GENERAL STRUCTURAL NOTES

1.0 GENERAL

1. THE DESIGN OF THIS PROJECT WAS PREPARED USING THE LATEST EDITIONS AS OF JULY 23, 2015 OF THE FOLLOWING RESOURCES AND REFERENCE MATERIALS:
   - A. "2015 INTERNATIONAL BUILDING CODE", INTERNATIONAL CODE COUNCIL.
   - B. "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES", ASCE 7-10 AMERICAN SOCIETY OF CIVIL ENGINEERS.
   - C. "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-14)", AMERICAN CONCRETE INSTITUTE.
   - D. "STEEL CONSTRUCTION MANUAL", AMERICAN INSTITUTE OF STEEL CONSTRUCTION, 14TH EDITION, 2011.
   - E. "STRUCTURAL WELDING CODE – STEEL", AWS D1.1-2015.
   - F. "DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS AND ROOF DECKS – NO. 31", 2007, STEEL DECK INSTITUTE.
   - G. "BUILDING CODE REQUIREMENTS AND SPECIFICATIONS FOR MASONRY STRUCTURES" (ACI 530-11), AMERICAN CONCRETE INSTITUTE.
   - H. UNITED FACILITIES CRITERIA:
     - UFC 1-200-01, "GENERAL BUILDING REQUIREMENTS"
     - UFC 1-300-09N, "DESIGN PROCEDURES", MAY 15, 2014
     - UFC 3-301-01, "STRUCTURAL ENGINEERING", INCLUDING CHANGE 1, MAY 15, 2014
     - UFC 3-320-06A, "CONCRETE FLOOR SLABS ON GRADE SUBJECT TO HEAVY LOADS
     - UFC 4-211-01N "AIRCRAFT MAINTENANCE HANGARS: TYPE I, TYPE II, AND TYPE III, INCLUDING CHANGE 3, DECEMBER 16, 2009
2. REPEAT WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES.
3. JOB SITE SAFETY AND CONSTRUCTION PROCEDURES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
4. PROVIDE FOR DEWATERING AS REQUIRED DURING EXCAVATION AND CONSTRUCTION.
5. COORDINATE OPENINGS, SLEEVES, CONCRETE HOUSEKEEPING PADS AND INSERTS SHOWN ON THE ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION DRAWINGS.
6. ALL COSTS OF INVESTIGATION AND/OR REDESIGN DUE TO CONTRACTOR IMPROPER INSTALLATION OF STRUCTURAL ELEMENTS OR OTHER ITEMS NOT IN CONFORMANCE WITH THE CONTRACT DOCUMENTS ARE AT THE CONTRACTOR'S EXPENSE.
7. USE THE STRUCTURAL DRAWINGS IN CONJUNCTION WITH THE SPECIFICATIONS, ARCHITECTURAL, CIVIL, MECHANICAL, ELECTRICAL AND FIRE PROTECTION DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN DRAWINGS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE CONTRACTING OFFICER PRIOR TO PERFORMING THE WORK.
8. VERIFY ALL EXISTING BUILDING INFORMATION SHOWN (DIMENSIONS, ELEVATIONS, ETC.) AND NOTIFY THE CONTRACTING OFFICER OF ANY DISCREPANCIES PRIOR TO FABRICATION OF ANY STRUCTURAL COMPONENT.
9. IF THE EXISTING FIELD CONDITIONS DO NOT PERMIT THE INSTALLATION OF THE WORK IN ACCORDANCE WITH THE DETAILS SHOWN, THE CONTRACTOR MUST NOTIFY THE CONTRACTING OFFICER IMMEDIATELY AND PROVIDE A SKETCH OF THE CONDITION WITH HIS PROPOSED MODIFICATION OF THE DETAILS GIVEN ON THE CONTRACT DOCUMENTS. DO NOT COMMENCE WORK UNTIL CONDITION IS RESOLVED AND WRITTEN DIRECTION FROM THE CONTRACTING OFFICER IS PROVIDED.
10. DETERMINE ALLOWABLE CONSTRUCTION LOADS AND PROVIDE DESIGN AND CONSTRUCTION OF FALSEWORK, FORMWORK, STAGINGS, BRACING, SHEETING, AND SHORING, ETC.
11. PROVIDE SHEETING, BRACING, AND UNDERPINNING AS NECESSARY TO PREVENT ANY LATERAL OR VERTICAL MOVEMENTS OF EXISTING BUILDINGS, STREETS, AND ANY EXISTING UTILITY LINES.
12. PROVIDE BRACING, SHEETING, SHORING, ETC., REQUIRED TO ENSURE THE STRUCTURAL INTEGRITY OF THE EXISTING BUILDINGS OR NEW CONSTRUCTION, SIDEWALKS, UTILITIES, ETC., DESIGNED BY A PROFESSIONAL ENGINEER ENGAGED BY THE CONTRACTOR. PREPARE DETAILED SIGNED AND SEALED SHOP DRAWINGS INDICATING ALL WORK TO BE PERFORMED. SUBMIT THE SHOP DRAWINGS IN ACCORDANCE WITH THE CONTRACT REQUIREMENTS.
13. THE DRAWINGS HAVE BEEN PRODUCED ENTIRELY ON PENNONI CADD SYSTEM. ANY OTHER LETTERING, LINES OR SYMBOLS, OTHER THAN PROFESSIONAL STAMPS AND SIGNATURES, HAVE BEEN MADE WITHOUT THE AUTHORIZATION OF PENNONI ARE INVALID.
14. THE STRUCTURAL DRAWINGS GOVERN THE WORK FOR ALL STRUCTURAL FEATURES, UNLESS NOTED OTHERWISE.

WIND DESIGN LOADS 2015 INTERNATIONAL BUILDING CODE, ASCE 7-10/UFC 3-301-01		
DESCRIPTION	SYMBOL	VALUE
ULTIMATE WIND SPEED	V	121 mph
OCCUPANCY CATEGORY	--	II
WIND LOAD IMPORTANCE FACTOR	IW	1.00
WIND EXPOSURE CATEGORY	--	C

SNOW DESIGN LOADS		
DESCRIPTION	SYMBOL	VALUE
GROUND SNOW LOAD	Pg	10 PSF
SNOW EXPOSURE FACTOR	Ce	0.8
SNOW LOAD IMPORTANCE FACTOR	Is	1.0
THERMAL FACTOR	Ct	1.1
SNOW SLOPE FACTOR	Cs	1.0
ROOF SNOW LOAD (1)	Pf	10 PSF

ICE LOADS		
DESCRIPTION	SYMBOL	VALUE
CONCURRENT WIND SPEED	Vc	36 PSF
IMPORTANCE FACTOR	Ii \Iw	1.00\1.0
NOMINAL ICE THICKNESS	t	0.5"
TOPOGRAPHIC FACTOR	KZt	1.0
ICE HEIGHT FACTOR	fZ AT 6"	1.06
DESIGN ICE THICKNESS	td	1.06"

FLOOR DESIGN LOADS	
DEAD LOAD (1)	
DESCRIPTION	VALUE (PSF)
SUSPENDED CEILING	5
SUSPENDED MECHANICAL / SPRINKLER	10
TOTAL	15
LIVE LOAD	
ROOF	20
MECHANICAL ROOMS	125
SECOND FLOOR	80
STAIRS	100
HANGER FLOOR	200
CONCENTRATED LOADS	
DESCRIPTION	VALUE(KIPS)
AIRCRAFT WHEEL LOAD	100

(1) SELF WEIGHT OF STRUCTURAL COMPONENTS (BEAMS, SLABS, COLUMNS) ARE INCLUDED SEPARATELY U.N.O.
(2) REDUCED LIVE LOAD PER SHEET NOTES ON S-1 OF THE EXISTING 1986 CONTRACT DRAWINGS "N62470-84-B-4081"

ROOF DESIGN LOADS	
DEAD LOAD (1)	
DESCRIPTION	VALUE (PSF)
ROOFING & INSULATION	5
ROOF DECK	2
SUSPENDED MECHANICAL / SPRINKLER	5
TOTAL	12
LIVE LOAD	
ROOF LIVE LOAD	20

(1) SELF WEIGHT OF STRUCTURAL COMPONENTS (BEAMS, SLABS, COLUMNS) ARE INCLUDED SEPARATELY U.N.O.

2.0 EARTHWORK

1. PERFORM EXCAVATION SO AS NOT TO DISTURB EXISTING BUILDING FOUNDATIONS AND UTILITY LINES. VERIFY LOCATION OF ALL UTILITIES PRIOR TO COMMENCEMENT OF WORK. HAND EXCAVATE AROUND UTILITIES AS REQUIRED.
2. SATISFACTORY FILL MATERIALS ARE THOSE COMPLYING WITH ASTM D2487, GROUPS GW, GP, GM, SM, SW, AND SP. TEST ON SITE BORROW MATERIAL TO DETERMINE SUITABILITY FOR USE AS FILL MATERIAL.
3. COMPACT SOIL TO NOT LESS THAN THE FOLLOWING PERCENTAGES OF MAXIMUM DENSITY OF MODIFIED PROCTOR (ASTM D1557):

   UNDER BUILDING SLABS, STEPS, PAVEMENTS – 95%

3.0 FOUNDATIONS

1. FOUNDATIONS HAVE BEEN DESIGNED AND FOOTING ELEVATIONS ESTABLISHED IN ACCORDANCE WITH THE INFORMATION SHOWN ON THE EXISTING BUILDING DRAWINGS AND IN ACCORDANCE WITH IBC 2015 SECTION 1806. A NEW SUBSURFACE INVESTIGATION REPORT, WITH FOUNDATION RECOMMENDATIONS, HAS NOT BEEN PROVIDED FOR THIS PROJECT AT THIS TIME.
2. SLABS ON GRADE MUST BEAR ON A VAPOR BARRIER ON MECHANICALLY COMPACTED SOIL. PROVIDE DRAINAGE FILL UNDER SLABS AS COMPACTED GRAVEL OR CRUSHED STONE.
3. POUR CONCRETE FOR FOUNDATIONS ON THE SAME DAY THE SUBGRADE IS APPROVED.
4. ONLY PLACE UTILITY LINES THROUGH OR BELOW FOUNDATIONS WHERE INDICATED ON THE STRUCTURAL DRAWINGS.
5. OBSERVE WATER CONDITIONS AT THE SITE DURING EXCAVATION. PROVIDE THE NECESSARY PRECAUTIONS IN ANTICIPATION THAT HIGH GROUND WATER WILL BE ENCOUNTERED. FOUNDATION EXCAVATION MUST REMAIN DRY THROUGHOUT CONSTRUCTION, SHORE THE EXCAVATION AND PROVIDE DEWATERING TO CONTROL INCOMING WATER AS REQUIRED.

4.0 CAST-IN-PLACE CONCRETE

1. SEE SPECIFICATIONS FOR CONCRETE MIX DESIGN.
2. REINFORCING STEEL: ASTM A615 GRADE 60.
3. WELDED WIRE REINFORCEMENT: (WWR) ASTM A-185.
4. REINFORCING STEEL CLEAR COVER AS FOLLOWS UNLESS NOTED OTHERWISE:

REINFORCING STEEL IN CONCRETE CAST AGAINST SOIL	3"
REINFORCING STEEL IN CONCRETE EXPOSED TO SOIL OR WEATHER #5 BARS AND SMALLER #6 BARS AND LARGER	 1 1/2" 2"
SLAB AND WALL REINFORCING NOT EXPOSED TO SOIL OR WEATHER	3/4"
HANGAR SLAB TOP BARS	2"

5. MAKE SPLICES IN REINFORCING STEEL ONLY AT THOSE LOCATIONS WHERE SPLICES ARE SHOWN ON THE STRUCTURAL DRAWINGS AND AT THOSE LOCATIONS WHERE SPLICES HAVE BEEN DETAILED ON THE REINFORCING STEEL PLACING DRAWINGS THAT HAVE BEEN REVIEWED BY THE CONTRACTING OFFICER. PROVIDE ALL CLASS "B" TENSION LAP SPLICES, EXCEPT WHERE INDICATED OTHERWISE ON THE STRUCTURAL DRAWINGS. MECHANICAL SPLICE COUPLERS CAPABLE OF DEVELOPING 125% OF THE TENSILE STRENGTH OF THE REINFORCING STEEL MAY BE USED INSTEAD OF TENSION LAP SPLICES AT THE CONTRACTOR'S OPTION AT ANY LOCATION. STAGGER SPLICES WHERE REQUIRED TO PROVIDE 1 1/2" CLEAR SPACING BETWEEN REINFORCING STEEL AT SPLICE LOCATIONS.
6. LAP WELDED WIRE REINFORCEMENT TWO (2) FULL WIRE SPACES AT SPLICES AND WIRE TOGETHER.
7. PLACING OF CONCRETE MUST NOT START UNTIL THE PLACEMENT OF REINFORCING HAS BEEN APPROVED BY THE INSPECTION AGENCY.
8. USE EPOXY ADHESIVE WHERE DOWELS ARE PROVIDED INTO EXISTING CONCRETE. SUBMIT MANUFACTURER INFORMATION FOR CONTRACTING OFFICER REVIEW.
9. NO SLEEVE WILL BE PLACED THROUGH ANY CONCRETE ELEMENT UNLESS SHOWN ON THE APPROVED SHOP DRAWINGS OR SPECIFICALLY AUTHORIZED IN WRITING BY THE CONTRACTING OFFICER. THE CONTRACTOR MUST VERIFY DIMENSIONS AND LOCATIONS OF ALL SLOTS, PIPE SLEEVES, ETC. AS REQUIRED FOR MECHANICAL TRADES BEFORE CONCRETE IS PLACED.
10. PROVIDE ALL INSERTS AND SLEEVES CAST-IN-PLACE WHENEVER FEASIBLE. DRILLED OR POWDER DRIVEN FASTENERS WILL BE PERMITTED WHEN PROVEN THAT THE FASTENERS WILL NOT SPALL THE CONCRETE AND HAVE THE SAME CAPACITY AS CAST-IN-PLACE INSERTS.
11. WHEN INSTALLING ADHESIVE ANCHORS, THE CONTRACTOR MUST TAKE MEASURES TO AVOID DRILLING OR CUTTING OF ANY EXISTING REINFORCING AND DESTRUCTION OF CONCRETE. BLOW CLEAN HOLES PRIOR TO PLACING BOLTS OR ADHESIVE ANCHORS.
12. CHAMFER ALL EXPOSED CONCRETE CORNERS UNLESS NOTED OTHERWISE ON ARCHITECTURAL DRAWINGS.
13. FINISH THE CONCRETE SLABS FLAT AND LEVEL WITHIN TOLERANCE, TO THE ELEVATION INDICATED ON THE DRAWINGS.

SYM	DESCRIPTION	DATE	APPR
1	FINAL SUBMISSION	5/2/2016	

NAVFAC

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APPROVED 5/11/16
FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO

DES	JL	DRW	KGM	CHK	DMS

PM/DM KPL/IAS
BRANCH MANAGER
CHIEF ENG/ARCH Mark J. Airaghi, PE
FIRE PROTECTION DPS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAS OCEANA - VIRGINIA BEACH, VIRGINIA
NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS
HAMPTON ROADS PT
REFERENCE SHEET - STRUCTURAL

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716251
SHEET 29 OF 170

S-001

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHDG\GHDG1501-NAVFAC Hsnger 111\DESIGN\S\1372146_S001.dwg LAYOUT NAME: S001 PLOTTED: Monday, April 25, 2016 - 4:15pm USER: KMusser

GENERAL STRUCTURAL AND CONSTRUCTION NOTES (CONT.)

5.0 CONCRETE & MASONRY ANCHORS

CAST IN PLACE ANCHORS

1. PROVIDE ALL HEADED CONCRETE ANCHORS MANUFACTURED FROM MATERIAL WHICH CONFORMS TO ASTM A307 GRD. 36 FOR CARBON STEEL.
2. INSTALL ANCHORS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES. SEE PLANS FOR SIZE, SPACING, AND EMBEDMENT.
3. PROVIDE ALL STUD ANCHORS WHICH CONFORM TO ASTM A108, GRADE 36 AND NUTS WHICH CONFORM TO ASTM A563.

POST–INSTALLED ANCHORS

1. PROVIDE ASTM A153 HOT DIPPED GALVANIZED, POST–INSTALLED, THREADED ANCHORS, ASTM F1554, GRD. 36, OR REBAR INTO CONCRETE WITH THE FOLLOWING DESIGN VALUES. TEST ADHESIVE IN ACCORDANCE WITH ASTM E488/E488M, BE APPROVED FOR USE IN CRACKED CONCRETE, AND HAVE AN ICC–ES REPORT IN ACCORDANCE WITH THE PROVISIONS OF ICC–ES AC308:

3/4"ø ANCHOR WITH 6–3/4" EMBEDMENT	MINIMUM ULTIMATE PULLOUT VALUE= 4,833 LBS MINIMUM ULTIMATE SHEAR VALUE= 10,261 LBS

2. PROVIDE ASTM A153 HOT DIPPED GALVANIZED, POST–INSTALLED, THREADED ANCHORS, ASTM F1554, GRD 36, INTO MASONRY WITH THE FOLLOWING DESIGN VALUES. ADHESIVE MUST BE TESTED IN ACCORDANCE WITH ASTM E488/E488M, AND HAVE A ICC–ES REPORT IN ACCORDANCE WITH THE PROVISIONS OF ICC–ES AC58:

3/8"ø ANCHOR WITH 2" EMBEDMENT	MINIMUM ULTIMATE PULLOUT VALUE= 390 LBS MINIMUM ULTIMATE SHEAR VALUE= 640 LBS

3. INSTALL ANCHORS PER THE MANUFACTURER INSTRUCTIONS, UNLESS NOTED OTHERWISE.
4. PROVIDE ANCHORING TO CONCRETE IN CONFORMANCE WITH ACI 318, APPENDIX D. POST INSTALLED ANCHORS ARE REQUIRED TO BE PRE–QUALIFIED PER ACI 355 TESTING.
5. UNLESS NOTED OTHERWISE, EMBED REINFORCING BARS AS REQUIRED TO DEVELOP THE FULL TENSION CAPACITY OF THE BAR.
6. THE ANCHOR MANUFACTURER MUST MAKE A REPRESENTATIVE AVAILABLE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED ON THE STRUCTURAL DRAWINGS. PROVIDE ANCHOR INSTALLATION TRAINING AT THE CONTRACTOR'S REQUEST AT NO ADDITIONAL COST TO THE CONTRACTING OFFICER.
7. AVOID DRILLING THROUGH EXISTING REBAR. USE A REBAR LOCATOR PRIOR TO DRILLING TO ENSURE THAT THE EXISTING REBAR IS NOT DAMAGED. RELOCATE DOWEL HOLES ADJACENT TO EXISTING REBAR WHILE MAINTAINING MANUFACTURER'S MINIMUM EDGE DISTANCE REQUIREMENTS.

