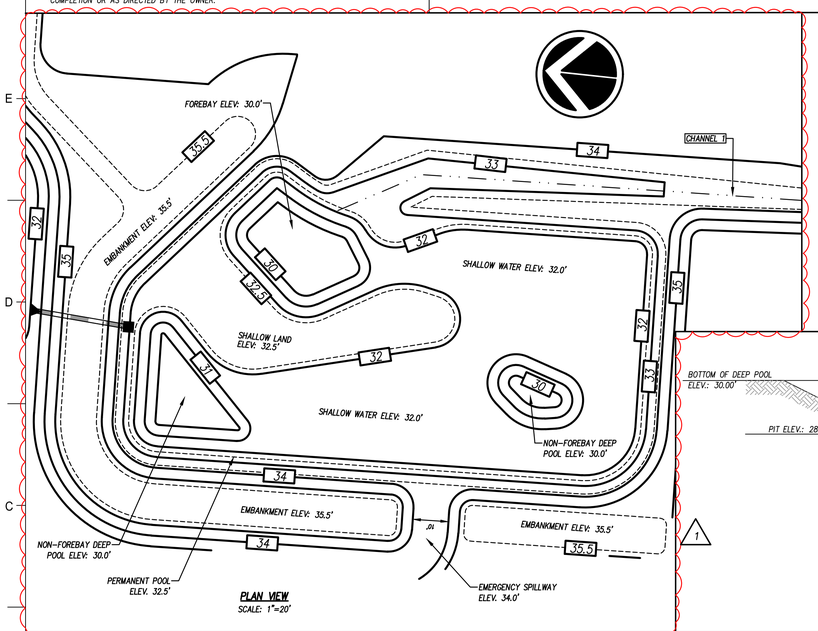
1. THE STORMWATER WETLAND SHALL BE UTILIZED AS A TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION.
   1.1. SCHEDULE THE FOLLOWING WORK TO COINCIDE WITH AN EXTENDED FORECAST OF NO PRECIPITATION SUCH THAT ALL WORK CAN BE COMPLETED DURING A PERIOD OF DRY WEATHER.
   1.2. INSTALL WETLAND BARREL, OUTLET STRUCTURE, KEY TRENCH. THEN THE EMBANKMENT, EMERGENCY SPILLWAY AND OTHER WETLAND COMPONENTS.
   1.3. CALL FOR SITE INSPECTION PRIOR TO BACKFILLING WETLAND BARREL.
   1.4. INSTALL TEMPORARY SKIMMER ON WETLAND DRAIN. DRAIN VALVE TO REMAIN OPEN.
   1.5. EXCAVATE WETLAND TO TEMPORARY SKIMMER BASIN DIMENSIONS, SEE EROSION CONTROL PLAN.
   1.6. INSTALL BAFFLES AND OTHER TEMPORARY SKIMMER BASIN COMPONENTS, SEE TEMPORARY SKIMMER BASIN DETAIL.
   1.7. SEED ALL DISTURBED AREAS.
2. FOLLOWING COMPLETION OF CONSTRUCTION AND STABILIZATION OF POND DRAINAGE BASIN, PERFORM THE FOLLOWING:
   2.1. SCHEDULE THE FOLLOWING WORK TO COINCIDE WITH AN EXTENDED FORECAST OF NO PRECIPITATION SUCH THAT ALL WORK CAN BE COMPLETED DURING A PERIOD OF DRY WEATHER.
   2.2. REMOVE TEMPORARY BAFFLES.
   2.3. REMOVE ALL ACCUMULATED SEDIMENT. GRADE WETLAND INTERIOR TO SUBGRADE ELEVATIONS.
   2.4. INSTALL CLAY LINER AND ARMORED SECTIONS OF FOREBAY WEIRS.
   2.5. IF ADDITIONAL DE-WATERING IS NEEDED BELOW DRAIN/SKIMMER ELEVATION, UTILIZE A MUD PUMP WITH FLOATING SUCTION INLET AND DISCHARGE REMAINING WATER THROUGH A SEDIMENT FILTER BAG LOCATED OUTSIDE OF THE BASIN. MONITOR PUMPING TO ENSURE FLOW DOES NOT EXCEED THE CAPACITY OF FILTER BAG.
   2.6. INSTALL AND FINE GRADE TOPSOIL TO FINISH GRADES.
   2.7. INSTALL TEMPORARY SLOPE LININGS.
   2.8. REMOVE TEMPORARY CAP/BLOCKING FROM PRIMARY SPILLWAY.
   2.9. INSTALL WETLAND PLANTINGS.
   2.10. PERFORM DETAILED TOPOGRAPHIC SURVEY.
   2.11. FOLLOWING APPROVAL OF SURVEY, REMOVE TEMPORARY SKIMMER AND CLOSE DRAIN VALVE.

TEMPORARY SEDIMENT BASIN NOTES:

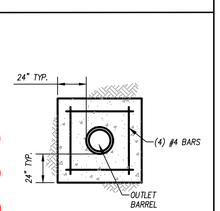
1. THE AREA OF THE NEW CONSTRUCTED WETLAND WILL BE UTILIZED AS A TEMP SEDIMENT BASIN DURING CONSTRUCTION.
2. A TEMP. SKIMMER SHALL BE ATTACHED TO THE OUTLET RISER DRAIN. THE BASIN SHALL BE GRADED TO TEMP. CONTOURS SHOWN ON THE EROSION CONTROL PLAN. TEMP. BAFFLES INSTALLED.
3. INSPECT DEVICE AFTER EACH RAINFALL. REMOVE SEDIMENT WHEN SEDIMENT REACHES A DEPTH OF NO MORE THAN ONE-HALF THE HEIGHT OF THE RISER. REPAIR BAFFLES IF DAMAGED.
4. PULL SKIMMER TO SIDE OF BASIN WITH ROPE AND INSPECT REGULARLY. KEEP SKIMMER HEAD, ORIFICE AND PIPE FREE OF DEBRIS. REMOVE SEDIMENT FROM BENEATH SKIMMER AND ENSURE VEGETATION DOES NOT INTERFERE WITH SKIMMER OPERATION.
5. PROVIDE PAINT MARK ON RISER AT 12" HEIGHT. CLEAN AND REPAIR ONCE SEDIMENT REACHES MARK.
6. INSTALL ALL COMPONENTS OF POND EMBANKMENT, OUTLET STRUCTURE, SKIMMER, EMERGENCY SPILLWAY, ETC. (UNLESS NOTED) PRIOR TO BEGINNING CLEARING OPERATIONS.
7. SEE SHEET C-401 & C-402 FOR TEMPORARY BAFFLE INSTALLATION.
8. PROVIDE GROUND COVER/TEMPORARY SEEDING ON BOTTOM OF TEMPORARY BASINS. SEE SEEDING SCHEDULE.
9. CHECK FABRIC LINED SPILLWAY FOR DAMAGE AND MAKE ANY REPAIRS WITH FABRIC THAT SPANS THE FULL WIDTH OF THE SPILLWAY.
10. MAINTENANCE NOTES

INSPECT DEVICE AFTER EACH RAINFALL. REMOVE SEDIMENT WHEN SEDIMENT REACHES A DEPTH OF NO MORE THAN ONE-HALF THE HEIGHT OF THE RISER. REPAIR BAFFELS IF THEY ARE DAMAGED.

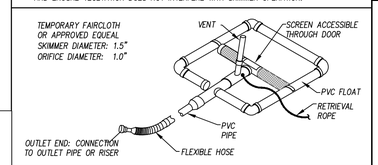
PULL SKIMMER TO SIDE OF BASIN WITH ROPE AND INSPECT REGULARLY. KEEP SKIMMER HEAD, ORIFICE AND PIPE FREE OF DEBRIS. REMOVE SEDIMENT FROM BENEATH SKIMMER AND ENSURE VEGETATION DOES NOT INTERFERE WITH SKIMMER OPERATION.



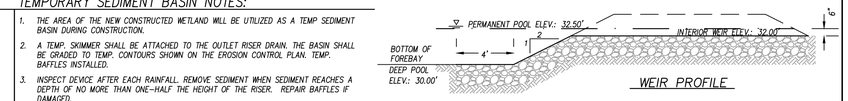
PLAN VIEW
SCALE: 1"=20'



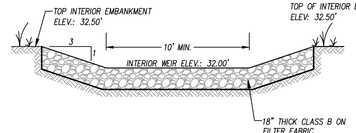
ANTI-SEEP COLLAR
SCALE: NTS



TEMPORARY SKIMMER N.T.S.

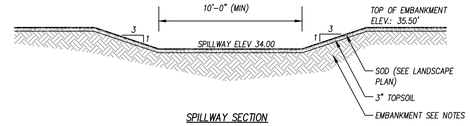


WEIR PROFILE



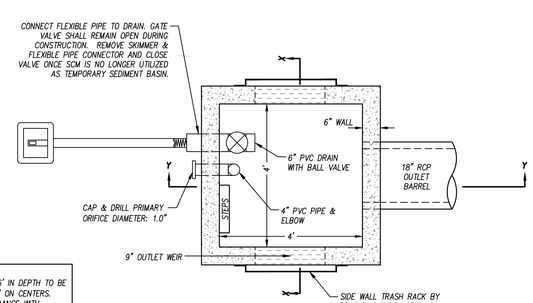
WEIR SECTION

ARMORED DEEP POOL WEIR
SCALE: 1"=5'



SPILLWAY SECTION

EMERGENCY SPILLWAY DETAIL
SCALE: 1"=5'

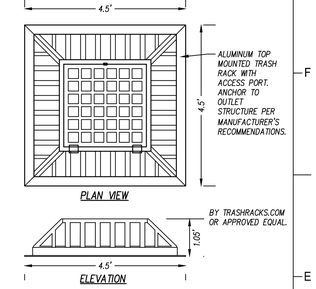


RISER PLAN VIEW
SCALE: 1"=2'

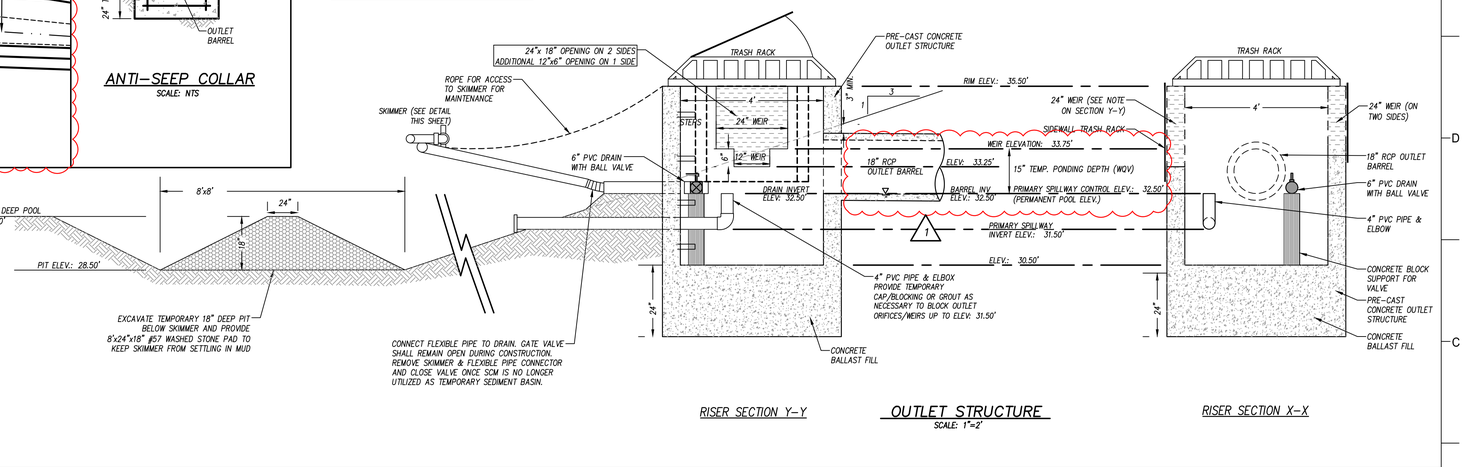
OUTLET STRUCTURE NOTES:
1. ALL STRUCTURES OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 1'-2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH NCDOT STANDARD 840.66.
2. LOCATE ACCESS GATE OVER STEPS.
3. PRECAST CONCRETE STRUCTURE, 4000 PSI CONCRETE, SEE SPECIFICATIONS.
4. APPLY A MINIMUM TWO COATS OF GRAY BASF MASTERSEAL 581 WATERPROOF SEALANT OR APPROVED EQUAL. APPLY UPON COMPLETION OF CONCRETE REPAIRS OR FILLING/GROUTING OF HOLES. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

NOTES:
TRASH RACK SHALL BE ALUMINUM 48" SQUARE TOP-MOUNT HINGED TRASH RACK, MODEL LSO-48 HINGED BY TRASHRACKS.COM OR APPROVED EQUAL.

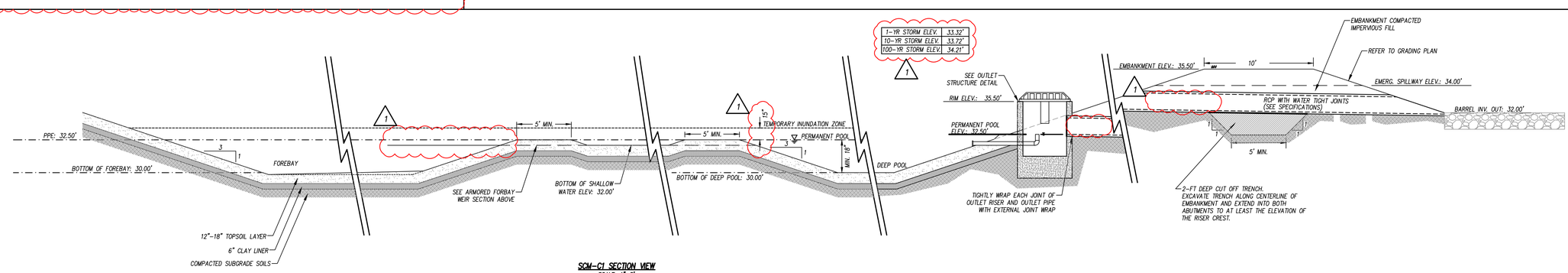
USE STAINLESS STEEL HARDWARE TO MOUNT TRASH RACK.



TRASH RACK DETAIL
SCALE: 1"=2'



RISER SECTION Y-Y **OUTLET STRUCTURE** SCALE: 1"=2' **RISER SECTION X-X**



SCM-C1 SECTION VIEW
SCALE: 1"=5'

WETLAND SCM 1 N.T.S.

DAVIS KANE ARCHITECTS, PA
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA PROFESSIONAL SEAL 22625 ENGINEER STEVEN J. MILLER

DKA JOB NUMBER
2324

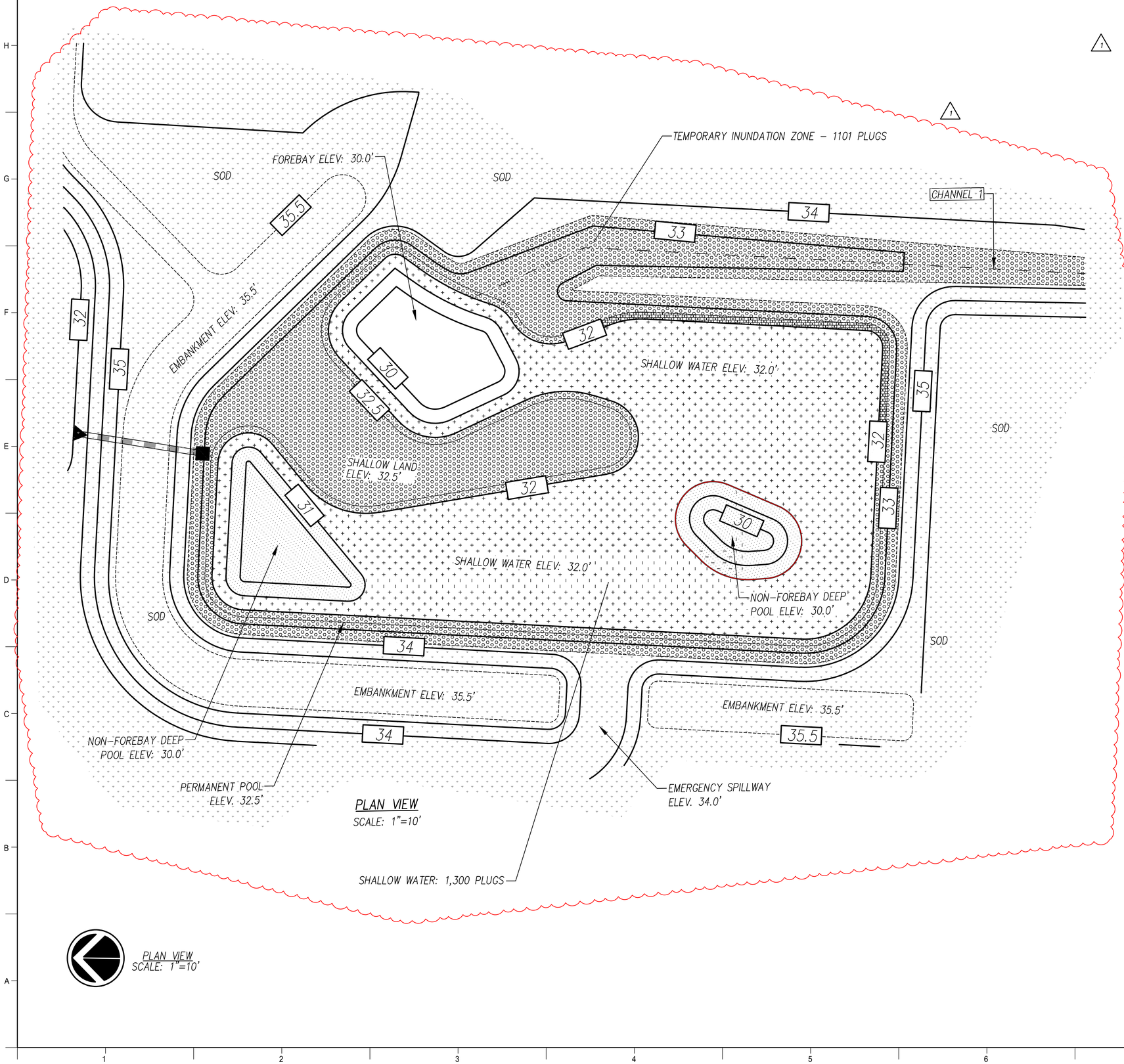
REVISIONS		
1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED
BID DOCUMENTS
04/17/2025

SHEET TITLE
SCM DETAIL

C703



PLAN VIEW
SCALE: 1"=10'

PLAN VIEW
SCALE: 1"=10'

DETENTION WETLAND PLANTING SCHEDULE

TEMPORARY INUNDATION ZONE PLANT LIST			
	260	CAREX STRICTA – TUSSOCK SEDGE	LARGE PLUGS (MIN. 6 CUBIC INCHES) SPACE 2' O.C.
	260	ASCLEPIAS INCARNATA – SWAMP MILKWEED	
	260	SAURURUS CERNUUS – LIZARD'S TAIL	
	260	LOBELIA CARDINALIS – CARDINAL FLOWER	
	260	LIATRIS SPICATA – BLAZING STAR	
SHALLOW WATER PLANT LIST			
	220	PELTANDRA VIRGINICA – ARROW ARUM	LARGE PLUGS (MIN. 6 CUBIC INCHES) SPACE 2' O.C.
	220	PONTEDERIA CORDATA – PICKERELWEED	
	220	ACORUS AMERICANUS – SWEETFLAG	
	220	IRIS VIRGINICA – VIRGINIA IRIS	
	221	JUNCUS EFFUSUS – COMMON RUSH	
DEEP POOL AND MICRO POOL PLANT LIST			
	416	NYMPHAEA ODORATA – WATERLILY	LARGE PLUGS (MIN. 6 CUBIC INCHES) SPACE 2' O.C.
		SOD – TIFTUF BERMUDA	

NOTES

1. WETLAND AREA SHALL BE DRAINED ONE DAY PRIOR TO PLANTING.
2. LANDSCAPE ARCHITECT TO APPROVE ALL LOCATIONS IN FIELD.
3. PLACE PLANTINGS IN DESIGNATED AREA BY SPECIES IN GROUPINGS OF 40 PLANTS OR MORE.
4. SODDED AREA SHALL NOT BE MOWED AT SIDE SLOPES.

WETLAND SOIL MIX

ADD 12" OF TOPSOIL THROUGHOUT STORMWATER WETLAND AREA. TOPSOIL SHALL BE PLACED WITHIN THE SHALLOW LAND, SHALLOW WATER AND DEEP POOL AREAS AND ADHERE TO THE FOLLOWING REQUIREMENTS:

1. THE SOIL MUST BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES.
2. SOIL TEXTURE SHALL BE A LOAMY SAND, WITH NO MORE THAN 10% CLAY (USDA SOIL TEXTURAL CLASSIFICATION).
3. A MINIMUM ORGANIC CONTENT OF 10% BY DRY WEIGHT.
4. THE PH SHALL BE BETWEEN 5.5 AND 7.0.

SCM-1 PLANT CALC.

SHALLOW WATER ZONE SQUARE FOOTAGE: 5,198 SF
PLANTINGS REQUIRED: 50 HERBACEOUS PLANTS PER 200 SF. (5,198/200)X50 = 1,299.5 (1300 PLANTS)
PLANTINGS PROVIDED: 1300 PLANTS

TEMPORARY INUNDATION ZONE SQUARE FOOTAGE: 4,402 SF
PLANTINGS REQUIRED: 50 HERBACEOUS PLANTS PER 200 SF. (4,402/200) X 50 = 1,100.5 (1,101 PLANTS)
PLANTINGS PROVIDED: 1101 PLANTS

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ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 1699 ZACHARY R PIERCE 04/17/25

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

BID DOCUMENTS

04/17/2025

SHEET TITLE
WETLAND PLANTING PLAN

C704

CONSTRUCTED WETLAND GENERAL NOTES:

1. CONSTRUCTED WETLAND SHALL CONFIRM PER SPEC SECTION 31-20-00 EARTH MOVING. ANY DISCREPANCIES NOTED ON DETAIL PERTAINING TO EARTH MOVING SHALL BE BROUGHT TO THE DESIGN TEAMS ATTENTION PRIOR TO CONSTRUCTION.
2. CONSTRUCTED WETLAND SHALL CONFIRM PER SPEC SECTION 31-25-00 EROSION & SEDIMENT CONTROL. ANY DISCREPANCIES NOTED ON DETAIL PERTAINING TO EROSION & SEDIMENT CONTROL SHALL BE BROUGHT TO THE DESIGN TEAMS ATTENTION PRIOR TO CONSTRUCTION.
3. CONSTRUCTED WETLAND SHALL CONFIRM PER SPEC SECTION 33-40-00 STORM DRAINAGE. ANY DISCREPANCIES NOTED ON DETAIL PERTAINING TO STORM DRAINAGE SHALL BE BROUGHT TO THE DESIGN TEAMS ATTENTION PRIOR TO CONSTRUCTION.
4. **CLAY LINERS (PROVIDE UNLESS NOTED BELOW)**

   CONTRACTOR SHALL FURNISH AND INSTALL A 6-IN THICK LAYER OF COMPACTED CLAY BENEATH THE WETLAND TOPSOIL.

   SUBGRADE OF WETLAND MUST BE OVER-EXCAVATED TO ACCOMMODATE CLAY LAYER.

   COMPACTED CLAY SHALL BE TESTED IN PLACE AND SHALL HAVE A PERMEABILITY NO GREATER THAN 0.01 IN/HR PRIOR TO INSTALLING TOPSOIL AND PLANTS
5. **WETLAND SOIL (SEE 32-90-00 PLANTING SPECIFICATION FOR ADDITIONAL INFO.**

PROVIDE 12-18" OF TOPSOIL THROUGHOUT STORMWATER WETLAND AREA. TOPSOIL SHALL BE PLACED WITHIN THE SHALLOW LAND, SHALLOW WATER AND DEEP POOL AREAS AND ADHERE TO THE FOLLOWING REQUIREMENTS:

THE SOIL MUST BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES.

SOIL TEXTURE SHALL BE A LOAMY SAND, WITH NO MORE THAN 10% CLAY (USDA SOIL TEXTURAL CLASSIFICATION).

A MINIMUM ORGANIC CONTENT OF 4% BY DRY WEIGHT.

THE pH SHALL BE BETWEEN 5.5 AND 7.0. MUST PROVIDE TEST REPORT TO DESIGN TEAM PRIOR TO INSTALLATION.

6. **AS-BUILT REQUIREMENT (SEE 33-40-00 STORM DRAINAGE FOR ADDITIONAL INFO)**

   CONTRACTOR SHALL PROVIDE AS-BUILT TOPOGRAPHIC SURVEY PERFORMED BY A PROFESSIONAL LAND SURVEYOR CERTIFYING WETLAND AREA DIMENSIONS AND ELEVATIONS OF THE FOLLOWING:

   6.1.1. OUTLET STRUCTURE TOPS AND INVERTS, ORIFICE DIAMETERS, BARREL PIPE SIZES AND INVERTS AND STRUCTURE DIMENSIONS.
   6.1.2. EMERGENCY SPILLWAY ELEVATION AND DIMENSIONS.
   6.1.3. TOPOGRAPHY THAT EXTENDS 20 FEET OUTSIDE LIMITS OF POND WATER SURFACE AND EMBANKMENT.
   6.1.4. VERIFY THAT SLOPES ARE 3:1 MAXIMUM.
7. **EMBANKMENT REQUIREMENTS (SEE 31-20-00 EARTH MOVING FOR ADDITIONAL INFO)**

EMBANKMENT SHALL BE CONSTRUCTED OF CLEAN STRUCTURAL IMPERVIOUS SOIL, FREE OF ROOTS, VEGETATION, ROCKS & OTHER OBJECTIONABLE MATERIAL. SCARIFY SURFACES BEFORE PLACING FILL. PLACE FILL IN 6-8 INCH LOOSE LIFTS. COMPACT TO AT LEAST 95% OF THE STANDARD PROCTOR DENSITY.

EMBANKMENT STRUCTURE SHALL BE TIFTUF BERMUDA GRASS SOD AND PERIMETER FILL SLOPES, WITH NON-CLUMPING TURF GRASS SOD, AND TREES AND WOODY SHRUBS SHALL NOT BE PERMITTED.

ALL GRADING SHALL BE IN ACCORDANCE WITH APPENDIX J OF THE CURRENT NORTH CAROLINA BUILDING CODE.

GEO-TECH CONSULTANT MUST PROVIDE COMPACTION TESTING PER 31-20-00 FOR ALL EMBANKMENTS DURING CONSTRUCTION. THESE MUST BE SUBMITTED TO THE DESIGN TEAM BEFORE THE PROJECTS COMPLETION OR AS DIRECTED BY THE OWNER.

CONSTRUCTION SEQUENCE

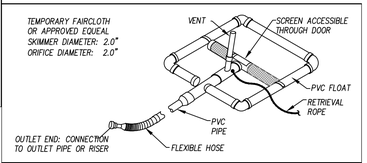
1. THE STORMWATER WETLAND SHALL BE UTILIZED AS A TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION.
   1.1. SCHEDULE THE FOLLOWING WORK TO COINCIDE WITH AN EXTENDED FORECAST OF NO PRECIPITATION SUCH THAT ALL WORK CAN BE COMPLETED DURING A PERIOD OF DRY WEATHER.
   1.2. INSTALL WETLAND BARREL, OUTLET STRUCTURE, KEY TRENCH. THEN THE EMBANKMENT, EMERGENCY SPILLWAY AND OTHER WETLAND COMPONENTS.
   1.3. CALL FOR SITE INSPECTION PRIOR TO BACKFILLING WETLAND BARREL.
   1.4. INSTALL TEMPORARY SKIMMER ON WETLAND DRAIN. DRAIN VALVE TO REMAIN OPEN.
   1.5. EXCAVATE WETLAND TO TEMPORARY SKIMMER BASIN DIMENSIONS, SEE EROSION CONTROL PLAN.
   1.6. INSTALL BAFFLES AND OTHER TEMPORARY SKIMMER BASIN COMPONENTS, SEE TEMPORARY SKIMMER BASIN DETAIL.
   1.7. SEED ALL DISTURBED AREAS.
2. FOLLOWING COMPLETION OF CONSTRUCTION AND STABILIZATION OF POND DRAINAGE BASIN, PERFORM THE FOLLOWING:
   2.1. SCHEDULE THE FOLLOWING WORK TO COINCIDE WITH AN EXTENDED FORECAST OF NO PRECIPITATION SUCH THAT ALL WORK CAN BE COMPLETED DURING A PERIOD OF DRY WEATHER.
   2.2. REMOVE TEMPORARY BAFFLES.
   2.3. REMOVE ALL ACCUMULATED SEDIMENT. GRADE WETLAND INTERIOR TO SUBGRADE ELEVATIONS.
   2.4. INSTALL CLAY LINER AND ARMORED SECTIONS OF FOREBAY WEIRS.
   2.5. IF ADDITIONAL DE-WATERING IS NEEDED BELOW DRAIN/SKIMMER ELEVATION, UTILIZE A MUD PUMP WITH FLOATING SUCTION INLET AND DISCHARGE REMAINING WATER THROUGH A SEDIMENT FILTER BAG LOCATED OUTSIDE OF THE BASIN. MONITOR PUMPING TO ENSURE FLOW DOES NOT EXCEED THE CAPACITY OF FILTER BAG.
   2.6. INSTALL AND FINE GRADE TOPSOIL TO FINISH GRADES.
   2.7. INSTALL TEMPORARY SLOPE LININGS.
   2.8. REMOVE TEMPORARY CAP/BLOCKING FROM PRIMARY SPILLWAY.
   2.9. INSTALL WETLAND PLANTINGS.
   2.10. PERFORM DETAILED TOPOGRAPHIC SURVEY.
   2.11. FOLLOWING APPROVAL OF SURVEY, REMOVE TEMPORARY SKIMMER AND CLOSE DRAIN VALVE.

TEMPORARY SEDIMENT BASIN NOTES:

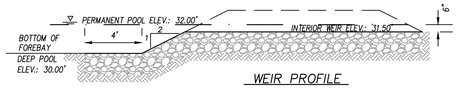
1. THE AREA OF THE NEW CONSTRUCTED WETLAND WILL BE UTILIZED AS A TEMP SEDIMENT BASIN DURING CONSTRUCTION.
2. A TEMP. SKIMMER SHALL BE ATTACHED TO THE OUTLET RISER DRAIN. THE BASIN SHALL BE GRADED TO TEMP. CONTOURS SHOWN ON THE EROSION CONTROL PLAN. TEMP. BAFFLES INSTALLED.
3. INSPECT DEVICE AFTER EACH RAINFALL. REMOVE SEDIMENT WHEN SEDIMENT REACHES A DEPTH OF NO MORE THAN ONE-HALF THE HEIGHT OF THE RISER. REPAIR BAFFLES IF DAMAGED.
4. PULL SKIMMER TO SIDE OF BASIN WITH ROPE AND INSPECT REGULARLY. KEEP SKIMMER HEAD, ORIFICE AND PIPE FREE OF DEBRIS. REMOVE SEDIMENT FROM BENEATH SKIMMER AND ENSURE VEGETATION DOES NOT INTERFERE WITH SKIMMER OPERATION.
5. PROVIDE PAINT MARK ON RISER AT 12" HEIGHT. CLEAN AND REPAIR ONCE SEDIMENT REACHES MARK.
6. INSTALL ALL COMPONENTS OF POND EMBANKMENT, OUTLET STRUCTURE, SKIMMER, EMERGENCY SPILLWAY, ETC. (UNLESS NOTED) PRIOR TO BEGINNING CLEARING OPERATIONS.
7. SEE SHEET C-401 & C-402 FOR TEMPORARY BAFFLE INSTALLATION.
8. PROVIDE GROUND COVER/TEMPORARY SEEDING ON BOTTOM OF TEMPORARY BASINS. SEE SEEDING SCHEDULE.
9. CHECK FABRIC LINED SPILLWAY FOR DAMAGE AND MAKE ANY REPAIRS WITH FABRIC THAT SPANS THE FULL WIDTH OF THE SPILLWAY.
10. MAINTENANCE NOTES

INSPECT DEVICE AFTER EACH RAINFALL. REMOVE SEDIMENT WHEN SEDIMENT REACHES A DEPTH OF NO MORE THAN ONE-HALF THE HEIGHT OF THE RISER. REPAIR BAFFELS IF THEY ARE DAMAGED.

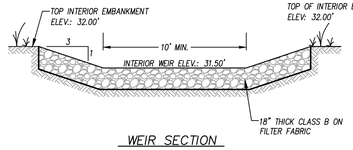
PULL SKIMMER TO SIDE OF BASIN WITH ROPE AND INSPECT REGULARLY. KEEP SKIMMER HEAD, ORIFICE AND PIPE FREE OF DEBRIS. REMOVE SEDIMENT FROM BENEATH SKIMMER AND ENSURE VEGETATION DOES NOT INTERFERE WITH SKIMMER OPERATION.



TEMPORARY SKIMMER N.T.S.



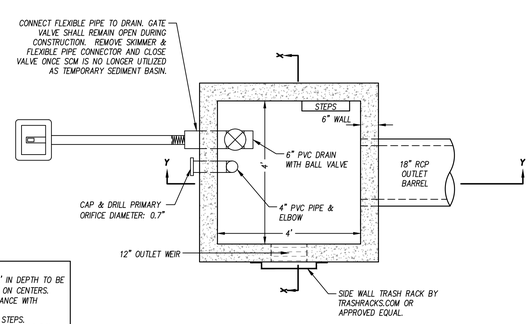
WEIR PROFILE



WEIR SECTION

ARMORED DEEP POOL WEIR

SCALE: 1"=5'



RISER PLAN VIEW

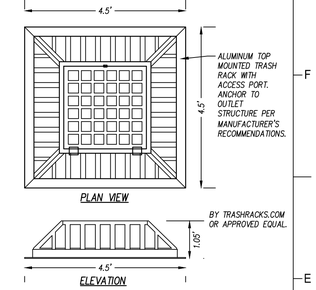
SCALE: 1"=2'

OUTLET STRUCTURE NOTES:

1. ALL STRUCTURES OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 1'-2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH NCDOT STANDARD 840.66.
2. LOCATE ACCESS GATE OVER STEPS.
3. PRECAST CONCRETE STRUCTURE, 4000 PSI CONCRETE, SEE SPECIFICATIONS.
4. APPLY A MINIMUM TWO COATS OF GRAY BASF MASTERSEAL 581 WATERPROOF SEALANT OR APPROVED EQUAL. APPLY UPON COMPLETION OF CONCRETE REPAIRS OR FILLING/GROUTING OF HOLES. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

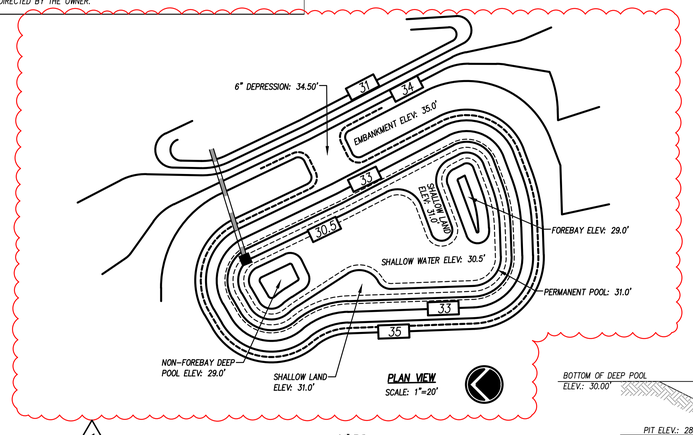
NOTES:
TRASH RACK SHALL BE ALUMINUM 48" SQUARE TOP-MOUNT HINGED TRASH RACK, MODEL LSQ-48 HINGED BY TRASHRACKS.COM OR APPROVED EQUAL.

USE STAINLESS STEEL HARDWARE TO MOUNT TRASH RACK.



