National Aeronautics and Space Administration

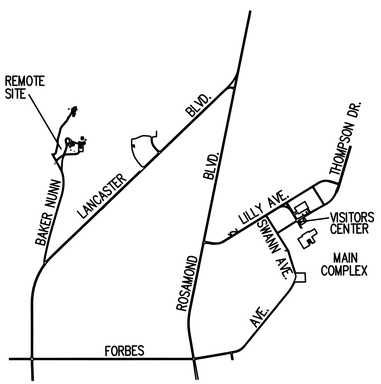
ARMSTRONG FLIGHT RESEARCH CENTER

PROJECT TITLE:

REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS

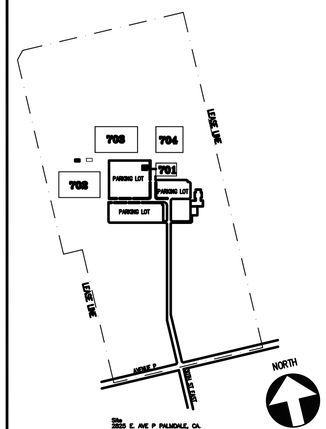
REMOTE SITE PLAN
SCALE: 1"= 400'

NORTH



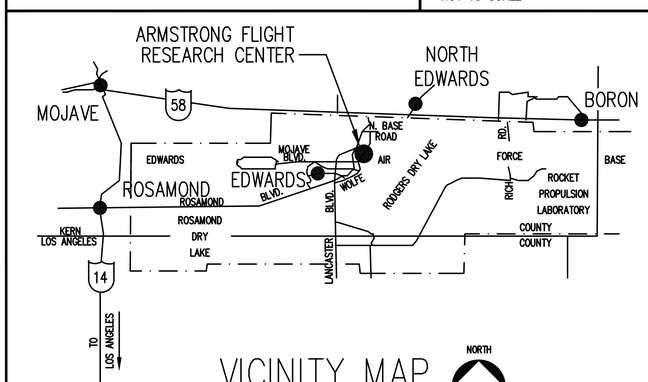
AREA PLAN
NOT TO SCALE

NORTH



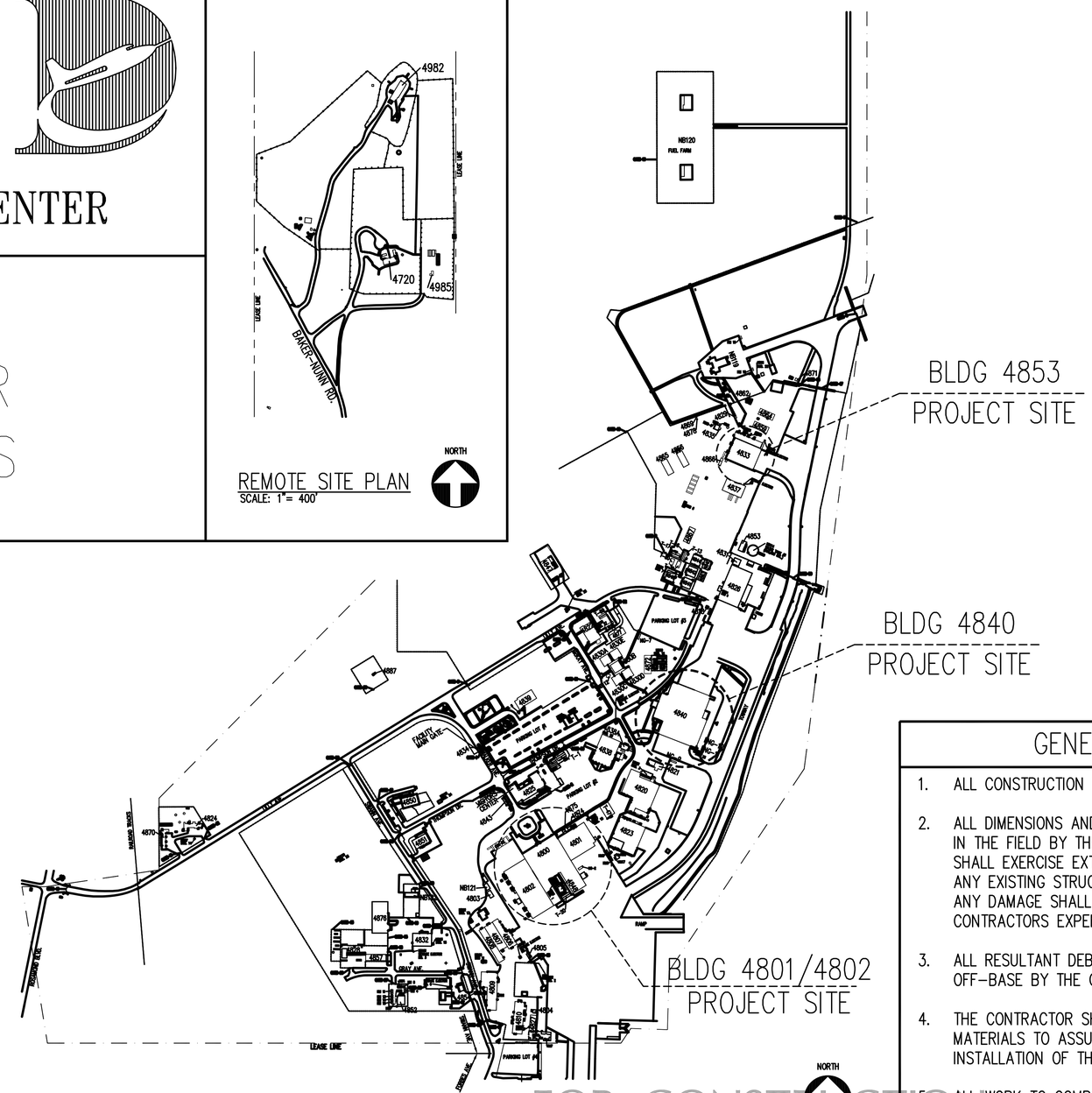
ARMSTRONG AIRCRAFT OPERATIONS FACILITY
NOT TO SCALE

NORTH



VICINITY MAP
NOT TO SCALE

NORTH



NORTH

FOR CONSTRUCTION

GENERAL NOTES

1. ALL CONSTRUCTION IS NEW UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION NOT TO DAMAGE ANY EXISTING STRUCTURES, EQUIPMENT, OR UTILITIES. ANY DAMAGE SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.
3. ALL RESULTANT DEBRIS SHALL BE DISPOSED OF OFF-BASE BY THE CONTRACTOR.
4. THE CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO ASSURE A COMPLETE AND PROPER INSTALLATION OF THIS PROJECT.
5. ALL WORK TO COMPLY WITH APPLICABLE CODES, IBC, NEC, NFPA, UPC, ETC.

ARMSTRONG FLIGHT RESEARCH CENTER MAIN COMPLEX SITE PLAN

SCALE: 1"= 400'

400' 200' 0' 400' 800'

100M 50M 0M 100M 200M

RAFI
Planning Architecture Urban Design

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/15
Renewal Date
STATE OF CALIFORNIA

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
TITLE SHEET

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	JS	EDM-1719	
SCALE	N.T.S.	TRADE Sh. No.	
FILE NAME	G-000.DWG	G-000	SHEET No. 1 of 137

PROJECT TEAM

PRINCIPAL DESIGN PROFESSIONAL

ARCHITECT

RAFI
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STRUCTURAL ENGINEER

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T: 702.365.9312
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www.lochsa.com

MPE ENGINEER

HENDERSON ENGEERS INC
5555 Redwood Street, Suite 201
T: 702.694.2187
F: 702.697.2188
www.hei-eng.com

GENERAL NOTES

1. IN ADDITION TO THE INTENT OF THE WORK INDICATED ON THE DRAWINGS, ALL WORK SHALL COMPLY WITH THE SPECIFIC REQUIREMENTS OF CONSTRUCTION, THE GENERAL CONDITIONS OF THE CONSTRUCTION, THE SUPPLEMENTAL CONDITIONS OF THE CONTRACT AND THE PROJECT SPECIFICATIONS.
2. THESE DOCUMENTS INDICATE THE SCOPE OF THE PROJECT IN TERMS OF THE ARCHITECTURAL DESIGN PLANS, THE DIMENSIONS OF THE ARCHITECTURAL AND INTERIOR ELEMENTS AND THE CONCEPTS OF THE MAJOR ELECTRICAL SYSTEMS. BASED ON THE SCOPE DESCRIBED OR INDICATED, PROVIDE ALL ITEMS, SYSTEM PRODUCTS, AND LABOR REQUIRED OR INFERRED FOR THE PROPER EXECUTION AND FULL AND COMPLETE PERFORMANCE OF THE PROJECT.
3. N/A
4. CONSTRUCTION OF WORK INDICATED ON THE DRAWINGS AS (N.I.C.) IS NOT IN CONTRACT.
5. WHEN DISCREPANCIES EXIST WITHIN DRAWINGS, OR BETWEEN DRAWINGS AND SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL APPLY.
6. VERIFY ALL DIMENSIONS IN FIELD BEFORE PROCEEDING WITH THE WORK. NOTIFY CONTRACTING OFFICER OF DISCREPANCIES, CONFLICTS, AND MODIFICATIONS.
7. WHERE DIMENSIONS OR EXACT LOCATIONS ARE REQUIRED, AND NOT INCLUDED ON THE DRAWINGS, REQUEST INFORMATION FROM CONTRACTING OFFICER.
8. WHERE GYPSUM BOARD LAYERS DIFFER BETWEEN TWO ADJOINING WALLS, MAINTAIN CONTINUOUS FINISH FACE OF WALL.
9. GLAZING SUBJECT TO HUMAN IMPACT AS IDENTIFIED IN 2012 IBC SHALL BE SAFETY GLAZING MATERIAL. IDENTIFY EACH TYPE OF LAMINATED OR TEMPERED GLAZING BY A PERMANENT LABEL WHICH SPECIFIES THE LABELER OR MANUFACTURER AND THAT SAFETY GLAZING MATERIAL HAS BEEN UTILIZED.
10. PROVIDE PROPER ANCHORAGE OF ESSENTIAL EQUIPMENT IN ACCORDANCE WITH APPLICABLE CODES.
11. THE CONTRACTOR SHALL COORDINATE AND PROVIDE ALL SLAB AND WALL OPENINGS REQUIRED BY MECHANICAL AND ELECTRICAL SYSTEMS. PROVIDE COORDINATION DRAWINGS TO CONTRACTING OFFICER FOR REVIEW.
12. VISIT THE SITE AND BE KNOWLEDGEABLE OF ALL CONDITIONS THEREOF. INVESTIGATE, VERIFY AND BE RESPONSIBLE FOR ALL CONDITIONS OF THE PROJECT AND NOTIFY THE CONTRACTING OFFICER OF ANY CONDITIONS REQUIRING MODIFICATION BEFORE PROCEEDING WITH THE WORK.
13. N/A
14. HAZARDAOUS MATERIALS AND / OR MATERIAL CONTAINING LEAD PAINT SHALL BE DISPOSED OF PER FEDERAL / STATE AND LOCAL CODE REQUIREMENTS.
15. COATINGS MUST COMPLY WITH ALL LOCAL AND FEDERAL LAWS GOVERNING VOLATILE ORGANIC COMPOUNDS, AND ALL EPA RECOMMENDATIONS.
16. DO NOT SCALE DRAWINGS.
17. DIMENSIONS ARE TO FACE OF STUDS, UNO.
18. ASBESTOS OR PRODUCTS CONTAINING ASBESTOS ARE NOT ALLOWED IN ANY ASPECT OF THIS CONSTRUCTION.
19. COORDINATE ALL DISCIPLINES AND ALL ASPECTS OF WORK. CONFLICTS AND DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER IMMEDIATELY.
20. ALL CONCRETE SURFACES WHICH RECEIVE A SPECIAL FINISH, FLOOR COVERING, COATINGS, HARDENERS, ETC. SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFIC FINISH MANUFACTURER'S SPECIFICATIONS.
21. ALL FINISH ELEVATIONS ARE TO TOP OF WALKS, GRADE, PAVING, WALLS, ROOFS, ETC., UNLESS NOTED OTHERWISE.
22. ALL EXPOSED WELDS SHALL BE GROUND SMOOTH AND FINISHED WITH NO PITS FOR ARCHITECTURAL APPEARANCE.
23. ALL EXPOSED METAL SURFACES THAT ARE NOT PREFINISHED ARE TO BE PAINTED.
24. PROVIDE SOLID BLOCKING AND ANCHORAGE FOR CEILING AND WALL MOUNTED EQUIPMENT.
25. PROVIDE SEPARATION AND/OR APPROPRIATE COATING BETWEEN ALL DISSIMILAR METALS.
26. ALL DOOR AND FRAME ASSEMBLIES AND INSTALLATIONS SHALL BE IN STRICT ACCORDANCE WITH UNIFORM LIFE SAFETY CODES GOVERNING EDITION.
27. ALL TRANSITIONS BETWEEN SIMILAR OR DISSIMILAR MATERIALS, EQUIPMENT, ACCESSORIES, ETC. SHALL BE CAULKED AND/OR SEALED AS REQUIRED WITH SPECIFIED SEALANT.

ABBREVIATIONS

A/C	AIR CONDITIONING	CU FT	CUBIC FEET	C DISP	CARBAGE DISPOSAL	MIRR	MIRROR	SC	SOLID CORE
AB	ANCHOR BOLT	CU YD	CUBIC YARD	GFI	GROUND FAULT INTERRUPTER	MISC	MISCELLANEOUS	SCH	SCHEDULE
ACT	ACOUSTICAL CEILILNG TILE	CW	COLD WATER PIPING	GL	GLASS	MO	MASONRY OPENING	SCHD	SCHEDULED
AD	AREA DRAIN	D	PENNY (NAIL)	GLU LAM	GLUE LAMINATED WOOD	MOD	MODULE, MODIFY	SEC	SECOND
ADDM	ADDENDUM			GRD	GRADE	MTD	MOUNTED	SECT	SECTION
ADDL	ADDITIONAL	DBL	DOUBLE	GYP BD	GYPSUM BOARD	MULL	MULLION	SF	SQUARE FEET
ADJ	ADJUSTABLE, ADJACENT	DEG	DEGREE	GYP	GYPSUM			SHR	SHOWER
A/E	ARCHITECT, ENGINEER	DEPT	DEPARTMENT			N	NORTH	SHT	SHEET, SHAFT
AFF	ABOVE FINISHED FLOOR	DET	DETAIL	H	HATCH (ROOF), HIGH	NO	NUMBER	SHTHG	SHEATHING
AGGR	AGGREGATE	DF	DRINKING FOUNTAIN	HB	HOSE BIBB	NOM	NOMINAL	SIM	SIMILAR
AHU	AIR HANDLING UNIT	DIA	DIAMETER	HC	HANDICAP, HOLLOW CORE	NTS	NOT TO SCALE	SPEC	SPECIFICATIONS
ALUM	ALUMINUM	DIAG	DIAGONAL	HDBD	HEADBOARD	SQ	SQUARE	SS	STORM SEWER, SERVICE SINK
ALT	ALTERNATE	DIFF	DIFFUSER	HDR	HEADER	OC	ON CENTER	SST	STAINLESS STEEL
AMP	AMPERE	DIM	DIMENSION	HDW	HARDWARE	OD	OUTSIDE DIAMETER	STD	STANDARD
ANOD	ANODIZE	DSPL	DISPOSAL	HDWD	HARDWOOD	OFD	OVERFLOW DRAIN	STL	STEEL
APPD	APPROVED	DL	DEAD LOAD	HM	HOLLOW METAL	OFF	OFFICE	STOR	STORAGE
ARCH	ARCHITECT	DN	DOWN	HORIZ	HORIZONTAL	O.F.O.I.	OWNER FURNISHED CONTRACTOR INSTALLED	STRUCT	STRUCTURAL
ASPH	ASPHALT	DR	DOOR	HP	HORSE POWER	OPNG	OPENING	SUB FL	SUBFLOOR
AVE	AVENUE	DS	DOWNSPOUT	HR	HOUR	OPP	OPPOSITE	SURF	SURFACE
AVG	AVERAGE	DSP	DRY STANDPIPE	HS	HIGH STRENGTH	OZ	OUNCE	SUSP	SUSPEND
AWT	ACOUSTICAL WALL TREATMENT	DWG	DRAWING	HT	HEIGHT			SYM	SYMBOL
				HW	HOT WATER	PT	PAINT	SYMM	SYMMETRICAL
BALC	BALCONY	E	EAST			PBD	PARTICLE BOARD		
BC	BACK OF CURB, BETWEEN CENTERS,	EA	EACH	ID	INSIDE DIAMETER	PRCST	PRECAST	T&B	TOP & BOTTOM
	BOOKCASES, BUILDING CODE	EJ	EXPANSION JOINT	IN	INCHES	PERF	PERFORATED	T&G	TONGUE & GROOVE
BD	BOARD	EL	ELEVATION	INSUL	INSULATION	PERP	PERPENDICULAR	TC	TERRA COTTA
BITUM	BITUMINOUS	ELEC	ELECTRICAL	INFO	INFORMATION	PH	PHASE	TEL	TELEPHONE
BLDG	BUILDING	ELEV	ELEVATOR	INSP	INSPECT	PL	PROPERTY LINE	TEMP	TEMPORARY, TEMPERATURE
BLVD	BOULEVARD	EMER	EMERGENCY	INSTL	INSTALL	PLAM	PLASTIC LAMINATE	TER	TERRAZZO
BM	BEAM, BENCHMARK	ENAM	ENAMEL	INT	INTERIOR	PLAS	PLASTER	TOF	TOP OF FOOTING, TOP OF FLOOR
BOT	BOTTOM	ENTR	ENTRANCE			PLYWD	PLYWOOD	THRES	THRESHOLD
BR	BEDROOM	EP	ELECTRICAL PANEL (PANEL BOARD)	JAN	JANITOR	PLBG	PLUMBING	TOC	TOP OF CURB, TABLE OF CONTENTS, TOP OF
BRG	BEARING	EQ	EQUAL			PNL	PANEL		CONCRETE
BSMT	BASEMENT	EQUIP	EQUIPMENT	KD	KILN DRIED	PP	PUSH, PULL	TOIL	TOILET
Btu	BRITISH THERMAL UNITS	EST	ESTIMATE	KIP	ONE THOUSAND POUNDS	PP PL	PUSH, PULL PLATE	TOL	TOLERANCE
		EWC	ELECTRIC WATER COOLER	KIT	KITCHEN	PROP	PROPERTY	TOS	TOP OF STEEL, TOP OF SLAB
C	CELCIUS, CHANNEL	EXC	EXCAVATE	KO	KNOCKOUT	PR	PAIR	TO	TOP OF
CAB	CABINET	EXH	EXHAUST	KPL	KICKPLATE	PREFAB	PREFABRICATE	TV	TELEVISION
CAP	CAPACITY	EXP	EXPANSION			PSF	POUNDS PER SQUARE FOOT	TYP	TYPICAL
CPT	CARPET	EXT	EXTERIOR	LAM	LAMINATE	PSI	POUNDS PER SQUARE INCH		
CB	CATCH BASIN, CHALKBOARD			LAV	LAVATORY	PTN	PARTITION	UL	UNDERWRITERS LABORATORIES
CBC	CALIFORNIA BUILDING CODE	F	FAHRENHEIT	LB	POUND	PVC	POLYVINYL CHLORIDE (PLASTIC)	UNFIN	UNFINISHED
CEM	CEMENT	FA	FIRE ALARM, FORCED AIR	LBR	LUMBER	PVG	PAVING	UR	URINAL
CEM PLAS	CEMENT PLASTER	FD	FLOOR DRAIN	LDR	LEADER			UNO	UNLESS NOTED OTHERWISE
CER	CERAMIC	FDTN	FOUNDATION	LH	LEFT HAND	QT	QUARRY TILE	UTIL	UTILITY
CG	CORNER GUARD	FE	FIRE EXTINGUISHER	LHR	LEFT HAND REVERSE	QTR	QUARTER		
CI	CAST IRON	FIN	FINISH	LKR	LOCKER			VAR	VARIABLE
CIP	CAST-IN-PLACE, CAST IRON PIPE	FLR	FLOOR	LL	LIVE LOAD	R	RISER, RADIUS, RANGE	VCT	VINYL COMPOSITE TILE
CIR	CIRCLE	FLR SK	FLOOR SINK	LPT	LOW POINT	RA	RETURN AIR	VERT	VERTICAL
CJ	CONTROL JOINT, CONSTRUCTION JOINT	FLUOR	FLUORESCENT	LR	LIVING ROOM	RB	RUBBER BASE	VEST	VESTIBULE
CL	CENTER LINE	FOC	FACE OF CONCRETE	LAM GL	LAMINATED GLASS	RCP	REFLECTED CEILING PLAN	VIF	VERIFY IN FIELD
CLG	CEILING	FOM	FACE OF MASONRY	LT	LIGHT	RD	ROOF DRAIN	VWC	VINYL WALL COVERING
CLO	CLOSET	FOS	FACE OF STUD, FACE OF SLAB	LT WT	LIGHT WEIGHT	RF	ROOF		
CLR	CLEAR	FP	FIREPROOF			RFG	ROOFING	W	WEST, WIDE
CMU	CONCRETE MASONRY UNIT	FR	FIRE RETARDANT, FIRE RATING	MACH	MACHINE	REBAR	REINFORCING STEEL BARS	W/O	WITHOUT
CO	CLEAN OUT, COMPANY	FS	FULL SIZE	MAINT	MAINTENANCE	RCPTN	RECEPTION	W/	WITH
COL	COLUMN	FT	FEET	MAS	MASONRY	RECPT	RECEPTACLE	WSCT	WAINSCOAT
CONC	CONCRETE	FTG	FOOTING	MATL	MATERIAL	REF	REFERENCE, REFRIGERATOR	WC	WATER CLOSET
CONN	CONNECT	FURN	FURNITURE	MAX	MAXIMUM	REINF	REINFORCE	WD	WOOD, WOOD DOOR
CONSTR	CONSTRUCTION	FURG	FURRING	MB	MACHINE BOLT	REQD	REQUIRED	WDW	WINDOW
CONT	CONTINUE	FUT	FUTURE	MECH	MECHANICAL	RESIL	RESILIENT	WGL	WIRED GLASS
COORD	COORDINATE			MEMB	MEMBRANE	RET	RETURN	WH	WATER HEATER, WEEP HOLE
CORR	CORRIDOR	G	NATURAL GAS, GROUND	MTL	METAL	REV	REVISION	WI	WROUGHT IRON
CSK	COUNTER SUNK	GA	GAGE	MEZZ	MEZZANINE	RM	ROOM	WP	WATERPROOFING
CT	CERAMIC TILE	GALV	GALVANIZED	MFR	MANUFACTURER	RO	ROUGH OPENING	WS	WEATHERSTRIP
CTR	CENTER	GB	GRAB BAR	MH	MAN HOLE	ROW	RIGHT OF WAY	WT	WEIGHT, WATERTIGHT
CU	CUBIC	GC	GENERAL CONTRACTOR	MIN	MINIMUM, MINUTE			WWF	WELDED WIRE FABRIC
						S	SOUTH, SANITARY SEWER	WWM	WELDED WIRE MESH

SYMBOLS

1 / 4 AX.XX 2 / 3	INTERIOR ELEVATION MARKER	1 / A1.01	EXTERIOR ELEVATION MARKER
101	DOOR IDENTIFICATION	9'-0	CEILING HEIGHT
W1	WALL TYPES	VCT-1	ROOM FINISH NOTE
XXXXX	KEYNOTES	0'-0" / 0'-0"	ELEVATION HEIGHT TAG
1 / A1.01	DETAIL NUMBER / DETAIL SHEET	#	SHEET NOTE
OFFICE 201	ROOM NAME & NUMBER		

FOR CONSTRUCTION

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/13
Renewal Date
STATE OF CALIFORNIA

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
GENERAL INFORMATION

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requester/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	SK	EDM-1719	
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	G-001.DWG	G-001	SHEET No. 2 of 137

CODE ANALYSIS

1	Applicable Model Code	Amendment	
	Building and Fire Administrative Code		
	2012 California Building Code (CBC)		
	2012 California Mechanical Code (CMC)		
	2012 California Plumbing Code (CPC)		
	2012 California Energy Code (CEC)		
	NASA STD - 8719.11A - Standard for Fire Protection		
	NFPA 409 "Standard on Aircraft Hangars," 2012 Edition		
	NFPA 11 "Standard for Low-, Medium-, and High-Expansion Foam," 2012 Edition		
	NFPA 70 "National Electrical Code," 2012 Edition		
	NFPA 72 "National Fire Alarm and Signaling Code," 2013 Edition		
	U.S. Corps of Engineers manual EM385-1-1 "Safety and Health Requirements Manual"		
2	Occupancy Classification	Code Reference	
	S-1: Moderate Hazard Storage	2010 CBC section 443	
3	Type of Construction (Assumed Equivalent)	Code Reference	
	N/A	2010 CBC section 602	
4	Fire Sprinklers / Type	Code Reference	
	Existing / Automatic	2010 CBC section 903	
5	Fire Alarm	Code Reference	
	Existing	2010 CBC section 907	

6 Building Height

Occupancy Classification	Type of Construction	Allowable Height per Table 503	Height increase per section 504.2	Allowable Height	Actual Building Height
S-1: Moderate Hazard Storage	N/A	N/A	N/A	N/A	

7 Stories

Occupancy Classification	Type of Construction	Allowable Stories per Table 503	Story increase per section 504.2	Allowable Stories	Actual number of Stories
S-1: Moderate Hazard Storage	N/A	N/A	N/A	N/A	N/A

8 Total Existing Building Area

9 Area

Allowable Area (Building SF):	N/A	Code Reference
Area of Improvement		2010 CBC Table 503

10	Occupant Load	Code Reference
	N/A	2010 CBC Table 1004.1.1
11	Required number of exits	
	Required / Provided	Code Reference
	N/A / N/A	2010 CBC
12	Required Fire Resistance of Exterior Walls	
	Required / 1 HR	Code Reference
	Provided / NA	2010 CBC Tables 601, 602

				Code Reference
13	Protection of Openings & Max. Area of Exterior Wall Openings		Not Applicable	CBC 704 & Table 704.8
14	Fire Resistance Rating Requirements for Building Elements		Not Applicable	CBC Chapter 7 & Table 601, 602
15	Spaces Requiring Fire Resistance-Rated Separation		Not Applicable	CBC Section 508 & Table 508.2
16	Roof Covering Material		Not Applicable	CBC Table 1505.1
17	Required plumbing Fixtures - N/A - Remodel does not modify occupant load.			CBC 2901 & Table 2902.1
18	Special Inspections Required			Code Reference
	Not Applicable			CBC Chapter 17
19	IECC Compliance Report :	Not Applicable		
20	Non-separated Usage	No occupancy changed		

REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS
DRAWING INDEX - BUILDINGS 4801, 4802, 4840, 4853

SHEET NO.	SHEET TITLE	30% SUBMITTAL 02/20/13	60% SUBMITTAL 02/05/14	95% SUBMITTAL 02/28/14	95% RESUBMITTAL 03/21/14	100% SUBMITTAL 04/18/14
G000	TITLE SHEET	X	X	X	X	X
G001	GENERAL INFORMATION	X	X	X	X	X
G002	CODE INFORMATION AND DRAWING INDEX	X	X	X	X	X
A-201	HANGAR 4801 REFLECTED CEILING PLAN AND SECTION	X	X	X	X	X
A-202	HANGAR 4802 REFLECTED CEILING PLAN AND SECTION	X	X	X	X	X
A-203	HANGAR 4840 REFLECTED CEILING PLAN	X	X	X	X	X
A-501	HANGAR 4840 SECTION			X	X	X
A-801	DRAFT CURTAIN CONNECTIONS		X	X	X	X
A-802	DETAILS		X	X	X	X
C-1	WATER CONNECTION PLAN		X	X	X	X
C-2	TRANSFORMER PLAN SHEET 1			X	X	X
S001	STRUCTURAL INFORMATION		X	X	X	X
S601	STRUCTURAL SECTIONS AND DETAILS		X	X	X	X
S602	STRUCTURAL SECTIONS AND DETAILS			X	X	X
E000	ELECTRICAL GENERAL NOTES AND LEGEND	X	X	X	X	X
E001	OVERALL ELECTRICAL SITE PLAN		X	X	X	X
E002	ELECTRICAL DUCT BANK PLAN		X	X	X	X
ED100	ELECTRICAL DEMOLITION PLAN - BUILDING 4853		X	X	X	X
ED101	ELECTRICAL DEMOLITION PLAN - BUILDING 4801		X	X	X	X
ED102	ELECTRICAL DEMOLITION PLAN - BUILDING 4802		X	X	X	X
ED103	ELECTRICAL DEMOLITION PLAN - BUILDING 4840		X	X	X	X
E100	ELECTRICAL PLAN - BUILDING 4853		X	X	X	X
E101	ELECTRICAL PLAN - BUILDING 4801		X	X	X	X
E102	ELECTRICAL PLAN - BUILDING 4802		X	X	X	X
E103	ELECTRICAL PLAN - BUILDING 4840		X	X	X	X
E200A	ONE LINE DIAGRAM - PEDC BUILDING - SUB STATION #16		X	X	X	X
E200	PARTIAL ONE LINE DIAGRAM & SCHEDULES - BUILDING 4853		X	X	X	X
E201	PARTIAL ONE LINE DIAGRAM & SCHEDULES - BUILDING 4801	X	X	X	X	X
E202	PARTIAL ONE LINE DIAGRAM & SCHEDULES - BUILDING 4802		X	X	X	X
E203	PARTIAL ONE LINE DIAGRAM & SCHEDULES - BUILDING 4840		X	X	X	X
F000	FIRE PROTECTION OVERALL SITE PLAN AND LEGEND	X	X	X	X	X
F001	FIRE PROTECTION ENLARGED SITE PLAN		X	X	X	X
F002	FIRE PROTECTION ENLARGED SITE PLAN		X	X	X	X
F100	FIRE SPRINKLER OVERALL DEMOLITION PLAN - BUILDING 4853	X	X	X	X	X
F101	FIRE SPRINKLER OVERALL DEMOLITION PLAN - BUILDING 4801	X	X	X	X	X
F101A	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4801 AREA A	X	X	X	X	X
F101B	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4801 AREA B	X	X	X	X	X
F102	FIRE SPRINKLER OVERALL DEMOLITION PLAN - BUILDING 4802	X	X	X	X	X
F102A	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA A	X	X	X	X	X
F102B	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA B	X	X	X	X	X
F102C	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA C	X	X	X	X	X
F103	FIRE SPRINKLER OVERALL DEMOLITION PLAN - BUILDING 4840	X	X	X	X	X
F103A	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA A	X	X	X	X	X
F103B	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA B	X	X	X	X	X
F103C	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA C	X	X	X	X	X
F103D	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA D	X	X	X	X	X
F103E	FIRE SPRINKLER ENLARGED DEMOLITION PLAN - BUILDING 4840 PUMP ROOM		X	X	X	X
F111	FOAM SUPPRESSION OVERALL DEMOLITION PLAN - BUILDING 4801	X	X	X	X	X
F111A	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4801 AREA A	X	X	X	X	X
F111B	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4801 AREA B	X	X	X	X	X
F111C	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4801 PUMP ROOM		X	X	X	X
F112	FOAM SUPPRESSION OVERALL DEMOLITION PLAN - BUILDING 4802	X	X	X	X	X
F112A	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA A	X	X	X	X	X
F112B	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA B	X	X	X	X	X
F112C	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA C	X	X	X	X	X
F112D	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4802 PUMP ROOM	X	X	X	X	X
F113	FOAM SUPPRESSION OVERALL DEMOLITION PLAN - BUILDING 4840	X	X	X	X	X
F113A	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA A	X	X	X	X	X
F113B	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA B	X	X	X	X	X
F113C	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA C	X	X	X	X	X
F113D	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA D	X	X	X	X	X
F113E	FOAM SUPPRESSION ENLARGED DEMOLITION PLAN - BUILDING 4840 PUMP ROOM		X	X	X	X
F120	FIRE ALARM DEMOLITION PLAN - BUILDING 4853	X	X	X	X	X
F121	FIRE ALARM OVERALL DEMOLITION PLAN - BUILDING 4801	X	X	X	X	X
F121A	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4801 AREA A	X	X	X	X	X
F121B	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4801 AREA B	X	X	X	X	X
F122	FIRE ALARM OVERALL DEMOLITION PLAN - BUILDING 4802	X	X	X	X	X
F122A	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA A	X	X	X	X	X
F122B	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA B	X	X	X	X	X
F122C	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4802 AREA C	X	X	X	X	X
F123	FIRE ALARM OVERALL DEMOLITION PLAN - BUILDING 4840	X	X	X	X	X
F123A	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA A	X	X	X	X	X
F123B	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA B	X	X	X	X	X
F123C	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA C	X	X	X	X	X
F123D	FIRE ALARM ENLARGED DEMOLITION PLAN - BUILDING 4840 AREA D	X	X	X	X	X
F200	FIRE SPRINKLER OVERALL PLAN - BUILDING 4853		X	X	X	X
F201	FIRE SPRINKLER OVERALL PLAN - BUILDING 4801		X	X	X	X
F201A	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4801 AREA A		X	X	X	X
F201B	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4801 AREA B		X	X	X	X
F202	FIRE SPRINKLER OVERALL PLAN - BUILDING 4802		X	X	X	X
F202A	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4802 AREA A		X	X	X	X
F202B	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4802 AREA B		X	X	X	X
F202C	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4802 AREA C		X	X	X	X
F203	FIRE SPRINKLER OVERALL PLAN - BUILDING 4840		X	X	X	X
F203A	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4840 AREA A		X	X	X	X
F203B	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4840 AREA B		X	X	X	X
F203C	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4840 AREA C		X	X	X	X
F203D	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4840 AREA D		X	X	X	X
F203E	FIRE SPRINKLER ENLARGED PLAN - BUILDING 4840 PUMP ROOM		X	X	X	X
F211	FOAM SUPPRESSION OVERALL PLAN - BUILDING 4801		X	X	X	X
F211A	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4801 AREA A		X	X	X	X
F211B	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4801 AREA B		X	X	X	X
F211C	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4801 PUMP ROOM		X	X	X	X
F212	FOAM SUPPRESSION OVERALL PLAN - BUILDING 4802		X	X	X	X
F212A	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4802 AREA A		X	X	X	X
F212B	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4802 AREA B		X	X	X	X
F212C	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4802 AREA C		X	X	X	X
F212D	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4802 PUMP ROOM		X	X	X	X
F213	FOAM SUPPRESSION OVERALL PLAN - BUILDING 4840		X	X	X	X
F213A	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4840 AREA A		X	X	X	X
F213B	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4840 AREA B		X	X	X	X
F213C	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4840 AREA C		X	X	X	X
F213D	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4840 AREA D		X	X	X	X
F213E	FOAM SUPPRESSION ENLARGED PLAN - BUILDING 4840 PUMP ROOM		X	X	X	X
F220	FIRE ALARM PLAN - BUILDING 4853		X	X	X	X
F221	FIRE ALARM OVERALL PLAN - BUILDING 4801		X	X	X	X
F221A	FIRE ALARM ENLARGED PLAN - BUILDING 4801 AREA A		X	X	X	X
F221B	FIRE ALARM ENLARGED PLAN - BUILDING 4801 AREA B		X	X	X	X
F222	FIRE ALARM OVERALL PLAN - BUILDING 4802		X	X	X	X
F222A	FIRE ALARM ENLARGED PLAN - BUILDING 4802 AREA A		X	X	X	X
F222B	FIRE ALARM ENLARGED PLAN - BUILDING 4802 AREA B		X	X	X	X
F222C	FIRE ALARM ENLARGED PLAN - BUILDING 4802 AREA C		X	X	X	X
F223	FIRE ALARM OVERALL PLAN - BUILDING 4840		X	X	X	X
F223A	FIRE ALARM ENLARGED PLAN - BUILDING 4840 AREA A		X	X	X	X
F223B	FIRE ALARM ENLARGED PLAN - BUILDING 4840 AREA B		X	X	X	X
F223C	FIRE ALARM ENLARGED PLAN - BUILDING 4840 AREA C		X	X	X	X
F223D	FIRE ALARM ENLARGED PLAN - BUILDING 4840 AREA D		X	X	X	X
F301	DEMOLITION RISER PLAN - BUILDING 4801	X	X	X	X	X
F302A	DEMOLITION RISER PLAN - BUILDING 4802 ZONE 1 AND ZONE 2	X	X	X	X	X
F302B	DEMOLITION RISER PLAN - BUILDING 4802 ZONE 3 AND ZONE 4	X	X	X	X	X
F302C	DEMOLITION RISER PLAN - BUILDING 4802 ZONE 5 AND ZONE 6	X	X	X	X	X
F302D	DEMOLITION RISER PLAN - BUILDING 4802 ZONE 7 AND ZONE 8	X	X	X	X	X
F302E	DEMOLITION RISER PLAN - BUILDING 4802 ZONE 9 AND ZONE 10	X	X	X	X	X
F303	DEMOLITION RISER PLAN - BUILDING 4840	X	X	X	X	X
F351	RISER PLAN - BUILDING 4801		X	X	X	X
F352A	RISER PLAN - BUILDING 4802 ZONE 1 AND ZONE 2		X	X	X	X
F352B	RISER PLAN - BUILDING 4802 ZONE 3 AND ZONE 4		X	X	X	X
F352C	RISER PLAN - BUILDING 4802 ZONE 5 AND ZONE 6		X	X	X	X
F352D	RISER PLAN - BUILDING 4802 ZONE 7 AND ZONE 8		X	X	X	X
F352E	RISER PLAN - BUILDING 4802 ZONE 9 AND ZONE 10		X	X	X	X
F353	RISER PLAN - BUILDING 4840		X	X	X	X
F400	ADDITIONAL DETAILS		X	X	X	X
F401	ADDITIONAL DETAILS		X	X	X	X
M-000	MECHANICAL LEGEND, GENERAL NOTES AND DETAILS		X	X	X	X
M-100	MECHANICAL PLAN - BUILDING 4801		X	X	X	X
M-101	MECHANICAL PLAN - BUILDING 4802		X	X	X	X
M-102	MECHANICAL PLAN - BUILDING 4840		X	X	X	X

FOR CONSTRUCTION

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/15
Renewal Date
STATE OF CALIFORNIA

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

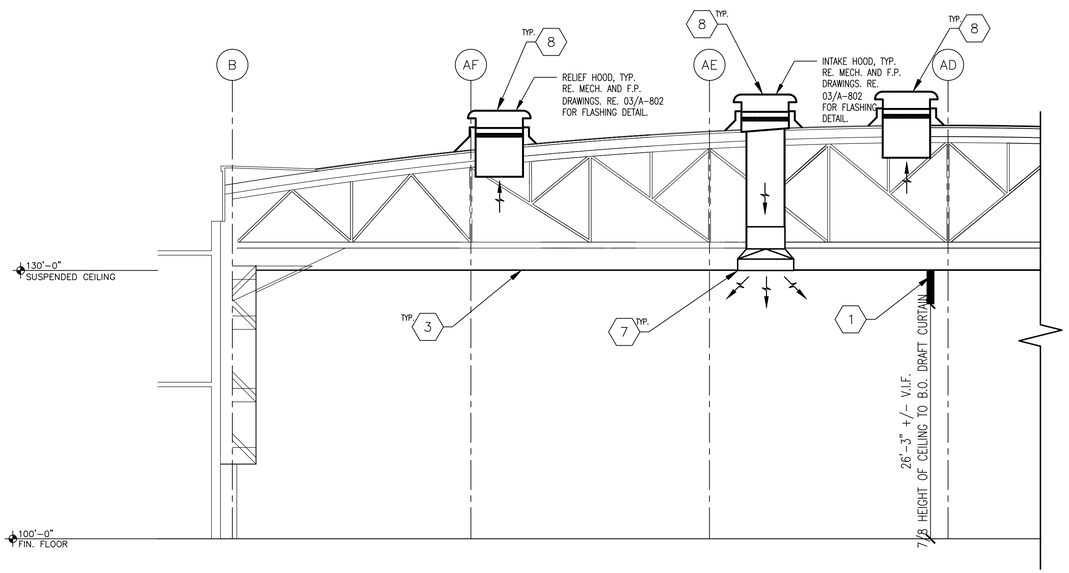
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
CODE INFORMATION & DRAWING INDEX

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

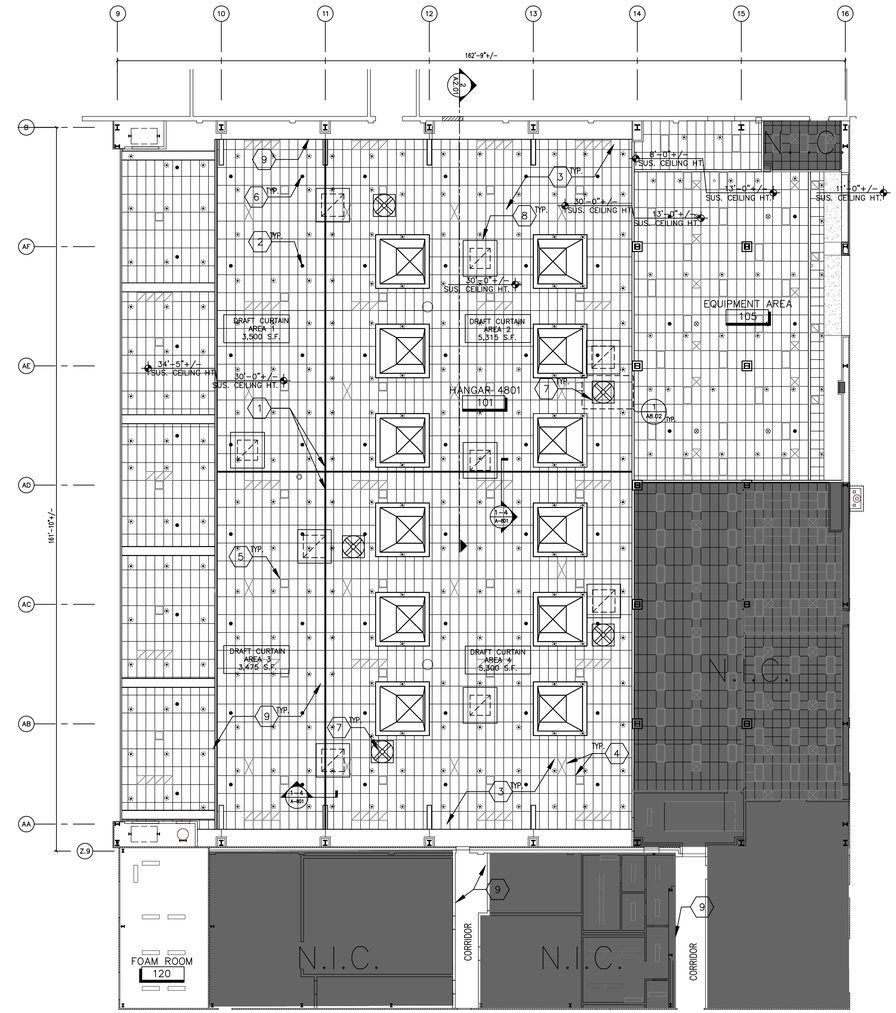
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	SK		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	G-002.DWG	G-002	SHEET No. 3 of 137



2 EXISTING BUILDING SECTION

1/8"=1'-0". FOR INFORMATION ONLY

DETAIL IS SCHEMATIC IN NATURE, MODIFY TO SUIT FIELD CONDITIONS.



1 REFLECTED CEILING PLAN –BUILDING 4801

1/16" = 1'-0"

N

FOR CONSTRUCTION

SHEET NOTES

1	CAREFULLY REMOVE EXISTING DRAFT CURTAIN AND REPLACE WITH NEW. RE. SHEET A-801.
2	EXISTING HEAT DETECTORS TO REMAIN, PROTECT IN PLACE TYP.
3	REMOVE EXISTING ACOUSTICAL CEILING TILES AND GRID AS NEEDED TO ACCOMMODATE NEW WORK. CLEAN, STORE AND PROTECT ACOUSTICAL CEILING TILES AND GRID AS NEEDED DURING CONSTRUCTION. RE-INSTALL EXISTING CEILING GRID AND TILES UPON COMPLETION OF CONSTRUCTION AND REPLACE ANY DAMAGED COMPONENTS WITH NEW TO MATCH EXISTING.
4	RETURN AIR GRILLES AND DIFFUSERS TO REMAIN PROTECT IN PLACE. TYP.
5	REMOVE, CLEAN AND STORE EXISTING LIGHT FIXTURES AND SPEAKERS AS REQUIRED. RE-INSTALL AFTER CONSTRUCTION COMPLETION. DISCARD DAMAGED ITEMS AND REPLACE WITH NEW ITEMS. COORDINATE REMOVAL OF AUDIO EQUIPMENT WITH GOVERNMENT.
6	EXISTING SPRINKLER HEADS AND BRANCHLINES TO REMAIN, PROTECT IN PLACE.
7	HIGH EXPANSION FOAM GENERATOR, TYP. RE: MECH. AND FIRE PROTECTION DRAWINGS. GENERATOR SCREEN SHALL NOT BE LOWER THAN THE DRAFT CURTAIN. SUSPENDED CEILING SYSTEM AND TILES MAY NEED TO BE MODIFIED TO ACCOMMODATE NEW FOAM GENERATOR. RE. 01/A-802.
8	ROOF INTAKE/RELIEF HOOD, TYP. RE: MECH. AND FIRE PROTECTION DRAWINGS.
9	PATCHING IS REQUIRED FOR REMOVAL OF EXISTING EQUIPMENT, RE. ELECTRICAL, FIRE PROTECTION AND MECHANICAL FOR LOCATIONS. AND RE. SPECS FOR PATCHING. DO NOT DAMAGE EXISTING RADIENT HEATERS IN CONCRETE SLAB. PATCH AND REPAIR RE. SPECS 02 41 00

LEGEND

ROOM NAME XXX	ROOM NAME AND ROOM NUMBER
	EXISTING ACOUSTICAL CEILING TILE
	EXISTING SPRINKLER HEAD
	EXISTING BIRD DETERRANT
	EXISTING SPEAKER
	EXISTING CAPPED OFF HVAC DUCT
	EXISTING HEAT DETECTORS
& &	EXISTING LIGHT FIXTURES
& &	EXISTING SUPPLY AND RETURN DIFFUSERS
	NEW DRAFT CURTAIN RE. SHEETS A-801 & A-802
	HIGH EXPANSION FOAM GENERATORS, RE. FIRE PROTECTION DRAWINGS
	ROOF INTAKE OR RELIEF HOOD. RE. MECH. DRAWINGS.

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO START OF WORK AND NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCY.
2. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH ALL LOCAL CODES.
3. DO NOT SCALE DRAWINGS.
4. FOR THE PURPOSE OF CLARITY, NOT ALL ELEMENTS ARE SHOWN IN THIS DRAWING.
5. LIGHT FIXTURES, MECHANICAL DUCTS AND REGISTERS ARE SHOWN FOR LOCATION PURPOSES ONLY. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR ACTUAL QUANTITIES, SIZES AND TYPES.
6. REFER TO FLOOR PLANS FOR ALL SCHEDULE EQUIPMENT
7. PROTECT EXISTING FURNITURE DURING CONSTRUCTION.
8. CONTRACTOR TO COORDINATE ALL WORK WITH GOVERNMENT PRIOR TO CONSTRUCTION.

NOTES

1. COORDINATE NEW DRAFT CURTAIN LAYOUT AND INSTALLATION REQUIREMENT WITH FIRE PROTECTION DRAWINGS AND DRAFT CURTAIN MANUFACTURER'S INSTALLATION/CONNECTION REQUIREMENT. SHOP DRAWINDS ARE REQUIRED.

2. DRAFT CURTAIN CONNECTION TO EXISTING STRUCTURE WILL VARY DEPENDING ON ACTUAL FIELD CONDITIONS AND IS REQUIRED TO BE FIELD VERIFIED PRIOR TO INSTALLATION.

3. LOCATION OF DRAFT CURTAIN MAY VARY SLIGHTLY DUE TO LOCATION OF STRUCTURE ABOVE (FOR ATTACHMENT PURPOSES).

4. DRAFT CURTAINS MUST BE LOCATED A MINIMUM OF 4' AWAY FROM INFRARED HEATERS OR LIGHT SOURCES WITH SIGNIFICANT HEAT OFFPUT.

5. EXISTING PAINTED ROOF STRUCTURAL MEMBERS DO CONTAIN LEAD BASED PAIN. RE: SPEC SECTION 02 83 1300.20

6. SEAL ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS, AND ROOF (INCLUDING HOLES LEFT FROM ANCHORS, BOLTS, SCREWS, ETC) WHERE COMPONENTS ARE REMOVED AND WHERE THE EXISTING PENETRATION IS NOT USED FOR THE NEW INSTALLATION. REPAIR DAMAGED SURFACES TO MATCH ADJACENT AREAS.

