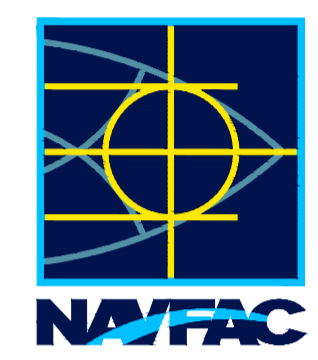


# MODULAR STORAGE MAGAZINE STANDARD DRAWINGS

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**DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD (DDESB) APPROVAL NOTES:**

- THIS STANDARD WAS ORIGINALLY APPROVED BY THE DEPARTMENT OF DEFENSE EXPLOSIVE SAFETY BOARD (DDESB) AS A 7-BAR EARTH COVERED MAGAZINE AND MAY BE SITED AS AN EXPOSED SITE MAGAZINE FROM OTHER POTENTIAL EXPLOSION SITES STORING UP TO 500,000 LBS HAZARD DIVISION 1.1 EXPLOSIVES. THESE DRAWINGS UPDATE AND SUPERSEDE NAVFAC DRAWINGS 14063806 TO 14063858.
- THE DESIGN IN THIS UPDATE DOES NOT SUBSTANTIALLY DEVIATE FROM THE ORIGINAL STANDARD.
- THE DESIGN AND DETAILING OF THE MODULAR STORAGE MAGAZINES FOR BLAST LOADING WAS PERFORMED BY, AND IS THE SOLE RESPONSIBILITY OF, THE GOVERNMENT.
- ENGINEER OF RECORD FOR THE BLAST DOORS IS THE GOVERNMENT. THE GOVERNMENT PERFORMED THE ENGINEERING DESIGN OF THE FRONT ENTRY BLAST DOORS. DETAILS FOR CONSTRUCTION OF THE FRONT ENTRY BLAST DOORS WERE PREPARED BY THE GOVERNMENT.
- ANY DEVIATION FROM THE STANDARD DRAWINGS, EXCEPT FOR FOUNDATION MODIFICATIONS, WITHOUT THE WRITTEN APPROVAL FROM THE DEPARTMENT OF DEFENSE EXPLOSIVE SAFETY BOARD (DDESB) MAY REQUIRE THE MAGAZINE TO BE CONSIDERED AN UNDEFINED MAGAZINE AND MAY SEVERELY RESTRICT THE ALLOWABLE STORAGE CAPACITY.



SYN	DESCRIPTION	DATE	APPR
	MSM STANDARD	09/14/22	

APPROVED	A/E INFO
FOR COMMANDER NAVFAC	ACTIVITY
SATISFACTORY TO DATE	MM/DD/YY
DESIGNED BY	CHK
DRW	IWR
CHK	LMM
FM/DM	
BRANCH MANAGER	JTW
DES PROD DIR	ROBERT L. STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS

DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
DESIGN AND CONSTRUCTION  
LDA-HOROLUX, VA

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
LDA-HOROLUX, VA

**MODULAR STORAGE MAGAZINE**

TITLE SHEET

SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAVFAC DRAWING NO.:	14115969
SHEET	1 OF 53
<b>G-001</b>	

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**GENERAL NOTES:**

- 1. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE DRAWINGS AND SPECIFICATIONS.
2. OPENING SIZES AND LOCATIONS WHEN INDICATED ON DRAWINGS ARE FOR INFORMATION ONLY AND SHALL BE VERIFIED WITH THE APPROPRIATE DRAWING AND/OR SUPPLIER BEFORE CONSTRUCTION.
3. THE STRUCTURAL DRAWINGS SHOW ONLY THE BASIC STRUCTURAL FRAME. REFER TO MECHANICAL, ELECTRICAL AND OTHER DRAWINGS FOR ORNAMENTS, GROOVES, CLIPS, GROUNDS, SLAB DEPRESSIONS, CURBS, EQUIPMENT PADS, PENETRATIONS, NON-BEARING WALLS AND OTHER NON-STRUCTURAL ITEMS.
4. GENERAL NOTES AND TYPICAL DETAILS SHALL BE USED WHERE APPLICABLE, UNLESS NOTED OTHERWISE.
5. ALL OMISSIONS AND/OR CONFLICTS BETWEEN VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER IN WRITING BEFORE PROCEEDING WITH ANY WORK INVOLVED.
6. DIMENSIONS SHALL NOT BE SCALED FROM THE PLANS, SECTIONS AND/OR DETAILS OF THE STRUCTURAL DRAWINGS.
7. SEE ELECTRICAL DRAWINGS FOR LIGHTNING PROTECTION.
8. INTERNAL LOCKING DEVICE (ILD/BOLTWORK) SEE (MODULAR STORAGE MAGAZINE BOLTWORKS DRAWING B-100 SERIES DATED 6/15/2015).
9. ILD UNIT SHALL BE PROCURED TO REQUIRE TWO UNIQUE KEYS IN ORDER TO OPERATE THE LOCKWORKS.
10. FOR ADDITIONAL SUPPLEMENTAL INSTALLATION GUIDES AND INFORMATION FOR THE FABRICATION AND INSTALLATION OF THE DOOR AND LOCKING SYSTEM THE CONTRACTOR SHALL CONTACT THE NAVAL FACILITIES AND EXPEDITIONARY WARFARE CENTER (NFEWC).
11. CONNECTION OF THE BMS (BALANCED MAGNETIC SWITCH) ON THE DOOR AND IN THE ILD LOCKING BOLTWORKS SHALL BE CONNECTED TO THE IDS (INSTRUSION DETECTION SYSTEM) BY SPAWARS.
12. ALL WELDMENT AND IMBEDS FOR THE DOOR JAMB, HEAD, LOCKING PILASTER AND TRENCHED SHALL BE MADE OF 304 STAINLESS STEEL.
13. ALL WELDMENTS (LEFT JAMB, HEAD ANGLE, RIGHT SECURITY PILASTER AND TRENCHES) EMBEDDED INTO THE HEAD WALL THAT CREATES THE DOOR OPENING SHALL BE TRUE AND PLUM IN THE PLAIN OF THE DOOR OPENING TO WITHIN 6MM OF FLATNESS

**DESIGN CRITERIA:**

- 1. THE STRUCTURAL DESIGN AND CONSTRUCTION SHALL COMPLY WITH THE CURRENT APPROVED INTERNATIONAL BUILDING CODE (IBC) BY NAVFAC EXCEPT AS NOTED.
2. THE STRUCTURAL DESIGN AND CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING GOVERNMENT STANDARDS:
3. DESIGN LOADS: THE FOLLOWING LOADS WERE USED AS BASIS OF DESIGN. IF THE LOCAL CONDITIONS REQUIRE MORE STRINGENT WIND AND/OR SEISMIC PARAMETERS THE STRUCTURE SHALL BE REVISED ACCORDINGLY.
4. WIND DESIGN DATA:
5. SEISMIC DESIGN DATA:

- E. SITE CLASS . . . . . D
6. EXPLOSIVE SAFETY DESIGN LOADS:
A. EXPLOSIVE SAFETY DESIGN LOADS FOR DOOR AND ROOF OF MAGAZINES ARE PRESCRIBED BY DESR 6055.09 (2019).
B. FOR 7-BAR EARTH-COVERED MAGAZINES (ECMs) WITH A 2224 KN (500,000 LB) NET EXPLOSIVE WEIGHTS (NEW) OF HD 1.1 MATERIAL THE TRIANGULAR PULSE LOAD VALUES ARE:
C. APPROVED LOCATION AND STORAGE CAPACITY OF EACH ECM SHALL BE DETERMINED BY THE SAFETY OFFICER BASED ON ORIENTATION AND PROXIMITY RELATIVE TO NEARBY FACILITIES/MAGAZINES.
D. EQUIVALENT STATIC BLAST LOADS ON DOOR FRAME CONNECTIONS FOR FOUR EDGE SUPPORT . . . . . 998.2kN/m(5700lb/in).
7. ALL MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE REQUIREMENTS OF THE ABOVE REFERENCED CODES.

**CONSTRUCTION PROCEDURES & SAFETY REQUIREMENTS:**

- 1. THE CONTRACT STRUCTURAL DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHOD OF CONSTRUCTION.
2. ENGAGE PROPERLY QUALIFIED PERSONS TO DETERMINE WHERE AND HOW TEMPORARY PRECAUTIONARY MEASURES SHALL BE USED AND INSPECT SAME IN FIELD.
3. SUPERVISE AND DIRECT THE WORK SO AS TO MAINTAIN SOLE RESPONSIBILITY FOR COORDINATING THE WORK OF ALL TRADES AND THE CHECKING OF ALL DIMENSIONS.
4. COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE AND FEDERAL LAWS, INCLUDING THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) AND REGULATIONS ADOPTED PURSUANT THERETO.
5. CONSTRUCTION LOADS INCLUDING MATERIALS SHALL NOT EXCEED THE DESIGN LIVE LOAD. PROVIDE ADEQUATE SHORING, RESHORING AND/OR BRACING WHERE REQUIRED.

**FOUNDATIONS:**

- 1. THE FOUNDATION DESIGN HAS BEEN PREPARED BASED ON THE FOLLOWING CRITERIA.
2. THE FOUNDATIONS HAVE BEEN DESIGNED USING THE FOLLOWING ALLOWABLE BEARING PRESSURES:
3. RETAINING WALLS HAVE BEEN DESIGNED USING THE FOLLOWING CRITERIA:
4. FOOTINGS SHALL HAVE A MINIMUM WIDTH OF 610 mm AND A MINIMUM BOTTOM DEPTH OF 610 mm BELOW ADJACENT GRADE.
5. STRUCTURAL DRAWINGS INDICATE GENERAL S.O.G. PREPARATION. SEE GEOTECHNICAL REPORT FOR SPECIFIC REQUIREMENTS.
6. ALL FILLING, BACKFILLING AND COMPACTING SHALL BE PER GEOTECHNICAL REPORT.
7. EXPANSIVE SOILS SHALL NOT BE USED FOR BACKFILL OR FILL.
8. ALL EXCAVATIONS SHALL BE PROPERLY BACKFILLED. DO NOT PLACE BACKFILL BEHIND RETAINING WALLS BEFORE CONCRETE HAS ATTAINED FULL DESIGN STRENGTH.

- 9. CONTRACTOR TO PROVIDE FOR DE-WATERING OF EXCAVATIONS FROM EITHER SURFACE, WATER, GROUND WATER OR SEEPAGE.
10. CONTRACTOR SHALL PROVIDE FOR DESIGN AND INSTALLATION OF ALL CRIBBING, SHEATHING, AND SHORING REQUIRED TO SAFELY RETAIN THE EARTH BANKS.
11. EXCAVATION FOR FOUNDATIONS SHALL BE APPROVED BY THE QC MANAGER PRIOR TO PLACING THE REINFORCING AND CONCRETE.
12. SHALLOW FOOTING FOUNDATIONS SHALL BE PLACED AND INSTALLED IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS, SPECIFICATIONS, AND GEOTECHNICAL REPORT PREPARED FOR THE PROJECT.
13. FOUNDATION BACKFILL AND UTILITY TRENCH BACKFILL WITHIN BUILDING AREA SHALL BE MECHANICALLY COMPACTED IN LAYERS TO THE APPROVAL OF THE QC MANAGER.
14. ALL ABANDONED FOOTINGS, UTILITIES, ETC. THAT INTERFERE WITH NEW CONSTRUCTION SHALL BE REMOVED. NEW FOUNDATIONS MUST EXTEND INTO UNDISTURBED SOILS.

**REINFORCED CONCRETE:**

- 1. THE DESIGN AND CONSTRUCTION OF REINFORCED CONCRETE SHALL CONFORM TO THE ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE ACI 318 INCLUDING THE FOLLOWING:
A. CONCRETE MIXING ASTM C94
B. CONCRETE PLACEMENT ACI 304
2. MATERIAL SHALL CONFORM TO ONE OF THE FOLLOWING STANDARD SPECIFICATIONS, LATEST EDITION:
A. PORTLAND CEMENT ASTM C150, TYPE I OR II OR JIS 5210, TYPE I
B. CONCRETE AGGREGATES ASTM C33
C. REINFORCING STEEL ASTM A615M (GRADE 420)
D. WELDED WIRE FABRIC ASTM A185M
3. CONCRETE SHALL ATTAIN THE FOLLOWING 28-DAY COMPRESSIVE STRENGTHS, UNLESS OTHERWISE INDICATED;
A. FOUNDATIONS 27.6 MPa
B. SLAB ON GRADE 27.6 MPa
C. TOPPING SLABS 34.5 MPa
D. SITE RETAINING WALLS 34.5 MPa
E. COLUMN AND HEADER BEAMS 34.5 MPa
F. LEAN CONCRETE 20.7 MPa
NO CHLORIDES OR CHLORIDE SALTS SHALL BE ALLOWED IN THE CONCRETE MIXES.
4. ALL REINFORCING STEEL DETAILING AND PLACEMENT SHALL CONFORM TO THE ACI DETAILING MANUAL - 2004 PUBLICATION SP-66.
5. MINIMUM CONCRETE PROTECTION (COVER) FOR REINFORCEMENT SHALL BE PROVIDED AS FOLLOWS:

**CAST-IN-PLACE CONCRETE**

- 1. CONCRETE POURED AGAINST EARTH . . . . 75 mm
2. CONCRETE POURED AGAINST FORM AND LATER EXPOSED TO EARTH OR WEATHER. . . . . 50 mm
3. COLUMNS AND BEAMS (FROM TIE OR STIRRUP) . . . . . 50 mm
4. SLAB EXPOSED TO WEATHER OR GROUND . . . . . 50 mm
5. SLABS AND WALLS (NOT EXPOSED TO WEATHER OR GROUND) . . . . . 19 mm

**PRECAST CONCRETE**

- 1. WALL PANEL EXPOSED TO EARTH OR WEATHER . . . . . 25 mm
2. WALL AND SLAB NOT EXPOSED TO EARTH OR WEATHER . . . . . 19 mm
3. OTHER MEMBERS . . . . . 38 mm

- 6. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", ACI 318 AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI-315, LATEST EDITION.
7. CURING COMPOUNDS SHALL BE USED ON CONCRETE IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.
8. PROJECTING CORNERS OF BEAMS, WALLS, COLUMNS, ETC., SHALL BE FORMED WITH 19 mm CHAMFER, UNLESS OTHERWISE NOTED.
9. PROVIDE SLEEVES FOR ELECTRICAL OPENINGS IN CONCRETE BEFORE PLACING. DO NOT CUT ANY REINFORCING WHICH MAY CONFLICT.
10. CONDUIT OR PIPE SIZE (O.D.) SHALL NOT EXCEED 30 PERCENT OF SLAB THICKNESS AND SHALL BE PLACED BETWEEN THE TOP AND BOTTOM REINFORCING UNLESS SPECIFICALLY DETAILED OTHERWISE.
11. ALL ROUGHENED SURFACES IN CONCRETE SHALL BE MADE WITH A MINIMUM AMPLITUDE OF 6.4 mm.
12. SEE SHEET S-701 FOR LIGHTWEIGHT CONCRETE FILL MIX DESIGN FOR HIGH SECURITY MAGAZINE DOOR.

**STRUCTURAL PRECAST CONCRETE:**

- 1. ALL PRECAST ELEMENTS NOT DETAILED ON DRAWINGS SHALL BE DESIGNED FOR THE SPAN AND CONCRETE AND CONSTRUCTION LOADING CONDITIONS SHOWN ON THE DRAWINGS BY A LICENSED STRUCTURAL ENGINEER.
2. DETAILED SHOP DRAWINGS SHOWING ALL STRUCTURAL ELEMENTS, DETAILS AND CONNECTIONS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER FOR REVIEW PRIOR TO THE START OF FABRICATION.
3. PRECAST DRAWINGS AND CALCULATIONS SHALL BE STAMPED BY A STRUCTURAL ENGINEER REGISTERED IN THE UNITED STATES.
4. PROVIDE ALL INSERTS WHICH ARE SHOWN ON STRUCTURAL, AND MECHANICAL DRAWINGS WITH PROVISIONS FOR SUCH MADE IN THE DESIGN OF THE PRECAST UNIT.
5. THE PRECAST MANUFACTURER SHALL BE RESPONSIBLE FOR COORDINATION OF MECHANICAL AND ELECTRICAL DETAILS AS THEY AFFECT THE PRECAST ELEMENTS.
6. THERE SHALL BE NO FIELD CUTTING OF PRECAST ELEMENTS WITHOUT THE PRIOR APPROVAL OF THE CONTRACTING OFFICER.
7. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", ACI 318 AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI-315, LATEST EDITION.
8. CONCRETE SHALL HAVE THE FOLLOWING MINIMUM COMPRESSIVE STRENGTHS AT TWENTY-EIGHT (28) DAYS: 34.5 MPa
9. ALL REINFORCING BARS SHALL CONFORM TO ASTM A615M, (GRADE 420).
10. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185M.
11. ALL GROUT SHALL BE NON-SHRINK, NON-FERROUS GROUT WITH f'c = 41.4 MPa.
12. ALL STEEL INSERTS SHALL BE GALVANIZED.

**NOTES TO DESIGNER - REMOVE THESE NOTES WHEN PREPARING CONSTRUCTION DRAWINGS FOR SITE ADAPTION:**

- 1. FOUNDATION MUST BE REVISED TO REFLECT SPECIFIC SITE SOIL CONDITIONS.
2. EDIT UFGS 01 45 35 "SPECIAL INSPECTIONS" IN ACCORDANCE WITH UFC 3 301 01 "STRUCTURAL ENGINEERING" AND INCORPORATE ADDITIONAL ITEMS IDENTIFIED IN APPENDIX C OF UFC 4-420-01.

Vertical sidebar containing project information, logos (NAFAC), and drawing title 'MODULAR STORAGE MAGAZINE'. Includes fields for date (09/14/22), author (JTW), and drawing number (14115970).

FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\S-001.dwg LAYOUT NAME: S-001 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jeb@coronado

## STRUCTURAL STEEL FRAMING:

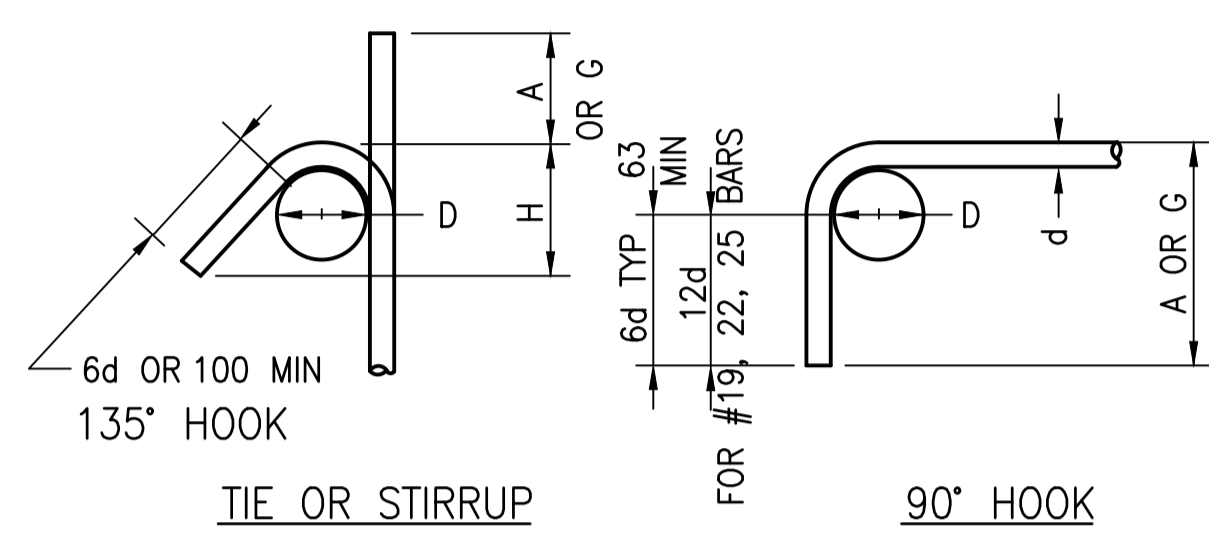
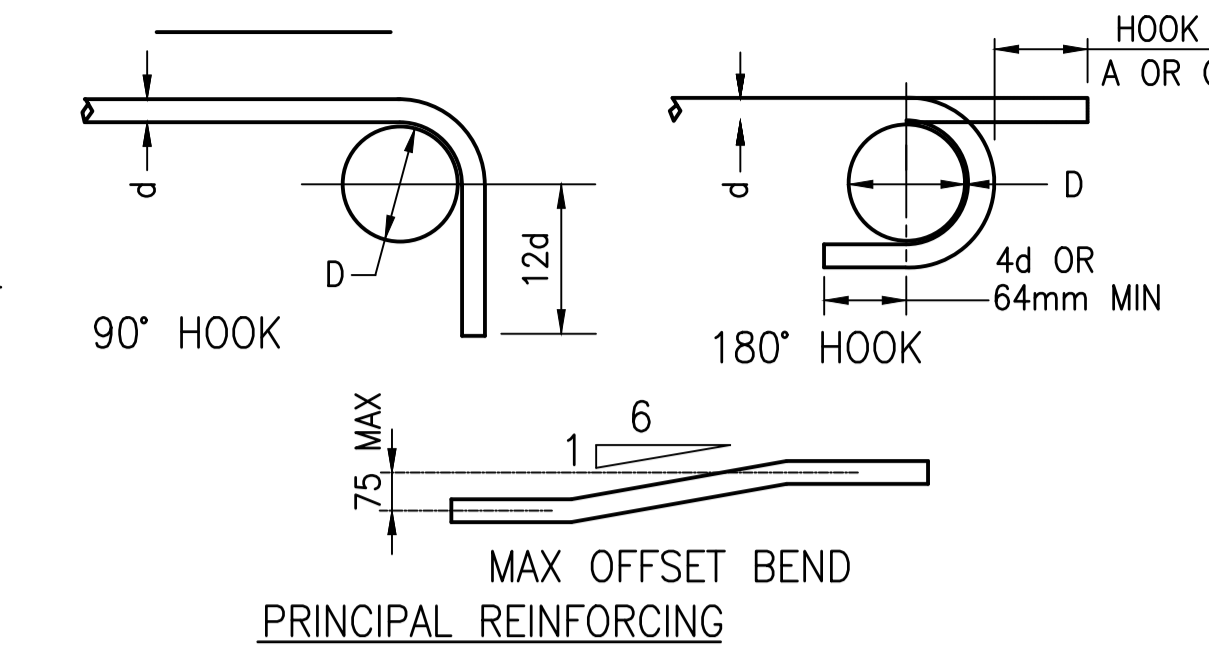
- STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS," LATEST EDITION. STRUCTURAL STEEL SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY THE CONTRACTOR PRIOR TO SUBMITTAL TO THE CONTRACTING OFFICER FOR REVIEW. FABRICATION SHALL NOT BEGIN PRIOR TO THE COMPLETION OF THE SHOP DRAWING REVIEW PROCESS.
- STRUCTURAL STEEL MATERIALS SHALL BE GALVANIZED AND CONFORM TO THE FOLLOWING STANDARD SPECIFICATIONS, LATEST EDITION:
  - STRUCTURAL STEEL WIDE FLANGE ASTM A992M GRADE 345
  - STRUCTURAL STEEL CHANNELS, ANGLES, & PLATES ASTM A572M GRADE 345
  - HOLLOW STRUCTURAL SECTIONS (TUBE STEEL) ASTM A500M (GRADE C)
  - ANCHOR BOLTS ASTM F1554, GRADE 380
  - HIGH STRENGTH BOLTS ASTM A325M
- CONNECTIONS OF STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION AND THE FOLLOWING:
  - BOLTED CONNECTIONS - ASTM A325M, GALVANIZED, UNLESS NOTED OTHERWISE.
  - WELDED CONNECTIONS - ALL WELDS SHALL USE MATCHING FILLER MATERIAL PER TABLE 3.1 AWS D1.1. USE ONLY LOW-HYDROGEN ELECTRODES ON ASTM A572M AND A992M STEEL.
  - TOUCH UP FIELD WELDS AND CONNECTIONS AS WELL AS ABRASSED AND RUSTED SHOP PAINT WITH SAME PAINT USED IN SHOP.
  - WHERE NOT INDICATED ON DRAWINGS, ALL WELDS SHALL BE CONTINUOUS 5 mm FILLET WELDS, BUT NOT GREATER THAN THE AISC MAXIMUM OR LESS THEN THE AISC MINIMUM BASED ON THE THICKNESS OF THE PARTS JOINED.
  - ALL WELDINGS SHALL BE DONE BY AWS CERTIFIED WELDERS. ELECTRODES SHALL BE E490xx.
- THE SPLICING OF STRUCTURAL STEEL WHERE NOT INDICATED SHALL NOT BE ALLOWED.
- FIELD MODIFICATIONS OF STRUCTURAL STEEL SUCH AS THE BURNING OF HOLES OR CUTTING OF STEEL SHALL NOT BE ALLOWED.
- BOLT HOLES IN STEEL SHALL BE 1.6 mm LARGER DIAMETER THAN NOMINAL SIZE OF BOLT USED, EXCEPT AS NOTED.
- ALL STRUCTURAL STEEL SURFACES THAT ARE ENCASED IN CONCRETE SHALL BE LEFT UNPAINTED.
- ALL GROUT (OR DRYPACK) BELOW BASE PLATES SHALL BE NON-SHRINK WITH  $f'_c = 27.9 \text{ MPa}$ .
- ALL EXTERIOR STRUCTURAL STEEL AND MISCELLANEOUS METAL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
- ALL STRUCTURAL STEEL EXPOSED TO SOIL SHALL BE COATED WITH COAL TAR EPOXY.
- NO SUBSTITUTIONS OF STEEL SHAPES AND SIZES ARE PERMITTED.

## ELECTRICAL BONDING & GROUNDING

- ALL STEEL LOUVERS, VENTILATORS, DOORS AND FRAMES SHALL BE ELECTRICALLY BONDED TO THE MAGAZINE REINFORCING CAGE.
- ALL STRUCTURAL AND MISCELLANEOUS ITEMS EMBEDDED IN CONCRETE SHALL BE ELECTRICALLY BONDED TO THE REINFORCING CAGE BY WIRE TIES.
- THE REINFORCING CAGE MUST BE MADE ELECTRICALLY CONTINUOUS BY WIRE TIES AT A MINIMUM OF 1200mm ON CENTERS IN EVERY DIRECTION, REFER TO DETAIL 4 ON DRAWING E-312.
- ALL WALLS AND CONSTRUCTION JOINTS SHALL BE ELECTRICALLY BONDED. SEE THE ELECTRICAL DRAWINGS FOR DETAILS.

## STRUCTURAL ABBREVIATIONS:

A.B. ADD'L.	ANCHOR BOLT	INFO. INTERM.	INFORMATION INTERMEDIATE
ALT. APPROX.	ALTERNATE ARCHITECTURAL	JT. LONG LEG VERTICAL	JOINT LONG LEG HORIZONTAL
BM. BOTTOM	BEAM	LLH LLV	LONGITUDINAL MAXIMUM MECHANICAL MANUFACTURER
C.I.P. CONCRETE	CAST-IN-PLACE CONSTRUCTION OR CONTROL JOINT	MANUF., MFR. MIN.	MINIMUM MISCELLANEOUS NOT IN CONTRACT NEAR SIDE
CLR. CLEAR (ANCE)	CLEAR (ANCE)	N.T.S. NOT TO SCALE	NOT TO SCALE
C.M.U. CONCRETE MASONRY UNIT	CONCRETE MASONRY UNIT	O.C. ON CENTER	ON CENTER
COL. COLUMN	COLUMN	O.F. OUTSIDE FACE	OUTSIDE FACE
CONC. CONCRETE	CONCRETE	O.H. OPPOSITE HAND	OPPOSITE HAND
CONN. CONNECTION	CONNECTION	OPNG. OPENING	OPENING
C.P. COMPLETE PENETRATION	COMPLETE PENETRATION	P.J. PANEL JOINT	PANEL JOINT
CONSTR. CONT. CONSTRUCTION	CONSTRUCTION	PL. PLATE	PLATE
DBA DBL. DOUBLE	DEFORMED BAR ANCHOR	PN PART NUMBER	PART NUMBER
DET. DETAIL	DETAIL	PL. PLATE	PLATE
DIA. DIAMETER	DIAMETER	PN PART NUMBER	PART NUMBER
DIM. DIMENSION	DIMENSION	RAD. RADIUS	RADIUS
DIST. DISTANCE	DISTANCE	REINF. REINFORCEMENT	REINFORCEMENT
DWG. DRAWING	DRAWING	REQ'D. REQUIRED	REQUIRED
EA. EACH	EACH	SCHED. SCHEDULE	SCHEDULE
E.F. EACH FACE	EACH FACE	SECT. SECTION	SECTION
E.J. EXPANSION JOINT	EXPANSION JOINT	SHT. SHEET	SHEET
EQ. EQUAL	EQUAL	SIM. SIMILAR	SIMILAR
E.S. EACH SIDE	EACH SIDE	S.O.G. SLAB-ON-GRADE	SLAB-ON-GRADE
EXT. EXTERIOR	EXTERIOR	SPA. SPACE	SPACE
FL. FLOOR	FLOOR	SPECS. SPECIFICATIONS	SPECIFICATIONS
FIN. FINISH	FINISH	SQ. SQUARE	SQUARE
FIN. FL. FINISH FLOOR	FINISH FLOOR	STD. STANDARD	STANDARD
F.S. FAR SIDE	FAR SIDE	STIFF. STIFFENER	STIFFENER
FT. FOOT OR FEET	FOOT OR FEET	STRUCT. STRUCTURAL	STRUCTURAL
GA. GAUGE	GAUGE	TEMP. TEMPERATURE	TEMPERATURE
HAS. HEADED ANCHOR STUD	HEADED ANCHOR STUD	THK. THICK	THICK
HORIZ., (H) HORIZONTAL	HORIZONTAL	THRU THROUGH	THROUGH
HSS HOLLOW STRUCTURAL SECTION	HOLLOW STRUCTURAL SECTION	T.O.S. TOP OF SLAB, TOP OF STEEL	TOP OF SLAB, TOP OF STEEL
IF INSIDE FACE	INSIDE FACE	TYP. TYPICAL	TYPICAL
		U.N.O. UNLESS NOTED OTHERWISE	UNLESS NOTED OTHERWISE
		VERT., (V) VERTICAL	VERTICAL
		W/ WITH	WITH



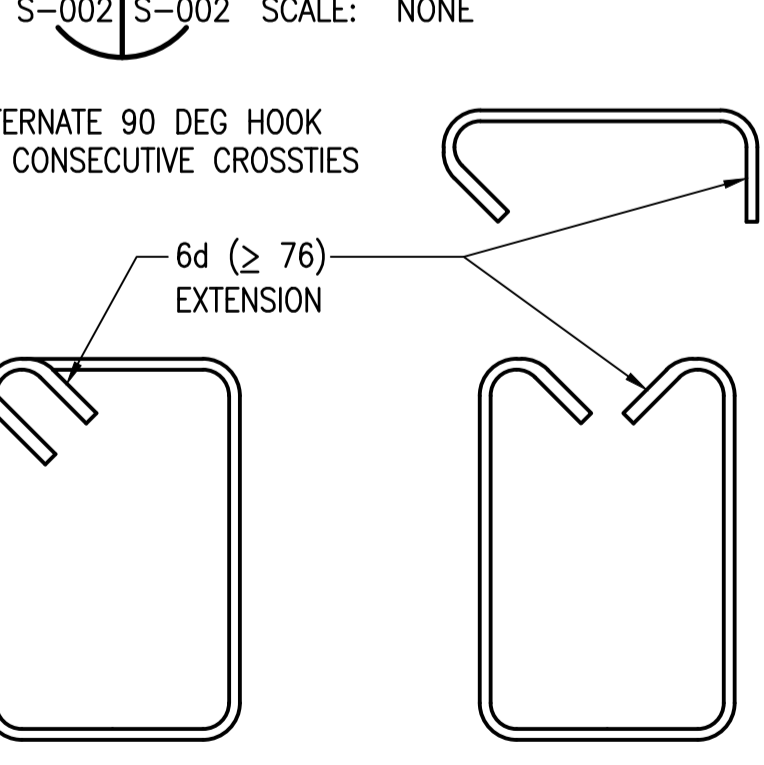
NOTES:  
D = FINISHED INSIDE BEND DIAMETER  
d = BAR DIAMETER

BAR SIZE	DIMENSIONS OF STANDARD 180-DEG HOOKS, ALL GRADE			DIMENSIONS OF STANDARD 90-DEG HOOKS, ALL GRADE	
	A OR G	J	D	A OR G	D
#10	127	76	57	152	57
#13	152	102	76	203	76
#16	178	127	96	254	96
#19	203	152	114	305	114
#22	254	178	133	356	133
#25	279	203	152	406	152
#29	381	298	241	483	241
#32	432	337	273	559	273
#36	483	375	305	610	305

STIRRUP HOOKS			
135° SEISMIC HOOK			
BAR SIZE	D	A OR G	APPROX H
#10	38	102	64
#13	51	114	76
#16	64	140	95
#19	114	203	114
#22	133	229	133
#25	152	267	152

BAR SIZE	MINIMUM TENSION LAP SPLICE LENGTHS ("1.3 l <sub>d</sub> ")		BAR SIZE	MINIMUM EMBEDMENT LENGTHS FOR STANDARD END HOOKS ("l <sub>dh</sub> ")	
	f' <sub>c</sub> = 27.6 MPa			f' <sub>c</sub> > 27.6 MPa	
	TOP BARS	OTHER BARS			
#10	610	483	#10	152	
#13	813	635	#13	203	
#16	1016	787	#16	229	
#19	1219	940	#19	279	
#22	1778	1372	#22	330	
#25	2032	1575	#25	381	
#29	2311	1778	#29	432	
#32	2591	2007	#32	483	
#36	2870	2210	#36	533	

### 1 REINFORCEMENT SPLICE SCHEDULE



- NOTES:**
- IF CONCRETE COVER IS NOT GREATER THAN THE DIAMETER OF THE BAR OR THE CENTER TO CENTER SPACING IS NOT GREATER THAN (3) BAR DIAMETERS, THEN VALUES SHALL BE INCREASED BY 50%. ALL LAPS ARE TYPICAL TENSION LAP SPLICES U.N.O. ON PLANS OR DETAILS.
  - "TOP BARS" ARE HORIZONTAL BARS WITH MORE THAN 305 mm DEPTH OF CONCRETE CAST BELOW THEM.
  - IF CONCRETE COVER IS NOT GREATER THAN 63.5 mm AND THE END COVER OF HOOK IS NOT GREATER THAN 51 mm, THEN VALUES SHALL BE INCREASED BY 43%.

### 2 SEISMIC HOOP CLOSED TIE DETAIL

S-002 S-002 SCALE: NONE

### 4 BAR SIZE CONVERSION TABLE

S-002 S-002 SCALE: NONE

REBAR SIZE		REBAR SIZE	
U.S. UNITS	METRIC	U.S. UNITS	METRIC
#3	#10	#8	#25
#4	#13	#9	#29
#5	#16	#10	#32
#6	#19	#11	#36
#7	#22		

### 3 STIRRUP AND TIE HOOK DIMENSIONS

S-002 S-002 SCALE: NONE

THESE DRAWINGS ARE A MODIFIED VERSION OF A DEFINITIVE SET OF 36 STRUCTURAL SHEETS PREPARED BY THE GOVERNMENT INCLUDING GENERAL NOTES SHEETS S-001 AND S-002, PLAN SHEETS S-101 AND 102, ELEVATION SHEETS S-201, S-202 AND S-203, SECTIONS S-301 TO S-304, TYPICAL DETAILS S-401, DETAIL SHEETS S-501 TO S-504, PRECAST DETAIL SHEET S-601, AND DETAIL SHEETS S-701 TO S-716. THREE (3) SHEETS S-103 THROUGH S-105 HAVE BEEN ADDED BY SAIC ENERGY ENVIRONMENT AND INFRASTRUCTURE LLC, ST. LOUIS, MISSOURI, IN CONJUNCTION WITH THE DEPARTMENT OF THE NAVY, NAVY FACILITIES ENGINEERING COMMAND, ATLANTIC DIVISION.

**AIR CONDITIONING ROOM (OPTIONAL)**

STRUCTURAL SHEETS S-103 THROUGH S-105 HAVE BEEN ADDED FOR AN AIR CONDITIONING ROOM ANNEX AS REQUIRED BY NAVFAC ATLANTIC. PER DIRECTION OF NAVFAC ATLANTIC, THE AIR CONDITIONING ROOM DIMENSIONS, DETAILS AND DESIGN SHOWN ON THESE DRAWINGS HAVE BEEN COPIED FROM MAEK-GA ARCHITECTS ASSOCIATES, STANDARD DESIGN DRAWINGS FOR KOREA, DATED MARCH 2006. MINOR MODIFICATIONS HAVE BEEN MADE BY SAIC TO INTERFACE POURED IN PLACE CONCRETE A/C ROOM WITH MODULAR (PRECAST CONCRETE) STORAGE MAGAZINE.

APPROVED: [Signature] DATE: 09/14/22

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE: MM/DD/YY

DESIGNED BY: [Signature] CHECKED BY: [Signature]

BRANCH MANAGER: JTW

DES. PROD. OR. [Signature] FIRE PROTECTION ENGINEER: DPS

NAVFAC DRAWING NO. 14115971

SHEET 3 OF 53

S-002

NAVFAC METRIC DRAWING REVISION: 01 OCTOBER 2018

FILE NAME: J:\USCE\Magazines\WMSM\2021\Interim\Updates\WMSM\S-002.dwg LAYOUT NAME: S-002 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jehic.coriano

FILE NAME: J:\USSE\Wegzines\WMSM\2021 Interim Updates\WMSM\S-101.dwg LAYOUT NAME: S-101 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jebkcoriano

1 2 3 4 5

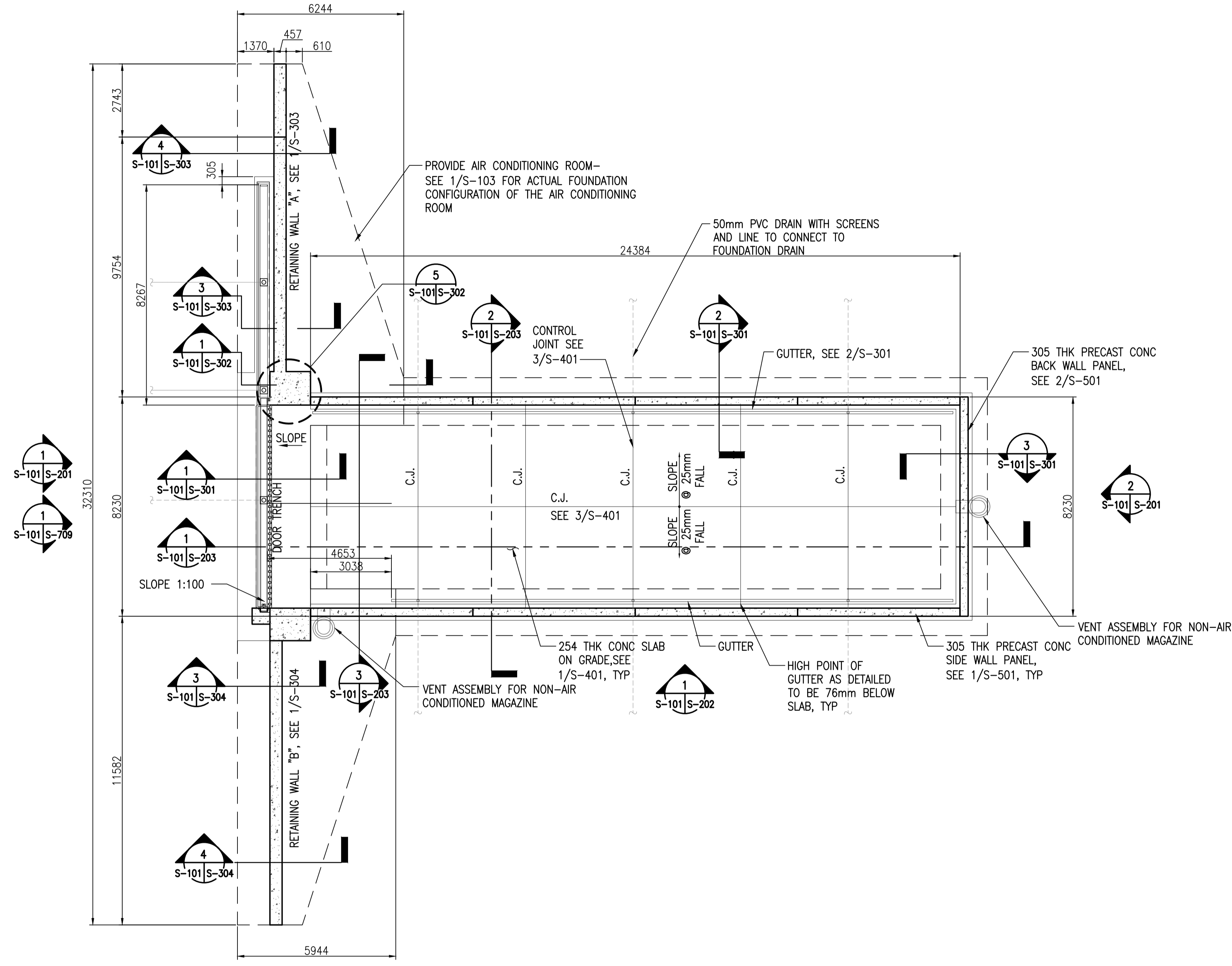
D

C

B

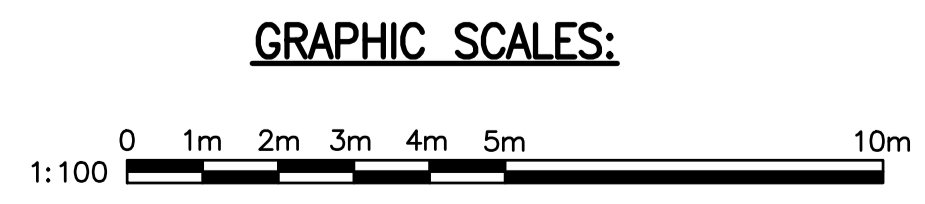
A

1 2 3 4 5



**1 FOUNDATION AND FLOOR PLAN**  
S-101/S-101 SCALE: 1:100

- FOUNDATION PLAN NOTES:**
- SEE SHEET S-001 AND S-002 FOR GENERAL NOTES.
  - SLAB-ON-GRADE SHALL BE 254 mm THICK REINFORCED WITH #16@305 OC TOP & BOT EACH WAY, SEE 1/S-401. PREPARE SUBGRADE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
  - C.J. INDICATES CONSTRUCTION OR CONTROL JOINT. SEE 2 OR 3/S-401.
  - SEE ELECTRICAL DRAWINGS FOR REINFORCING STEEL BONDING REQUIREMENTS.



APPROVED	DATE	09/14/22
FOR COMMANDER NAFAF	DESCRIPTION	MSM STANDARD
ACTIVITY	SYN	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNER	CHK	LMM
BRANCH MANAGER	JTW	
DES PROJ DIR	ROHARD L STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND LDA-NORFOLK, VA	
<b>MODULAR STORAGE MAGAZINE</b>		
FOUNDATION AND FLOOR PLAN		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAF DRAWING NO.:	14115972	
SHEET	4	OF 53
<b>S-101</b>		
<small>NAFAF METRIC DRAWING REVISION: 01 OCTOBER 2018</small>		

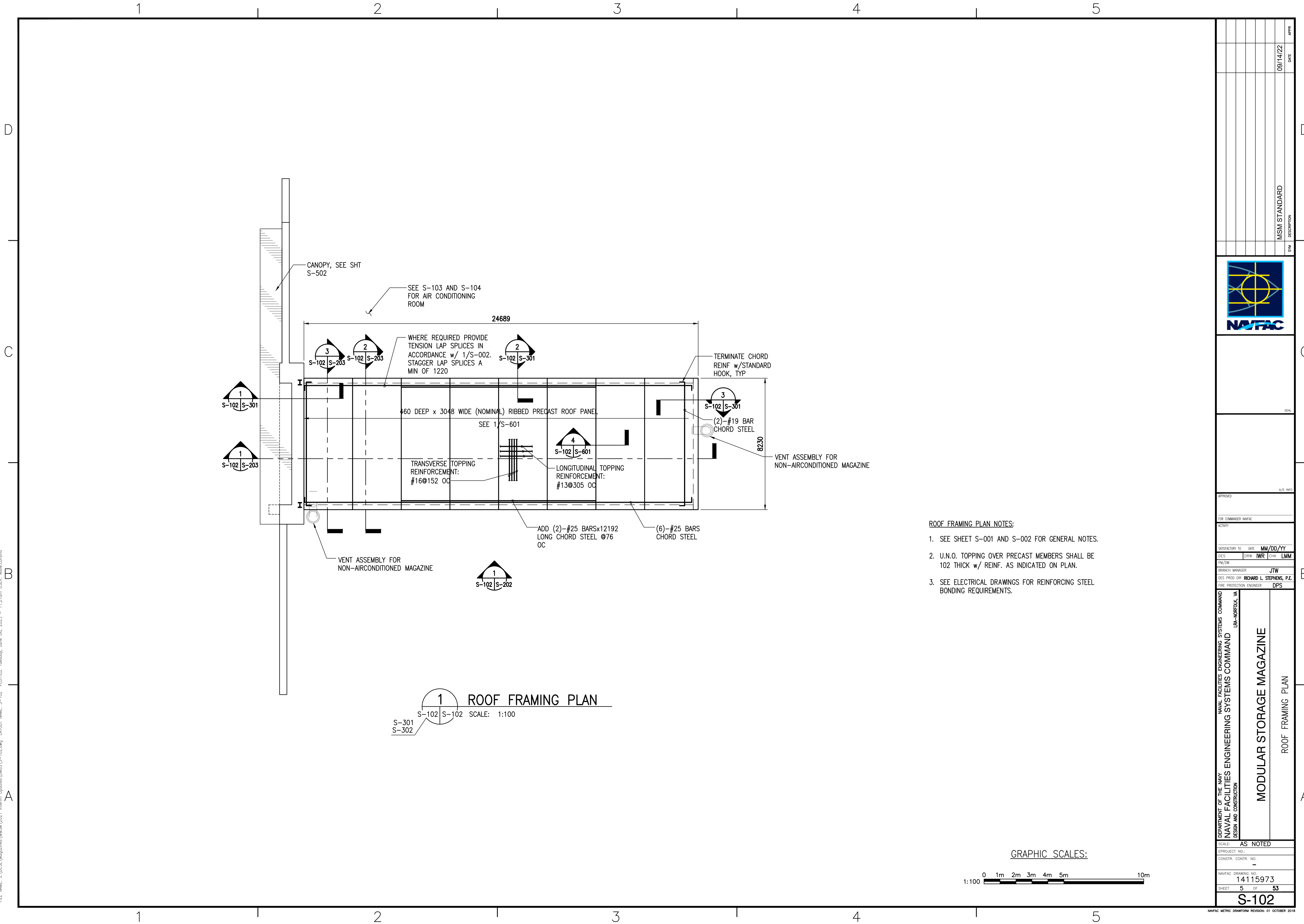
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C

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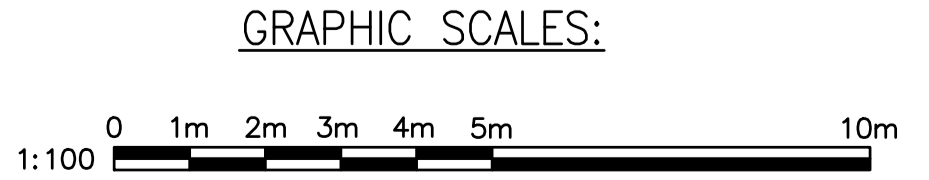
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FILE NAME: J:\USSE\Projects\WMSM\2021 Interim Updates\WMSM\S-102.dwg LAYOUT NAME: S-102 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jeb.corsino



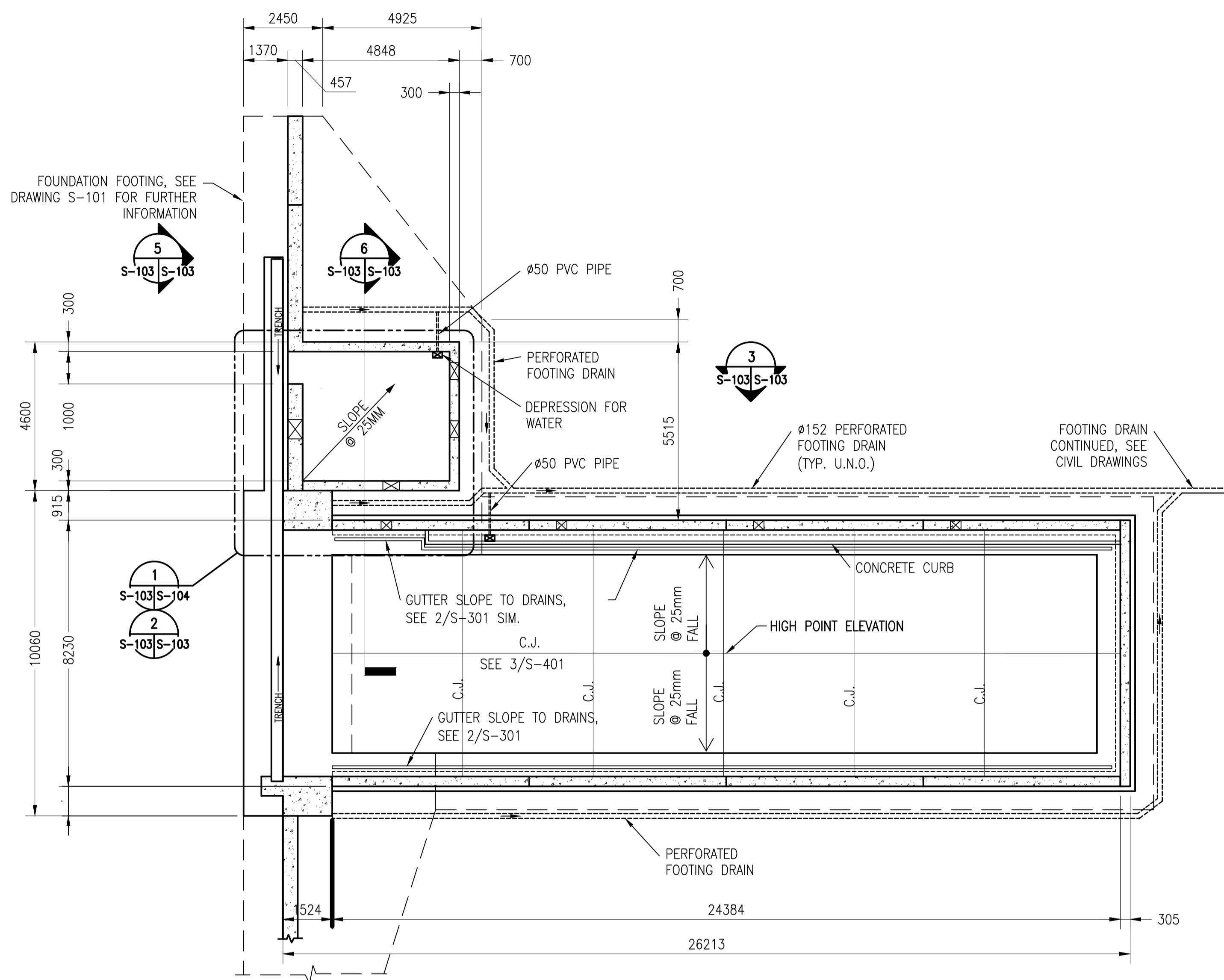
**1** ROOF FRAMING PLAN  
 S-301 S-302 S-102 S-102 SCALE: 1:100

- ROOF FRAMING PLAN NOTES:**
- SEE SHEET S-001 AND S-002 FOR GENERAL NOTES.
  - U.N.O. TOPPING OVER PRECAST MEMBERS SHALL BE 102 THICK w/ REINF. AS INDICATED ON PLAN.
  - SEE ELECTRICAL DRAWINGS FOR REINFORCING STEEL BONDING REQUIREMENTS.

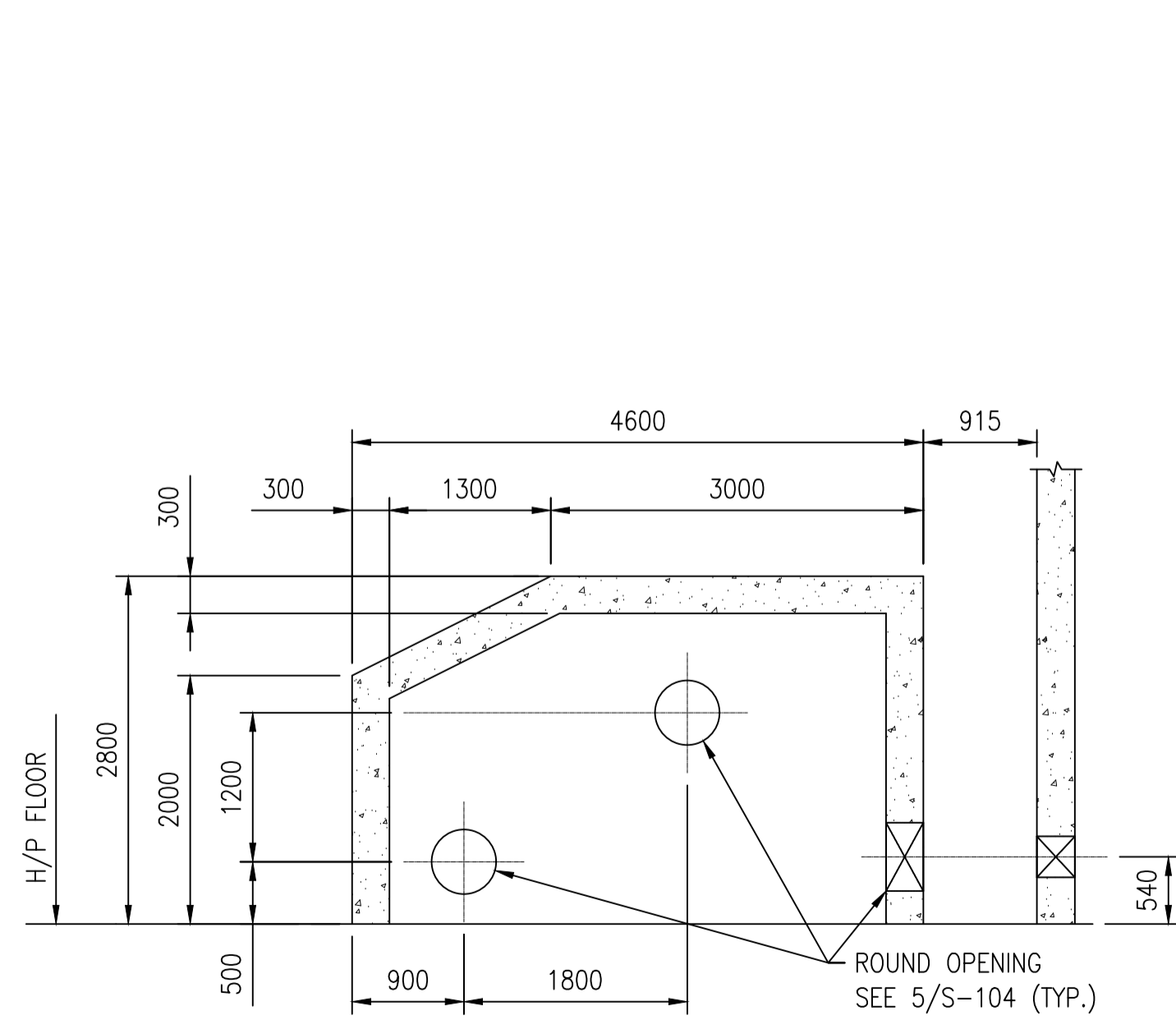


DATE	09/14/22
DESCRIPTION	MSM STANDARD
SYMBOL	
APPROVED	
FOR COMMANDER NAIFAC	
ACTIVITY	
SATISFACTORY TO	DATE MM/DD/YY
DESIGNER	DRW IWR CHK LMM
PM/DIM	
BRANCH MANAGER	JTW
DES PROD DIR	RICHARD L STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	LEA-HOBOKEN, VA
DEPARTMENT OF THE NAVY	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
DESIGN AND CONSTRUCTION	
<b>MODULAR STORAGE MAGAZINE</b>	
ROOF FRAMING PLAN	
SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAIFAC DRAWING NO.:	14115973
SHEET	5 OF 53
<b>S-102</b>	
NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018	

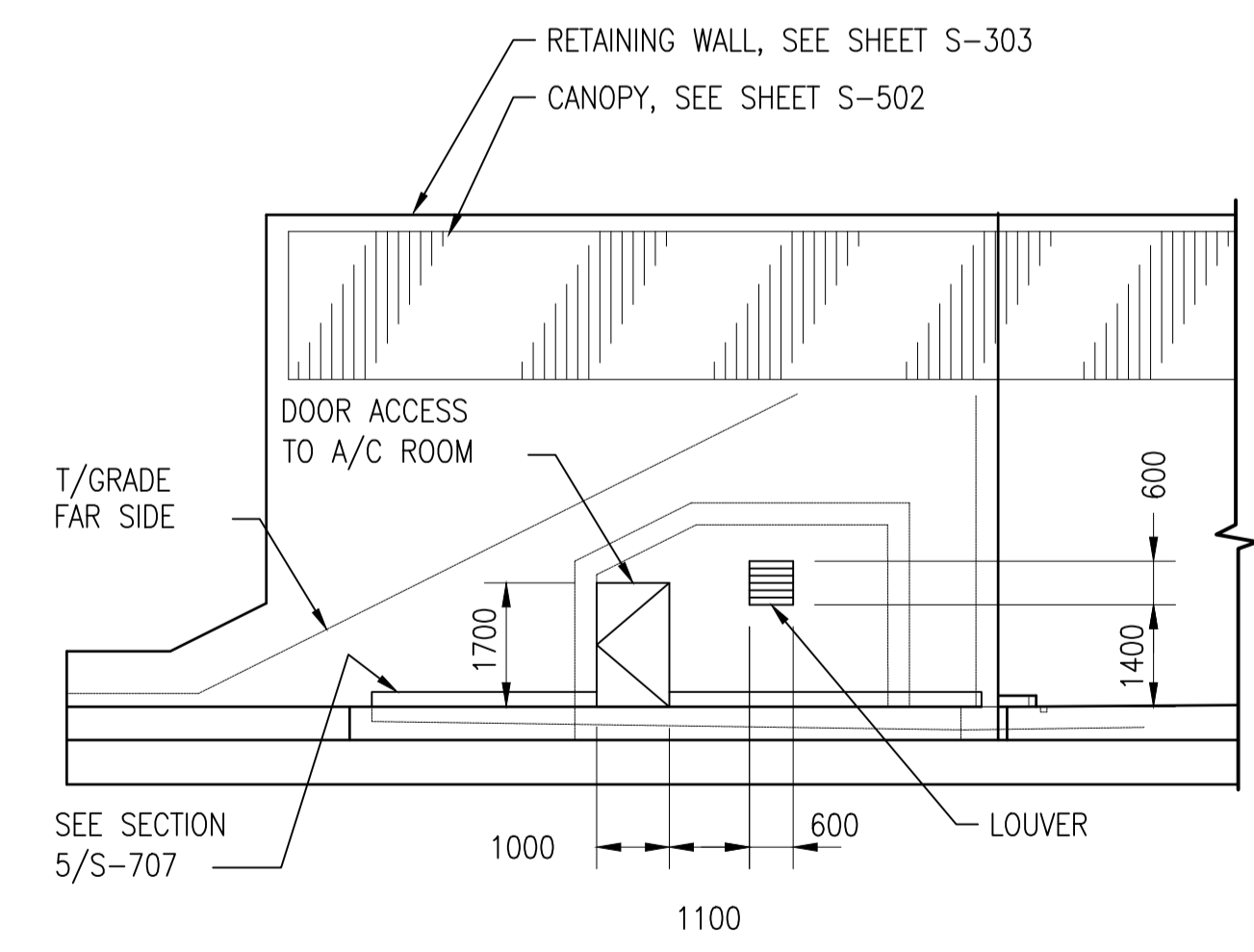
FILE NAME: J:\USSE\Magazines\WMSMA\2021\Interim\Updates\WMS\103.dwg LAYOUT NAME: S-103 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jacob.coronado



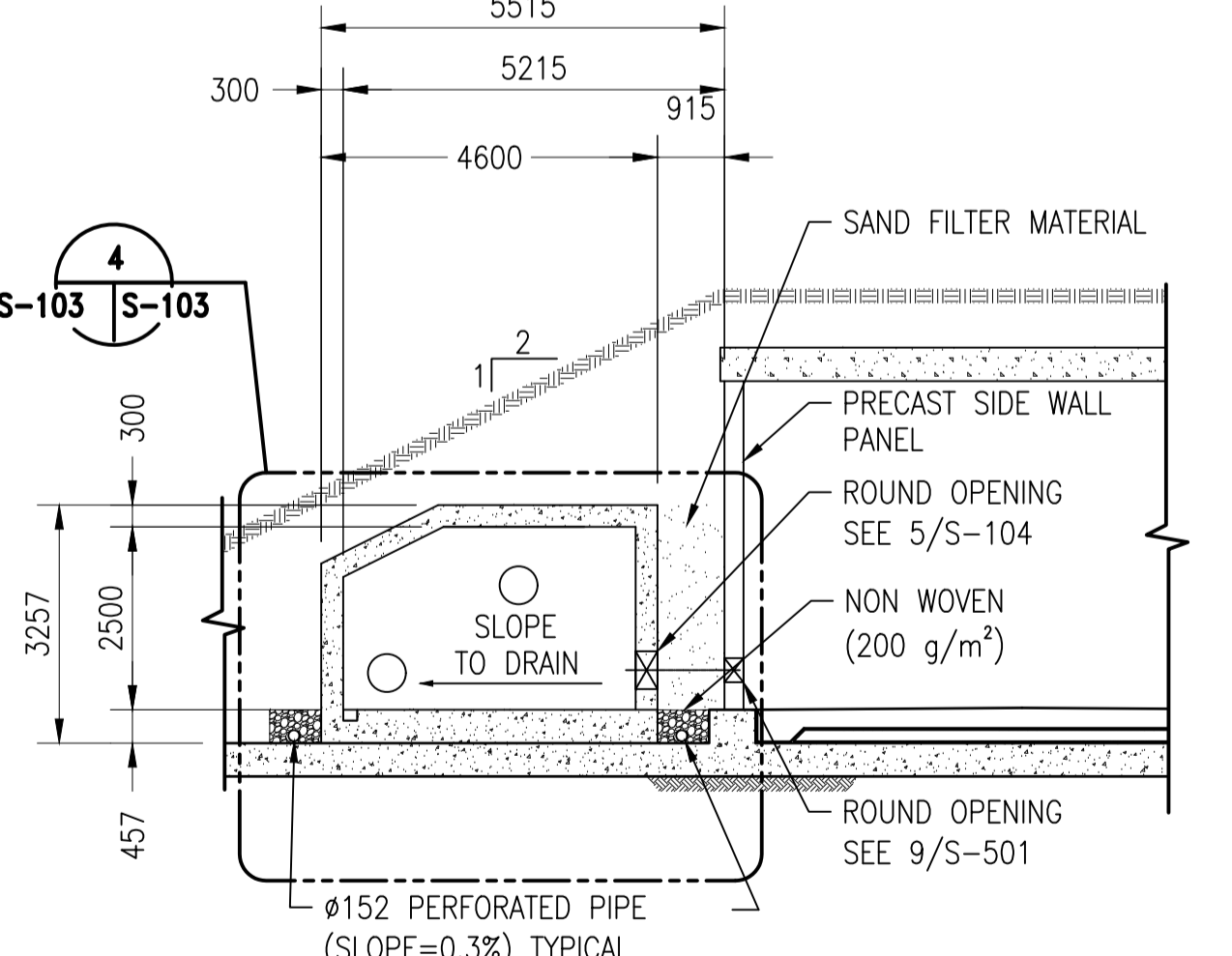
**1 PARTIAL PLAN - WITH ALTERNATE AIR CONDITIONING ROOM**  
S-103 S-103 SCALE: 1:100 SEE DRAWING S-101 FOR REMAINDER OF FOUNDATION INFORMATION.



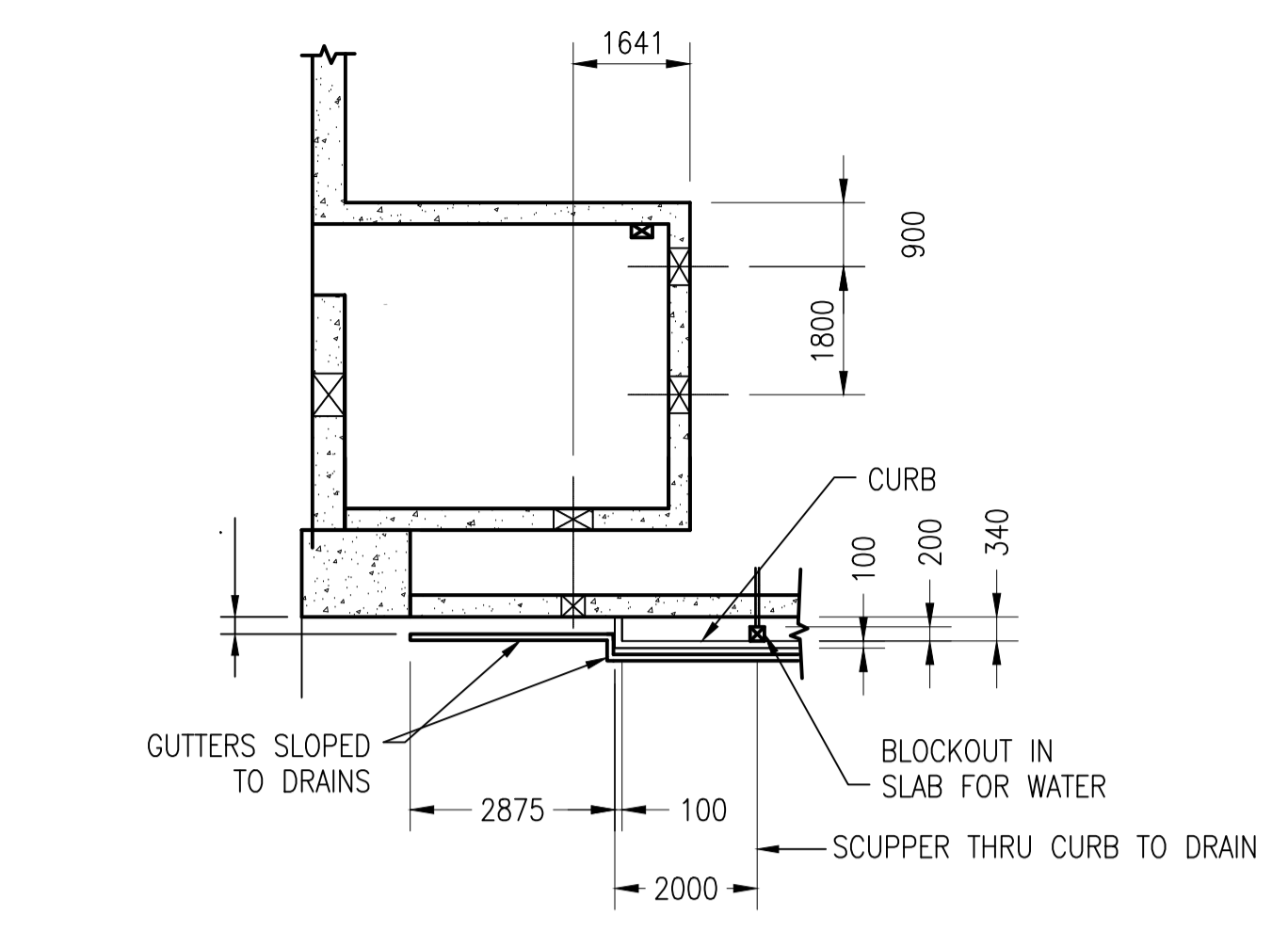
**4 A/C ROOM WALL ELEVATION**  
S-103 S-103 SCALE: 1:50



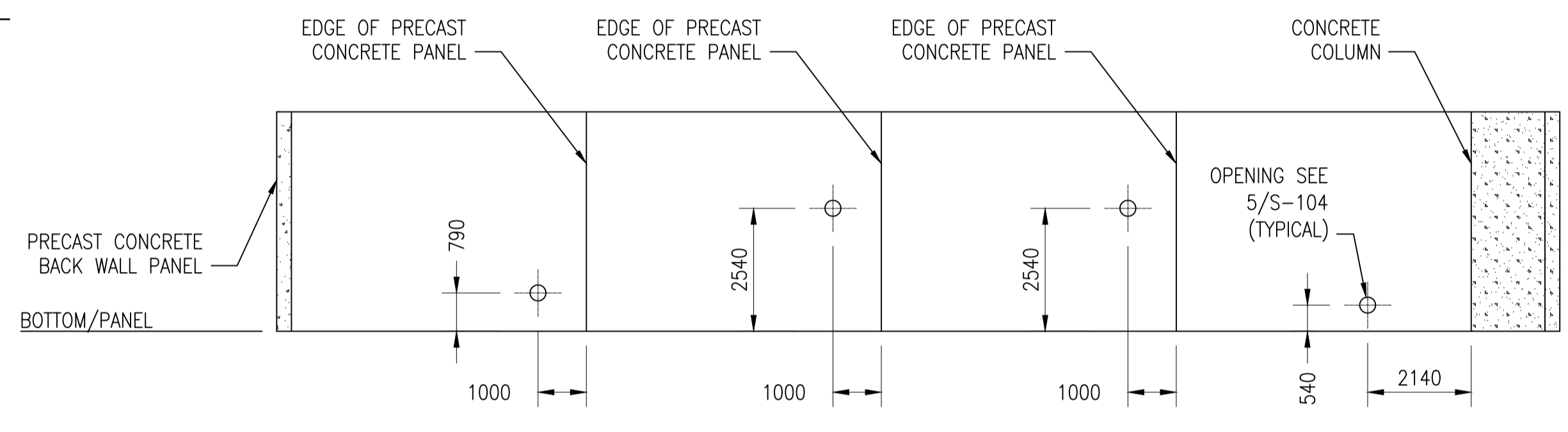
**5 FRONT ELEVATION**  
S-103 S-103 SCALE: 1:100



**6 AIR CONDITIONING ROOM SECTION**  
S-103 S-103 SCALE: 1:100



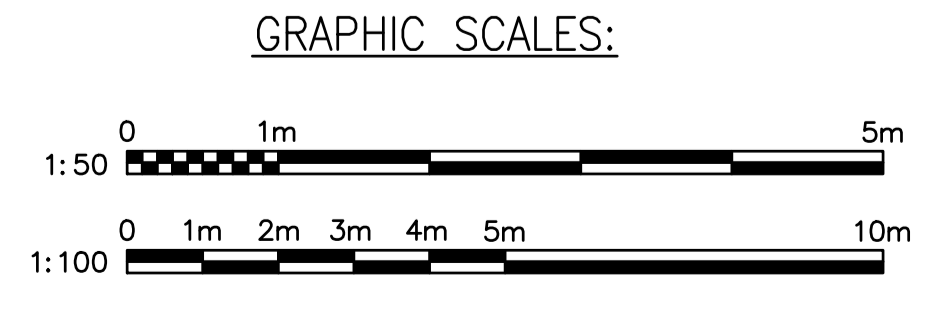
**2 A/C ROOM DUCT PENETRATION PLAN**  
S-103 S-103 SCALE: 1:100



**3 MAGAZINE WALL ELEVATION (OPENINGS REQUIRED FOR AIR CONDITIONED MAGAZINE)**  
S-103 S-103 SCALE: 1:100

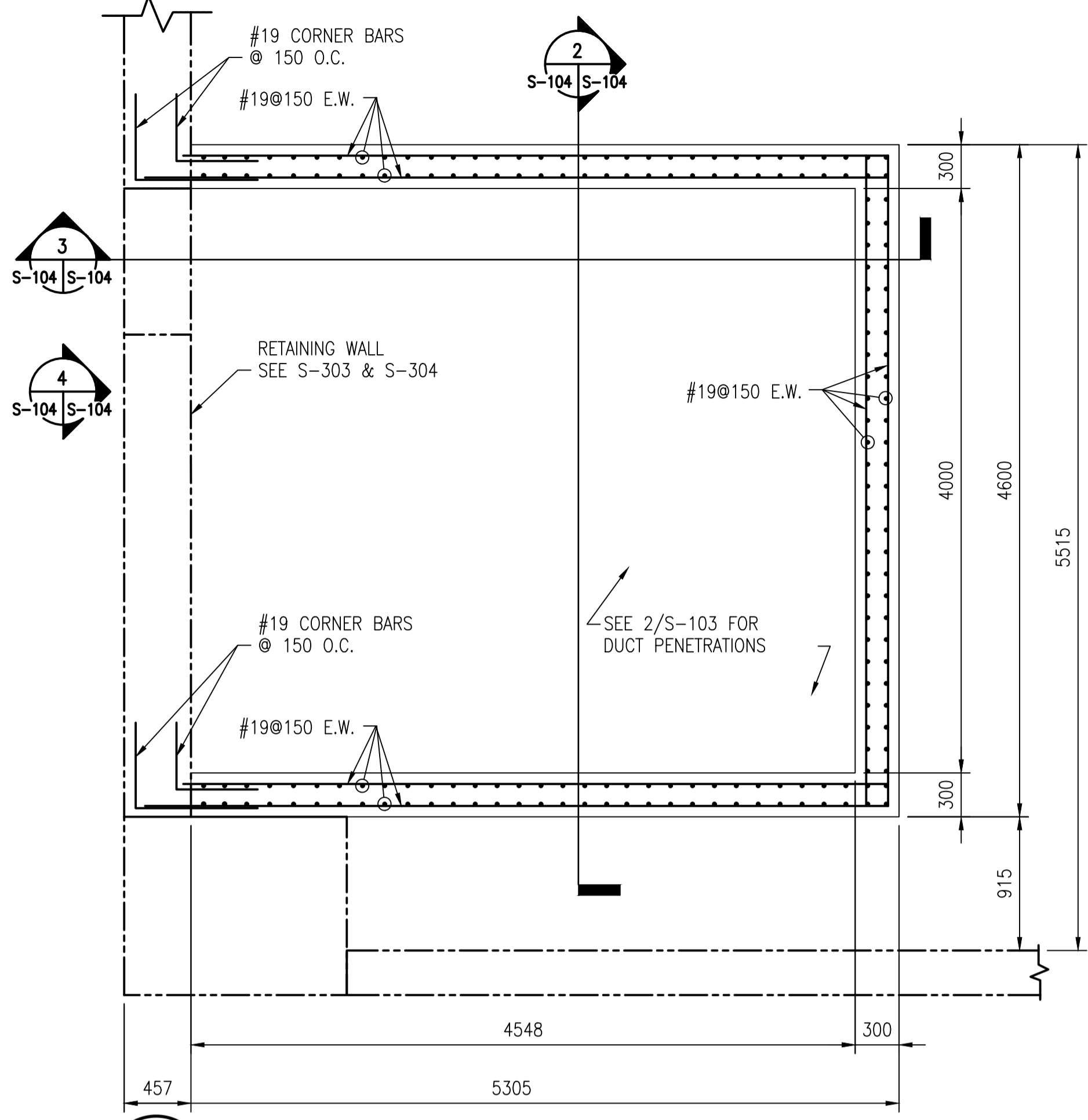
**NOTES TO DESIGNER - REMOVE NOTES WHEN PREPARING CONSTRUCTION DRAWINGS:**

- INCLUDE SHEETS S-103 TO S-105 FOR AIR CONDITIONED MAGAZINES ONLY.
- REMOVE VENT ASSEMBLIES ANNOTATED "FOR NON-AIR CONDITIONED MAGAZINE" THROUGHOUT THE SET.

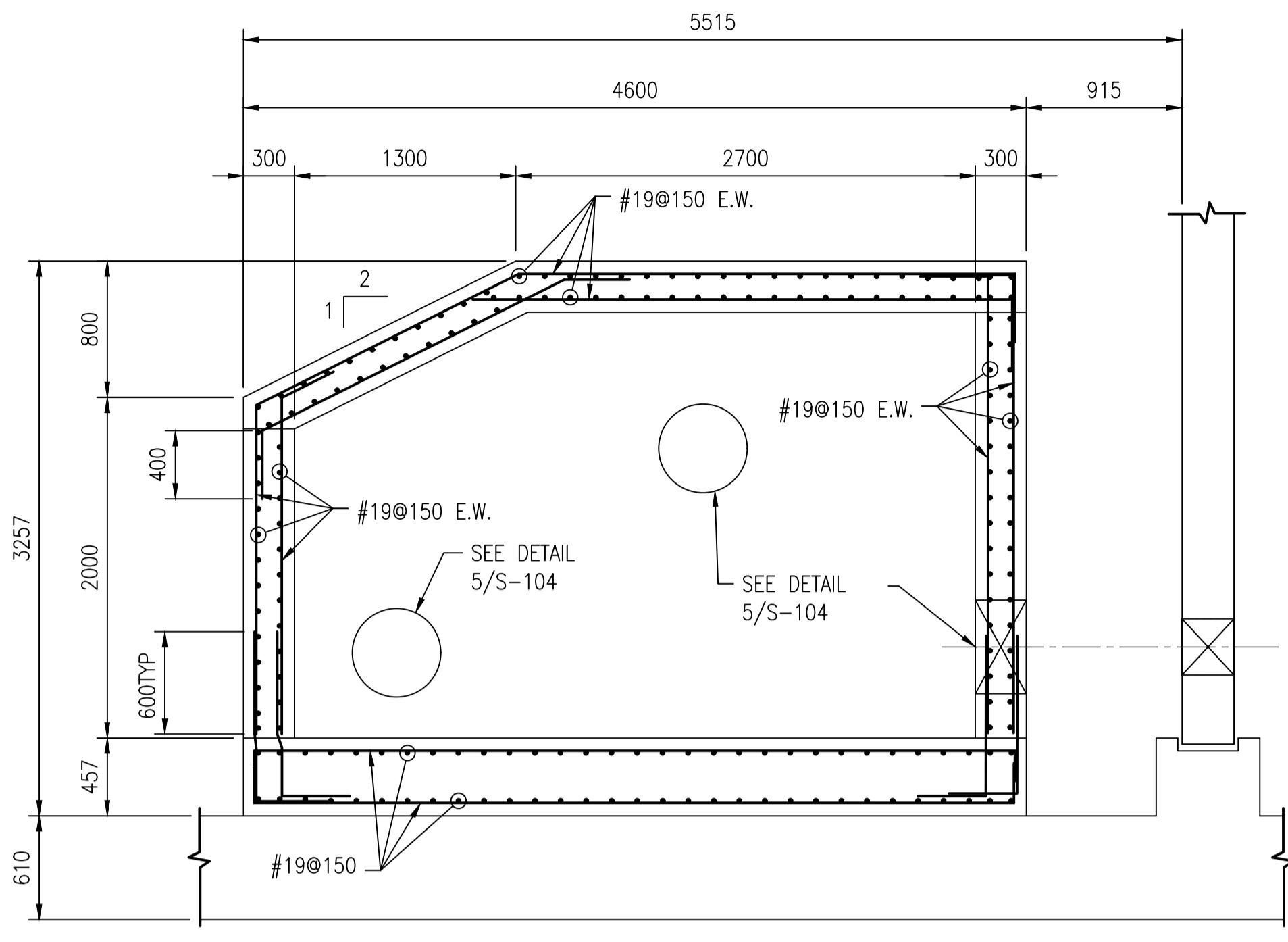


APPROVED	DATE	09/14/22
FOR COMMANDER NAFAAC	DESCRIPTION	MSM STANDARD
ACTIVITY		
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	DRW	IWR
CHECKED BY	CHK	LMM
PM/DM		
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LRA-HORRDLK, VA		
<b>MODULAR STORAGE MAGAZINE</b> FOUNDATION AND FLOOR PLAN		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAAC DRAWING NO.:	14115974	
SHEET	6	OF 53
<b>S-103</b>		
NAFAAC METRIC DRAWING REVISION: 01 OCTOBER 2018		

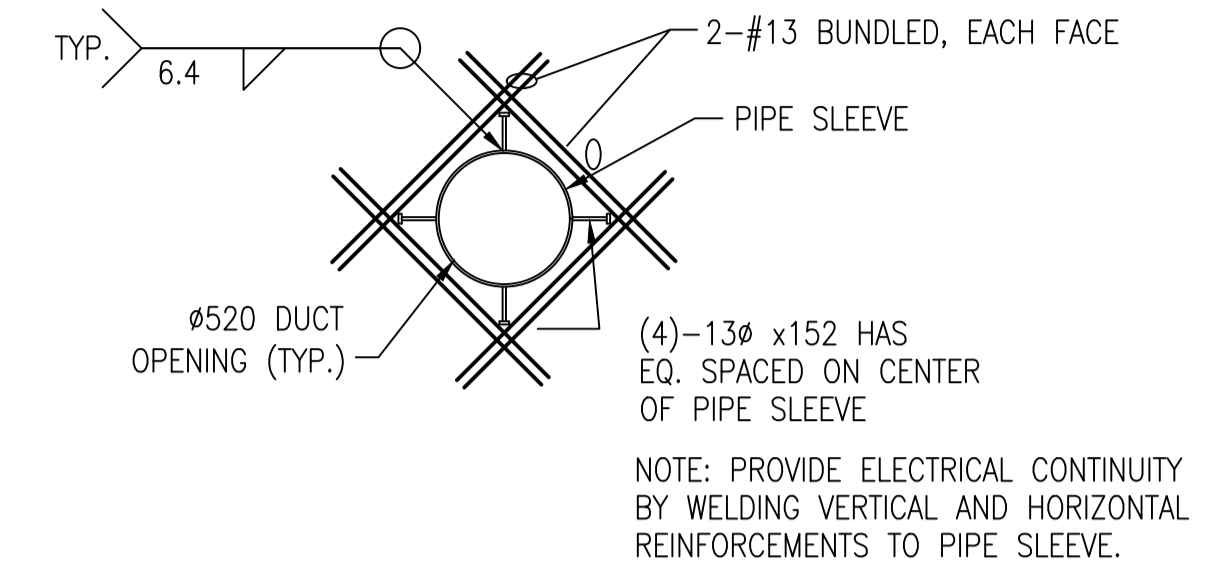
FILE NAME: J:\USSE\Magazines\MSM\2021\Interim\Updates\UNOS\S-104.dwg LAYOUT NAME: S-104 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jacob.corsino



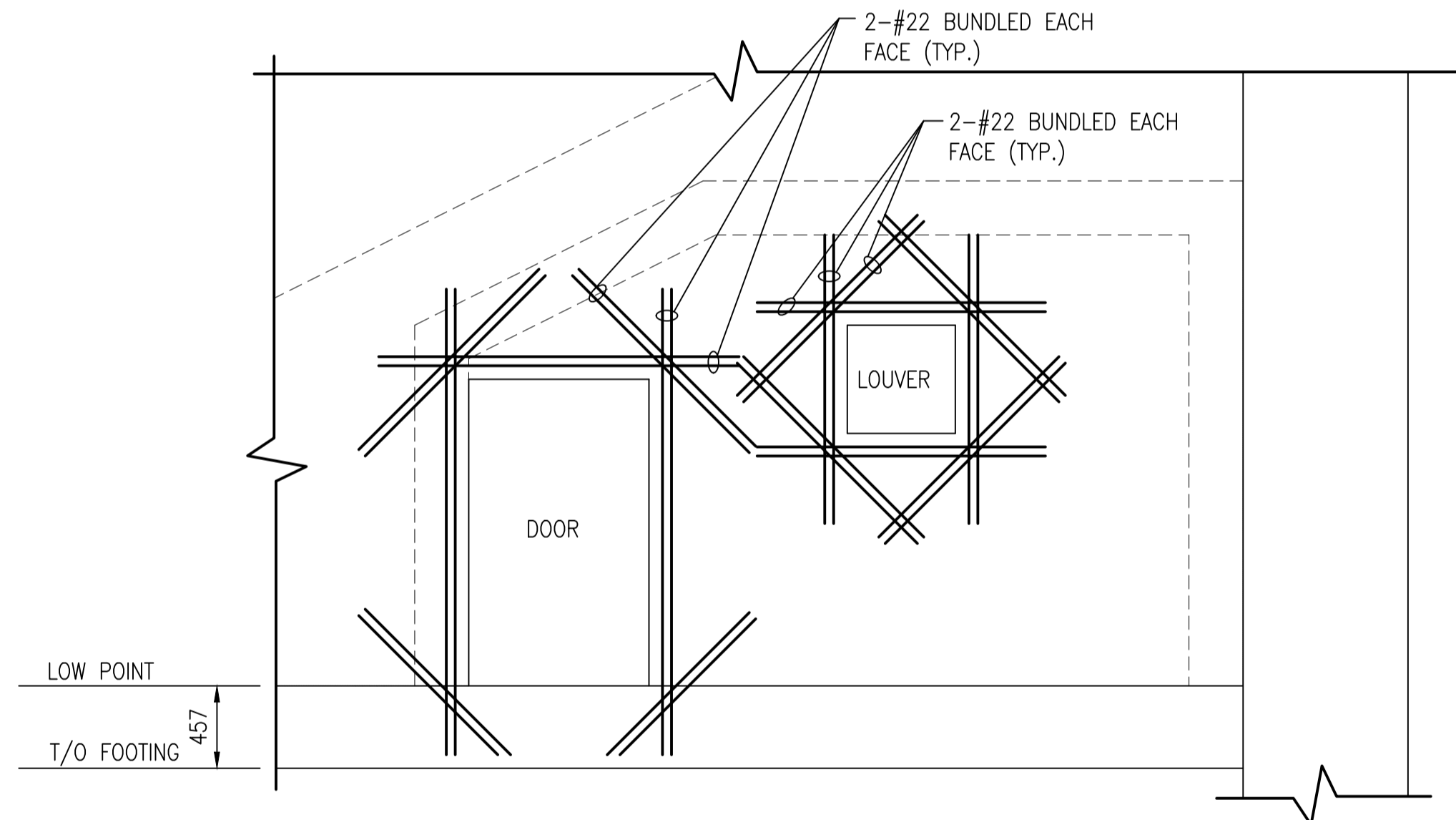
**1 PLAN - AIR CONDITIONING ROOM**  
S-104 S-104 SCALE: 1:30(60)



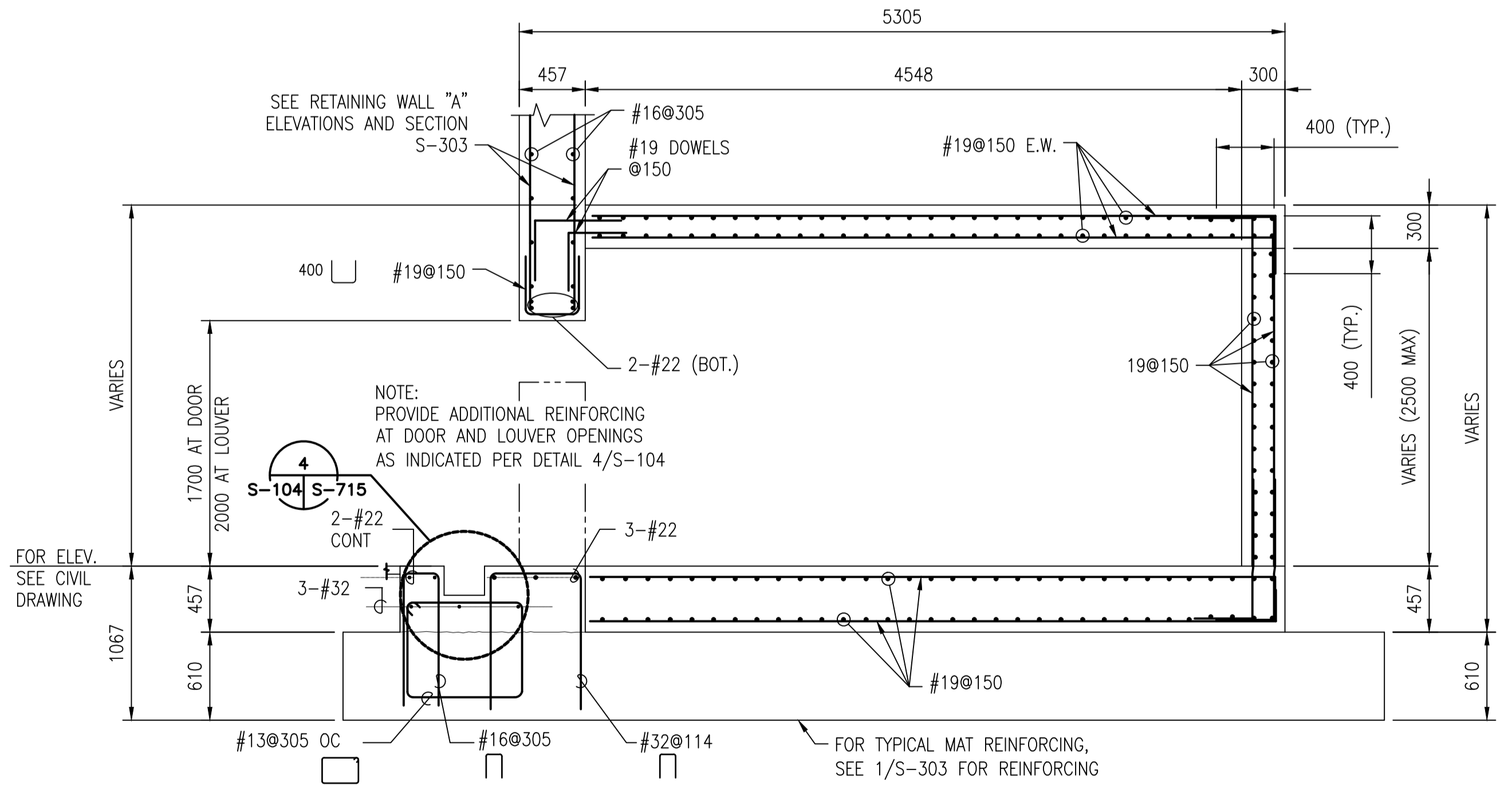
**2 SECTION**  
S-104 S-104 SCALE: 1:30(60)



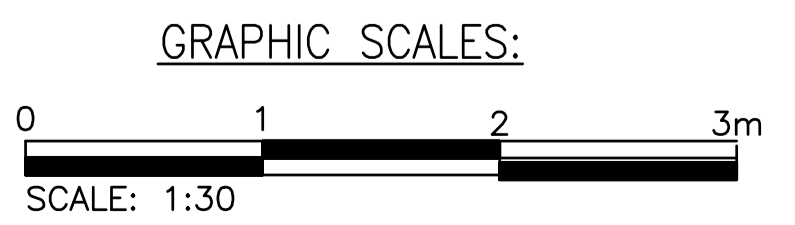
**5 DETAIL - REINFORCING AT DUCT OPENING**  
S-104 S-104 SCALE: 1:30(60)



**4 DETAIL**  
S-104 S-104 SCALE: 1:30(60)



**3 SECTION**  
S-104 S-104 SCALE: 1:30(60)



APPROVED	DATE	09/14/22
FOR COMMANDER NAIFAC	DESCRIPTION	MSM STANDARD
ACTIVITY		
SATISFACTORY TO DATE	MM/DD/YY	
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES. PROJ. DIR.	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	USNA-NORFOLK, VA
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION	
<b>MODULAR STORAGE MAGAZINE</b>		
FOUNDATION AND FLOOR PLAN		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAIFAC DRAWING NO.:	14115975	
SHEET	7	OF 53
<b>S-104</b>		
NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018		

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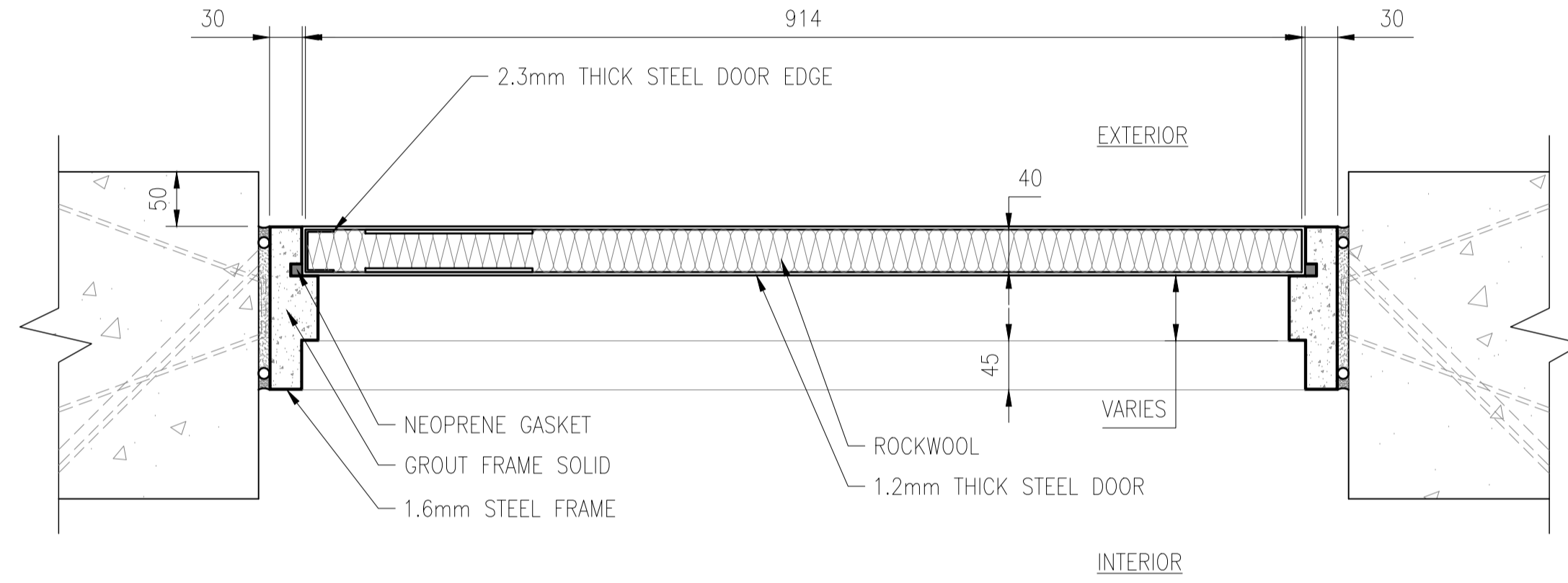
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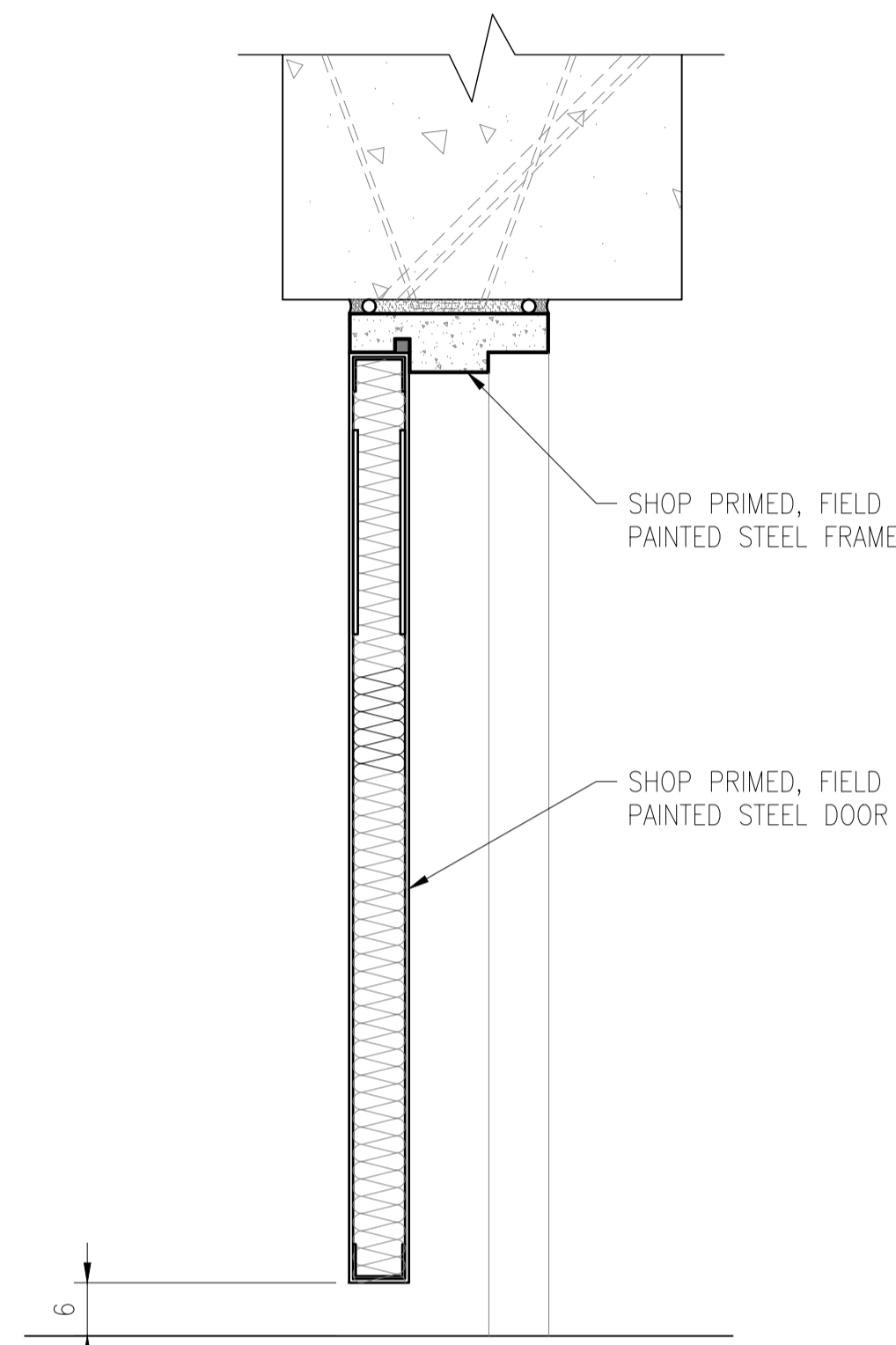
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3 PLAN OF DOOR DETAIL

S-105 S-105 SCALE: 1:5

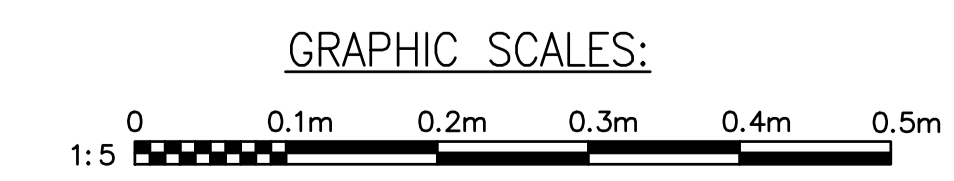


4 SECTION OF DOOR DETAIL

S-105 S-105 SCALE: 1:5

PLACE	DOOR IN AIR CONDITIONING ROOM
FORM	
DOOR	SHOP PRIMED STEEL
FRAME	SHOP PRIMED STEEL
FINISH	FIELD PAINTED, 2 COATS
HARDWARE	DOOR LOCK 1 SET, PIVOT HINGE 1 SET, DOOR STOP 1 SET

NOTES: 1. PROVIDE DOOR LOCK THAT MEETS OR EXCEEDS BASE SECURITY REQUIREMENTS.