6.0 STRUCTURAL STEEL

1. PERFORM ALL WELDING BY CERTIFIED WELDERS AND CONFORM TO "STRUCTURAL WELDING CODE ANSI/AWS D1.1–15", AMERICAN WELDING SOCIETY.
2. MATERIALS:

SHAPE	SPECIFICATION
WIDE FLANGE SHAPES:	ASTM A992 OR A572, GRADE 50.
STRUCTURAL SHAPES & PLATES:	ASTM A36, A572 OR A992.
STEEL PIPE:	ASTM A53, GRADE B.
STEEL TUBING (SQUARE, RECT. OR ROUND):	ASTM A500, GRADE B.
GALVANIZED STRUCTURAL STEEL: STRUCTURAL SHAPES AND RODS BOLTS, FASTENERS AND HARDWARE	 ASTM A123. ASTM A153.
BOLTED CONNECTIONS	ASTM A325 HIGH STRENGTH BOLTS 3/4" MINIMUM DIAMETER, UNLESS NOTED OTHERWISE.
WELDING ELECTRODES (MINIMUM WELD SIZE 3/16" UNLESS NOTED OTHERWISE)	E70XX (FOR MANUAL ARC WELDING)

3. CONNECTIONS:
   A. PROVIDE ALL BOLTED CONNECTIONS WITH ASTM A325 HIGH STRENGTH BOLTS 3/4" MINIMUM DIAMETER, UNLESS NOTED OTHERWISE. PROVIDE ALL BOLTS SNUG TIGHT UNLESS NOTED OTHERWISE IN CONTRACT DOCUMENTS OR AISC.
4. NOTIFY THE CONTRACTING OFFICER OF ANY FABRICATION OR ERECTION ERRORS OR DEVIATIONS AND RECEIVE WRITTEN APPROVAL BEFORE ANY FIELD CORRECTIONS ARE MADE.
5. PROVIDE ALL EXTERIOR EXPOSED STRUCTURAL STEEL HOT–DIPPED GALVANIZED PER ASTM A123.
6. THOROUGHLY CLEAN EXISTING FRAMING REQUIRING WELDING TO ENSURE PROPER WELDING. PROVIDE TEMPORARY SHORING WHEN WELDING TO EXISTING STEEL.
7. TREAT OR SEPARATE ALL DISSIMILAR METALS TO PREVENT GALVANIC AND/OR CORROSIVE EFFECTS.

7.0 MASONRY

1. SEE SPECIFICATIONS FOR MORTAR MIX REQUIREMENTS.
2. SEE SPECIFICATIONS FOR GROUT MIX REQUIREMENTS.
3. CONCRETE BLOCK UNITS:
   A. SOLID AND HOLLOW LOAD BEARING UNITS PER ASTM C90, TYPE N–1, AS REQUIRED TO PROVIDE 28 DAY COMPRESSIVE STRENGTH AS NOTED IN SPECIFICATIONS.
4. PROVIDE FULL BED AND HEAD JOINTS.
5. HORIZONTAL JOINT REINFORCING: ASTM A82; 9–GAGE TRUSS–TYPE, GALVANIZED.
6. DEFORMED BAR REINFORCEMENT WHICH CONFORMS TO ASTM A615, GRADE 60. PROVIDED BARS FULL HEIGHT OF WALLS UNLESS OTHERWISE NOTED. PROVIDE BAR SPACERS AND POSITIONERS AS REQUIRED TO LOCATE AND STABILIZE REINFORCING DURING GROUTING OPERATIONS. GROUT ALL REINFORCED CELLS SOLID WITH GROUT.
7. GROUT SOLID ALL CELLS OF NORMAL WEIGHT HOLLOW CONCRETE UNITS BELOW GRADE AND SLAB ON GRADE.
8. PROVIDE TEMPORARY BRACING TO ENSURE STABILITY OF ALL WALLS DURING CONSTRUCTION AND UNTIL ERECTION OF ATTACHED STRUCTURAL FRAMING IS COMPLETED.
9. PROVIDE GALVANIZED HORIZONTAL JOINT REINFORCEMENT IN ALL WALLS AND PARTITIONS AT 16" O.C. UNLESS OTHERWISE SHOWN OR NOTED. PROVIDE ONE (1) PIECE PREFABRICATED UNITS AT 8" O.C. AT ALL WALL CORNERS AND INTERSECTIONS.
10. 50 BAR DIAMETER LAP SPLICES FOR DEFORMED REINFORCING BARS USED IN MASONRY CONSTRUCTION.
11. FILL ALL CELLS IN TOP TWO COURSES BELOW FINISHED FLOOR, CMU LINTELS, BOND BEAMS, AND BEAM BEARINGS AND CELLS WITH REINFORCEMENT FULL HEIGHT SOLID WITH GROUT.
12. ALLOW GROUT IN REINFORCED CMU WALLS TO CURE A MINIMUM OF 48 HOURS BEFORE IMPOSING CONCENTRATED OR OTHER LOADS FROM ABOVE.
13. PROVIDE MASONRY ANCHORS SET ON COURSING AND ATTACHED TO ALL BEAMS AT 32" O.C. HORIZONTAL, COLUMNS AT 24" O.C. VERTICAL, PARTITIONS AND WALLS AT 16" O.C AT ALL BEAMS, COLUMNS, PARTITIONS AND WALLS ABUTTING OR EMBEDDED IN MASONRY UNLESS NOTED OTHERWISE ON ARCHITECTURAL AND STRUCTURAL DRAWINGS.
14. PROVIDE BOND BEAMS WITH TWO (2) #4 HORIZONTAL REINFORCEMENT CONTINUOUS IN ALL MASONRY WALLS AT EACH FRAMING LEVEL. PROVIDE A MINIMUM OF TWO (2) #4 BARS AT THE ENDS OF ALL WALLS AND ON EACH SIDE OF EACH OPENING.
15. BOND OR ANCHOR ALL PIERS AND PARTITIONS TO ADJACENT MASONRY WALLS. PROVIDE TIES TO ADJACENT FLOOR AND ROOF CONSTRUCTION IN ACCORDANCE WITH DETAILS ON DRAWINGS.
16. DO NOT PLACE OPENING ABOVE ANY LINTEL WITHIN A HEIGHT LESS THAN OR EQUAL TO THE WIDTH OF THE CLEAR OPENING BELOW THE LINTEL, UNLESS SPECIFICALLY SHOWN OR APPROVED BY THE CONTRACTING OFFICER.
17. FULLY GROUT ALL WALL SECTIONS AND PIERS LESS THAN TWO SQUARE FEET IN CROSS–SECTIONAL AREA.
18. PROVIDE VERTICAL MASONRY CONTROL JOINTS AT MAXIMUM 25'–0" ON CENTER UNLESS DETAILED ON ARCHITECTURAL DRAWINGS.

STM	DESCRIPTION	DATE	APPR
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APPROVED 5/16/16
FOR COMMANDER NAVFAC
ACTIVITY

SATISFACTORY TO
DES JL | DRW KGM | CHK DMS
PM/QM KPL/IAS
BRANCH MANAGER
CHIEF ENG/ARCH Mark J. Airaghi, PE
FIRE PROTECTION DPS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
HAMPTON ROADS PT
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NAS OCEANA – VIRGINIA BEACH, VIRGINIA
NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

REFERENCE SHEET - STRUCTURAL

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716252
SHEET 30 OF 170

S-002

DRAWFORM REVISION: 10 MAY 2014

GENERAL STRUCTURAL AND CONSTRUCTION NOTES (CONT.)

8.0 DEMOLITION NOTES

1. THE CONTRACTOR MUST COMPLY WITH THE FOLLOWING REGULATIONS:
   - A. ANSI A10.5 SAFETY REQUIREMENTS FOR MATERIAL HOISTS, LATEST EDITION.
   - B. ANSI 10.8 CONSTRUCTION AND DEMOLITION OPERATIONS – SCAFFOLDING – SAFETY REQUIREMENTS, LATEST EDITION.
   - C. OSHA 1910 LATEST EDITION.
   - D. ALL OTHER APPLICABLE OSHA REQUIREMENTS.
2. IF THE EXISTING FIELD CONDITIONS DO NOT PERMIT DEMOLITION IN ACCORDANCE WITH THE DETAILS SHOWN, THE CONTRACTOR MUST NOTIFY THE CONTRACTING OFFICER IMMEDIATELY AND PROVIDE A SKETCH OF THE CONDITION WITH HIS PROPOSED MODIFICATION OF THE DETAILS GIVEN ON THE CONTRACT DOCUMENTS. DO NOT COMMENCE WORK UNTIL CONDITION IS RESOLVED AND MODIFICATION IS APPROVED.
3. HANGAR FLOOR SLAB REMOVAL METHOD: REMOVE CONCRETE BY MEANS OF APPROVED HAND OPERATED PNEUMATIC HAMMERS EMPLOYING POINTED OR BLUNT CHISEL TOOLS. HYDRAULIC HOE–RAM TYPE HAMMERS WILL NOT BE PERMITTED. WEIGHT OF HAMMER SHALL NOT BE MORE THAN 35 POUNDS OPERATED AT AN ANGLE OF NO MORE THAN 45 DEGREES FROM HORIZONTAL. PERFORM CONCRETE REMOVAL AROUND EXISTING ITEMS THAT ARE TO BE RETAINED WITH A HAND HELD WAND 10,000 PSI (690 BAR) MINIMUM.

9.0 FRP COMPOSITE STRENGTHENING SYSTEMS

1. PROVIDE STRENGTHENING REPAIR OF STRUCTURAL MEMBERS WITH AN EXTERNAL STRENGTHENING FIBER REINFORCED POLYMER (FRP) SYSTEM OF GLASS FIBER FABRIC AND CARBON FIBER BONDED WITH ADHESIVE EPOXY RESIN.
2. THE INTENT OF THE SYSTEM IS TO RESTORE THE LOAD–CARRYING CAPACITY OF THE EXISTING STRUCTURAL COMPONENTS IDENTIFIED ON THE DRAWINGS. THE SYSTEM MUST HAVE A LOW PROFILE AND BE FLEXIBLE WITH VERY HIGH STRENGTH FOR APPLICATIONS WITH LIMITED ACCESS AND/OR COMPLEX GEOMETRIES.
3. THE FRP REPAIR DETAIL SHOWN IS CONCEPTUAL AND IS FOR ESTIMATING PURPOSES. AT THE OPTION OF THE CONTRACTOR THE FRP DETAIL, MATERIAL PROPERTIES, MATERIAL DATA AND INSTALLATION PROCEDURES MAY BE DIFFERENT THAN THOSE STATED IN THESE NOTES. THE DESIGN FOR THE ACTUAL FRP REPAIR WILL BE PERFORMED BY THE FRP MANUFACTURE BASED ON THE RESULTS OF THE INSPECTION OF EXISTING STRUCTURAL STEEL USING RATIONAL ENGINEERING DESIGN AND STANDARD PRACTICE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. RESTORE THE CAPACITY OF THE EXISTING PIPE STAY. DESIGN DATA: EXISTING 12"ø STD. PIPE STAY, ASTM A501 FY=36,000 PSI AS SHOWN ON S–16 OF CONSTRUCTION CONTRACT N62470–84–B–4081.
4. PERFORM REPAIR OF EXISTING STAYS BY AN INSTALLER WHO IS TRAINED AND CERTIFIED BY THE FRP MANUFACTURER PER THE FRP MANUFACTURER'S INSTRUCTIONS.
5. PRIOR TO ORDERING MATERIALS AND PERFORMING ANY REPAIR WORK, SUBMIT MATERIALS, MATERIAL DATA, INSTALLATION PROCEDURES, FIELD QUALITY CONTROL, STORAGE, HANDING AND CLEANUP, AND REPAIR DETAIL SHOP DRAWINGS WITH DESIGN CALCULATIONS DEVELOPED BY A VIRGINIA REGISTERED PROFESSIONAL ENGINEER IN ACCORDANCE WITH PROJECT SPECIFICATIONS TO THE CONTRACTING OFFICER FOR REVIEW AND APPROVAL.
6. MATERIALS:
   - A. HIGH STRENGTH CARBON FIBER FABRIC: UNIDIRECTIONAL CARBON FIBER FABRIC ORIENTED IN THE 0° DIRECTION WITH THE FOLLOWING MATERIAL PROPERTIES.

MATERIAL DATA:
STORAGE CONDITIONS: STORE DRY AT 40°F – 90°F
COLOR: BLACK
PRIMARY FIBER DIRECTION: 0° (UNIDIRECTIONAL)
WEIGHT: 40 OZ./YD^2
SHELF LIFE: 10 YEARS

CURED LAMINATE PROPERTIES	AVERAGE VALUES	DESIGN VALUES(1)
TENSILE STRENGTH:	143,000 PSI	121,000 PSI
MODULUS OF ELASTICITY:	13.9 X 10^6 PSI	13.9 X 10^6 PSI
ELONGATION AT BREAK:	1.0%	0.85%
THICKNESS:	0.08 INCH	0.08 INCH
STRENGTH PER UNIT WIDTH:	11,000 LBS./INCH	8,000 LBS./INCH

   (1) DESIGN PROPERTIES ARE BASED ON ACI 440.2R USING AVERAGE MINUS THREE STANDARD DEVIATIONS.
   - B. HIGH STRENGTH GLASS FIBER FABRIC: BIDIRECTIONAL GLASS FIBER FABRIC ORIENTED IN THE ±45° DIRECTIONS WITH THE FOLLOWING MATERIAL PROPERTIES.

MATERIAL DATA:
STORAGE CONDITIONS: STORE DRY AT 40°F – 90°F
COLOR: WHITE
PRIMARY FIBER DIRECTION: ±45° (BI–DIRECTIONAL)
WEIGHT: 24 OZ./YD2
SHELF LIFE: 10 YEARS

CURED LAMINATE PROPERTIES:	AVERAGE VALUES(1)	DESIGN VALUES(2)
TENSILE STRENGTH:	40,500 PSI	32,400 PSI
MODULUS OF ELASTICITY:	2.7 X 106 PSI	2.5 X 106 PSI
ELONGATION AT BREAK:	1.5%	1.3%
THICKNESS:	0.034 INCH	0.034 INCH
STRENGTH PER UNIT WIDTH:	1,370 LBS./INCH	1,100 LBS./INCH

   (1) TYPICAL AVERAGE TEST VALUES PER ASTM 3039
   (2) DESIGN PROPERTIES ARE BASED ON ACI 440 GUIDELINES WILL VARY SLIGHTLY.
   - C. EPOXY ADHESIVE: TWO–PART, 100% SOLID EPOXY FOR HIGH STRENGTH COMPOSITE BONDING APPLICATIONS WITH THE FOLLOWING MATERIAL PHYSICAL PROPERTIES.

TENSILE STRENGTH (ASTM D638): 10,500 PSI
TENSILE MODULUS (ASTM D638): 461,000 PSI
FLEXURAL STRENGTH (ASTM D790): 17,900 PSI
FLEXURAL MODULUS (ASTM D790): 452,000 PSI
ELONGATION AT BREAK (ASTM D638): 5.0%
TG (ASTM D4065): 180°F
DENSITY:
MIXED PRODUCT: 9.17 LBS./GAL
PART A: 9.7 LBS./GAL
PART B: 7.9 LBS./GAL
VOC CONTENT: (ASTM D–2369): 0% VOC

   - D. FUMED SILICA: MODIFIED WITH POLYDIMETHYLSILOXANE TO RENDER THE MATERIAL HYDROPHOBIC FOR USE WITH THE EPOXY ADHESIVE.
8. INSTALLATION:
   - A. SURFACE PREPARATION: PREPARE SURFACES CLEAN AND SOUND, AND DRY AND FREE OF PROTRUSIONS AND FROST. REMOVE ALL DUST, LAITANCE, GREASE, CURING COMPOUNDS, WAXES, DETERIORATED MATERIALS, AND OTHER BOND INHIBITING MATERIALS FROM THE SURFACE PRIOR TO APPLICATION. SURFACE CLEAN TO ACHIEVE SSPC SP10/NACE 2 NEAR WHITE METAL FINISH OR BETTER. FILL EXISTING UNEVEN SURFACES WITH EPOXY PUTTY OR REPAIR MORTAR. A MINIMUM LAP OF 12–INCHES IS REQUIRED BEYOND THE DAMAGED AREAS OF STEEL IN ORDER TO ACHIEVE CONTINUITY OF THE REPAIR. THE ADHESIVE STRENGTH OF THE STEEL MAY BE VERIFIED AFTER SURFACE PREPARATION BY RANDOM PULL–OFF TESTING (ASTM D7522) AT THE DISCRETION OF THE CONTRACTING OFFICER. ACHIEVE MINIMUM TENSILE STRENGTH OF 200 PSI.
   - B. PROVIDE LOCALIZED OUT–OF–PLANE VARIATIONS GROUND OR SMOOTHED OVER WITH THICKENED EPOXY APPROVED BY THE MANUFACTURER ENGINEER TO A MAXIMUM SURFACE VARIATIONS NOT TO EXCEED 0.04–INCH. MINIMUM PHYSICAL PROPERTIES OF THE EPOXY MUST COMPLY WITH THE GENERAL NOTES. PROVIDE ALL SURFACES DRY AND FREE OF MOISTURE AT THE TIME OF GLASS FRP REINFORCING INSTALLATION. MINIMUM PHYSICAL PROPERTIES OF THE FRP MUST COMPLY WITH THE GENERAL NOTES.
   - C. PROVIDE CARBON FIBER AND FRP SHEETS LAPPED IN THE FIBER DIRECTION AT LEAST 12–INCHES TO ACHIEVE CONTINUITY.
   - D. PROVIDE GLASS FRP SHEETS LAPPED AT LEAST 1–INCH IN THE CIRCUMFERENTIAL AND VERTICAL DIRECTIONS.
   - E. AFTER SURFACE PREPARATION IS COMPLETE, PROVIDE THE BI–DIRECTIONAL GLASS LAYER, FOLLOWED BY LAYERS OF LONGITUDINAL CARBON FIBER, THEN A LAYER OF CIRCUMFERENTIAL CARBON FIBER.
   - F. AFTER CURE OF THE FRP SYSTEM, PROVIDE 3–COAT PAINT SYSTEM. COORDINATE WITH PAINT MANUFACTURE EPOXY COATING PRIMER APPLICATION TO CARBON FIBER REINFORCING. PROVIDE TEST AREA FOR INITIAL PRIMER APPLICATION TO ENSURE MANUFACTURE'S RECOMMENDED PREPARATION AND APPLICATION PROCEDURES ARE SUCCESSFUL.