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/13
Renewal Date
STATE OF CALIFORNIA

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

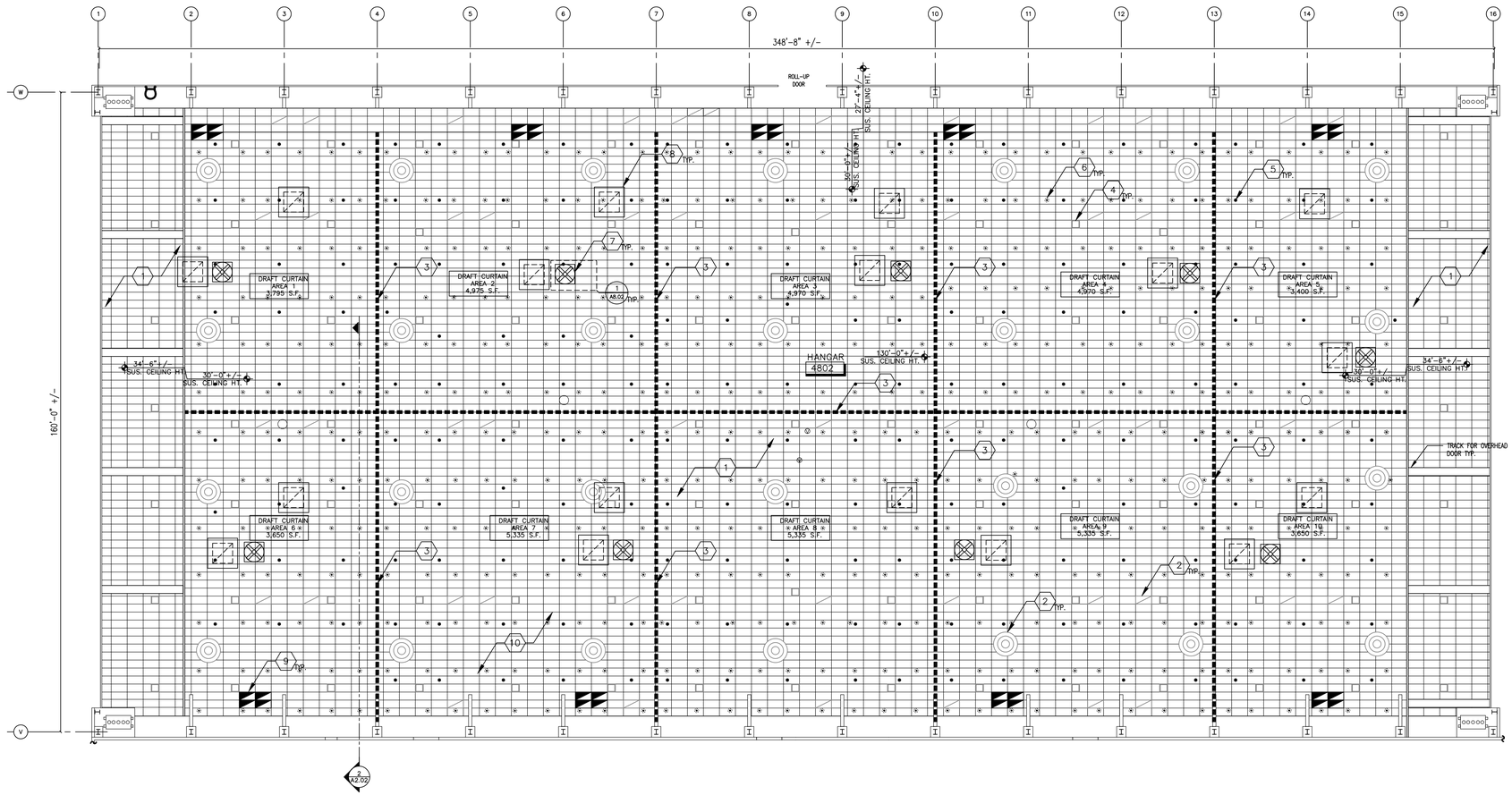
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
HANGAR 4801 REFLECTED CEILING PLAN AND SECTION

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requester/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

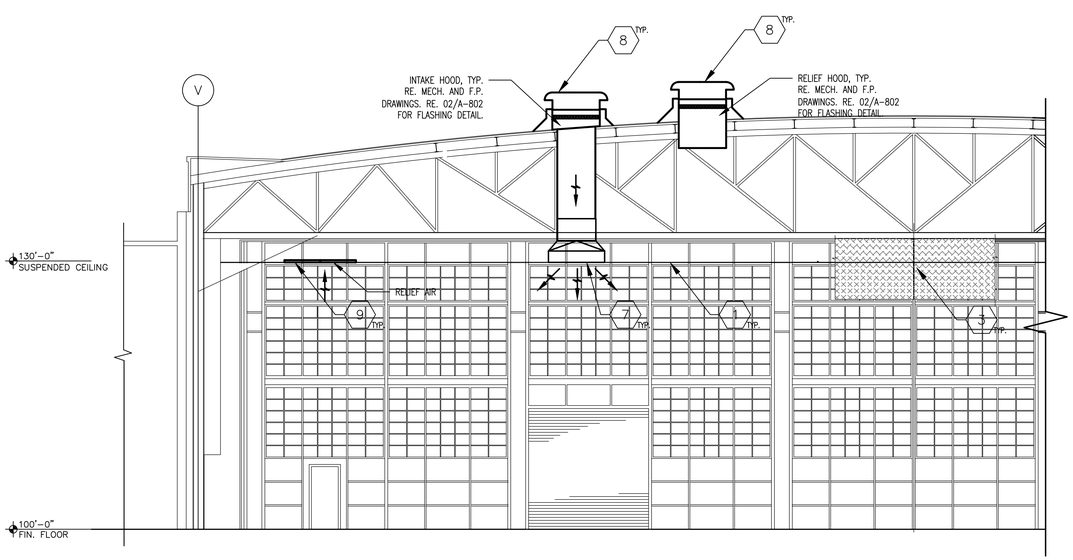
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	JC		
SCALE	N.T.S.	TRADE SH. No.	EDM-1719
FILE NAME	A-201.DWG	A-201	SHEET No. 4 of 137



1 REFLECTED CEILING PLAN –BUILDING 4802

1/16" = 1'-0"

N



2 EXISTING BUILDING SECTION

N.T.S. FOR INFORMATION ONLY

DETAIL IS SCHEMATIC IN NATURE, MODIFY TO SUIT FIELD CONDITIONS.

SHEET NOTES

1	REMOVE EXISTING ACOUSTICAL CEILING TILES, GRID AND INSULATION AS NEEDED TO ACCOMMODATE NEW WORK. CLEAN, STORE AND PROTECT ACOUSTICAL CEILING TILES AND GRID AS NEEDED DURING CONSTRUCTION. RE-INSTALL EXISTING CEILING GRID AND TILES UPON COMPLETION OF CONSTRUCTION AND REPLACE ANY DAMAGED COMPONENTS WITH NEW TO MATCH EXISTING. DISCARD EXISTING INSULATION ABOVE SUSPENDED CEILING AND REPLACE WITH NEW.
2	EXISTING SUPPLY AND RETURN GRILLES TO REMAIN PROTECT IN PLACE. TYP.
3	EXISTING DRAFT CURTAINS TO REMAIN. PROTECT IN PLACE TYP.
4	REMOVE, CLEAN AND STORE EXISTING LIGHT FIXTURES AND SPEAKERS AS REQUIRED. REINSTALL AFTER CONSTRUCTION COMPLETION. DISCARD DAMAGED ITEMS AND REPLACE WITH NEW ITEMS. COORDINATE REMOVAL OF AUDIO EQUIPMENT WITH GOVERNMENT.
5	EXISTING HEAT DETECTORS TO REMAIN, PROTECT IN PLACE TYP.
6	EXISTING SPRINKLER HEADS AND BRANCHLINES TO REMAIN, PROTECT IN PLACE.
7	HIGH EXPANSION FOAM GENERATOR, TYP. RE: MECH. AND FIRE PROTECTION DRAWINGS. GENERATOR SCREEN SHALL NOT BE LOWER THAN THE DRAFT CURTAIN. SUSPENDED CEILING SYSTEM AND TILES MAY NEED TO BE MODIFIED TO ACCOMMODATE NEW FOAM GENERATOR. RE. 01/A-802.
8	ROOF INTAKE/RELIEF HOOD, TYP. RE: MECH. DRAWINGS.
9	INSTALL NEW RETURN GRILLES, RE. MECH. DRAWINGS.
10	PATCHING IS REQUIRED FOR REMOVAL OF EXISTING EQUIPMENT, RE. ELECTRICAL, FIRE PROTECTION AND MECHANICAL FOR LOCATIONS. AND RE. SPECS FOR PATCHING. PATCH AND REPAIR RE. SPECS 02 41 00

LEGEND

ROOM NAME XXX	ROOM NAME AND ROOM NUMBER
	EXISTING ACOUSTICAL CEILING TILE
	EXISTING DIFFUSERS
	EXISTING RETURN GRILLES
	EXISTING LED LIGHT FIXTURES
	EXISTING VIDEO CAMERAS
	EXISTING SPRINKLER HEADS
	EXISTING HEAT SENSORS
	EXISTING BIRD DETERRANTS
	EXISTING DRAFT CURTAINS
	NEW RETURN GRILLES RE. MECH DRAWINGS.
	HIGH EXPANSION FOAM GENERATORS, RE. FIRE PROTECTION DRAWINGS
	ROOF INTAKE OR RELIEF HOOD. RE. MECH DRAWINGS.

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO START OF WORK AND NOTIFY CONTRACTING OFFICER IMMEDIATELY OF ANY DISCREPANCY.
2. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH ALL LOCAL CODES.
3. DO NOT SCALE DRAWINGS.
4. FOR THE PURPOSE OF CLARITY, NOT ALL ELEMENTS ARE SHOWN IN THIS DRAWING.
5. LIGHT FIXTURES, MECHANICAL DUCTS AND REGISTERS ARE SHOWN FOR LOCATION PURPOSES ONLY. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR ACTUAL QUANTITIES, SIZES AND TYPES.
6. REFER TO FLOOR PLANS FOR ALL SCHEDULE EQUIPMENT
7. PROTECT EXISTING FURNITURE DURING CONSTRUCTION.
8. CONTRACTOR TO COORDINATE ALL WORK WITH GOVERNMENT PRIOR TO CONSTRUCTION.

NOTE

1. EXISTING PAINTED ROOF STRUCTURAL MEMBERS DO CONTAIN LEAD BASED PAIN. RE: SPEC SECTION 02 83 1300.20

2. SEAL ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS, AND ROOF (INCLUDING HOLES LEFT FROM ANCHORS, BOLTS, SCREWS, ETC) WHERE COMPONENTS ARE REMOVED AND WHERE THE EXISTING PENETRATION IS NOT USED FOR THE NEW INSTALLATION. REPAIR DAMAGED SURFACES TO MATCH ADJACENT AREAS.

FOR CONSTRUCTION

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/15
Renewal Date
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE

HANGAR 4802 REFLECTED CEILING PLAN AND SECTION

PROJECT TITLE

REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	08/08/2012	DATE PRNTD	4/18/2014
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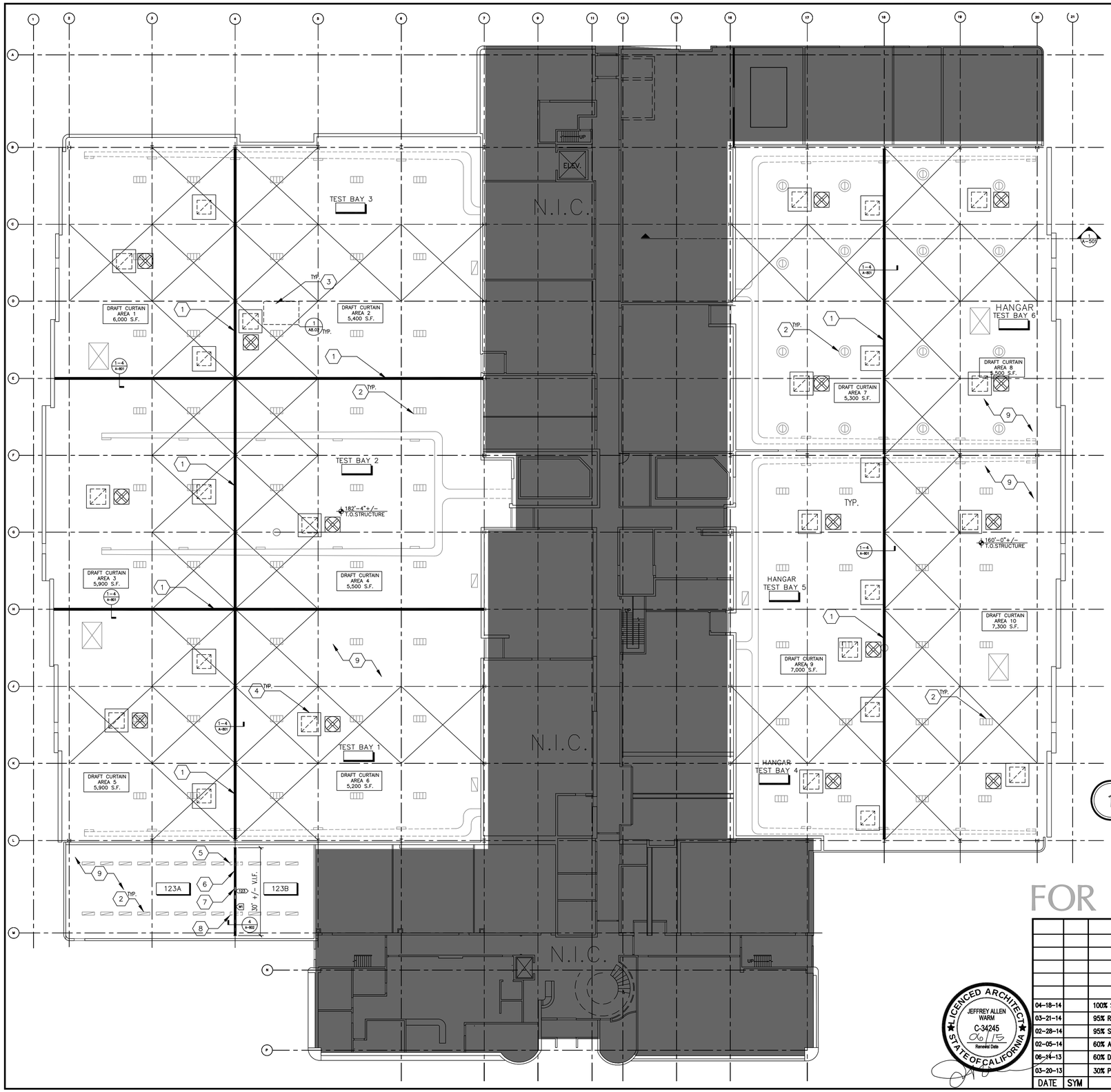
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	A-202.DWG	A-202	SHEET No. 5 of 137



SHEET NOTES

1	NEW DRAFT CURTAIN. RE. SHEET A-801.
2	EXISTING LIGHTS TO REMAIN, PROTECT IN PLACE.
3	HIGH EXPANSION FOAM GENERATOR, TYP. RE: MECH. AND FIRE PROTECTION DRAWINGS. SUSPENDED CEILING SYSTEM AND TILES MAY NEED TO BE MODIFIED TO ACCOMMODATE NEW FOAM GENERATOR.
4	ROOF INTAKE OR RELIEF HOOD, TYP. RE: MECH. AND FIRE PROTECTION DRAWINGS.
5	REMOVE EXISTING LIGHT TO MAKE ROOM FOR NEW WALL AND RELOCATE LIGHT IN ROOM 123.
6	CONSTRUCT NEW WALL CENTERED ALONG EXISTING COLUMNS, RE. 4/A-802. MODIFY SPRINKLER SYSTEM AS NEEDED TO ACCOMMODATE NEW WALL.
7	INSTALL NEW DOOR AND CENTER ON NEW WALL. RE. DOOR SCHEDULE AND HARDWARE SCHEDULE.
8	REMOVE EXISTING LIGHT TO MAKE ROOM FOR NEW WALL AND RELOCATE LIGHT IN ROOM 123A.
9	PATCHING IS REQUIRED FOR REMOVAL OF EXISTING EQUIPMENT, RE. ELECTRICAL, FIRE PROTECTION AND MECHANICAL FOR LOCATIONS. AND RE. SPECS FOR PATCHING. PATCH AND REPAIR RE. SPECS 02 41 00

LEGEND

ROOM NAME XXX	ROOM NAME AND ROOM NUMBER
	EXISTING ACOUSTICAL CEILING TILE
	EXISTING METAL HALIDE PENDANT
	EXISTING 1'X4' FLUORESCENT FIXTURE
	EXISTING LED PENDANT FIXTURE
	EXISTING BIRD DETERRANTS
	EXISTING SUPPLY DIFFUSERS
	EXISTING RETURN DUCT
	EXISTING UNIT HEATER
	NEW DRAFT CURTAIN RE. SHEETS A-801 & A-802
	HIGH EXPANSION FOAM GENERATORS, RE. FIRE PROTECTION DRAWINGS
	ROOF INTAKE OR RELIEF HOOD. RE. MECH. DRAWINGS.

NOTES

1. COORDINATE NEW DRAFT CURTAIN LAYOUT AND INSTALLATION REQUIREMENT WITH FIRE PROTECTION DRAWINGS AND DRAFT CURTAIN MANUFACTURER'S INSTALLATION/CONNECTION REQUIREMENT. SHOP DRAWINGS ARE REQUIRED.
2. DRAFT CURTAIN CONNECTION TO EXISTING STRUCTURE WILL VARY DEPENDING ON ACTUAL FIELD CONDITIONS AND IS REQUIRED TO BE FIELD VERIFIED PRIOR TO INSTALLATION.
3. LOCATION OF DRAFT CURTAIN MAY VARY SLIGHTLY DUE TO LOCATION OF STRUCTURE ABOVE (FOR ATTACHMENT PURPOSES).
4. DRAFT CURTAINS MUST BE LOCATED A MINIMUM OF 4' AWAY FROM INFRARED HEATERS OR LIGHT SOURCES WITH SIGNIFICANT HEAT OFFPUT.
5. SEAL ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS, AND ROOF (INCLUDING HOLES LEFT FROM ANCHORS, BOLTS, SCREWS, ETC) WHERE COMPONENTS ARE REMOVED AND WHERE THE EXISTING PENETRATION IS NOT USED FOR THE NEW INSTALLATION. REPAIR DAMAGED SURFACES TO MATCH ADJACENT AREAS.

1 REFLECTED CEILING PLAN–BUILDING 4840

1/16" = 1'-0"

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO START OF WORK AND NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCY.
2. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH ALL LOCAL CODES.
3. DO NOT SCALE DRAWINGS.
4. FOR THE PURPOSE OF CLARITY, NOT ALL ELEMENTS ARE SHOWN IN THIS DRAWING.
5. LIGHT FIXTURES, MECHANICAL DUCTS AND REGISTERS ARE SHOWN FOR LOCATION PURPOSES ONLY. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR ACTUAL QUANTITIES, SIZES AND TYPES.
6. REFER TO FLOOR PLANS FOR ALL SCHEDULE EQUIPMENT
7. PROTECT EXISTING FURNITURE DURING CONSTRUCTION.
8. CONTRACTOR TO COORDINATE ALL WORK WITH GOVERNMENT PRIOR TO CONSTRUCTION.

FOR CONSTRUCTION

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/15
Renewal Date
STATE OF CALIFORNIA

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

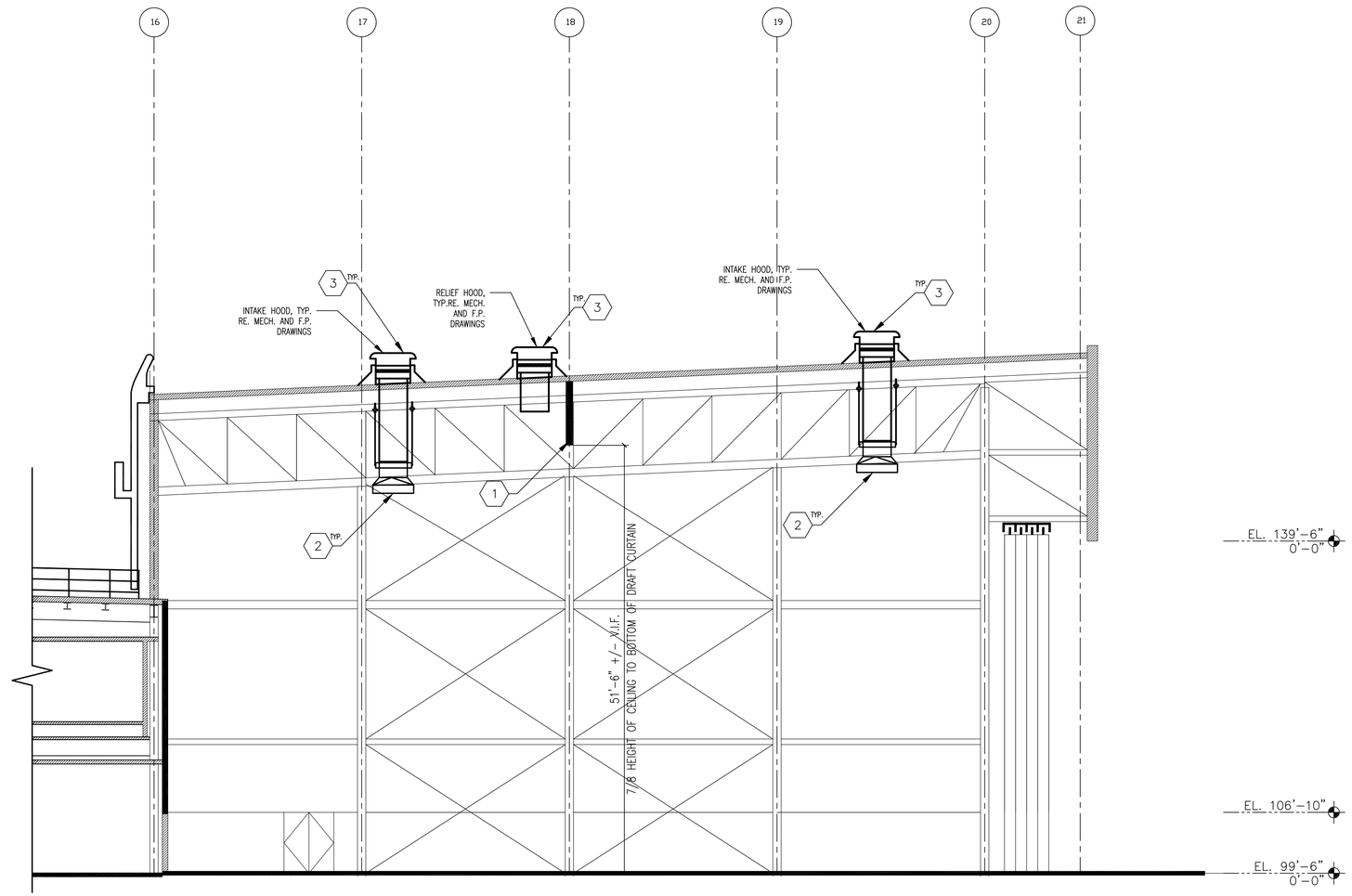
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
HANGAR 4840 REFLECTED CEILING PLAN

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requester/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	JC		
SCALE	N.T.S.	TRADE SKL No.	EDM-1719
FILE NAME	A-203.DWG	A-203	SHEET No. 6 of 137



1 EXISTING BUILDING SECTION 4840

3/32"=1'-0" FOR INFORMATION ONLY

DETAIL IS SCHEMATIC IN NATURE, MODIFY TO SUIT FIELD CONDITIONS.

SHEET NOTES

1	NEW DRAFT CURTAIN. RE. SHEET A-801.
2	HIGH EXPANSION FOAM GENERATOR, TYP. RE: MECH. AND FIRE PROTECTION DRAWINGS.
3	ROOF INTAKE/RELIEF HOOD, TYP. RE: MECHANICAL DRAWINGS.

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO START OF WORK AND NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCY.
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3. DO NOT SCALE DRAWINGS.
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6. REFER TO FLOOR PLANS FOR ALL SCHEDULE EQUIPMENT
7. PROTECT EXISTING FURNITURE DURING CONSTRUCTION.
8. CONTRACTOR TO COORDINATE ALL WORK WITH GOVERNMENT PRIOR TO CONSTRUCTION.

FOR CONSTRUCTION

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/15
Renewal Date
STATE OF CALIFORNIA

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE

HANGAR 4840 SECTION

PROJECT TITLE

REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requester/Customer	
Facilities Project Manager	
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Chief, Safety, Health & Environmental Office	
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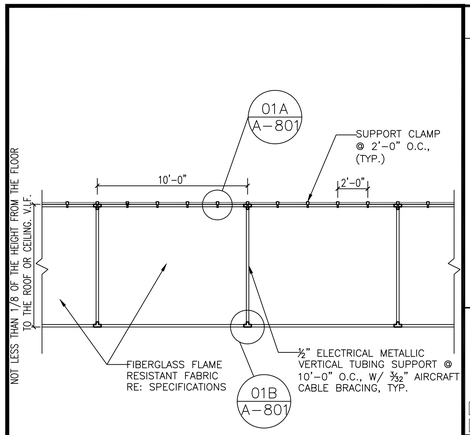
DRAWN BY	JC		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	A-501.DWG	A-501	SHEET No. 7 of 137



NOTES:

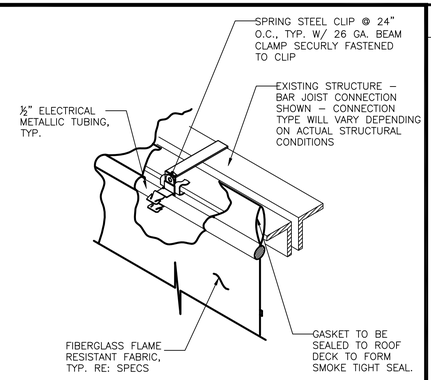
DRAFT CURTAIN TYP. ELEVATION VIEW

Scale: NTS

File:

Project No: 634

01



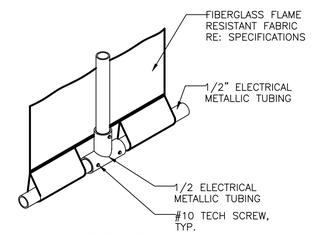
TYP. CLIP CONNECTION TO TOP CORD OF BAR JOIST BELOW FLANGE

DRAFT CURTAIN ENLARGED DETAIL

Scale: NTS

Project No: 634

01A



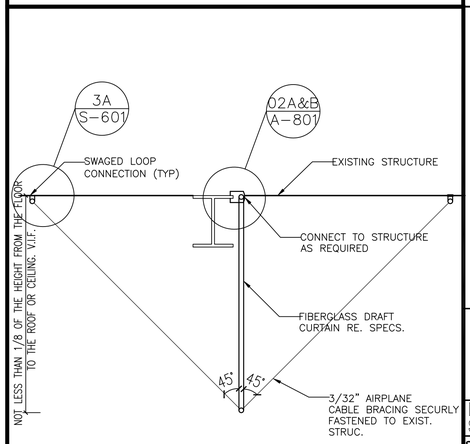
TUBING TEE DETAIL
NO SCALE

DRAFT CURTAIN ENLARGED DETAIL

Scale: NTS

Project No: 634

01B



NOTES:

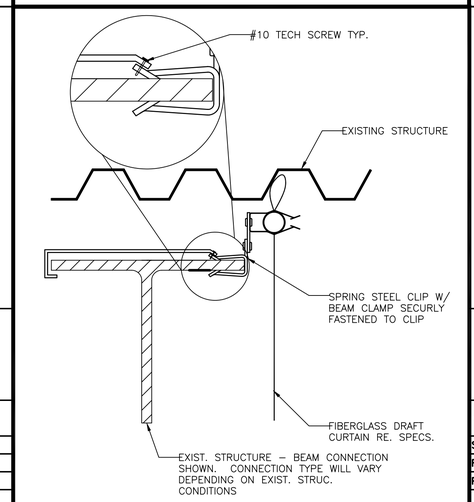
DRAFT CURTAIN SECTION, TYP.

Scale: NTS

File:

Project No: 634

02



NOTES:

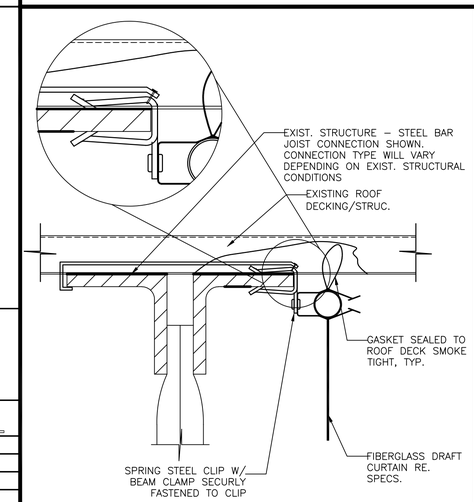
DRAFT CURTAIN ENLARGED DETAIL

Scale: NTS

File:

Project No: 634

02A



NOTES:

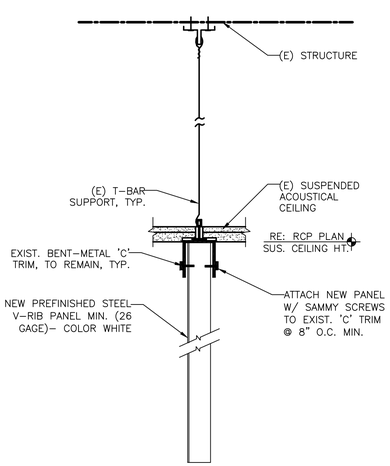
DRAFT CURTAIN ENLARGED DETAIL

Scale: NTS

File:

Project No: 634

02B



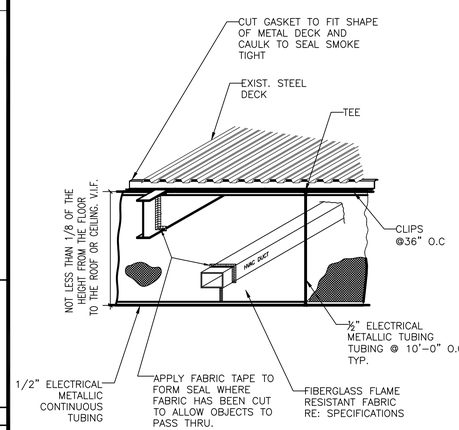
NOTES:

DRAFT CURTAIN ENLARGED DETAIL

NTS

Project No: 634

03



NOTES:

FOR REFERENCE ONLY

DRAFT CURTAIN ISOMETRIC DETAIL

Scale: NTS

File:

Project No: 634

04

NOTES

1. COORDINATE NEW DRAFT CURTAIN LAYOUT AND INSTALLATION REQUIREMENT WITH FIRE PROTECTION DRAWINGS AND DRAFT CURTAIN MANUFACTURER'S INSTALLATION/CONNECTION REQUIREMENT. SHOP DRAWINGS ARE REQUIRED.

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4. DRAFT CURTAINS MUST BE LOCATED A MINIMUM OF 4' AWAY FROM INFRARED HEATERS OR LIGHT SOURCES WITH SIGNIFICANT HEAT OFFPUT.

5. SEAL ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS, AND ROOF (INCLUDING HOLES LEFT FROM ANCHORS, BOLTS, SCREWS, ETC) WHERE COMPONENTS ARE REMOVED AND WHERE THE EXISTING PENETRATION IS NOT USED FOR THE NEW INSTALLATION. REPAIR DAMAGED SURFACES TO MATCH ADJACENT AREAS.

FOR CONSTRUCTION

LICENCED ARCHITECT
JEFFREY ALLEN WARM
C-34245
06/15
Renewal Date
STATE OF CALIFORNIA

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE

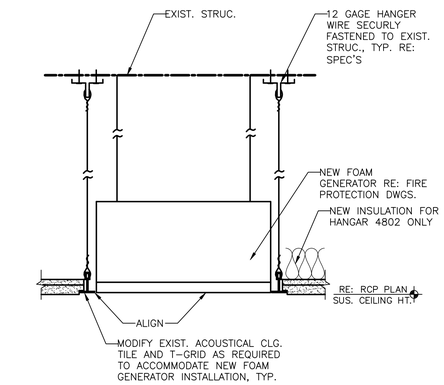
DRAFT CURTAIN CONNECTIONS

PROJECT TITLE

REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	JC		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	A-501.DWG	A-801	SHEET No. 8 of 137

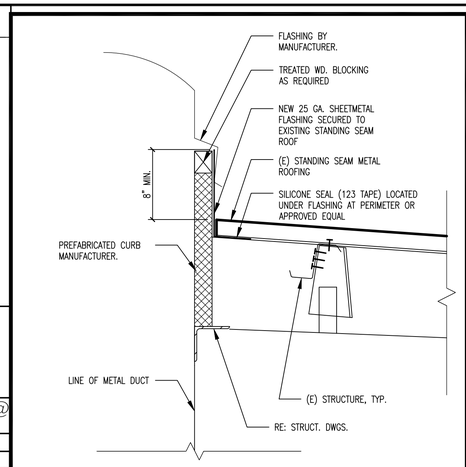


NOTES:

ACOUSTICAL CLG @ FOAM GENERATOR

Scale: NTS
File:
Project No: 634

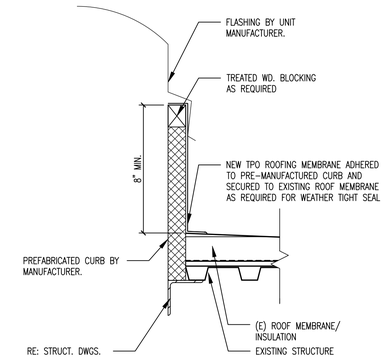
01



TYP. MECH. EQUIP. CURB DETAIL

Scale: 1-1/2" = 1'-0"
File: –
Project No: 634

02

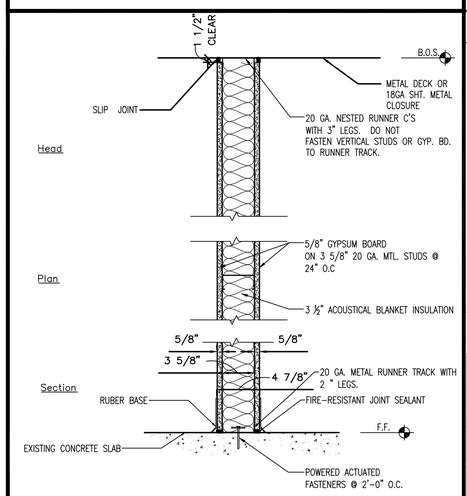


NOTE: ANY MODIFICATION TO TPO MEMBRANE TO BE PERFORMED WITH FACTORY AUTHORIZED PERSONNEL IN ORDER TO MAINTAIN WARRANTY.

TYP. MECH. EQUIP. CURB DETAIL

Scale: 1-1/2" = 1'-0"
File: –
Project No: 634

03

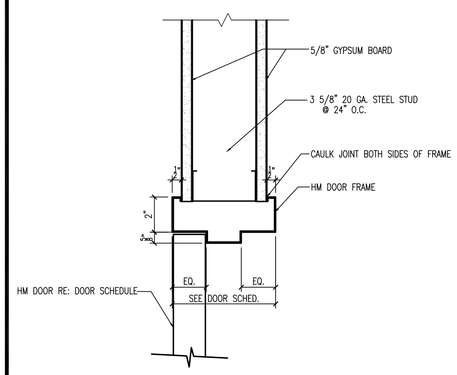


NOTES:

PUMP ROOM 123B WALL ASSEMBLY WALL TYPE 1

Scale: 1-1/2" = 1'-0"
File:
Project No: 634

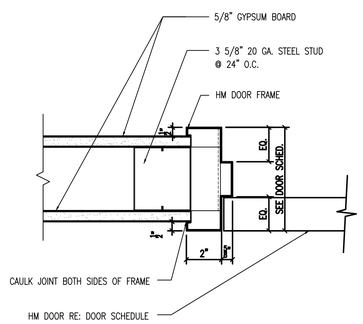
04



HOLLOW METAL HEAD DETAIL

Scale: 3" = 1'-0"
File:
Project No: 636

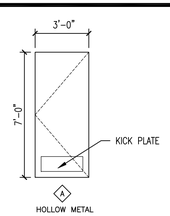
05



081400 – HM JAMB, 4" WALL

Scale: 3" = 1'-0"
File:
Project No: 636

06



1 DOOR TYPE

SCALE N/A

HW SET: 01
Door Number: 123

Qty	Description	Catalog Number	Finish
6 EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	612
1 SET	CONST LATCHING BOLT	FB51P	612
1 EA	DUST PROOF STRIKE	DP1	612
1 EA	STOREROOM LOCK	L9080L LLL 06A L283-150	612
1 EA	MORTISE CYLINDER	1E74 "G" KEYWAY	612
2 EA	SURFACE CLOSER	4040XP EDA	691
2 EA	FLOOR STOP	FS441	612
1 SET	SEALS	2891PK	
1 EA	ASTRAGAL	357SP	600

* FINISH TO MATCH HARDWARE

3 DOOR HARDWARE

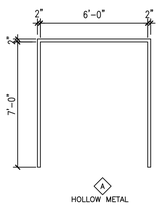
SCALE: N/A

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOORING		CEILING		WALL FINISHES				INTERIOR FINISH NOTES
		MTRL.	BASE	FINISH	HEIGHT	NORTH	EAST	SOUTH	WEST	
123B	NEW FOAM ROOM	SEALED CONC.	—	OPEN TO STRUC.	OPEN	P-1	P-1	P-1	P-1	

5 FINISH SCHEDULE

SCALE: N/A



2 DOOR FRAME TYPES

SCALE: N/A

DOOR AND FRAME SCHEDULE

DOOR NO.	DOOR MATL	DOOR SIZE W	DOOR SIZE HT	DOOR SIZE TYPE	FIRE RATING	FRAME MATL	FRAME DETAIL JAMB	FRAME DETAIL HEAD	FRAME DETAIL SILL	HARDWARE GROUP NO.	NOTES.
123	HM	PAIR (3'-0")	7'-0"	A	_	MTL.	5/A-802	6/A-802	__	1	

4 DOOR SCHEDULE

SCALE: N/A

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
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DRAWING TITLE
DRAFT CURTAIN CONNECTIONS

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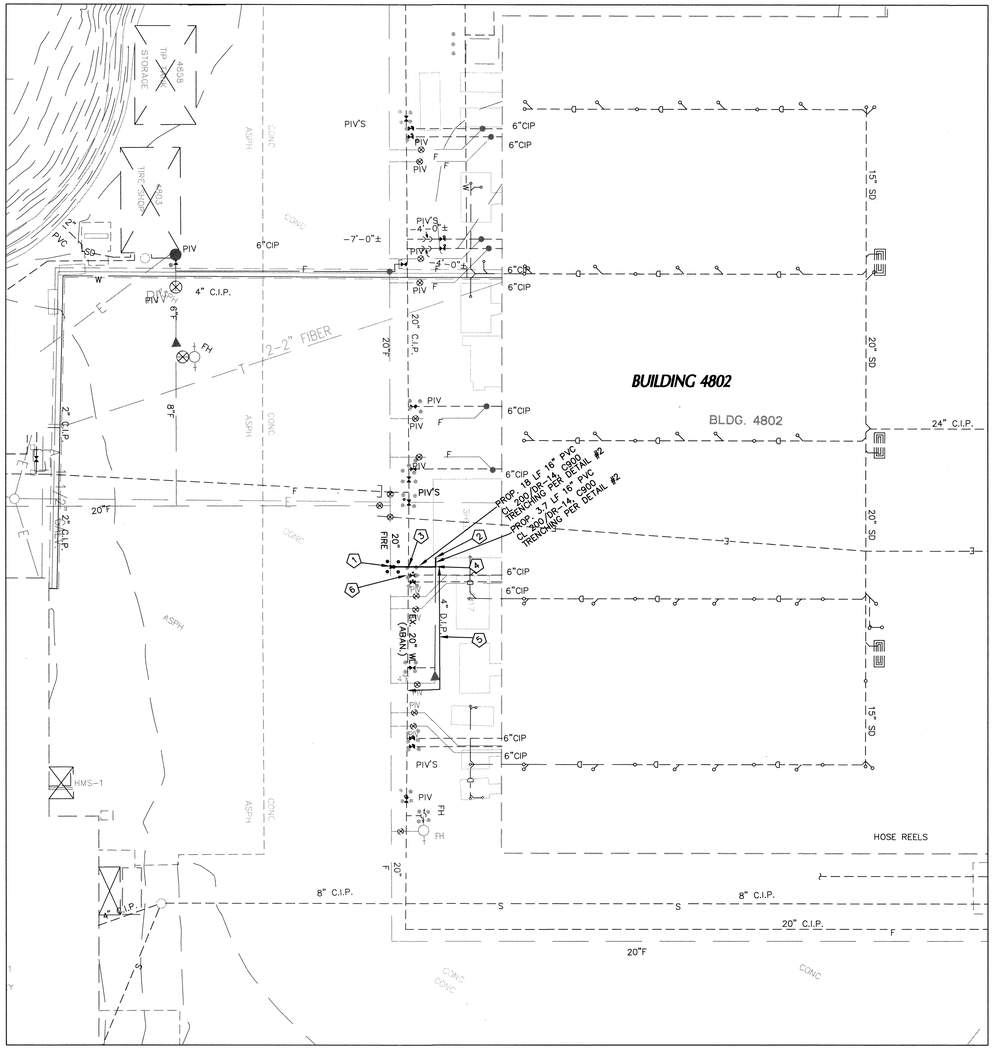
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	JC		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	A-802.DWG	A-802	SHEET No. 9 of 137



BUILDING 4802

WATER CONSTRUCTION NOTES:

- NOT ALL NOTES USED ON THIS SHEET –
  EXISTING TEE AND GATE VALVE INSTALLED PER FIRE MAINS PROJECT. REMOVE CAP AND CONNECT. INSTALL
1. POST INDICATOR VALVE (MATCH MAKE & MODEL USED ON-SITE). INSTALL BOLLARDS PER DETAIL #1 ON THIS SHEET
2. CAP AND REFER TO FIRE SPRINKLER PLANS FOR CONTINUATION
3. CONTRACTOR TO VERIFY CROSSING ELEVATIONS. UTILIZE ALTERNATE CROSSING DETAIL #5 AS REQUIRED
4. INSTALL 90° BEND (SAME SIZE AS PIPE)
5. ABANDON REMAINING PORTION OF 4" D.I.P. AND P.I.V. VALVE
6. REMOVE BOLLARDS AROUND ABANDONED P.I.V. VALVES
7. CAUTION – CONTRACTOR TO VERIFY LOCATION OF EXISTING ELECTRICAL AND TELEPHONE CONDUIT

GENERAL NOTES

1. CONTRACTOR TO PROTECT ANY MONITORING WELLS LOCATED IN THE CONSTRUCTION AREA.
2. TAXIWAY SHALL REMAIN OPEN AND UNOBSTRUCTED DURING CONSTRUCTION.
3. ABANDONMENT OF WATER LATERAL
   ALL VALVES TO BE ABANDONED SHALL BE ABANDONED IN THE CLOSED POSITION, UNLESS SHOWN OTHERWISE, BY REMOVING A MINIMUM OF THE TOP TWENTY-FOUR (24) INCHES OF THE VALVE BOX AND THEN FILLING THE BOTTOM OF THE BOX WITH A MINIMUM OF EIGHT (8) INCHES OF SAND OR TYPE II AGGREGATE BASE, THE REMAINING PORTION OF THE VALVE BOX SHALL BE FILLED WITH CONCRETE HAVING A COMPRESSIVE STRENGTH OF AT LEAST TWO-THOUSAND (2,000) PSI. IF THE VALVE IS TO BE ABANDONED IN THE CLOSED POSITION, THE LATERAL MUST BE CUT WITHIN ONE (1) FOOT OF THE ABANDONED VALVE, OR AS SHOWN ON PLANS, AND CAPPED. WHERE A JOINT OR COUPLING IN THE EXISTING PIPE IS UNCOVERED AT THE CUT AND CAP LOCATIONS. THE CONTRACTOR SHALL INSTALL A CONCRETE THRUST BLOCK AT ALL CAP OR PLUG LOCATIONS.
4.

ALL NEW PIPING TO BE FULLY RESTRAINED USING "MEGALUG" (OR APPROVED EQUAL) AND BELL RESTRAINTS.

LEGEND

— — UGE — —	UNDERGROUND ELECTRIC LINE
— — OHE — —	OVERHEAD ELECTRIC LINE
— — X" FIRE — —	WATER SERVICE, FIRE
— — X" DOM — —	WATER SERVICE, DOMESTIC
— — X" SD — —	STORM DRAIN
— — — —	SEWER
— — TELE — —	TELEPHONE
— — GAS — —	GAS
— X —	FENCE
	FLOW LINE
	SAW CUT LINE
	CULVERT WITH FLARED END SECTION
	CULVERT(S) WITH HEADWALL
	TAXIWAY LIGHT
	ABANDONED LIGHT
	FOUND TEMPORARY BENCH MARK
E	ELECTRIC MANHOLE
	POWER POLE W/ANCHOR
	DRAIN INLET
	CONCRETE IRRIGATION PIPE
	UTILITY MARKER
	TELEPHONE MANHOLE
	GUARD POST
	SIGN
WV	WATER VALVE
	JOSHUA TREE
	POWER POLE
3	CONSTRUCTION NOTE
XX.XX	PROPOSED ELEVATION
(XX.XX)	EXISTING ELEVATION
asph	EXISTING ASPHALT CONCRETE
conc	EXISTING CONCRETE
EG	EXISTING GRADE
EP	EDGE OF PAVEMENT
FL	FLOW LINE

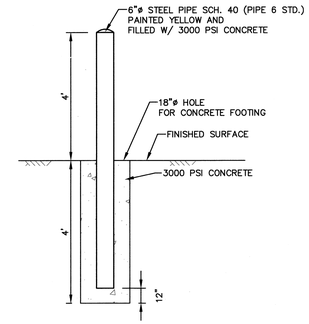
BASIS OF BEARINGS & BENCHMARK

INTERSECTION OF WALKER AND THOMPSON (LAKESHORE)
NORTHING: 528,183.086
EASTING: 2,033,650.182
ELEVATION: 2292.15

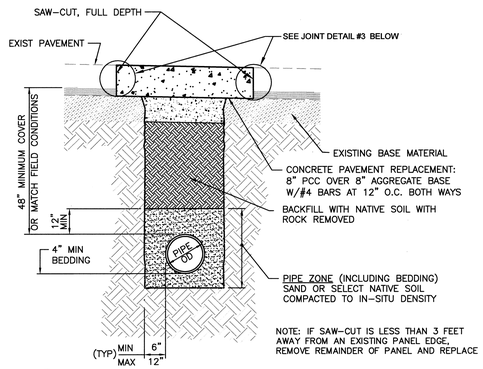
McKAY AND THOMPSON (LAKESHORE):
NORTHING: 526,601.559
EASTING: 2,034,416.916
ELEVATION: 2280.85

LOCHSA ENGINEERING

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.

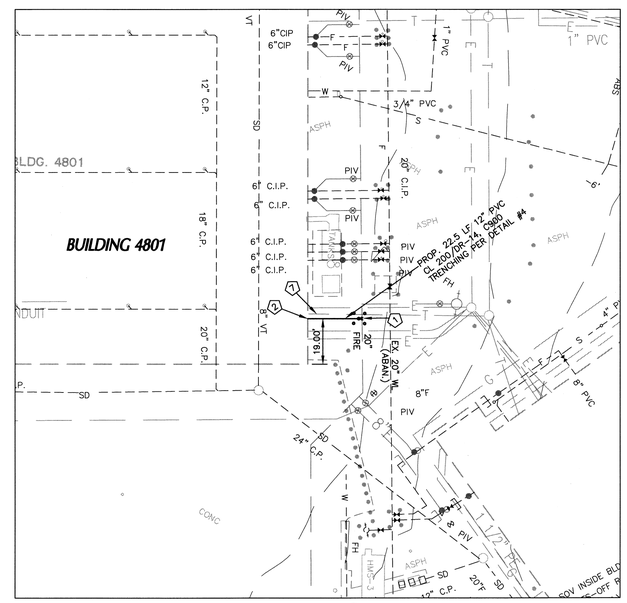


1 BOLLARD DETAIL

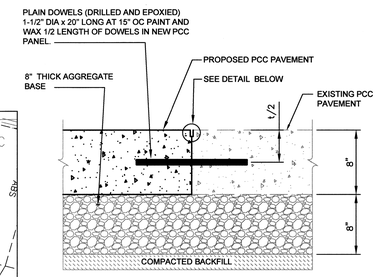


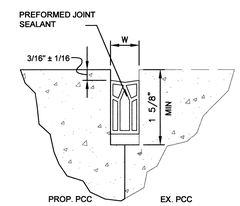
2 TRENCH DETAIL

CONCRETE

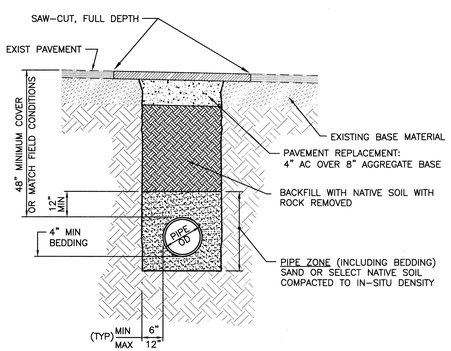


BUILDING 4801



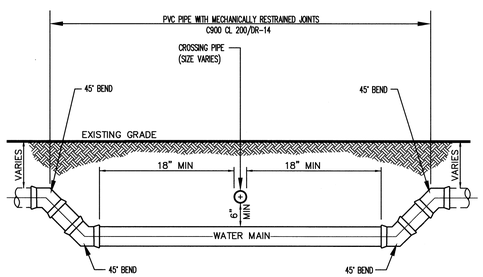


3 JOINT DETAIL



4 TRENCH DETAIL

ASPHALT



5 ALTERNATE CROSSING DETAIL

FOR CONSTRUCTION

RAFI Planning Architecture Urban Design

REGISTERED PROFESSIONAL ENGINEER JAMES M. MORRIS NO. 76026 EXP. 6-30-16 CIVIL STATE OF CALIFORNIA
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DATE	SYM	REVISION	BY	A'PD
04-11-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

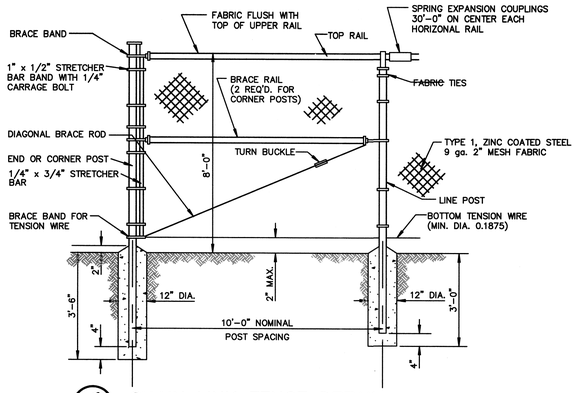
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
WATER CONNECTION PLAN

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

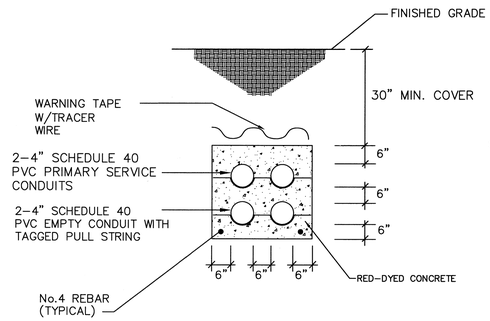
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/11/2014
DRAWN BY	G.M.		
SCALE	1"=30'	TRADE SH. No.	EDM-1719
FILE NAME	C-1 UTILITY PLAN.DWG	C-1	SHEET No. 10 of 137



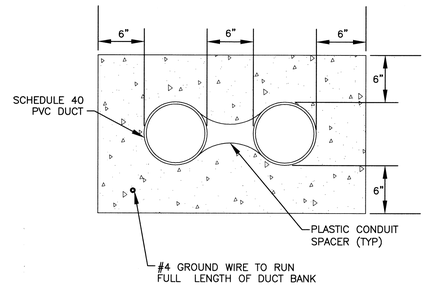
1 CHAIN LINK FENCE DETAIL

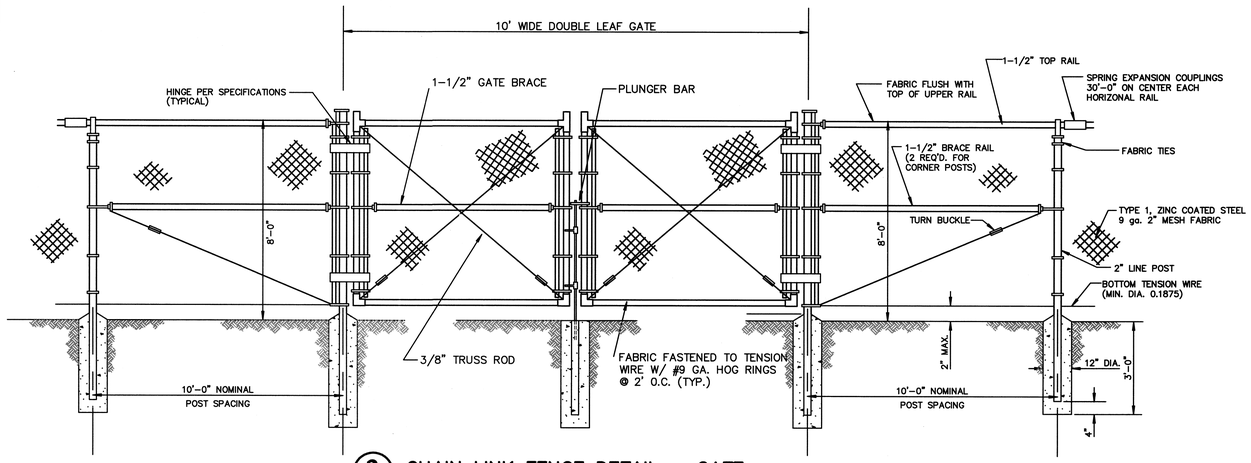
N.T.S.