DATE	09/14/22
APPR	
SYN	MSM STANDARD
DESCRIPTION	



SEAL	
------	--

A/E INFO	
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APPROVED				
FOR COMMANDER NAFAC				
ACTIVITY				
SATISFACTORY TO DATE	MM/DD/YY			
DES	DRW	IWR	CHK	LMM
PM/DW				
BRANCH MANAGER	JTW			
DES PROJ DIR	RICHARD L. STEPHENS, P.E.			
FIRE PROTECTION ENGINEER	DPS			

DEPARTMENT OF THE NAVY  
 NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
 DESIGN AND CONSTRUCTION  
 LNA-HOBOKEN, VA

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
 LNA-HOBOKEN, VA

MODULAR STORAGE MAGAZINE  
 DETAILS OF A/C DOOR

SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAFAC DRAWING NO.:	14115976
SHEET	8 OF 53
<b>S-105</b>	

1

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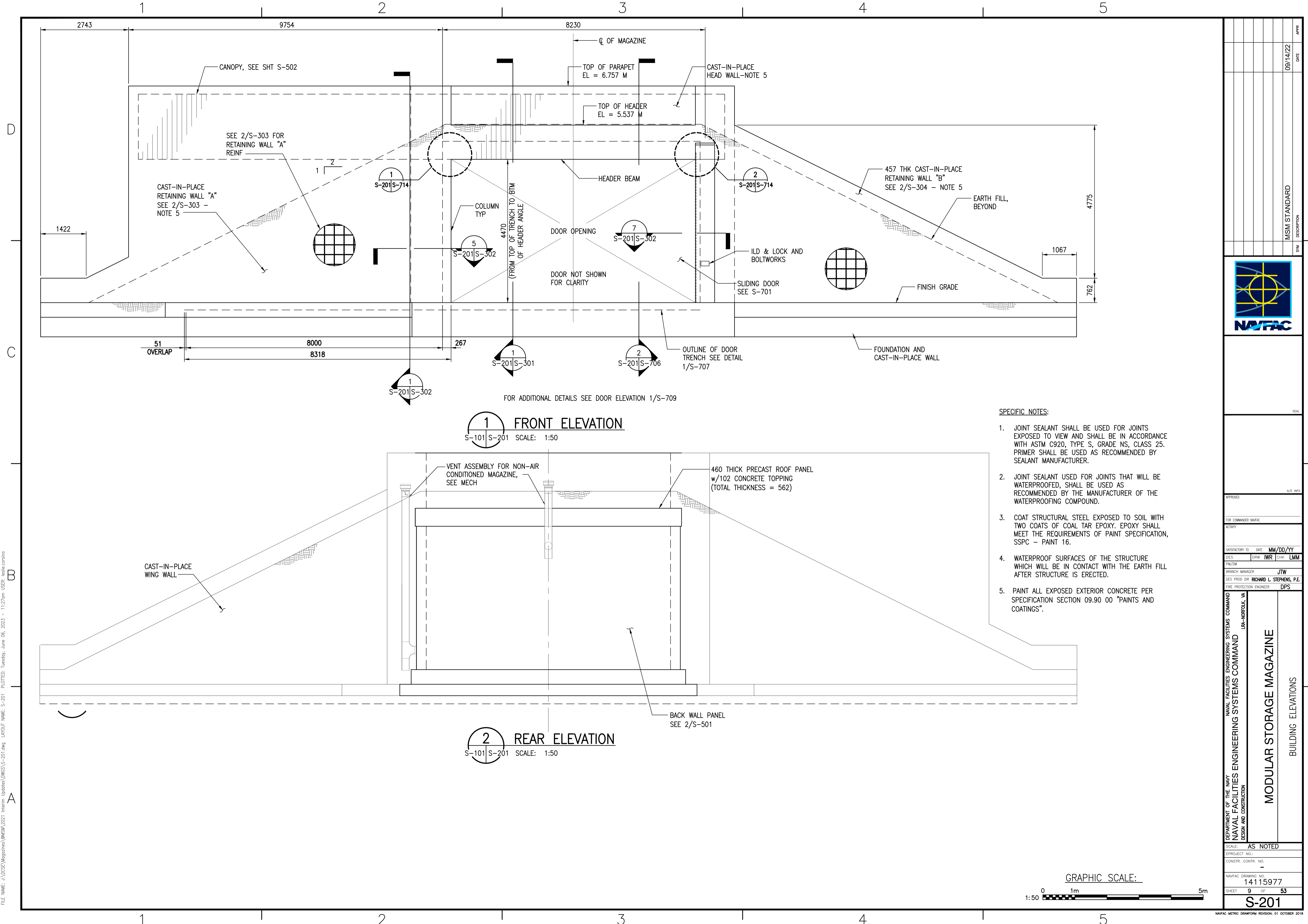
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FILE NAME: J:\USSE\Wegzines\WMSM\2021 Interim Updates\WMSM\S-105.dwg LAYOUT NAME: S-105 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jeb.corsano



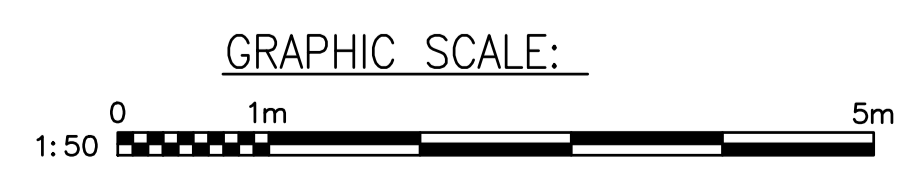


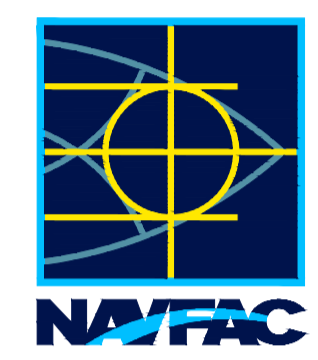
FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim Updates\WMSM\S-201.dwg LAYOUT NAME: S-201 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jebelicoriano

**1 FRONT ELEVATION**  
S-101 S-201 SCALE: 1:50

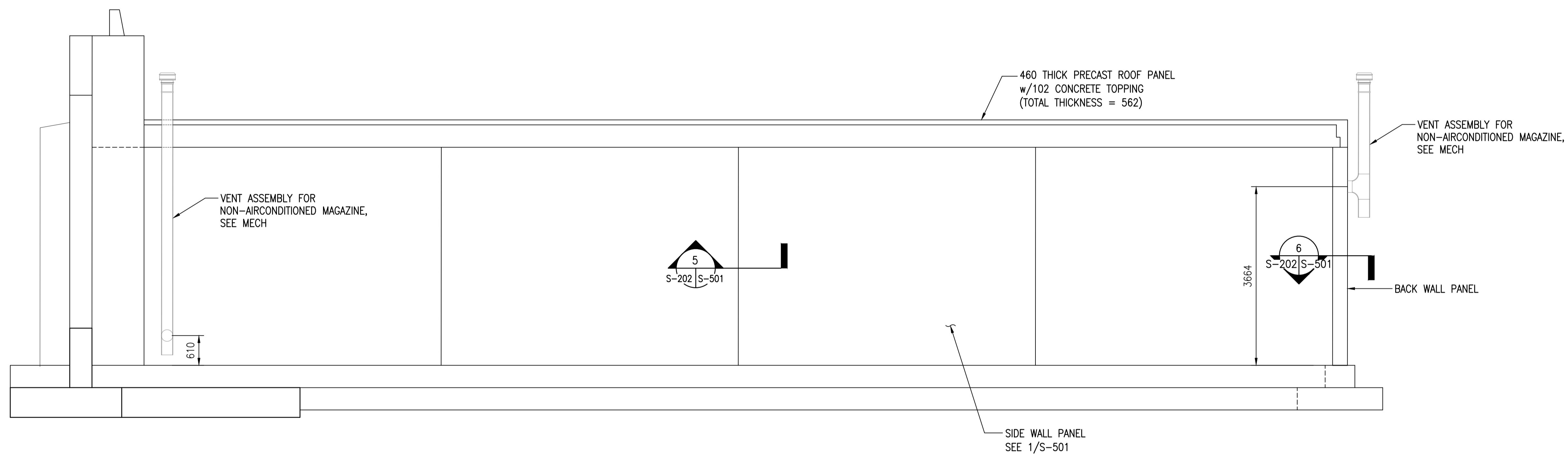
**2 REAR ELEVATION**  
S-101 S-201 SCALE: 1:50

- SPECIFIC NOTES:**
1. JOINT SEALANT SHALL BE USED FOR JOINTS EXPOSED TO VIEW AND SHALL BE IN ACCORDANCE WITH ASTM C920, TYPE S, GRADE NS, CLASS 25. PRIMER SHALL BE USED AS RECOMMENDED BY SEALANT MANUFACTURER.
  2. JOINT SEALANT USED FOR JOINTS THAT WILL BE WATERPROOFED, SHALL BE USED AS RECOMMENDED BY THE MANUFACTURER OF THE WATERPROOFING COMPOUND.
  3. COAT STRUCTURAL STEEL EXPOSED TO SOIL WITH TWO COATS OF COAL TAR EPOXY. EPOXY SHALL MEET THE REQUIREMENTS OF PAINT SPECIFICATION, SSPC - PAINT 16.
  4. WATERPROOF SURFACES OF THE STRUCTURE WHICH WILL BE IN CONTACT WITH THE EARTH FILL AFTER STRUCTURE IS ERECTED.
  5. PAINT ALL EXPOSED EXTERIOR CONCRETE PER SPECIFICATION SECTION 09.90 00 "PAINTS AND COATINGS".

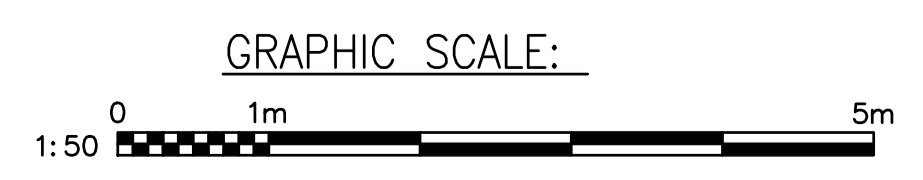


	APPROVED: _____ FOR COMMANDER NAFAC: _____ ACTIVITY: _____ SATISFACTORY TO: _____ DATE: MM/DD/YY DESIGNED BY: JTW DES. PROJ. DIR: RICHARD L. STEPHENS, P.E. FIRE PROTECTION ENGINEER: DPS
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LDU-HORRDLK, VA	
<b>MODULAR STORAGE MAGAZINE</b> BUILDING ELEVATIONS	
SCALE: AS NOTED PROJECT NO.: _____ CONSTR. CONTR. NO.: _____ NAFAC DRAWING NO.: 14115977 SHEET 9 OF 53 <b>S-201</b>	
NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018	

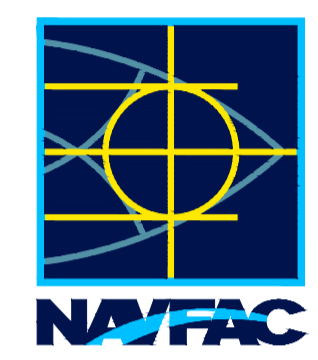
FILE NAME: J:\USSE\Projects\WMSM\2021 Interim Updates\WMSM\S-202.dwg LAYOUT NAME: S-202 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jeb.corsano

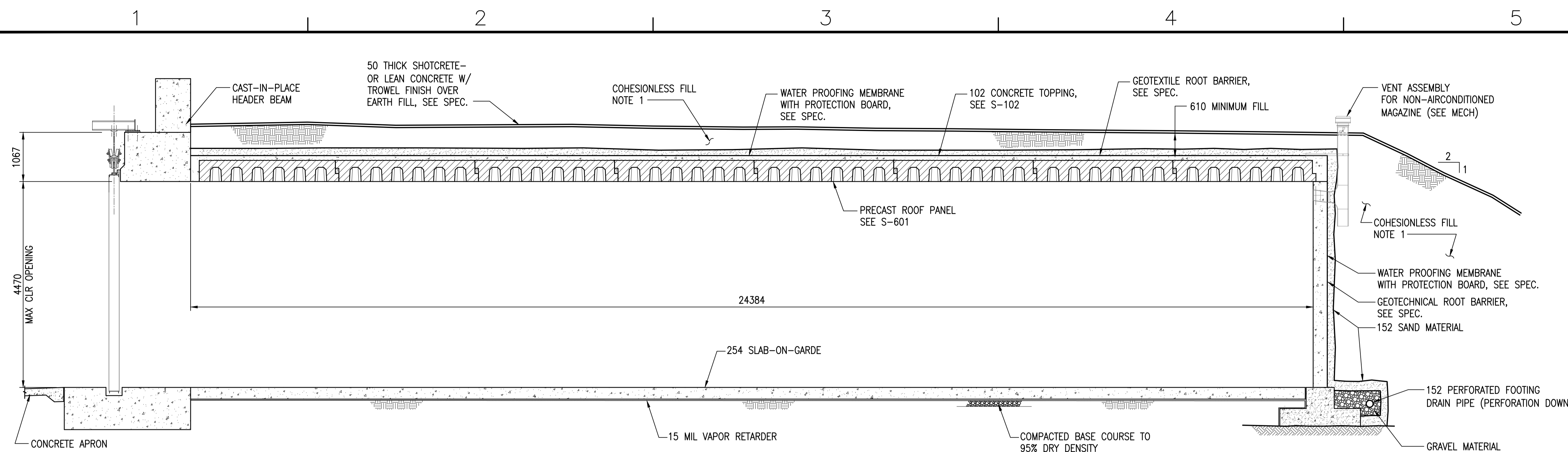


**1** SIDE ELEVATION  
 S-101 S-202 SCALE: 1:50

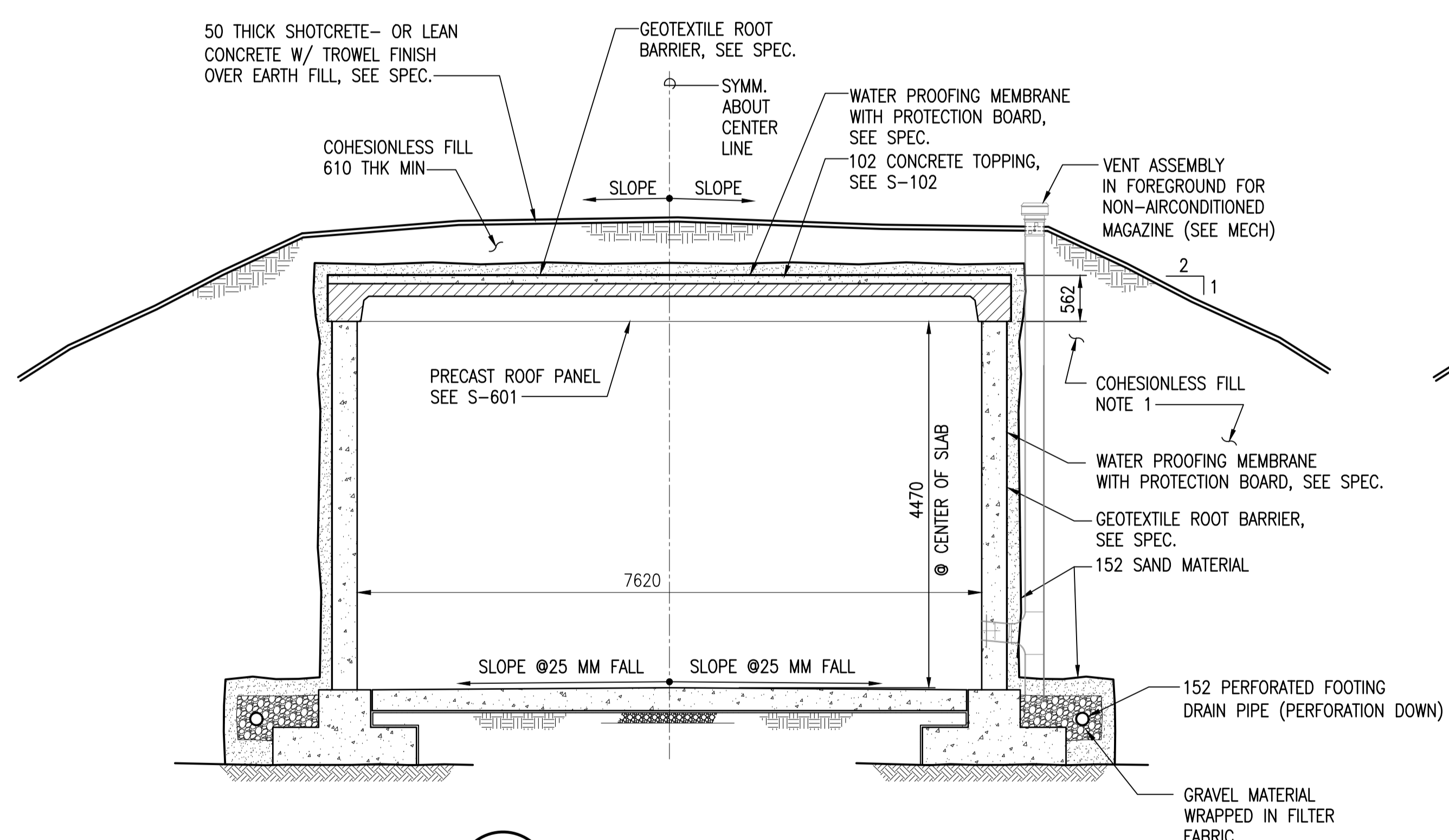


APPROVED	DATE	09/14/22
FOR COMMANDER NAIFAC	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD DIR	RICHARD L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LNA-HOBOKEN, VA		
<b>MODULAR STORAGE MAGAZINE</b> BUILDING SIDE ELEVATION		
SCALE: AS NOTED		
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAIFAC DRAWING NO. 14115978		
SHEET 10 OF 53		
<b>S-202</b>		
NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018		

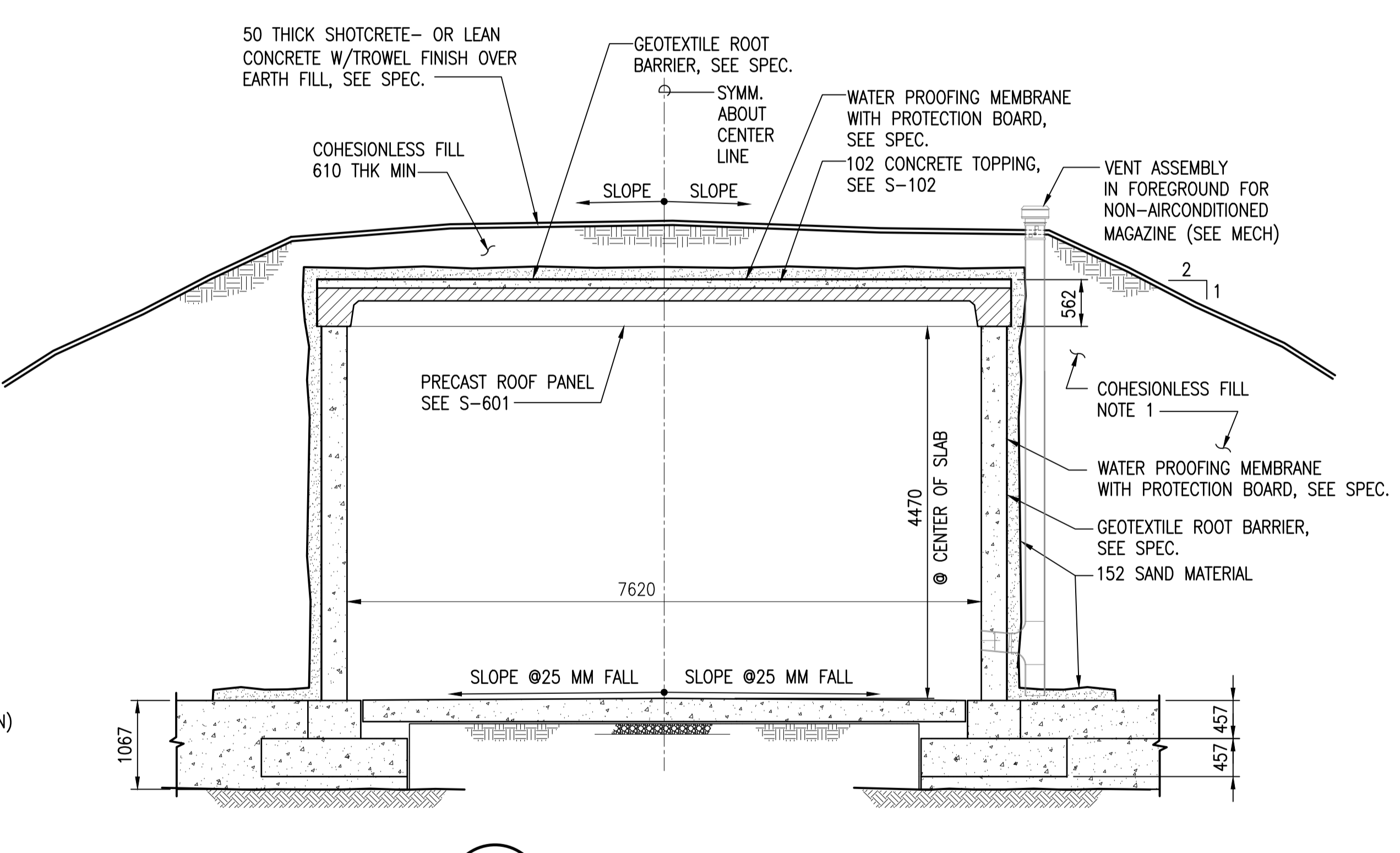




**1 BUILDING SECTION**  
S-101 S-203 SCALE: 1:50  
S-102

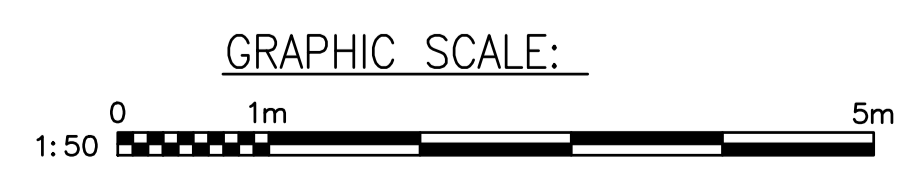


**2 BUILDING SECTION**  
S-101 S-203 SCALE: 1:50  
S-102



**3 BUILDING SECTION**  
S-101 S-203 SCALE: 1:50  
S-102

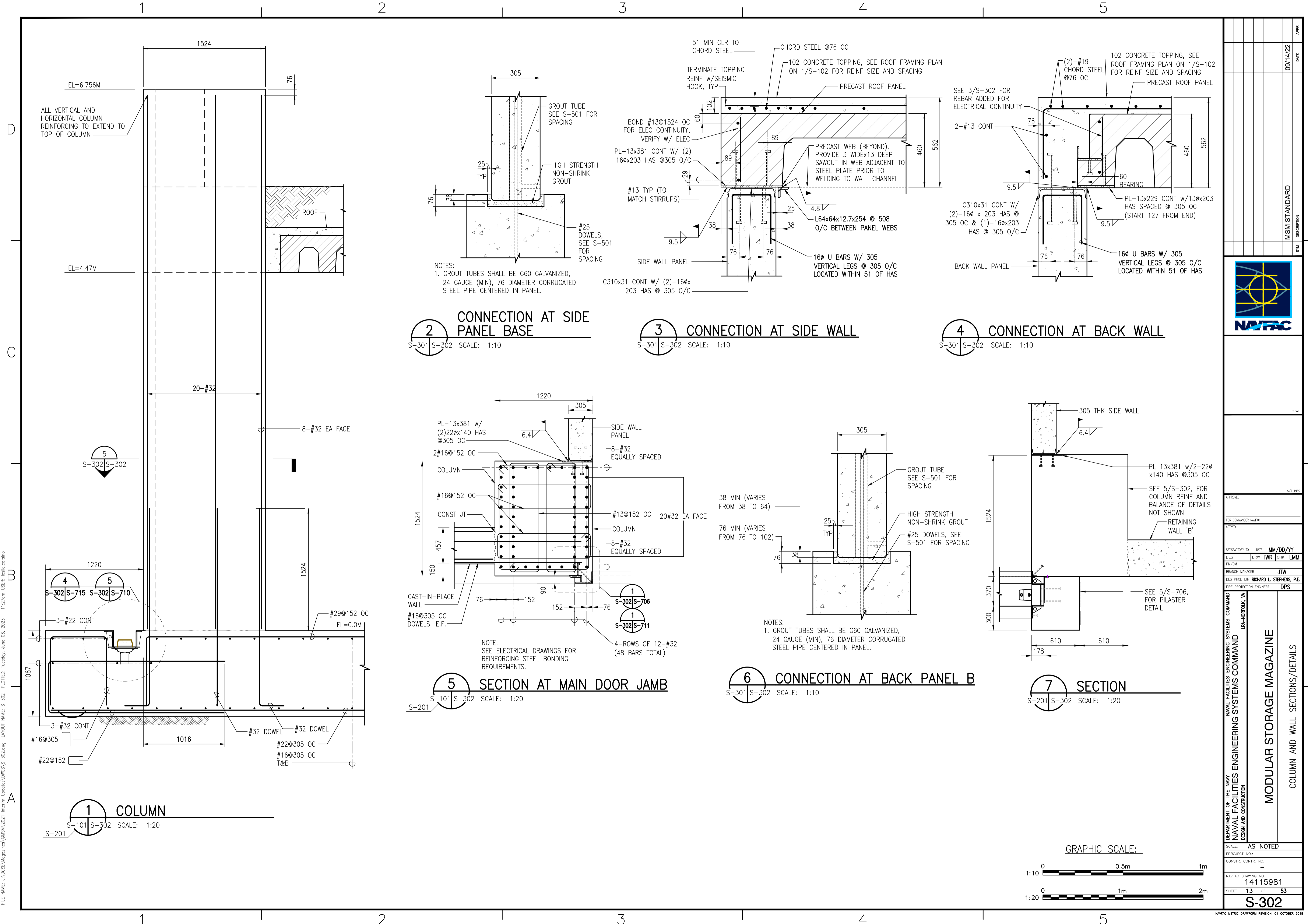
NOTES:  
1. COHESIONLESS FILL SHALL NOT INCLUDE ANY STONES HEAVIER THAN 4kg, OR BE LARGER THAN 150mm IN ANY DIRECTION.



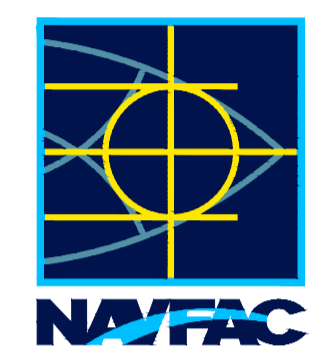
DATE	09/14/22
APPR	
SYN	MSM STANDARD
DESCRIPTION	
<b>MODULAR STORAGE MAGAZINE</b> BUILDING SECTIONS	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
DESIGN AND CONSTRUCTION	LAJ-HOBOKEN, VA
SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAFAC DRAWING NO.:	14115979
SHEET	11 OF 53
<b>S-203</b>	
NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018	

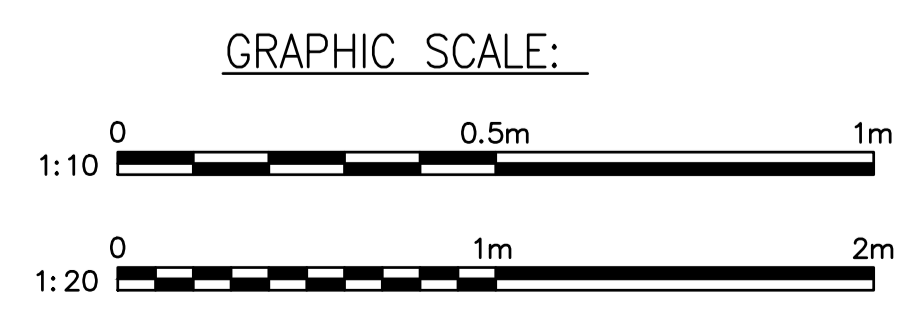
FILE NAME: J:\USCE\Magazines\WMSM\2021 Interim Updates\WMSM\S-203.dwg LAYOUT NAME: S-203 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jelicoriano

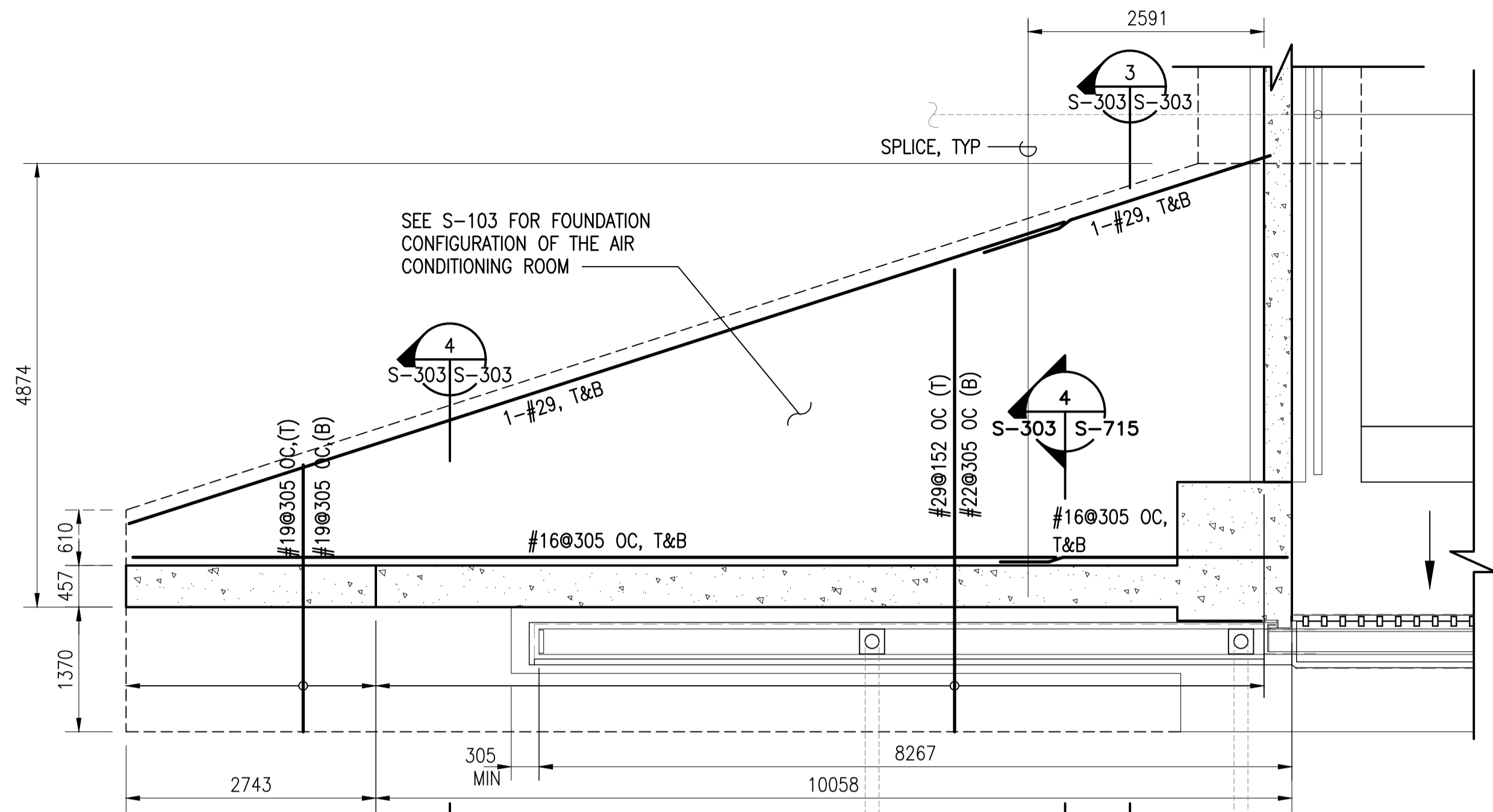




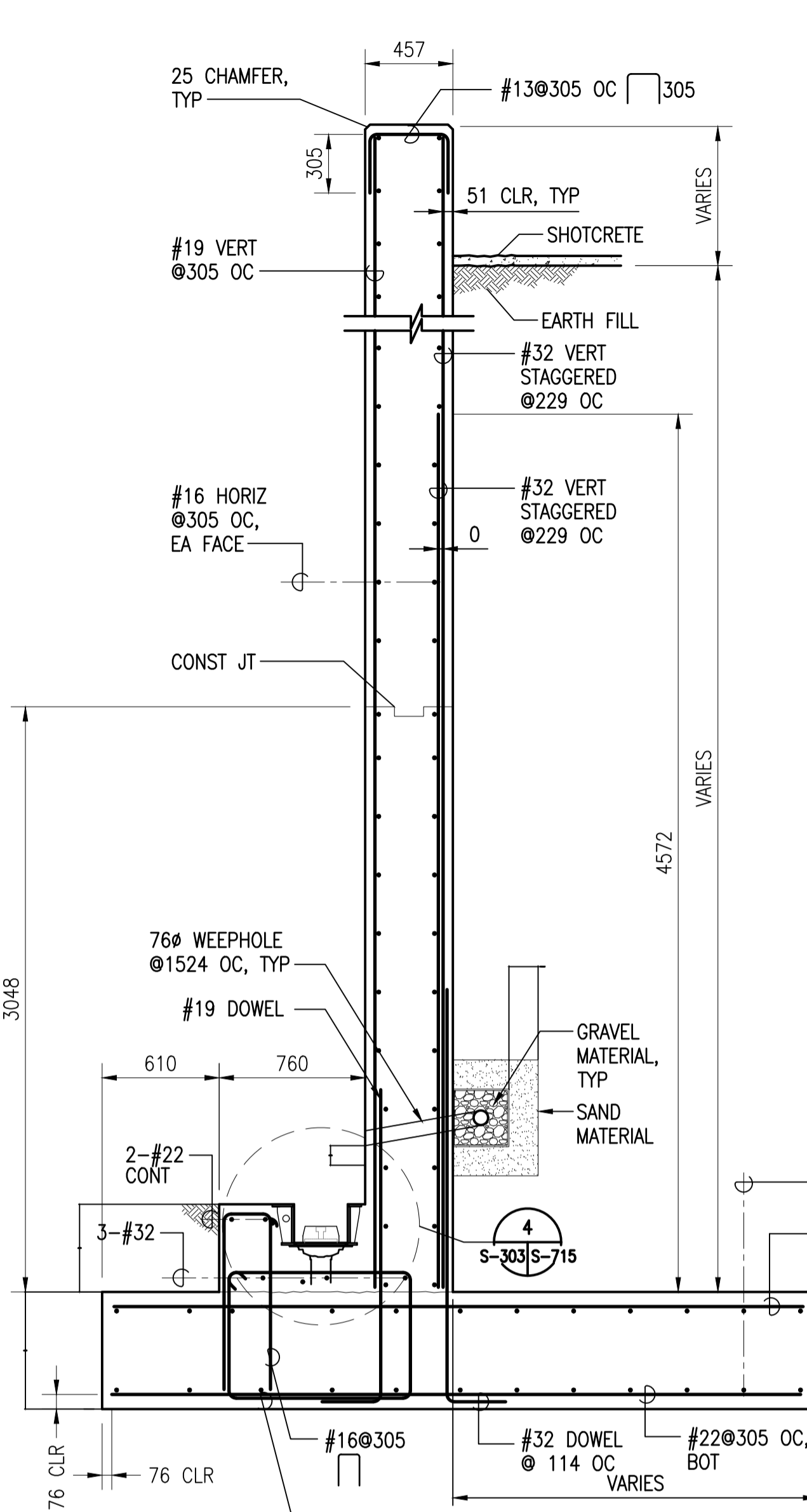
FILE NAME: J:\USSE\Magazines\MSM\2021\Interim\Updates\UNOS\S-302.dwg LAYOUT NAME: S-302 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jeb@coronado

APPR	09/14/22	DATE
MSM STANDARD	DESCRIPTION	
		
APPROVED	DATE	MM/DD/YY
FOR COMMANDER NAFAC		
ACTIVITY		
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNER	CHK	LMM
TRM/DM		
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DESIGN AND CONSTRUCTION	LAH-HORROCK, VA	
<b>MODULAR STORAGE MAGAZINE</b> COLUMN AND WALL SECTIONS/DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:	14115981	
CONSTR. CONTR. NO.:		
NAFAC DRAWING NO.:	14115981	
SHEET	13	OF 53
<b>S-302</b>		
<small>NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018</small>		

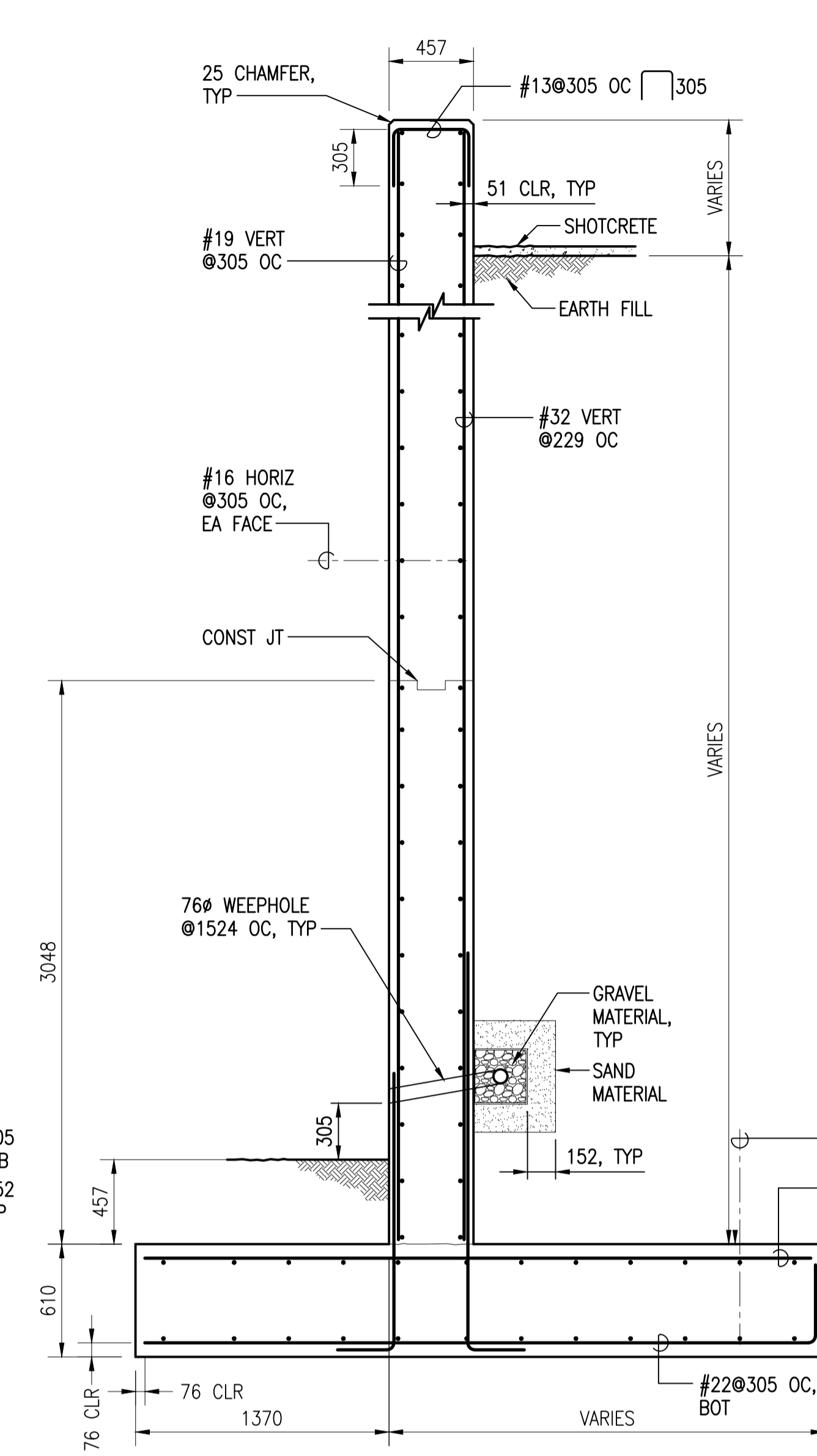




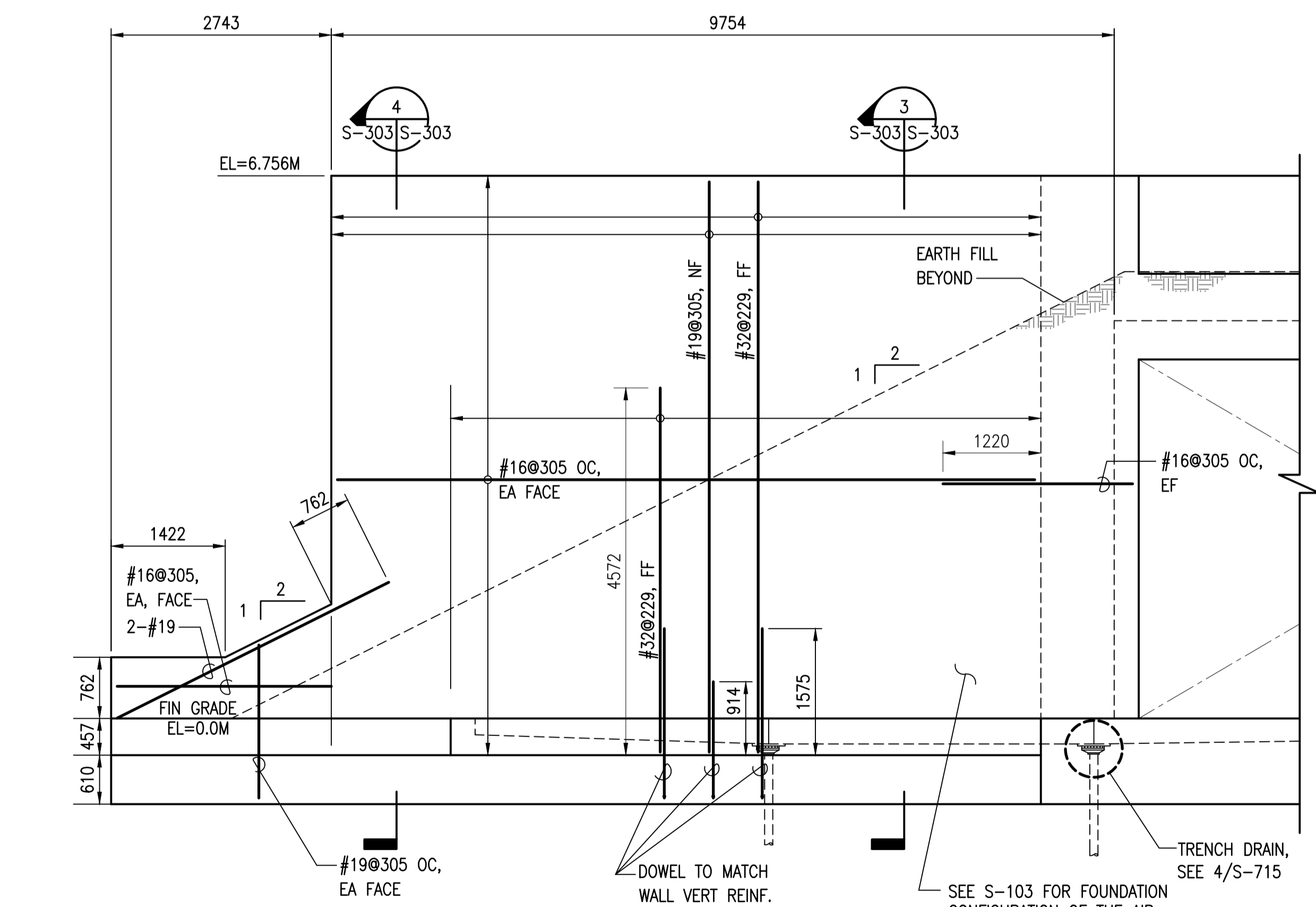
**1** RETAINING WALL "A" FOUNDATION PLAN  
S-101 S-303 SCALE: 1:50



**3** RETAINING WALL SECTION  
S-101 S-303 S-303 SCALE: 1:25

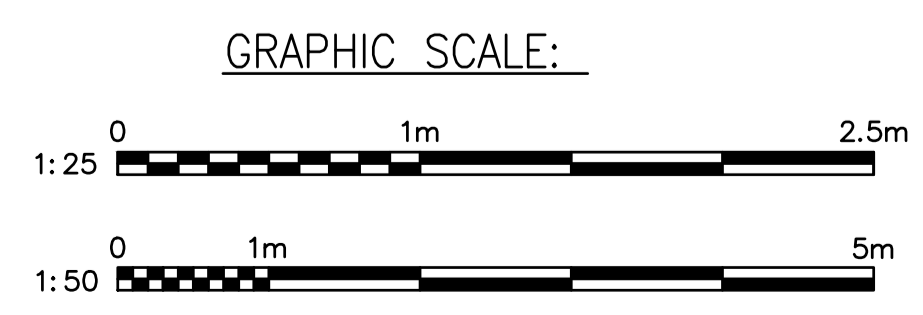


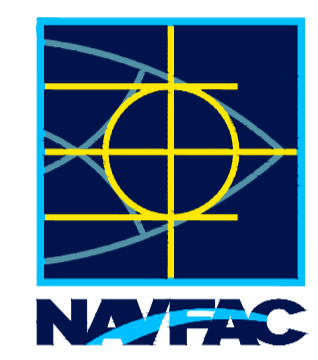
**4** RETAINING WALL SECTION  
S-101 S-303 S-303 SCALE: 1:25



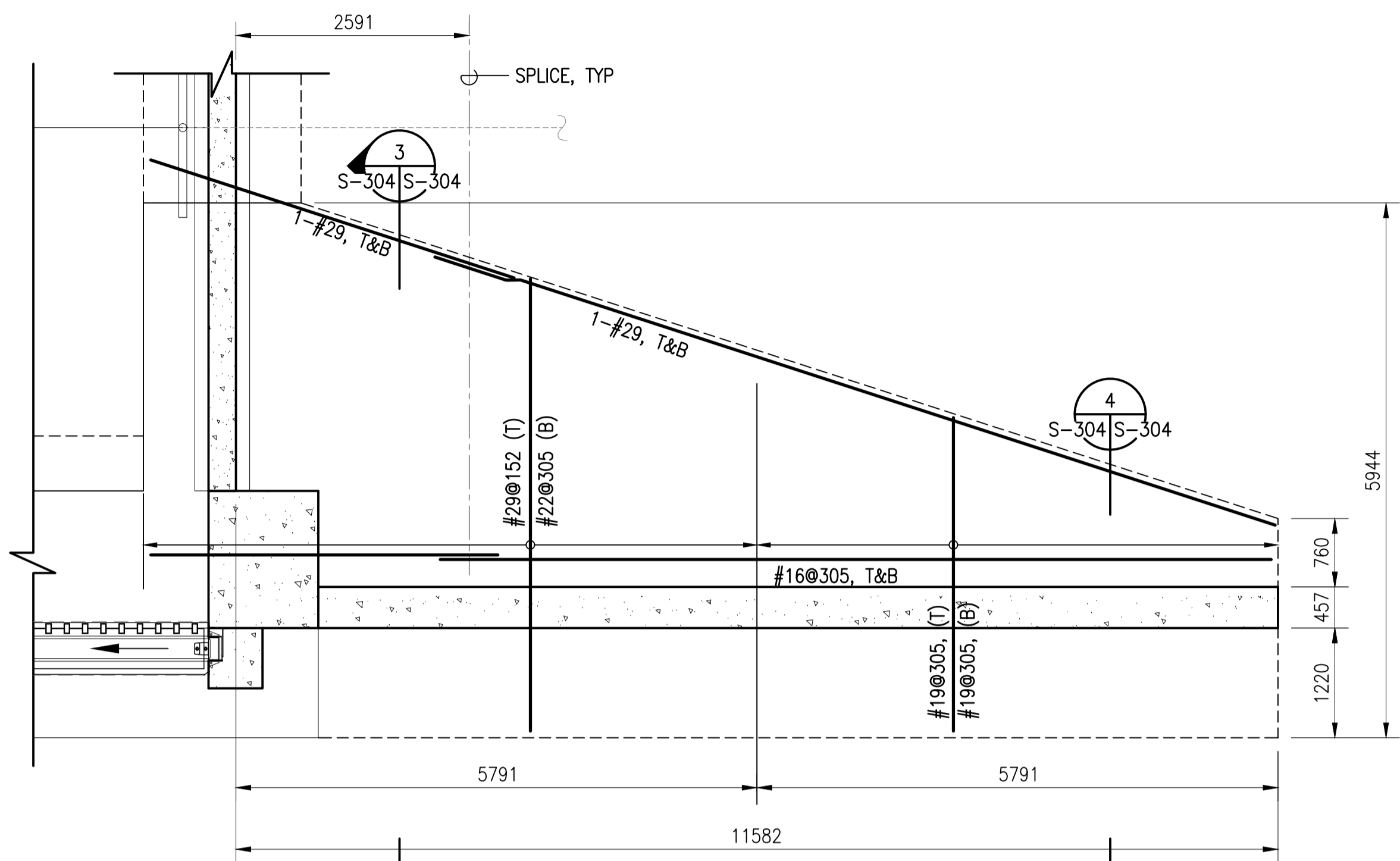
**2** RETAINING WALL "A" ELEVATION  
S-201 S-303 SCALE: 1:50

NOTE:  
SEE ELECTRICAL DRAWINGS FOR  
REINFORCING STEEL BONDING  
REQUIREMENTS.

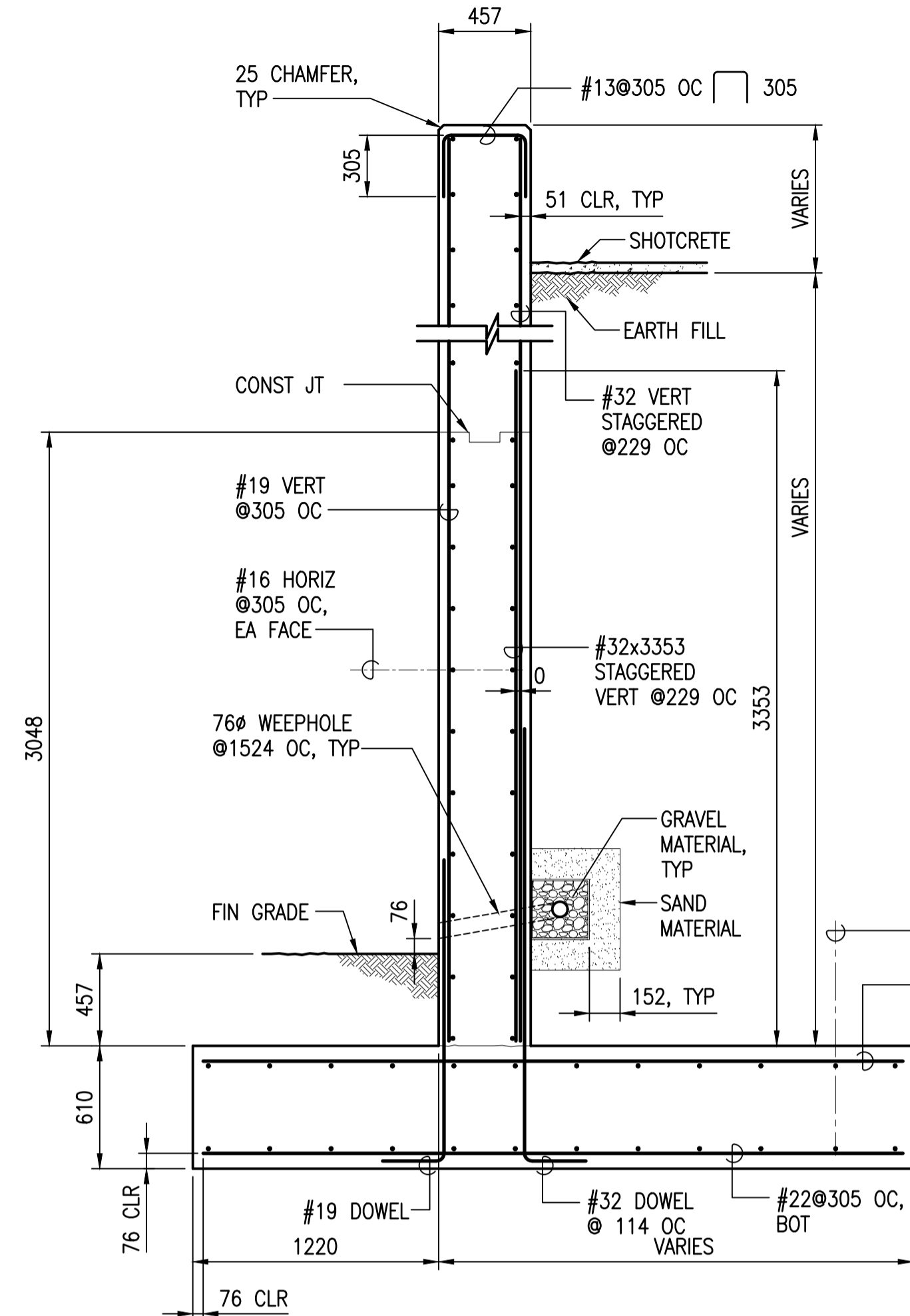


DATE	09/14/22
APPR	
DESCRIPTION	MSM STANDARD
	
<b>MODULAR STORAGE MAGAZINE</b> RETAINING WALL "A" FOUNDATION PLANS AND SECTIONS	
DESIGNED BY	JTW
CHECKED BY	RD
DATE	MM/DD/YY
SCALE	AS NOTED
PROJECT NO.	14115982
CONSTR. CONTR. NO.	
NAFAC DRAWING NO.	14115982
SHEET	14 OF 53
<b>S-303</b>	

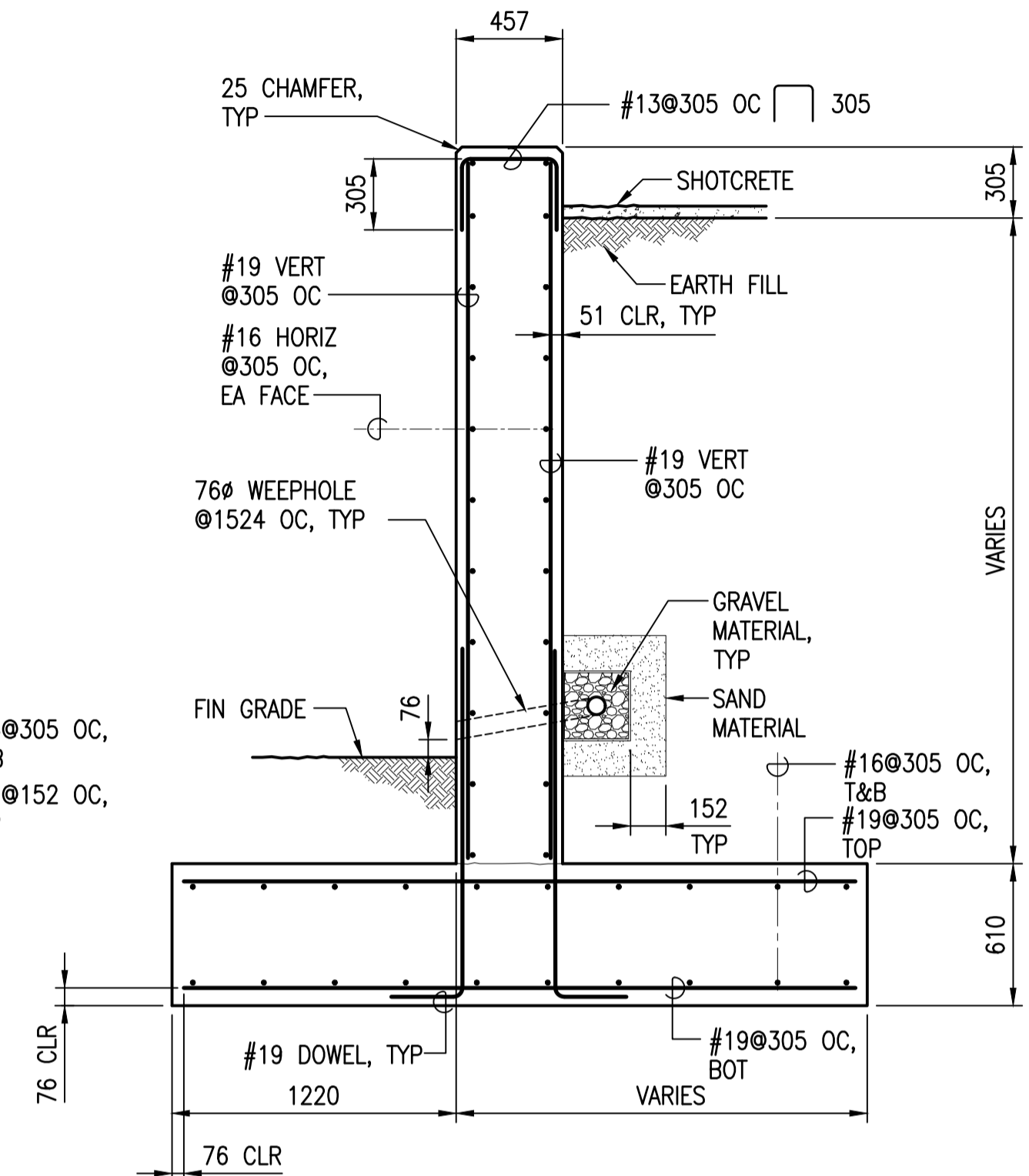
FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\S-303.dwg LAYOUT NAME: S-303 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jehickcoriano



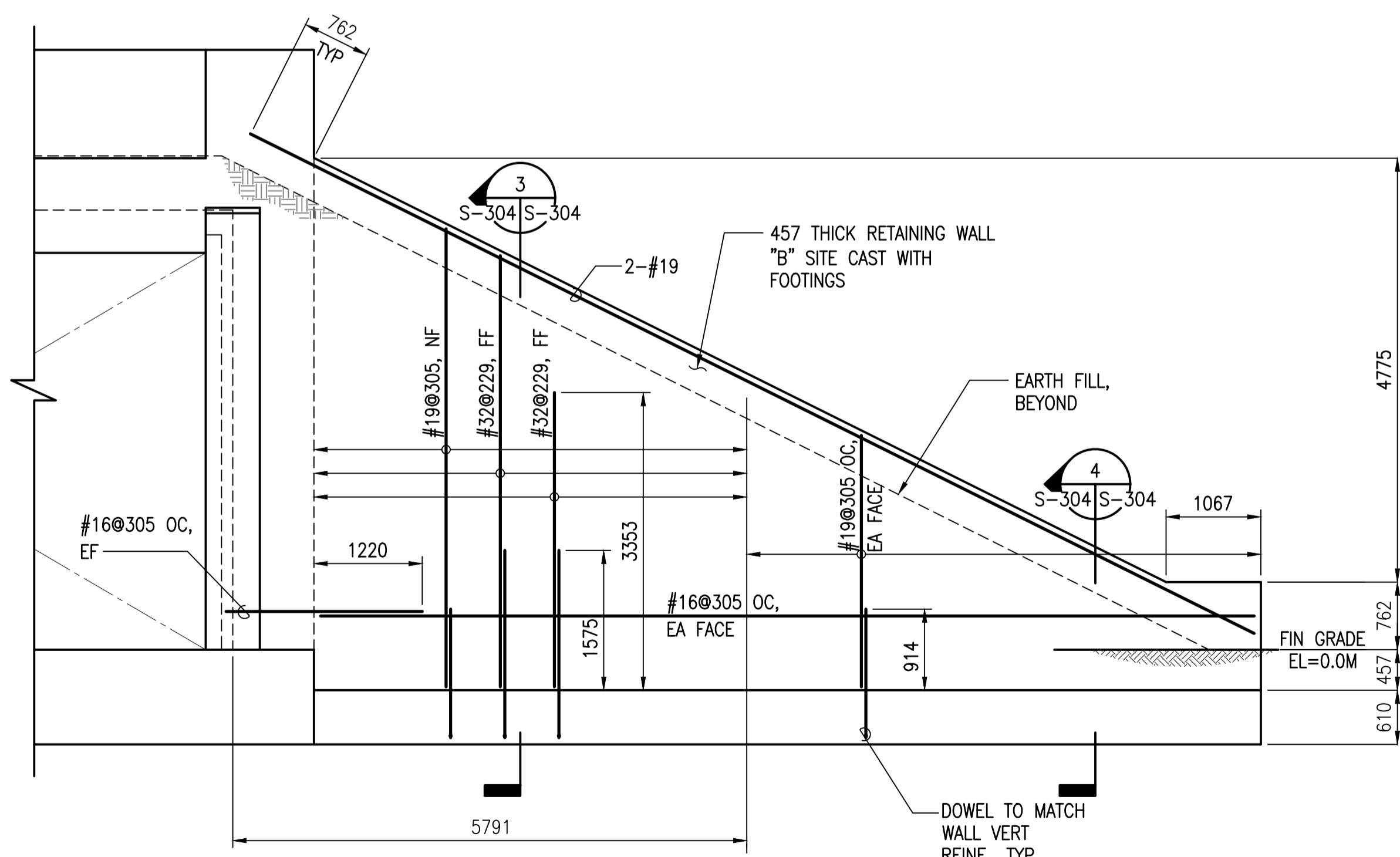
**1** RETAINING WALL "B" FOUNDATION PLAN  
S-101 S-304 SCALE: 1:50



**3** RETAINING WALL SECTION  
S-304 S-304 SCALE: 1:25

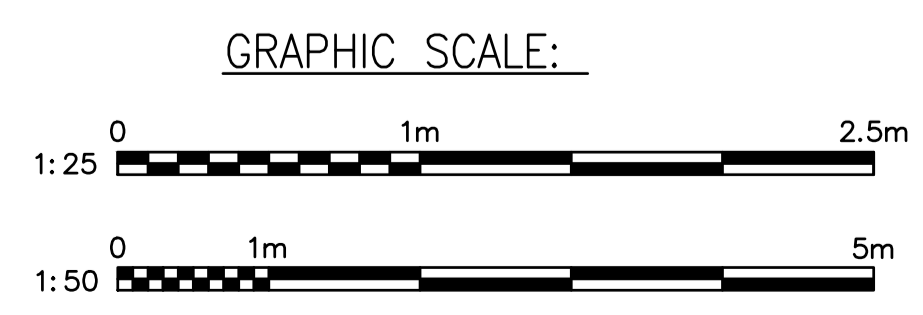


**4** RETAINING WALL SECTION  
S-101 S-304 SCALE: 1:25



**2** RETAINING WALL "B" ELEVATION  
S-201 S-304 SCALE: 1:50

NOTE:  
SEE ELECTRICAL DRAWINGS FOR  
REINFORCING STEEL BONDING  
REQUIREMENTS.



APPROVED	DATE	09/14/22
FOR COMMANDER NAFAF	DESCRIPTION	MSM STANDARD
ACTIVITY		
SATISFACTORY TO DATE	MM/DD/YY	
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD OR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION	MODULAR STORAGE MAGAZINE RETAINING WALL "B" FOUNDATION PLANS AND SECTIONS	
SCALE:	AS NOTED	
PROJECT NO.:	-	
CONSTR. CONTR. NO.:	-	
NAFAF DRAWING NO.:	14115983	
SHEET	15	OF 53
<b>S-304</b>		
<small>NAFAF METRIC DRAWING REVISION: 01 OCTOBER 2018</small>		

FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\S-304.dwg LAYOUT NAME: S-304 PLOTTED: Tuesday, June 06, 2023 - 11:27am USER: jeblicoriano

1

2

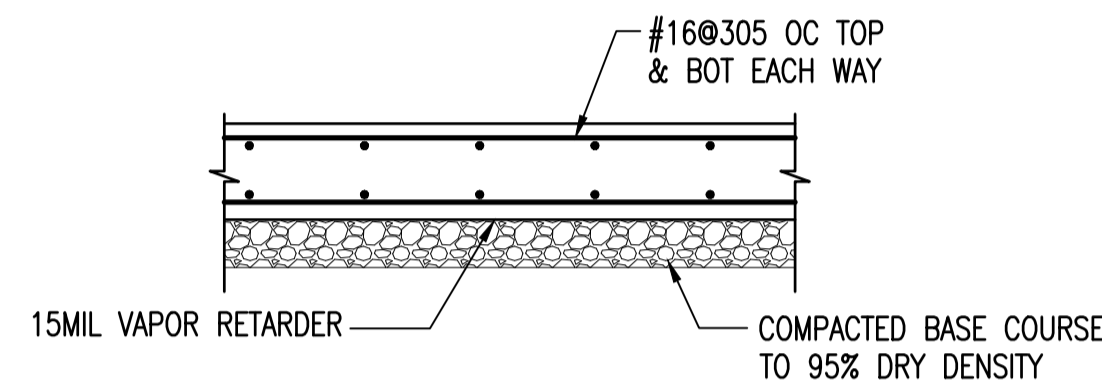
3

4

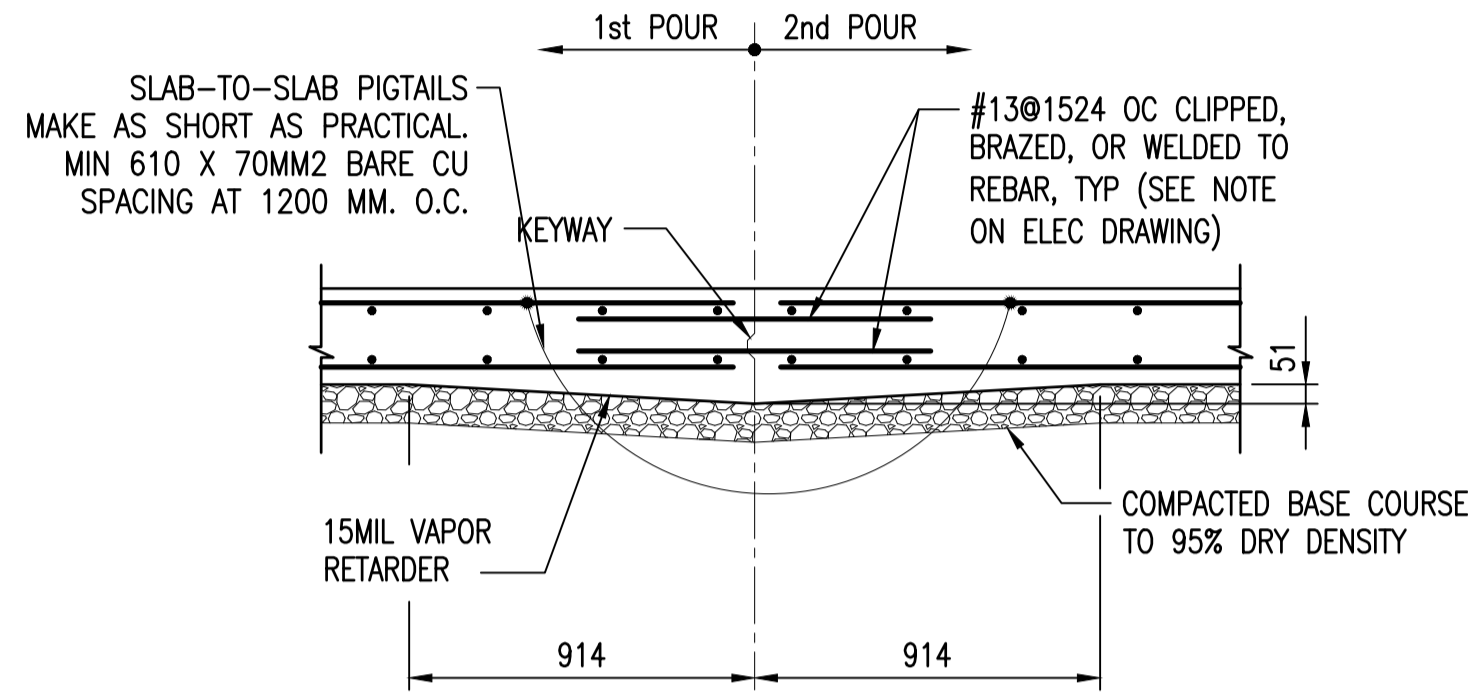
5

SLAB ON GRADE JOINT NOTES:

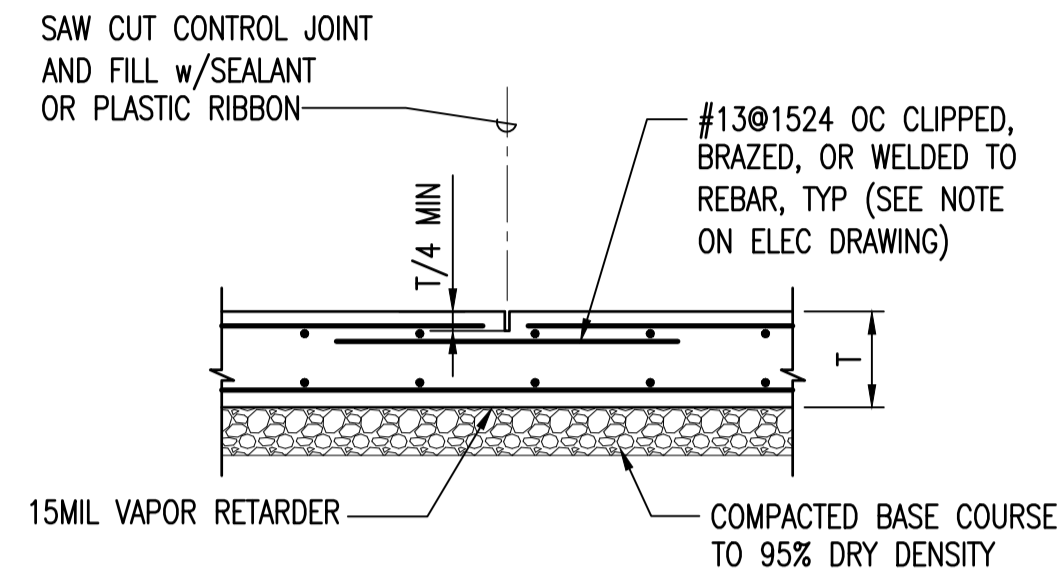
- 1. PROVIDE CURING COMPOUND & CONTROL JOINTS TO MINIMIZE SHRINKAGE CRACKS.
- 2. SPACING OF JOINTS SHALL BE AS INDICATED ON SHEET S-101.
- 3. CONTROL JOINTS MAY BE EITHER CONSTRUCTION JOINTS OR CONTRACTION CONTROL JOINTS.
- 4. SEE 2/S-401 & 3/S-401 FOR SLAB ON GRADE JOINT DETAILS.
- 5. SEE ELECTRICAL DRAWINGS FOR REINFORCING STEEL BONDING REQUIREMENTS.



**1** TYP SLAB-ON-GRADE DETAIL  
S-101 S-401 SCALE: NONE

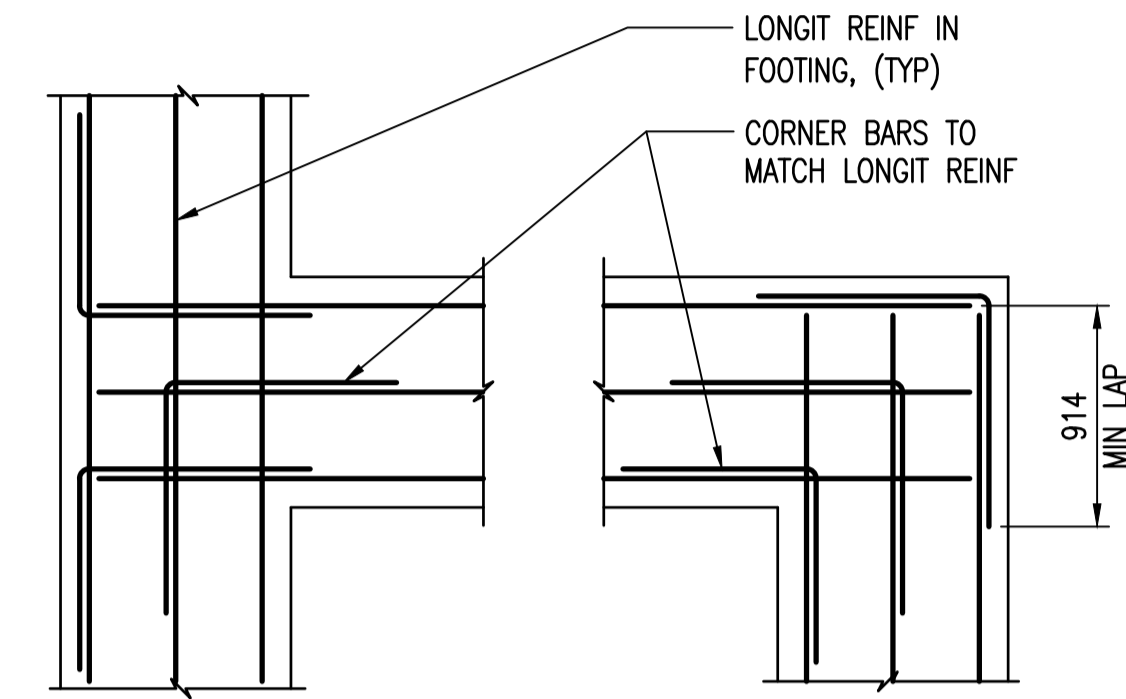


**2** TYP SLAB-ON-GRADE CONSTRUCTION JOINT DETAIL  
S-101 S-401 SCALE: NONE

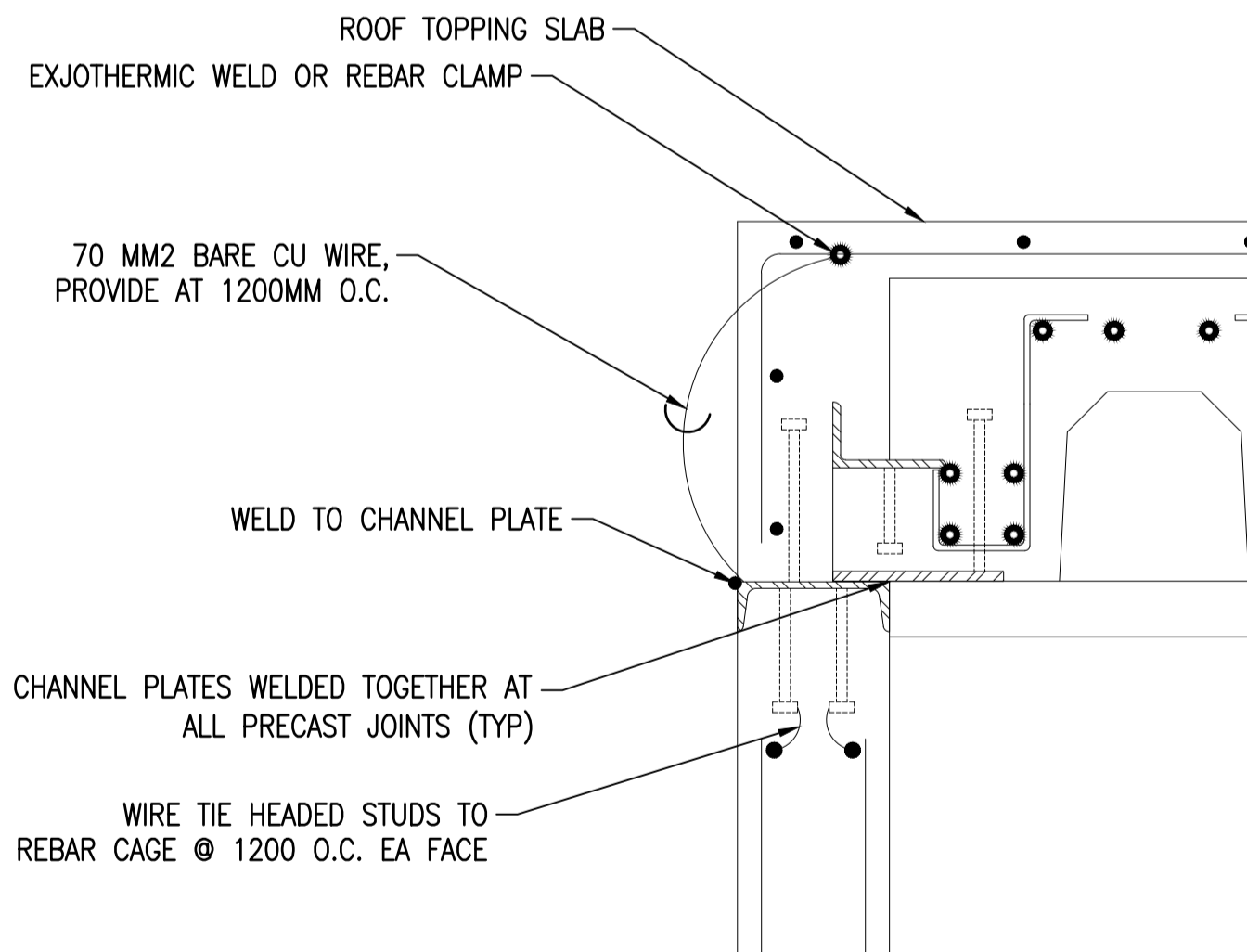


**3** TYP SLAB-ON-GRADE CONTRACTION CONTROL JT DETAIL  
S-101 S-401 SCALE: NONE

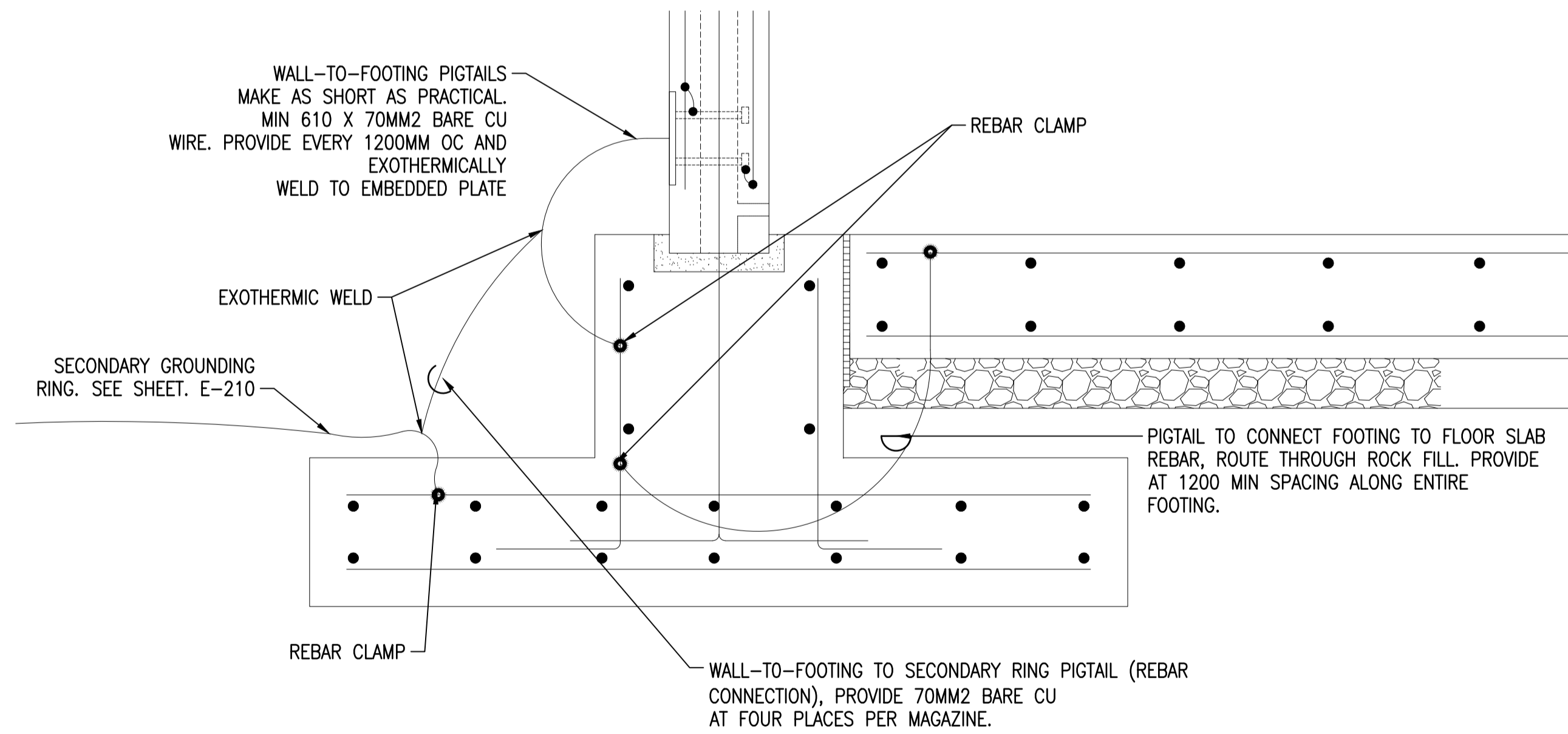
NOTE: SAW CUT MUST OCCUR AS SOON AS CONCRETE SURFACE IS FIRM ENOUGH SO THAT CONCRETE WILL NOT BE DAMAGED, WITHIN 4 TO 12 HOURS AFTER CONCRETE PLACEMENT.