10.0 INSPECTION OF EXISTING STRUCTURAL STEEL

1. INSPECTOR QUALIFICATION REQUIREMENTS: PERFORM NONDESTRUCTIVE TESTING AND MEASUREMENTS BY A TECHNICIAN CERTIFIED AS LEVEL III BY THE AMERICAN SOCIETY OF NONDESTRUCTIVE TESTING. THE INSPECTOR MUST HAVE PREVIOUS EXPERIENCE IN INSPECTION OF STRUCTURAL STEEL.
2. VISUALLY INSPECT ALL EXISTING ROOF MEMBERS (STAYS, BRACES, WF–APEX POST) AND THEIR CONNECTIONS FOR ANY DEFECTS, SECTION LOSS, AND CRACKS.
3. COMPLETE THE INSPECTION PRIOR TO THE APPLICATION OF THE 3–COAT PAINT SYSTEM.
4. PROVIDE THE INSPECTOR WITH ACCESS TO ALL PARTS OF THE WORK.
5. ASSIST AS REQUIRED TO MAKE A COMPLETE AND DETAILED INSPECTIONS.
6. PRIOR TO INSPECTION REMOVE THE PART OF THE ROOF SYSTEM AT ROOF PENETRATIONS AS SHOWN ON THE ARCHITECTURE PLANS.
7. IF THE INSPECTOR REQUIRES IT AND AFTER IT IS APPROVED BY THE CONTRACTING OFFICER, REMOVE OR UNCOVER ANY ADDITIONAL PORTION OF THE ROOF WHICH INTERFERES WITH THE INSPECTIONS.
8. PERFORM SURFACE PERPETRATION OF THE STEEL MEMBERS AS IT MAY BE REQUIRED BY THE INSPECTOR.
9. NOTIFY THE INSPECTOR AT LEAST 24 HOURS PRIOR TO SCHEDULED INSPECTIONS.
10. RECONSTRUCT THE ROOFING SYSTEM PER DETAILS AND REQUIREMENTS OF THE CONTRACT DOCUMENTS.
11. USE NON–DESTRUCTIVE METHODS AS DESCRIBED IN MIL–HDBK–1823A. EDDY CURRENT (ISO 17643), MAGNETIC PARTICLE (ASTM E1444/E1444M & ISO 17638) OR LIQUID DYE PENETRATE (ISO 3453) TESTING IS RECOMMENDED FOR INSPECTION OF WELDS. ULTRASONIC TESTING (ASTM E2261–07) IS RECOMMENDED FOR MEASURING SECTION LOSS.
12. NOTE LENGTH, SIZE, AND LOCATION OF CRACKS, NOTE EXTEND AND SEVERITY OF RUST, MEASURE THICKNESS OF METAL, NOTE ANY TYPE OF DAMAGE AND MEASURE THE OFFSET OR DEFLECTION TYPE, NOTE SPECIFIC INFORMATION ON LOCATION, LENGTH AND DEPTH SO AN ELEVATION AND REPAIR RECOMMENDATION CAN BE MADE.
13. IMMEDIATELY REPORT ANY CRACKS FOUND TO THE CONTRACTING OFFICER.
14. REPORT IMMEDIATELY TO THE CONTRACTING OFFICER ANY MEASUREMENTS OF MEMBER THICKNESS LESS THAN INDICATED BELOW.
    - A. EXISTING 12"ø STAY SHELL THICKNESS IS LESS THAN 0.281 (ORIGINAL SHELL THICKNESS OF 0.375 INCHES)
    - B. EXISTING 8"ø DIAGONAL AND HORIZONTAL BRACE SHELL THICKNESS IS LESS THAN 0.241 INCHES (ORIGINAL SHELL THICKNESS OF 0.322 INCHES)
    - C. EXISTING VERTICAL WF–APEX POST WEB THICKNESS IS LESS THAN 0.318 INCHES (ORIGINAL THICKNESS OF 0.375 INCHES)
    - D. EXISTING VERTICAL WF–APEX POST FLANGE THICKNESS IS LESS THAN 0.548 INCHES (ORIGINAL THICKNESS OF 0..645 INCHES)
15. MEASURE EXISTING MEMBER THICKNESS AT LOCATIONS IDENTIFIED BY THE VISUAL INSPECTION.
16. AT THE PIPE SHAPES, DIVIDED THE TEST AREA INTO 4–INCH SEGMENTS LONGITUDINALLY AND 12–INCH SEGMENTS (30 DEGREE INCREMENTS) CIRCUMFERENTIALLY.
17. AT THE WF–APEX POST, PROVIDE (4) READING ALONG THE TOP AND BOTTOM FLANGE (2 READINGS IN EITHER SIDE OF THE WEB) AND (4) READINGS ALONG THE WEB.
18. PROVIDE AND RECORD THICKNESS MEASUREMENTS TO THE NEAREST 0.001 INCH.
19. THE INSPECTOR MUST PROVIDE AN INSPECTION REPORT WITH INSPECTION RESULTS. THE INSPECTION REPORT MUST PROVIDE COMPREHENSIVE RECORDS OF STEEL DETERIORATION INCLUDE DESCRIPTION, MEASUREMENTS, SKETCHES, MAPS OF ALL INSPECTIONS FINDINGS, ETC. SUBMIT THE FINAL INSPECTION REPORT TO THE GOVERNMENT FOR RECORDING PURPOSES.
20. COST: INCLUDE ALL COST ASSOCIATED WITH THE INSPECTION OF THE EXISTING STRUCTURAL STEEL AS DESCRIBED ABOVE.

11.0 HANGAR DOOR NOTES

1. THE EXISTING HANGAR DOOR FRAMES ARE HIDDEN BEHIND THE DOOR SURFACE PANELS. THE EXISTING PLANS WITH DOOR FRAME DETAILS ARE NOT AVAILABLE, AND THE ACTUAL CONDITION OF FRAME MEMBERS IS UNKNOWN.
2. AFTER THE EXISTING PANELS ARE REMOVED VISUALLY INSPECT THE EXISTING DOOR FRAMES AND THEIR CONNECTIONS FOR ANY DEFECTS, SECTION LOSS, AND CRACKS.
3. REPORT ANY DEFECT AND/OR CRACKS THAT ARE FOUND TO THE CONTRACTING OFFICER.
4. SUBMIT A REPAIR DETAIL WHICH RESTORES THE LOAD–CARRYING CAPACITY OF THE EXISTING DOOR FRAME TO THE CONTRACTING OFFICER FOR REVIEW AND APPROVAL.
5. DO NOT ORDER MATERIALS OR PERFORM ANY WORK ASSOCIATED WITH HANGAR DOOR FRAME REPAIR UNLESS REPAIR DETAILS AND LOCATIONS ARE APPROVED BY THE CONTRACTING OFFICER.
6. SEE GENERAL NOTE SECTION 10.0 "INSPECTION OF EXISTING STRUCTURAL STEEL" FOR ADDITIONAL REQUIREMENTS.
7. COST: INCLUDE ALL COST ASSOCIATED WITH VISUAL INSPECTION OF ALL (18)–EXISTING DOOR FRAMES AND THE REPLACEMENT OF (30)–LINEAR FEET OF EXISTING DOOR FRAME STEEL.

APPR	DATE	DESCRIPTION	STM
	5/2/2016	FINAL SUBMISSION	1

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ACTIVITY

SATISFACTORY TO

DES	JL	DRW	KGM	CHK	DMS

PM/DM KPL/IAS
BRANCH MANAGER
CHIEF ENG/ARCH Mark J. Airaghi, PE
FIRE PROTECTION DPS

DEPARTMENT OF THE NAVY
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NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
HAMPTON ROADS IPT
NAVAL AIR STATION OCEANA
IAS OCEANA – VIRGINIA BEACH, VIRGINIA
VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

REFERENCE SHEET - STRUCTURAL

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716253
SHEET 31 OF 170

S-003

DRAWFORM REVISION: 10 MAY 2014

ABBREVIATIONS

ADD'L	ADDITIONAL
APP'D	APPROVED
ALT.	ALTERNATE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIAL
ARCH.	ARCHITECT; ARCHITECTURAL
BM.	BEAM
BRG.	BEARING
B.F.	BOTH FACES
B.S.	BOTH SIDES
BLDG.	BUILDING
BOTT.	BOTTOM
B.O.F.	BOTTOM OF FOOTING
B.P.	BASE PLATE
B/	BOTTOM OF
CTR.	CENTER
C.L.	CENTER LINE
CLR.	CLEAR
COL.	COLUMN
CONC.	CONCRETE
C.M.	CONSTRUCTION MANAGER
CMU	CONCRETE MASONRY UNIT
CONN.	CONNECTION
CONSTR.	CONSTRUCTION
CJ	CONSTRUCTION JOINT
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
DL	DEAD LOAD
DEMO.	DEMOLITION, DEMOLISH
DIM.	DIMENSION
DO	DUPLICATE
DWL.	DOWEL
DWG.	DRAWING(S)
(E)	EXISTING
E.F.	EACH FACE
E.W.	EACH WAY
ELEC.	ELECTRICAL
EL.	ELEVATION
ENGR.	ENGINEER
EQ.	EQUAL
EXIST., EX.	EXISTING
EXP.	EXPANSION
E.J.	EXPANSION JOINT
F.S.	FAR SIDE
FT.	FEET
FIN.	FINISH(ED)
FLR.	FLOOR
FTG.	FOOTING(S)
FDN.	FOUNDATION
F.O.	FACE OF
GALV.	GALVANIZED
GA.	GAGE
GR.	GRADE
GRTG.	GRATING
HGR.	HANGER
H.P.	HIGH POINT
HORIZ.	HORIZONTAL
I.D.	INSIDE DIAMETER
I.F.	INSIDE FACE
IN.	INCHES
INC.	INCORPORATED
INFO	INFORMATION
INV.	INVERT
I.J.	ISOLATION JOINT
JT.	JOINT
K	KIP
LG.	LONG
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LSL	LONG SLOTTED
L.P.	LOW POINT
LBS.	POUNDS
MFR.	MANUFACTURER
MFD.	MANUFACTURED
MAX.	MAXIMUM
MTL.	METAL
MECH'L	MECHANICAL
M	METER
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MP	MAGNETIC PARTICLE
NDT	NON DESTRUCTIVE TESTING
N.S.	NEAR SIDE
N.W.	NORMAL WEIGHT
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NO.	NUMBER
o.c.	ON CENTER
O.F.	OUTSIDE FACE
OPP.	OPPOSITE
OPNG.	OPENING
OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
PERP.	PERPENDICULAR
Pc	PIECE
PL.	PLATE
P.J.F.	PREFORMED JOINT FILLER
P.T.	PRESSURE TREATED
PROJ.	PROJECTION
QTY.	QUANTITY
R	RADIUS, RISER
REF.	REFERENCE
REINF.	REINFORCE(D)
REQ'D	REQUIRED
REV.	REVISION
SCH.	SCHEDULE
SECT.	SECTION
SER	STRUCTURAL ENGINEER OF RECORD
SHT.	SHEET
SL	SLANT
SSL	SHORT SLOTTED
SIM.	SIMILAR
S.O.G.	SLAB ON GRADE
SPA.	SPACE
STD.	STANDARD
STL.	STEEL
STIFF'R	STIFFENER
STIR.	STIRRUP
SYM.	SYMMETRICAL
STRUCT.	STRUCTURAL
TBD	TO BE DETERMINED
TEMP.	TEMPORARY
THK.	THICK
T&B	TOP AND BOTTOM
T.O.F.	TOP OF FOOTING
T.O.S.	TOP OF SLAB; TOP OF STEEL
T/	TOP OF
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
w/	WITH
w/o	WITHOUT
W.W.R.	WELDED WIRE REINFORCING
WF	WIDE FLANGE
W.P.	WORKPOINT

SYM	DESCRIPTION	DATE	APPR
1	FINAL SUBMISSION	5/2/2016	

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FOR COMMANDER NAVFAC

ACTIVITY

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PM/DM KPL/IAS

BRANCH MANAGER

CHIEF ENG/ARCH Mark J. Airaghi, PE

FIRE PROTECTION DMS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
HAMPTON ROADS IPT

NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NAS OCEANA – VIRGINIA BEACH, VIRGINIA

NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA

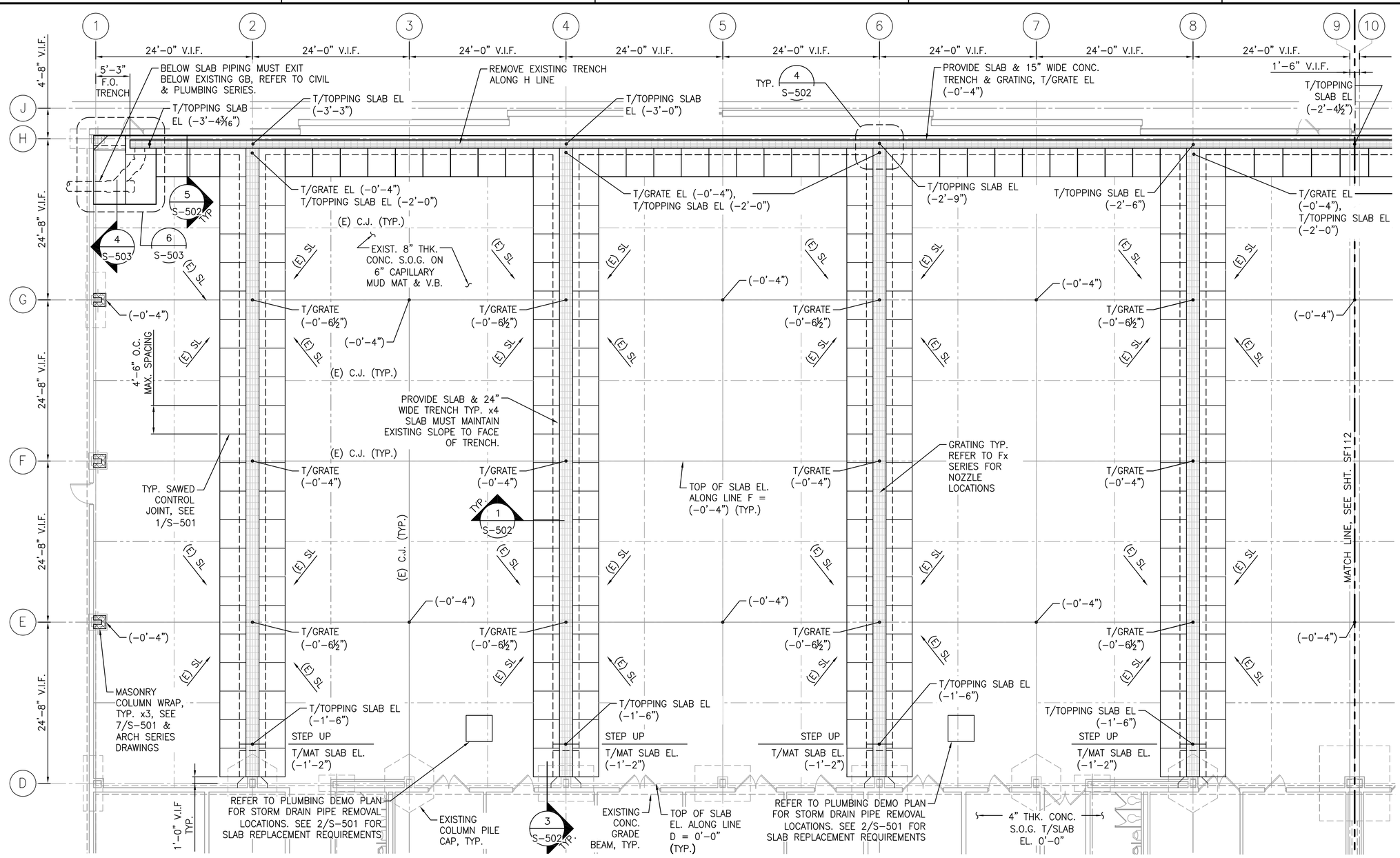
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

REFERENCE SHEET - STRUCTURAL

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716254
SHEET 32 OF 170

S-004

DRAWFORM REVISION: 10 MAY 2014



SHEET NOTES

1. DATUM EL. 0'-0" = TOP OF EXISTING HANGAR FLOOR SLAB ALONG GRID LINE D.
2. TOP OF EXISTING HANGAR FLOOR SLAB EL. VARIES AND IS NOTED THUS (-#'-#") FROM DATUM EL. 0'-0".
3. TOP OF NEW HANGAR FLOOR SLAB EL. (-0'-0 3/16") BELOW TOP OF EXISTING HANGAR FLOOR SLAB EL. TO ACCOMMODATE DEPTH OF NEW EPOXY FLOOR COATING.
4. TOP OF TRENCH MAT SLAB EL., PARALLEL TO HANGAR DOORS, ALONG GRID LINE H, IS (-3'-4 3/16") FROM DATUM EL. 0'-0". TOP OF TRENCH MAT SLAB EL., ALONG GRID LINES 2,4,6,8,11,13,15,17,20,22,24,&26 BETWEEN GRID LINES D&H IS (-2'-0") FROM DATUM EL. 0'-0"
5. TOP OF SLOPED TOPPING SLAB EL. VARIES, SEE PLAN FOR TOPPING SLAB EL. FROM DATUM EL. 0'-0". TOPPING SLAB TO MAINTAIN A 1/16" PER FT. MIN. SLOPE BETWEEN ELEVATION CALLOUTS. REFER TO CIVIL SERIES FOR ADDITIONAL REQUIREMENT.
6. TOP OF GRATING EL. IS NOTED THUS (-#'-#") FROM DATUM EL. 0'-0" ON PLAN. TOP OF GRATING EL. TO MATCH TOP OF EXISTING HANGAR FLOOR SLAB EL. V.I.F.
7. TOP OF EXISTING GRADE BEAMS & PILE CAPS ARE (-2'-0") U.N.O. (V.I.F)
8. SEE S-001 THROUGH S-005 FOR GENERAL NOTES AND S-501 FOR TYPICAL DETAILS
9. MAINTAIN EXISTING STATIC GROUND SYSTEM. REFER TO ELECTRICAL SERIES DRAWINGS FOR ADDITIONAL INFORMATION.
10. EXISTING STATIC GROUND RECEPTACLE TO REMAIN. REFER TO ELECTRICAL SERIES DRAWINGS FOR ADDITIONAL INFORMATION.
11. REFER TO ARCH. DRAWINGS FOR EPOXY FLOOR COATING REQUIREMENTS. MINIMUM CONCRETE CURE TIME, MAXIMUM CONCRETE MOISTURE CONTENT AND MINIMUM SURFACE ROUGHNESS MUST COMPLY WITH MFR. INSTALLATION RECOMMENDATIONS AND REQUIREMENTS.