2 DUCT BANK CONCRETE ENCASEMENT DETAIL

NOT TO SCALE



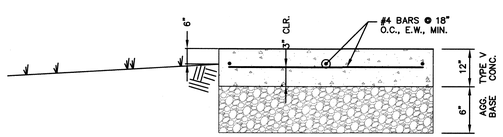


3 CHAIN LINK FENCE DETAIL – GATE

N.T.S.

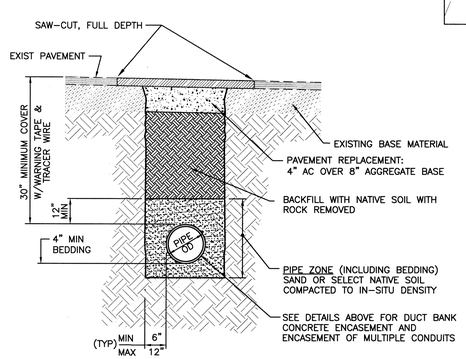
NOTES:

POSTS TO BE ZINC COATED, 1.9" O.D, (MIN.) 0.12" (MIN.) WALL THICKNESS
POSTS & RAILS TO BE CLASS I STEEL PIPE, GRADE A OR B
GATE ASSEMBLIES TO CONFORM TO ASTM F-900 AND/OR F-1184
GATE FRAMES TO CONFORM TO ASTM F-1083 EXTERNAL COATING TYPE "A"
PROVIDE BARBED-WIRE SUPPORT POSTS AND BARBED WIRE PER SPECIFICATION SECTION 32 31 13.00 20
CONCRETE TO BE 3000 Psi (MIN.) W/ 3/4" (MAX.) AGGREGATE SIZE



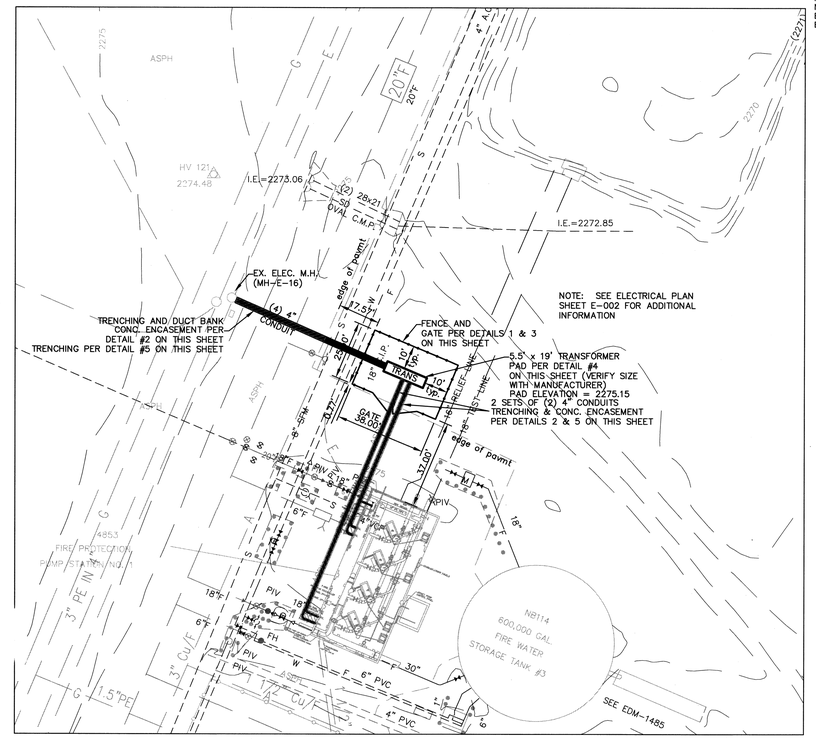
4 TRANSFORMER PAD SECTION

NOT TO SCALE



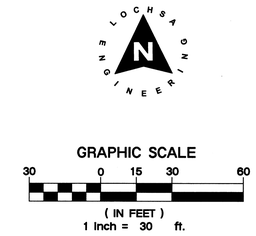
5 TRENCH DETAIL

ASPHALT



PLAN VIEW

SCALE: 1"=30'



BASIS OF BEARINGS & BENCHMARK

INTERSECTION OF WALKER AND THOMPSON (LAKESHORE)
NORTHING: 528,183.086
EASTING: 2,033,650.182
ELEVATION: 2292.15

McKAY AND THOMPSON (LAKESHORE):
NORTHING: 528,601.559
EASTING: 2,034,416.916
ELEVATION: 2280.85

LEGEND

UGE	UNDERGROUND ELECTRIC LINE
OHE	OVERHEAD ELECTRIC LINE
X" FIRE	WATER SERVICE, FIRE
X" DOM	WATER SERVICE, DOMESTIC
X" SD	STORM DRAIN
	SEWER
TELE	TELEPHONE
GAS	GAS
X	FENCE
	FLOW LINE
	SAW CUT LINE
	CULVERT WITH FLARED END SECTION
	CULVERT(S) WITH HEADWALL
	TAXIWAY LIGHT
	ABANDONED LIGHT
	FOUND TEMPORARY BENCH MARK
E	ELECTRIC MANHOLE
	POWER POLE W/ANCHOR
	DRAIN INLET
	CONCRETE IRRIGATION PIPE
	UTILITY MARKER
T	TELEPHONE MANHOLE
	GUARD POST
	SIGN
WV	WATER VALVE
	JOSHUA TREE
	POWER POLE
3	CONSTRUCTION NOTE
XX.XX	PROPOSED ELEVATION
(XX.XX)	EXISTING ELEVATION
asph	EXISTING ASPHALT CONCRETE
conc	EXISTING CONCRETE
EG	EXISTING GRADE
EP	EDGE OF PAVEMENT
FL	FLOW LINE

TEMPORARY EROSION CONTROL:

1) The surface of all slopes more than three (3) feet in vertical height and steeper than 5:1 shall be covered with erosion control blankets. Installation shall conform to manufacturer's specifications. Deviations from this requirement shall be submitted in writing with an alternative plan for temporary erosion control. This plan shall be approved by the AFP-42 Civil Engineer.

2) Installation of the erosion blankets shall be installed to the satisfaction of the AFP-42 Civil Engineer prior to acceptance of rough grading and shall be per the manufacturer's specifications.

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RAFI Planning Architecture Urban Design

REGISTERED PROFESSIONAL ENGINEER
RICHARD M. MORRIS
NO. 76026
EXP. 6-30-16
CIVIL
STATE OF CALIFORNIA
6-10-14

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
TRANSFORMER PLAN SHEET 1

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840, 4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/11/2014
DRAWN BY			EDM-1719
SCALE	1"=30'	TRADE SH. No.	
FILE NAME	EDM-1719 C-1.DWG	C-2	SHEET No. 11 of 137

Structural Notes

GENERAL

1. The Contractor shall verify all dimensions prior to starting construction. The Contracting Officer shall be notified of any discrepancies or inconsistencies.

2. Structure noted in the drawings as existing shall be field verified by the contractor and any discrepancies noted shall be reported to the Contracting Officer.

3. Do not scale the drawings.

4. Typical details and schedules indicated may not be specifically referenced on the drawings. The contractor is responsible to determine where each typical detail or schedule applies. If locations are found where no typical detail, typical schedule, or specific detail applies, notify the Contracting Officer.

5. All work shall conform to the minimum standards of following codes:

   The 2010 edition of the California Building Code, and other regulating agencies which have authority over any portion of the work, and those codes and standard listed in these notes and in the project specifications.

6. See the architectural drawings for the following: details, dimensions not shown on the structural drawings, ceiling assemblies.

7. See mechanical and electrical drawings for the following: Pipes, hangers, duct penetration etc., except as shown or noted size and location of machine or equipment bases and anchor bolts for mounts.

8. For mechanical and electrical equipment anchorage to be designed by others, see CBC 2010. Use isolators, fasteners and bracing approved by ICC capable of transmitting code required lateral loads. Secure suspended equipment with lateral bracing.

9. For piping and ductwork bracing to be designed by others, see the latest edition of "Guidelines for Seismic Restraints of Mechanical Systems" by the Sheet Metal and Air Conditioning Contractors National Association.

10. The contract Structural drawings and specifications represent the finished structure. They do not indicate the method of construction. Contractor to provide construction means, methods, techniques, sequences and procedures as required. Contractor to provide adequate, shoring, bracing and erection procedures complying with national, state and local safety ordinances. The Contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to: bracing and shoring for loads due to wind or seismic forces, construction quipment, etc.

11. Observation visits (site visits) by representatives of Contracting Officer do not include inspection of construction means and methods. Site visits during construction are not continuous and detailed inspection services which are to be performed by others. Observations are performed solely for the purpose of determining if the Contractor understands design intent shown in the contract drawings. Observations do not guarantee Contractor's performance and are not to be construed as supervision or verification of construction.

12. Notify the Contracting Officer when drawings by others show openings, pockets, etc., not shown on the structural drawings, but which are located in the structural members.

13. Design Loads:

Live Loads:	
Roof	20 psf
Dead Loads:	
Roof	20 psf (Assumed existing loads)
Foam generators	720 lbs max.
New 6" Pipe (Full)	23 lbs/ft.
New 4" Pipe (Full)	11.8 lbs/ft.
New 3" Pipe (Full)	8 lbs/ft.
New 2" Pipe (Full)	5 lbs/ft.
New 1½" Pipe (Full)	3.6 lbs/ft.

14. CBC Lateral Loads
    Internal Wind pressure = 5 psf

    Seismic:
    Soil site class: = C
    Seismic coefficients:
    S_s = 0.871
    S_1 = 0.406
    Fa = 1.05
    Fv = 1.39

    Design Spectral Acceleration Parameters:
    S_{DS} = 0.611
    S_{D1} = 0.377

    Importance Factor:
    I_E = 1.25
    Ip = 1.0 (Component Importance Factor)

    Seismic Design Category = D

15. An overall structural analysis has not been performed.

16. Individual beams loaded with fire protection equipment have been checked for gravity only. Added mass is less than 5% of existing elements. Therefore the impact on the lateral load-carrying structural elements can be neglected.

DEFERRED SUBMITTALS
Deferred submittal item calculations and plans shall bear the wet ink signature of the engineer responsible for their preparation and shall bear the shop drawing review stamp or other notation of review by the Contracting Officer.

Concrete

1. All aspects of work pertaining to the concrete construction shall be in accordance with ACI 318-08, 'Building Code Requirements for Structural Concrete' and the latest edition of 'Specifications for Structural Concrete for Buildings', ACI 301, with modifications as noted on the project drawings and\or specifications.

2. Fly ash may be used in concrete mixes. The fly ash shall conform to ASTM C618 Class F. The loss of ignition shall be limited to 2%. The addition rate for fly ash shall be limited to 25% of the cement weight. The contractor shall submit all certificates showing the fly ash is in accordance with the above criteria.

3. Do not use concrete or grout containing chlorides.

4. All concrete exposed to freeze – thaw cycles shall contain 6% +/- 1% of entrained air.

5. Hard rock concrete – aggregate shall conform to all requirements and tests of ASTM C33 and project specifications. Exceptions may be used only with approval of the Contracting Officer. Provide concrete mix design with proven shrinkage characteristics of less than 0.0005 inches/inch.

6. Structural concrete 28-day strengths & types are as follows:

Location of Concrete	Strength, psi	Type
Mechanical pads	3000	Hard Rock
Grout	7000	
Slab on Grade	4500	Hard Rock

7. The modulus of elasticity of concrete, shall be tested in accordance with ASTM C469 for framed concrete slabs and beams and shall be at least the value given by the equations in section 8.5.1 of ACI 318 for the specified concrete 28-day strength.

8. Concrete mixing operations, etc., shall be in accordance with ASTM C94.

9. Concrete placement shall be in accordance with ACI standard 304 and project specifications. Provide keys in construction joints unless detailed otherwise. Thoroughly clean, remove laitance and thoroughly wet and remove standing water in construction joints before placing new concrete. At vertical joints, slush with a coat of neat cement before placing new concrete.

10. Roughen concrete surface to a full amplitude of 1/4 inch where new concrete interfaces with existing concrete.

11. Clear coverage of concrete over reinforcing bars shall be as follows:

Location of Concrete	Minimum Concrete Cover
Concrete cast against and permanently exposed to earth	3"
Concrete exposed to earth or weather: #6 through #18 bar #5 bar and smaller	 2" 1 1/2"
Concrete not exposed to weather or in contact with ground, UNO: Slabs: #14 and #18 bar. #11 bar and smaller.	 1 1/2" 3/4"
Slab on grade:	2" clear from top

12. Prior to concrete placement, all reinforcing bars, anchor bolts and other concrete inserts shall be well secured in position.

13. Maintain concrete above 50 degrees Fahrenheit and in a moist condition for a minimum of 7 days after placement unless otherwise accepted by Contracting Officer.

Structural Legend

Slope Direction (down)
Span Direction
00'-0" Miscellaneous Elevation
00'-0" Floor or Steel Elevation
[00] Number of Headed Shear Studs Required
Rigid Connection
c=0" Camber Up
# AT Indicates Size of Deformed Bar. Spacing Center to Center Direction in Which Bars Extend
Limits of Area Covered By Bars or Post Tension
H H Brace Up / Braced Frame / Brace Down
S S Step in Foundation (Footing)
Change (Step) in Elevation
SC 2-3 Slip Critical Connection / Number of Bolts per Row / Number of Rows
Revision

Masonry (CMU) Wall
Concrete Wall
Earth
New Construction
Existing Construction
A Section Cut
A Elevation Reference
N North

Welding per AWS
Structural Steel per AISC
Symbols for Concrete per ACI

NOTE: This is a master legend. Not all symbols are necessarily used on the drawings.

Reinforcing Steel (for Concrete and Masonry)

1. All reinforcing steel shall be detailed and placed in accordance with the 'Building Code Requirements for Reinforced Concrete' (ACI 318-08) and the 'Manual of Standard Practice for Reinforced Concrete Construction' by CRSI and WCRSI as modified by the project drawings and specifications.

2. Deformed reinforcing bars shall conform to the requirements of ASTM A615 grade 60 and ASTM A706 grade 60 for deformed weldable bars.

3. Welding of reinforcing is permitted only where shown on the drawings or when approved by the Contracting Officer. Welding of reinforcing bars shall be with low hydrogen electrodes in accordance with the 'Recommended Practices for Welding Reinforcing Steel, Etc.', American Welding Society, AWS D1.4 and CBC section 1704.4.1 all reinforcing to be welded shall conform to ASTM A706 grade 60 u.n.o.

4. All reinforcing bar bends shall be made cold.

5. Lap splices shall be made only where shown on the structural drawings.

6. All reinforcing bars shall be marked so their identification can be made when the final in-place inspection occurs.

Post Installed Anchors in Concrete

1. Post-installed anchors shall only be used where specified on the drawings.

2. Contractor shall obtain approval from the Contracting officer prior to using post-installed anchors for missing or misplaced cast-in-place anchors.

3. Care shall be given to avoid conflicts with existing rebar. Holes shall be drilled and cleaned per the manufacturer's instructions. Anchors shall be installed per the manufacturer's installation instructions at not less than minimum edge distances and/or spacing indicated in the manufacturer's literature.

4. Anchors shall be embedded in the appropriate substrate with the embedment indicated on the drawings.

5. Substitution requests for products other than those listed below shall be submitted to the Contracting officer with calculations that are prepared and sealed by a Registered Professional Engineer showing that the substituted product will achieve an equivalent capacity using the appropriate design procedure required by the Building Code.

6. Contractor shall contact manufacturer for free product and installation training prior to anchors being installed. Contact Simpson Strong-Tie at (800) 999-5099 or Hilti at (800) 879-8000 for training, product related questions and availability.

7. Special Inspection shall be provided as required by the applicable ICC-ES Evaluation Services Report.

8. Acceptable products for installation in cracked and uncracked concrete are as follows:

A. Expansion anchors shall be:
   Simpson Strong-Tie "Strong-Bolt" per ICC-ES-1771
   Simpson Strong-Tie "Strong-Bolt 2" per ICC-ES ESR-3037
   Hilti "Kwik Bolt TZ" per ICC-ES ESR-1917 ITW Red Head Trubolt+ (1/2" and 5/8" diameter only) per ICC-ES ESR-2427

B. Screw anchors shall be:
   Simpson Strong-Tie "Titen HD" and "Titen HD Rod Hanger" per ICC-ES ESR-2713

C. Undercut anchors shall be:
   Simpson Strong-Tie "Torq-Cut" per ICC-ES ESR-pending Hilti "HDA" per ICC-ES ESR-1546

D. Adhesive anchors shall be:
   Simpson Strong-Tie "SET-XP Epoxy-Tie Adhesive" per ICC-ES ESR-2508 Hilti "HIT-RE 500-SD" per ICC-ES ESR-2322

E. Powder Actuated Fasteners shall be:
   Simpson Strong-Tie "Powder-Driven Fasteners" per ICC-ES SR-2138
   Hilti "Low-Velocity Powder-Driven Fasteners" per ICC-ES ESR-1663.

Existing Masonry Notes

1. No pipes or electrical conduit shall pass through masonry lintels unless specifically detailed.

2. Mechanical pipes and electrical conduits which pass through masonry walls do not require sleeves, unless otherwise indicated in the project specifications, mechanical and/or electrical drawings. If sleeves are required, install sleeves before grouting. Do not cut any reinforcing which may interfere with sleeve placement. Notify the Contracting officer in advance of conditions not shown on the structural drawing.

FOR CONSTRUCTION

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www.lochsa.com

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
02-28-14		95% SUBMITTAL		
01-29-14		60% DEVELOPED DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
STRUCTURAL INFORMATION

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN PRIMARY SCOPE 4801,4802,4840

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	6/10/2013	DATE PRNTD	01/29/2014	
DRAWN BY	REF			EDM-1719
SCALE	AS SHOWN	TRADE SH. No.		
FILE NAME	EDM-1719 S-001.dwg	S-001	SHEET No. 12 of 137	

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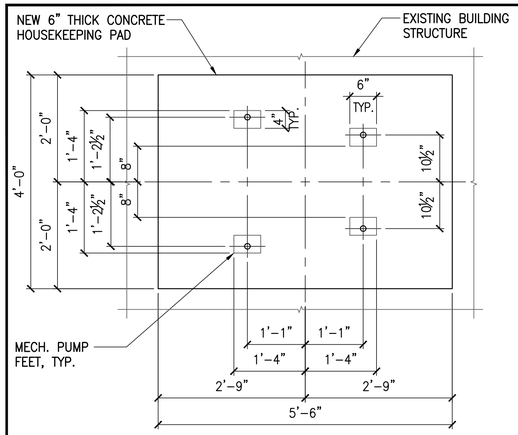
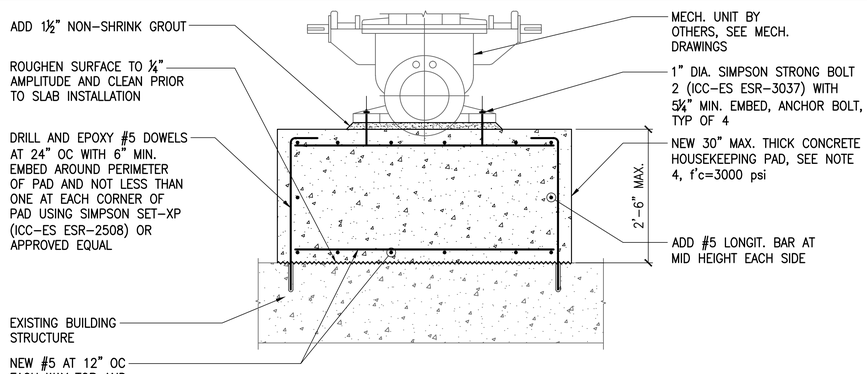


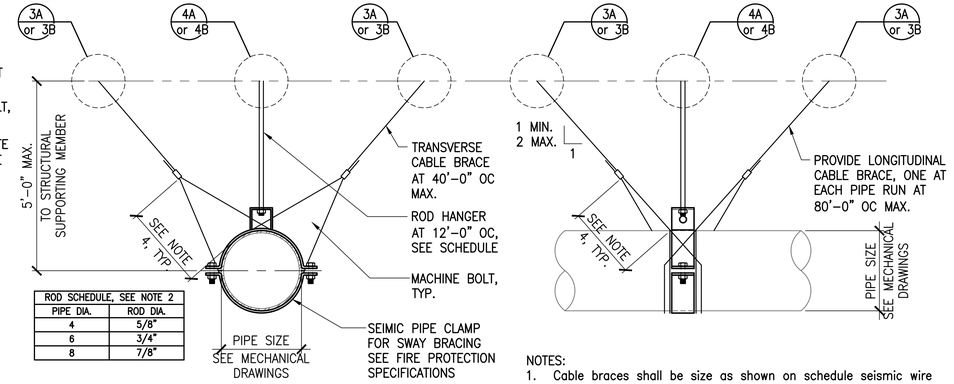
DIMENSIONING PLAN



NOTES:
1. For additional information see fire protection drawings.
2. Demo existing concrete pads.
3. Patch and level floor as required, see detail 10/–.
4. Thickness of housekeeping pad varies see fire protection drawings.

1 TYPICAL HOUSEKEEPING PAD FOR NEW PUMPS IN BUILDING 4853

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



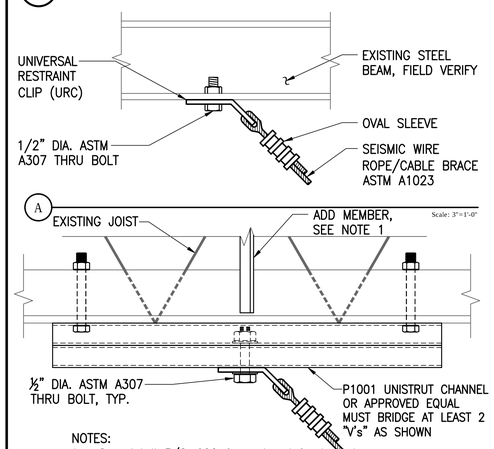
ROD SCHEDULE, SEE NOTE 2	
PIPE DIA.	ROD DIA.
4	5/8"
6	3/4"
8	7/8"

SEISMIC WIRE/ROPE SCHEDULE		
PIPE DIA.	CABLE SIZE	LOAD RATING
4	18	1100
6	36	2800
8	48	4400

NOTES:
1. Cable braces shall be size as shown on schedule seismic wire rope/cable ASTM A1023.
2. See fire protection drawings for locations and balance of information.
3. See 7/– for typical placement of seismic bracing.
4. Maintain a minimum of 1 1/2 pipe diameters from the side of the pipe to the oval sleeve.

2 TYPICAL PIPE BRACING DETAIL

Scale: 1 1/2"=1'-0"



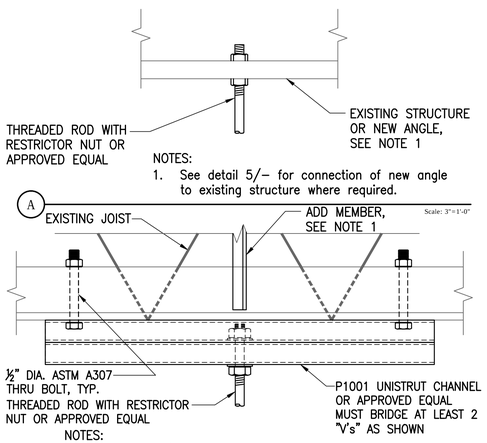
NOTES:
1. See detail 3/S-602 for web reinforcing when concentrated loads do not occur at panel points.

B

Scale: 3"=1'-0"

3 SPLAYED SEISMIC BRACING WIRE ATTACHMENT

Scale: 3"=1'-0"



NOTES:
1. See detail 5/– for connection of new angle to existing structure where required.

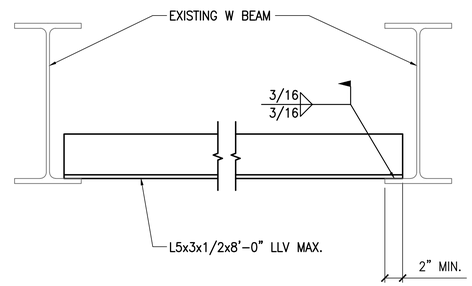
NOTES:
1. See detail 3/S-602 for web reinforcing when concentrated loads do not occur at panel points.

B

Scale: 3"=1'-0"

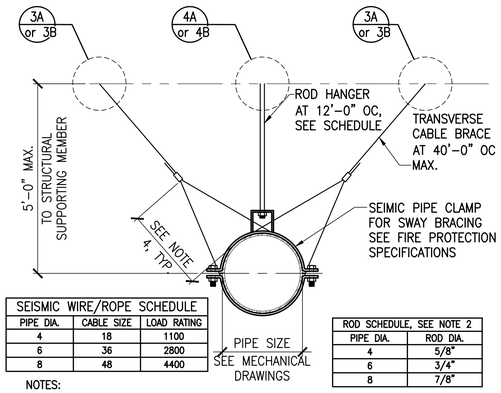
4 HANGER TOP CONNECTION

Scale: 3"=1'-0"



5 NEW ANGLE TO EXISTING STRUCTURE

Scale: 1 1/2"=1'-0"



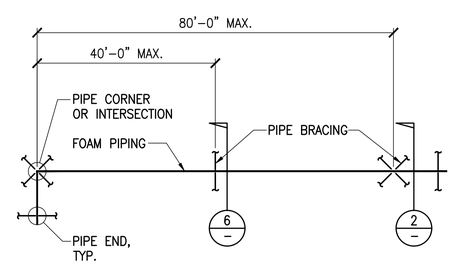
SEISMIC WIRE/ROPE SCHEDULE		
PIPE DIA.	CABLE SIZE	LOAD RATING
4	18	1100
6	36	2800
8	48	4400

ROD SCHEDULE, SEE NOTE 2	
PIPE DIA.	ROD DIA.
4	5/8"
6	3/4"
8	7/8"

NOTES:
1. Cable braces shall be size as shown on schedule seismic wire rope/cable ASTM A1023.
2. See fire protection drawings for locations and balance of information.
3. See 7/– for typical placement of seismic bracing.
4. Maintain a minimum of 1 1/2 pipe diameters from the side of the pipe to the oval sleeve.

6 TYPICAL PIPE BRACING DETAIL

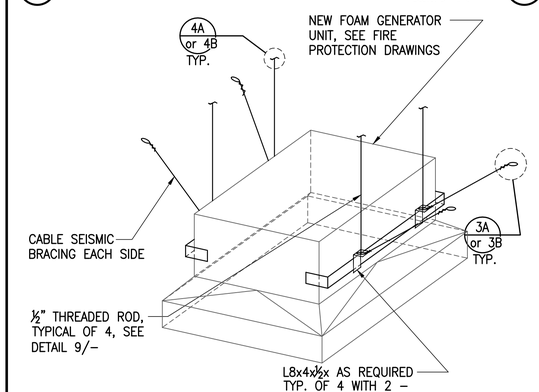
Scale: 1 1/2"=1'-0"



NOTES:
1. Seismic bracing shall comply with 2013 nfpa-13, chapter 9.
2. Provide both transverse and longitudinal bracing at intersections of two or more pipes.
3. Each run of pipe between changes in direction shall be provided with both transverse and longitudinal bracing.
4. The last length of pipe at the end of a feed or cross main shall be provided with a transverse brace.

7 TYPICAL PLACEMENT OF SEISMIC BRACING

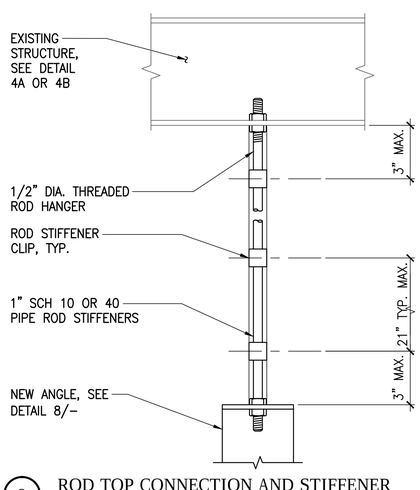
Scale: 1 1/2"=1'-0"



NOTES:
1. Cable braces shall be size 12 seismic wire rope/cable ASTM A1023.
2. Max weight of generator = 720 lbs.

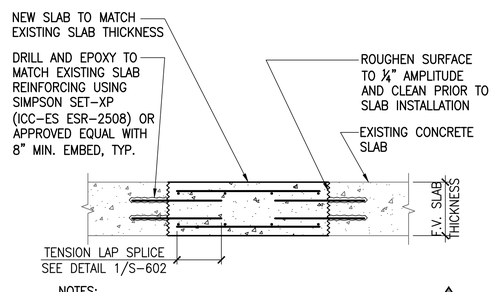
8 HIGH EXPANSION FOAM GENERATOR SUPPORT

Scale: 1 1/2"=1'-0"



9 ROD TOP CONNECTION AND STIFFENER

Scale: 3"=1'-0"



NOTES:
1. Use manufacturer's recommendations for dowel installation, do not damage existing concrete slab reinforcing.

10 NEW FLOOR TO EXISTING FLOOR

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

FOR CONSTRUCTION

RAFI Planning Architecture Urban Design

REGISTERED PROFESSIONAL ENGINEER KENNETH M. KAMIYA No. S4475 Exp. 9/30/15 STRUCTURAL STATE OF CALIFORNIA 5/9/14

Lochsa engineering
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DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
02-28-14		95% SUBMITTAL		
01-29-14		60% DEVELOPED DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
STRUCTURAL SECTIONS AND DETAILS

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	6/10/2013	DATE PRNTD	01/29/2014
DRAWN BY	REF	EDM-1719	
SCALE	AS SHOWN	TRADE SH. No.	
FILE NAME	EDM-1719 S-601.dwg	S-601	SHEET No. 13 of 137

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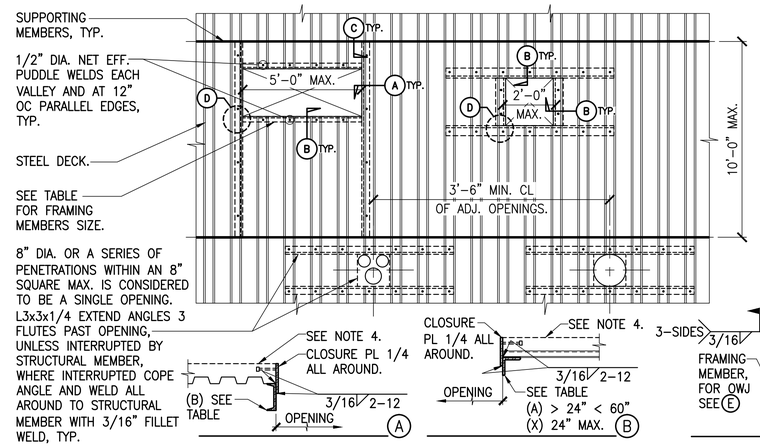
BAR SIZE	LAP CLASS	f'c = 3000 psi				f'c = 4000 psi				f'c = 4500 psi			
		TOP BARS		OTHER BARS		TOP BARS		OTHER BARS		TOP BARS		OTHER BARS	
		CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2
#3	A	22	32	17	25	19	28	15	22	18	27	14	21
	B	28	42	22	32	24	36	19	28	23	34	18	27
#4	A	29	43	22	33	25	37	19	29	24	35	18	27
	B	37	56	29	43	32	48	25	37	31	46	24	35
#5	A	36	54	28	41	31	47	24	36	29	44	23	34
	B	47	70	36	54	40	60	31	47	38	57	29	44
#6	A	43	64	33	50	37	56	29	43	35	53	27	41
	B	56	84	43	64	48	72	37	56	46	68	35	53
#7	A	63	94	48	72	54	81	42	63	51	77	40	59
	B	81	122	63	94	70	106	54	81	67	100	51	77
#8	A	72	107	55	82	62	93	48	71	59	88	45	68
	B	93	139	72	107	80	121	62	93	76	114	59	88
#9	A	81	121	62	93	70	105	54	81	66	99	51	76
	B	105	157	81	121	91	136	70	105	85	128	66	99
#10	A	91	136	70	105	79	118	61	91	73	109	56	84
	B	118	177	91	136	102	153	79	118	95	142	73	109
#11	A	101	151	78	116	87	131	67	101	80	120	62	93
	B	131	196	101	151	113	170	87	131	104	156	80	120

NOTES:
1. Table for use with normal weight hardrock concrete and grade 60 uncoated reinforcing bars. For lightweight aggregate use 1.3ℓ
2. Class A – Half or less of the bars are spliced within a required lap length. Class B – More than half of the bars are spliced within a required lap length.
3. Top bars are horizontal bars with 12" or more of concrete cast in the member below the bar.
4. For bars enclosed in standard column spirals, use 0.75ℓ or 12" min.
5. Lap splices of individual bars with a bundle shall be 1.2ℓ for that bar in a 3–bar bundle and 1.33ℓ for a 4–bar bundle. Entire bundles shall not be lap spliced at the same location. Splices for individual bars within a bundle shall be staggered such that they do not overlap.
6. ℓ – Basic lap length, shown at left.
7. Case Selection
   - –For foundation reinforcement use Case 1 uno.
   - –For column reinforcement and dowels use case 1 uno.
   - –For beam reinforcement use Case 1 uno.
   - –For structural slab reinforcement use Case 2 uno.
   - –For slab on grade reinforcement use Case 1 uno.
   - –For wall reinforcement and dowels use Case 1 (Except as noted below) uno.
   - –For walls with a single mat of steel centered in the wall, use Case 1 for wall reinforcement and dowels uno.
   - –For chord steel reinforcement use Case 2 uno.

TENSION LAP SPLICE LENGTHS, ℓ (CONCRETE ONLY) (IN INCHES) FOR GRADE 60 UNCOATED BARS

1 TENSION LAP SPLICE

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

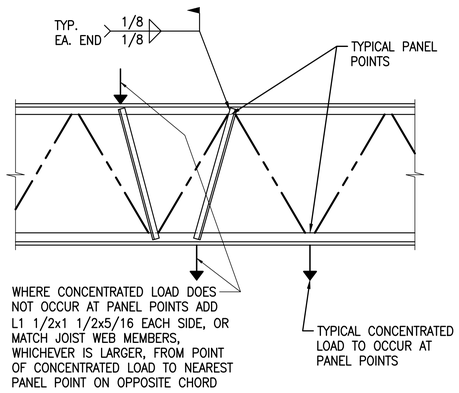


FRAME MEMBER SIZES.	
LONG OPENINGS DIM. > 24" < 60" MAX.	
(A)	L4x3x3/8 LLV
(B)	C6x8.2
(C)	L7x4x1/2x0'–3" LLV MIN.
LONG OPENINGS DIM. 24" MAX.	
(X)	L3x3x1/4

NOTES:
1. Added framing is not reqd. for openings where long opening dim. is less than 8".
2. For structure required to support mechanical unit gravity and lateral loads and curbs etc. see mech. and arch. drawings.
3. See mech. for equipment mounting, attachment openings, etc.
4. Composite slab or roofing see plans and arch. drawings. Where hard rock conc. occurs provide 1/2" Dia. x 6" Nelson Headed Studs at 24" oc.
5. Connection at top chord panel point. If not at panel point, field install L2x2x1/4 from point of load to nearest panel point on bottom chord. Shore joist during welding.
6. At existing concrete slabs, attach members with 3/8" dia. Titen HD anchors with 3/4" embed and at existing roof decks use #12 screws to replace puddle welds.

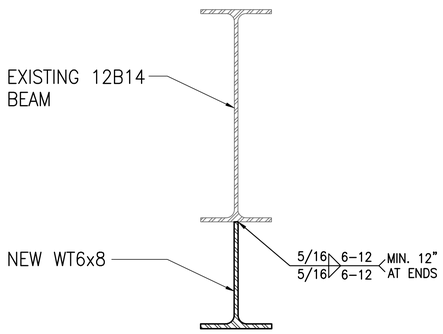
2 TYPICAL OPENING IN STEEL DECK

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



3 TYPICAL JOIST REINFORCEMENT DETAIL

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



NOTES:
1. Reinforce all beams loaded with new fire protection pipes and/or foam generators.

4 RETROFIT FOR EXISTING 12B14 BEAMS IN BUILDINGS 4801 and 4802

Scale: 3"=1'-0"

FOR CONSTRUCTION

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KENNETH M. KAPLAN
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Exp. 9/30/15
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STATE OF CALIFORNIA
5/9/14

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DRAWING TITLE
STRUCTURAL SECTIONS AND DETAILS

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	6/10/2013	DATE PRNTD	01/29/2014
DRAWN BY	REF	EDM–1719	
SCALE	AS SHOWN	TRADE SH. No.	
FILE NAME	EDM–1719 S–602.dwg	S–602	SHEET No. 14 of 137

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ELECTRICAL SYMBOLS

NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ABBREVIATIONS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

ELECTRICAL ONE-LINE & RISER

- PANELBOARD (SEE SCHEDULES)
- MULTI-SECTION PANELBOARD (SEE SCHEDULES)
- TX# TRANSFORMER TYPE AND RATINGS AS SHOWN
- TX# SHIELDED TRANSFORMER TYPE AND RATINGS AS SHOWN
- 800A 3P SWITCH RATING AS SHOWN
- 225A 3P CIRCUIT BREAKER RATINGS AS SHOWN
- 200AS 3P 200AF FRS FUSED SWITCH RATING, POLES AND FUSE TYPE AS SHOWN
- ### CIRCUIT IDENTIFICATION – SEE CIRCUIT SCHEDULE
- GFR GROUND FAULT RELAY
- ST SHUNT TRIP
- UTILITY METER (M) UTILITY METER (AS REQUIRED BY UTILITY)
- CURRENT TRANSFORMER RATING AS SPECIFIED OR REQUIRED
- TVSS TRANSIENT VOLTAGE SURGE SUPPRESSOR
- GROUND CONNECTION
- GROUND ROD
- CONTACT (OPEN OR CLOSED)
- HEATER
- (HP) MOTOR
- ## BLOCK LOAD KW OR KVA

SIGNALING

- B SIGNALING BELL
- B SIGNALING BUZZER
- T LV TRANSFORMER

ABBREVIATIONS

A	AMPERES, AIR (COMPRESSED)
A/C	AIR CONDITIONING
AF	AMPERE FUSE
AFC	ABOVE FINISHED CEILING
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFEA	AREA FOR EVACUATION ASSISTANCE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AI	ANALOG INPUT
AIC	AMPERE INTERRUPTING CURRENT
AL	ALUMINUM
AO	ANALOG OUTPUT
AP	ACCESS PANEL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BI	BINARY INPUT
BKR	BREAKER
BO	BINARY OUTPUT
C	CONDUIT
CD	CANDELA
CT	CURRENT TRANSFORMER
CATV	CABLE TELEVISION SYSTEM
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CPT	CONTROL POWER TRANSFORMER
CU	COPPER, CONDENSING UNIT
CVD	CUMULATIVE VOLTAGE DROP
DDC	DIRECT DIGITAL CONTROL
DI	DIGITAL INPUT, DUCTILE IRON
DN	DOWN
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPST	DOUBLE-POLE, SINGLE-THROW
(E)	EXISTING TO REMAIN
EM	EMERGENCY
EPO	EMERGENCY POWER OFF
ETR	EXISTING TO REMAIN
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS/OWNER
FCA	FAULT CURRENT AMPS
FF	FINISHED FLOOR
FLA	FULL LOAD AMPS
FLR	FLOOR
FVNR	FULL-VOLTAGE, NON-REVERSING
GC	GENERAL CONTRACTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
G	GROUND
GND	GROUND
GRS	GALVANIZED RIGID STEEL
HOA	HAND-OFF-AUTOMATIC
IG	ISOLATED GROUND
ISC	SHORT CIRCUIT CURRENT
JB	JUNCTION BOX
J-BOX	JUNCTION BOX
kcmil	1000 CIRCULAR MILS
KK	KIRK KEY
kV	KILOVOLT
kVA	KILOVOLT-AMPS
kVAR	KILOVOLT-AMPS REACTIVE
kW	KILOWATT
kWH	KILOWATT-HOUR
LF	LINEAR FEET
MATV	MASTER ANTENNA TELEVISION SYSTEM

MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MG	MOTOR GENERATOR
MH	MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MSB	MAIN SWITCHBOARD
MSWB	MAIN SWITCHBOARD
MS/TP	MASTER SLAVE/TOKEN PASSING
–	COMMUNICATION TRUNK
MTD	MOUNTED
N/A	NOT APPLICABLE
N/C	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
N/O	NORMALLY OPEN
OC	ON CENTER
OS	OCCUPANCY SENSOR
PDU	POWER DISTRIBUTION UNIT
PH, ø	PHASE
PIV	POST INDICATOR VALVE
PNL	PANEL
PNLBD	PANELBOARD
PROVIDE	FURNISH AND INSTALL
PT	POTENTIAL TRANSFORMER
PTZ	PAN, TILT, ZOOM
QTY	QUANTITY
RCPT	RECEPTACLE
RLA	RUNNING LOAD AMPS
RTU	ROOFTOP UNIT
SD	SMOKE DETECTOR, SUPPLY DUCT
SF	SQUARE FEET, SUPPLY FAN
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SS	STAINLESS STEEL, SANITARY SEWER, SOIL STACK
ST	SHUNT TRIP, STEAM TRAP
SWBD	SWITCHBOARD
TL	TWISTLOCK
TR	TAMPER RESISTANT
TX	TRANSFORMER
TYP	TYPICAL
U/F	UNDERFLOOR
U/G	UNDERGROUND
UH	UNIT HEATER
U/S	UNDERSLAB
UL	UNDERWRITERS LABORATORIES, INC.
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT(S)
VAC	VOLTS ALTERNATING CURRENT
VD	VOLTAGE DROP
VDC	VOLTS DIRECT CURRENT
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE
WP	WEATHER PROOF COVER
WR	WEATHER RESISTANT
XP	EXPLOSION-PROOF

CIRCUITING & WIRING

- SWITCHED HOT CONDUCTORS (SHOWN TRAILING NEUTRAL)
- NEUTRAL CONDUCTOR
- UNSWITCHED HOT CONDUCTORS (SHOWN LEADING NEUTRAL)
- 7 5 3 P1 OR P1–3,5,7 HOMERUN TO PANELBOARD, ARROWS INDICATE NUMBER OF CIRCUITS, HASH MARKS INDICATE NUMBER OF CONDUCTORS. INFORMATION AT ARROWS ARE CIRCUIT NUMBERS AND PANELBOARD.
- EQUIPMENT GROUNDING CONDUCTOR IN CONDUIT (GREEN INSULATION OR BARE)
- ISOLATED GROUNDING CONDUCTOR IN CONDUIT (GREEN INSULATION WITH YELLOW TRACER)
- CONDUIT CONCEALED
- CONDUIT IN/UNDER FLOOR/GROUND CONSTRUCTION
- EXPOSED CONDUIT
- FLEXIBLE CONDUIT
- LOW VOLTAGE CABLE (NOT ROUTED IN CONDUIT)
- CONDUIT TURNING DOWN
- CONDUIT TURNING UP
- CONNECTION POINT OR EQUIPMENT TERMINATION
- EQUIPMENT TERMINATION

LIGHTING

- A / a LIGHT FIXTURE — SEE LIGHT FIXTURE SCHEDULE
  - a = SWITCHED BY SWITCH "a"
  - A = LIGHT FIXTURE TYPE "A"
  - NL = NIGHT LIGHT
  - ⊥ = WALL MOUNT
  - 〉 = ARROW INDICATES AIMING DIRECTION
- LIGHT FIXTURE WITH NIGHT LIGHT
- EMERGENCY LIGHT FIXTURE WITH EMERGENCY LIGHTING BATTERY PACK OR CONNECTED TO EMERGENCY SOURCE
- LIGHT FIXTURE WITH DUAL BALLASTS CIRCUITED SEPARATELY. (SHADING IMPLIES EMERGENCY LIGHT FIXTURE)
- LIGHTING TRACK WITH LIGHT FIXTURE TYPES AS INDICATED
- MIRROR LIGHTS
- SITE LIGHTING FIXTURE
- EXIT SIGN – CEILING / WALL MOUNTED, ARROWS AS INDICATED.
- EMERGENCY BATTERY PACK LIGHT FIXTURE – CEILING/WALL MOUNTED
- AFEA (AREA FOR EVACUATION ASSISTANCE) SIGN – CEILING/WALL MOUNTED, ARROWS AS INDICATED.