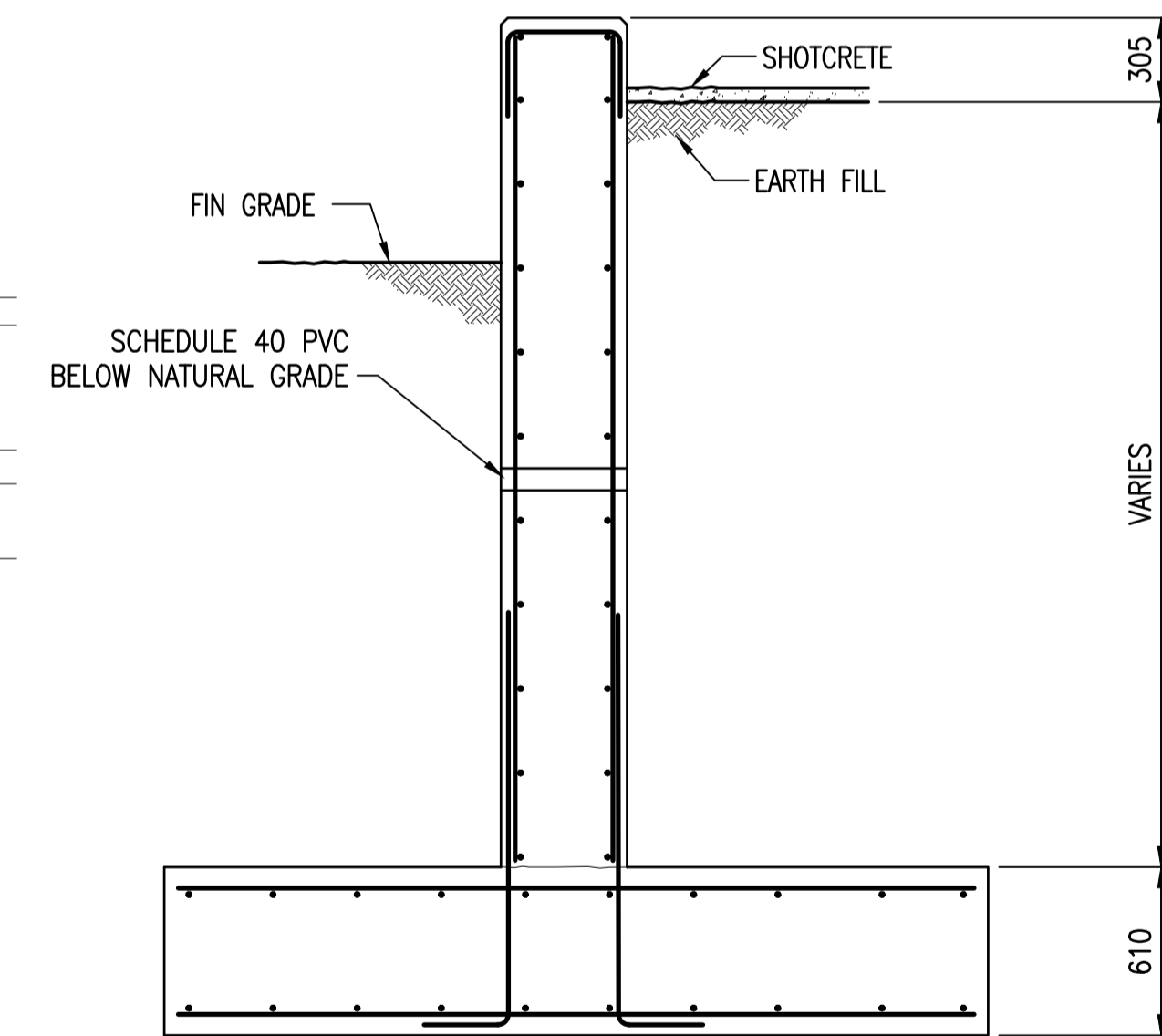
**4** TYP FOOTING CORNER BAR DETAIL  
S-401 S-401 SCALE: NONE



**5** WALL/ROOF BONDING DETAIL  
E-312 S-401 SCALE: 1:10

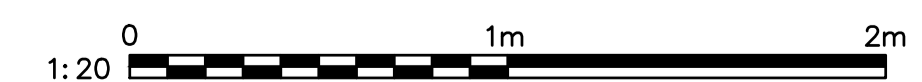


**6** WALL/FOOTING BONDING DETAIL  
E-312 S-401 SCALE: 1:10



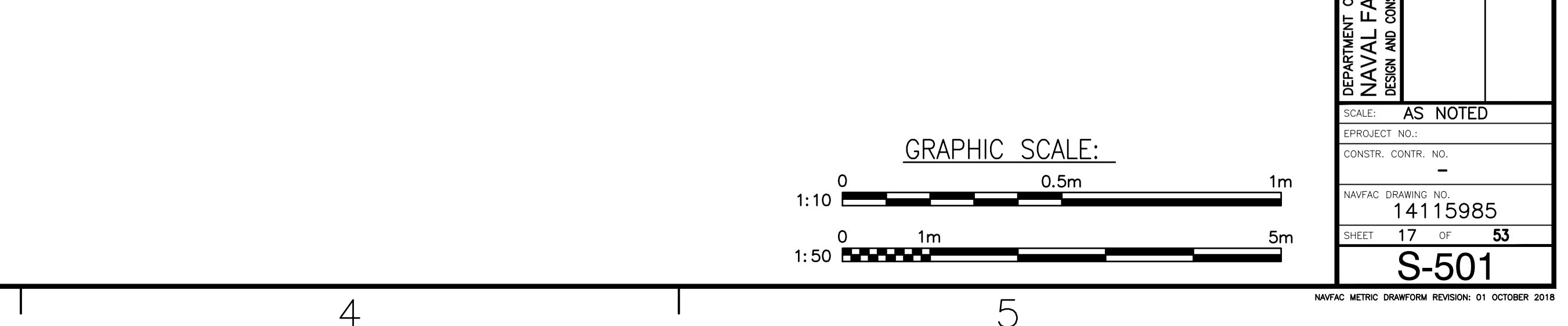
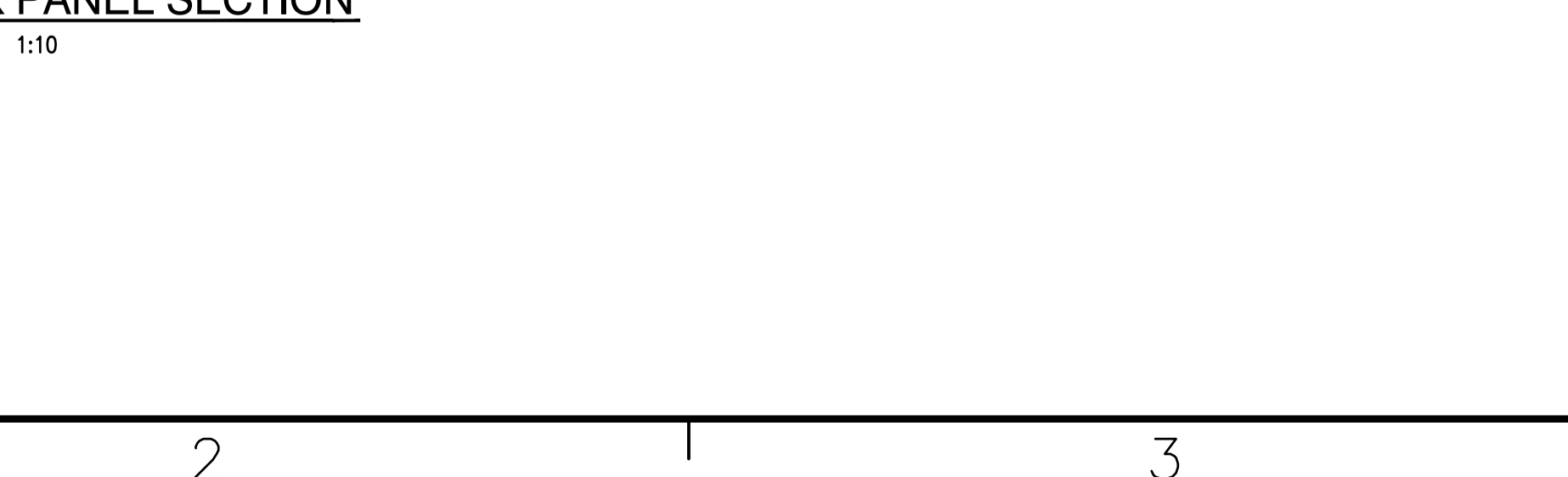
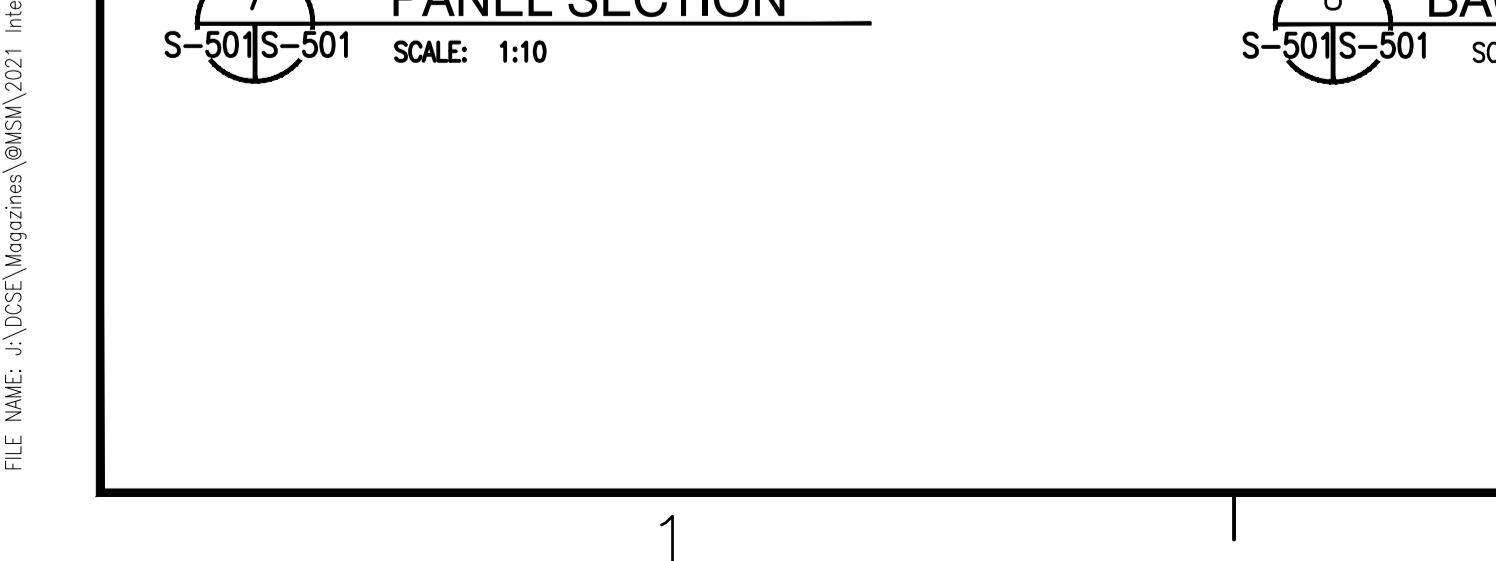
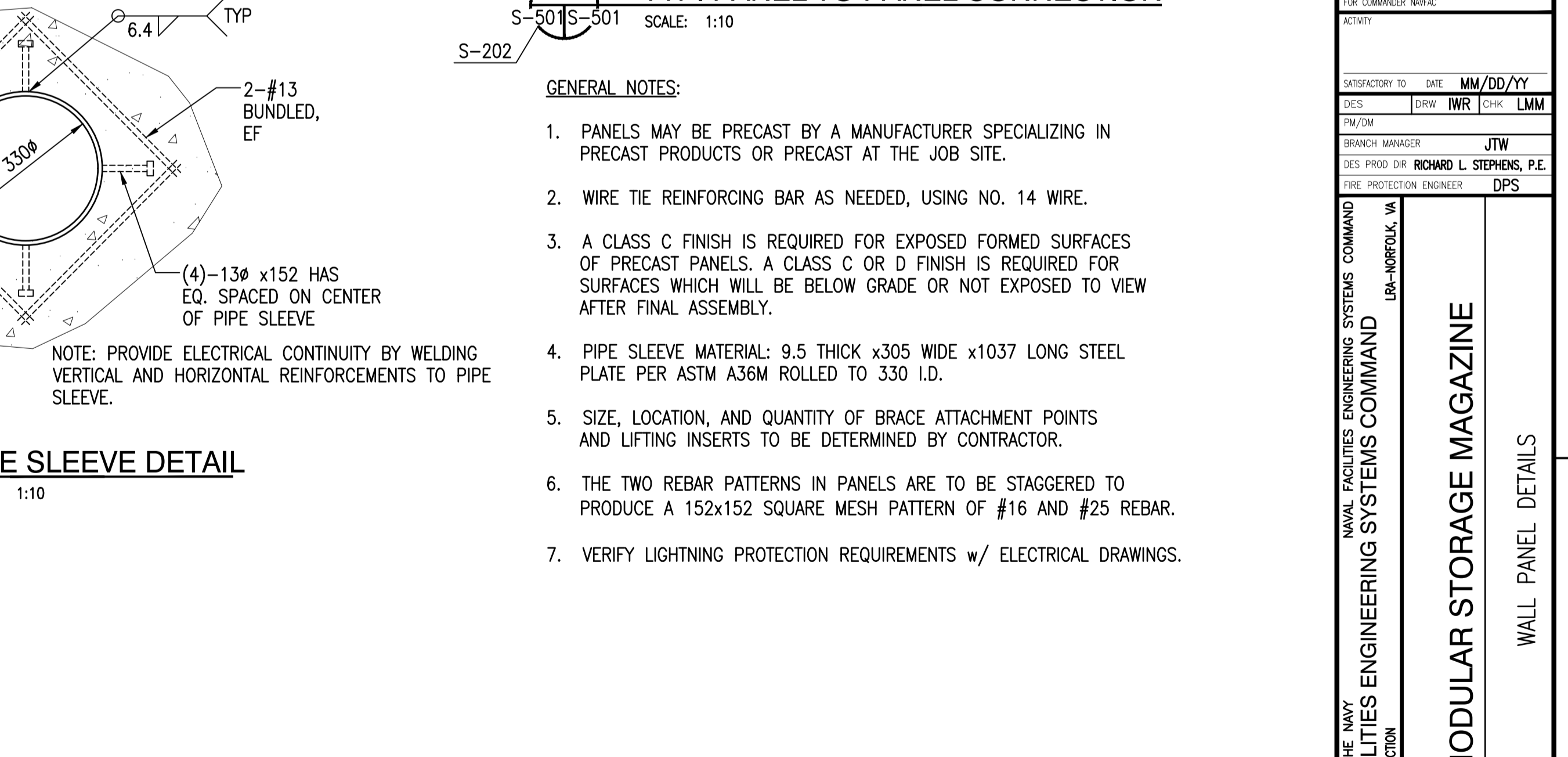
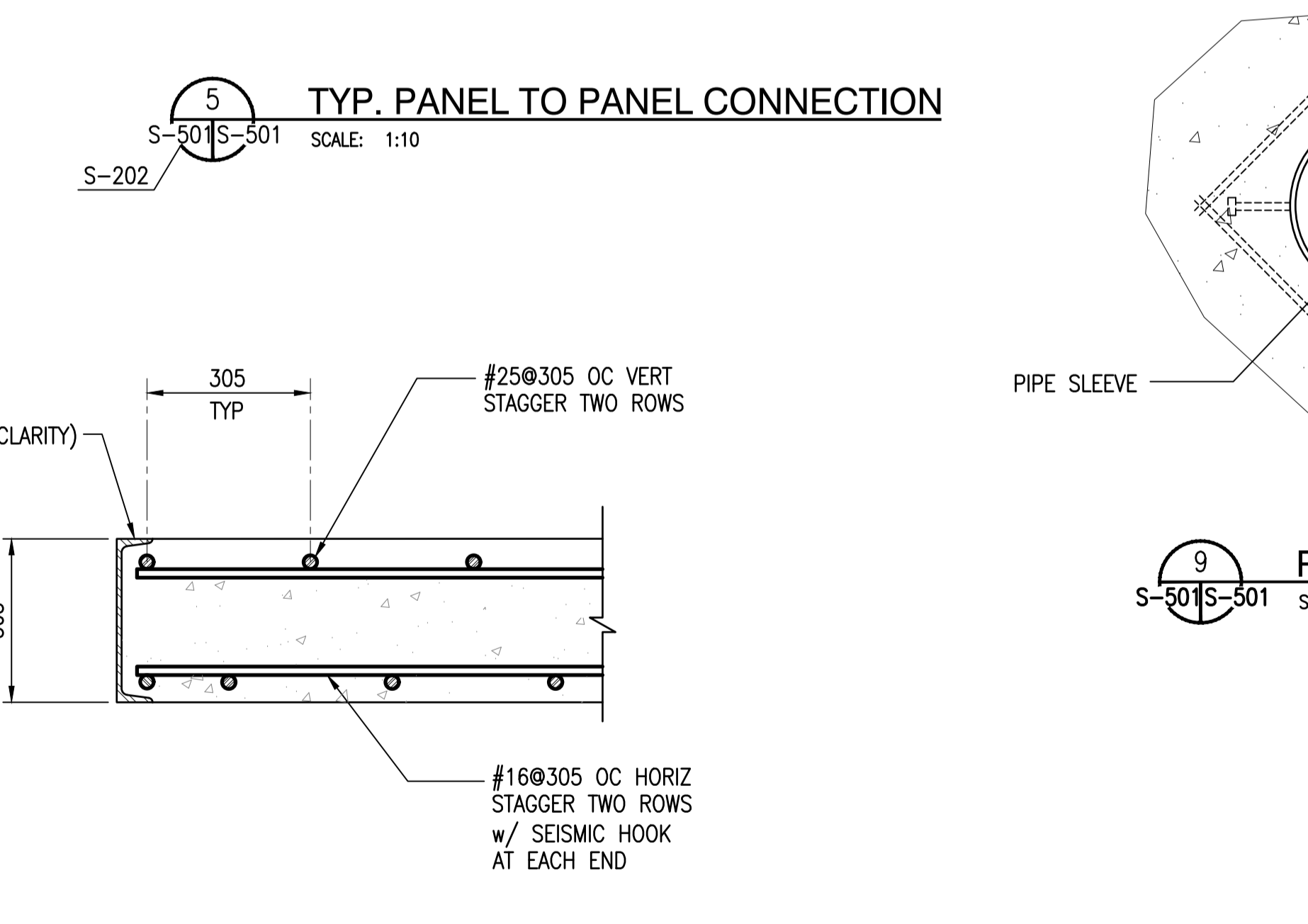
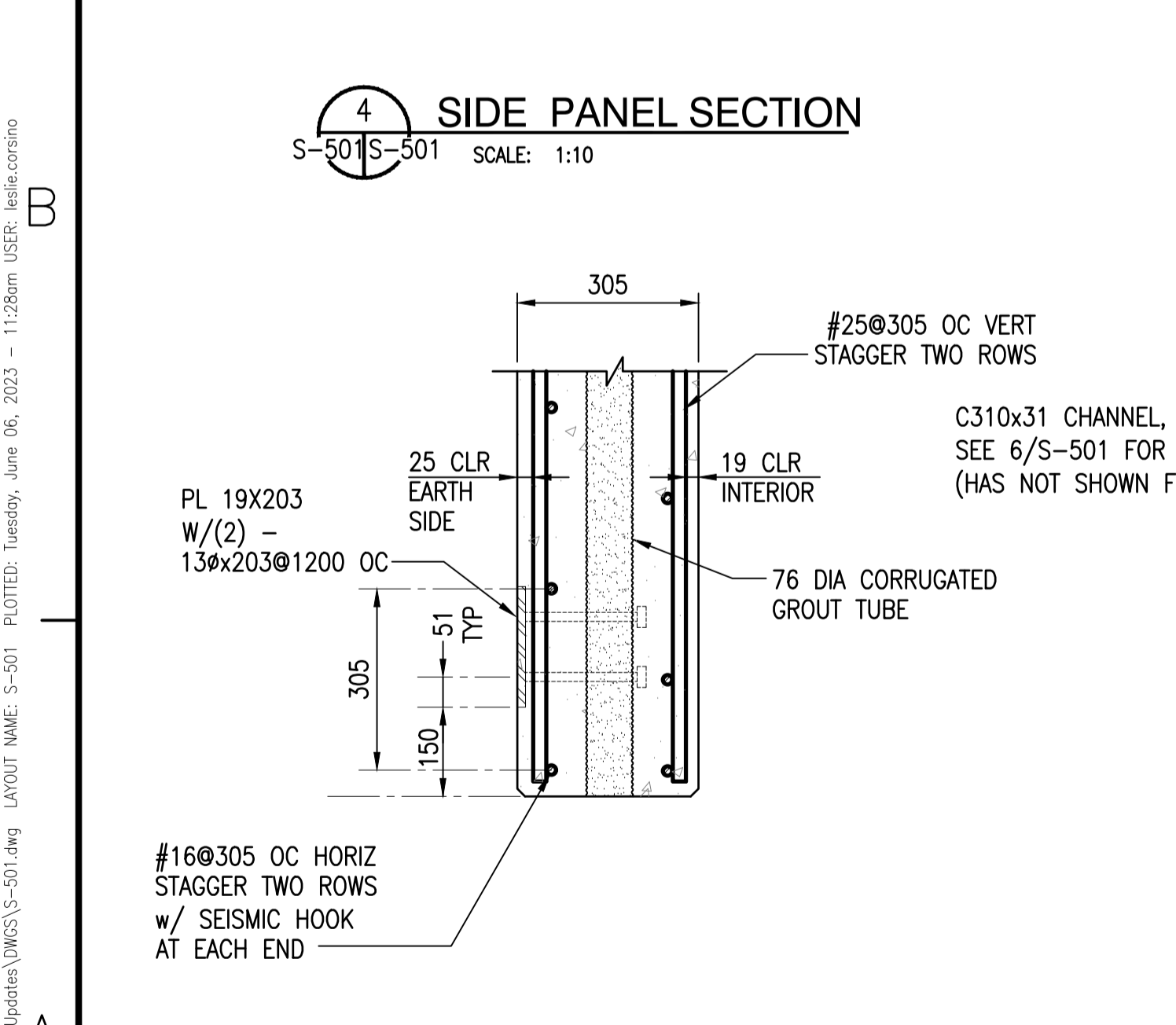
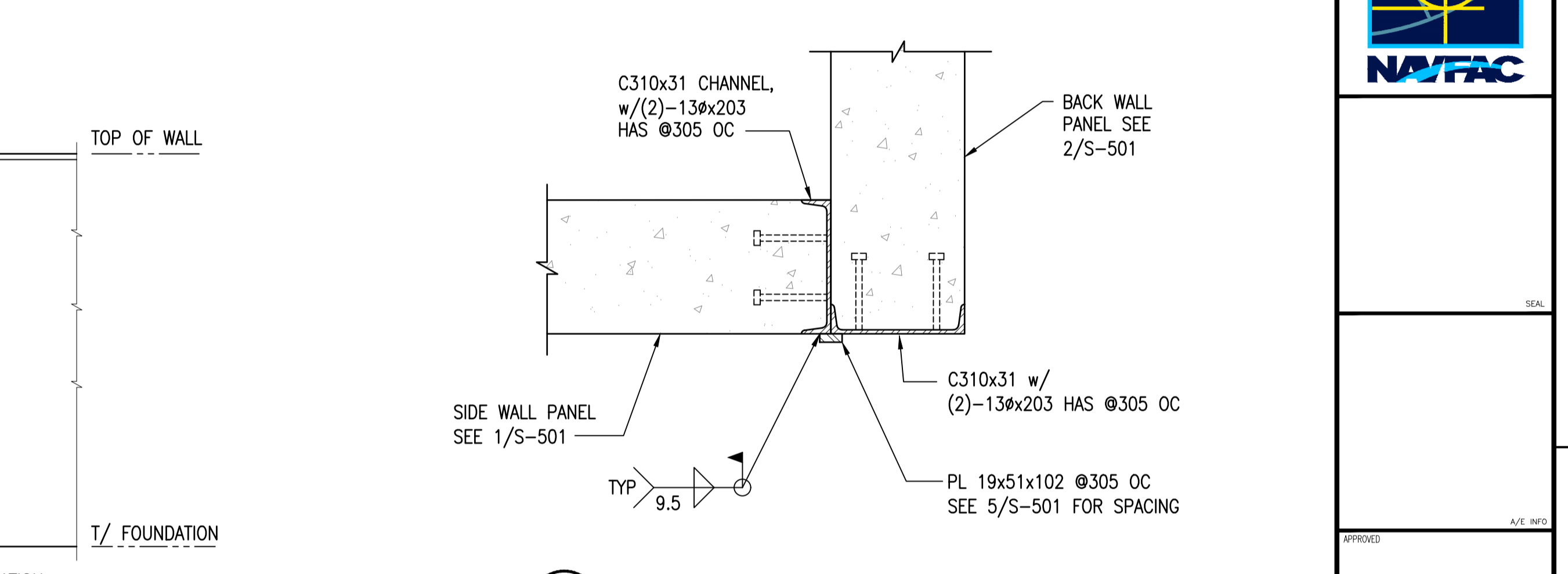
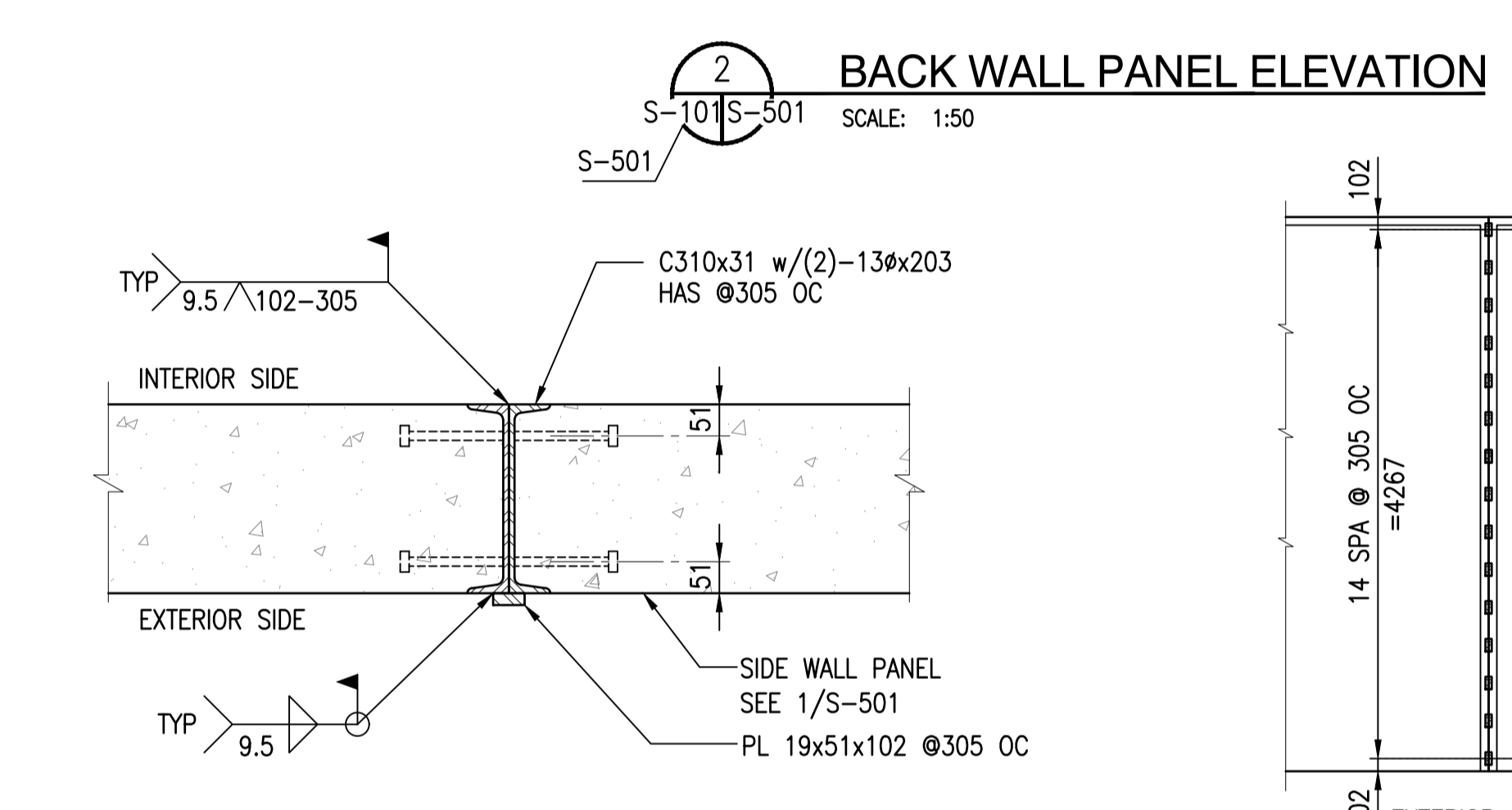
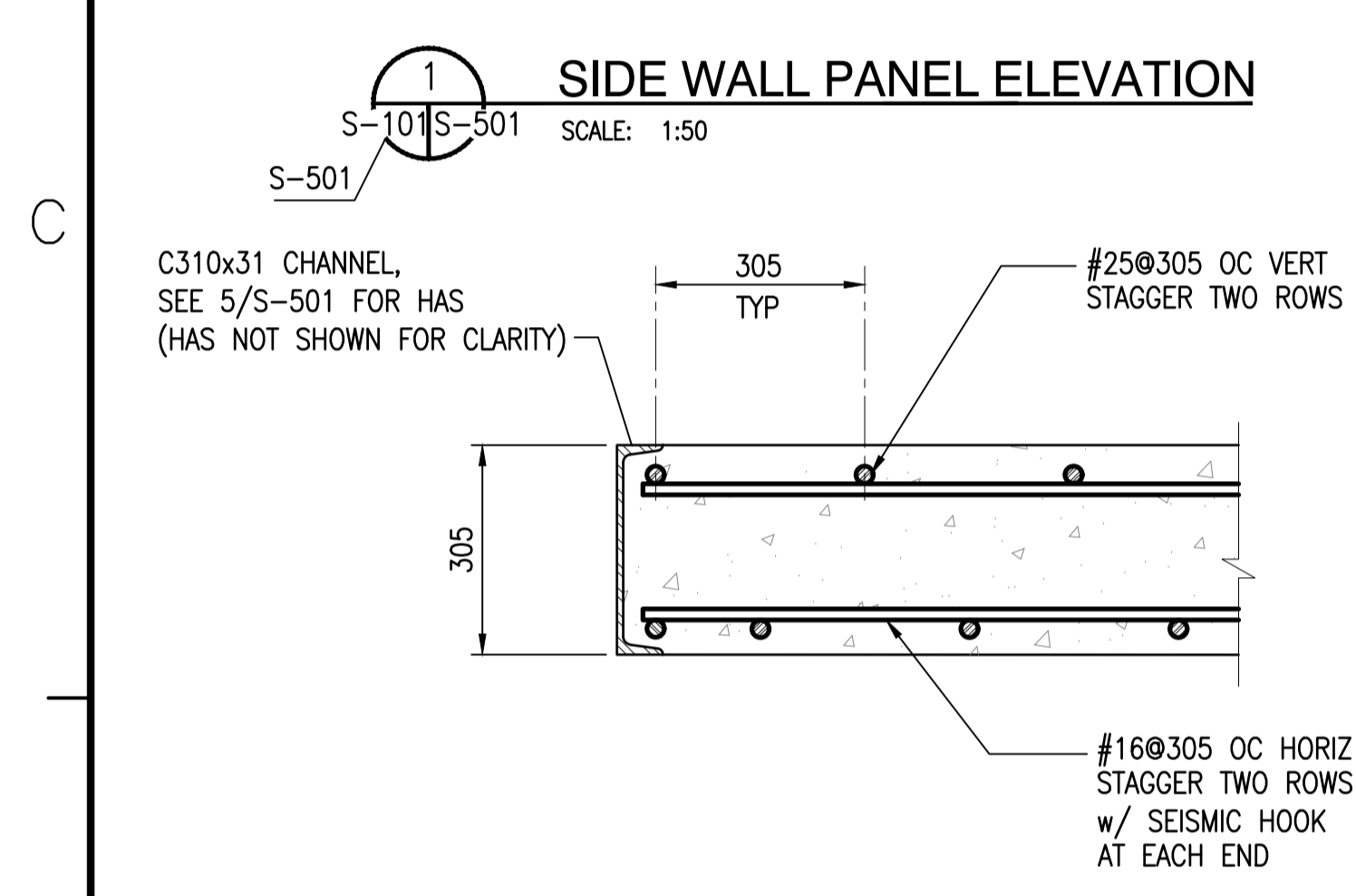
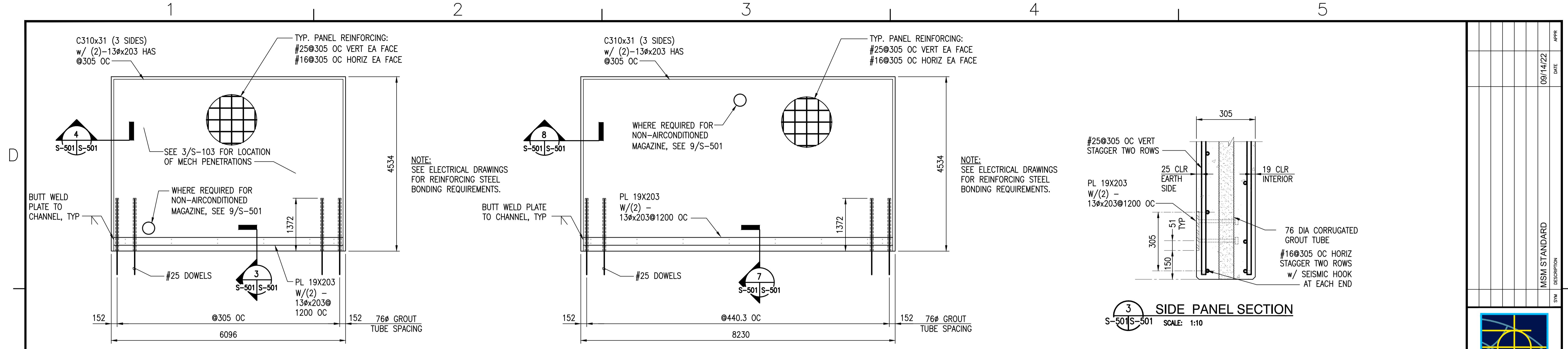
**7** RETAINING WALL SECTION  
E-310 S-303 SCALE: 1:25

GRAPHIC SCALE:

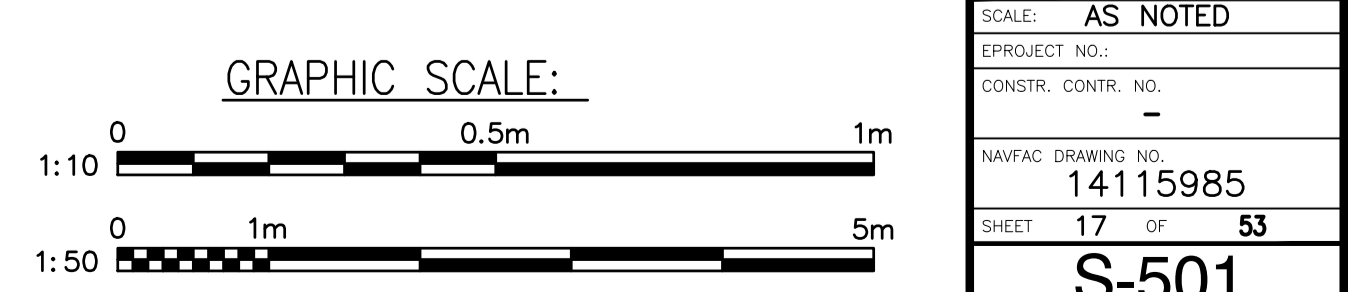


APPROVED	DATE	09/14/22
FOR COMMANDER NAFAC	DESCRIPTION	MSM STANDARD
SATISFACTORY TO DATE	MM/DD/YY	
DESIGNED BY	CHK	IWR
TRACED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES. PROJ. DIR.	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION	
LEA-HOBOKEN, VA	MODULAR STORAGE MAGAZINE	
FOUNDATION SECTIONS	FOUNDATION SECTIONS	
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAC DRAWING NO.:	14115984	
SHEET	16	OF 53
<b>S-401</b>		



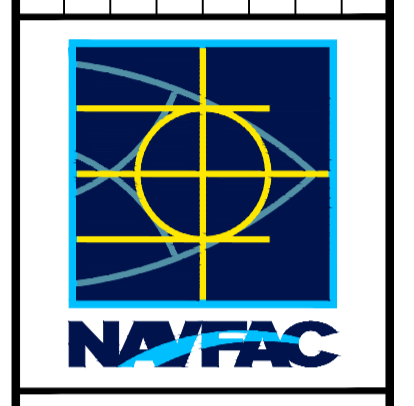


- GENERAL NOTES:**
- PANELS MAY BE PRECAST BY A MANUFACTURER SPECIALIZING IN PRECAST PRODUCTS OR PRECAST AT THE JOB SITE.
  - WIRE TIE REINFORCING BAR AS NEEDED, USING NO. 14 WIRE.
  - A CLASS C FINISH IS REQUIRED FOR EXPOSED FORMED SURFACES OF PRECAST PANELS. A CLASS C OR D FINISH IS REQUIRED FOR SURFACES WHICH WILL BE BELOW GRADE OR NOT EXPOSED TO VIEW AFTER FINAL ASSEMBLY.
  - PIPE SLEEVE MATERIAL: 9.5 THICK x305 WIDE x1037 LONG STEEL PLATE PER ASTM A36M ROLLED TO 330 I.D.
  - SIZE, LOCATION, AND QUANTITY OF BRACE ATTACHMENT POINTS AND LIFTING INSERTS TO BE DETERMINED BY CONTRACTOR.
  - THE TWO REBAR PATTERNS IN PANELS ARE TO BE STAGGERED TO PRODUCE A 152x152 SQUARE MESH PATTERN OF #16 AND #25 REBAR.
  - VERIFY LIGHTNING PROTECTION REQUIREMENTS w/ ELECTRICAL DRAWINGS.



FILE NAME: J:\USSE\Magazines\MSMA\2021 Interim Updates\MS-S-501.dwg LAYOUT NAME: S-501 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jehicoriano  
 DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION  
 BRANCH MANAGER: JTW  
 DES PROD DIR: RICHARD L. STEPHENS, P.E.  
 FIRE PROTECTION ENGINEER: DPS  
 NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
 MODULAR STORAGE MAGAZINE  
 WALL PANEL DETAILS  
 SCALE: AS NOTED  
 PROJECT NO.:  
 CONSTR. CONTR. NO.:  
 NAIFAC DRAWING NO.: 14115985  
 SHEET 17 OF 53  
 S-501  
 NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018

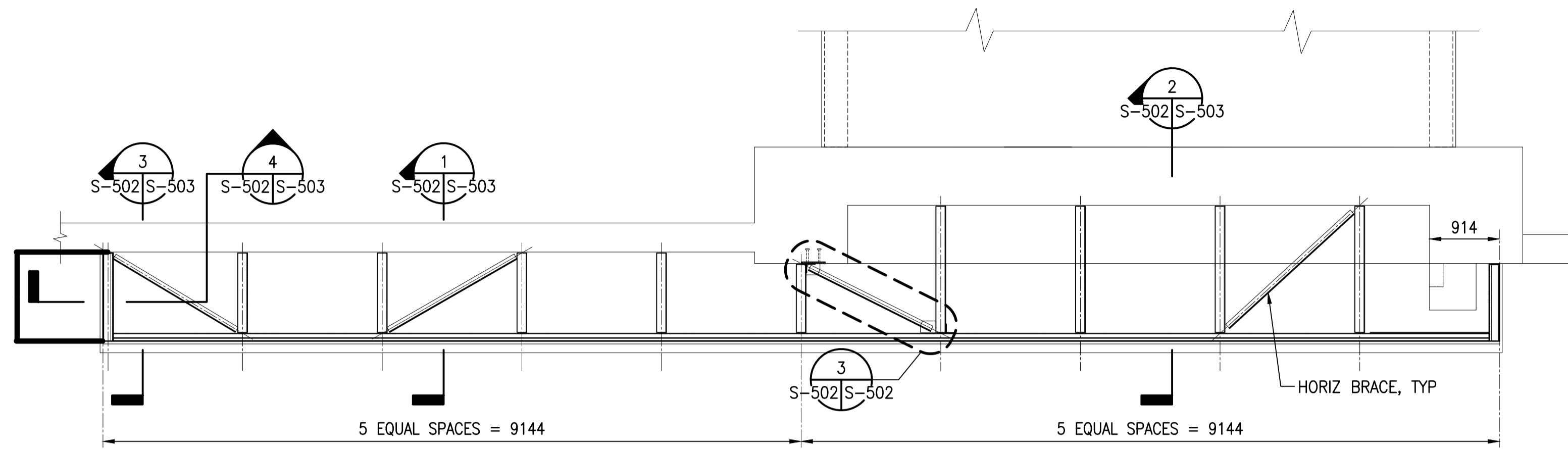
APPR	
DATE	09/14/22
DESCRIPTION	MSM STANDARD
SYMBOL	



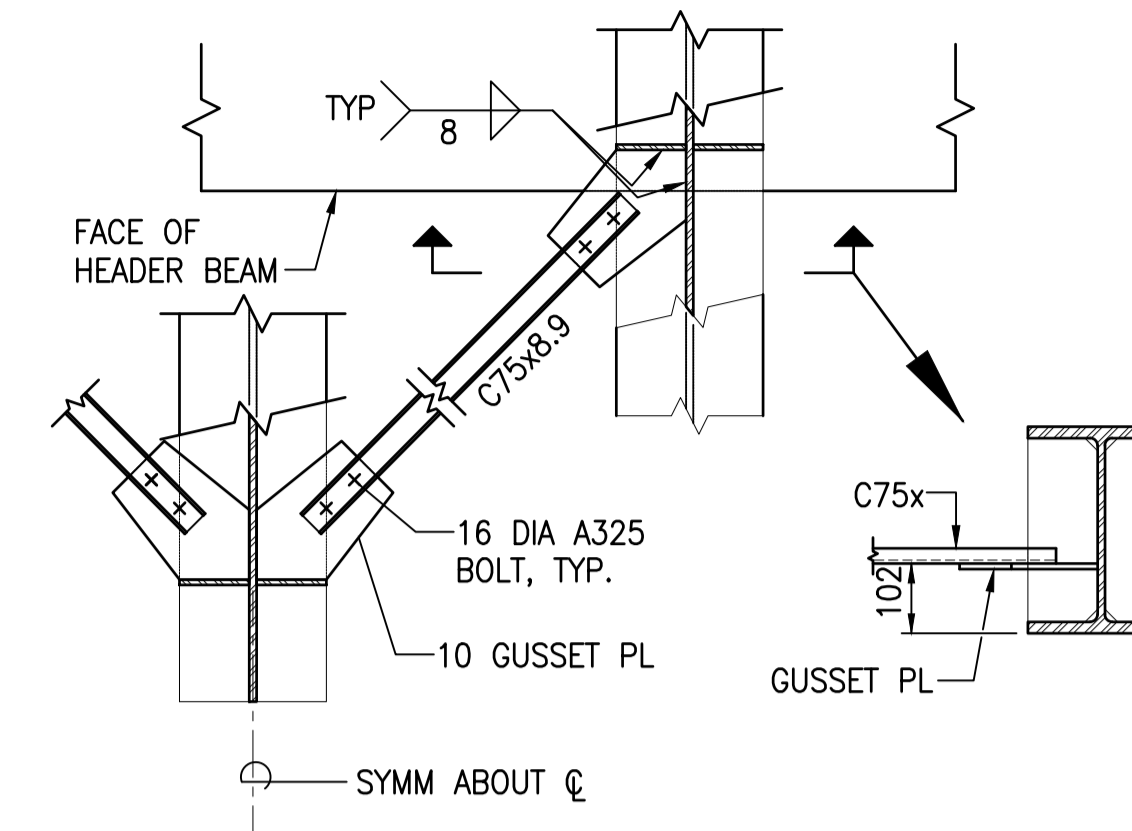
APPROVED	
FOR COMMANDER NAFAC	
ACTIVITY	
SATISFACTORY TO DATE	MM/DD/YY
DESIGNER	DRW IWR CHK LMM
BRANCH MANAGER	JTW
DES PROD DIR	RICHARD L. STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS

APPROVED	
FOR COMMANDER NAFAC	
ACTIVITY	
SATISFACTORY TO DATE	MM/DD/YY
DESIGNER	DRW IWR CHK LMM
BRANCH MANAGER	JTW
DES PROD DIR	RICHARD L. STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS

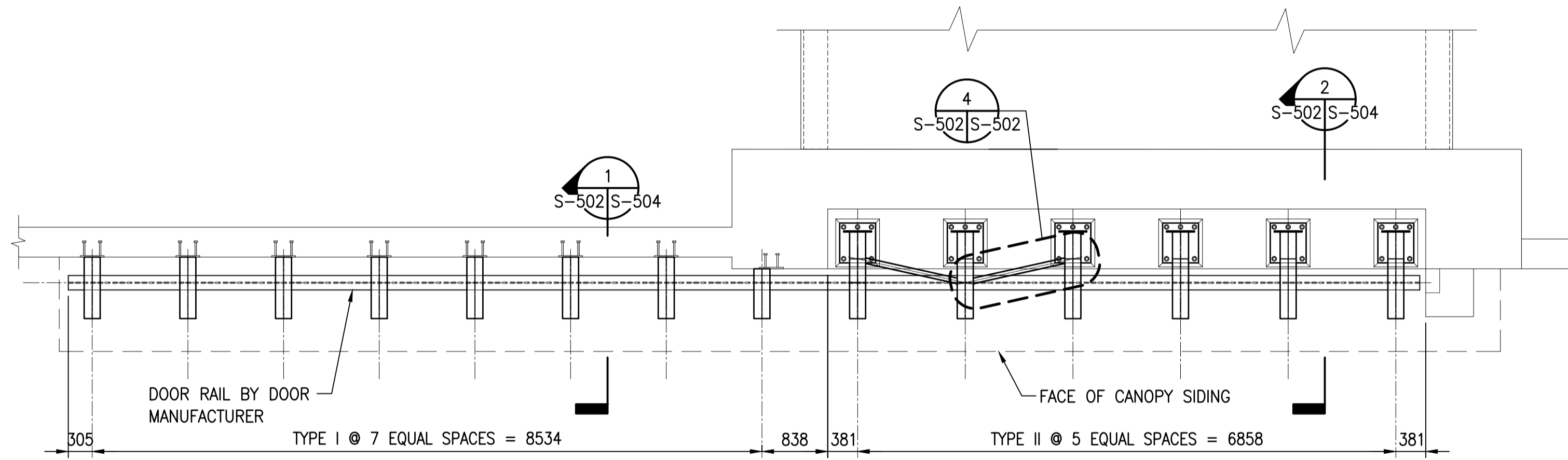
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION
BRANCH MANAGER	JTW
DES PROD DIR	RICHARD L. STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS
SCALE	AS NOTED
PROJECT NO.	
CONSTR. CONTR. NO.	
NAIFAC DRAWING NO.	14115985
SHEET	17 OF 53
DRAWING NO.	S-501



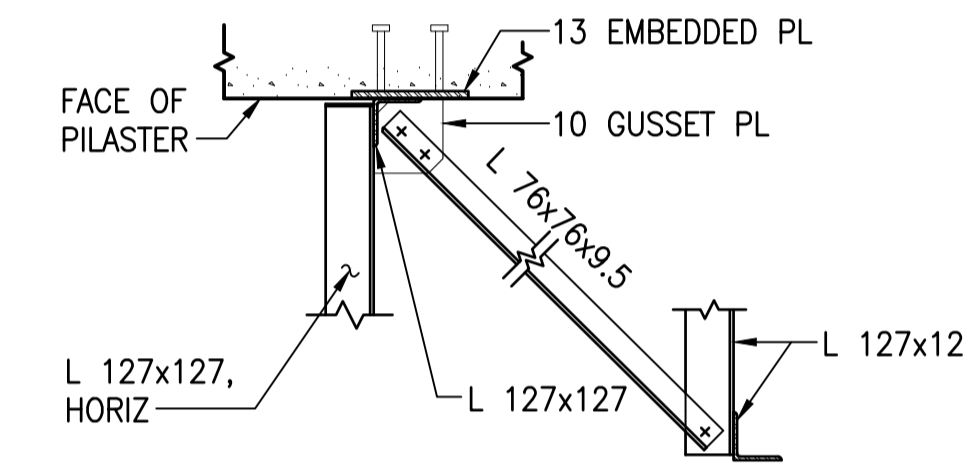
**1 PARTIAL PLAN - CANOPY SUPPORT FRAMES**  
S-102 S-502 SCALE: 1:50



**4 DETAIL**  
S-502 S-502 SCALE: 1:20



**2 PARTIAL PLAN - DOOR RAIL SUPPORT BEAMS**  
S-502 S-502 SCALE: 1:50



NOTE: BOTTOM ELEVATION OF L76x BRACE = 5.979M  
**3 DETAIL**  
S-502 S-502 SCALE: 1:20

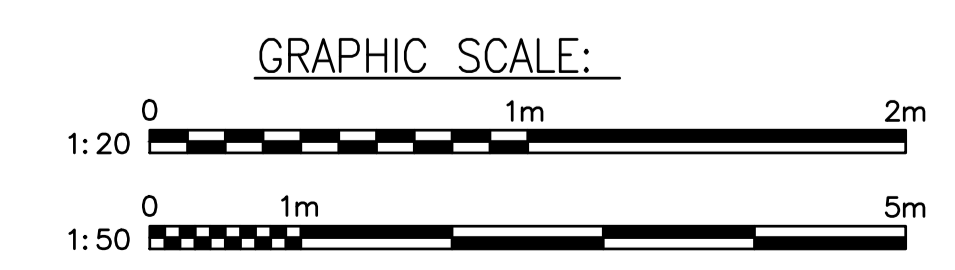
APPROVED	DATE	09/14/22
FOR COMMANDER NAIFAC	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD OR	ROBERT L STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	



DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION
MODULAR STORAGE MAGAZINE	
CANOPY AND DOOR RAIL SUPPORT FRAMING PLANS AND DETAILS	

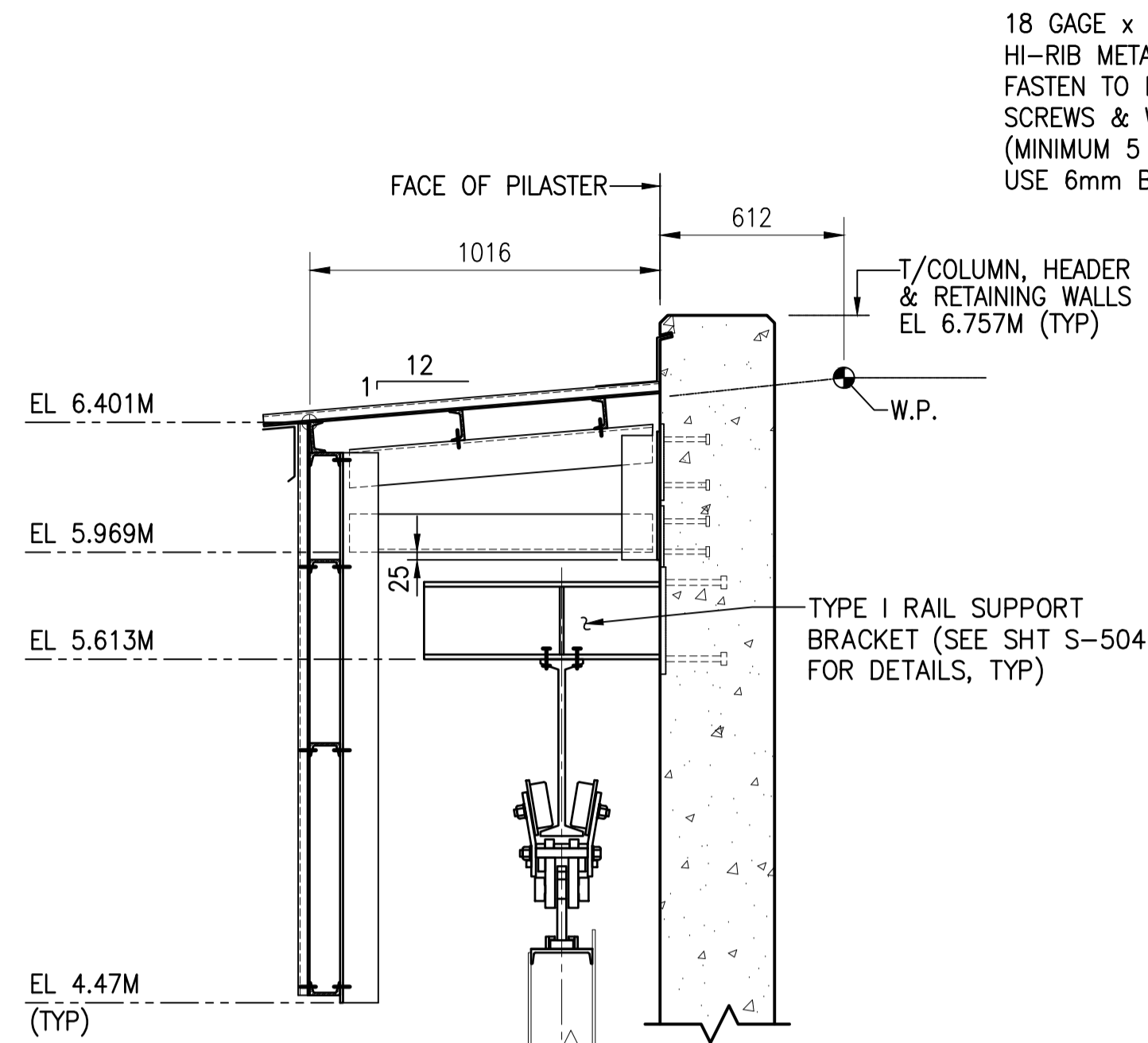
SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAIFAC DRAWING NO.:	14115986
SHEET	18 OF 53

FILE NAME:	J:\USCE\Magazines\WMSM\2021 Interim Updates\WMSM\S-502.dwg
LAYOUT NAME:	S-502
PLOTTED:	Tuesday, June 06, 2023 - 11:28am
USER:	jeff.corsino



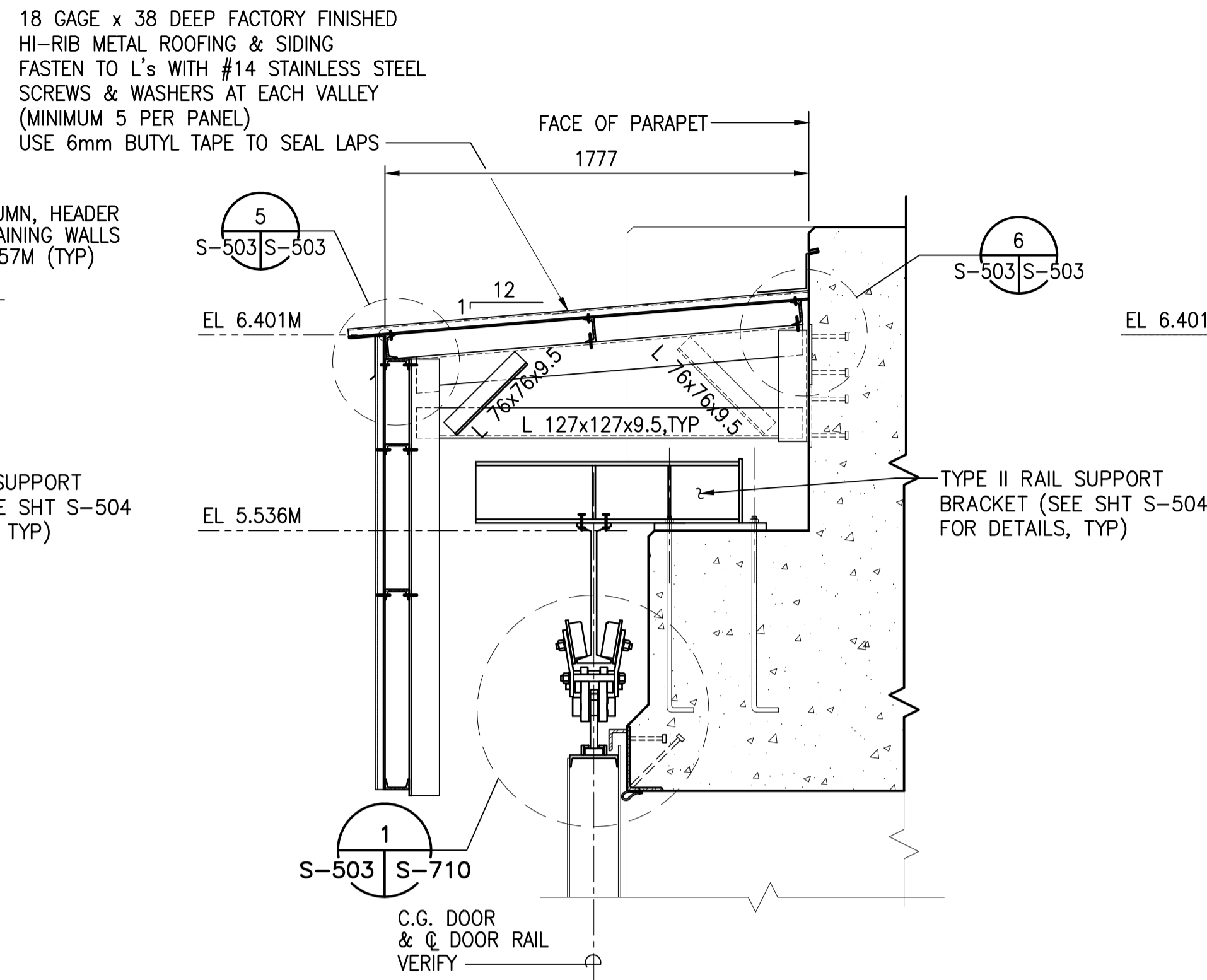
FILE NAME: J:\USCE\Magazines\WMSM\2021 Interim Updates\WMSM\S-502.dwg LAYOUT NAME: S-502 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jeff.corsino

FILE NAME: J:\USSE\Magazines\NMSM\2021 Interim Updates\NMS\5-503.dwg LAYOUT NAME: S-503 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jls@coronado

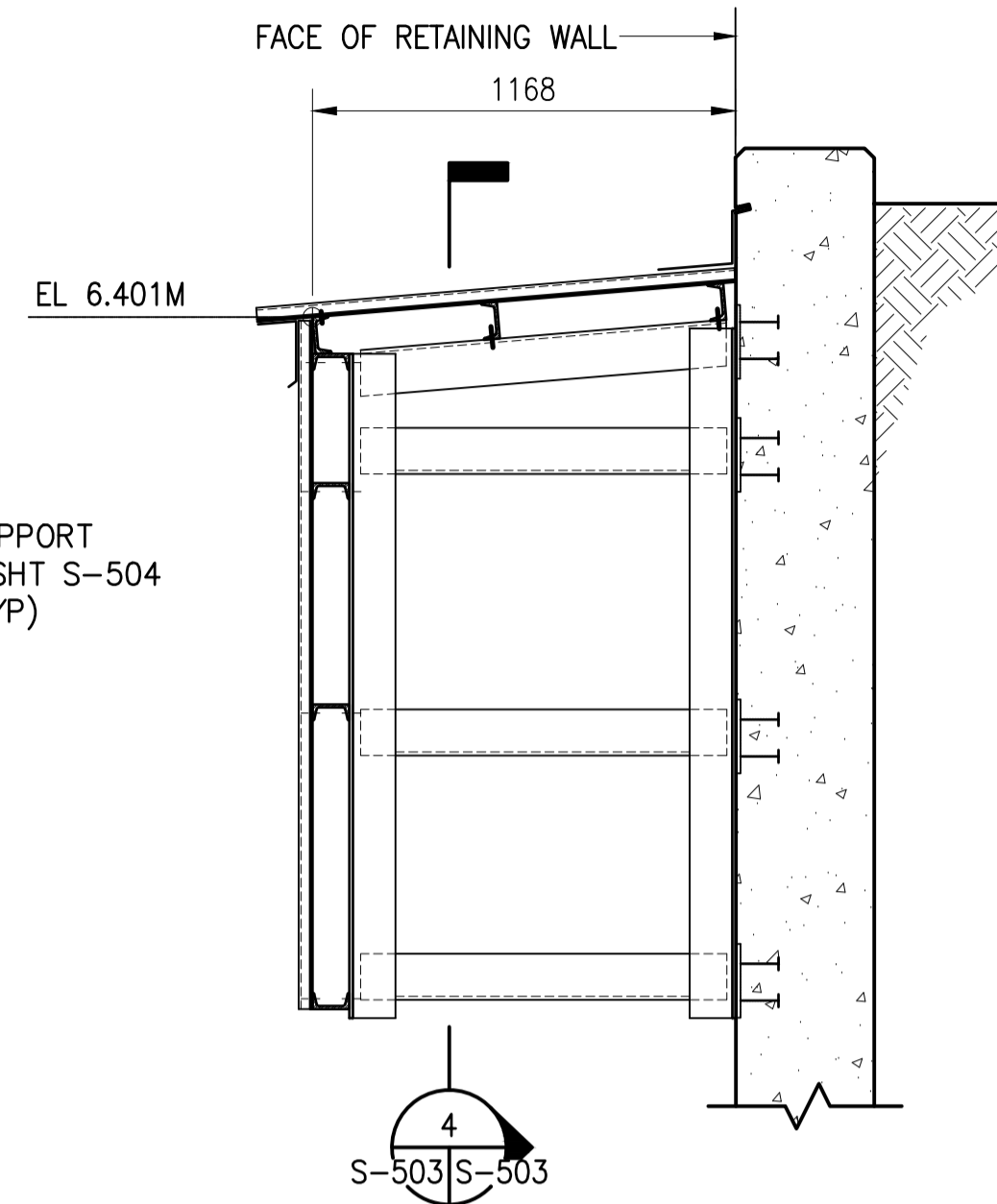


- NOTES:**
1. ALL ANGLES TO BE 127x127x9.5, UNLESS NOTED OTHERWISE.
  2. ALL PURLINS AND GIRTS TO BE C100x10.8, FASTENED TO ANGLES WITH TWO 16 DIAMETER, A325M BOLTS (TYP).
  3. FOR SUPPORT BRACKET DETAILS, SEE DWG S-504.
  4. THE DOOR MUST BE INSTALLED PLUMB FOR SMOOTH OPERATION.

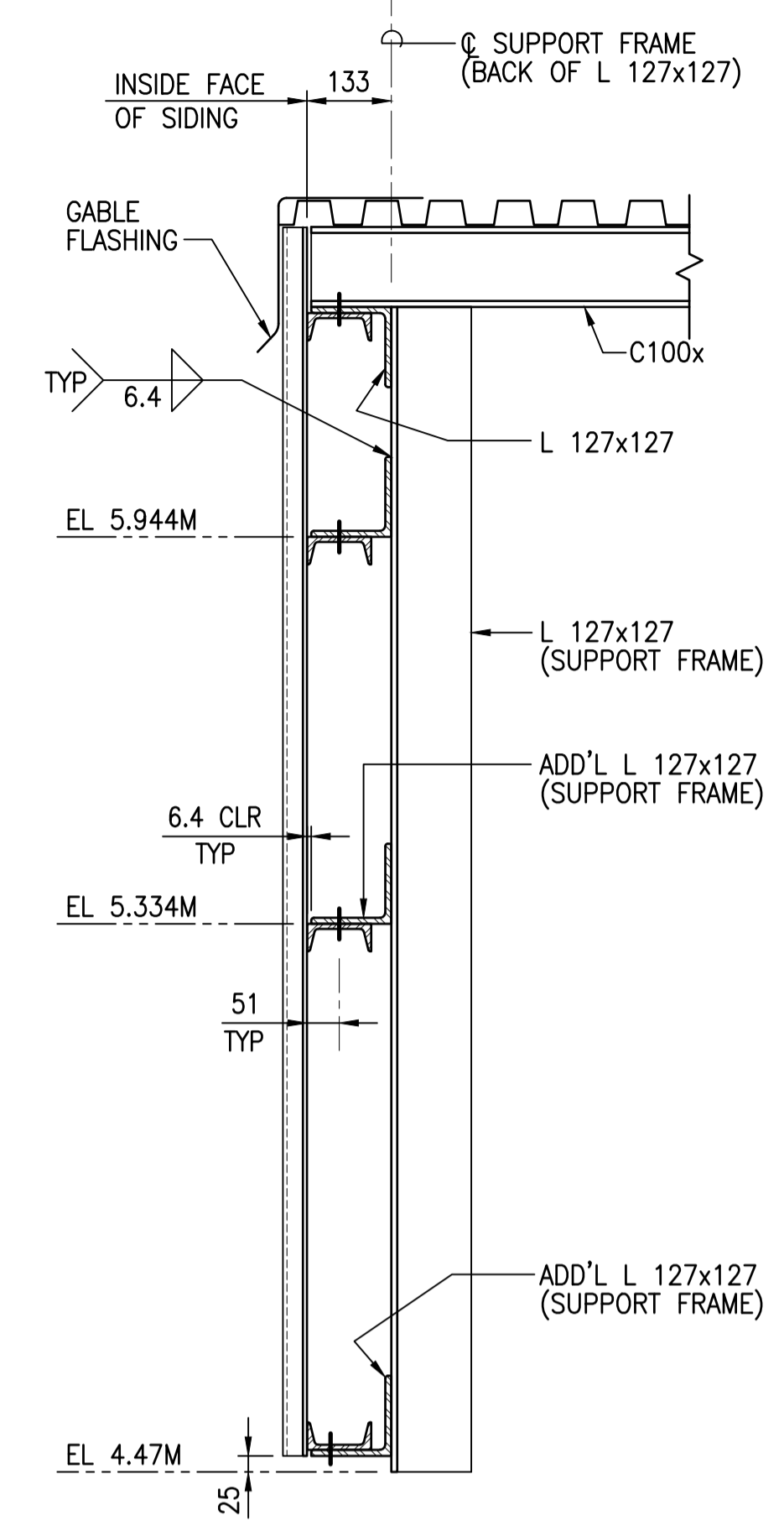
**1 SECTION**  
S-502 | S-503 SCALE: 1:20



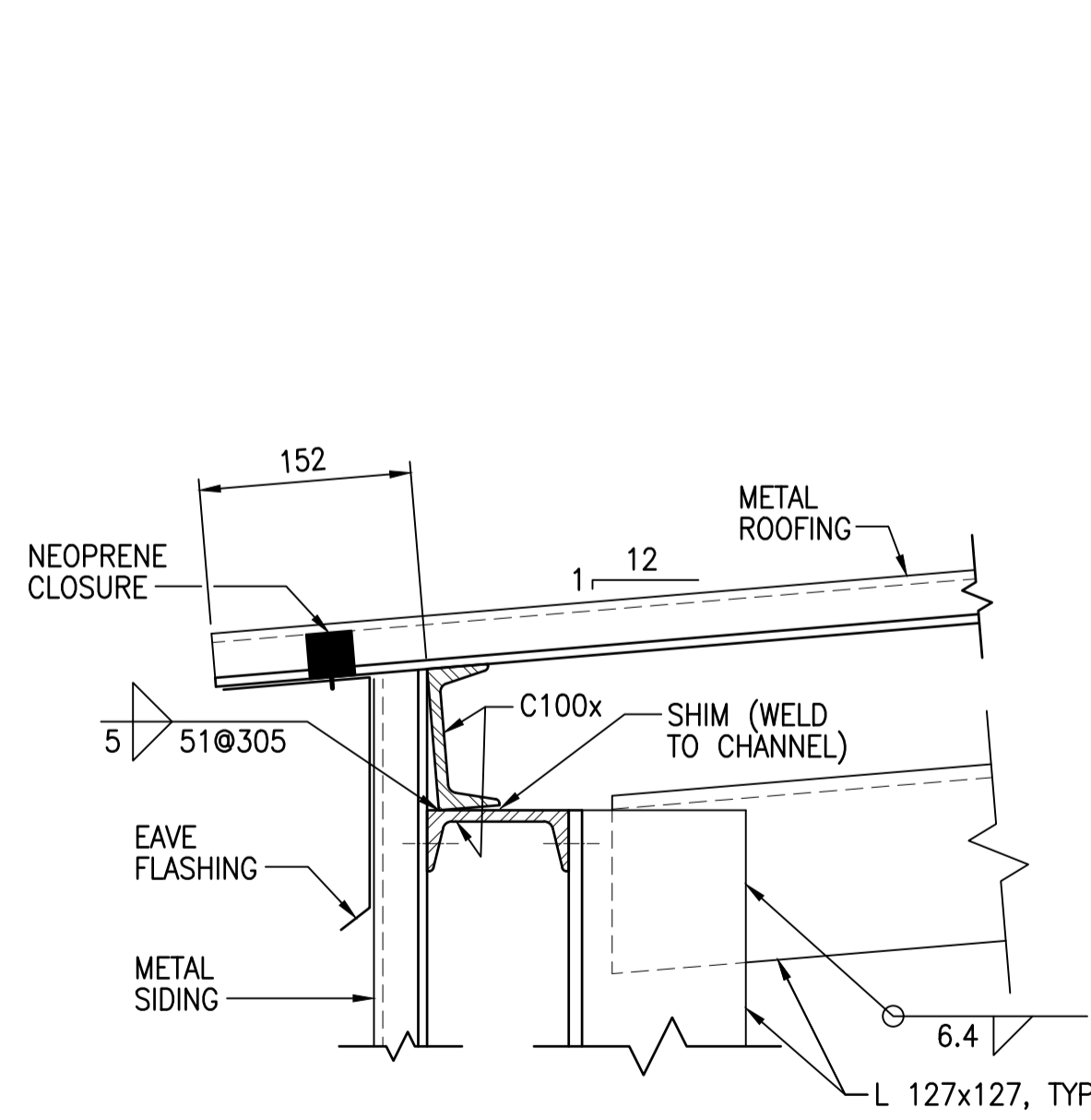
**2 SECTION**  
S-502 | S-503 SCALE: 1:20



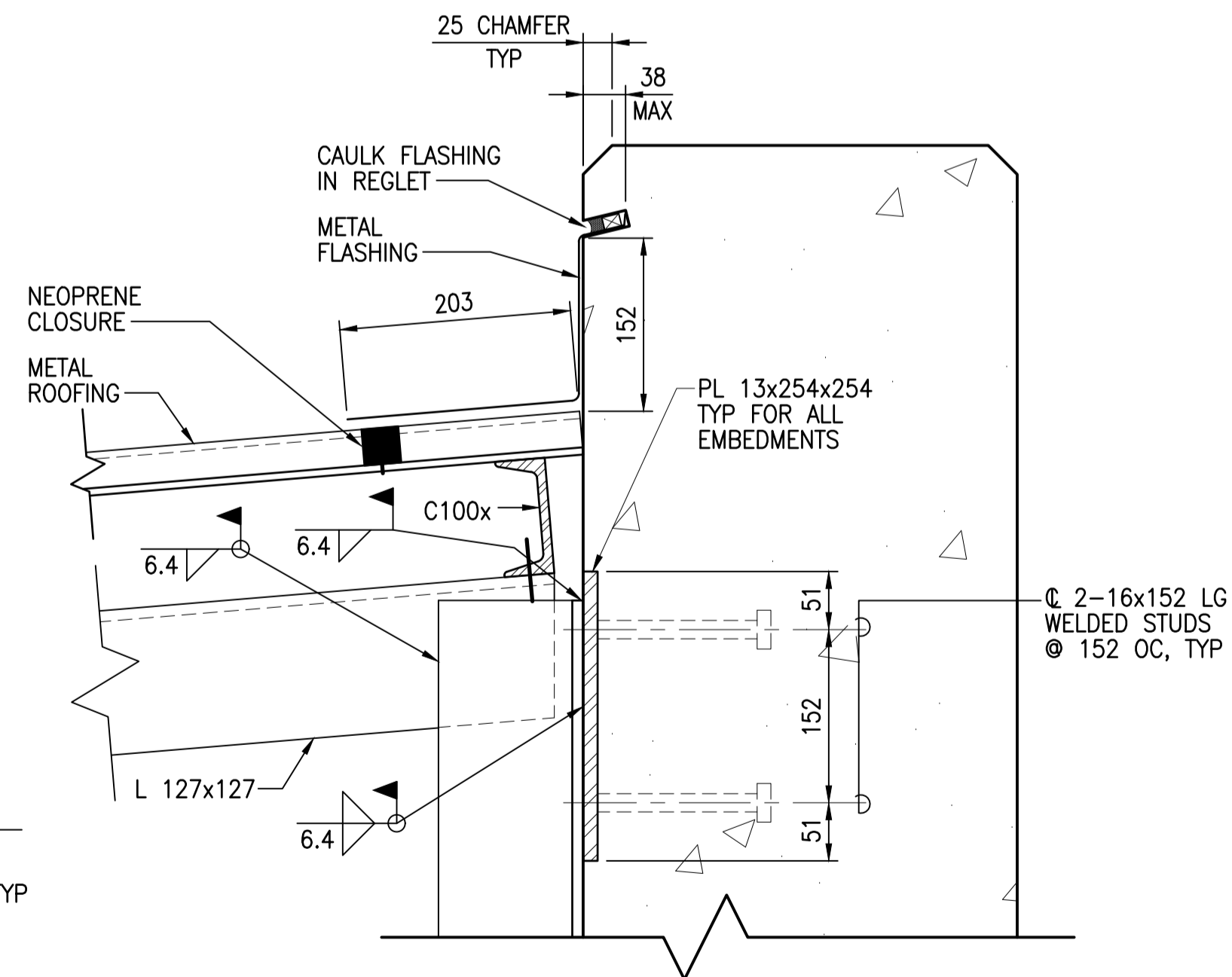
**3 SECTION**  
S-502 | S-503 SCALE: 1:20



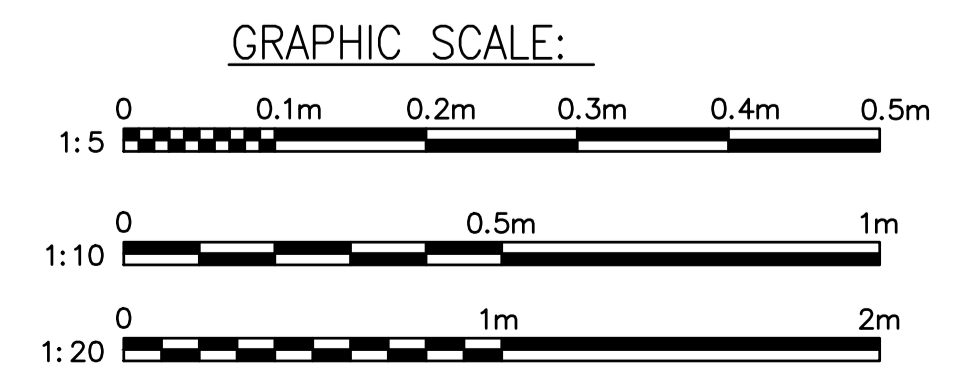
**4 SECTION**  
S-503 | S-503 SCALE: 1:10



**5 DETAIL**  
S-503 | S-503 SCALE: 1:5



**6 DETAIL**  
S-503 | S-503 SCALE: 1:5



DATE	09/14/22
APPR	
SYN	MSM STANDARD
DESCRIPTION	
<b>MODULAR STORAGE MAGAZINE</b> CANOPY SUPPORT DETAILS	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION
SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAFAC DRAWING NO.:	14115987
SHEET	19 OF 53
<b>S-503</b>	
NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018	

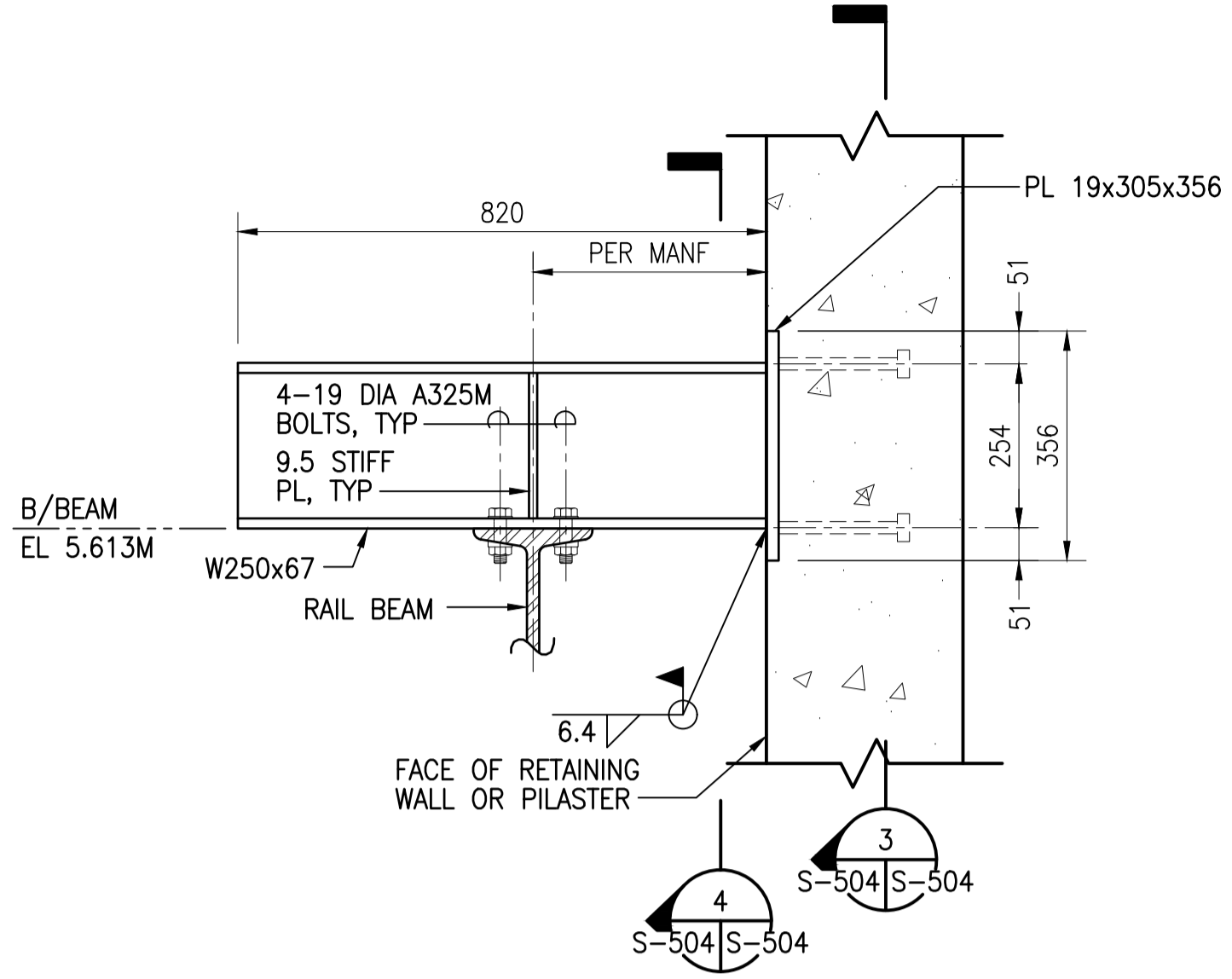
1

2

3

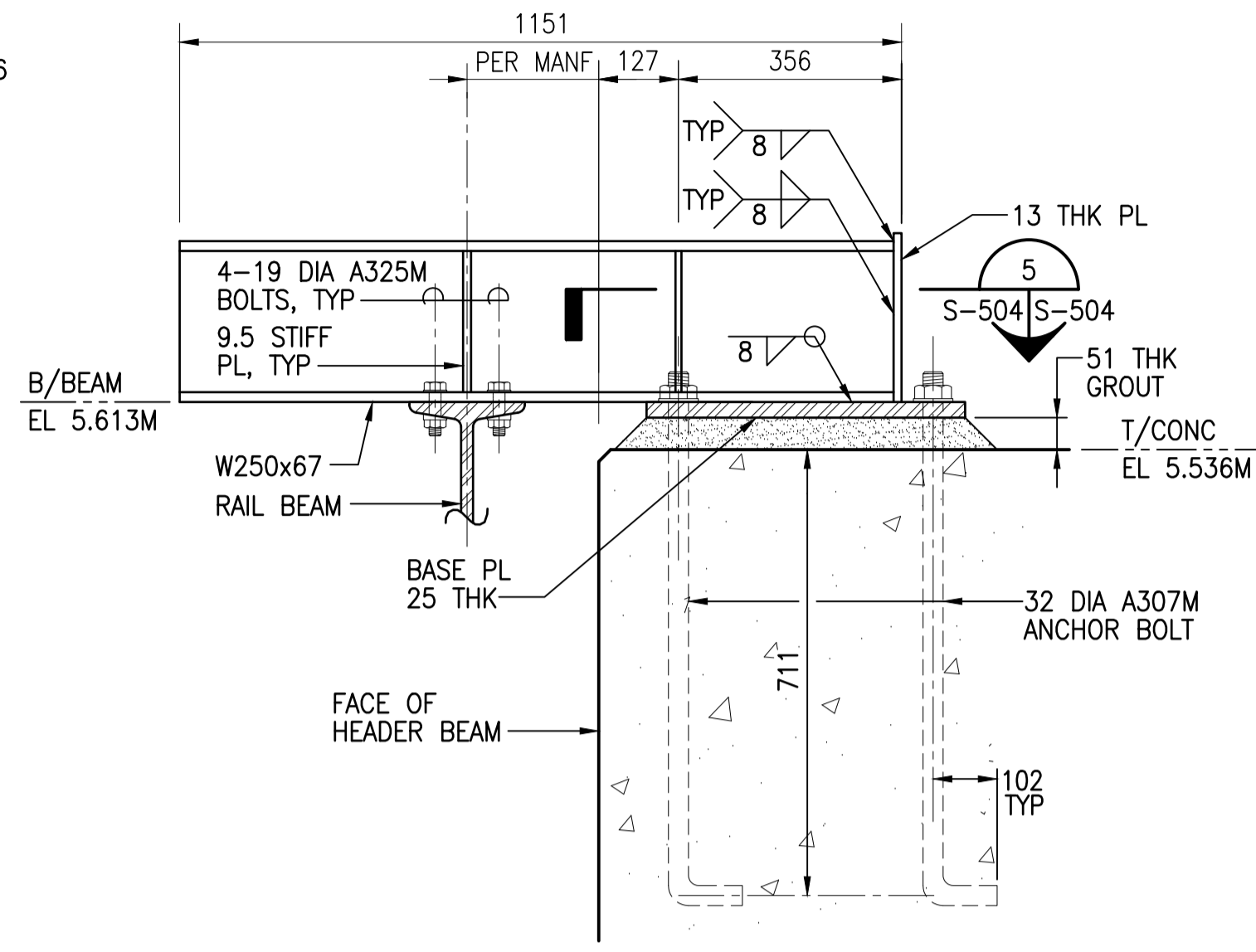
4

5



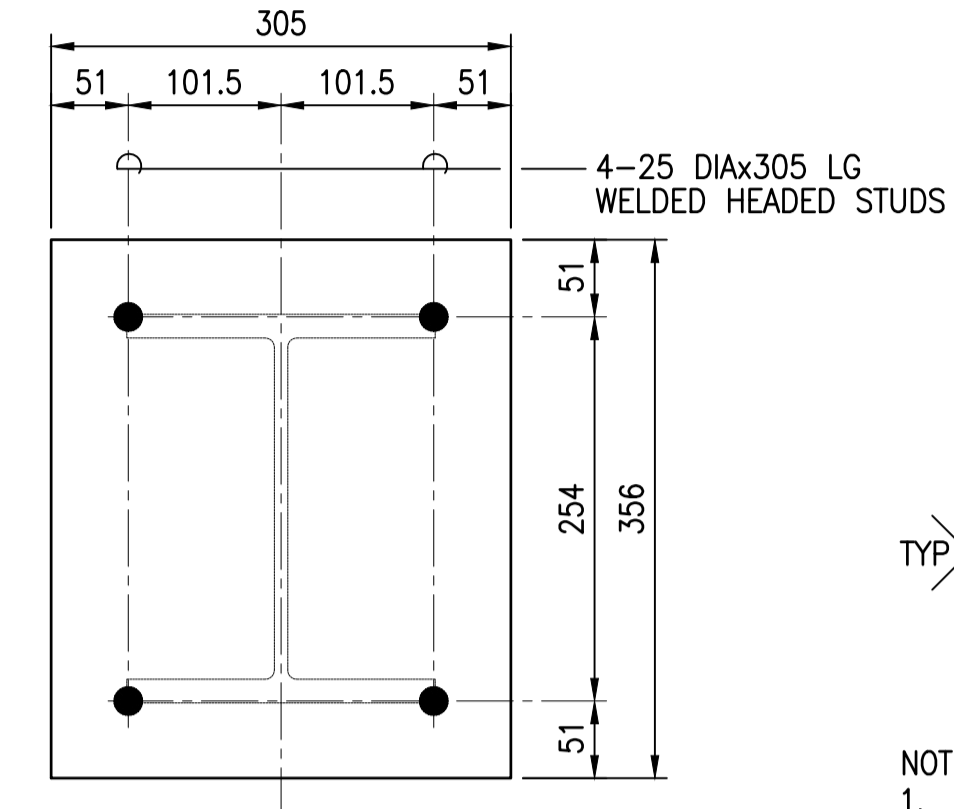
NOTE 1: LOCATION OF RAIL BEAM TO BE VERIFIED BY DOOR MANUFACTURER FOR CENTER OF GRAVITY AND DOOR CLEARANCES.

**1 TYPE I RAIL SUPPORT BEAM**  
S-502 S-504 SCALE: 1:10

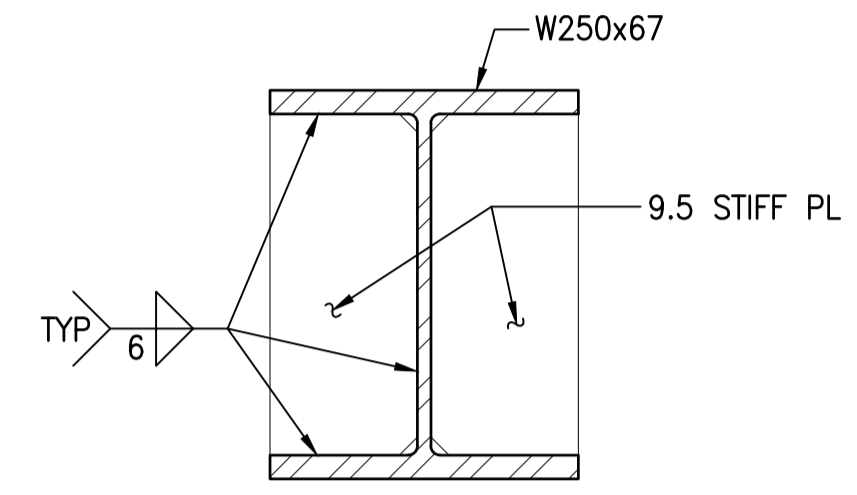


NOTE 1: LOCATION OF RAIL BEAM TO BE VERIFIED BY DOOR MANUFACTURER FOR CENTER OF GRAVITY AND DOOR CLEARANCES.

**2 TYPE II RAIL SUPPORT BEAM**  
S-502 S-504 SCALE: 1:10

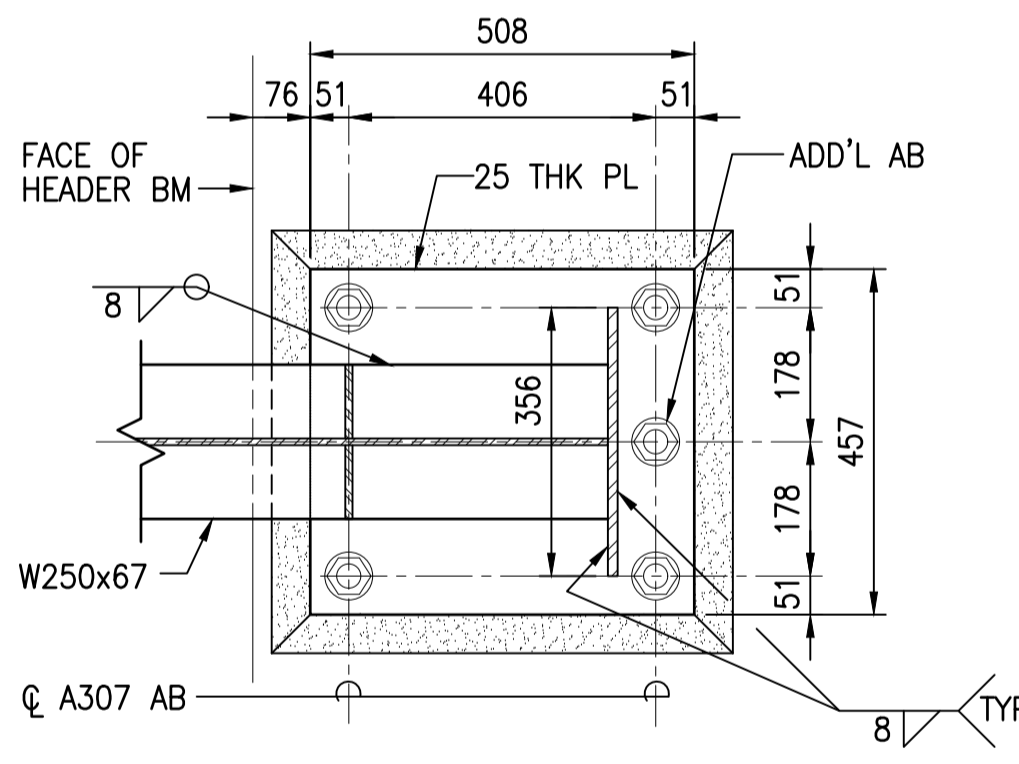


**3 SECTION**  
S-504 S-504 SCALE: 1:5



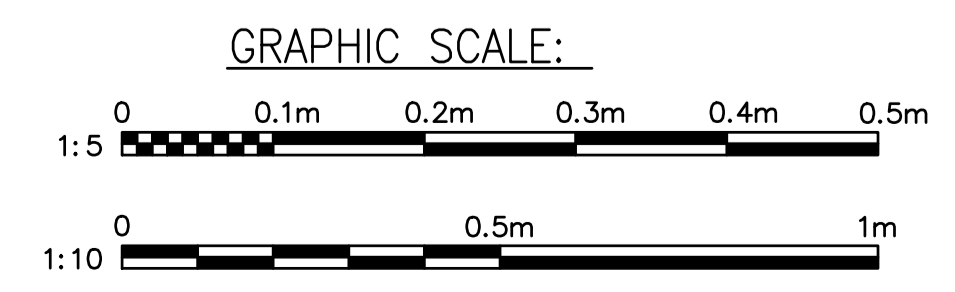
- NOTES:
- TROLLEY BEAM AND TROLLEY SUPPORT BOLT HOLES SHALL BE SLOTTED FOR ADJUSTMENT, ALL BOLTS SHALL BE A325 WITH LOCK & BEVEL WASHERS. COORDINATE WITH TROLLEY MANUFACTURER'S SPECS.
  - WELD TRACK BEAM AND SHIMS IN PLACE AFTER NECESSARY ADJUSTMENTS HAVE BEEN MADE USING BOLTS IN SLOTTED HOLES.
  - TRACK BEAM SUPPORT BRACKETS, BOLTS AND ANCHOR BOLT PROJECTIONS SHALL BE GALVANIZED.

**4 SECTION**  
S-504 S-504 SCALE: 1:5



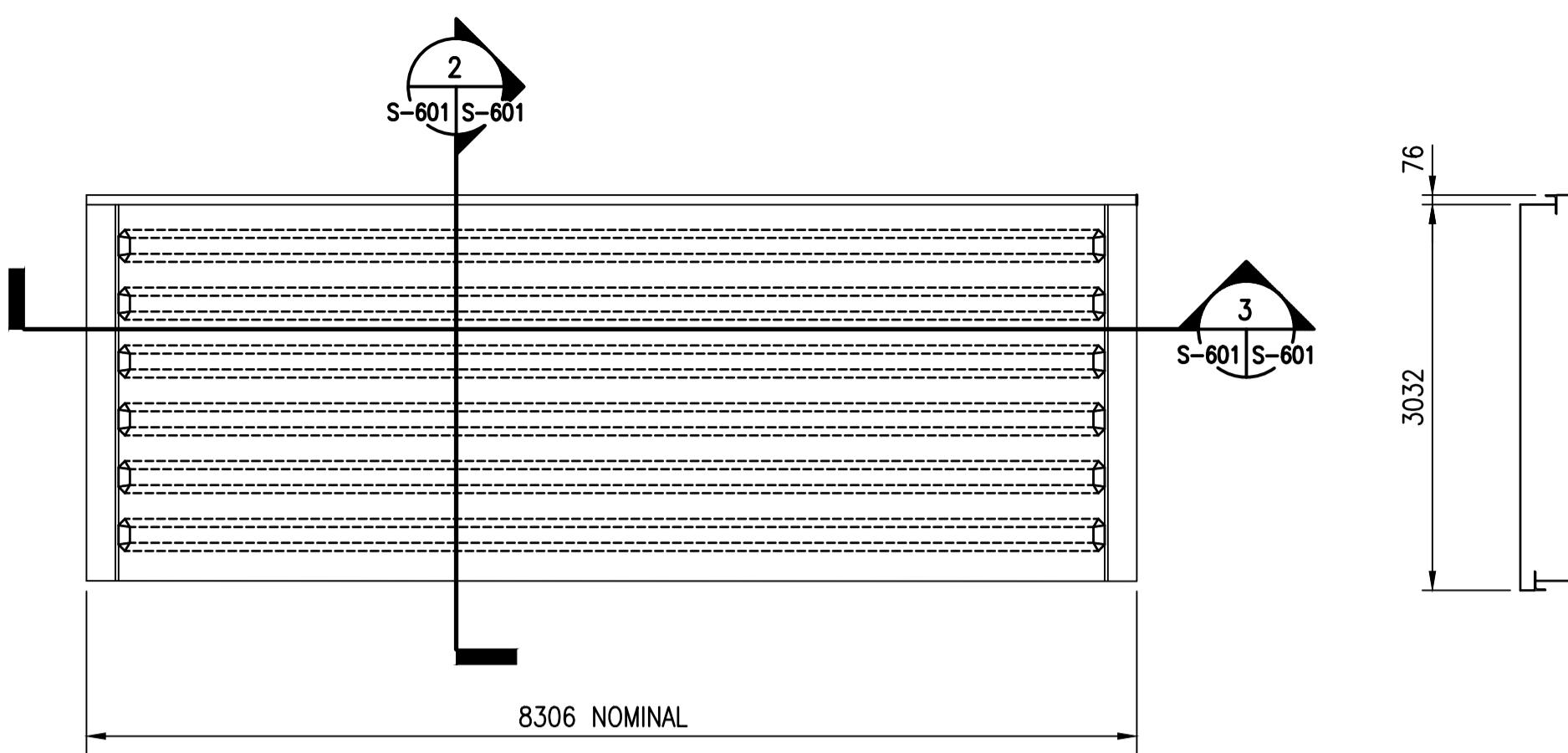
**5 SECTION**  
S-504 S-504 SCALE: 1:10

- NOTES:
- BOND ANCHOR BOLTS TO REINFORCING STEEL. SEE "ELECTRICAL BONDING & GROUNDING" NOTES ON S-002 AND SEE S-401 FOR THE REINFORCING STEEL BONDING REQUIREMENTS.
  - DOOR MANUFACTURER TO CALCULATE CENTER OF GRAVITY OF DOOR.
  - AT HEAD WALL AND LEFT COLUMN CONDITION = 360mm-150mm = 210mm
  - TROLLEY BEAM AND TROLLEY SUPPORTS BOLT HOLES MUST BE SLOTTED FOR ADJUSTMENT, ALL BOLTS MUST BE A325 WITH LOCK & BEVEL WASHERS. COORDINATE WITH TROLLEY MANUFACTURER'S SPECS.
  - WELD TRACK BEAM AND SHIMS IN PLACE AFTER NECESSARY ADJUSTMENTS HAVE BEEN MADE USING BOLTS IN SLOTTED HOLES
  - TRACK BEAM, SUPPORT BRACKETS, BOLTS, AND ANCHOR BOLT PROJECTIONS MUST BE GALVANIZED.