1 PARTIAL SLAB PLAN

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

PROJECT NORTH

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 4' 8' 12' 16'

1/8" = 1'-0

KEY PLAN

A	B	C
D	E	F

1	FINAL SUBMISSION			5/2/2016	APPR
SYM	DESCRIPTION			DATE	

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FIRE PROTECTION DPS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
HAMPTON ROADS PT. NAS OCEANA – VIRGINIA BEACH, VIRGINIA
NAVAL AIR STATION OCEANA VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

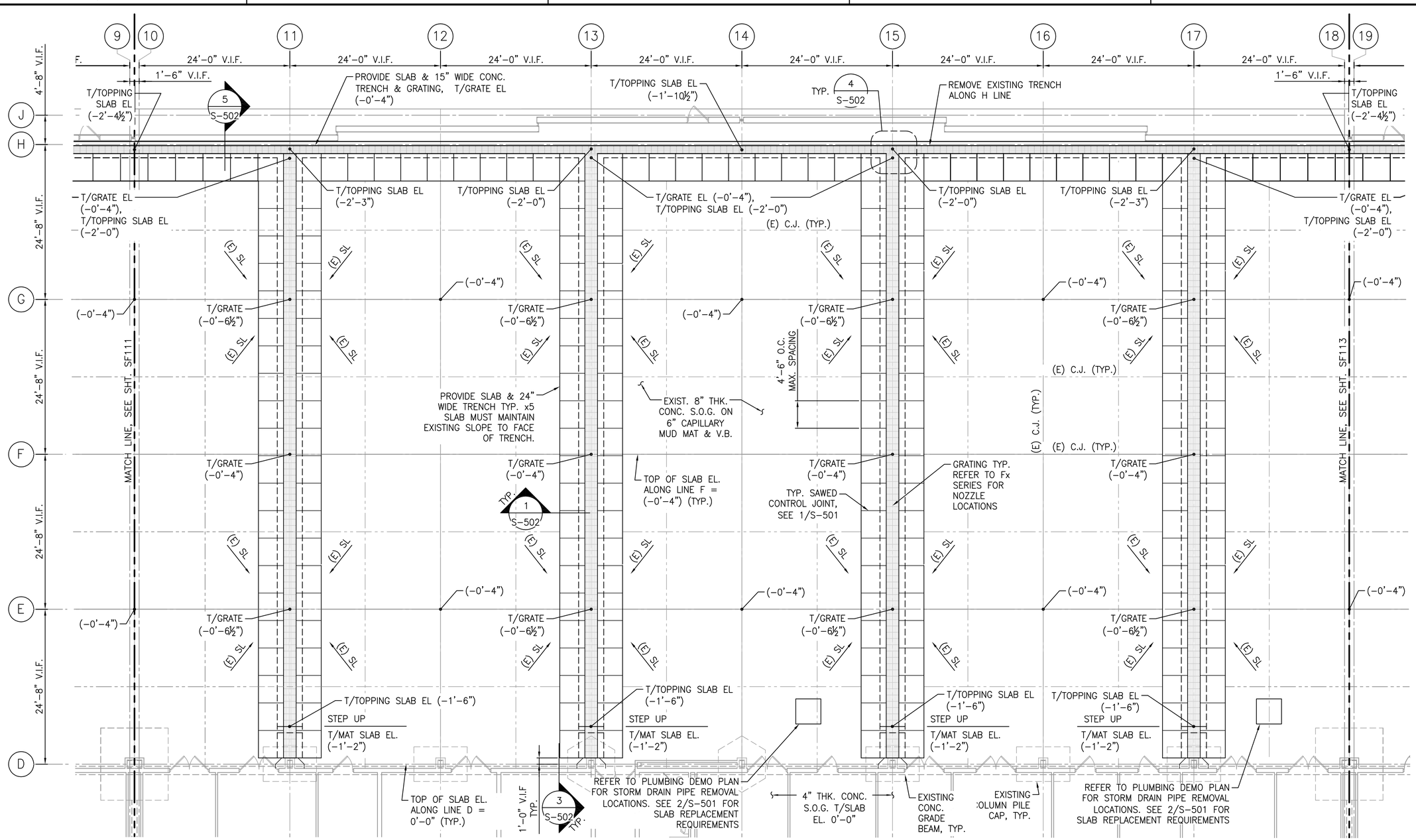
FOUNDATION AND SLAB PLAN - AREA A

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716255
SHEET 33 OF 170

SF111

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHDO\GHDG1501-NAVFAC Hangar 111\DESIGN\S\1372146_S-SF111.dwg LAYOUT NAME: SF111 PLOTTED: Tuesday, April 26, 2016 - 10:23am USER: KMusser



1 PARTIAL SLAB PLAN

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

PROJECT NORTH

PLAN NOTES

1. FOR ADDITIONAL NOTES, SEE PLAN SHEET SF111.

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 4' 8' 12' 16'

⅛" = 1'-0

KEY PLAN

A	B	C
D	E	F

NO.	DESCRIPTION	DATE	APPR
1	FINAL SUBMISSION	5/2/2016	

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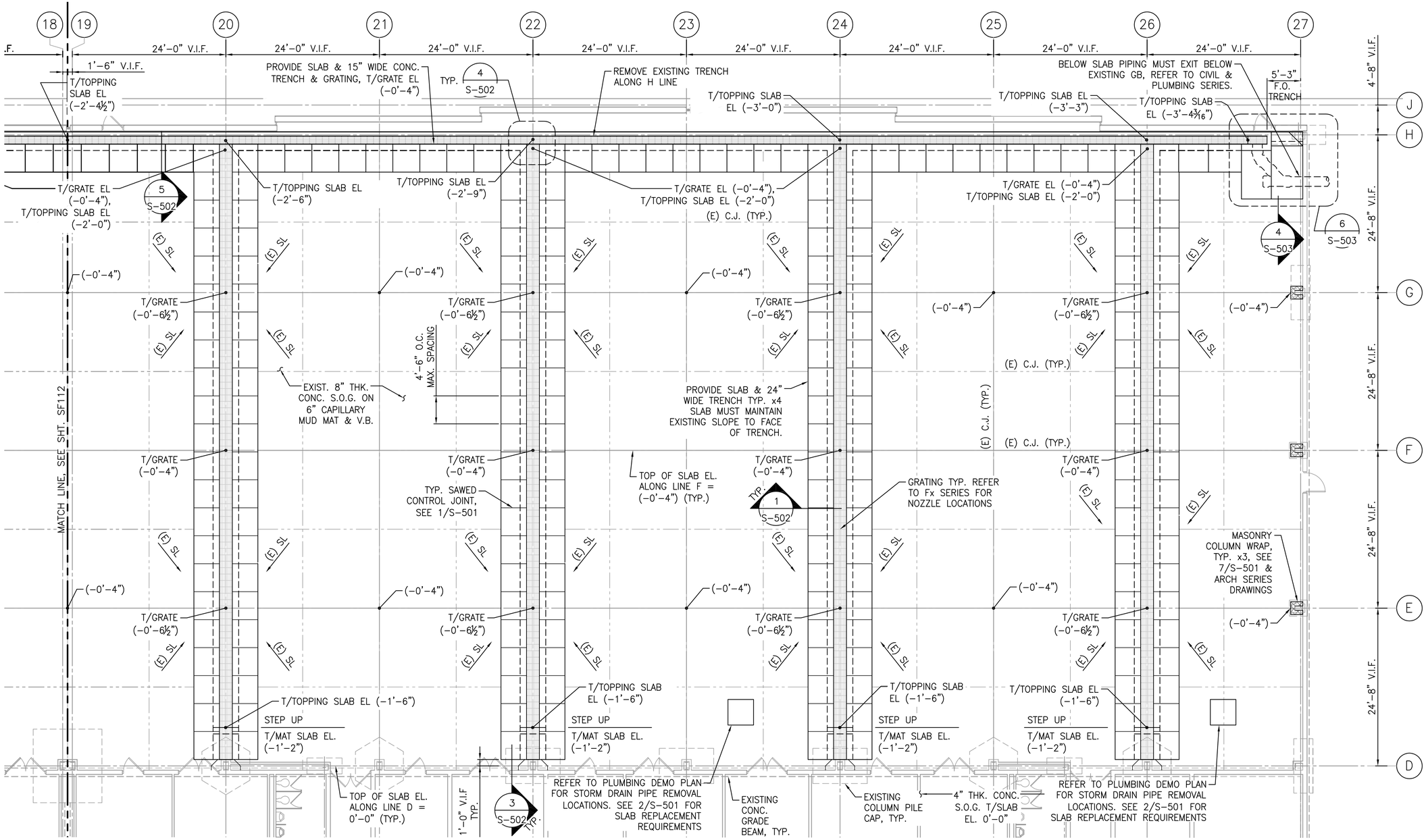
NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS
FOUNDATION AND SLAB PLAN - AREA B

SCALE:	1/8" = 1'-0"
EPROJECT NO.:	1372146
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12716256
SHEET	34 OF 170

SF112

DRAWFORM REVISION: 10 MAY 2014



1 PARTIAL SLAB PLAN

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

PROJECT NORTH

PLAN NOTES

1. FOR ADDITIONAL NOTES, SEE PLAN SHEET SF111.

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 4' 8' 12' 16'

⅛" = 1'-0

KEY PLAN

A	B	C
D	E	F

APPR	DATE	SYM	DESCRIPTION
	5/2/2016	1	FINAL SUBMISSION

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FIRE PROTECTION DPS

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HAMPTON ROADS PT.

NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAS OCEANA ~ VIRGINIA BEACH, VIRGINIA

NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

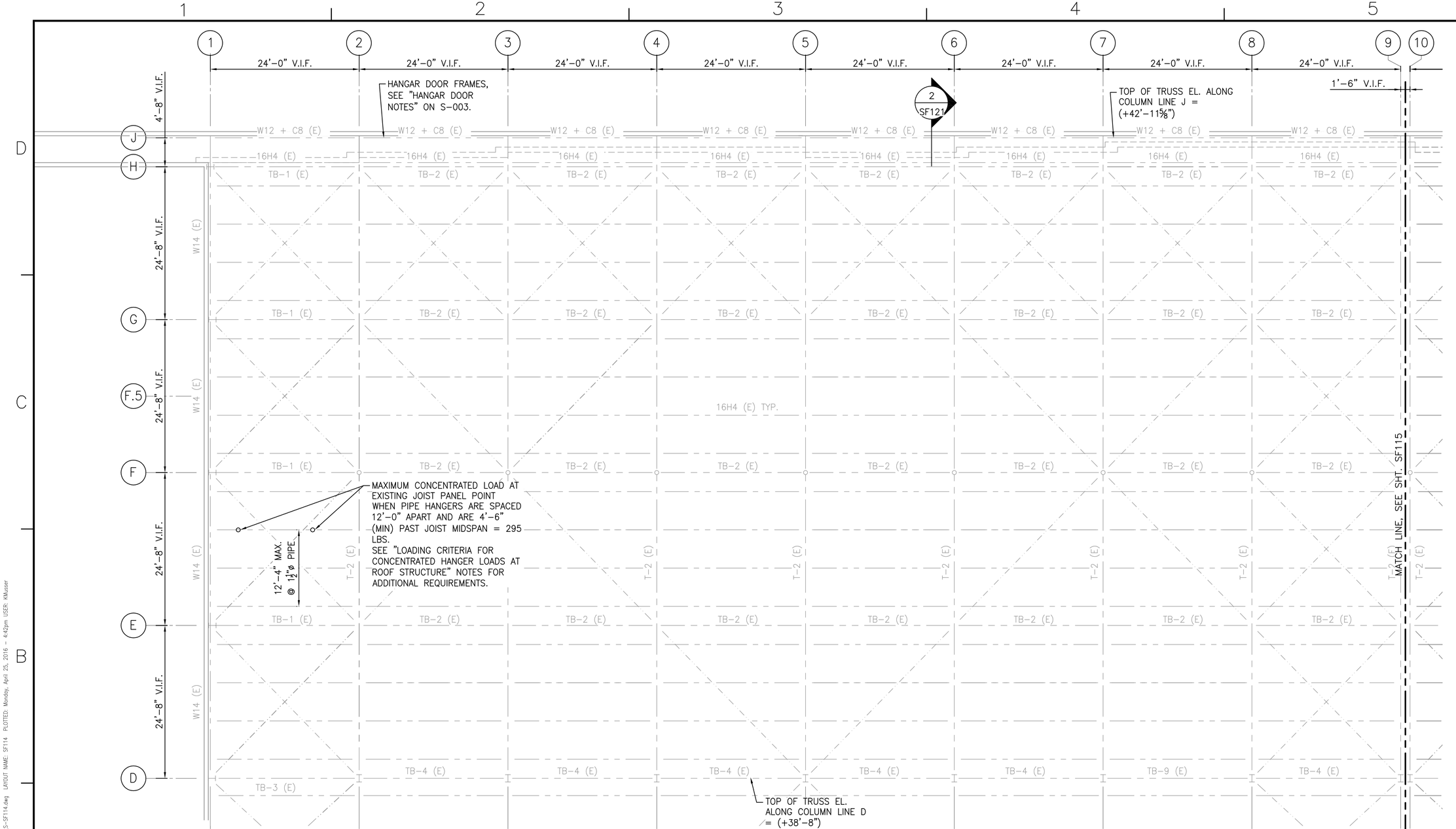
FOUNDATION AND SLAB PLAN - AREA C

SCALE: 1/8" = 1'-0"
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716257
SHEET 35 OF 170

SF113

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHDO\GHDO1501-NAVFAC Hangar 111\DESIGN\S\1372146_S-SF113.dwg LAYOUT NAME: SF113 PLOTTED: Tuesday, April 26, 2016 - 10:24am USER: KMusser



1 PARTIAL ROOF FRAMING PLAN

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

PROJECT NORTH

HANGAR DOOR NOTES

1. REFER TO GENERAL NOTE SECTION 11.0 "HANGER DOOR NOTES" AND ARCHITECTURAL DRAWINGS FOR REQUIREMENTS.

SHEET NOTES

1. DATUM ELEVATION (0'-0") CORRESPONDS TO TOP EXISTING ROOF ELEVATION.
2. SEE DRAWINGS S-001 THROUGH S-004 FOR GENERAL NOTES.
3. SEE DRAWINGS S-501 FOR TYPICAL DETAILS
4. REFER TO Fx SERIES DRAWINGS FOR SPRINKLER PIPE.
5. EXISTING JOISTS SPACING VARIES, MAX SPACING 6'-1" O.C.
6. REFER TO Fx SERIES DRAWINGS FOR SPRINKLER PIPE REQ'MTS. ATTACH HANGERS AT TRUSS BOTTOM CHORD AND JOIST PANEL POINTS ONLY, DO NOT ATTACH TO METAL ROOF DECK. WHERE HANGER IS LOCATED BETWEEN JOIST, PROVIDE CROSS MEMBER TO RECEIVE HANGER. WHERE HANGER IS NOT LOCATED AT JOIST PANEL POINT, REF 6/S-501.

CRITERIA FOR CONCENTRATED HANGER LOADS AT ROOF STRUCTURE

1. TRUSS BRACING [TB-X]: MAXIMUM CONCENTRATED LOAD OF 2000 LBS AT PANEL POINTS
2. BOTTOM CHORD OF TRUSS [T-X]: MAXIMUM CONCENTRATED LOAD OF 2000 LBS AT PANEL POINTS.
3. ROOF JOIST [16H4]: MAXIMUM CONCENTRATED LOAD OF 200 LBS AT PANEL POINTS, U.O.N
4. PROVIDE SHOP DRAWINGS FOR REVIEW OF PIPING AND HANGER LAYOUT TO ENSURE THAT LOADING CRITERIA IS MET.
5. REFER TO Fx SERIES DRAWINGS FOR ADDITIONAL REQUIREMENTS.