STANDARD MOUNTING HEIGHTS

(AFF, AFG, UNLESS NOTED OTHERWISE)

ELECTRICAL

ALARMS	48"
ANNUNCIATOR PANELS	48"
CLOCK OUTLETS (CENTERLINE)	84"
CONTROLS (CENTERLINE)	48"
EXIT SIGNS (WALL MOUNTED, BOTTOM)	80"
INTERCOM (AFEA ONLY)	36"
INTERCOMS	48"
PANELS/PANELBOARDS (TOP)	72"
PHOTOCELLS	144"
RECEPTACLES (CENTERLINE)	18"
RECEPTACLES (EXTERIOR)	24"
RECEPTACLES (GARAGES)	26"
RECEPTACLES IN EQUIPMENT ROOMS	48"
REMOTE INDICATING LIGHT (EQUIPMENT ROOMS)	48"
REMOTE INDICATING LIGHT (FINISHED AREAS)	CEILING
SAFETY SWITCHES	48"
STARTERS	48"
SWITCHES (CENTERLINE)	48"
TELEPHONES (PUBLIC)	1 @ 48", 1 @ 36"
TELEPHONE, DATA OUTLETS (CENTERLINE)	18"
TELEPHONE TERMINAL BOARD (BOTTOM)	6"
TELEVISION OUTLETS	18"

ANNOTATION

- 1 ELECTRICAL PLAN NOTE CALLOUT
- 1 TECHNOLOGY PLAN CALLOUT
- 1 EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1/M1 DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1/M1 SECTION CUT DESIGNATION

WIRING DEVICES & OUTLETS

- $ SINGLE POLE WALL SWITCH (NO LETTER DESIGNATION)
- $2 SWITCH LETTER DESIGNATIONS AS FOLLOWS:
  - 2 = TWO POLE WALL SWITCH
  - 3 = THREE-WAY WALL SWITCH
  - 4 = FOUR-WAY WALL SWITCH
  - D = DIMMER TYPE SWITCH
  - OS# = OCCUPANCY SENSOR (SEE OCCUP. SENSOR SCHEDULE)
  - P = SPST PILOT LIGHT SWITCH
  - K = KEYED LIGHT SWITCH
  - M = MOTOR RATED SWITCH
  - WP = WEATHER PROOF
- OCCUPANCY SENSOR (SEE OCCUPANCY SENSOR SCHEDULE FOR TYPE AND MOUNTING CONFIGURATIONS)
  - # = OCCUPANCY SENSOR TYPE "#"
- (P) SENSOR POWER PACK FOR LIGHTING CONTROL
- (P)A SENSOR AUXILIARY RELAY PACK FOR LIGHTING CONTROL
- SIMPLEX RECEPTACLE – NEMA 5-20R, UNO
- DUPLEX RECEPTACLE – NEMA 5-20R, UNO
- DOUBLE DUPLEX RECEPTACLE – NEMA 5-20R, UNO
- SPECIAL RECEPTACLE – NEMA TYPE AS NOTED
- TWIST-LOCK TYPE RECEPTACLE
- OR GFCI GFCI TYPE RECEPTACLE*
- ISOLATED GROUND TYPE RECEPTACLE*
- EMERGENCY RECEPTACLE*
- RECEPTACLE INSTALLED 6" ABOVE COUNTER OR BACKSPLASH*
- RECEPTACLE INSTALLED IN CEILING*
- RECEPTACLE INSTALLED IN FLOOR*
- RECEPTACLE INSTALLED VIA DROP CORD*
- *DUPLEX RECEPTACLE SHOWN, SIMILAR FOR OTHERS
- WR/WP RECEPTACLE LETTER DESIGNATIONS AS FOLLOWS:
  - C = CLOCK HANGER TYPE
  - E = EMERGENCY POWER
  - S = SWITCHED
  - IG = ISOLATED GROUND
  - TR = TAMPER RESISTANT
  - WP = WEATHER PROOF COVER
  - WR = WEATHER RESISTANT
- MULTI-OUTLET SURFACE RACEWAY WITH NEMA 5-20R RECEPTACLES 12" ON CENTER, UNO.
- TELEPHONE OUTLET – FLOOR OR WALL MOUNTED. INSTALL AT SAME ELEVATION AS ADJACENT RECEPTACLE, UNO.
- DATA OUTLET – FLOOR OR WALL MOUNTED. INSTALL AT SAME ELEVATION AS ADJACENT RECEPTACLE, UNO.
- MULTI-SERVICE OUTLET; TELEPHONE AND DATA – FLOOR OR WALL MOUNTED. INSTALL AT SAME ELEVATION AS ADJACENT RECEPTACLE, UNO.
- A MULTI-SERVICE POWER POLE WITH TELEPHONE, DATA AND POWER OUTLETS A = TYPE, SEE SCHEDULE IN SPECIFICATIONS
- A MULTI-SERVICE FLOOR BOX WITH TELEPHONE, DATA AND POWER OUTLETS A = TYPE, SEE SCHEDULE IN SPECIFICATIONS
- A POKE THROUGH, A = TYPE, SEE SCHEDULE IN SPECIFICATIONS
- THERMOSTAT
- J JUNCTION BOX/OUTLET BOX
- BLANK FACE GFCI FEED THROUGH DEVICE
- ALC AUTOMATIC LOAD CONTROL RELAY

POWER EQUIPMENT & DEVICES

- ELECTRICAL SERVICE PANELBOARD (SURFACE OR FLUSH MOUNT)
- TERMINAL CABINET (SURFACE OR FLUSH MOUNT), TYPE AS NOTED
- PLYWOOD TERMINAL BOARD FOR TELEPHONE SYSTEM, UNO. SIZE AS NOTED.
- ELECTRICAL DISTRIBUTION PANELBOARD
- SWITCHBOARD OR MOTOR CONTROL CENTER ON HOUSEKEEPING PAD
- TRANSFORMER
- MOTOR
- 200/3/150 DISCONNECT SWITCH – "200/3/150" DENOTES AMPERES/POLE/FUSE NF= NON-FUSED CB= CIRCUIT BREAKER (200/3/CB)
- 30/3/15/1 COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER "30/3/15/1" DENOTES AMPERES/POLE/FUSE/NEMA STARTER SIZE NF= NON-FUSED CB= CIRCUIT BREAKER (30/3/CB/1)
- 2 MAGNETIC MOTOR STARTER, NEMA SIZE AS NOTED. 3-POLE, UNO.
- MS MANUAL STARTER
- VFD VARIABLE FREQUENCY DRIVE
- (R) RELAY OR CONTACTOR (IN SCHEMATICS)
- C L MAGNETIC CONTACTOR, SIZE, COIL VOLTAGE AND NUMBER OF POLES AS INDICATED (L= LIGHTING CONTACTOR, P= POWER CONTACTOR)
- TS TIME SWITCH
- PC PHOTOCELL
- INDICATING LIGHT
- PUSH BUTTON
- STOP-START PUSH BUTTON CONTROL STATION
- HAND-OFF-AUTO PUSH BUTTON CONTROL STATION
- MUSHROOM-TYPE PUSH BUTTON
- OVERHEAD PADDLE FAN

GENERAL

- NOT IN SCOPE

GENERAL ELECTRICAL DEMOLITION NOTES:

1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE FACILITY. REVIEW THE GENERAL NOTES AND ALL OTHER TRADE DRAWINGS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY THE CONTRACTING OFFICER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMITTING BID.
2. EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS AND LIMITED SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY ALL EXISTING CONDITIONS AND CAREFULLY COORDINATE NEW WORK AND DEMOLITION WITH ALL OTHER DISCIPLINES AND EXISTING CONDITIONS.
3. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF MECHANICAL EQUIPMENT BACK TO ITS ORIGINATING SOURCE. WHERE NEW EQUIPMENT IS TO REPLACE THE DEMOLISHED IN SAME LOCATION RE-USE EXISTING CONDUIT IF IN GOOD CONDITION. IF CIRCUIT BREAKER IS NOT REPLACED TURN OFF EXISTING AND LABEL AS SPARE.
4. AVOID DAMAGING EXISTING SURFACES AND EQUIPMENT TO REMAIN DURING DEMOLITION. REPAIR DAMAGE CAUSED DURING WORK AT NO EXTRA COST TO THE OWNER.
5. AVOID DAMAGING EXISTING WIRING FOR INTERCOM, AND FIRE ALARM. REPAIR DAMAGE CAUSED DURING WORK BACK TO NORMAL OPERATING CAPACITY AT NO EXTRA COST TO OWNER IMMEDIATLEY.
6. SEAL ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS, AND ROOF (INCLUDING HOLES LEFT FROM ANCHORS, BOLTS, SCREWS, ETC) WHERE ELECTRICAL COMPONENTS ARE REMOVED AND WHERE THE EXISTING PENETRATION IS NOT USED FOR THE NEW INSTALLATION. REPAIR DAMAGED SURFACES TO MATCH ADJACENT AREAS. COORDINATE WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

GENERAL ELECTRICAL NOTES:

1. CONDUIT SIZES CALLED OUT ON DRAWINGS ARE NOT NECESSARILY BASED ON THE MINIMUM SIZE ALLOWED BY THE NATIONAL ELECTRICAL CODE AND MAY BE PURPOSELY OVERSIZED FOR EASE OF CONDUCTOR PULLING OR TO AVOID EXCESS CONDUIT HEATING. IN NO CASE SHALL CONDUIT SIZE BE SMALLER THAN IS REQUIRED BY THE NATIONAL ELECTRICAL CODE. MINIMUM CONDUIT SIZE SHALL BE 3/4 INCH USED AT NASA ARMSTRONG.
2. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL JUNCTION AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT, WHETHER OR NOT SPECIFICALLY INDICATED ON THE PLANS. SIZE OF THESE BOXES SHALL BE PER THE NATIONAL ELECTRICAL CODE.
3. THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT FOR TEMPORARY CONSTRUCTION POWER AND LIGHTING AS REQUIRED.
4. ALL PENETRATIONS THROUGH FIRE BARRIERS SHALL BE FIRE STOPPED TO MAINTAIN THE INTEGRITY OF THE FIRE BARRIER. FIRE STOPPING MATERIAL SHALL BE U.L. LISTED.
5. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CONTRACTING OFFICER BEFORE DRILLING ANY PENETRATION THROUGH STRUCTURAL MEMBERS OR FIRE RATED WALLS AND SLABS.
6. SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF WORK, THE CONTRACTOR SHALL MARK SUCH CHANGES ON THE AS-BUILT DRAWINGS. IF THESE CHANGES REQUIRE ALTERNATE METHODS TO THOSE SPECIFIED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SUBMIT DRAWINGS SHOWING THE PROPOSED ALTERNATE METHODS TO THE CONTRACTING OFFICER. THE CONTRACTOR SHALL NOT PROCEED UNTIL APPROVAL IS OBTAINED. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION SHALL NOT BE CONSIDERED AN ITEM FOR EXTRA COST.
7. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. TESTING SHALL BE DONE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT A COPY OF SHOP DRAWINGS TO THE CONTRACTING OFFICER FOR INFORMATION.
8. PROVIDE ELECTRICAL SYSTEM EQUIPMENT TESTS AND RUNNING TEST TO DEMONSTRATE ITS OPERATING AND COMPLIANCE WITH THE EQUIPMENT SPECIFICATIONS, TEST ALL WIRING AND EQUIPMENT TO INSURE PROPER OPERATION ACCORDING TO FUNCTIONS SPECIFIED HEREIN AND ON THE DRAWINGS. THE CONTRACTOR WILL SUBMIT DETAILED TESTING PLANS TO THE GOVERNMENT FOR REVIEW AND APPROVAL BEFORE TESTING CAN BEGIN. A PRETEST WILL BE PERFORMED BY THE CONTRACTOR AND ALL DISCREPANCIES MITIGATED BEFORE THE GOVERNMENT ACCEPTANCE TESTING WILL BEGIN. THE PRETEST WILL BE WITNESSED BY A GOVERNMENT REPRESENTATIVE. VERY LOW FREQUENCY TESTING, PER SECTION 337102, SHALL BE ONLY PERFORMED ON NEW MEDIUM VOLTAGE CABLES.
9. WARRANTY:
   ALL WORK IN THIS SECTION SHALL BE UNDER WARRANTY FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE WORK AS A WHOLE BY THE CONTRACTING OFFICER. SHOULD ANY EQUIPMENT OR MATERIAL FAIL WITHIN THIS PERIOD, THE CONTRACTOR SHALL REPLACE OR REPAIR THAT ITEM AT NO COST FOR MATERIAL AND/OR SERVICES IF SUCH IS DUE TO FAULTY WORKMANSHIP OR QUALITY OF MATERIAL FURNISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO ANY PART OF THE PREMISES CAUSED BY FAILURE IN THE EQUIPMENT FURNISHED AS PART OF THE CONTRACT DRAWINGS FOR A PERIOD OF ONE YEAR AFTER THE FINAL ACCEPTANCE OF THE WORK AS A WHOLE.
10. ALL MECHANICAL CONTROL SYSTEMS EQUIPMENT SHALL BE PROVIDED, INSTALLED, AND WIRED BY THE MECHANICAL CONTRACTOR PER THE CONTRACT DOCUMENT. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUITS ONLY FOR CONTROL WIRING.
    ELECTRICAL POWER FOR THE MECHANICAL CONTROL SYSTEM EQUIPMENT SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. THIS INCLUDES THE POWER WIRING AND CONNECTION TO THE MECHANICAL CONTROL SYSTEMS EQUIPMENT.
11. ALL EQUIPMENT SHALL BE DESIGNED AND INSTALLED FOR USE IN A SEISMIC ZONE 4 AREA. ALL SEISMIC DESIGN SHALL BE STAMPED AND SIGNED BY A PROFESSIONAL STRUCTURAL ENGINEER.
12. POTHOLE AND LOCATE ALL UTILITY LINES WITHIN THE PROJECT AREA PRIOR TO START OF EXCAVATION IN ORDER TO AVOID DAMAGE TO EXISTING UNDERGROUND UTILITIES. REPAIR ALL DAMAGES TO EXISTING UTILITIES AT NO COST TO OWNER. EXCAVATION AT ARMSTRONG IS A PERMIT REQUIRED ACTIVITY. FOLLOW PERMIT REQUIREMENTS PRIOR TO PERFORMING ANY EXCAVATION.
13. PATCH AND PAINT ALL EXPOSED ELECTRICAL MATERIAL, INCLUDING CONDUIT, SURFACE METAL RACEWAYS, JUNCTION BOXES, PANELS, AND DEVICES TO MATCH THE ADJACENT SURFACES IN TEXTURE AND COLOR. COORDINATE WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
14. REPAIR ANY DAMAGE TO EXISTING CONSTRUCTION RESULTING FROM THE INSTALLATION OF ELECTRICAL ITEMS. THE AREAS REPAIRED SHALL MATCH THE ADJACENT SURFACES IN TEXTURE AND COLOR. COORDINATE WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
15. PROVIDE DEWATERING EFFORT FOR NEW BELOW GRADE EXCAVATION/TRENCHING IF GROUND WATER IS ENCOUNTERED. THE CONTRACTOR SHALL OBTAIN A DIGGING PERMIT BEFORE ANY EXCAVATION OR TRENCHING.
16. ALL ELECTRICAL SPLICES SHALL BE WATERPROOF. THE CONTRACTOR SHALL SUBMIT AN AHA ON HOW SPLICING IS TO BE PERFORMED TO MITIGATE THE RISK OF ACCIDENTAL EXPOSURE TO HIGH VOLTAGE.
17. ALL MOUNTING HARDWARE, CHANNELS, AND FASTENING DEVICES IN EXTERIOR LOCATIONS SHALL BE 316 STAINLESS STEEL, UNLESS NOTED.
18. PROVIDE A COMPLETE AND OPERATING ELECTRICAL SYSTEM. PROVIDE SHALL MEAN FURNISH AN INSTALL. WORK INCLUDES INSTALLATION OF ALL ELECTRICAL EQUIPMENT AND SYSTEMS, INCLUDING ANY FURNISHED BY OWNER OR OTHER TRADES, COMPLETE AND OPERATIONAL TO THE SATISFACTION OF THE CONTRACTING OFFICER, AS LIMITED BY THE INTENT OF THE CONTRACT DOCUMENTS.
19. THE CONTRACTOR SHALL COMPLY WITH THE CONSTRUCTION PRACTICES AND REQUIREMENTS OF THE LATEST ADOPTED EDITIONS OF THE NATIONAL ELECTRICAL CODE (NFPA 70), NATIONAL ELECTRICAL SAFETY AND NFPA 70E STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE CODE, AMERICAN ELECTRICIANS HANDBOOK BY CROFT EDISON ELECTRIC INSTITUTE, AMERICANS WITH DISABILITIES ACT, APPLICABLE INSTRUCTIONS OF MANUFACTURERS OF EQUIPMENT AND MATERIALS SUPPLIED FOR THE PROJECT, AND ALL ORDINANCES, RULES, AND POLICIES OF THE STATE AND COUNTY IN WHICH THE WORK IS TO BE PERFORMED.
20. THE CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS AND THE EXTENT OF REMOVAL, RELOCATION, RECONNECTION, AND/OR NEW WORK PRIOR TO BIDDING. THE BID SUBMISSION PROCESS SHALL RESOLVE ALL DISCREPANCIES AND QUESTIONS AND NO EXTRA PAYMENT WILL BE AUTHORIZED FOR WORK MADE NECESSARY BY THE CONTRACTORS FAILURE TO DO SO.
21. ALL CIRCUITS SHALL INCLUDE AN INSULATED GREEN GROUNDING CONDUCTOR, SIZED PER THE NATIONAL ELECTRICAL CODE. THIS CONDUCTOR SHALL BE CARRIED IN ALL RACEWAYS, INCLUDING THOSE INSTALLED FOR SWITCH LEGS, AND SHALL BE ATTACHED TO THE DEVICE AND EQUIPMENT HOUSING USING A SUITABLE GROUNDING LUG.
22. ALL EQUIPMENT SHOWN ON ONE-LINE DIAGRAMS IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE. DASHED LINE TYPE INDICATES DEMOLITION AND BOLD LINE TYPE INDICATES NEW WORK.
23. SAWCUT EXISTING AC PAVEMENT/SIDEWALK FOR NEW UNDERGROUND DUCTLINE INSTALLATION, PATCH, AND REPAIR AC PAVEMENT/SIDEWALK TO MATCH EXISTING ADJACENT SURFACES. AT NON-PAVED AREAS, RESTORE SURFACES TO MATCH EXISTING ADJACENT SURFACES.
24. ALL OUTAGES SHALL BE COORDINATED AND SCHEDULED WITH THE CONTRACTOR OFFICE AND DIVISION 1 SPECS. PROVIDE REQUEST FOR OUTAGE IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING GENERATOR SUPPORT FOR SCHEDULED ELECTRICAL OUTAGE DUE TO CONSTRUCTION CONTRACT WORK.
25. ALL NEW PRIMARY ELECTRICAL DUCTS SHALL BE ENCASED WITH RED COLORED CONCRETE.
26. ALL SITE 15KV DISTRIBUTION CONDUITS SHALL INCLUDE #4/0 AWG BARE COPPER GROUND CONDUCTOR.
27. PROVIDE GROUND BOND OF SWITCHGEAR SECTIONS TO SUBSTATION GRID USING #4/0 AWG BARE COPPER WIRE AND BOLTED CONNECTIONS.
28. ALL ELECTRICAL CONDUCTORS FOR DISTRIBUTION AT 480 VOLTS AND BELOW SHALL BE THHN, 90°C INSULATION EXCEPT WHERE SPECIFIED ON SINGLE LINE DIAGRAM TO INSTALL DOL TYPE RHH/RHW-2 90°C CONDUCTORS.
29. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG FOR BOTH POWER (480 & 208 VOLT) AND CONTROL CIRCUITS.
30. OBTAIN CONFINED SPACE PERMIT FROM NASA PRIOR TO ENTRY OF UNDERGROUND MANHOLES AND VAULTS. SUBMIT A WRITTEN CONFINED SPACE SAFETY PLAN FOR REVIEW. PROVIDE PERSONNEL TRAINING CERTIFICATIONS AND MONITORING EQUIPMENT CALIBRATION TEST CERTIFICATION.
31. GOVERNMENT RESERVES THE RIGHT TO WITNESS FACTORY TESTING. NOTIFY GOVERNMENT 30 CALENDAR DAYS PRIOR TO EQUIPMENT FACTORY TESTS FOR GOVERNMENT REPRESENTATIVE ATTENDANCE.
32. A FAULT CURRENT AND COORDINATION STUDY WILL BE PERFORMED BY A REGISTERED ELECTRICAL ENGINEER, HIRED BY THE CONTRACTOR, TO VERIFY EQUIPMENT BUS BRACING REQUIREMENTS, CIRCUIT BREAKER AIC RATING REQUIREMENTS AND ESTABLISH CIRCUIT BREAKER TRIP COORDINATION SETTINGS AT ALL NEW DISTRIBUTION EQUIPMENT IN THE SCOPE OF WORK. EQUIPMENT BUS BRACING AND AMPERE INTERRUPT CAPABILITY WILL EXCEED THE AVAILABLE SHORT CIRCUIT CURRENT AT THE INPUT TERMINATION. AN ARC FLASH STUDY FOR EQUIPMENT LABEL APPLICATIONS WILL BE PERFORMED BY THE ENGINEER PER NFPA 70E AND IEEE STANDARD 2584 FOR THE CREATION OF MAINTENANCE PERSONNEL WARNING LABELS TO BE INSTALLED BY CONTRACTOR. THE FAULT CURRENT AND COORDINATION STUDY SHALL INCLUDE COORDINATION BETWEEN THE NEW SUBSTATION, SUBSTATION 16 AND THE EMERGENCY GENERATOR PLANT B4872 TO ENSURE CONTROLS AND PROGRAMMING FOR THESE FACILITIES ARE PROTECTED. PERFORM GENERATOR TEST AFTER COMPLETION AND RELAY SETTING TO VERIFY EMERGENCY POWER PLANT OPERATION IS NOT EFFECTED. TURN OVER REPORT TO NASA CONTRACTING OFFICER.
33. PROVIDE 3/4 INCH CONDUIT WITH BUSHING AT FREE ENDS CONCEALED WITHIN WALL FROM ALL THERMOSTAT LOCATIONS TO 6 INCHES ABOVE ACCESSIBLE CEILING.
34. ALL NEW CONDUIT TO BE CONCEALED UNLESS NOTED OTHERWISE. IN AREAS OPEN TO STRUCTURE (MECHANICAL ROOMS, FAN HOUSES, ETC) CONDUIT MAY BE RUN EXPOSED. INSTALL ALL CONDUIT PERPENDICULAR TO STRUCTURE IN A WORKMAN LIKE MANNER.
35. AVAILABLE FAULT CURRENT AT SECONDARY OF SERVICE TRANSFORMERS IS CALCULATED BASED ON NAME PLATE KVA RATING AND IMPEDENCE VALUES. REFERENCE ONE-LINE DIAGRAMS FOR EACH TRANSFORMERS VALUES.
36. PANELBOARD SCHEDULES WERE CREATED USING AVAILABLE DESCRIPTIONS IN FIELD. WHERE EXISTING LOAD IS INDICATED SCHEDULES IN THIS SET VERIFY ACTUAL LOAD AND UPDATE SCHEDULE ACCORDINGLY. OPEN CIRCUIT BREAKERS NO LONGER USED DUE TO DEMOLITION AND LABEL AS SPARE. PROVIDE NEW TYPE WRITTEN PANELBOARD DIRECTORIES FOR ALL PANELBOARDS AFFECTED BY CONSTRUCTION. PROVIDE A COPY OF ALL EXISTING DIRECTORIES PRIOR TO MODIFICATIONS TO GOVERNMENT.
37. PROVIDE ALL CONDUITS NECESSARY FOR NEW FIRE ALARM SYSTEM COMPONENTS. ALL CONDUITS FOR USE WITH FIRE ALARM SYSTEM SHALL BE RED. DUCT SMOKE DETECTORS LOCATIONS ARE SHOWN ON PLANS FOR REFERENCE ONLY. COORDINATE WITH DIVISION 28 CONTRACTOR FOR FINAL LOCATIONS. REFERENCE FIRE ALARM GENERAL NOTES ON SHEET FP-000.

NOTE:
EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS & SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY ALL EXISTING CONDITIONS. CAREFULLY COORDINATE NEW WORK AND DEMOLITION WITH ALL OTHER DISCIPLINES AND EXISTING CONDITIONS.

REGISTERED PROFESSIONAL ENGINEER DAVID D. HAAKE E 16137 ELECTRICAL STATE OF CALIFORNIA

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DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

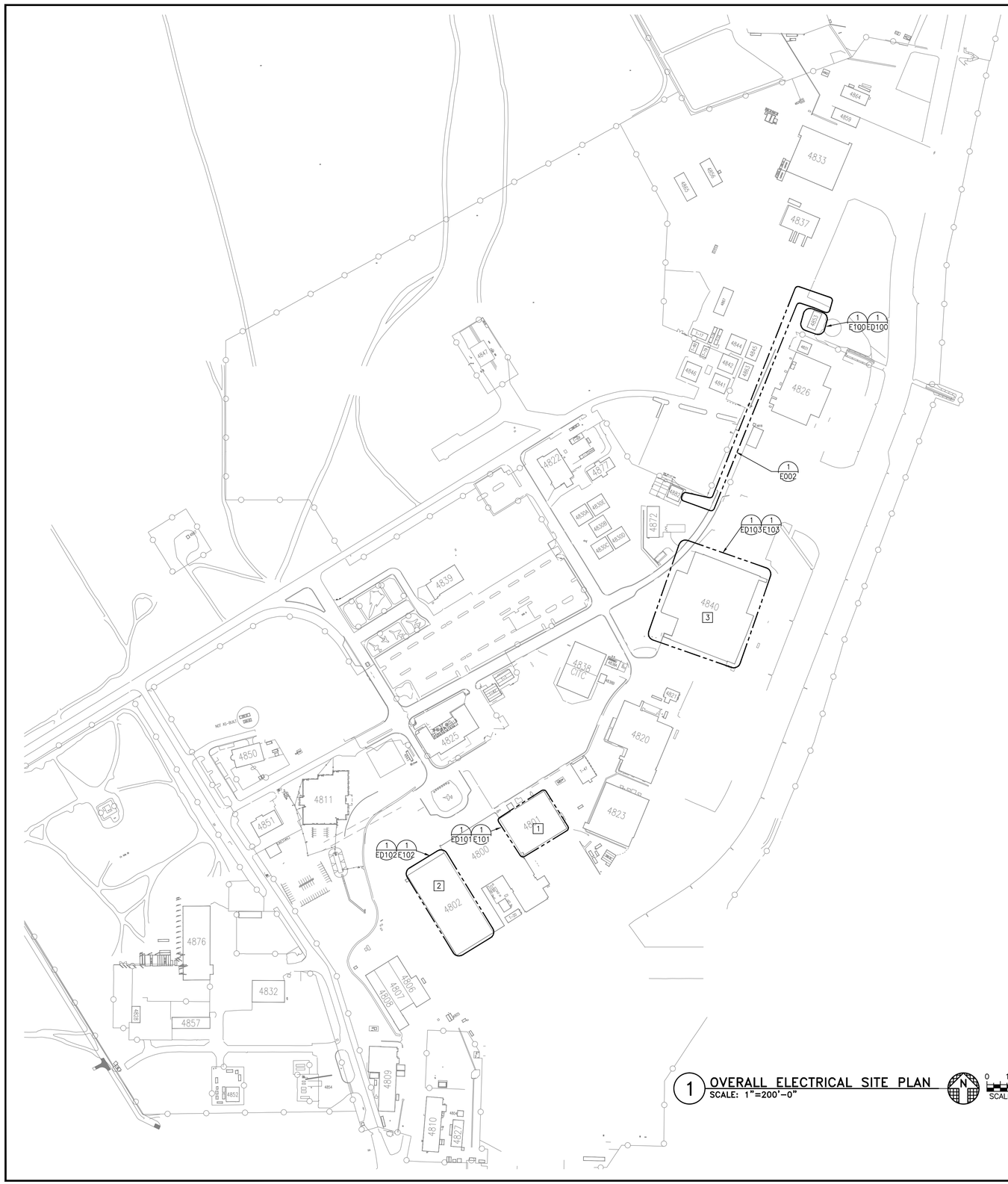
DRAWING TITLE
ELECTRICAL GENERAL NOTES AND LEGEND

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

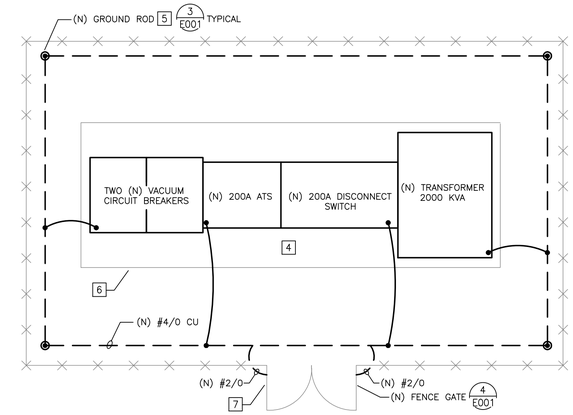
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	EDM-1719 E000.dwg	E-000	SHEET No. 15 of 137

DAVID D. HAAKE



1 OVERALL ELECTRICAL SITE PLAN
SCALE: 1"=200'-0"

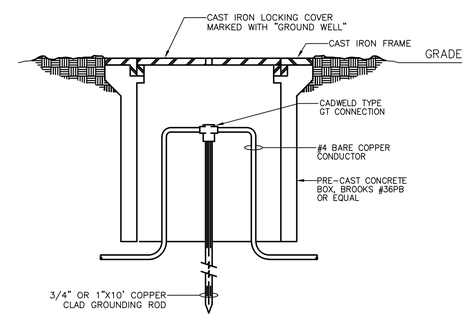
0 100' 200' 300'
SCALE: 1"=200'-0"



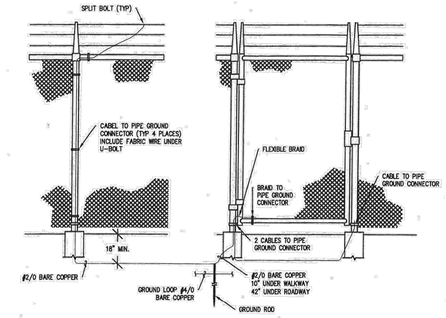
2 PARTIAL SITE PLAN, SUBSTATION 4853
SCALE: 1/8" = 1'-0"

ELECTRICAL PLAN NOTES:

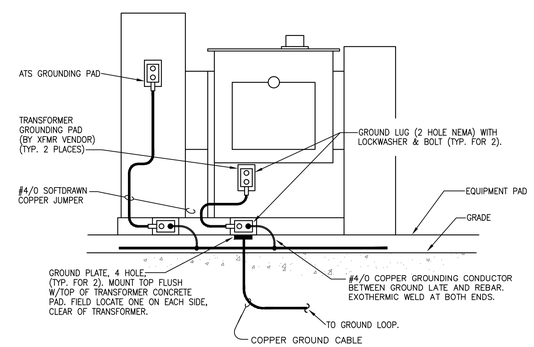
1. REFER TO SHEET E101 FOR ELECTRICAL ROOM LOCATION.
2. REFER TO SHEET E102 FOR ELECTRICAL ROOM LOCATION.
3. REFER TO SHEET E103 FOR ELECTRICAL ROOM LOCATION.
4. REFER TO SHEET E002 AND E200A FOR EQUIPMENT LOCATION AND ADDITIONAL INFORMATION ON EQUIPMENT.
5. PROVIDE GROUND WELL WITH 10'X3/4" DIAMETER COPPER-CLAD STEEL ROD. PROVIDE CONNECTING GROUND WIRE (#4/0 CU) TO ALL GROUND RODS, AT 12" BELOW GRADE. PROVIDE EXOTHERMIC WELDS AT BARE COPPER GROUND LOCATIONS. ALL NEW POWER EQUIPMENT AND FENCING TO GROUND SYSTEM WITH #2/0 COPPER CONDUCTORS.
6. EQUIPMENT PAD SHALL BE SIZED TO ACCOMMODATE EQUIPMENT PROVIDED BY CONTRACTOR. COORDINATE PAD SIZE AND REQUIREMENTS WITH EQUIPMENT MANUFACTURER AND CONTRACTING OFFICER. REFERENCE CIVIL PLANS FOR SPECIFIC INFORMATION REGARDING EQUIPMENT PAD.
7. PROVIDE SIGNAGE AT SUBSTATION PER NASA REQUIREMENTS. COORDINATE WITH CONTRACTING OFFICER.



3 GROUND WELL DETAIL
SCALE: NTS



4 GROUNDING FENCE DETAIL
SCALE: NTS



5 TRANSFORMER AND ATS GROUNDING DETAIL
SCALE: NTS

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DRAWING TITLE
OVERALL ELECTRICAL SITE PLAN

PROJECT TITLE
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PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
OFTC Chief Information Officer	

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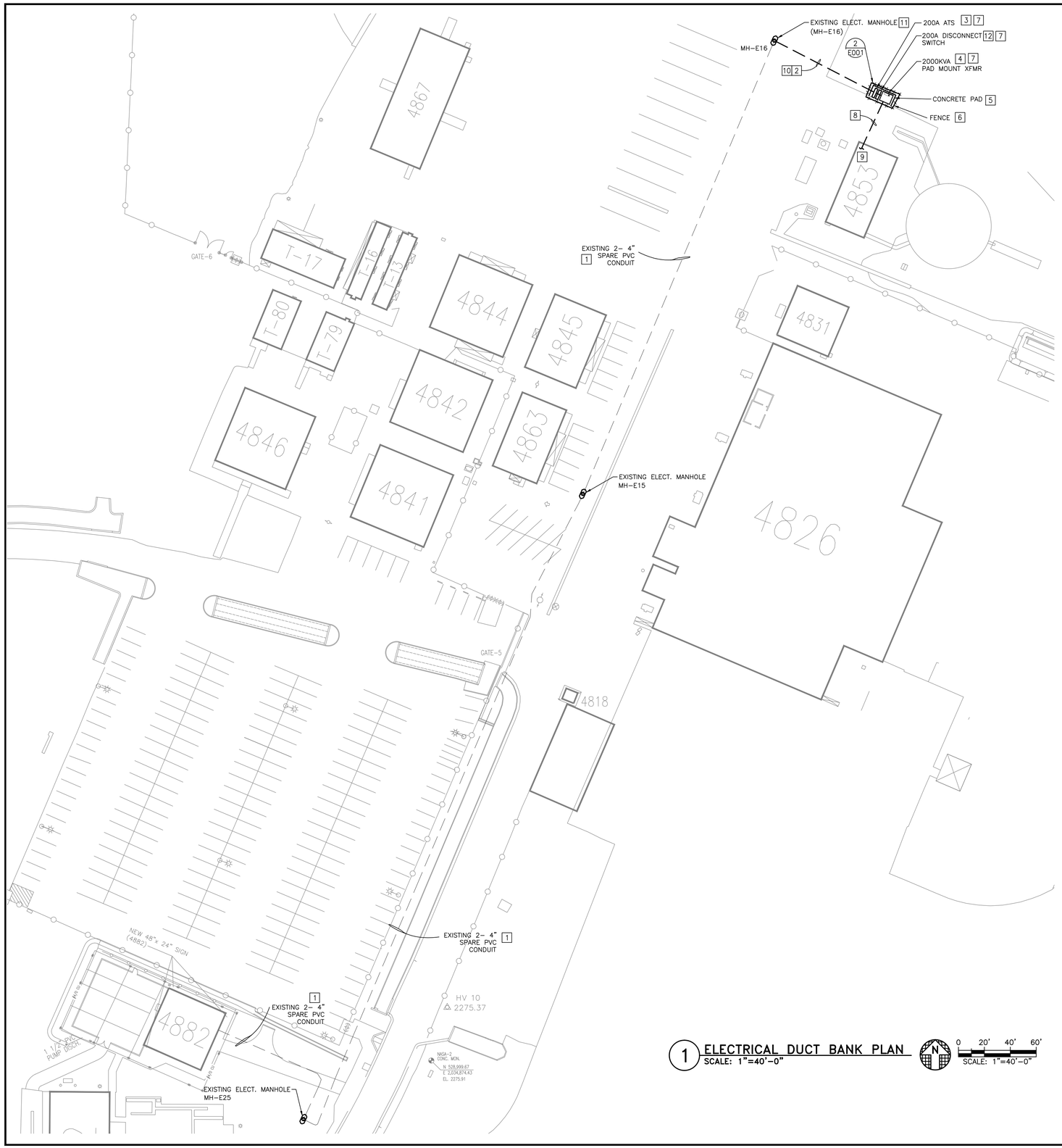
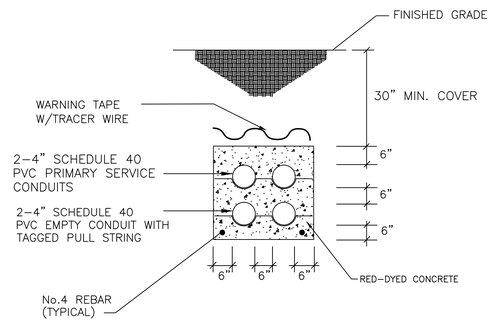


1 ELECTRICAL DUCT BANK PLAN
SCALE: 1"=40'-0"

N
0 20' 40' 60'
SCALE: 1"=40'-0"

ELECTRICAL PLAN NOTES:

1. EXISTING CONCRETE DUCT BANK WITH (2) 4"C SPARE. PROVIDE 2 SETS OF (3)#2/0, (1) #6 CU GROUND 15KV, 133% INSULATION, IN EACH SPARE CONDUIT AS SHOWN. REFER TO ELECTRICAL ONE LINE DIAGRAM SHEET E200 AND E200A FOR MORE INFORMATION.
2. 4-WAY DUCT BANK, SEE DUCT BANK DETAIL 2 ON THIS SHEET. PROVIDE 2 SETS OF (3)#2/0, (1) #6 CU GROUND 15KV MV-105 CABLE, 133% INSULATION, IN 2-4" CONDUIT IN THE NEW DUCT BANK AS SHOWN. ROUTE FEEDERS TO 200A AUTOMATIC TRANSFER SWITCH AND NEW 2000KVA TRANSFORMER AS INDICATED. PROVIDE 2-4" SCHEDULE 40 PVC EMPTY CONDUIT WITH TAGGED PULL STRING IN THE NEW DUCT BANK FOR FUTURE USE. CONTRACTOR SHALL ADJUST DUCT BANK LOCATION AND ROUTING AS NECESSARY BASED ON FIELD CONDITIONS. REFER TO ELECTRICAL ONE LINE DIAGRAM SHEET E200 AND E200A FOR MORE INFORMATION.
3. 200A, 15KV SERVICE ENTRANCE RATED, NEMA 3R AUTOMATIC TRANSFER SWITCH.
4. 2000KVA TRANSFORMER 12.470KV : 4.170KV, 3ϕ 3W SECONDARY. REFER TO ELECTRICAL ONE LINE DIAGRAM SHEET E200 AND E200A FOR MORE INFORMATION.
5. REFER TO CIVIL PLANS AND SPECIFICATIONS FOR TRANSFORMER CONCRETE PAD REQUIREMENTS.
6. REFER TO CIVIL PLANS AND SPECIFICATIONS FOR CHAIN LINKED FENCE REQUIREMENTS. GROUNDING IS SHOWN ON SHEET E-001 DETAIL 2. GROUND FENCE PER ARTICLE 250 N.E.C REQUIREMENTS. PROVIDE HIGH VOLTAGE SIGNS ON EACH SIDE OF FENCE PER SPECIFICATIONS.
7. TRANSFORMER AND TRANSFER SWITCH TO BE GROUNDED AT CONCRETE PAD WITH UFER EXOTHERMIC TO EMBEDDED REBAR AND SUBSTATION GROUND GRID. REFER TO SHEET E-001 FOR ADDITIONAL INFORMATION.
8. 4-WAY DUCT BANK, SEE DUCT BANK DETAIL 2 ON THIS SHEET. PROVIDE 1 SET OF (3)#3, (1) #6 CU GROUND 5KV MV-90 CABLE, 133% INSULATION, IN (1) 4" CONDUIT IN THE NEW DUCT BANK. ROUTE FEEDERS FROM NEW 2000KVA TRANSFORMER TO BUILDING 4853. TURN-UP CONDUITS FROM DUCT BANK TO EXTERIOR WALL. PROVIDE WRAPPED RIGID ELBOWS AND PVC TO RGS TRANSITIONS FOR THROUGH GRADE TRANSITION. ROUTE EXPOSED CONDUIT ON EXTERIOR OF BUILDING FOR THROUGH WALL PENETRATION TO FIRE PUMP CONTROLLER INSIDE BUILDING. REFERENCE 1/E-100 FOR LOCATIONS OF FIRE PUMP CONTROLLERS. CONTRACTOR SHALL ADJUST DUCT BANK LOCATION AND ROUTING AS NECESSARY BASED ON FIELD CONDITIONS. REFER TO ELECTRICAL ONE LINE DIAGRAM SHEET E200 AND E200A FOR MORE INFORMATION.
9. SEE SHEET E100 FOR THE CONTROLLER LOCATIONS. REFER TO ELECTRICAL ONE LINE DIAGRAM SHEET E200 AND E200A FOR MORE INFORMATION.
10. COORDINATE EXISTING UTILITIES IN AREA OF DUCT BANK ROUTING. CONTRACTOR SHALL COORDINATE TRENCHING, LOCATION AND DEPTH WITH CONTRACTING OFFICER AFTER EXISTING UTILITIY LOCATIONS HAVE BEEN VERIFIED. MINIMUM DUCT BANK COVER SHALL BE 30".
11. PROVIDE BELL ENDS AT EXISTING MANHOLE FOR NEW CONDUITS EXITING TO SUBSTATION.
12. 200A, 15KV SERVICE ENTRANCE RATED, NEMA 3R DISCONNECT SWITCH.



2 CONCRETE ENCASED ELECTRICAL DUCT BANK
NO SCALE

REGISTERED PROFESSIONAL ENGINEER
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ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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1250001459

FOR CONSTRUCTION

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04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ELECTRICAL DUCT BANK PLAN

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

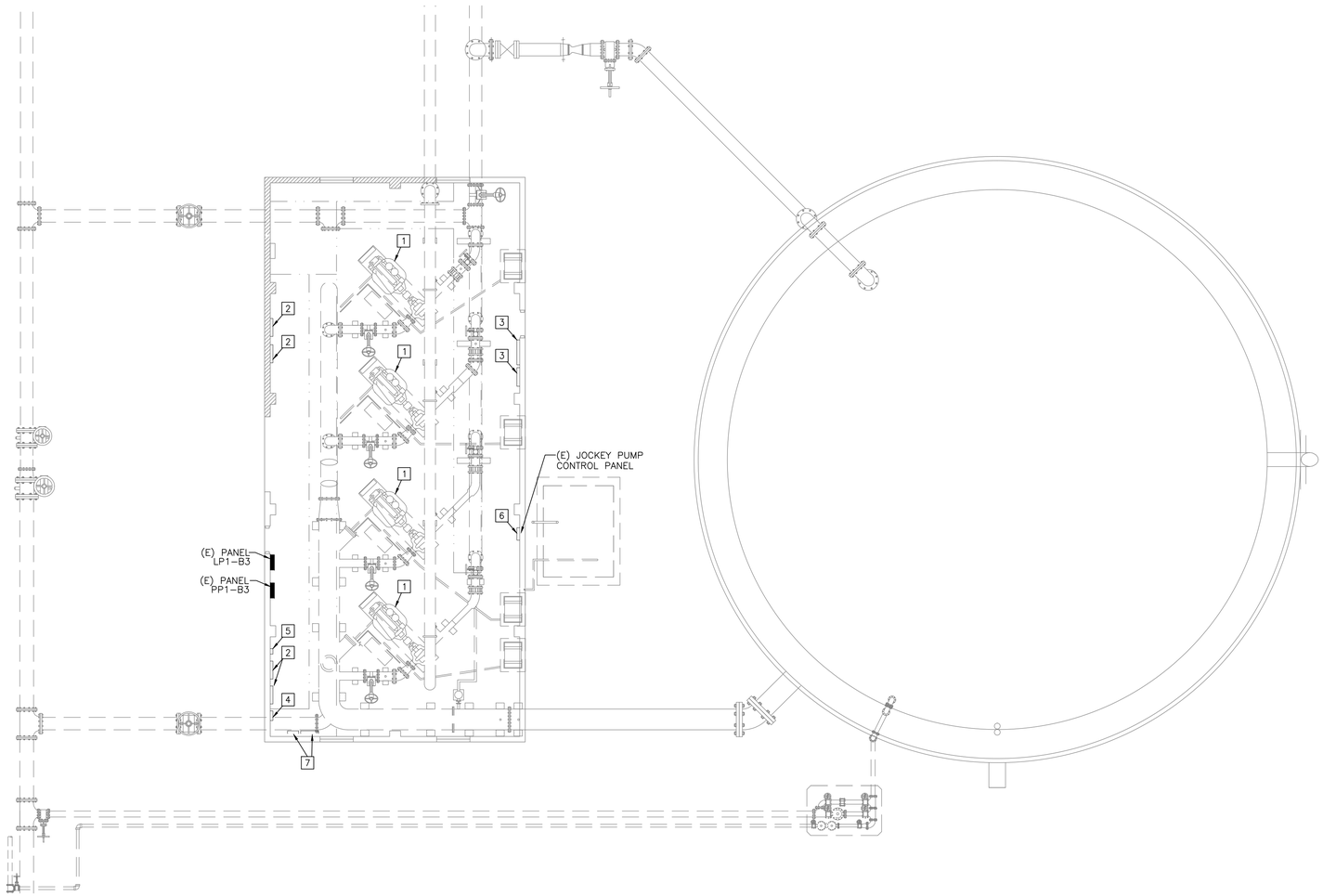
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1"=40'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 E002.dwg	E-002	SHEET No. 17 of 137

DAVID D. HAAKE

DEMOLITION OF ANY FIRE ALARM AND OR FIRE PROTECTION DEVICES WITH ELECTRICAL CONNECTION SHALL BE PERFORMED BY DIVISION 26 CONTRACTOR.

ELECTRICAL DEMOLITION PLAN NOTES:

1. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE PUMP BACK TO ITS ORIGINATING SOURCE. WHERE NEW EQUIPMENT IS TO REPLACE THE DEMOLISHED IN SAME LOCATION RE–USE EXISTING CONDUIT IF IN GOOD CONDITION.
2. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE PUMP CONTROLLER TO ITS ORIGINATING SOURCE.
3. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE CONTROL PANELS TO ITS ORIGINATING SOURCE.
4. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE PUMP LOW SUCTION PRESSURE CONTROLLER TO ITS ORIGINATING SOURCE.
5. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FUEL TANK CONTROLLER TO ITS ORIGINATING SOURCE.
6. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING JOCKEY PUMP CONTROLLER TO ITS ORIGINATING SOURCE.
7. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE CONTROL PANELS TO ITS ORIGINATING SOURCE. KEEP EXISTING 120V CIRCUIT FOR NEW FACP. SEE SHEET E100 FOR ADDITIONAL INFORMATION.



1 ELECTRICAL DEMOLITION PLAN – BUILDING 4853
SCALE: 1/8"=1'–0"

N 0 4' 8' 12'
SCALE: 1/8"=1'–0"

REGISTERED PROFESSIONAL ENGINEER DAVID D. HAAKE E 16137 ELECTRICAL STATE OF CALIFORNIA

Jun 12 2014

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02–28–14		95% SUBMITTAL		
02–05–14		60% ADDENDUM SUBMITTAL		
06–14–13		60% DEVELOPED DESIGN SUBMITTAL		
03–20–13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ELECTRICAL DEMOLITION PLAN
BUILDING 4853

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

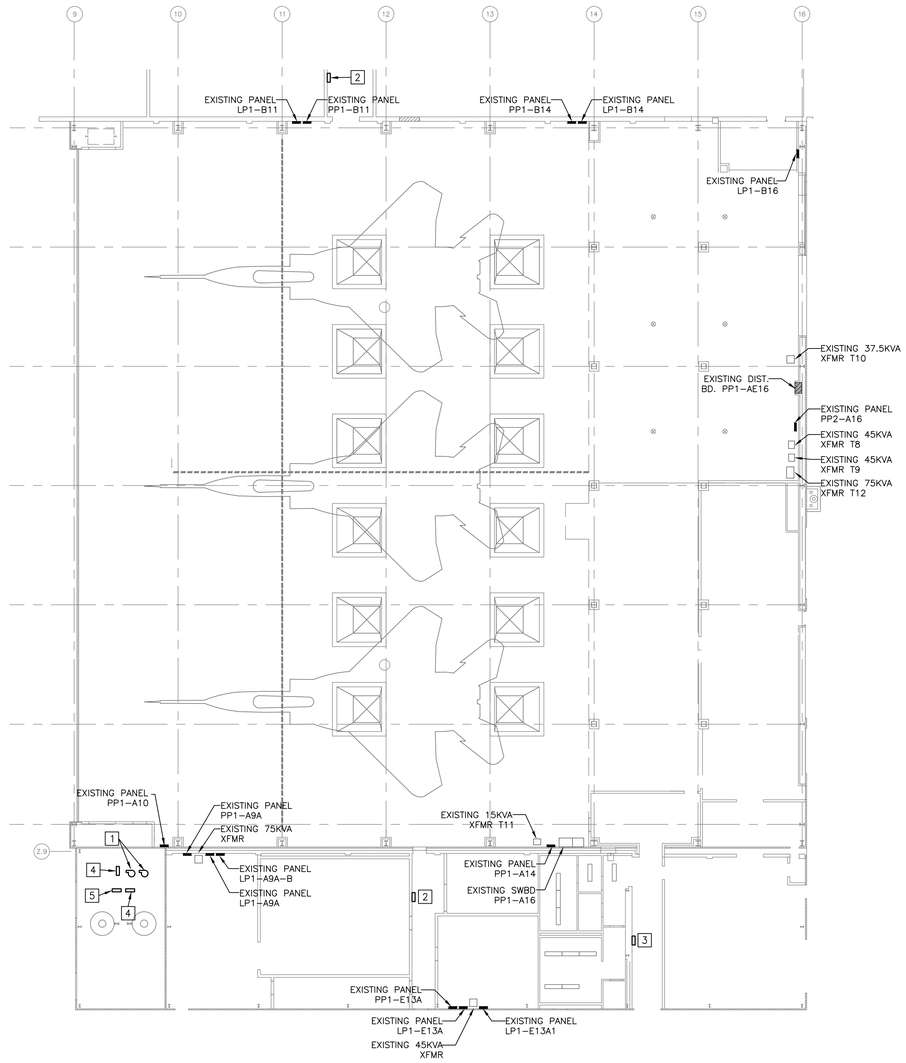
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM–1719
SCALE	1/8"=1'–0"	TRADE SH. No.	
FILE NAME	EDM–1719 ED100.dwg	ED–100	SHEET No. 18 of 137

DAVID D. HAAKE

ELECTRICAL DEMOLITION PLAN NOTES:

1. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING PUMP BACK TO ITS ORIGINATING SOURCE. WHERE NEW EQUIPMENT IS TO REPLACE THE DEMOLISHED IN SAME LOCATION RE–USE EXISTING CONDUIT IF IN GOOD CONDITION.
2. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING DELUGE PANEL.
3. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE ALARM CONTROL PANEL.
4. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE PUMP CONTROLERS.
5. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE ALARM INTERFACE PANEL.



1 ELECTRICAL DEMOLITION PLAN – BUILDING 4801
SCALE: 1/16"=1'–0"

N

0 8' 16' 24'
SCALE: 1/16"=1'–0"

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAAKE
E 16137
ELECTRICAL
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Jun 12 2014

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02–05–14		60% ADDENDUM SUBMITTAL		
06–14–13		60% DEVELOPED DESIGN SUBMITTAL		
03–20–13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ELECTRICAL DEMOLITION PLAN
BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

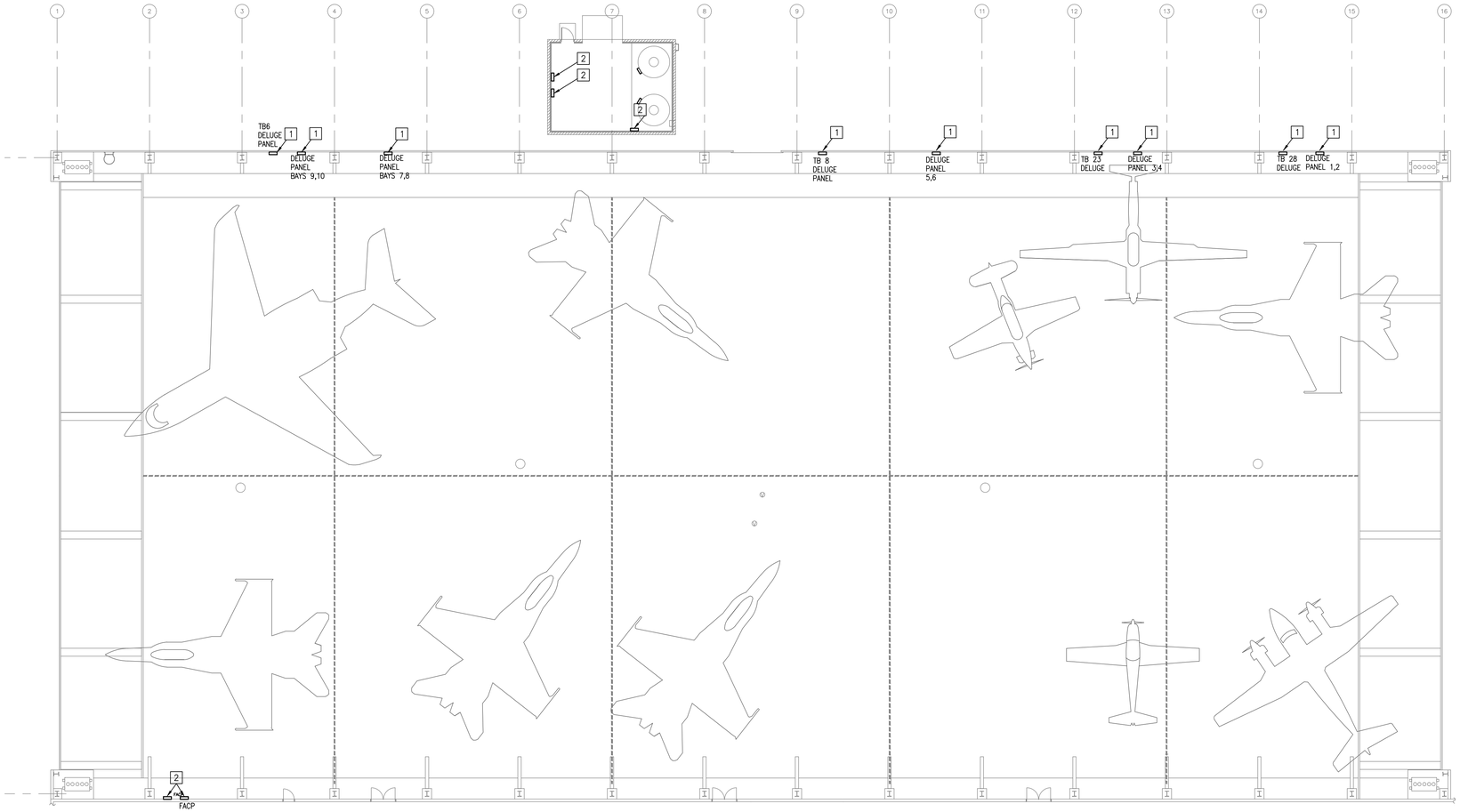
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM–1719	
SCALE	1/16"=1'–0"	TRADE SH. No.	
FILE NAME	EDM–1719 ED101.dwg	ED–101	SHEET No. 19 of 137

DAVID D. HAAKE

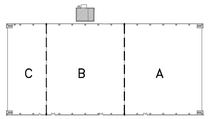
ELECTRICAL DEMOLITION PLAN NOTES:

1. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING DELUGE PANEL.
2. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE CONTROL PANELS. WHERE NEW EQUIPMENT IS TO REPLACE THE DEMOLISHED IN SAME LOCATION RE-USE EXISTING CONDUIT IF IN GOOD CONDITION.