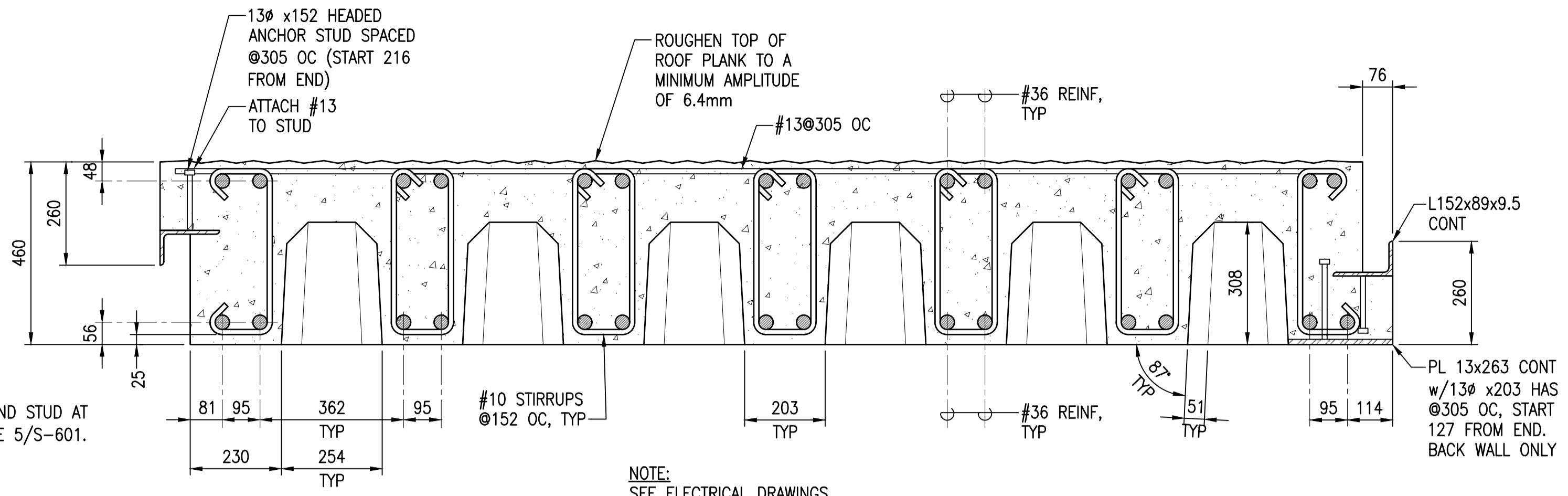


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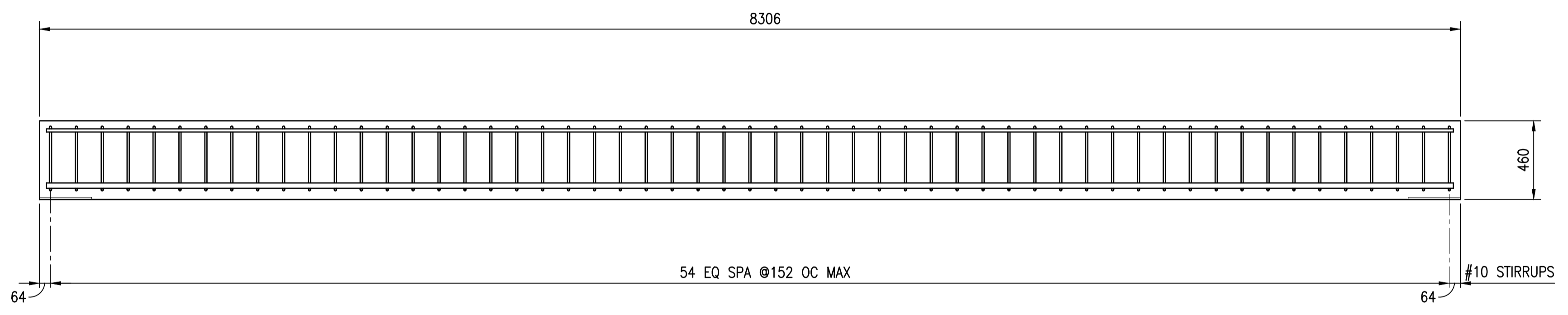
APPROVED	DATE: 09/14/22
FOR COMMANDER NAFAC	MSM STANDARD
ACTIVITY	DESCRIPTION
SATISFACTORY TO DATE: MM/DD/YY	
DESIGNED BY: JTW	
DES. PROJ. DIR: RICHARD L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER: DPS	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
MODULAR STORAGE MAGAZINE	
DOOR RAIL SUPPORT DETAILS	
SCALE: AS NOTED	
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAFAC DRAWING NO.:	14115988
SHEET 20 OF 53	
<b>S-504</b>	



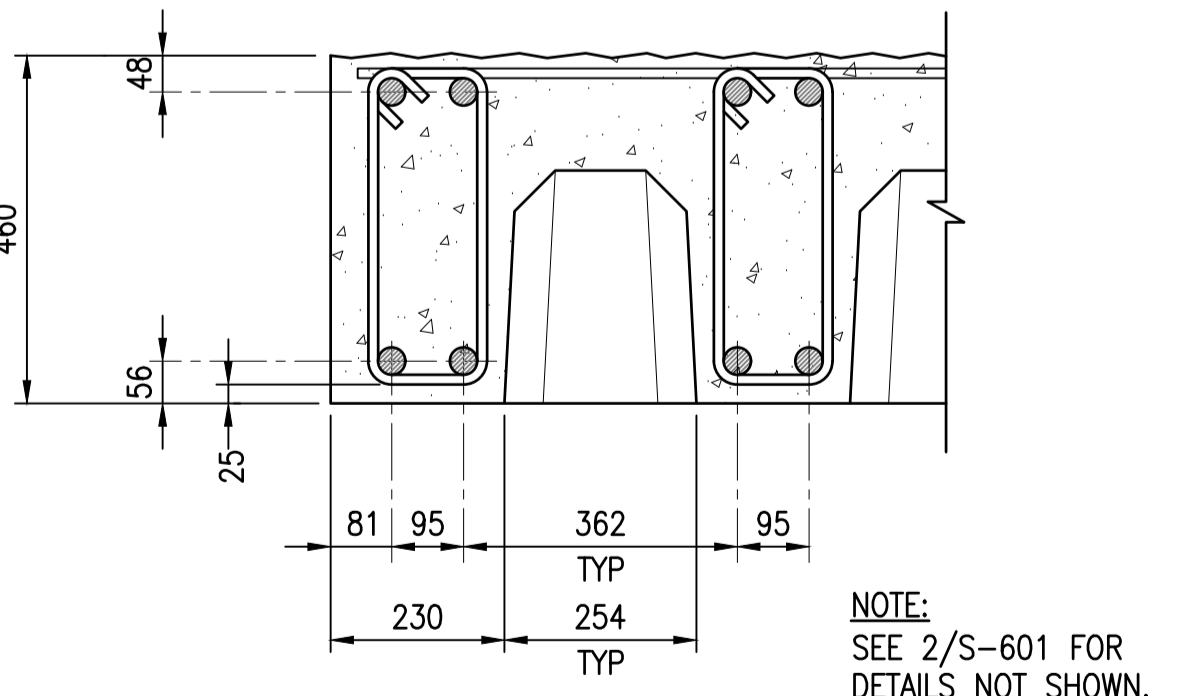
**1 ROOF PANEL PLAN**  
S-102S-601 SCALE: 1:50



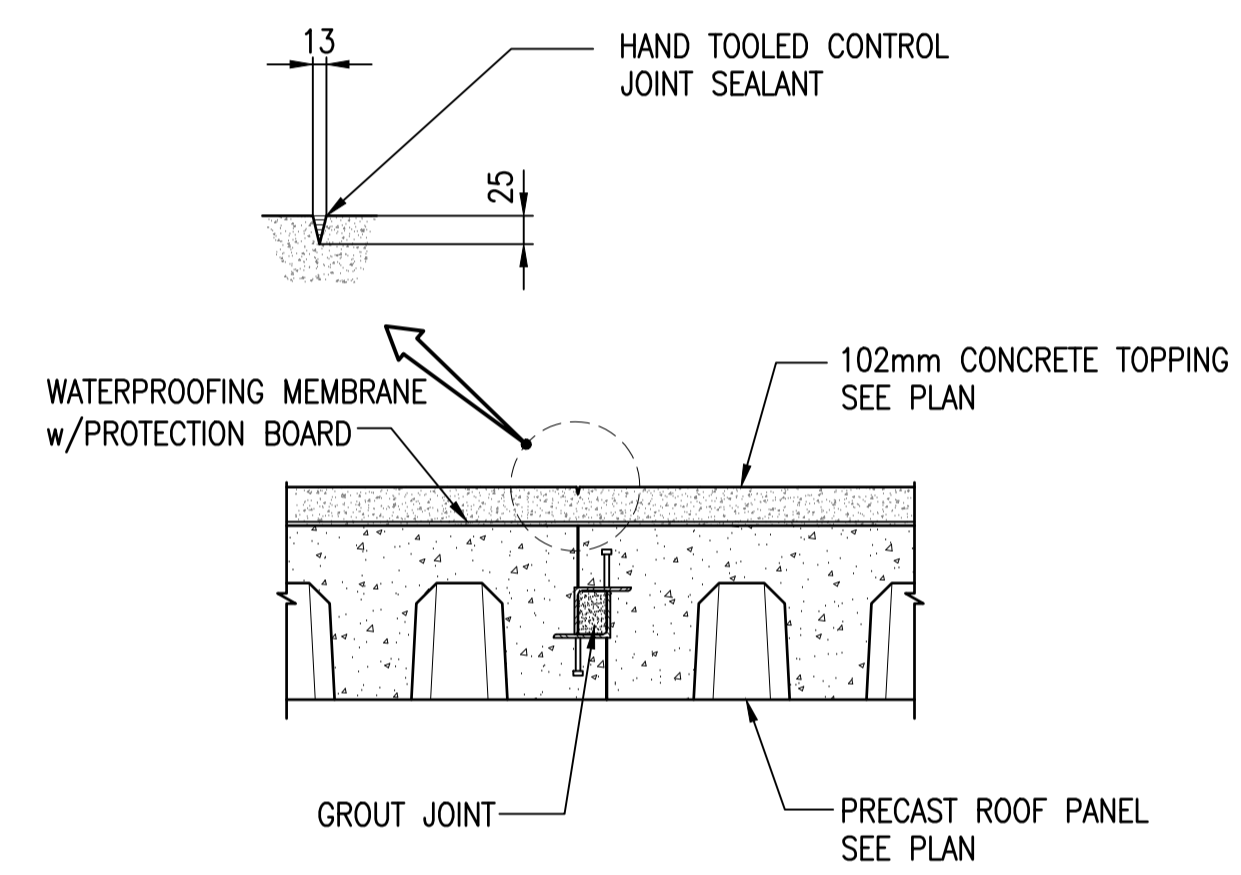
**2 ROOF PANEL SECTION**  
S-601S-601 SCALE: 1:10



**3 ROOF PANEL SECTION**  
S-601S-601 SCALE: 1:20

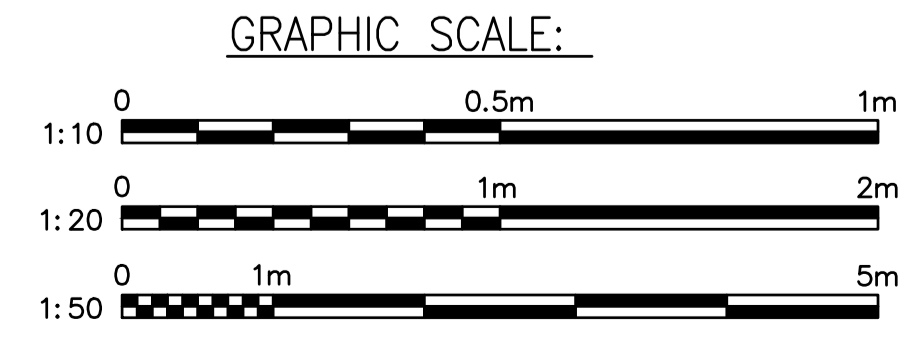


**5 ROOF PANEL AT HEADWALL**  
S-601S-601 SCALE: 1:10



**4 ROOF PANEL JOINT SECTION**  
S-102S-601 SCALE: 1:20

- GENERAL NOTES:**
- PANELS MAY BE PRECAST BY A MANUFACTURER SPECIALIZING IN PRECAST PRODUCTS OR PRECAST AT THE JOB SITE.
  - WIRE TIE REINFORCING BAR AS NEEDED, USING NO. 13 WIRE.
  - A CLASS C FINISH IS REQUIRED FOR EXPOSED FORMED SURFACES OF ROOF PANELS. A CLASS D FINISH IS REQUIRED FOR SURFACES WHICH WILL BE BELOW GRADE OR NOT EXPOSED TO VIEW AFTER FINAL ASSEMBLY. ROUGHEN TOP OF ROOF PLANK TO A MINIMUM AMPLITUDE OF 6.4MM.
  - SIZE, LOCATION, AND QUANTITY OF LIFTING INSERTS TO BE DETERMINED BY CONTRACTOR.
  - VERIFY LIGHTNING PROTECTION REQUIREMENTS w/ ELECTRICAL DRAWINGS.



APPR	09/14/22	DATE
MSM STANDARD	DESCRIPTION	
APPROVED	A/E/ INFO	
FOR COMMANDER NAFAC	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD DIR	RICHARD L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION	MODULAR STORAGE MAGAZINE PRECAST ROOF PANEL DETAILS	
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAC DRAWING NO.:	14115989	
SHEET	21	OF 53
<b>S-601</b>		
<small>NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018</small>		

FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\S-601.dwg LAYOUT NAME: S-601 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jls@coronado

FILE NAME: J:\USSE\magazines\WMSM\2021 Interim Updates\WMSM\S-701.dwg LAYOUT NAME: S-701 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jeb@coriano

**DOOR AND MISC METAL PAINT SPEC:**

ALL PAINTING SHALL COMPLY WITH UFGS 09.97.13.27  
SHOP PAINTING: SSPC QP3  
FIELD PAINTING: SSP QP1 + QS1  
COLOR: LIGHT GRAY

- A. PREPARATION:
1. SLAG REMOVAL FROM ALL WELDING PRIOR TO CLEANING PER SP 0178
  2. SOLVENT CLEAN TO SSPC SP1
  3. BLAST CLEAN TO SSPC SP10

- B. PAINT SYSTEM: SYSTEM DRY FILM THICKNESS TO BE 12 MILS MINIMUM GALVANIZED METALS:
1. PRIMER: MPI 101
  2. EPOXY INTERMEDIATE COAT: MPI 108
  3. POLYURETHANE TOP COAT: MPI 72

- NON-GALVANIZED METALS:
1. PRIMER: MPI 20
  2. EPOXY INTERMEDIATE COAT: MPI 108
  3. POLYURETHANE TOP COAT: MPI 72

C. SOLVENT CLEAN SURFACE TO BE COATED PRIOR TO ABRASIVE BLASTING IN ACCORDANCE WITH SSPC-SP1.

D. DRY ABRASIVE BLAST TO NEAR WHITE FINISH IN ACCORDANCE WITH SSPC-SP10. BLAST PROFILE SHALL BE 1-3 MILS TOOTH HEIGHT.

E. PRIMER COAT: ABRASION RESISTANT INORGANIC ZINC SILICATE PRIMER (3-5 MILS). SSPC PAINT 20, TYPE IC, LEVEL 1, WITH AT LEAST 85% ZINC IN DRY FILM.

F. INTERMEDIATE COAT: HIGH SOLIDS EPOXY COATING (3-5 MILS). MPI #108

G. TOP COAT HIGH SOLIDS POLYURETHANE COATING (3-5 MILS) MPI #72

H. TOTAL COATING DRY FILM THICKNESS (DFT): 12 MILS

ALL SURFACES OF ALL DOOR COMPONENTS SHALL BE SOLVENT CLEANED, DRY ABRASIVE BLASTED, AND ZINC RICH PRIMER COATED. PRIOR TO FULLY ASSEMBLING OR FABRICATING DOOR, CLEAN AND PRIMER SURFACES THAT WILL BECOME INACCESSIBLE AFTER DOOR IS FULLY ASSEMBLED. EPOXY INTERMEDIATE AND TOP COATS NEED ONLY BE APPLIED TO THE EXTERIOR SURFACES OF THE FULLY ASSEMBLED DOOR.

NOTES:

1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET WELDING SYMBOLS PER ANSI/AWS A2.4. ALL WELDING SHALL BE PER ANSI/AWS D1.1.
3. CENTER ALL SEAMS OVER VERTICAL STIFFENERS. INTERIOR PLATE SPLICE LOCATIONS TO BE SELECTED BY MANUFACTURER BASED ON AVAILABLE PLATE WIDTH.
4. FINISH: TREAT ALL SURFACE TO RECEIVE PAINT. APPLY ONE COAT OF POLYURETHANE BASED TOP COAT.
5. INSIDE CAVITIES OF DOOR SHALL BE ABRASIVE BLASTED TO NEAR WHITE CONDITION, TO RECEIVE PAINT. APPLY ONE COAT OF PRIMER TO ALL INSIDE SURFACES INCLUDING WHERE THE LIGHTWEIGHT CONCRETE WILL BE POURED.
6. AFTER APPLICATION OF PRIMER POUR LIGHTWEIGHT CONCRETE INTO CAVITIES OF THE BACK SIDE OF THE DOOR TO A THICKNESS OF 50.8 (2").
7. CONCRETE FILLED DOORS REQUIRE TROLLEY HANGERS OFFSET NOMINAL TOWARD THE BACKSIDE OF THE DOOR. VERIFY CENTER OF GRAVITY OF DOOR PRIOR TO FINAL CONSTRUCTION, DOOR SHALL HANG PLUMB. DOOR MANUF TO CALCULATE DOOR WEIGHT, CENTER GRAVITY, AND TROLLEY HANGER SUPPORT OFFSET.
8. THESE DOOR DRAWINGS HAVE BEEN APPROVED BY THE DDES FOR CONSTRUCTION. THERE SHALL BE NO DEVIATION FROM THESE DOOR DRAWINGS. ANY REVISION AND OR CHANGES MUST BE REVIEWED AND APPROVED BY THE CONTRACTING OFFICER AND MAY RESULT IN THE REVIEW AND APPROVAL BY THE DDES.
9. THE DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR THE MANUFACTURING OF SLIDING STEEL SECURITY DOORS, SUPPORTS, TROLLEY, TRENCH, PILASTER POCKET AND OPERATING SYSTEMS AND SHALL FABRICATE THE DOOR FROM START TO FINISH IN A CONTROLLED ENVIRONMENT GUARANTEEING QUALITY CONTROL WITHIN SPECIFICATIONS AND TOLERANCES PROVIDED AND THE ABILITY TO SHIP THE DOORS TO DESIRED LOCATION IN ONE COMPLETE PIECE WITHOUT DAMAGE.
10. THE DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR THE FABRICATION AND INSTALLATION OF THE SLIDING STEEL SECURITY DOORS, SUPPORTS, TROLLEY, TRENCH AND OPERATING SYSTEMS.
11. THE DOOR MANUFACTURER SHALL INSTALL THE DOOR PER THE DOOR INSTALLATION GUIDELINES TO READY FOR THE INSTALLATION OF THE BOLTWORKS LOCKING SYSTEM.
12. THE DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR FIXING AND DAMAGE IN SHIPPING AND/OR INSTALLATION AND WHEN DOOR INSTALLATION IS COMPLETED SHALL TOUCH UP ANY DEFICIENCIES IN THE PAINT COATING TO GUARANTEE THE PROTECTION OF ALL METAL COMPONENTS FROM THE ELEMENTS.
13. FABRICATION OF DOORS SHALL CONFORM TO AISC 360 AND AISC 303. THE ASSEMBLED DOOR SHALL BE FABRICATED TO WITHIN 6mm FLATNESS IN EITHER DIRECTION.

HIGH SECURITY DOOR LIGHTWEIGHT CONCRETE FILL				
MATERIAL	AMOUNT	UNITS	SPECIFIC GRAVITY	ASTM
LIGHTWEIGHT AGGREGATE	694	kg	1.38	C331/C331M
CEMENT TYPE II	327	kg	3.15	C150
WATER	143	kg	1	C1602
SILICA FUME	37	kg	2.2	C1240
SUPER PLASTICIZER - TYPE A	202	g*	1.27	C494/C494M
SYNTHETIC FIBERS - TYPE III **	0.32	kg	0.855	C1116/C1116M
TOTAL VOLUME	0.76	m <sup>3</sup>	m <sup>3</sup>	
*g/45.4 kg OF CEMENTITIOUS MATERIAL				
**POLYETHYLENE, POLYPROPYLENE, NYLON, OR CARBON FIBERS MAY BE USED				

CONCRETE MATERIAL CHARACTERIZATION REQUIREMENTS				
SLUMP	50+6	kg	-	C143/C143M
DENSITY - UNIT WEIGHT	602-762	kg/m <sup>3</sup>	-	C138/C138M
STRENGTH (28 DAY MINIMUM)	27.6	MPa	-	C78

LIGHTWEIGHT CONCRETE NOTES:

1. LIGHTWEIGHT AGGREGATES SHOULD BE DRY.
2. ADJUST WATER AMOUNT TO +/- 10 kg SO THAT MIX HOLDS SHAPE WHEN FORMED INTO A BALL IN THE HAND.
3. MIX CAN BE SPLIT, DOUBLED, ETC. FOR VOLUME NEEDED.
4. MIX PROCEDURE:
  - A. WEIGH OUT ALL MATERIALS.
  - B. IN A SEPARATE CONTAINER, COMBINE AND MIX HALF OF WATER, PLASTICIZER AND ALL FIBERS.
  - C. IN ANOTHER SEPARATE CONTAINER, COMBINE AND MIX SILICA FUME AND CEMENT.
  - D. POUR WATER WITH PLASTICIZER AND ALL FIBERS INTO MIXER.
  - E. POUR LIGHTWEIGHT FINE AGGREGATE INTO MIXER.
  - F. SLOWLY ADD SILICA FUME AND CEMENT TO MIXER.
  - G. ADD REMAINING WATER ADJUSTING AS NECESSARY (NOTE 2).
  - H. ALLOW TO MIX FOR AT LEAST 10 MINUTES.
  - I. WHEN MIX IS READY, POUR IN TO DOOR CAVITIES OVER REBAR, TO PRESCRIBED DEPTH. ENSURE MIX FILLS ALL AREAS BEHIND REBAR, VIBRATE AS NECESSARY, NO VOIDS ALLOWED.
5. ALLOW CONCRETE TO CURE FOR 14 DAYS BEFORE MOVING DOOR AND 28 DAYS BEFORE WELDING FRONT PANELS ONTO DOOR.
6. QUESTIONS CAN BE REFERRED TO NAVFAC EXWC DOD LOCK PROGRAM, AND SECURITY ENGINEERING DIV SH22.



APPROVED

FOR COMMANDER NAFAC

ACTIVITY

SATISFACTORY TO DATE MM/DD/YY

DES IWR CHK LMM

PM/DW

BRANCH MANAGER JTW

DES PROD DIR RICHARD L STEPHENS, P.E.

FIRE PROTECTION ENGINEER DPS

USNA-NORFOLK, VA

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND

MODULAR STORAGE MAGAZINE

DOOR ELEVATION, NOTES AND SCHEDULES

SCALE: AS NOTED

EPROJECT NO.:

CONSTR. CONTR. NO.:

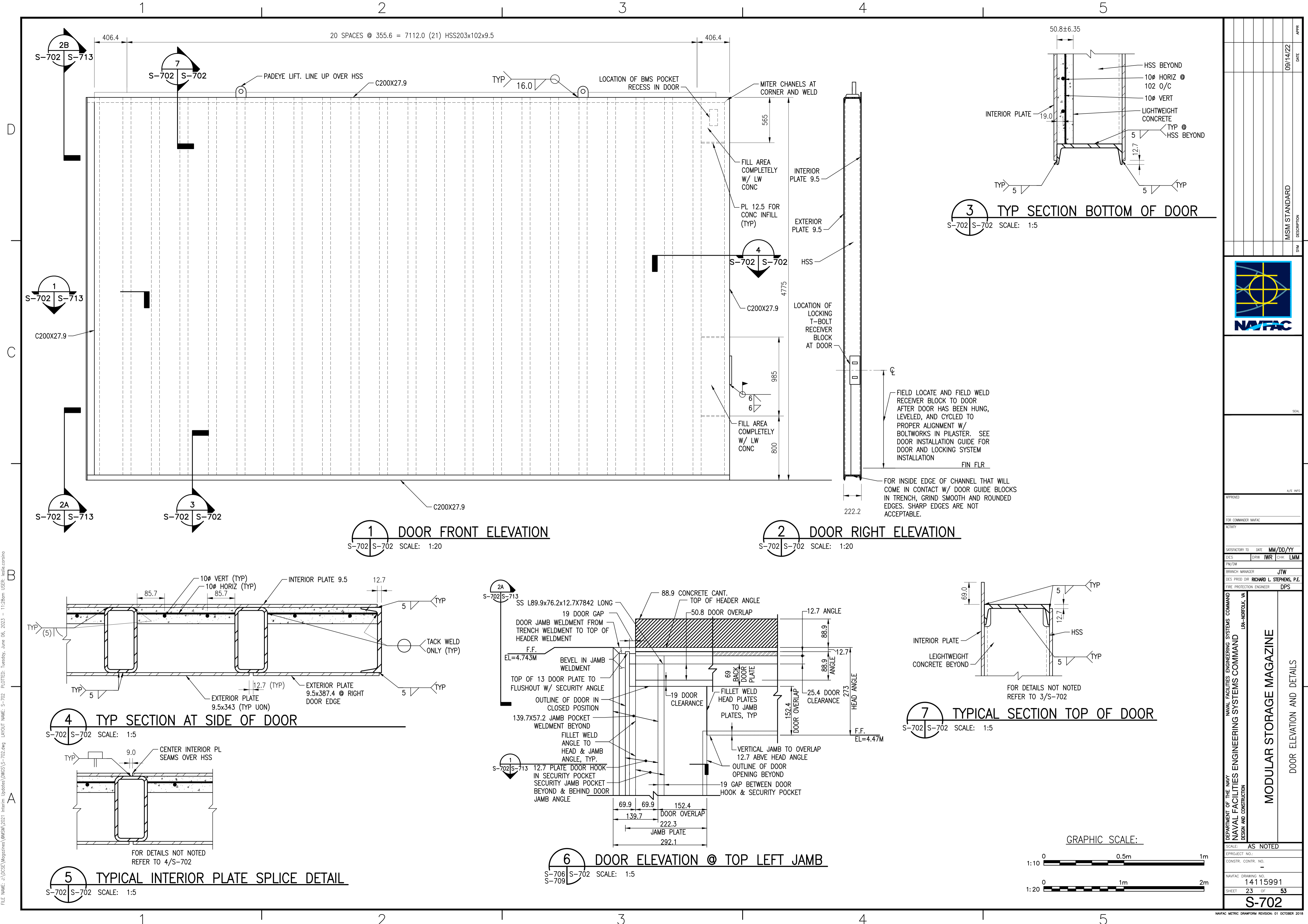
NAFAC DRAWING NO.:

14115990

SHEET 22 OF 53

S-701

NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018



**1 DOOR FRONT ELEVATION**  
S-702 S-702 SCALE: 1:20

**2 DOOR RIGHT ELEVATION**  
S-702 S-702 SCALE: 1:20

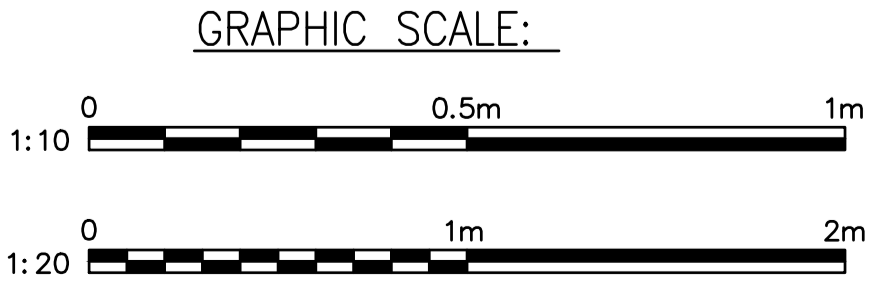
**3 TYP SECTION BOTTOM OF DOOR**  
S-702 S-702 SCALE: 1:5

**4 TYP SECTION AT SIDE OF DOOR**  
S-702 S-702 SCALE: 1:5

**5 TYPICAL INTERIOR PLATE SPLICE DETAIL**  
S-702 S-702 SCALE: 1:5

**6 DOOR ELEVATION @ TOP LEFT JAMB**  
S-706 S-702 SCALE: 1:5  
S-709

**7 TYPICAL SECTION TOP OF DOOR**  
S-702 S-702 SCALE: 1:5



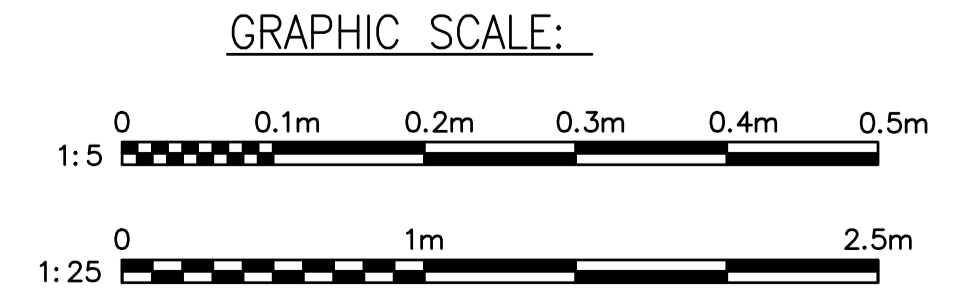
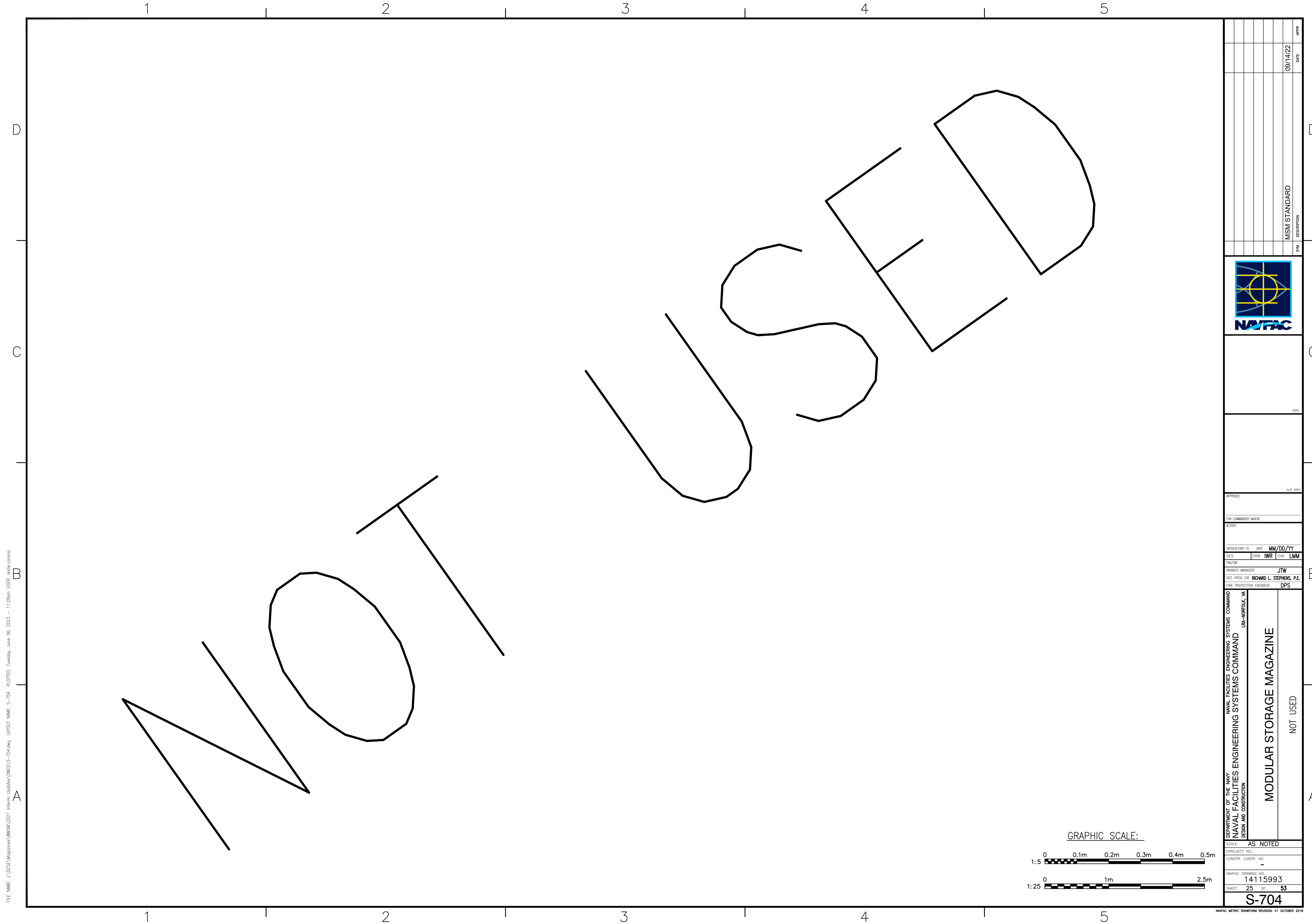
APPROVED	DATE	09/14/22
FOR COMMANDER NAFAF	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	DRW	IWR
CHECKED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD DIR	ROHARD L STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
MODULAR STORAGE MAGAZINE	DOOR ELEVATION AND DETAILS	
SCALE:	AS NOTED	
PROJECT NO.:	14115991	
CONSTR. CONTR. NO.:		
NAFAF DRAWING NO.:	14115991	
SHEET	23	OF 53
<b>S-702</b>		

FILE NAME: J:\USSE\Magazines\MSMA\2021 Interim Updates\UNOS\S-702.dwg LAYOUT NAME: S-702 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jehicoriano



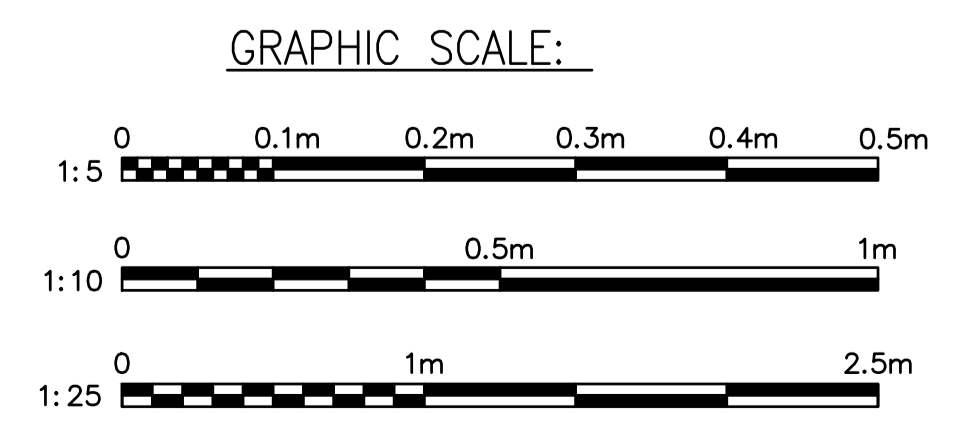
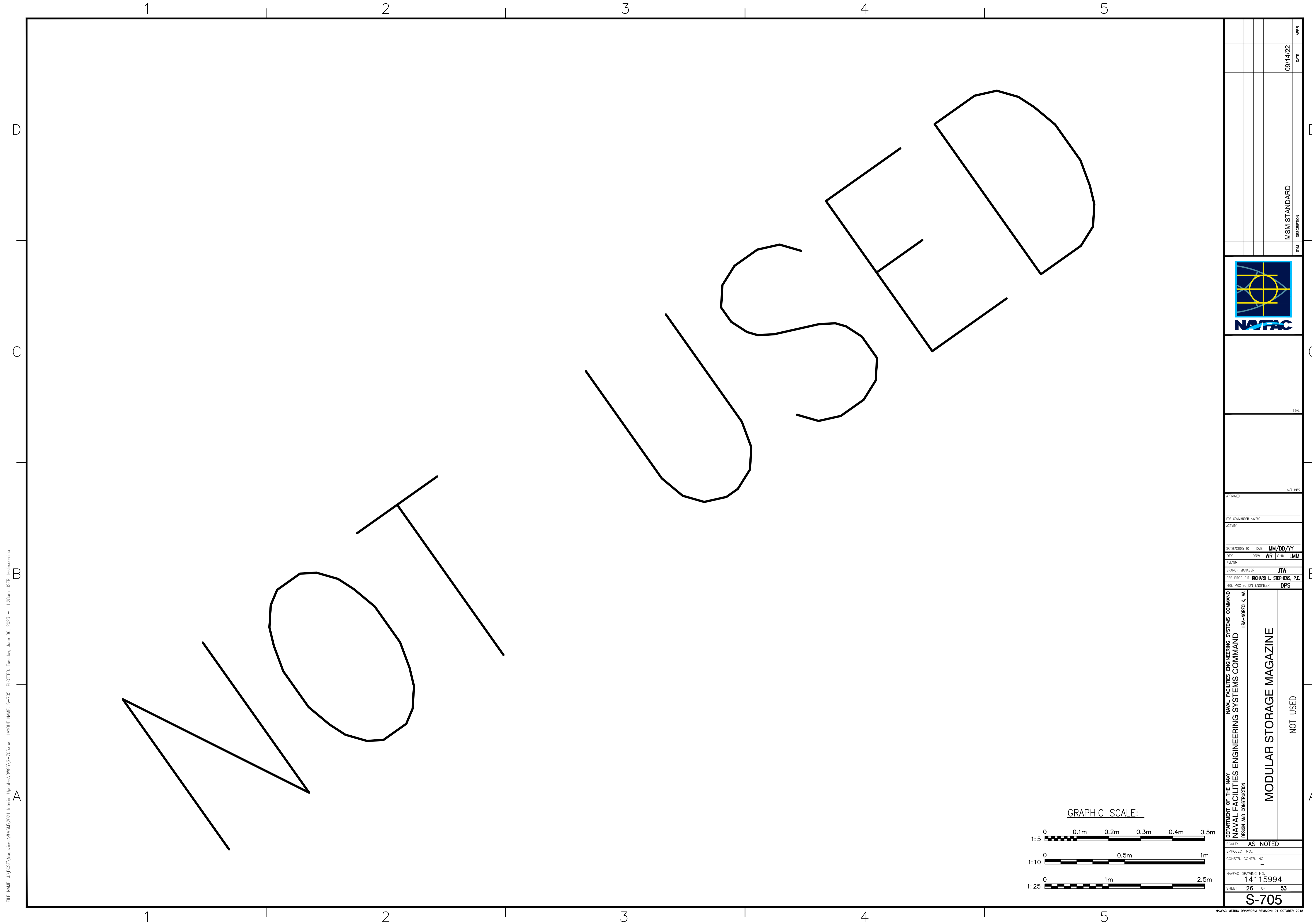


FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim Updates\WMS\S-704.dwg LAYOUT NAME: S-704 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jls@coronado



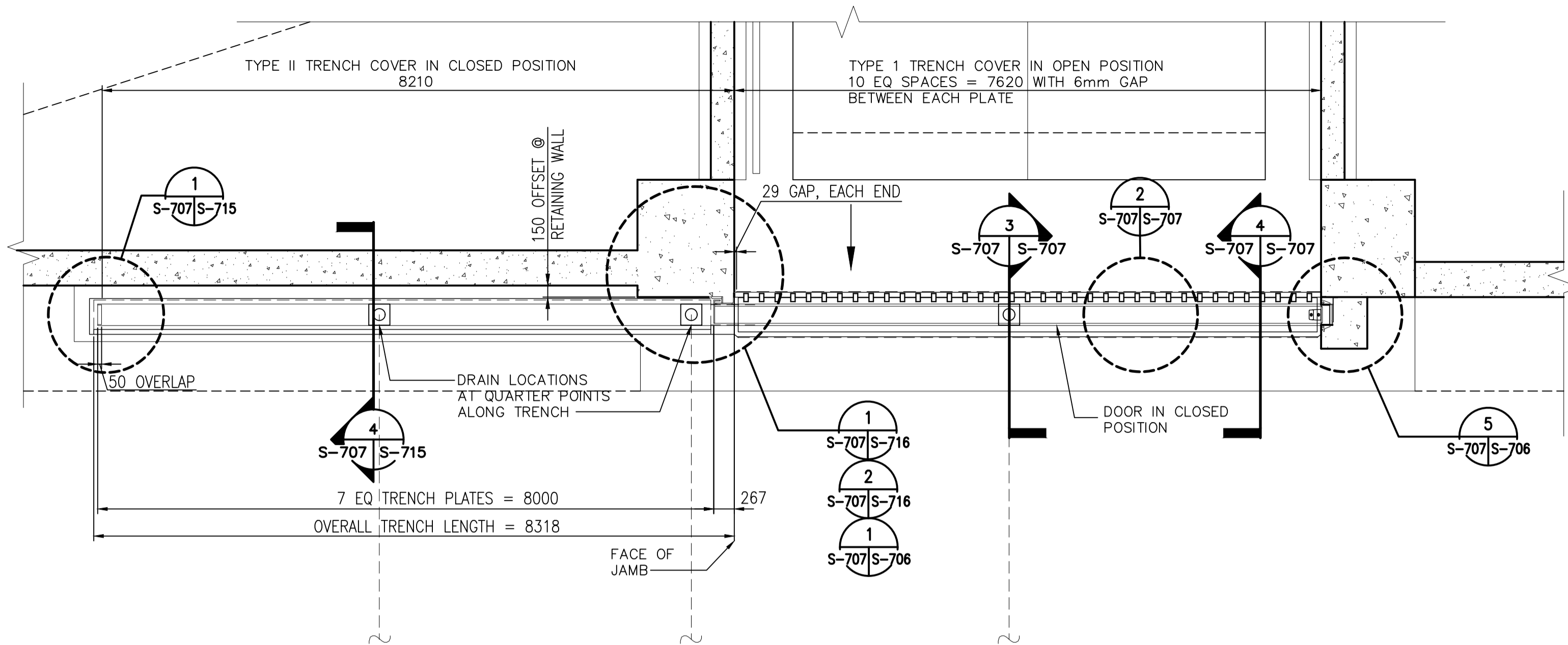
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION		NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND LDA-HORRDLK, VA	
MODULAR STORAGE MAGAZINE		NOT USED	
SCALE: AS NOTED			
PROJECT NO.:			
CONSTR. CONTR. NO.:			
NAVFAC DRAWING NO. 14115993			
SHEET 25 OF 53			
<b>S-704</b>			
FOR COMMANDER NAVFAC		SEAL	
ACTIVITY		DATE	
SATISFACTORY TO		DATE MM/DD/YY	
DES	DRW	IWR	CHK
PM/DM			LMM
BRANCH MANAGER JTW			
DES PRD DR RICHARD L. STEPHENS, P.E.			
FIRE PROTECTION ENGINEER DPS			
APPROVED		DATE 09/14/22	
APPR		DATE	
SYN		DESCRIPTION	
MSM STANDARD			

FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim Update\WMSM\S-705.dwg LAYOUT NAME: S-705 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jls@coronado

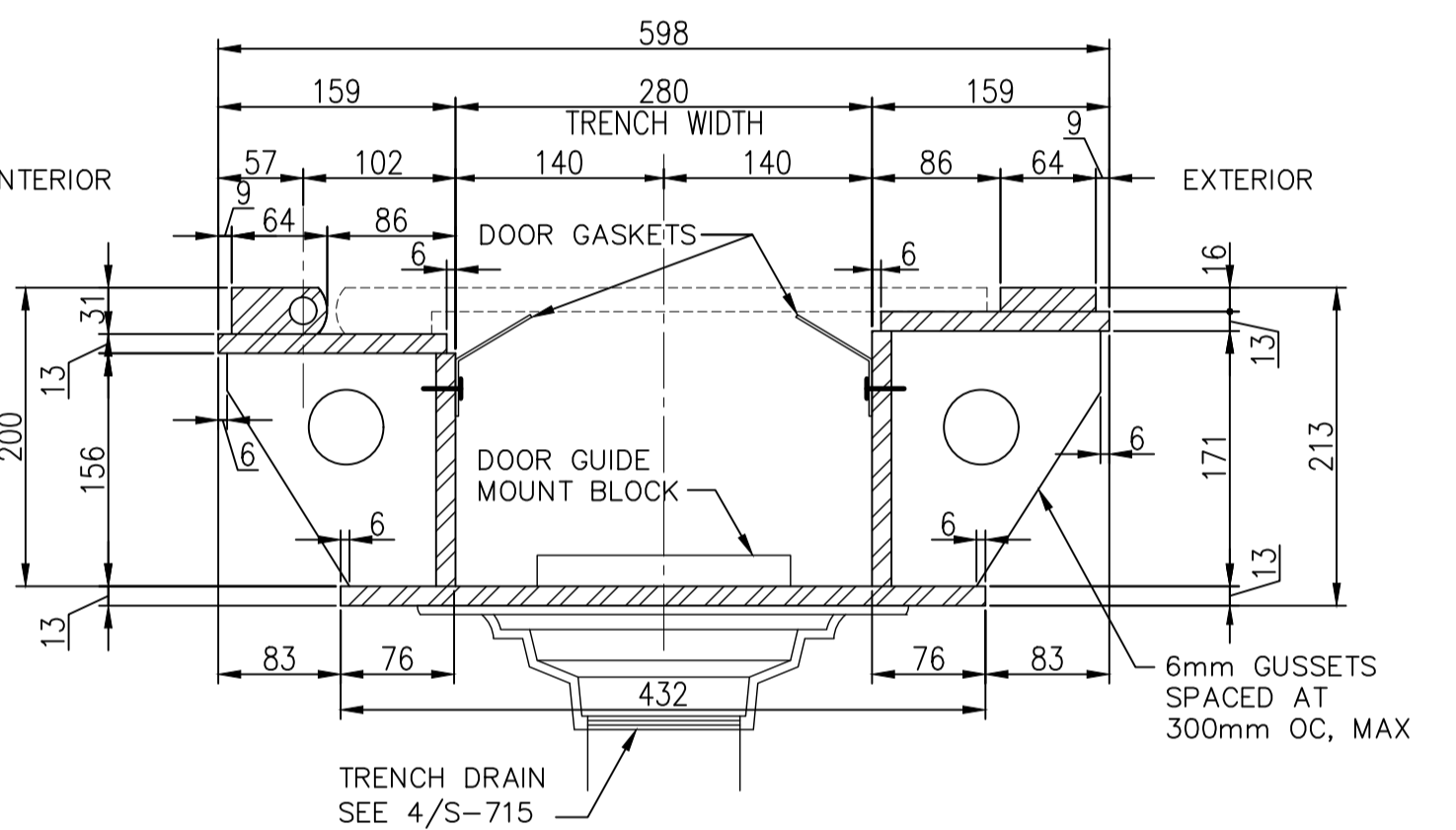


DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION		NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND LDA-HORRDLK, VA		MODULAR STORAGE MAGAZINE		NOT USED	
SCALE: AS NOTED		PROJECT NO.:		NAVFAC DRAWING NO. 14115994		SHEET 26 OF 53	
CONSTR. CONTR. NO.:		SHEET 26 OF 53		S-705		NAVFAC METRIC DRAWING REVISION: 01 OCTOBER 2018	
Satisfactory to DATE MM/DD/YY		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR		CHECKED BY LMM	
FOR COMMANDER NAVFAC		BRANCH MANAGER JTW		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
ACTIVITY		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
APPROVED		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
A/E INFO		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
SEAL		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
NAVFAC		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
SYMBOL DESCRIPTION		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
DATE		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	
APPROVED		FIRE PROTECTION ENGINEER DPS		DESIGNED BY RICHARD L. STEPHENS, P.E.		DRAWN BY IWR	

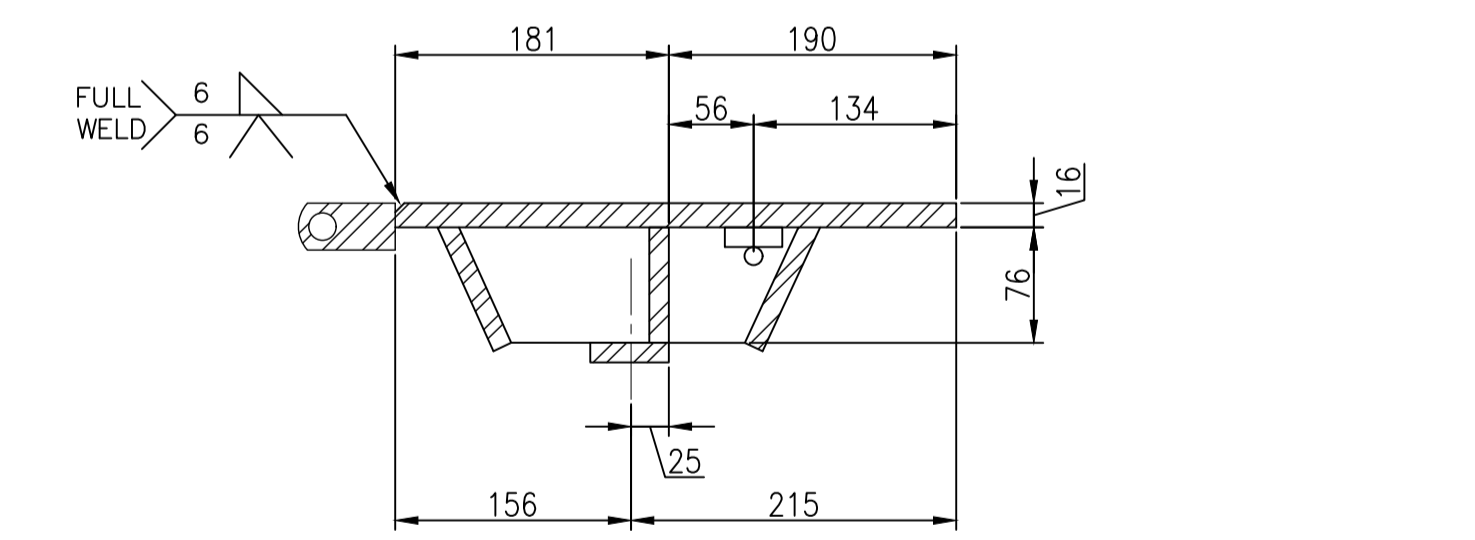




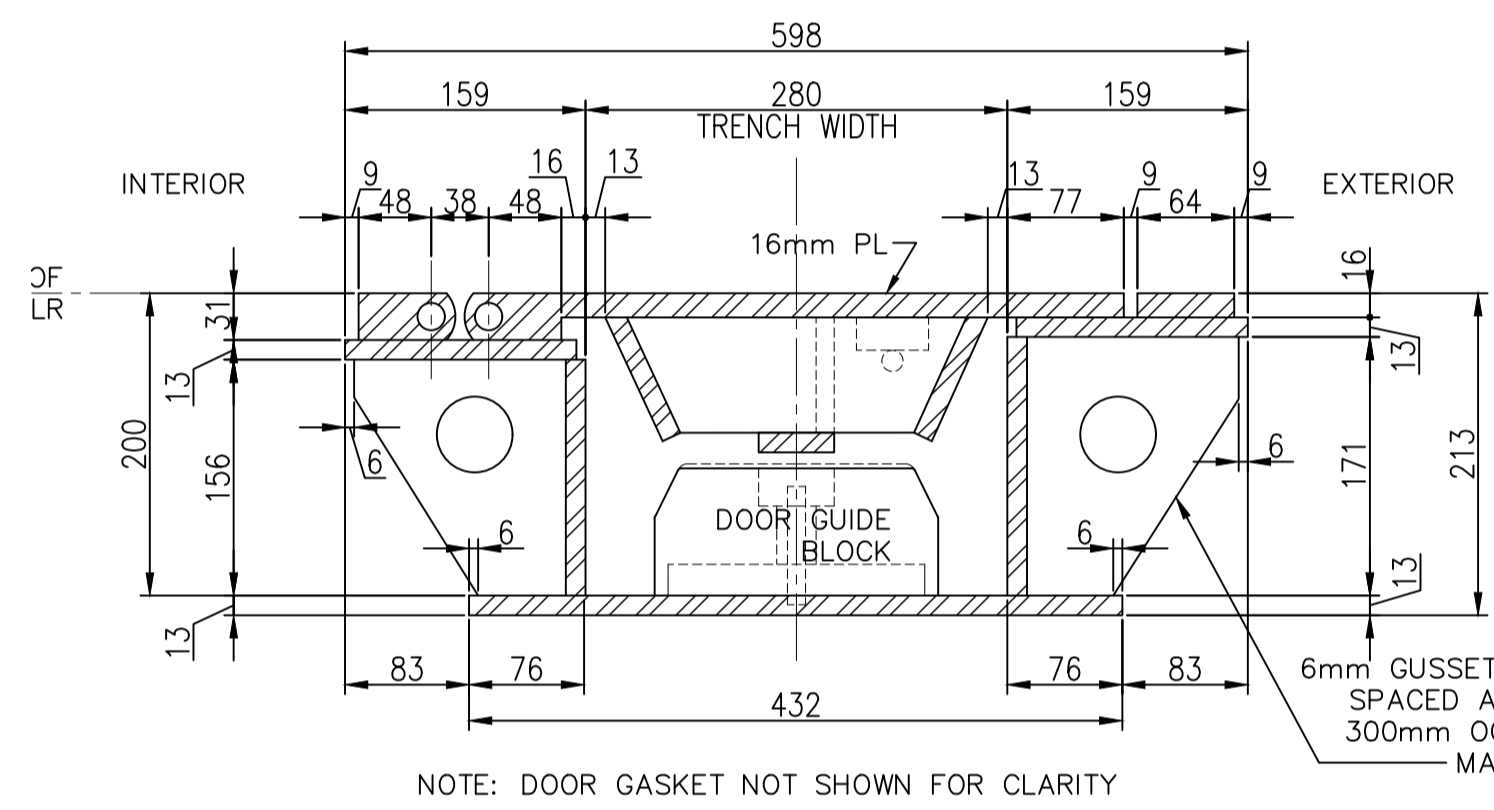
**1 TRENCH & TRENCH COVER LAYOUT PLAN**  
S-707 S-707 SCALE: 1:50



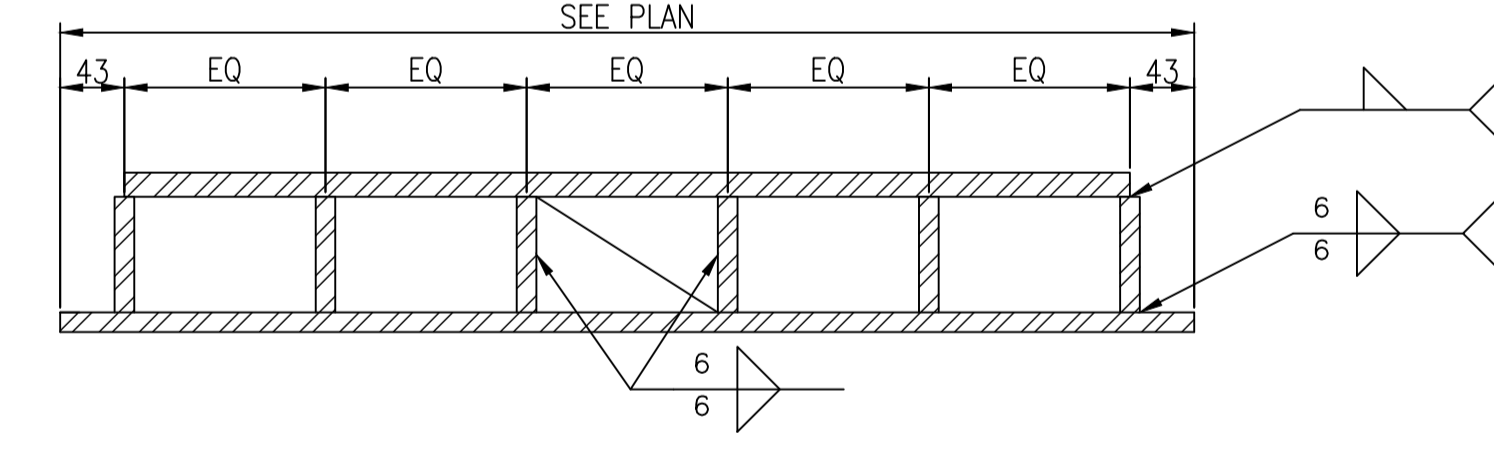
**3 SECTION AT DRIVE THRU TRENCH**  
S-707 S-707 SCALE: 1:5  
S-712



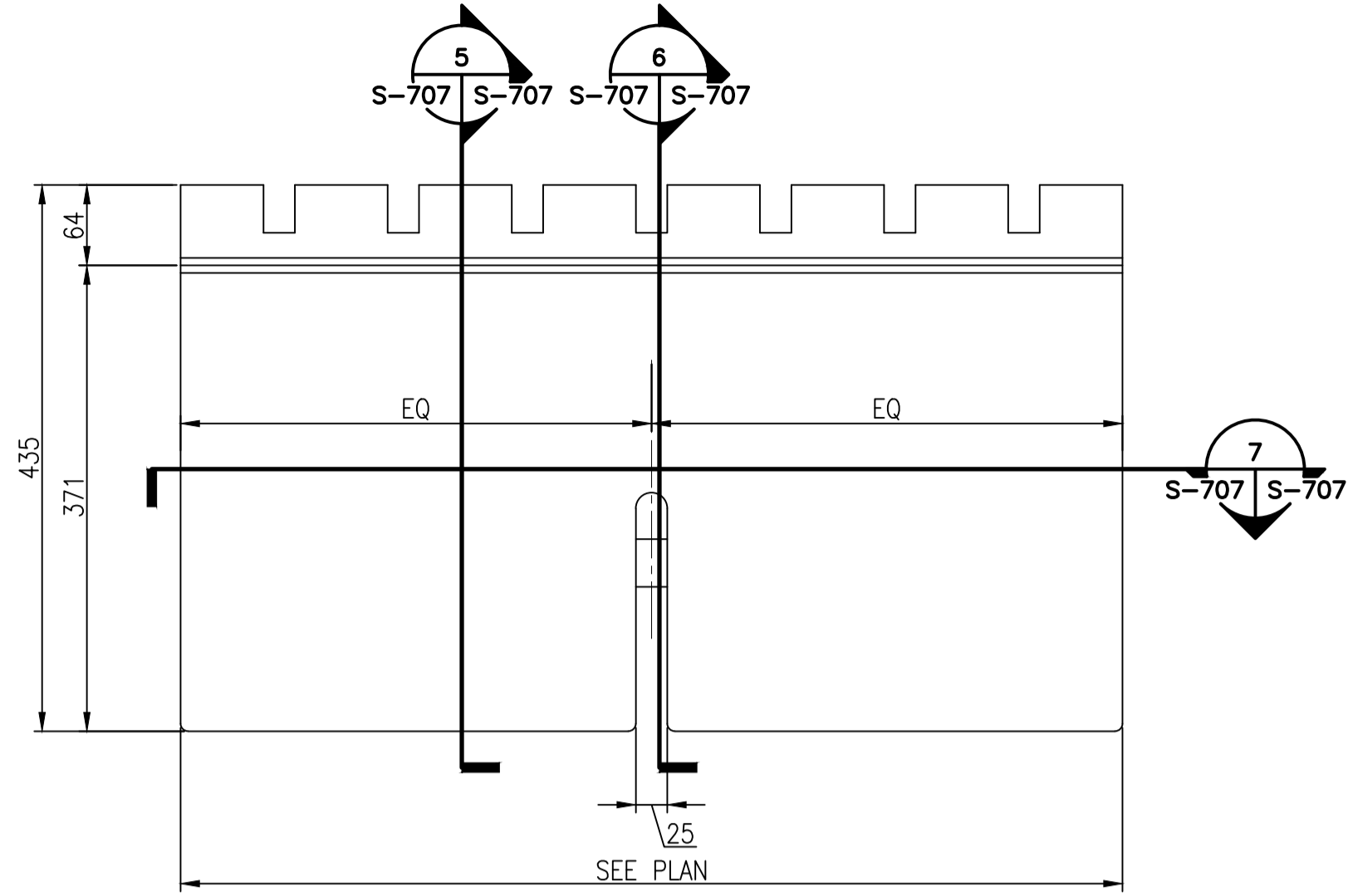
**6 SECTION AT DRIVE THRU TRENCH**  
S-707 S-707 SCALE: 1:5



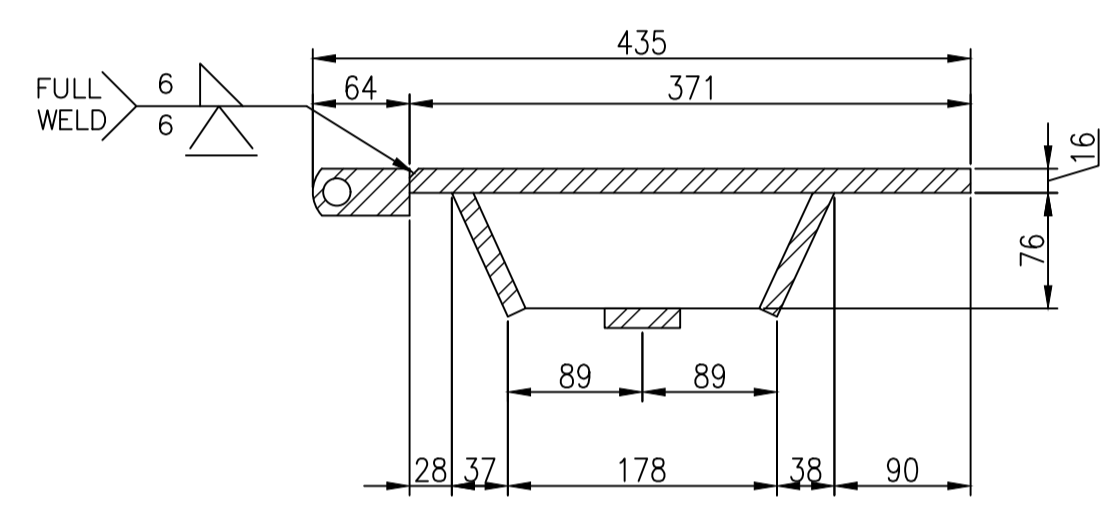
**4 SECTION AT DRIVE THRU TRENCH**  
S-707 S-707 SCALE: 1:5  
S-706



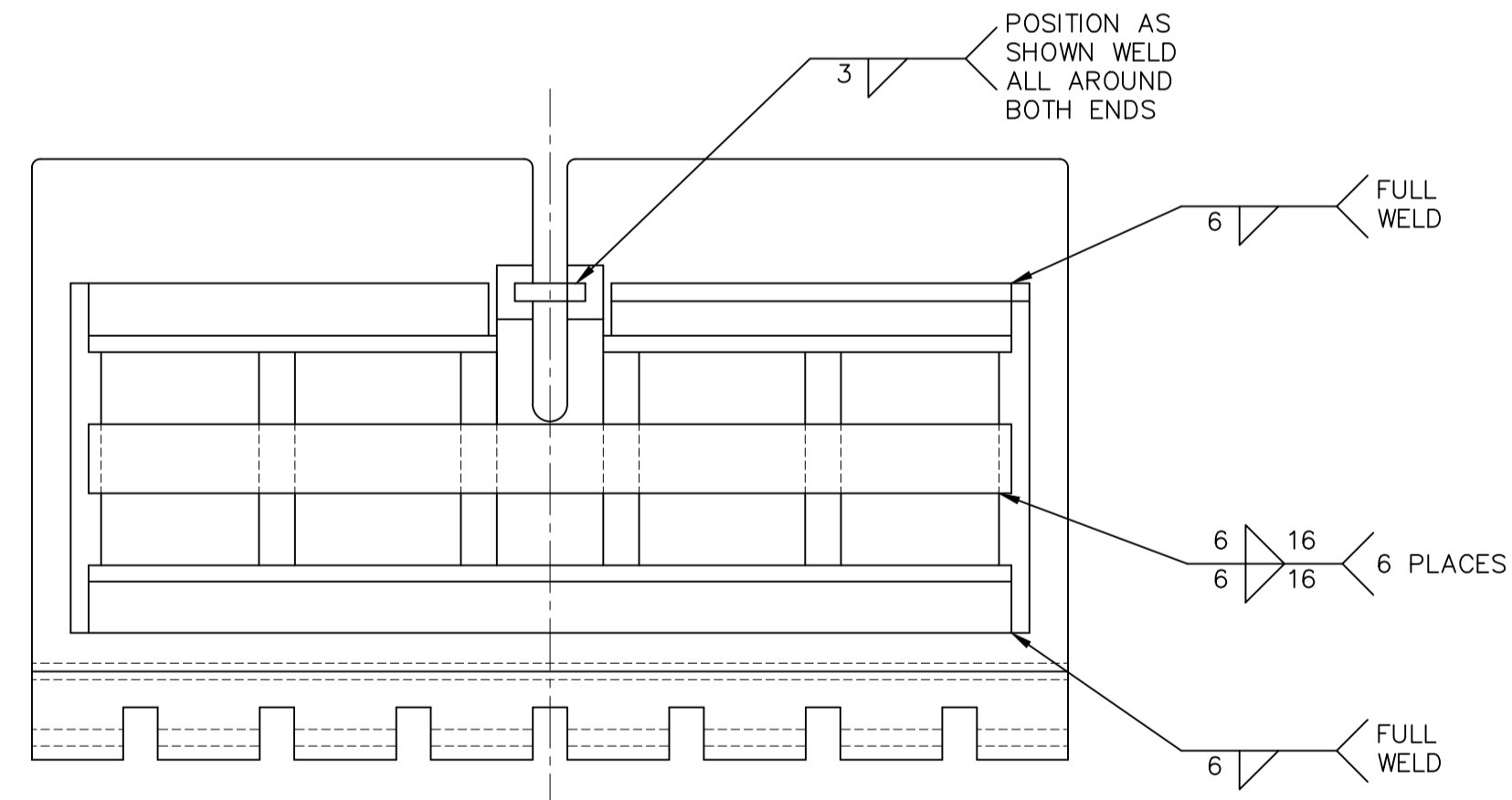
**7 SECTION AT DRIVE THRU TRENCH**  
S-707 S-707 SCALE: 1:5



**2 TRENCH COVER PLAN**  
S-707 S-707 SCALE: 1:5

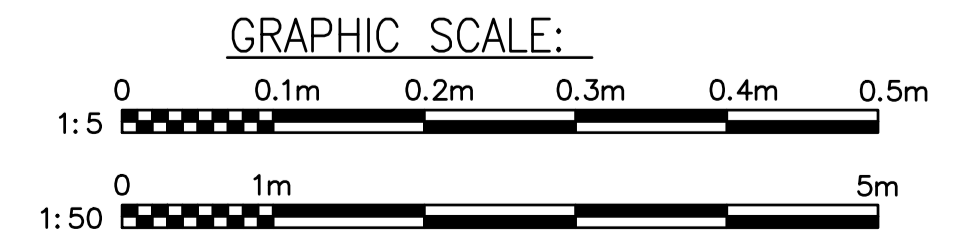


**5 SECTION AT DRIVE THRU TRENCH**  
S-707 S-707 SCALE: 1:5



**8 TRENCH COVER PLAN BOTTOM VIEW**  
S-707 S-707 SCALE: 1:5

NOTES:  
1. EMBEDMENT WELDMENT FABRICATOR SHALL SUPPLY TEMPORARY REMOVABLE TRENCH AND SECURITY PILASTER BLOCK SPACERS FOR TRENCH AND SECURITY PILASTER ANGLES TO ENSURE WIDTH OF THE TRENCH AND SECURITY PILASTER TO BE MAINTAINED DURING SHIPPING AND POURING OF CONCRETE. TRENCHES SHALL BE SHIPPED IN TWO SECTIONS READY FOR INSTALLATION, 1. DRIVER THROUGH TRENCH, 2. NON-DRIVE THROUGH TRENCH, REFER TO THE MSM WELDMENT FABRICATION DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRENCH CLEARANCES TO BE TRUE, STRAIGHT, PLUM AND SECURED DURING THE POURING OF CONCRETE. SEE GENERAL NOTES #10 ON SHEET S-001.  
2. ALL PLATES FOR TRENCH SHALL BE 13mm THICK, U.N.O.



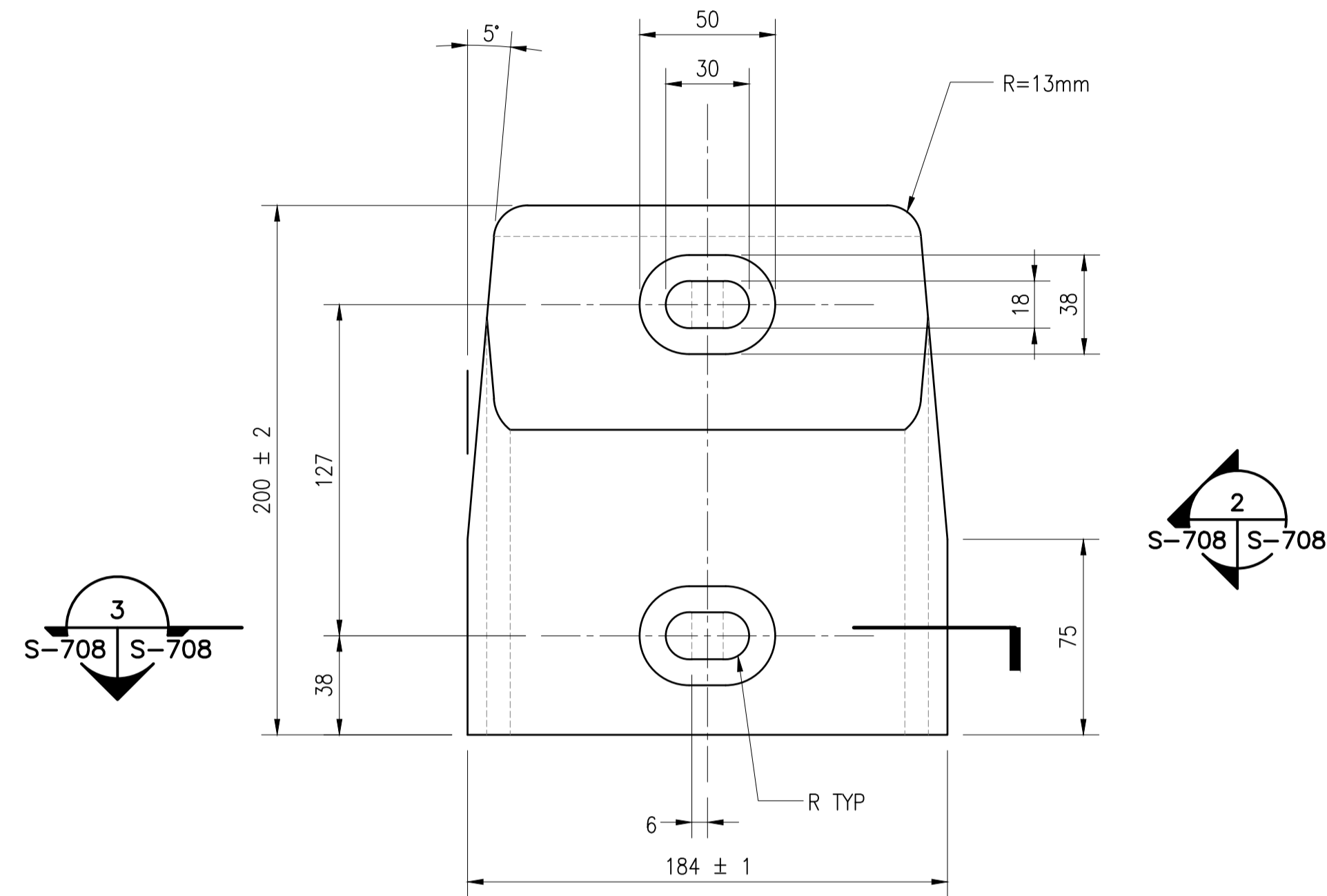
APPROVED	DATE	09/14/22
FOR COMMANDER NAIFAC	ACTIVITY	
SATISFACTORY TO DATE	MM/DD/YY	
DESIGNER	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD OR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	NAIFAC
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION	10A-H0000LX, VA
<b>MODULAR STORAGE MAGAZINE</b>		
DOOR TRENCH COVER DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAIFAC DRAWING NO.:	14115996	
SHEET	28	OF 53
<b>S-707</b>		
<small>NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018</small>		

FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\S-707.dwg LAYOUT NAME: S-707 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jls@hccorino

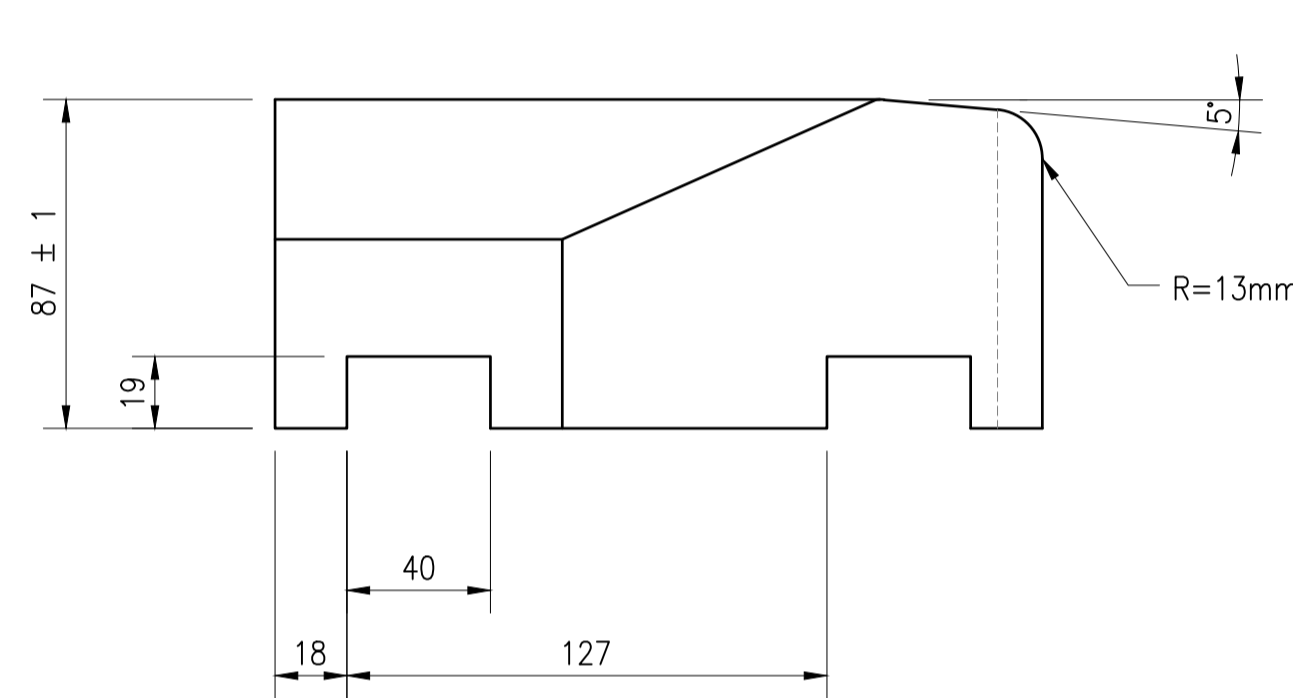
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF NAVFAC EXWC, ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF NAVFAC EXWC IS PROHIBITED.

TAPERED SIDE OF DOOR GUIDE FACES DOORS WHEN OPENING OR CLOSING. ALL DOOR GUIDES SHALL BE POSITIONED SO THAT TAPERED SIDE FACES THE CENTER OF THE TRENCH.

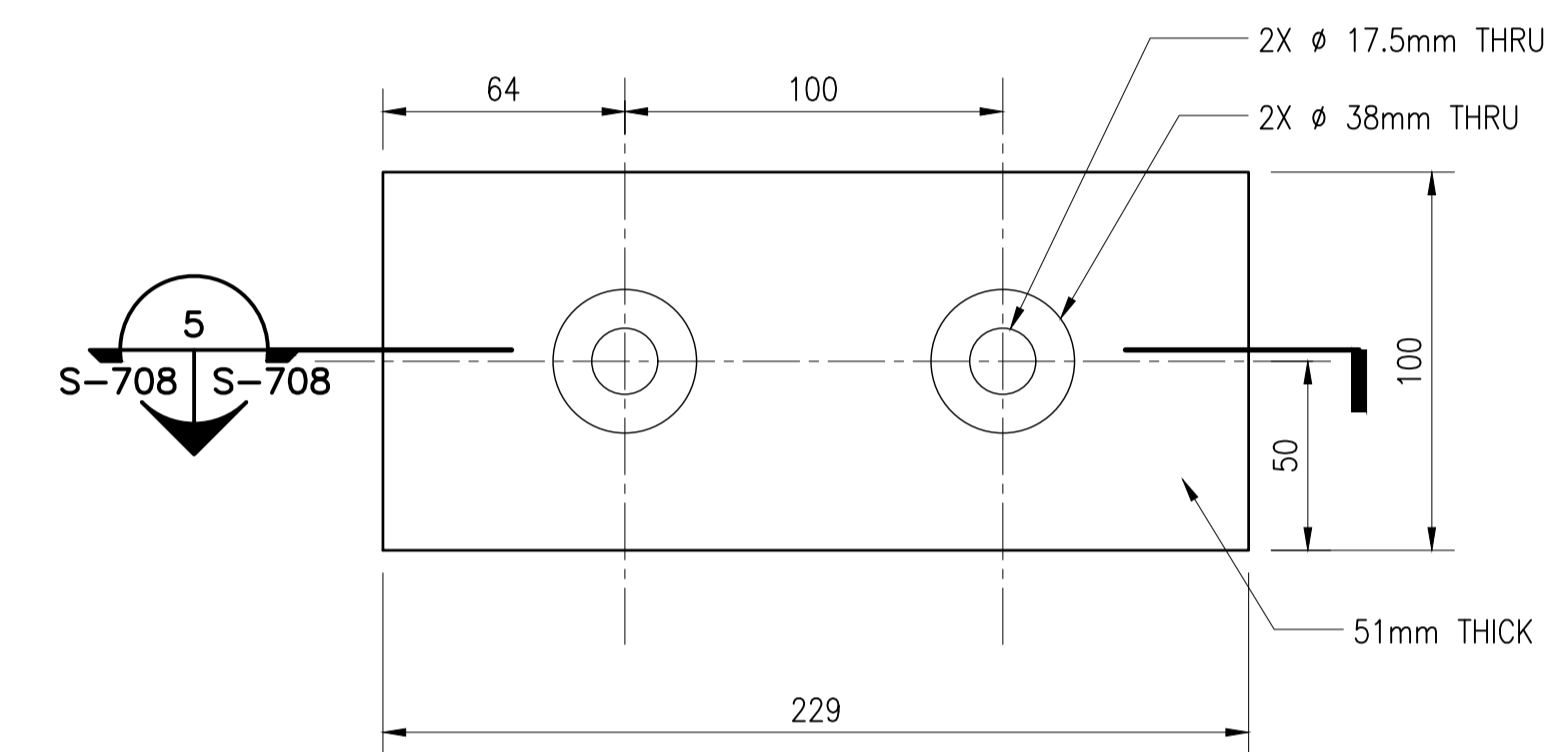
NOTES:  
1. MATERIAL FOR DOOR GUIDES AND DOOR STOP SHOWN THIS SHEET: UHMW WATER COLOR OPTIONAL. ASTM-D4020



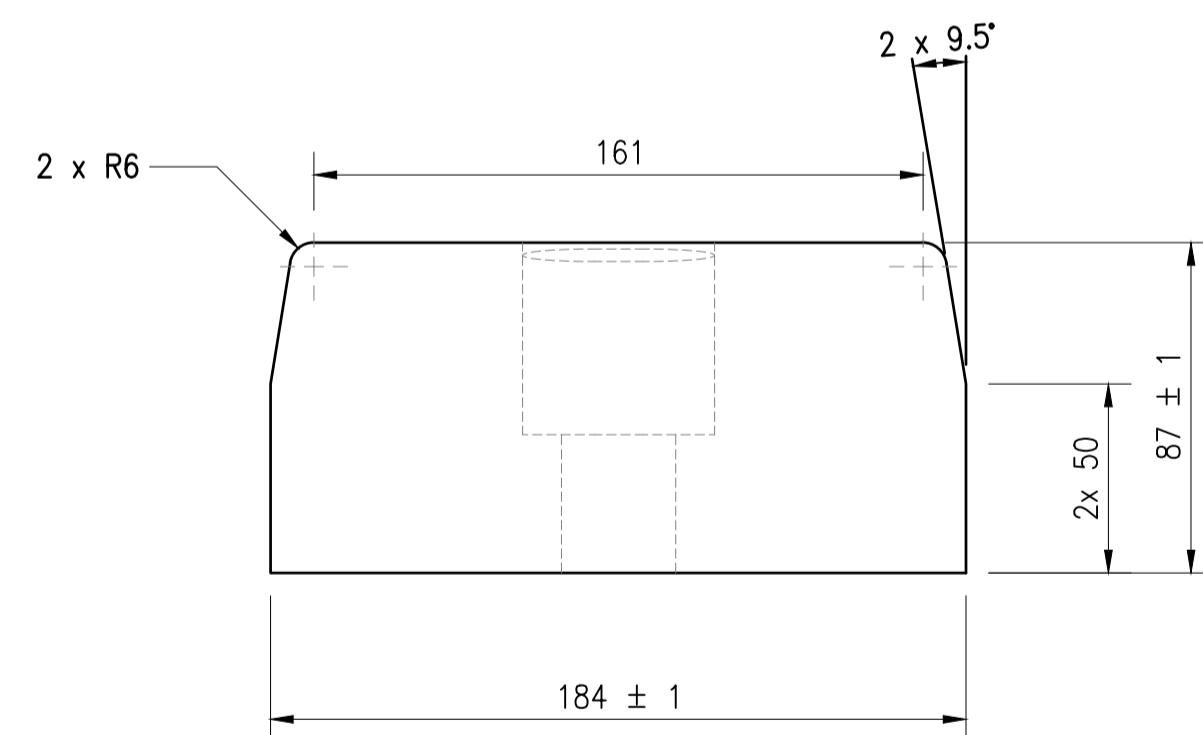
**1 FORWARD DOOR GUIDE DETAIL**  
S-708 S-708 SCALE: NONE



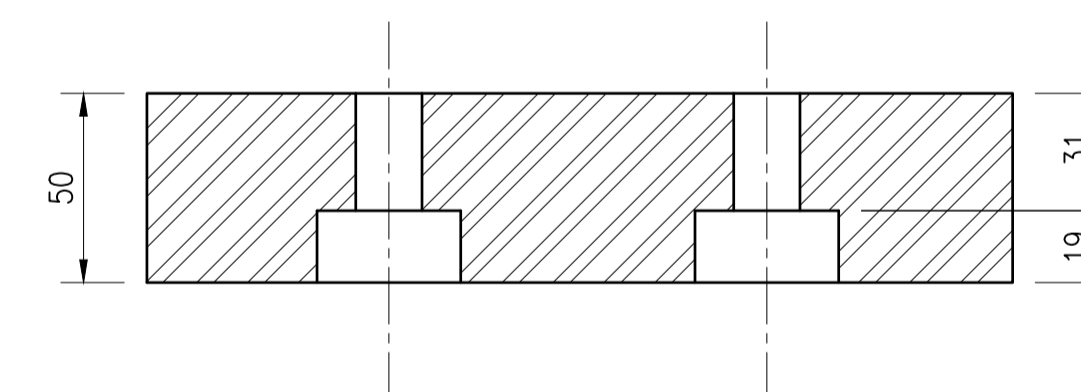
**2 ELEVATION**  
S-708 S-708 SCALE: NONE



**4 DOOR STOP**  
S-708 S-708 SCALE: NONE



**3 DOOR GUIDE SECTION**  
S-708 S-708 SCALE: NONE



**5 DOOR STOP SECTION**  
S-708 S-708 SCALE: NONE

DATE	09/14/22
APPR	
SYN	MSM STANDARD
DESCRIPTION	



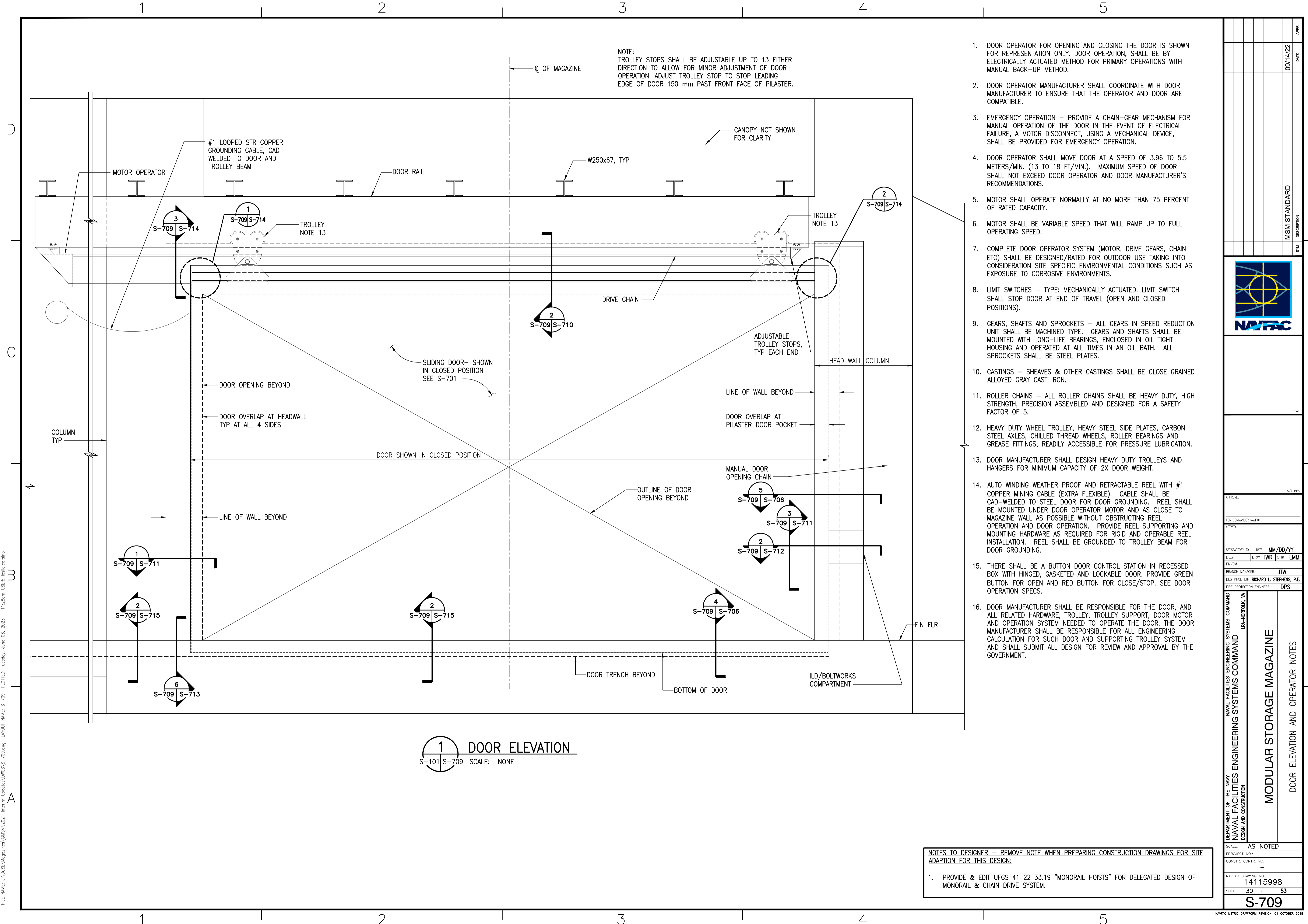
APPROVED	
FOR COMMANDER NAVFAC	
ACTIVITY	
SATISFACTORY TO	DATE MM/DD/YY
DESIGNER	CHK
DRW	IWR
CHK	LMM
PM/DW	
BRANCH MANAGER	JTW
DES PROJ DIR	RICHARD L. STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS

DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	LEA-HORRUCK, VA

MODULAR STORAGE MAGAZINE
DOOR GUIDE DETAILS

SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAVFAC DRAWING NO.:	14115997
SHEET	29 OF 53
<b>S-708</b>	

FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim Updates\WMSM\S-708.dwg LAYOUT NAME: S-708 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jebkcoriano

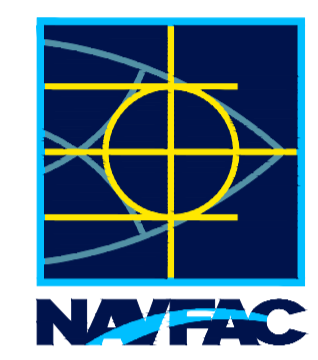


1. DOOR OPERATOR FOR OPENING AND CLOSING THE DOOR IS SHOWN FOR REPRESENTATION ONLY. DOOR OPERATION, SHALL BE BY ELECTRICALLY ACTUATED METHOD FOR PRIMARY OPERATIONS WITH MANUAL BACK-UP METHOD.
2. DOOR OPERATOR MANUFACTURER SHALL COORDINATE WITH DOOR MANUFACTURER TO ENSURE THAT THE OPERATOR AND DOOR ARE COMPATIBLE.
3. EMERGENCY OPERATION - PROVIDE A CHAIN-GEAR MECHANISM FOR MANUAL OPERATION OF THE DOOR IN THE EVENT OF ELECTRICAL FAILURE, A MOTOR DISCONNECT, USING A MECHANICAL DEVICE, SHALL BE PROVIDED FOR EMERGENCY OPERATION.
4. DOOR OPERATOR SHALL MOVE DOOR AT A SPEED OF 3.96 TO 5.5 METERS/MIN. (13 TO 18 FT/MIN.). MAXIMUM SPEED OF DOOR SHALL NOT EXCEED DOOR OPERATOR AND DOOR MANUFACTURER'S RECOMMENDATIONS.
5. MOTOR SHALL OPERATE NORMALLY AT NO MORE THAN 75 PERCENT OF RATED CAPACITY.
6. MOTOR SHALL BE VARIABLE SPEED THAT WILL RAMP UP TO FULL OPERATING SPEED.
7. COMPLETE DOOR OPERATOR SYSTEM (MOTOR, DRIVE GEARS, CHAIN ETC) SHALL BE DESIGNED/RATED FOR OUTDOOR USE TAKING INTO CONSIDERATION SITE SPECIFIC ENVIRONMENTAL CONDITIONS SUCH AS EXPOSURE TO CORROSIVE ENVIRONMENTS.
8. LIMIT SWITCHES - TYPE: MECHANICALLY ACTUATED. LIMIT SWITCH SHALL STOP DOOR AT END OF TRAVEL (OPEN AND CLOSED POSITIONS).
9. GEARS, SHAFTS AND SPROCKETS - ALL GEARS IN SPEED REDUCTION UNIT SHALL BE MACHINED TYPE. GEARS AND SHAFTS SHALL BE MOUNTED WITH LONG-LIFE BEARINGS, ENCLOSED IN OIL TIGHT HOUSING AND OPERATED AT ALL TIMES IN AN OIL BATH. ALL SPROCKETS SHALL BE STEEL PLATES.
10. CASTINGS - SHEAVES & OTHER CASTINGS SHALL BE CLOSE GRAINED ALLOYED GRAY CAST IRON.
11. ROLLER CHAINS - ALL ROLLER CHAINS SHALL BE HEAVY DUTY, HIGH STRENGTH, PRECISION ASSEMBLED AND DESIGNED FOR A SAFETY FACTOR OF 5.
12. HEAVY DUTY WHEEL TROLLEY, HEAVY STEEL SIDE PLATES, CARBON STEEL AXLES, CHILLED THREAD WHEELS, ROLLER BEARINGS AND GREASE FITTINGS, READILY ACCESSIBLE FOR PRESSURE LUBRICATION.
13. DOOR MANUFACTURER SHALL DESIGN HEAVY DUTY TROLLEYS AND HANGERS FOR MINIMUM CAPACITY OF 2X DOOR WEIGHT.
14. AUTO WINDING WEATHER PROOF AND RETRACTABLE REEL WITH #1 COPPER MINING CABLE (EXTRA FLEXIBLE). CABLE SHALL BE CAD-WELDED TO STEEL DOOR FOR DOOR GROUNDING. REEL SHALL BE MOUNTED UNDER DOOR OPERATOR MOTOR AND AS CLOSE TO MAGAZINE WALL AS POSSIBLE WITHOUT OBSTRUCTING REEL OPERATION AND DOOR OPERATION. PROVIDE REEL SUPPORTING AND MOUNTING HARDWARE AS REQUIRED FOR RIGID AND OPERABLE REEL INSTALLATION. REEL SHALL BE GROUNDED TO TROLLEY BEAM FOR DOOR GROUNDING.
15. THERE SHALL BE A BUTTON DOOR CONTROL STATION IN RECESSED BOX WITH HINGED, GASKETED AND LOCKABLE DOOR. PROVIDE GREEN BUTTON FOR OPEN AND RED BUTTON FOR CLOSE/STOP. SEE DOOR OPERATION SPECS.
16. DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR THE DOOR, AND ALL RELATED HARDWARE, TROLLEY, TROLLEY SUPPORT, DOOR MOTOR AND OPERATION SYSTEM NEEDED TO OPERATE THE DOOR. THE DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR ALL ENGINEERING CALCULATION FOR SUCH DOOR AND SUPPORTING TROLLEY SYSTEM AND SHALL SUBMIT ALL DESIGN FOR REVIEW AND APPROVAL BY THE GOVERNMENT.