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 4' 8' 12' 16'

½" = 1'-0

KEY PLAN

A	B	C
D	E	F

STM	DESCRIPTION	DATE	APPR
1	FINAL SUBMISSION	5/2/2016	

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A/E INFO

APPROVED 5/2/16
FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO

DES	JL	DRW	KGM	CHK	DMS
PM/DM	KPL/IAS				
BRANCH MANAGER	KPL				
CHIEF ENG/ARCH	Mark J. Airaghi, PE				
FIRE PROTECTION	DPS				

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VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

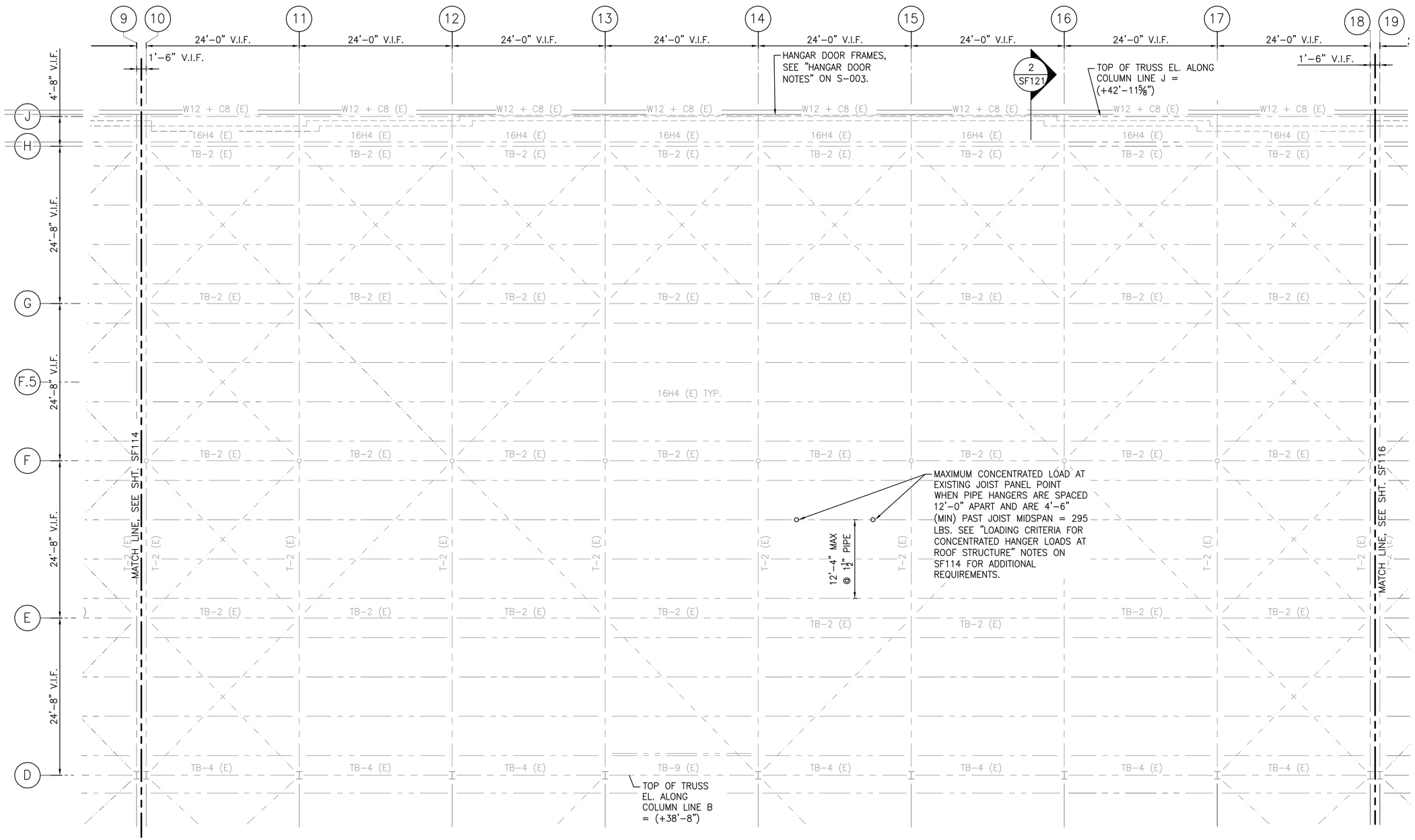
ROOF FRAMING PAN - AREA A

SCALE:	1/8" = 1'-0"
EPROJECT NO.:	1372146
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12716258
SHEET	36 OF 170

SF114

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHGO\GH001501-NAVFAC Hangar 111\DESIGN\S\1372146_G-SF114.dwg LAYOUT NAME: SF114 PLOTTED: Monday, April 25, 2016 - 4:42pm USER: KMasser



1 PARTIAL ROOF FRAMING PLAN

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

PROJECT NORTH

SHEET NOTES

1. FOR ADDITIONAL NOTES, SEE PLAN SHEET SF114.

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 4' 8' 12' 16'

⅛" = 1'-0

KEY PLAN

A	B	C
D	E	F

1	FINAL SUBMISSION	5/2/2016	APPR
STM	DESCRIPTION	DATE	

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ACTIVITY

SATISFACTORY TO

DES	NM	DRW	KM	CHK	RS
PM/DM	KPL/IAS				
BRANCH MANAGER					
CHIEF ENG/ARCH	Mark J. Airaghi, PE				
FIRE PROTECTION	DPS				

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VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

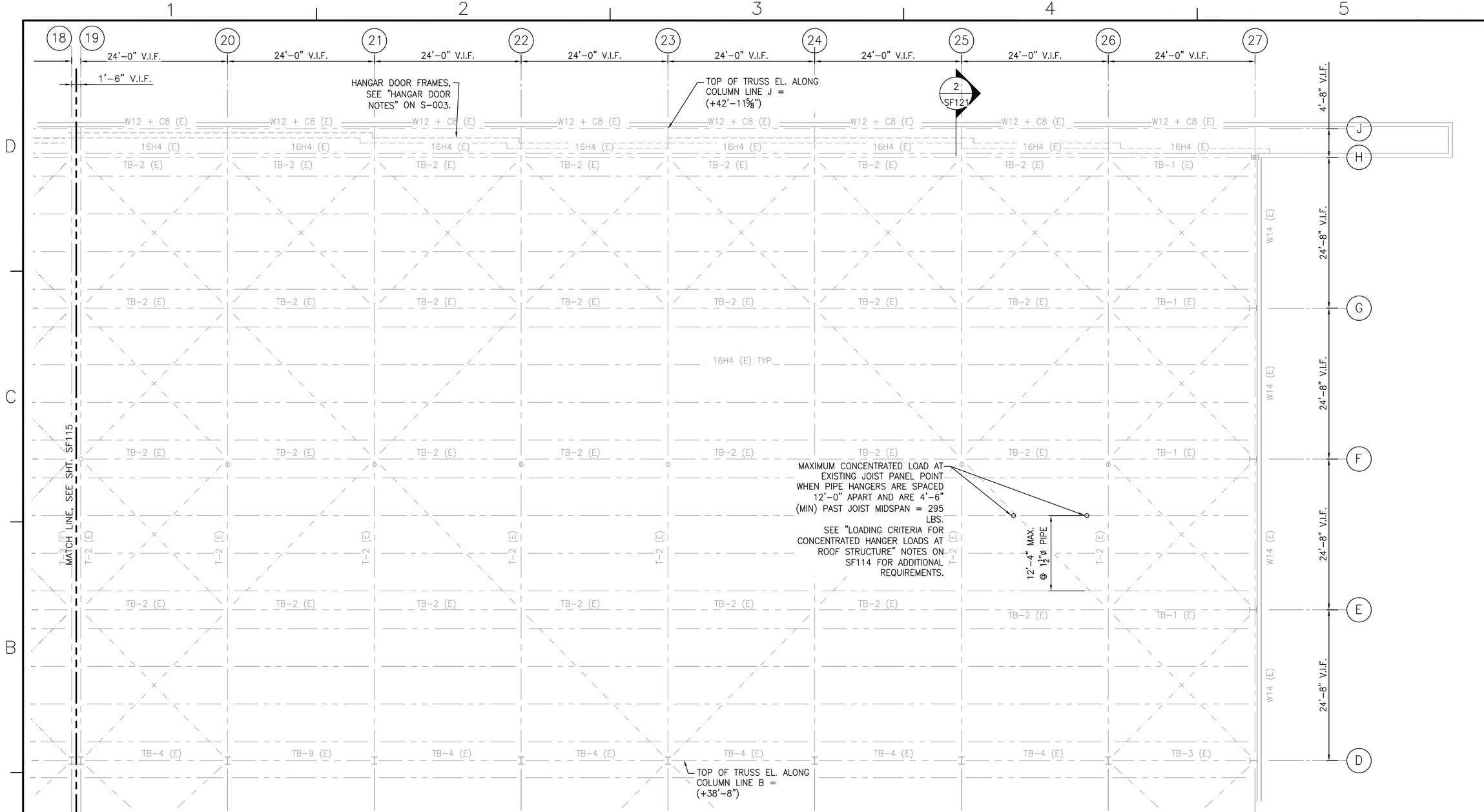
ROOF FRAMING PLAN - AREA B

SCALE:	1/8" = 1'-0"
EPROJECT NO.:	1372146
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12716259
SHEET	37 OF 170

SF115

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHDG\GHDG1501--NAVFAC Hangar 111\DESIGN\S\1372146_S--SF115.dwg LAYOUT NAME: SF115 PLOTTED: Monday, April 25, 2016 - 4:41pm USER: KMusser



1 PARTIAL ROOF FRAMING PLAN

SCALE: 1/8" = 1'–0"

PROJECT NORTH

SHEET NOTES

1. FOR ADDITIONAL NOTES, SEE PLAN SHEET SF114.

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 4' 8' 12' 16'

⅛" = 1'–0

KEY PLAN

A	B	C
D	E	F

APPR	DATE	DESCRIPTION	SYM
	5/2/2016	FINAL SUBMISSION	1

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BRANCH MANAGER
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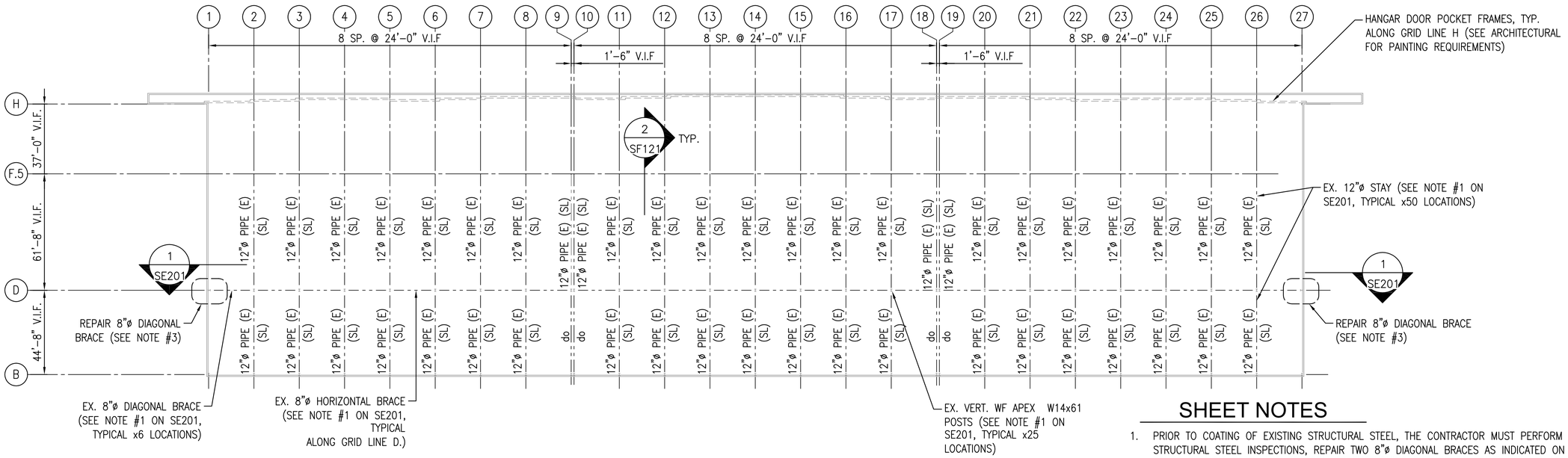
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS
ROOF FRAMING PLAN - AREA C

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716260
SHEET 38 OF 170

SF116

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHGO\GHGO1501-NAVFAC Hangar 111\DESIGN\S\1372146_G-SF116.dwg LAYOUT NAME: SF116 PLOTTED: Monday, April 25, 2016 - 4:40pm USER: KMasser



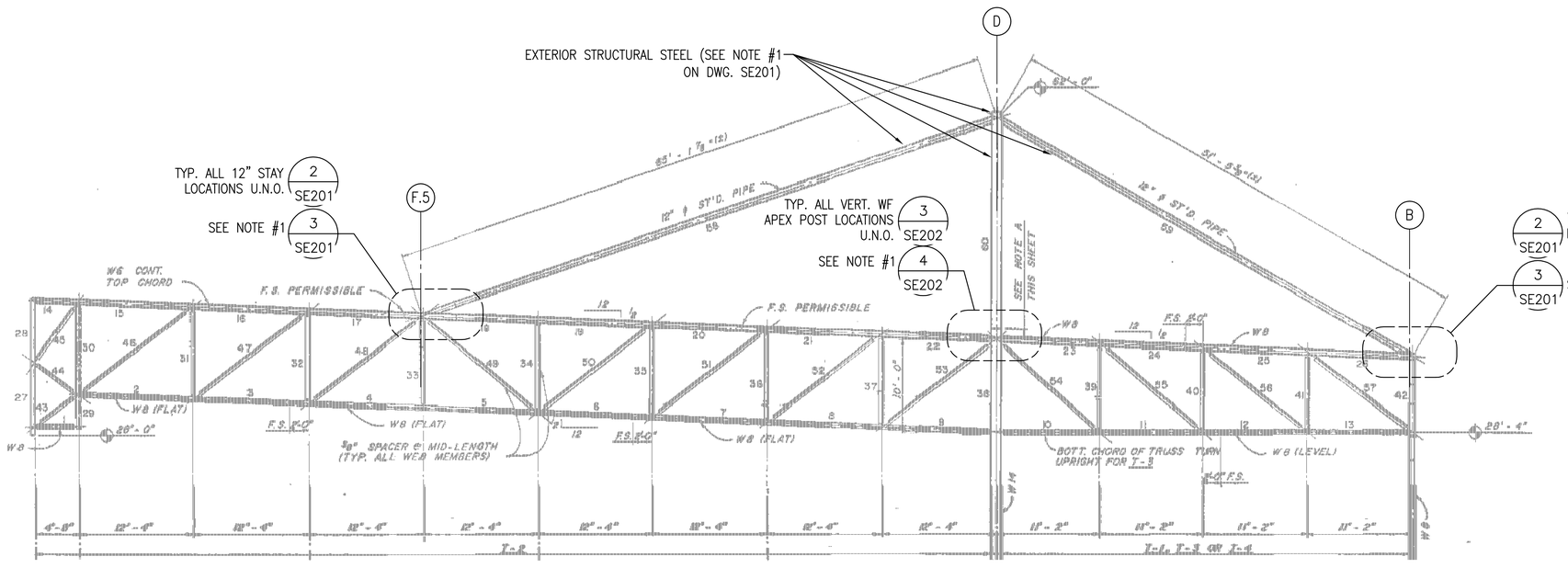
1 EXTERIOR TRUSS FRAMING PLAN

SCALE: 1/32" = 1'-0"

PROJECT NORTH

SHEET NOTES

1. PRIOR TO COATING OF EXISTING STRUCTURAL STEEL, THE CONTRACTOR MUST PERFORM STRUCTURAL STEEL INSPECTIONS, REPAIR TWO 8"ø DIAGONAL BRACES AS INDICATED ON TRUSS FRAMING PLAN, AND PERFORM STRENGTHENING REPAIRS OF STAYS AND WF-APEX POSTS AT THE LOCATIONS DETERMINED BY THE STRUCTURAL STEEL INSPECTOR.
2. FOR INSPECTION REQUIREMENTS, SEE GENERAL NOTES SECTION 10.0 ON SHEET S-003.
3. FOR DIAGONAL BRACE REPAIR DETAIL, SEE DETAIL 1 ON SE202.
4. FOR STRENGTHENING REPAIR DETAILS, SEE DETAIL 3 ON SE201 AND DETAIL 4 ON SE202.



2 ROOF CROSS SECTION

SCALE: 1/8" = 1'-0" SF121

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 16' 32' 48' 64'
½" = 1'-0

0 4' 8' 12' 16'
⅛" = 1'-0

KEY PLAN

A	B	C
D	E	F

1	FINAL SUBMISSION	5/2/2016	APPR
STM	DESCRIPTION	DATE	

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BRANCH MANAGER
CHIEF ENG/ARCH Mark J. Airaghi, PE
FIRE PROTECTION DPS

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HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

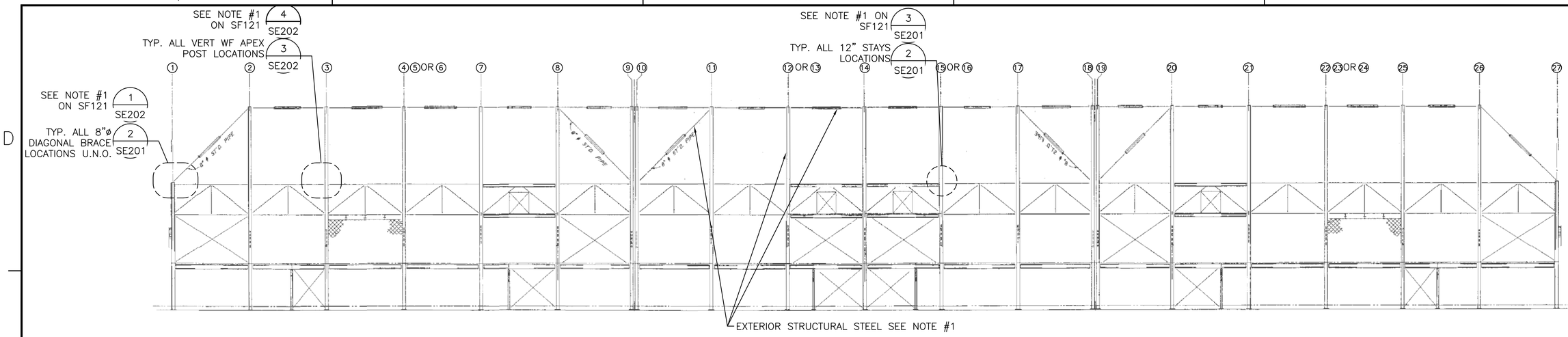
EXTERIOR TRUSS FRAMING PLAN

SCALE:	NO SCALE
EPROJECT NO.:	1372146
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12716261
SHEET	39 OF 170

SF121

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHDG\GHDG1501-NAVFAC Hangar 111\DESIGN\S\1372146_S121.dwg LAYOUT NAME: SF121 PLOTTED: Monday, April 25, 2016 - 4:04pm USER: KMusser

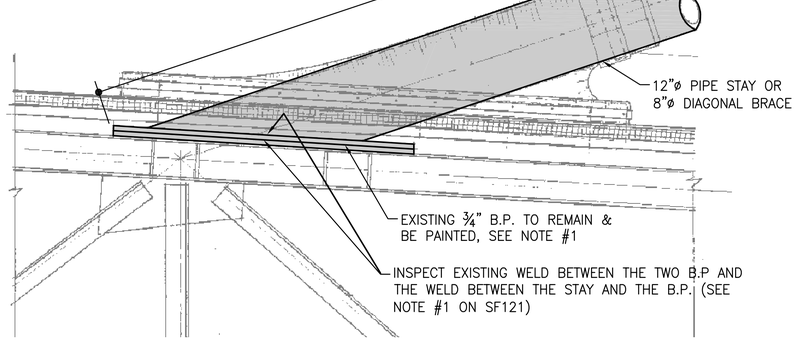


1 ELEVATION ALONG LINE D (LOOKING NORTH)

SCALE: 1/16" = 1'-0" SF121

SHEET NOTES

1. COAT ALL EXTERIOR STRUCTURAL STEEL INCLUDING ROOF STAYS, HORIZONTALS AND DIAGONAL BRACES AND WF-APEX POST, ETC. WITH HIGH-PERFORMACE 3-COAT PAINT SYSTEM. PROVIDE SURFACE PREPARATION AND PAINTING PER PROJECT SPECIFICATIONS.
2. THE CONTRACTOR MUST REMOVE PART OF EXISTING ROOF AT EACH ROOF PENETRATION TO ALLOW FOR STRUCTURAL STEEL INSPECTION AND COATING. AFTER COATING OF STRUCTURAL STEEL IS COMPLETE THE CONTRACTOR MUST RECONSTRUCT THE ROOF. FOR PARTIAL REMOVAL OF EXISTING ROOF, ROOF RECONSTRUCTION, FLASHING DETAILS, AND ADDITIONAL INFORMATION, SEE ARCHITECTURAL DRAWINGS.
3. STRENGTHENING REPAIR DETAIL 3 AS IT IS SHOWN IS FOR ESTIMATING PURPOSES ONLY. CONTRACTOR MUST DETERMINE NUMBER OF PLIES & OVERALL REPAIR LENGTH BASED ON PERCENTAGE OF SECTION LOSS TO RESTORE ORIGINAL CAPACITY OF STAY. REFER TO MATERIAL PROPERTIES AND INSTALLATION PROCEDURES DESCRIBED IN THE GENERAL NOTES 9.0-FRP COMPOSITE STRENGTHENING SYSTEM ON PLAN SHEET S-003.