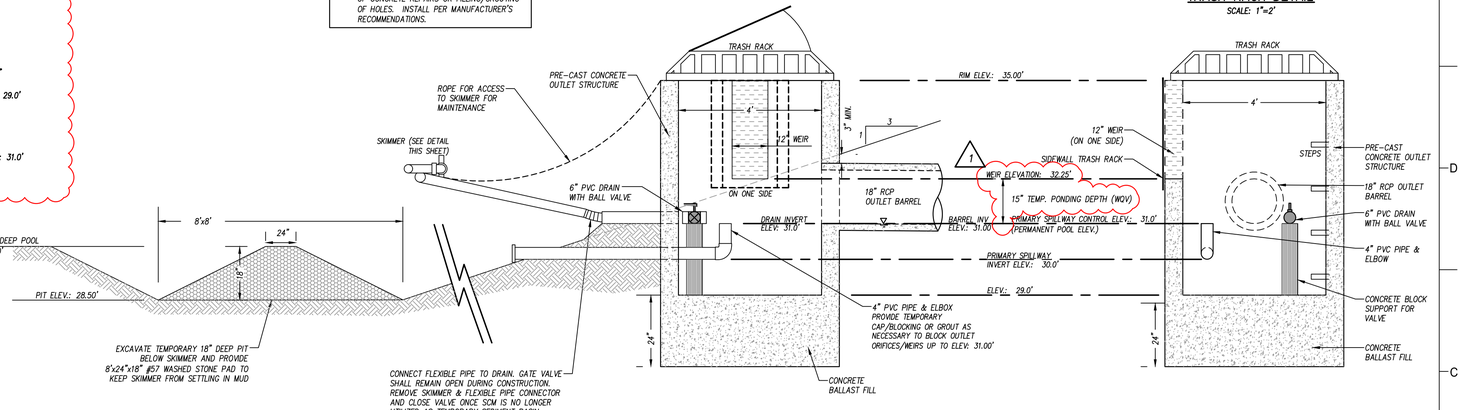
TRASH RACK DETAIL

SCALE: 1"=2'



PLAN VIEW

SCALE: 1"=20'

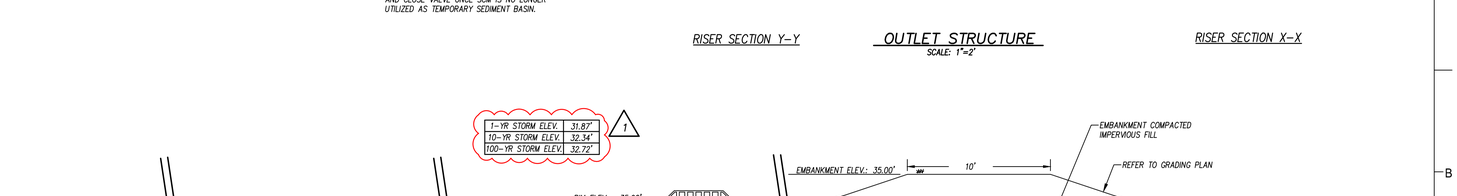


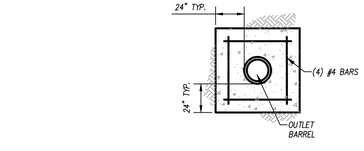
RISER SECTION Y-Y

OUTLET STRUCTURE

SCALE: 1"=2'

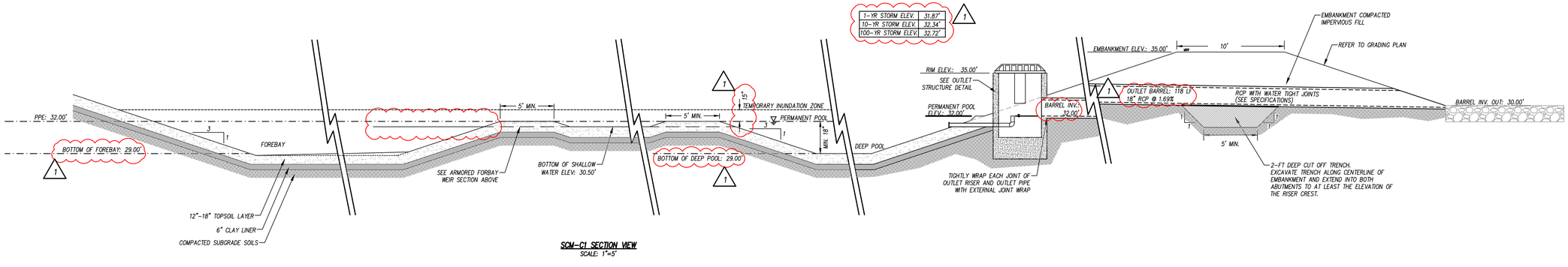
RISER SECTION X-X





ANTI-SEEP COLLAR

SCALE: NTS



SCM-C1 SECTION VIEW

SCALE: 1"=5'

WETLAND SCM 2 N.T.S.

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DKA JOB NUMBER

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PA:	ZP
PM:	YA
Drawn By:	SL/SH
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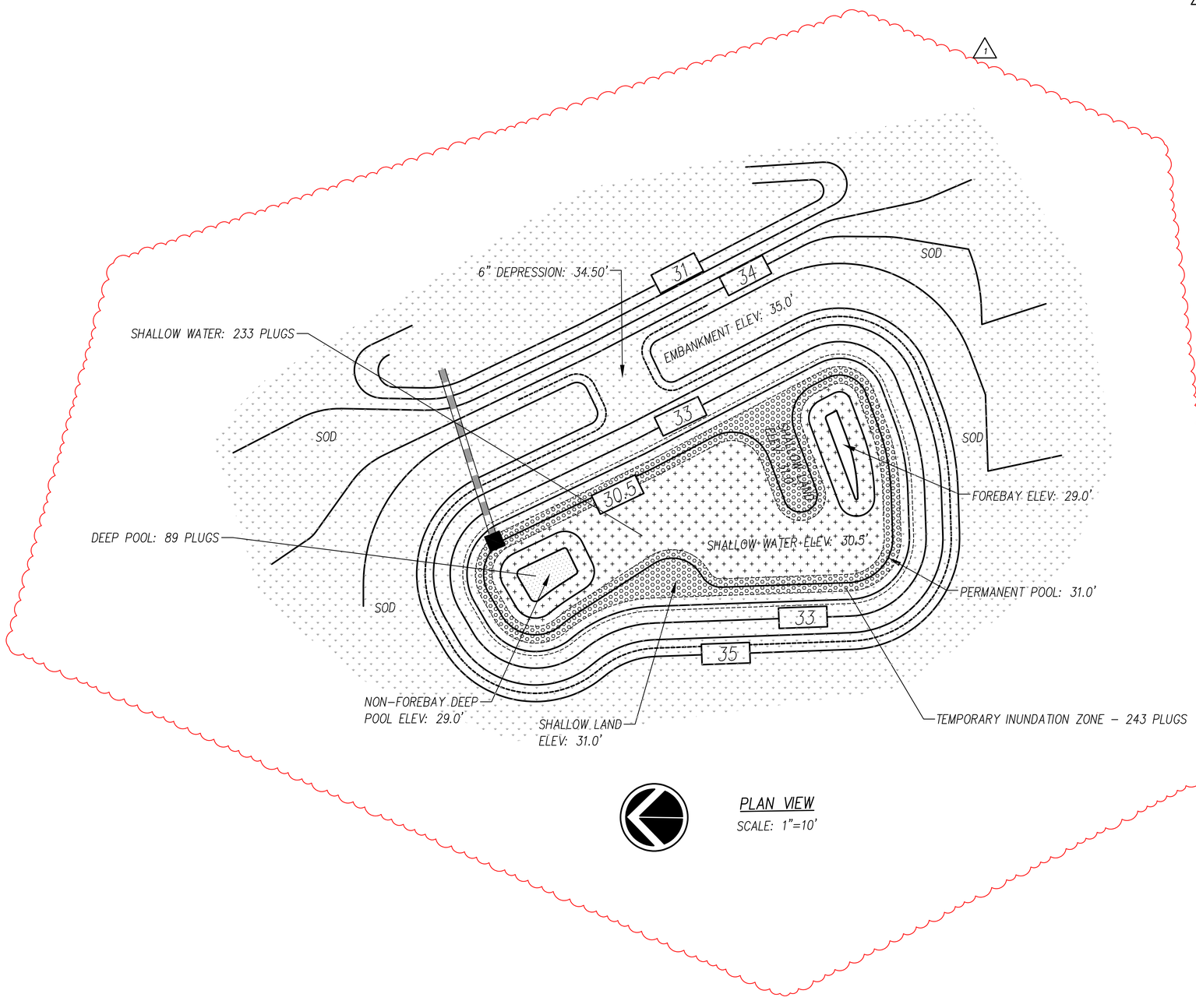
BID DOCUMENTS

04/17/2025

SHEET TITLE

SCM DETAIL

C705



PLAN VIEW
SCALE: 1"=10'

DETENTION WETLAND PLANTING SCHEDULE

TEMPORARY INUNDATION ZONE PLANT LIST			
	46	CAREX STRICTA – TUSSOCK SEDGE	LARGE PLUGS (MIN. 6 CUBIC INCHES) SPACE 2' O.C.
	46	ASCLEPIAS INCARNATA – SWAMP MILKWEED	
	47	SAURURUS CERNUUS – LIZARD'S TAIL	
	47	LOBELIA CARDINALIS – CARDINAL FLOWER	
	47	LIATRIS SPICATA – BLAZING STAR	
SHALLOW WATER PLANT LIST			
	48	PELTANDRA VIRGINICA – ARROW ARUM	LARGE PLUGS (MIN. 6 CUBIC INCHES) SPACE 2' O.C.
	48	PONTEDERIA CORDATA – PICKERELWEED	
	49	ACORUS AMERICANUS – SWEETFLAG	
	49	IRIS VIRGINICA – VIRGINIA IRIS	
	49	JUNCUS EFFUSUS – COMMON RUSH	
DEEP POOL AND MICRO POOL PLANT LIST			
	89	NYMPHAEA ODORATA – WATERLILY	LARGE PLUGS (MIN. 6 CUBIC INCHES) SPACE 2' O.C.
		SOD – TIFTUF BERMUDA	

NOTES

1. WETLAND AREA SHALL BE DRAINED ONE DAY PRIOR TO PLANTING.
2. LANDSCAPE ARCHITECT TO APPROVE ALL LOCATIONS IN FIELD.
3. PLACE PLANTINGS IN DESIGNATED AREA BY SPECIES IN GROUPINGS OF 40 PLANTS OR MORE.
4. SODDED AREA SHALL NOT BE MOWED AT SIDE SLOPES.

WETLAND SOIL MIX

ADD 12" OF TOPSOIL THROUGHOUT STORMWATER WETLAND AREA. TOPSOIL SHALL BE PLACED WITHIN THE SHALLOW LAND, SHALLOW WATER AND DEEP POOL AREAS AND ADHERE TO THE FOLLOWING REQUIREMENTS:

1. THE SOIL MUST BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES.
2. SOIL TEXTURE SHALL BE A LOAMY SAND, WITH NO MORE THAN 10% CLAY (USDA SOIL TEXTURAL CLASSIFICATION).
3. A MINIMUM ORGANIC CONTENT OF 10% BY DRY WEIGHT.
4. THE PH SHALL BE BETWEEN 5.5 AND 7.0.

SCM-1 PLANT CALC.

SHALLOW WATER ZONE SQUARE FOOTAGE: 929 SF
PLANTINGS REQUIRED: 50 HERBACEOUS PLANTS PER 200 SF. (929/200)X50 = 232.25 (233) PLANTS
PLANTINGS PROVIDED: 233 PLANTS

TEMPORARY INUNDATION ZONE SQUARE FOOTAGE: 972 SF
PLANTINGS REQUIRED: 50 HERBACEOUS PLANTS PER 200 SF. (972/200)X50 = 223.75 (243) PLANTS
PLANTINGS PROVIDED: 243 PLANTS

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OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA LICENSED LANDSCAPE ARCHITECT 1699 ZACHARY R PIERCE 04/17/25

DKA JOB NUMBER
2324

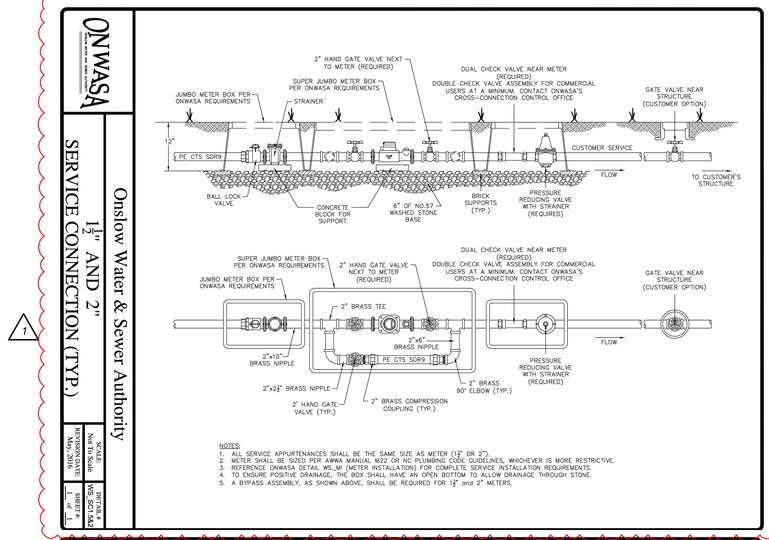
REVISIONS

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED
BID DOCUMENTS
04/17/2025

SHEET TITLE
WETLAND PLANTING PLAN

C706



1

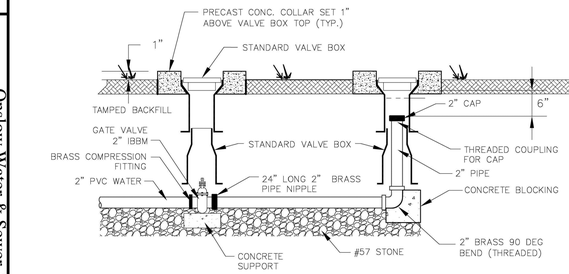
NOTES:
1. ALL SERVICE APPURTENANCES SHALL BE THE SAME SIZE AS METER (1½" OR 2").
2. METER SHALL BE SIZED PER AWWA MANUAL M32 OR NC PLUMBING CODE GUIDELINES, WHICHEVER IS MORE RESTRICTIVE.
3. REFERENCE ONWASA DETAIL WS_MI (METER INSTALLATION) FOR COMPLETE SERVICE INSTALLATION REQUIREMENTS.
4. TO ENSURE POSITIVE DRAINAGE, THE BOX SHALL HAVE AN OPEN BOTTOM TO ALLOW DRAINAGE THROUGH STONE.
5. A BYPASS ASSEMBLY, AS SHOWN ABOVE, SHALL BE REQUIRED FOR 1½" and 2" METERS.

ONWASA

Onslow Water & Sewer Authority

1½" AND 2" SERVICE CONNECTION (TYP.)

SCALE:	DETAIL #:
NOT TO SCALE	WS_SC12
REVISION DATE:	SHEET #:
May, 2016	1 of 1



NOTE: NO PLASTIC OR GALVANIZED SCREW FITTINGS BEFORE VALVE

ONWASA

Onslow Water & Sewer Authority

USE WITH "ONWASA MANUAL OF SPECIFICATIONS, STANDARDS and DETAILS, latest revision"

2-INCH PERMANENT BLOW OFF ASSEMBLY

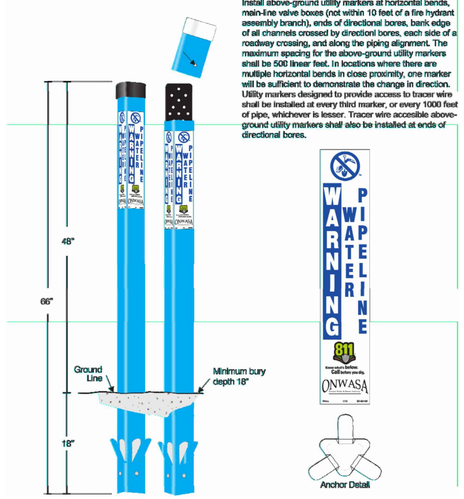
SCALE:	DETAIL #:
Not To Scale	WS_BO2
REVISION DATE:	SHEET #:
May, 2016	1 of 1

Parts List
1 - Rhino # TVF66UB - Rhino TriView Flex™, 66" Blue with Black Cap OR
1 - Rhino # TVT66UW2 - Rhino TriView™ Test Station, 66", 2 Inside Terminals, Blue with White Cap
1 - Cap Lock - TS-LOCK for Test Stations
3 - Decal # SD-8516K Custom Decals

NOTES:
The TriGrip Anchor Flaps™ shall be extended priority to burial of the post. Soil shall be compacted during placement of marker post.

All materials shall be provided by Rhino Marking & Protection Systems, Inc.

Install above-ground utility markers at horizontal bends, main-line valve boxes (not within 10 feet of a fire hydrant assembly branch), ends of directional bores, bank edge of all channels crossed by directional bores, each side of a roadway crossing, and along the piping alignment. The maximum spacing for the above-ground utility markers shall be 500 linear feet. In locations where there are multiple horizontal bends in close proximity, one marker will be sufficient to demonstrate the change in direction. Utility markers designed to provide access to tracer wire shall be installed at every third marker, or every 1000 feet of pipe, whichever is lesser. Tracer wire accesible above-ground utility markers shall also be installed at ends of directional bores.



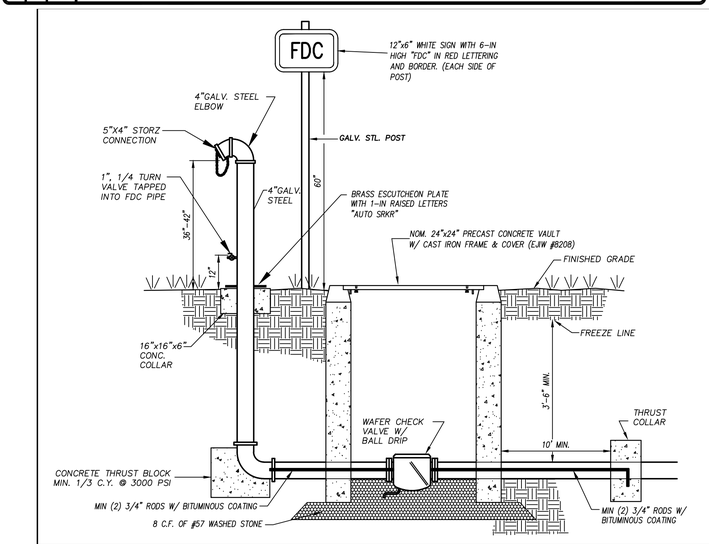
ONWASA

Onslow Water & Sewer Authority

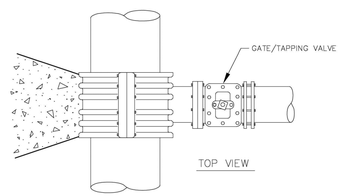
USE WITH "ONWASA MANUAL OF SPECIFICATIONS, STANDARDS and DETAILS, latest revision"

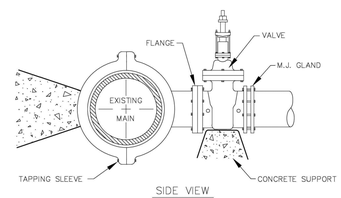
STANDARD UTILITY MARKER FOR WATER MAIN

SCALE:	DETAIL #:
Not To Scale	WS_WMRK
REVISION DATE:	SHEET #:
May, 2016	1 of 1



FIRE DEPARTMENT STORZ CONNECTION DETAIL NTS





NOTES:
1. CONCRETE SHALL NOT CONTACT GLANDS, BOLTS OR ENDS OF MECHANICAL BOLTS, OR ENDS OF MECHANICAL JOINT FITTINGS. TAPPING SLEEVE AND BOTTOM OF VALVE SHALL BE WRAPPED IN POLYETHYLENE.
2. SEE STANDARD THRUST BLOCK TABLE FOR AREA OF CONCRETE REQUIRED.
3. TAPPING SLEEVE SHALL BE TESTED IN ACCORDANCE WITH ONWASA REQUIREMENTS.
4. TAPS ON SDR26 PIPE SHALL REQUIRE LONG SS TAPPING SLEEVES.

ONWASA

Onslow Water & Sewer Authority

USE WITH "ONWASA MANUAL OF SPECIFICATIONS, STANDARDS and DETAILS, latest revision"

4" AND LARGER TAPPING SLEEVE AND VALVE ASSEMBLY

SCALE:	DETAIL #:
Not To Scale	WS_TS
REVISION DATE:	SHEET #:
May, 2016	1 of 1

DAVIS KANE ARCHITECTS, PA
503 OBERLIN ROAD | SUITE 300
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Suite 120
Cary, North Carolina 27518
Phone: (919) 319-0776
Fax: (919) 319-7516
LA: C-106
PE: C-1595

PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA REGISTERED SEAL 22625 ENGINEER STEVEN J. MILLER

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
Plot Date: 04/17/2025

DATE ISSUED

BID DOCUMENTS

04/17/2025

SHEET TITLE

UTILITY DETAILS

C902

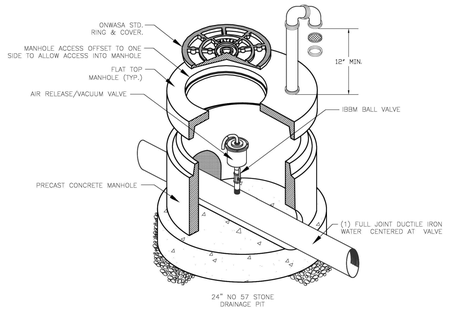
ONWASA

Onslow Water & Sewer Authority

USE WITH CURRENT ONWASA "STANDARD SPECIFICATIONS AND DETAILS MANUAL FOR WATER AND SEWER CONSTRUCTION" (latest revision)

AIR RELEASE/VACUUM VALVE SEWER

REVISION DATE: May 2016 | SCALE: Not To Scale | DETAIL #: SS ARV | SHEET #: 1 of 3



1. WHEN TAPPING THE SEWER MAIN, DO NOT EXCEED THE PIPE MANUFACTURERS ALLOWANCES.
2. ON ALL AIR RELEASE VALVES USE DOUBLE STRAP SERVICE SADDLE.
3. UNLESS OTHERWISE INDICATED ON THE PLANS, MANHOLE SHALL BE FLAT-TOP.
4. AIR RELEASE/VACUUM VALVE SHALL BE CRISPIN S SERIES OR VAL-MATIC SERIES 300.
5. IF FORCE MAIN IS DUCTILE IRON UPSTREAM AND DOWNSTREAM OF AIR RELEASE VALVE, 5 FULL SECTIONS OF DUCTILE IRON PIPE, WITH EPOXY LINING PER THE PROJECT SPECIFICATIONS, SHALL BE CENTERED AT THE VALVE.
6. AIR RELEASE/VACUUM VALVE MANHOLES SHALL BE 5' MINIMUM INSIDE DIAMETER.
7. BOTTOM OF VENT PIPE SHALL BE A MINIMUM OF 12" OR 3' ABOVE FLOOD ELEVATION, WHICHEVER IS APPLICABLE

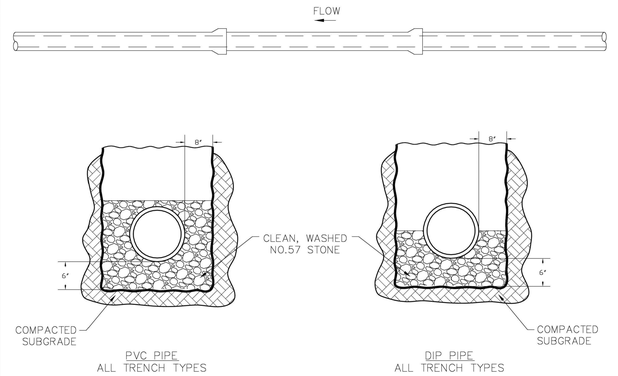
ONWASA

Onslow Water & Sewer Authority

USE WITH CURRENT ONWASA "STANDARD SPECIFICATIONS AND DETAILS MANUAL FOR WATER AND SEWER CONSTRUCTION" (latest revision)

GRAVITY SEWER EMBEDMENT DETAIL

REVISION DATE: May 2016 | SCALE: Not To Scale | DETAIL #: SS GSED | SHEET #: 1 of 3



1

PUMP STATION DESIGN

DESIGN FLOW:	FIRE, RESCUE & EMERG. RESPONSE FACILITY 25-GPD/PERSON/SHIFT 25-EMPLOYEES 625-GPD (AVE. DAILY FLOW) 3.5 PEAK FACTOR 2,625-GPD (PEAK DAILY FLOW) 2-GPM (PEAK FLOW)
PUMP RATE:	45-GPM MIN.
PUMP OWNER:	ONSLOW COUNTY
FORCEMAIN OWNER:	ONWASA (ONSLOW WATER & SEWER AUTH.)

CONTROL FEATURES:

ENCLOSURES:	NEMA 4X STAINLESS STEEL
AUTO DIALER:	YES
ALARM HORN:	YES
ALARM STROBE:	YES
GFI DUPLEX RECEP.:	YES

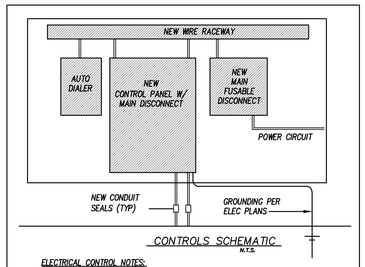
ALTERNATE POWER SOURCE:

GENERATOR:	YES, ON-SITE FACILITY GENERATOR
TRANS. SWITCH:	YES, INTERNAL TO BLDG. POWER

PUMP SPECIFICATION:

MANUFACTURER:	LIBERTY
MODEL:	XLSG203M
PUMP TYPE:	SUBMERSSIBLE GRINDER
SOLIDS HANDLING:	YES, GRINDER
DISCHARGE:	1.25-IN
NO. OF PUMPS:	2 INSTALLED + 1 SPARE
MIN. FLOW (2-FPS):	44-GPM
PRIMARY DESIGN FLOW:	50-GPM
PRIMARY DESIGN HEAD:	23-FT
MIN. SHUT-OFF HEAD:	105-FT
MOTOR HORSEPOWER:	2-HP (EACH)
MOTOR SPEED:	3,450-FPM
ELECTRICAL:	208-V, 3-PH, 60-Hz

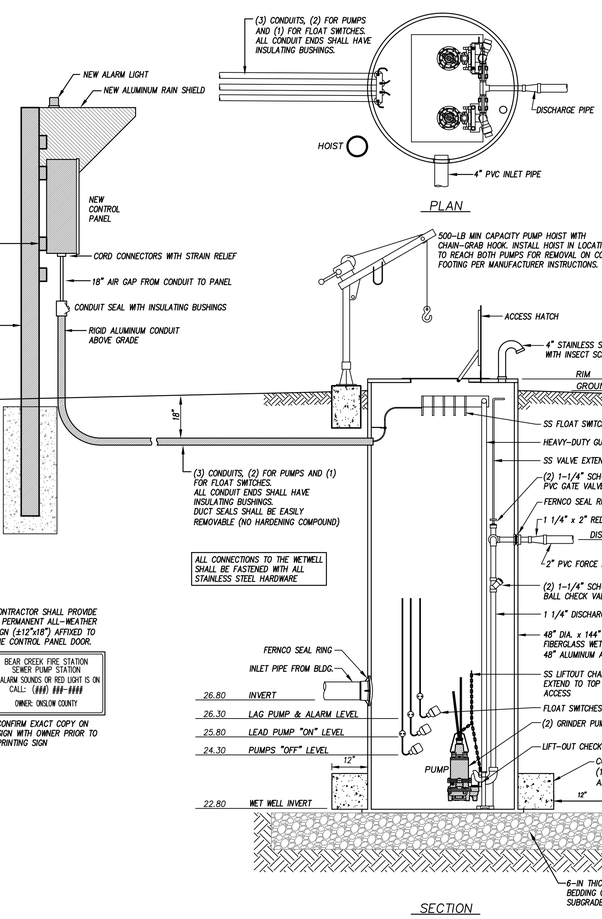
* DESIGN OF PUMP STATION BASED ON THE PUMP SPECIFIED ABOVE. PUMPS SHALL BE MANUFACTURED BY LIBERTY, SULZER, MEYERS, HYDROMATIC OR APPROVED EQUAL MEETING THE REQUIREMENTS OF THE WRITTEN SPECIFICATIONS AND THE PERFORMANCE REQUIREMENTS LISTED ABOVE.



CONTROLS SCHEMATIC
N.T.S.

ELECTRICAL CONTROL NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO LATEST NATIONAL, STATE AND LOCAL CODES AND REQUIREMENTS.
2. PANEL LAYOUT IS SCHEMATIC ONLY. ADJUST AS NEEDED TO ACCOMMODATE EQUIPMENT.
3. ALL ENCLOSURES SHALL BE NEMA 4X RATED AND LOCKABLE.
4. ALL CONDUITS SHALL BE SEALED WITH INSULATING BUSHINGS TO PREVENT MOISTURE, SEWER GASES, ETC. FROM ENTERING EQUIPMENT ENCLOSURES.
5. NO EQUIPMENT SHALL BE MOUNTED LESS THAN 36-IN ABOVE GRADE.



SECTION

CONTRACTOR SHALL PROVIDE A PERMANENT ALL-WEATHER SIGN (±12"x18") AFFIXED TO THE CONTROL PANEL DOOR.

BEAR CREEK FIRE STATION
SEWER PUMP STATION
IF ALARM SOUNDS OR RED LIGHT IS ON CALL: (###) ###-####
OWNER: ONSLOW COUNTY

CONFIRM EXACT COPY ON SIGN WITH OWNER PRIOR TO PRINTING SIGN

SEWER PUMP STATION N.T.S.

DAVIS KANE ARCHITECTS, PA
503 OBERLIN ROAD | SUITE 300
RALEIGH, NC 27605
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LA: C-106
PE: C-1595

PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA REGISTERED SEAL 22625 ENGINEER STEVEN J. MILLER

DKA JOB NUMBER

2324

REVISIONS

1	ADD 02	04/22/25

PA: ZP
PM: YA
Drawn By: SL/SH
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BID DOCUMENTS

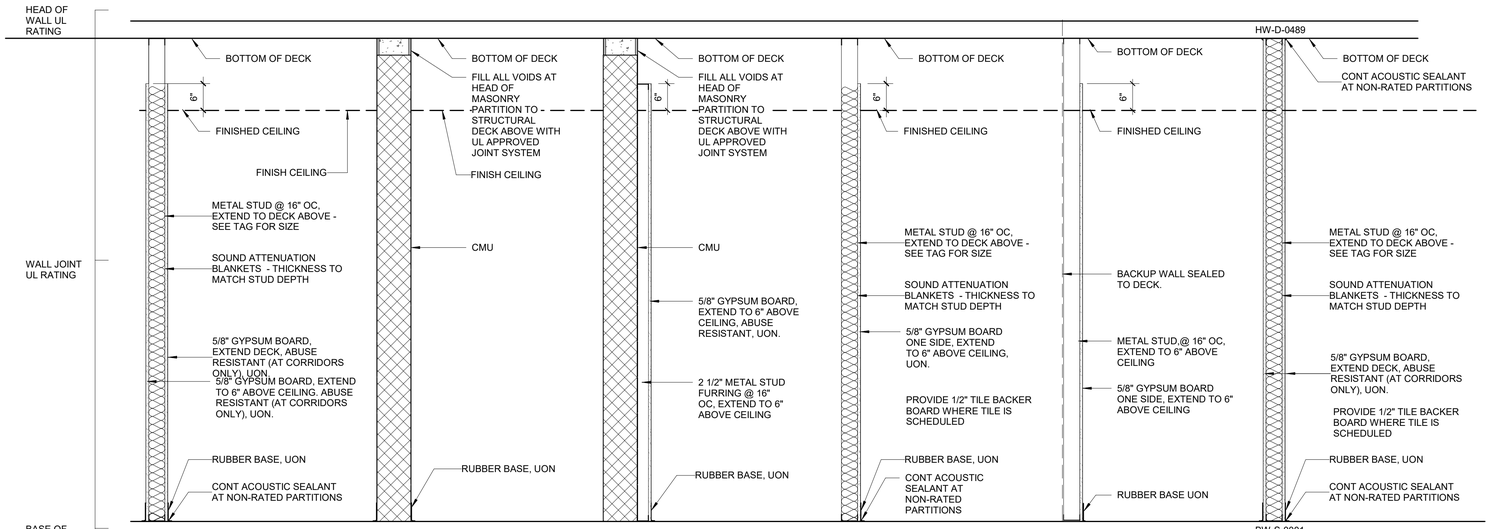
04/17/2025

SHEET TITLE

UTILITY DETAILS

C903

INTERIOR PARTITIONS LEGEND



A3 3 5/8" METAL STUD U407

A6 6" METAL STUD U407

B4 4" CMU

B8 8" CMU UL - U905 AT RATED WALL

C8 8" CMU

D3 3 5/8" METAL STUD

D6 6" METAL STUD

E2 2-1/2" METAL STUD

E3 3 5/8" METAL STUD

F3 3 5/8" METAL STUD U407

F6 6" METAL STUD U407

ARCHITECTURAL MATERIALS LEGEND

- EARTH
- GRANULAR FILL
- SAND, GROUT AS NOTED
- CAST-IN-PLACE CONCRETE
- PRECAST CONCRETE, CAST STONE
- CONCRETE MASONRY UNIT
- BRICK MASONRY
- STONE: QUARTZ
- METAL: TYPE AS NOTED
- METAL: ROLLED SHAPES
- WOOD FRAMING / BLOCKING: CONTINOUS
- WOOD SHIM
- FINISHED WOOD SHOWN CUT AND ELEVATION
- PARTICLEBOARD
- PLYWOOD
- SPRAYED FIREPROOFING SHOWN ON ROLLED SHAPE
- BATT INSULATION: THERMAL OR ACOUSTICAL, UON
- RIGID INSULATION: THERMAL, ACOUSTICAL, OR SAFING
- GYPSUM WALL BOARD
- SHEATHING: GYPSUM, OR AS NOTED
- ACOUSTICAL CEILING TILE
- RESINOUS FLOORING: TERRAZO, TROWEL-ON, UON
- TILE: CERAMIC, QUARRY, UON
- INSULATED GLASS: (SMALL SCALE)
- INSULATED GLASS: (DETAIL)
- ROOF MEMBRANE
- WATER PROOFING, DAMP PROOFING
- TRANSITION MEMBRANE FLASHING
- AIR BARRIER

NOTE: PATTERNS SHOWN REPRESENT CUT MATERIALS IN PLAN OR SECTION, UNLESS NOTED OTHERWISE ABOVE.

FURNITURE, FIXTURES, AND EQUIPMENT LEGEND

NOTE: CONTRACTOR TO COORDINATE ALL FF&E ITEMS WITH OWNER PRIOR TO SCHEDULING DELIVERY AND INSTALLATION

01 SOAP DISPENSER, WALL MOUNTED	13 SURFACE MOUNTED COMBINATION PAPER TOWEL AND WASTE RECEPTACLE	30 FIRE EXTINGUISHER ON HOOK	50 ICE MAKER, OPCI
02 PAPER TOWEL DISPENSER / TRASH RECEPTACLE	14 CASCADE SCBA SYSTEM, OPCI	31 FIRE EXTINGUISHER IN CABINET	51 DISHWASHER, OPCI
03 TOILET PAPER DISPENSER	15 EYE WASH - SEE PLUMBING DRAWINGS	32 TWIN SIZE BED, NIC	52 REFRIGERATOR, OPCI
04 ADA INTEGRATED PIPE PROTECTION	16 STAINLESS STEEL RECESSED SHOWER SHELF	33 WALL MOUNTED FLAT SCREEN TV, OPCI	53 WASTE/ RECYCLING CONTAINER, OPCI
05 ACCESIBLE SHOWER SEAT	17 MOP HOLDER		54 RANGE HOOD, SEE MECHANICAL DRAWINGS
06 SHOWER CURTAIN, ROD & HOOKS	18 WASHER EXTRACTOR - BASIS-OF-DESIGN - UNIMAC UW65	34 48" X 72" GLASS BOARD, MOUNT BOTTOM OF GLASS/MARKER HOLDER AT 34" AFF. BASIS-OF-DESIGN: EGAN GLASSWRITE FROSTED GLASS DRY-ERASE BOARD	55 RESIDENTIAL RANGE, OPCI
07 TOWEL HOOK	19 HEAVY DUTY TUMBLE DRYER, OPCI		56 COFFEE MAKER, NIC
08 24" X 36" MIRROR	20 ADA DUAL HEIGHT DRINKING FOUNTAIN - SEE PLUMBING DRAWINGS	35 GEAR LOCKER ON CASTER	
09 18" GRAB BAR	21 SCULLERY SINK, SEE PLUMBING DRAWINGS	36 WALL MOUNTED GEAR LOCKER	
10 24" GRAB BAR	22 WASHER & DRYER, OPCI	37 DUAL BLACKOUT AND SHEER ROLLING SHADE	
11 36" GRAB BAR		38 2" WINDOW BLINDS	
12 42" GRAB BAR		39 LOCKERS, SEE SPECIFICATIONS	

RATED ASSEMBLIES GENERAL NOTES:

1. UL CERTIFIED RATED ASSEMBLIES ARE REPRINTED FROM THE ONLINE CERTIFICATIONS DIRECTORY WITH PERMISSION FROM UNDERWRITERS LABORATORIES, INC.
2. FIRE PROTECTION MATERIALS DENOTED IN THE FIRE PROTECTION DETAILS PROVIDED HEREIN SHALL NOT BE CONSTRUED AS PROPRIETARY. EQUIVALENT FIRE PROTECTION SYSTEMS MAY BE UTILIZED IF SUBMITTED BY THE CONTRACTOR FOLLOWING REQUIREMENTS SET FORTH IN THE GENERAL CONDITIONS.
3. ANY SUBSTITUTIONS OF MATERIALS USED IN RATED ASSEMBLIES ARE SUBJECT TO APPROVAL BY AUTHORITIES HAVING JURISDICTION.
4. SEE SHEET **G005** FOR RATED ASSEMBLIES LEGEND.