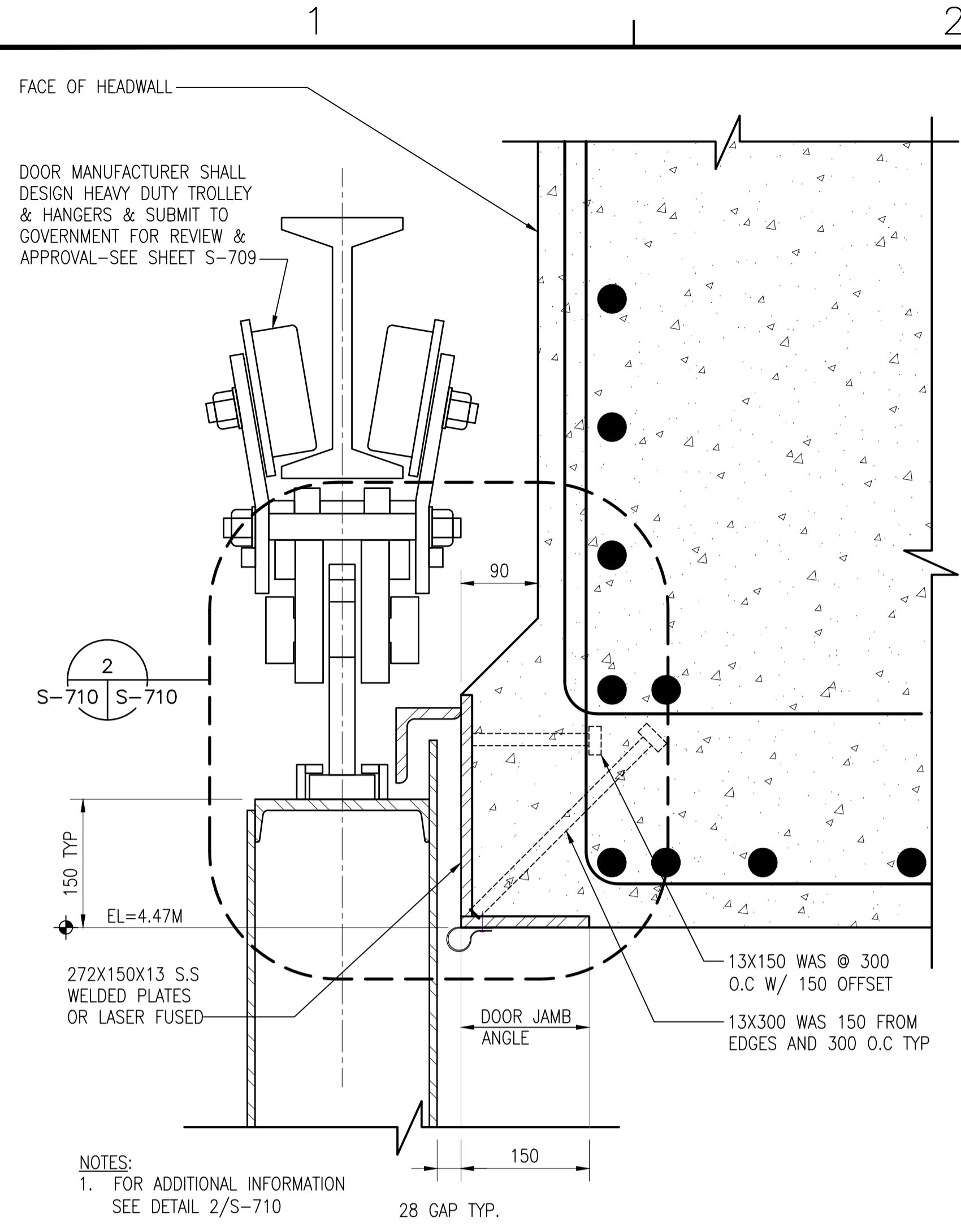
1 DOOR ELEVATION  
S-101/S-709 SCALE: NONE

NOTES TO DESIGNER - REMOVE NOTE WHEN PREPARING CONSTRUCTION DRAWINGS FOR SITE ADAPTION FOR THIS DESIGN:

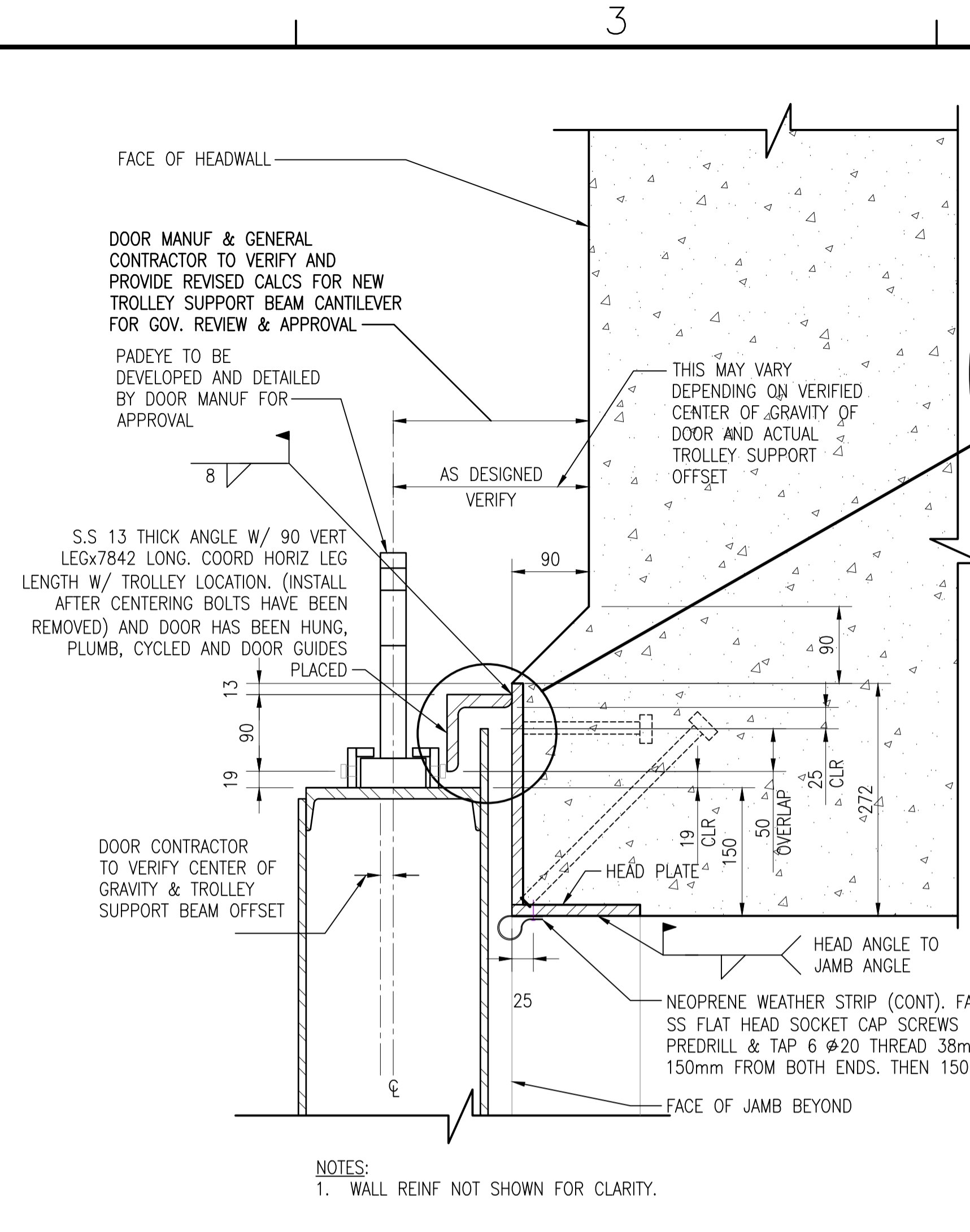
1. PROVIDE & EDIT UFGS 41 22 33.19 "MONORAIL HOISTS" FOR DELEGATED DESIGN OF MONORAIL & CHAIN DRIVE SYSTEM.

	DATE: 09/14/22 APPR: [Signature] SWM DESCRIPTION: MSM STANDARD
APPROVED: [Signature] FOR COMMANDER NAFAC: [Signature] ACTIVITY: [Blank]	
SATISFACTORY TO: [Blank] DATE: MM/DD/YY DES: [Blank] DRW: [Blank] IWR: [Blank] CHK: [Blank] LMM: [Blank]	
BRANCH MANAGER: JTW DES PROD DIR: ROYAL L STEPHENS, P.E. FIRE PROTECTION ENGINEER: DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION UJA-HORRDLK, VA	
<b>MODULAR STORAGE MAGAZINE</b> DOOR ELEVATION AND OPERATOR NOTES	
SCALE: AS NOTED EPROJCT NO.: [Blank] CONSTR. CONTR. NO.: [Blank]	
NAFAC DRAWING NO.: 14115998 SHEET 30 OF 53	
<b>S-709</b>	

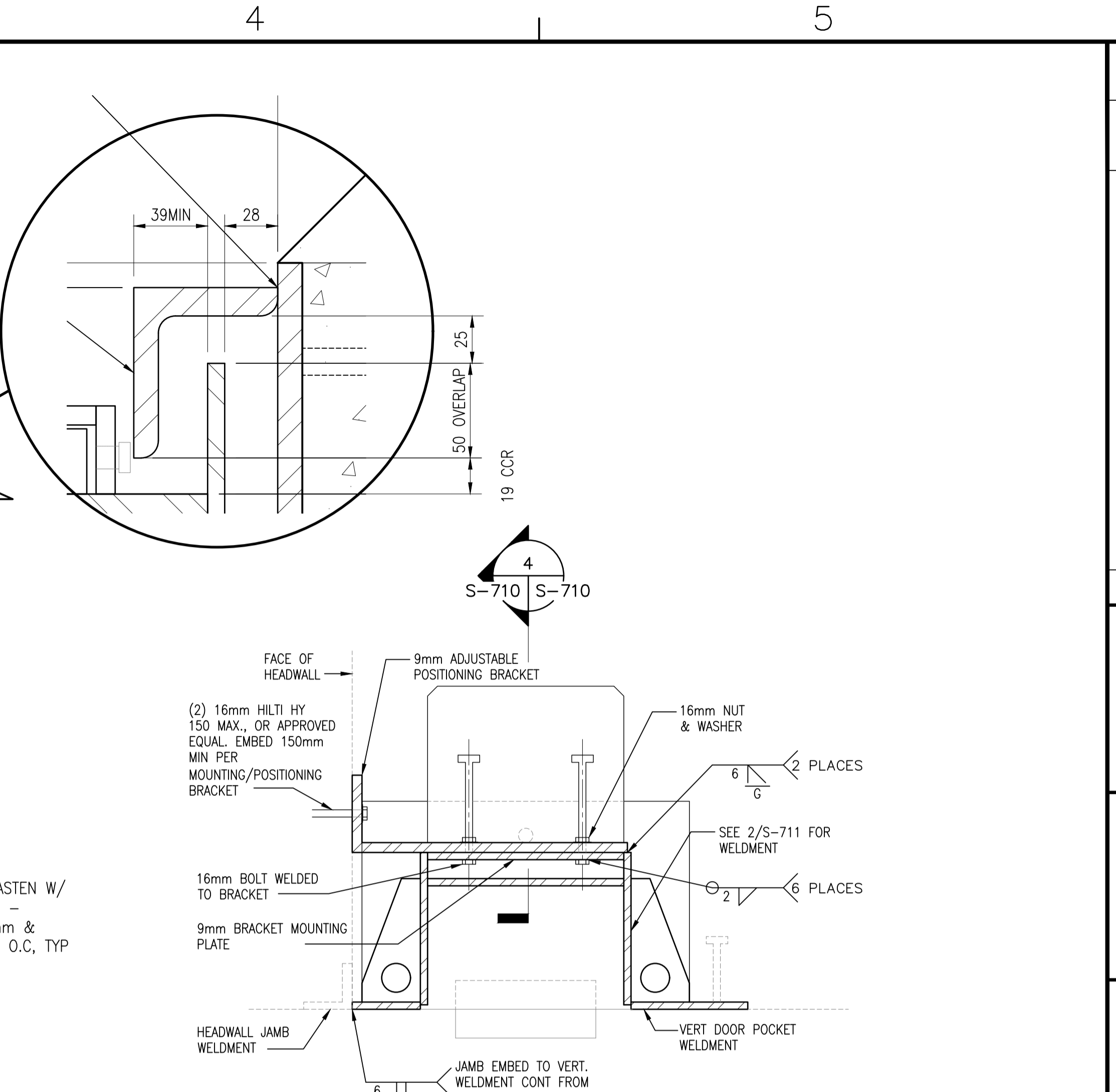
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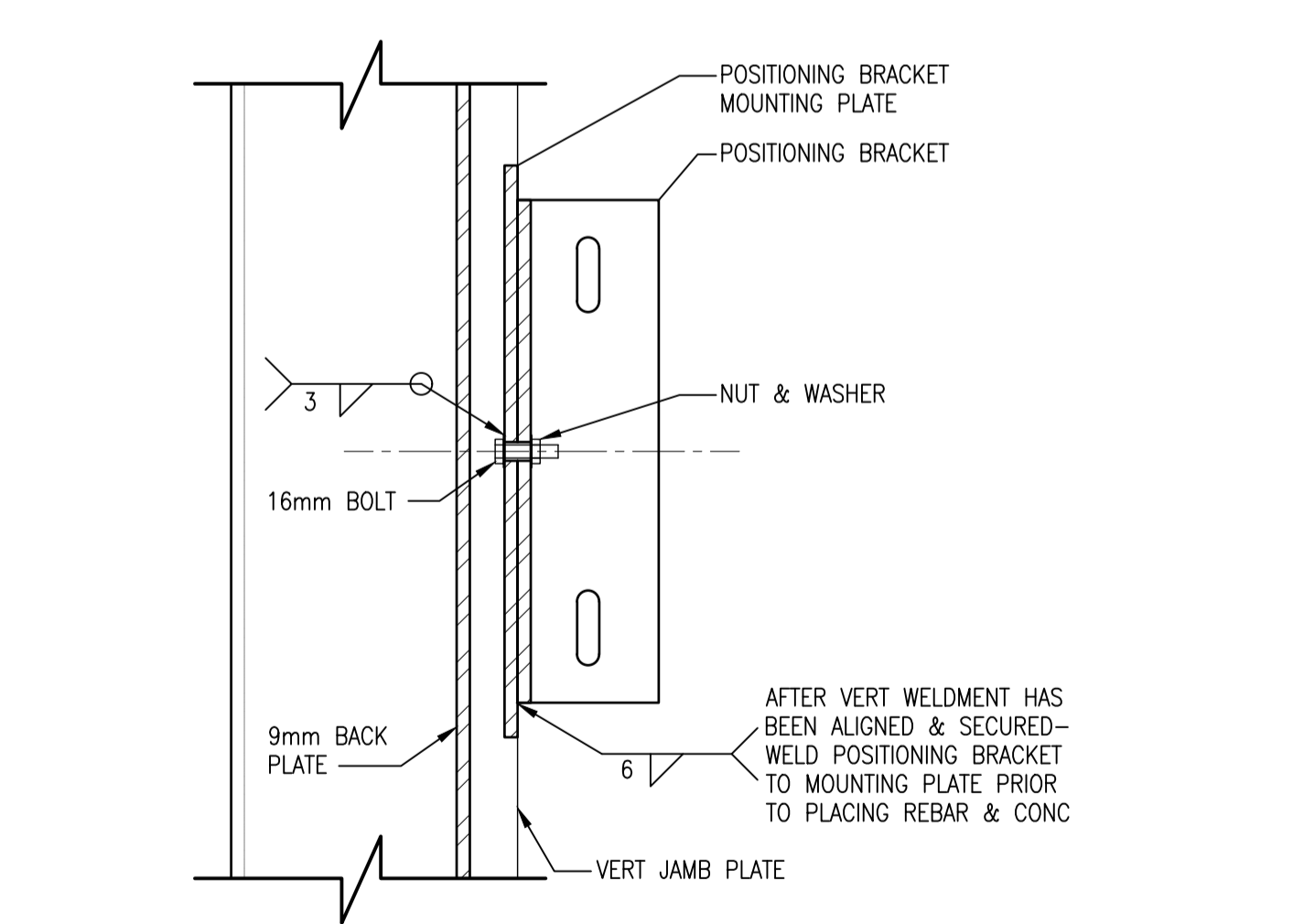
**1 DOOR TROLLEY & HEAD DETAIL**  
 S-301 S-710 SCALE: 1:5  
 S-503



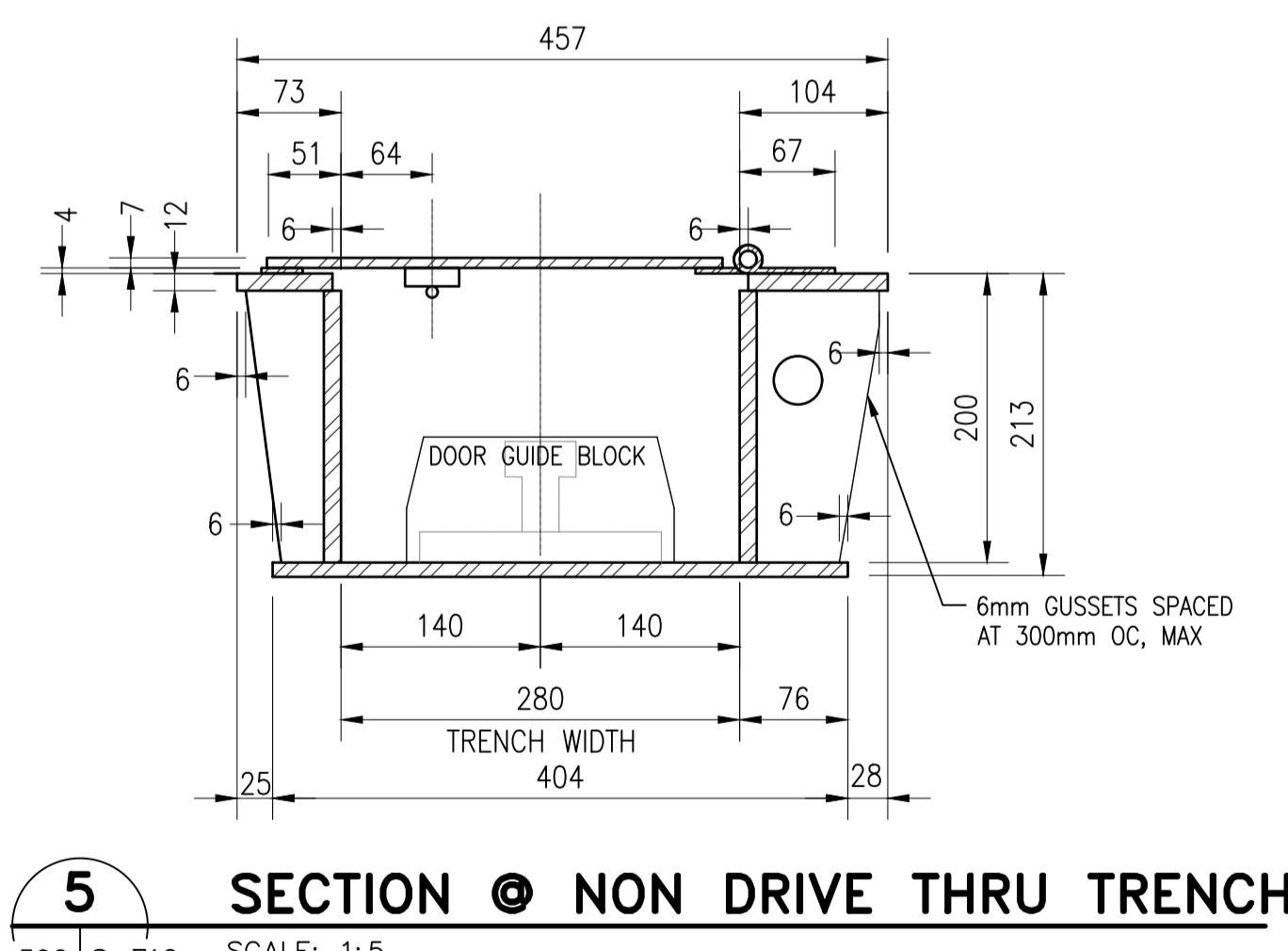
**2 DOOR AND HEADER CORNER DETAIL**  
 S-709, S-706 S-710 SCALE: 1:5  
 S-714, S-710



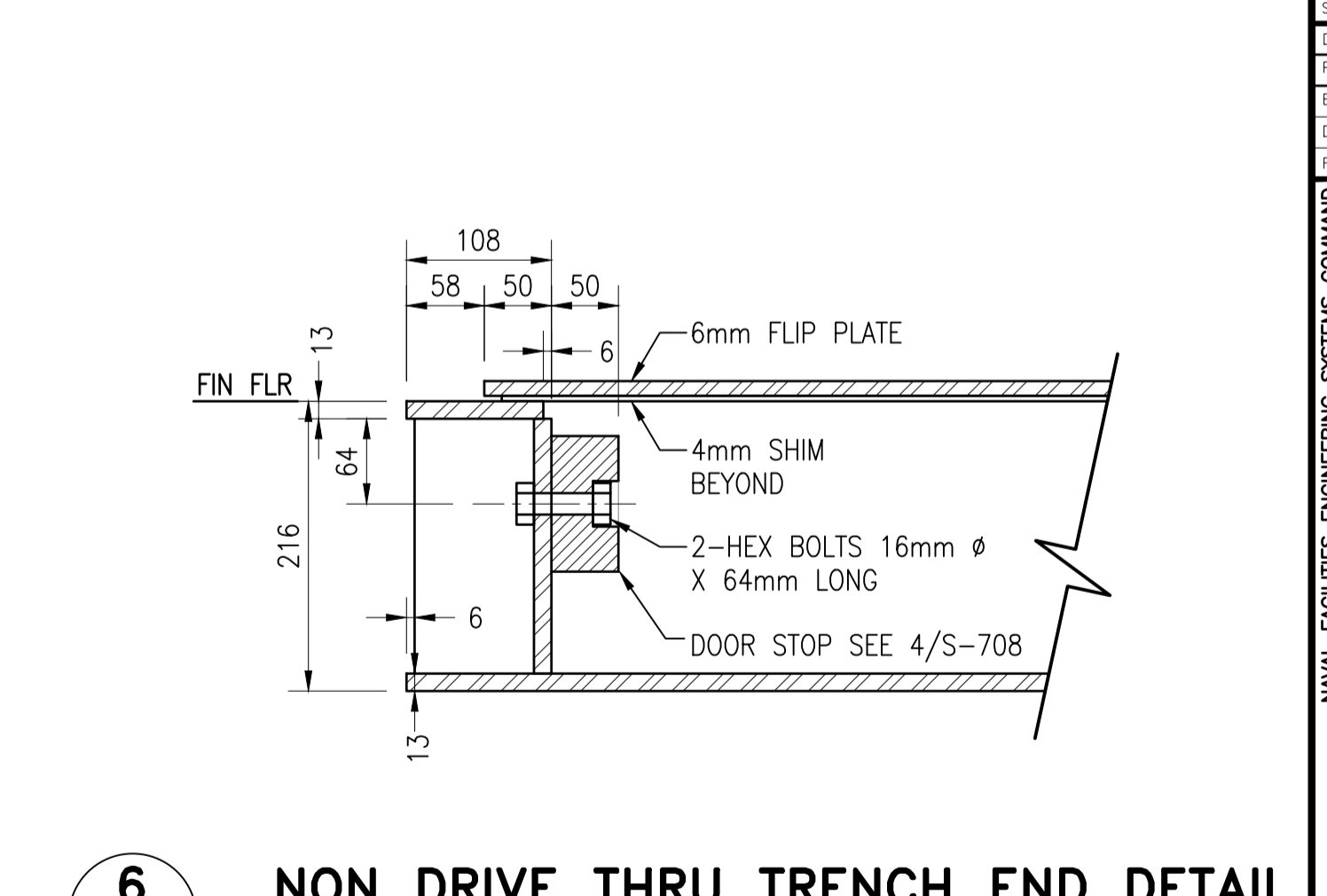
**3 VERT WELDMENT POSITIONING BRACKET & HEADWALL ATTACHMENT**  
 S-706 S-710 SCALE: 1:5



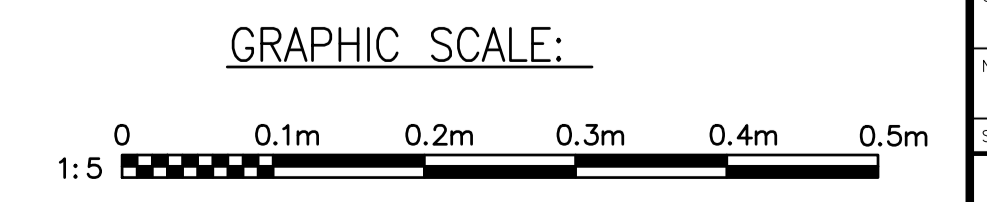
**4 VERT WELDMENT POSITIONING BRACKET DETAIL (TYP OF 3)**  
 S-710 S-710 SCALE: 1:5



**5 SECTION @ NON DRIVE THRU TRENCH**  
 S-302 S-710 SCALE: 1:5

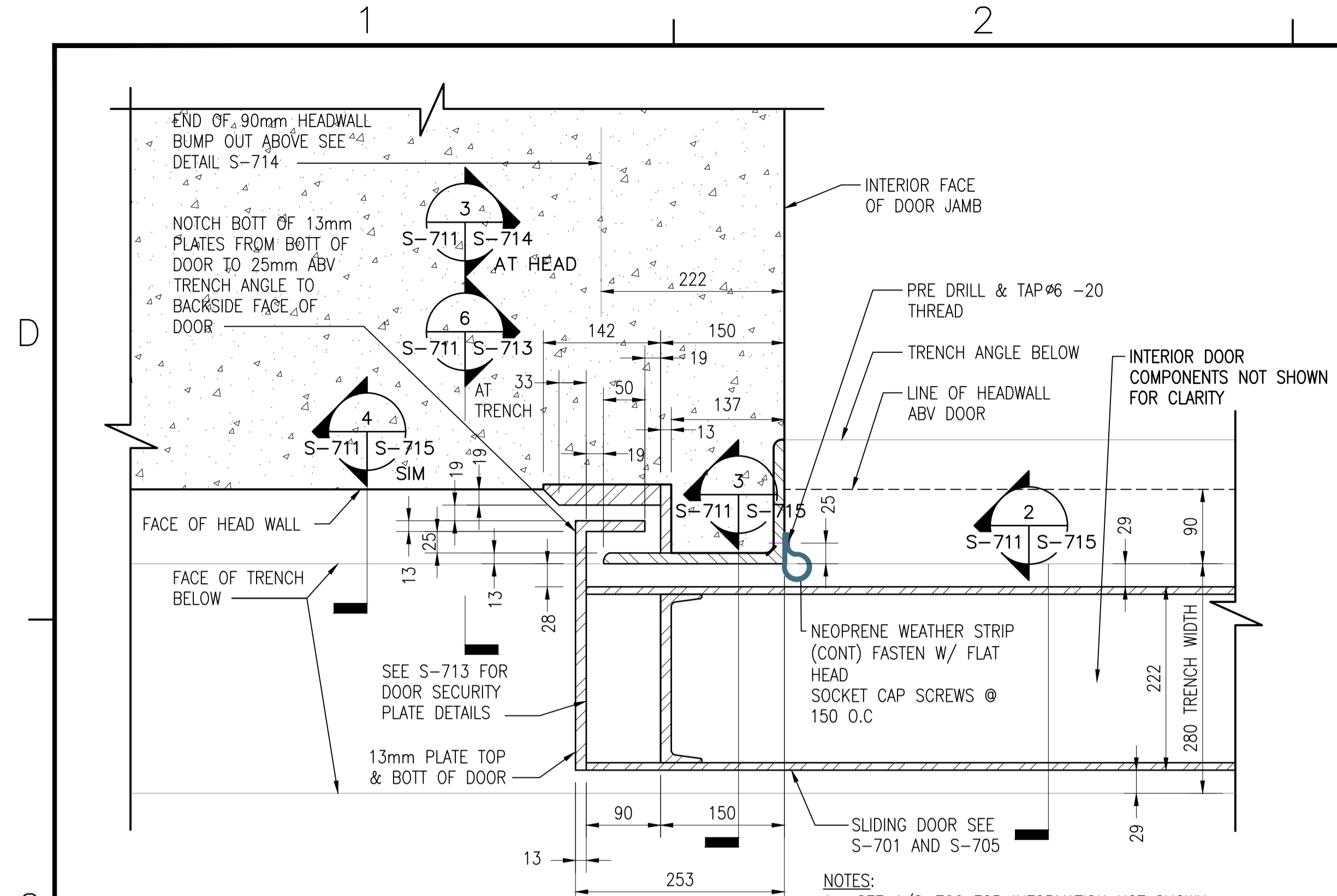


**6 NON DRIVE THRU TRENCH END DETAIL**  
 S-715 S-710 SCALE: 1:5



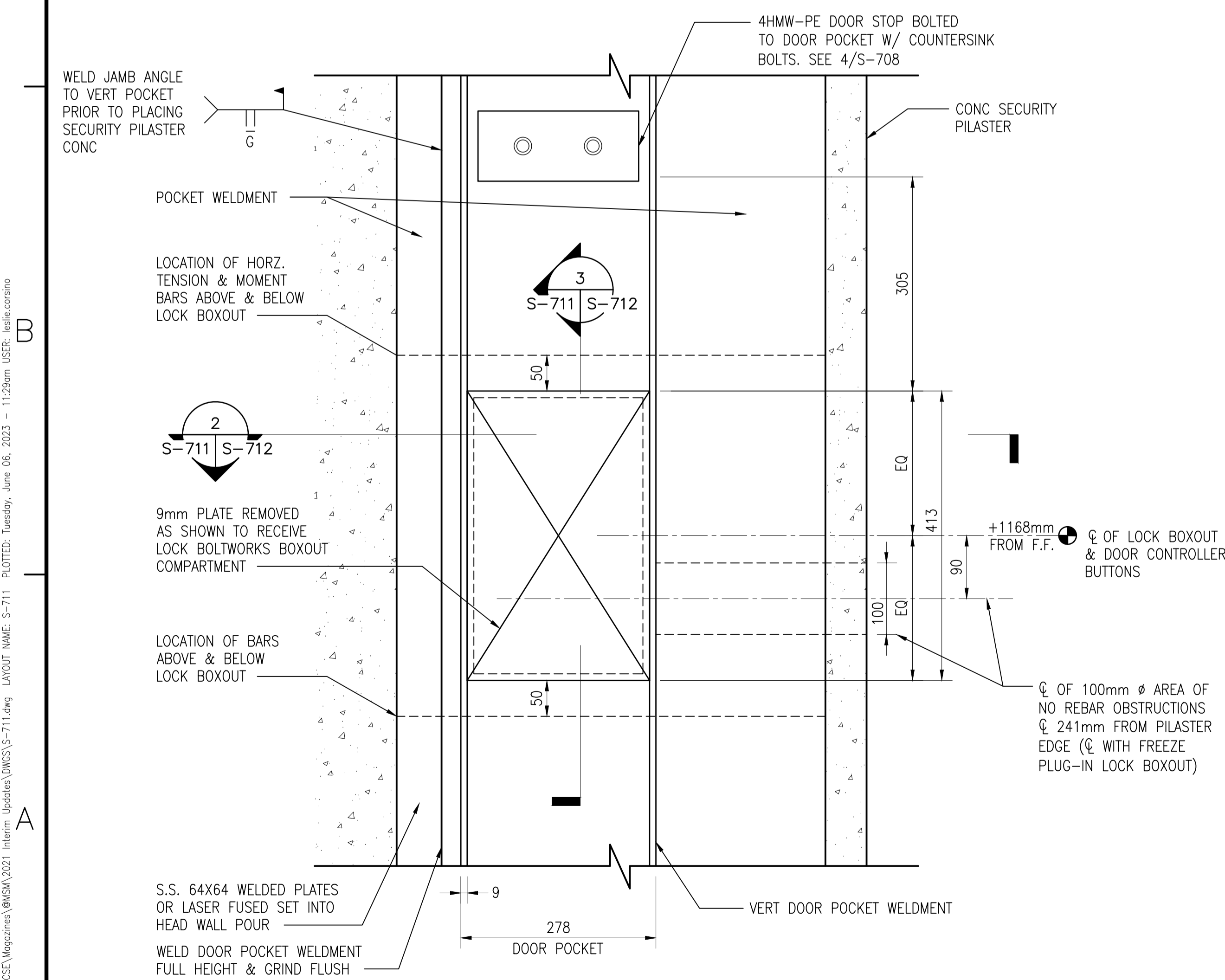
APPROVED	DATE	09/14/22
FOR COMMANDER NAFAF	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	UVA-HORRUCK, VA	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION
<b>MODULAR STORAGE MAGAZINE</b>		
SECTIONS / DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAF DRAWING NO.:	14115999	
SHEET	31	OF 53
<b>S-710</b>		
NAFAF METRIC DRAWING REVISION: 01 OCTOBER 2018		

FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim Updates\WMSM\S-710.dwg LAYOUT NAME: S-710 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jeb@corano



**1 LEFT JAMB AND DOOR DETAIL**

S-302, S-709 S-711 SCALE: 1:5  
S-713, S-714



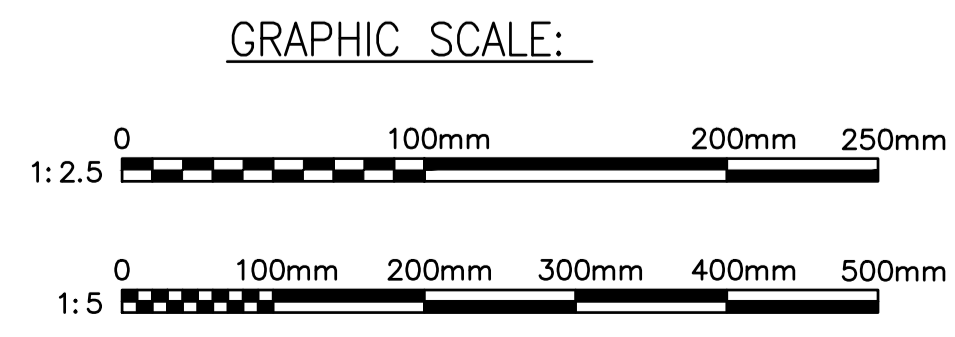
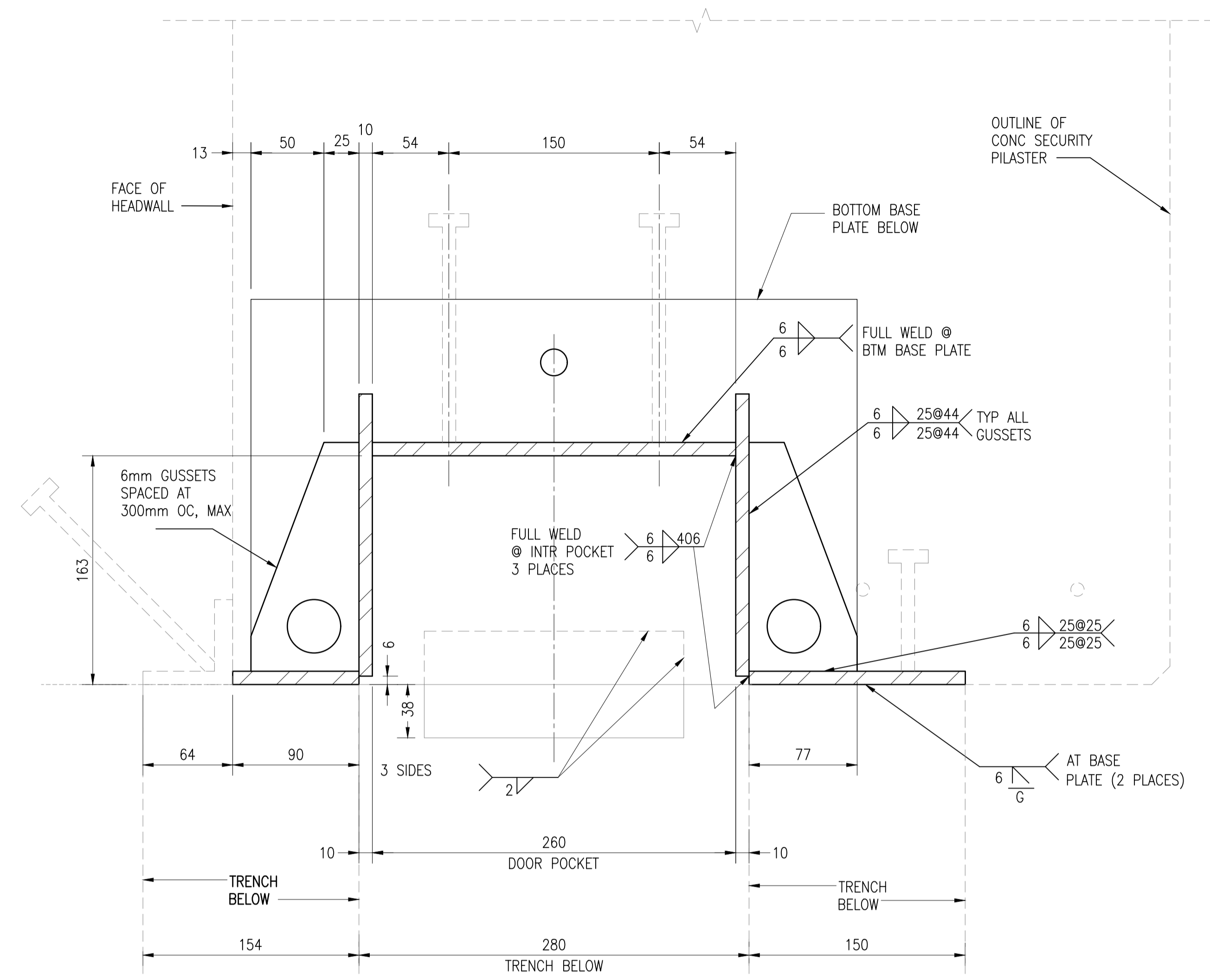
**2 VERT DOOR POCKET WELDMENT TYP DETAIL**

S-706 S-711 SCALE: 1:2.5

NOTE: ALL PLATES SHALL BE 13mm THICK, U.N.O.

**3 DOOR POCKET ELEV @ BOLTWORKS LOCATION**

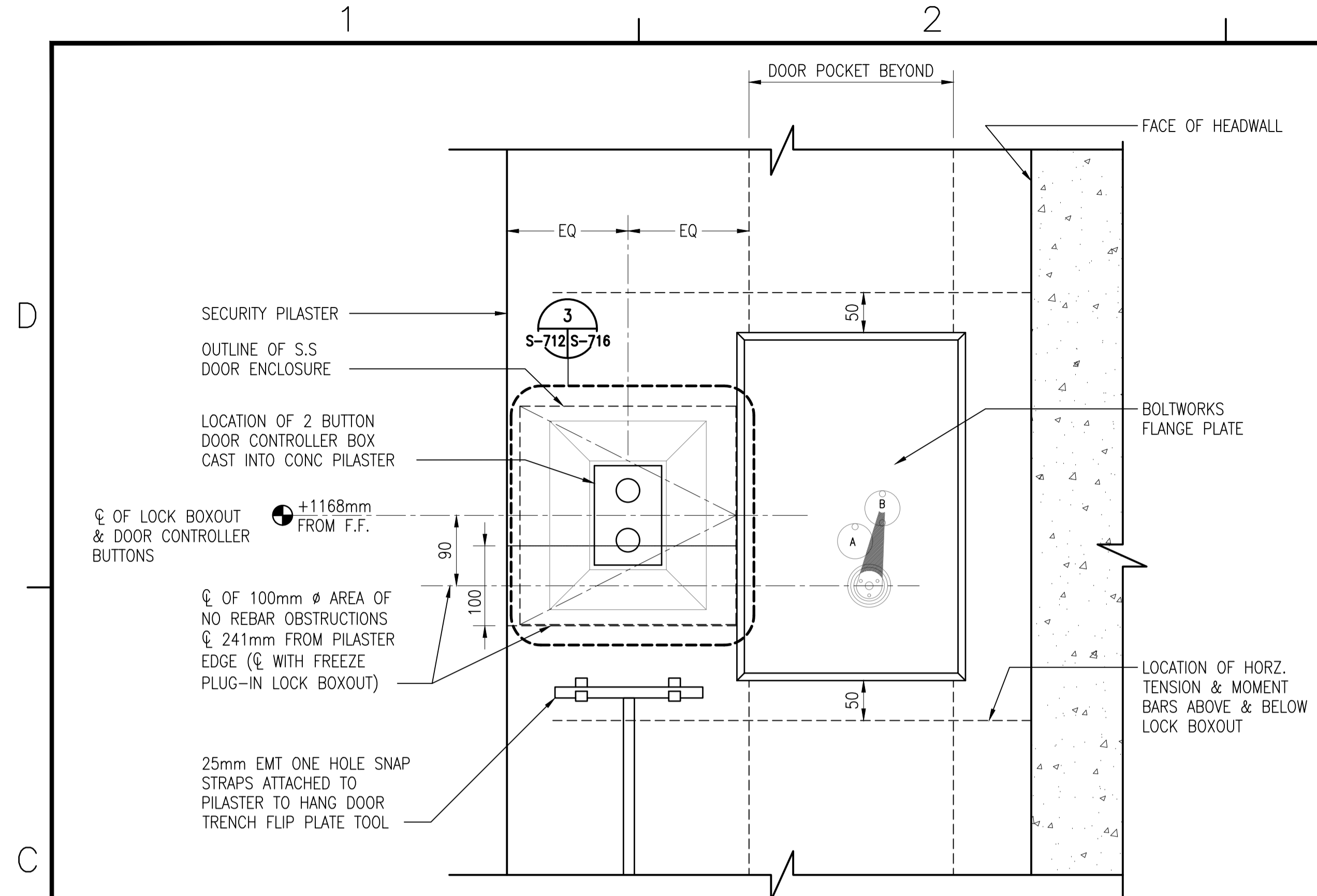
S-706, S-709 S-711 SCALE: 1:5



APPROVED	DATE	09/14/22
FOR COMMANDER NAFAF	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD OR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DA-108000L, VA
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION	
<b>MODULAR STORAGE MAGAZINE</b>		
SECTIONS/ DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAF DRAWING NO.:	14116000	
SHEET	32	OF 53
<b>S-711</b>		
NAFAF METRIC DRAWING REVISION: 01 OCTOBER 2018		

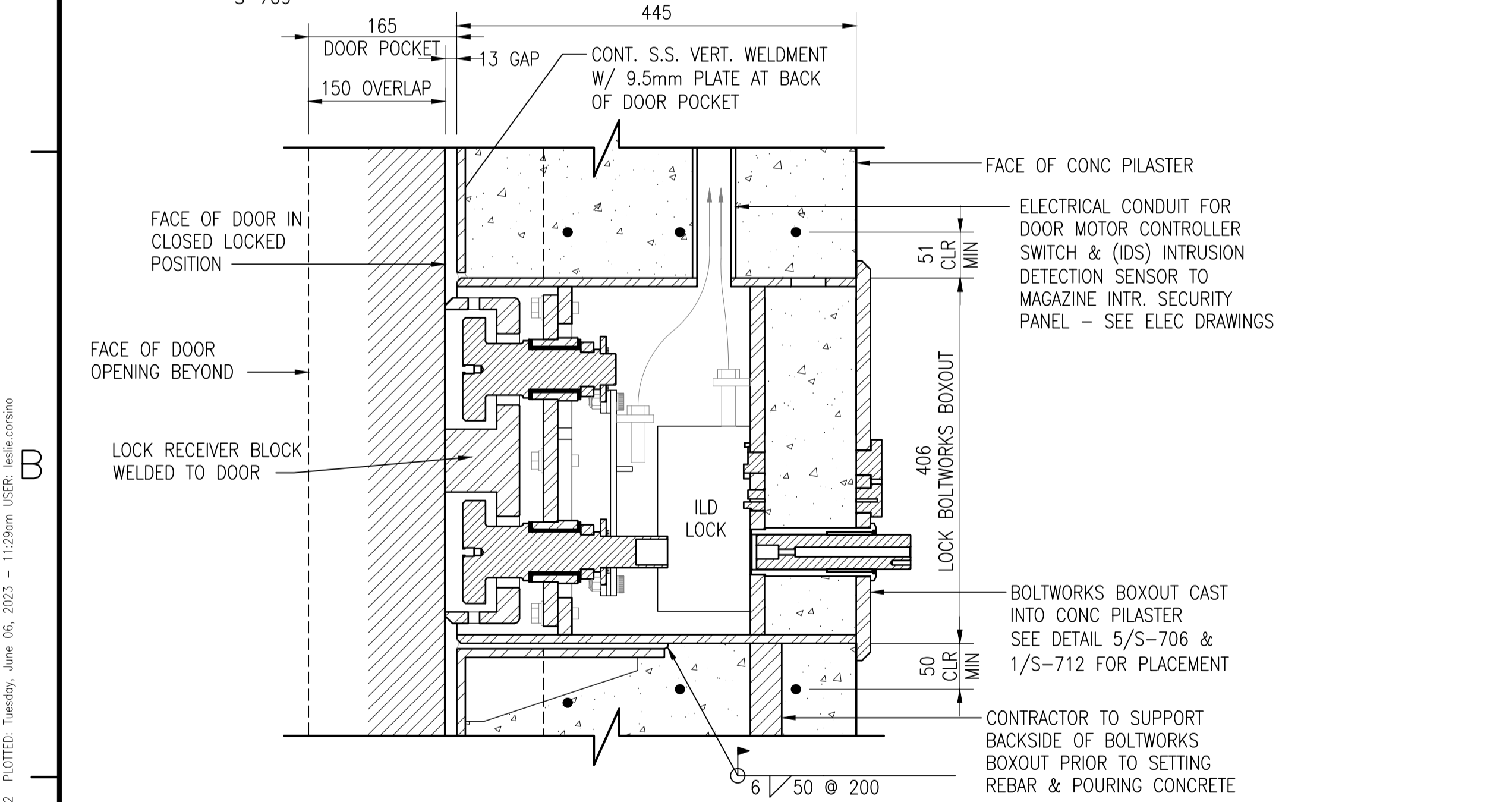
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**1 SECURITY PILASTER LOCK ELEVATION**

S-706 S-712 SCALE: 1:5  
S-709

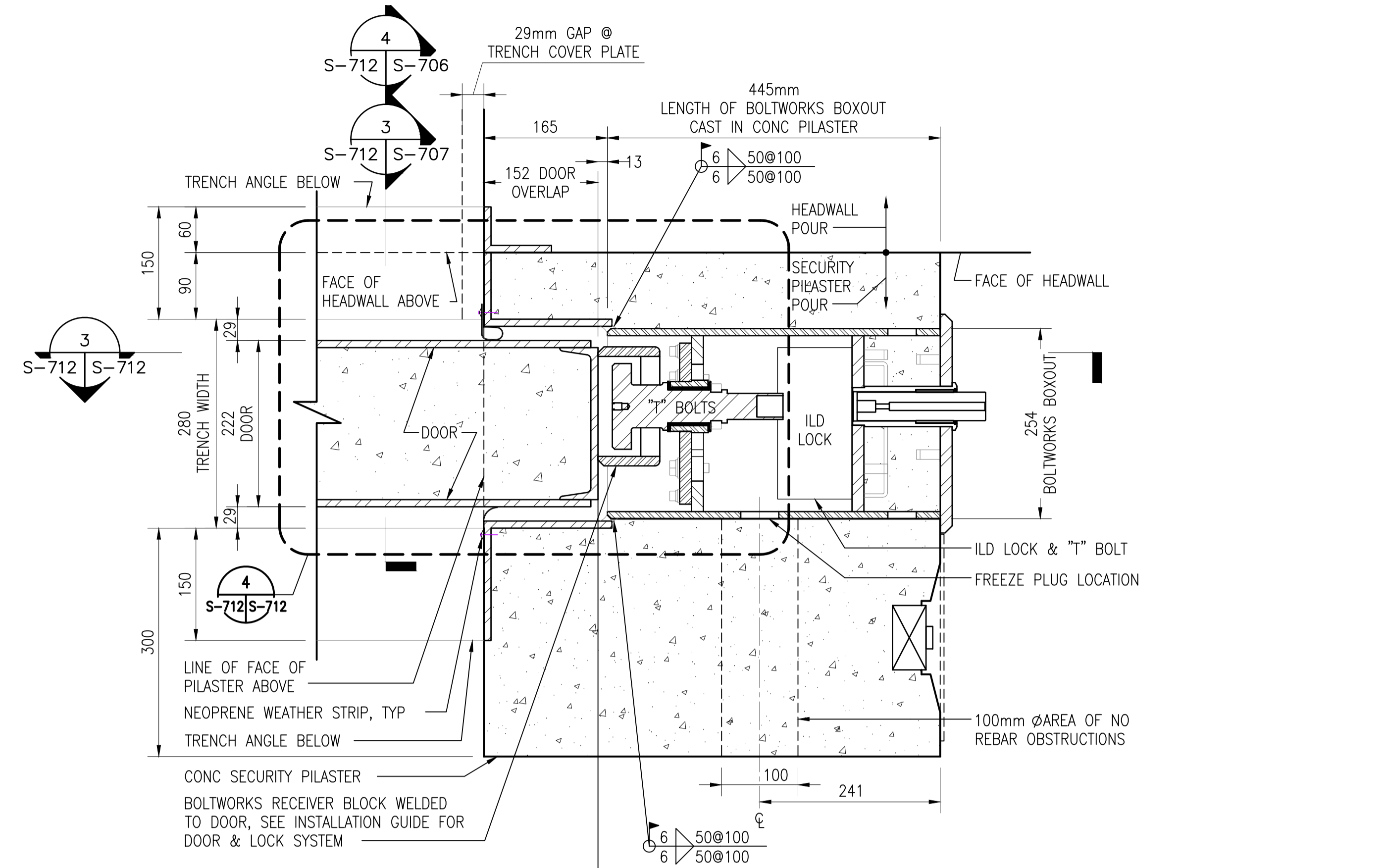


**3 PILASTER SECTION @ DOOR & BOLTWORKS**

S-706 S-712 SCALE: 1:5  
S-712 S-711

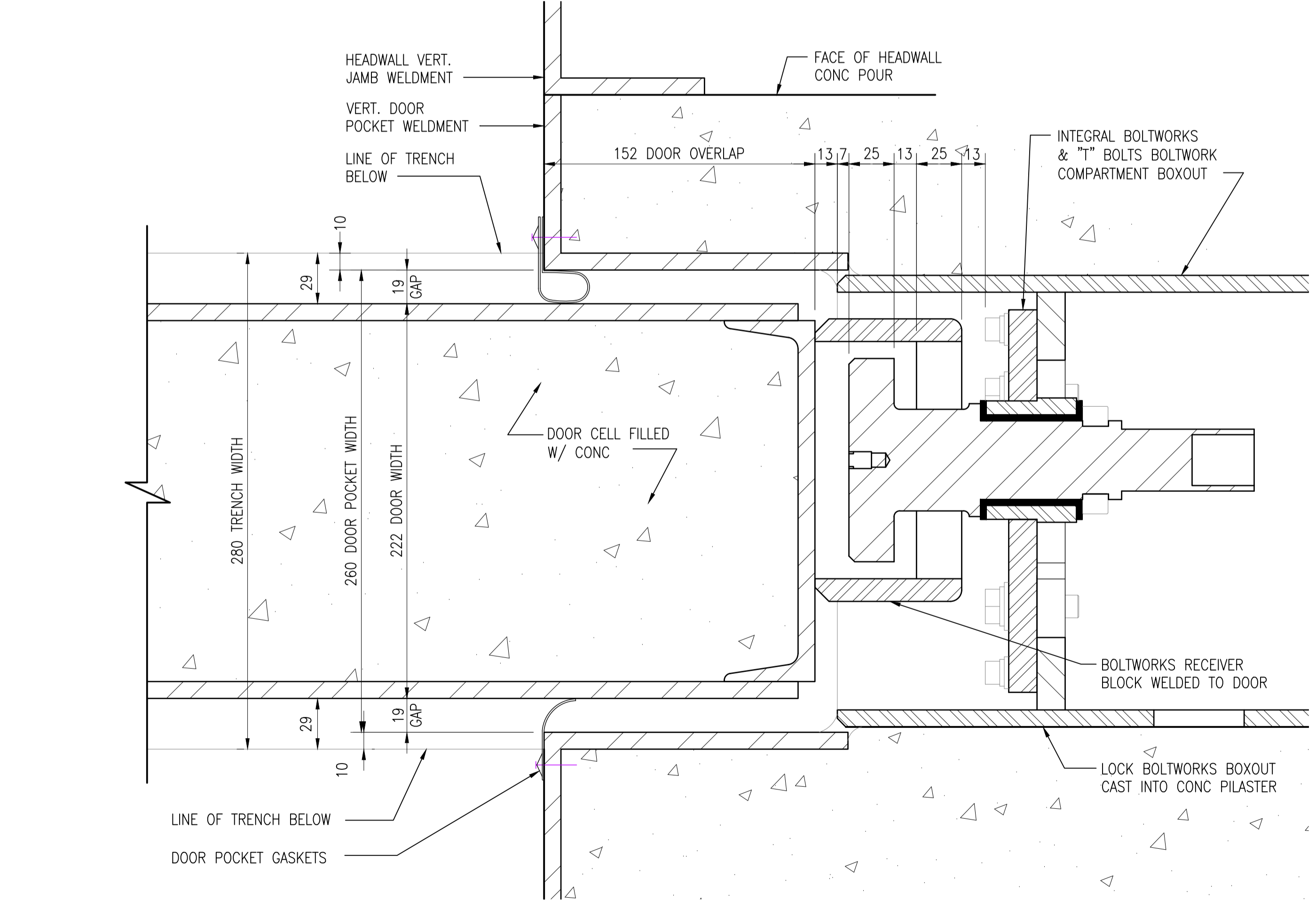
NOTE: DOOR MOTOR CONTROL SWITCH IN LOCK COMPARTMENT TO DOOR CONTROL PANEL @ INTR. OF MAGAZINE THEN TO DOOR CONTROL BUTTON IN PILASTER.

- NOTES:
- PROTECT & COVER BOLTWORKS BOXOUT OPENING IN PILASTER DOOR POCKET DURING CONSTRUCTION. KEEP CLEAN & FREE OF DEBRIS.
  - BOLTWORKS TO BE PLACED @ CL OF DOOR POCKET & TRENCH AS SHOWN. LEVEL & PLUMB TO HEADWALL & DOOR.



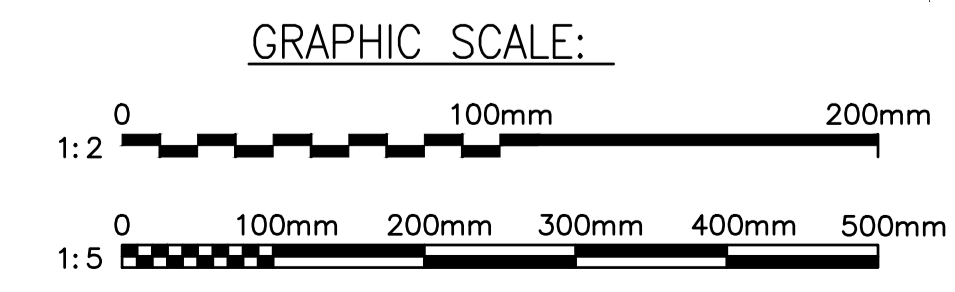
**2 PILASTER SECTION @ DOOR & BOLTWORKS**

S-706 S-712 SCALE: 1:5  
S-709, S-711



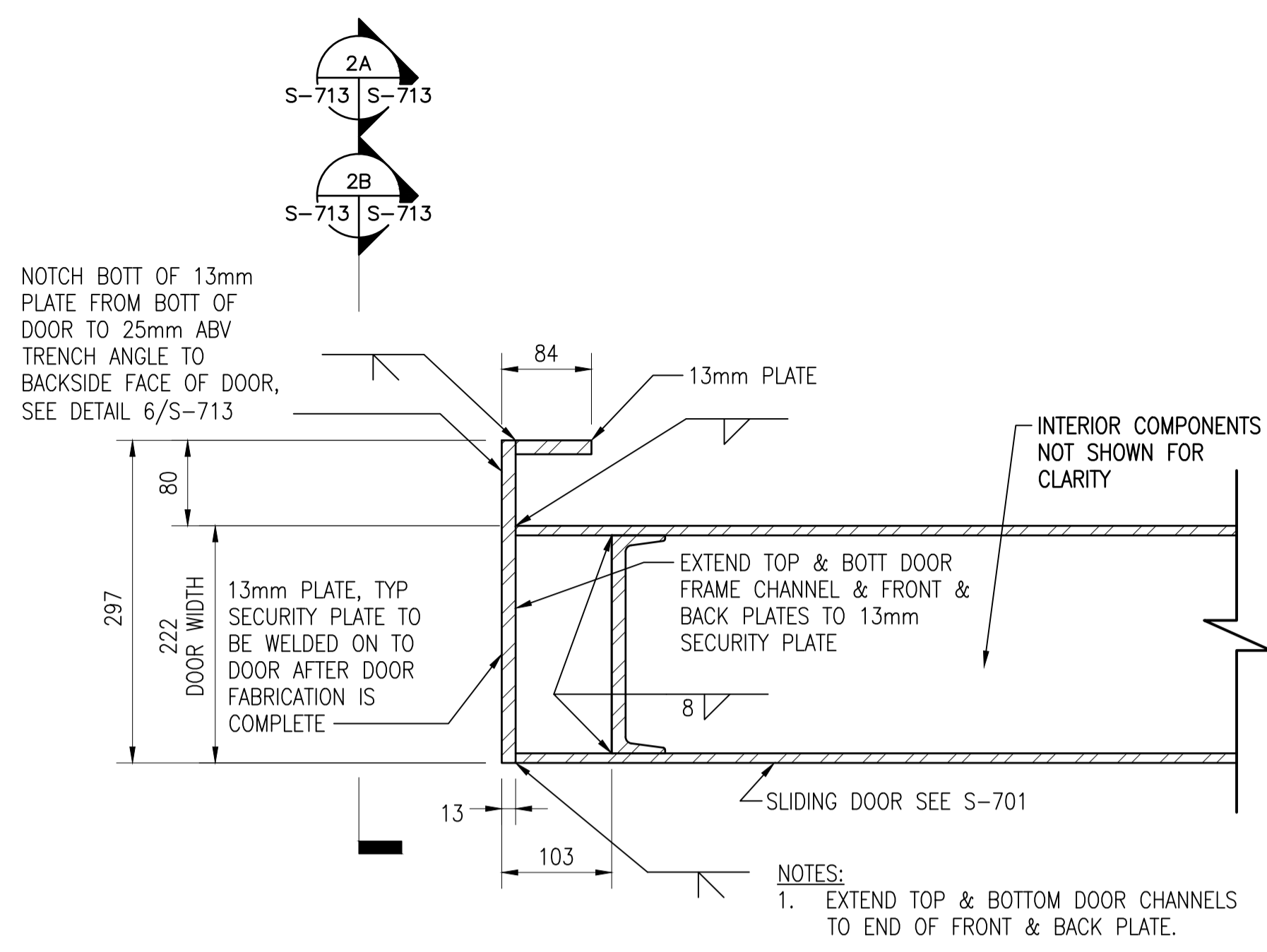
**4 DOOR & BOLTWORKS CLEARANCES**

S-712 S-712 SCALE: 1:2

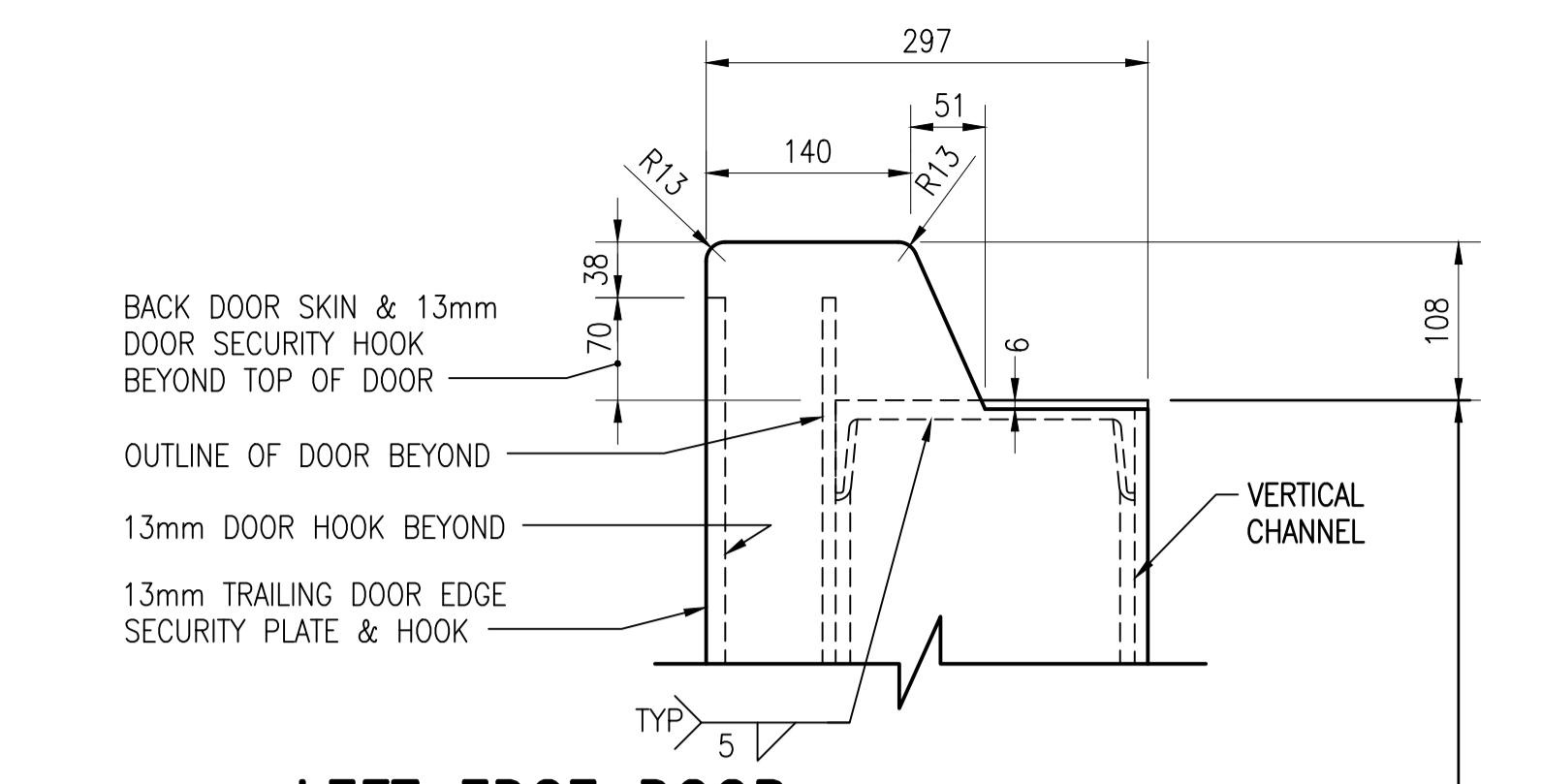


APPR	DATE	09/14/22
MSM STANDARD	DESCRIPTION	
APPROVED	DATE	MM/DD/YY
FOR COMMANDER NAFAC	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LRA-HORRUCK, VA		
<b>MODULAR STORAGE MAGAZINE</b> SECTIONS/ DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:	14116001	
CONSTR. CONTR. NO.:		
NAFAC DRAWING NO.:	14116001	
SHEET	33 OF 53	
<b>S-712</b>		
<small>NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018</small>		

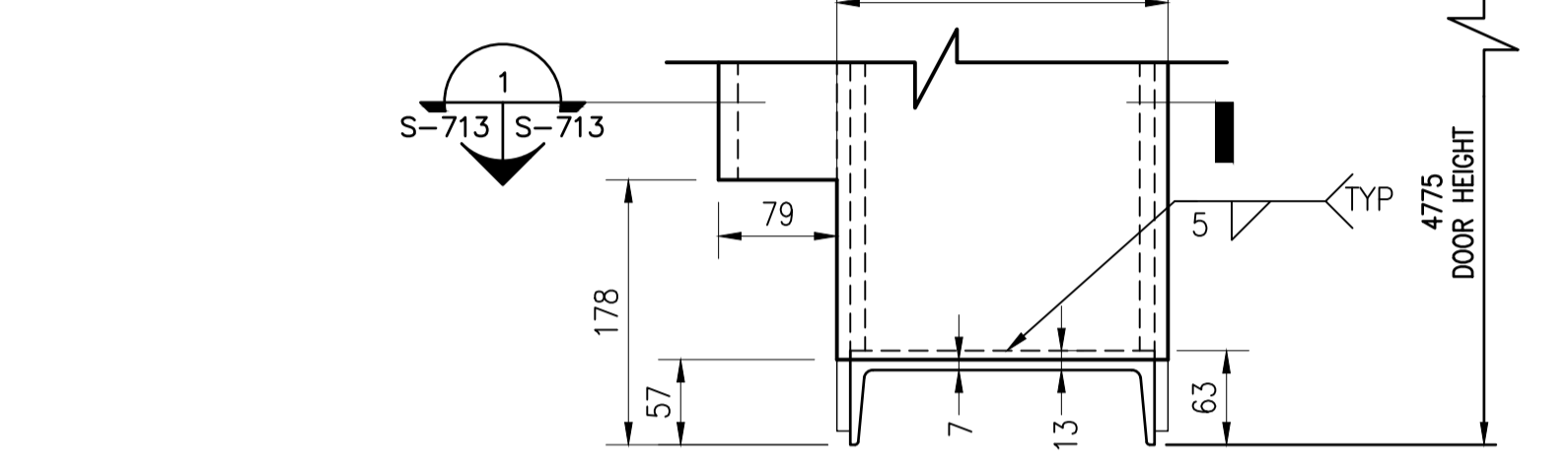
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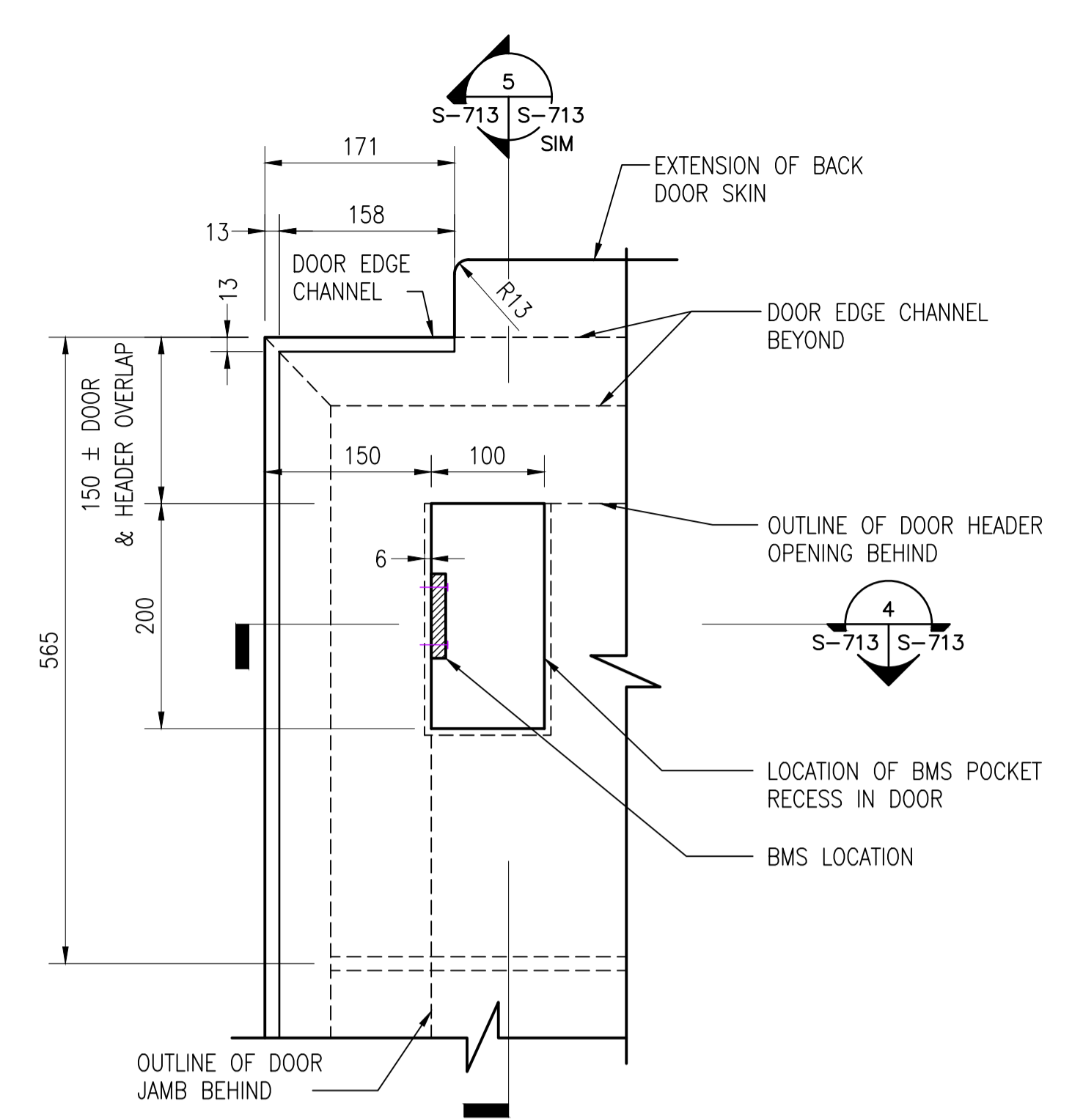
**1 SECURITY PLATE @ LEFT DOOR EDGE**  
 S-702 S-713 SCALE: 1:5  
 S-713



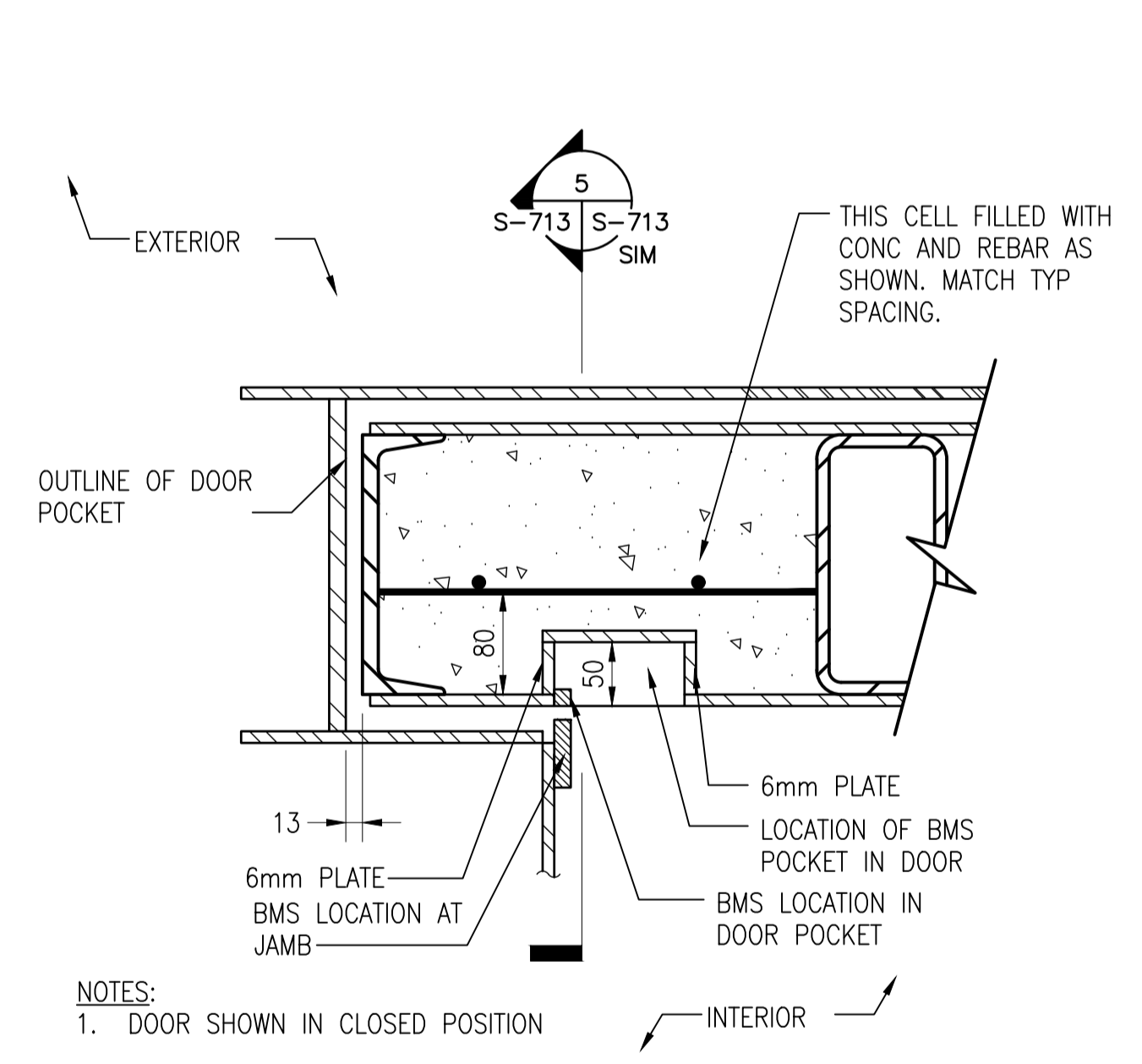
**2B LEFT EDGE DOOR SECURITY PLATE TOP EDGE DETAIL**  
 S-713 S-713 SCALE: 1:5



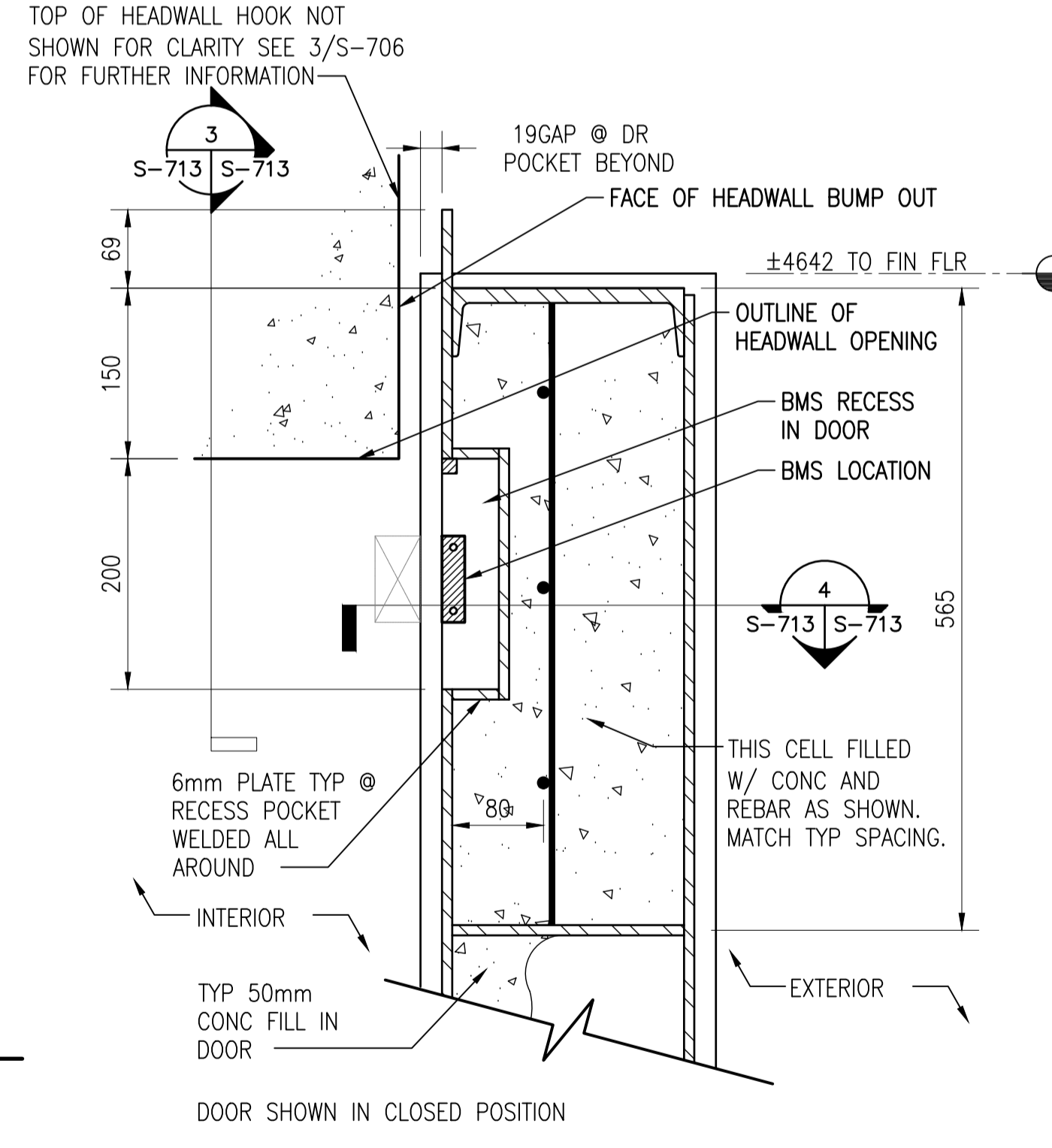
**2A LEFT EDGE DOOR SECURITY PLATE BOTTOM EDGE DETAIL**  
 S-713 S-713 SCALE: 1:5



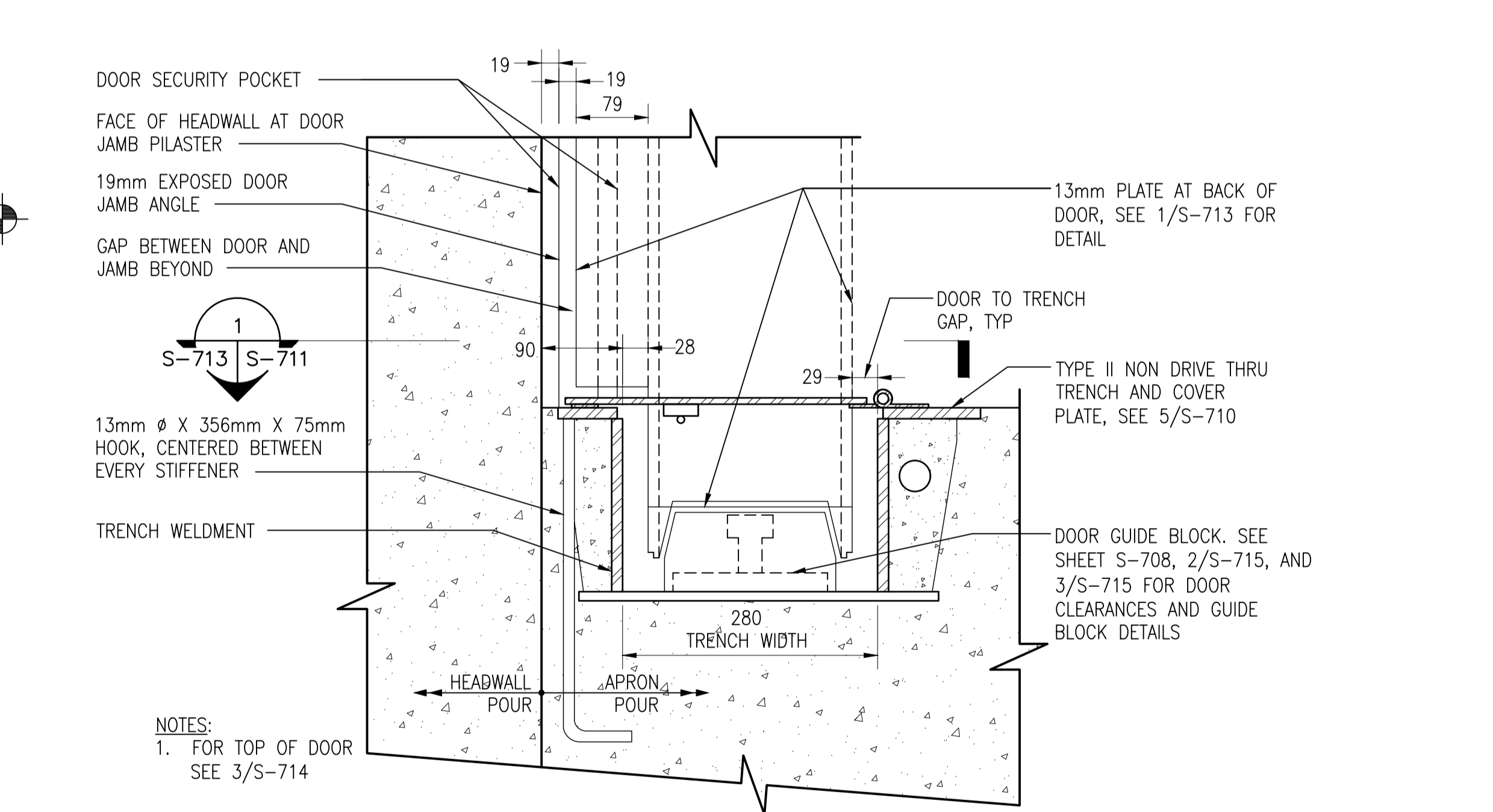
**3 BMS RECESS DOOR POCKET-DOOR INTERIOR VIEW**  
 S-713 S-713 SCALE: 1:5



**4 BMS RECESS DOOR POCKET**  
 S-713 S-713 SCALE: 1:5



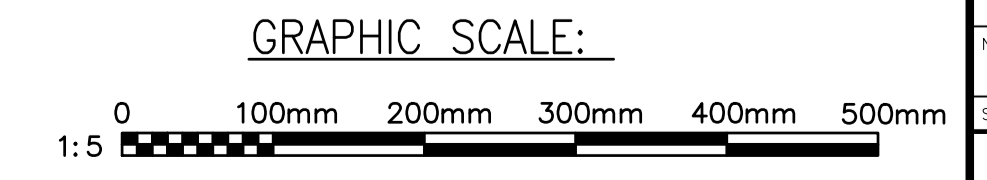
**5 BMS RECESS DOOR POCKET**  
 S-713 S-713 SCALE: 1:5

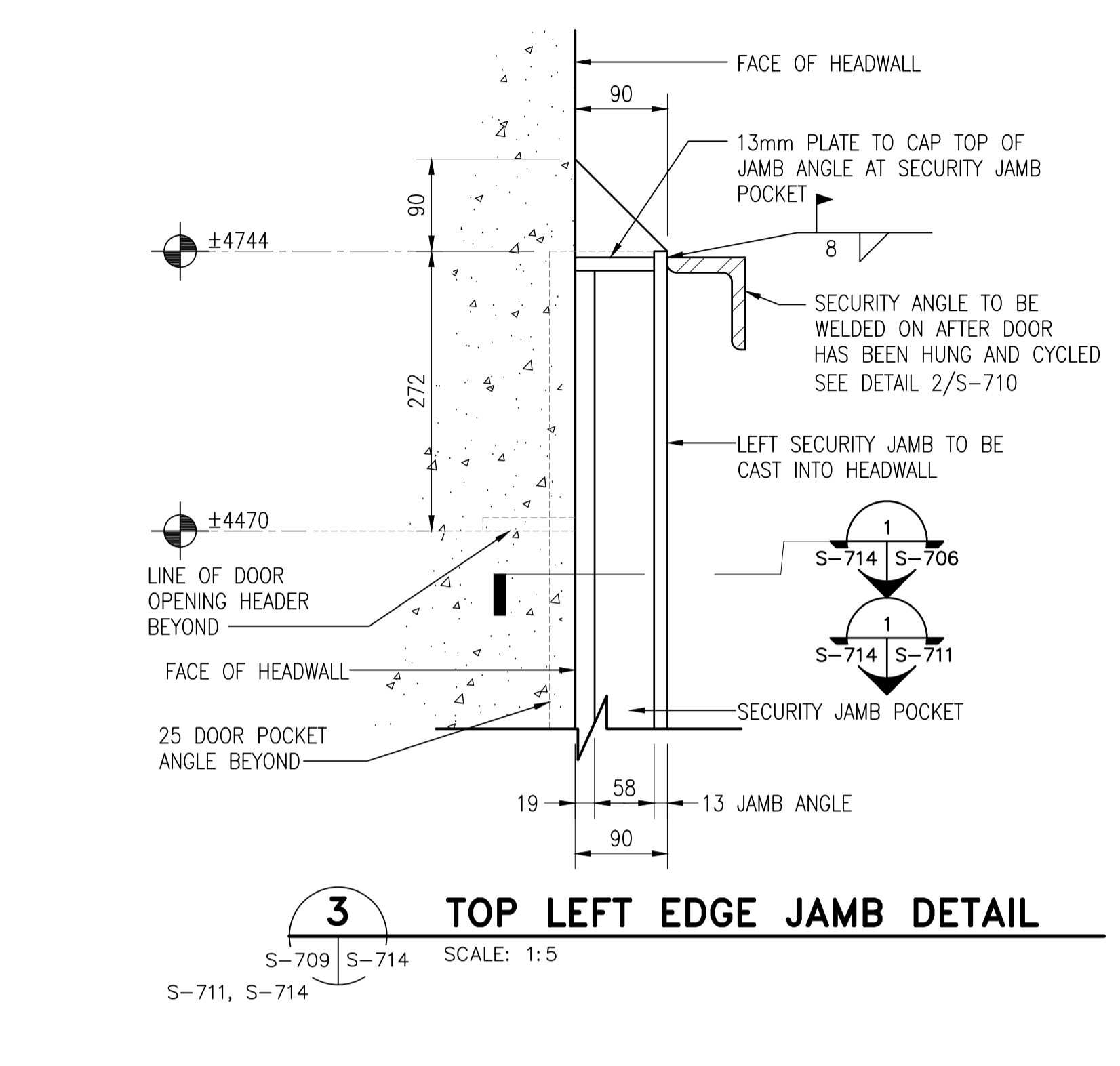
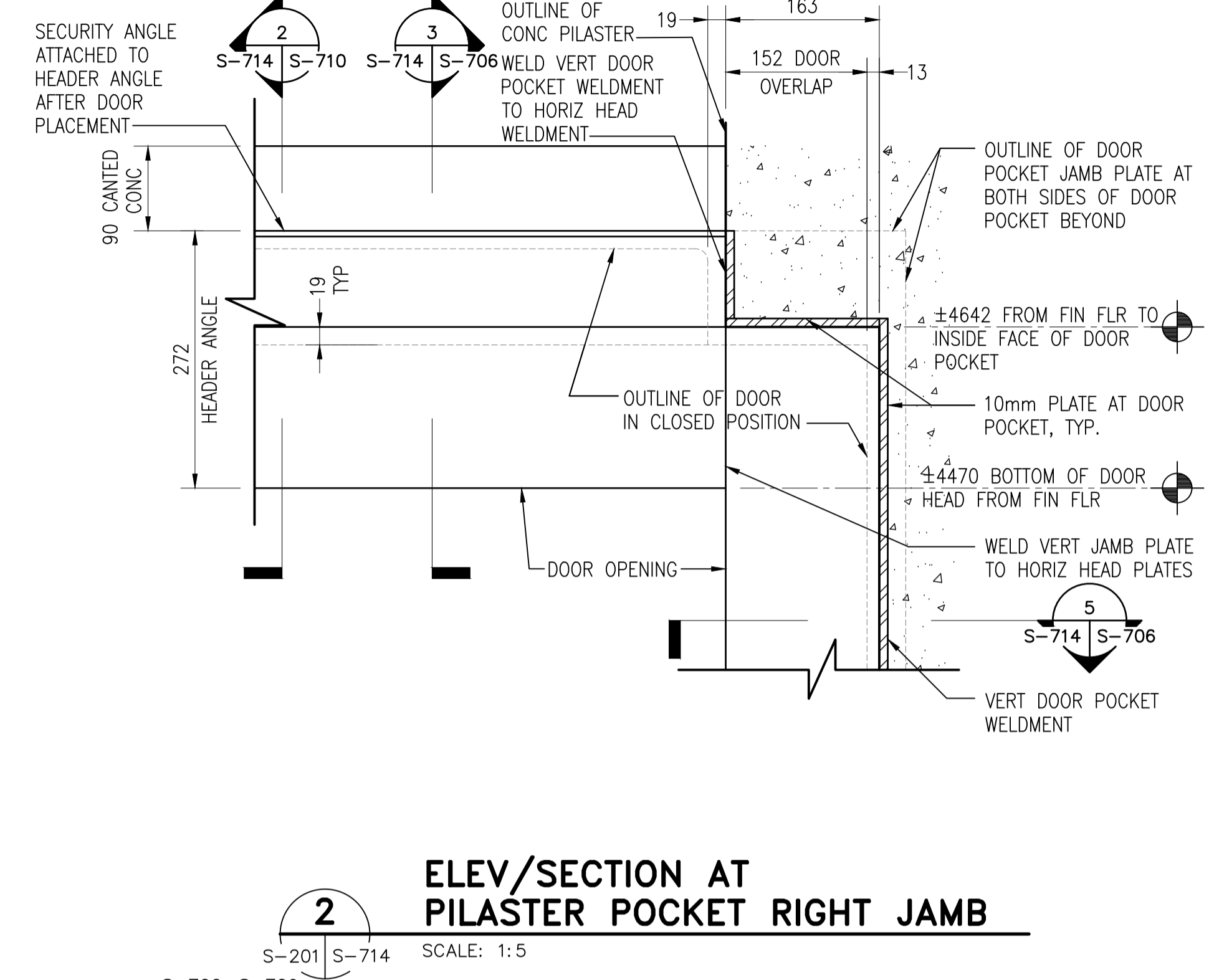
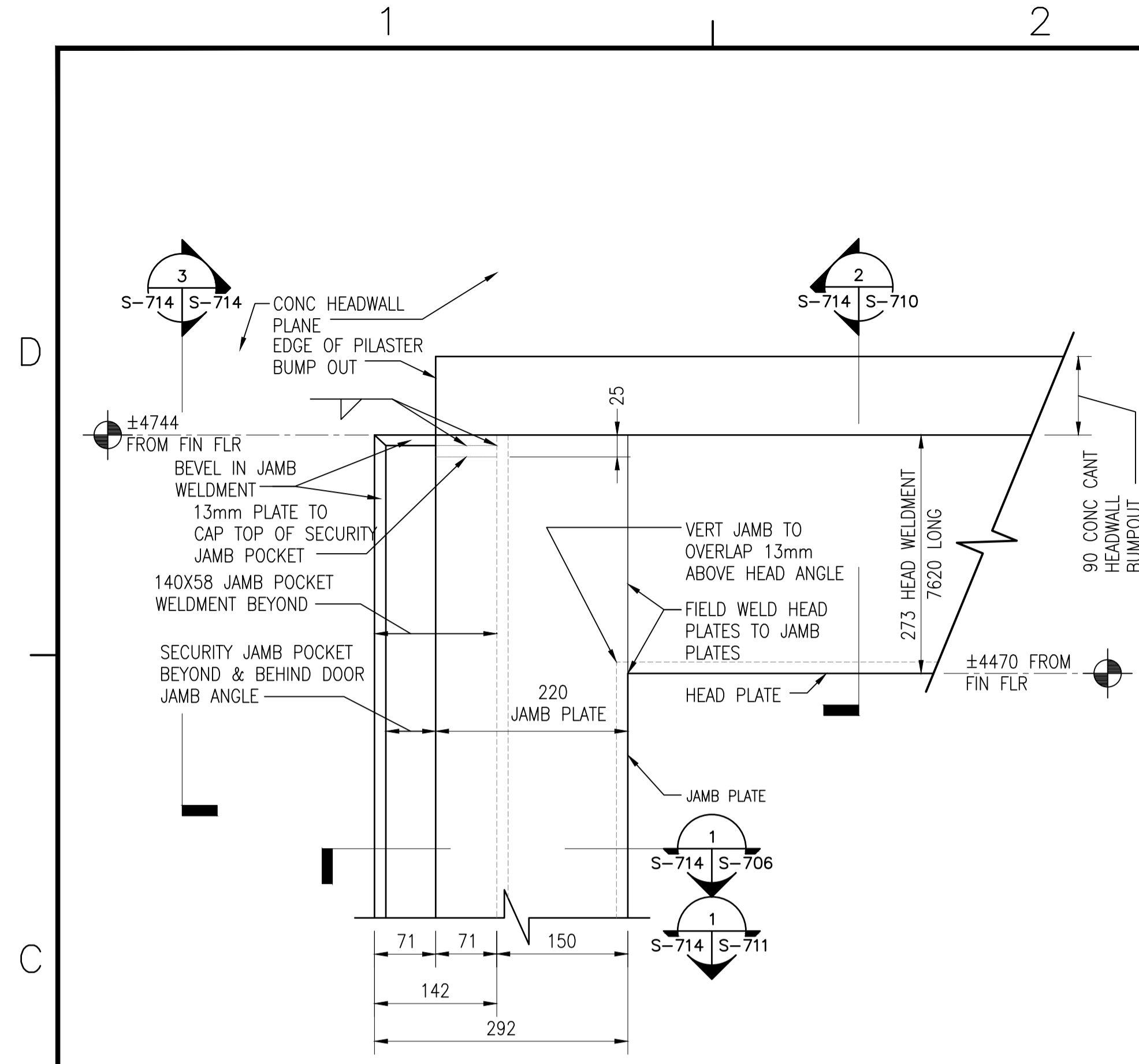