1 ELECTRICAL DEMOLITION PLAN – BUILDING 4802
SCALE: 1/16"=1'-0"

N
0 8' 16' 24'
SCALE: 1/16"=1'-0"



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAAKE
E 16137
ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

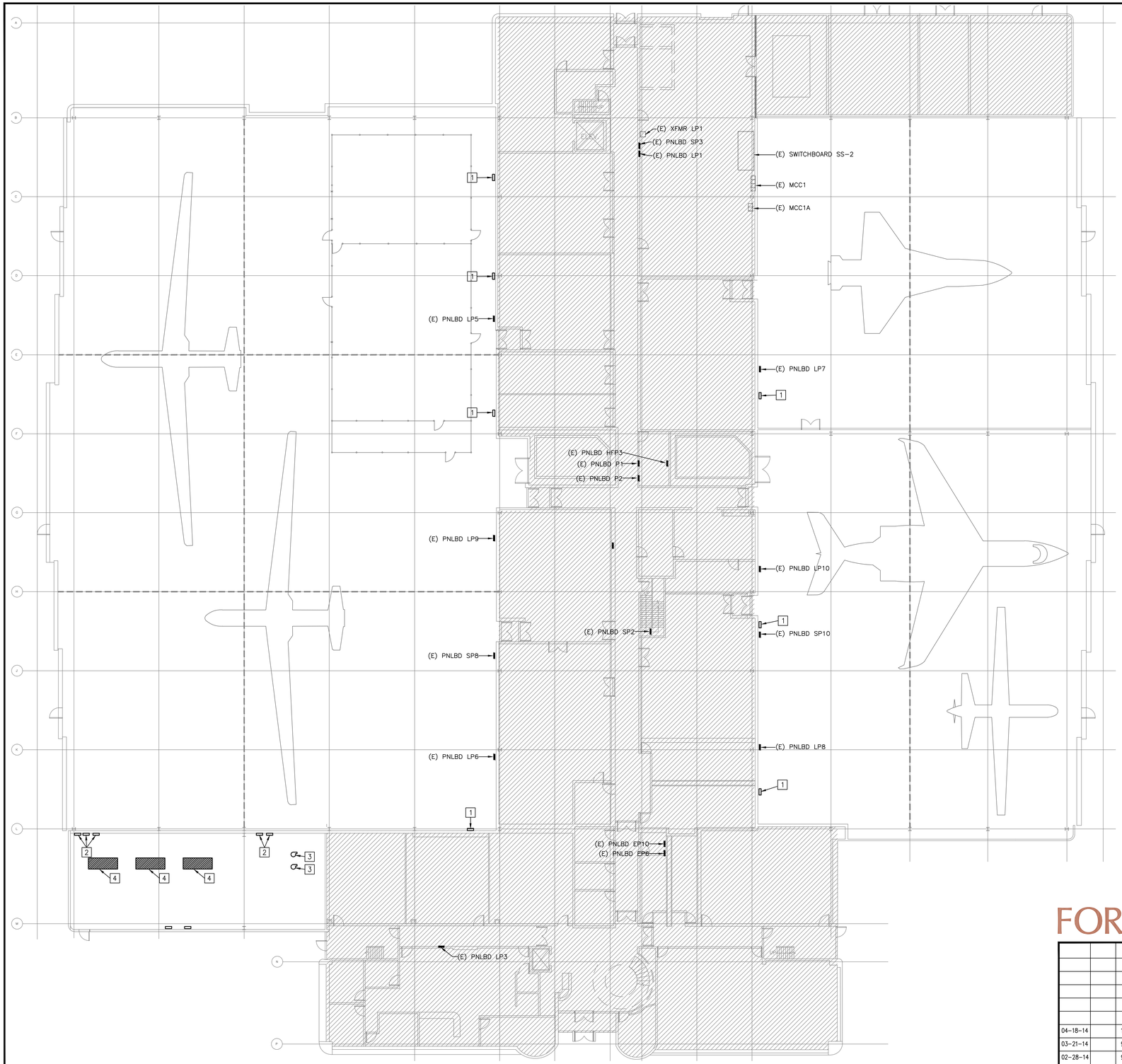
DRAWING TITLE
ELECTRICAL DEMOLITION PLAN
BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 ED102.dwg	ED-102	SHEET No. 20 of 137

DAVID D. HAAKE

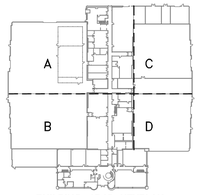


1 ELECTRICAL DEMOLITION PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

N 0 8' 16' 24'
SCALE: 1/16"=1'-0"

ELECTRICAL DEMOLITION PLAN NOTES:

1. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING DELUGE PANEL.
2. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH EXISTING FIRE PUMP CONTROLLER PANEL.
3. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH EXISTING FOAM PUMP.
4. REMOVE ALL ELECTRICAL COMPONENTS INCLUDING BUT NOT LIMITED TO DISCONNECT SWITCHES, WIRING, CONDUIT, AND JUNCTION BOXES ASSOCIATED WITH THE REMOVAL OF EXISTING FIRE PUMP BACK TO ITS ORIGINATING SOURCE. WHERE NEW EQUIPMENT IS TO REPLACE THE DEMOLISHED IN SAME LOCATION RE-USE EXISTING CONDUIT IF IN GOOD CONDITION.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAKE
E 16137
ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ELECTRICAL DEMOLITION PLAN
BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION
SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

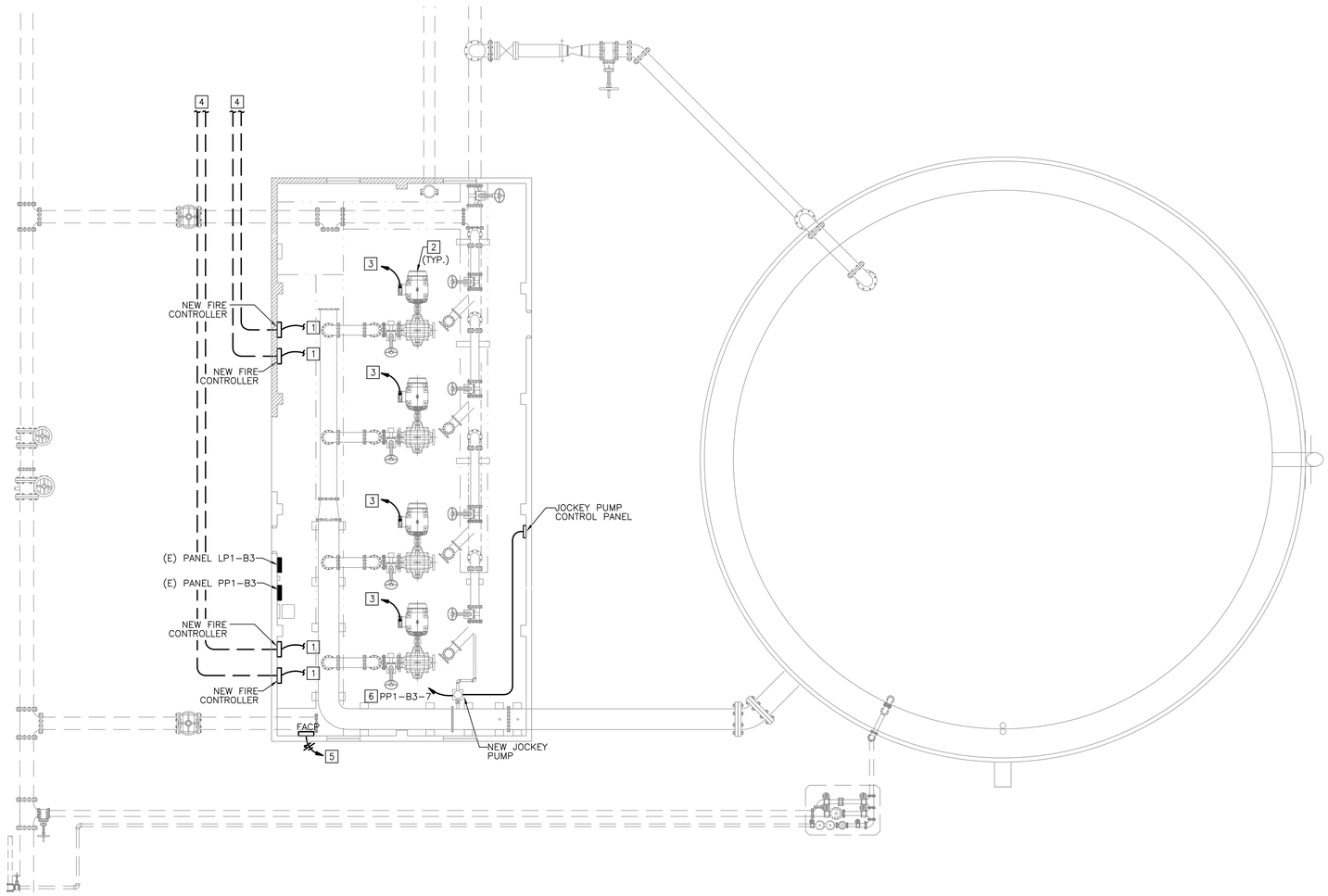
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	1/16"=1'-0"	TRADE Sh. No.	EDM-1719
FILE NAME	EDM-1719 ED103.dwg	ED-103	SHEET No. 21 of 137

DAVID D. HAKE

ELECTRICAL PLAN NOTES:

1. REFER TO SHEET E200 FOR POWER CONNECTION FROM FIRE PUMP CONTROLLER TO FIRE PUMP MOTOR.
2. 600HP FIRE PUMP SHALL BE MONITORED FOR PHASE REVERSAL AS A SUPERVISORY SIGNAL. REFERENCE FIRE PROTECTION DRAWINGS FOR ADDITIONAL INFORMATION.
3. CONNECT TO FIRE PUMP CONTROL PANEL. REFERENCE FIRE PROTECTION DRAWINGS FOR ADDITIONAL INFORMATION. PROVIDE NEW CONDUIT FROM FIRE PUMP TO FIRE PUMP CONTROLLER IF EXISTING CONDUIT IS DAMAGED DURING DEMOLITION.
4. CONNECT TO SECONDARY TAP OF TRANSFORMER. REFER TO SHEET E200 FOR MORE INFORMATION.
5. CONNECT NEW FACP TO EXISTING 120V POWER FROM EXISTING FACP THAT WAS REMOVED. SEE SHEET ED100 FOR ADDITIONAL INFORMATION.
6. CIRCUIT NUMBER SHOWN FOR CLARIFICATION PURPOSES ONLY AND WERE TAKEN FROM AS-BUILT DRAWINGS. EXISTING JOCKEY PUMP INDICATED AS 15HP WITH 40/3 CIRCUIT BREAKER AND FEEDER. CONNECT JOCKEY PUMP TO EXISTING CIRCUIT MADE AVAILABLE FROM DEMOLITION OF EXISTING.



1 ELECTRICAL PLAN – BUILDING 4853
SCALE: 1/8"=1'-0"

N 0 4' 8' 12'
SCALE: 1/8"=1'-0"

REGISTERED PROFESSIONAL ENGINEER DAVID D. HAAKE E 16137 ELECTRICAL STATE OF CALIFORNIA

Jun 12 2014

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02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NOTE:
EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS & SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY ALL EXISTING CONDITIONS. CAREFULLY COORDINATE NEW WORK AND DEMOLITION WITH ALL OTHER DISCIPLINES AND EXISTING CONDITIONS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ELECTRICAL PLAN BUILDING 4853

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

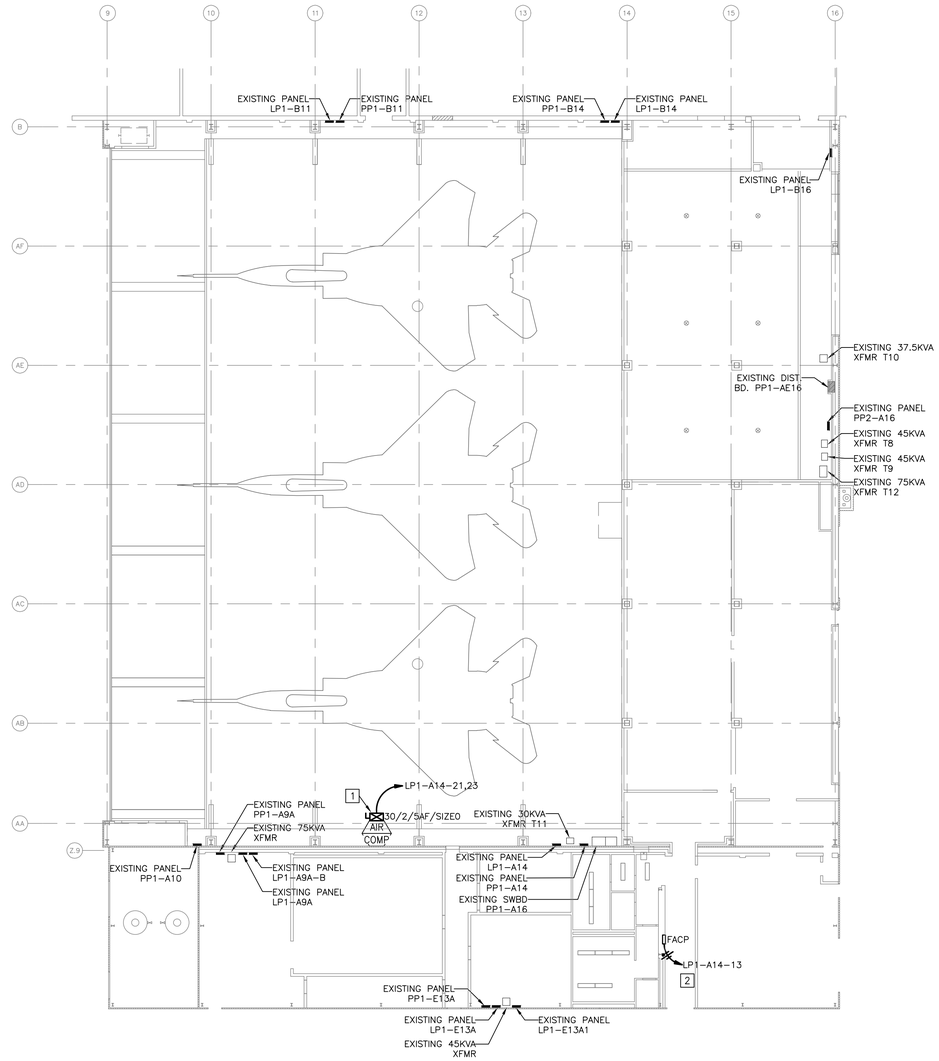
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 E100.dwg	E-100	SHEET No. 22 of 137

DAVID D. HAAKE

ELECTRICAL PLAN NOTES:

1. CONNECT AIR COMPRESSOR PER MANUFACTURERS INSTALLATION DIAGRAMS. VERIFY DISCONNECT, STARTER AND FUSE SIZE ON EQUIPMENT NAMEPLATE AND PROVIDE AS REQUIRED. REFER TO SHEET E201 FOR PANEL SCHEDULE INFORMATION.
2. PROVIDE 120V POWER TO NEW FACP. REFER TO SHEET E201 FOR PANEL SCHEDULE INFORMATION.



1 ELECTRICAL PLAN – BUILDING 4801
SCALE: 1/16"=1'-0"

N

0 8' 16' 24'
SCALE: 1/16"=1'-0"

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAAKE
E 16137
ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ELECTRICAL PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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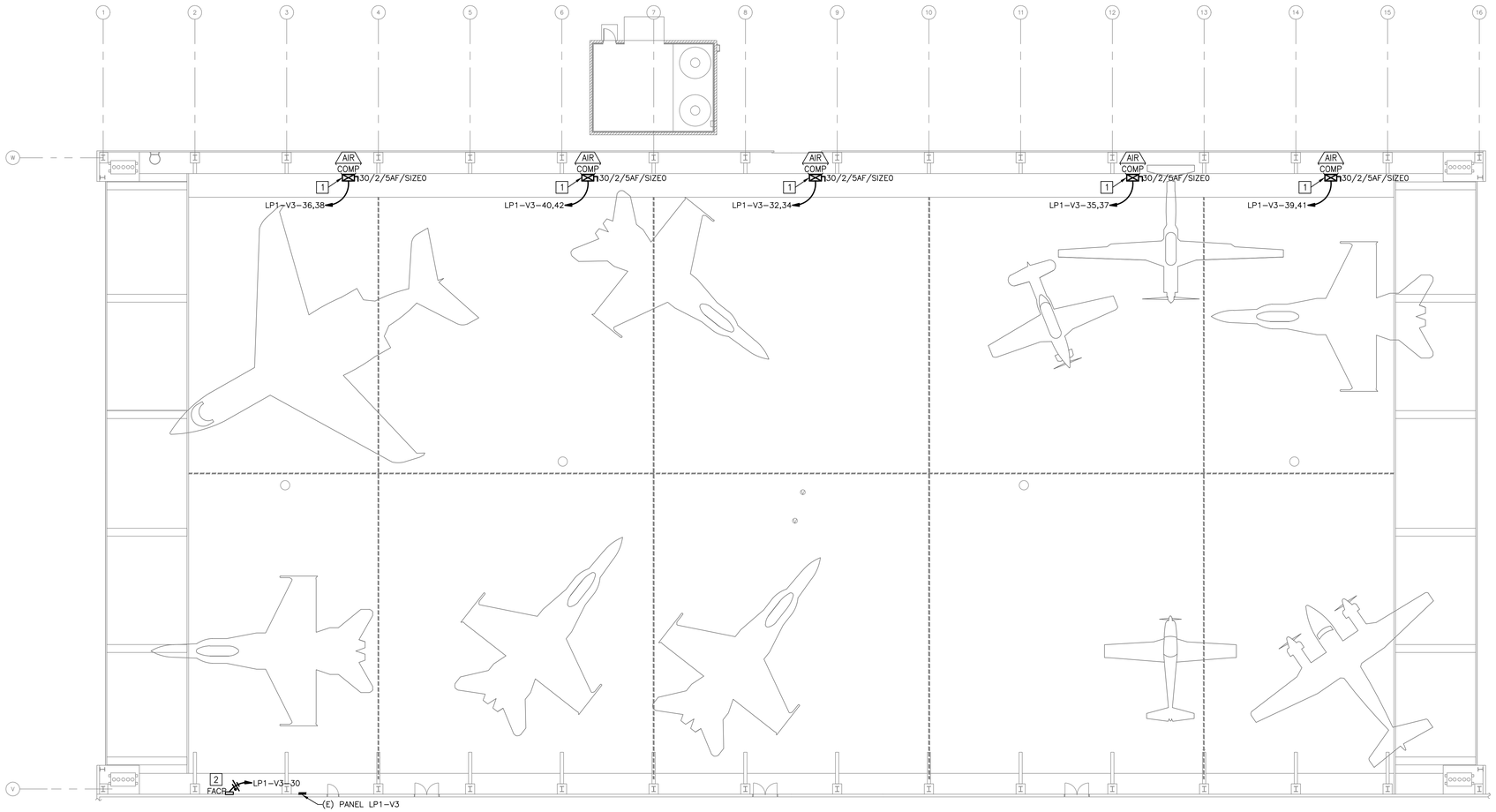
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 E101.dwg	E-101	SHEET No. 23 of 137

DAVID D. HAAKE

ELECTRICAL PLAN NOTES:

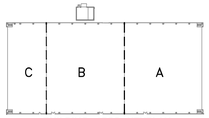
1. CONNECT AIR COMPRESSOR PER MANUFACTURERS INSTALLATION DIAGRAMS. VERIFY DISCONNECT, STARTER AND FUSE SIZE ON EQUIPMENT NAMEPLATE AND PROVIDE AS REQUIRED. REFER TO SHEET E202 FOR PANEL SCHEDULE INFORMATION.
2. PROVIDE 120V POWER TO NEW FACP. REFER TO SHEET E202 FOR PANEL SCHEDULE INFORMATION.



1 ELECTRICAL PLAN – BUILDING 4802
SCALE: 1/16"=1'-0"

N

0 8' 16' 24'
SCALE: 1/16"=1'-0"



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAAKE
E 16137
ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
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FOR CONSTRUCTION

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

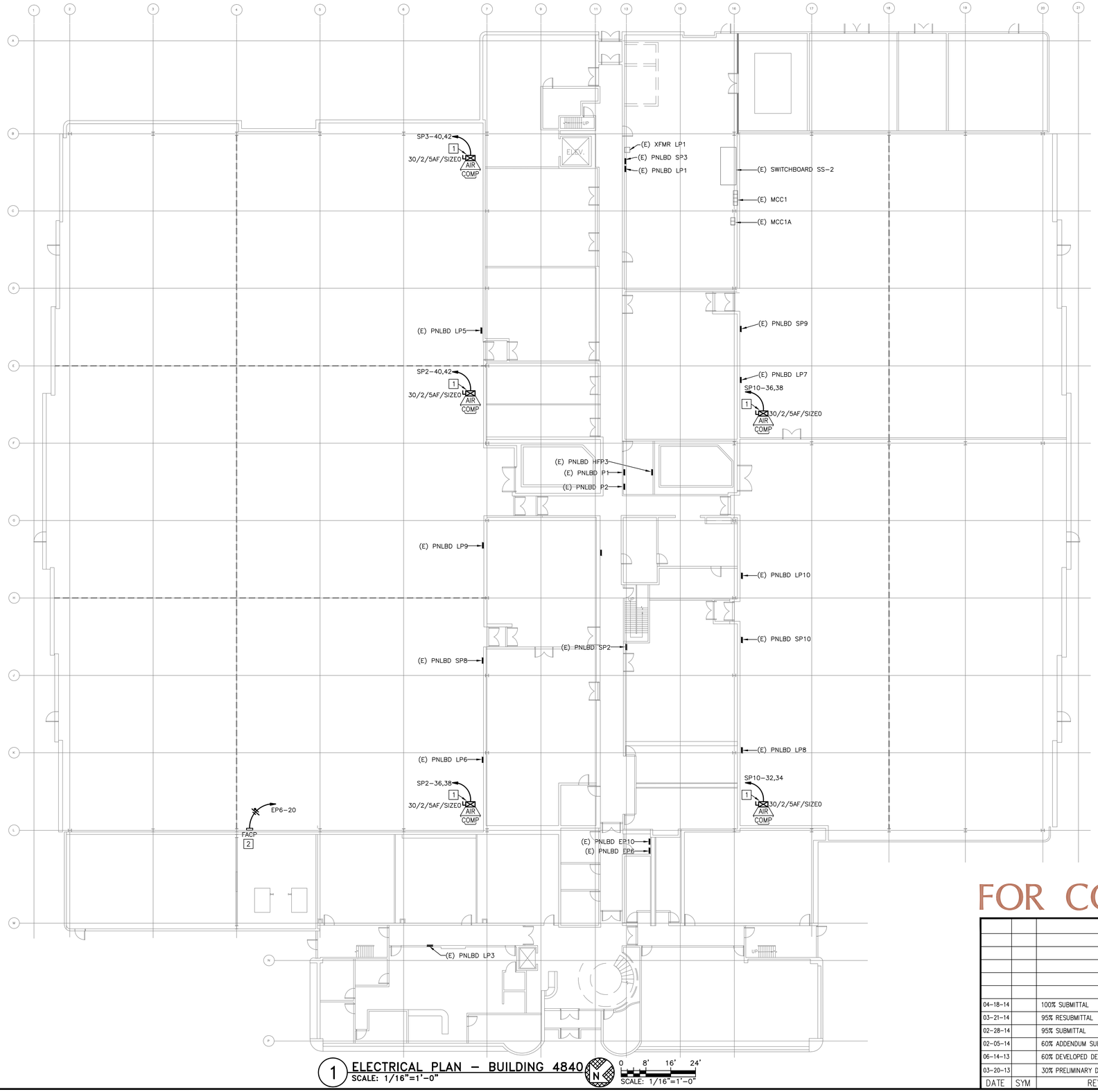
DRAWING TITLE
ELECTRICAL PLAN – BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 E102.dwg	E-102	SHEET No. 24 of 137

DAVID D. HAAKE

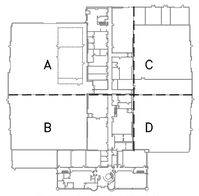


1 ELECTRICAL PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

N 0 8' 16' 24'
SCALE: 1/16"=1'-0"

ELECTRICAL PLAN NOTES:

1. CONNECT AIR COMPRESSOR PER MANUFACTURERS INSTALLATION DIAGRAMS. VERIFY DISCONNECT, STARTER AND FUSE SIZE ON EQUIPMENT NAMEPLATE AND PROVIDE AS REQUIRED. REFER TO SHEET E203 FOR PANEL SCHEDULE INFORMATION.
2. PROVIDE 120V POWER TO NEW FACP. REFER TO SHEET E203 FOR PANEL SCHEDULE INFORMATION.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAAKE
E 16137
ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
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FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

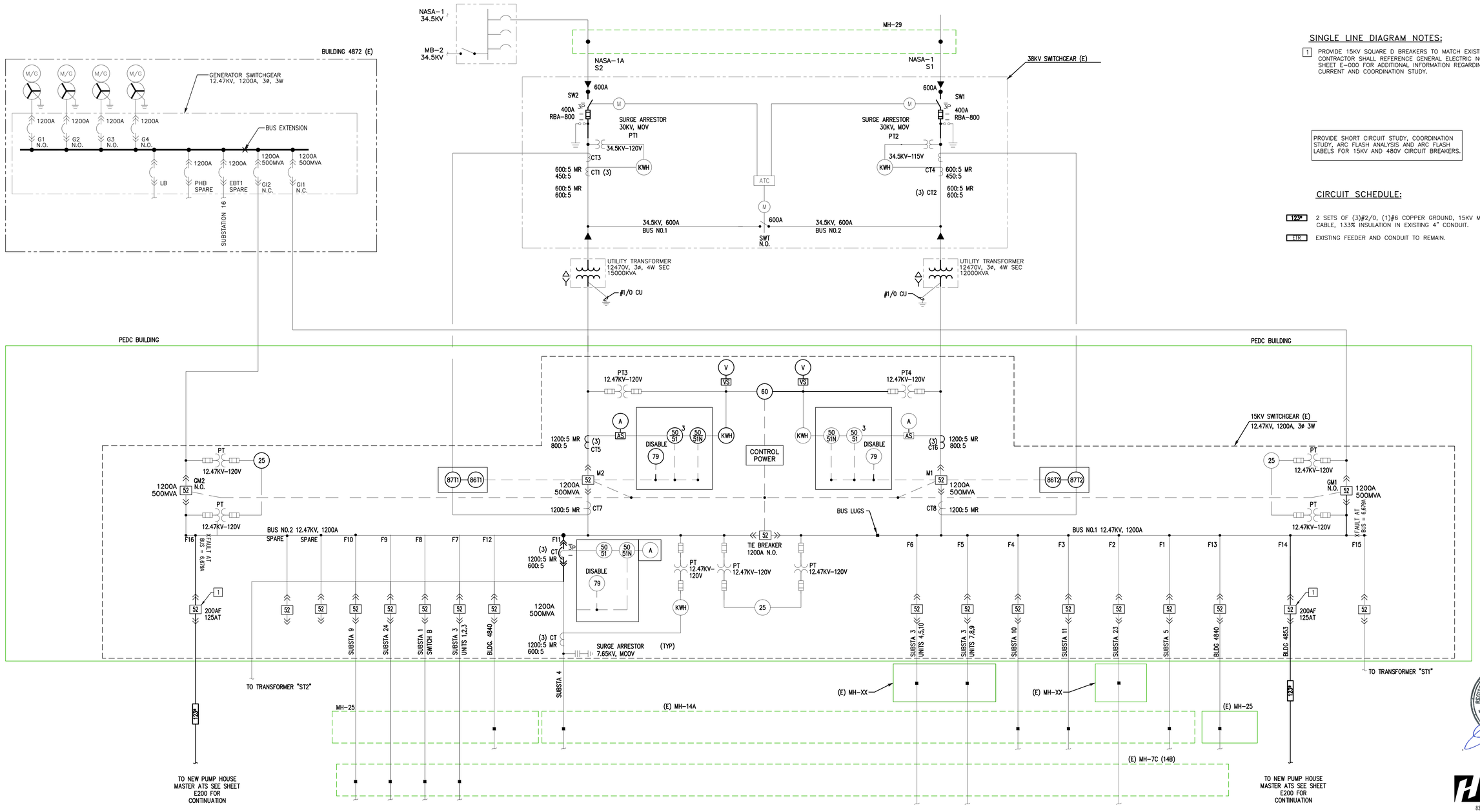
DRAWING TITLE
ELECTRICAL PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	1/16"=1'-0"	TRADE SH. No.	E-103
FILE NAME	EDM-1719 E103.dwg	SHEET No. 25 of 137	

DAVID D. HAAKE



SINGLE LINE DIAGRAM NOTES:

1. PROVIDE 15KV SQUARE D BREAKERS TO MATCH EXISTING. CONTRACTOR SHALL REFERENCE GENERAL ELECTRIC NOTE #32 ON SHEET E-000 FOR ADDITIONAL INFORMATION REGARDING THE FAULT CURRENT AND COORDINATION STUDY.

PROVIDE SHORT CIRCUIT STUDY, COORDINATION STUDY, ARC FLASH ANALYSIS AND ARC FLASH LABELS FOR 15KV AND 480V CIRCUIT BREAKERS.

CIRCUIT SCHEDULE:

123*	2 SETS OF (3)#2/0, (1)#6 COPPER GROUND, 15KV MV-105 CABLE, 133% INSULATION IN EXISTING 4" CONDUIT.
ETR	EXISTING FEEDER AND CONDUIT TO REMAIN.

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAAKE
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ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ONE LINE DIAGRAM – PEDC BUILDING – SUB STATION #16

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	EDM-1719 E200A.dwg	E-200A	SHEET No. 26 of 137

DAVID D. HAAKE

Available Fault @ Bus per fault study: 6,679 A.I.C.

Available Fault @ ***ATS***

Service Lateral distance: 1,200 feet
Service Lateral feeders: 2 set of #2/0 Copper (C value = 11,423)
Voltage: 12,470 volt

f = ((1.732 x 1,200 feet x 6,679) / (2 x 11,423 x 12,470)) = 0.049
M = 1/(1+ f) = 0.95
I s.c. = 6,679 A x 0.95 = 6,369 A

Available Fault @ Transformer ***XFMR***

Feeder length from "ATS": 20 feet
Branch feeders: 2 set of #2/0 Copper (C value = 11,423)
Voltage: 12,470 volt

f = ((1.732 x 20 feet x 6,369) / (2 x 11,423 x 12,470)) = 0.001
M = 1/(1+ f) = 1.00
I s.c. = 6,369 A x 1.00 = 6,364 A

Xfmr. kVA Rating: 2,000 kVA
Xfmr. Primary Voltage: 12,470 volt
Xfmr. Secondary Voltage: 4,160 volt
Available Fault (primary side): 6,369 A

f = ((1.732 x 3.5 (%Z) x 6,369 x 12,470)) / (100,000 x 2,000 kVA) = 2.41
M = 1/(1+ f) = 0.29
I s.c. = (12470/4160 x 0.29 x 6,369 A = 5,603 A

Available Fault Fire pump ***#1***

Feeder length from: **MSA** 20 feet
Branch feeders: 1 set of #2 Copper (C value = 6,044)
Voltage: 4,160 volt

f = ((1.732 x 20 feet x 5,603) / (1 x 6,044 x 4,160)) = 0.008
M = 1/(1+ f) = 0.99
I s.c. = 5,603 A x 0.99 = 5,560 A

Available Fault Fire pump ***#2***

Feeder length from: **MSA** 30 feet
Branch feeders: 1 set of #2 Copper (C value = 6,044)
Voltage: 4,160 volt

f = ((1.732 x 30 feet x 5,603) / (1 x 6,044 x 4,160)) = 0.012
M = 1/(1+ f) = 0.99
I s.c. = 5,603 A x 0.99 = 5,539 A

Available Fault Fire pump ***#3***

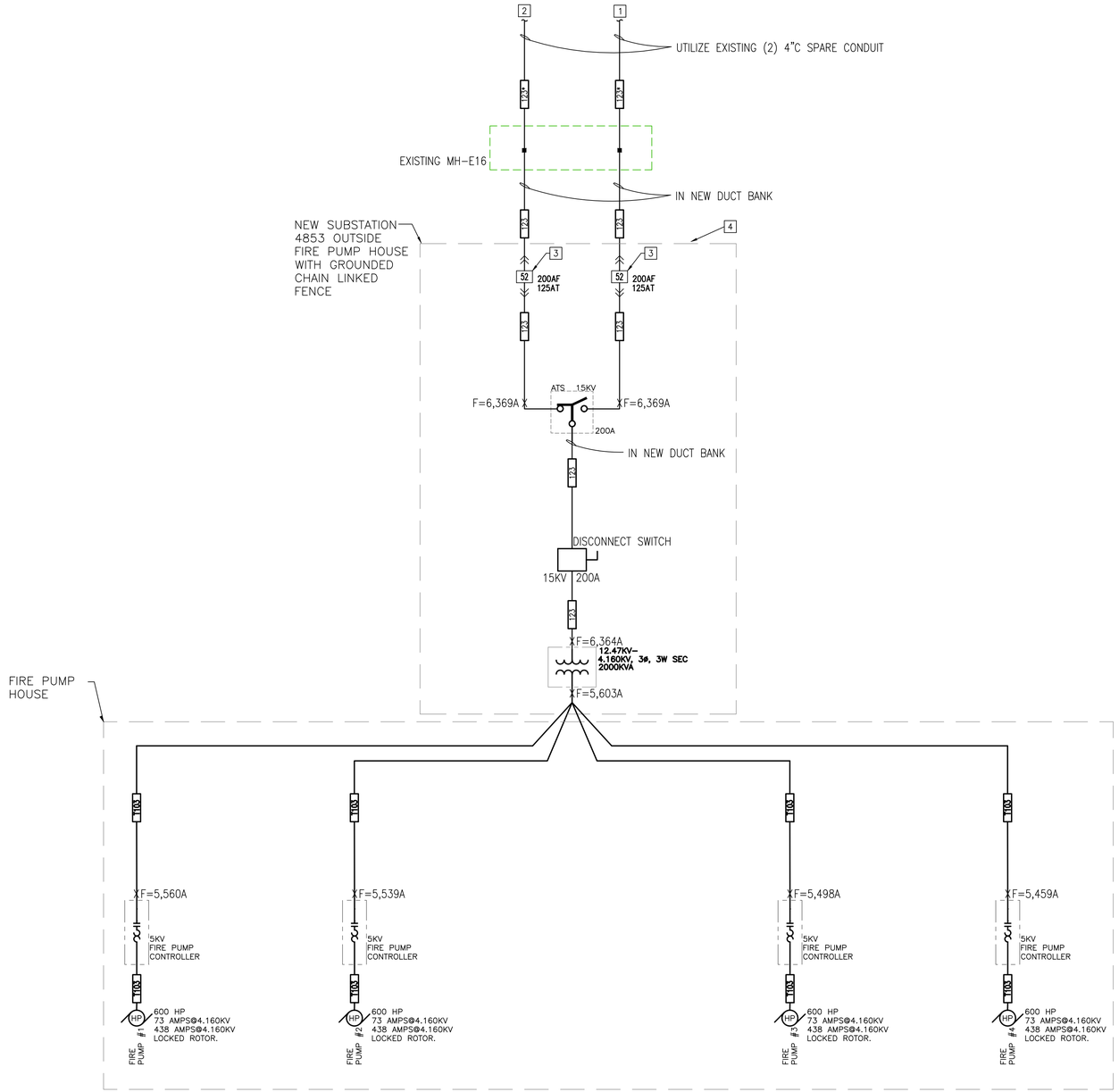
Feeder length from: **MSA** 50 feet
Branch feeders: 1 set of #2 Copper (C value = 6,044)
Voltage: 4,160 volt

f = ((1.732 x 50 feet x 5,539) / (1 x 6,044 x 4,160)) = 0.019
M = 1/(1+ f) = 0.98
I s.c. = 5,603 A x 0.98 = 5,498 A

Available Fault Fire pump ***#4***

Feeder length from: **MSA** 60 feet
Branch feeders: 1 set of #2 Copper (C value = 6,044)
Voltage: 4,160 volt

f = ((1.732 x 60 feet x 6,369) / (1 x 6,044 x 4,160)) = 0.026
M = 1/(1+ f) = 0.97
I s.c. = 5,603 A x 0.97 = 5,459 A



SINGLE LINE DIAGRAM NOTES:

1. SEE SHEET E-200A FOR CONTINUATION. CONNECT TO BUS NO. 1 NEW SWITCH IN EXISTING SWITCHGEAR AS INDICATED. REFERENCE SHEET 2/E001 FOR DUCT BANK DETAIL.
2. SEE SHEET E-200A FOR CONTINUATION. CONNECT TO BUS NO. 2 NEW SWITCH IN EXISTING SWITCHGEAR AS INDICATED. REFERENCE SHEET 2/E001 FOR DUCT BANK DETAIL.
3. PROVIDE FIXED MOUNTED VACUUM CIRCUIT BREAKER WITH INTEGRAL 50/50 OVERCURRENT PROTECTIVE DEVICE AND ARC REDUCTION MAINTENANCE MODE SWITCH. PROVIDE EATON MODEL 150 VCP-TR40 15KV VACUUM BREAKER WITH MODEL DT520MCV 50/50 PROTECTIVE RELAY OR APPROVED EQUAL.
4. ALL EXPOSED CONDUIT ROUTING TO NEW PUMP HOUSE SHALL BE RGS TYPE. REFERENCE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

CIRCUIT SCHEDULE:

123*	2 SETS OF (3)#2/0, (1)#4 COPPER GROUND, 15KV MV-105 CABLE, 133% INSULATION IN EXISTING 4" CONDUIT.
123	2 SETS OF (3)#2/0, (1)#4 COPPER GROUND, 15KV MV-105 CABLE, 133% INSULATION IN 4" CONDUIT.
103	(3)#2, (1)#6 COPPER GROUND, 5KV MV-90 CABLE, 133% INSULATION, IN 4" CONDUIT.

PROVIDE SHORT CIRCUIT STUDY, COORDINATION STUDY, ARC FLASH ANALYSIS AND ARC FLASH LABELS FOR 15KV AND 480V CIRCUIT BREAKERS.

REGISTERED PROFESSIONAL ENGINEER DAVID D. HAKE E 16137 ELECTRICAL STATE OF CALIFORNIA

Jun 12 2014

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1250001459

FOR CONSTRUCTION

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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

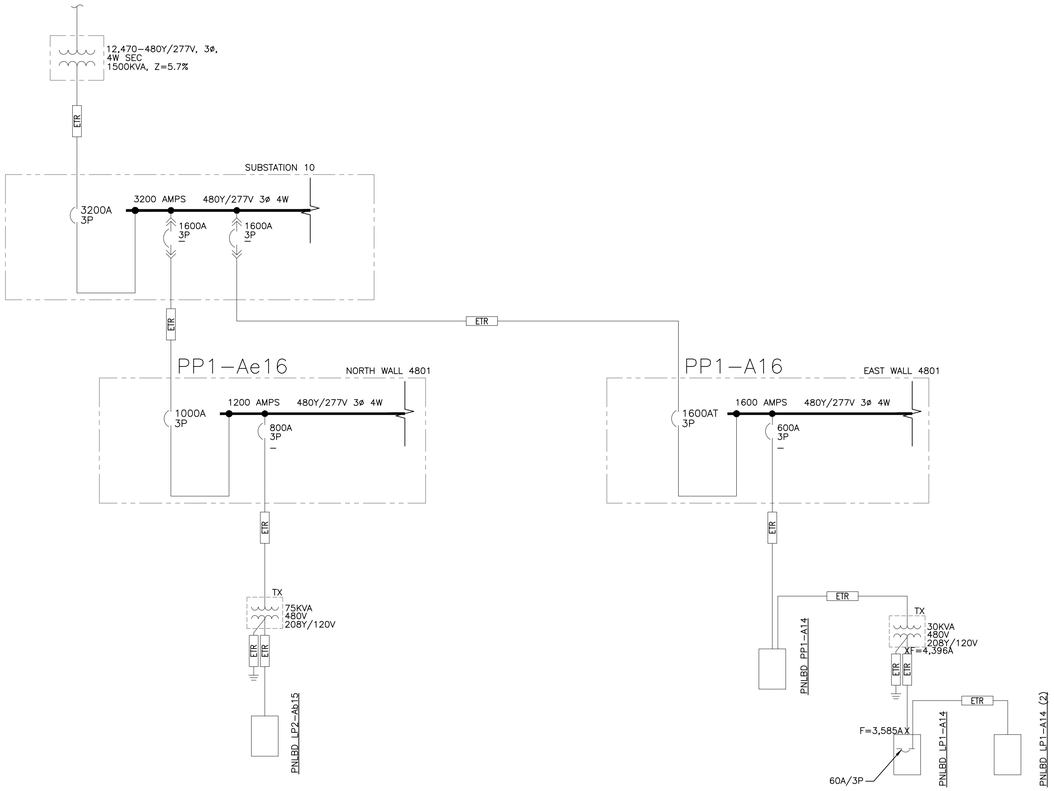
DRAWING TITLE
PARTIAL ONE LINE DIAGRAM - BUILDING 4853

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	EDM-1719 E200.dwg	E-200	SHEET No. 27 of 137

DAVID D. HAKE



PANELBOARD: LP1-A14 (EXISTING)

BUS AMPS: 100A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1

FAULT CURRENT: EXISTING
AIC RATING: N/A
SERVES: FIRST FLOOR
MOUNTING: SURFACE
LOCATION: EAST WALL

EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VOLTAMPS/PHASE A	VOLTAMPS/PHASE B	VOLTAMPS/PHASE C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VOLTAMPS/PHASE A	VOLTAMPS/PHASE B	VOLTAMPS/PHASE C	DESCRIPTION	CKT NO.
1	SPARE				EX	20	1	1	20	EX	800			EF-3 (ROOF)	2
3	UTILITY PNL #4		360		EX	20	1	1	20	EX		1,500		WATER COOLER	4
5	EXISTING LOAD			530	EX	20	1	1	20	EX			540	RMS 124,127,128	6
7	RBC	500			EX	20	1	1	20	EX	2,000			HEAT TRACING	8
9	EXISTING LOAD		500		EX	20	1	1	20					SPARE	10
11	WATER COOLER			650	EX	15	1	1	20	EX			720	RMS 106,107,108	12
13	FACP	1,200			12	20	1	1	20	EX	900			RMS 106,107,108	14
15	PNLBD LP1-A14(2)		2,500					1	20	EX		900		RMS 106,107,108	16
17				2,500	EX	60	3	1	20	EX			900	RMS 106,107,108	18
19		1,980						1	20	EX	500			EF-5	20
N 21	AIR COMPRESSOR				12	20	2	1	20	EX		500		EF-6	22
23				1,150	12			1	20	EX			900	400Hz ELEC & FOAM RMS	24
SUBTOTAL		3,680	3,360	4,830							4,200	2,900	3,060	SUBTOTAL	

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF
TOTAL PHASE A – VA	7,880	COOLING		1.00	REFRIGERATION		1.00
AMPS	66	HEATING		0	SIGN/DISPLAY		1.25
TOTAL PHASE B – VA	6,260	LIGHTING	300	1.25	KITCHEN		1.00
AMPS	52	RECEPTACLES	7,040	1.0/.5	EXISTING		1.00
TOTAL PHASE C – VA	7,890	MOTORS	4,450	1.00	LARGE MOTOR		1.25
AMPS	66	SUPP HEAT		1.00	SHOW WINDOW		1.25
TOTAL PNLBD – VA	22,030	MISC EQUIP	10,240	1.00	LTG TRACK		1.00
AMPS	61						

TOTAL DEMAND	
	22,105 VA
	61 A

PANELBOARD NOTES

N – PROVIDE NEW CIRCUIT BREAKER

CONTRACTOR SHALL VERIFY EXISTING PANEL AIC RATING AND REPORT FINDINGS TO CONTRACTING OFFICER. ALL NEW AND EXISTING CIRCUIT BREAKERS MUST EITHER MATCH THE EXISTING AIC RATING OR EXCEED THE CALCULATED FAULT CURRENT OF THE ONE-LINE DIAGRAM BY A MINIMUM OF 10% WHICHEVER IS GREATER.

LTG TRACK – TRACK LENGTH
SIGN/DISPLAY – SIGNAGE & DISPLAY CASE

Short-Circuit and Voltage Drop Calculations

v2.09.02

Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding - Contractor shall notify Engineer of any field condition that results in a change of 10% or greater circuit distance

The following calculations are based on the 'Point-by-Point' method where:

ISC (2) = ISC(1) x M(1) M= 1/(1+f)
ISC (1) = short circuit current at fault point 1
ISC (2) = short circuit current at fault point 2

Feeder f (3Ø) = 1.732 x L x Isc / C x E
Feeder f (1Ø) = 2 x L x Isc / C x E

XFMR: f (3Ø) = IP(sca) x Vp x 1.73 x %Z / 100,000 x KVA
XFMR: f (1Ø) = IP(sca) x Vp x %Z / 100,000 x KVA

IS(sca) = Vp x M x IP(sca) / Vs

VOLTAGE DROP (3Ø):
%VD= ((R x cos(arccos(pf)) + X x sin (arccos(pf))) x L/# x I x 1.73) / E

VOLTAGE DROP (1Ø):
%VD= ((R x cos(arccos(pf)) + X x sin(arccos(pf))) x 2 x L/# x I) / E

L = Length of circuit E = Line to line volts
C = "C" Factor from Bussman table where "C" = 1 / impedance per linear foot

IP = Primary short circuit current
Vp = Primary voltage
IS= Secondary short circuit current
Vs= Secondary voltage

%VD CUM= Cumulative Voltage Drop from Fault Point 1 to Fault Point #
R= resistance in ohms per LF
X= reactances in ohms per LF

Feeder Types =
NM – Non Magnetic Conduit, M – Magnetic Conduit, FB – Feeder Busway, PB – Plug-in Busway, TX – Transformer

Fault Point (F#)	Bus/Feeder Description	Phase	Source (Fault Point)	Source Isc (amps)	Feeder Conduit Type	Feeder Material CU or AL	Feeder #	Feeder Wire/Bus Size	Conductor 'C' value	Busway C value	L-L Volts E	Circuit Length L	Load Power Factor(pf)	Circuit Load A	Conductor Resistance R	Conductor Reactance X	Conductor Impedence, Z/ Ø	Transformer Type	Transformer kVA	Transformer Degree Rise	Transformer Z	Transformer V sec	f	M	FAULT CURRENT Isc	VOLTAGE DROP %VD	TOTAL V.D. %VD CUM	Fault Point (F#)
1	Utility Service Point			18643	at the secondary of the utility transformer 480Y/277V – 3 phase																				18643			1
	Motor Contribution				The connected full load motor amps (includes compressors) on the system																				Source Isc + 6X Motor Contribution =			
2	XFMR T11	3	18643	18643	M	CU	1	Set(s) of 8 AWG	1557		480	75	0.9	32	0.000780	0.000065	0.451027	TP-1	30	115	4	208	3.240	0.24	4396	0.63%	0.63%	2
3	LP1-A14	3	2	4396	M	CU	1	Set(s) of 6 AWG	2425		208	15	0.9	30	0.000490	0.000064	0.451027						0.226	0.82	3585	0.18%	0.81%	3

Jun 12 2014

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FOR CONSTRUCTION

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

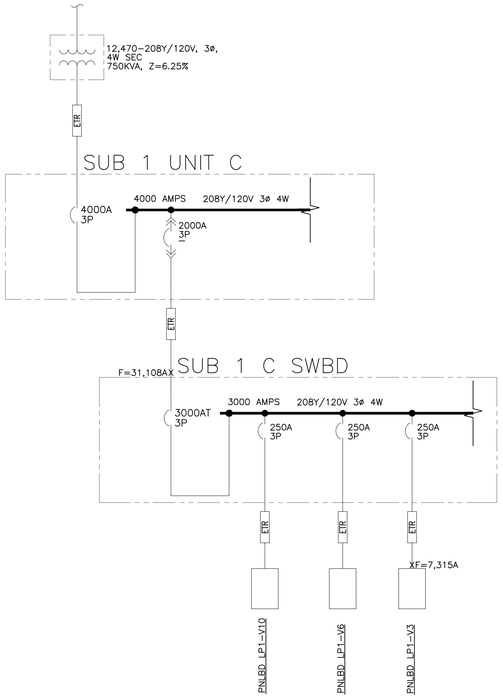
DRAWING TITLE
PARTIAL SINGLE LINE DIAGRAM & PANEL SCHEDULES – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	EDM-1719 E201.dwg	E-201	SHEET No. 28 of 137

DAVID D. HAKKE



PANELBOARD: LP1-V3 (EXISTING)

BUS AMPS: 225A
MAIN SIZE/TYPE: 225A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1

FAULT CURRENT: EXISTING
AIC RATING: N/A
SERVES: FIRST FLOOR
MOUNTING: SURFACE
LOCATION: WEST WALL- MAIN HANGAR

EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VOLTAMPS/PHASE A	B	C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VOLTAMPS/PHASE A	B	C	DESCRIPTION	CKT NO.	
1		2,930									2,930				2	
3	EC-1		2,930		6	50	3	3	50	EX		2,930		EC-2	4	
5	(7.5 HP)			2,930									2,930	(7.5 HP)	6	
7		3,720						1	20	EX	386			EM CTW LTS SOUTH	8	
9	EC-3		3,720		4	60	3	1	30	EX				SPARE	10	
11	(10 HP)			3,720				1	20	EX			1,000	RCPT- CTW SOUTH	12	
13	LC-15 (ON UP 15)	3,000			EX	60	2				950				14	
15			3,000					3	20	EX		950		OVERHEAD DOOR OD-1	16	
17	LC-16 (ON UP 16)			3,000	EX	60	2						950		18	
19		3,000									950				20	
21	SPARE					20	1	3	20	EX		950		OVERHEAD DOOR OD-2	22	
23	SPARE					20	1						950		24	
25	SPARE					20	1	1	20					SPARE	26	
27	SPARE					20	1	1	20					SPARE	28	
29	SPARE					20	1	1	20	EX			1,200	FACP	30	
31	SPACE						1	2	20	10	1,150			AIR COMPRESSOR	32	N
33	SPACE						1			10		1,150			34	
N 35	AIR COMPRESSOR			1,150	12	20	2	2	20	8			1,150	AIR COMPRESSOR	36	N
37		1,150			12					8	1,150				38	
N 39	AIR COMPRESSOR		1,150		10	20	2	2	20	8		1,150		AIR COMPRESSOR	40	N
41				1,150	10					8			1,150		42	
	SUBTOTAL	13,800	10,800	11,950							7,516	7,130	9,330	SUBTOTAL		

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF
TOTAL PHASE A - VA	21,316	COOLING		1.00	REFRIGERATION		1.00
AMPS	178	HEATING		0	SIGN/DISPLAY		1.25
TOTAL PHASE B - VA	17,930	LIGHTING		1.25	KITCHEN		1.00
AMPS	149	RECEPTACLES		1.0/.5	EXISTING	49,026	1.00
TOTAL PHASE C - VA	21,280	MOTORS	11,500	1.00	LARGE MOTOR		1.25
AMPS	177	SUPP HEAT		1.00	SHOW WINDOW		1.25
TOTAL PNLBD - VA	60,526	MISC EQUIP		1.00	LTG TRACK		1.00
AMPS	168						

TOTAL DEMAND
60,526 VA
168 A

PANELBOARD NOTES

N = PROVIDE NEW CIRCUIT BREAKER

CONTRACTOR SHALL VERIFY EXISTING PANEL AIC RATING AND REPORT FINDINGS TO CONTRACTING OFFICER. ALL NEW AND EXISTING CIRCUIT BREAKERS MUST EITHER MATCH THE EXISTING AIC RATING OR EXCEED THE CALCULATED FAULT CURRENT OF THE ONE-LINE DIAGRAM BY A MINIMUM OF 10% WHICHEVER IS GREATER.