INTERIOR PARTITION NOTES:

1. ALL RATED ASSEMBLIES SHALL BE STENCILED WITH RATED WALL WARNING MESSAGE IN RED TO READ AS FOLLOWS: "__-HOUR RATED FIRE BARRIER. SEAL ALL PENETRATIONS" WITH APPLICABLE HOUR RATING INSERTED. HOUR RATING TO BE AS NOTED ON PLANS. MESSAGE TO BE 4" MIN HIGH LETTERS, PLACED 12" ABOVE CEILING, SPACED AT 6'-0" OC ON BOTH SIDES OF WALLS AND ON UNDERSIDE OF HORIZONTAL RATED ASSEMBLIES.
2. ALL INTERIOR PARTITION WALLS ARE TO BE A3 UON.
3. SEE SHEET **G005** FOR UL CERTIFIED RATED ASSEMBLIES AS REQUIRED BY INTERIOR PARTITION LEGEND. AT ALL RATED ASSEMBLIES, PROTECT ALL JOINTS AS REQUIRED BY INTERIOR PARTITION LEGEND. SEE PLUMBING, MECHANICAL AND ELECTRICAL SHEETS FOR PROTECTION OF PENETRATIONS IN RATED ASSEMBLIES. SEAL PERIMETER OF ALL RATED ASSEMBLIES AT DECK, STRUCTURE, CEILING, FLOOR AND ADJACENT WALLS, TYP.
4. COORDINATE LAYOUT OF WALLS OF DIFFERENT TYPES SUCH THAT FINISH GWB SURFACES ALIGN IN SAME PLANE.
5. SEAL PERIMETER OF ALL FIRE RATED WALLS AT DECK, STRUCTURE, CEILING, FLOOR AND ADJACENT WALLS, TYP. RATED WALLS TO BE SEALED AT WALL PENETRATIONS AND TO ADJACENT CONSTRUCTION WITH APPLICABLE JOINT PROTECTION SYSTEM.
6. AT ALL RATED PARTITIONS, RATE ALL JOINTS AND PENETRATIONS PER APPLICABLE UL DETAIL.
7. AT ALL NON-RATED WALLS AND PARTITIONS, SEAL ALL PENETRATIONS USING APPROVED NON-COMBUSTIBLE MATERIAL
8. AT PARTITION WALLS WITH SOUND BATT INSULATION, PROVIDE CONTINUOUS ACOUSTIC SEALANT AROUND FULL PERIMETER OF PARTITION AT ADJACENT SURFACES AND AT PENETRATIONS.
9. TOP OF WALL BRACING NOT SHOWN THIS SHEET, SEE STRUCTURAL DRAWINGS FOR TYPICAL WALL BRACING DETAILS AND ADDITIONAL REINFORCEMENT REQUIREMENTS.
10. PROVIDE LATERAL BRACING FOR PARTITIONS WHICH EXTEND ABOVE CEILING.
11. ISOLATE NON-LOAD-BEARING STUD FRAMING FROM BUILDING STRUCTURE TO PREVENT TRANSFER OF VERTICAL LOADS WHILE PROVIDING LATERAL SUPPORT AS SPECIFIED.
12. PROVIDE PARTITION CONTROL JOINTS PER DETAILS ON SHEET A310_ AS INDICATED ON INTERIOR ELEVATIONS AND ON RCPS. DRYWALL CONTRACTOR TO VERIFY ALL RECOMMENDED LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
13. REFER TO INTERIOR FINISHES PLANS AND REFLECTED CEILING PLANS FOR ADDITIONAL WALL FINISH, BASE, AND CEILING INFORMATION.
14. PROVIDE WATER RESISTANT GWB WITHIN 4 FEET OF DRINKING FOUNTAINS / WATER COOLERS, UON.
15. OUTSIDE CORNER OF CMU WALLS TO BE BULLNOSED FROM 8" AFF TO 8'-8" AFF TYPICAL, UON.
16. PENETRATIONS OF NON-RATED WALLS AND PARTITIONS OF NON-COMBUSTIBLE CONSTRUCTION SHALL BE SEALED USING APPROVED NON-COMBUSTIBLE MATERIAL.
17. PROVIDE 2X SOLID WOOD BLOCKING CONCEALED IN METAL STUD WALL CONSTRUCTION FOR WALL-MOUNTED FIXTURES, FURNISHINGS, EQUIPMENT AND ACCESSORIES.

DAVIS KANE ARCHITECTS, PA
503 OBERLIN ROAD | SUITE 300
RALEIGH, NC 27605
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED LANDSCAPE ARCHITECT 13823 05.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

1	ADD 01	04/01/25
2	ADD 02	04/22/25

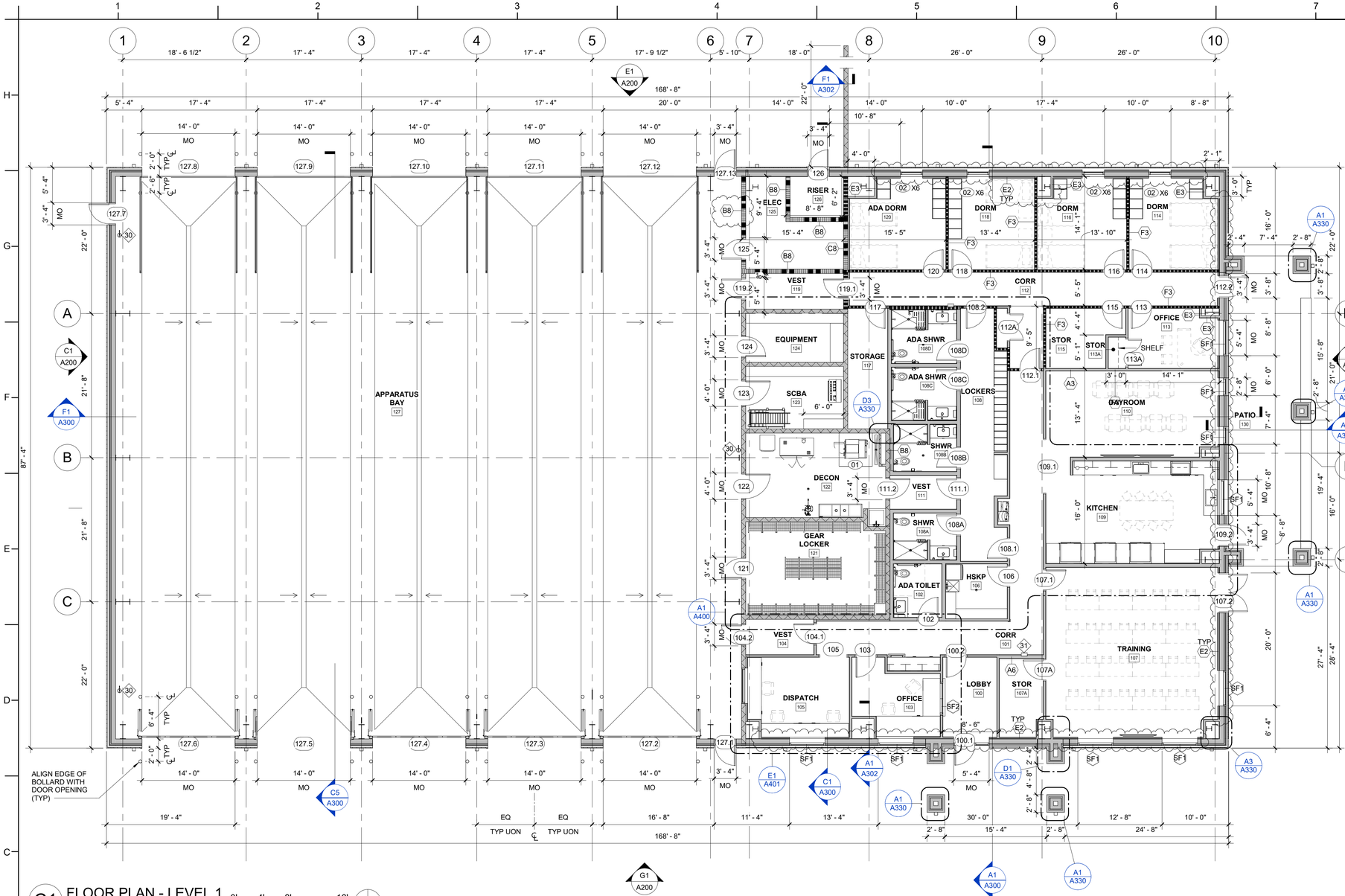
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: Author
Plot Date: 4/21/2025 10:20:39 AM

DATE ISSUED

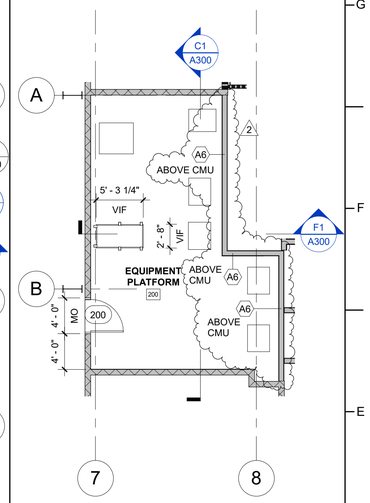
BID DOCUMENTS
03/12/2025

SHEET TITLE
PARTITION WALL TYPES

A002



C1 FLOOR PLAN - LEVEL 1
1/8" = 1'-0"



C8 EQUIPMENT PLATFORM
1/8" = 1'-0"

FLOOR PLAN KEY NOTES

NOTE: NOT ALL KEY NOTES BELOW ARE APPLICABLE TO THIS SHEET. KEY NOTES SUPPLEMENT INFORMATION FOUND ELSEWHERE IN THE DRAWINGS. SEE SHEETS A001 & A002 FOR FLOOR PLAN GENERAL NOTES. PARTITION GENERAL NOTES, LEGENDS, AND ADDITIONAL REQUIREMENTS.

01	THICKENED SLAB FOR EXTRACTOR - SEE STRUCTURAL DRAWINGS
02	WARDROBE - SEE DETAIL A7/A401

RATED ASSEMBLIES LEGEND:

NOTES: RATINGS ARE NOT SHOWN THROUGH DOORS FOR CLARITY. SEE A002 FOR PARTITION TYPES. SEE LIFE SAFETY PLANS ON G004 FOR FULL EXTENT OF RATINGS, INCLUDING HORIZONTAL RATINGS. RATINGS ARE CONTINUOUS AROUND OPENINGS AND OPENINGS ARE TO BE PROTECTED IN ACCORDANCE WITH THE NC STATE BUILDING CODE. PROTECT ALL PENETRATIONS.

ALL RATED ASSEMBLIES SHALL BE STENCILED WITH RATED WALL WARNING MESSAGE IN RED TO READ AS FOLLOWS: "__-HOUR RATED FIRE BARRIER. SEAL ALL PENETRATIONS* WITH APPLICABLE HOUR RATING INSERTED. HOUR RATING TO BE AS NOTED ON PLANS. MESSAGE TO BE 4" MIN HIGH LETTERS, PLACED 12" ABOVE CEILING, SPACED AT 12'-0" OC ON BOTH SIDES OF WALLS AND ON UNDERSIDE OF HORIZONTAL RATED ASSEMBLIES.

SEE T-SHEETS FOR UL RATINGS AND ADDITIONAL INFORMATION.

2-HR. FIRE BARRIER

1/2-HR FIRE PARTITION

FLOOR PLAN GENERAL NOTES:

1. 0'-0" FLOOR ELEVATION ON ARCHITECTURAL DRAWINGS EQUALS 36'-0" ELEVATION AS INDICATED ON CIVIL DRAWINGS.
2. DO NOT SCALE DRAWINGS. REFER DIMENSION QUESTIONS TO ARCHITECT FOR INTERPRETATION.SEE SHEET A002 FOR INTERIOR PARTITION LEGEND AND NOTES. SEE WALL SECTIONS FOR EXTERIOR WALLS, TYP.
3. ALL HINGE-SIDE DOOR JAMBS IN GYPSUM WALLS TO BE 4" TO THE INSIDE OF ADJACENT PERPENDICULAR WALL, UNLESS DIMENSIONED OTHERWISE.
4. ALL HINGE-SIDE JAMBS IN CMU WALLS TO BE 4" TO 8" AT A MASONRY HEAD JOINT TO INSIDE OF ADJACENT PERPENDICULAR WALL, UNLESS DIMENSIONED OTHERWISE.
5. ALL DOORS IN ALCOVES TO BE 18" MIN FROM STRIKE SIDE OF DOOR TO INSIDE OF ADJACENT PERPENDICUALR WALL, UNLESS DIMENSIONED OTHERWISE.
6. ALL DIMENSIONS TO FACE OF METAL STUD, FACE OF MASONRY, FACE OF CONCRETE, OR COLUMN CENTERLINE, UON.
7. PROVIDE CONTROL JOINTS IN INTERIOR AND EXTERIOR CMU WALLS EVERY 20' O.C. MAX, UON. MAINTAIN 2'-0" MINIMUM FROM JAMBS AT ALL OPENINGS.
8. PROVIDE CONTROL JOINTS IN GYPSUM BOARD WALL CONSTRUCTION AS INDICATED. VERIFY FINAL CONTROL JOINT LOCATIONS WHETHER OR NOT INDICATED ON THE DRAWINGS WITH ARCHITECT PRIOR TO STARTING WORK.
9. SEE KEY NOTES AND NOTES ON PLANS FOR SPECIFIC NOTES FOR EACH DRAWING AREA.
10. SEE PLUMBING, MECHANICAL, ELECTRICAL, FIRE PROTECTION, CIVIL AND STRUCTURAL DRAWINGS FOR RELATED WORK AND ADDITIONAL REQUIREMENTS.
11. COORDINATE EQUIPMENT WORK WITH MANUFACTURERS AND SUPPLIERS TO ENSURE PROPER ROUGH-IN CLEARANCES FOR INSTALLATION, USE AND MAINTENANCE.
12. ALL OPENINGS IN MASONRY WALLS ARE TO RECEIVE LINTEL OR BOND BEAM. SEE STRUCTURAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.
13. PROVIDE SEALANT AT JUNCTION OF DIFFERENT MATERIALS UNLESS OTHER MEANS OF SEALING AND CLOSURE IS SPECIFIED.
14. INSTALL METAL "F" TRIM IN GWB WALL AT VERTICAL EDGE WHERE GWB WALL MEETS CMU WALL. PROVIDE SEALANT AT JUNCTION OF DIFFERENT MATERIALS UNLESS OTHER MEANS OF SEALING AND CLOSURE IS SPECIFIED.
15. PROVIDE THOROUGH FINAL CLEANING THROUGHOUT INTERIOR PRIOR TO OWNER OCCUPANCY. INTERIOR CLEANING TO INCLUDE FLOORS, BASE, WALLS, WALL-MOUNTED EQUIPMENT, FIXTURES, FURNISHINGS, DOORS, WINDOWS, FRAMES, SILLS, CEILINGS, CEILING MOUNTED EQUIPMENT AND FIXTURES.
16. THE ANNULAR SPACE OF EACH PENETRATION OF EACH FLOOR ASSEMBLY IS TO BE FILLED WITH MATERIAL THAT IS TESTED FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS.
17. VERIFY MOUNTING HEIGHTS OF ACCESSORIES, EQUIPMENT, DOOR HARDWARE, CASEWORK, ETC., AND PROVIDE SOLID BLOCKING BEHIND ITEMS REQUIRING ANCHORAGE. WHERE MOUNTING HEIGHTS ARE NOT INDICATED, MOUNT ITEMS IN ACCORDANCE WITH RECOGNIZED INDUSTRY STANDARDS, COORDINATE LOCATIONS WITH MANUFACTURER OR SUPPLIER AND REFER MOUNTING HEIGHT QUESTIONS TO ARCHITECT FOR INTERPRETATION.
18. SEE I-SHEETS FOR INTERIOR FINISHES PLANS, FF&E PLANS, SCHEDULES, AND ADDITIONAL FINISHES.
19. ALL PARTITIONS ARE TYPE A3, UON.

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED SEAL 13823 05.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

1	ADD 01	04/01/25
2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: RM
Plot Date: 4/21/2025 10:03:52 AM

DATE ISSUED

BID DOCUMENTS
03/12/2025

SHEET TITLE
FIRST FLOOR & EQUIP PLATFORM FLOOR PLANS

A100

C1 FIRST FLOOR RCP
1/8" = 1'-0"

0' 4' 8' 16'

C8 RCP -EQUIPMENT PLATFORM
1/8" = 1'-0"

0' 4' 8' 16'

REFLECTED CEILING PLAN KEY NOTES

NOTE: KEY NOTES SUPPLEMENT INFORMATION FOUND ELSEWHERE IN THE DRAWINGS. SEE PLANS FOR KEYED ITEM LOCATIONS. SEE SHEET A000 FOR REFLECTED CEILING PLAN GENERAL NOTES, REFLECTED CEILING PLAN LEGEND AND FF&E LEGEND.

01	HIGH VOLUME, LOW SPEED INDUSTRIAL FAN, SEE MECH. DRAWINGS FOR DETAILS
02	METAL SOFFIT
03	PAINTED EXPOSED STRUCTURE

RATED ASSEMBLIES LEGEND:

NOTES: RATINGS ARE NOT SHOWN THROUGH DOORS FOR CLARITY. SEE A002 FOR PARTITION TYPES. SEE LIFE SAFETY PLANS ON G004 FOR FULL EXTENT OF RATINGS, INCLUDING HORIZONTAL RATINGS. RATINGS ARE CONTINUOUS AROUND OPENINGS AND OPENINGS ARE TO BE PROTECTED IN ACCORDANCE WITH THE NC STATE BUILDING CODE. PROTECT ALL PENETRATIONS.

ALL RATED ASSEMBLIES SHALL BE STENCILED WITH RATED WALL WARNING MESSAGE IN RED TO READ AS FOLLOWS: "__-HOUR RATED FIRE BARRIER. SEAL ALL PENETRATIONS" WITH APPLICABLE HOUR RATING INSERTED. HOUR RATING TO BE AS NOTED ON PLANS. MESSAGE TO BE 4" MIN HIGH LETTERS, PLACED 12" ABOVE CEILING, SPACED AT 12'-0" OC ON BOTH SIDES OF WALLS AND ON UNDERSIDE OF HORIZONTAL RATED ASSEMBLIES.

SEE T-SHEETS FOR UL RATINGS AND ADDITIONAL INFORMATION.

2-HR. FIRE BARRIER

1/2-HR FIRE PARTITION

RCP GENERAL NOTES:

1. CEILING GRIDS TO BE CENTERED IN ROOM AS SHOWN, UNLESS DIMENSIONED OTHERWISE.
2. DOUBLE CEILING TRACK AT THE EDGE OF ANY LAY-IN AREAS IS NOT ACCEPTABLE. PROVIDE A 2'x4' TILE CUT TO FIT THE LARGER OPENING WHERE A STRIP OF TILE LESS THAN 2 1/2" IN EITHER DIRECTION WOULD HAVE TO BE USED, TYP.
3. MECHANICAL, ELECTRICAL, FIRE PROTECTION, AND AV COMPONENTS ARE SHOWN FOR COORDINATION PURPOSES ONLY. SEE PLUMBING, ELECTRICAL, MECHANICAL, AND FIRE PROTECTION DRAWINGS FOR ADDITIONAL REQUIREMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSTALLATION OF MECHANICAL, FIRE PROTECTION, ELECTRICAL, AND PLUMBING WORK ABOVE CEILING, IN ORDER TO PROVIDE FINISHED CEILINGS AT HEIGHTS REQUIRED ON CEILING PLAN.
5. PRIME AND PAINT ALL NON-GALVANIZED STEEL LINTELS THAT ARE TO REMAIN EXPOSED.
6. SEE INTERIOR FINISHES SCHEDULE AND INTERIOR FINISHES PLANS ON I-SHEETS FOR ADDITIONAL CEILING INFORMATION AND REQUIREMENTS.
7. SEE SECTIONS AND INTERIOR ELEVATIONS FOR BULKHEAD DIMENSIONS NOT NOTED ON REFLECTED CEILING PLANS AND DETAILS.
8. PROVIDE CONTROL JOINTS IN GYPSUM BOARD CEILING CONSTRUCTION AS INDICATED. WHERE NOT SHOWN, PROVIDE MAXIMUM SPACING BETWEEN JOINTS OF 30'-0". VERIFY FINAL CONTROL JOINT LOCATIONS WITH ARCHITECT PRIOR TO STARTING WORK WHETHER OR NOT INDICATED ON THE DRAWINGS.
9. ALL GWB CONTROL JOINTS ARE TO RUN HORIZONTALLY AS SHOWN ON REFLECTED CEILING PLANS AND VERTICALLY UP THE FACE OF THE BULKHEAD.
10. CENTER PENETRATIONS IN ACOUSTICAL CEILING SYSTEMS WITHIN INDIVIDUAL CEILING PANELS, SUCH AS SPRINKLER HEADS, DIFFUSERS, LIGHT FIXTURES, ETC. UON
11. PAINT ALL EXPOSED GWB CEILINGS AND BULKHEADS.
12. USE OVERSIZE 2'x4' MATCHING CEILING PANEL CUT TO SIZE AT ROOM PERIMETER WHERE CEILING AND GRID LAYOUT RESULTS IN PANEL WIDTH LESS THAN 3 INCHES.
13. SUBMIT COORDINATION DRAWINGS AND LAYOUT FOR APPROVAL IN ALL AREAS WITH EXPOSED STRUCTURE PRIOR TO INSTALLATION.
14. AUTOMATIC SPRINKLER DESIGN BY PERFORMANCE SPECIFICATION. SPRINKLER HEADS SHOWN FOR AREAS WITH AESTHETIC OR ADDITIONAL REQUIREMENTS COORDINATION. CONTRACTOR RESPONSIBLE FOR FULL RCP COORDINATION.
15. ALL CEILINGS 9'-0" AFF UON.
16. WHERE NO CEILING IS SCHEDULED, PAINT ALL EXPOSED AND SEMI-EXPOSED SURFACES INCLUDING STEEL STRUCTURE, STEEL DECK, PIPING, DUCT, CONDUIT, BOXES, ETC. DO NOT PAINT EXPOSED CONCRETE SURFACES. MASK AND PROTECT FROM PAINT THOSE ITEMS THAT WILL NOT PROPERLY OPERATE WITH FIELD-APPLIED COATINGS, INCLUDING SPRINKLER HEADS, CONTROLS, LEVERS, VALVES, SENSORS, ETC. SEE F, P, M, AND E DRAWINGS FOR ADDITIONAL REQUIREMENTS.

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ONSLOW COUNTY
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138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DKA JOB NUMBER
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REVISIONS

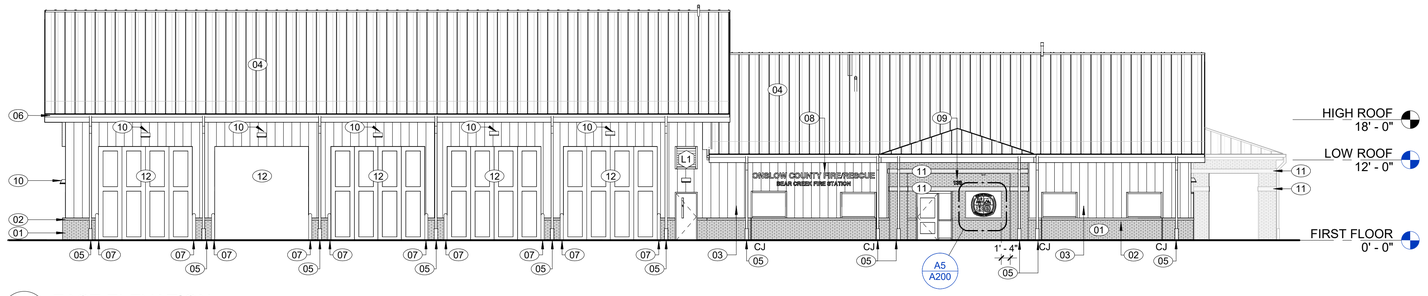
2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: RM
Plot Date: 4/21/2025 10:04:00 AM

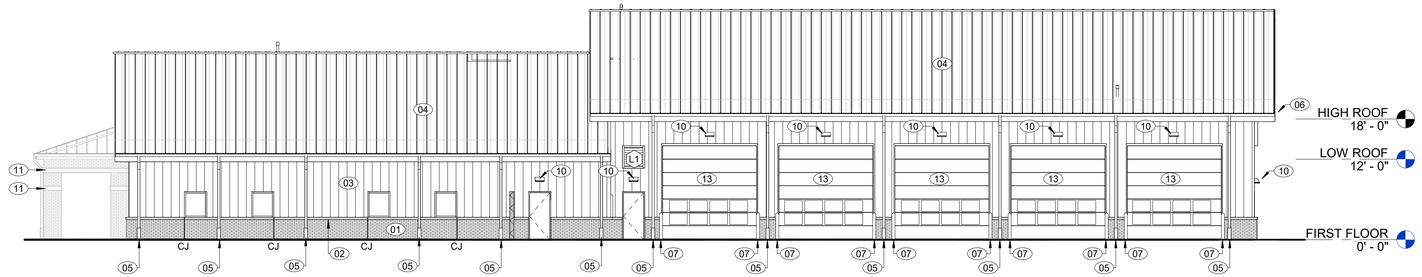
DATE ISSUED
BID DOCUMENTS
03/12/2025

SHEET TITLE
FIRST FLOOR & EQUIP PLATFORM RCP

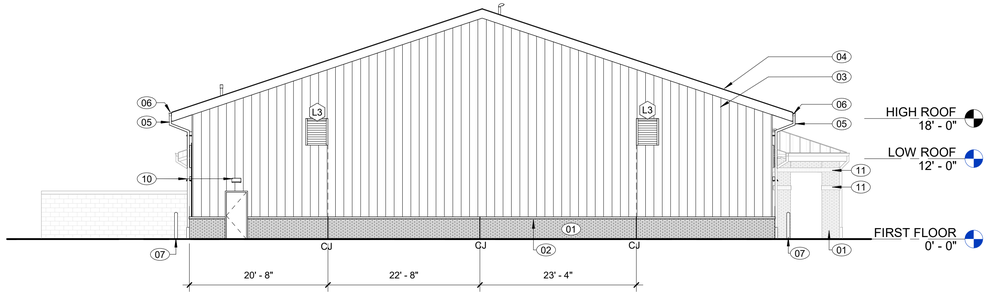
A110



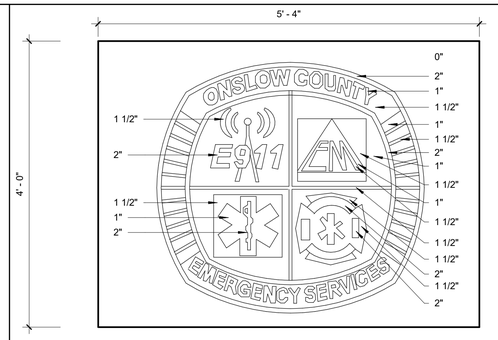
G1 EAST ELEVATION
3/32" = 1'-0"



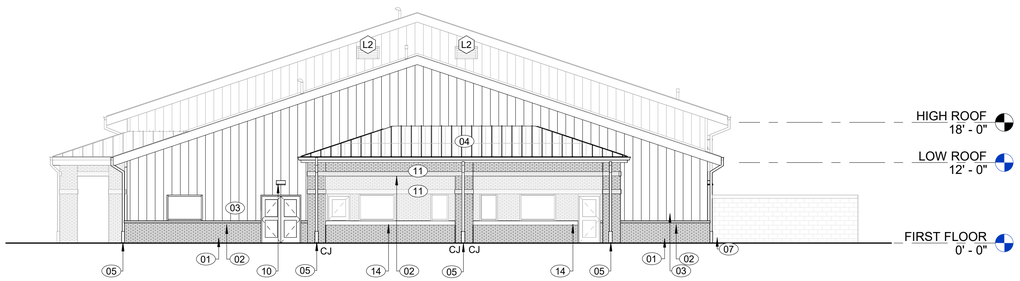
E1 WEST ELEVATION
3/32" = 1'-0"



C1 SOUTH ELEVATION
3/32" = 1'-0"



A5 PRECAST SIGN
1" = 1'-0"



A1 NORTH ELEVATION
3/32" = 1'-0"

EXTERIOR ELEVATION GENERAL NOTES:

1. FOR SYMBOLS LEGEND, SEE A000.
2. LOUVERS NOT TAGGED IN EXTERIOR ELEVATIONS ARE TAGGED IN BUILDING AREA PLANS.
3. PROVIDE CONTROL JOINTS (CJ) IN MASONRY CONSTRUCTION AS INDICATED.
4. PROVIDE CONTROL JOINTS (CJ) AT ALL INSIDE CORNERS.
5. VERIFY FINAL CONTROL JOINT (CJ) LOCATIONS WITH ARCHITECT PRIOR TO STARTING WORK.
6. AIR BARRIER AND ASSOCIATED FLASHING SHALL BE CONTINUOUS AND UNBROKEN AT ALL SURFACES OF WALL MEMBRANE TO BE FLASHED TO ALL OTHER COMPONENTS AND ASSEMBLIES TO PROVIDE AIR-TIGHT CONDITION.

EXTERIOR ELEVATIONS KEY NOTES

NOTE: SEE ELEVATIONS FOR KEYED ITEM LOCATIONS. KEY NOTES SUPPLEMENT INFORMATION FOUND ELSEWHERE IN THE DRAWINGS.

01	BRICK VENEER
02	BRICK VENEER, ROWLOCK
03	METAL PANEL, CONCEALED FASTENER,COLOR TO BE SELECTED FROM MFR'S FULL RAND OF COLORS
04	STANDING SEAM METAL ROOF, MECHANICALLY SEAMED, ARCHITECT TO SELECT LIGHT GRAY COLOR FROM MFR'S FULL RANGE OF COLORS, TYP
05	PRE-FINISHED METAL DOWNSPOUT, COLOR TO MATCH ROOFING
06	PRE-FINISHED METAL BOX GUTTER, COLOR TO MATCH ROOFING
07	BOLLARD, SLEEVE COLOR TO BE SELECTED FROM MFR'S FULL RANGE OF COLORS
08	10"/8"/4" HELVETICA FONT WITH SOFFIT LIGHTING - SEE ELECTRICAL DRAWINGS
09	7" HIGH BUILDING ADDRESS NUMBERS, HELVETICA FONT
10	LIGHT FIXTURE - SEE ELECTRICAL DRAWINGS
11	BRICK VENEER, SOLDIER COURSE
12	BI-FOLDING DOORS
13	OVERHEAD DOORS
14	PRECAST CAP

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. — REGISTERED ARCHITECTURAL CORPORATION — 50304 — NORTH CAROLINA — RALEIGH, N.C.

JIMMY ARDEL EDWARDS — REGISTERED ARCHITECT — 13823 — 03-12-25 — NORTH CAROLINA — RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: SMK
Plot Date: 4/21/2025 10:03:37 AM

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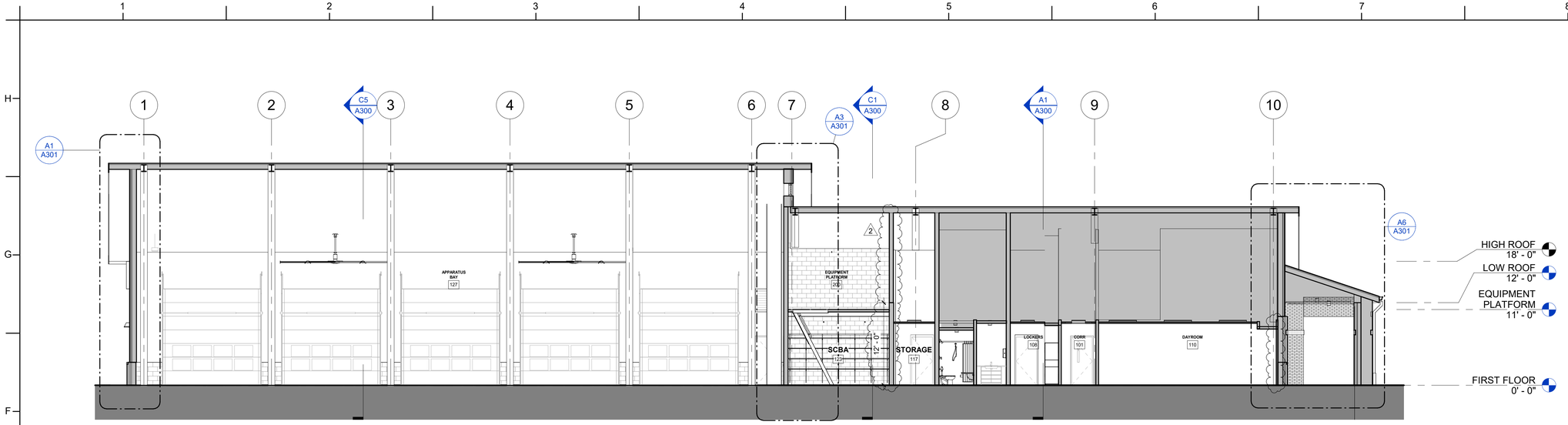
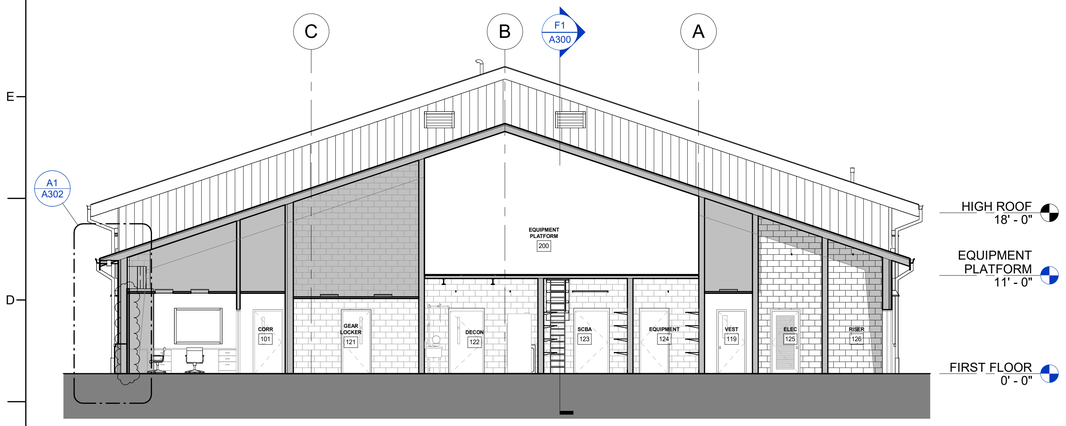
SHEET TITLE
EXTERIOR ELEVATIONS

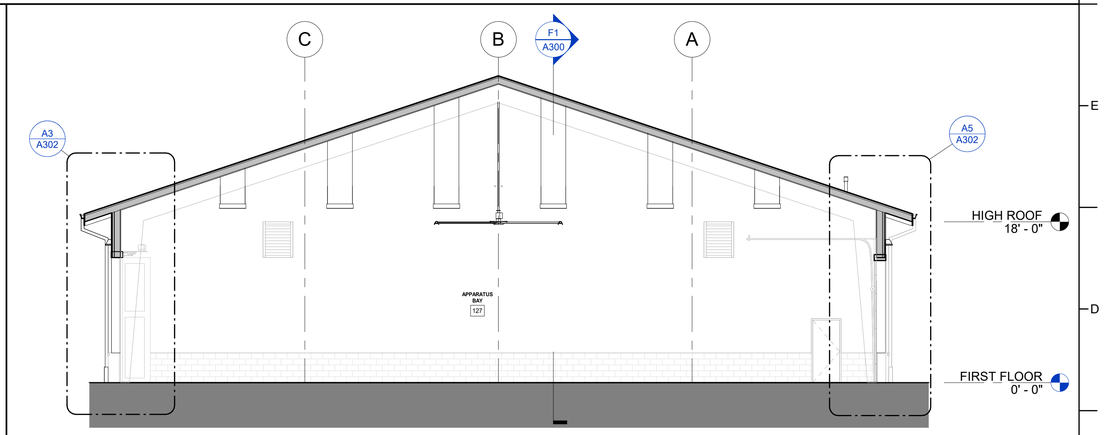
A200



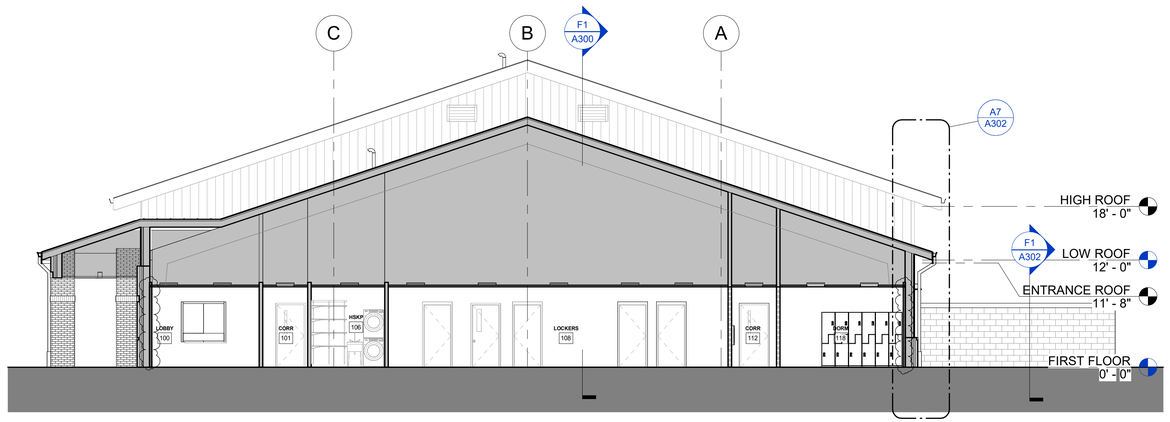
F1 BUILDING SECTION - WEST
1/8" = 1'-0"