**6 DETAIL AT HEADWALL PILASTER BEYOND JAMB ANGLE**  
 S-702, S-706 S-713 SCALE: 1:5  
 S-709, S-711, S-716

FILE NAME: J:\USSE\Magazines\NMSM\2021\Interim\Updates\NMS-S-713.dwg LAYOUT NAME: S-713 PLOTTED: Tuesday, June 06, 2023 - 11:28am USER: jebkcoriano

APPROVED	DATE	09/14/22
FOR COMMANDER NAFAAC	DESCRIPTION	MSM STANDARD
ACTIVITY		
SATISFACTORY TO DATE	MM/DD/YY	
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LRA-HOBOKEN, VA		
<b>MODULAR STORAGE MAGAZINE</b> SECTIONS/ DETAILS		
SCALE: AS NOTED		
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAAC DRAWING NO. 14116002		
SHEET 34 OF 53		
<b>S-713</b>		
NAFAAC METRIC DRAWING REVISION: 01 OCTOBER 2018		





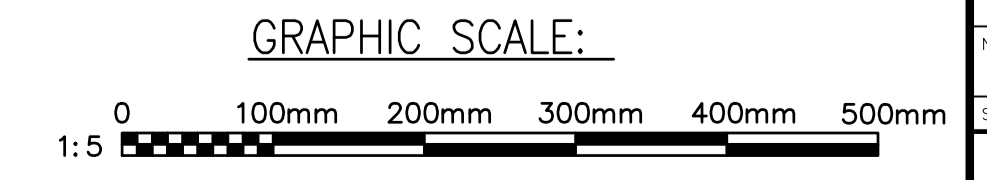
**1 TOP AT LEFT DOOR JAMB**  
S-201, S-714 SCALE: 1:5  
S-709

**2 ELEV/SECTION AT PILASTER POCKET RIGHT JAMB**  
S-201, S-714 SCALE: 1:5  
S-706, S-709

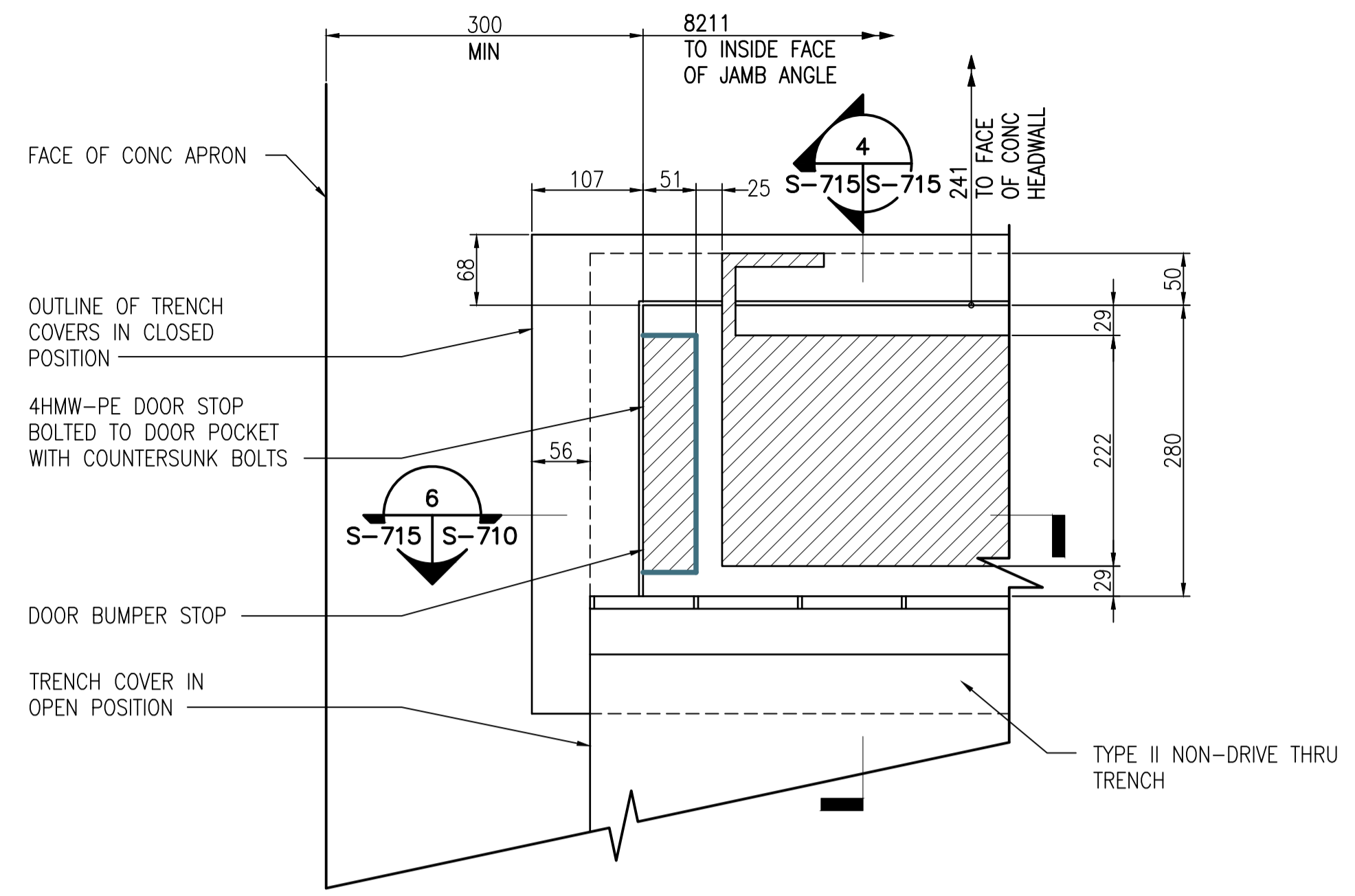
**3 TOP LEFT EDGE JAMB DETAIL**  
S-709, S-714 SCALE: 1:5  
S-711, S-714

**4 COVER PLATE FLIPPING TOOL**  
S-714, S-714 SCALE: 1:5

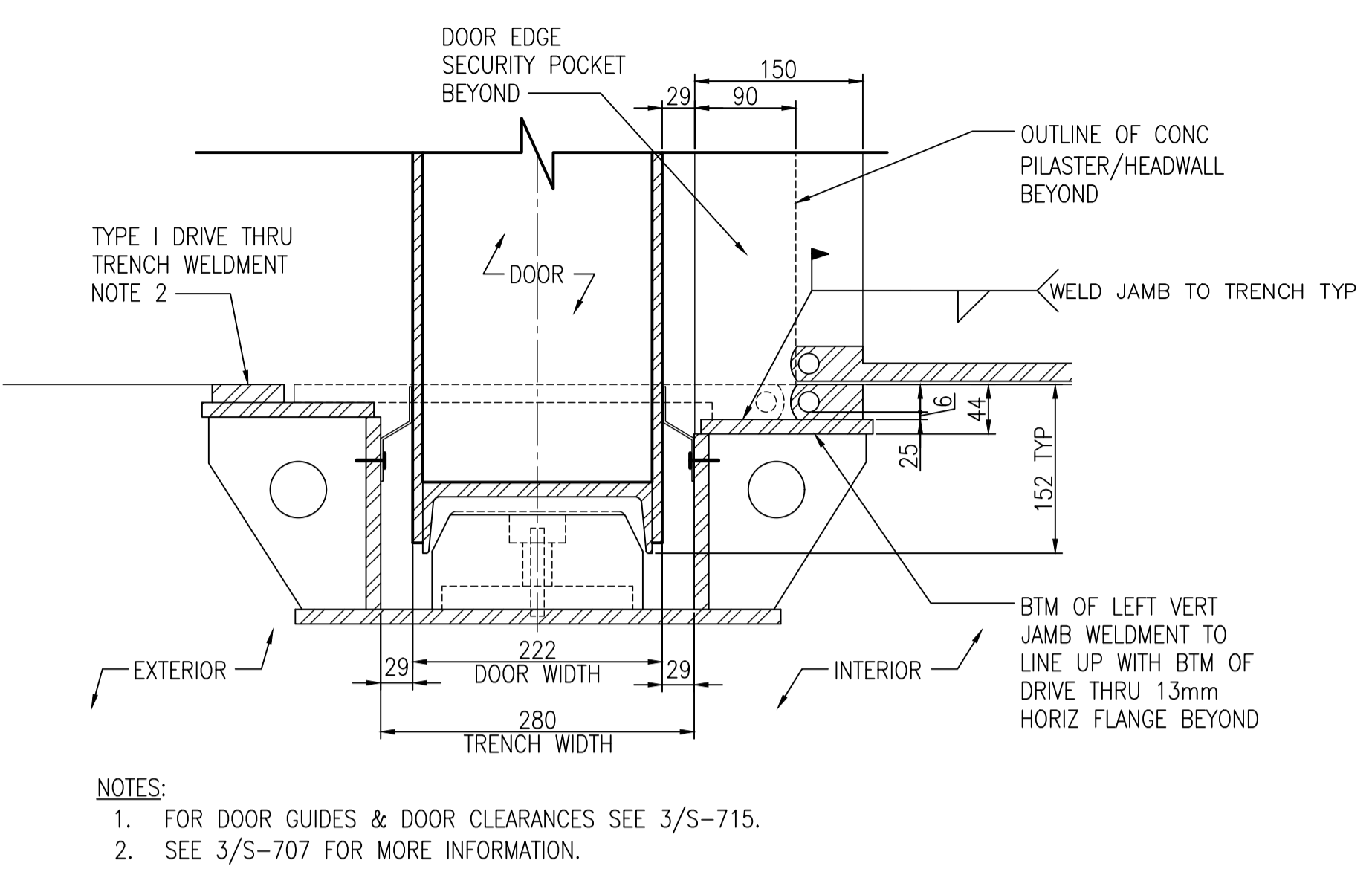
DATE	09/14/22
APPR	
DESCRIPTION	MSM STANDARD
APPROVED	
FOR COMMANDER NAFAC	
ACTIVITY	
SATISFACTORY TO DATE	MM/DD/YY
DESIGNER	DRW IWR CHK LMM
BRANCH MANAGER	JTW
DESIGN PRODUCTION	ROBERT L. STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LDU-HOBOKEN, VA	
<b>MODULAR STORAGE MAGAZINE</b> SECTIONS/ DETAILS	
SCALE	AS NOTED
PROJECT NO.	
CONSTR. CONTR. NO.	
NAFAC DRAWING NO.	14116003
SHEET	35 OF 53
<b>S-714</b>	
<small>NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018</small>	



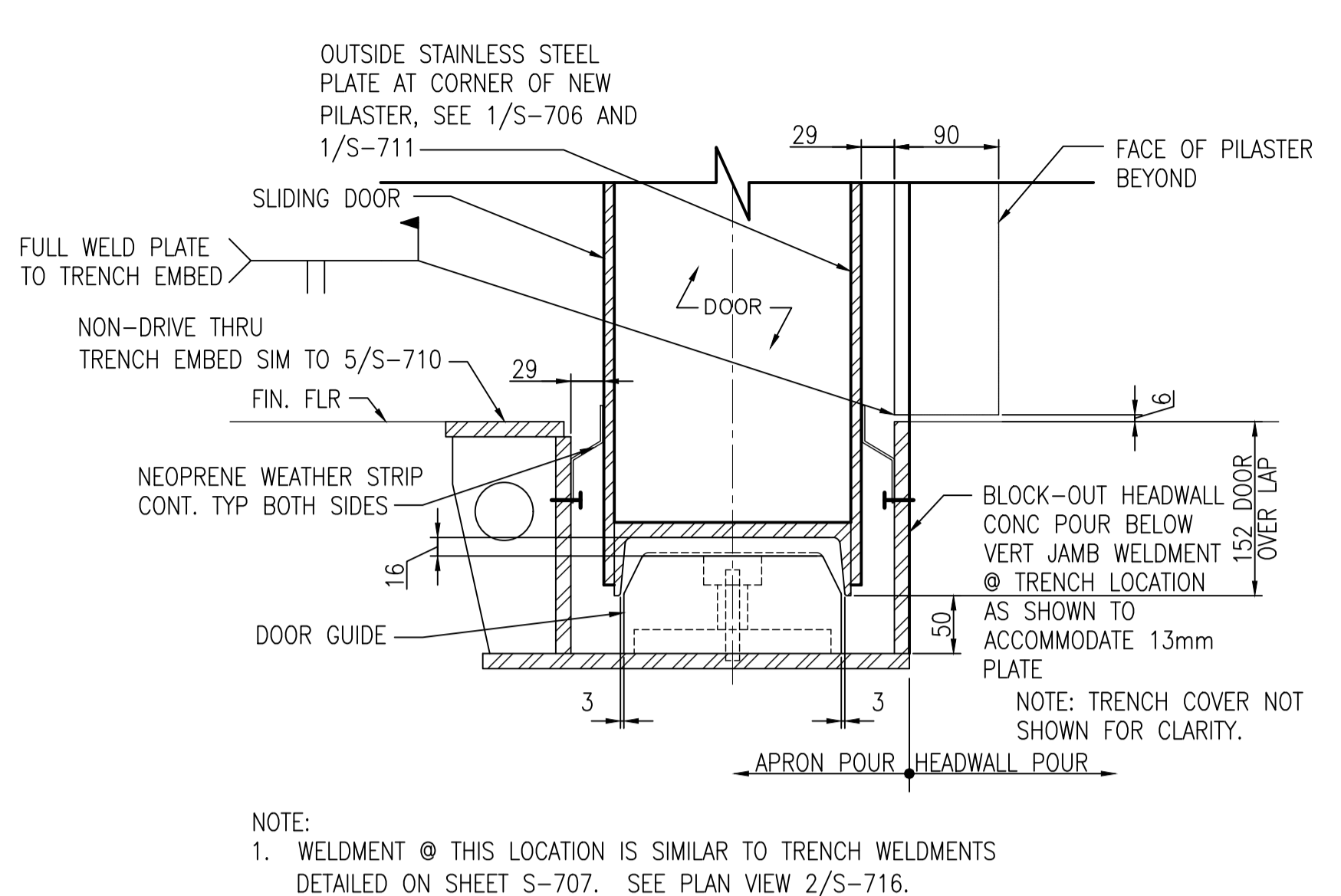
FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\S-714.dwg LAYOUT NAME: S-714 PLOTTED: Tuesday, June 06, 2023 11:29am USER: jeb.corsano



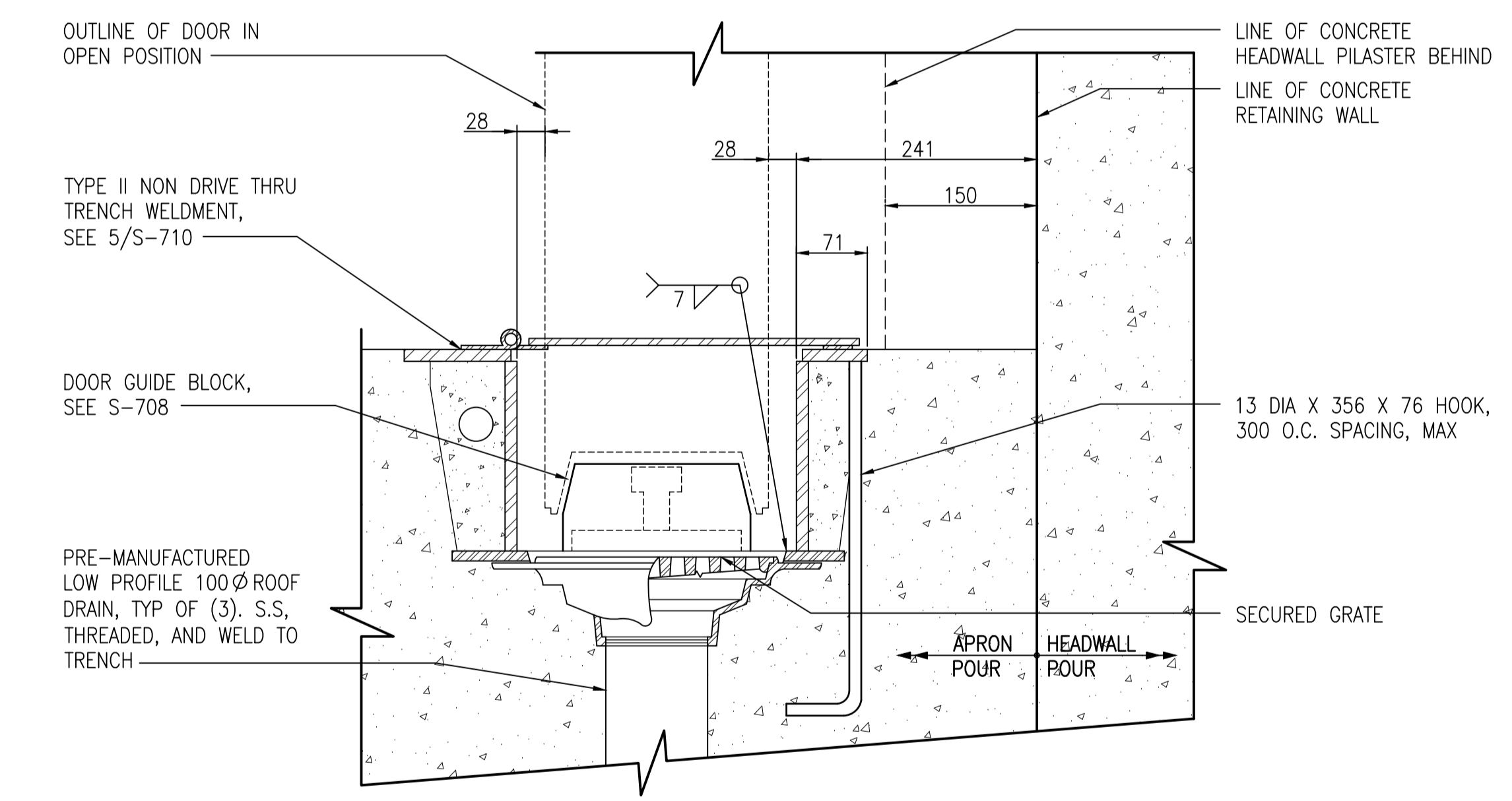
**1 LEFT TRENCH DETAIL**  
 S-707 S-715 SCALE: 1:5  
 S-716, S-709, S-706



**2 TRENCH DETAIL AT DOOR OPENING TYPE I AT LEFT JAMB WELDMENT**  
 S-301 S-715 SCALE: 1:5



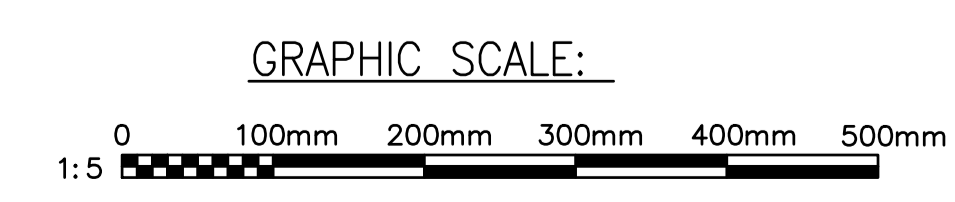
**3 SECTION AT TRENCH AND LEFT JAMB**  
 S-715 S-715 SCALE: 1:5  
 S-706, S-716



**4 TRENCH DETAIL AT RETAINING WALL**  
 S-104, S-302, S-303 S-715 SCALE: 1:5  
 S-706, S-707, S-711, S-715

FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim\ipdines\WMSM\S-715.dwg LAYOUT NAME: S-715 PLOTTED: Tuesday, June 06, 2023 - 11:29am USER: jeb@coriano

APPROVED	DATE	09/14/22
FOR COMMANDER NAIFAC	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNER	CHK	LMM
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LRA-HOBOKEN, VA		
<b>MODULAR STORAGE MAGAZINE</b> SECTIONS/ DETAILS		
SCALE: AS NOTED		
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAIFAC DRAWING NO. 14116004		
SHEET 36 OF 53		
<b>S-715</b>		
NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018		



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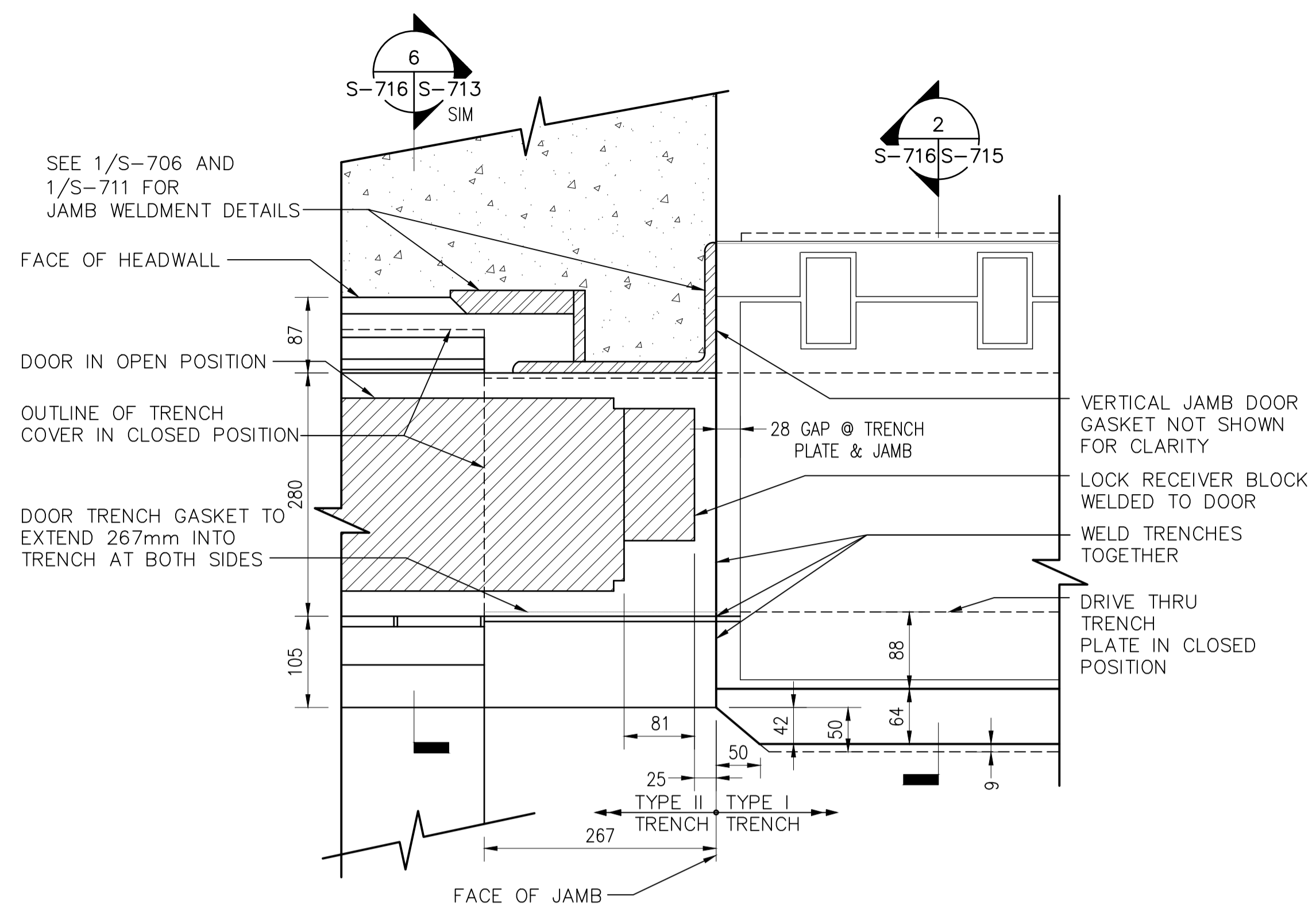
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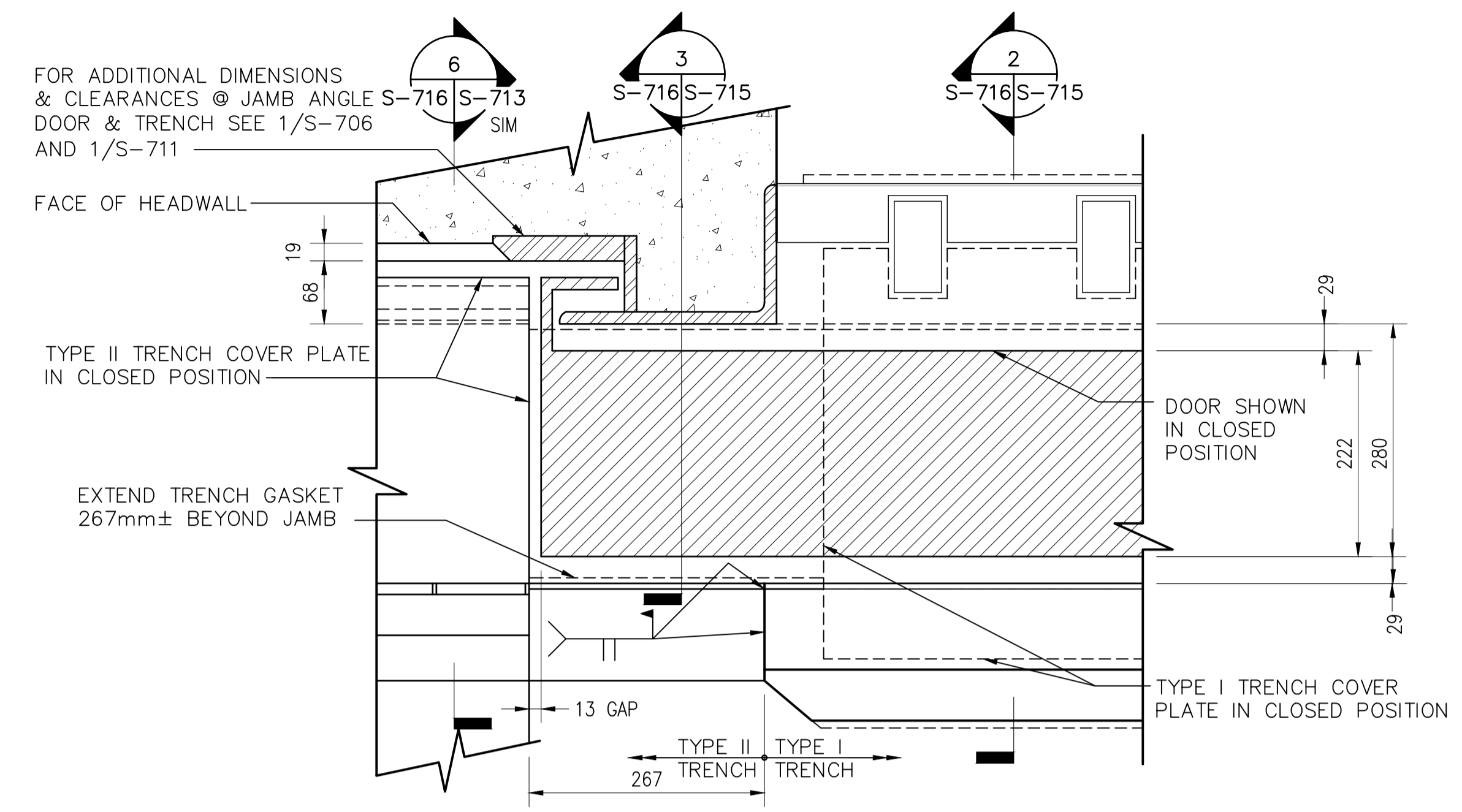
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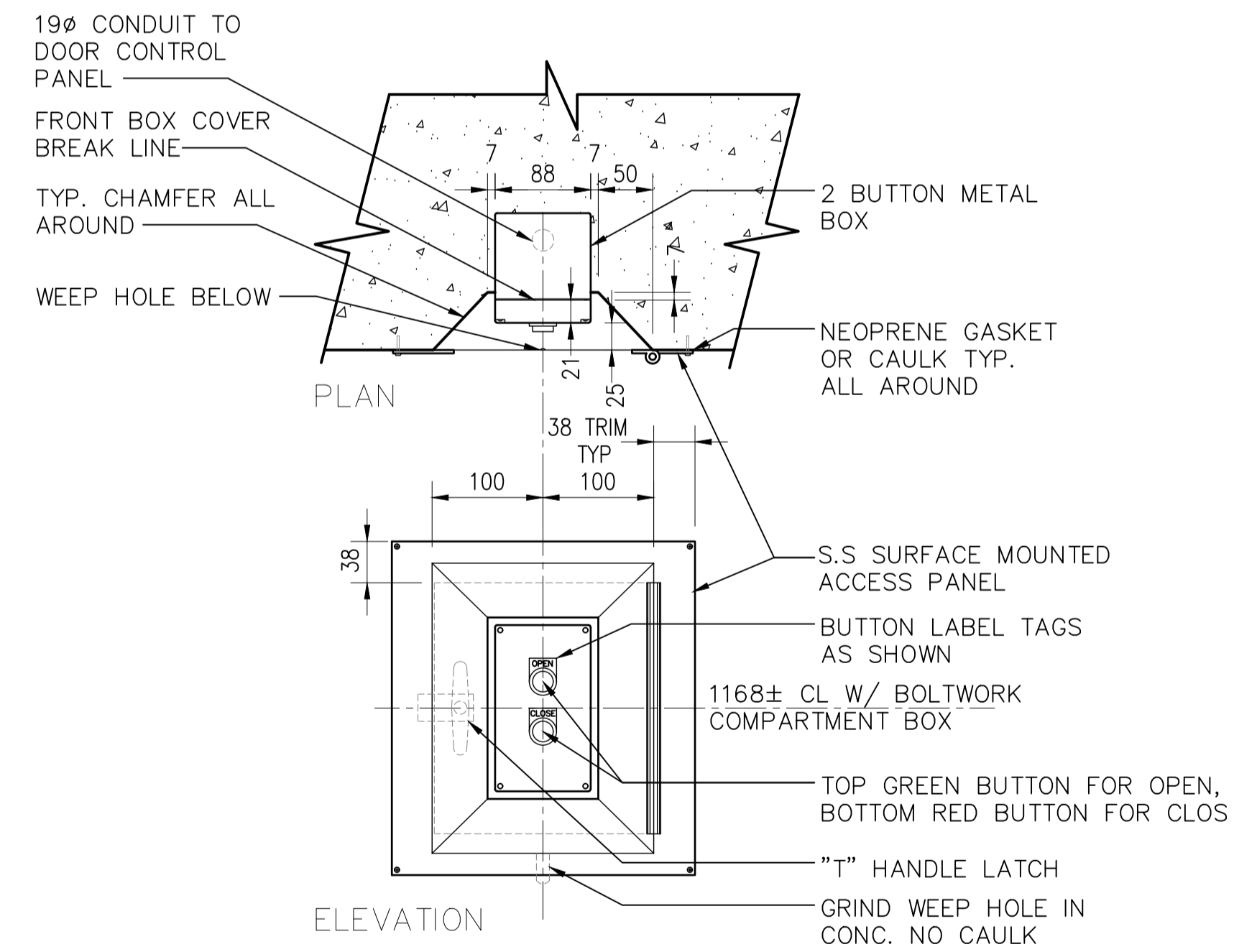
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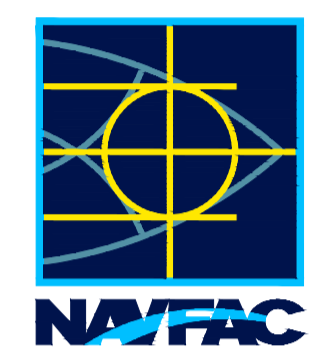
**1 DOOR TRENCH DETAIL - DOOR IN OPEN POSITION**  
S-707 S-716 SCALE: 1:5

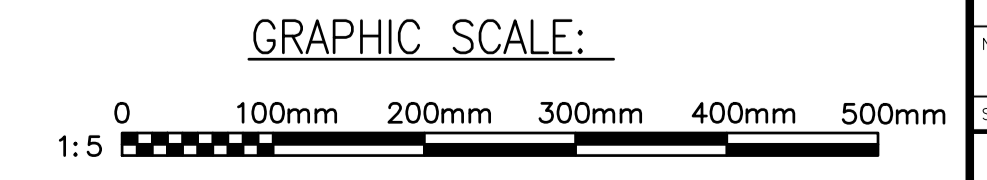


**2 DOOR TRENCH DETAIL DOOR IN CLOSED POSITION**  
S-707 S-716 SCALE: 1:5



**3 2 BUTTON DOOR CONTROL CAST INTO CONC. PILASTER W/ACCESS DOOR**  
S-712 S-716 SCALE: 1:5

DATE	09/14/22
APPR	
SYN	DESCRIPTION
MSM STANDARD	
	
SEAL	
A/E INFO	
APPROVED	
FOR COMMANDER NAFAC	
ACTIVITY	
SATISFACTORY TO DATE	MM/DD/YY
DES	DRW IWR CHK LMM
TPM/DM	
BRANCH MANAGER	JTW
DES PROD DIR	RICHARD L. STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	LDN-HORRDLK, VA
DEPARTMENT OF THE NAVY	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
DESIGN AND CONSTRUCTION	
<b>MODULAR STORAGE MAGAZINE</b> SECTIONS/ DETAILS	
SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAFAC DRAWING NO.:	14116005
SHEET	37 OF 53
<b>S-716</b>	
<small>NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018</small>	



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FILE NAME: J:\USSE\Magazines\MSM\2021 Interim\ipdres\UNOS\S-716.dwg LAYOUT NAME: S-716 PLOTTED: Tuesday, June 06, 2023 - 11:29am USER: jeb.corsano

FILE NAME: J:\USSE\Magazines\WMSM\2021\Interim\Updates\WMSM-001.dwg LAYOUT NAME: M-001 PLOTTED: Tuesday, June 16, 2023 - 11:29am USER: jalis.corralino

### PIPING SYMBOLS

	EXISTING PIPING TO REMAIN		PIPE ANCHOR
	EXISTING PIPING TO BE REMOVED		PIPE GUIDE
	HEAT RECOVERY SUPPLY		EXPANSION JOINT
	HEAT RECOVERY RETURN		VENTURI
	HIGH PRESSURE STEAM (____ PSIG)		GATE VALVE
	HIGH PRESSURE CONDENSATE		GLOBE VALVE
	MEDIUM PRESSURE STEAM (____ PSIG)		HOSE VALVE WITH CAP
	MEDIUM PRESSURE CONDENSATE		BUTTERFLY VALVE
	LOW PRESSURE STEAM (____ PSIG)		CHECK VALVE
	LOW PRESSURE CONDENSATE		BALANCING VALVE
	STEAM VENT		CALIBRATED BALANCING VALVE
	HEATING-HOT WATER SUPPLY		BALL VALVE
	HEATING-HOT WATER RETURN		PLUG VALVE
	CHILLED WATER SUPPLY		SOLENOID VALVE
	CHILLED WATER RETURN		SAFETY OR PRESSURE RELIEF, ANGLE VALVE
	HOT/CHILLED WATER SUPPLY		SAFETY OR PRESSURE RELIEF, STRAIGHT THRU VALVE
	HOT/CHILLED WATER RETURN		PRESSURE REDUCING VALVE (PRV)
	BRINE SUPPLY		AUTOMATIC CONTROL VALVE, 2 WAY
	BRINE RETURN		AUTOMATIC CONTROL VALVE, 3 WAY
	COLD CONDENSER WATER		ELECTRICALLY OPERATED VALVE
	HOT CONDENSER WATER		BLIND FLANGE
	MAKE-UP WATER		LATERAL Y
	REFRIGERANT HOT GAS		CAP
	REFRIGERANT SUCTION		ELBOW, 90°
	REFRIGERANT LIQUID		ELBOW, 90° TURNED UP
	CONDENSATE PUMP DISCHARGE		ELBOW, 90° TURNED DOWN
	BOILER FEEDWATER		ELBOW, 45°
	BOILER BLOW DOWN		TEE
	FUEL-OIL SUPPLY		TEE, OUTLET TURNED UP
	FUEL-OIL RETURN		TEE, OUTLET TURNED DOWN
	FUEL-OIL VENT		CONCENTRIC REDUCER
	STEAM TRAP		ECCENTRIC REDUCER (STRAIGHT INVERT)
	DRIP STATION		UNION
	PRESSURE REDUCING STATION		FLEXIBLE PIPE CONNECTION
			PRESSURE GAGE
			TEMPERATURE GAGE
			THERMOMETER
			PRESSURE/TEMPERATURE TEST PORT

\* PROVIDE SHUT OFF COCK WITH SIPHON OR PULSATION DAMPENERS.

### DOUBLE LINE DUCTWORK SYMBOLS

	RECTANGULAR DUCT (FIRST FIGURE IS FOR SIDE SHOWN, SECOND FIGURE IS FOR SIDE NOT SHOWN)		45° ELBOW, ROUND OR FLAT OVAL (SMOOTH OR 3 PIECE ELBOWS)
	ROUND DUCT		DIVIDED FLOW FITTING
	FLAT OVAL DUCT (FIRST FIGURE IS FOR SIDE SHOWN, SECOND FIGURE IS FOR SIDE NOT SHOWN)		TAP-IN BRANCH, RECTANGULAR
	FLEXIBLE ROUND DUCT		BRANCH DUCT, CONICAL LATERAL FITTING, ROUND OR FLAT OVAL
	FLEXIBLE DUCT CONNECTION		BRANCH DUCT, CONICAL TEE FITTING, ROUND OR FLAT OVAL
	MANUAL OPPOSED BLADE VOLUME DAMPER		BRANCH DUCT, "Y" FITTING, ROUND OR FLAT OVAL
	MOTORIZED DAMPER		SUPPLY DUCT SECTION, RECTANGULAR
	BACK DRAFT DAMPER		EXHAUST OR RETURN DUCT SECTION, RECTANGULAR
	FIRE DAMPER, 1 1/2 HOUR FIRE RATED		90° ELBOW TURNED UP, RECTANGULAR
	BLAST SUPPRESSION DAMPER		90° ELBOW TURNED DOWN, RECTANGULAR
	SMOKE DAMPER		90° ELBOW TURNED UP, ROUND; FLAT OVAL SIMILAR
	DUCT TRANSITION, ROUND OR FLAT OVAL TO RECTANGULAR		90° ELBOW TURNED DOWN, ROUND; FLAT OVAL SIMILAR
	DUCT TRANSITION, RECTANGULAR TO ROUND OR FLAT OVAL		CEILING DIFFUSER (ARROWS INDICATE THROW DIRECTIONS)
	DUCT TRANSITION, RECTANGULAR, ROUND, OR FLAT OVAL		CEILING DIFFUSER (ARROWS INDICATE THROW DIRECTIONS)
	INCLINED RISE W/RESPECT TO AIR FLOW, RECTANGULAR		CEILING REGISTER OR GRILLE (RETURN OR EXHAUST)
	INCLINED DROP W/RESPECT TO AIR FLOW, RECTANGULAR		CEILING REGISTER OR GRILLE (SUPPLY)
	INCLINED RISE W/RESPECT TO AIR FLOW, ROUND OR FLAT OVAL		REGISTER OR GRILLE
	INCLINED DROP W/RESPECT TO AIR FLOW, ROUND OR FLAT OVAL		CEILING DIFFUSER WITH FLEXIBLE DUCT CONNECTION (ARROWS INDICATE THROW DIRECTIONS)
	90° ELBOW, RECTANGULAR		LIGHT TROFFER WITH FLEXIBLE DUCT CONNECTION. "S" INDICATES SUPPLY, NUMBER INDICATES CFM.
	45° ELBOW, RECTANGULAR		CEILING LINEAR SLOT OR INTEGRATED CEILING DIFFUSER (CLSD) WITH FLEXIBLE DUCT CONNECTION (ARROWS INDICATE THROW DIRECTIONS)
	90° ELBOW, ROUND OR FLAT OVAL (SMOOTH OR 5 PIECE ELBOWS)		STATIC PRESSURE SENSOR
	MITERED 90° ELBOW, ROUND OR FLAT OVAL		HUMIDIFIER

\* PROVIDE SHUT OFF COCK WITH SIPHON OR PULSATION DAMPENERS.

### SINGLE LINE DUCTWORK SYMBOLS

	RECTANGULAR DUCT (FIRST FIGURE IS FOR SIDE SHOWN, SECOND FIGURE IS FOR SIDE NOT SHOWN)		90° ELBOW, ROUND OR FLAT OVAL (SMOOTH OR 5-PIECE ELBOWS)
	ROUND DUCT		45° ELBOW, RECTANGULAR
	FLAT OVAL DUCT (FIRST FIGURE IS FOR SIDE SHOWN, SECOND FIGURE IS FOR SIDE NOT SHOWN)		45° ELBOW, ROUND OR FLAT OVAL (SMOOTH OR 3-PIECE ELBOWS)
	FLEXIBLE ROUND DUCT		DIVIDED FLOW FITTING, RECTANGULAR
	FLEXIBLE DUCT CONNECTION		RECTANGULAR TAP-IN BRANCH OR ROUND OR FLAT OVAL CONICAL TEE
	MANUAL OPPOSED BLADE VOLUME DAMPER		INCLINED CONICAL TAKE-OFF, ROUND OR FLAT OVAL
	MOTORIZED DAMPER		"Y" FITTING, ROUND OR FLAT OVAL
	BACK DRAFT DAMPER		EXISTING WORK TO BE REMOVED
	FIRE DAMPER, 1 1/2 HOUR FIRE RATED		EXISTING WORK TO REMAIN
	FIRE DAMPER, 3 HOUR FIRE RATED		WATER SENSOR (LOCATED BELOW ACCESS FLOOR)
	COMBINATION FIRE/SMOKE DAMPER		HEAT DETECTOR
	SMOKE DAMPER		SMOKE DETECTOR
	DUCT TRANSITION		INTERVAL TIMER
	INCLINED RISE W/RESPECT TO AIR FLOW, RECTANGULAR		HUMIDISTAT
	INCLINED DROP W/RESPECT TO AIR FLOW, RECTANGULAR		THERMOSTAT
	INCLINED RISE W/RESPECT TO AIR FLOW, ROUND OR FLAT OVAL		NIGHT THERMOSTAT
	INCLINED DROP W/RESPECT TO AIR FLOW, ROUND OR FLAT OVAL		WALL SWITCH
	90° ELBOW, RECTANGULAR		SPLIT SYSTEM AIR CONDITIONING UNIT, NO.1

### MISC SYMBOLS

	ROOM NUMBER
	ROUND DUCT
	FLAT OVAL DUCT
	POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
	POINT BETWEEN EXISTING WORK TO REMAIN AND EXISTING WORK TO BE REMOVED
	EXISTING WORK TO BE REMOVED
	EXISTING WORK TO REMAIN
	WATER SENSOR (LOCATED BELOW ACCESS FLOOR)
	HEAT DETECTOR
	SMOKE DETECTOR
	INTERVAL TIMER
	HUMIDISTAT
	THERMOSTAT
	NIGHT THERMOSTAT
	WALL SWITCH
	SPLIT SYSTEM AIR CONDITIONING UNIT, NO.1

### GENERAL NOTES

- MECHANICAL LAYOUTS ARE SCHEMATIC. PROVIDE ANY ADDITIONAL DROPS, RISES, OR OFFSETS REQUIRED FOR A COMPLETE INSTALLATION. COORDINATE EXACT ROUTING OF WORK WITH ALL OTHER TRADES AND OBSTRUCTIONS. COORDINATE EXACT LOCATIONS OF CEILING MOUNTED WORK WITH LIGHTS, CEILING GRID, AND OTHER OBSTRUCTIONS.
- UNLESS OTHERWISE INDICATED, ROUTE ALL DUCTWORK AND PIPING ABOVE CEILINGS. ROUTE ALL DUCTWORK AND PIPING AS HIGH AS POSSIBLE IN AREAS WITHOUT CEILINGS.
- DUCT DIMENSIONS ARE INSIDE CLEAR DIMENSIONS.
- ALL WORK INDICATED IS NEW UNLESS INDICATED AS EXISTING.
- SOME SYMBOLS INDICATED ON THIS LEGEND SHEET MAY NOT APPEAR ON THE DRAWINGS.
- SS'T = STAINLESS STEEL
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE GOVERNMENT RULES, REGULATIONS AND LAWS, INCLUDING, BUT NOT LIMITED TO, THE CURRENT EDITIONS OF THE INTERNATIONAL BUILDING CODE & THE INTERNATIONAL MECHANICAL CODE.
- COORDINATE WORK WITH OTHER TRADES TO AVOID CONFLICTS AND ENSURE THAT THERE IS ADEQUATE SPACE FOR THE WORK.
- IT IS THE INTENTION OF THE PLANS TO PROVIDE A COMPLETE & WORKING SYSTEM. PROVIDE ALL ITEMS & WORK REQUIRED FOR SUCH AN INSTALLATION WHETHER SHOWN OR MENTIONED SPECIFICALLY OR NOT.
- COORDINATE THE LOCATION OF AND PROVIDE BLOCKOUTS AND SLEEVES FOR ALL MECHANICAL FEATURES INCLUDING PIPING, VENTILATORS, ETC.
- EQUIPMENT CONFIGURATION, DIMENSIONS, PIPING AND DUCT CONNECTIONS MAY VARY WITH MANUFACTURERS AND MAY DIFFER FROM THAT SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL VERIFY THE DIMENSIONS AND DETAILS OF PROPOSED EQUIPMENT TO ENSURE PROPER FIT AND OPERATION OF ALL SYSTEM COMPONENTS.
- DIAGRAMMATIC LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE ONLY AND SUBJECT TO MODIFICATION FOR PROPER INSTALLATION AND FIT. AVOID INTERFERENCE WITH FEATURES OF OTHER TRADES.
- ALL MATERIALS AND EQUIPMENT INSTALLED SHALL BE NEW AND IN PERFECT CONDITION, AND OF THE HIGHEST QUALITY.

#### NOTES TO DESIGNER:

- EDIT/INCLUDE SHEETS M-101, M-102, M-501 TO M-503 AND M-801, DELETE MV100 AND MV101 IF USING THE SPLIT SYSTEM AIR CONDITIONING (SSAC) SYSTEM. EDIT AND INCLUDE SHEETS MV100 AND MV101, DELETE SSAC SHEETS IF USING THE MAGAZINE VENTILATION SYSTEM ONLY.

DATE	09/14/22
APPR	
DESCRIPTION	MSM STANDARD
SYMBOL	
SCALE	AS NOTED
PROJECT NO.	14116006
CONSTR. CONTR. NO.	
NAFAC DRAWING NO.	14116006
SHEET	38 OF 53
<b>M-001</b>	

NAFAC  
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
DESIGN AND CONSTRUCTION

BRANCH MANAGER: JTW  
DES PROD OR: ROWARD L. STEPHENS, P.E.  
FIRE PROTECTION ENGINEER: DPS

MODULAR STORAGE MAGAZINE  
MECHANICAL LEGEND AND GENERAL NOTES

1

2

3

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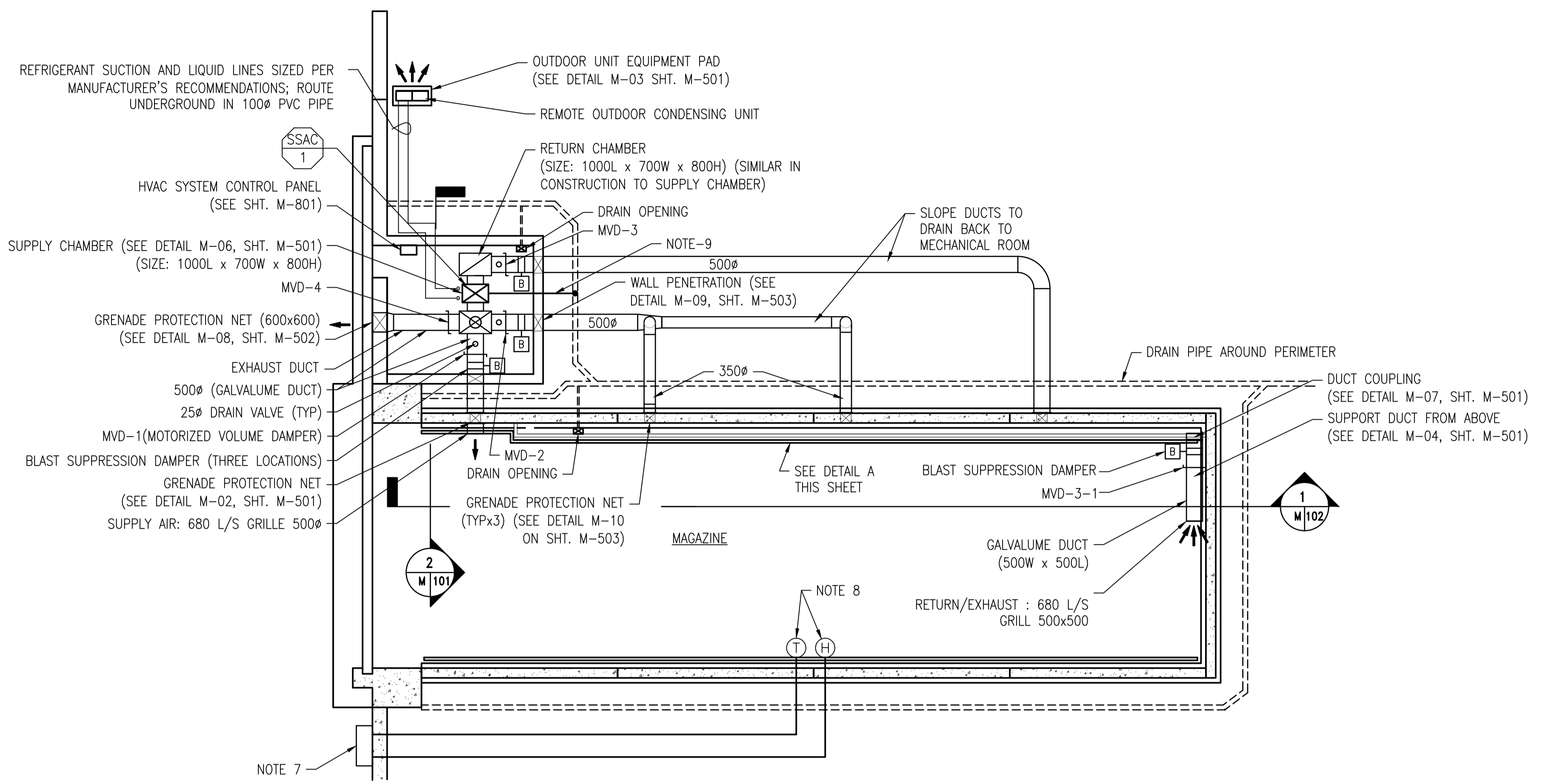
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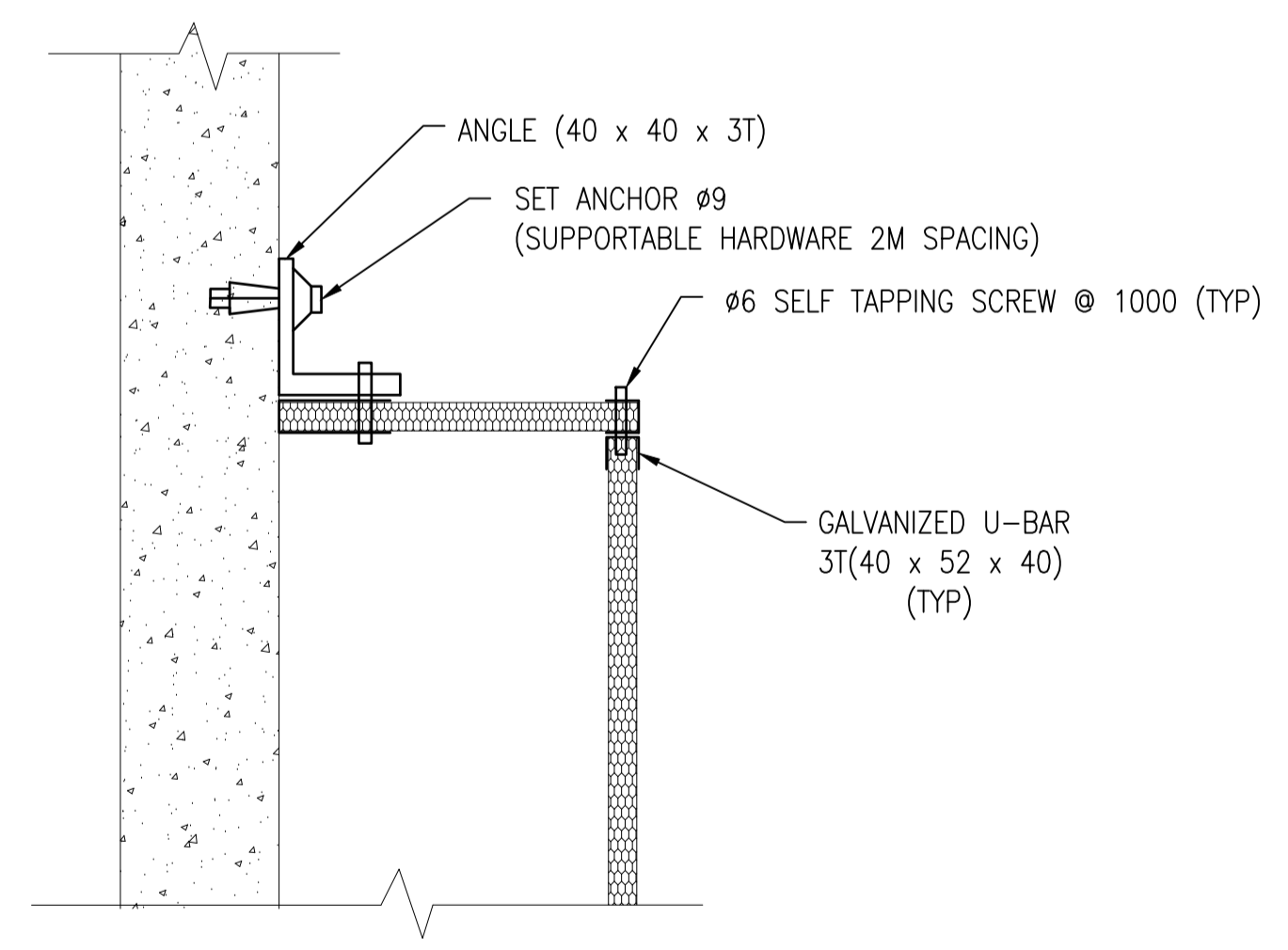
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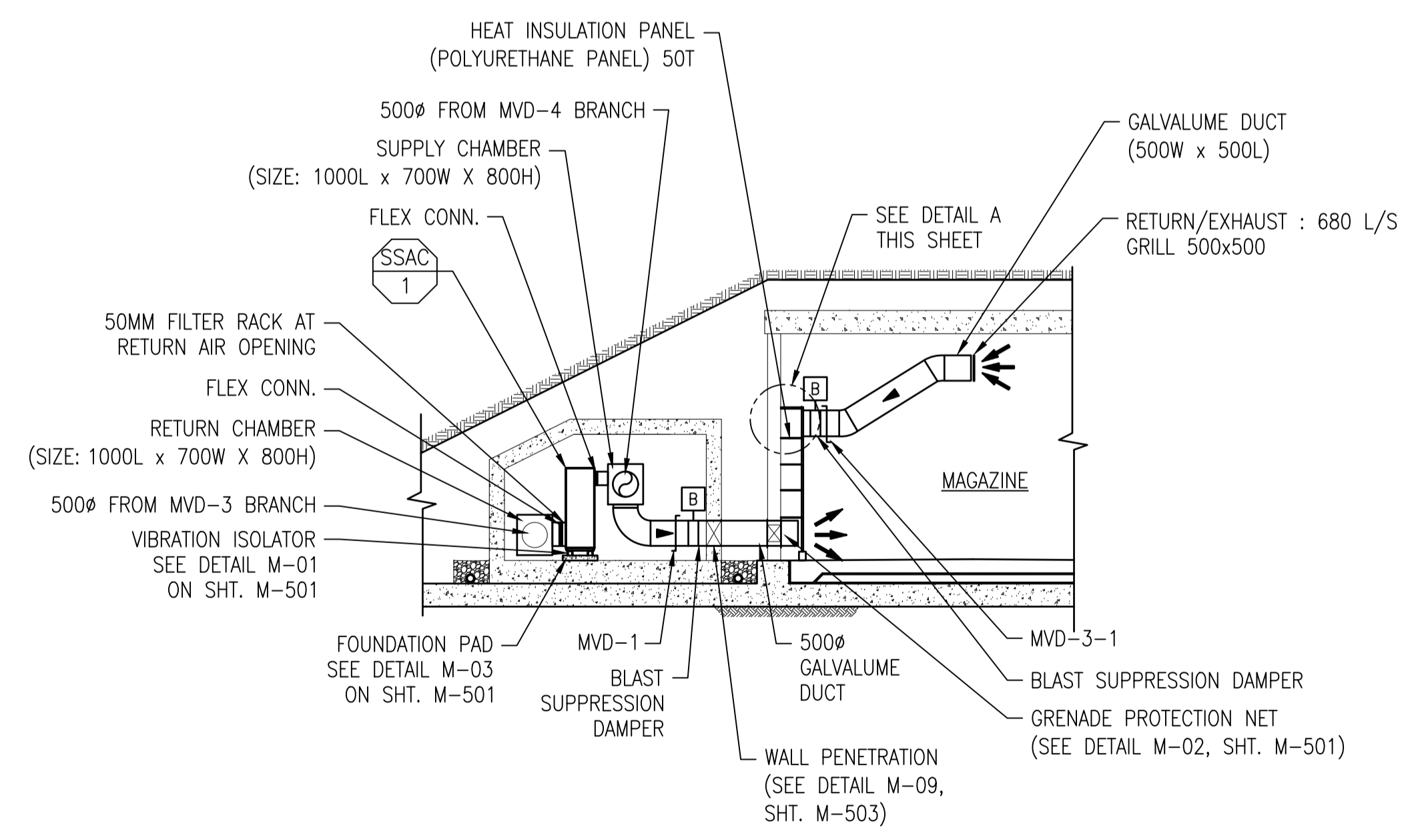
### GENERAL NOTES

- DUCTWORK BETWEEN THE EXTERIOR MECHANICAL ROOM WALL AND THE EXTERIOR MAGAZINE WALL SHALL BE PVC COATED GALVANIZED STEEL DUCTWORK ENCASED IN CONCRETE. SEE DETAIL M-11 ON SHT. M-503.
- SSAC MECHANICAL DETAILS AND SCHEDULE ARE SHOWN ON SHEET M-102.
- ALL DUCTWORK, SUPPLY CHAMBER AND EXHAUST CHAMBER LOCATED IN THE AIR CONDITIONING ROOM SHALL BE INSULATED WITH 38mm ELASTOMERIC INSULATION.
- ACTUAL SIZE OF SSAC-1 AND ASSOCIATED REMOTE CONDENSING UNIT SHALL BE CONFIRMED WITH CERTIFIED SHOP DRAWINGS PRIOR TO INSTALLATION OF EQUIPMENT FOUNDATION CONCRETE PADS.
- ROUTE CONDENSATE DRAIN FROM SSAC-1 TO TERMINATE OVER DRAIN OPENING IN FLOOR IN CORNER OF ROOM.
- REFRIGERANT PIPING RUNS SHALL BE LESS THAN 15 METERS UNLESS LONGER RUNS ARE ALLOWED BY EQUIPMENT MANUFACTURER.
- THE MECHANICAL EQUIPMENT, DUCTWORK AND INSULATED PANEL SYSTEMS SHOWN ON SHEETS M-101, M-102, M-501, M-502 AND M-503.
- MOUNT TWO DIGITAL DISPLAYS VISIBLE FROM FACE OF WEATHERPROOF ENCLOSURE - ONE FOR TEMPERATURE AND ONE FOR RELATIVE HUMIDITY.
- TEMPERATURE AND RELATIVE HUMIDITY TRANSMITTERS. LOCATE NEAR CENTER OF MAGAZINE.
- CONDENSATE DRAIN, PROVIDE AIR GAP IN MECH RM.
- ELECTRICALLY BOND ALL DUCT ENTERING THE MAGAZINE PER DETAIL 5 ON SHEET S-104.

**1 AIR CONDITIONING DUCT PLAN**  
 M-101 M-101 SCALE: 1:100

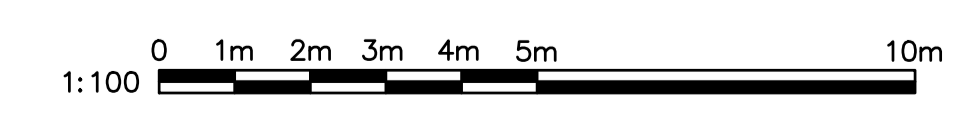


**A DETAIL "A"**  
 M-101 M-101 SCALE: NONE



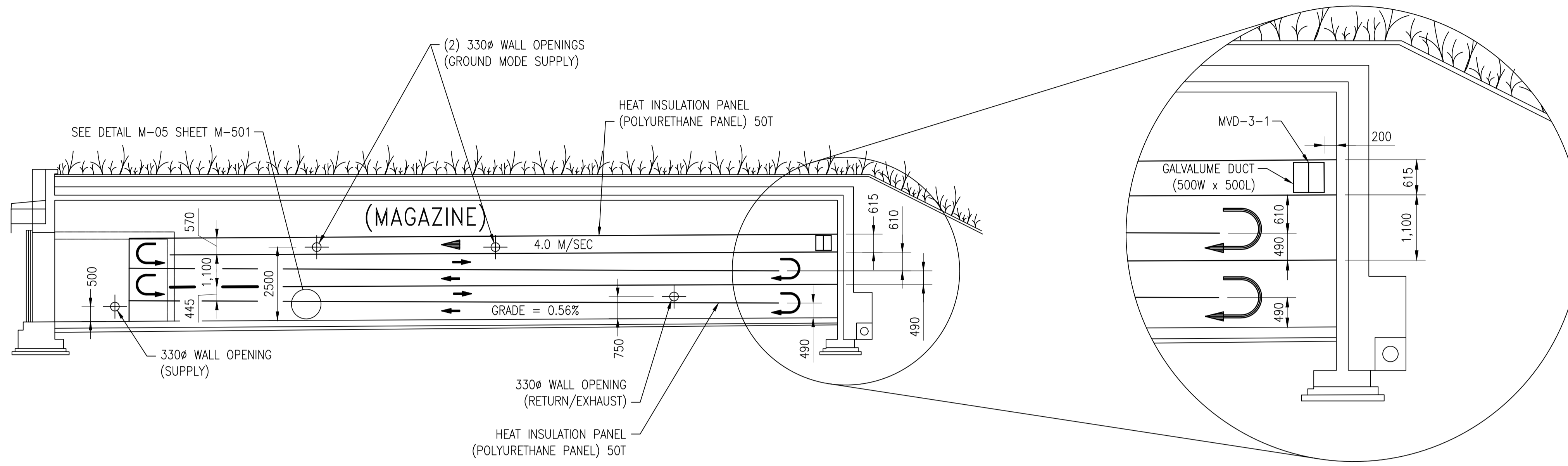
**2 AIR CONDITIONING ROOM SECTION**  
 M-101 M-101 SCALE: 1:100

### GRAPHIC SCALES:



DATE	09/14/22
APPR	
DESCRIPTION	MSM STANDARD
SYMBOL	
<b>MODULAR STORAGE MAGAZINE</b> SSAC MECHANICAL PLAN	
APPROVED	
FOR COMMANDER NAFAC	
ACTIVITY	
SATISFACTORY TO	DATE MM/DD/YY
DESIGNER	DRW IWR CHK LMM
PROJECT/CDM	
BRANCH MANAGER	JTW
DES PROD DIR	ROHARD L STEPHENS, P.E.
FIRE PROTECTION ENGINEER	DPS
DEPARTMENT OF THE NAVY	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
DESIGN AND CONSTRUCTION	
SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAFAC DRAWING NO.:	14116007
SHEET	39 OF 53
<b>M-101</b>	
NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018	

FILE NAME: J:\USSE\Wegzines\WMSM\2021 Interim Updates\WMSM-101.dwg LAYOUT NAME: M-101 PLOTTED: Tuesday, June 06, 2023 - 11:29am USER: laelis.corralino



**1** MAGAZINE ROOM SECTION  
M-101 | M-102 SCALE: 1:100

**2** SECTION DETAIL  
M-102 | M-102 SCALE: 1:50

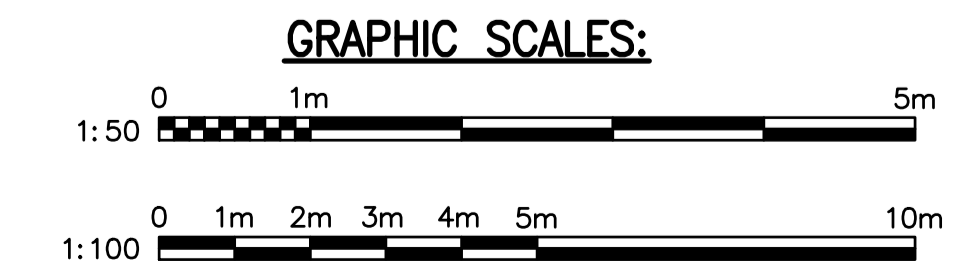
**NOTE:**  
1. COORDINATE EXACT SPACING BETWEEN HEAT INSULATION PANELS AS REQUIRED TO ACCOMMODATE WALL OPENING LOCATIONS FOR THE TWO GROUND MODE SUPPLY CONNECTIONS AND THE RETURN/EXHAUST CONNECTION.

**SPLIT SYSTEM AIR CONDITIONING UNIT SCHEDULE (SSAC)**

GENERAL		FAN SECTION				COOLING				ELECTRIC REHEAT COIL		REMOTE OUTDOOR AIR COOLED CONDENSING UNIT								NOTES					
MARK	LOCATION AND AREA SERVED	SUPPLY AIR (L/s)	EVAP FAN (KW)	POWER		CAPACITY kW		EAT		LAT		CAPACITY (kW)	STEPS	VOLT/PH/HZ	MARK	NOMINAL CAPACITY (kW)	MINIMUM SEER	AMBIENT TEMP(°C)	REFRIGERANT		COMPRESSOR (AMPS)	ELECTRICAL			COND. FANS NO.
				VOLTS	PHASE	TOTAL	SENSIBLE	DB °C	WB °C	DB °C	WB °C											AMPS	VOLTS	PHASE	
SSAC-1	MUNITIONS MAGAZINE	680	1.5	400	3	14.1	14.1	30.0	13.3	12.9	5.7	12.0	4	400/3/60	-	17.6	13.0	50	R-410A	8.9	12.7	400	3	1	1, 2, 3, 4, 5, 6, 7, 8

**NOTE:**  
 1. FIELD CONVERTIBLE TO HORIZONTAL DISCHARGE.  
 2. CONDENSER CAPACITY MATCHED TO EVAPORATOR SECTION CAPACITY FOR HIGH OUTDOOR AMBIENT OPERATION (50°C).  
 3. VERTICAL ARRANGEMENT REAR RETURN AIR INLET, FRONT HORIZONTAL DISCHARGE, 50mm PLEATED FILTERS.  
 4. OVERSIZED EVAPORATOR FAN MOTOR, 500 Pa EXT. STATIC PRESSURE.  
 5. PROVIDE FILTER RACK AT RETURN AIR INLET TO ACCOMMODATE 50MM MERV 8 FILTERS.  
 6. ALTERNATE MECHANICAL SYSTEM ARRANGEMENTS WHERE COMPRESSOR IS LOCATED AT OUTDOOR UNIT MAY BE GIVEN CONSIDERATION.  
 7. MULTISTAGE CONTROL ELECTRIC REHEAT COIL WITH BUILT-IN STEP CONTROLLER.  
 8. VERIFY SSAC-1 FITS INSIDE SPACE PRIOR TO BUILDING MECH ROOM. INCREASE ROOM SIZE AS NECESSARY TO ACCOMMODATE SSAC-1.

AIR CONDITIONING UNIT REQUIREMENTS:  
 THE COOLING CAPACITY AND REHEAT CAPACITY OF SSAC-1 SHALL BE EVALUATED AND MODIFIED ACCORDINGLY BASED ON ACTUAL PROJECT LOCATION.



APPROVED: \_\_\_\_\_  
 FOR COMMANDER NAFAAC: \_\_\_\_\_  
 ACTIVITY: \_\_\_\_\_  
 SATISFACTORY TO: DATE: MM/DD/YY  
 DESIGNED: IWR | CHECKED: LMM  
 BRANCH MANAGER: JTW  
 DES PROD DIR: RICHARD L. STEPHENS, P.E.  
 FIRE PROTECTION ENGINEER: DPS

DEPARTMENT OF THE NAVY  
 NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
 DESIGN AND CONSTRUCTION  
 LPA-HORRDLK, VA

**MODULAR STORAGE MAGAZINE**  
 SSAC MECHANICAL DETAILS AND SCHEDULE

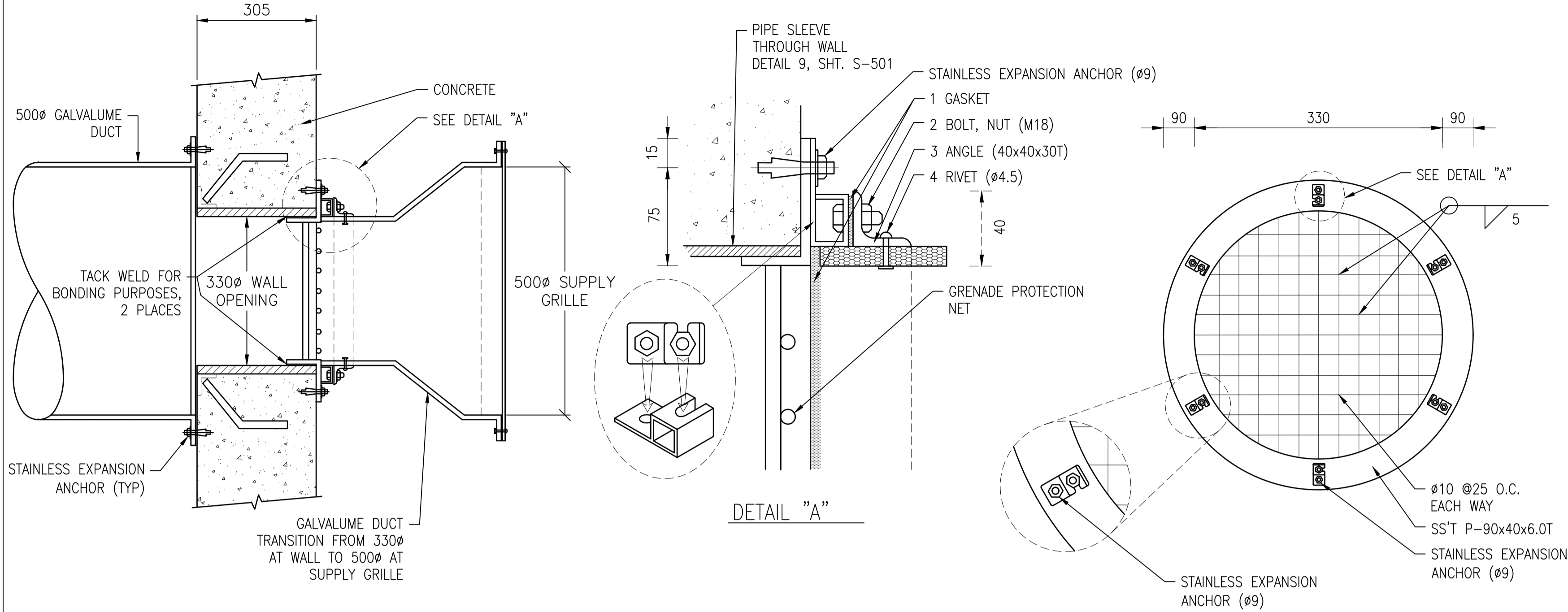
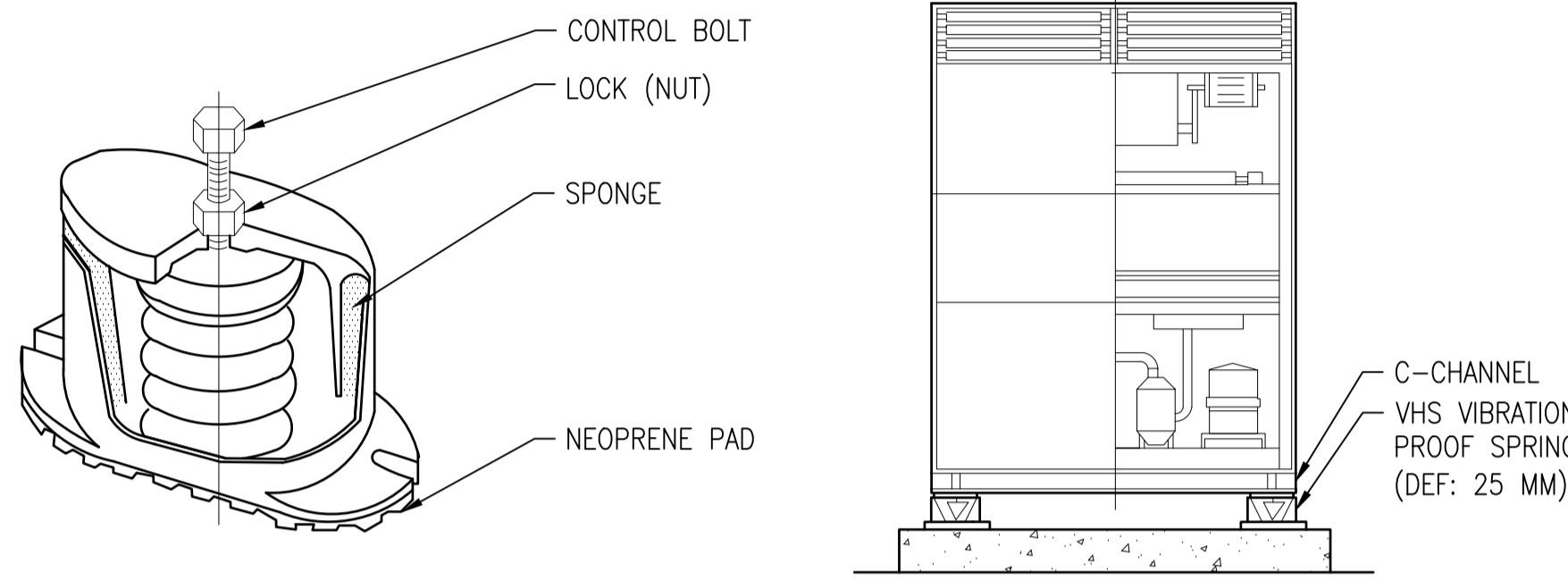
SCALE: AS NOTED  
 EPROJCT NO.: \_\_\_\_\_  
 CONSTR. CONTR. NO.: \_\_\_\_\_  
 NAFAAC DRAWING NO.: 14116008  
 SHEET 40 OF 53  
**M-102**

MSM STANDARD  
 DATE: 09/14/22

FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim Updates\WMSM-102.dwg LAYOUT NAME: M-102 PLOTTED: Tuesday, June 06, 2023 - 11:29am USER: laelis.coriano

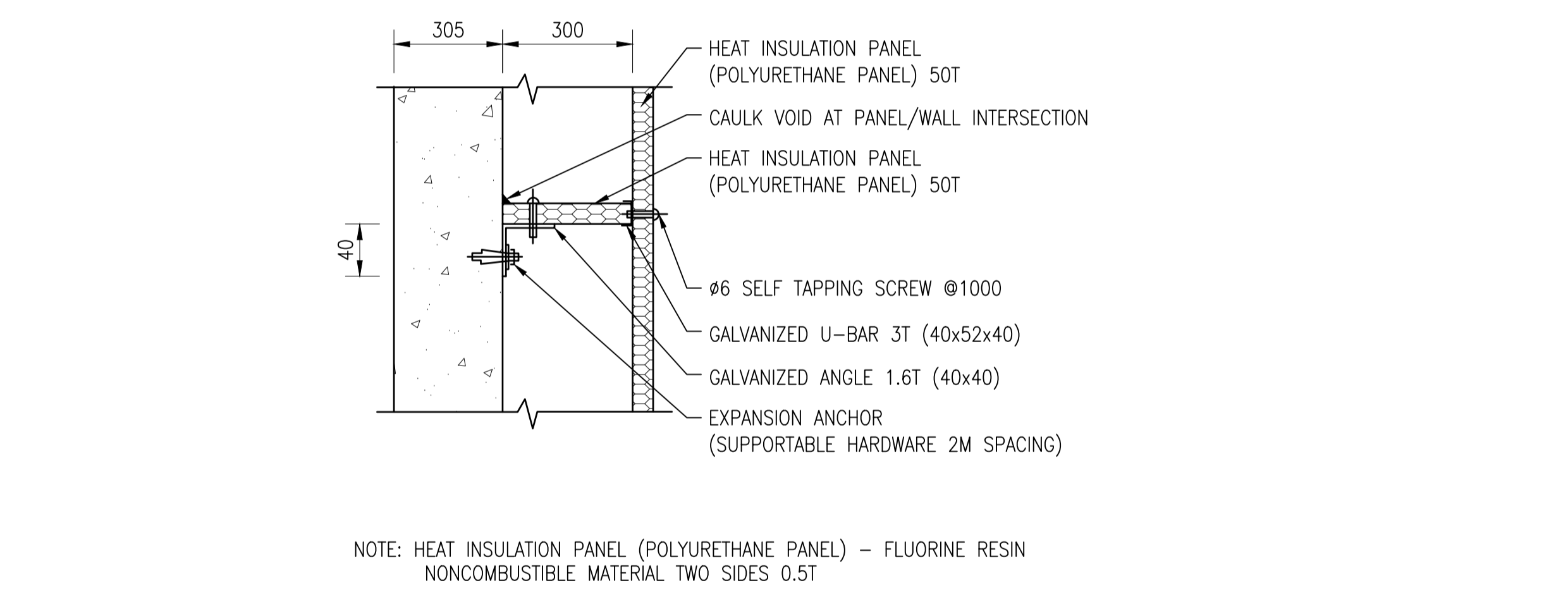
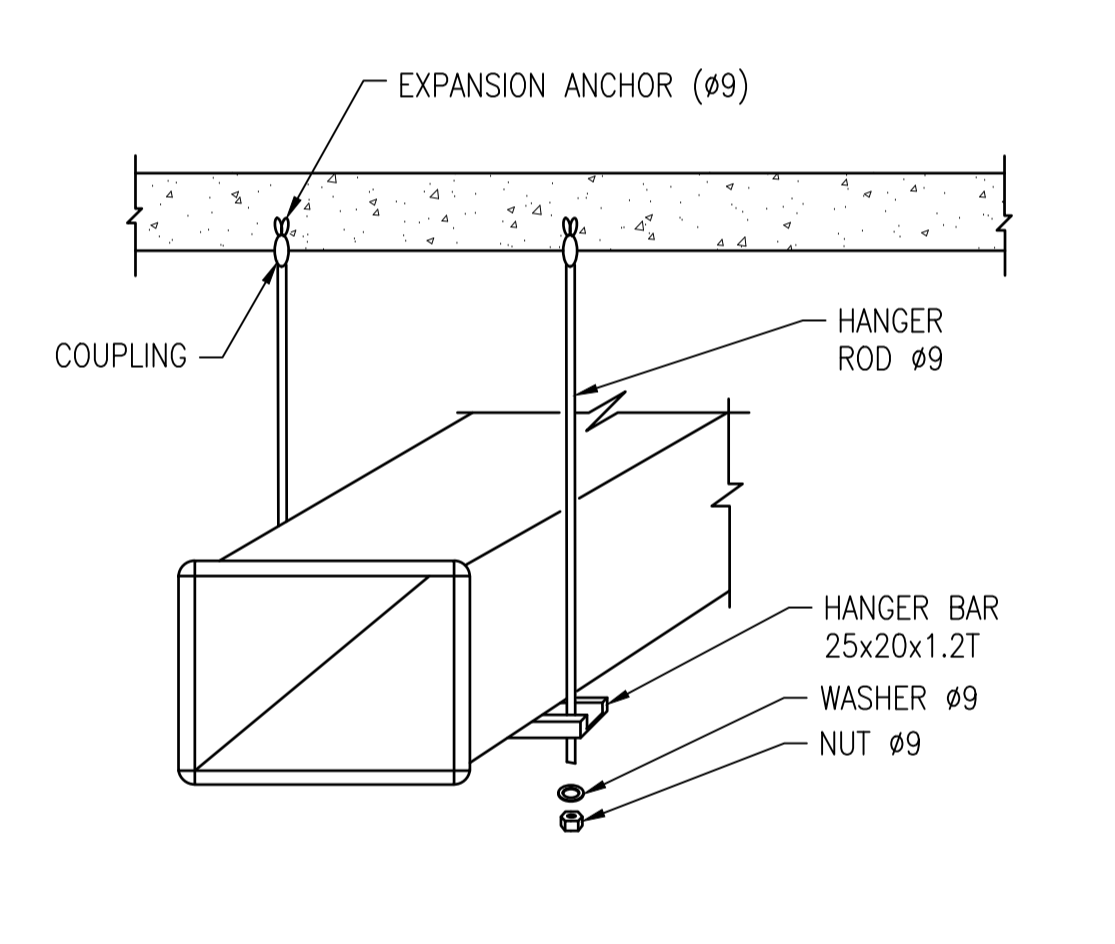
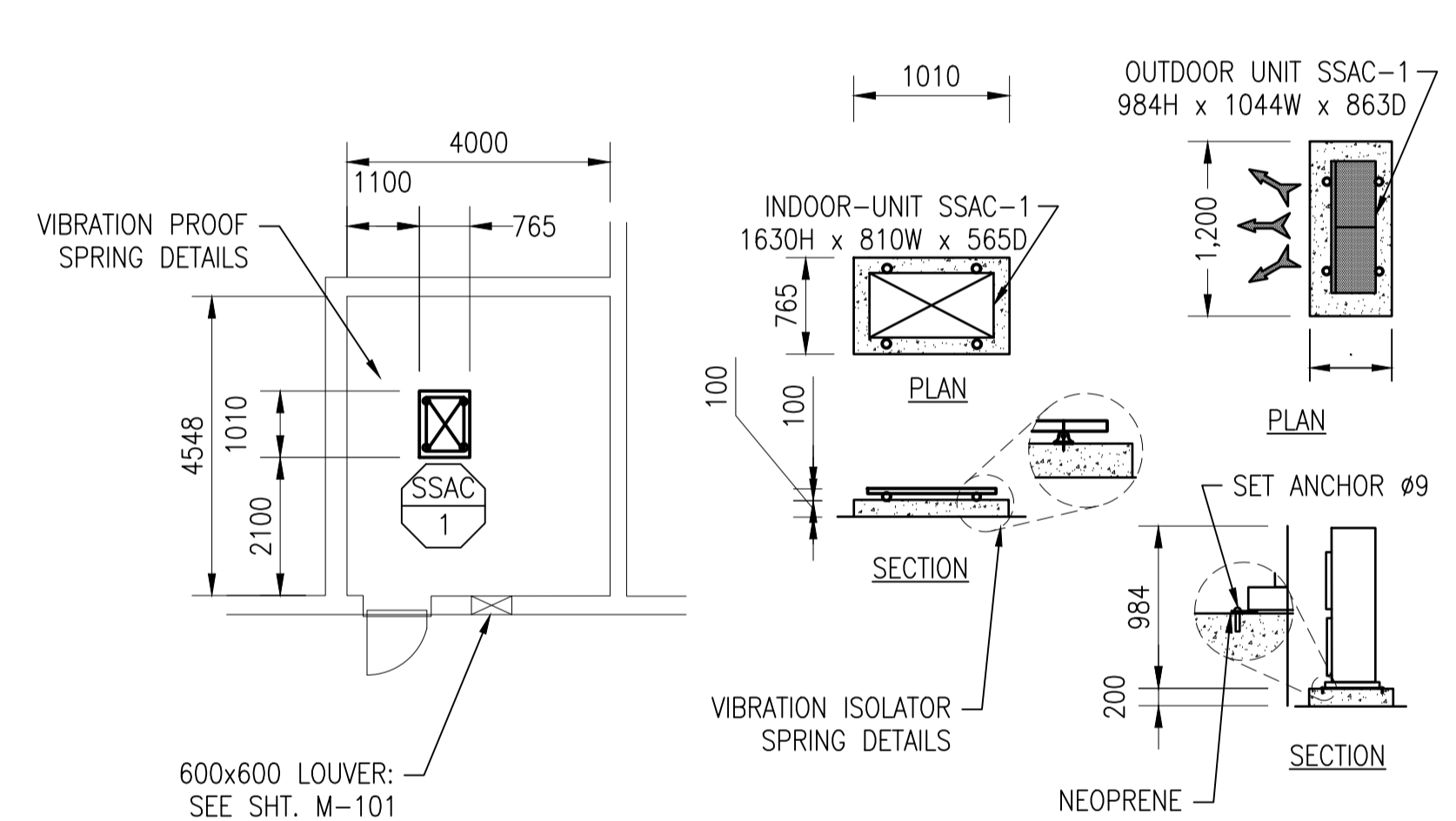


VIBRATION ISOLATOR SYSTEM					
EQUIP. NO.	QTY	ISOLATOR TYPE	DEF. (MM)	QTY/UNIT (EA)	REMARK
SSAC-1	1	RESTRAINED SPRING	25	4	



M-01 VIBRATION ISOLATOR SCHEDULE

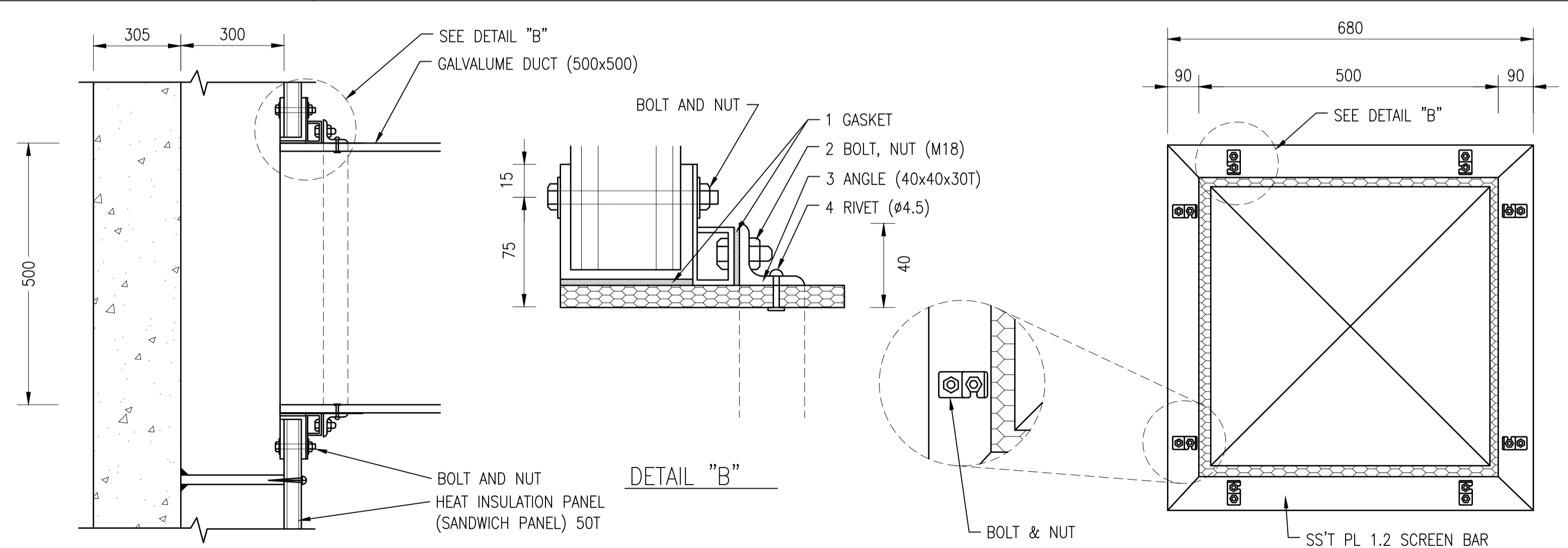
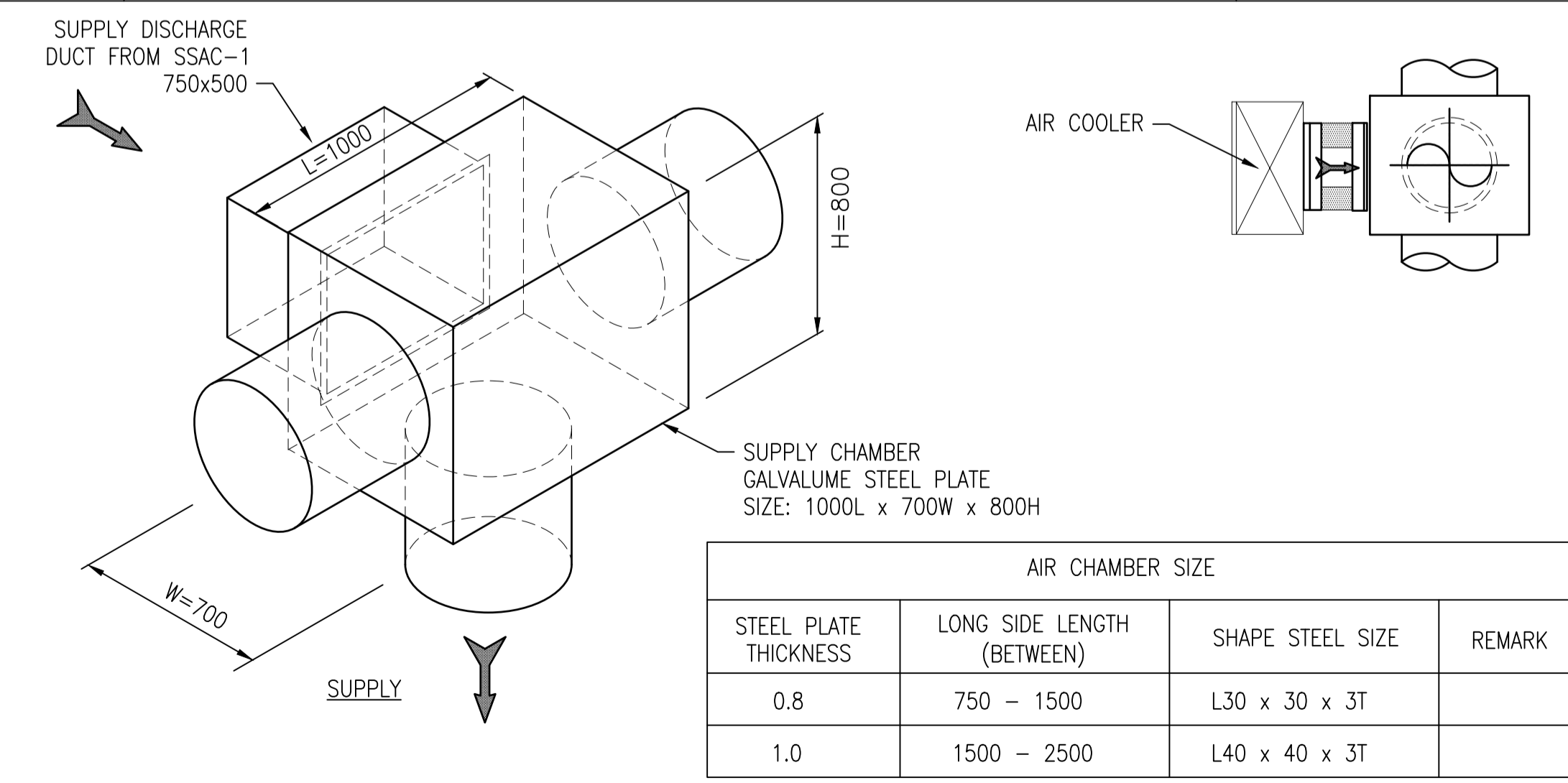
M-02 DUCT THROUGH MAGAZINE WALL DETAIL (MVD-1 DUCT BRANCH)



M-03 AIR CONDITIONER AND CONDENSER FOUNDATION PAD DETAIL

M-04 DUCT HANGER DETAIL

M-05 HEAT INSULATION PANEL (POLYURETHANE PANEL)



M-06 SUPPLY CHAMBER DETAIL

M-07 HEAT INSULATION PANEL - DUCT COUPLING DETAIL (MVD-3-1 DUCT BRANCH)

APPROVED: [Signature]

FOR COMMANDER NAFAAC: [Signature]