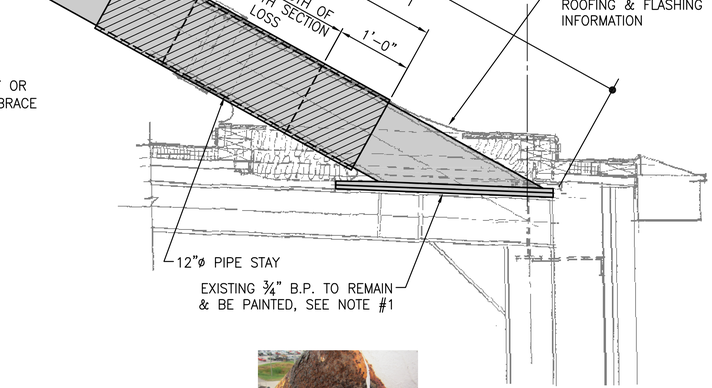
REPRESENTATIVE PHOTO

INSPECT WELDS AT THE TOP STAY APEX CONTINUITY (SEE NOTE #1 ON SF121).

2 TYPICAL DETAIL AT 12"Ø STAY & 8"Ø DIAGONAL BRACE

SCALE: N.T.S. SF121

COLUMN LINE F.5 DEPICTED IN DETAIL. OTHER STAYS AND DIAGONAL BRACES ARE SIMILAR.

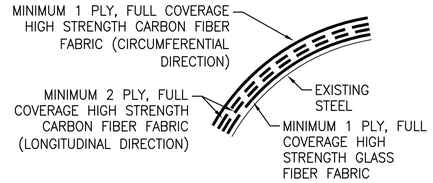


REPRESENTATIVE PHOTO

3 STRENGTHENING REPAIR DETAIL AT 12"Ø STAY

SCALE: N.T.S. SF121

1. COLUMN LINE B DEPICTED IN DETAIL. OTHER STAYS ARE SIMILAR.
2. THE CONTRACTOR MUST NOT ORDER MATERIALS OR PERFORM ANY WORK ASSOCIATED WITH STRENGTHENING REPAIR DETAIL UNLESS THE REPAIR MATERIALS AND LOCATIONS ARE APPROVED AND AUTHORIZED BY CONTRACTING OFFICER.
3. THE CONTRACTOR MUST INCLUDE ALL COST ASSOCIATED WITH THE PERFORMING OF STRENGTHENING REPAIRS FOR ALL (50)-12"ø PIPE. THE ACTUAL WORK LOCATIONS AND QUANTITIES USED MUST BE IDENTIFIED BY THE STRUCTURAL INSPECTOR AND AT THE DISCRETION OF THE CONTRACTING OFFICER.



A DETAIL A

SCALE: N.T.S. SF121

SEE NOTE #3 FOR ADDITIONAL INFORMATION

KEY

INDICATES EXISTING EXTERIOR STRUCTURAL STEEL WITH HIGH PERFORMANCE 3 COAT PAINT. SEE NOTE #1

INDICATES EXISTING EXTERIOR STRUCTURAL STEEL WITH STRENGTHENING REPAIR

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 8' 16' 24' 32'

3/16" = 1'-0

1	FINAL SUBMISSION	5/2/2016	APPR
STM	DESCRIPTION	DATE	

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ACTIVITY

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DES	JL	DRW	KGM	CHK	DMS

PM/DM KPL/IAS
BRANCH MANAGER
CHIEF ENG/ARCH Mark J. Airaghi, PE
FIRE PROTECTION DPS

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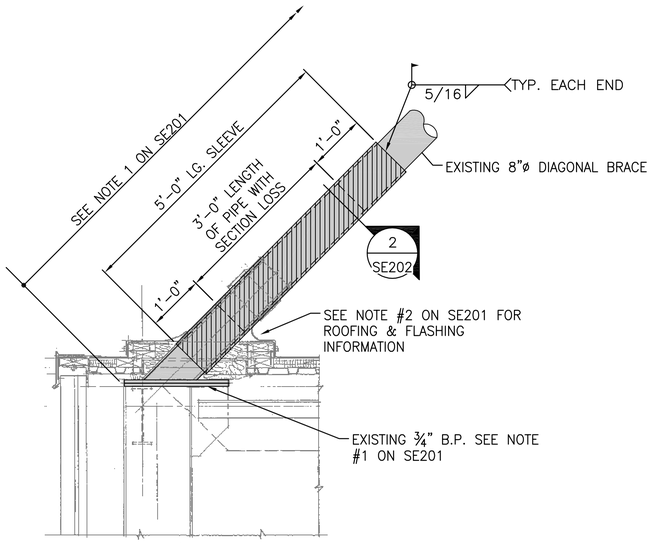
VIRGINIA BEACH, VIRGINIA
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS
EXTERIOR TRUSS ELEVATIONS AND DETAILS

SCALE:	NO SCALE
EPROJECT NO.:	1372146
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12716262
SHEET	40 OF 170

SE201

DRAWFORM REVISION: 10 MAY 2014

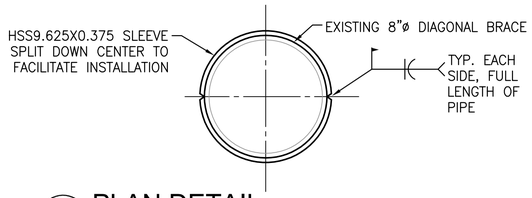
FILE NAME: P:\Projects\VHDG\VH001501-NAVFAC Hangar 111\DESIGN\S\1372146_SE201.dwg LAYOUT NAME: SE201 PLOTTED: Monday, April 25, 2016 - 4:02pm USER: KMusser



1. TOTAL OF TWO DIAGONAL BRACE REPAIRS, ONE AT EACH END OF HANGAR ROOF AS INDICATED ON "EXTERIOR TRUSS FRAMING PLAN" ON SE121.
2. NOTIFY CONTRACTING OFFICER IF LENGTH OF CORRODED/DAMAGED AREA EXCEEDS 3'-0" LG.
3. INCLUDE ALL COSTS ASSOCIATED WITH THE PERFORMING OF STRENGTHENING REPAIRS AT (4) – ADDITIONAL 8"ø DIAGONAL BRACES. THE ACTUAL LOCATIONS AND QUANTITIES USED MUST BE IDENTIFIED BY STRUCTURAL INSPECTIONS AND AT THE DISCRETION OF CONTRACTING OFFICER.

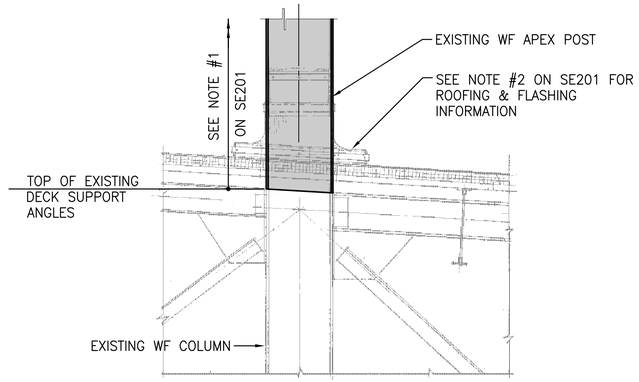
1 STRENGTHENING REPAIR DETAIL AT 8"Ø DIAGONAL BRACE

SCALE: N.T.S. SE201



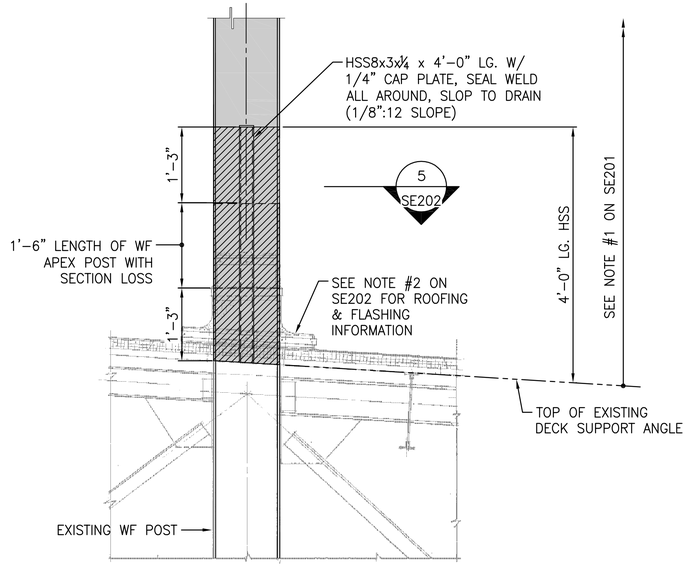
2 PLAN DETAIL

SCALE: N.T.S. SE202



3 TYPICAL DETAIL AT WF APEX POST

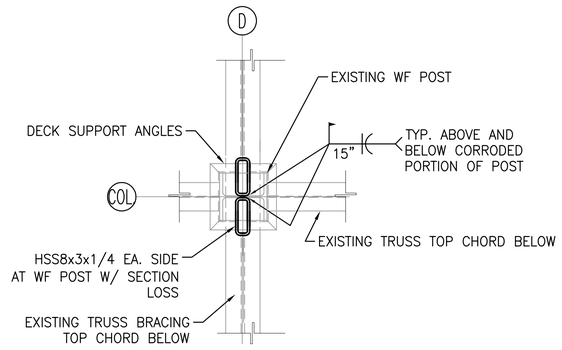
SCALE: N.T.S. SE201



1. DO NOT ORDER MATERIALS OR PERFORM ANY WORK ASSOCIATED WITH STRENGTHENING REPAIR DETAIL UNLESS THE REPAIR MATERIAL AND LOCATIONS ARE APPROVED AND AUTHORIZED BY CONTRACTING OFFICER.
2. INCLUDE ALL COSTS ASSOCIATED WITH THE PERFORMING OF STRENGTHENING REPAIRS FOR ALL (25) – WF APEX POSTS. THE ACTUAL LOCATIONS AND QUANTITIES USED MUST BE IDENTIFIED BY STRUCTURAL INSPECTION AND AT THE DISCRETION OF THE CONTRACTING OFFICER.
3. STRENGTHENING REPAIR LENGTH AS IT IS SHOWN IS FOR ESTIMATING PURPOSES ONLY. OVERALL REPAIR LENGTH TO BE IDENTIFIED BY STRUCTURAL INSPECTIONS.
4. IF CORROSION EXTENDS PAST THE TOP OF EXISTING DECK SUPPORT ANGLE, THEN NOTIFY CONTRACTING OFFICER, TO OBTAIN APPROVAL TO REMOVE DRYWALL FOR FURTHER INSPECTION. REMOVAL OF DRYWALL NOT INCLUDED IN BASE BID.

4 STRENGTHENING REPAIR DETAIL AT WF APEX POST

SCALE: N.T.S. SE201



1. NO WELD TO BE PROVIDED BETWEEN WF POST AND HSS WHERE SECTION LOSS IS PRESENT.

5 PLAN DETAIL

SCALE: N.T.S. SE202

KEY

- INDICATES EXISTING EXTERIOR STRUCTURAL STEEL WITH HIGH PERFORMANCE 3 COAT PAINT. SEE NOTE #1 ON SE201
- INDICATES EXISTING EXTERIOR STRUCTURAL STEEL WITH STRENGTHENING REPAIR

STM	DESCRIPTION	DATE	APPR
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DES	JL	DRW	KGM	CHK	DMS

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FIRE PROTECTION DMS

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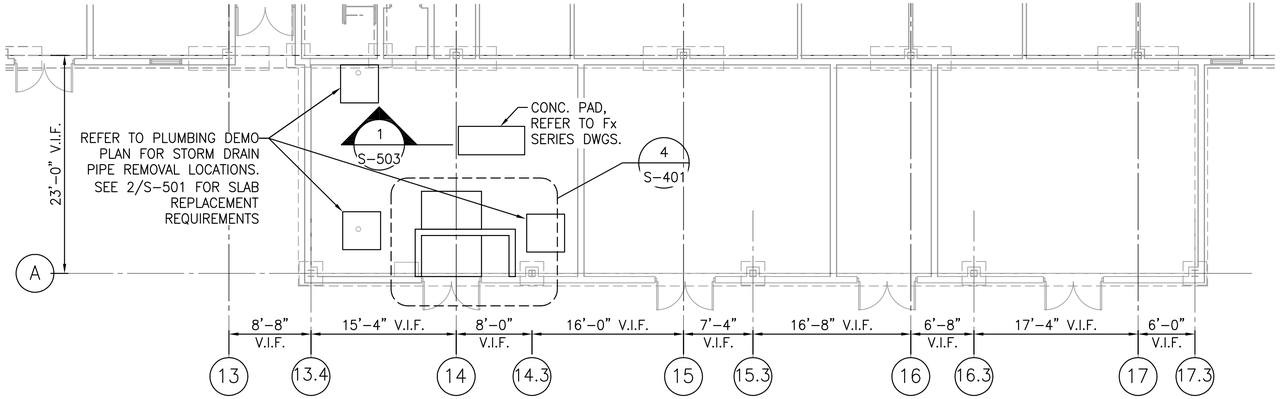
NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS
EXTERIOR TRUSS ELEVATIONS AND DETAILS

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716263
SHEET 41 OF 170

SE202

DRAWFORM REVISION: 10 MAY 2014



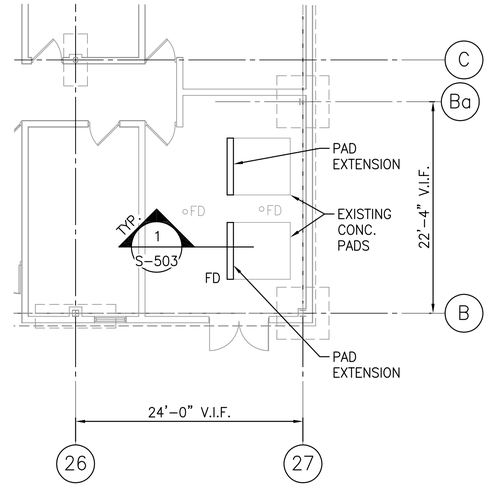
1 PARTIAL SLAB PLAN

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

PROJECT NORTH

PLAN NOTES

1. FOR ADDITIONAL NOTES, SEE PLAN SHEET SF111.



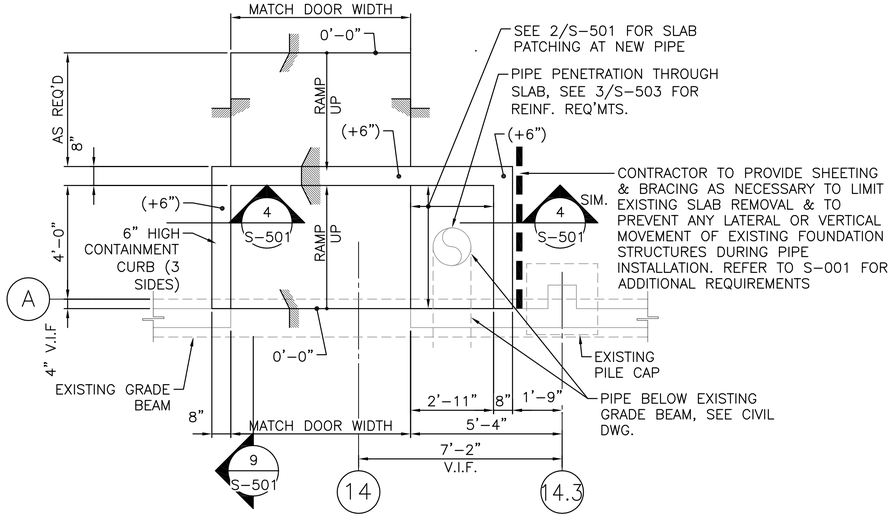
2 PARTIAL SLAB PLAN AT COMPRESSOR ROOM

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

PROJECT NORTH

PLAN NOTES

1. DATUM EL. (0'-0") CORRESPONDS TO TOP OF EXISTING FIRST FLOOR ELEVATION (X'-X").
2. TOP OF SLAB ELEVATION IS NOTED THUS (-#'-#") FROM DATUM EL. 0'-0".
3. SEE S-001 THROUGH S-004 FOR GENERAL NOTES
4. REFER TO MECHANICAL DRAWINGS FOR REQUIREMENTS.



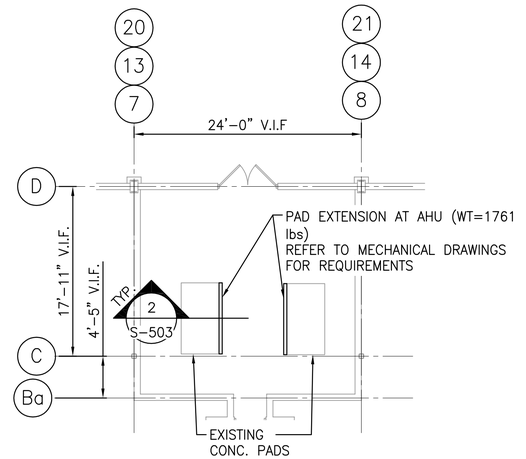
4 PARTIAL SLAB PLAN - FOAM ROOM

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

PROJECT NORTH

PLAN NOTES

1. DATUM EL. 0'-0" = TOP OF EXISTING FOAM FLOOR SLAB.
2. TOP OF SLAB ELEVATION IS NOTED THUS (-#'-#") FROM DATUM EL. 0'-0".
3. REFER TO ARCH. SERIES FOR EPOXY FLOOR COATING REQUIREMENTS. MINIMUM CONCRETE CURE TIME, MAXIMUM CONCRETE MOISTURE CONTENT AND MINIMUM SURFACE ROUGHNESS TO COMPLY WITH MANUF. INSTALLATION RECOMMENDATIONS AND REQUIREMENTS.



3 TYPICAL PARTIAL THIRD FLOOR FRAMING PLAN AT MECHANICAL ROOM

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

PROJECT NORTH

PLAN NOTES

1. DATUM EL. (0'-0") CORRESPONDS TO TOP OF EXISTING MECHANICAL ROOF FLOOR ELEVATION (28'-5").
2. TOP OF SLAB ELEVATION IS NOTED THUS (-#'-#") FROM DATUM EL. 0'-0".
3. SEE S-001 THROUGH S-004 FOR GENERAL NOTES
4. EXISTING FLOOR FRAMING NOT SHOWN FOR CLARITY.