C1 BUILDING SECTION - WARDROBES, DECON, OFFICES - SOUTH
1/8" = 1'-0"



C5 BUILDING SECTION - APPARATUS BAY SOUTH
1/8" = 1'-0"



A1 BUILDING SECTION - LOCKERS, HSKP - SOUTH
1/8" = 1'-0"

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED ARCHITECT 13823 03.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: SMK
Plot Date: 4/21/2025 10:04:34 AM

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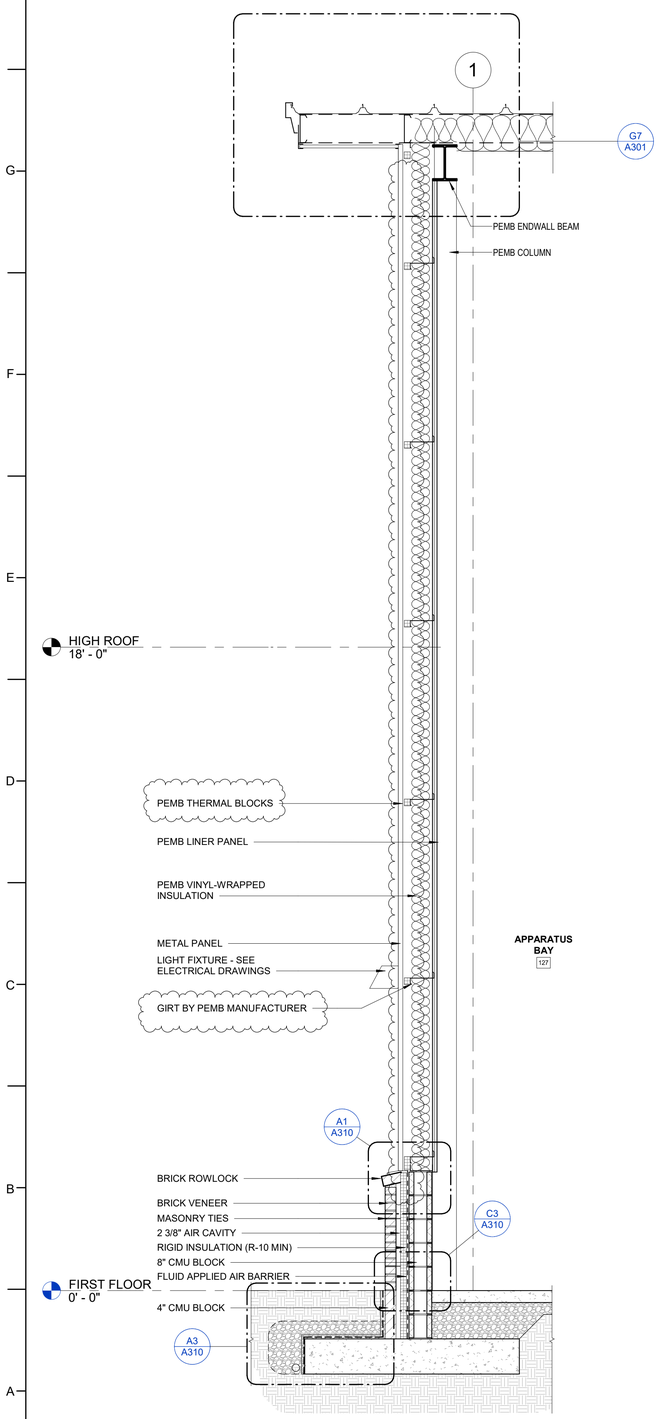
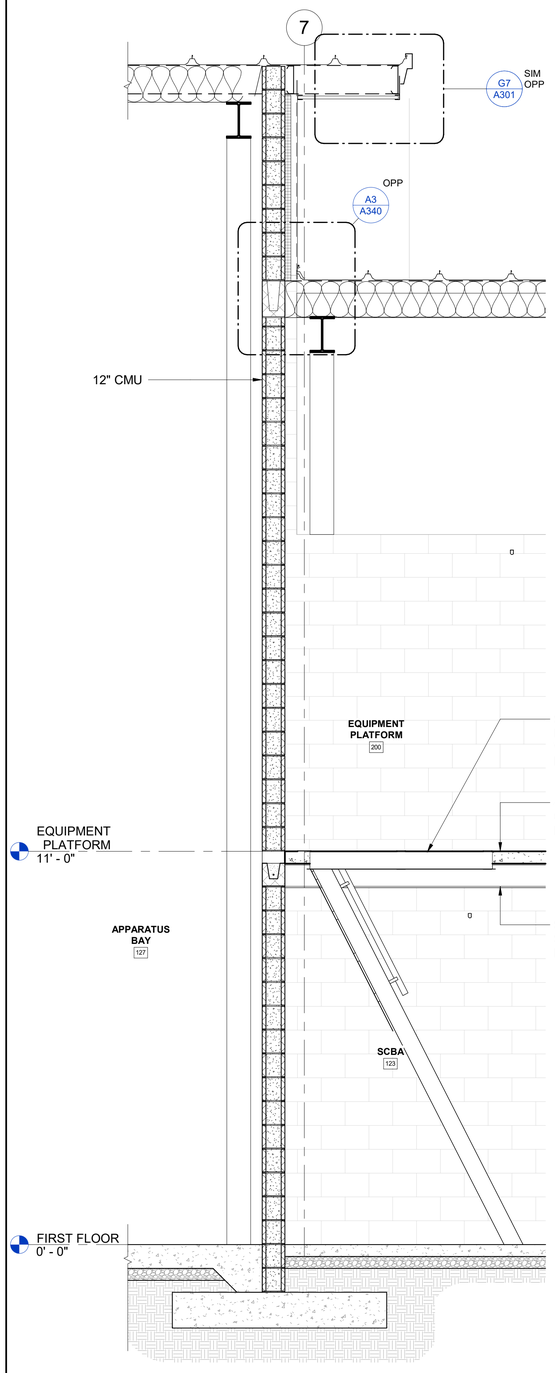
BID DOCUMENTS
03/12/2025

SHEET TITLE
BUILDING SECTIONS

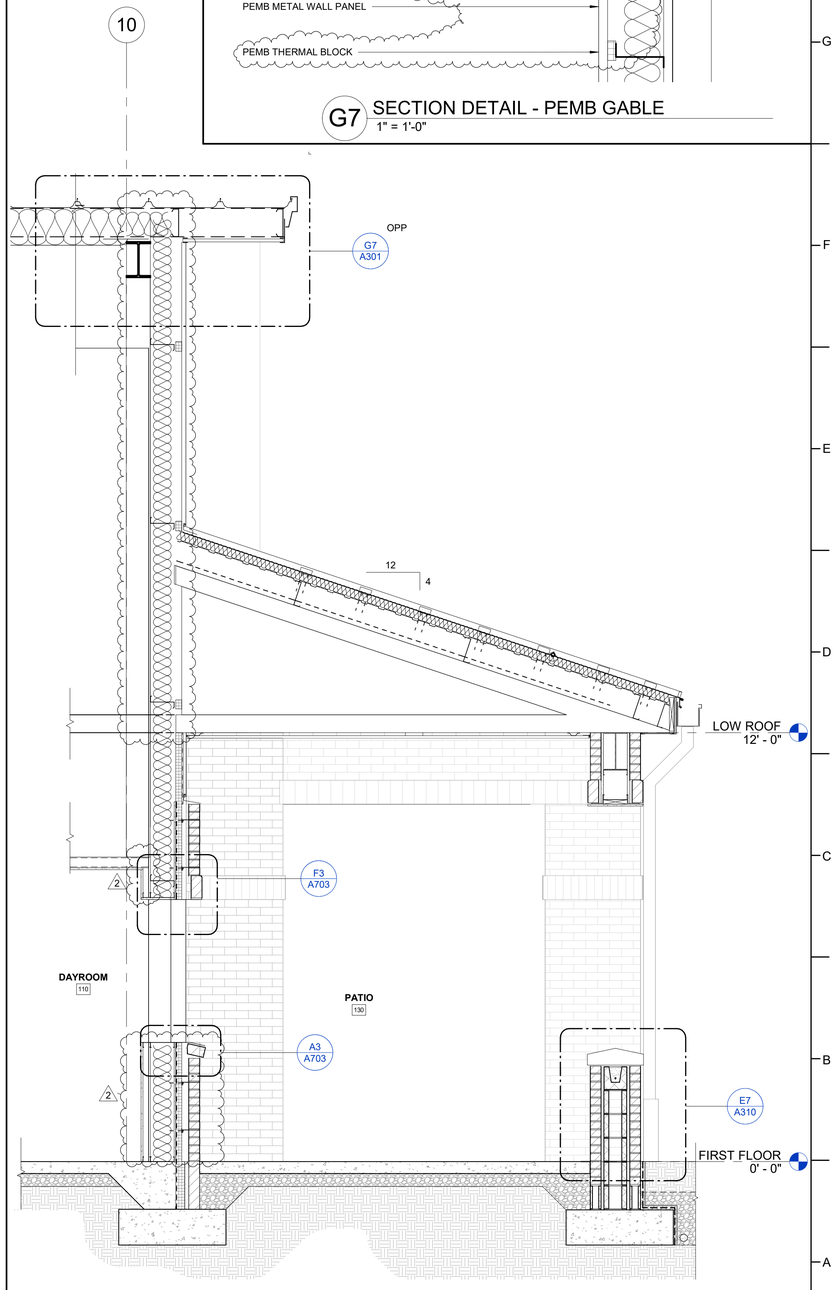
A300



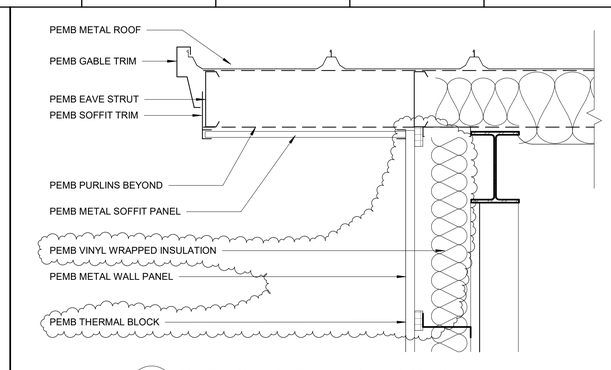
A1 WALL SECTION - APPARATUS BAY WEST
1/2" = 1'-0"



A3 WALL SECTION - MASONRY DEMISING WALL - WEST
1/2" = 1'-0"



A6 WALL SECTION - NORTH CANOPY
1/2" = 1'-0"



G7 SECTION DETAIL - PEMB GABLE
1" = 1'-0"

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. 50304 NORTH CAROLINA REGISTERED ARCHITECTURAL CORPORATION RALEIGH, N.C.

JIMMY ARDEL EDWARDS 13823 NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT RALEIGH, N.C. 03.12.25

DKA JOB NUMBER
2324

REVISIONS

1	ADD 01	04/01/25
2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: VK
Plot Date: 4/21/2025 10:35:52 AM

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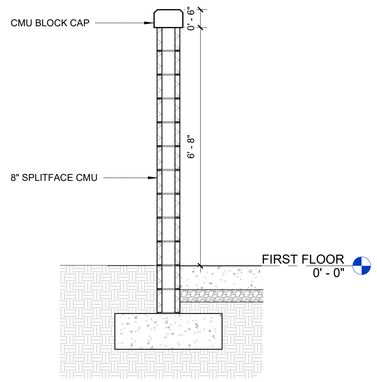
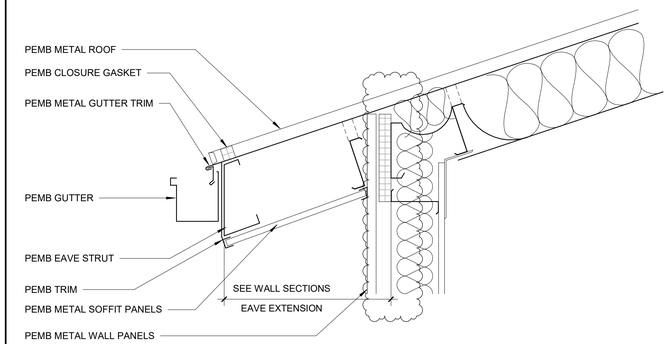
SHEET TITLE
WALL SECTIONS

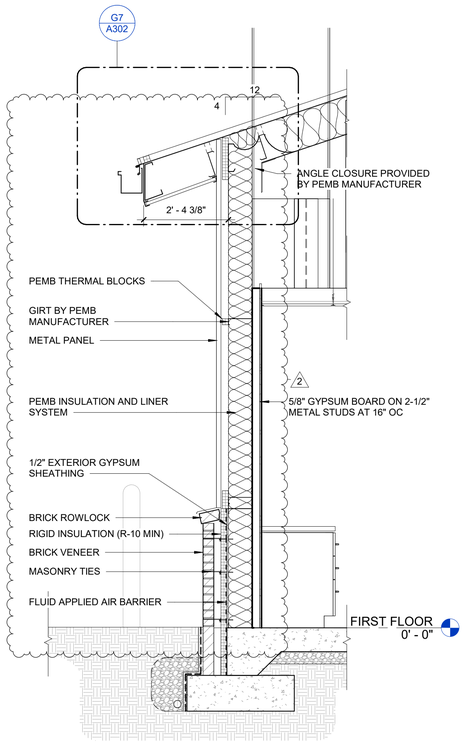
A301



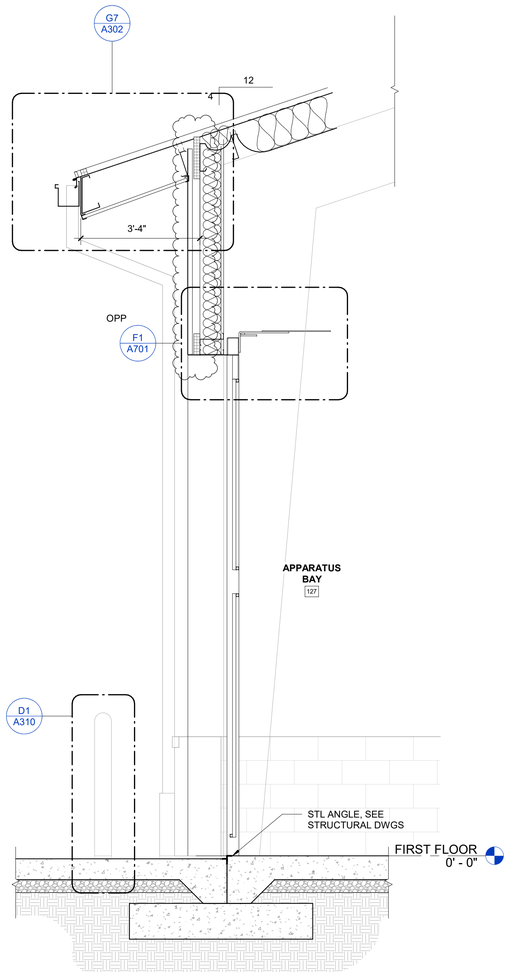
F1 WALL SECTION - CMU SCREEN WALL
1/2" = 1'-0"



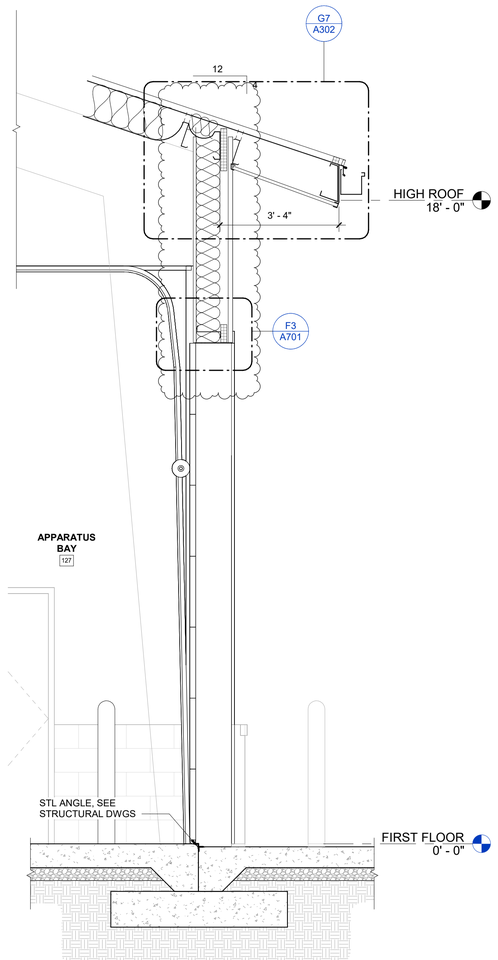
G7 SECTION DETAIL - PEMB EAVE
1" = 1'-0"



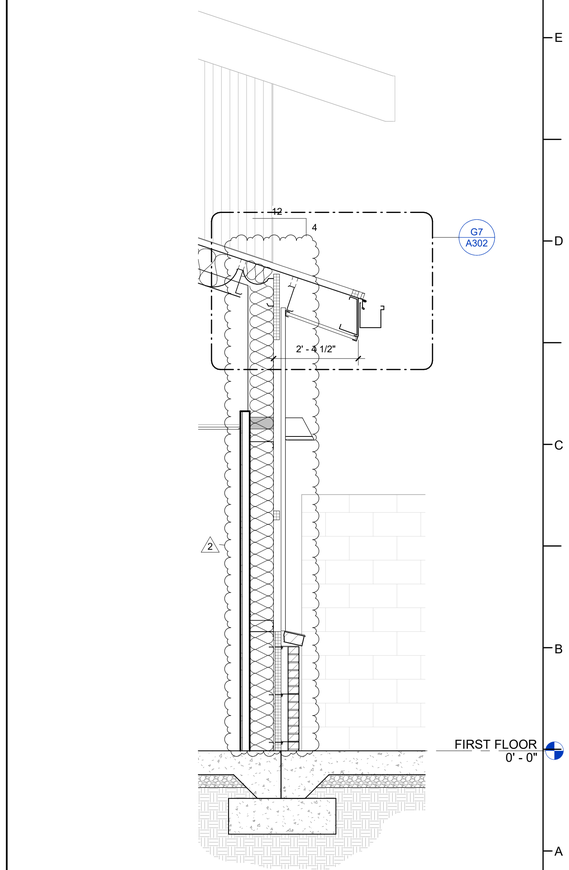
A1 WALL SECTION - TYPICAL METAL STUD WALL
1/2" = 1'-0"



A3 WALL SECTION - APPARATUS BAY
FOUR FOLD DOOR
1/2" = 1'-0"



A5 WALL SECTION - APPARATUS BAY
OVERHEAD DOOR
1/2" = 1'-0"



A7 WALL SECTION - DORM 118
1/2" = 1'-0"

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PROJECT INFORMATION

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BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

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JIMMY ARDEL EDWARDS REGISTERED SEAL 13823 05.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: VK
Plot Date: 4/21/2025 10:04:10 AM

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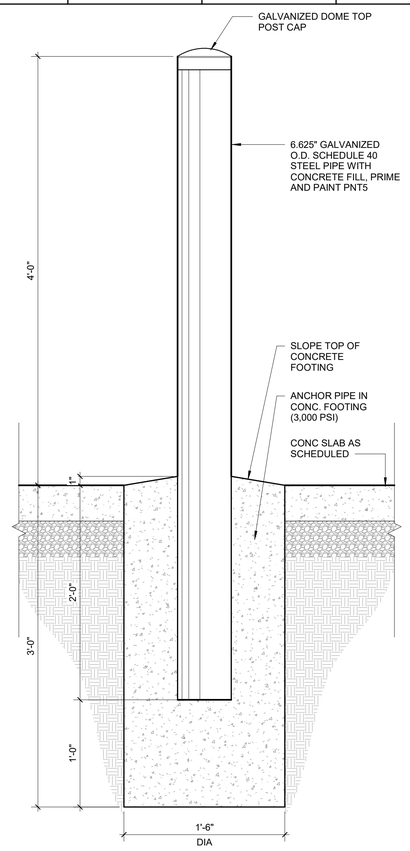
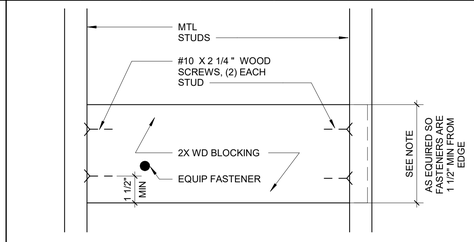
SHEET TITLE
WALL SECTIONS

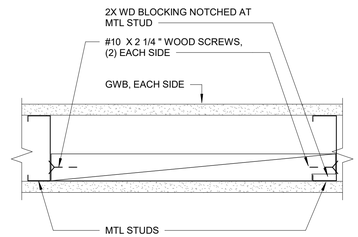
A302



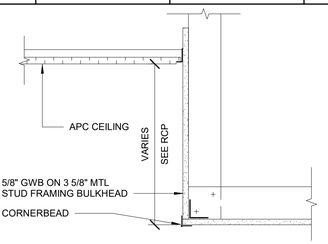
D1 SECTION DETAIL - PIPE BOLLARD
1 1/2" = 1'-0"



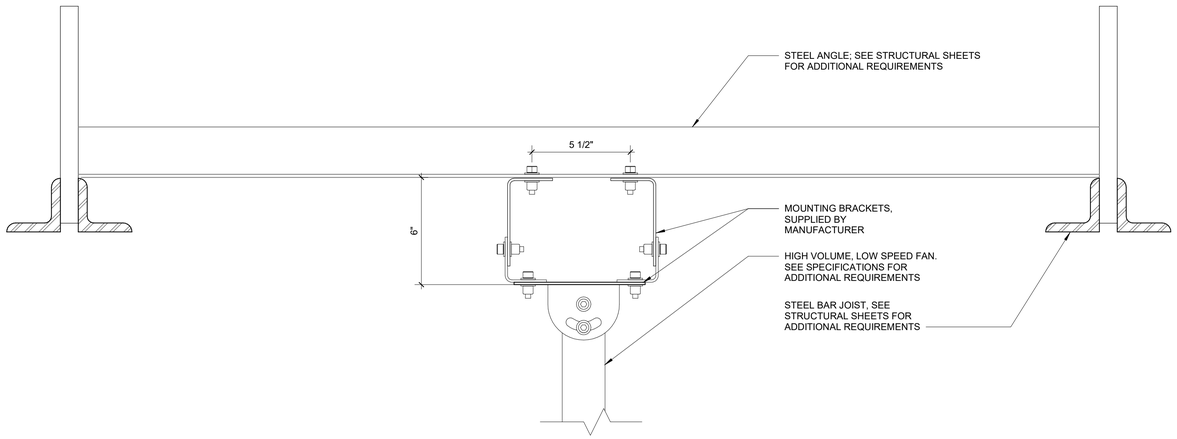
G3 WOOD "BLOCKING ELEVATION" IN GWB WALL TYP
3" = 1'-0"



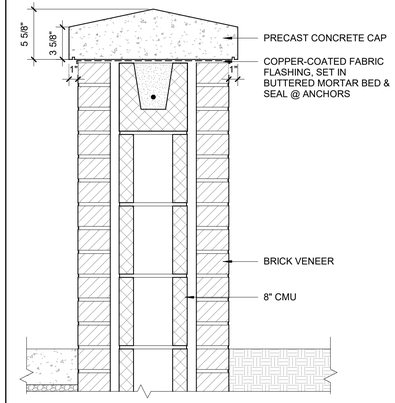
G5 WOOD "BLOCKING PLAN" IN GWB WALL TYP
3" = 1'-0"



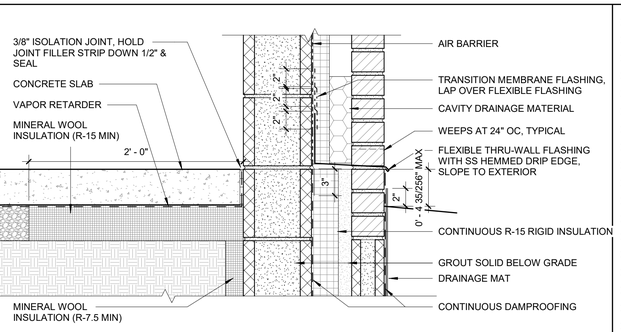
G7 SECTION DETAIL - GYPSUM BOARD SOFFIT
1 1/2" = 1'-0"



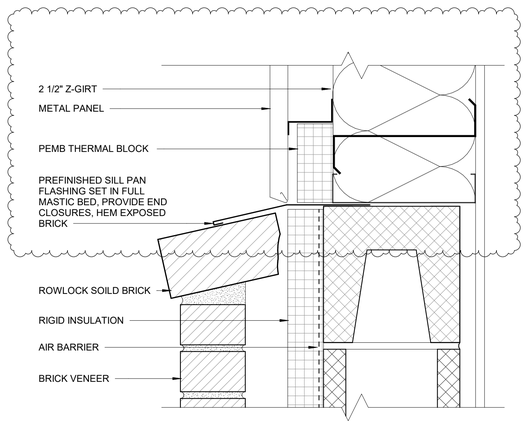
E3 SECTION DETAIL - FAN ATTACHMENT AT APPARATUS BAY
3" = 1'-0"



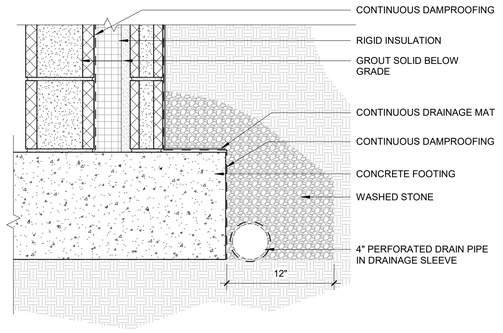
E7 SECTION DETAIL - KNEE WALL
1 1/2" = 1'-0"



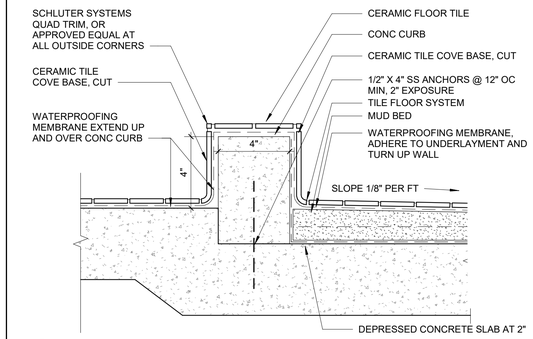
C3 SECTION DETAIL - WALL BASE, CMU
1 1/2" = 1'-0"



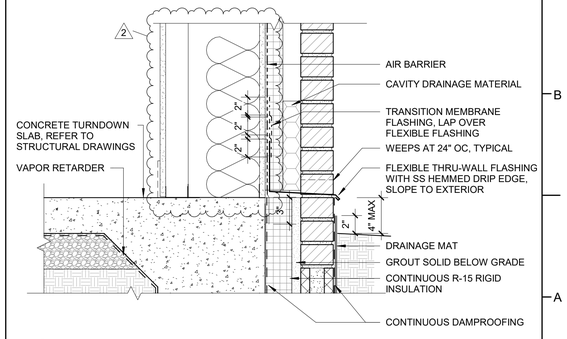
A1 SECTION DETAIL - METAL PANEL TO BRICK
3" = 1'-0"



A3 TYP FOUNDATION DRAIN
1 1/2" = 1'-0"



A5 SHOWER CURB DETAIL AT NON-ADA SHOWERS
3" = 1'-0"



A7 SECTION DETAIL - WALL BASE, STUD
1 1/2" = 1'-0"

DAVIS KANE ARCHITECTS, PA
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED ARCHITECT 13821 03.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

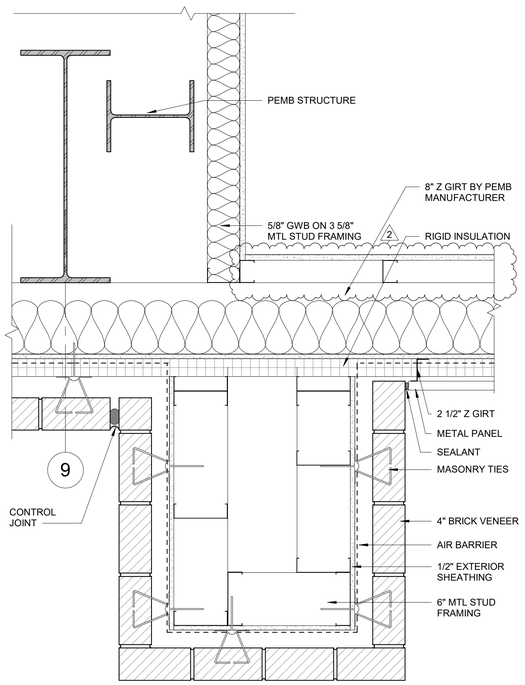
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: BY
Plot Date: 4/21/2025 10:03:47 AM

DATE ISSUED

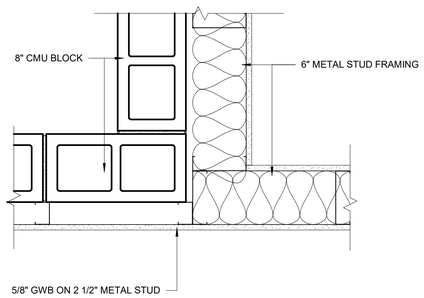
BID DOCUMENTS
03/12/2025

SHEET TITLE
DETAILS

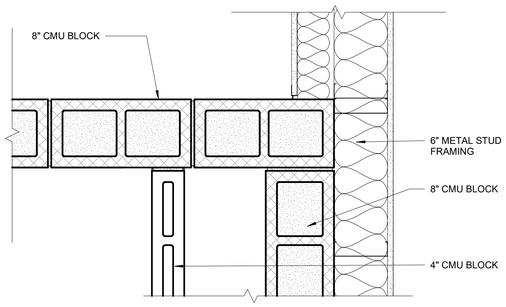
A310



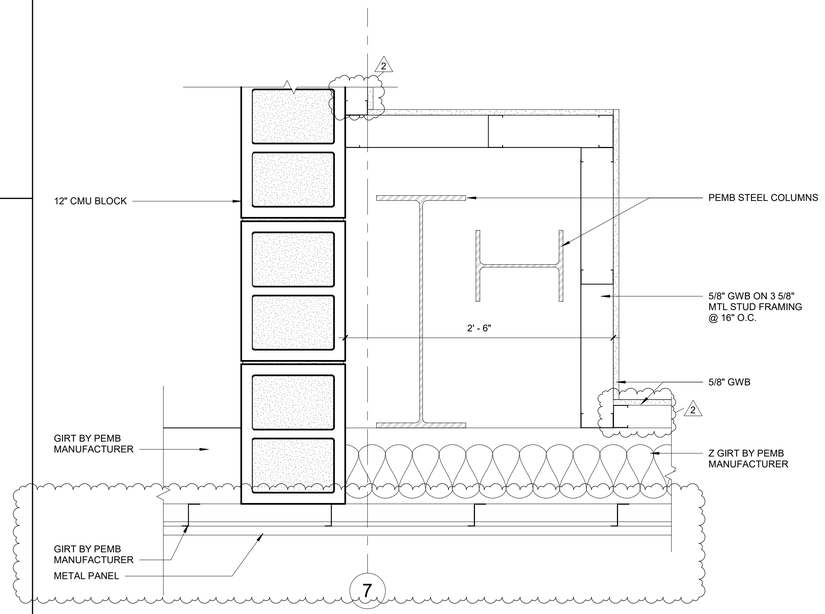
D1 PLAN DETAIL @ EAST CANOPY
1 1/2" = 1'-0"



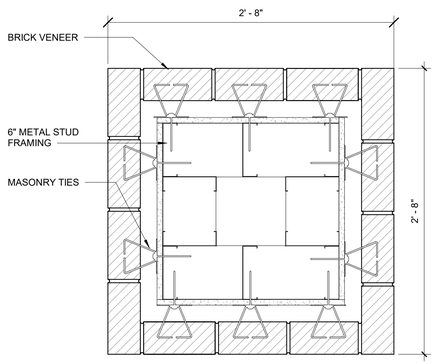
F3 PLAN DETAIL @ GEAR LOCKER 122
1 1/2" = 1'-0"



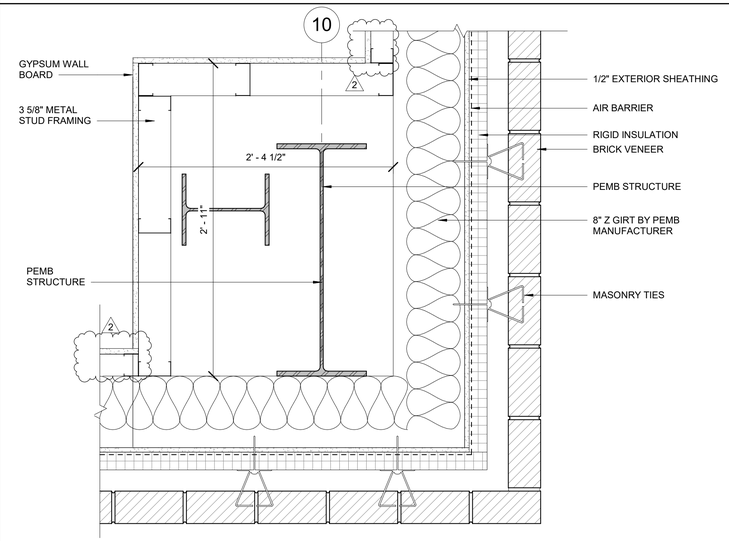
D3 PLAN DETAIL @ DECON 123
1 1/2" = 1'-0"



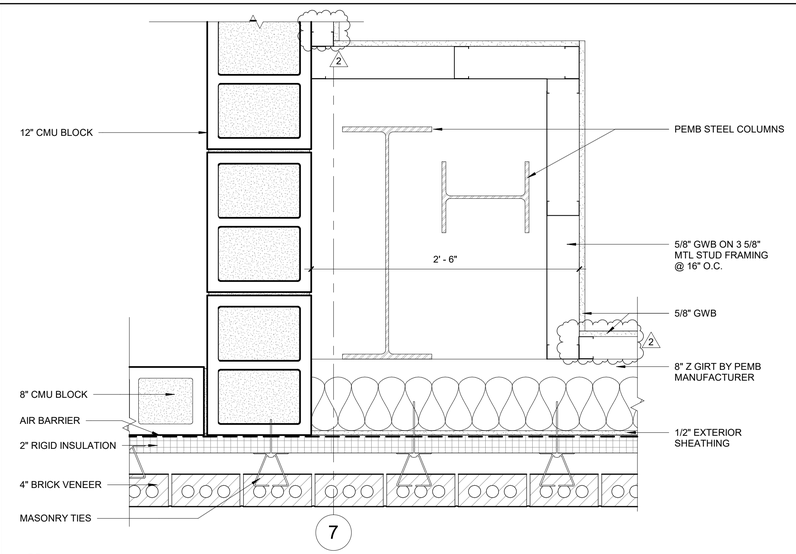
D6 PLAN DETAIL @ DISPATCH 105 - HIGH
1 1/2" = 1'-0"



A1 PLAN DETAIL @ COLUMN WRAP
1 1/2" = 1'-0"



A3 PLAN DETAIL @ TRAINING 107
1 1/2" = 1'-0"



A6 PLAN DETAIL @ DISPATCH 105 - LOW
1 1/2" = 1'-0"

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED ARCHITECT 13823 03.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: BY
Plot Date: 4/21/2025 10:04:16 AM

DATE ISSUED

BID DOCUMENTS
03/12/2025

SHEET TITLE
PLAN DETAILS

A330

ENLARGED PLAN & INTERIOR ELEVATION GENERAL NOTES:

1. SEE SHEET A001 FOR TOILET ACCESSORIES, TYPICAL MOUNTING HEIGHTS AND ADDITIONAL REQ.
2. FOR FF&E SCHEDULE SEE A002.
3. CLEAR DIMENSIONS ARE FROM FINISH FACE OF THE WALL TO FINISH FACE OF THE WALL OR PARTITION.
4. PROVIDE 2X SOLID WOOD BLOCKING CONCEALED IN METAL STUD WALL CONSTRUCTION FOR WALL-MOUNTED FIXTURES, FURNISHINGS, EQUIPMENT AND ACCESSORIES.