SATISFACTORY TO: DATE: MM/DD/YY

DESIGNED BY: [Signature]

DES. PROJ. DR: [Signature]

FIRE PROTECTION ENGINEER: [Signature]

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND

DESIGN AND CONSTRUCTION

MODULAR STORAGE MAGAZINE

SSAC MECHANICAL DETAILS

SCALE: AS NOTED

PROJECT NO.:

CONSTR. CONTR. NO.:

NAFAAC DRAWING NO. 14116009

SHEET 41 OF 53

M-501

DATE: 09/14/22

DESCRIPTION: MSM STANDARD

NAFAAC

FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\M-501.dwg LAYOUT NAME: M-501 PLOTTED: Tuesday, June 06, 2023 11:29am USER: laelis.corrao

1

2

3

4

5

D

C

B

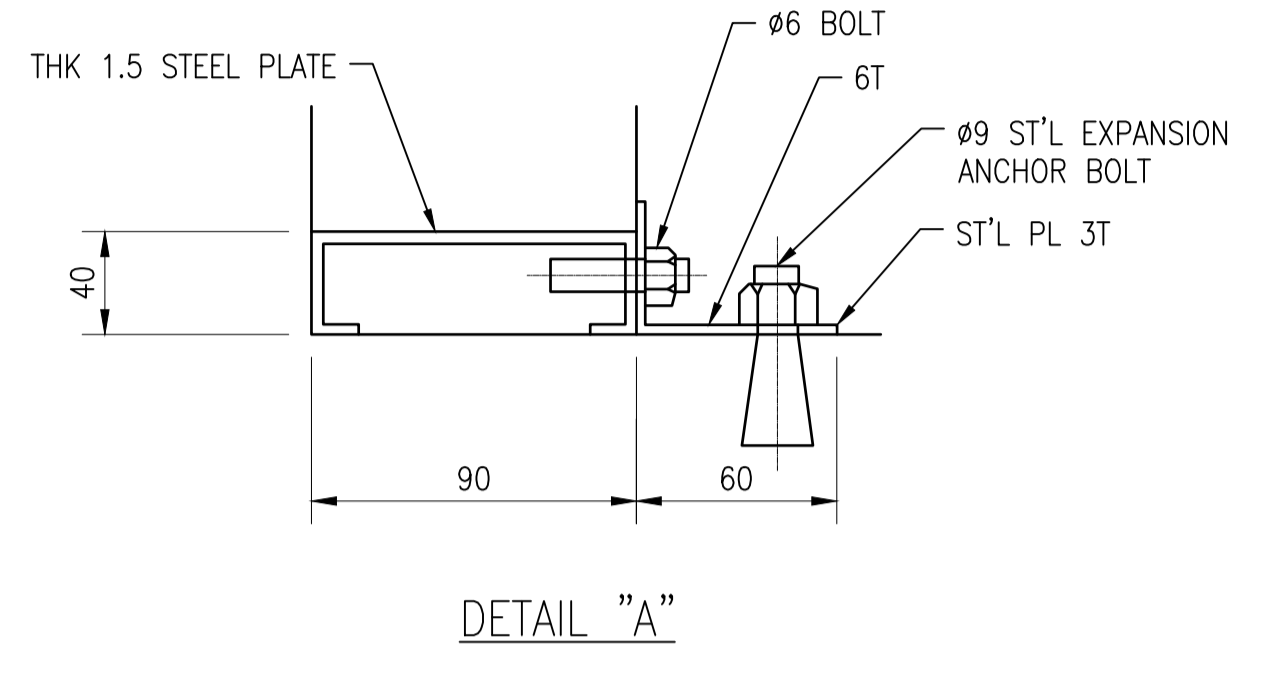
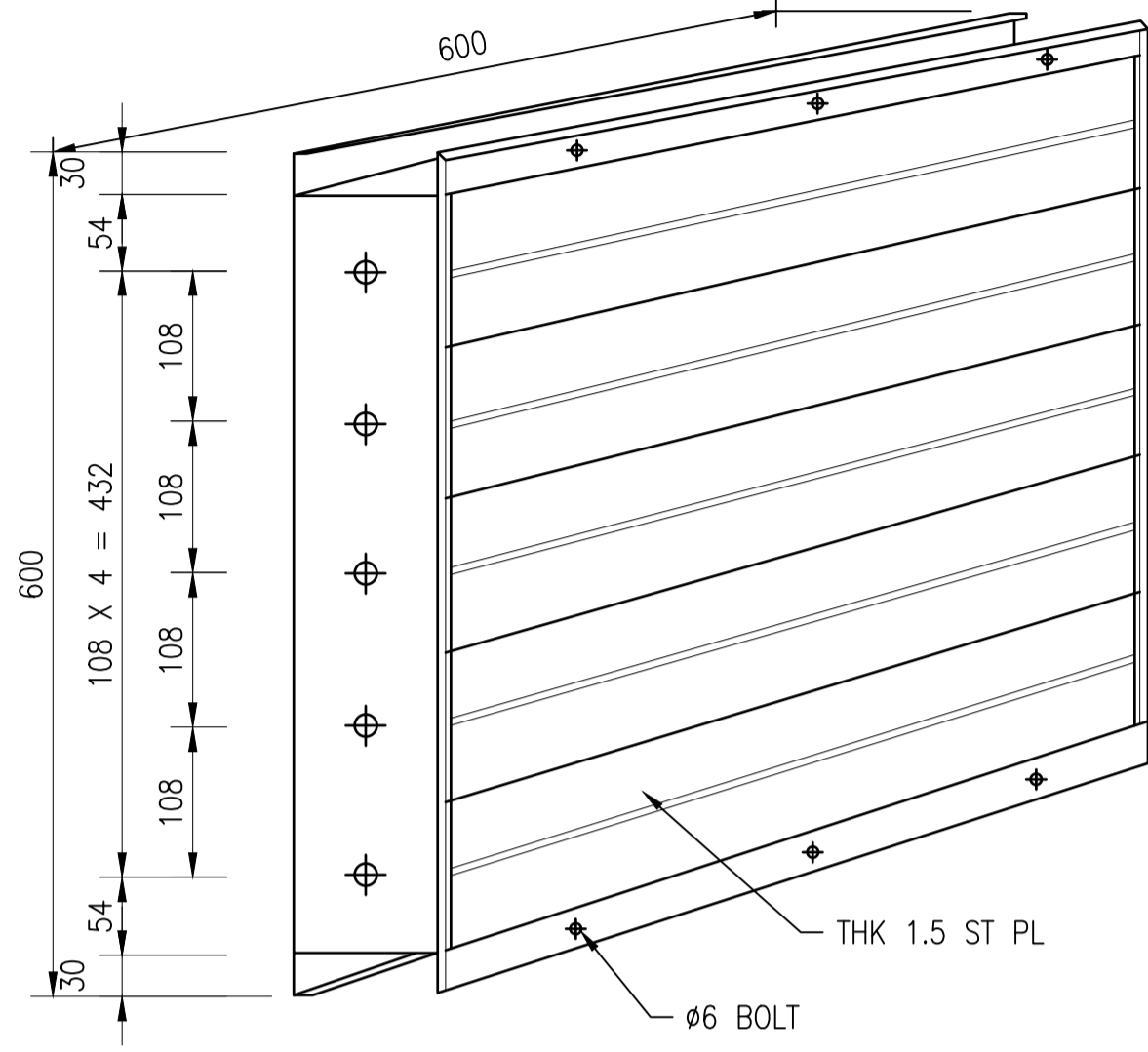
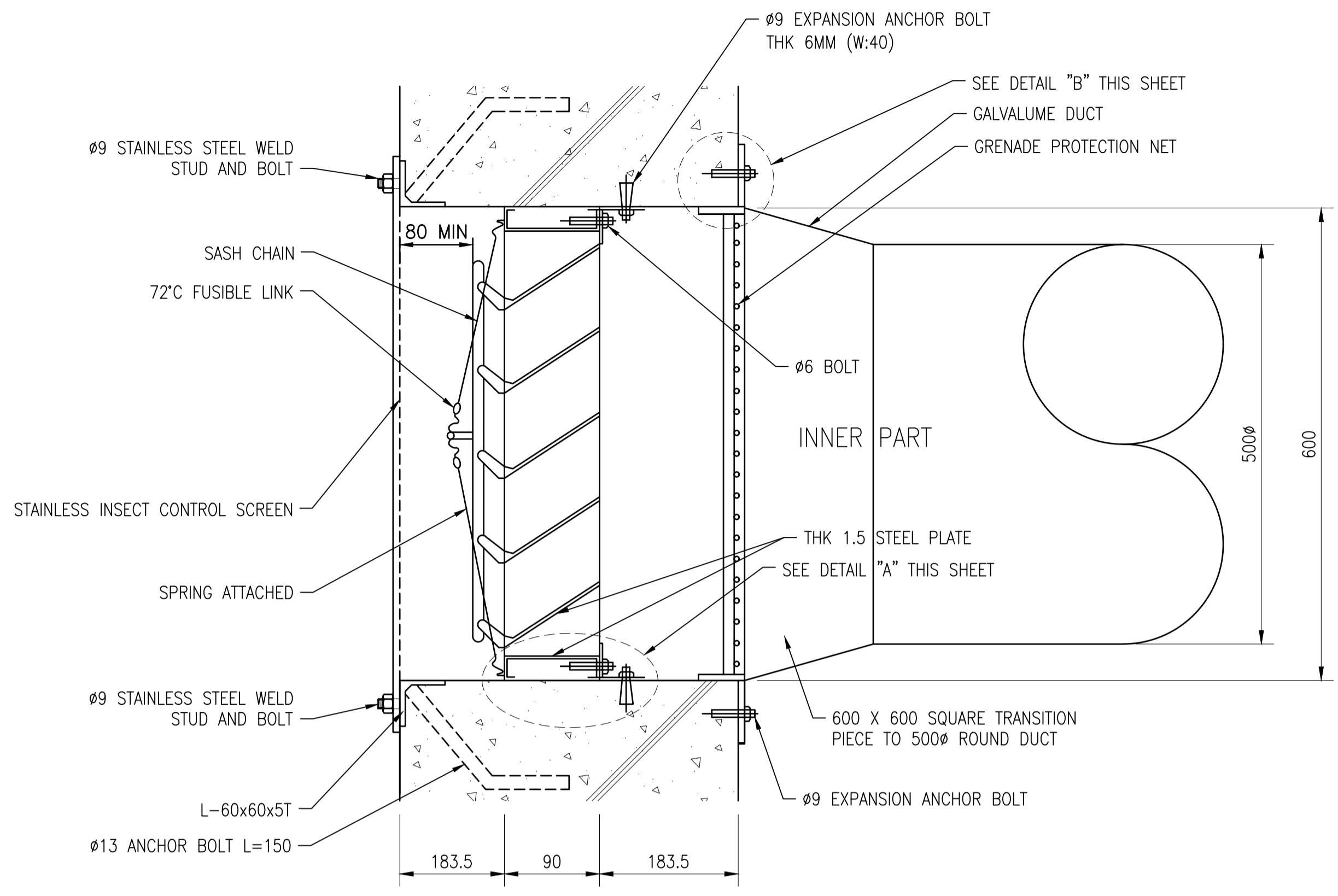
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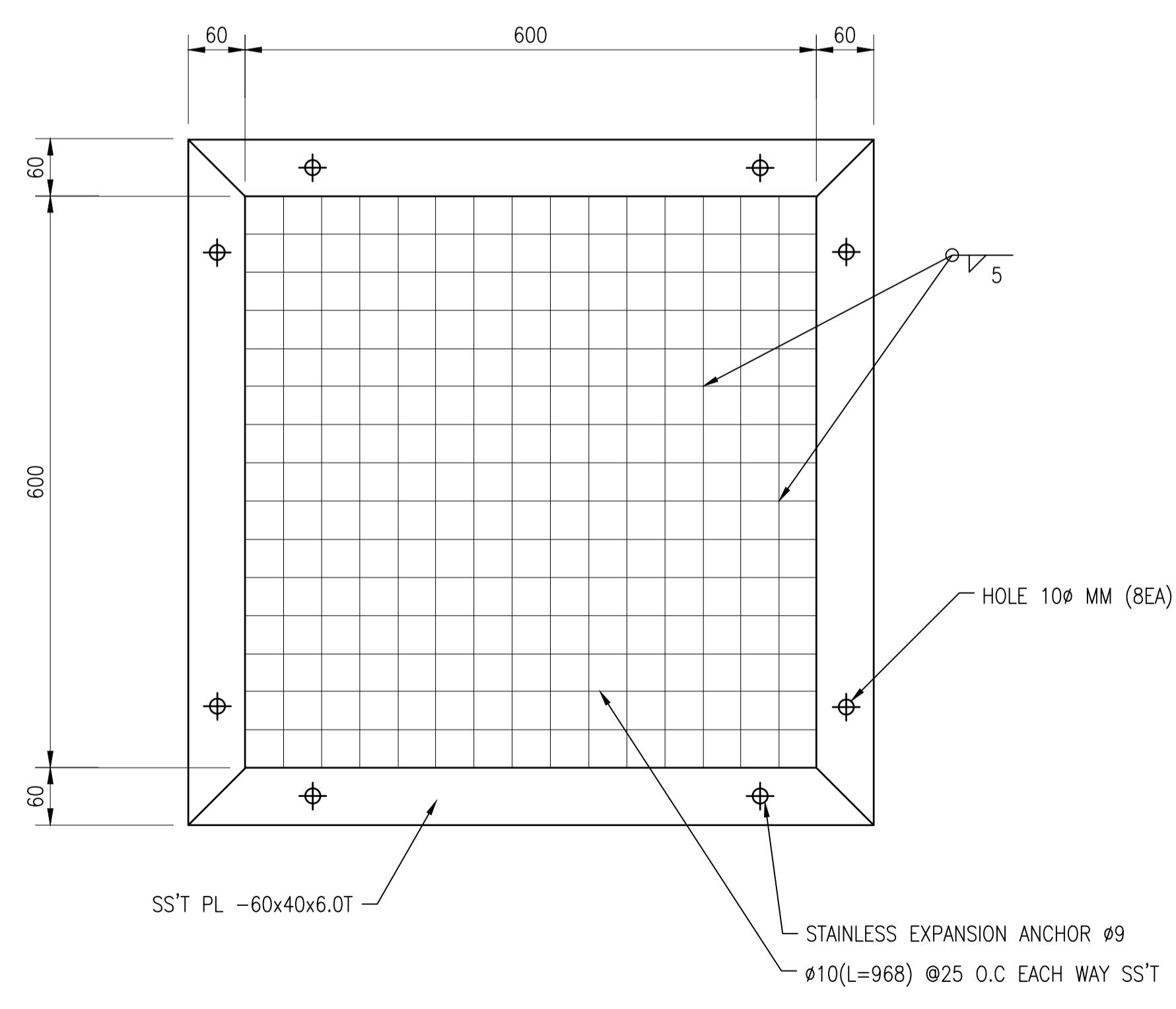
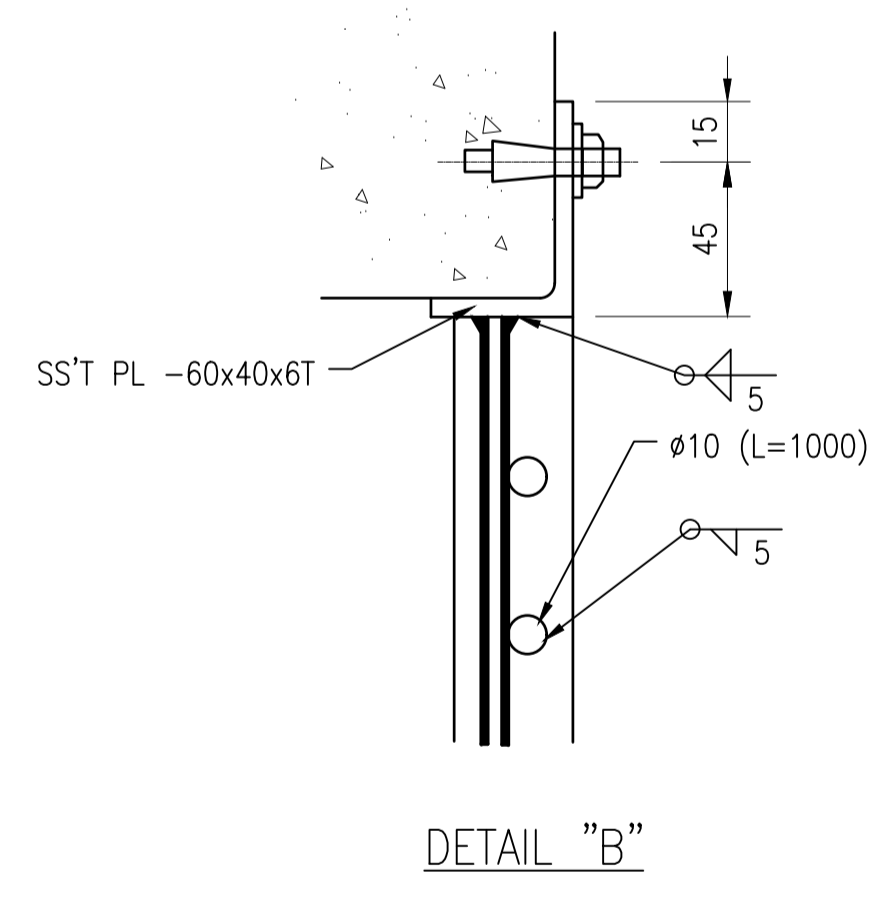
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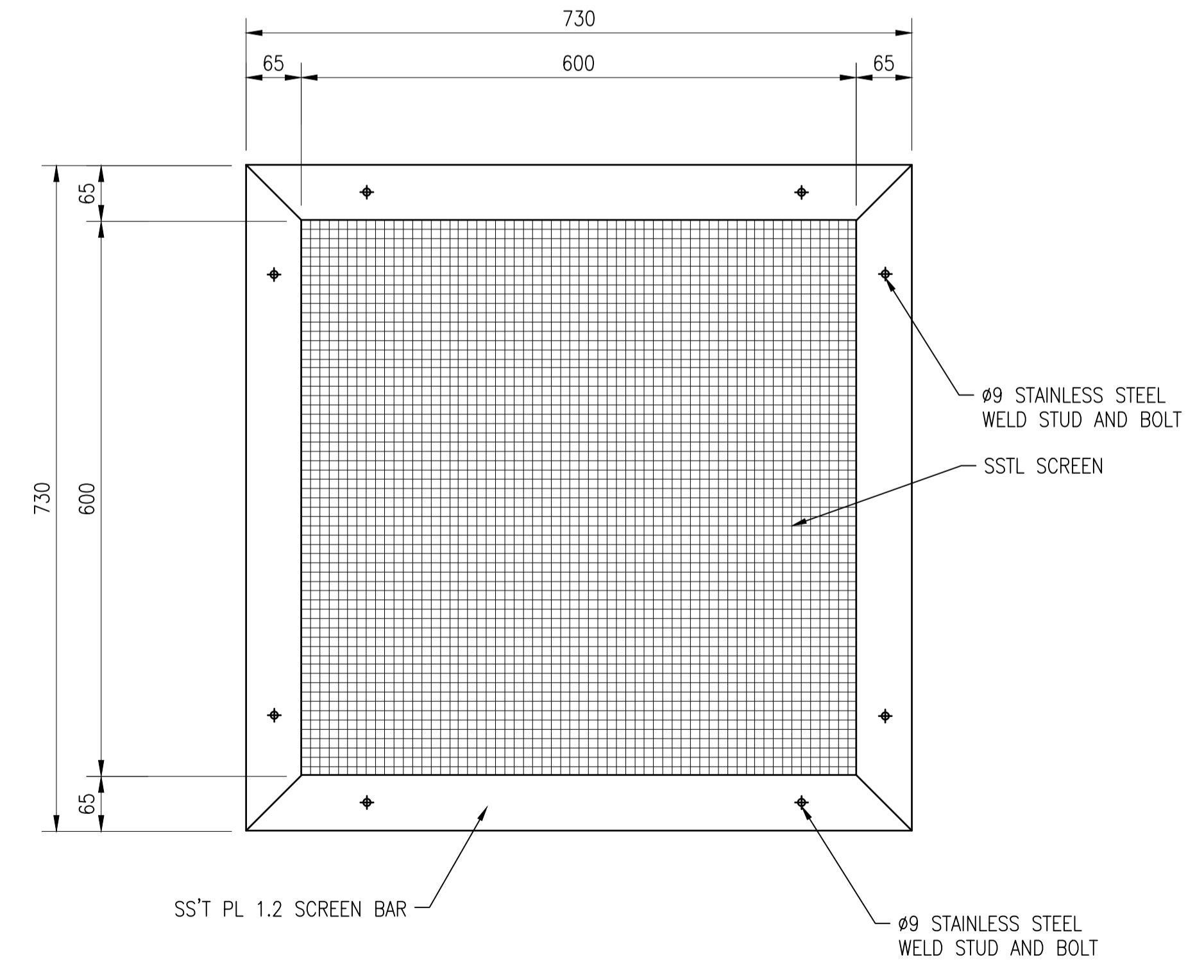
A



**OPERABLE FIRE DAMPER/LOUVER**  
 NOTE: PROVIDE LOUVER AND SEPARATE FIRE DAMPER IF UNABLE TO LOCATE OPERABLE FIRE DAMPER/LOUVER.



**GRENADE PROTECTION NET**



**STAINLESS INSECT CONTROL SCREEN**

M-08

VENT HOLE, LOUVER, AND GRENADE PROTECTION NET DETAILS (MVD-4 DUCT BRANCH)

APPROVED	DATE	09/14/22
FOR COMMANDER NAIFAC	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	LMM
BRANCH MANAGER	JTW	
DES. PROD. OR	ROHARD L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	NAIFAC
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DESIGN AND CONSTRUCTION	NAIFAC
<b>MODULAR STORAGE MAGAZINE</b>		
SSAC MECHANICAL DETAILS		
SCALE: NOT TO SCALE		
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAIFAC DRAWING NO. 14116010		
SHEET 42 OF 53		
<b>M-502</b>		
NAIFAC METRIC DRAWING REVISION: 01 OCTOBER 2018		

1

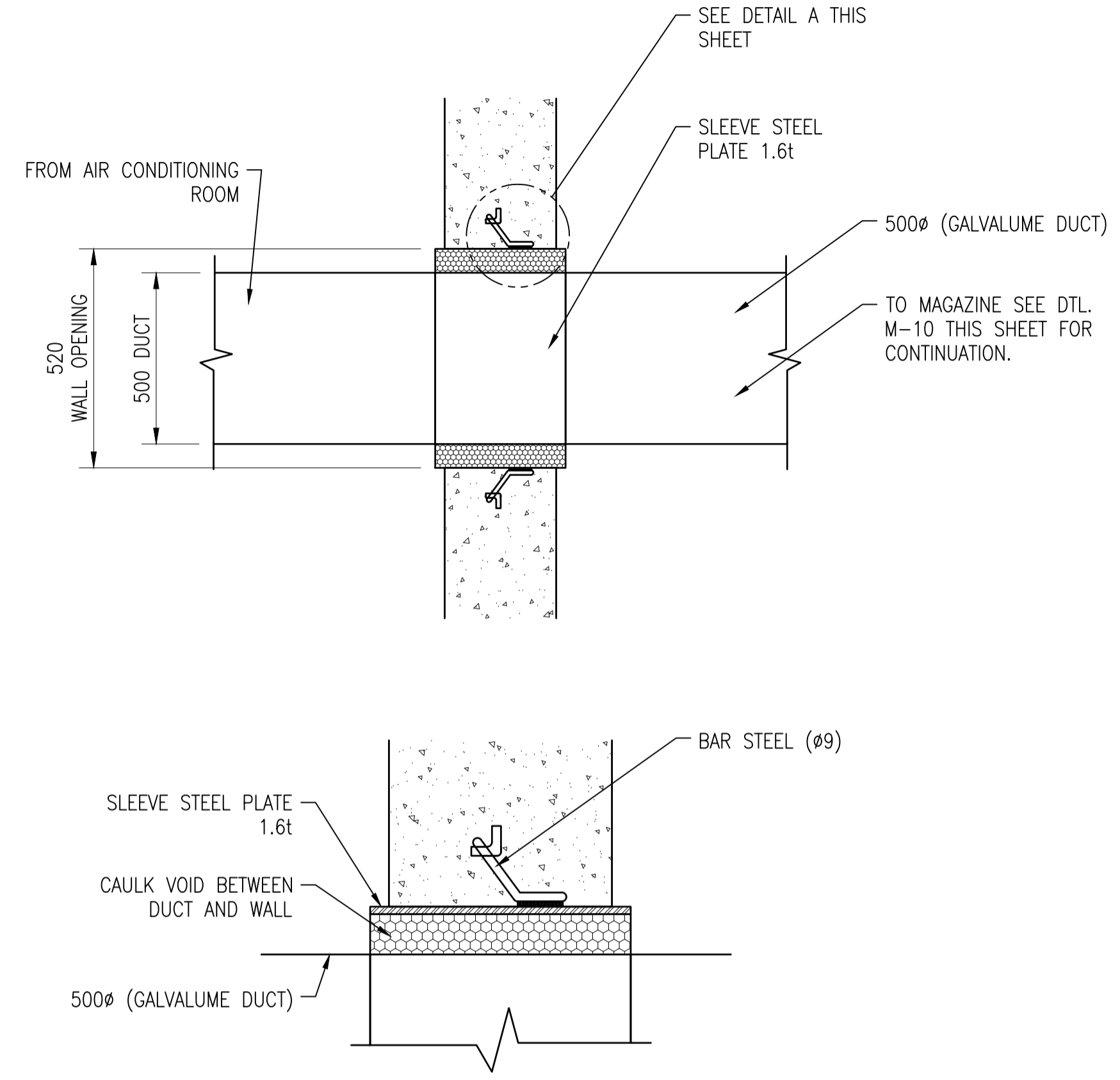
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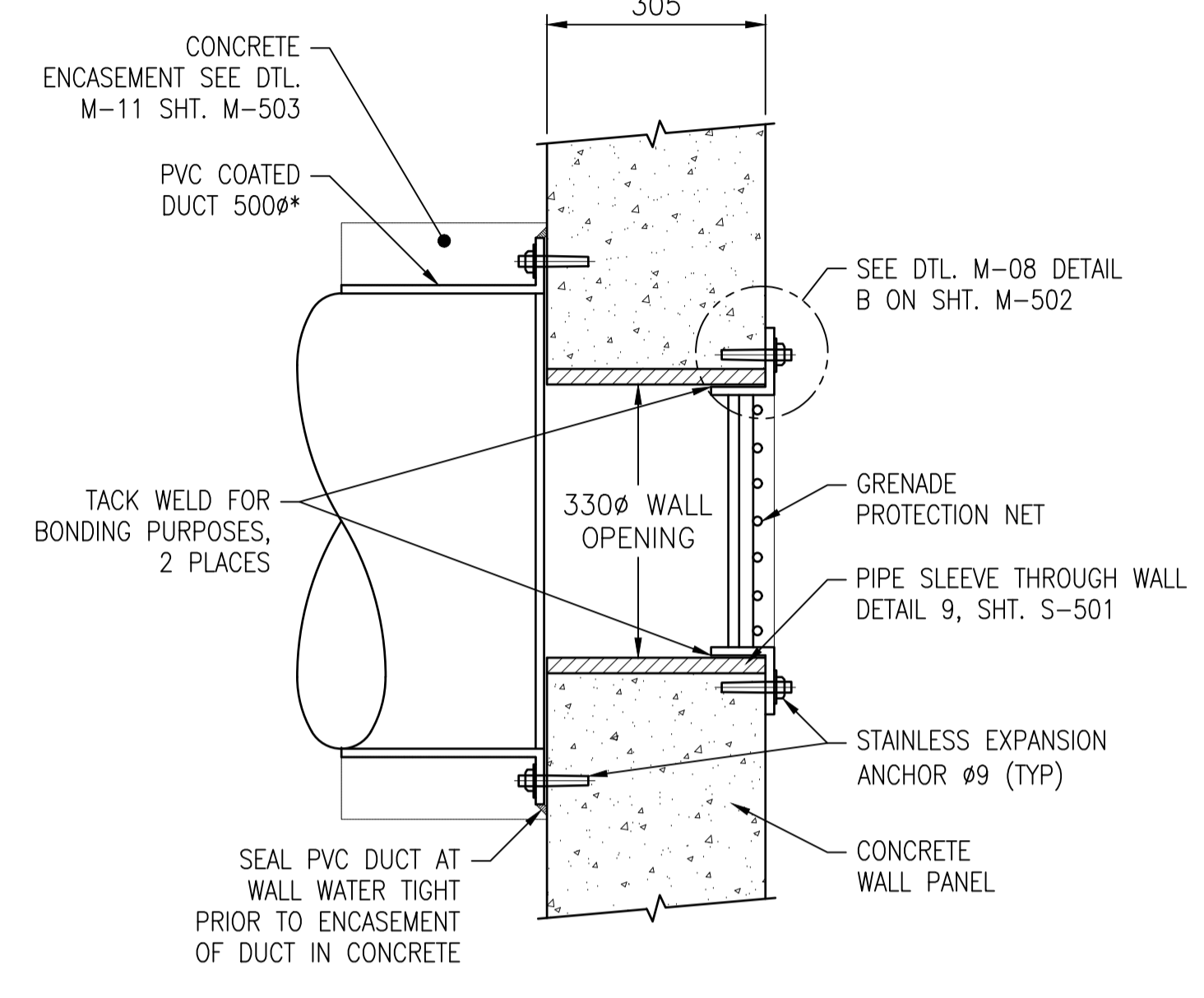
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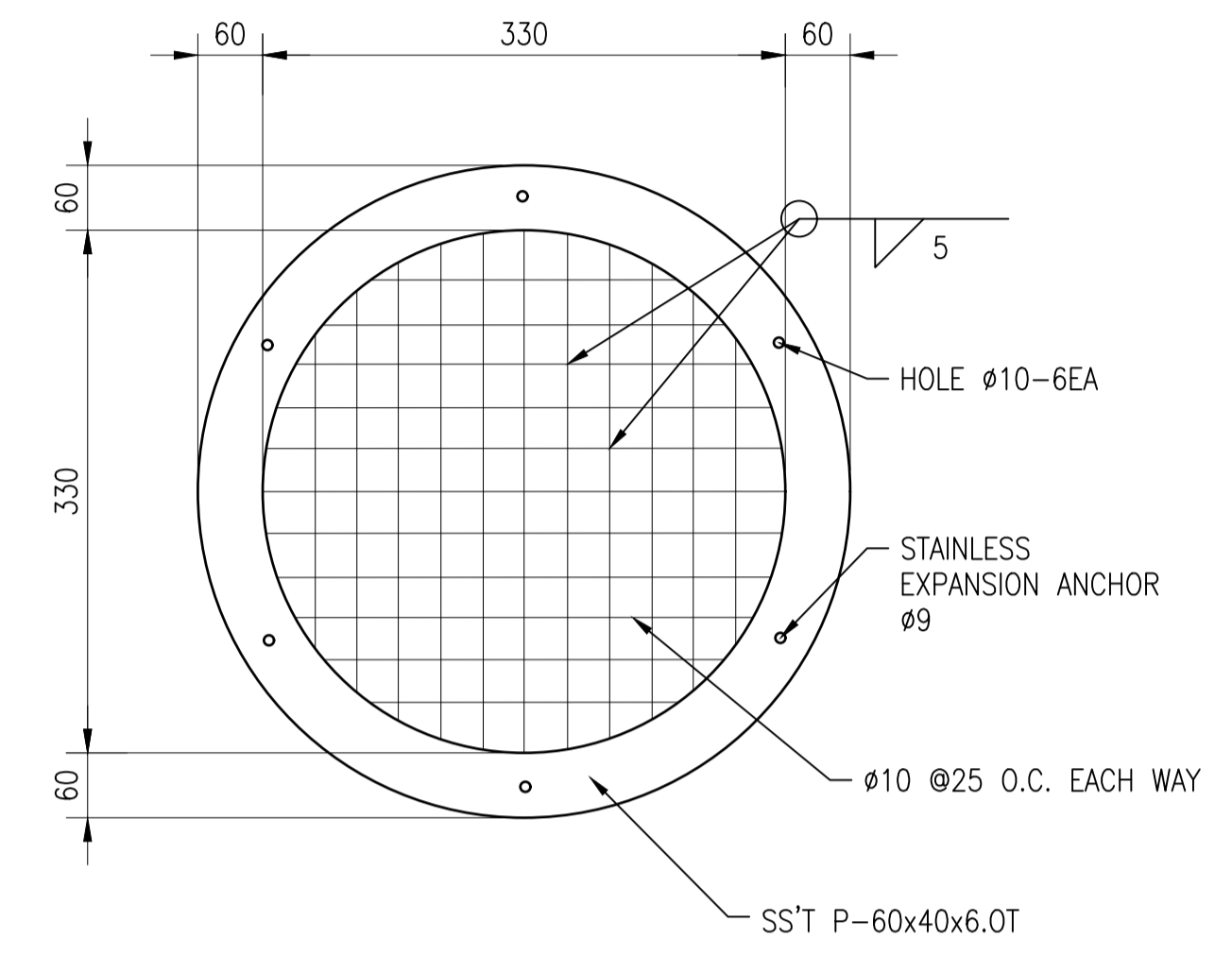
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DETAIL A

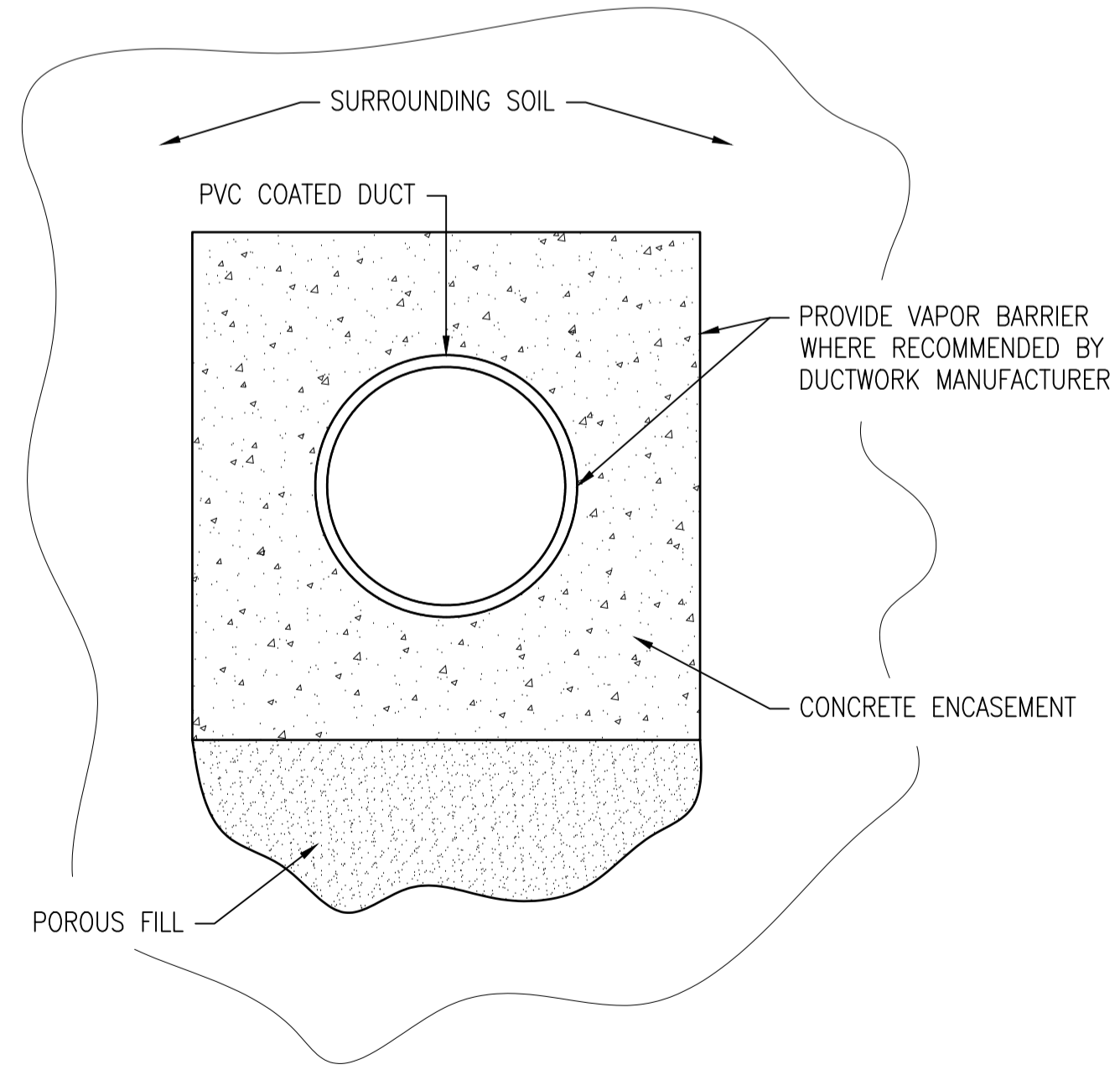


\* THE RETURN/ EXHAUST BRANCH TO MVD-3 IS 500Ø AND THE TWO GROUND COOLING MODE SUPPLY CONNECTIONS ARE 350Ø.



M-09 DUCT THROUGH MECHANICAL ROOM WALL DETAIL (MVD-1, MVD-2 & MVD-3 DUCT BRANCH)

- NOTES:
1. DUCTWORK AND FITTINGS INSTALLED UNDERGROUND SHALL BE GALVANIZED STEEL WITH A POLYVINYL CHLORIDE (PVC) PLASTIC COATING THAT HAS BEEN SPECIALLY DEVELOPED TO RESIST CORROSION IN UNDERGROUND AND CONCRETE ENCASED UNDERGROUND DUCTWORK APPLICATIONS.
  2. INSTALL DUCTWORK AND FITTINGS IN ACCORDANCE WITH DUCTWORK MANUFACTURERS RECOMMENDATIONS.
  3. TRENCHES SHALL BE PITCHED TO PREVENT THE BUILDUP OF WATER AROUND THE DUCTWORK.
  4. DUCTWORK SHALL BE TIED DOWN TO AVOID FLOATING DURING POURING OF CONCRETE ENCASEMENT.
  5. WATER BASED DUCT SEALANTS SHALL NOT BE USED IN UNDERGROUND APPLICATIONS.
  6. CONCRETE MUST NOT BE POURED DIRECTLY ONTO THE DUCTWORK. IT SHALL BE POURED IN SUCCESSIVE LAYERS AND TAMPED FIRMLY AROUND THE DUCTWORK. POURING FILL OR CONCRETE DIRECTLY ONTO THE DUCTWORK WILL CAUSE DENTING OR COLLAPSE.



M-11 CONCRETE ENCASED DUCTWORK

M-10 GRENADE PROTECTION NET DETAIL AT MAGAZINE WALL (MVD-2 & MVD-3 DUCT BRANCH)

DUCT CONSTRUCTION / LEAK TEST SCHEDULE				
SYSTEM	PRESSURE CLASS (Pa)	SEAL CLASS	LEAK CLASS	TEST TYPE
SSAC-1 SUPPLY, RETURN AND EXHAUST AIR	+500/-500	A	12/6	NOTE 1
NOTE: 1. TEST PER SMACNA HVAC AIR DUCT LEAKAGE MANUAL.				

M-12 DUCT CONSTRUCTION / LEAK TEST SCHEDULE

APPROVED: [Signature] DATE: 09/14/22

FOR COMMANDER NAFAC: [Signature]

ACTIVITY: [Blank]

SATISFACTORY TO: DATE: MM/DD/YY

DESIGNED BY: IWR IWR LMM

BRANCH MANAGER: JTW

DES. PROJ. DIR: RICHARD L. STEPHENS, P.E.

FIRE PROTECTION ENGINEER: DPS

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
 DESIGN AND CONSTRUCTION  
 LRA-HOBOKEN, VA

MODULAR STORAGE MAGAZINE  
 SSAC MECHANICAL DETAILS

SCALE: AS NOTED

PROJECT NO.: [Blank]

CONSTR. CONTR. NO.: [Blank]

NAFAC DRAWING NO.: 14116011

SHEET 43 OF 53

M-503

NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018

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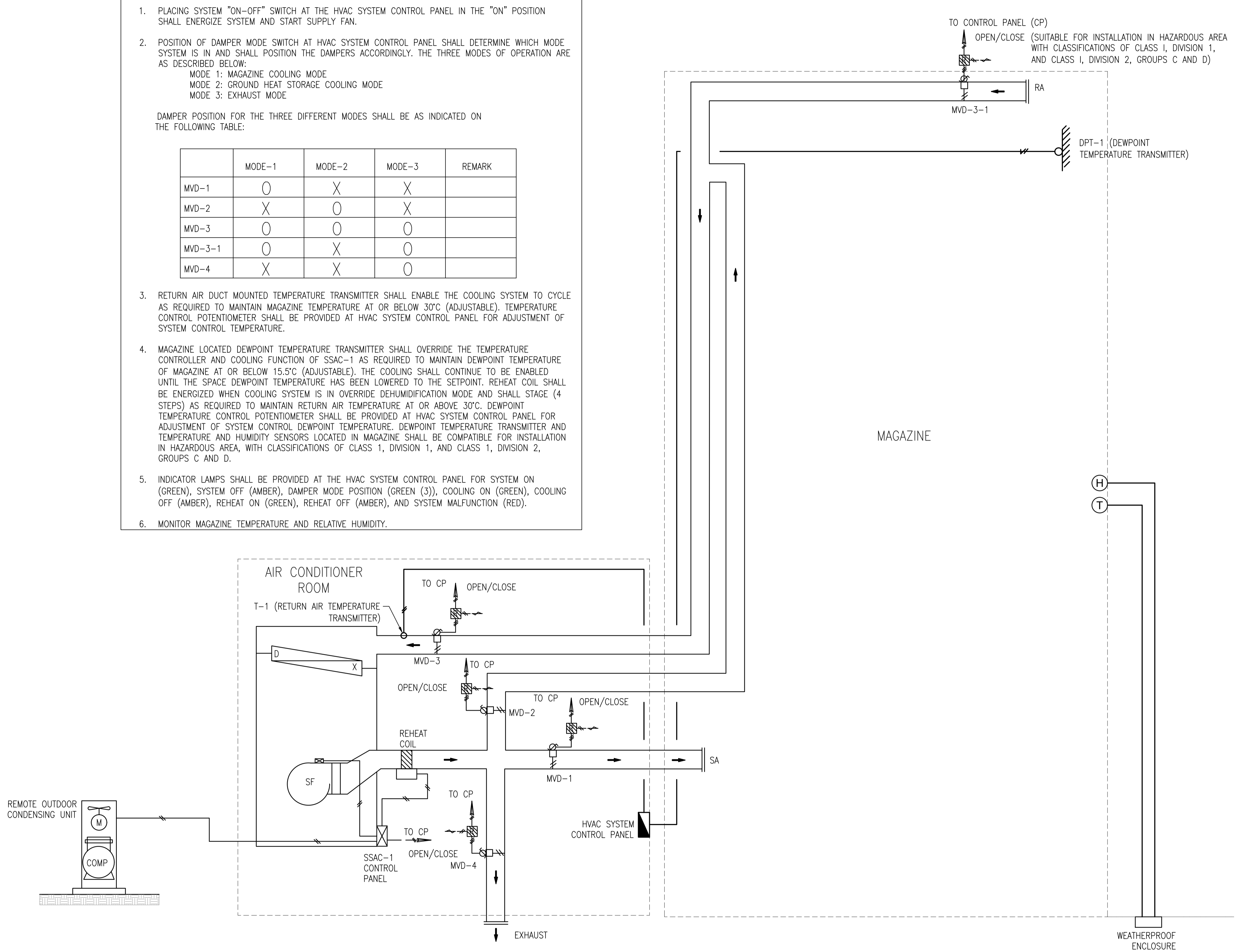
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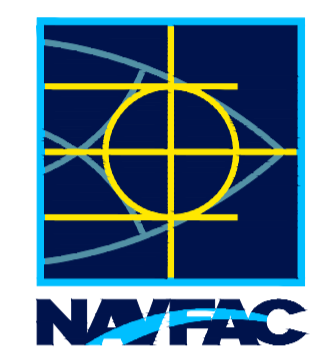
**SEQUENCE OF OPERATION**

1. PLACING SYSTEM "ON-OFF" SWITCH AT THE HVAC SYSTEM CONTROL PANEL IN THE "ON" POSITION SHALL ENERGIZE SYSTEM AND START SUPPLY FAN.
2. POSITION OF DAMPER MODE SWITCH AT HVAC SYSTEM CONTROL PANEL SHALL DETERMINE WHICH MODE SYSTEM IS IN AND SHALL POSITION THE DAMPERS ACCORDINGLY. THE THREE MODES OF OPERATION ARE AS DESCRIBED BELOW:  
 MODE 1: MAGAZINE COOLING MODE  
 MODE 2: GROUND HEAT STORAGE COOLING MODE  
 MODE 3: EXHAUST MODE  
 DAMPER POSITION FOR THE THREE DIFFERENT MODES SHALL BE AS INDICATED ON THE FOLLOWING TABLE:

	MODE-1	MODE-2	MODE-3	REMARK
MVD-1	O	X	X	
MVD-2	X	O	X	
MVD-3	O	O	O	
MVD-3-1	O	X	O	
MVD-4	X	X	O	

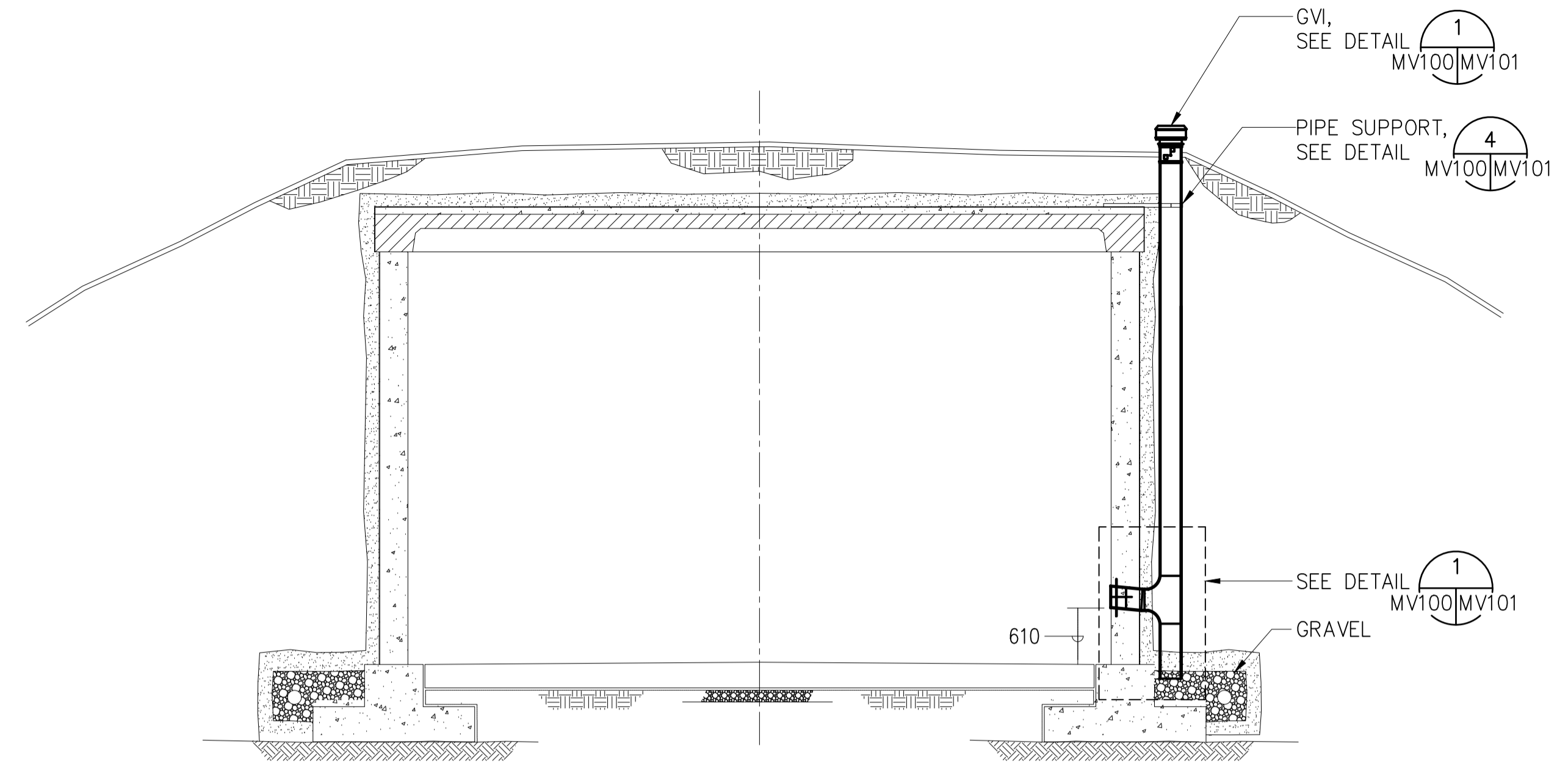
3. RETURN AIR DUCT MOUNTED TEMPERATURE TRANSMITTER SHALL ENABLE THE COOLING SYSTEM TO CYCLE AS REQUIRED TO MAINTAIN MAGAZINE TEMPERATURE AT OR BELOW 30°C (ADJUSTABLE). TEMPERATURE CONTROL POTENTIOMETER SHALL BE PROVIDED AT HVAC SYSTEM CONTROL PANEL FOR ADJUSTMENT OF SYSTEM CONTROL TEMPERATURE.
4. MAGAZINE LOCATED DEWPOINT TEMPERATURE TRANSMITTER SHALL OVERRIDE THE TEMPERATURE CONTROLLER AND COOLING FUNCTION OF SSAC-1 AS REQUIRED TO MAINTAIN DEWPOINT TEMPERATURE OF MAGAZINE AT OR BELOW 15.5°C (ADJUSTABLE). THE COOLING SHALL CONTINUE TO BE ENABLED UNTIL THE SPACE DEWPOINT TEMPERATURE HAS BEEN LOWERED TO THE SETPOINT. REHEAT COIL SHALL BE ENERGIZED WHEN COOLING SYSTEM IS IN OVERRIDE DEHUMIDIFICATION MODE AND SHALL STAGE (4 STEPS) AS REQUIRED TO MAINTAIN RETURN AIR TEMPERATURE AT OR ABOVE 30°C. DEWPOINT TEMPERATURE CONTROL POTENTIOMETER SHALL BE PROVIDED AT HVAC SYSTEM CONTROL PANEL FOR ADJUSTMENT OF SYSTEM CONTROL DEWPOINT TEMPERATURE. DEWPOINT TEMPERATURE TRANSMITTER AND TEMPERATURE AND HUMIDITY SENSORS LOCATED IN MAGAZINE SHALL BE COMPATIBLE FOR INSTALLATION IN HAZARDOUS AREA, WITH CLASSIFICATIONS OF CLASS 1, DIVISION 1, AND CLASS 1, DIVISION 2, GROUPS C AND D.
5. INDICATOR LAMPS SHALL BE PROVIDED AT THE HVAC SYSTEM CONTROL PANEL FOR SYSTEM ON (GREEN), SYSTEM OFF (AMBER), DAMPER MODE POSITION (GREEN (3)), COOLING ON (GREEN), COOLING OFF (AMBER), REHEAT ON (GREEN), REHEAT OFF (AMBER), AND SYSTEM MALFUNCTION (RED).
6. MONITOR MAGAZINE TEMPERATURE AND RELATIVE HUMIDITY.



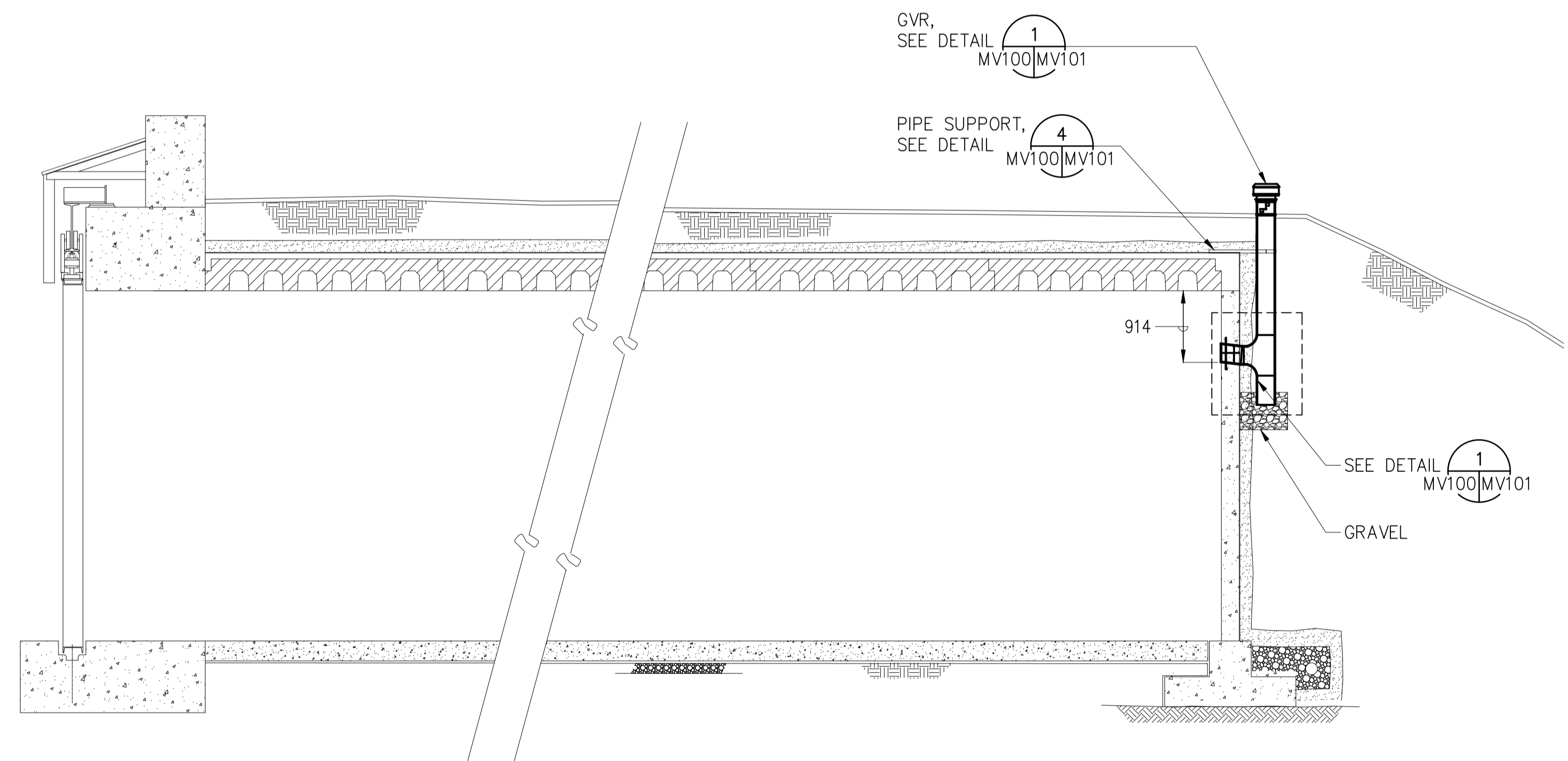
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SEAL: [Blank]	
APPROVED: [Blank]	
FOR COMMANDER NAFAC: [Blank]	
ACTIVITY: [Blank]	
SATISFACTORY TO DATE: MM/DD/YY	
DESIGNED BY: LMM CHECKED BY: TWB	
BRANCH MANAGER: JTW	
DES. PROJ. DIR: RICHARD L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER: DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LDU-HORRDLUX, VA	
<b>MODULAR STORAGE MAGAZINE</b>	
AIR CONDITIONING MECHANICAL CONTROL DIAGRAM	
SCALE: AS NOTED	
PROJECT NO.: [Blank]	
CONSTR. CONTR. NO.: [Blank]	
NAFAC DRAWING NO.: 14116012	
SHEET 44 OF 53	
<b>M-801</b>	
NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018	

# VENTILATORS

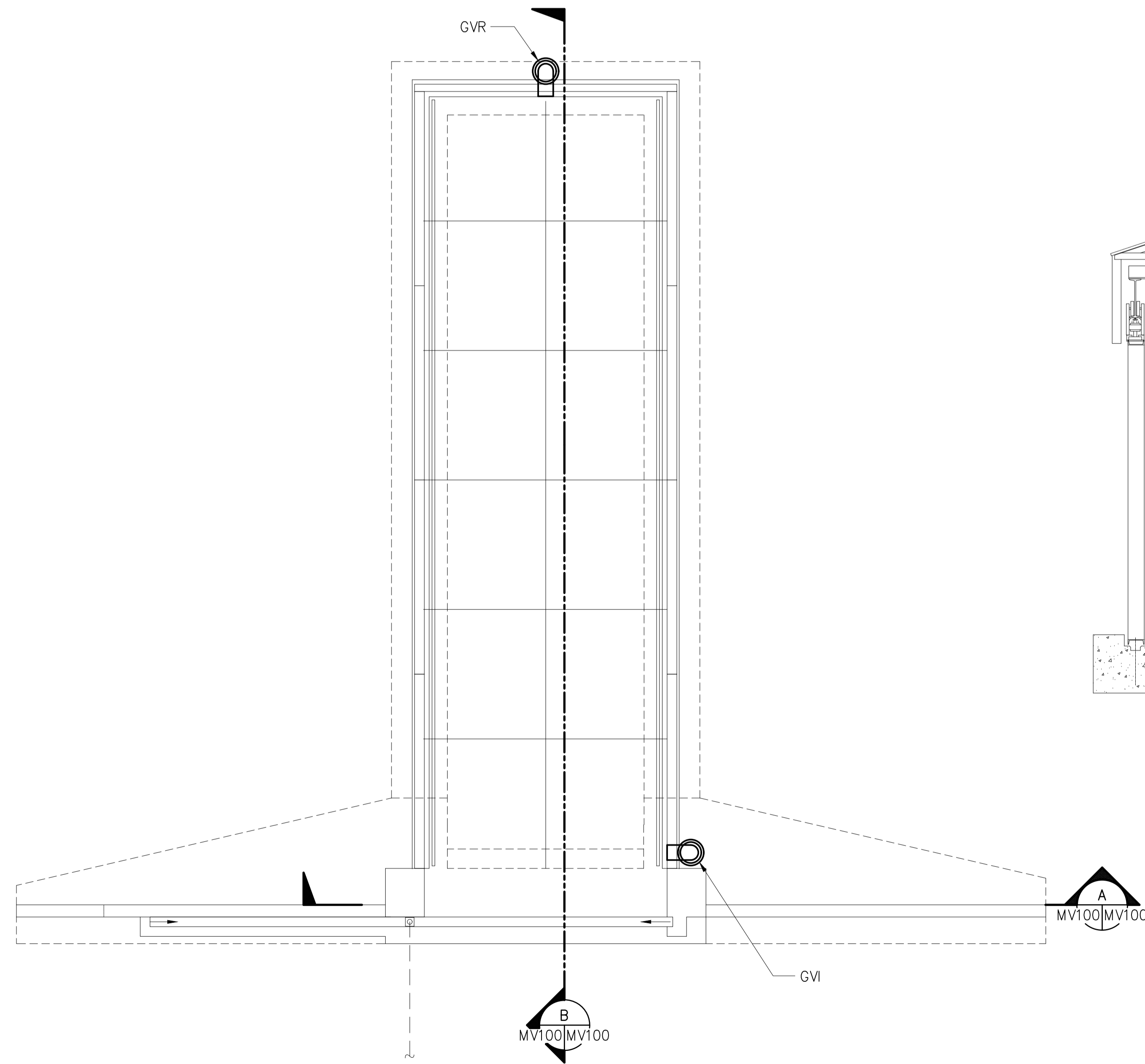
MARK	LOCATION/SERVICE	TYPE	REMARKS
GVR	MUNITION MSM/ VENTILATION	GRAVITY VENTILATOR (RELIEF)	STAINLESS STEEL GRAVITY VENTILATOR FABRICATED AS SHOWN IN PLAN OR APPROVED EQUAL
GVI	MUNITION MSM/ VENTILATION	GRAVITY VENTILATOR (INTAKE)	STAINLESS STEEL GRAVITY VENTILATOR FABRICATED AS SHOWN IN PLAN OR APPROVED EQUAL



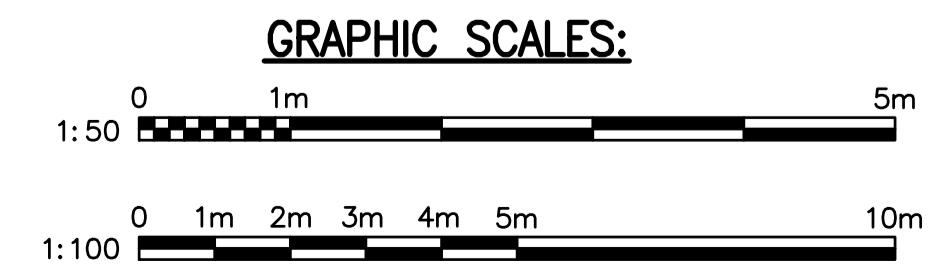
**A SECTION**  
MV100 | MV100 SCALE: 1:50



**B SECTION**  
MV100 | MV100 SCALE: 1:50



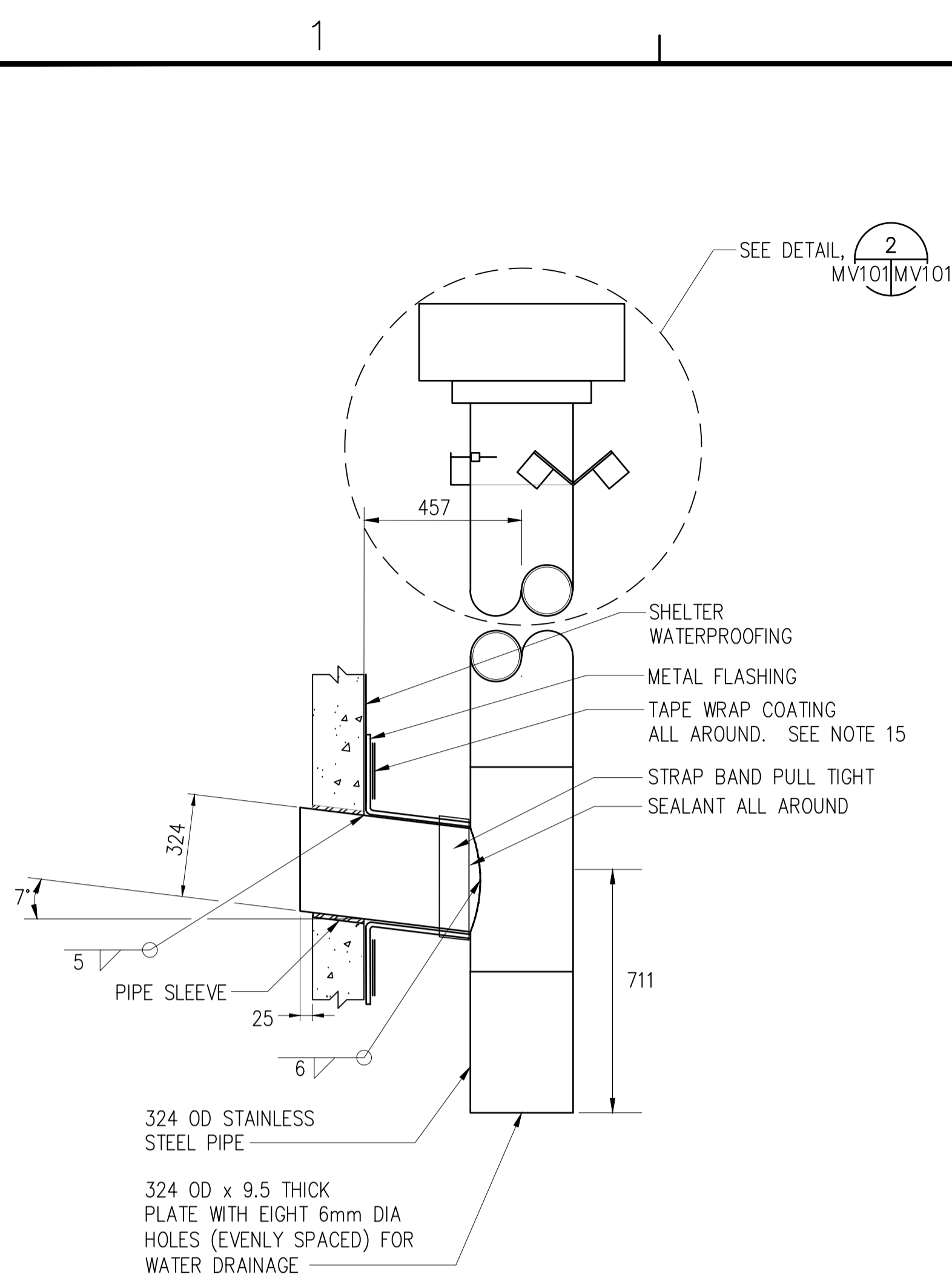
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SCALE: 1:100



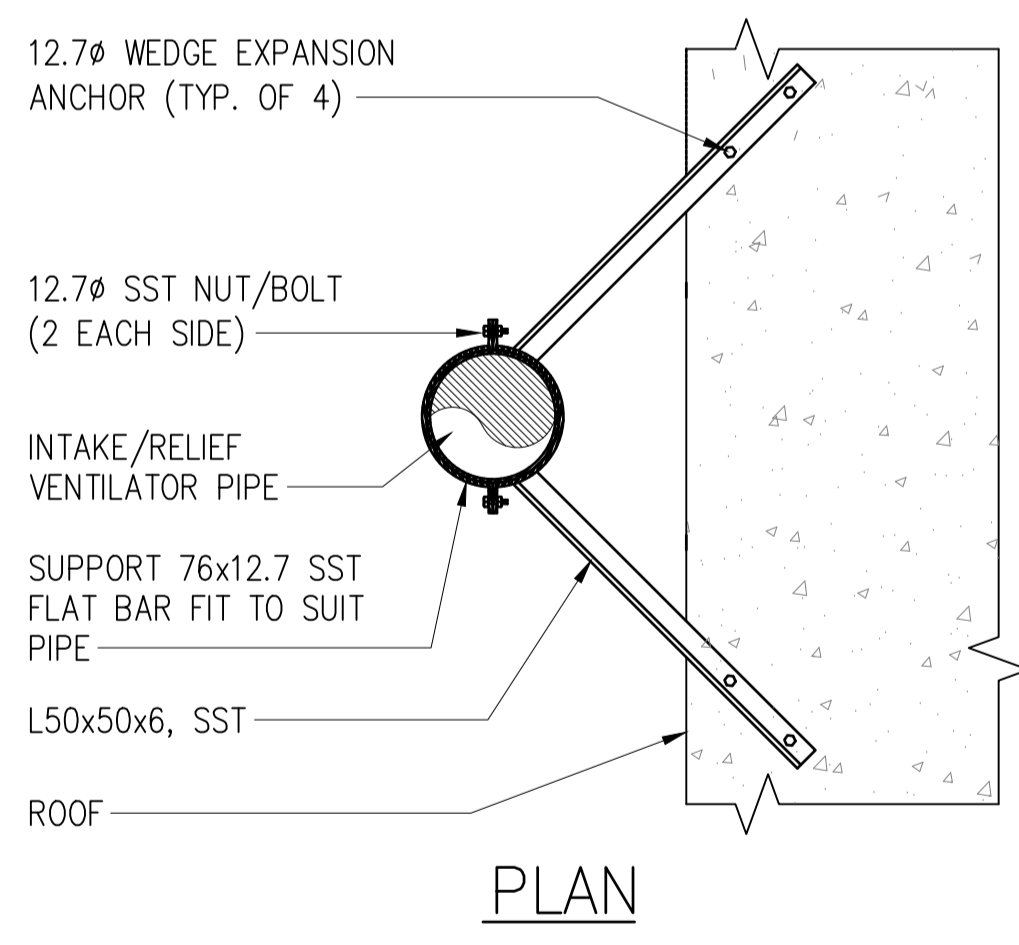
APPROVED	DATE	09/14/22
FOR COMMANDER NAIFAC	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNER	CHK	LMM
BRANCH MANAGER	JTW	
DES PROJ DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LNA-HOBOKEN, VA		
<b>MODULAR STORAGE MAGAZINE</b>		
VENTILATION PLAN AND SECTION FOR NON-AIR CONDITIONING		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAIFAC DRAWING NO.:	14116013	
SHEET	45 OF 53	
<b>MV100</b>		

FILE NAME: J:\USSE\Magazines\MSM\2021 Interim Updates\UNOS\MV100.dwg LAYOUT NAME: MV100 PLOTTED: Tuesday, June 06, 2023 - 11:30am USER: naifac\coriano

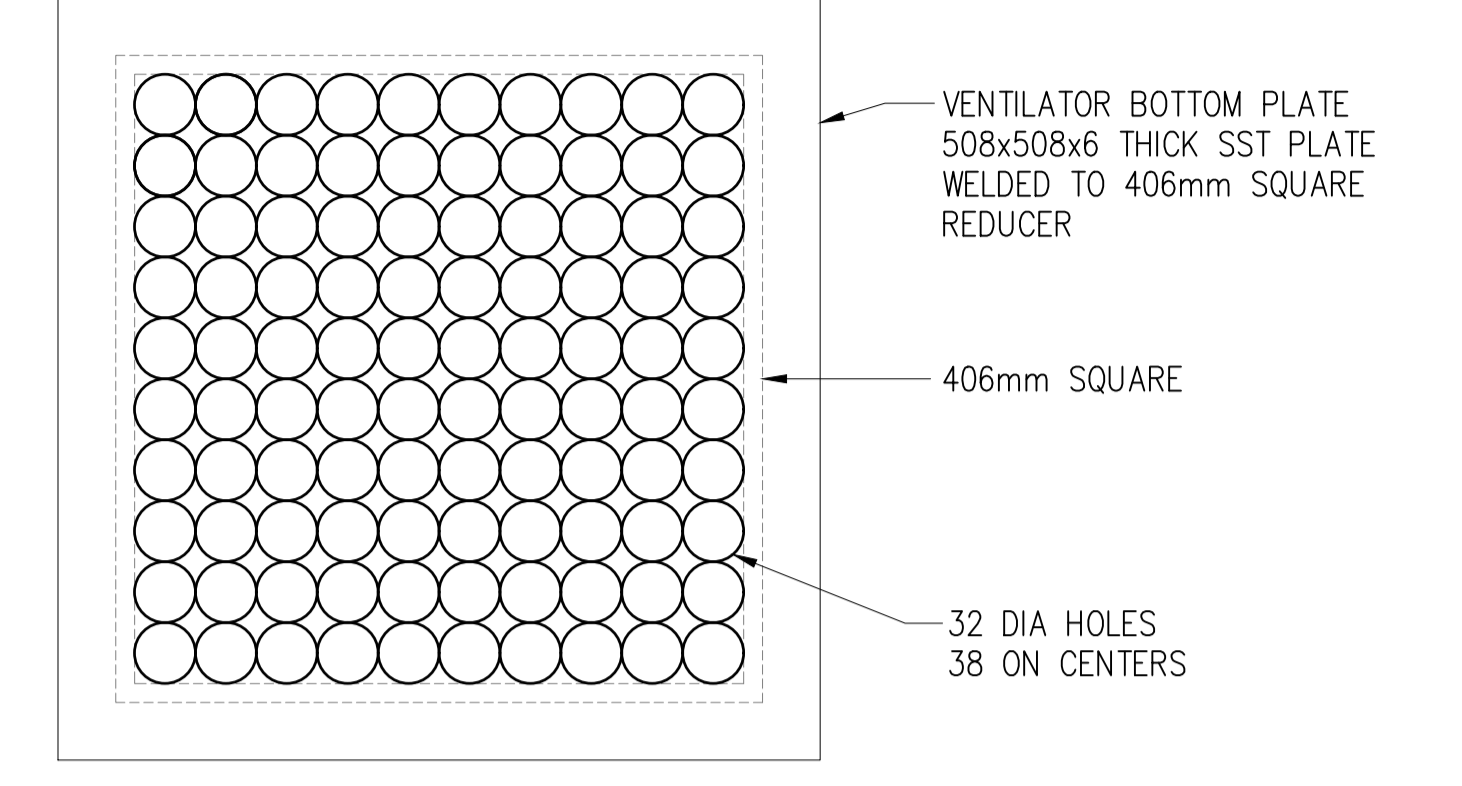
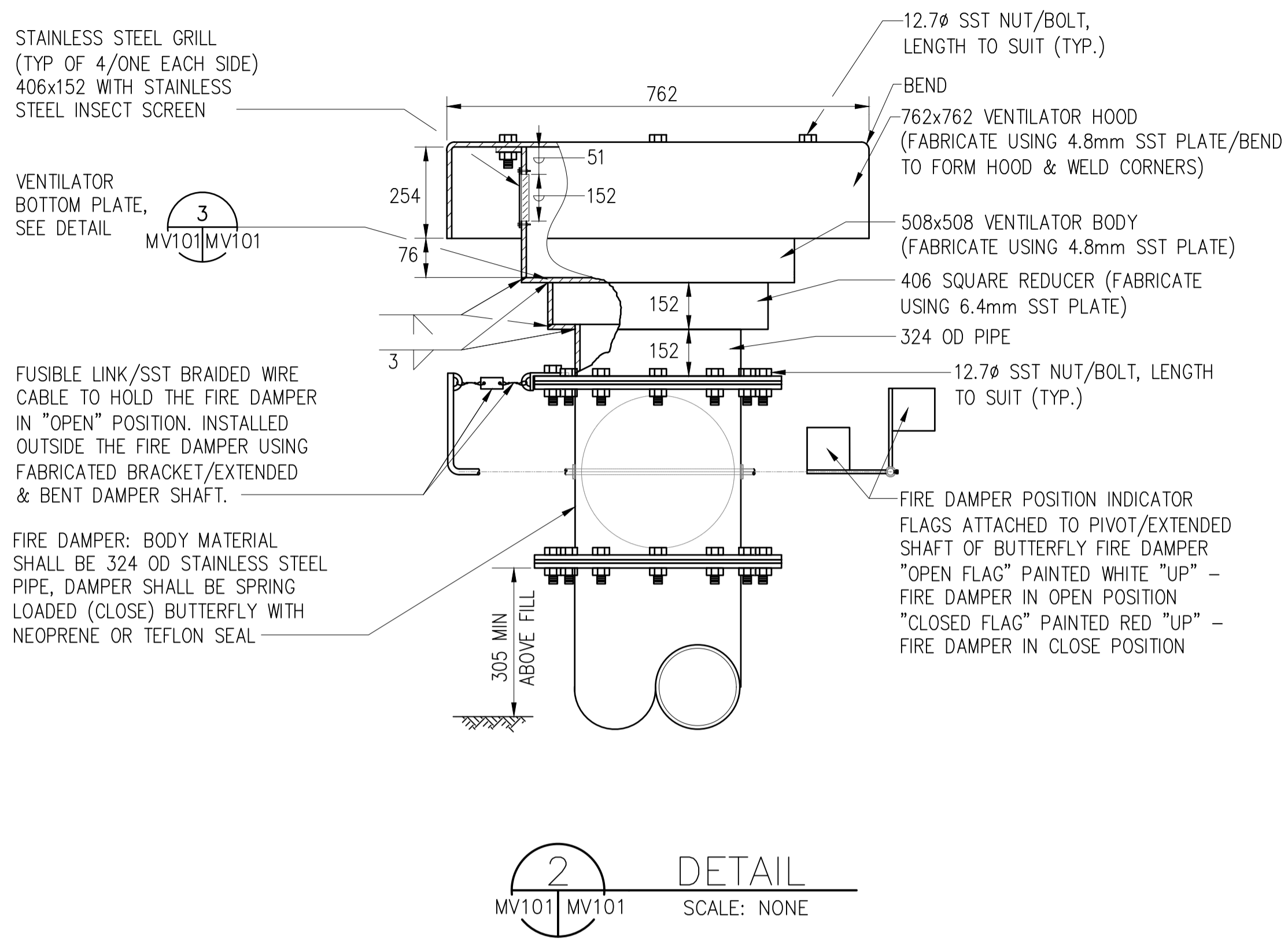
FILE NAME: J:\USSE\Wegzines\WMSM\2021 Interim Updates\WMSM\WV101.dwg LAYOUT NAME: MV101 PLOTTED: Tuesday, June 06, 2023 - 11:30am USER: haldiscorsino



**1** DETAIL  
MV100 MV101 SCALE: NONE



**4** INTAKE/RELIEF PIPE SUPPORT DETAIL  
MV100 MV101 SCALE: NONE



**3** VENTILATOR BOTTOM PLATE DETAIL  
MV101 MV101 SCALE: NONE

**NOTES:**

- DESIGN AND CONSTRUCT VENTILATOR TO PROVIDE NATURAL AIRFLOW TO PREVENT EXCESSIVE BUILD-UP OF HUMIDITY OVER AMBIENT CONDITIONS THAT COULD CAUSE THE MAGAZINE CONTENTS TO RUST. VENTILATOR SHALL HAVE FLAME ARRESTING CAPABILITY TO PREVENT OUTSIDE FIRES (FLAMES) FROM ENTERING THE STORAGE SPACE THROUGH THE VENT. THE VENTILATOR SHALL BE DESIGNED SO THAT SECURITY BARS ARE NOT REQUIRED OVER THE PIPE OPENING.
- VENTILATOR SHALL BE WEATHERPROOF.
- VENTILATOR SHALL BE DESIGNED FOR WINDLOADS IN ACCORDANCE WITH ASCE/SEI 7. DESIGN WINDLOAD SHALL BE AT LEAST 85 METERS PER SECOND.
- FIRE DAMPER SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE VENTILATOR. PROVIDE FUSIBLE LINK ATTACHED TO A SPRING LOADED DAMPER. FUSIBLE LINK TO HAVE TEMPERATURE RATING OF 68.3 DEGREES CELCIUS (C). DAMPER SHALL COMPLETELY CLOSE THE OPENING AUTOMATICALLY IN CASE OF FIRE.
- PROVIDE INSECT SCREENS AND FRAMES OF SAME MATERIAL AS VENTILATOR. FRAMES SHALL BE ATTACHED IN A MANNER THAT WILL PERMIT EASY REMOVAL FOR ACCESS AND CLEANING.
- PLATE AND SHEET: ASTM A 240/A 240M, TYPE 316L STAINLESS STEEL.
- PIPE: ASTM A 312/A 312M, GRADE TP 316L STAINLESS STEEL, SCHEDULE 40, SEAMLESS.
- PIPE FITTINGS: ASME B16.9 AND ASTM A 403/A 403M, TYPE WP 316L STAINLESS STEEL, SCHEDULE 40, BUTT WELD.
- FLANGES: ASME B16.5 AND ASTM A 182/A 182M, GRADE F 316L STAINLESS STEEL, CLASS 300, FORGED, WELD NECK, RAISED FACE AND CONCENTRIC SERRATED FINISH.
- GASKETS: ASME B16.5, GROUP 1, SPIRAL WOUND, FILLED WITH CHLORIDE ION-FREE NON-ASBESTOS MATERIALS, CORROSION-RESISTANT STEEL, COMPATIBLE WITH THE PROVIDED FLANGES, WITH CENTERING PROVISIONS.
- BOLTING, NUTS AND WASHERS: ASTM A 320/A 320M, GRADE B8M/B8MA, HEAVY HEX HEAD BOLTS OR BOLT STUDS, HEAVY HEX HEAD NUTS AND WASHERS.
- ANTI-GALL/ANTI-SIEZE LUBRICANTS AND COMPOUNDS: PROVIDE ON THREADS OF STAINLESS STEEL FASTENERS.
- STEEL SHAPES AND MISCELLANEOUS METAL: TYPE 316L STAINLESS STEEL.
- PROVIDE NONCONDUCTIVE SEPARATORS TO PREVENT GALVANIC ACTION AND CORROSION BETWEEN DISSIMILAR METALS.
- PROVIDE PETROLATUM TAPE WRAP COATING SYSTEM AND PRIMER ON EXTERIOR OF ALL BURIED METAL ITEMS UP TO 150mm ABOVE GRADE FOR CORROSION PROTECTION. TAPE SHALL HAVE AN AVERAGE THICKNESS OF AT LEAST 1.1mm AND AN AVERAGE WEIGHT OF AT LEAST 1.2 KILOGRAMS PER SQUARE METER. TAPE SHALL BE RESISTANT TO ACIDS, ALKALIES, SALTS AND WATER.

APPR	09/14/22	DATE
SM	MSM STANDARD	DESCRIPTION
<b>MODULAR STORAGE MAGAZINE</b> VENTILATION MECHANICAL DETAILS		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION LRA-HORROCK, VA		
Satisfactory to: DATE MM/DD/YY DES PROJ DR: <b>ROBERT L. STEPHENS, P.E.</b> FIRE PROTECTION ENGINEER: <b>DPS</b>		
BRANCH MANAGER: <b>JTW</b> DES PROJ DR: <b>ROBERT L. STEPHENS, P.E.</b> FIRE PROTECTION ENGINEER: <b>DPS</b>		
FOR COMMANDER NAFAC ACTIVITY		
APPROVED:		
A/E INFO:		
SCALE: AS NOTED		
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAC DRAWING NO.: <b>14116014</b>		
SHEET <b>46</b> OF <b>53</b>		
<b>MV101</b>		
NAFAC METRIC DRAWING REVISION: 01 OCTOBER 2018		

\* ABBREVIATIONS

A	AMPS, AMPERES
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
APPROX.	APPROXIMATELY
ATS	AUTOMATIC TRANSFER SWITCH
BC	BARE COPPER
BFG	BELOW FINISHED GRADE
BLDG	BUILDING
BMS	BALANCED MAGNETIC SWITCH
CHH	COMMUNICATIONS HANDHOLE
C	CONDUIT
CKT	CIRCUIT
CONC	CONCRETE
CU	COPPER
DIA	DIAMETER
DWGS	DRAWINGS
EC	EMPTY CONDUIT
EHH	ELECTRICAL HANDHOLE
EU	EUROPEAN
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
G,GND	GROUND
GRSC	GALVANIZED RIGID STEEL CONDUIT
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTO-SWITCH
HPS	HIGH-PRESSURE SODIUM
HT	HEIGHT
HZ	HERTZ
IDS	INTRUSION DETECTION SYSTEM
KAIC	THOUSAND AMPERES INTERRUPTING CAPACITY
KCMIL	THOUSAND CIRCULAR MILS
KV	KILOVOLTS
KVA	KILOVOLTS-AMPERES
KW	KILOWATT
MCB	MOLDED CASE CIRCUIT BREAKER; MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MIN	MINIMUM
MOV	METAL-OXIDE VARISTOR
MTD	MOUNTED
MTG	MOUNTING
N	NEUTRAL
NTS	NOT TO SCALE
OC	ON CENTER
PC	PHOTOCONTROL
PE	PHOTOELECTRIC
PH	PHASE
PIR	PASSIVE INFRARED
PVC	POLYVINYL CHLORIDE
SDBC	SOFT DRAWN BARE COPPER
SCH	SCHEDULE
SPD	SURGE PROTECTIVE DEVICE
STD	STANDARD
TYP	TYPICAL
UG	UNDERGROUND
UGN	UNGROUNDING NEUTRAL
UON	UNLESS OTHERWISE NOTED
V	VOLT
VA	VOLT-AMPERE(S)
VAC	VOLTS ALTERNATING CURRENT
W	WIRE, WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
XPLE	CROSSLINKED POLYETHYLENE
&	AND

\* EXTERIOR LEGEND (UNDERGROUND)

	US	UNDERGROUND SECONDARY CIRCUIT, RUN IN CONDUIT, CONCRETE ENCASED (UON). CIRCUITRY VARIES. SEE RESPECTIVE POWER RISER DIAGRAMS OR SITE PLANS.
	UT	UNDERGROUND TELEPHONE CIRCUIT, RUN IN CONDUIT, DIRECT BURIED, 50mm, UON. TELEPHONE CABLES PROVIDED BY GOVERNMENT. PROVIDE PULL WIRE.
	USC	UNDERGROUND SECURITY SYSTEM CIRCUIT, RUN IN CONDUIT, DIRECT BURIED, 25mm UNLESS OTHERWISE NOTED. SECURITY CABLES PROVIDED BY GOVERNMENT. PROVIDE PULL WIRE.
	UG	UNDERGROUND GROUNDING CONDUCTOR, 70mm <sup>2</sup> (UON) BARE COPPER, DIRECT BURIED.
	SG	SECONDARY GROUND RING - UNDERGROUND GROUNDING CONDUCTOR, 70mm <sup>2</sup> (UON) BARE COPPER, DIRECT BURIED 1.0 METER BELOW FINISH GRADE (UON)
	G	GROUNDING CONDUCTOR, 70mm <sup>2</sup> (UON) BARE COPPER, RUN EXPOSED ON STRUCTURE
	UG	CONNECTION OF GROUNDING CONDUCTOR(S). TYPICAL FOR UNDERGROUND CONDUCTORS AND ABOVE GROUND CONDUCTORS. PROVIDE EXOTHERMAL TYPE CONNECTIONS UNLESS OTHERWISE NOTED.

\* PLAN LEGEND

	△	LIGHTING FIXTURE TYPE SYMBOL, SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-313.
	SPD	SURGE PROTECTIVE DEVICE
	—	BRANCH CIRCUIT OR FEEDER WIRING IN CONDUIT.
	OR 	BRANCH CIRCUIT OR FEEDER WIRING IN CONDUIT. NO TICK MARKS INDICATE 2 #12 CONDUCTORS & 1 #12 GND. IN 16 mm CONDUIT UON. TICK MARKS, WHEN SHOWN, INDICATE NUMBER OF #12 CONDUCTORS IF OTHER THAN THREE; (✓) INDICATES GROUND. CONDUIT LARGER THAN 16 mm & WIRE LARGER THAN #12 SHALL BE AS INDICATED.
	→	HOME RUN TO PANEL. PANEL AND CIRCUIT DESIGNATIONS AS INDICATED.
	—	INDICATES CONDUIT RUN CONCEALED IN CEILING, WALL, OR FLOOR.
	—	EXPOSED CONDUIT OR DUCT
	▨	ELECTRICAL PANELBOARD
	GFI	DUPLEX CONVENIENCE RECEPTACLE WITH INTERNAL GROUND FAULT PROTECTION. 20A., 125 VAC. MOUNT 460mm AFF UON
	J	JUNCTION BOX
	S	SWITCH, MTG HT 1220
	S <sup>H</sup> <sub>A</sub>	HAND-OFF-AUTO SWITCH
	■	GROUND CONNECTION
	⊙	COPPER-CLAD STEEL GROUND ROD - 19mm x 3050mm (3/4" x 10')
	⊙	GROUND TEST WELL
	⊗	LIGHTNING PROTECTION AIR TERMINAL
	▭	LED LUMINAIRE
	▭	LED LUMINAIRE WITH BATTERY BACK-UP
	●	WALL MOUNTED LED LUMINAIRE
	—	SINGLE POINT GROUND BAR (SPGB)
	M	MOTOR
	60/40	MOTOR WITH DISCONNECT SWITCH. 60=SWITCH RATING, 40=FUSE RATING (NF=NON-FUSIBLE)
	MTS	MANUAL TRANSFER SWITCH, 3-POLE, 30-AMP, HEAVY DUTY
	⊙	PORTABLE GENERATOR RECEPTACLE
	▭	TELEPHONE CABINET

GENERAL NOTES

- UNLESS OTHERWISE INDICATED, ALL ELECTRICAL WORK AND MATERIAL IS NEW AND SHALL BE PROVIDED BY THE CONTRACTOR.
- PROVIDE SURGE PROTECTION FOR ALL CONDUCTORS (ENTERING AND EXITING THE MAGAZINE) IN ACCORDANCE WITH NFPA 780. CONNECT ALL SURGE PROTECTION GROUNDING CONDUCTORS TO THE SECONDARY GROUND RING.
- IF THE MAGAZINE SPACE IS DETERMINED TO BE A HAZARDOUS (CLASSIFIED) LOCATION, THEN EXTENSIVE REDESIGN IS REQUIRED TO MEET NFPA 70, ARTICLE 500.
- ALL CONDUIT ENTERING AND INSIDE THE MAGAZINE SHALL BE RGS CONDUIT.

NOTES TO DESIGNER

- A SIGNIFICANT CHANGE MADE TO THE STANDARD DRAWINGS DURING THIS UPDATE IS THAT "THE REQUIREMENT TO CONSIDER ORDNANCE STORAGE MAGAZINES AS HAZARDOUS ELECTRICAL SPACES HAS BEEN DETERMINED BY NOSSA TO NOT BE REQUIRED FOR GENERAL PURPOSE ORDNANCE FACILITIES". THE ONLY PLACE WHERE HAZARDOUS ELECTRICAL EQUIPMENT IS REQUIRED IS IN LOCATIONS WHERE AN EXPLOSIVE ATMOSPHERE (DUST, GASES, VAPORS, ETC PER NFPA 70, ARTICLE 500) MIGHT BE PRESENT, SUCH AS AT AN EXPLOSIVE PRODUCTION FACILITY. THE ORIGINAL OLDER STANDARD DESIGNS FOR THE MAGAZINES INCLUDED THE REQUIREMENT FOR HAZARDOUS ELECTRICAL FIXTURES UNNECESSARILY.
- THREE FEET WORKING CLEARANCE MUST BE MAINTAINED FOR THE PANELBOARD PER NFPA 70. WHERE MAXIMUM STORAGE SPACE IN THE MAGAZINE IS CRITICAL, PANELBOARD AND SURGE PROTECTIVE DEVICES (SPD) MAY BE LOCATED EXTERIOR OF MAGAZINE. COORDINATE WITH ACTIVITY, AND MODIFY DRAWINGS AND PANELBOARD ENCLOSURE ACCORDINGLY.
- SINGLE PHASE SYSTEMS IDENTIFIED WILL BE APPROPRIATE FOR MOST MAGAZINES. IF AIR CONDITIONING OR LARGER MOTOR ARE USED, DESIGNER SHOULD CHOOSE THE MAGAZINE PLAN WITH AIR CONDITIONING AND INCORPORATE APPROPRIATE, MORE EXPENSIVE, THREE PHASE SYSTEM.
- IF THE PROJECT SITE IS IN A COLD WEATHER CLIMATE, HEAT TRACING MAY BE REQUIRED FOR THE DOOR TRENCH. TYPICAL DETAILS ON HEAT TRACING ARE AVAILABLE AT [HTTP://WWW.WBDG.ORG/FFC/NAVY-NAVFAC/CAD/ELECTRICAL-DETAILS-MAGAZINE](http://www.wbdg.org/ffc/navy-navfac/cad/electrical-details-magazine)
- (X) INFORMATION SHOWN IN "ABBREVIATIONS" AND "LEGENDS" IS BASED ON A COMPLETE PROJECT WITH SITE SPECIFIC REQUIREMENTS. COORDINATE (ADD TO / REMOVE) ITEMS THAT ARE NOT APPLICABLE TO THE SPECIFIC PROJECT.
- DETERMINE ACTUAL ELECTRICAL RATINGS OF THE LOCAL ELECTRICAL PRIMARY DISTRIBUTION SYSTEM.
- PROVIDE THE ELECTRICAL SYSTEMS IN ACCORDANCE WITH NAVSEA OP 5, VOL 1 : AMMUNITION AND EXPLOSIVES ASHORE SAFETY REGULATIONS FOR HANDLING, STORING, PRODUCTION, RENOVATION AND SHIPPING. AMONG OTHER REQUIREMENTS, ENSURE ALL RESPECTIVE ELECTRICAL SERVICES (POWER, TELEPHONE, SECURITY, ETC.) ARE RUN UNDERGROUND FOR THE LAST 15 METERS. ALSO, ENSURE THE ELECTRICAL SERVICE GROUND IS CONNECTED TO THE SECONDARY GROUND RING.
- DETERMINE WHICH SPECIALTY SYSTEMS (TELEPHONE, SECURITY, IDS, FIRE ALARM, ETC.) ARE REQUIRED FOR EACH SPECIFIC PROJECT. COORDINATE WITH BOTH THE USING ACTIVITY AND THE REVIEWING FEC TO DETERMINE WHICH ELEMENTS (IF ANY) THE GOVERNMENT DESIRES TO PROVIDE. SYSTEM'S INTERIOR ELEMENTS VERSUS THEIR RESPECTIVE EXTERIOR ELEMENTS ARE SEPARATE ISSUES AND ARE REQUIRED TO BE RESOLVED SEPARATELY.
- SOME USING ACTIVITIES PREFER ELECTRICAL CONDUITS TO BE RUN EXPOSED, MAXIMIZING THE USE OF THE PORTAL WALL'S OUTDOOR SURFACE. CONFIRM RACEWAY ROUTING PREFERENCES WITH BOTH THE USING ACTIVITY AND THE REVIEWING FEC.