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 1' 2' 4' 6'
3/8" = 1'-0

0 4' 8' 12' 16'
1/8" = 1'-0

KEY PLAN

A	B	C
D		F

STM	DESCRIPTION	DATE	APPR
1	FINAL SUBMISSION	5/2/2016	

NAVFAC

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A/E INFO

APPROVED 5/11/16
FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO

DES	JL	DRW	KGM	CHK	DMS

PM/DM KPL/IAS
BRANCH MANAGER
CHIEF ENG/ARCH Mark J. Airaghi, PE
FIRE PROTECTION DPS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
HAMPTON ROADS IPT
NAVAL FACILITIES ENGINEERING COMMAND
IAS OCEANA ~ VIRGINIA BEACH, VIRGINIA
NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA

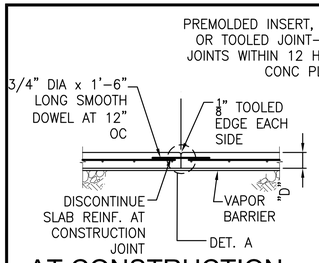
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

ENLARGED PLANS - STRUCTURAL

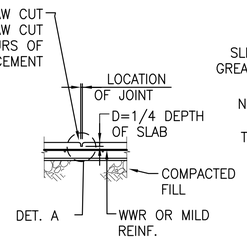
SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716264
SHEET 42 OF 170

S-401

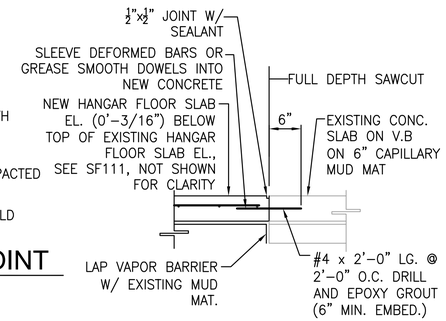
DRAWFORM REVISION: 10 MAY 2014

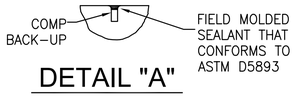


AT CONSTRUCTION JOINT



AT CONTROL JOINT

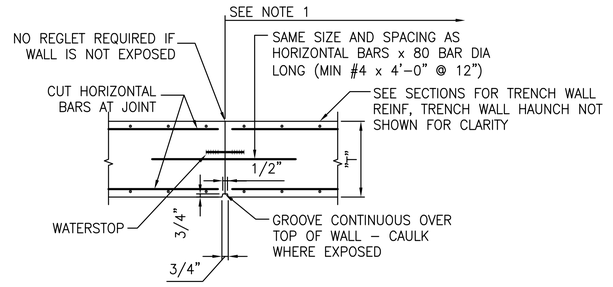




DETAIL "A"

SLAB REMOVAL & REPLACEMENT NOTES

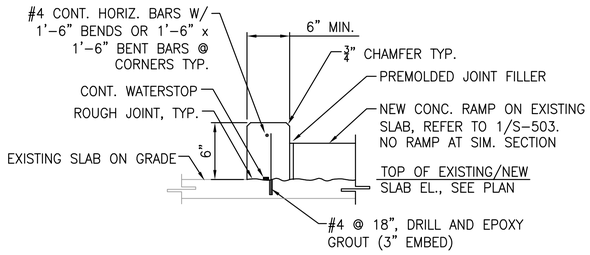
1. REMOVE EXISTING CONCRETE SLABS ON GRADE TO PROVIDE TRENCHES, UTILITIES & SERVICE PIT. REFER TO DRAWINGS OF THE VARIOUS TRADES FOR LOCATIONS. SLAB REMOVAL MUST RESULT IN A MAXIMUM SLOPE OF 2:1 FROM THE BOTTOM OF THE EXCAVATION TO THE EDGE OF THE REMAINING EXISTING SLAB. DETERMINE THE EXTENT OF SLAB REMOVAL BASED UPON THE DEPTHS AND SIZES OF EXCAVATIONS. IN ANY LOCATION WHERE SLAB REMOVAL RESULTS IN STRIPS OF EXISTING REMAINING SLABS LESS THAN 10 FEET WIDE, REMOVE THE SLAB BETWEEN THE ADJACENT CUTS. DO NOT CUT INTO OR DAMAGE ANY LOAD BEARING CONCRETE FOUNDATION.
2. AFTER INSTALLATION OF UTILITIES, TRENCH, AND/OR SERVICE PIT, BACKFILL AND COMPACT WITH APPROVED, ENGINEERED FILL OR WITH "CONTROLLED LOW STRENGTH MATERIAL (CLSM). CLSM MUST HAVE A COMPRESSIVE STRENGTH OF A MINIMUM OF 120 PSI.
3. DRILL AND EPOXY GROUT #4 x 2'–0" LG. REBAR AT MID–HEIGHT OF EXISTING SLAB. SPACE AT 2'–0" O.C. MAXIMUM AND EMBED 6 INCHES INTO EXISTING ADJACENT SLABS.
4. PROVIDE CONCRETE SLAB ON GRADE THICKNESS TO MATCH EXISTING OR AS NOTED ON PLANS, (4" MIN.), REINFORCING TO MATCH EXISTING OR AS NOTED ON PLANS (6x6 W2.0xW2.0 WWF MIN.) OVER NEW VAPOR BARRIER WHICH LAPS, PER MANUF. REQMTS., OVER 6" CRUSHED STONE U.N.O. PROVIDE JOINTS IN SLABS PER TYPICAL DETAILS.



1. ALIGN VERTICAL CONTROL JOINTS IN TRENCH WALL WITH EXISTING SLAB CONTROL JOINTS.
2. HORIZONTAL CONSTRUCTION JOINTS ARE NOT PERMITTED EXCEPT WHERE SHOWN.

1 TYPICAL DETAIL SLAB ON GRADE

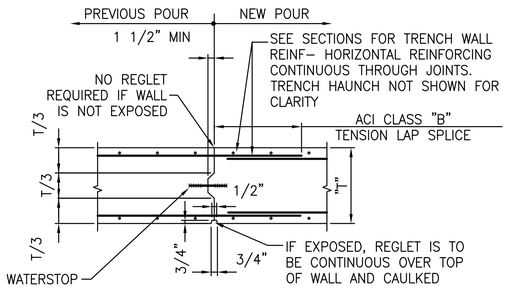
SCALE: N.T.S.



1. REFER TO ARCHITECTURAL DRAWINGS AND AND S–401 FOR CURB SIZE AND LOCATION.

2 TYPICAL NEW/EXISTING SLAB JOINT

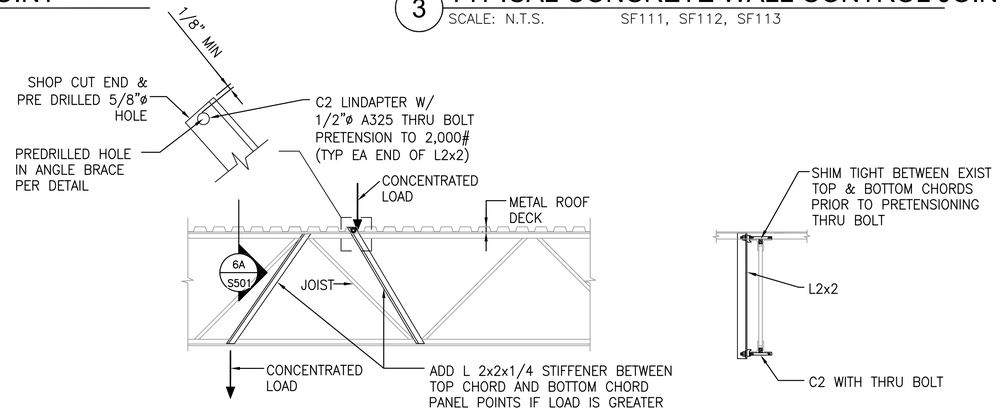
SCALE: N.T.S. S–502



1. HORIZONTAL CONSTRUCTION JOINTS ARE NOT PERMITTED EXCEPT WHERE SHOWN.
2. CONTRACTOR TO SUBMIT LOCATION FOR APPROVAL.

3 TYPICAL CONCRETE WALL CONTROL JOINT

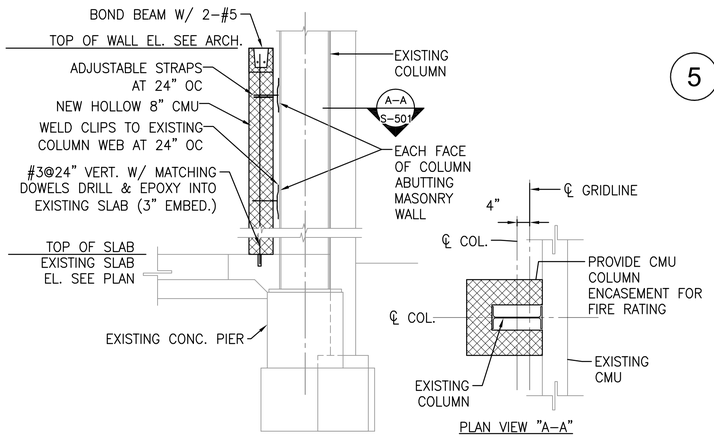
SCALE: N.T.S. SF111, SF112, SF113



1. HANGER LOADS GREATER THAN 50 LBS, REF. SF104–SF106 FOR MAXIMUM CONCENTRATED LOAD CRITERIA. REFER TO Fx SERIES DRAWINGS.

4 TYPICAL CURB DETAIL

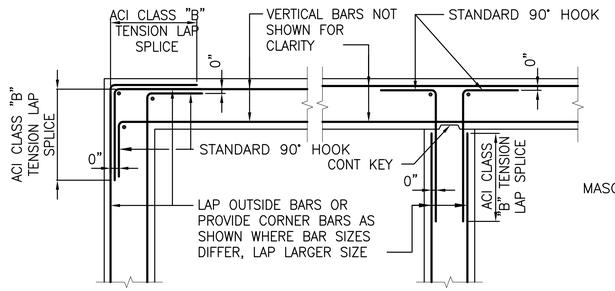
SCALE: N.T.S. S–401



1. PROVIDE WELD ON ADJUSTABLE MASONRY STEEL TRIANGLE TIES ($\frac{3}{16}$"ø) WITH WELD ON ANCHOR RODS ($\frac{1}{4}$"ø) AT COLUMNS ABUTTING MASONRY COLUMN PROTECTION.
2. PROVIDE ADJUSTABLE TIES AND STEEL WELD–ON ANCHOR ROD CLIPS.
3. KEEP ANCHORS IN BLOCK COURSING.

5 TYPICAL TRENCH WALL CONSTRUCTION JOINT

SCALE: N.T.S.



AT CORNERS

AT INTERSECTIONS

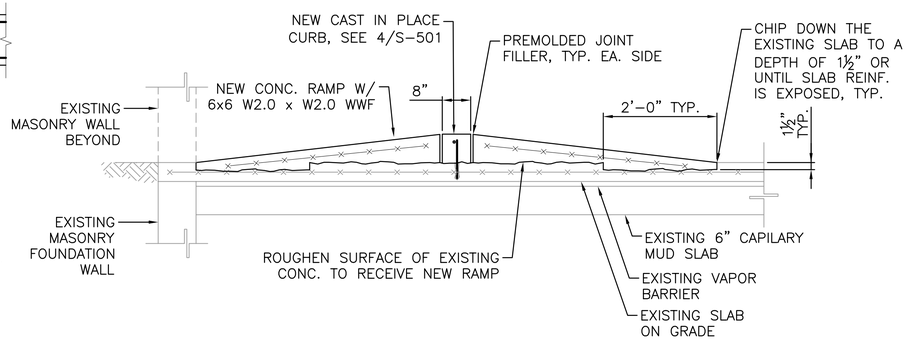
1. PROVIDE ALL DOWELS, CORNER BARS AND "U" BARS SAME SIZE AND SPACING AS HORIZONTAL REINFORCING.

6 TYPICAL REINFORCED JOIST AT PIPE HANGER

SCALE: N.T.S. SF114, SF115, SF116

6A

SCALE: N.T.S. S–501



7 TYPICAL DETAIL MASONRY ANCHORS

SCALE: N.T.S. SF111, SF113

8 TYPICAL CONCRETE WALL CORNER JOINT

SCALE: N.T.S. S–502

9 CONTAINMENT CURB DETAIL

SCALE: N.T.S. S–401

NO	DESCRIPTION	DATE	APPR
1	FINAL SUBMISSION	5/2/2016	

NAVFAC

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A/E NPD

APPROVED 5/16/16
FOR COMMANDER NAVFAC

ACTIVITY

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PM/DM	KPL/IAS				
BRANCH MANAGER					
CHIEF ENG/ARCH	Mark J. Airaghi, PE				
FIRE PROTECTION	DPS				

DEPARTMENT OF THE NAVY
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NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAS OCEANA – VIRGINIA BEACH, VIRGINIA

NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA

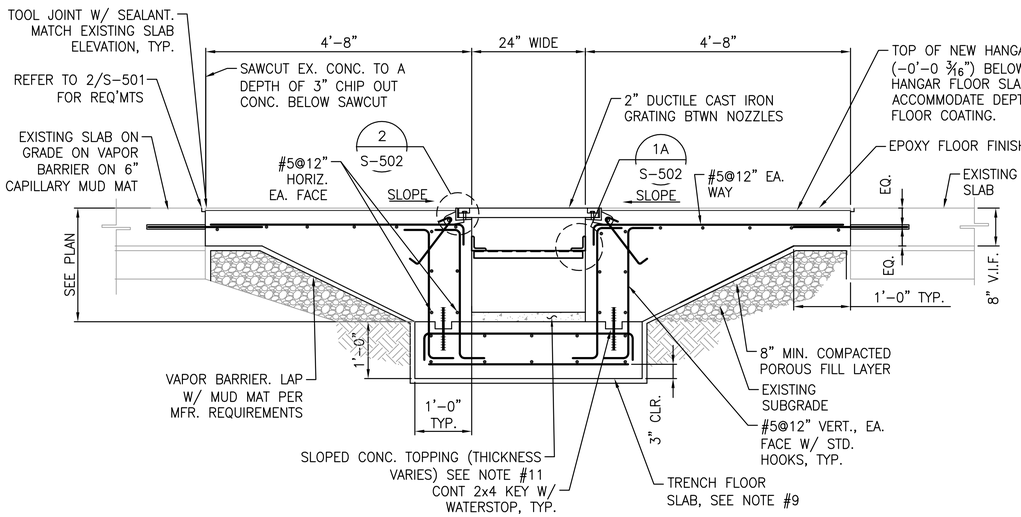
HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

DETAILS - STRUCTURAL

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716265
SHEET 43 OF 170

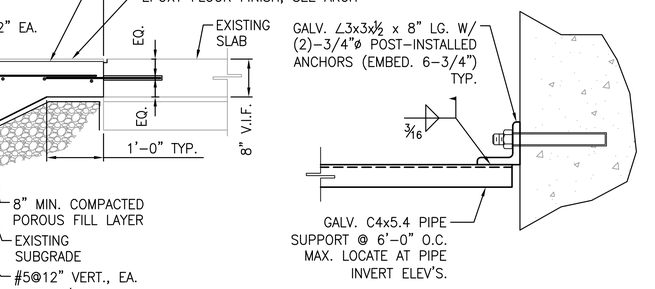
S-501

DRAWFORM REVISION: 10 MAY 2014



1 TYPICAL TRENCH DETAIL

SCALE: 3/4" = 1'-0" SF111, SF112, SF113

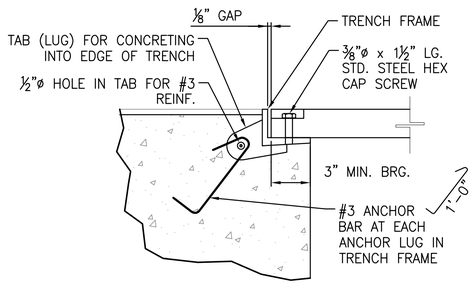


1A PIPE SUPPORT DETAIL

SCALE: N.T.S.

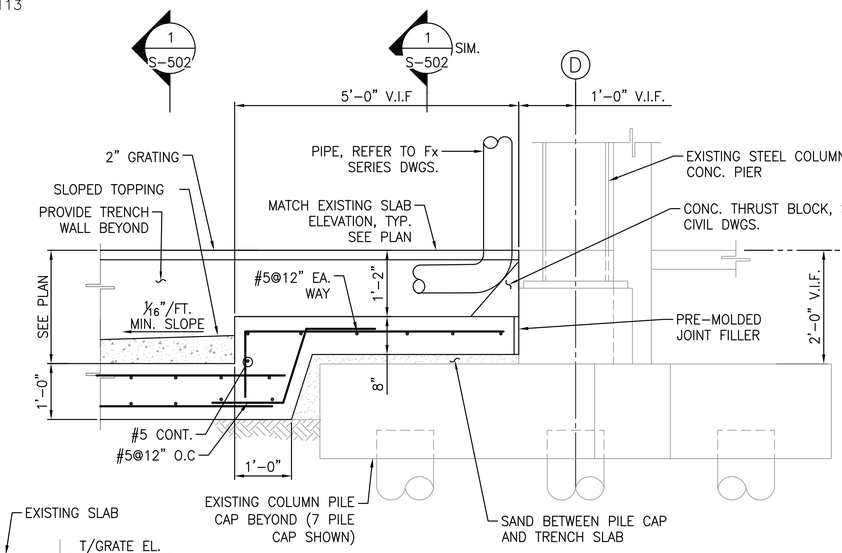
TRENCH NOTES

1. ALL ELEVATIONS ARE MEASURED FROM TOP OF EXISTING SLAB ELEVATION AT HIGH POINT AT DATUM ELEVATION 0'-0", ACTUAL ELEVATION _'-_" (V.I.F.)
2. REMOVE ALL CONCRETE SLABS AND PROVIDE A ROUGHENED INTERFACE TO FACILITATE AGGREGATE INTERLOCK. LIMITS OF SLAB DEMOLITION ARE INDICATED IN DETAILS.
3. THE CONTRACTING OFFICER MUST APPROVE THE EXCAVATION, SELECTION OF FILL MATERIAL, AND COMPACTION OF FILL.
4. PROVIDE A MINIMUM ONE-FOOT WIDE SHOULDER OF UNDISTURBED SUBGRADE MATERIAL AT THE EDGES OF ALL TRENCH EXCAVATIONS TO PREVENT UNDERMINING OF THE EXISTING CONCRETE SLAB.
5. ALL EXCAVATIONS MUST MAINTAIN A MAXIMUM SLOPE OF 2 HORIZONTAL: 1 VERTICAL. PROVIDE SHEET PILING OR OTHER SHORING AS REQUIRED TO PREVENT UNDERMINING OF EXISTING CONSTRUCTION IN THE AREA OF THE EXCAVATIONS WHEREVER THE SIDES OF THE EXCAVATIONS WILL BE STEEPER THAN THE MAXIMUM SLOPED STATED.
6. AFTER THE TRENCH EXCAVATIONS ARE MADE, BUT PRIOR TO PLACING FOUNDATION REINFORCING, INSPECT THE BOTTOMS TO VERIFY THAT THE SUPPORTING SOILS ARE ADEQUATE TO SUPPORT THE TRENCHES AND FLOOR LOADING.
7. REFER TO FX SERIES FOR NOZZLE LOCATIONS, PROVIDE GRATING BETWEEN NOZZLES.
8. PROVIDE GRAY, DUCTILE CAST IRON EXTRA HEAVY DUTY TRENCH GRATING, RATED TO SUPPORT THE FOLLOWING AIRCRAFT LOADS IN AREAS TO RECEIVE GRATING:
   AIRCRAFT WHEEL LOAD 100 KIPS
   AIRCRAFT TIRE PRESSURE 250 PSI
   COORDINATE TRENCH GRATES WITH SEPARATE CAST SECTIONS TO ACCOMMODATE AFFF SPRINKLER NOZZLES. PROVIDE TRENCH GRATES WITH SEPARATE CAST IRON FRAME SECTIONS FOR EMBEDMENT INTO CONCRETE.
9. PROVIDE TRENCH SLAB NORMAL WEIGHT CONCRETE PLACED 12" THICK REINFORCED W/ #5@12" O.C. T&B. TOP OF TRENCH SLAB TO BE AT A LEVEL SURFACE ELEVATION AS INDICATED ON PLAN.
10. ONCE TRENCH SLAB CURES PLACE SLOPED CONCRETE TOPPING, REFER TO SLAB PLAN DRAWINGS (SF111, SF112 & SF113) FOR TOPPING SLAB ELEVATIONS. PROVIDE 1/16"/FT. MIN. SLOPE BETWEEN ELEVATIONS CALLOUTS.