EQUIPMENT 124
STORAGE 117
SCBA 123
STEEL BOX FRAME HATCH WITH ALUM LADDER
DECON 122
PREFABRICATED MOP SINK WITH 20GA STAINLESS STEEL SHEET TO 4'-0" ABOVE, SEE PLUMB DWGS
GEAR LOCKER 121
ADA SHWR 108D
ADA SHWR 108C
SHWR 108B
SHWR 108A
LOCKERS 108
VEST 111
ADA TOILET 102
HSKP 106
KITCHEN 109
ALIGN
CLEAR

A1 ENLARGED FLOOR PLAN
3/8" = 1'-0"
0' 1' 2' 4'

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PROJECT INFORMATION

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138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. — REGISTERED ARCHITECTURAL CORPORATION — 50304 — RALEIGH, N.C. — NORTH CAROLINA

JIMMY ARDEL EDWARDS — REGISTERED ARCHITECT — 13821 — 05.12.25 — NORTH CAROLINA — RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

1	ADD 01	04/01/25
2	ADD 02	04/22/25

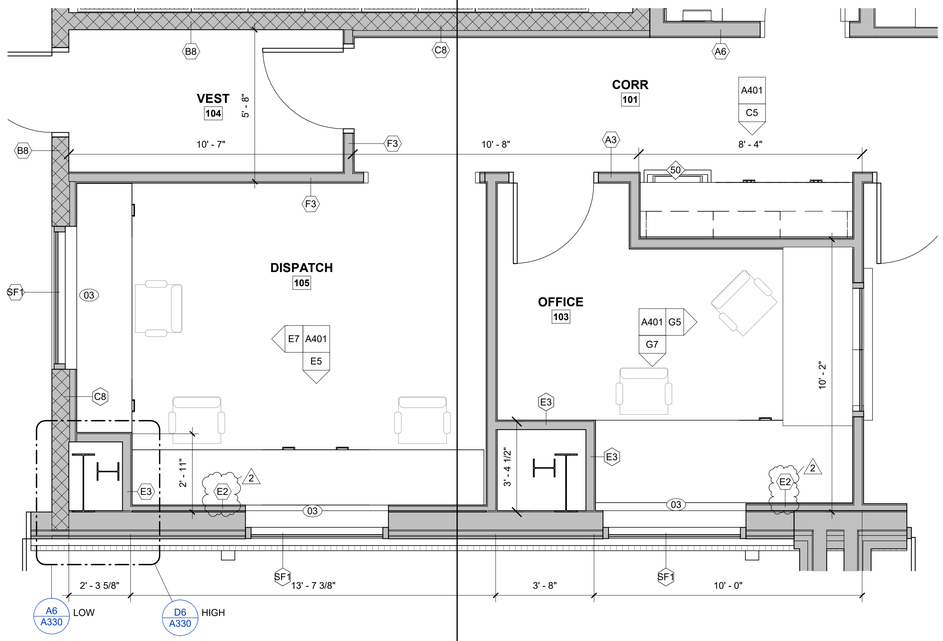
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEQUE
Drawn By: RM
Plot Date: 4/21/2025 10:04:20 AM

DATE ISSUED

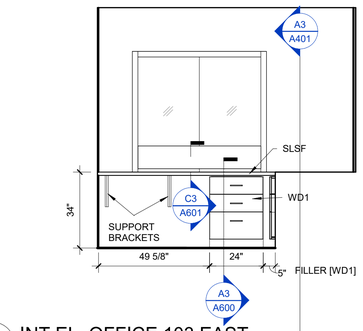
BID DOCUMENTS
03/12/2025

SHEET TITLE
ENLARGED PLANS

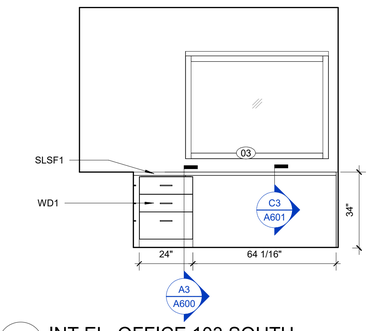
A400



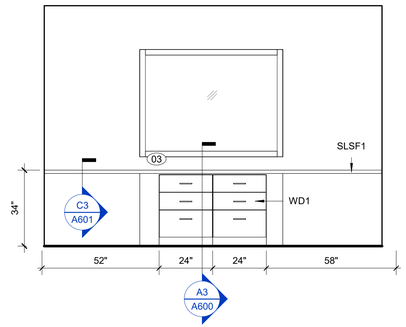
E1 ENLARGED FLOOR PLAN B
3/8" = 1'-0"



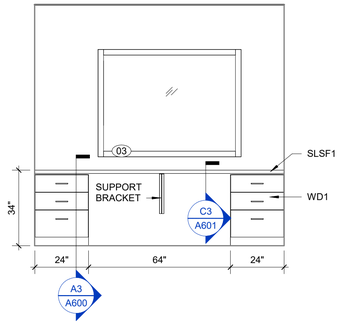
G5 INT.EL. OFFICE 103 EAST
3/8" = 1'-0"



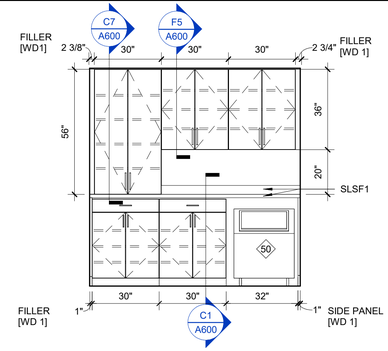
G7 INT.EL. OFFICE 103 SOUTH
3/8" = 1'-0"



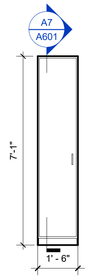
E5 INT.EL. DISPATCH 105 SOUTH
3/8" = 1'-0"



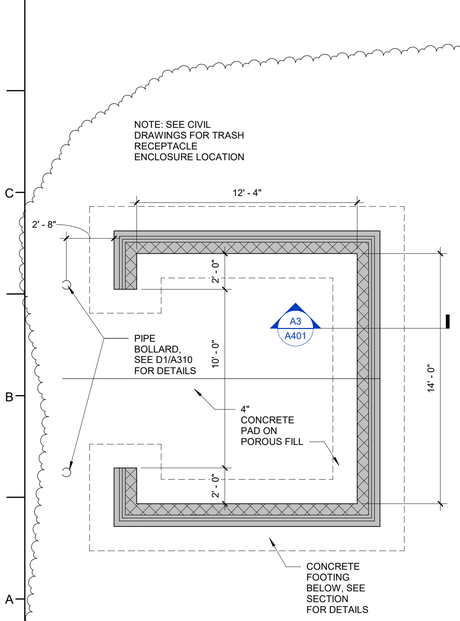
E7 INT.EL. DISPATCH 105 WEST
3/8" = 1'-0"



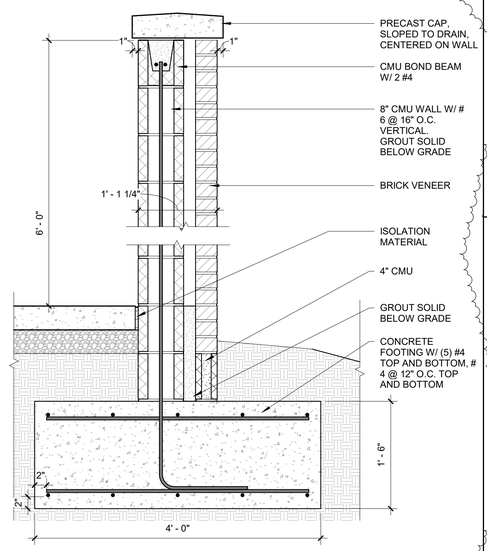
C5 INT.EL. CORR 101 ICE MAKER
3/8" = 1'-0"



A7 INT. EL. - TYP DORM WARDROBE
3/8" = 1'-0"



A1 TRASH RECEPTACLE ENCLOSURE FLOOR PLAN
1/4" = 1'-0"



A3 TRASH RECEPTACLE ENCLOSURE SECTION
1" = 1'-0"

FINISHES KEY NOTES:

NOTE: NOT ALL OF THE KEY NOTES ARE APPLICABLE TO THIS PLAN. SEE PLAN FOR KEYED ITEM LOCATIONS. KEY NOTES SUPPLEMENT INFORMATION FOUND ELSEWHERE IN THE DRAWINGS.

01 CORNER GUARDS

02 METAL TILE TRIM EDGE

DAVIS KANE ARCHITECTS, PA
503 OBERLIN ROAD | SUITE 300
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED ARCHITECT 13823 NORTH CAROLINA RALEIGH, N.C. 03.12.25

DKA JOB NUMBER
2324

REVISIONS

1	ADD 01	04/01/25
2	ADD 02	04/22/25

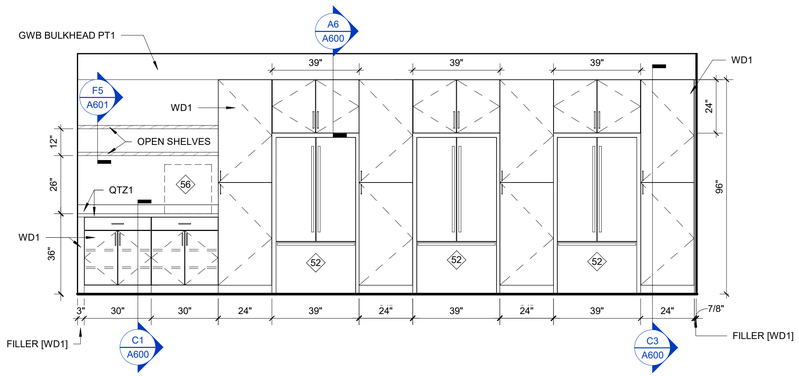
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: RM
Plot Date: 4/21/2025 10:04:13 AM

DATE ISSUED

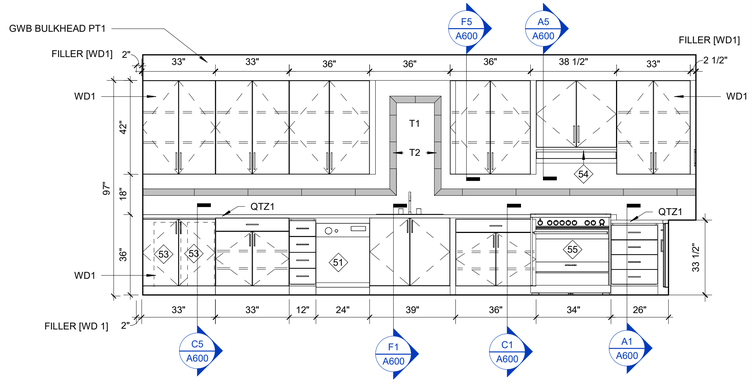
BID DOCUMENTS
03/12/2025

SHEET TITLE
ENLARGED PLANS AND ELEVATIONS

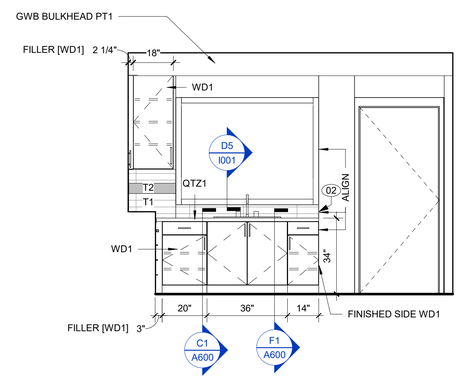
A401



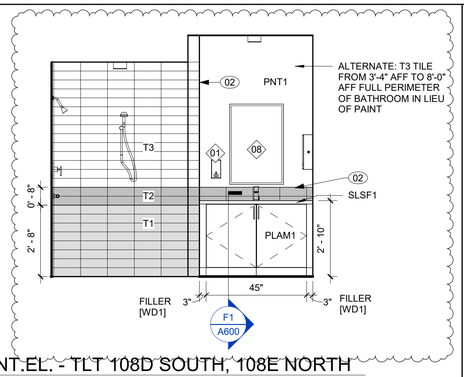
F1 INT.EL. KITCHEN SOUTH
3/8" = 1'-0"



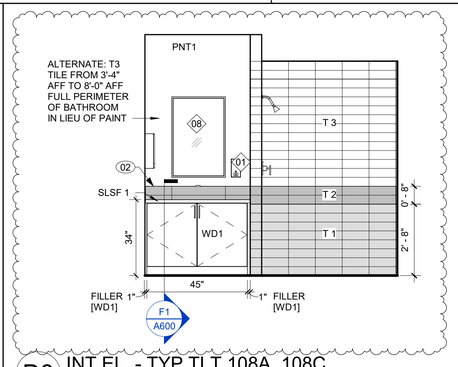
F4 INT.EL. KITCHEN NORTH
3/8" = 1'-0"



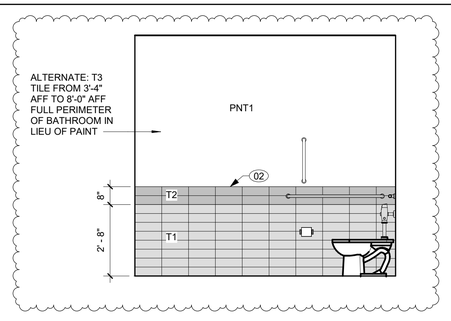
F7 INT.EL. KITCHEN EAST
3/8" = 1'-0"



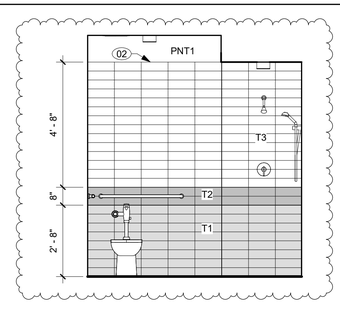
D1 INT.EL. - TLT 108D SOUTH, 108E NORTH
3/8" = 1'-0"



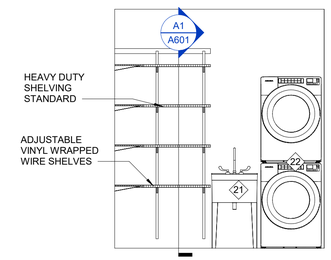
D3 INT.EL. - TYP TLT 108A, 108C
3/8" = 1'-0"



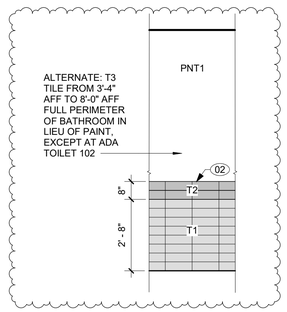
D5 INT.EL. -TYP TLT 108 A,C,D,E
3/8" = 1'-0"



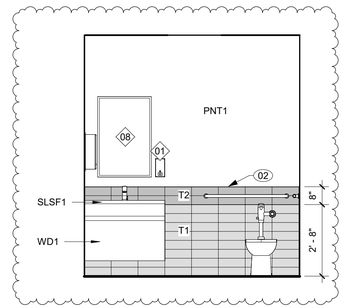
D7 INT.EL. -TYP WEST TLT 108A,C,D,E
3/8" = 1'-0"



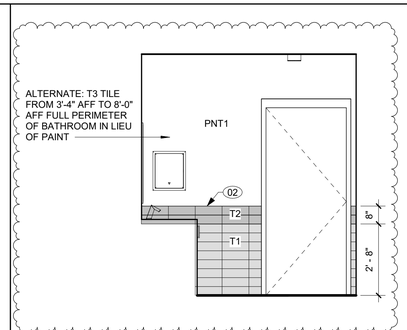
B3 INT. EL. HSKPING WEST
3/8" = 1'-0"



B4 INT.EL. -TYP TLT TILE PATTERN
3/8" = 1'-0"



B6 INT.EL. - TLT102 WEST
3/8" = 1'-0"



B7 INT.EL. -TYP EAST TLT 108A,C,D,E
3/8" = 1'-0"

FINISHES KEY NOTES:

NOTE: NOT ALL OF THE KEY NOTES ARE APPLICABLE TO THIS PLAN. SEE PLAN FOR KEYED ITEM LOCATIONS. KEY NOTES SUPPLEMENT INFORMATION FOUND ELSEWHERE IN THE DRAWINGS.

01 CORNER GUARDS

02 METAL TILE TRIM EDGE

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PROJECT INFORMATION

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SEALS

DAVIS KANE ARCHITECTS, P.A. 50304 REGISTERED ARCHITECTURAL CORPORATION NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS 13823 REGISTERED ARCHITECT 05-12-25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: NK
Plot Date: 4/21/2025 10:04:07 AM

DATE ISSUED

BID DOCUMENTS
03/12/2025

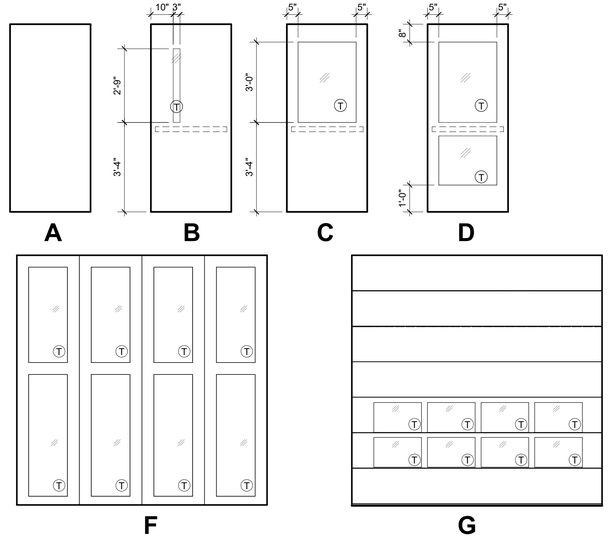
SHEET TITLE
INTERIOR ELEVATIONS

A410

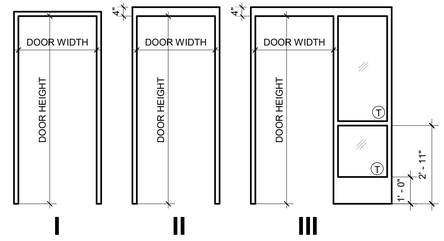
DOOR, FRAME AND SIGNAGE SCHEDULE

DOOR NUMBER	DOOR TYPE	DOOR WIDTH	DOOR HEIGHT	DOOR THICKNESS	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HARDWARE	FIRE RATING LABEL	SIGN TYPE	COMMENTS
100.1	D	3' - 0"	7' - 0"	1 3/4	HM	PAINT	III	HM	PAINT	SET 01			
100.2	C	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 05			
102	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 20		D	
103	B	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 16		B	
104.1	B	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 09		B	
104.2	B	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 07		B, E	
105	-	4' - 0"	7' - 0"	-	-	-	I	HM	PAINT	-		B	CASED OPENING
106	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 15		B	
107.1	B	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 16		B	
107.2	D	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 04			
107A	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 16			
108.1	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 17		B	
108.2	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 06	20 MIN	B	
108A	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 20		C	
108B	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 20		C	
108C	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 20		D	
108D	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 20		D	
109.1	-	4' - 0"	7' - 0"	-	-	-	I	HM	PAINT	-		B	CASED OPENING
109.2	D	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 01			
111.1	B	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 09		B	
111.2	B	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 09		B, E	
112.1	B	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 06	20 MIN	B	
112.2	D	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 01		B, H	
112A	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 21		A	
113	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 18	20 MIN	B	
113A	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 21			
114	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 14	20 MIN	A	
115	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 08	20 MIN	A	
116	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 14	20 MIN	A	
117	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 08	20 MIN	B	
118	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 14	20 MIN	A	
119.1	B	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	I	HM	PAINT	SET 06	20 MIN	B	
119.2	B	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 07		B, E	
120	A	3' - 0"	7' - 0"	1 3/4"	WOOD	STAIN	I	HM	PAINT	SET 14	20 MIN	A	
121	B	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 11		B	
122	B	3' - 8"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 13		B	
123	A	3' - 8"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 13		B	
124	A	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 12		B	
125	E	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 10	90 MIN	B	
126	A	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 03		B	
127.1	C	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 02		B, G	
127.2	F	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	EXTERIOR, FOUR-FOLD DOORS, PROVIDE MANUFACTURERS UV TINTED INSULATED GLAZING TO MATCH SCHEDULED WINDOW GLAZING
127.3	F	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	EXTERIOR, FOUR-FOLD DOORS, PROVIDE MANUFACTURERS UV TINTED INSULATED GLAZING TO MATCH SCHEDULED WINDOW GLAZING
127.4	F	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	EXTERIOR, FOUR-FOLD DOORS, PROVIDE MANUFACTURERS UV TINTED INSULATED GLAZING TO MATCH SCHEDULED WINDOW GLAZING
127.5	F	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	EXTERIOR, FOUR-FOLD DOORS, PROVIDE MANUFACTURERS UV TINTED INSULATED GLAZING TO MATCH SCHEDULED WINDOW GLAZING
127.6	F	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	EXTERIOR, FOUR-FOLD DOORS, PROVIDE MANUFACTURERS UV TINTED INSULATED GLAZING TO MATCH SCHEDULED WINDOW GLAZING
127.7	C	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 02		B, G	
127.8	G	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	ALTERNATE A-1: DOOR TO BE TYPE F.
127.9	G	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	ALTERNATE A-1: DOOR TO BE TYPE F.
127.10	G	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	ALTERNATE A-1: DOOR TO BE TYPE F.
127.11	G	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	ALTERNATE A-1: DOOR TO BE TYPE F.
127.12	G	14' - 0"	14' - 0"	3"	ALUM	FACT	*	ALUM	FACT	-		-	ALTERNATE A-1: DOOR TO BE TYPE F.
127.13	C	3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 02		B, G	
200		3' - 0"	7' - 0"	1 3/4"	HM	PAINT	II	HM	PAINT	SET 22			

DOOR TYPES:



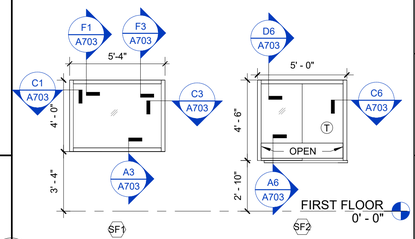
DOOR FRAME TYPES:



FENESTRATION SYMBOL LEGEND:

- INDICATES GLAZING
- (T) INDICATES TEMPERED GLAZING

STOREFRONT SCHEDULE:



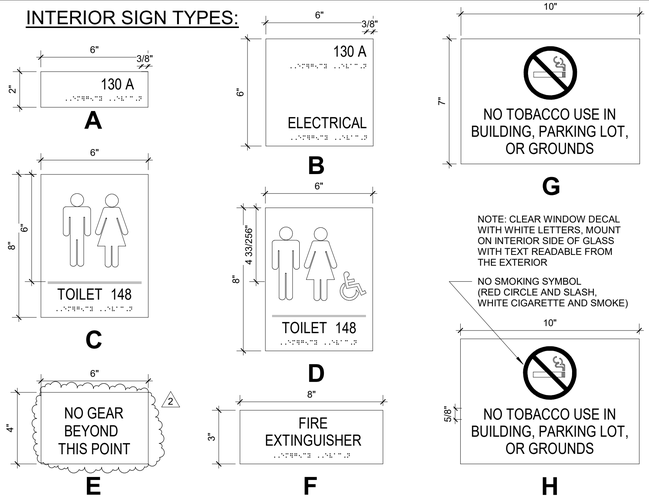
DOOR & FRAME GENERAL NOTES:

1. SEE DOOR FRAME DETAILS ON SHEET **A701** FOR FRAME DEPTHS.
2. PAINT ALL HM FRAMES. PAINT ALL HM DOORS.
3. PROVIDE FIRE-RATED SAFETY GLAZING AT RATED OPENINGS.
4. ADJUST MASONRY TO PROVIDE A 3/8" JOINT AT EACH JAMB OF A DOOR FRAME OPENING.
5. SEE ENLARGED STOREFRONT ELEVATIONS ON SHEET **A700**.
6. ALL HM FACE FRAME WIDTHS TO BE 2" UON.
7. SEE SHEET **G004** FOR LOCATIONS OF PANIC HARDWARE TO COORDINATE HARDWARE.
8. SEE SHEET **E121** FOR LOCATIONS OF CARD READERS TO COORDINATE HARDWARE.

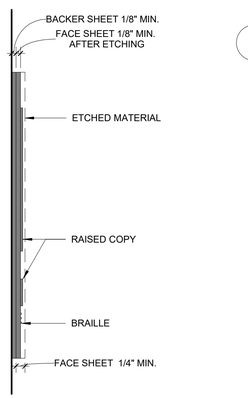
INTERIOR SIGNAGE NOTES:

1. SEE INTERIOR FINISHES PLANS FOR SIGNAGE LOCATIONS NOT NOTED IN DOOR, FRAME, AND SIGNAGE SCHEDULE. ON FINISHES PLANS, "ST" DENOTES SIGN TYPE. FOR EXAMPLE, "ST-K" DENOTES SIGN TYPE K.
2. REFERENCE DOOR SCHEDULE FOR SIGNAGE LOCATIONS.
3. TEXT SHOWN ON SIGNS IS SAMPLE TEXT ONLY.
4. SEE SECTION FOR TYPICAL NOTES.
5. SUBMIT SIGNAGE ROOM NUMBERING PLAN, SHOWING LOCATIONS OF SIGNS AND THEIR TEXT FOR ARCHITECT AND OWNER'S APPROVAL PRIOR TO FABRICATION.
6. MOUNT ALL DOOR SIGNS 60" A.F.F. TO CENTER OF THE SIGN & 3" FROM EDGE OF DOOR JAMB. INSTALL DOOR SIGN ON WALL ADJACENT TO THE DOOR LATCH U.N.O.. CONSULT ARCHITECT WHEN NO WALL ADJACENT TO THE DOOR IS AVAILABLE.
7. MOUNT ON SURFACE WITH VINYL PRESSURE SENSITIVE FOAM TAPE.
8. BACKGROUND & LETTER COLOR SAMPLES SHALL BE SUBMITTED BY THE CONTRACTOR & SELECTED BY THE ARCHITECT.
9. ALL DOOR SIGNS TO HAVE BRAILLE INSCRIPTIONS. LETTERS, NUMERALS, & CARICATURES TO BE RAISED 1/32" MIN. - FONT TYPE TO BE HELVETICA MEDIUM UNLESS OTHERWISE NOTED.

INTERIOR SIGN TYPES:



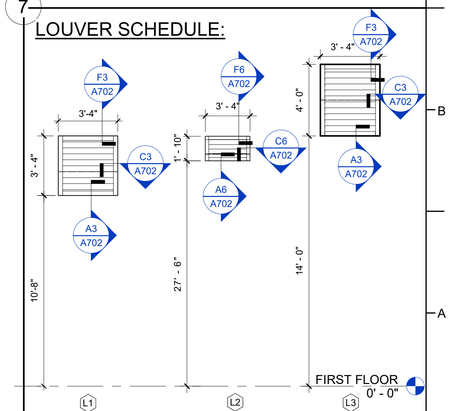
TYPICAL INTERIOR SIGN SECTION:



SECTION NO INSERT

7

LOUVER SCHEDULE:



DAVIS KANE ARCHITECTS, PA
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DKA JOB NUMBER
2324

REVISIONS		
1	ADD 01	04/01/25
2	ADD 02	04/22/25

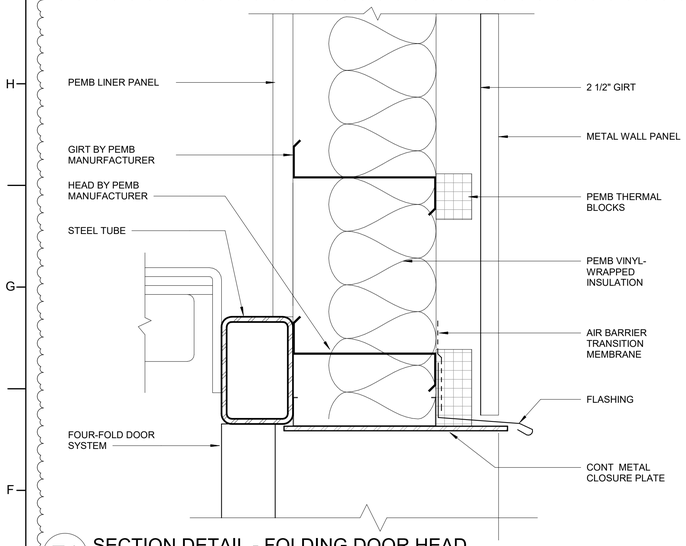
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: Author
Plot Date: 4/21/2025 10:04:41 AM

DATE ISSUED

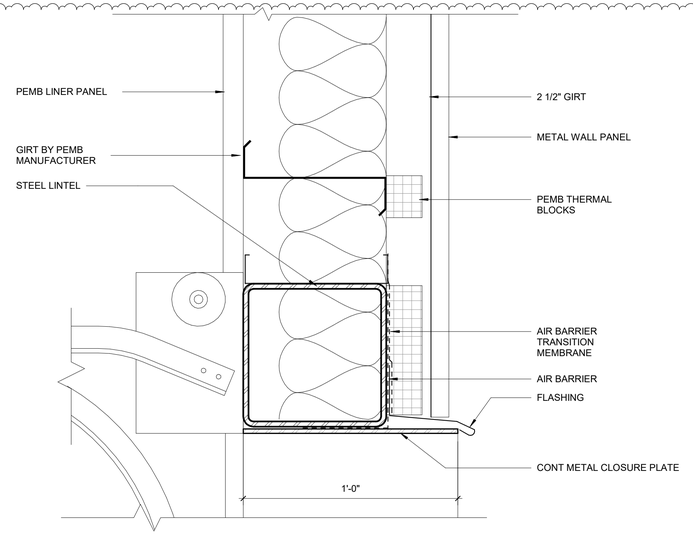
BID DOCUMENTS
03/12/2025

SHEET TITLE
FENESTRATION SCHEDULE AND NOTES

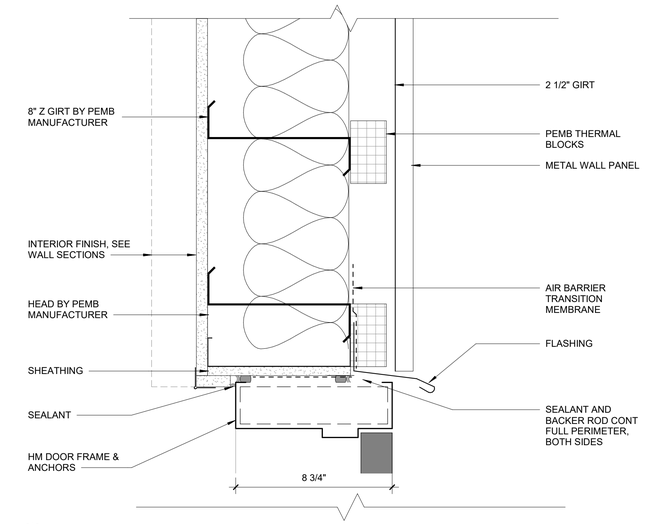
A700



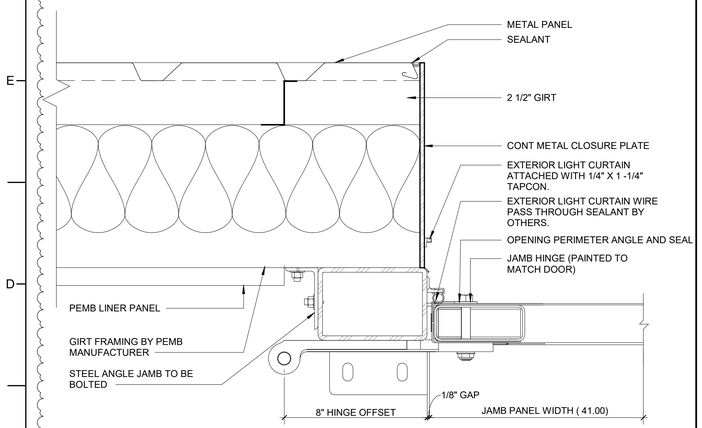
F1 SECTION DETAIL - FOLDING DOOR HEAD
3" = 1'-0"



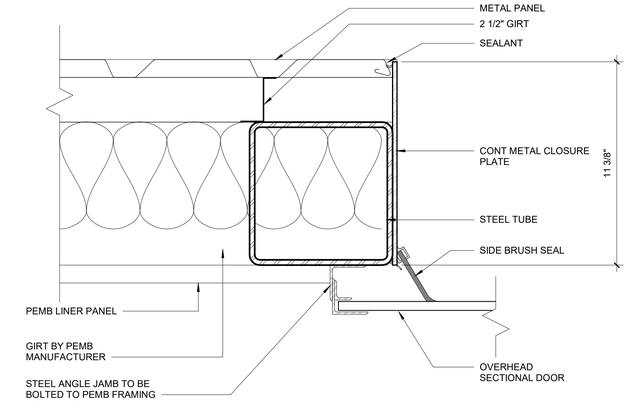
F3 SECTION DETAIL - OVERHEAD DOOR HEAD
3" = 1'-0"



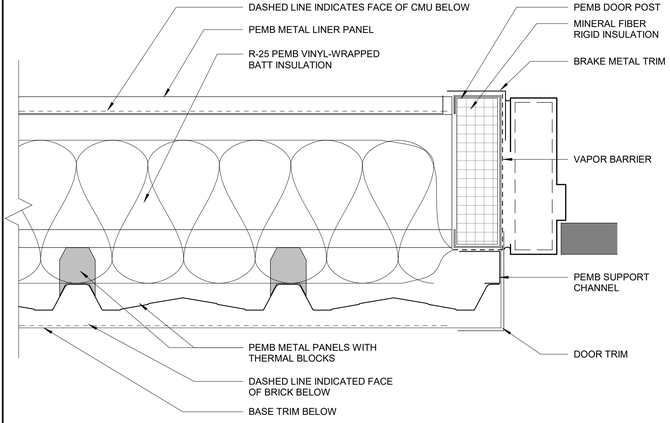
F6 SECTION DETAIL - EXTERIOR HM HEAD @ PEMB/METAL SIDING
3" = 1'-0"



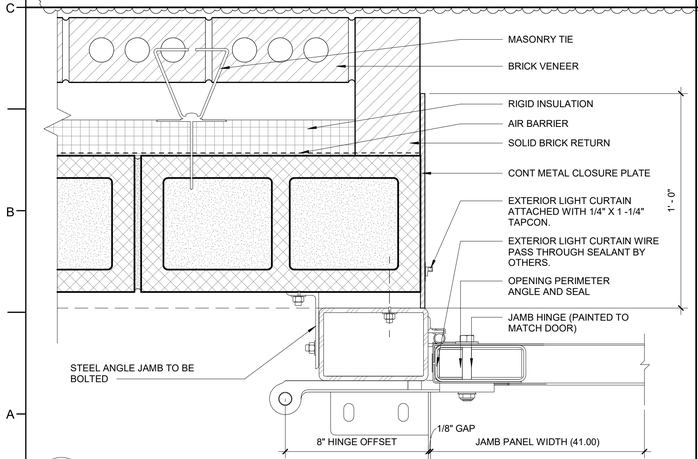
C1 PLAN DETAIL - FOLDING DOOR JAMB @ PEMB/METAL PANEL
3" = 1'-0"



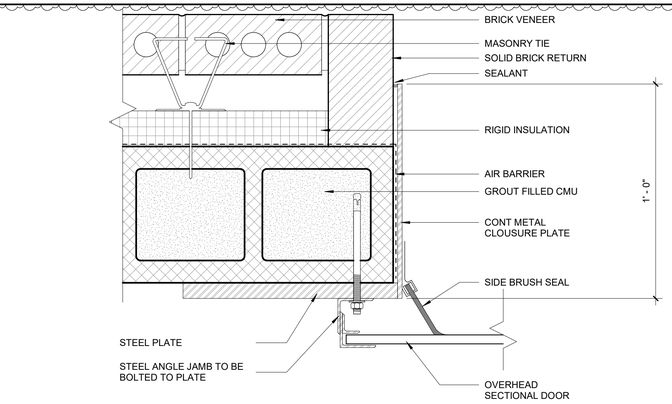
C3 PLAN DETAIL - OVERHEAD DOOR JAMB @ PEMB/METAL PANEL
3" = 1'-0"



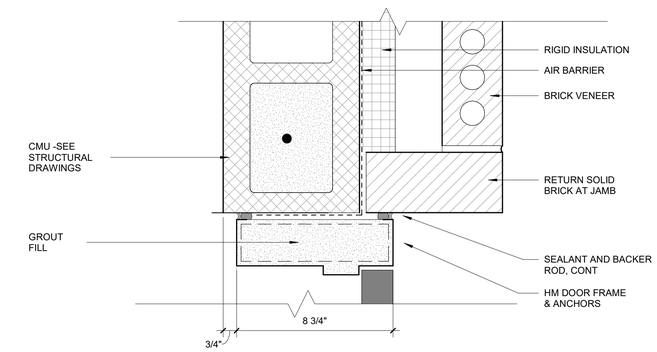
C6 PLAN DETAIL - EXTERIOR HM JAMB @ PEMB/METAL PANEL
3" = 1'-0"



A1 PLAN DETAIL - FOLDING DOOR JAMB @ CMU
3" = 1'-0"



A3 PLAN DETAIL - OVERHEAD DOOR JAMB @ CMU
3" = 1'-0"



A6 PLAN DETAIL - EXTERIOR HM JAMB @ CMU/BRICK
3" = 1'-0"

DAVIS KANE ARCHITECTS, PA
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED ARCHITECT 13823 05.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

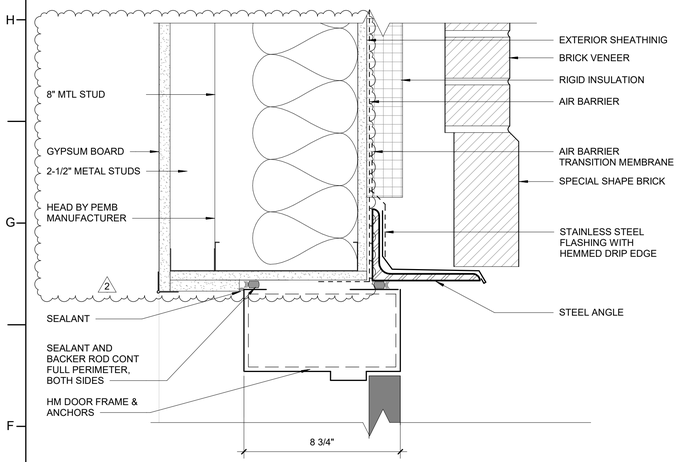
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: BG
Plot Date: 4/21/2025 10:04:43 AM