LTG TRACK - TRACK LENGTH
SIGN/DISPLAY - SIGNAGE & DISPLAY CASE

Short-Circuit and Voltage Drop Calculations

v2.09.02

Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding - Contractor shall notify Engineer of any field condition that results in a change of 10% or greater circuit distance

The following calculations are based on the 'Point-by-Point' method where:

ISC (2) = ISC(1) x M(1) M= 1/(1+f)
ISC (1) = short circuit current at fault point 1
ISC (2) = short circuit current at fault point 2

Feeder: (3Ø) = $\frac{1.732 \times L \times Isc}{C \times E}$

Feeder: (1Ø) = $\frac{2 \times L \times Isc}{C \times E}$

XFMR: (3Ø) = $\frac{IP(sca) \times Vp \times 1.73 \times \%Z}{100{,}000 \times KVA}$ **IS(sca)=** $\frac{Vp \times M \times IP(sca)}{Vs}$

XFMR: (1Ø) = $\frac{IP(sca) \times Vp \times \%Z}{100{,}000 \times KVA}$

VOLTAGE DROP (3Ø):
%VD= ((R x cos(arccos(pf)) + X x sin (arccos(pf))) x L/# x I x 1.73) / E

VOLTAGE DROP (1Ø):
%VD= ((R x cos(arccos(pf)) + X x sin(arccos(pf))) x 2 x L/# x I) / E

L = Length of circuit E = Line to line volts
C = "C" Factor from Bussman table where "C" = 1 / impedance per linear foot

IP = Primary short circuit current
Vp = Primary voltage
IS= Secondary short circuit current
Vs= Secondary voltage

%VD CUM= Cumulative Voltage Drop from Fault Point 1 to Fault Point #
R= resistance in ohms per LF
X= reactances in ohms per LF

Feeder Types =
NM - Non Magnetic Conduit, M - Magnetic Conduit, FB - Feeder Busway, PB - Plug-in Busway, TX - Transformer

Fault Point (F#)	Bus/Feeder Description	Phase	Source (Fault Point)	Source Isc (amps)	Feeder Conduit Type	Feeder Material CU or AL	Feeder #	Feeder Wire/Bus Size	Conductor 'C' value	Busway C value	L-L Volts E	Circuit Length L	Load Power Factor(pf)	Circuit Load A	Conductor Resistance R	Conductor Reactance X	Conductor Impedence, Z/ Ø	Transformer Type	Transformer kVA	Transformer Degree Rise	Transformer Z	Transformer V sec	f	M	FAULT CURRENT Isc	VOLTAGE DROP %VD	TOTAL V.D. %VD CUM	Fault Point (F#)
1	Utility Service Point			31108	at the secondary of the utility transformer 480Y/277V - 3 phase																				Source Isc + 6X Motor Contribution =			1
	Motor Contribution				The connected full load motor amps (includes compressors) on the system																							
2	SUB 1 C SWBD	3	31108	31108	M	CU	8	Set(s) of 500 kcmil	22185		208	75	0.9	2400	0.000029	0.000048	0.451027	TP-1	30	115	4	208	0.109	0.90	28039	0.88%	0.88%	2
3	LP1-V3	3	2	28039	M	CU	1	Set(s) of 250 kcmil	16483		208	200	0.9	30	0.000054	0.000052	0.451027						2.833	0.26	7315	0.36%	1.24%	3

REGISTERED PROFESSIONAL ENGINEER
DAVID D. HAKE
E 16137
ELECTRICAL
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
www.hei-eng.com
1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

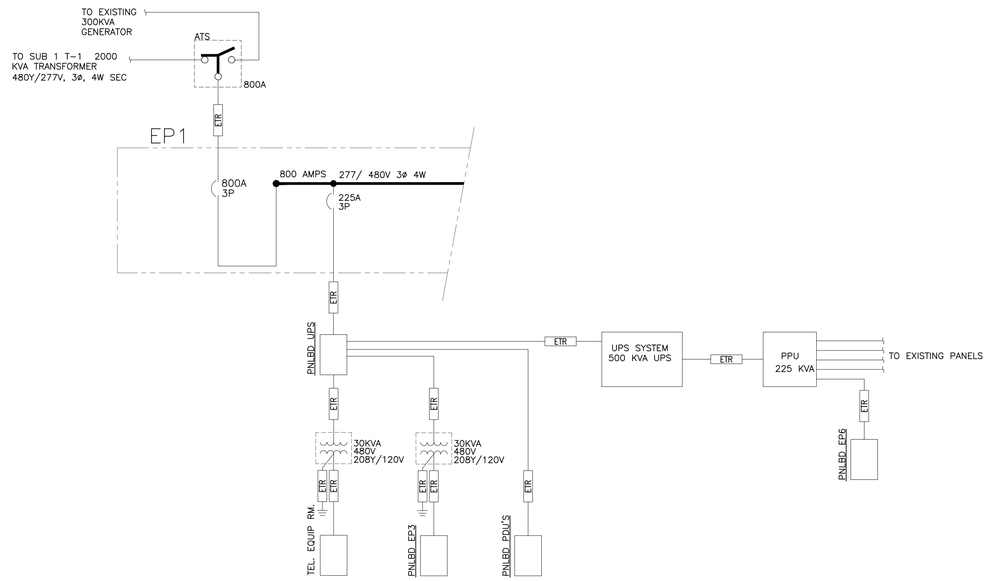
DRAWING TITLE
PARTIAL SINGLE LINE DIAGRAM & PANEL SCHEDULES - BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

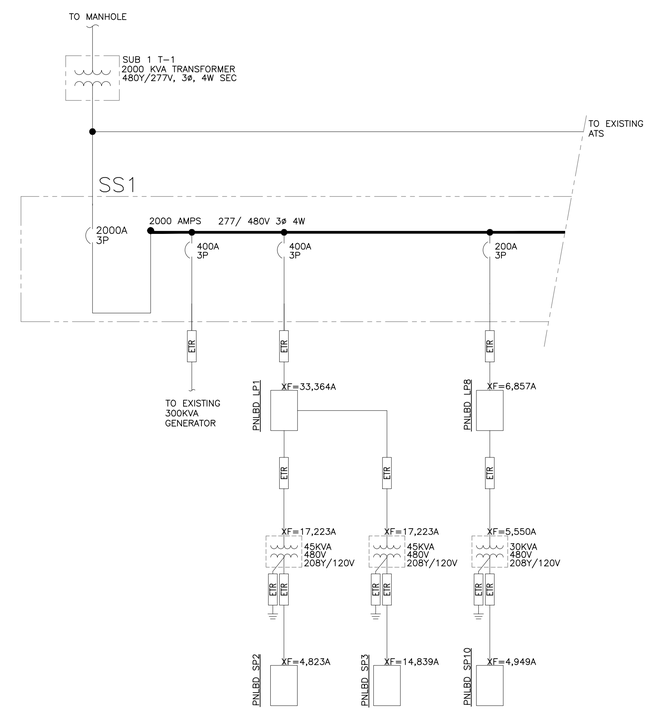
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	N.T.S.	TRADE Sh. No.	
FILE NAME	EDM-1719 E202.dwg	E-202	SHEET No. 29 of 137

DAVID D. HAKE



1 PARTIAL SINGLE LINE DIAGRAM
SCALE: NTS



2 PARTIAL SINGLE LINE DIAGRAM
SCALE: NTS

PANELBOARD: SP3 (EXISTING)

BUS AMPS: 150A
MAIN SIZE/TYPE: 150A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1

FAULT CURRENT: REFER TO ONE-LINE DIAGRAM
AIC RATING: FCA +10% MINIMUM, FULLY RATED
SERVES: FIRST FLOOR
MOUNTING: SURFACE
LOCATION: BUILDING 4840
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VOLTAMPS/PHASE A	B	C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VOLTAMPS/PHASE A	B	C	DESCRIPTION	CKT NO.
1	CONV. RECEPT. RM 163	1,620			EX	15	1	1	15	EX	1,080			CONV. RECEPT. RM 139, 158	2
3	CONV. RECEPT. RM 162		1,260		EX	15	1	1	15	EX		200		PNEU. HVAC CONTRL. PNL	4
5	CONV. RECEPT. RM 161,163			1,440	EX	15	1	1	20	EX			900	CONV. RECEPT. RM 158	6
7	CONV. RECEPT. RM 137	1,440			EX	20	1	1	20	EX	1,260			CONV. RECEPT. RM 156	8
9	CONV. RECEPT. RM 136		1,440		EX	20	1	1	20	EX		1,260		CONV. RECEPT. RM 156	10
11	CONV. RECEPT. RM 135			1,440	EX	20	1	1	20	EX			1,440	CONV. RECEPT. RM 156	12
13	CONV. RECEPT. RM 141, 155	1,260			EX	20	1	1	20	EX	1,080			CONV. RECEPT. RM 130	14
15	CONV. RECEPT. RM 134		1,080		EX	20	1	1	20	EX		1,080		CONV. RECEPT. RM 131	16
17	CONV. RECEPT. RM 134			1,260	EX	20	1	1	20	EX			1,080	CONV. RECEPT. RM 132	18
19	REMOTE PACKAGE CHILLER	750			EX	20	1	1	20	EX	750			REMOTE PACKAGE CHILLER	20
21	FAN FB RM 139		372		EX	20	1	1	20	EX		1,140		UNIT HTRS UH-5F, 4C,5	22
23	UNIT HTRS, UH-5C			1,080	EX	20	1	1	20	EX			696	FAN F-4C	24
25	CHILLER PUMP CONTRL	200			EX	20	1	1	20	EX	1,080			UNIT HTRS UH-5D, 5E	26
27	REFR. (HALON) SENR PNL		200		EX	20	1	1	20	EX		200		WATER TREATMENT PANELS	28
29	TEMP CONTL PNL			500	EX	20	1								30
31		3,000						3	30	EX				28VDC POWER SUPPLY DC5	32
33	28VDC POWER SUPPLY DC5		3,000		EX	30	3								34
35				3,000				2	30	EX			1,000	REFIG AIR DRYER	36
37	UPS RM. 134	1,000			EX	20	1				1,000				38
39	REM. OUTLET LOADING DOCK		1,000				2	2	20	12		1,150		AIR COMPRESSOR	40 N
41				1,000						12		1,150			42 N
	SUBTOTAL	9,270	8,352	9,720							6,250	5,030	6,266	SUBTOTAL	

TOTAL PHASE A – VA	15,520	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF		
AMPS	129	COOLING		1.00	REFRIGERATION		1.00		
TOTAL PHASE B – VA	13,382	HEATING		0	SIGN/DISPLAY		1.25		
AMPS	112	LIGHTING		1.25	KITCHEN		1.00		
TOTAL PHASE C – VA	15,986	RECEPTACLES	24,420	1.0/.5	EXISTING		1.00		
AMPS	133	MOTORS	6,668	1.00	LARGE MOTOR		1.25	TOTAL DEMAND	
TOTAL PNLBD – VA	44,888	SUPP HEAT		1.00	SHOW WINDOW		1.25	37,678 VA	
AMPS	125	MISC EQUIP	13,800	1.00	LTG TRACK		1.00	105 A	

PANELBOARD NOTES
N = PROVIDE NEW CIRCUIT BREAKER
CONTRACTOR SHALL VERIFY EXISTING PANEL AIC RATING AND REPORT FINDINGS TO CONTRACTING OFFICER. ALL NEW AND EXISTING CIRCUIT BREAKERS MUST EITHER MATCH THE EXISTING AIC RATING OR EXCEED THE CALCULATED FAULT CURRENT OF THE ONE-LINE DIAGRAM BY A MINIMUM OF 10% WHICHEVER IS GREATER.
LTG TRACK – TRACK LENGTH
SIGN/DISPLAY – SIGNAGE & DISPLAY CASE

PANELBOARD: EP6 (EXISTING)

BUS AMPS: 100A
MAIN SIZE/TYPE: 100A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1

FAULT CURRENT: REFER TO ONE-LINE DIAGRAM
AIC RATING: FCA +10% MINIMUM, FULLY RATED
SERVES: FIRST FLOOR
MOUNTING: SURFACE
LOCATION: BUILDING 4840
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VOLTAMPS/PHASE A	B	C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VOLTAMPS/PHASE A	B	C	DESCRIPTION	CKT NO.
1	UPS RECEPT. RM 103	900			EX	20	1	1	20	EX	900			UPS RECEPT. RM 105	2
3	UPS RECEPT. RM 103		900		EX	20	1	1	20	EX		900		UPS RECEPT. RM 105	4
5	UPS RECEPT. RM 103			900	EX	20	1	1	20	EX			900	UPS RECEPT. RM 134	6
7	UPS RECEPT. RM 103	900			EX	20	1	1	20	EX	900			UPS RECEPT. RM 105	8
9	UPS RECEPT. RM 103		900		EX	20	1	1	20	EX		900		UPS RECEPT. RM 105	10
11	UPS RECEPT. RM 103			900	EX	20	1	1	20	EX			900	UPS RECEPT. RM 105	12
13	UPS RECEPT. RM 118	900			EX	20	1	1	20	EX	900			UPS RECEPT. RM 134	14
15	UPS RECEPT. RM 118		900		EX	20	1	1	20	EX		900		UPS RECEPT. RM 134	16
17	UPS RECEPT. RM 118			900	EX	20	1	1	20	EX			900	UPS RECEPT. RM 134	18
19	UPS RECEPT. RM 118	900			EX	20	1	1	20	12	1,200			FACP	20 N
21	UPS RECEPT. RM 118		900		EX	20	1	1						SPACE	22
23	UPS RECEPT. RM 118			900	EX	20	1	1						SPACE	24
25	SPACE							1	1					SPACE	26
27	SPACE							1	1					SPACE	28
29	SPACE							1	1					SPACE	30
	SUBTOTAL	3,600	3,600	3,600							3,900	2,700	2,700	SUBTOTAL	

TOTAL PHASE A – VA	7,500	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF		
AMPS	63	COOLING		1.00	REFRIGERATION		1.00		
TOTAL PHASE B – VA	6,300	HEATING		0	SIGN/DISPLAY		1.25		
AMPS	53	LIGHTING		1.25	KITCHEN		1.00		
TOTAL PHASE C – VA	6,300	RECEPTACLES	18,900	1.0/.5	EXISTING		1.00		
AMPS	53	MOTORS		1.00	LARGE MOTOR		1.25	TOTAL DEMAND	
TOTAL PNLBD – VA	20,100	SUPP HEAT		1.00	SHOW WINDOW		1.25	15,650 VA	
AMPS	56	MISC EQUIP	1,200	1.00	LTG TRACK		1.00	43 A	

PANELBOARD NOTES
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LTG TRACK – TRACK LENGTH
SIGN/DISPLAY – SIGNAGE & DISPLAY CASE

PANELBOARD: SP10 (EXISTING)

BUS AMPS: 100A
MAIN SIZE/TYPE: 100A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1

FAULT CURRENT: REFER TO ONE-LINE DIAGRAM
AIC RATING: FCA +10% MINIMUM, FULLY RATED
SERVES: FIRST FLOOR
MOUNTING: SURFACE
LOCATION: BUILDING 4840
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VOLTAMPS/PHASE A	B	C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VOLTAMPS/PHASE A	B	C	DESCRIPTION	CKT NO.
1	CONV. RECEPT. TEST BAY 5	540			EX	20	1	1	20	EX	540			UTILITY STA. TEST BAY 5	2
3	CONV. RECEPT. TEST BAY 5		540		EX	20	1	1	20	EX		540		UTILITY STA. TEST BAY 5	4
5	DCP-5 TEST BAY 5			540	EX	20	1	1	20	EX			540	UTILITY STA. TEST BAY 5	6
7	UTILITY STA. TEST BAY 5	540			EX	20	1	1	20	EX	540			CONV. RECEPT. TEST BAY	8
9	UTILITY STA. TEST BAY 5		540		EX	20	1	1	20	EX		540		CONV. RECEPT. TEST BAY	10
11	UTILITY STA. TEST BAY 5			540	EX	20	1	1	20	EX			540	UTILITY STA. TEST BAY 4	12
13	UTILITY STA. TEST BAY 4	540			EX	20	1	1	20	EX	540			UTILITY STA. TEST BAY 4	14
15	UTILITY STA. TEST BAY 4		540		EX	20	1	1	20	EX		900		UTILITY STA. H/ B-4	16
17	BOOM HOIST H/B-4			1,920	EX	20	1	1	20	EX			900	UTILITY STA. H/ B-4	18
19		2,500									2,500				20
21	TEST PANEL RECEPT.		2,500		EX	30	3	3	30	EX		2,500		TEST PANEL RECEPT	22
23				2,500									2,500		24
25											2,500				26
27	SPARE					20	3	3	30	EX		2,500		28 VDC PWR. SUPPLY DC-2	28
29													2,500		30
31	SPACE					1	2	20	12		1,150			AIR COMPRESSOR	32 N
33	SPACE					1			12			1,150			34 N
35	SPACE					1	2	20	12				1,150	AIR COMPRESSOR	36 N
37	SPACE					1			12		1,150				38 N
39	SPACE					1	1							SPACE	40
41	SPACE					1	1							SPACE	42
	SUBTOTAL	4,120	4,120	5,500							8,920	8,130	8,130	SUBTOTAL	

TOTAL PHASE A – VA	13,040	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF		
AMPS	109	COOLING		1.00	REFRIGERATION		1.00		
TOTAL PHASE B – VA	12,250	HEATING		0	SIGN/DISPLAY		1.25		
AMPS	102	LIGHTING		1.25	KITCHEN		1.00		
TOTAL PHASE C – VA	13,630	RECEPTACLES	32,400	1.0/.5	EXISTING		1.00		
AMPS	114	MOTORS	4,600	1.00	LARGE MOTOR		1.25	TOTAL DEMAND	
TOTAL PNLBD – VA	38,920	SUPP HEAT		1.00	SHOW WINDOW		1.25	27,720 VA	
AMPS	108	MISC EQUIP	1,920	1.00	LTG TRACK		1.00	77 A	

PANELBOARD NOTES
N = PROVIDE NEW CIRCUIT BREAKER
CONTRACTOR SHALL VERIFY EXISTING PANEL AIC RATING AND REPORT FINDINGS TO CONTRACTING OFFICER. ALL NEW AND EXISTING CIRCUIT BREAKERS MUST EITHER MATCH THE EXISTING AIC RATING OR EXCEED THE CALCULATED FAULT CURRENT OF THE ONE-LINE DIAGRAM BY A MINIMUM OF 10% WHICHEVER IS GREATER.
LTG TRACK – TRACK LENGTH
SIGN/DISPLAY – SIGNAGE & DISPLAY CASE

PANELBOARD: SP2 (EXISTING)

BUS AMPS: 150A
MAIN SIZE/TYPE: 150A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1

FAULT CURRENT: REFER TO ONE-LINE DIAGRAM
AIC RATING: FCA +10% MINIMUM, FULLY RATED
SERVES: FIRST FLOOR
MOUNTING: SURFACE
LOCATION: BUILDING 4840
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VOLTAMPS/PHASE A	B	C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VOLTAMPS/PHASE A	B	C	DESCRIPTION	CKT NO.
1	CONV. RECEPT RM 151	1,260			EX	15	1	1	15	EX	1,440			CONV. RECEPT RM 128	2
3	CONV. RECEPT RM 152,141		1,080		EX	15	1	1	20	EX		1,620		CONV. RECEPT RM 128	4
5	CONV. RECEPT RM 154			1,260	EX	20	1	1	20	EX			1,080	CONV. RECEPT RM 128	6
7	CONV. RECEPT RM 146	1,440			EX	20	1	1	20	EX	720			CONV. RECEPT RM 149	8
9	CONV. RECEPT RM 146		1,440		EX	20	1	1	20	EX		900		CONV. RECEPT 141, 149	10
11	CONV. RECEPT RM 146			1,260	EX	20	1	1	15	EX			750	REMOTE PACKAGE CHILLER	12
13	CONV. RECEPT RM 126	1,620			EX	20	1	1	20	EX	1,440			CONV. RECEPT RM 1142- 145	14
15	CONV. RECEPT RM 126		1,620		EX	20	1	1	20	EX		1,620		CONV. RECEPT RM 125	16
17	REMOTE PACKAGE CHILLER			750	EX	20	1	1	20	EX			1,620	CONV. RECEPT RM 126	18
19	ELECTRIC WATER COOLER	500			EX	20	1	1	20	EX	1,920			JUNCTION BOX RM 103	20
21	PASS ELEVATOR		500		EX	20	1	1	20	EX		1,920		JUNCTION BOX RM 105	22
23	COPY MACHINE OUTLET RM 104			1,000	EX	20	1	1	20	EX			100	LAB HOOD LTG. RM 128	24
25	CONF ROOM FLOOR REC'S	720				20	1				2,000				26
27	CONF ROOM FLOOR REC'S		720			20	1	3	30	EX		2,000		28V DC POWER SUPPLY DC4	28
29	CONF ROOM 113A REC'S			900		20	1						2,000		30
31		3,000				1	20	EX	1,620		1,620			CONV. RECEPT RM. 126	32
33	28V DC POWER SUPPLY DC3		3,000		EX	50	3	1	20	EX		1,440		CONV. RECEPT RM. 126	34
35			3,000					2	20	12			1,150	AIR COMPRESSOR	36 N
37	OFFICE 113C REC'S	900					1			12	1,150				38 N
39	POWER SLIDING DOOR		1,000				1	2	20	12		1,150		AIR COMPRESSOR	40 N
41	DUCT DETECTOR			200			1			12			1,150		42 N
	SUBTOTAL	9,440	9,360	8,370							10,290	10,650	7,850	SUBTOTAL	

TOTAL PHASE A – VA	19,730	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF		
AMPS	164	COOLING		1.00	REFRIGERATION		1.00		
TOTAL PHASE B – VA	20,010	HEATING		0	SIGN/DISPLAY		1.25		
AMPS	167	LIGHTING	100	1.25	KITCHEN		1.00		
TOTAL PHASE C – VA	16,220	RECEPTACLES	33,760	1.0/.5	EXISTING		1.00		
AMPS	135	MOTORS	4,600	1.00	LARGE MOTOR		1.25	TOTAL DEMAND	
TOTAL PNLBD – VA	55,960	SUPP HEAT		1.00	SHOW WINDOW		1.25	44,105 VA	
AMPS	155	MISC EQUIP	17,500	1.00	LTG TRACK		1.00	122 A	

PANELBOARD NOTES
N = PROVIDE NEW CIRCUIT BREAKER
CONTRACTOR SHALL VERIFY EXISTING PANEL AIC RATING AND REPORT FINDINGS TO CONTRACTING OFFICER. ALL NEW AND EXISTING CIRCUIT BREAKERS MUST EITHER MATCH THE EXISTING AIC RATING OR EXCEED THE CALCULATED FAULT CURRENT OF THE ONE-LINE DIAGRAM BY A MINIMUM OF 10% WHICHEVER IS GREATER.
LTG TRACK – TRACK LENGTH
SIGN/DISPLAY – SIGNAGE & DISPLAY CASE

Short-Circuit and Voltage Drop Calculations

v2.09.02

Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding - Contractor shall notify Engineer of any field condition that results in a change of 10% or greater circuit distance

The following calculations are based on the 'Point-by-Point' method where:

ISC (2) = ISC(1) x M(1) M= 1/(1+f)
ISC (1) = short circuit current at fault point 1
ISC (2) = short circuit current at fault point 2

Feeder: (3Ø) = $\frac{1.732 \times L \times Isc}{C \times E}$
Feeder: f (1Ø)= $\frac{2 \times L \times Isc}{C \times E}$

XFMR: f (3Ø) = $\frac{IP(sca) \times Vp \times 1.73 \times \%Z}{100{,}000 \times KVA}$ **IS(sca)=** $\frac{Vp \times M \times IP(sca)}{Vs}$
XFMR: f (1Ø)= $\frac{IP(sca) \times Vp \times \%Z}{100{,}000 \times KVA}$

VOLTAGE DROP (3Ø):
%VD= ((R x cos(arccos(pf))) + X x sin (arccos(pf))) x L/# x I x 1.73) / E
VOLTAGE DROP (1Ø):
%VD= ((R x cos(arccos(pf))) + X x sin(arccos(pf))) x 2 x L/# x I) / E

L = Length of circuit E = Line to line volts
C = "C" Factor from Bussman table where "C" = 1 / impedance per linear foot

IP = Primary short circuit current
Vp = Primary voltage
IS= Secondary short circuit current
Vs= Secondary voltage

%VD CUM= Cumulative Voltage Drop from Fault Point 1 to Fault Point #
R= resistance in ohms per LF
X= reactances in ohms per LF

Feeder Types =
NM – Non Magnetic Conduit, M – Magnetic Conduit, FB – Feeder Busway, PB – Plug-in Busway, TX – Transformer

Fault Point (F#)	Bus/Feeder Description	Phase	Source (Fault Point)	Source Isc (amps)	Feeder Conduit Type	Material CU or AL	#	Wire/Bus Size	Conductor 'C' value	Busway C value	L-L Volts E	Circuit Length L	Load Power Factor(pf)	Circuit Load A	Conductor Resistance R	Conductor Reactance X	Conductor Impedence, Z/ Ø	Transformer Type	kVA	Degree Rise	Z	V sec	f	M	FAULT CURRENT Isc	VOLTAGE DROP %VD	TOTAL V.D. %VD CUM	Fault Point (F#)
1	Utility Service Point			33364	at the secondary of the utility transformer								480Y/277V – 3 phase												33364			1
	Motor Contribution				The connected full load motor amps (includes compressors) on the system																				Source Isc + 6X Motor Contribution =			
2	LP1	3	33364	33364	M	CU	1	Set(s) of 250 kcmil	16483		480	85	0.9	320	0.000054	0.000052	0.451027						0.621	0.62	20584	0.70%	0.70%	2
3	XFMR	3	2	20584	M	CU	1	Set(s) of 4 AWG	3806		480	10	0.9	50	0.000310	0.000060	0.451027	TP-1	45	115	2	208	0.195	0.84	17223	0.06%	0.75%	3
4	SP2	3	3	17223	M	CU	1	Set(s) of 1/0 AWG	8925		208	160	0.9	120	0.000120	0.000055	0.451027						2.571	0.28	4823	2.11%	2.86%	4
5	SP3	3	3	17223	M	CU	1	Set(s) of 1/0 AWG	8925		208	10	0.9	120	0.000120	0.000055	0.451027						0.161	0.86	14839	0.13%	0.89%	5
6	LP8	3	2	20584	M	CU	1	Set(s) of 3/0 AWG	12844		208	150	0.9	160	0.000079	0.000052	0.451027						2.002	0.33	6857	1.87%	2.57%	6
7	XFMR	3	6	6857	M	CU	1	Set(s) of 6 AWG	2425		208	10	0.9	40	0.000490	0.000064	0.451027	TP-1	30	115	4	208	0.235	0.81	5550	0.16%	2.73%	7
8	SP10	3	7	5550	M	CU	1	Set(s) of 4 AWG	3806		208	10	0.9	50	0.000310	0.000060	0.451027						0.121	0.89	4949	0.13%	2.86%	8

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
PARTIAL SINGLE LINE DIAGRAM & PANEL SCHEDULES – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	EDM-1719 E203.dwg	E-203	SHEET No. 30 of 137

REGISTERED PROFESSIONAL ENGINEER DAVID D. HAAKE E 16137 ELECTRICAL STATE OF CALIFORNIA

Jun 12 2014

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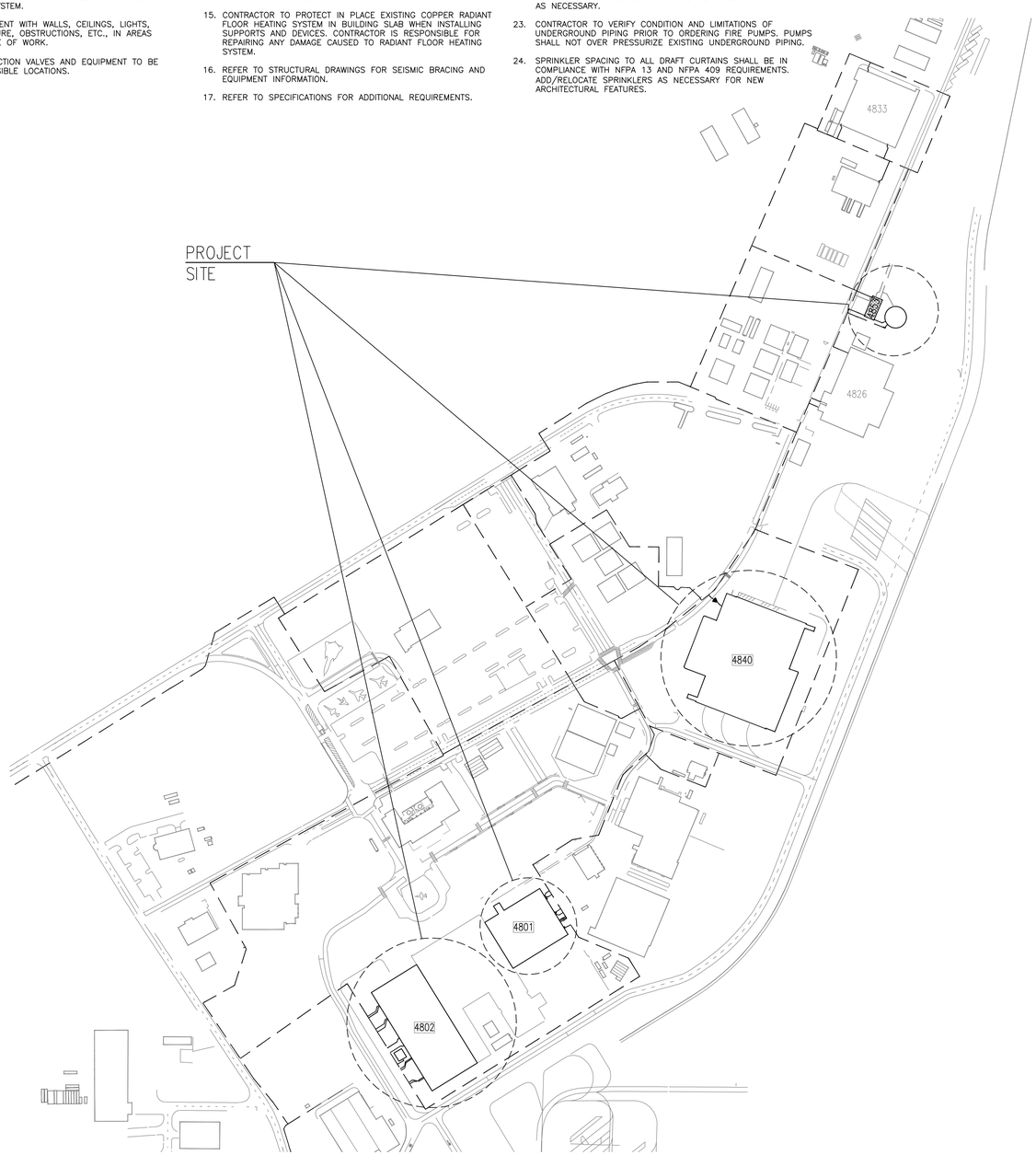
DAVID D. HAAKE

FIRE PROTECTION GENERAL NOTES

1. FIRE PROTECTION SYSTEM DESIGN, INSTALLATION AND MATERIALS SHALL BE IN ACCORDANCE WITH NFPA 11, NFPA 13, NFPA 70, NFPA 72, NFPA 409, AND ETL 02-15 WHERE APPLICABLE. SYSTEM SHALL ALSO MEET ALL APPLICABLE BUILDING CODES, FIRE CODES AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. VERIFY REQUIREMENTS PRIOR TO BID SUBMITTAL.
2. INFORMATION ON CONTRACT DOCUMENTS IS GENERAL INFORMATION AND FOR BID PURPOSES ONLY. PERFORM REQUIRED CALCULATIONS AND COORDINATE WITH OTHER TRADES.
3. PERFORM ALL WORK ACCORDING TO THE PHASING SCHEDULE FOR THIS PROJECT.
4. PROVIDE ADDITIONAL MATERIALS AND LABOR REQUIRED DUE TO LACK OF COORDINATION OR TO MEET CONTRACTING OFFICER REQUIREMENTS AT NO ADDITIONAL COST TO THE OWNER.
5. MODIFY AND ADD TO EXISTING FIRE PROTECTION SYSTEMS AS SPECIFIED ON PLANS. RELOCATE AND/OR PROVIDE ADDITIONAL EQUIPMENT AS REQUIRED FOR A COMPLETE AND OPERATIONAL FIRE PROTECTION SYSTEM.
6. COORDINATE EQUIPMENT WITH WALLS, CEILINGS, LIGHTS, DIFFUSERS, STRUCTURE, OBSTRUCTIONS, ETC., IN AREAS AFFECTED BY SCOPE OF WORK.
7. ALL DELUGE/PRE-ACTION VALVES AND EQUIPMENT TO BE MOUNTED IN ACCESSIBLE LOCATIONS.
8. ALL FOAM CONCENTRATE PIPING AND FITTINGS SHALL BE STAINLESS STEEL.
9. REMOVE ALL ABANDONED PIPING, FITTINGS, HANGERS, ETC.
10. DO NOT CONNECT MORE THAN ONE SPRINKLER TO AN EXISTING ONE-INCH OUTLET.
11. COORDINATE PIPE ROUTING NEAR ELECTRICAL EQUIPMENT WITH NFPA 70.
12. PROVIDE NEW FIRE ALARM EQUIPMENT COMPATIBLE WITH AND CONNECTED TO THE EXISTING FIRE ALARM SYSTEM.
13. COORDINATE FIRE PROTECTION SYSTEM MODIFICATIONS TO MINIMIZE SYSTEM IMPAIRMENT. PROVIDE FIRE WATCH AND/OR INTERIM FIRE PROTECTION MEASURES WHERE REQUIRED BY THE CONTRACTING OFFICER.
14. FORWARD COMPLETED CONTRACTOR MATERIAL TEST CERTIFICATES TO THE CONTRACTING OFFICER.
15. CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.
16. REFER TO STRUCTURAL DRAWINGS FOR SEISMIC BRACING AND EQUIPMENT INFORMATION.
17. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
18. OWNER RETAINS RIGHTS OF SALVAGE FOR EQUIPMENT AND FIXTURES TO BE REMOVED. COORDINATE WITH THE OWNER THE EQUIPMENT AND FIXTURES TO BE SALVAGED AND THE LOCATION FOR STORAGE. AVOID DAMAGE TO EQUIPMENT, FIXTURE AND DEVICES DURING DEMOLITION WORK AND DURING TRANSPORT TO OWNER'S DESIGNATED STORAGE LOCATION.
19. SEAL ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS, AND ROOFS FOR NEW AND REMOVED PIPING, CONDUIT AND EQUIPMENT.
20. INSTALL DELUGE VALVES AND NEW EQUIPMENT FOR FOAM SYSTEM TO NOT OPEN WHEN ABORT SWITCH IS PUSHED.
21. ALL CONTROL VALVES AND SIGNALING DEVICES SHALL BE CONNECTED TO THE ALARM PANEL.
22. CONTRACTOR TO FIELD VERIFY ALL RELOCATED DELUGE VALVES AND ASSOCIATED EQUIPMENT ARE FUNCTIONAL AND IN GOOD WORKING ORDER. NON-WORKING COMPONENTS OR COMPONENTS IN NEED OF MAINTENANCE SHALL BE REPLACED OR REPAIRED AS NECESSARY.
23. CONTRACTOR TO VERIFY CONDITION AND LIMITATIONS OF UNDERGROUND PIPING PRIOR TO ORDERING FIRE PUMPS. PUMPS SHALL NOT OVER PRESSURIZE EXISTING UNDERGROUND PIPING.
24. SPRINKLER SPACING TO ALL DRAFT CURTAINS SHALL BE IN COMPLIANCE WITH NFPA 13 AND NFPA 409 REQUIREMENTS. ADD/RELOCATE SPRINKLERS AS NECESSARY FOR NEW ARCHITECTURAL FEATURES.
25. PRE-ACTION SYSTEMS EXCEEDING 500 GALLONS IN VOLUME WILL REQUIRE A QUICK OPENING DEVICE CONNECTED TO VALVE TRIM AND EQUIPMENT.
26. ALL STRAINERS TO BE MOUNTED IN ACCESSIBLE LOCATIONS AND SHALL MEET MANUFACTURER RECOMMENDATIONS ON CLEARANCE REQUIREMENTS FOR MAINTENANCE.



2 FIRE PROTECTION OVERALL SITE PLAN
SCALE: 1"=200'-0"

N
0 100' 200' 300'
SCALE: 1"=200'-0"

SYMBOLS LEGEND

EQUIPMENT LINETYPE LEGEND

- DEMOLITION
- EXISTING TO REMAIN
- NEW

FIRE SPRINKLERS

- DEMOLITION UPRIGHT SPRINKLER
- DEMOLITION PENDENT SPRINKLER
- DEMOLITION SIDEWALL SPRINKLER
- EXISTING UPRIGHT SPRINKLER
- EXISTING PENDENT SPRINKLER
- NEW UPRIGHT SPRINKLER
- NEW PENDENT SPRINKLER
- NEW SIDEWALL SPRINKLER

PIPING

- PIPING
- UNDERGROUND PIPE (REFER TO CIVIL)
- TEST PORT
- SHUTOFF VALVE
- CHECK VALVE
- STRAINER
- REDUCER
- PRESSURE REDUCING VALVE
- PROPORTIONER
- HYDRAULIC CONTROL VALVE
- CAP
- RISER
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- FIRE DEPARTMENT CONNECTION
- INSPECTOR'S TEST CONNECTION / AUXILIARY DRAIN
- FIRE HYDRANT
- SPRINKLER RISER
- TOP BEAM CLAMP
- TRAPEZE HANGER

HYDRAULIC CALCULATIONS

- (XX) HYDRAULIC REFERENCE NODE POINT

GENERAL

- NOT IN SCOPE
- DRAFT CURTAIN

SYMBOLS LEGEND

EQUIPMENT LINETYPE LEGEND

- DEMOLITION
- EXISTING TO REMAIN
- NEW

FOAM SUPPRESSION

- FOAM SYSTEM RISER
- OSCILLATING MONITOR NOZZLE
- FIRE OR FOAM PUMP
- FOAM JOCKEY PUMP
- SURGE SUPPRESSER TANK
- VERTICAL FOAM ATMOSPHERIC STORAGE TANK
- HORIZONTAL FOAM ATMOSPHERIC STORAGE TANK
- HORIZONTAL FOAM BLADDER TANK
- HAND HOSE RISER
- HAND HOSE STATION
- HIGH EXPANSION FOAM GENERATOR

ANNOTATION

- (1) FIRE PROTECTION PLAN CALLOUT
- CONNECTION POINT OF NEW WORK TO EXISTING
- (1/M1) DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- (1/M1) SECTION CUT DESIGNATION

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	NIC	NOT IN CONTRACT
AFG	ABOVE FINISHED GRADE	NTS	NOT TO SCALE
CD	CANDELA	OC	ON CENTER
DI	DUCTILE IRON	PIV	POST INDICATOR VALVE
ESFR	EARLY SUPPRESSION FAST RESPONSE	PROVIDE	FURNISH AND INSTALL
ETR	EXISTING TO REMAIN	PRV	PRESSURE REDUCING VALVE
FHC	FIRE HOSE CABINET	RD	RETURN DUCT
FP	FIRE PROTECTION	REV	REVISION
GC	GENERAL CONTRACTOR	SD	SUPPLY DUCT
GPM	GALLONS PER MINUTE	SF	SQUARE FEET
JB	JUNCTION BOX	TYP	TYPICAL
MAX	MAXIMUM	UL	UNDERWRITERS LABORATORIES, INC.
MIN	MINIMUM	UNO	UNLESS NOTED OTHERWISE
N/A	NOT APPLICABLE	V	VOLT(S)
		WP	WEATHERPROOF

SYMBOLS LEGEND

EQUIPMENT LINETYPE LEGEND

- DEMOLITION
- EXISTING TO REMAIN
- NEW

FIRE ALARM

- FACP FIRE ALARM CONTROL PANEL/UNIT
- FPC FIRE OR FOAM PUMP CONTROLLER
- DRP DELUGE (PREACTION) RELEASING PANEL
- A FOAM SYSTEM ABORT SWITCH
- FIRE ALARM PULL STATION
- M FOAM AND PREACTION SYSTEM MANUAL RELEASE PULL STATION
- UV/IR DETECTOR
- A AMBER STROBE
- BELL/STROBE
- HEAT DETECTOR
- F EXISTING WALL MOUNTED AUDIBLE NOTIFICATION APPLIANCE
- VT CONTROL VALVE TAMPER SWITCH
- PS HIGH/LOW PRESSURE SWITCH
- FS FLOW SWITCH
- HL HIGH/LOW LEVEL TANK SENSOR
- MM MONITOR MODULE
- BEACON LIGHT

STANDARD MOUNTING HEIGHTS

(AFF, AFG, UNLESS NOTED OTHERWISE)

FIRE ALARM	
AUDIBLE APPLIANCES (CENTERLINE)	84"
FIRE ALARM ANNUNCIATOR PANEL (DISPLAY)	60"
FIRE ALARM BELL (EXTERIOR)	120"
FIRE ALARM CONTROL PANEL/UNIT (DISPLAY)	60"
PULL STATIONS (HANDLE)	48"
VISIBLE APPLIANCES (CENTERLINE)	84"

PIPE TABLE

PRODUCT	NOMINAL PIPE SIZE	INSIDE DIAMETER
SCHEDULE 40	1"	1.049
SCHEDULE 40	1¼"	1.380
SCHEDULE 40	1½"	1.610
SCHEDULE 40	2"	2.067
SCHEDULE 40	3"	3.042
SCHEDULE 40	4"	3.998
SCHEDULE 40	6"	6.031
SCHEDULE 40	8"	7.942

PIPE TABLE (UNDERGROUND)

PRODUCT	NOMINAL PIPE SIZE	INSIDE DIAMETER
PVC	6"	6.09
PVC	8"	7.98
PVC	10"	9.79
PVC	12"	11.65
PVC	16"	15.53
PVC	18"	17.20
PVC	20"	19.06
PVC	24"	22.76

PIPE SIZES SHOWN ARE FOR HYDRAULIC CALCULATIONS PURPOSES ONLY. REFER TO SPECIFICATIONS FOR ALLOWABLE SUBSTITUTIONS.

1 PIPE DIMENSION TABLE
NO SCALE

NOTE:
EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS & SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY ALL EXISTING CONDITIONS. CAREFULLY COORDINATE NEW WORK AND DEMOLITION WITH ALL OTHER DISCIPLINES AND EXISTING CONDITIONS.

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE PROTECTION OVERALL SITE PLAN AND LEGEND

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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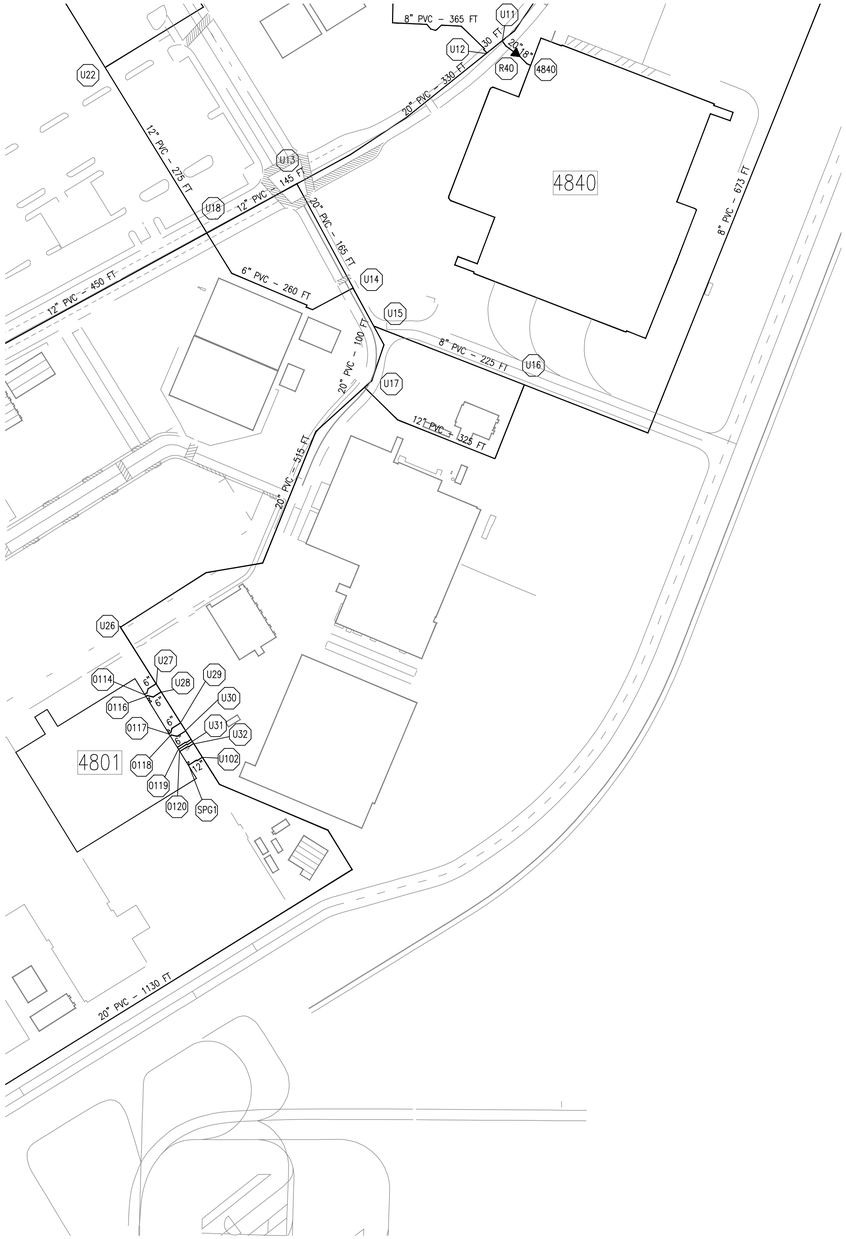
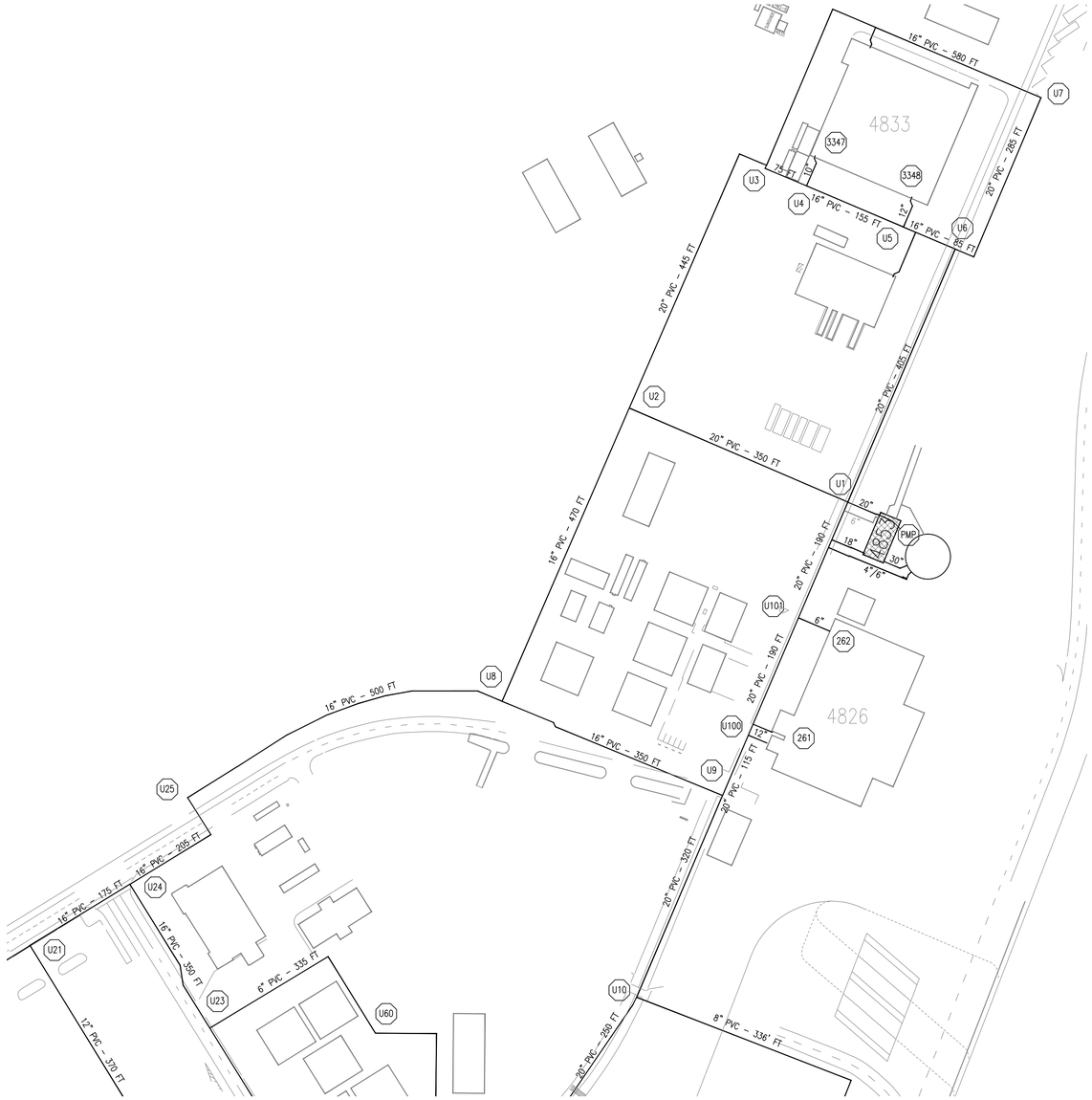
SCALE	1"=200'	TRADE SH. No.	EDM-1719
FILE NAME	EDM-1719 F000.dwg	F-000	SHEET No. 31 of 137

DARRELL E. STEIN



2 FIRE PROTECTION SITE PLAN – SECTION B
SCALE: 1"=100'-0"



1 FIRE PROTECTION SITE PLAN – SECTION A
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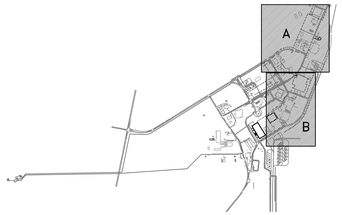

KEY PLAN

REGISTERED PROFESSIONAL ENGINEER
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FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE PROTECTION ENLARGED SITE PLAN

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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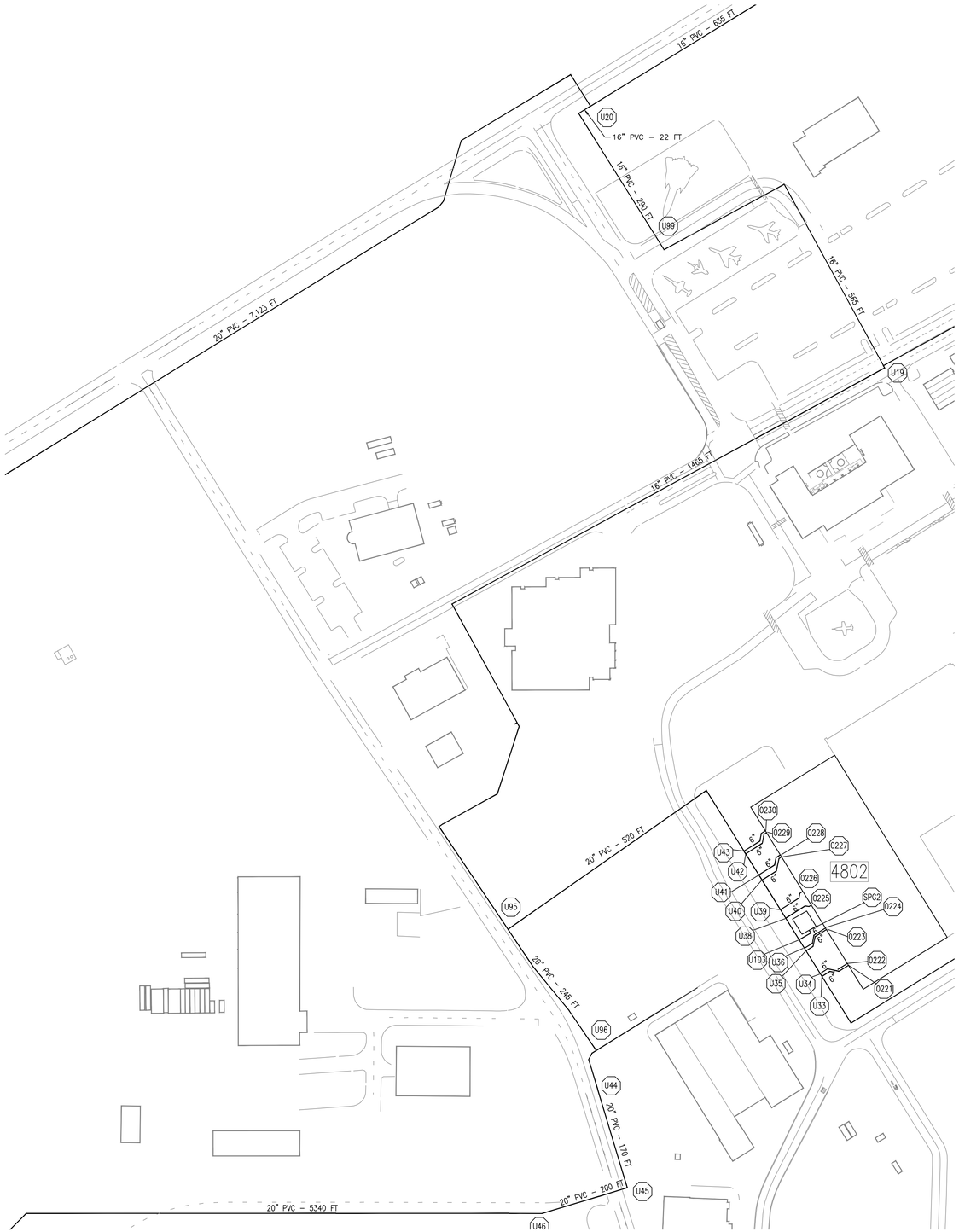
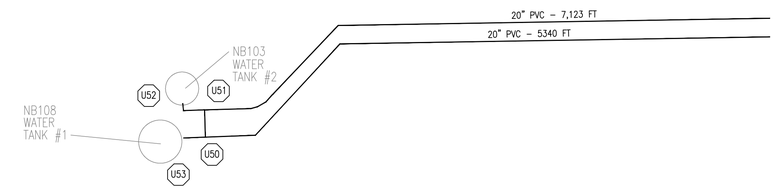
FILE NAME	EDM-1719 F001.dwg	F-001	SHEET No. 32 of 137

DARRELL E. STEIN



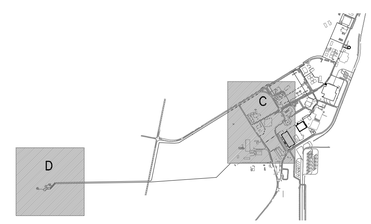
2 FIRE PROTECTION SITE PLAN – SECTION C
SCALE: 1"=100'–0"

0 50' 100' 150'
SCALE: 1"=100'–0"



1 FIRE PROTECTION SITE PLAN – SECTION D
SCALE: 1"=100'–0"

0 50' 100' 150'
SCALE: 1"=100'–0"



KEY PLAN

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Jun 12 2014

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03–20–13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE PROTECTION ENLARGED SITE PLAN

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
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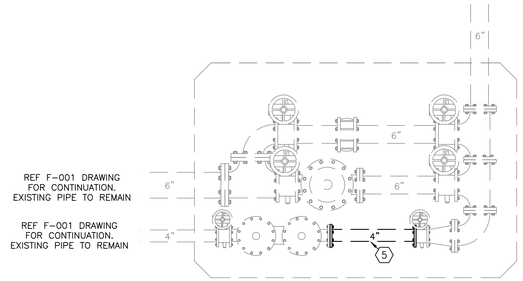
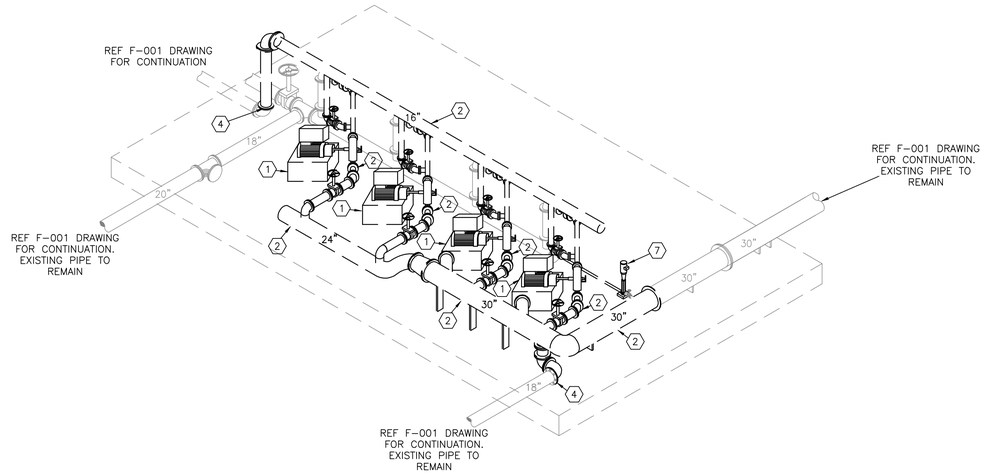
DARRELL E. STEIN

PUMP ROOM AND TANK DEMOLITION PLAN NOTES:

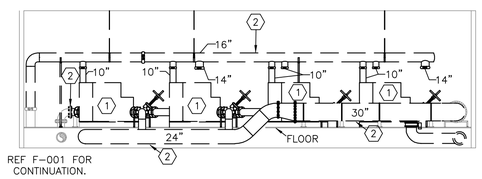
1. REMOVE EXISTING FIRE PUMPS, DIESEL EXHAUST VENTS, CONCRETE BASES, AND ALL ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
2. REMOVE PIPING, FITTINGS AND VALVES AS SHOWN.
3. REMOVE EXISTING DIESEL FUEL TANKS AND CONCRETE CONTAINMENT ENCLOSURES. TANKS TO BE PROPERLY EMPTIED AND CLEANED PRIOR TO REMOVAL FROM SITE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
4. CAP EXISTING PIPE NOT INTENDED FOR REUSE.
5. REMOVE PORTION OF PIPING AS SHOWN.
6. REMOVE DIESEL FUEL STORAGE TANK. TANK TO BE PROPERLY EMPTIED AND CLEANED PRIOR TO REMOVAL FROM SITE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION
7. REMOVE JOCKEY PUMP, ASSOCIATED EQUIPMENT AND PIPING.
8. REMOVE PUMP CONTROL PANEL AND ASSOCIATED EQUIPMENT.