2 GRATING DETAIL

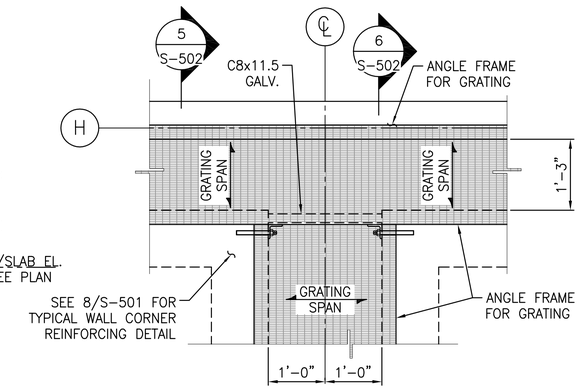
SCALE: N.T.S. S-502



SEE 1/S-502 FOR ADD'L REQUIREMENTS

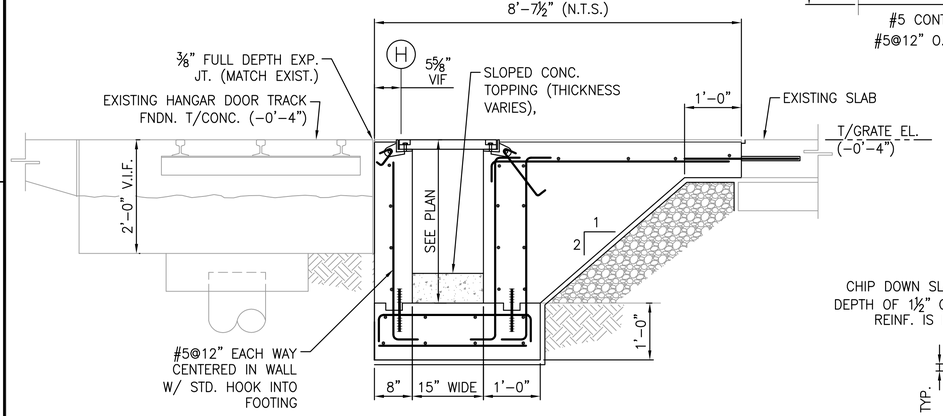
3 DETAIL AT TRENCH END

SCALE: 3/4" = 1'-0" SF111, SF112, SF113



4 TRENCH INTERSECTION DETAIL

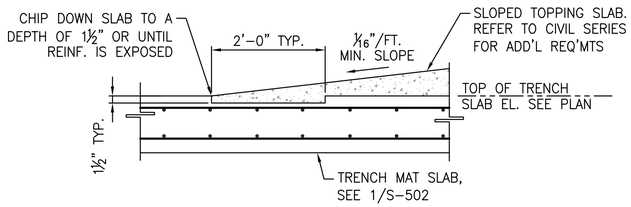
SCALE: 3/4" = 1'-0" SF111, SF112, SF113



SEE 1/S-502 FOR ADD'L REQUIREMENTS

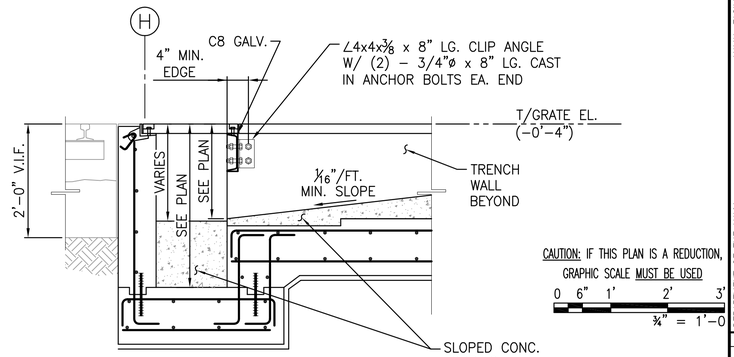
5 TRENCH DETAIL ALONG GRID LINE H

SCALE: 3/4" = 1'-0" S-502



7 TYPICAL SLOPED TOPPING SLAB AT TRENCH

SCALE: 3/4" = 1'-0"



SEE 1&5/S-502 FOR ADD'L INFO NOT SHOWN.

6 SECTION

SCALE: 3/4" = 1'-0" S-502

CAUTION: IF THIS PLAN IS A REDUCTION, GRAPHIC SCALE MUST BE USED

0 6" 1' 2' 3'

3/4" = 1'-0

APPR	DATE	DESCRIPTION	SYM
	5/2/2016	FINAL SUBMISSION	1

NAVFAC

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PM/DM KPL/IAS
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DEPARTMENT OF THE NAVY
HAMPTON ROADS PT.
NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

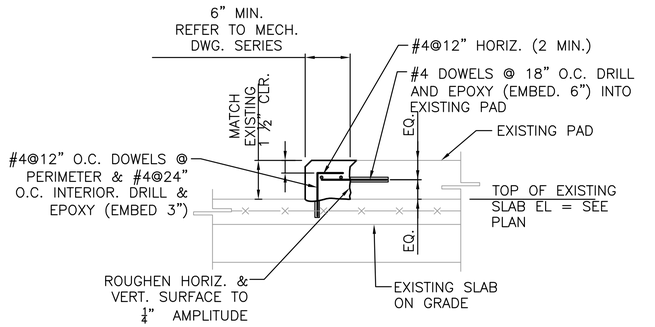
DETAILS - STRUCTURAL

SCALE:	AS SHOWN
EPROJECT NO.:	1372146
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12716266
SHEET	44 OF 170

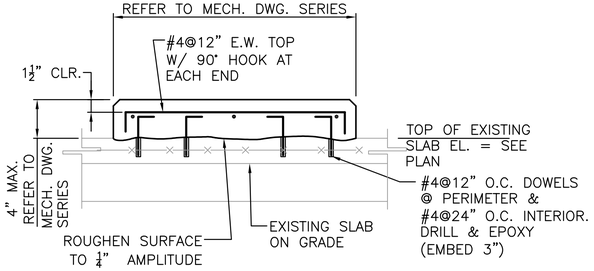
S-502

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHGO\GHGO1501-NAVFAC Hangar 111\DESIGN\S\1372146_S-502.dwg LAYOUT NAME: S502 PLOTTED: Tuesday, April 26, 2016 - 10:17am USER: KMusser



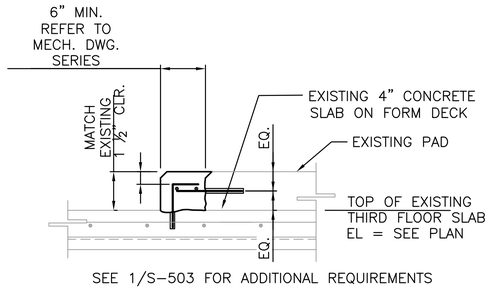
NEW EXTENSION TO EXISTING EQUIPMENT PAD



1. COORDINATE PAD SIZE, HEIGHT, EMBEDDED UTILITIES, ANCHOR BOLTS & PAD LOCATIONS WITH FINAL EQUIPMENT REQUIREMENTS AND MANUFACTURER'S RECOMMENDATIONS.
2. ALL PADS TO HAVE 3/4" CHAMFERED EDGES, ALL AROUND.
3. REFER TO MECH. SERIES DWG. FOR ADDITIONAL REQUIREMENTS.

1 NEW EQUIPMENT PAD ON EXISTING SLAB ON GRADE DETAIL

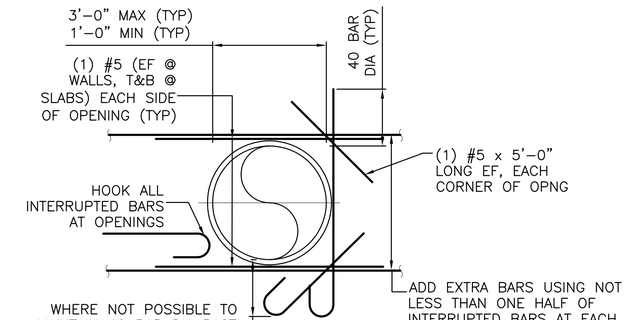
SCALE: N.T.S. S-401



SEE 1/S-503 FOR ADDITIONAL REQUIREMENTS

2 NEW EQUIPMENT PAD EXTENSION AT EXISTING ELEVATED SLAB DETAIL

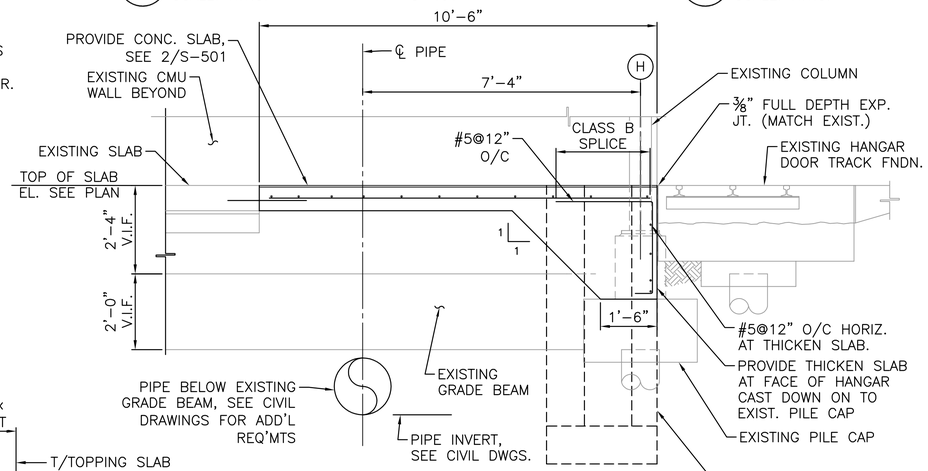
SCALE: N.T.S. S-401



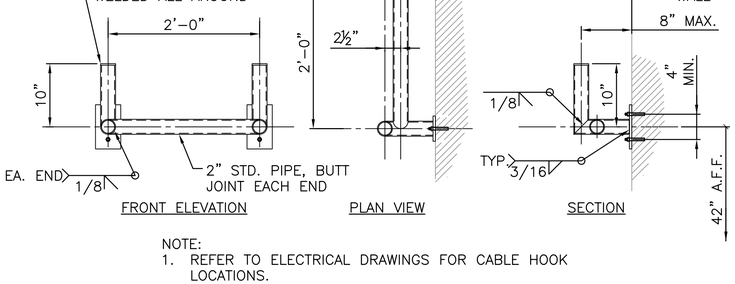
1. NOT ALL BARS ARE SHOWN FOR CLARITY. INFORMATION NOTED APPLIES TO ALL SIDES OF OPENING.

3 REINFORCING AT PIPE PENETRATION DETAIL

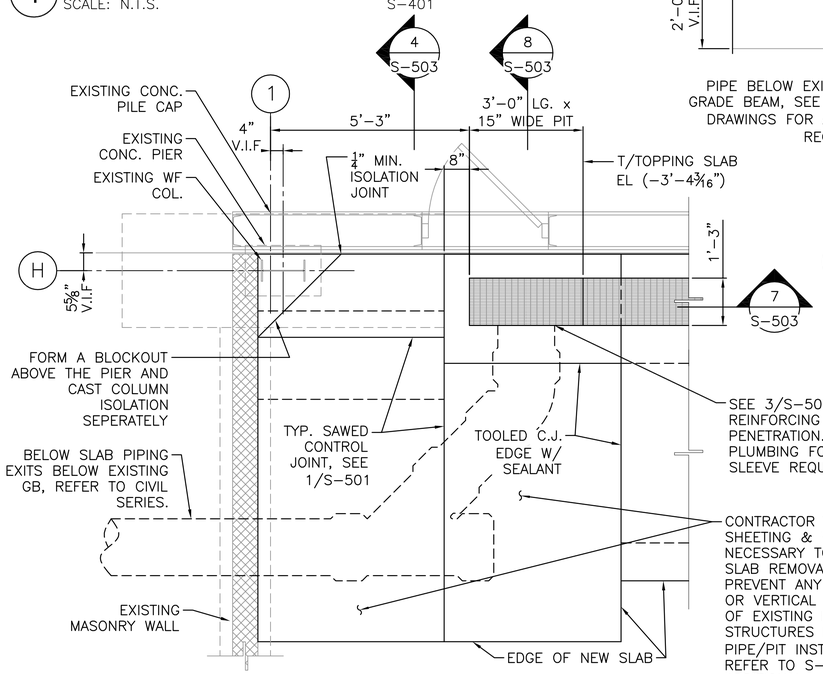
SCALE: N.T.S. S-401, S-503



1. DO NOT DAMAGE OR CUT EXISTING GRADE BEAM, PIER, OR PILE CAP



NOTE:
1. REFER TO ELECTRICAL DRAWINGS FOR CABLE HOOK LOCATIONS.

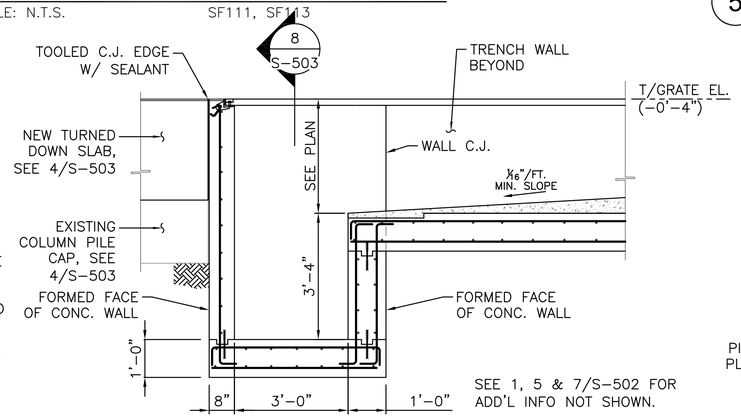


6 PLAN DETAIL AT END OF TRENCH

SCALE: N.T.S. SF111, SF113

4 SECTION AT BELOW SLAB PIPING

SCALE: N.T.S. SF111, SF113



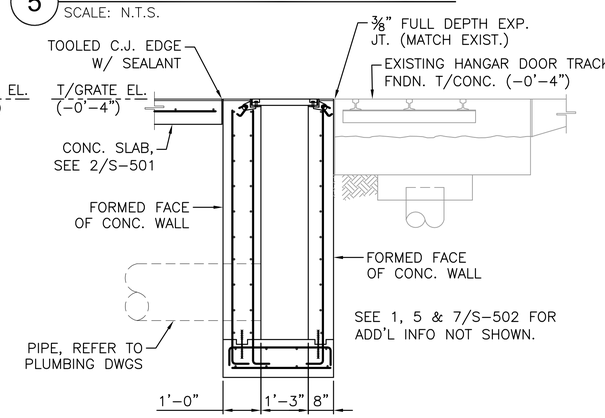
SEE 1, 5 & 7/S-502 FOR ADD'L INFO NOT SHOWN.

7 SECTION

SCALE: 3/4" = 1'-0" S-503

5 CABLE HOOK DETAIL

SCALE: N.T.S.



SEE 1, 5 & 7/S-502 FOR ADD'L INFO NOT SHOWN.

8 SECTION

SCALE: 3/4" = 1'-0" S-503

	1	FINAL SUBMISSION	5/2/2016
APPR	STM	DESCRIPTION	DATE

NAVFAC

COMMONWEALTH OF VIRGINIA
DENNIS MATTHEW STUART
Lic. No. 029761
PROFESSIONAL ENGINEER
5-2-16
SEAL

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A/E INFO

APPROVED 5/11/16
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO
DES JL DRW KGM CHK DMS
PM/QM KPL/IAS
BRANCH MANAGER
CHIEF ENG/ARCH Mark J. Airaghi, PE
FIRE PROTECTION DPS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
HAMPTON ROADS PT
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NAS OCEANA – VIRGINIA BEACH, VIRGINIA
NAVAL AIR STATION OCEANA
VIRGINIA BEACH, VIRGINIA

HANGAR 111 FIRE PROTECTION AND STRUCTURAL REPAIRS

DETAILS - STRUCTURAL

SCALE: NO SCALE
EPROJECT NO.: 1372146
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12716267
SHEET 45 OF 170

S-503

DRAWFORM REVISION: 10 MAY 2014

FILE NAME: P:\Projects\GHDG\GHDG1501–NAVFAC Hangar 111\DESIGN\S\1372146_S–S503.dwg LAYOUT NAME: S503 PLOTTED: Tuesday, April 26, 2016 – 11:00am USER: KMusser