DATE ISSUED

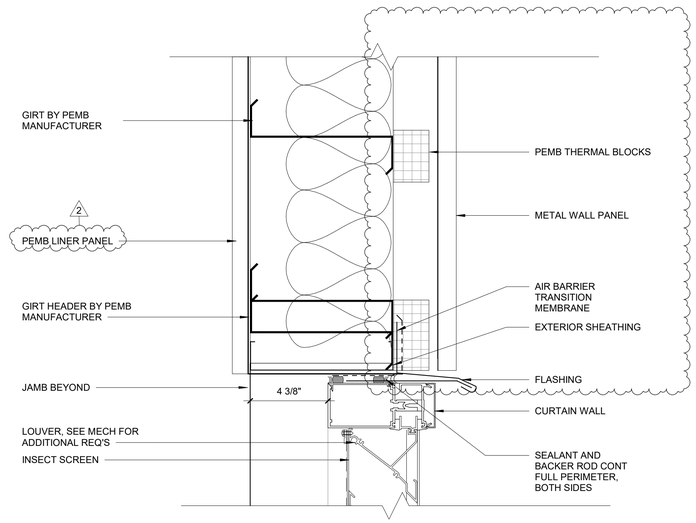
BID DOCUMENTS
03/12/2025

SHEET TITLE
FENESTRATION DETAILS

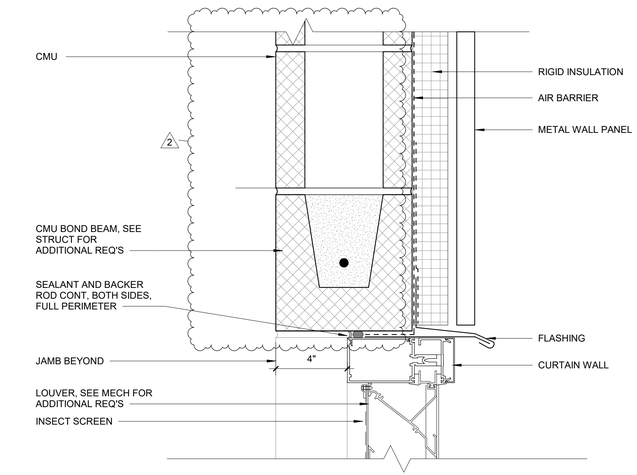
A701



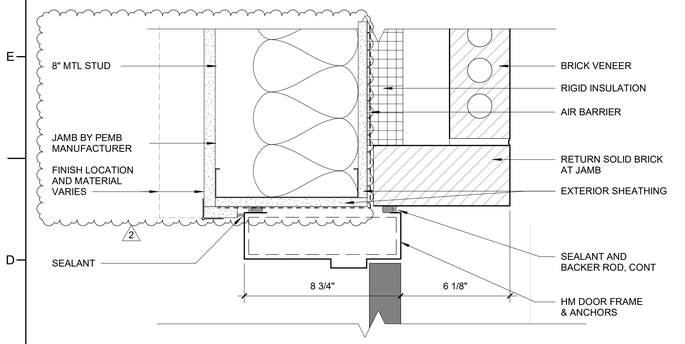
F1 SECTION DETAIL - EXTERIOR HM HEAD @ PEMB/BRICK
3" = 1'-0"



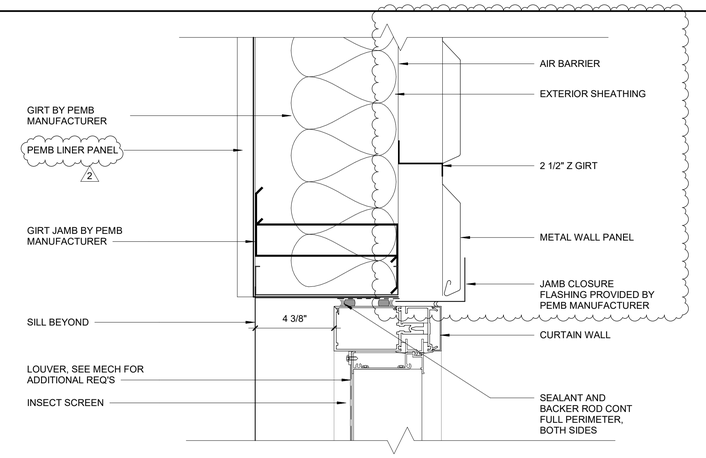
F3 SECTION DETAIL - LOUVER HEAD @ PEMB/METAL PANEL
3" = 1'-0"



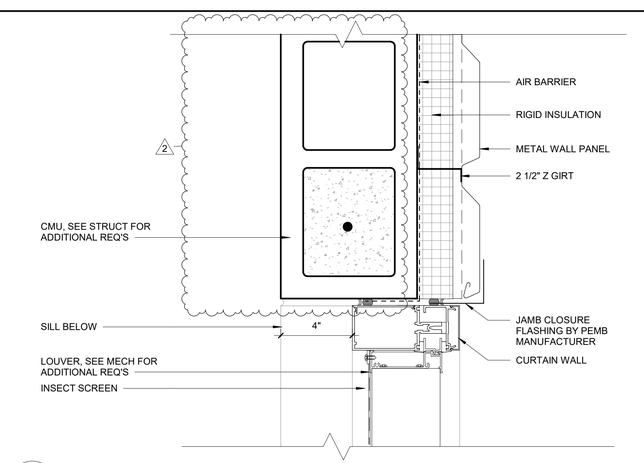
F6 SECTION DETAIL - LOUVER HEAD @ CMU/METAL PANEL
3" = 1'-0"



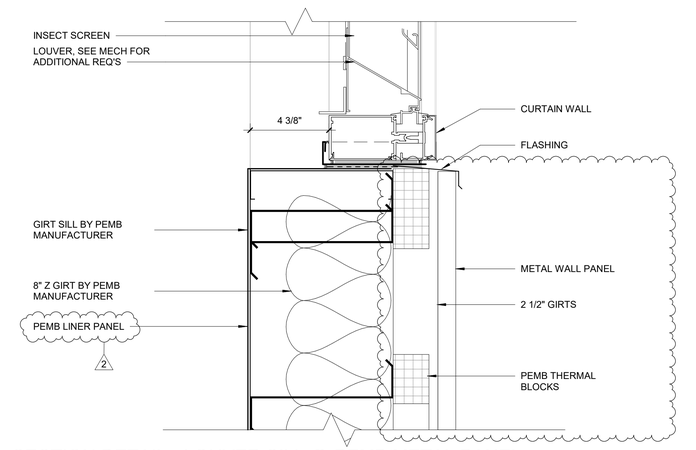
C1 PLAN DETAIL - EXTERIOR HM JAMB @ PEMB/BRICK
3" = 1'-0"



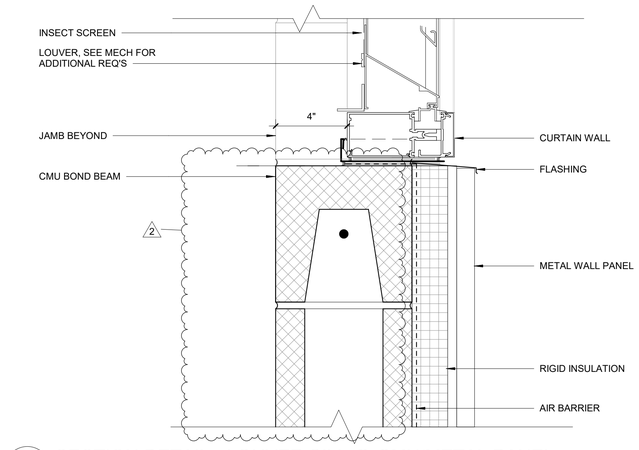
C3 PLAN DETAIL - LOUVER JAMB @ PEMB/METAL PANEL
3" = 1'-0"



C6 PLAN DETAIL - LOUVER JAMB @ CMU/METAL PANEL
3" = 1'-0"



A3 SECTION DETAIL - LOUVER SILL @ PEMB/METAL PANEL
3" = 1'-0"



A6 SECTION DETAIL - LOUVER SILL @ CMU/METAL PANEL
3" = 1'-0"

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JIMMY ARDEL EDWARDS REGISTERED ARCHITECT 13823 05.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

2	ADD 02	04/22/25

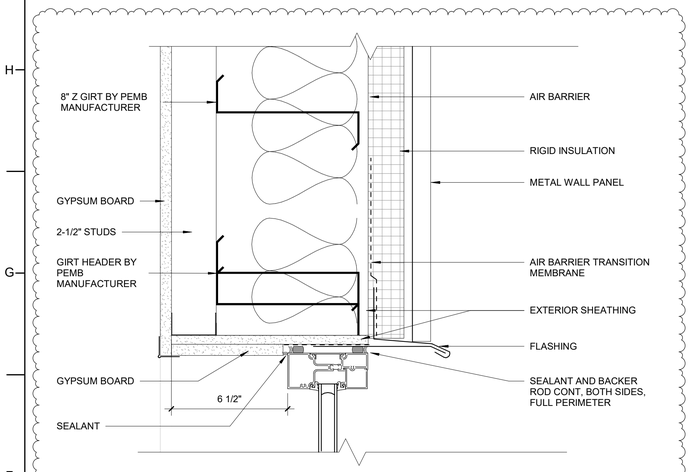
PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: BG
Plot Date: 4/21/2025 10:04:36 AM

DATE ISSUED

BID DOCUMENTS
03/12/2025

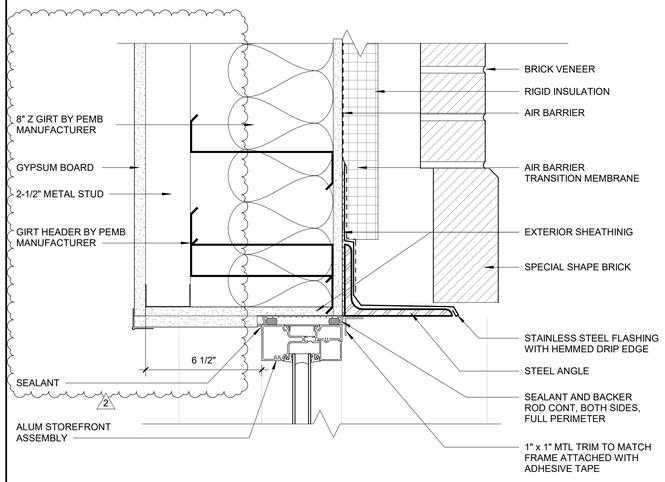
SHEET TITLE
FENESTRATION DETAILS

A702



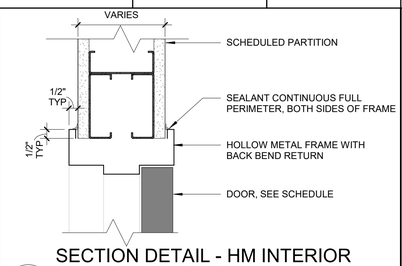
SECTION DETAIL - EXTERIOR STOREFRONT HEAD @ PEMB/METAL PANEL

F1 3" = 1'-0"



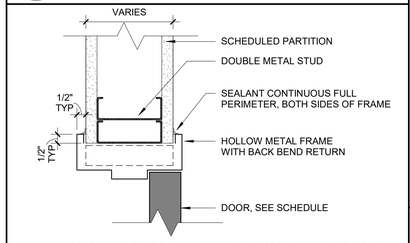
SECTION DETAIL - EXTERIOR STOREFRONT HEAD @ PEMB/BRICK

F3 3" = 1'-0"



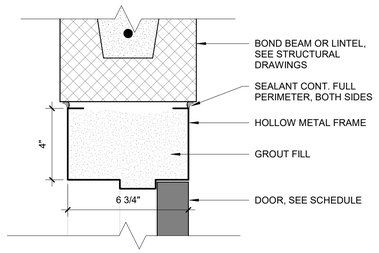
SECTION DETAIL - HM INTERIOR HEAD IN STUD WALL

G6 3" = 1'-0"



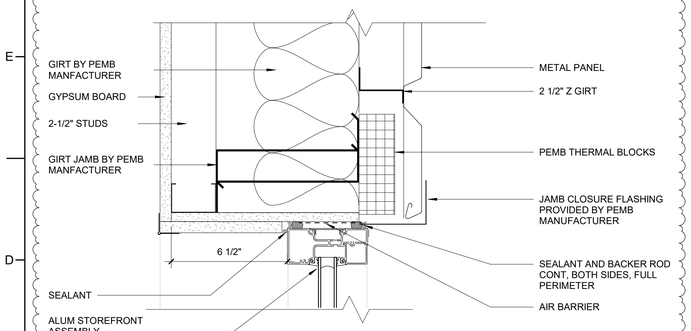
PLAN DETAIL - INTERIOR HM JAMB IN STUD WALL

F6 3" = 1'-0"



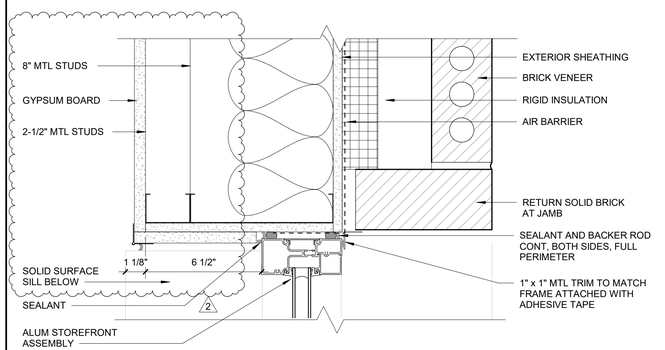
SECTION DETAIL - INTERIOR HM HEAD IN MASONRY

D7 3" = 1'-0"



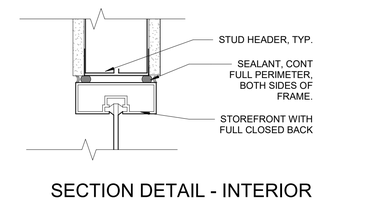
PLAN DETAIL - EXTERIOR STOREFRONT JAMB @ PEMB/METAL PANEL

C1 3" = 1'-0"



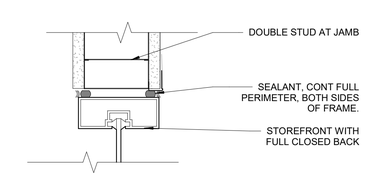
PLAN DETAIL - EXTERIOR STOREFRONT JAMB @ PEMB/BRICK

C3 3" = 1'-0"



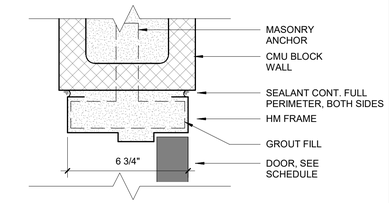
SECTION DETAIL - INTERIOR STOREFRONT HEAD @ METAL FRAMING

D6 3" = 1'-0"



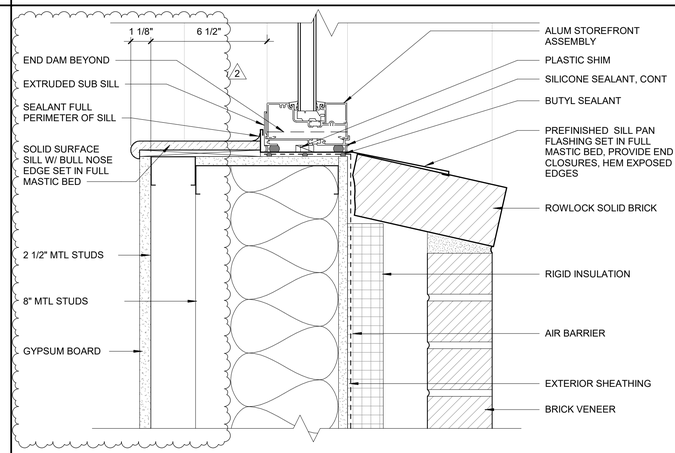
PLAN DETAIL - INTERIOR STOREFRONT JAMB @ METAL FRAMING

C6 3" = 1'-0"



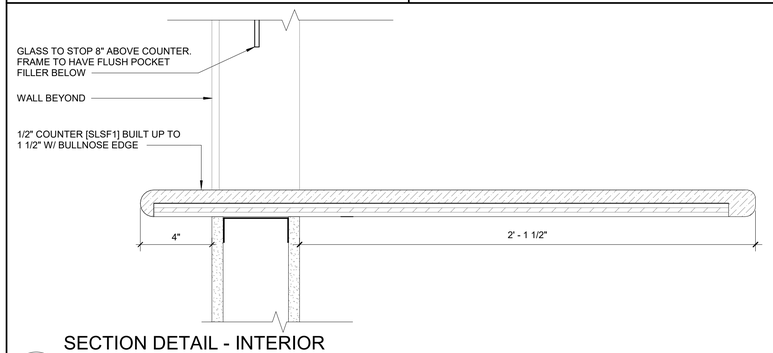
PLAN DETAIL - INTERIOR HM JAMB IN MASONRY

C7 3" = 1'-0"



SECTION DETAIL - EXTERIOR STOREFRONT SILL @ PEMB/BRICK

A3 3" = 1'-0"



SECTION DETAIL - INTERIOR STOREFRONT SILL @ COUNTER

A6 3" = 1'-0"

DAVIS KANE ARCHITECTS, PA
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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY

BID NO. 102-25C

138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. 50304 NORTH CAROLINA REGISTERED ARCHITECTURAL CORPORATION RALEIGH, N.C.

JIMMY ARDEL EDWARDS 13823 NORTH CAROLINA REGISTERED ARCHITECT RALEIGH, N.C. 03.12.25

DKA JOB NUMBER

2324

REVISIONS

2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: BG
Plot Date: 4/21/2025 10:04:26 AM

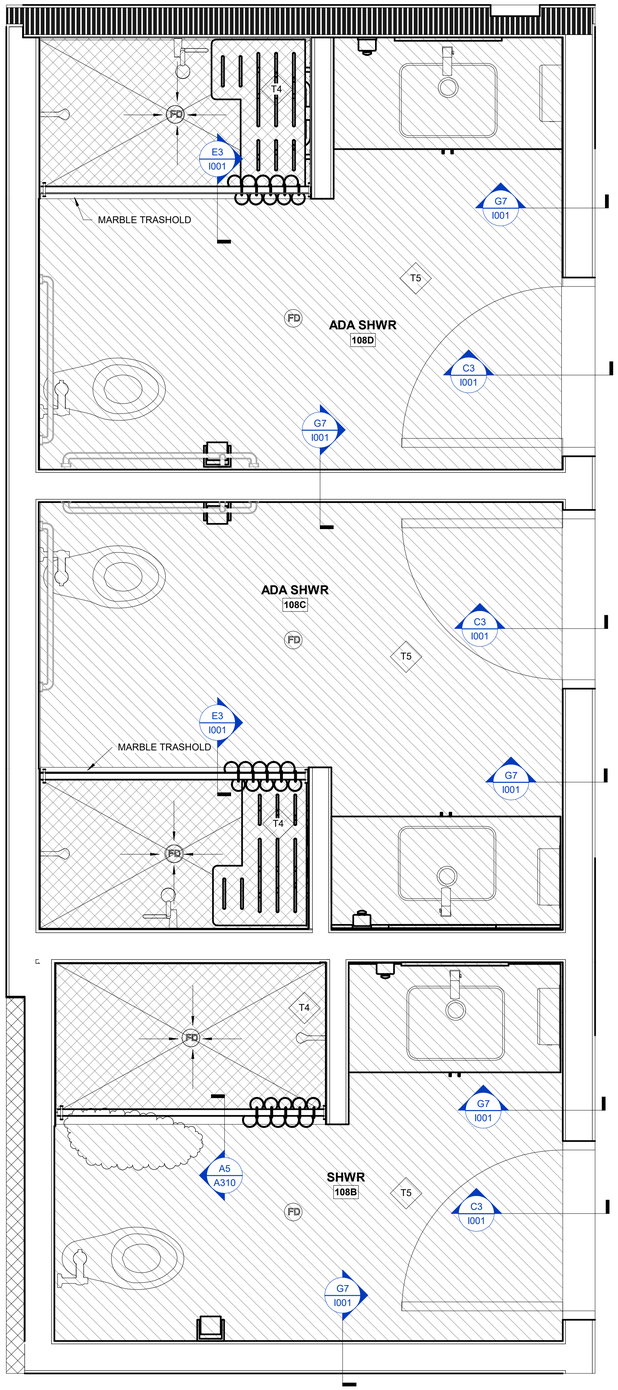
DATE ISSUED

BID DOCUMENTS
03/12/2025

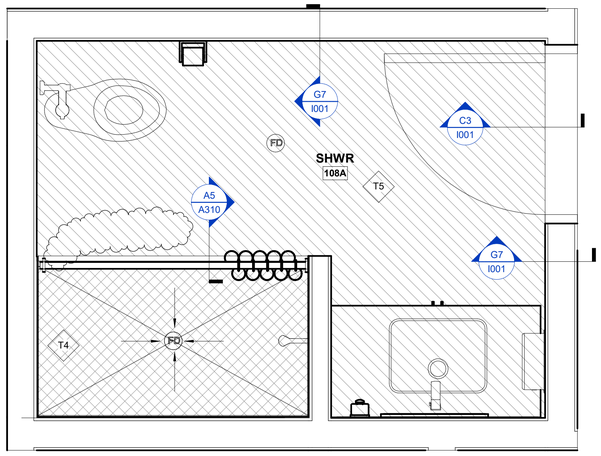
SHEET TITLE

FENESTRATION DETAILS

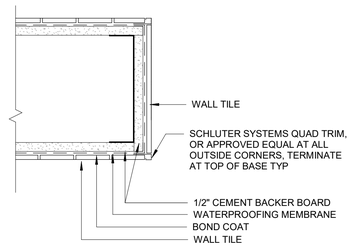
A703



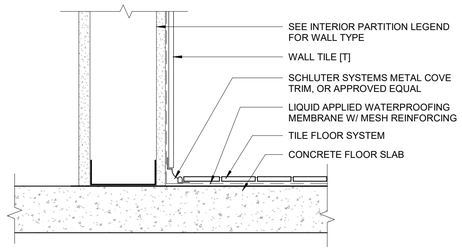
A1 FIRST FLOOR - TILE SYSTEM PLAN SHWR 108 B-D
3/4" = 1'-0"



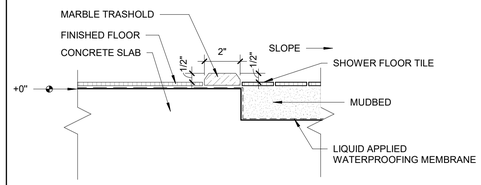
F3 FIRST FLOOR - TILE SYSTEM PLAN SHWR 108A
3/4" = 1'-0"



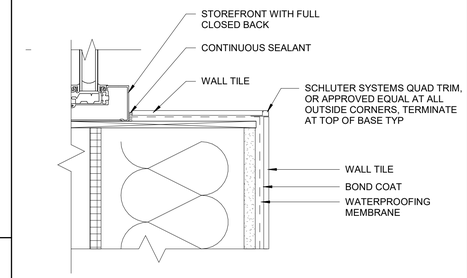
G6 TILE WALL END CAP
3" = 1'-0"



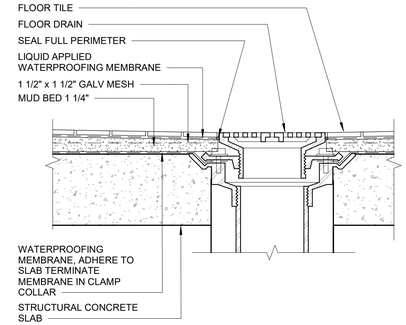
G7 TLT TILE BASE DETAIL WITH COVE TRIM
3" = 1'-0"



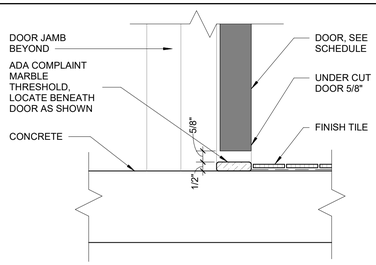
E3 MARBLE THRESHOLD AT RECESSED SLAB
3" = 1'-0"



D5 SECTION DETAIL - KITCHEN TILE SILL
3" = 1'-0"



D7 TILE FLOOR SYSTEM 2
3" = 1'-0"

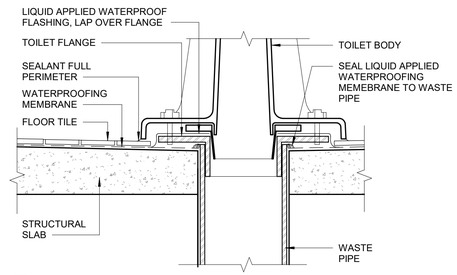


C3 INT DOOR SILL - MARBLE THRESHOLD
3" = 1'-0"

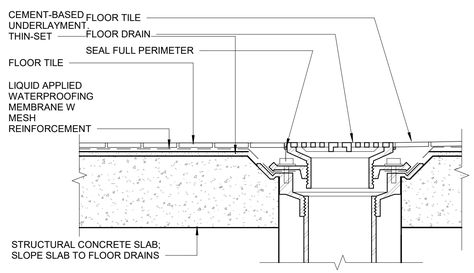
TILE FLOOR SYSTEM PLAN KEY:

TILE FLOOR SYSTEM 1

TILE FLOOR SYSTEM 2



C7 TOILET FLANGE DETAIL AT THIN SET
3" = 1'-0"



A3 TILE FLOOR SYSTEM 1
3" = 1'-0"

REMOVED TB1

INTERIOR FINISHES LEGEND

TYPE	DESIGNATION	BASIS OF DESIGN MANUFACTURER	PATTERN/COLOR	NOTES
EPOXY FLOOR	EP1	SEE SPECIFICATION	GRAY	
EPOXY FLOOR	EP2	SEE SPECIFICATION	RED	
PAINT	PNT1	SHERWIN-WILLIAMS	SW 7064	LIGHT GRAY
PAINT	PNT2	SHERWIN-WILLIAMS	SW 9163	DARK GRAY
QUARTZ	QTZ1	LX HOUSYS AMERICA	VIATERA NIMBUS	
QUARY TILE	QT	DALTILE	6X6 ASHEN GRAY	
RUBBER BASE	RB1	FLEXICO	DARK GRAY	
SOLID SURFACE	SLSF1	WILSONART	NORTHERN MELNGE 9195ML	
SOLID SURFACE	SLSF2	WILSONART	DUSK ICE	WINDIW SILL
STAINED WOOD	WD1	SEE SPECIFICATION	MAPLE	
TILE	T1	DALTILE	COLOR WHEEL LINEAR 4X12 SUEDE GRAY 0182 GLOSSY	GRAY
TILE	T2	DALTILE	COLOR WHEEL LINEAR 4X12 CURRANT SH17 (3) GLOSSY	RED
TILE	T3	DALTILE	COLOR WHEEL LINEAR 4X12 ALMOND X114 (1) GLOSSY	WHITE
TILE	T4	CROSSVILLE	COLOR BOX 2.0 I SEE THE MOON 3X3	SHOWER FLOOR MOSAIC 3X3
TILE	T5	CROSSVILLE	COLOR BOX 2.0 I SEE THE MOON 12X12	TLT FLOOR
VINYL FLOORING	LVT1	MILLIKEN	THE MAGIC HOUR HORIZON HZN176-121 ETHERAL	

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

DAVIS KANE ARCHITECTS, P.A. REGISTERED ARCHITECTURAL CORPORATION 50304 NORTH CAROLINA RALEIGH, N.C.

JIMMY ARDEL EDWARDS REGISTERED ARCHITECT 13823 05.12.25 NORTH CAROLINA RALEIGH, N.C.

DKA JOB NUMBER
2324

REVISIONS

1	ADD 01	04/01/25
2	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: NK
Plot Date: 4/21/2025 10:03:57 AM

DATE ISSUED

BID DOCUMENTS
03/12/2025

SHEET TITLE
FINISH SCHEDULES AND DETAILS

I001

WALL FOOTING SCHEDULE

MARK	SIZE		REINFORCING	
	WIDTH	DEPTH	CONTINUOUS	TRANSVERSE
WF3	3' - 0"	1'-0"	(4) #5 BOT	#5 AT 24" OC
WF4	4' - 0"	1'-0"	(5) #5 BOT	#5 AT 24" OC
WF6	6' - 0"	1'-0"	(7) #5 BOT	#5 AT 12" OC

COLUMN FOOTING SCHEDULE

MARK	SIZE			REINFORCING		
	LENGTH	WIDTH	DEPTH	BOTTOM	TOP	REMARKS
CF3	3' - 0"	3' - 0"	1'-0"	(4) #5 EW	(4) #5 EW	-
CF7	7' - 0"	7' - 0"	2'-0"	(8) #7 EW	(8) #7 EW	-

GRADE BEAM SCHEDULE

MARK	SIZE		REINFORCING			
	WIDTH	DEPTH	BOTTOM	TOP	MID	STIRRUPS
GB1	1'- 6"	1'- 0"	(3) #5	(3) #5	(2) #5	#3 AT 12" OC

KEY NOTES

101 4" CONCRETE SLAB-ON-GRADE OVER VAPOR RETARDER AND 6" DEPTH OF POROUS FILL. REINFORCE SLAB WITH 6x6 W2.9xW2.9 WELDED WIRE FABRIC REINFORCING PLACED 1 1/2" CLEAR BELOW TOP OF SLAB. MAINTAIN REINFORCEMENT IN POSITION ON BOLSTERS, CHAIRS OR SPACERS DURING CONCRETE PLACEMENT.

102 8" CONCRETE SLAB-ON-GRADE OVER VAPOR RETARDER AND 6" DEPTH OF POROUS FILL. REINFORCE SLAB WITH #4 AT 12" ON CENTER LOCATED 2 1/2" CLEAR BELOW TOP OF SLAB. MAINTAIN REINFORCEMENT IN POSITION ON BOLSTERS, CHAIRS OR SPACERS DURING CONCRETE PLACEMENT.

103 8" CMU WITH #5 BARS AT 16" ON CENTER.

108 8" CMU KNEEWALL WITH #5 BARS AT 32" ON CENTER.

110 EXTRACTOR PAD. REFERENCE B1/S502 FOR DETAILS. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION AND SIZE.

111 SCREEN WALL AND FOOTING, REFER TO TYPICAL DETAIL ON S502. REFER TO ARCHITECTURAL DRAWINGS FOR EXTENTS AND LOCATION.

113 16"X16" CONCRETE PEDESTAL. REFERENCE A3/S505.

114 40"x40" CONCRETE PEDESTAL. REFERENCE A3/S505.

FOUNDATION / SLAB ON GRADE PLAN NOTES

A. REFERENCE ARCHITECTURAL DRAWINGS FOR DIMENSIONS TO NONBEARING WALLS, WALL CONTROL JOINTS AND OPENINGS.

B. UNLESS OTHERWISE NOTED, ALL ELEVATIONS ARE BASED ON A FINISHED FIRST FLOOR REFERENCE OF 0'-0". FINISHED FLOOR ELEVATIONS AT EACH LEVEL ARE INDICATED ON SLAB PLANS. REFERENCE ARCHITECTURAL DRAWINGS FOR FINISHED FLOOR MATERIALS.

C. TOP OF ALL FOOTINGS MUST BE AT ELEVATION -1'-4" UNLESS OTHERWISE NOTED.

D. NOT ALL UTILITY LOCATIONS ARE SHOWN ON PLAN. THE CONTRACTOR MUST COORDINATE THE LOCATIONS, SIZES, AND INVERTS OF UTILITIES. AT LOCATIONS WHERE UTILITIES PASS BELOW THE TOP OF FOOTING ELEVATION, STEP THE TOP OF FOOTING DOWN ON EACH SIDE PER THE "TYPICAL STEPPED FOOTING DETAIL" AND SLEEVE THE UTILITY THROUGH THE FOUNDATION WALL. THE CONTRACTOR MAY, AT HIS/HER OPTION, SLEEVE THE UTILITY THROUGH THE FOUNDATION PER THE "TYPICAL PIPE SLEEVE AT WALL FOOTING DETAILS."

F. UNLESS OTHERWISE INDICATED, EXTEND WALL FOOTINGS A MINIMUM OF 6 INCHES BEYOND ENDS OF WALLS.

G. NOT ALL SITE WALLS ARE SHOWN ON PLAN. CONTRACTOR MUST COORDINATE CIVIL AND LANDSCAPE DRAWINGS FOR SITE WALL INFORMATION.

H. DIMENSIONS SHOWN ON FOUNDATION PLAN ARE TO COLUMN GRIDLINES AND OUTSIDE FACE OF FOUNDATION WALLS, UNLESS OTHERWISE NOTED.

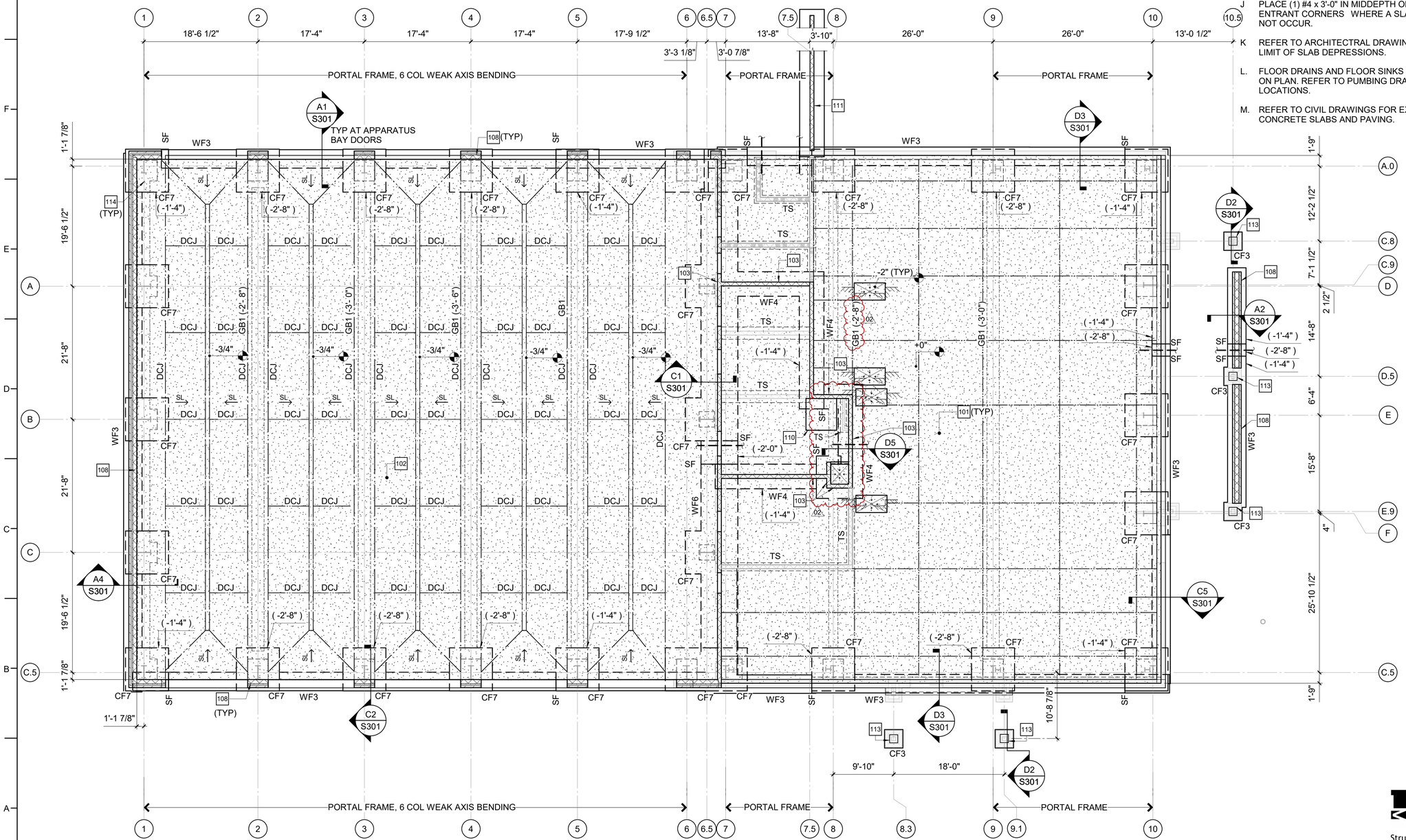
I. SLAB-ON-GRADE JOINTS MUST BE SAWED JOINTS OR DOWELED CONSTRUCTION JOINTS, UNLESS OTHERWISE NOTED. CONTRACTOR MUST COORDINATE ALL SLAB JOINTS WITH JOINTS IN BONDED FLOOR FINISHES. REFERENCE ARCHITECTURAL DRAWINGS FOR FLOOR FINISH JOINT LOCATIONS.

J PLACE (1) #4 x 3'-0" IN MIDDEPTH OF SLAB AT RE-ENTRANT CORNERS WHERE A SLAB JOINT DOES NOT OCCUR.

K REFER TO ARCHITECTRAL DRAWINGS FOR EXACT LIMIT OF SLAB DEPRESSIONS.