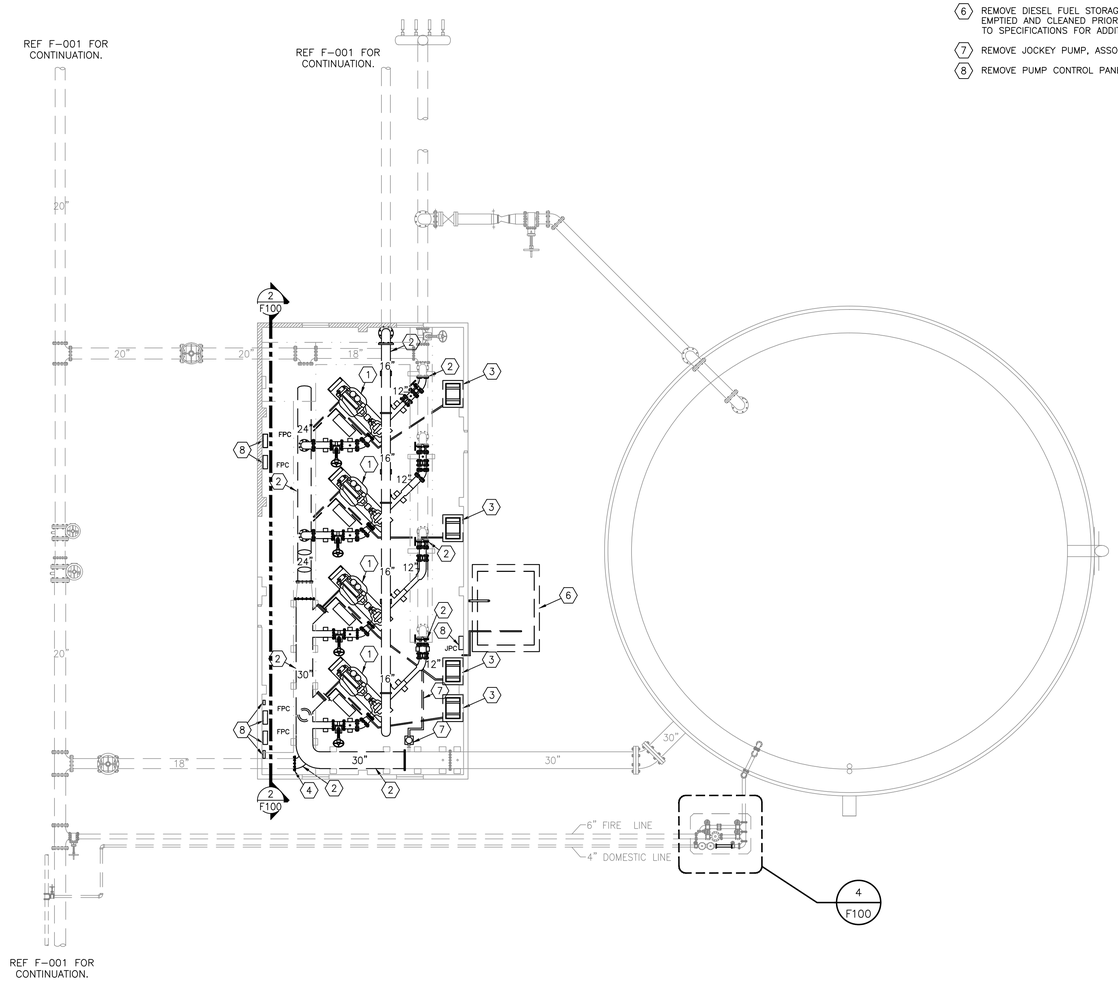
4 UNDERGROUND VAULT DEMOLITION PLAN
SCALE: 1/2"=1'-0"



3 PUMP ROOM DEMOLITION ISOMETRIC VIEW
SCALE: 3/32"=1'-0"



2 PUMP ROOM SECTION A-A DEMOLITION PLAN – BUILDING 4853
SCALE: 3/32"=1'-0"



1 PUMP ROOM AND TANK DEMOLITION PLAN – BUILDING 4853
SCALE: 3/32"=1'-0"

N

0 4' 8' 12' 16'
SCALE: 3/32"=1'-0"

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DRAWING TITLE
FIRE SPRINKLER OVERALL DEMOLITION PLAN – BUILDING 4853

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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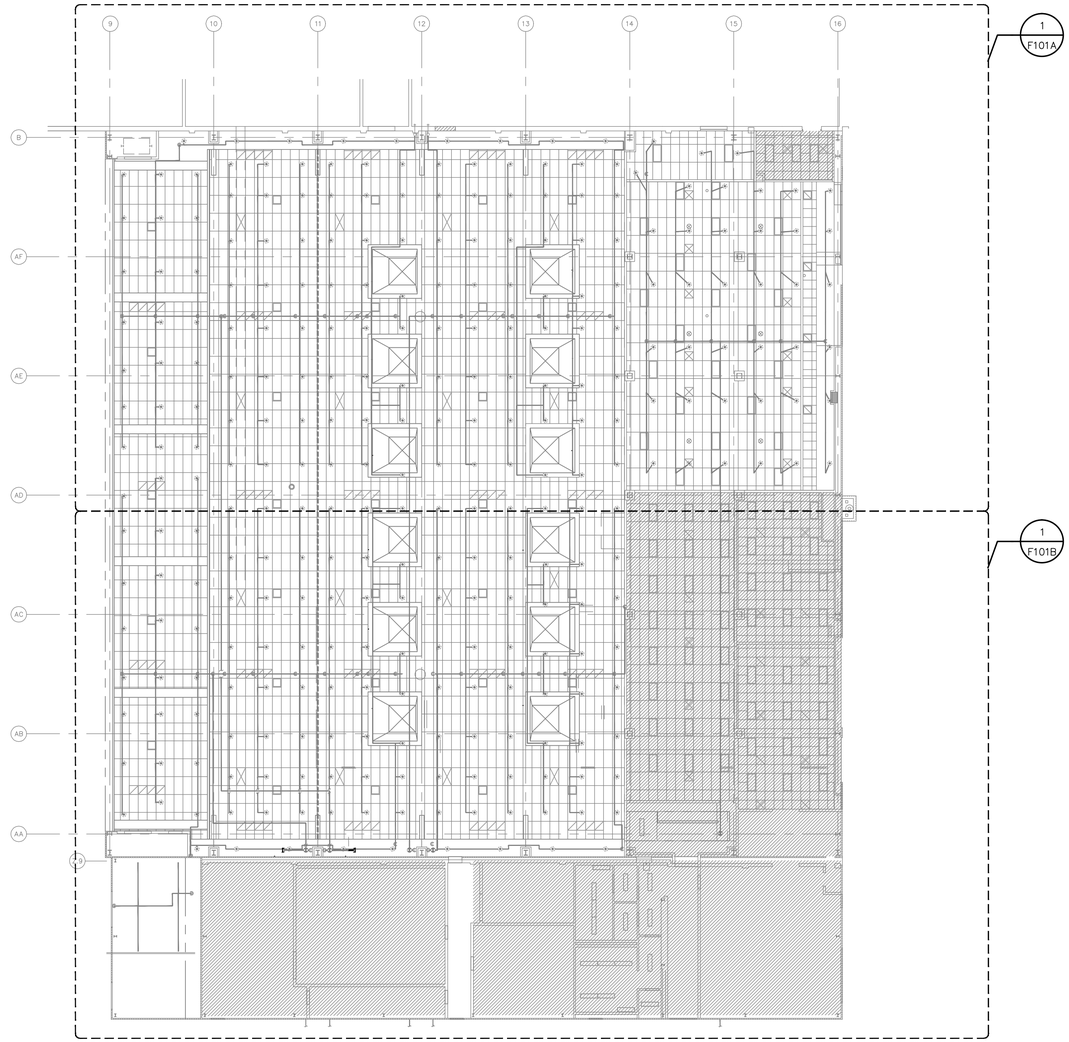
DRAWN BY	HEI	EDM-1719	
SCALE	VARIES	TRADE SH. No.	
FILE NAME	EDM-1719 F100.dwg	F-100	SHEET No. 34 of 137

DARRELL E. STEIN

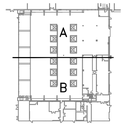


1 FIRE SPRINKLER OVERALL DEMOLITION PLAN – BUILDING 4801
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
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Jun 12 2014

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER OVERALL DEMOLITION PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

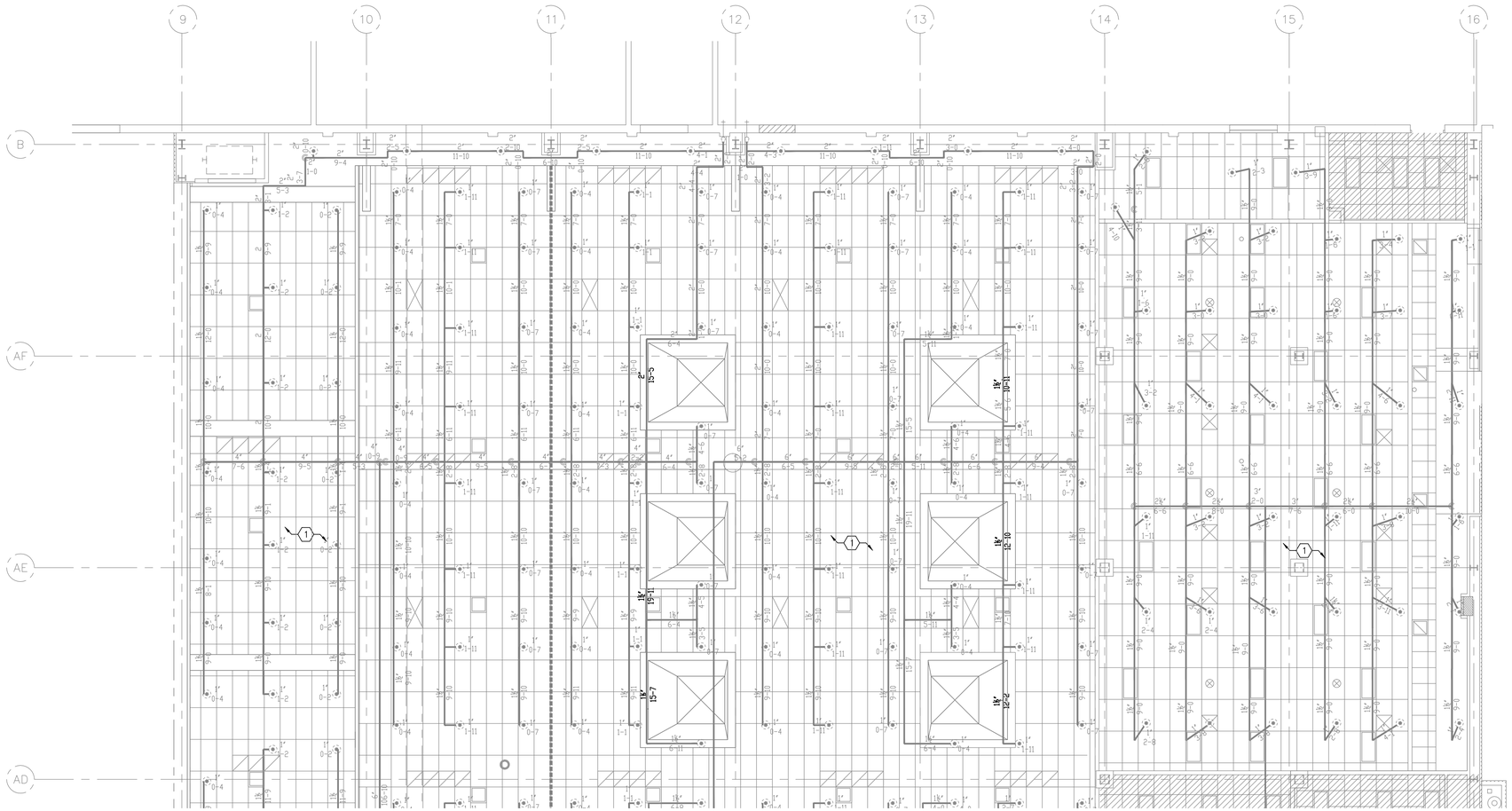
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM–1719
SCALE	1/16"=1'–0"	TRADE SH. No.	
FILE NAME	EDM–1719 F101.dwg	F–101	SHEET No. 35 of 137

DARRELL E. STEIN

FIRE SPRINKLER DEMOLITION PLAN NOTES:

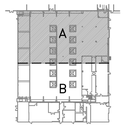
(1) EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.



1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA A
SCALE: 1/8"=1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
www.hei-eng.com
1250001459

FOR CONSTRUCTION

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F101A.dwg	F-101A	SHEET No. 36 of 137

DARRELL E. STEIN

FIRE SPRINKLER DEMOLITION PLAN NOTES:

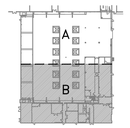
1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. REMOVE RISER MANIFOLD PIPING AT GROUND LEVEL.

1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA B

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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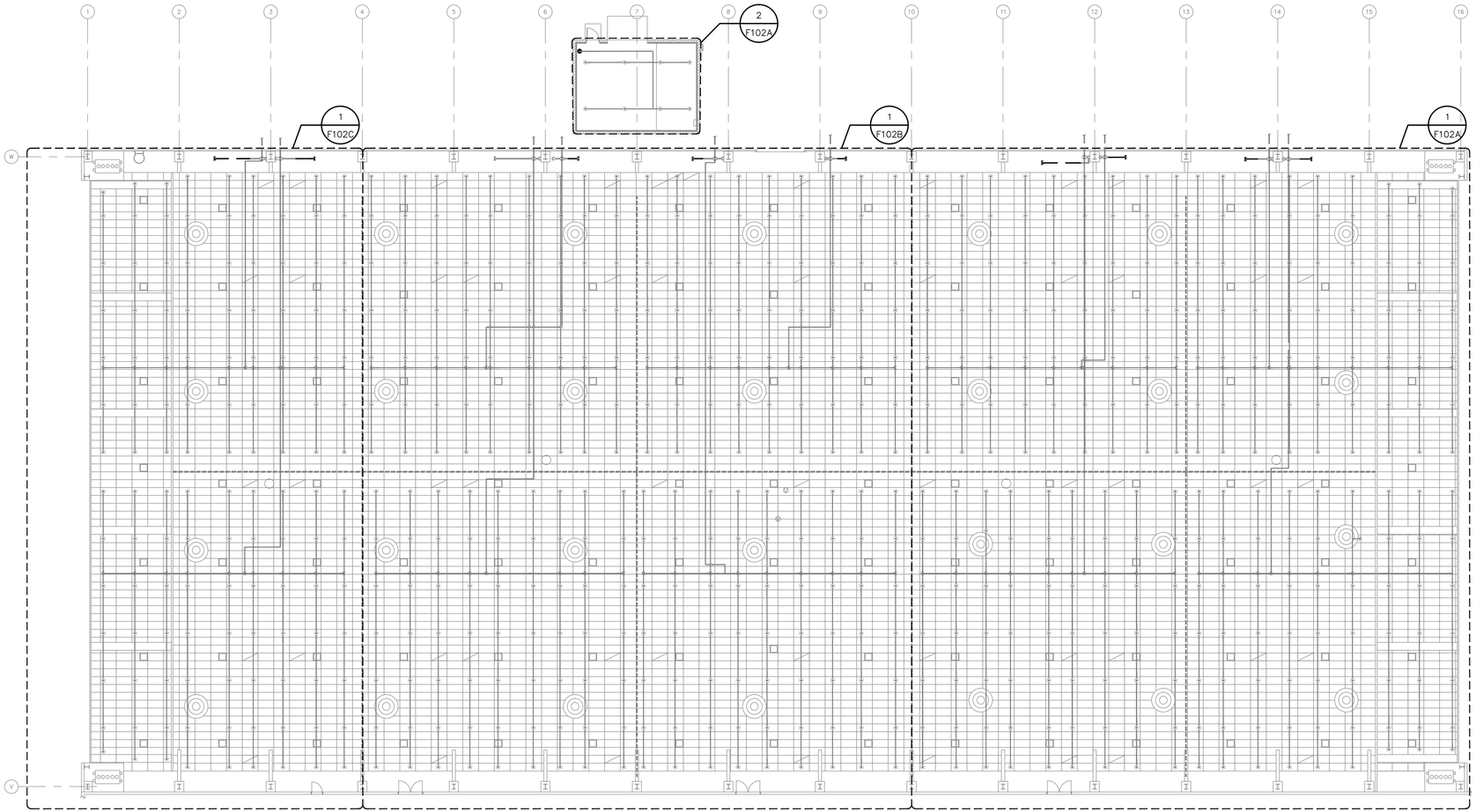
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F101B.dwg	F-101B	SHEET No. 37 of 137

DARRELL E. STEIN



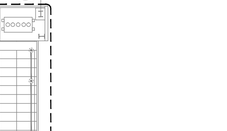
1 FIRE SPRINKLER OVERALL DEMOLITION PLAN – BUILDING 4802
SCALE: 1/16"=1'-0"

N

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

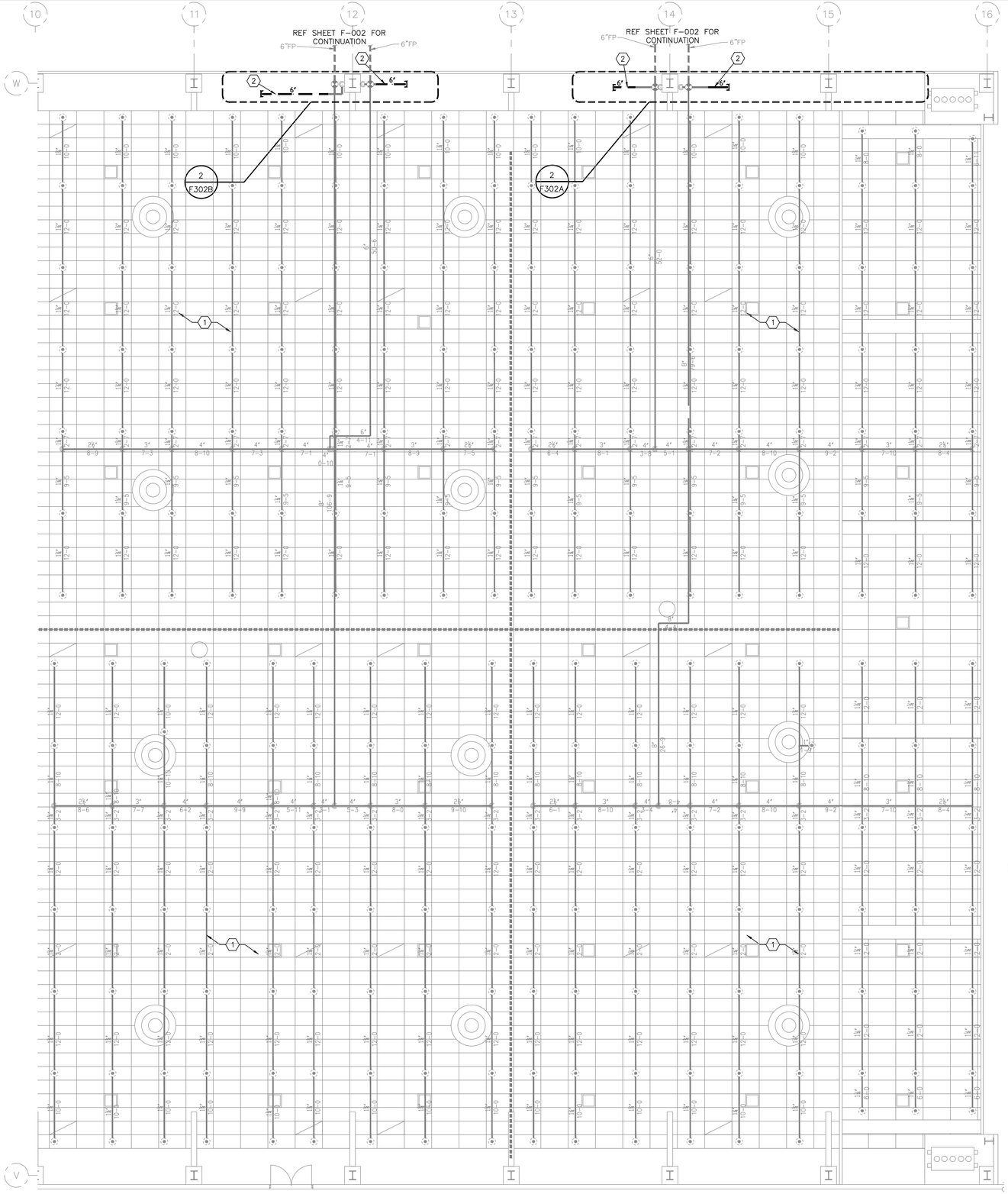
DRAWING TITLE
FIRE SPRINKLER OVERALL DEMOLITION PLAN – BUILDING 4802

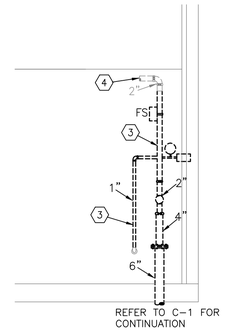
PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F102.dwg	F-102	SHEET No. 38 of 137

DARRELL E. STEIN





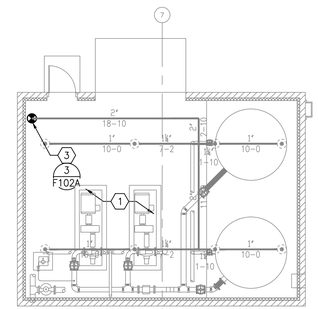
3 FIRE SPRINKLER RISER – BUILDING 4802

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

0 2' 4' 6'
SCALE: 1/4"=1'-0"

FIRE SPRINKLER DEMOLITION PLAN NOTES:

1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. REMOVE RISER MANIFOLD PIPING AT GROUND LEVEL.
3. REMOVE SPRINKLER RISER PIPING AND EQUIPMENT AS SHOWN.
4. EXISTING SPRINKLER RISER PIPING TO REMAIN AS SHOWN.



2 FIRE SPRINKLER FOAM PUMP ROOM ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA A

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

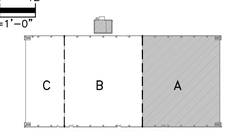
0 4' 8' 12'
SCALE: 1/8"=1'-0"

1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA A

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
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03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

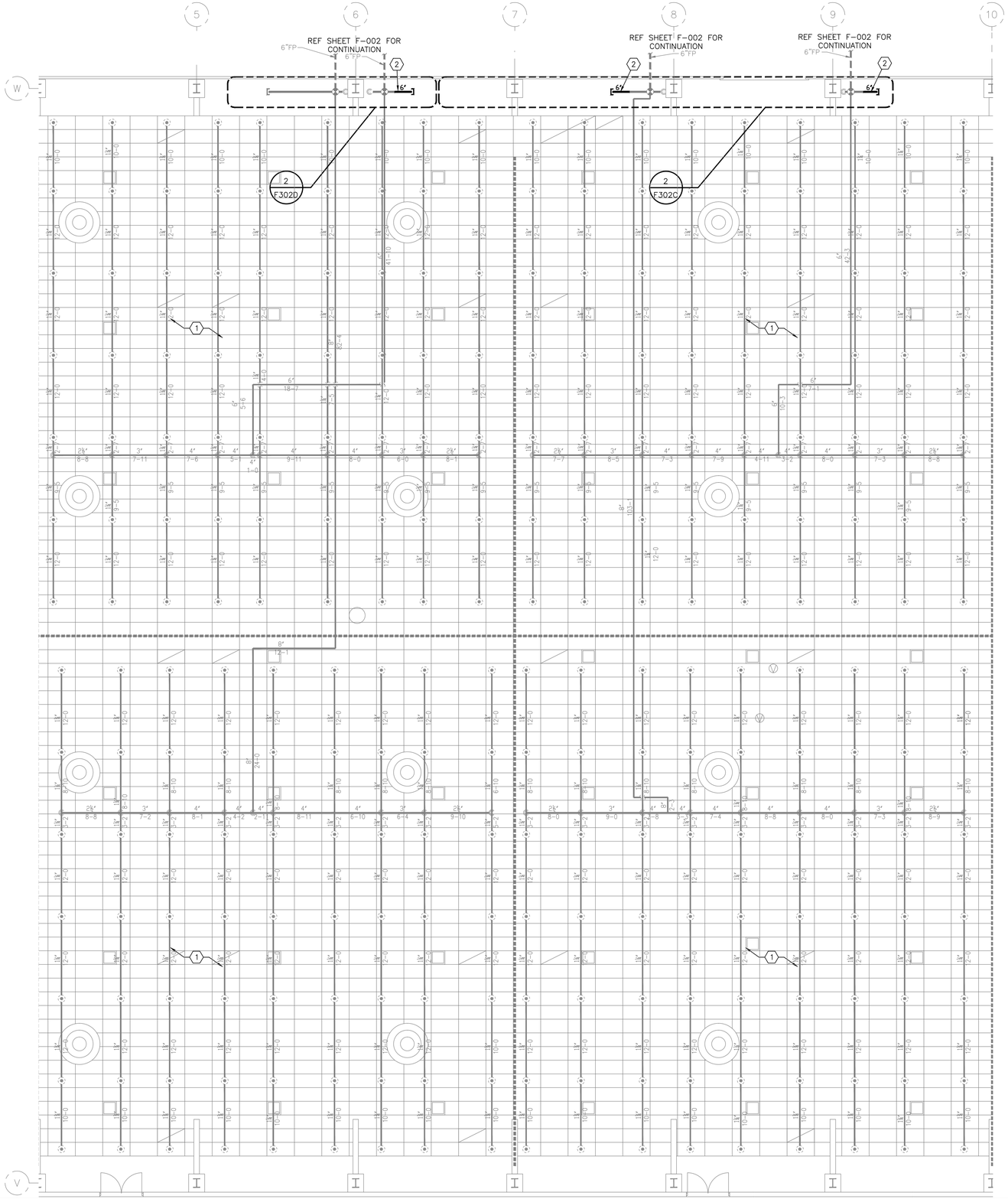
DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F102A.dwg	F-102A	SHEET No. 39 of 137

DARRELL E. STEIN



FIRE SPRINKLER DEMOLITION PLAN NOTES:

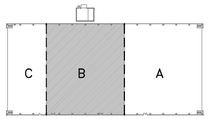
1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. REMOVE RISER MANIFOLD PIPING AT GROUND LEVEL.

1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA B

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
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FOR CONSTRUCTION

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

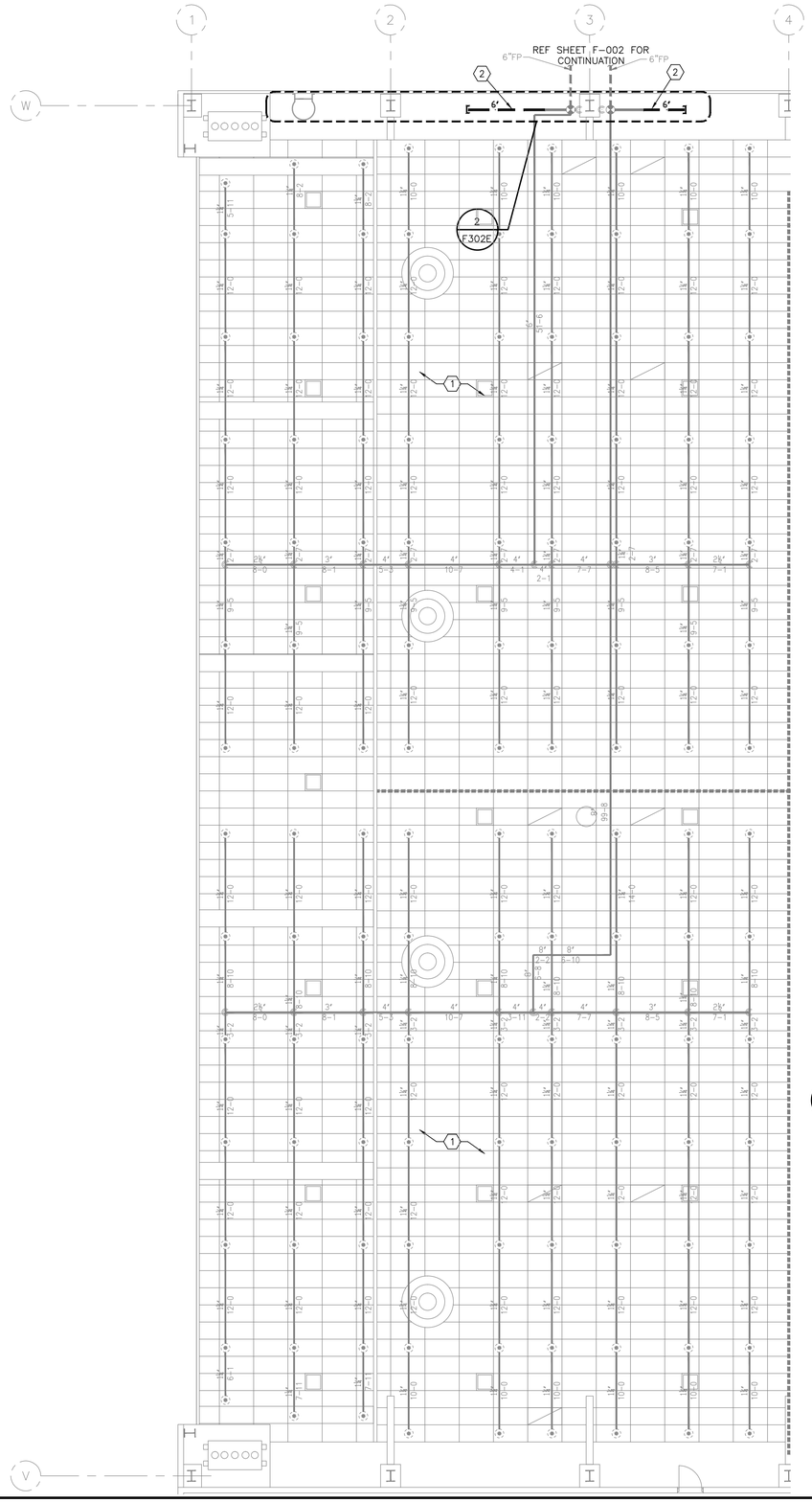
DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	1/8"=1'-0"	TRADE Sh. No.	EDM-1719
FILE NAME	EDM-1719 F102B.dwg	F-102B	SHEET No. 40 of 137

DARRELL E. STEIN



FIRE SPRINKLER DEMOLITION PLAN NOTES:

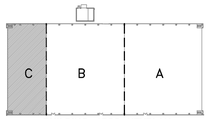
1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. REMOVE RISER MANIFOLD PIPING AT GROUND LEVEL.

1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA C

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

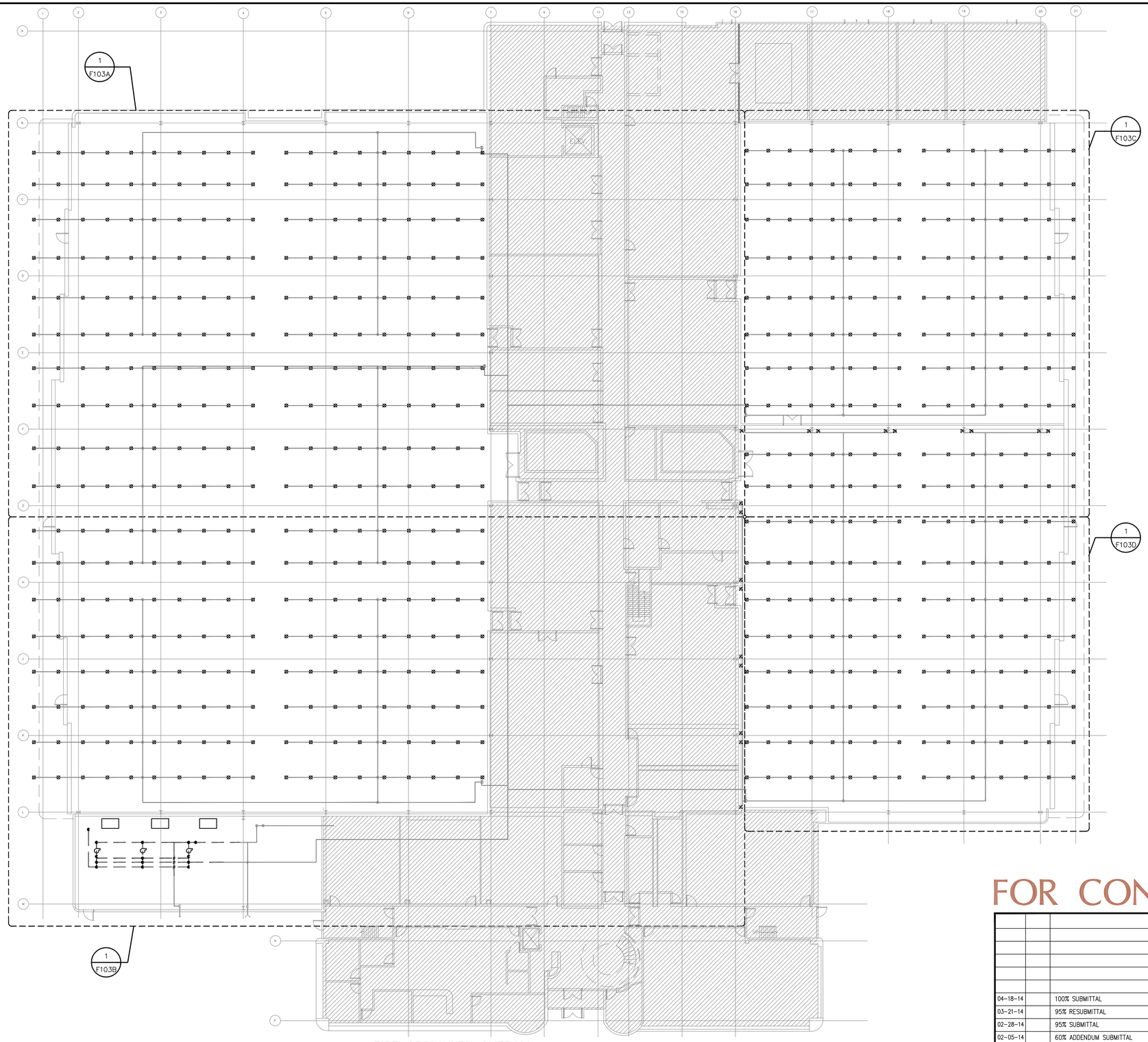
DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	1/8"=1'-0"	TRADE Sh. No.	EDM-1719
FILE NAME	EDM-1719 F102C.dwg	F-102C	SHEET No. 41 of 137

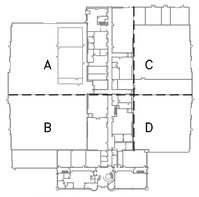
DARRELL E. STEIN



1 FIRE SPRINKLER OVERALL DEMOLITION PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

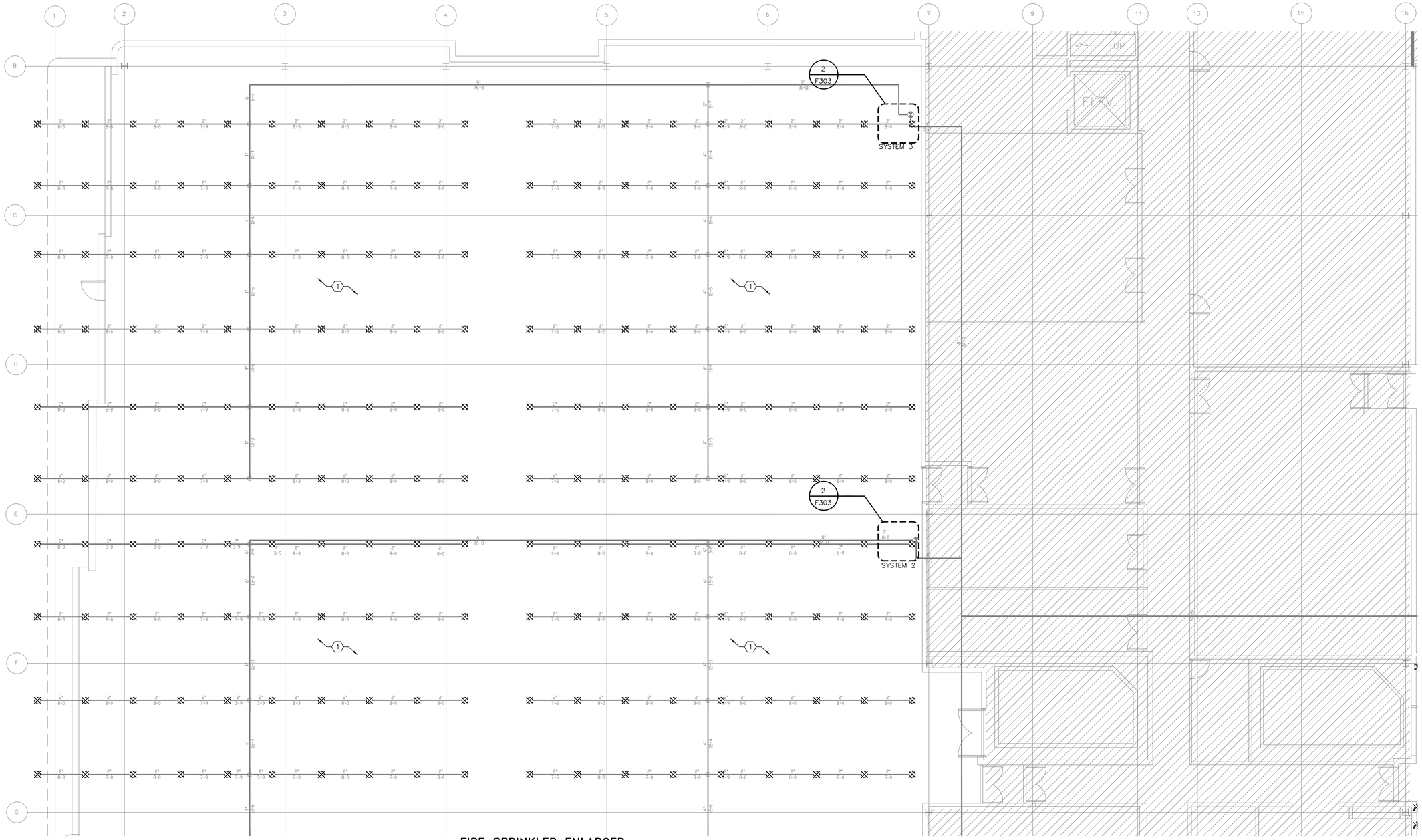
DRAWING TITLE
FIRE SPRINKLER OVERALL DEMOLITION PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F103.dwg	F-103	SHEET No. 42 of 137

DARRELL E. STEIN



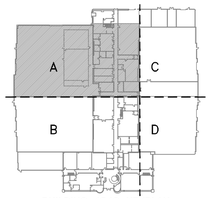
FIRE SPRINKLER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING OPEN-ORIFICE SPRINKLERS IN THIS AREA. SPRINKLER PIPING EXISTING TO REMAIN.

1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA A

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4840 KEYPLAN

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
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02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F103A.dwg	F-103A	SHEET No. 43 of 137

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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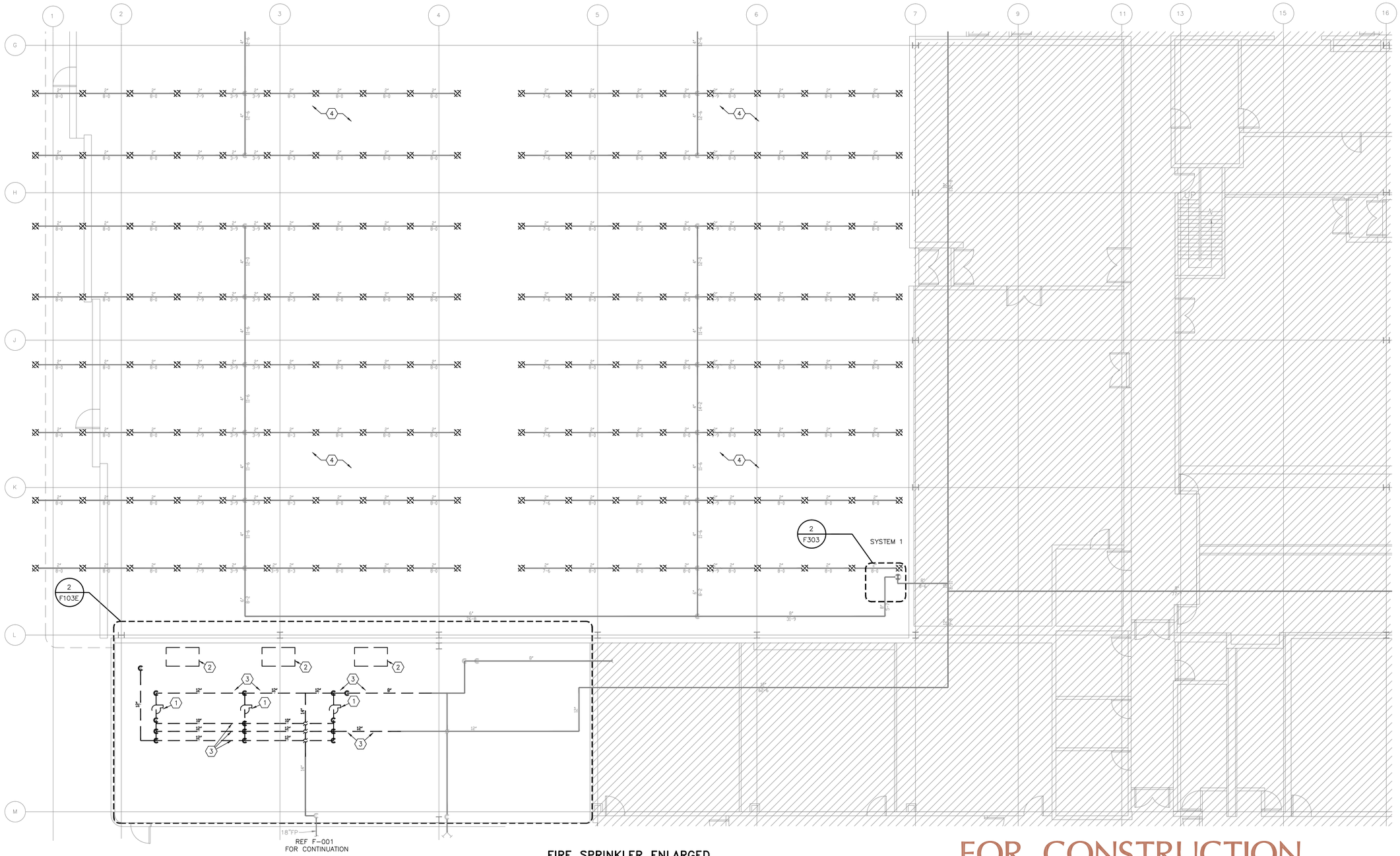
DARRELL E. STEIN



FIRE SPRINKLER DEMOLITION PLAN NOTES:

1. REMOVE FIRE PUMPS, CONCRETE BASES, AND ALL ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
2. REMOVE DIESEL STORAGE TANKS AND CONCRETE CONTAINMENT ENCLOSURES. TANKS TO BE PROPERLY EMPTIED AND CLEANED PRIOR TO REMOVAL FROM SITE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
3. REMOVE PIPING, HANGERS AND ASSOCIATED VALVES.
4. REMOVE ALL EXISTING OPEN-ORIFICE SPRINKLERS IN THIS AREA. SPRINKLER PIPING EXISTING TO REMAIN.

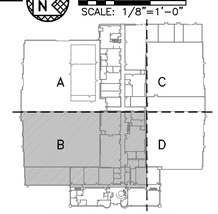
1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA B

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

N

0 4' 8' 12'

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



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

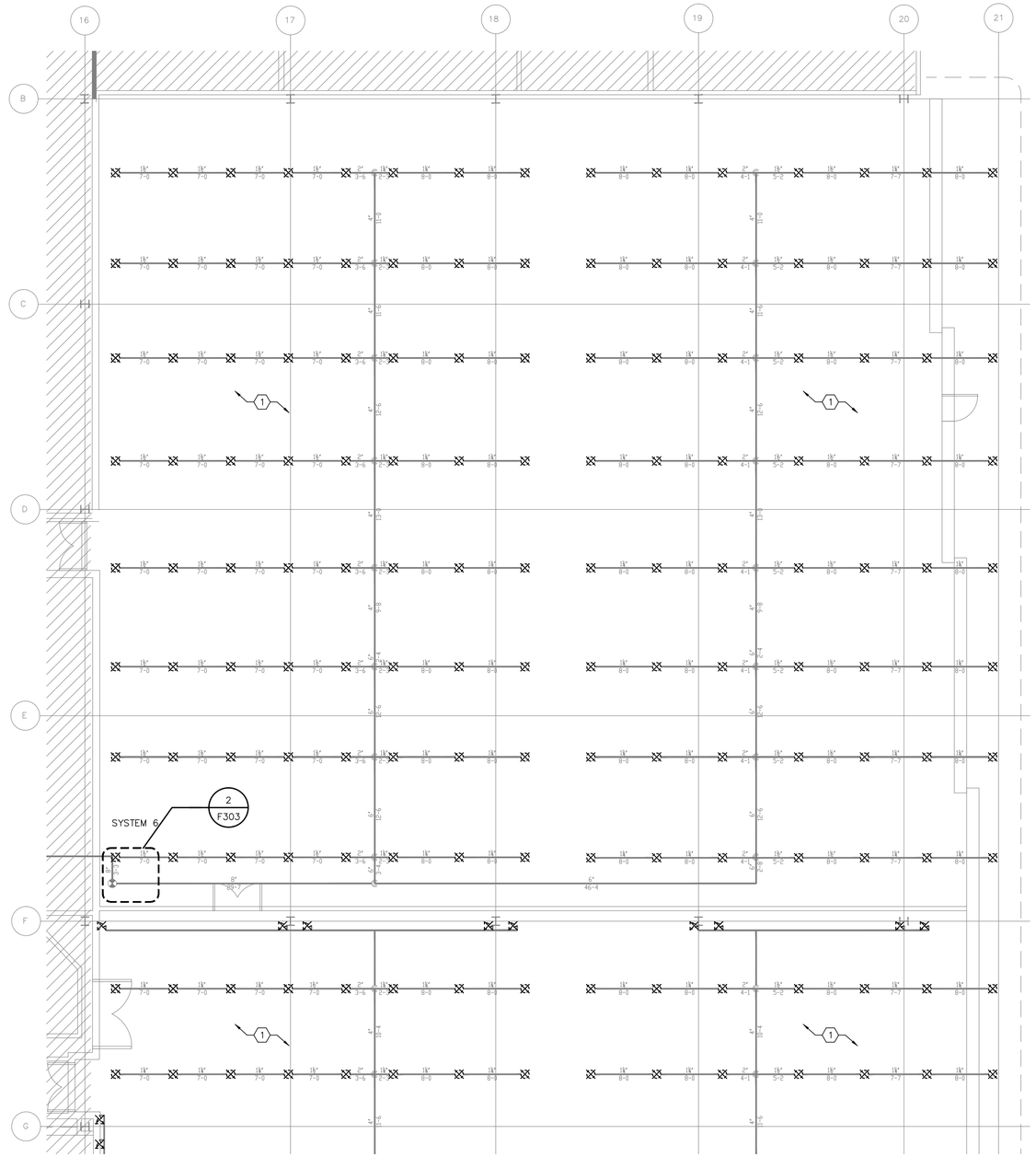
DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F103B.dwg	F-103B	SHEET No. 44 of 137

DARRELL E. STEIN



FIRE SPRINKLER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING OPEN-ORIFICE SPRINKLERS IN THIS AREA. SPRINKLER PIPING EXISTING TO REMAIN.