NOTE:

TYPICAL DIMENSIONS AND SPECIFICATIONS ARE PROVIDED. CONSULT WITH ACTIVITY TO DETERMINE REQUIREMENTS BEYOND THOSE SHOWN ON THE DRAWINGS, INCLUDING BUT NOT LIMITED TO WHEEL LOAD RATINGS, BACKFILL REQUIREMENTS, AND HANDHOLE SIZES.

APPR				
DATE	09/14/22			
DESCRIPTION	MSM STANDARD			
SYN				
SEAL				
DATE INFO				
APPROVED				
FOR COMMANDER NAVFAC				
ACTIVITY				
SATISFACTORY TO DATE	MM/DD/YY			
DES	CHK	RJL	CHK	SEK
TRM/DM				
BRANCH MANAGER	JTW			
DES PROJ DIR	ROBERT L. STEPHENS, P.E.			
FIRE PROTECTION ENGINEER	DPS			
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	DA-40800LX, VA			
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND			
DESIGN AND CONSTRUCTION				
<b>MODULAR STORAGE MAGAZINE</b>				
ELECTRICAL LEGEND, SYMBOLS, ABBREVIATIONS AND GENERAL NOTES				
SCALE:	AS NOTED			
EPROJECT NO.:				
CONSTR. CONTR. NO.				
NAVFAC DRAWING NO.	14116015			
SHEET	47	OF	53	
<b>E-101</b>				

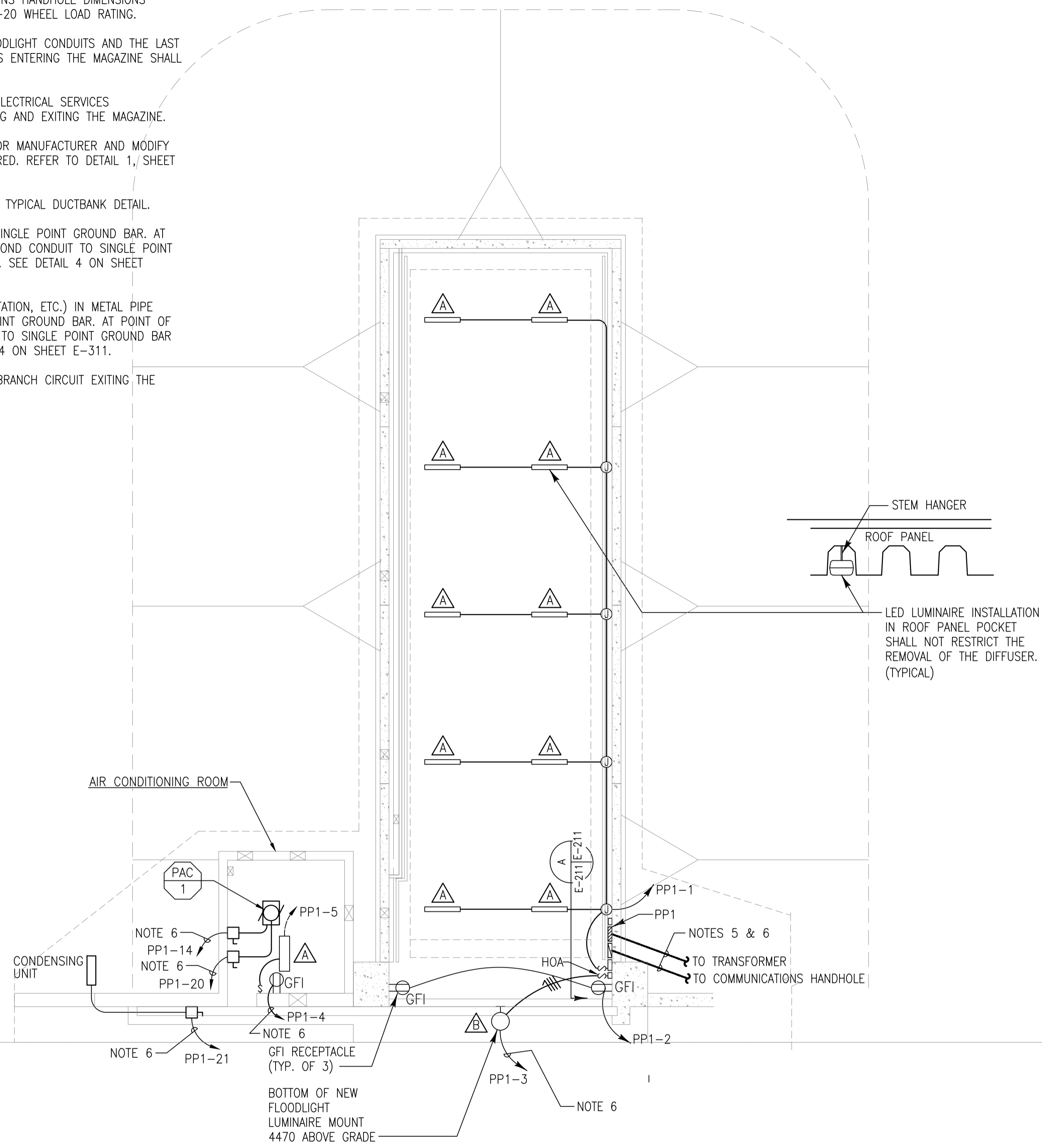
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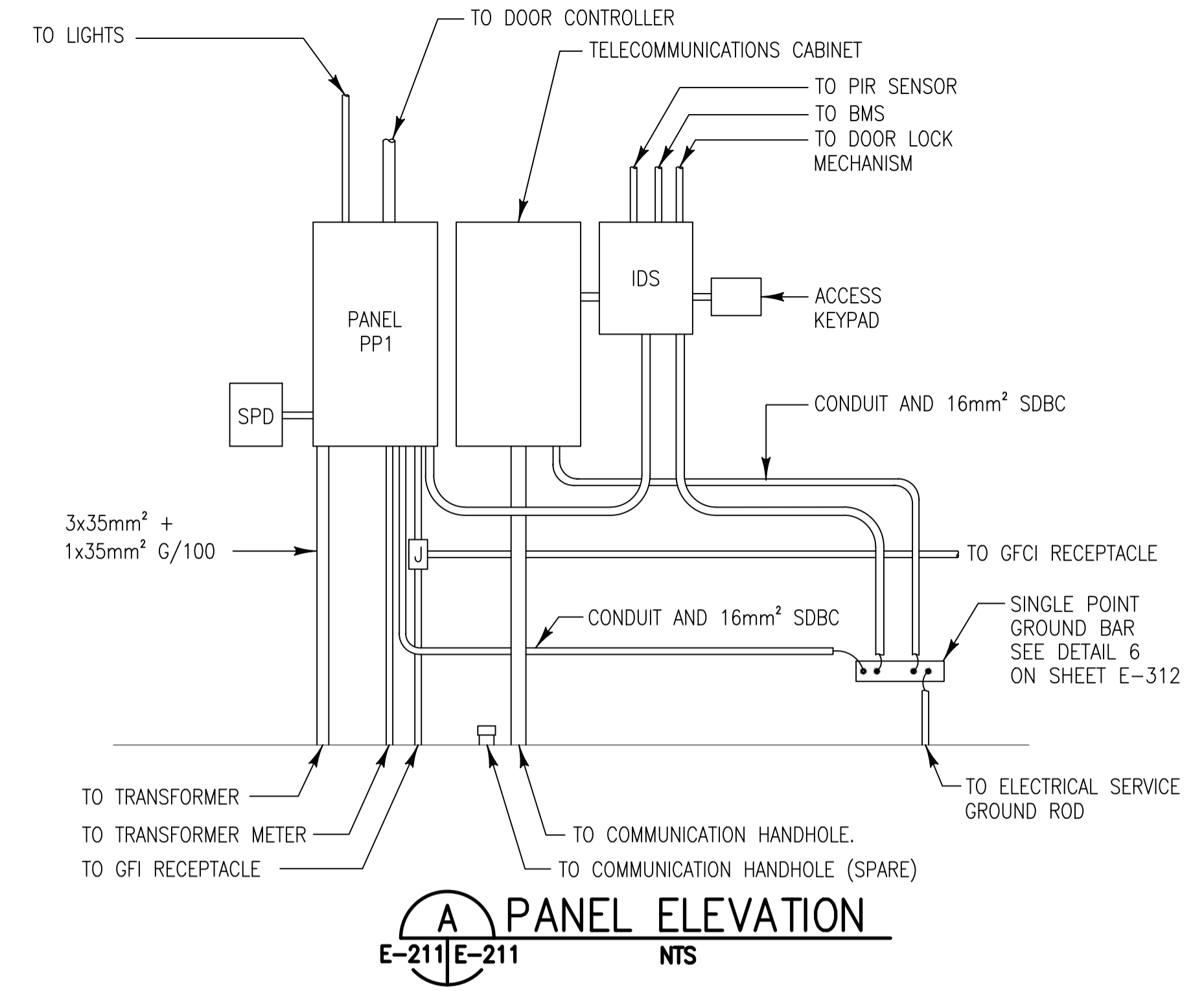
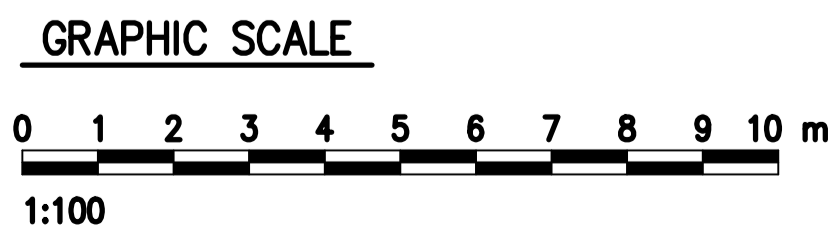


**NOTES:**

1. PROVIDE ELECTRICAL AND COMMUNICATIONS HANDHOLE DIMENSIONS 1220x1830x1220 MINIMUM AND WITH H-20 WHEEL LOAD RATING.
2. ALL INTERIOR CONDUITS, EXTERIOR FLOODLIGHT CONDUITS AND THE LAST 15 METERS OF UNDERGROUND CONDUITS ENTERING THE MAGAZINE SHALL BE RIGID METAL CONDUIT.
3. PROVIDE SURGE PROTECTION FOR ALL ELECTRICAL SERVICES (COMMUNICATIONS AND POWER) ENTERING AND EXITING THE MAGAZINE.
4. VERIFY POWER REQUIREMENTS WITH DOOR MANUFACTURER AND MODIFY PANELBOARD AND CIRCUITING AS REQUIRED. REFER TO DETAIL 1, SHEET E-313 FOR DOOR CONTROL DIAGRAM.
5. REFER TO DETAIL 2, SHEET E-313 FOR TYPICAL DUCTBANK DETAIL.
6. CONDUIT MUST ENTER VIA WALL NEAR SINGLE POINT GROUND BAR. AT POINT OF ENTRY INTO THE MAGAZINE, BOND CONDUIT TO SINGLE POINT GROUND BAR WITH #2/0 BARE COPPER. SEE DETAIL 4 ON SHEET E-311.
7. ALL UTILITIES (WATER, FIRE, INSTRUMENTATION, ETC.) IN METAL PIPE MUST ENTER VIA WALL NEAR SINGLE POINT GROUND BAR. AT POINT OF ENTRY INTO THE MAGAZINE, BOND PIPE TO SINGLE POINT GROUND BAR WITH #2/0 BARE COPPER. SEE DETAIL 4 ON SHEET E-311.
8. PROVIDE SURGE PROTECTION FOR ANY BRANCH CIRCUIT EXITING THE MAGAZINE, SUCH AS EXTERIOR LIGHTING.



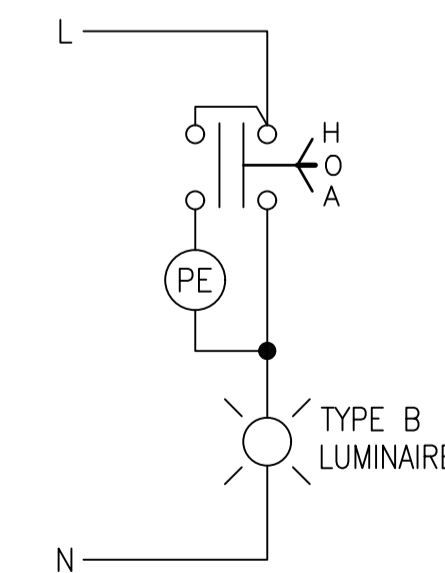
**MAGAZINE ELECTRICAL PLAN**  
SCALE = 1:100



**A PANEL ELEVATION**  
E-211 E-211 NTS

PANELBOARD "PP1" SCHEDULE																					
100A W/100A MCB, 208Y/120V, 3 PHASE, 4 WIRE, 10KAIC MINIMUM, SURFACE MOUNT, SERVICE ENTRANCE RATED																					
LOAD SERVED	LOAD (AMPS)			BKR TRIP	WIRE SIZE	CKT. NO.	PHASE A B C			CKT. NO.	WIRE SIZE	BKR TRIP	LOAD (AMPS)			LOAD SERVED					
	A	B	C				A	B	C				A	B	C						
INTERIOR LIGHTING	6.3			20	12	1				2	12	20	3.0			RECEPTACLES - MAGAZINE					
EXTERIOR LIGHTING	2.1			20	12	3				4	12	20	1.5			RECEPTACLE - A/C RM					
LIGHTING - A/C RM			0.6	20	12	5				6	12	20			8.6	DOOR OPERATOR (NOTE 4)					
IDS PANEL	1.9			20	12	7							8.6								
SPACE						9				10	--	20	0			SPARE					
SPACE						11				12	--	20	0			SPARE					
SURGE PROTECTIVE DEVICE	0.2			50	6	13				14	8	40	27.9			PAC-1 REHEAT COIL					
		0.2											27.9								
SPARE	0			20	--	19				20	10	30	20.2								
CONDENSING UNIT	5.9			20	12	21							20.2			PAC-1 AC					
SPARE				20	--	23							20.2								
<b>TOTAL</b>	<b>8.4</b>	<b>8.2</b>	<b>0.8</b>										<b>59.7</b>	<b>49.6</b>	<b>56.7</b>	<b>TOTAL</b>					
TOTAL CONNECTED AMPS													A: 68.1			B: 57.8			C: 57.5		

**PANELBOARD SCHEDULE**  
NTS



**FLOODLIGHT CONTROL**  
NTS

APPROVED: [Signature] DATE: 09/14/22

FOR COMMANDER NAFAC

ACTIVITY

SATISFACTORY TO: DATE: MM/DD/YY

DESIGNED BY: RHL CHK: SEK

BRANCH MANAGER: JTW

DES. PROD. DIR: RICHARD L. STEPHENS, P.E.

FIRE PROTECTION ENGINEER: DPS

DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
DESIGN AND CONSTRUCTION

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
LDA-HORRDLK, VA

**MODULAR STORAGE MAGAZINE**

MAGAZINE ELECTRICAL PLAN WITH AIR CONDITIONING

SCALE: AS NOTED

PROJECT NO.:

CONSTR. CONTR. NO.:

NAVFAC DRAWING NO. 14116017

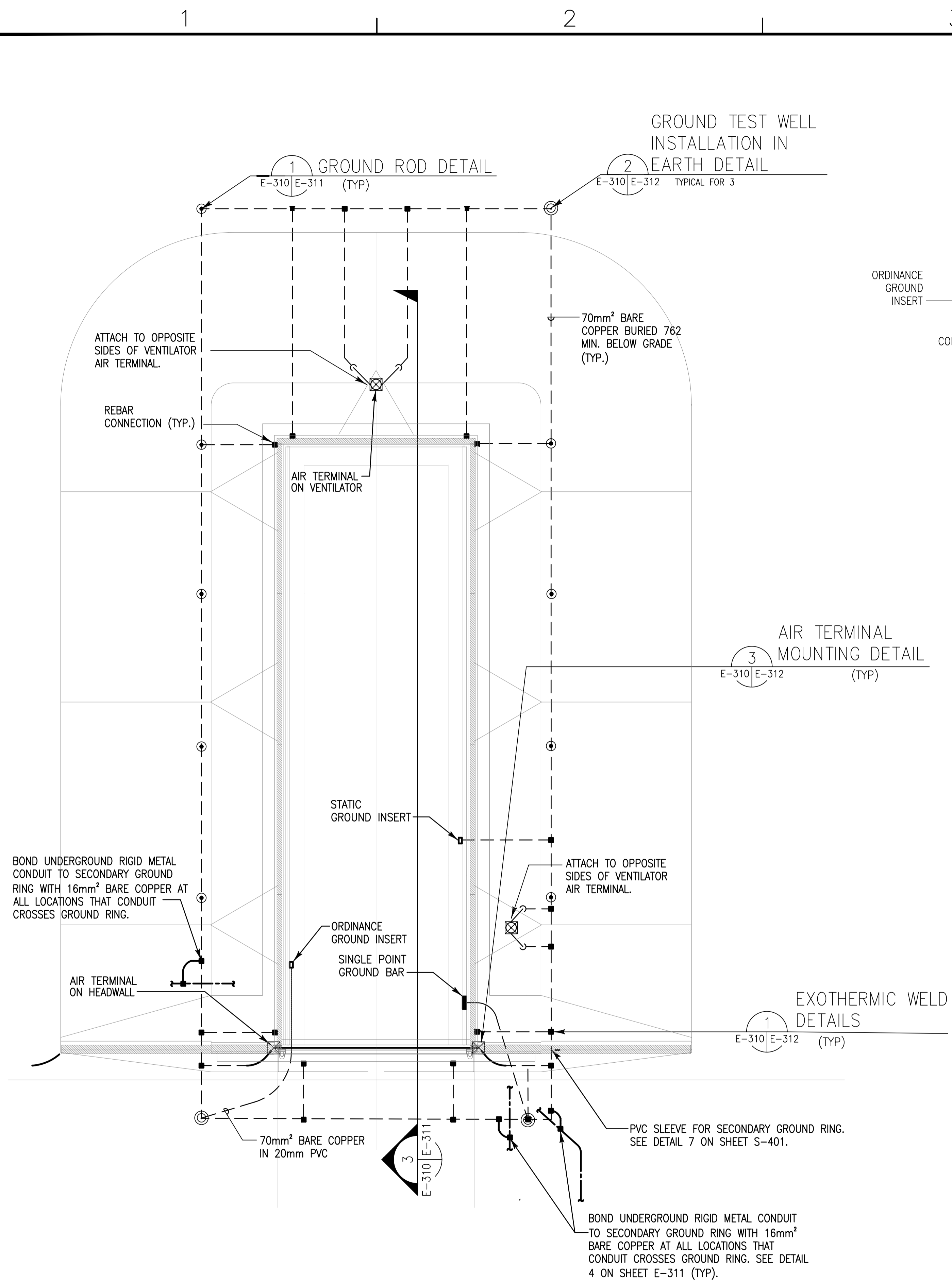
SHEET 49 OF 53

**E-211**

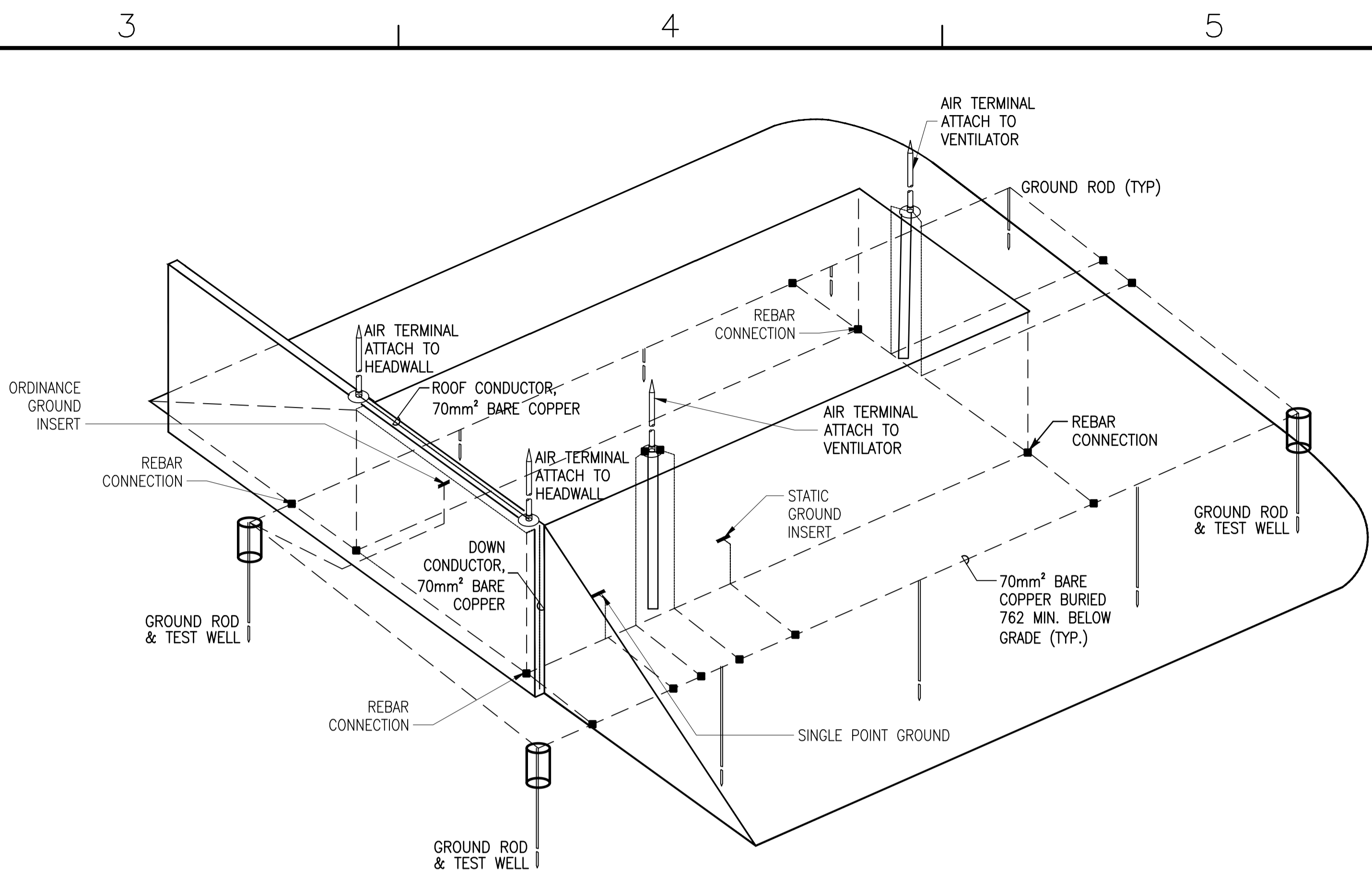
NAVFAC METRIC DRAWING REVISION: 01 OCTOBER 2018

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FILE NAME: J:\USSE\Magazines\NMSA\2021 Interim Updates\NMSA-E-310.dwg LAYOUT NAME: E-310 PLOTTED: Tuesday, June 06, 2023 - 11:30am USER: jehiccoriano



LIGHTNING PROTECTION AND GROUNDING PLAN  
SCALE = 1:100



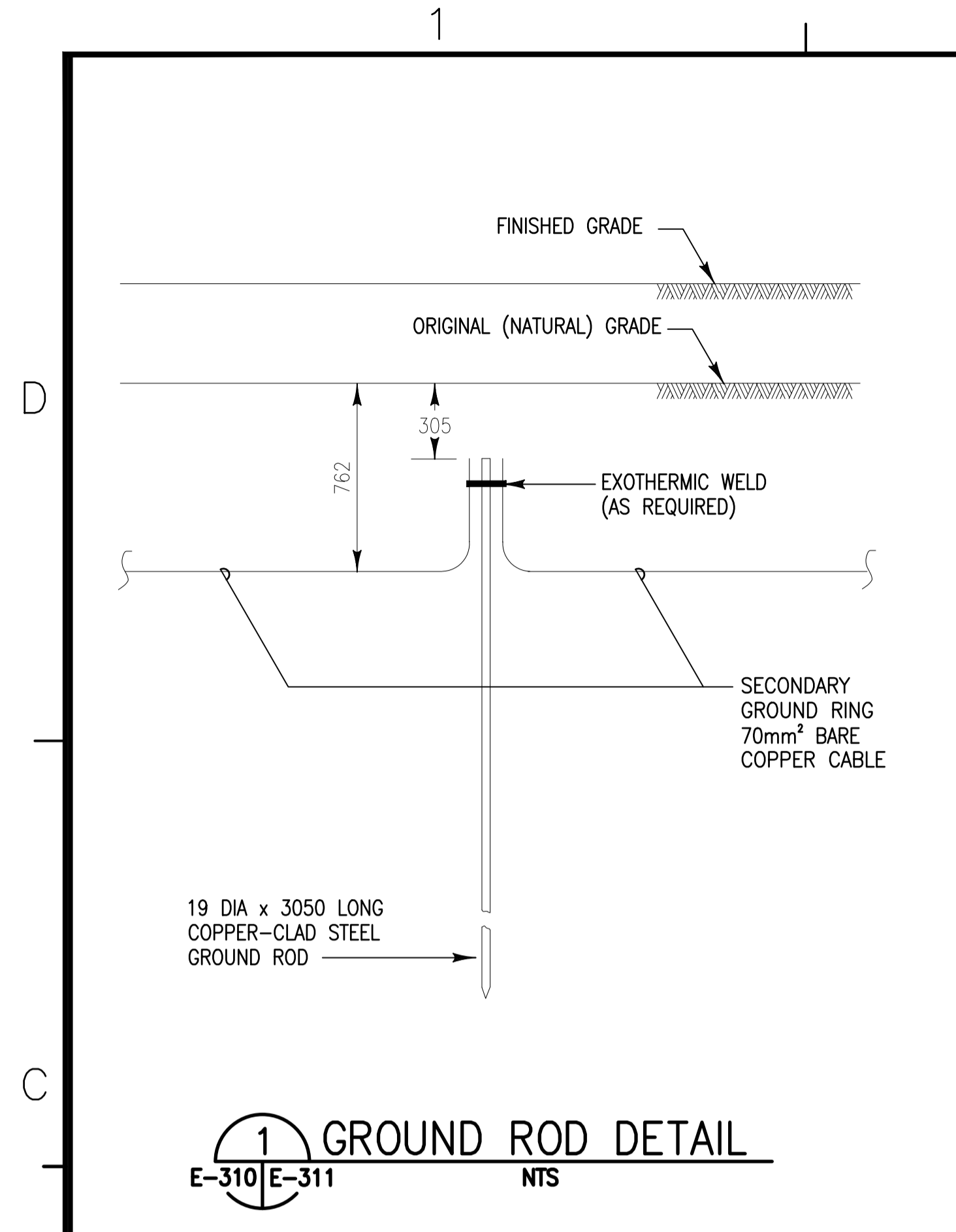
LIGHTNING PROTECTION AND GROUNDING ISOMETRIC

SCALE: NO SCALE

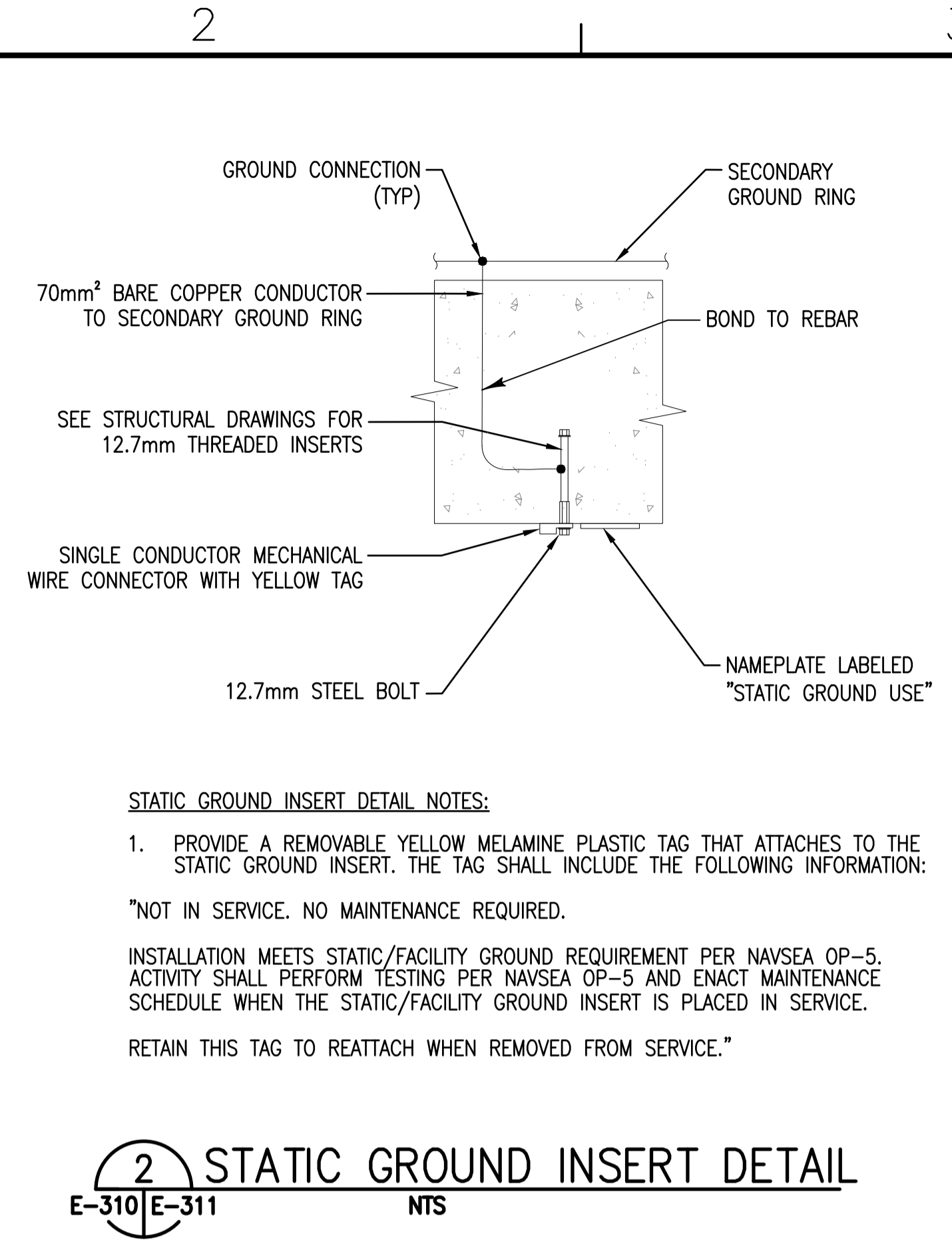
NOTES:

1. LIGHTNING PROTECTION SYSTEM (LPS) SHALL CONFORM TO NAVSEA OP-5. ALL METAL PARTS, TO INCLUDE REINFORCEMENT IN FLOOR, PRECAST WALLS AND ROOF PANELS, LOUVERS, VENTILATORS, DOORS AND DOOR FRAME, SHALL BE MADE ELECTRICALLY CONTINUOUS BY BONDING (WELDING) AT 1200mm INTERVALS. ELECTRICAL CONTINUITY SHALL BE PROVIDED ACROSS FLOOR EXPANSION AND ISOLATION JOINTS TO FOUNDATION PEDESTALS AT 1200mm INTERVALS. ELECTRICAL CONTINUITY BETWEEN WALL AND ROOF PRECAST PANELS, AND BETWEEN PRECAST WALLS AND CONCRETE PEDESTAL FOOTING SHALL BE PROVIDED DURING CONSTRUCTION.
2. PROVIDE ORDINANCE GROUND INSERT WITH 70mm² BARE COPPER IN 20mm PVC CONDUIT TO GROUND TEST WELL AS INDICATED. PROVIDE NAMEPLATE AND REMOVABLE TAG. SEE DETAIL 3 ON SHEET E-313
3. PROVIDE STATIC GROUND INSERT, NAMEPLATE AND REMOVABLE TAG AS INDICATED. SEE DETAIL 2 ON SHEET E-311.
4. DOWN CONDUCTORS FROM THE AIR TERMINAL AND VENTILATOR SHALL COURSE DIRECTLY TO THE SECONDARY GROUND RING, MINIMIZING CONDUCTOR LENGTH AND BENDS.
5. SEE DETAIL 5, SHEET E-311 FOR GROUND CONNECTION TO SHEET METAL (TYPICAL), DETAIL 6, SHEET E-311 FOR GROUNDING CONDUCTOR SUPPORT DETAILS (TYPICAL). SEE DETAIL 4 ON SHEET E-312 FOR WALL / FLOOR / ROOF BONDING DETAIL (TYPICAL), DETAIL 5 ON SHEET S-401 FOR WALL/ROOF BONDING DETAIL (TYPICAL), DETAIL 6 ON SHEET S-401 FOR WALL/FOOTING BONDING DETAIL (TYPICAL), AND DETAIL 2 ON SHEET S-401 FOR GROUND CONNECTION TO REINFORCING STEEL IN FLOOR (TYPICAL).
6. GROUNDING RODS MUST NOT BE LOCATED CLOSER THAN TWO TIMES THE LENGTH OF THE GROUND ROD.

APPROVED	DATE	09/14/22
FOR COMMANDER NAFAF	ACTIVITY	
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	SEK
BRANCH MANAGER	JTW	
DES. PROJ. DIR.	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION	
MODULAR STORAGE MAGAZINE	LIGHTNING PROTECTION AND GROUNDING ISOMETRIC	
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAFAF DRAWING NO.:	14116018	
SHEET	50	OF 53
E-310		



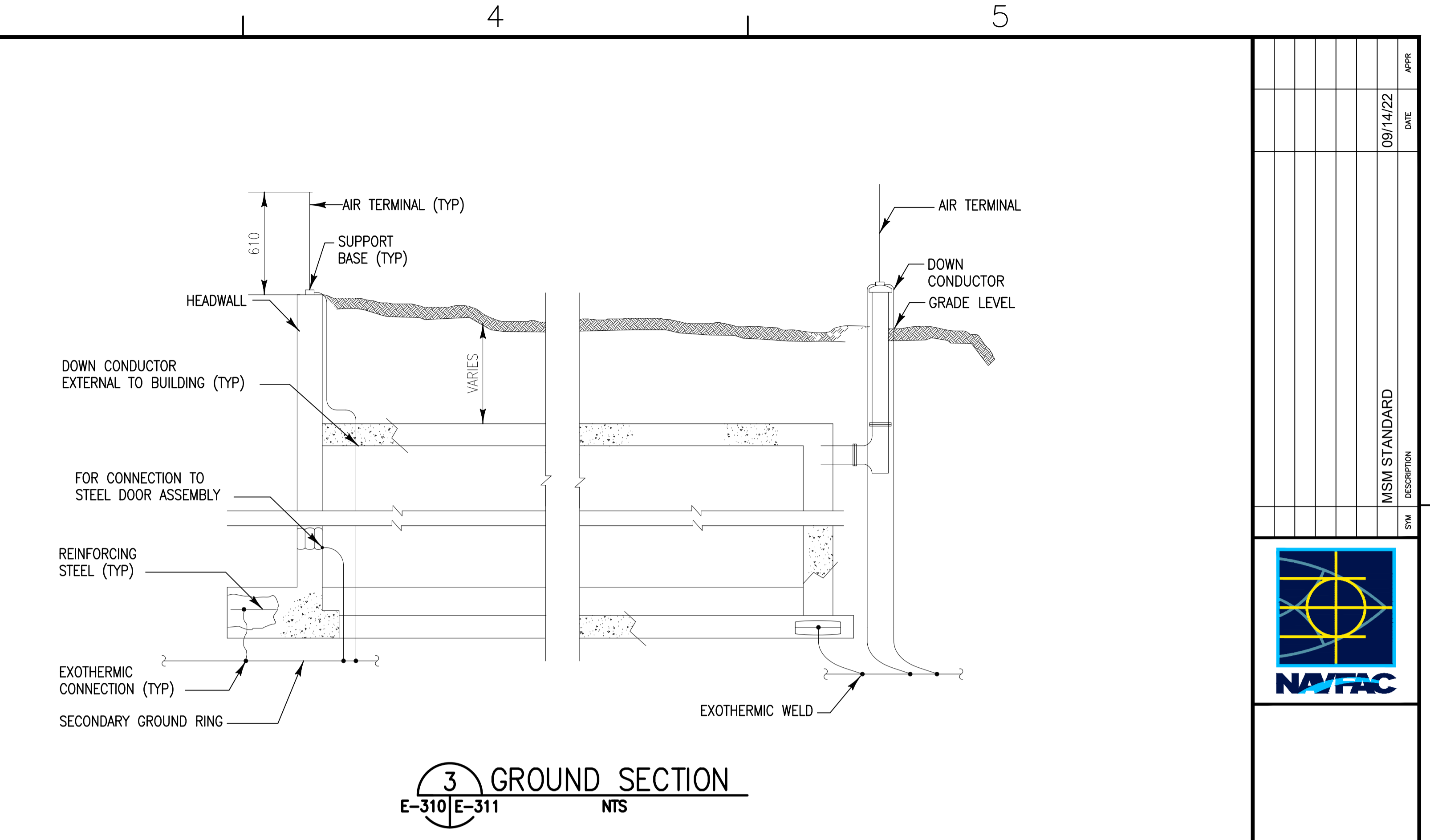
**1** GROUND ROD DETAIL  
E-310|E-311 NTS



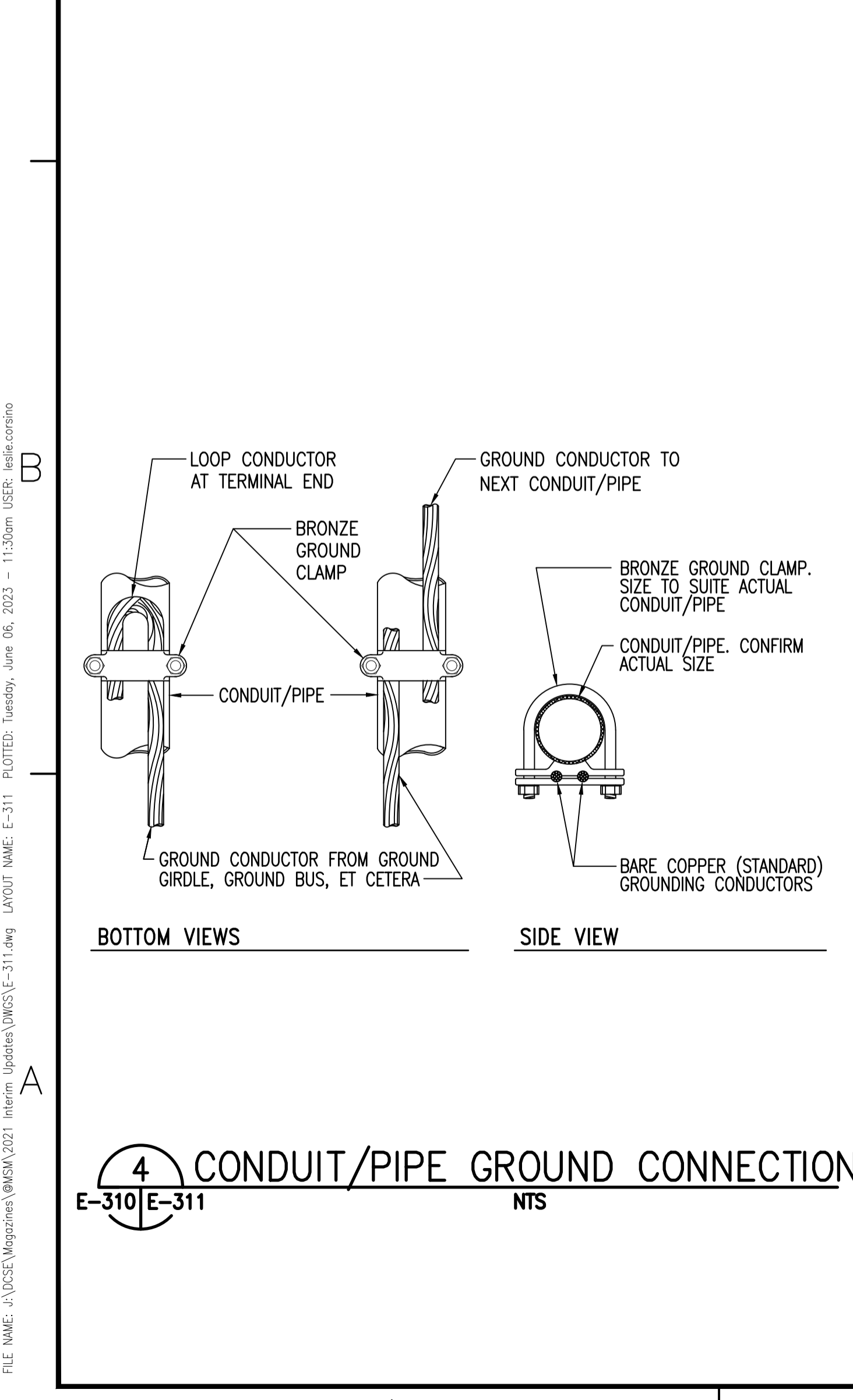
**2** STATIC GROUND INSERT DETAIL  
E-310|E-311 NTS

**STATIC GROUND INSERT DETAIL NOTES:**

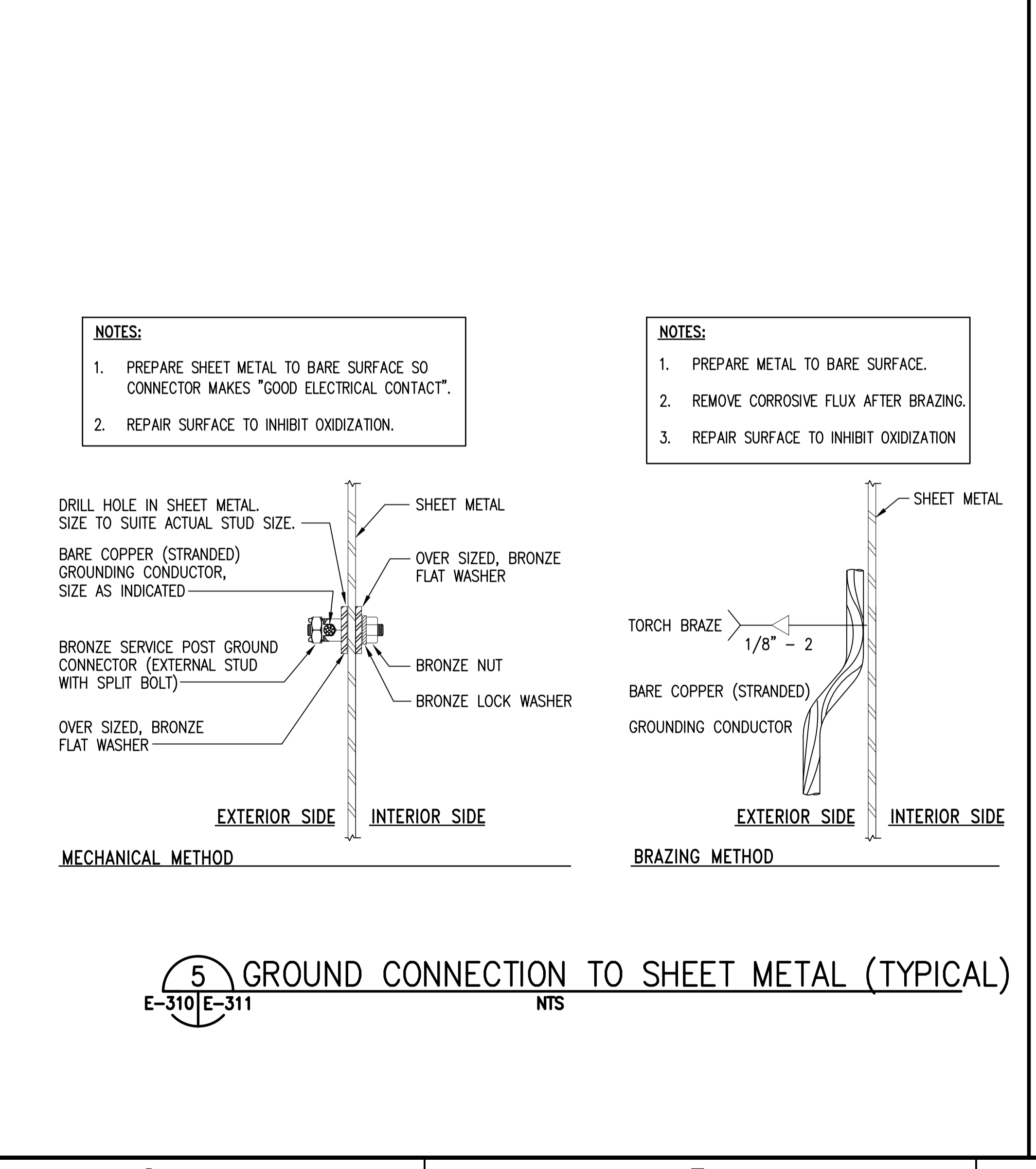
1. PROVIDE A REMOVABLE YELLOW MELAMINE PLASTIC TAG THAT ATTACHES TO THE STATIC GROUND INSERT. THE TAG SHALL INCLUDE THE FOLLOWING INFORMATION:  
"NOT IN SERVICE. NO MAINTENANCE REQUIRED."  
INSTALLATION MEETS STATIC/FACILITY GROUND REQUIREMENT PER NAVSEA OP-5. ACTIVITY SHALL PERFORM TESTING PER NAVSEA OP-5 AND ENACT MAINTENANCE SCHEDULE WHEN THE STATIC/FACILITY GROUND INSERT IS PLACED IN SERVICE.  
RETAIN THIS TAG TO REATTACH WHEN REMOVED FROM SERVICE."



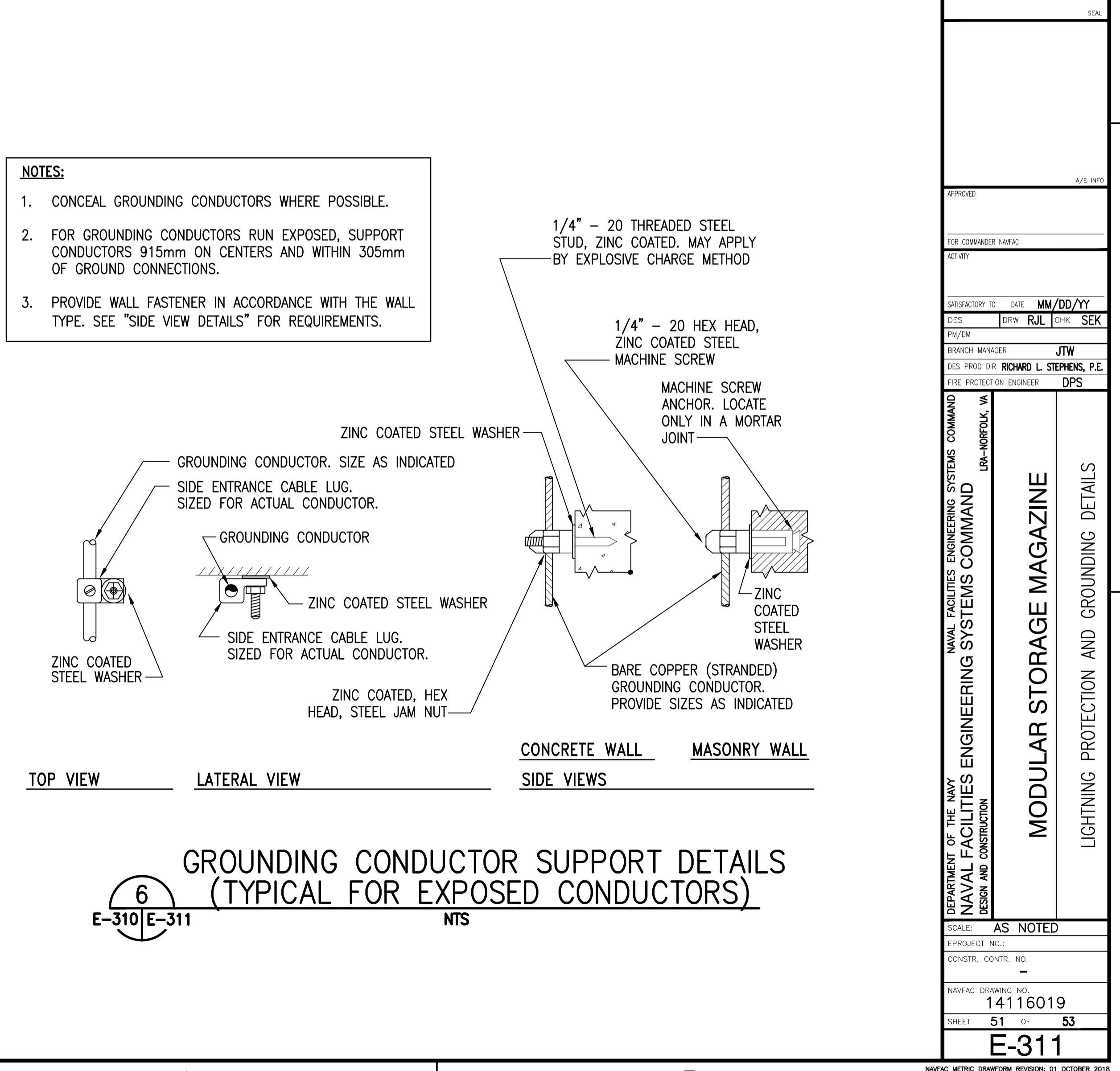
**3** GROUND SECTION  
E-310|E-311 NTS



**4** CONDUIT/PIPE GROUND CONNECTION  
E-310|E-311 NTS



**5** GROUND CONNECTION TO SHEET METAL (TYPICAL)  
E-310|E-311 NTS



**6** GROUNDING CONDUCTOR SUPPORT DETAILS (TYPICAL FOR EXPOSED CONDUCTORS)  
E-310|E-311 NTS

**NOTES:**

1. CONCEAL GROUNDING CONDUCTORS WHERE POSSIBLE.
2. FOR GROUNDING CONDUCTORS RUN EXPOSED, SUPPORT CONDUCTORS 915mm ON CENTERS AND WITHIN 305mm OF GROUND CONNECTIONS.
3. PROVIDE WALL FASTENER IN ACCORDANCE WITH THE WALL TYPE. SEE "SIDE VIEW DETAILS" FOR REQUIREMENTS.

FILE NAME: J:\USSE\Magazines\NAMESA\2021\Interim\Updates\UNOS\E-311.dwg LAYOUT NAME: E-311 PLOTTED: Tuesday, June 06, 2023 - 11:30am USER: jehlicoriano

APPROVED	DATE	09/14/22
FOR COMMANDER NAFAC	SYN	DESCRIPTION
SATISFACTORY TO	DATE	MM/DD/YY
DESIGNED BY	CHK	SEK
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND DESIGN AND CONSTRUCTION JEA-HOBOKEN, VA		
<b>MODULAR STORAGE MAGAZINE</b> LIGHTNING PROTECTION AND GROUNDING DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAVFAC DRAWING NO.:	14116019	
SHEET	51	OF 53
<b>E-311</b>		
NAVFAC METRIC DRAWING REVISION: 01 OCTOBER 2018		

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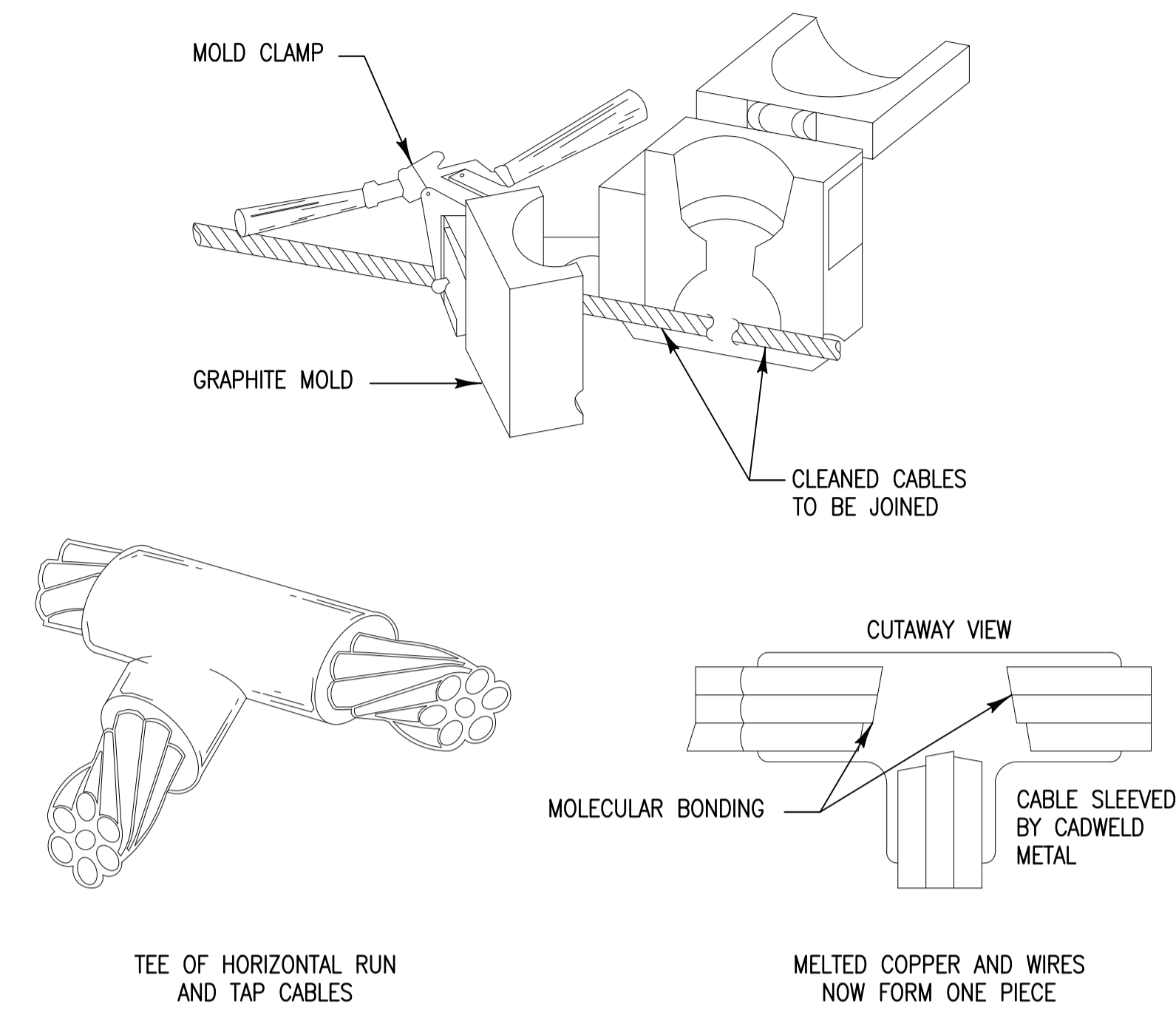
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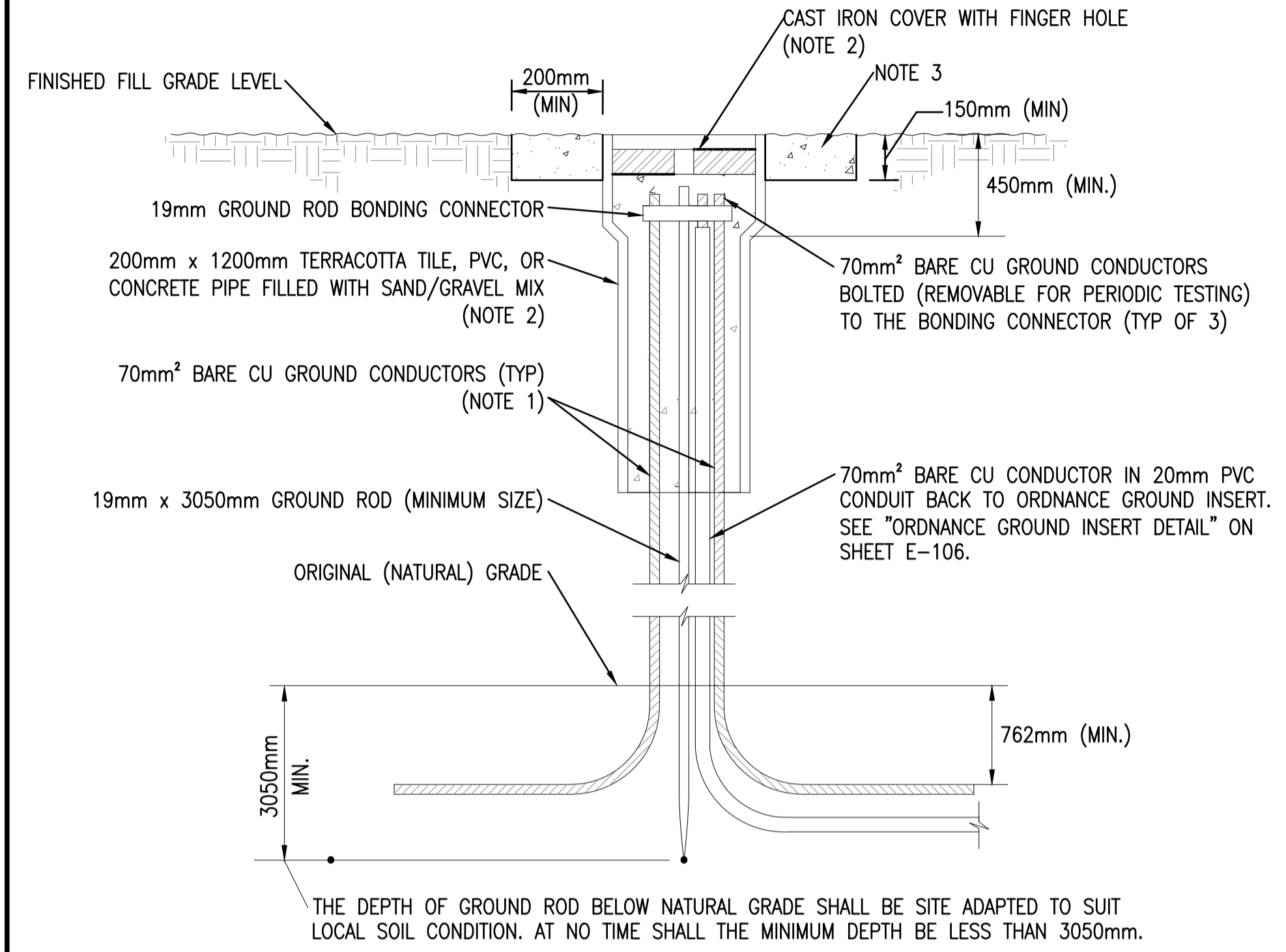
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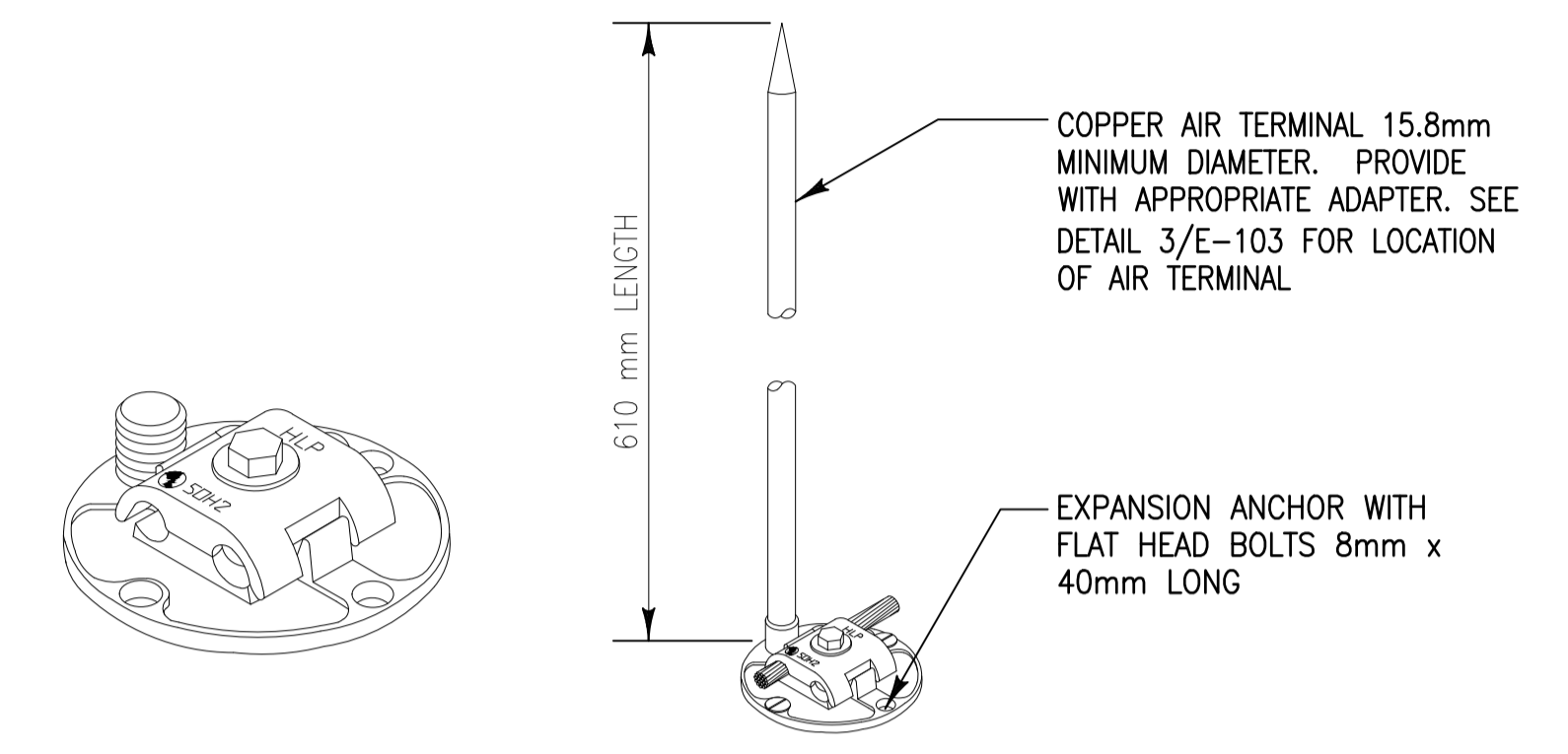
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**1** EXOTHERMIC WELD DETAILS  
E-310 | E-312 NTS



**2** GROUND TEST WELL INSTALLATION IN EARTH DETAIL  
E-310 | E-312 NTS

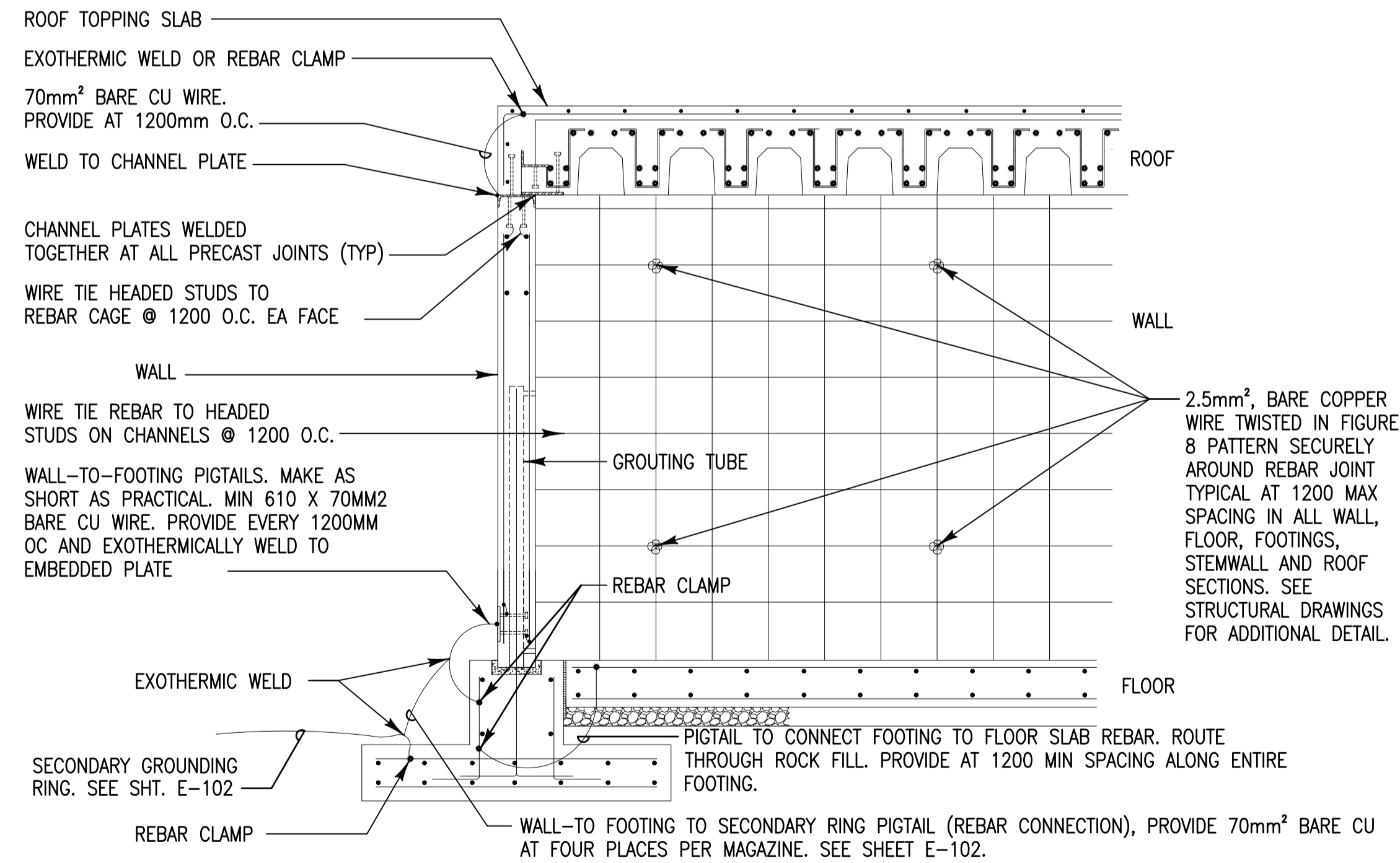


PRESSURE CABLE CONNECTOR ACCOMMODATES ONE OR TWO LIGHTNING CONDUCTORS. 9.5 MOUNTING HOLES ARE PROVIDED FOR SECURE MOUNTING TO ANY FLAT SURFACE. 15.8 STUD ENGAGES ALL AIR TERMINAL ADAPTERS.

**3** AIR TERMINAL MOUNTING DETAIL  
E-310 | E-312 NTS

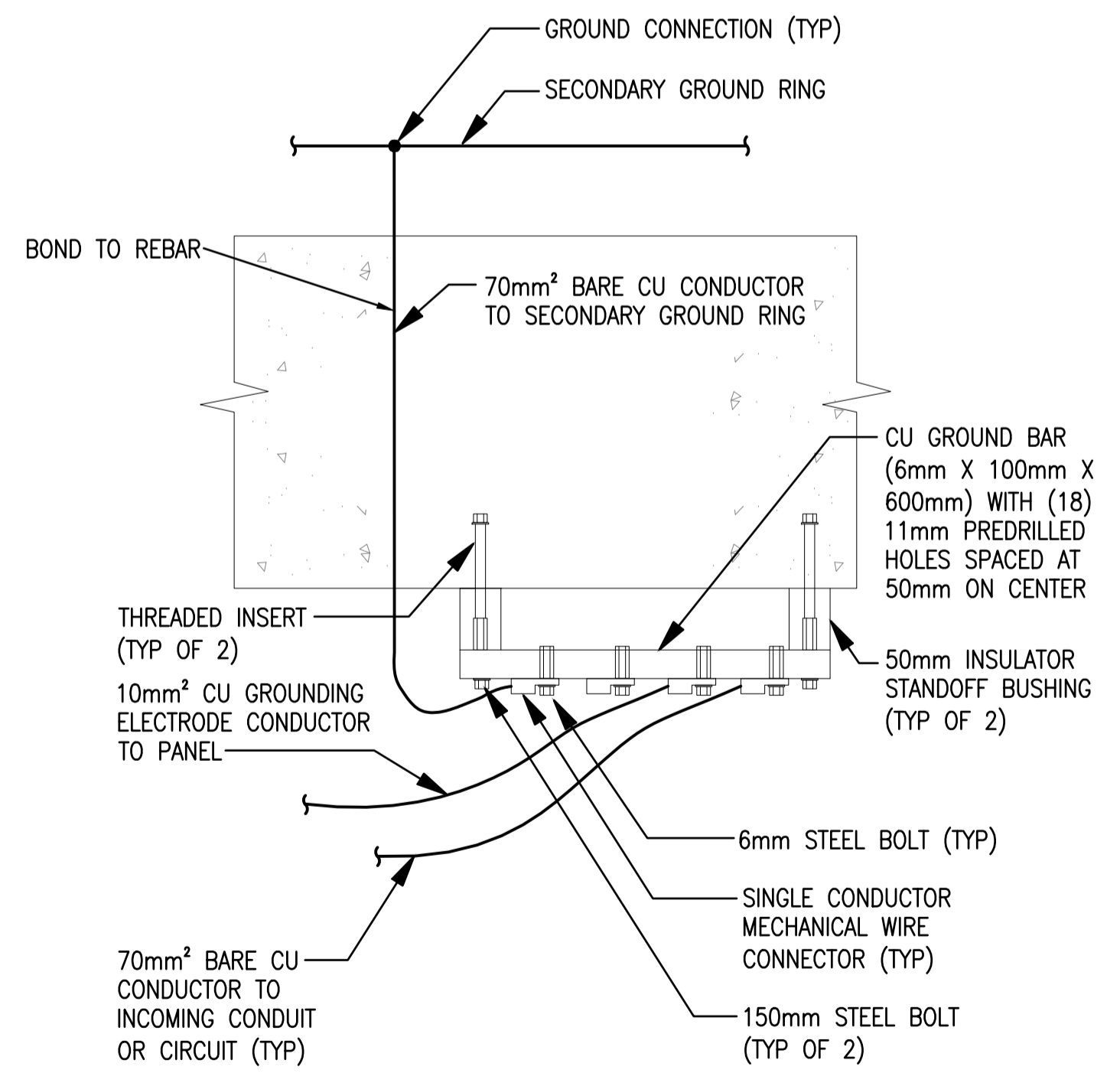
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**NOTES:**  
1. TACK WELDS MAY BE USED AS AN ALTERNATE BONDING METHOD.  
2. BONDING AND GROUNDING NOTE: ELECTRICAL BONDING REQUIREMENTS INTERNAL TO PRECAST ROOF AND WALL PANELS SHALL BE PROVIDED BY THE PRECAST MANUFACTURER IN ACCORDANCE WITH THE STRUCTURAL DRAWINGS. ELECTRICAL BONDING REQUIREMENTS EXTERNAL TO PRECAST PANELS AND WITHIN CAST-IN-PLACE CONCRETE SLABS SHALL BE FIELD INSTALLED.

**4** WALL/FLOOR/ROOF BONDING DETAIL (TYPICAL)  
E-310 | E-312 NTS



**6** SINGLE POINT GROUND BAR DETAIL  
E-310 | E-312 NTS

APPROVED	DATE	09/14/22
FOR COMMANDER NAFAC	DESCRIPTION	MSM STANDARD
ACTIVITY	SYN	
SATISFACTORY TO DATE	MM/DD/YY	
DRAWN	RJL	CHK
SEK		
TPM/DM		
BRANCH MANAGER	JTW	
DES PROD DIR	ROBERT L. STEPHENS, P.E.	
FIRE PROTECTION ENGINEER	DPS	
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	LDN-HORRUBUK, VA	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND	
DESIGN AND CONSTRUCTION		
<b>MODULAR STORAGE MAGAZINE</b>		
LIGHTNING PROTECTION AND GROUNDING DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:		
CONSTR. CONTR. NO.:		
NAVFAC DRAWING NO.:	14116020	
SHEET	52	OF 53
<b>E-312</b>		

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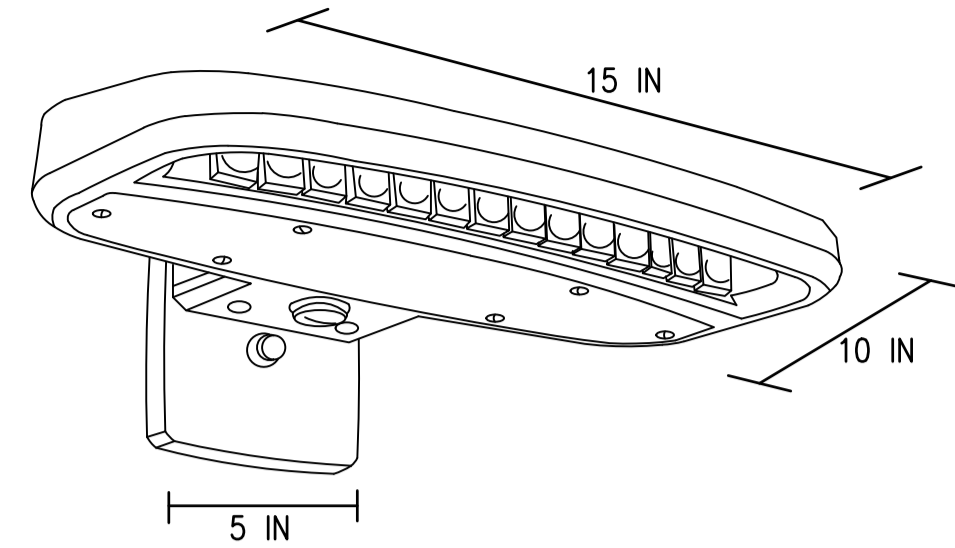
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**LUMINAIRE REQUIREMENTS:**

- HOUSING – DIE-CAST OR EXTRUDED ALUMINUM WITH INTEGRAL PASSIVE COOLING MECHANISM. HEAT SINK SHALL BE INCORPORATED DIRECTLY INTO HOUSING OR DRIVER COMPARTMENT TO ENSURE MAXIMUM HEAT TRANSFER AND DISSIPATION.
- FINISH – MULTI-STAGE PRE-TREATMENT, FINISHED WITH BAKED-ON POLYESTER POWDER COAT. FINISH SHALL PASS 2500 HOUR SALT SPRAY TEST PER ASTM B117. STANDARD FINISH IS DARK BRONZE, WITH OTHER CUSTOM COLORS AVAILABLE.
- POWER SUPPLY/LED DRIVER – CLASS 1 DRIVER SHALL OPERATE AT 120/277 VOLTS, 50/60 HZ, WITH OTHER VOLTAGES OPTIONAL; POWER FACTOR GREATER THAN 0.9 AND THD LESS THAN 20% AT FULL LOAD. MINIMUM EFFICACY SHALL BE 60 LM/W AT MAXIMUM 600mA OPERATING CURRENT.
- LED OPTICAL ASSEMBLY – PRECISION MOLDED ACRYLIC LENS PROVIDED FOR MULTIPLE HIGH-POWERED LEDS PRODUCING NEMA TYPE III DISTRIBUTION OR AS OTHERWISE INDICATED. BUG UPLIGHT RATING OF U0, WITH GLARE RATING AS DETERMINED BY LIGHTING ZONE INSTALLED. MINIMUM COLOR RENDERING INDEX (CRI) SHALL BE 70 FOR CORRELATED COLOR TEMPERATURE (CCT) OF 4000-4500 DEGREES K.
- CERTIFICATION – UL AND/OR ETL LISTED FOR DAMP OR WET LOCATIONS AS INDICATED, AND RoHS COMPLIANT.
- OPTIONS – VARIOUS LUMEN OUTPUT RATING AS INDICATED, PHOTOCCELL, AND 0-10 VOLT DIMMING DRIVER.
- OTHER – THE ABOVE SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS AND IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER'S PREFERENCE. ALL DIMENSIONS ARE NOMINAL AND VARY PER MANUFACTURER.

**LED WALL PACK**

REVISED: MARCH 2013 LUMINAIRE PLATE: **XL-17**

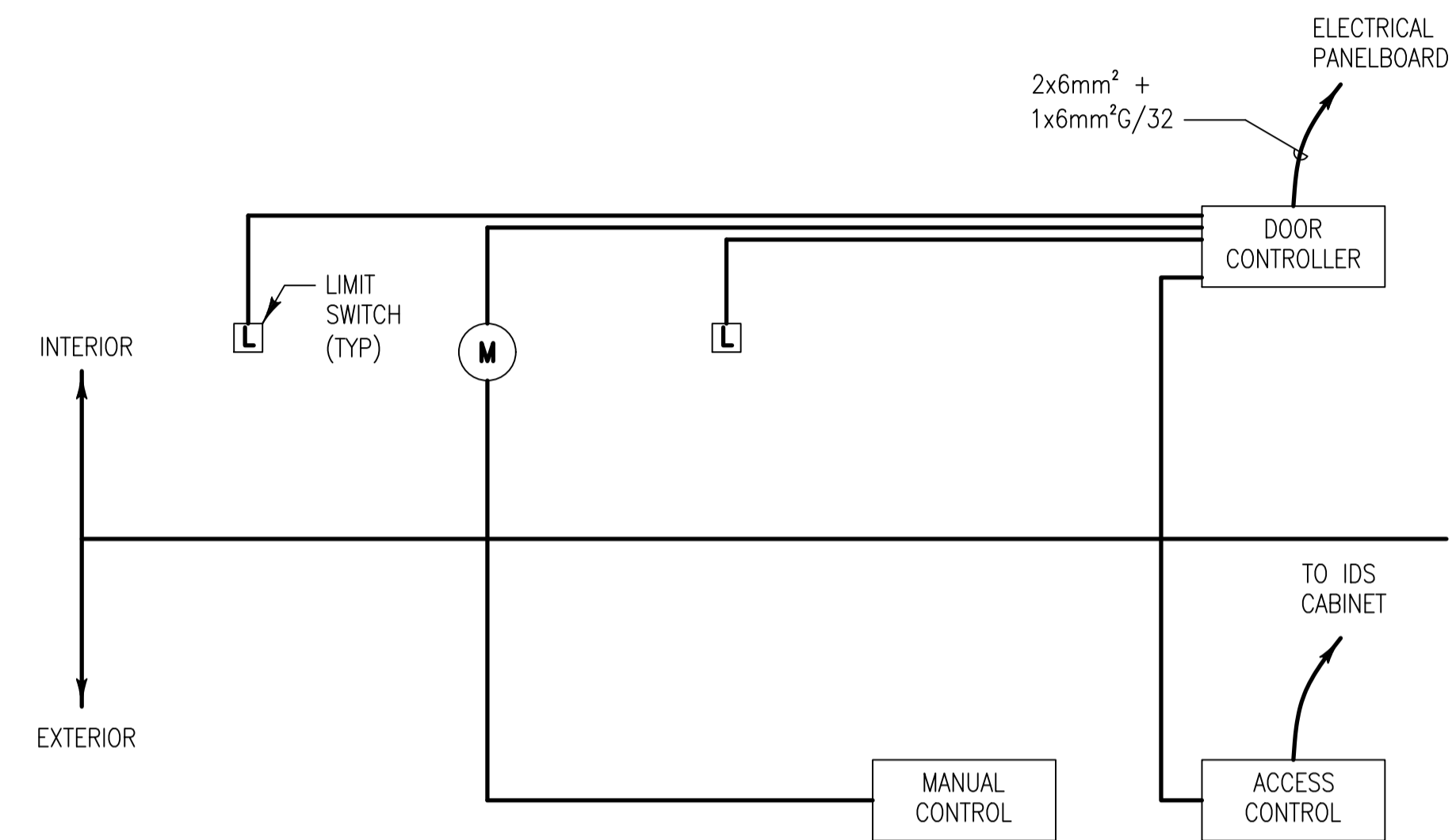


**LUMINAIRE REQUIREMENTS:**

- HOUSING – FIBERGLASS OR FIBERGLASS-REINFORCED POLYESTER OUTER HOUSING, WITH ALUMINUM COMPONENT TRAY AND HEAT SINK. OPTIONAL LENGTHS OF 4FT OR 8FT.
- LENS – IMPACT-RESISTANT ACRYLIC OR OPTIONAL POLYCARBONATE, WITH CONTINUOUS CLOSED-CELL POLYURETHANE GASKET, SECURED WITH STAINLESS STEEL OR POLYCARBONATE LATCHES.
- LIGHT SOURCE – SOLID STATE LEDS WITH MINIMUM 50K HOURS RATED LIFE AT L70, 3500K CCT UON, MINIMUM 80 CRI, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY, AND MINIMUM EFFICACY OF 100 LUMENS/WATT. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
- DRIVER – REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. ON-OFF CONTROL, STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED.
- CERTIFICATION – UL 1598, WET LOCATION (IP65, IP66, IP67), DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
- MOUNTING – SURFACE-MOUNTED OR SUSPENDED FROM CEILING.
- OPTIONS – POWER CORD, INTEGRAL MOTION SENSOR, EMERGENCY BACK-UP.
- THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

**LED ENCLOSED AND GASKETED**

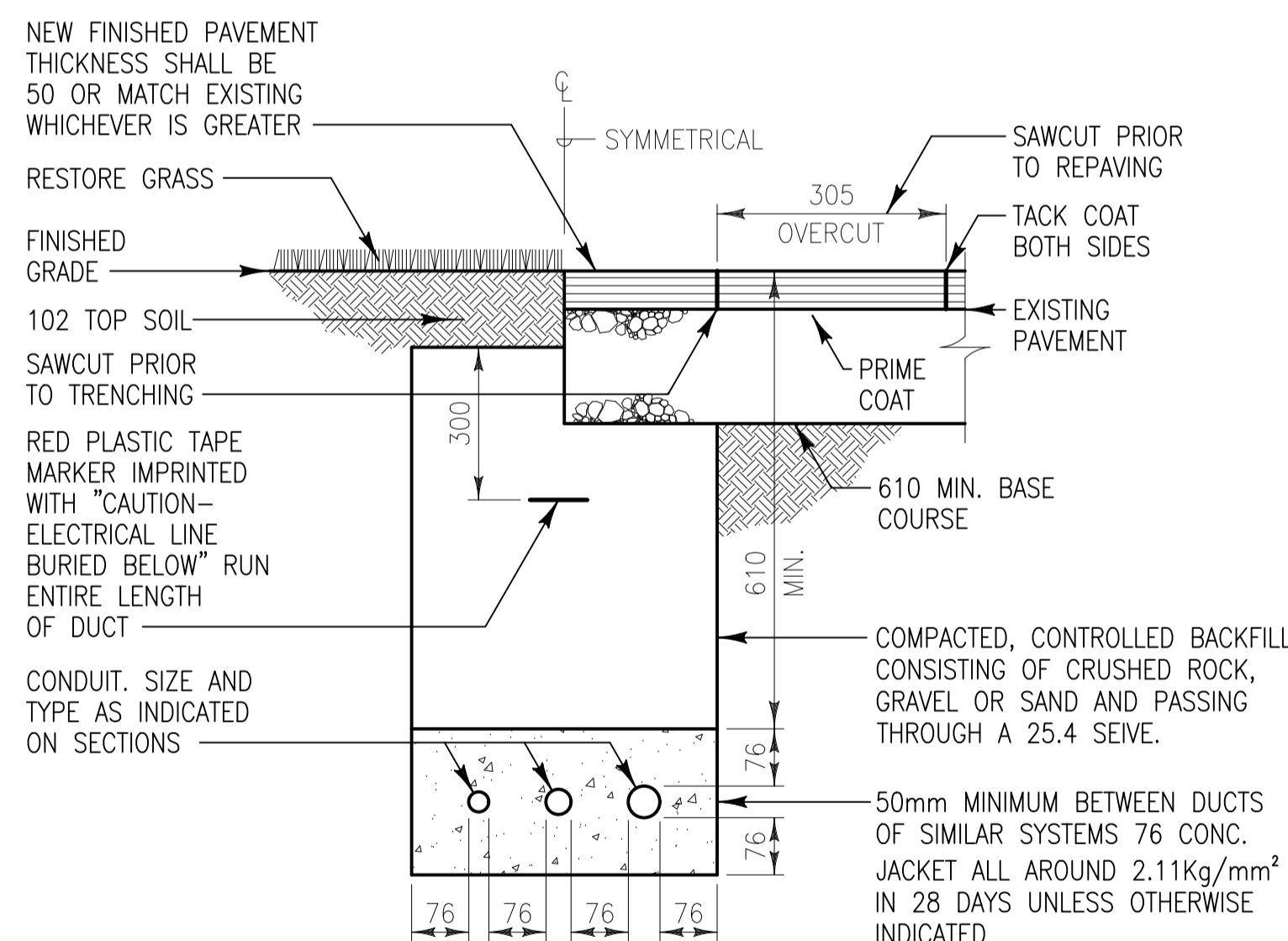
REVISED: APRIL 2016 LIGHTING PLATE: **NL-11**



**NOTE:**

- VERIFY FIELD WIRING WITH DOOR MANUFACTURER.
- USE IDS INPUT FOR AUTOMATIC DOOR CONTROL.

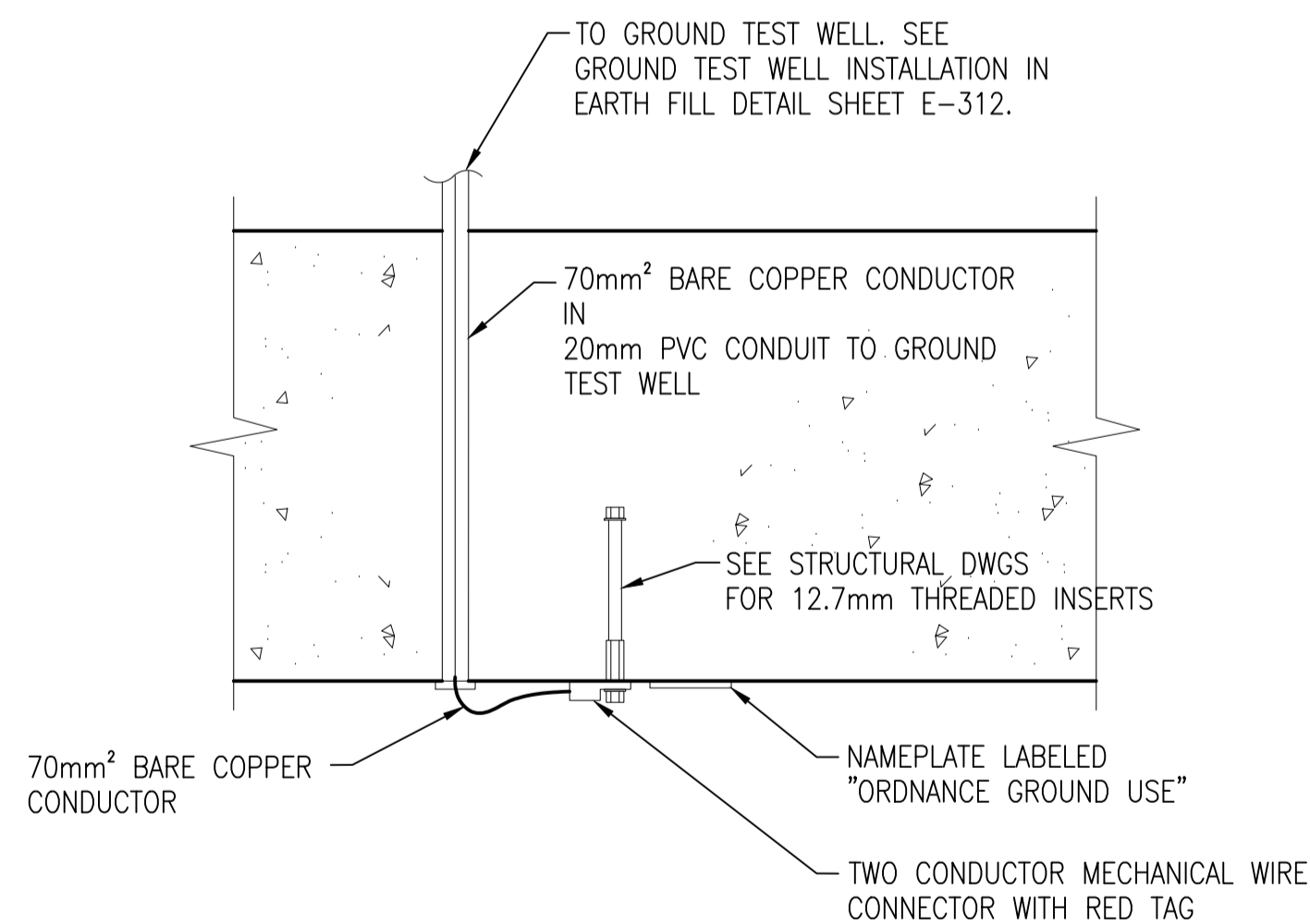
**1 DOOR CONTROL DIAGRAM**  
E-210|E-313 NTS



**DUCT SECTION NOTES:**

- 50mm MINIMUM SEPARATION BETWEEN DUCTS OF SIMILAR SYSTEMS (I.E. ELECTRIC-ELECTRIC).
- ALL DIMENSIONS, COVER REQUIREMENTS, ETC. TYPICAL UNLESS OTHERWISE NOTED.
- PAVEMENT REPAIRS
  - BASE COURSE: CRUSHED GRAVEL OR STONE.
  - BITUMINOUS PRIME COAT: ASTM D977, TYPE SS-1
  - BITUMINOUS TACK COAT: ASTM D977, TYPE SS-1
  - ASPHALTIC CONCRETE: ASTM 3515 TABLE II, TYPE II, 100% PASSING 13 SIEVE, AR 8000 VISCOSITY GRADE ASPHALT CONCRETE, ROLL AND COMPACT NOT LESS THAN 95% OF MAXIMUM DENSITY PER ASTM D2041.

**2 TYPICAL DUCT SECTION**  
E-210|E-313 NTS



**ORDNANCE GROUND INSERT DETAIL NOTES:**

- PROVIDE A REMOVABLE RED MELAMINE PLASTIC TAG THAT ATTACHES TO THE ORDNANCE GROUND INSERT. THE TAG SHALL INCLUDE THE FOLLOWING INFORMATION:  
"NOT IN SERVICE. NO MAINTENANCE REQUIRED."  
INSTALLATION MEETS ORDNANCE GROUND REQUIREMENT PER NAVSEA OP-5. ACTIVITY SHALL PERFORM TESTING PER NAVSEA OP-5 AND ENACT MAINTENANCE SCHEDULE WHEN THE ORDNANCE GROUND INSERT IS PLACED IN SERVICE.  
RETAIN THIS TAG TO REATTACH WHEN REMOVED FROM SERVICE."
- MAINTAIN THREADED INSERT ISOLATION. DO NOT ALLOW THE THREADED INSERT TO TOUCH REBAR OR OTHER METALLIC OBJECTS IN THE WALL.

**3 ORDNANCE GROUND INSERT DETAIL**  
E-310|E-313

LUMINAIRE TYPE	LIGHTING PLATE NO.	LIGHT SOURCE	VOLTAGE	MOUNTING	NOTES	LUMEN OUTPUT
△	NL-11	LED	120	SURFACE CEILING MOUNTED, UON	1	12000
△	XL-17	LED	120	SURFACE-MOUNTED 4270 mm AFG, UON	2	3600

**LUMINAIRE SCHEDULE NOTES**

- INCLUDE OPTIONAL NON-DIMMING DRIVER, 3500K COLOR TEMP, STAINLESS STEEL LATCHES AND MOUNTING BRACKET, AND FROSTED, IMPACT-RESISTANT ACRYLIC LENS.
- INCLUDE OPTIONAL NON-DIMMING DRIVER, WET LOCATION RATING, 4000K COLOR TEMP, AND DARK BRONZE FINISH.

APPROVED: \_\_\_\_\_ DATE: 09/14/22

FOR COMMANDER NAFAC: \_\_\_\_\_

ACTIVITY: \_\_\_\_\_

SATISFACTORY TO: DATE: MM/DD/YY

DESIGNED BY: R.J.L. CHECKED BY: SEK

BRANCH MANAGER: JTW

DESIGN PRODUCTION OFFICER: RICHARD L. STEPHENS, P.E.

FIRE PROTECTION ENGINEER: DPS

DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND  
DESIGN AND CONSTRUCTION  
LDA-HORRDLK, VA

MODULAR STORAGE MAGAZINE  
ELECTRICAL DETAILS, LUMINAIRE SCHEDULE

SCALE: AS NOTED

PROJECT NO.: \_\_\_\_\_

CONSTR. CONTR. NO.: \_\_\_\_\_

NAVFAC DRAWING NO.: 14116021

SHEET 53 OF 53

**E-313**

NAVFAC METRIC DRAWING REVISION: 01 OCTOBER 2018

FILE NAME: J:\USSE\Magazines\WMSM\2021 Interim Updates\WMSV-E-313.dwg LAYOUT NAME: E-313 PLOTTED: Tuesday, June 06, 2023 - 11:30am USER: rickicoriano