L. FLOOR DRAINS AND FLOOR SINKS ARE NOT SHOWN ON PLAN. REFER TO PUMBING DRAWINGS FOR LOCATIONS.

M. REFER TO CIVIL DRAWINGS FOR EXTERIOR CONCRETE SLABS AND PAVING.



1 FOUNDATION AND SLAB PLAN

1/8" = 1'-0"

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA PROFESSIONAL ENGINEERING CORPORATION C-4360 STRUCTURAL ENGINEERS

NORTH CAROLINA PROFESSIONAL SEAL 044996 ENGINEER SCOTT M. FRANCIS

03/12/2025

DKA JOB NUMBER
2324

REVISIONS

01	ADD 01	04/01/25
02	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM:
Drawn By: Author
Plot Date: 4/21/2025 5:03:33 PM

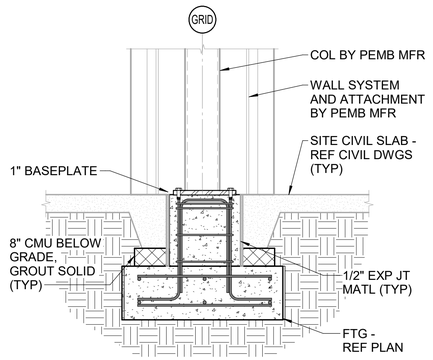
DATE ISSUED

PERMIT DOCUMENTS
3/12/2025

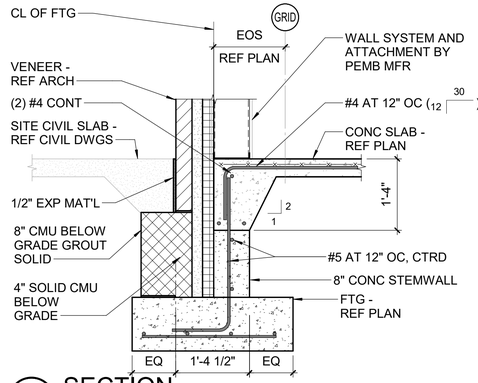
SHEET TITLE
FOUNDATION PLAN

S111

lynchmykins
CALCULATE. COLLABORATE. CREATE.
Structural Engineers
301 N. West Street, Suite 105
Raleigh, NC 27603
919.782.1833 - lynchmykins.com
LM Project Number: LM23.192



D2 SECTION
3/4" = 1'-0"



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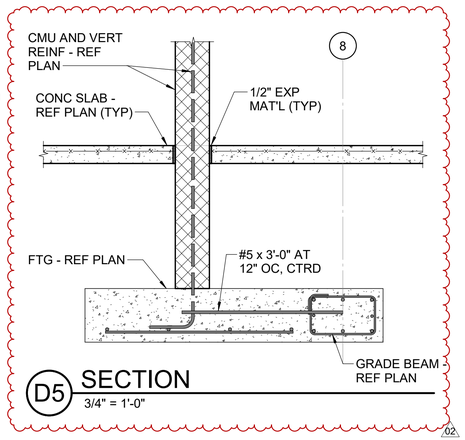
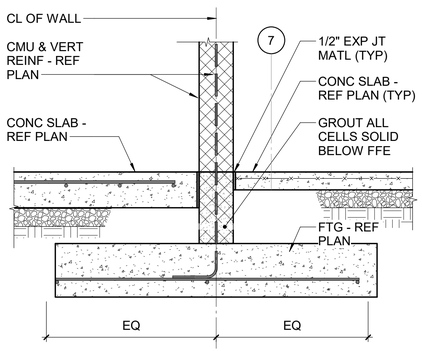
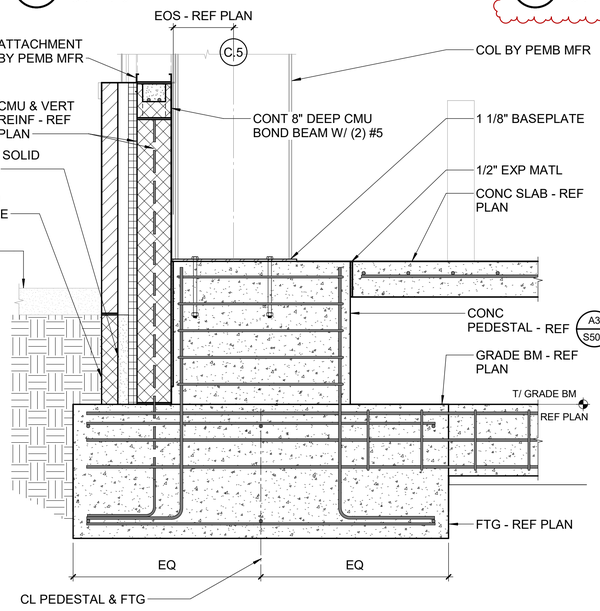


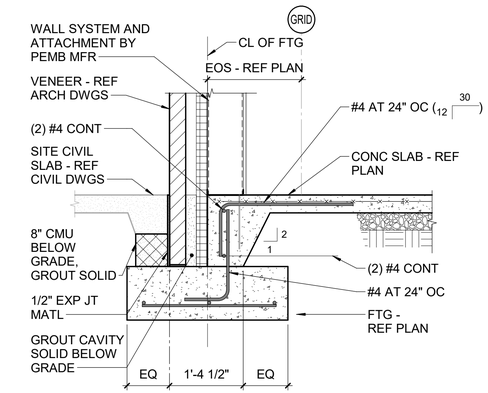
D5 SECTION
3/4" = 1'-0"



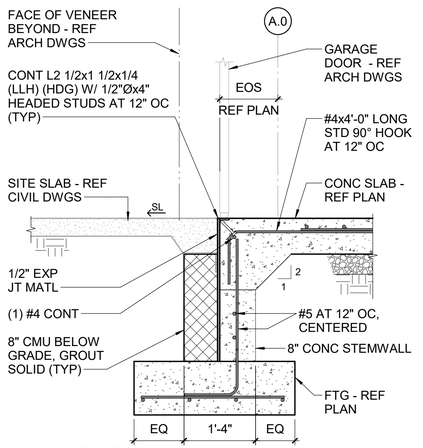
C1 SECTION
3/4" = 1'-0"



C2 SECTION
3/4" = 1'-0"



C5 SECTION
3/4" = 1'-0"



A1 SECTION
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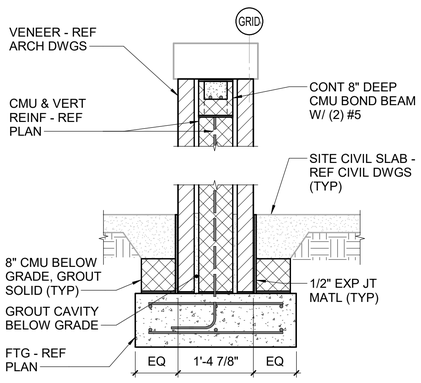
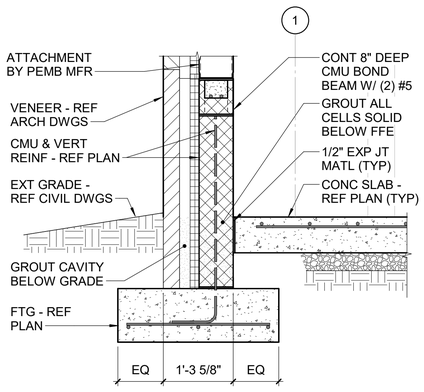


A2 SECTION
3/4" = 1'-0"



A4 SECTION
3/4" = 1'-0"

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C

OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA ENGINEERING CORPORATION C-4360 SCOTT M. FRANCIS

NORTH CAROLINA PROFESSIONAL SEAL 044996 ENGINEER SCOTT M. FRANCIS

03/12/2025

DKA JOB NUMBER
2324

REVISIONS

01	ADD 01	04/01/25
02	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM:
Drawn By: Author
Plot Date: 4/21/2025 5:03:33 PM

DATE ISSUED

PERMIT DOCUMENTS
3/12/2025

SHEET TITLE
SECTIONS

S301

lynchmykins
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Structural Engineers
301 N. West Street, Suite 105
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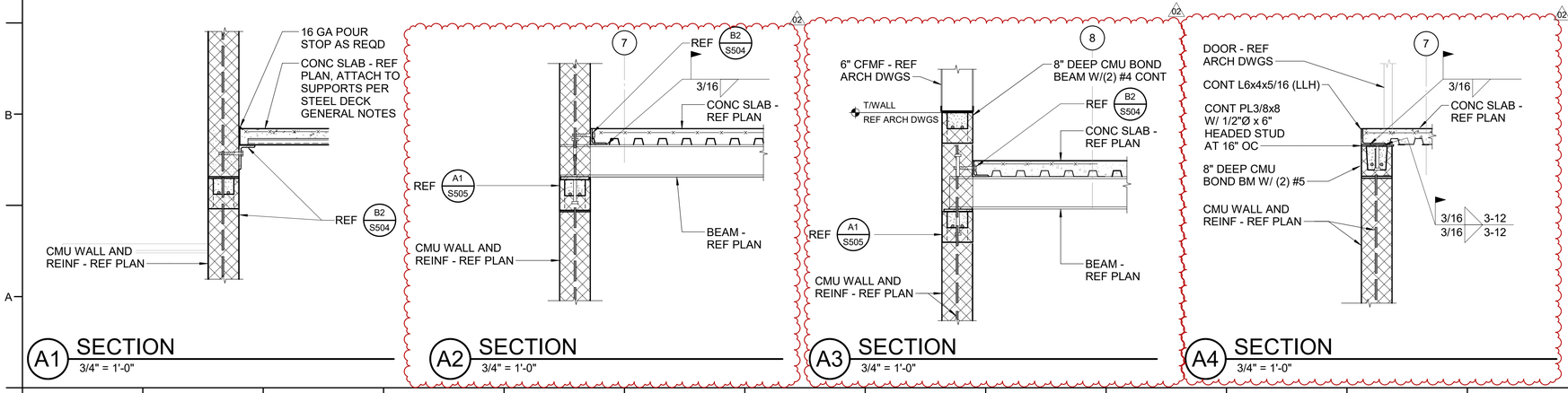
LM Project Number: LM23.192



A1 SECTION
3/4" = 1'-0"

A2 SECTION
3/4" = 1'-0"

A3 SECTION
3/4" = 1'-0"

A4 SECTION
3/4" = 1'-0"

DAVIS KANE
ARCHITECTS, PA

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NORTH CAROLINA ENGINEERING CORPORATION C-4360 NATIONAL COUNCIL OF EXAMINERS FOR ENGINEERING AND SURVEYING

NORTH CAROLINA PROFESSIONAL SEAL 044996 ENGINEER SCOTT M. FRANCIS

03/12/2025

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SHEET TITLE
SECTIONS

S310

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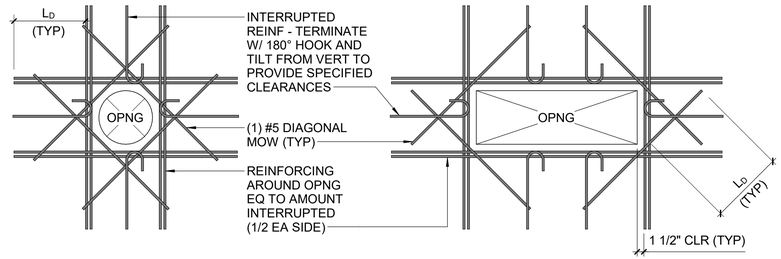
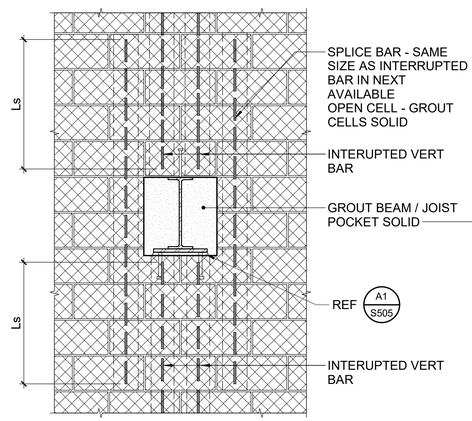


NOTES:

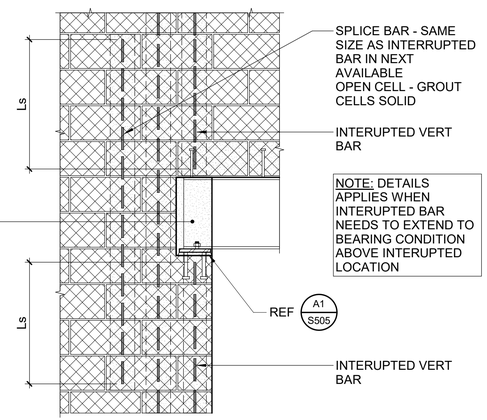
1. ALL OPENINGS IN CONCRETE WALLS REQUIRE ADDITIONAL REINFORCING AS INDICATED EXCEPT WHERE OPENING SIZE OR LOCATION IS SUCH THAT REINFORCING STEEL IS NOT INTERRUPTED.
2. CONDUITS, SMALL PIPES AND OTHER SMALL SLEEVES THAT DO NOT REQUIRE PRECISE LOCATIONS MUST BE SHIFTED SLIGHTLY TO CLEAR REINFORCING.

C1 TYPICAL CONCRETE WALL OPENING DETAILS

NTS



BEAM / JOIST PERPENDICULAR TO WALL



NOTE: DETAILS APPLIES WHEN INTERUPTED BAR NEEDS TO EXTEND TO BEARING CONDITION ABOVE INTERUPTED LOCATION

BEAM PARALLEL TO WALL

B1 TYPICAL OFFSET SPLICE AT MASONRY WALL DETAIL

NTS

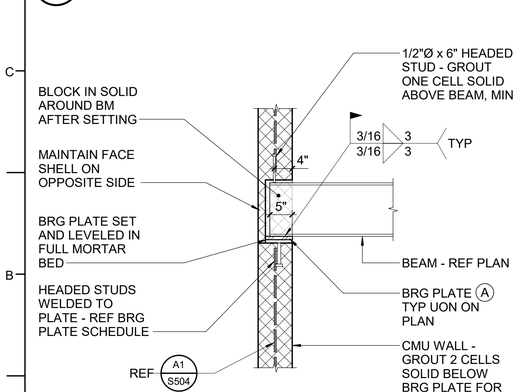
TENSION DEVELOPMENT LENGTH AND LAP SPLICE SCHEDULE

BAR SIZE	TYPE	CONCRETE COMPRESSIVE STRENGTH (PSI)							
		3000		4000		5000		6000	
		TOP BAR	OTHER	TOP BAR	OTHER	TOP BAR	OTHER	TOP BAR	OTHER
#3	Ld	22	17	19	15	17	13	22	17
	Ls	28	22	24	19	22	17	28	22
#4	Ld	29	22	25	19	22	17	29	22
	Ls	37	29	32	25	29	22	37	29
#5	Ld	36	28	31	24	28	22	36	28
	Ls	47	36	40	31	36	28	47	36
#6	Ld	43	33	37	29	33	26	43	33
	Ls	56	43	48	37	43	33	56	43
#7	Ld	63	48	54	42	49	37	63	48
	Ls	81	63	70	54	63	49	81	63
#8	Ld	72	55	62	48	55	43	72	55
	Ls	93	72	80	62	72	55	93	72

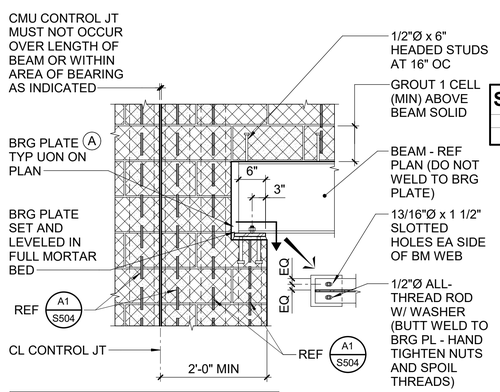
NOTES:
1. ALL VALUES LISTED ARE INCHES.
2. TABLE IS BASE ON VALUES FOR ACI 318-14.
3. VALUES LISTED ARE FOR NORMAL WEIGHT CONCRETE. FOR LIGHTWEIGHT CONCRETE, MULTIPLY LENGTHS BY 1.33.
4. TOP BARS ARE DEFINED AS BARS WITH MORE THAN 12" OF CONCRETE COVER BELOW BAR.
5. WHERE DIFFERENT SIZE BARS ARE SPLICED, PROVIDE THE SPLICE LENGTH ASSOCIATED WITH THE LARGER BARS.

B2 TYPICAL REINFORCING SPLICE SCHEDULES

NTS



PERPENDICULAR TO WALL SECTION (TYPICAL)

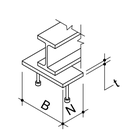


NOTE: REFER TO ARCHITECTURAL DRAWINGS FOR SIZE AND LOCATION OF OPENINGS AND FOR LINTEL ELEVATIONS.

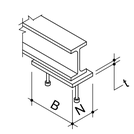
PARALLEL TO WALL ELEVATION (TYPICAL WF)

STEEL BEAM BEARING PLATE SCHEDULE

MARK	LENGTH (B)	WIDTH (N)	THICKNESS (t)	HEADED STUDS
A	1'-4"	6"	3/4"	(2) 3/4"Ø x 6" LONG



PERP TO WALL



PARALLEL TO WALL

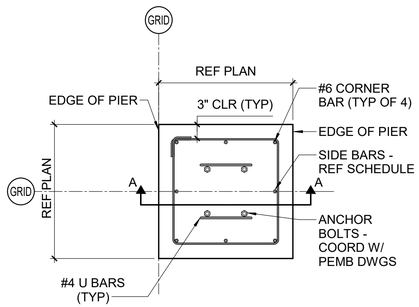
ISOMETRIC VIEW BEARING PLATES

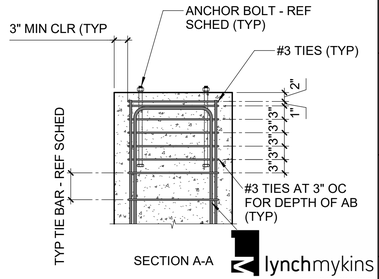
A1 TYPICAL STEEL BEAM BEARING ON MASONRY DETAILS

NTS

PEDESTAL REINFORCING SCHEDULE

SIZE	SIDE BARS (EA FACE)	TYPICAL TIE BARS	ANCHOR BOLTS
40"x 40"	(8) #6	#3 AT 6" OC	(4) 1"Ø BOLTS (15" MIN EMBED)
16"x 16"	(2) #6	#3 AT 6" OC	(4) 1"Ø BOLTS (9" MIN EMBED)





SECTION A-A

A3 TYP PEMB PEDESTAL REINFORCING DETAILS

3/4" = 1'-0"

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PROJECT INFORMATION

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID NO. 102-25C
OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044996 SCOTT M. FRANCIS
03/12/2025

DKA JOB NUMBER
2324

REVISIONS

01	ADD 01	04/01/25
02	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM:
Drawn By: Author
Plot Date: 4/21/2025 5:03:34 PM

DATE ISSUED

PERMIT DOCUMENTS
3/12/2025

SHEET TITLE
TYPICAL DETAILS

S505

FIRE FLOW ANALYSIS PER NCFC APPENDIX B

FIRE FLOW CALCULATION AREA (INCLUDES MEZZANINE):	17,800 SQ. FT.
CONSTRUCTION TYPE:	V-B
SPRINKLER SYSTEM:	PER 903.3.1.1 (NFPA 13)
ALLOWED FLOW REDUCTION PER TABLE B105.2:	25% OF VALUE LISTED IN TABLE B105.1(2) (1,000 GPM MINIMUM)
REQUIRED FIRE FLOW PER TABLE B105.1(2):	3,500 GPM @ 20 PSI
REQUIRED FIRE FLOW:	1,000 GPM @ 20 PSI
AVAILABLE FIRE FLOW:	1,610 GPM @ 20 PSI
REQUIRED FLOW DURATION PER TABLE B105.1(2):	3 HOURS

GENERAL NOTES: (APPLIES TO ALL FIRE PROTECTION DRAWINGS)

1. SPRINKLER CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH BUILDING STRUCTURE AND SYSTEMS, AS WELL AS THE WORK OF OTHER TRADES IN ORDER TO ELIMINATE CONFLICTS.

2. SPRINKLER CONTRACTOR'S DESIGN SHALL BE PER NFPA 13 (2013 EDITION), AND THE 2018 NC STATE FIRE PREVENTION CODE.

3. SPRINKLER CONTRACTOR SHALL PERFORM FLOW TEST PRIOR TO STARTING DESIGN, AND PERFORM HYDRAULIC CALCULATIONS USING THE FLOW TEST DATA PER THE SPECIFICATIONS.

4. PROVIDE AUXILIARY DRAINS WHEREVER WET SYSTEM PIPING IS ROUTED SUCH THAT WATER IS TRAPPED IN EXCESS OF 5 GALLONS.

5. LIGHT HAZARD OCCUPANCIES (WET SYSTEM): PER NFPA 13, DESIGN DENSITY SHALL BE 0.1 GPM PER SQUARE FOOT OVER THE MOST REMOTE 1,500 SQUARE FEET. HOSE ALLOWANCE FOR LIGHT HAZARD SHALL BE 100 GPM PER NFPA 13.

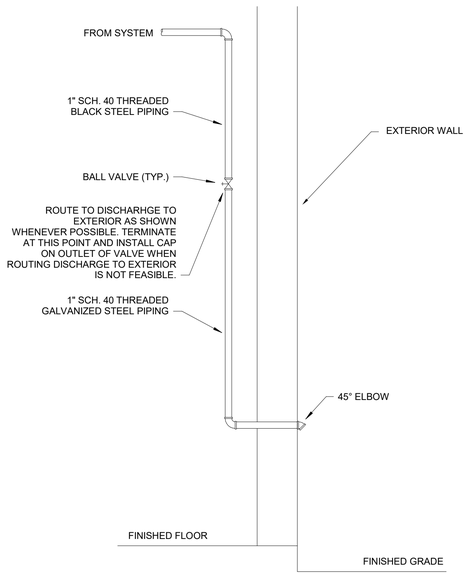
6. ORDINARY HAZARD I OCCUPANCIES (WET SYSTEM): PER NFPA 13, DESIGN DENSITY SHALL BE 0.15 GPM PER SQUARE FOOT OVER THE MOST REMOTE 1,500 SQUARE FEET. HOSE ALLOWANCE FOR ORDINARY HAZARD I SHALL BE 250 GPM PER NFPA 13.

7. ORDINARY HAZARD II OCCUPANCIES (WET SYSTEM): PER NFPA 13, DESIGN DENSITY SHALL BE 0.20 GPM PER SQUARE FOOT OVER THE MOST REMOTE 1,500 SQUARE FEET. HOSE ALLOWANCE FOR ORDINARY HAZARD II SHALL BE 250 GPM PER NFPA 13.

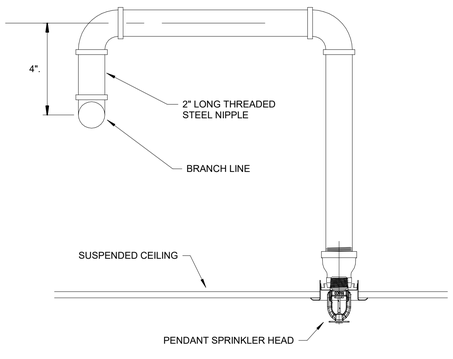
8. REMOTE AREAS MAY BE REDUCED DUE TO THE USE OF QUICK RESPONSE HEADS PER NFPA 13. REMOTE AREAS SHALL BE INCREASED BY 30% WHERE CEILING OR ROOF SLOPES MORE THAN 2 INCHES PER FOOT.

9. SPRINKLER CONTRACTOR SHALL PROVIDE SEISMIC BRACING. DESIGN OF SEISMIC BRACING SHALL BE BY THE SPRINKLER CONTRACTOR OR A LICENSED STRUCTURAL ENGINEER WHOM THE SPRINKLER CONTRACTOR HAS RETAINED THE SERVICES OF. DESIGN SHALL BE PER NFPA 13 AND ASCE-07 FOR SEISMIC DESIGN CATEGORY 'C', FOR AN OCCUPANCY CATEGORY ## BUILDING.

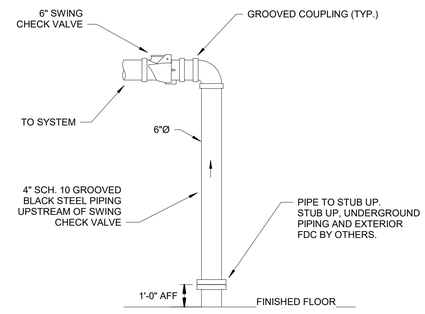
10. LOCATE SPRINKLER HEADS IN THE CENTER OF CEILING TILES.



D F001 AUXILIARY DRAIN DETAIL
SCALE: NONE



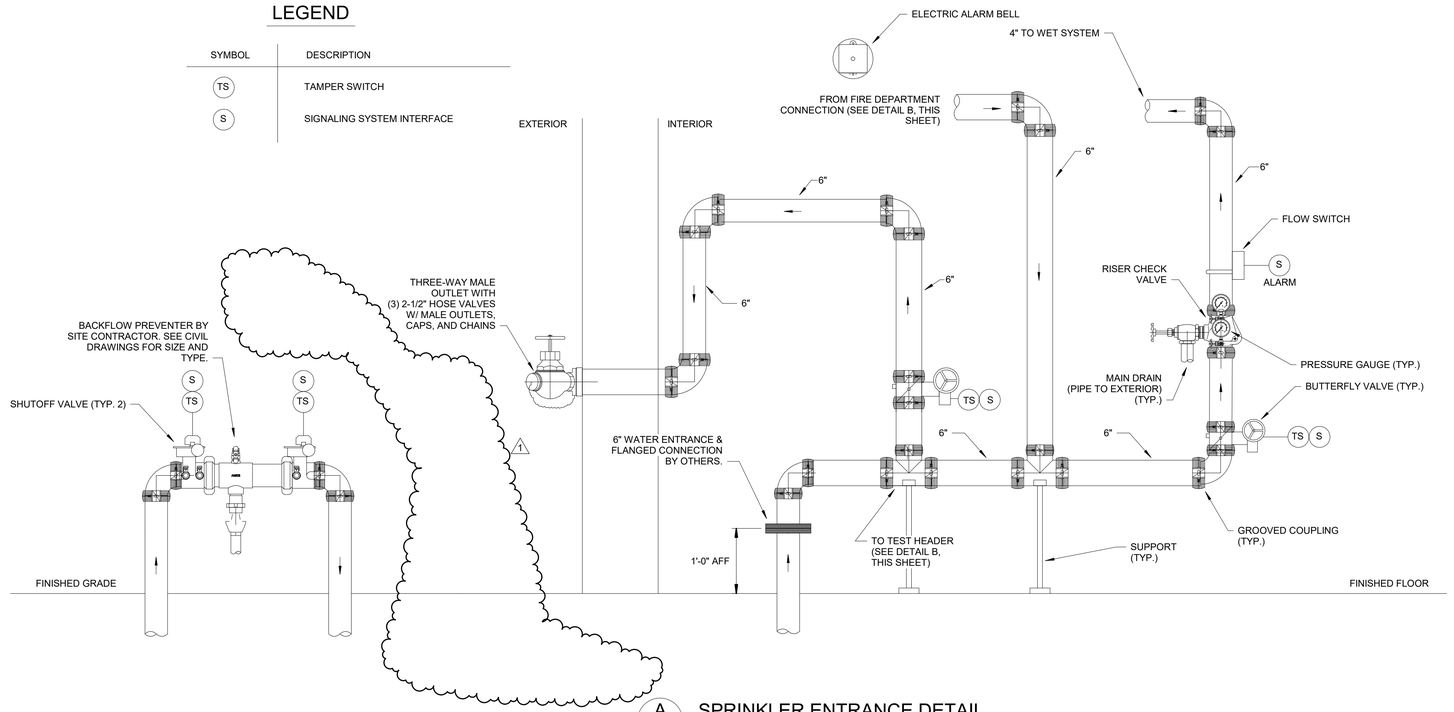
C F001 ARMOVER DETAIL
SCALE: NONE



B F001 FIRE DEPT. CONNECTION DETAIL - REMOTE
SCALE: NONE

LEGEND

SYMBOL	DESCRIPTION
TS	TAMPER SWITCH
S	SIGNALING SYSTEM INTERFACE



A F001 SPRINKLER ENTRANCE DETAIL
SCALE: NONE

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ONSLOW COUNTY BEAR CREEK FIRE STATION

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SEALS

NORTH CAROLINA REGISTERED SEAL 043164 ENGINEER CASEY D. GILLMAN

Digitally signed by Casey Gilman
Date: 2025.04.21 09:54:15-04'00'

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: CDG
Plot Date: 4/21/2025 9:39:13 AM

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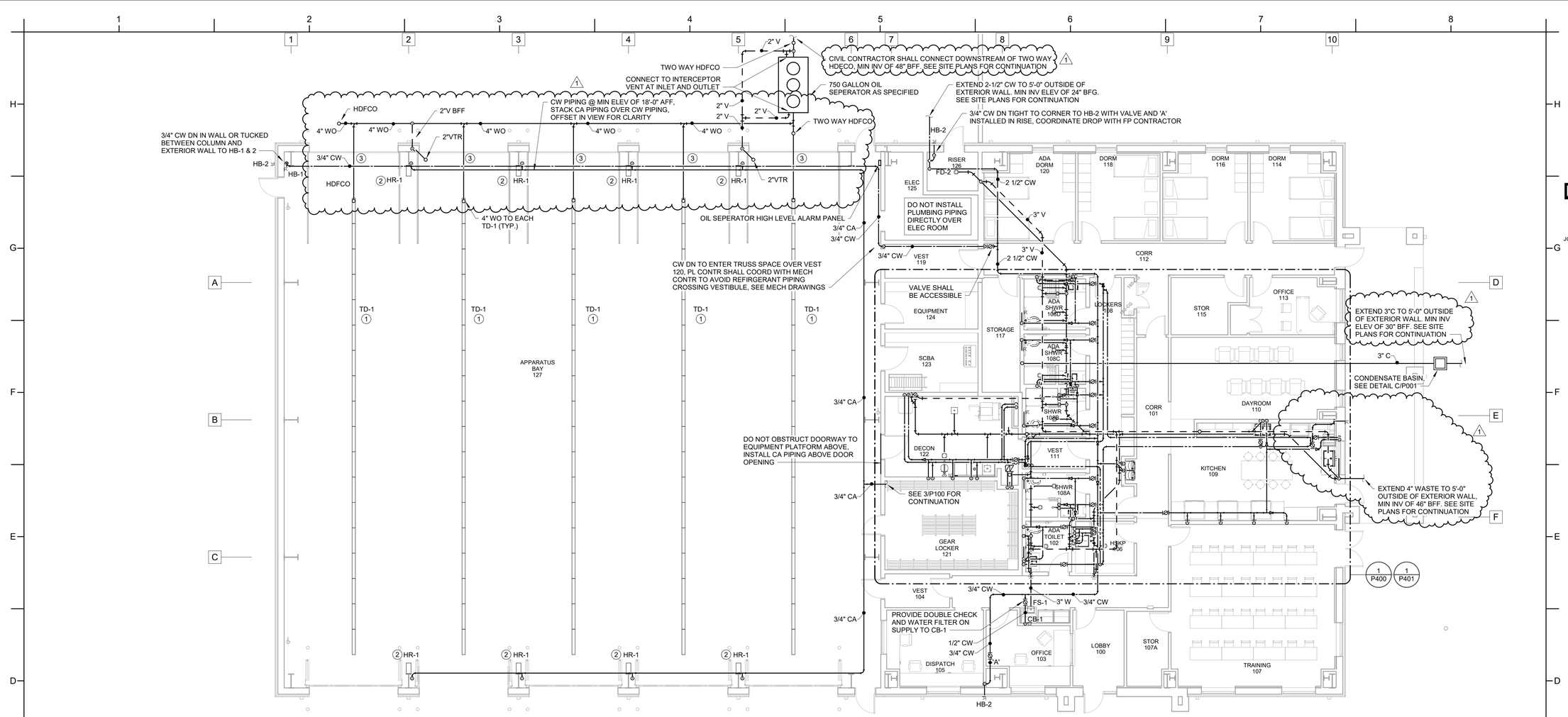
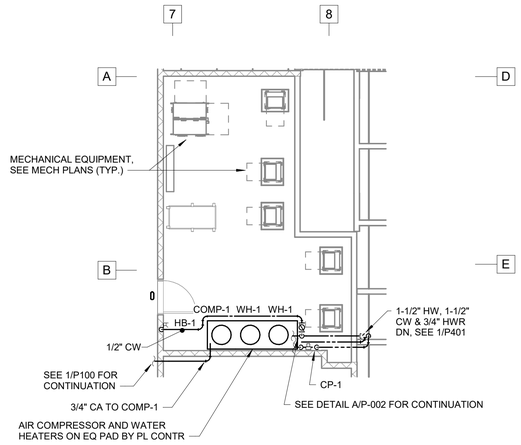
SHEET TITLE
FIRE PROTECTION LEGEND AND DETAILS

F001



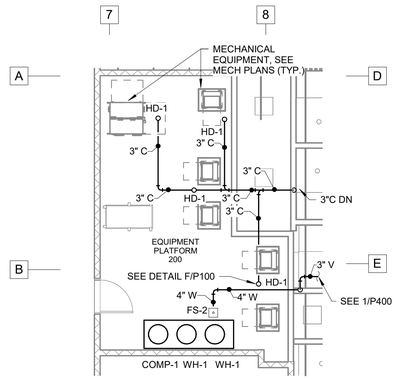
1 P100 PLUMBING FLOOR PLAN

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



3 P100 PLUMBING EQUIPMENT PLATFORM PLAN - DOMESTIC WATER

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



2 P100 PLUMBING EQUIPMENT PLATFORM PLAN - WASTE & VENT

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

KEY NOTES:

1. 4"WO TO TD-1, SEE ARCHITECTURALS FOR DIMENSIONS
2. 3/4"CA TO HR-1, ROUTE CA TIGHT TO STRUCTURE AND IN COLUMN FOOTPRINT TO PREVENT ACCIDENTAL DAMAGES
3. ROUTE WASTE OIL PIPING BELOW TURNED DOWN SLAB AND ABOVE FOOTING, SEE STRUCTURAL DRAWINGS AND COORDINATE WITH STRUCTURAL CONTRACTOR

GRAPHIC SCALES

8' 4' 0 8' 16'

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

RATED ASSEMBLIES LEGEND:

2-HR. FIRE BARRIER

1/2-HR FIRE PARTITION

SEE T-SHEETS FOR UL RATINGS AND ADDITIONAL INFORMATION.

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ONSLOW COUNTY BEAR CREEK FIRE STATION

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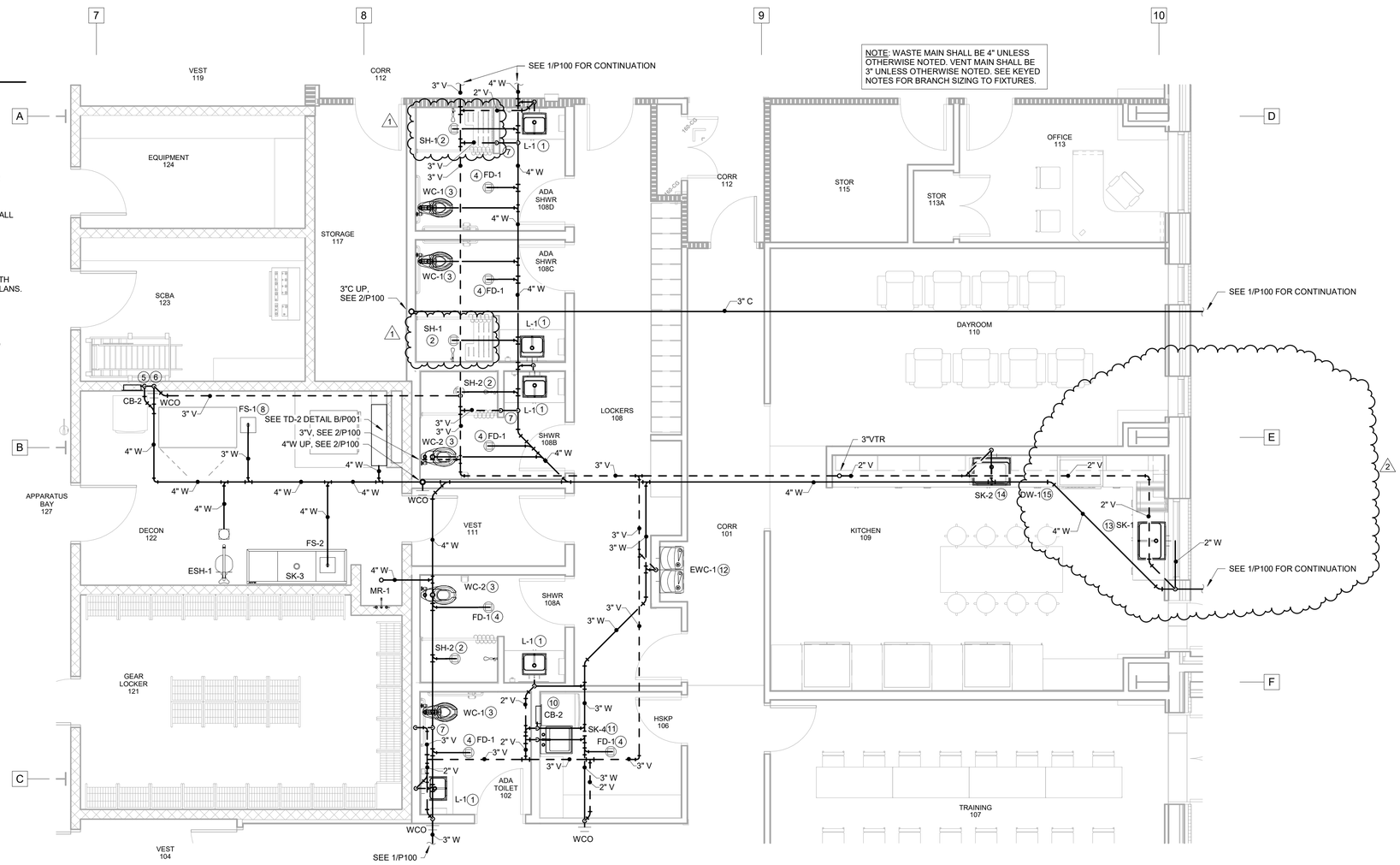
SHEET TITLE

PLUMBING PLANS

P100

KEY NOTES:

1. 2"W & V TO L-1
2. 2"W TO SH-1 OR SH-2
3. 4"W TO WC-1 OR WC-2.
4. 2"W TO FD-1
5. 3"W UP IN WALL, 2"V SHALL RISE A MIN OF 6" ABOVE WASHER BEFORE CONNECTING TO ADJACENT VENT RISE, 2"W TO CB-2
6. 4"W TO WCO & 3" WET VENT UP TO VENT MAIN
7. 3" CIRCUIT VENT FROM WASTE MAIN BFF, RISE IN NEAREST WALL TO ABOVE CEILING AS INDICATED
8. 3"W TO FS-1
9. NOT USED
10. 3"W UP IN WALL, 2"W TO CB-2 & 2" V UP, COORDINATE CB-2 WITH DRYER DUCT & MECHANCANICAL CONTRACTOR, SEE MECH PLANS.
11. 2"W & V TO SK-4
12. 2"W & V TO EWC-1
13. 2"W & V TO SK-1, 2"W SHALL RISE ADJACENT TO WINDOW AND OFFSET BELOW WINDOW TO SK-1
14. 2"W & V TO SK-2
15. CONNECT DW-1 TO WASTE SERVING SK-2 PER DISHWASHER MANUFACTURERS INSTALLATION INSTRUCTIONS



1 P400 ENLARGED WASTE & VENT
SCALE: 1/4" = 1'-0"

GRAPHIC SCALE

4' 2' 0 4' 8'

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

RATED ASSEMBLIES LEGEND:

- 2-HR. FIRE BARRIER
- 1/2-HR FIRE PARTITION

SEE T-SHEETS FOR UL RATINGS AND ADDITIONAL INFORMATION.

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ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
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138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA PROFESSIONAL SEAL 043164 ENGINEER CASEY D. GILMAN

Digitally signed by Casey Gilman
Date: 2025.04.21 09:56:47-04'00'

DKA JOB NUMBER
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1	ADD 01	04/01/25
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PA: JIMMY ARDEL EDWARDS
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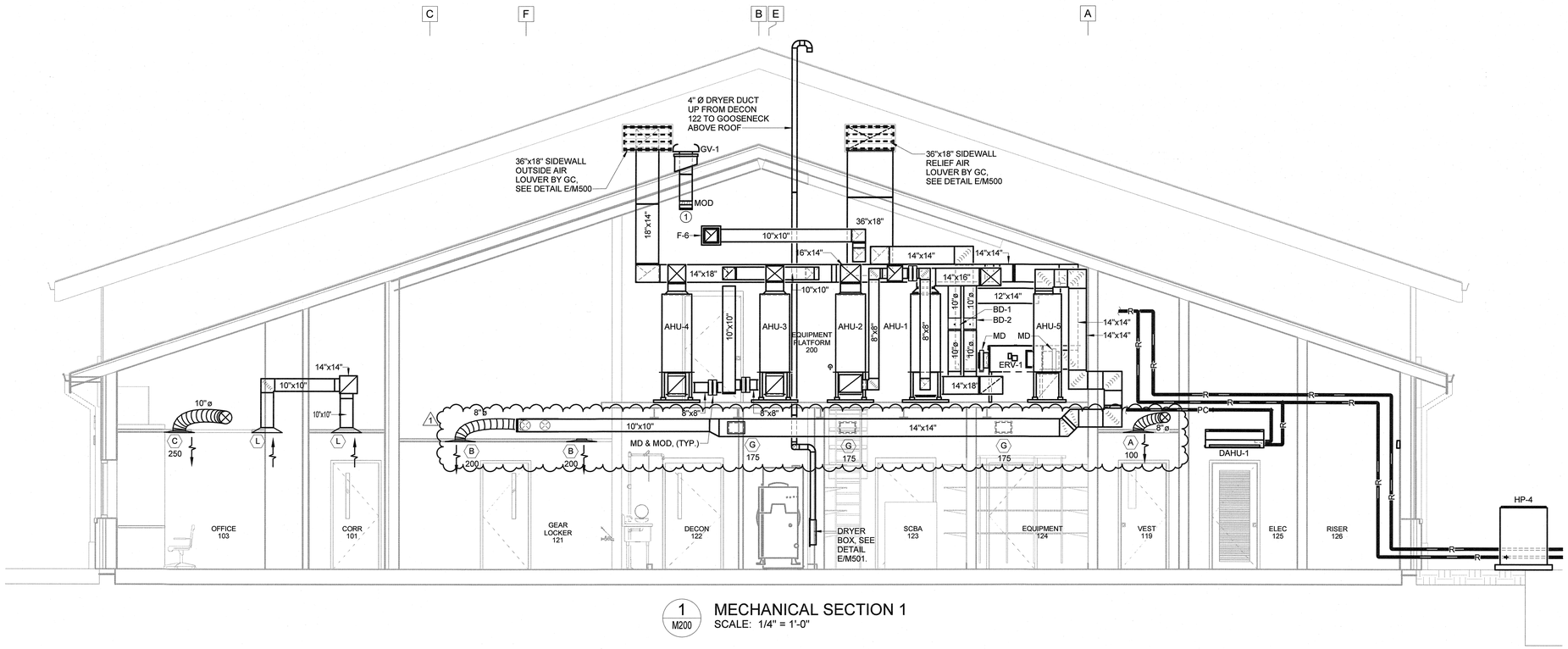
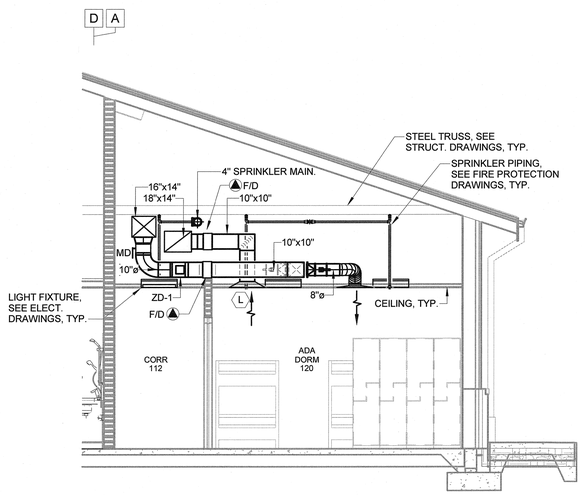
SHEET TITLE
ENLARGED WASTE & VENT

P400



1 M200 MECHANICAL SECTION 1
SCALE: 1/4" = 1'-0"



2 M200 MECHANICAL SECTION - DORM AREA
SCALE: 1/4" = 1'-0"

KEYED NOTES: (THIS SHEET ONLY)

1. 10"x10" MAKE-UP AIR DN FROM GV-1 ON ROOF TO PROVIDE MAKE-UP AIR FOR AIR COMPRESSOR. COVER END OF DUCTOWRK WITH WIRE MESH. INSTALL MOD IN DUCT RISE. MOD SHALL BE INTERLOCKED WITH AIR COMPRESSOR TO BE OPEN ONLY WHEN AIR COMPRESSOR IS ON.

GRAPHIC SCALE
4' 2' 0 4' 8'
SCALE: 1/4"=1'-0"

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ONSLOW COUNTY BEAR CREEK FIRE STATION

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BID. NO. 102-25C
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SEALS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 17655 KENNETH LYNCH 04/22/2025

DKA JOB NUMBER
2324

REVISIONS

1	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: NAH
Plot Date: 4/17/2025 1:26:11 PM

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03/12/2025

SHEET TITLE
MECHANICAL SECTIONS

M200

ENERGY RECOVERY VENTILATOR SCHEDULE

SYMBOL	AIR QUANTITY		EXT SP "H20		FAN HP		CORE HEAT EXCHANGER									ELECTRICAL			BASIS OF DESIGN	REMARKS
							OUTSIDE AIR			EXHAUST AIR			SUPPLY AIR							
	OUTSIDE AIR CFM	EXHAUST AIR CFM	OA/SA (1)	EX.A (1)	OA/SA	EX. A	COOLING DB°F	COOLING WB°F	HEATING DB°F	COOLING DB°F	COOLING WB°F	HEATING DB°F	COOLING DB°F	COOLING WB°F	HEATING DB°F	MCA	MOCP	VOLTAGE & PHASE		
ERV-1	1100	1100	0.75	0.75	3/4	3/4	93.0	77.0	24.0	75.0	62.4	70.0	82.0	70.6	52.1	16	20	208V-1Ø	RUSKIN MCV1000	SERVING AHU-5

(1) EXT. S.P. INCLUDES DUCTWORK. FILTERS IN UNIT ARE NOT INCLUDED IN THIS FIGURE.

SPLIT SYSTEM HEAT PUMP UNIT SCHEDULE

SYMBOL	AIR HANDLING UNIT SECTION (6)								OUTDOOR HEAT PUMP SECTION							REMARKS
	AIR QUANTITY		EXT SP "H20 (1)	ELECTRICAL						ELECTRICAL						
	TOTAL CFM	OUTSIDE CFM		MCA	MOCP	STRIP HEAT (KW)	FAN HP	VOLTAGE & PHASE		MCA	MOCP	VOLTAGE & PHASE	COOLING CAPACITY BTUH (2)	HEATING CAPACITY BTUH (3)	SEER	
AHU-1	1500	200	1.00	45	45	10.8	3/4	208V-3Ø	HP-1	18	30	208V-3Ø	44,000	28,000	14.3	
AHU-2	1500	200	0.65	45	45	10.8	3/4	208V-3Ø	HP-2	18	30	208V-3Ø	44,000	28,000	14.3	
AHU-3	900	210	0.65	30	30	7.2	1/2	208V-3Ø	HP-3	16	25	208V-1Ø	29,000	16,500	14.3 (5)	
AHU-4	800	100	0.65	29	30	7.2	1/2	208V-3Ø	HP-4	13	20	208V-1Ø	23,000	14,700	14.3 (5)	
AHU-5	1100	1100 (4)	0.50	42	40	10.8	1/2	208V-3Ø	HP-5	16	25	208V-3Ø	32,500	21,500	14.3	

(1) EXT. S.P. INCLUDES SUPPLY & RETURN AIR DUCTWORK. FILTERS IN UNIT ARE NOT INCLUDED IN THIS FIGURE.
(2) CAPACITY WHEN MATCHED WITH INDOOR HEAT PUMP SECTION AT AHRI CONDITIONS.
(3) CAPACITY AT 17° F OUTSIDE AIR TEMPERATURE.
(4) FROM ERV-1.
(5) SEER2.
(6) WITH FACTORY INSTALLED INTEGRAL REFRIGERANT LEAK DETECTOR AND SAFETY SEQUENCE FOR A2L REFRIGERANTS.

POWER VENTILATOR SCHEDULE

SYMBOL	CFM	ESP	RPM	TIP SPEED	ELECTRICAL		TYPE	DRIVE	CONTROL	REMARKS
					HP	VOLTAGE				
F-1	3000	0.50"	1690	10,630	3/4	208V-3Ø	SIDEWALL PROPELLER EXHAUST	BELT	(3)	APPARATUS BAY 129
F-2	3000	0.50"	1690	10,630	3/4	208V-3Ø	SIDEWALL PROPELLER EXHAUST	BELT	(3)	APPARATUS BAY 129
F-3	50,000	-	-	-	1-1/2	208V-3Ø	14'-0" HVLS AIR MOVEMENT (5)	DIRECT	(4)	APPARATUS BAY 129
F-4	50,000	-	-	-	1-1/2	208V-3Ø	14'-0" HVLS AIR MOVEMENT (5)	DIRECT	(4)	APPARATUS BAY 129
F-5	100	0.50"	810	1430	34 (1)	115V-1Ø	CEILING EXHAUST	DIRECT	(2)	ADA TOILET 102
F-6	400	0.50"	1630	4630	1/10	115V-1Ø	INLINE CENTRIFUGAL	DIRECT	AHU-2	SHWR 108A, SHWR 108D, ADA SHWR 108E, ADA SHWR 108F

(1) WATTS
(2) VIA LIGHTING CONTROL SYSTEM'S OCCUPANCY SENSOR.
(3) MANUAL SWITCH IN PARALLEL WITH CO & NO2 SENSING SYSTEM, SEE APPARATUS BAY HEATING & VENTIALTION CONTROL DIAGRAM ON M701. NOTE THAT F-1 AND F-2 ALWAYS OPERATE AT THE SAME TIME.
(4) VARIABLE SPEED/ON/OFF/FORWARD/REVERSE FACTORY CONTROLLER.
(5) BASIS OF DESIGN IS RITE HITE REVOLUTION.
(6) INTERLOCK HVLS FAN WITH FIRE ALARM SHUTDOWN. SEE ELECTRICAL DRAWINGS FOR FIRE ALARM RELAY. 1

AIR SCRUBBER SCHEDULE - **ALTERNATE M-1**

SYMBOL	CFM	ESP	RPM	ELECTRICAL			TYPE	DRIVE	CONTROL	REMARKS
				HP	AMP	VOLTAGE				
AS-1	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-2	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-3	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-4	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-5	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-6	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-7	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-8	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-9	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127
AS-10	-	-	1725	3/4	13.6	208V-1Ø	EXHAUST REMOVAL SYSTEM	DIRECT	(1)	APPARATUS BAY 127

(1) FACTORY AUTOMATIC TIMER CONTROL PANEL IN PARALLEL WITH:
a. MAGNETIC DOOR SWITCH (ONE PER VEHICLE DOOR) AS PART OF AIR SCRUBBER SYSTEM.
b. PHOTOELECTRIC EYES (TO DETECT VEHICLE MOVEMENT) AS PART OF AIR SCRUBBER SYSTEM.
c. MANUAL ON-OFF-AUTO SELECTOR WITH LABEL.
d. INPUT SIGNAL FROM CARBON MONOXIDE (CO)/NITROGEN DIOXIDE (NO2) SENSING SYSTEM IN SPACE, SENSING SYSTEM AS SPECIFIED IN SECTION 230900 BY CONTROL CONTRACTOR.

DUCTLESS SPLIT SYSTEM HEAT PUMP UNIT SCHEDULE

SYMBOL	AIR QUANTITY		EXT SP "H20 (1)	ELECTRICAL		SYMBOL	ELECTRICAL			COOLING CAPACITY BTUH (2)	HEATING CAPACITY BTUH (3)	SEER	REMARKS
	TOTAL CFM	OUTSIDE CFM		FAN FLA	VOLTAGE & PHASE		MCA	MOCP	VOLTAGE & PHASE				
DAHU-1	700	-	-	1.0	208V-1Ø	DHP-1	19	25	208V-1Ø	10,000 - 24,000	15,700	21.4	ELECTRICAL 125

(1) EXT. S.P. INCLUDES SUPPLY & RETURN AIR DUCTWORK. FILTERS IN UNIT ARE NOT INCLUDED IN THIS FIGURE.
(2) MINIMUM AND MAXIMUM CAPACITY WHEN MATCHED WITH INDOOR HEAT PUMP SECTION AT AHRI CONDITIONS.
(3) CAPACITY AT 17° F OUTSIDE AIR TEMPERATURE.

REGISTER, GRILLE & DIFFUSER SCHEDULE

SYMBOL	C.F.M.	NECK SIZE	TYPE	RUNOUT SIZE	REMARKS
A	50-100	6"X6"	2'X2' LAY-IN CEILING SA DIFFUSER	6"Ø	
B	125-225	9"X9"	2'X2' LAY-IN CEILING SA DIFFUSER	8"Ø	
C	250-400	12"X12"	2'X2' LAY-IN CEILING SA DIFFUSER	10"Ø	
D	50-100	6"X6"	CEILING SA DIFFUSER	6"Ø	
E	125-225	9"X9"	CEILING SA DIFFUSER	8"Ø	
F	250-400	12"X12"	CEILING S.A. DIFFUSER	10"Ø	
G	175-225	12"X6"	SIDEWALL SA REGISTER	10"Ø	
H	250-400	16"X8"	SIDEWALL SA REGISTER	12"Ø	
J	0-300	12"X10"	SIDEWALL EX. A REGISTER	-	
K	325-550	18"X12"	SIDEWALL EX. A REGISTER	-	
L	250-1000	22"X22"	2'X2' LAY-IN RA GRILLE	-	
M	50-200	10"X10"	EXHAUST REGISTER	-	
N	0-300	12"X10"	SIDEWALL TRANSFER AIR GRILLE	-	
P	0-300	12"X10"	CEILING RA REGISTER	-	
Q	225-500	12"X12"	EXHAUST REGISTER	-	

ELECTRIC UNIT HEATER SCHEDULE

SYMBOL	CFM	BTU	ELECTRICAL		MOUNTING HEIGHT	DISCHARGE	REMARKS
			KW	VOLTAGE			
UH-1	700	25.6	7.5	208V-3Ø	15'-0" AFF	HORIZONTAL	APPARATUS BAY 127
UH-2	700	25.6	7.5	208V-3Ø	15'-0" AFF	HORIZONTAL	APPARATUS BAY 127
UH-3	700	25.6	7.5	208V-3Ø	15'-0" AFF	HORIZONTAL	APPARATUS BAY 127
UH-4	700	25.6	7.5	208V-3Ø	15'-0" AFF	HORIZONTAL	APPARATUS BAY 127
UH-5	700	25.6	7.5	208V-3Ø	15'-0" AFF	HORIZONTAL	APPARATUS BAY 127
UH-6	700	25.6	7.5	208V-3Ø	15'-0" AFF	HORIZONTAL	APPARATUS BAY 127

ELECTRIC BASEBOARD HEATER SCHEDULE

SYMBOL	BTU/HR	ELECTRICAL		MAXIMUM LENGTH	MOUNTING HEIGHT	REMARKS
		WATTS	VOLTAGE			
EBB-1	2560	750	208V-1Ø	40"	8'-0" AFF	RISER ROOM 126

VARIABLE VOLUME ZONE DAMPER SCHEDULE

SYMBOL	MAX CFM	MIN CFM	DAMPER SIZE	RUNOUT SIZE	AHU	REMARKS
ZD-1	425	25	10"Ø	10"Ø	AHU-1	
ZD-2	225	25	8"Ø	8"Ø	AHU-1	
ZD-3	225	25	8"Ø	8"Ø	AHU-1	
ZD-4	250	25	10"Ø	10"Ø	AHU-1	
ZD-5	375	25	10"Ø	10"Ø	AHU-1	

GRAVITY VENTILATOR SCHEDULE

SYMBOL	CFM	MIN. THROAT SIZE	MAXIMUM AIR PRESS DROP "H20	TYPE	SERVING
GV-1	200	11"x11"	0.10	MAKE-UP AIR	AIR COMPRESSORS

BYPASS DAMPER SCHEDULE

SYMBOL	DAMPER CFM	UNIT CFM	DAMPER SIZE	AHU	REMARKS
BD-1	700	1900	10"Ø	AHU-1	
BD-2	700	1900	10"Ø	AHU-1	

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JOB # 24012 NC LICENSE# C-1073

ONSLOW COUNTY BEAR CREEK FIRE STATION

ONSLOW COUNTY
BID. NO. 102-25C
138 OLD SAND RIDGE RD, HUBERT, NC 28539

SEALS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 17655 KENNETH LYNCH

DKA JOB NUMBER
2324

REVISIONS

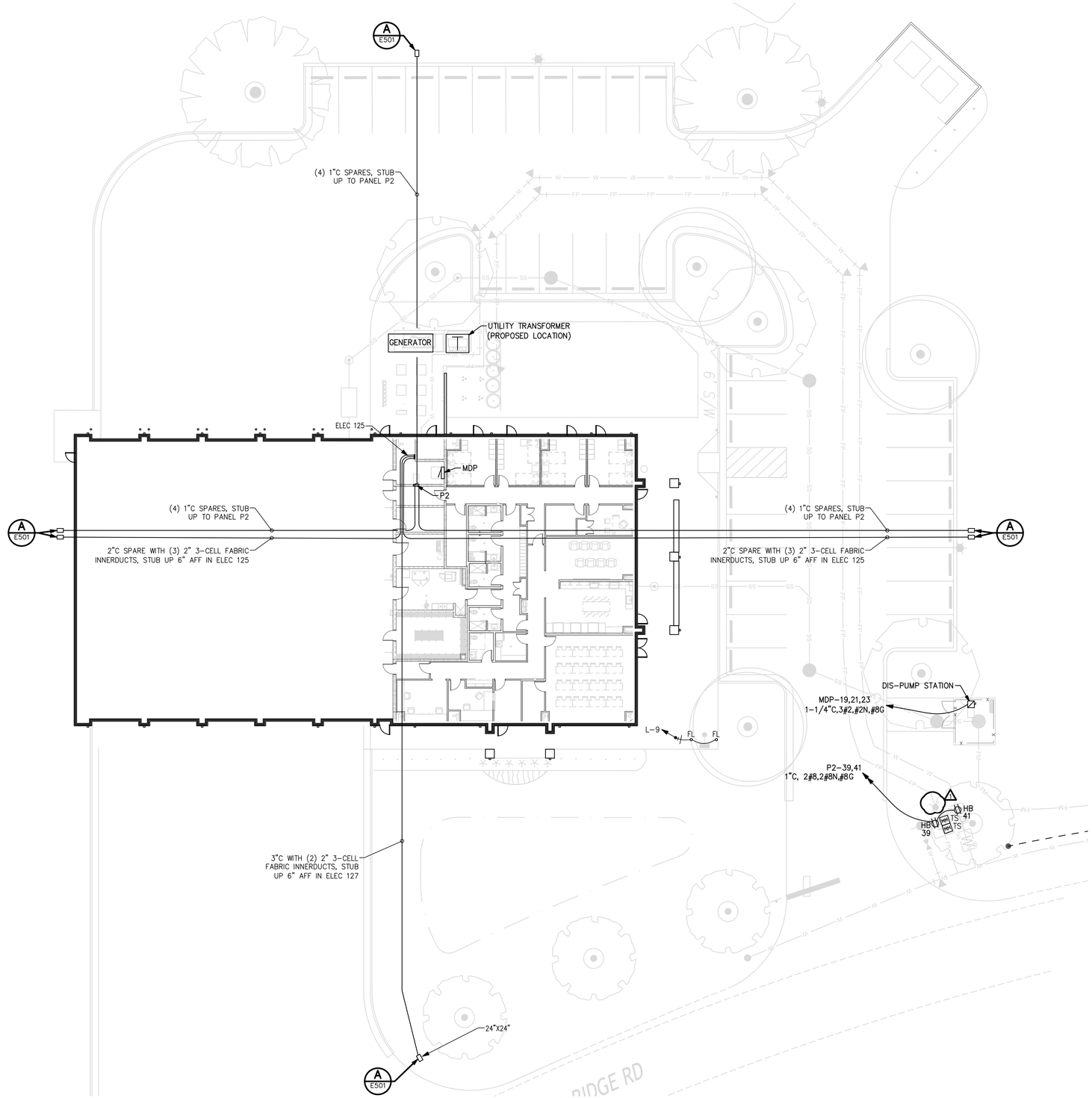
1	ADD 02	04/22/25

PA: JIMMY ARDEL EDWARDS
PM: ALEXANDRE PENEGRE
Drawn By: NAH
Plot Date: 4/21/2025 9:45:47 AM

DATE ISSUED
BID DOCUMENTS
03/12/2025

SHEET TITLE
MECHANICAL SCHEDULES

M600



1 E011 ELECTRICAL SITE PLAN
SCALE: 1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32'
SCALE: 1/16"=1'-0"

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SEALS

NORTH CAROLINA PROFESSIONAL SEAL 17593 ENGINEER MARK A CIARROCCA

Digitally signed by Mark A. Ciarrocca
Date: 2025.04.22 14:29:43-04'00'

DKA JOB NUMBER
2324

REVISIONS

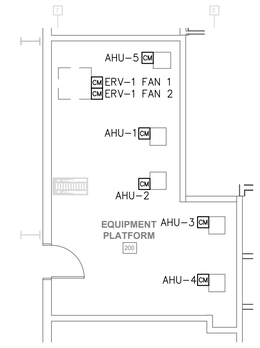
1	ADD 02	04/22/25

PE: M. CIARROCCA
PM: ALEXANDRE PENEGRE
Drawn By: J. GRITTON
Plot Date: 1/27/2025

DATE ISSUED
BID DOCUMENTS
03/12/2025

SHEET TITLE
ELECTRICAL SITE PLAN

E011



KEYED NOTES:

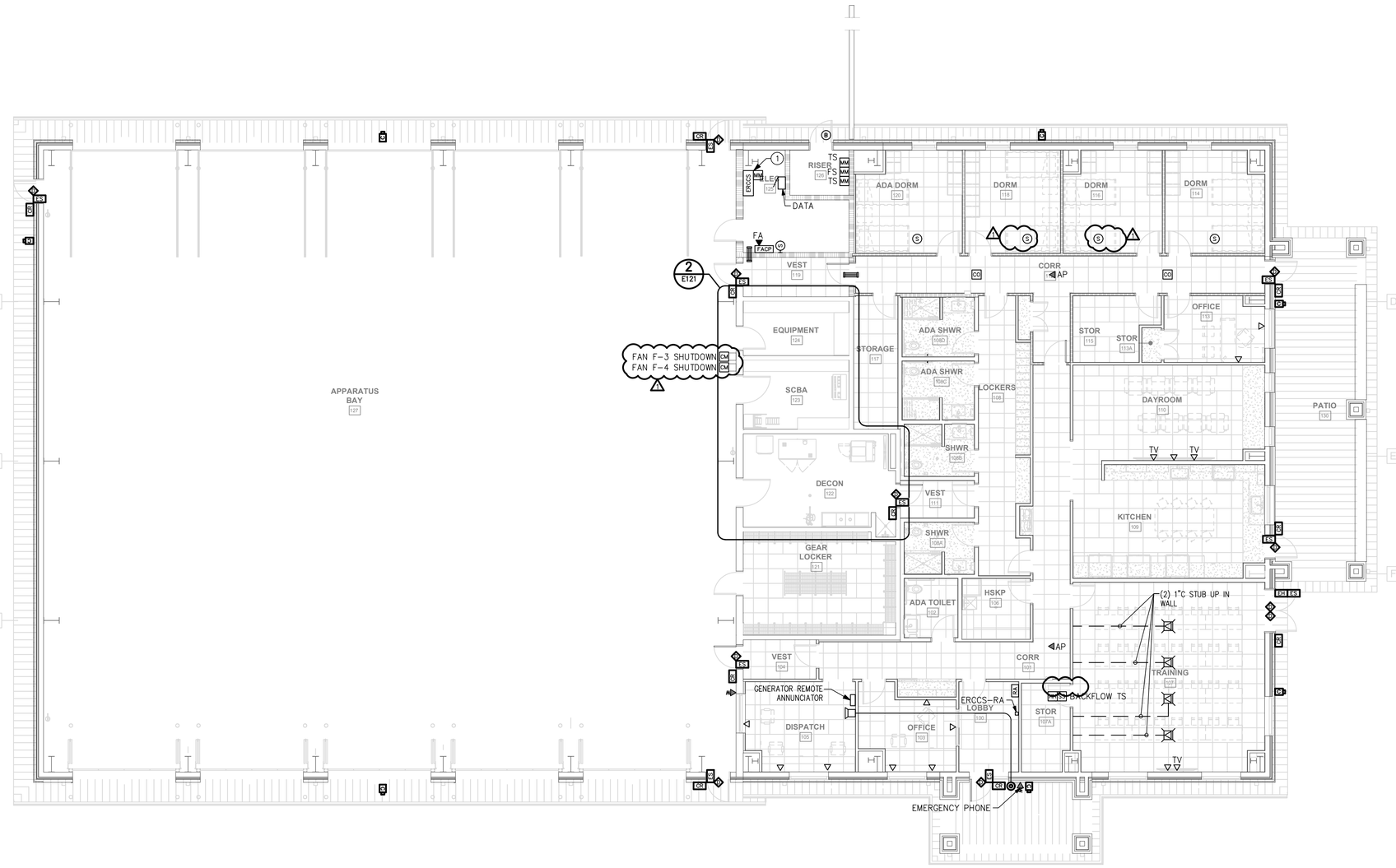
1. (8) MONITOR MODULES FOR EMERGENCY RESPONDER COMMUNICATION COVERAGE SYSTEM

2 E121 ELECTRICAL AUXILIARY SYSTEMS PLAN – EQUIPMENT PLATFORM

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

GRAPHIC SCALE 8' 4' 0 8' 16'

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



1 E121 ELECTRICAL AUXILIARY SYSTEMS PLAN

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

GRAPHIC SCALE 8' 4' 0 8' 16'

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

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03/12/2025

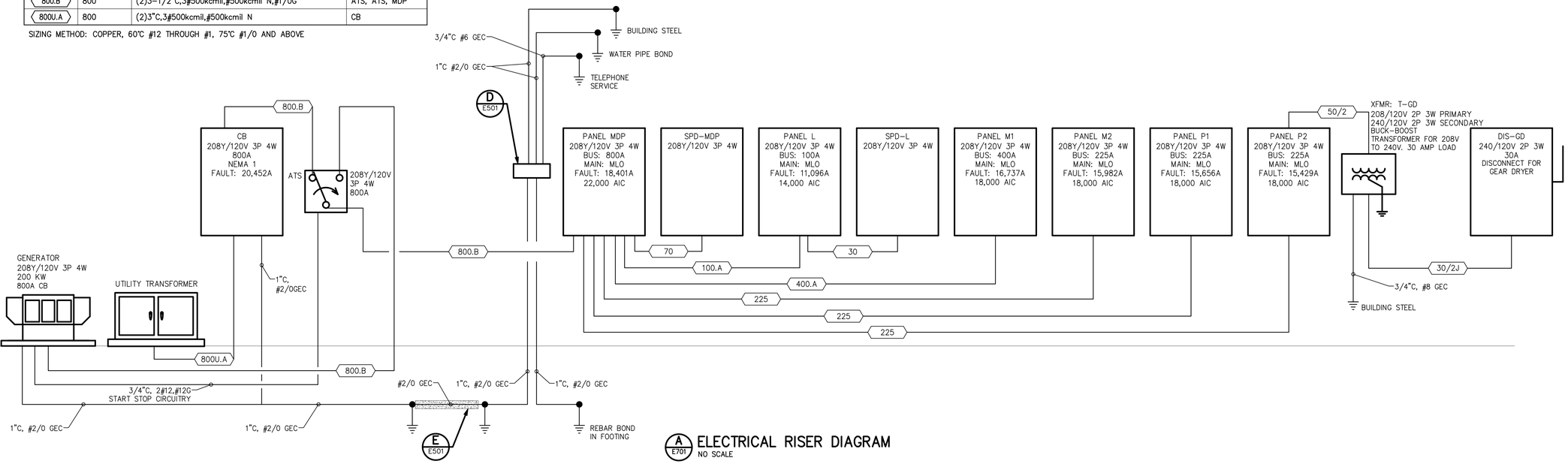
SHEET TITLE
ELECTRICAL AUXILIARY SYSTEMS PLANS

E121

FEEDER SCHEDULE

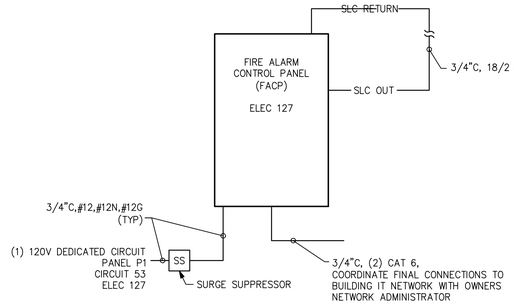
ID	FEEDER AMPS	CONDUIT AND FEEDER	FEEDING THESE DEVICES
30	30	3/4"C,3#10,#10N,#10G	SPD-L
30/2J	30	3/4"C,2#10,#10N,#8G	DIS-GD
50/2	50	3/4"C,2#6,#6N,#10G	T-GD
70	70	1-1/4"C,3#4,#4N,#4G	SPD-MDP
100.A	100	1-1/4"C,3#2,#2N,#8G	L
225	225	2-1/2"C,3#4/0,#4/0N,#4G	M2, P1, P2
400.A	400	3-1/2"C,3#500kcmil,#500kcmil N,#3G	M1
800.B	800	(2)3-1/2"C,3#500kcmil,#500kcmil N,#1/0G	ATS, ATS, MDP
800U.A	800	(2)3"C,3#500kcmil,#500kcmil N	CB

SIZING METHOD: COPPER, 60°C #12 THROUGH #1, 75°C #1/0 AND ABOVE

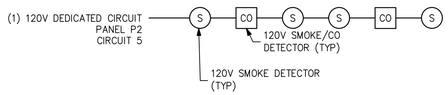


A E701 ELECTRICAL RISER DIAGRAM
NO SCALE

FIRE ALARM OPERATION MATRIX	FACP ANNUNCIATION							NOTIFICATION			CONTROL				
SYSTEM INPUTS	ACTIVATE COMMON ALARM SIGNAL INDICATOR	ACTIVATE AUDIBLE ALARM SIGNAL	ACTIVATE COMMON SUPERVISORY SIGNAL INDICATOR	ACTIVATE AUDIBLE SUPERVISORY SIGNAL	ACTIVATE COMMON TROUBLE SIGNAL INDICATOR	ACTIVATE AUDIBLE COMMON TROUBLE SIGNAL		TRANSMIT FIRE ALARM SIGNAL TO SUPERVISING STATION	TRANSMIT SUPERVISORY SIGNAL TO SUPERVISING STATION	TRANSMIT TROUBLE SIGNAL TO SUPERVISING STATION	BYPASS AIR HANDLER SHUTDOWN	SHUT DOWN ALL BUILDING AIR HANDLERS & ERV	ACTIVATE EXTERIOR ELECTRIC ALARM BELL	SHUT DOWN APPARATUS BAY FANS AIR SCRUBBERS	
	A	B	C	D	E	F	G	H	J	K	L	M	N		
1	WALL MOUNTED SMOKE DETECTOR	X	X					X				X		X	1
2	SPRINKLER WATERFLOW	X	X					X				X	X	X	2
3	SPRINKLER CONTROL VALVE TAMPER SWITCH			X	X				X				X		3
4	FIRE ALARM SYSTEM POWER FAILURE (8 HRS)					X	X			X					4
4	FIRE ALARM SYSTEM LOW BATTERY					X	X			X					4
5	OPEN CIRCUIT					X	X			X					5
6	GROUND FAULT					X	X			X					6
7	NOTIFICATION APPLICANCE CIRCUIT SHORT					X	X			X					7
8	AHU SHUTDOWN DEFEAT SWITCH					X	X				X				8
9	ERRCS ANTENNA MALFUNCTION			X	X				X						9
10	ERRCS BDA FAILURE			X	X				X						10
11	ERRCS LOW BATTERY			X	X				X						11
12	ERRCS AC POWER LOSS			X	X				X						12
13	ERRCS SYSTEM COMPONENTS FAILURE			X	X				X						13
14	ERRCS BATTERY CHARGER FAILURE			X	X				X						14
15	ERRCS COMMUNICATION LINK TO FACP			X	X				X						15
16	ERRCS OSCILLATION DETECTION			X	X				X						16
	A	B	C	D	E	F	G	H	J	K	L	M	N		



CORRIDOR 112 AND DORM ROOMS SHALL CONTAIN 120V POWERED DETECTORS. DEVICES SHALL BE INTERCONNECTED TO ALARM ALL DEVICES UPON DETECTION AT ANY DEVICE. DEVICES SHALL HAVE INTEGRAL 9V REPLACEABLE BATTERY BACKUP.



NOTE:

1. FIELD VERIFY MANUFACTURER'S NPL ENTRANCE KO ON ALL ENCLOSURES.
2. CONDUCTOR SIZES INDICATED ARE MINIMUM GAUGE REQUIREMENTS. ACTUAL INSTALLED CONDUCTOR SIZES SHALL BE DETERMINED BY VOLTAGE DROP CALCULATIONS PERFORMED BY THE CONTRACTOR.
3. ALL CONDUIT SHALL BE 3/4" UNO.

B E701 FIRE ALARM SYSTEM RISER DIAGRAMS
NO SCALE

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SHEET TITLE
ELECTRICAL RISERS

E701