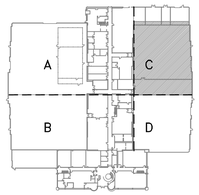
1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA C

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

N

0 4' 8' 12'

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



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
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FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	1/8"=1'-0"	TRADE Sh. No.	F-103C
FILE NAME	EDM-1719 F103C.dwg		

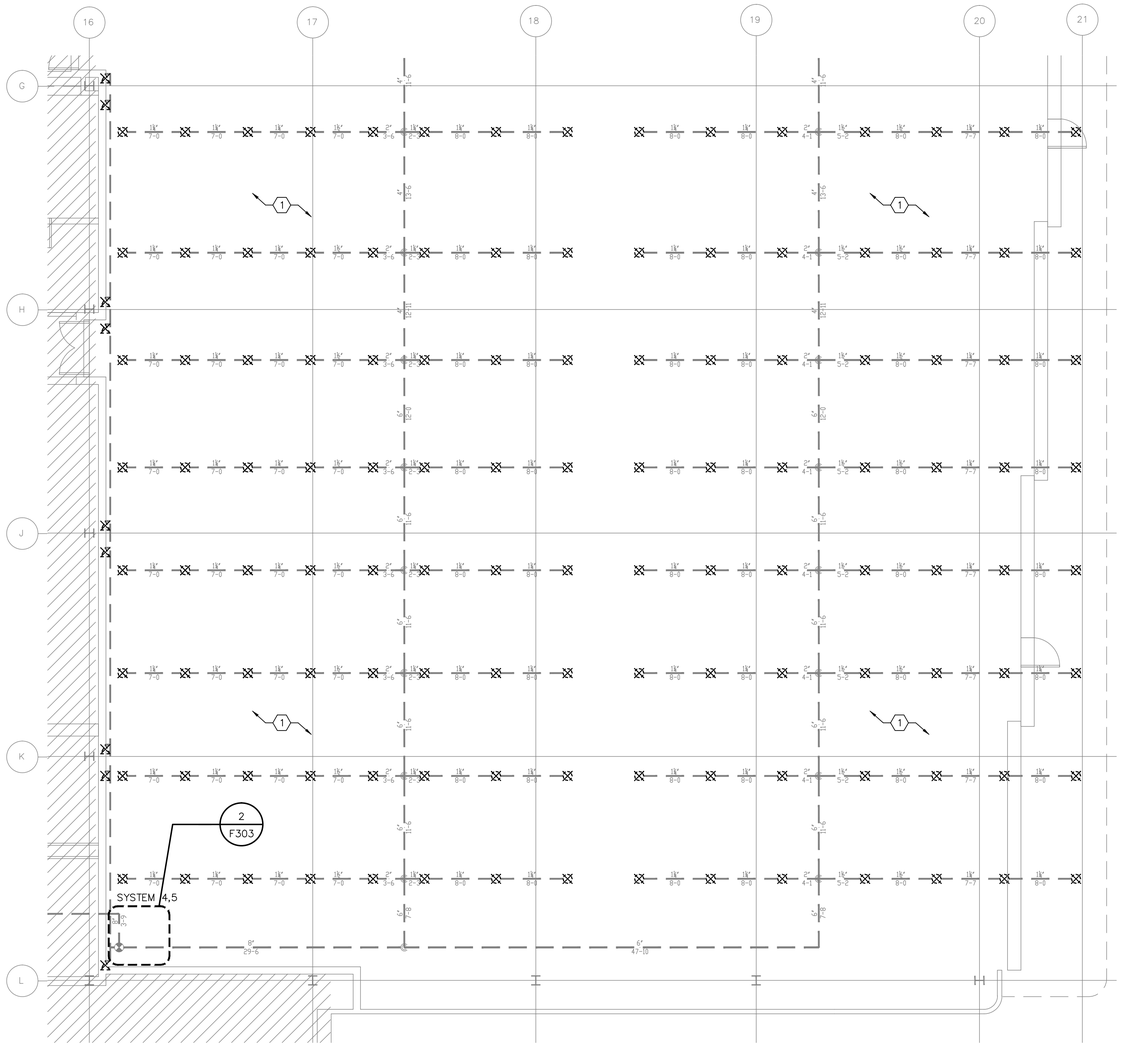
EDM-1719

SHEET No. 45 of 137

DARRELL E. STEIN

FIRE SPRINKLER DEMOLITION PLAN NOTES:

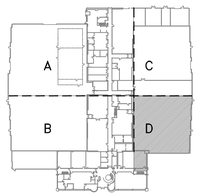
1. REMOVE ALL EXISTING OPEN-ORIFICE SPRINKLERS IN THIS AREA. SPRINKLER PIPING EXISTING TO REMAIN.



1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA D
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA D

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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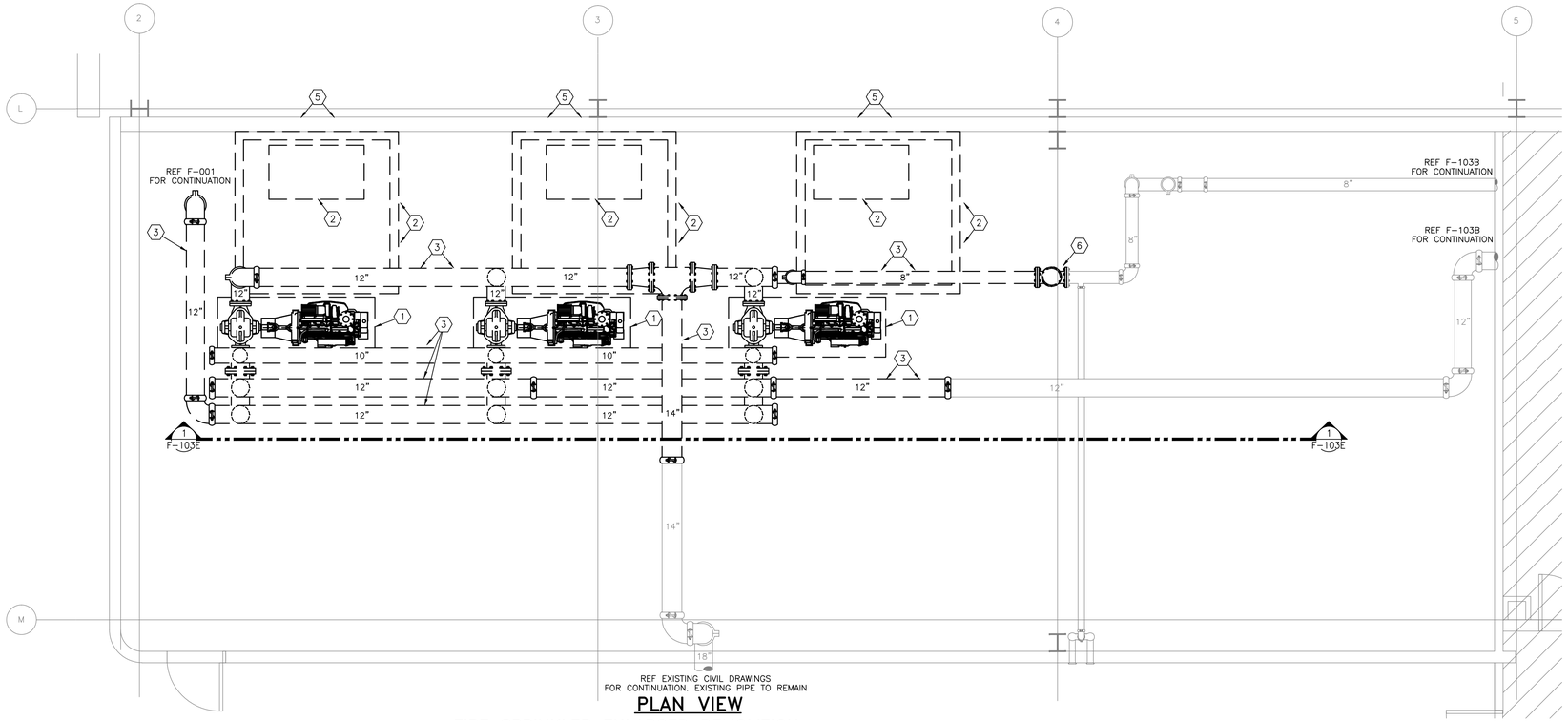
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F103D.dwg	F-103D	SHEET No. 43 of 137

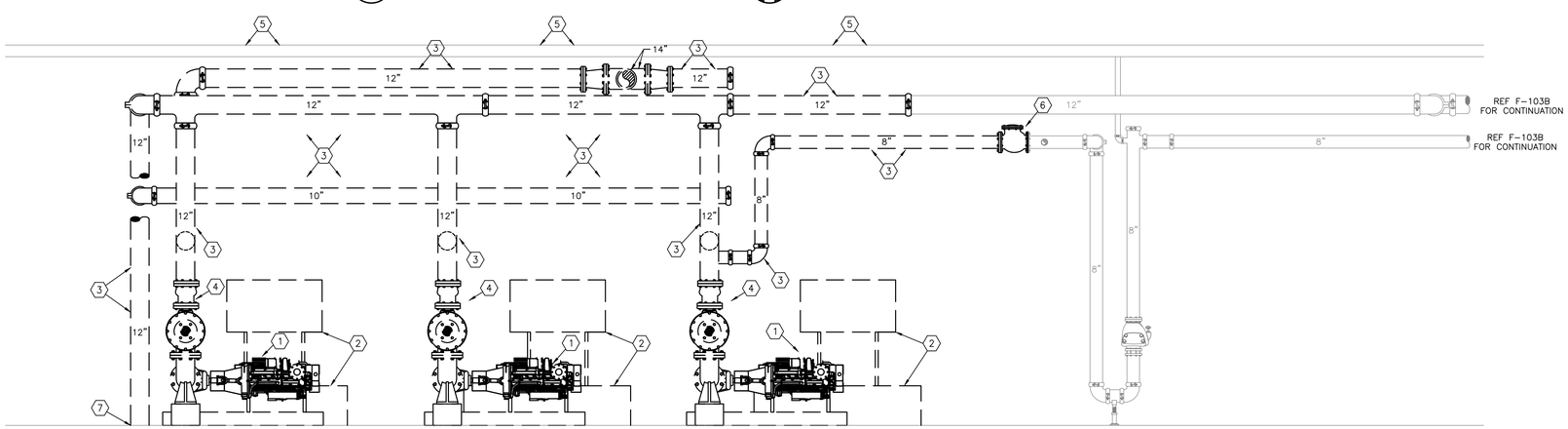
DARRELL E. STEIN



PLAN VIEW

2 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 PUMP ROOM
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"



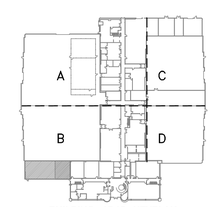
ELEVATION VIEW

1 FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 PUMP ROOM
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"

PUMP ROOM DEMOLITION PLAN NOTES:

1. REMOVE FIRE PUMPS, CONCRETE BASES, AND ALL ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
2. REMOVE DIESEL STORAGE TANKS, PIPING, AND CONCRETE CONTAINMENT CURBS. TANKS TO BE PROPERLY EMPTIED AND CLEANED PRIOR TO REMOVAL FROM SITE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
3. REMOVE PIPING, HANGERS AND VALVES AS SHOWN.
4. REMOVE RELIEF VALVE AND CONE.
5. DIESEL FIRE PUMP EXHAUST AND VENT LINE PENETRATIONS TO BE SEALED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
6. EXISTING CHECK VALVE TO BE REMOVED AND RELOCATED.
7. REMOVE PIPING AND CAP BENEATH FINISHED FLOOR. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR SEALING INFORMATION.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED DEMOLITION PLAN – BUILDING 4840 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F103E.dwg	F-103E	SHEET No. 47 of 137

DARRELL E. STEIN

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

1 FOAM SUPPRESSION OVERALL DEMOLITION PLAN – BUILDING 4801

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

N

0 8' 16' 24'

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

FOR CONSTRUCTION

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION OVERALL DEMOLITION PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

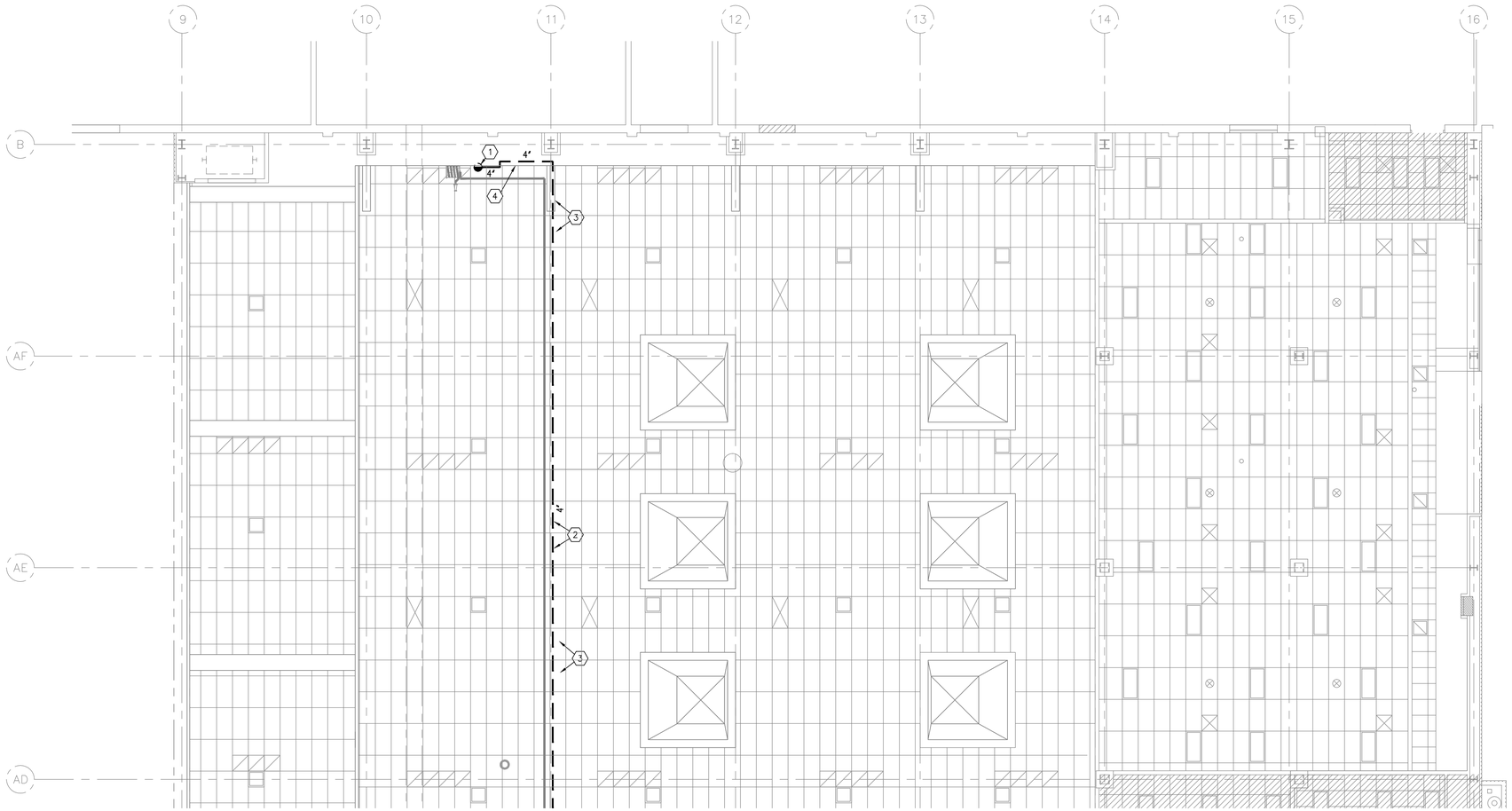
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F111.dwg	F-111	SHEET No. 48 of 137

DARRELL E. STEIN

FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE EXISTING OSCILLATING FOAM MONITORS AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING/FINISHING CEILING AND FLOOR PENETRATIONS.
2. REMOVE ALL FOAM PIPING, HANGERS AND ASSOCIATED HARDWARE AS SHOWN.
3. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
4. REMOVAL AND INSTALLATION OF CORRUGATED METAL REQUIRED TO COMPLETE WORK.

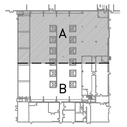


1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA A
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
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No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4801 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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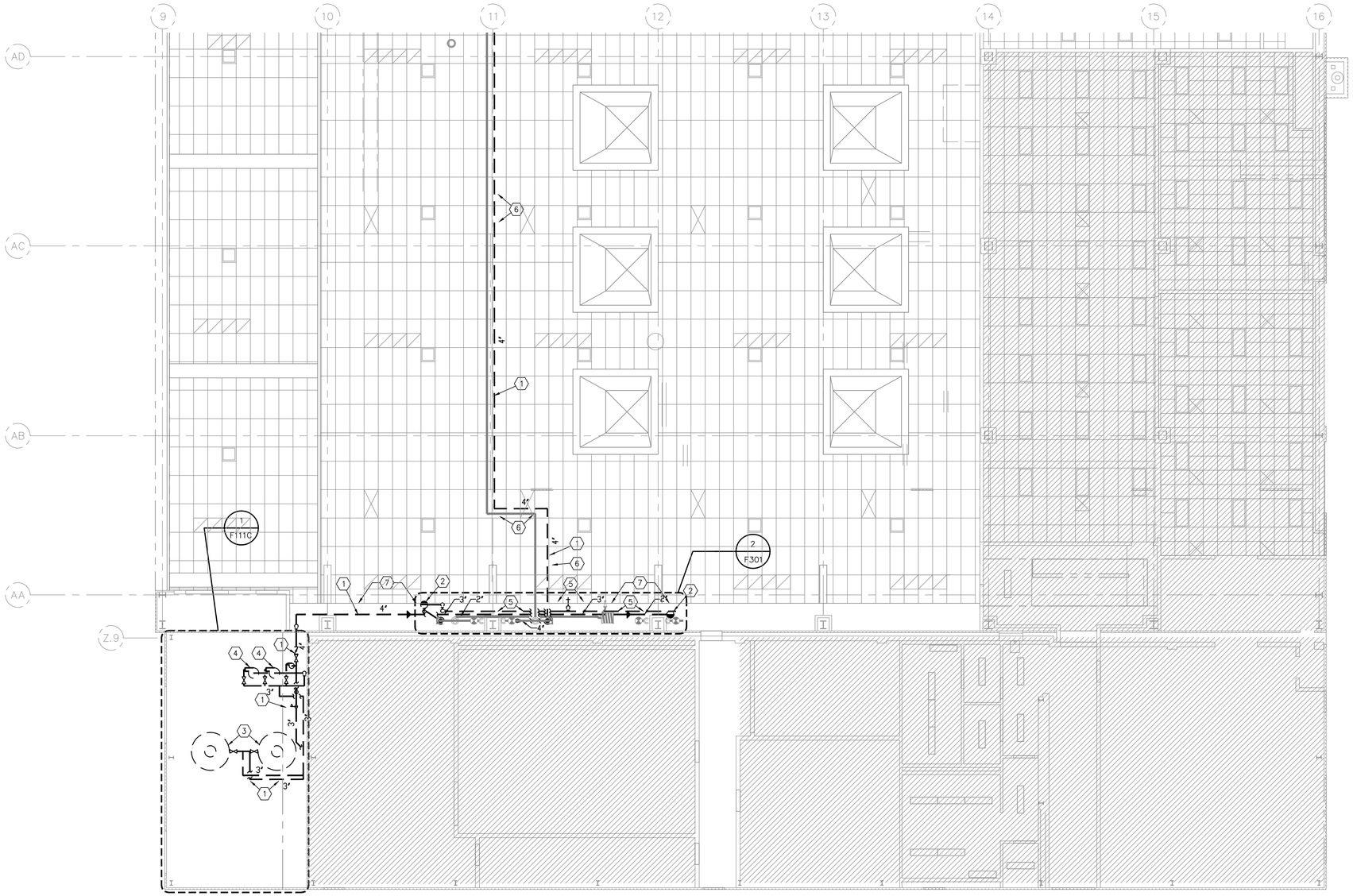
FILE NAME	EDM-1719 F111A.dwg	F-111A	SHEET No. 49 of 137

DARRELL E. STEIN



FOAM SUPPRESSION DEMOLITION PLAN NOTES:

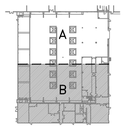
1. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT AS SHOWN FOR OSCILLATING FOAM MONITORS.
2. REMOVE ALL EXISTING OSCILLATING FOAM MONITORS AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING/FINISHING CEILING AND FLOOR PENETRATIONS.
3. REMOVE EXISTING FOAM TANKS AND ASSOCIATED EQUIPMENT.
4. REMOVE EXISTING FOAM PUMPS AND ASSOCIATED EQUIPMENT.
5. REMOVE ALL TEST PORT PIPING AND VALVES.
6. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
7. REMOVAL AND INSTALLATION OF CORRUGATED METAL REQUIRED TO COMPLETE WORK.

1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA B

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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02-28-14		95% SUBMITTAL		
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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4801 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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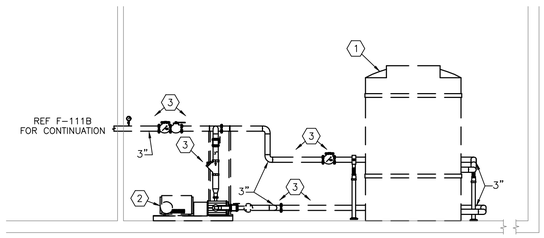
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F111B.dwg	F-111B	SHEET No. 50 of 137

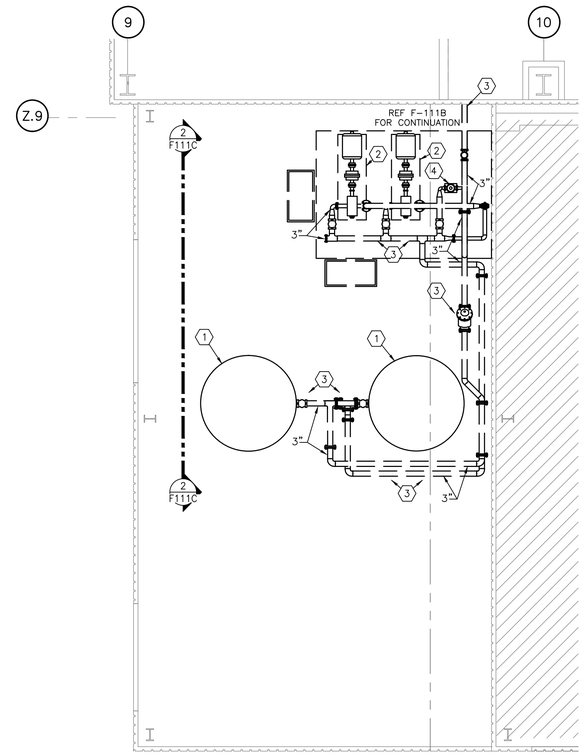
DARRELL E. STEIN

FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE TWO EXISTING FOAM TANKS AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
2. REMOVE TWO EXISTING FOAM PUMPS, CONCRETE BASES, AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
3. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING OF WALL PENETRATIONS.
4. REMOVE JOCKEY PUMP, CONCRETE BASE, AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.



2 PUMP ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"



1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4801 PUMP ROOM
SCALE: 1/4"=1'-0"

N

0 2' 4' 6'
SCALE: 1/4"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
www.hei-eng.com
1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

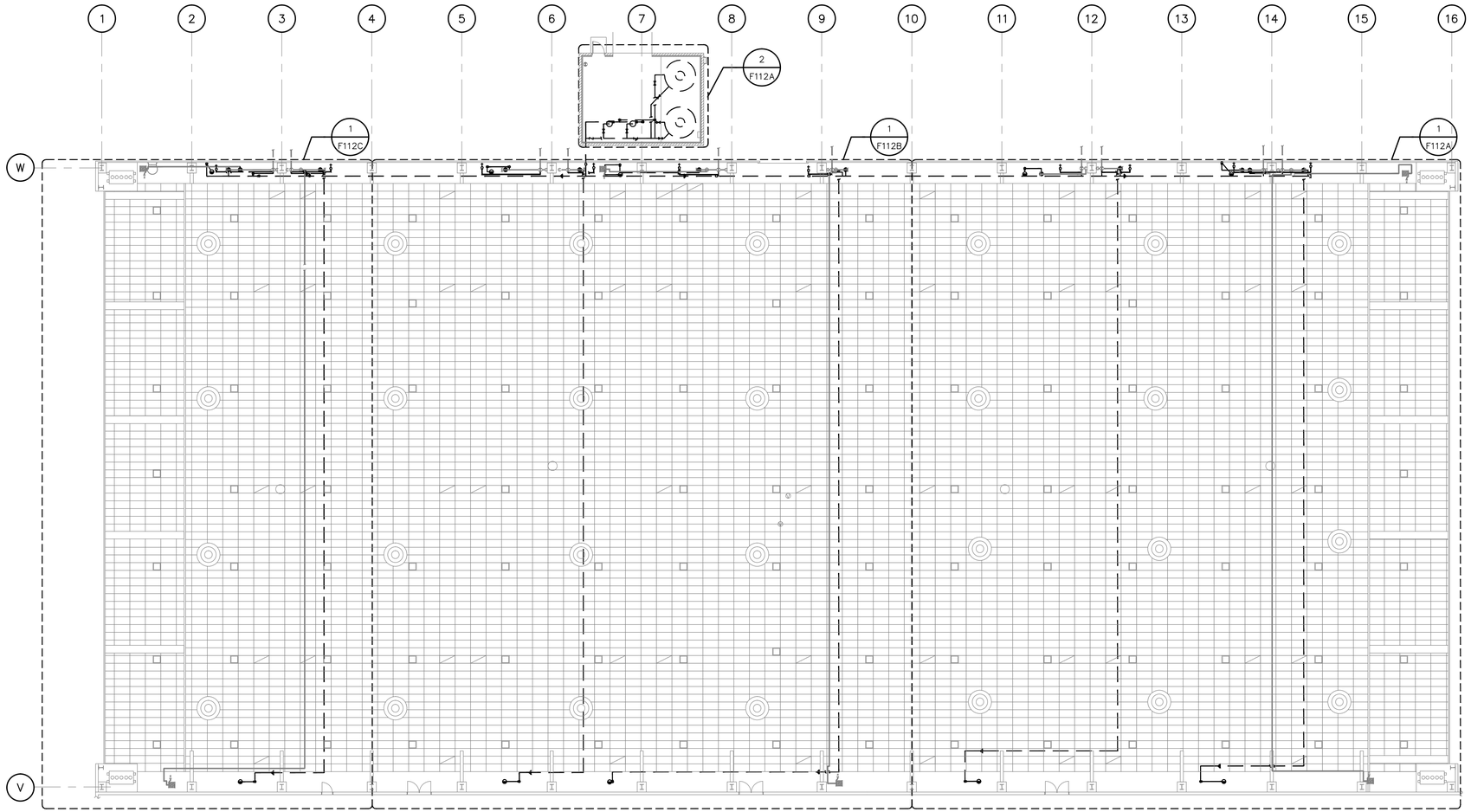
DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4801 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F111C.dwg	F-111C	SHEET No. 51 of 137

DARRELL E. STEIN



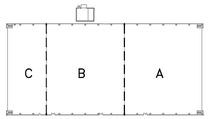
1 FOAM SUPPRESSION OVERALL DEMOLITION PLAN – BUILDING 4802
SCALE: 1/16"=1'-0"

N

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1562
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

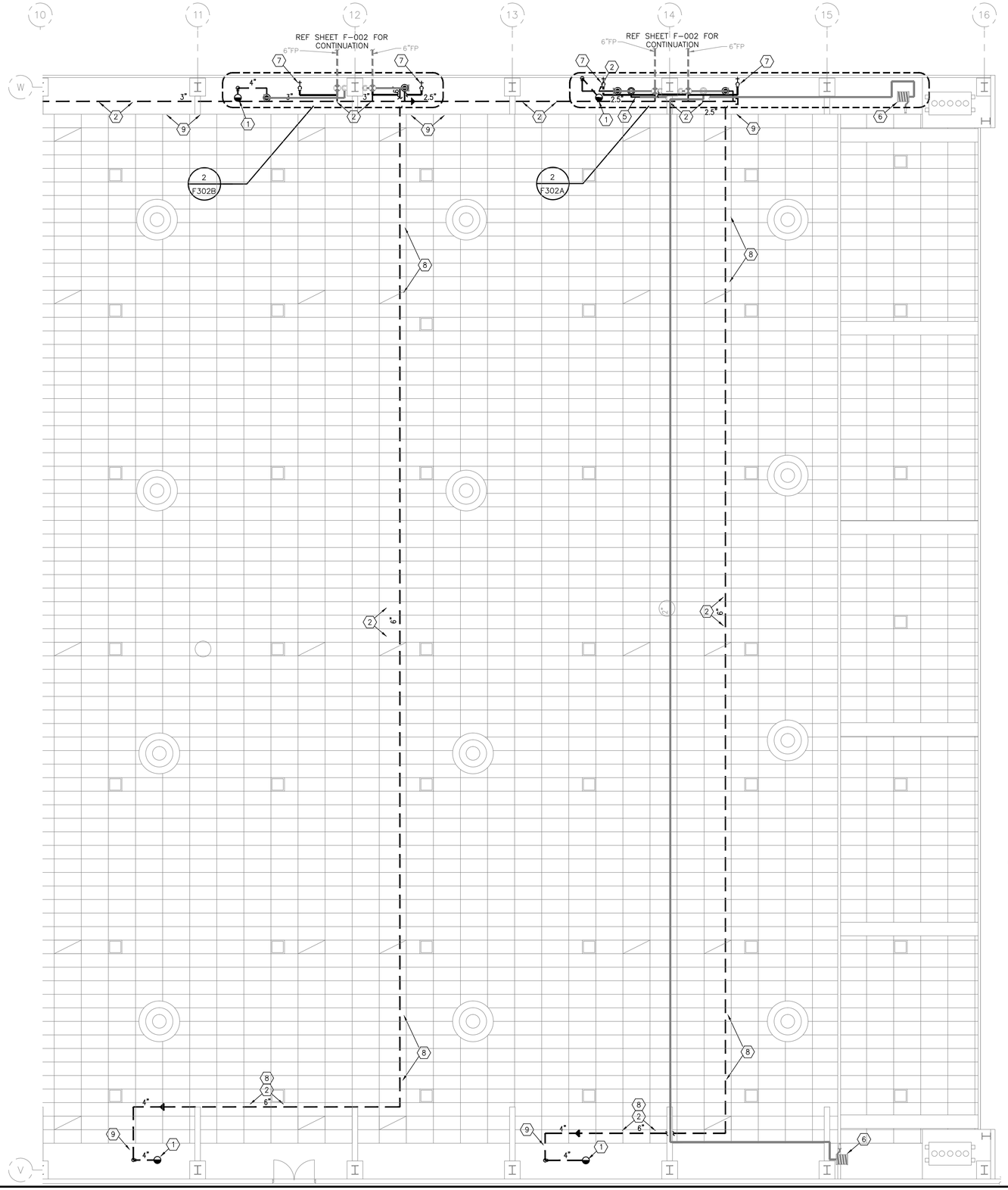
DRAWING TITLE
FOAM SUPPRESSION OVERALL DEMOLITION PLAN – BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

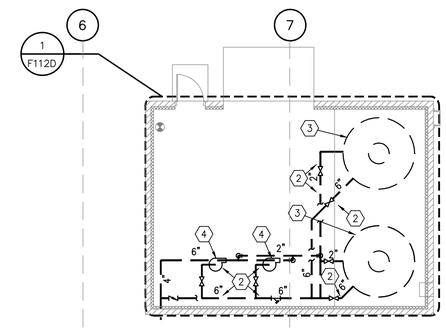
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F112.dwg	F-112	SHEET No. 52 of 137

DARRELL E. STEIN



FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING OSCILLATING FOAM MONITORS AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING/FINISHING CEILING AND FLOOR PENETRATIONS.
2. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT AS SHOWN FOR OSCILLATING FOAM MONITORS.
3. REMOVE TWO EXISTING FOAM TANKS AND ASSOCIATED EQUIPMENT.
4. REMOVE TWO EXISTING FOAM PUMPS AND ASSOCIATED EQUIPMENT.
5. REMOVE EXISTING HAND HOSE STATION SUPPLY PIPING IN THIS AREA.
6. EXISTING HAND HOSE STATION TO REMAIN.
7. REMOVE ALL TEST PORT PIPING AND VALVES.
8. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
9. REMOVAL AND INSTALLATION OF CORRUGATED METAL REQUIRED TO COMPLETE WORK.



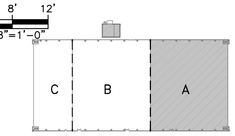
2 FOAM SUPPRESSION PUMP ROOM DEMOLITION PLAN – BUILDING 4802 AREA A
SCALE: 1/8"=1'-0"

N 0 4' 8' 12'
SCALE: 1/8"=1'-0"

1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA A
SCALE: 1/8"=1'-0"

N 0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1562
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
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LENEXA, KS 66214
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1250001459

FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

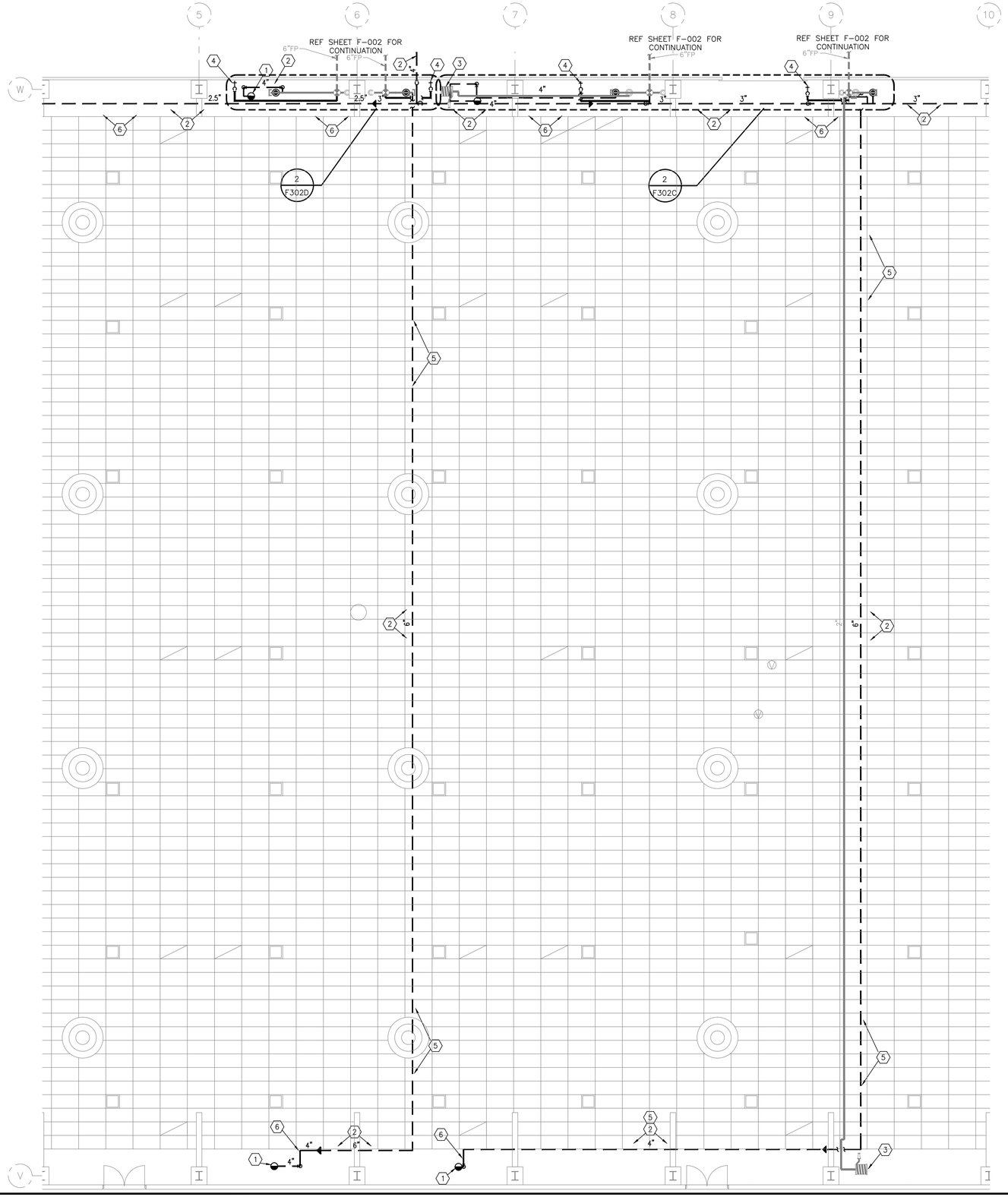
DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4802 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F112A.dwg	F-112A	SHEET No. 53 of 137

DARRELL E. STEIN



FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING OSCILLATING FOAM MONITORS AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING/FINISHING CEILING AND FLOOR PENETRATIONS.
2. REMOVE ALL FOAM PIPING, HANGERS AND ASSOCIATED HARDWARE AS SHOWN.
3. EXISTING HAND HOSE STATION TO REMAIN.
4. REMOVE ALL TEST PORT PIPING AND VALVES.
5. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
6. REMOVAL AND INSTALLATION OF CORRUGATED METAL REQUIRED TO COMPLETE WORK.

1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA B

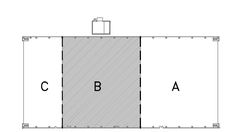
SCALE: 1/8"=1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014



BUILDING 4802 KEYPLAN

HENDERSON ENGINEERS INC
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

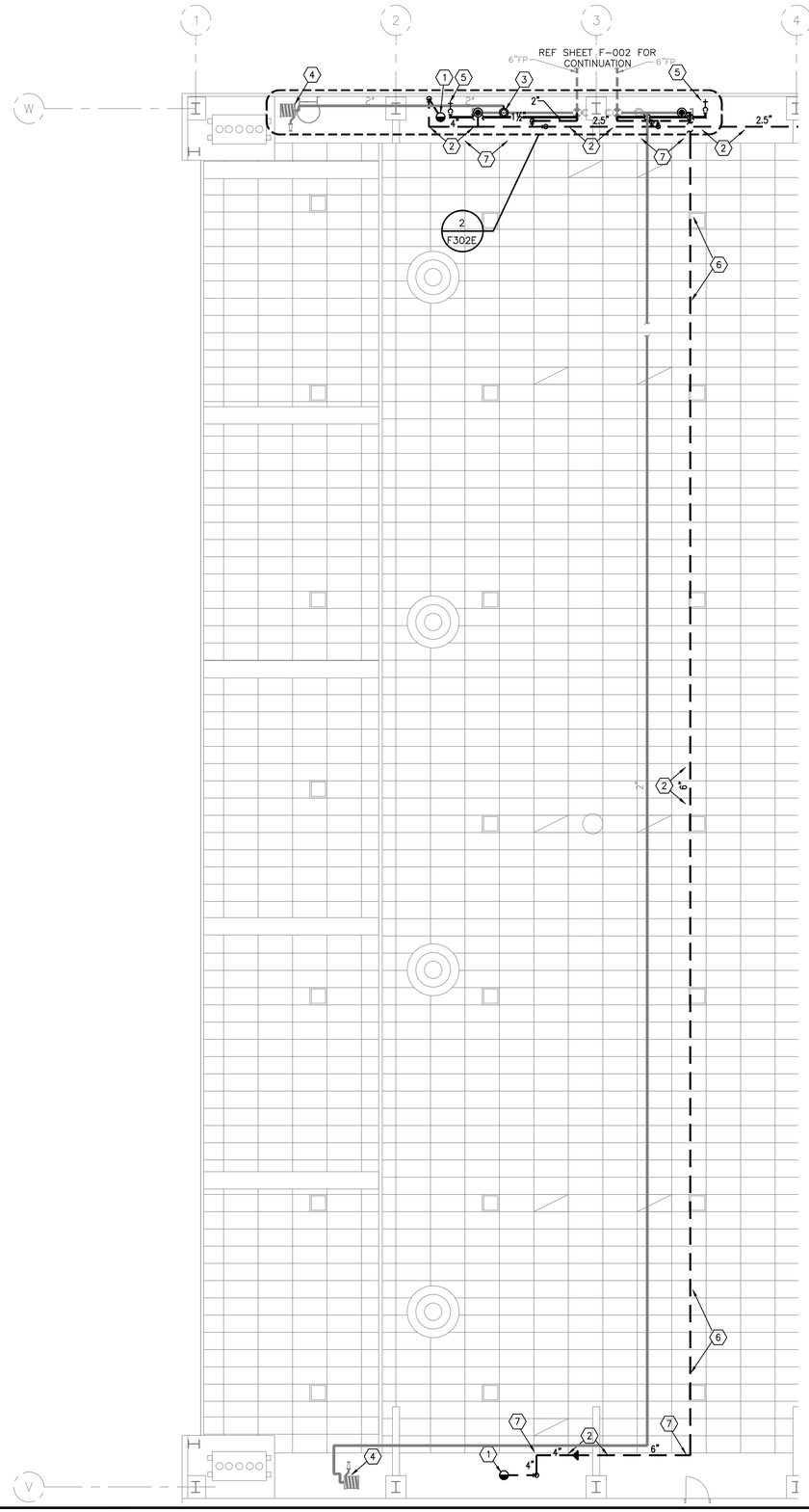
DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4802 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F112B.dwg	F-112B	SHEET No. 54 of 137

DARRELL E. STEIN



FOAM SUPPRESSION DEMOLITION PLAN NOTES:

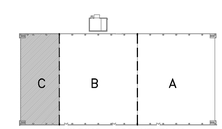
1. REMOVE ALL EXISTING OSCILLATING FOAM MONITORS AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING/FINISHING CEILING AND FLOOR PENETRATIONS.
2. REMOVE ALL FOAM PIPING, HANGERS AND ASSOCIATED HARDWARE AS SHOWN.
3. REMOVE EXISTING HAND HOSE STATION SUPPLY PIPING IN THIS AREA.
4. EXISTING HAND HOSE STATION TO REMAIN.
5. REMOVE ALL TEST PORT PIPING AND VALVES.
6. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
7. REMOVAL AND INSTALLATION OF CORRUGATED METAL REQUIRED TO COMPLETE WORK.

1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA C

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4802 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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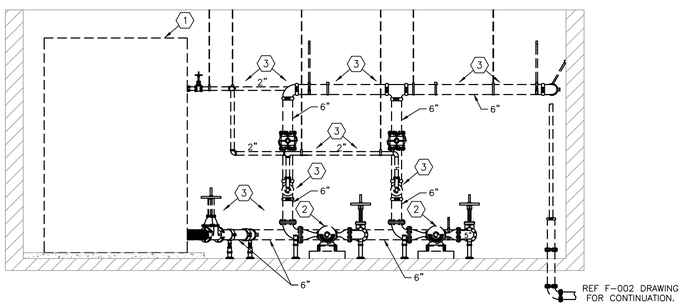
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F112C.dwg	F-112C	SHEET No. 55 of 137

DARRELL E. STEIN

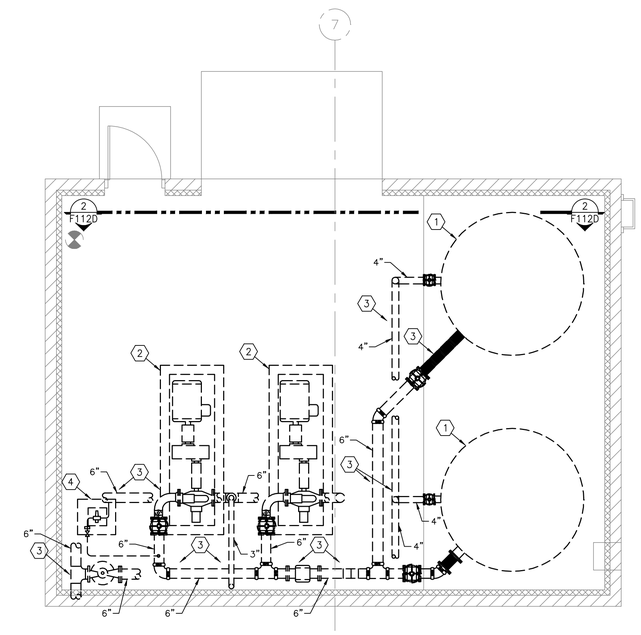
FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE TWO EXISTING FOAM TANKS AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
2. REMOVE TWO EXISTING FOAM PUMPS, CONCRETE BASES AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING/FINISHING CEILING AND FLOOR PENETRATIONS
3. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT AS SHOWN. REFER TO SPECIFICATIONS FOR SEALING/FINISHING CEILING AND FLOOR PENETRATIONS
4. REMOVE JOCKEY PUMP, CONCRETE BASE, AND ASSOCIATED EQUIPMENT. REFER TO SSPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.



2 PUMP ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"

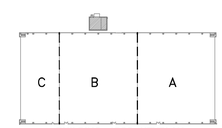


1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4802 PUMP ROOM
SCALE: 1/4"=1'-0"

N

0 2' 4' 6'
SCALE: 1/4"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
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1250001459

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

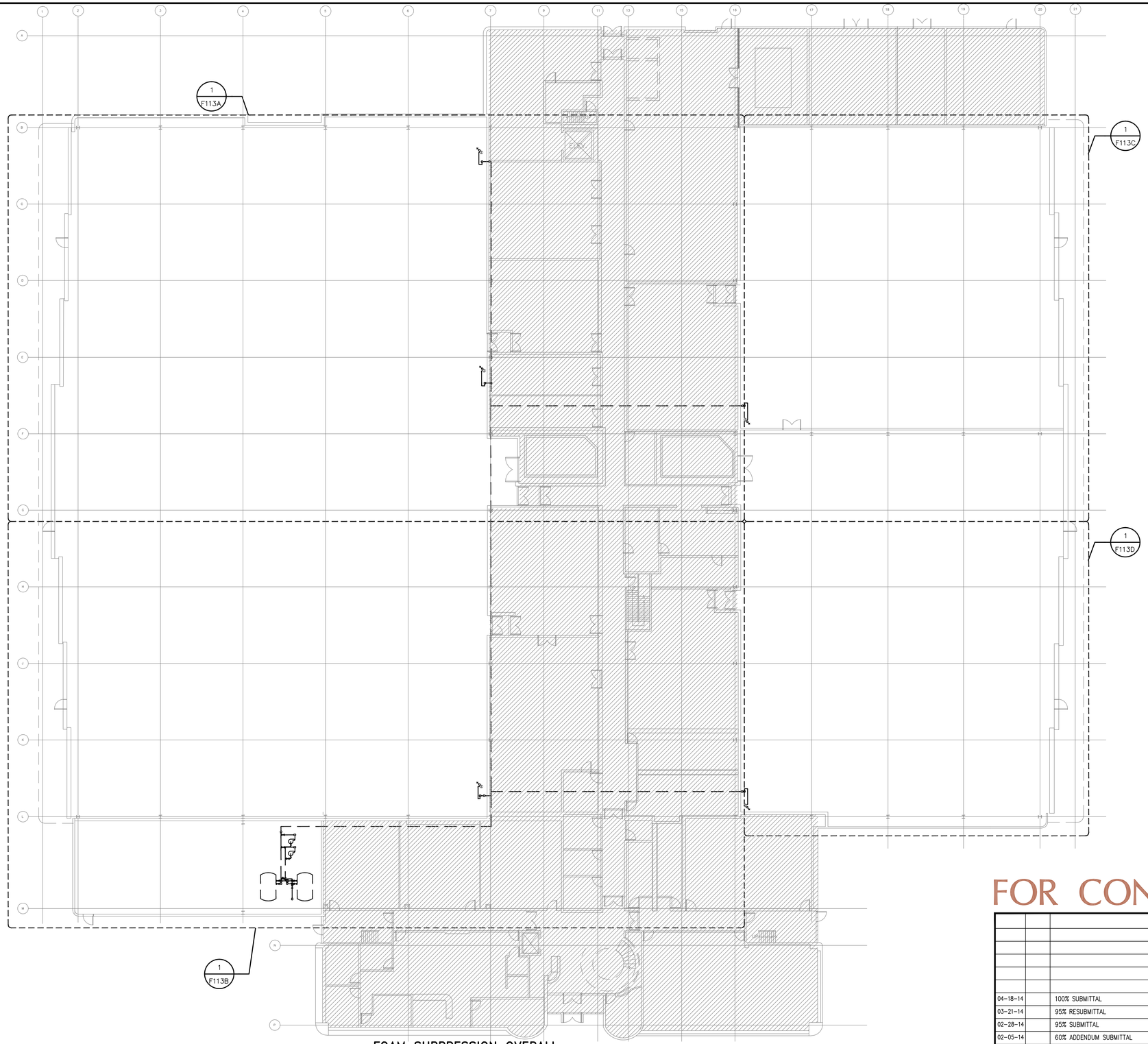
DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4802 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	1/4"	TRADE SH. No.	EDM-1719
FILE NAME	EDM-1719 F112D.dwg	F-112D	SHEET No. 56 of 137

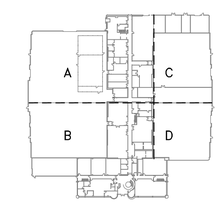
DARRELL E. STEIN



1 FOAM SUPPRESSION OVERALL DEMOLITION PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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8345 LENEXA DRIVE, SUITE 300
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION OVERALL DEMOLITION PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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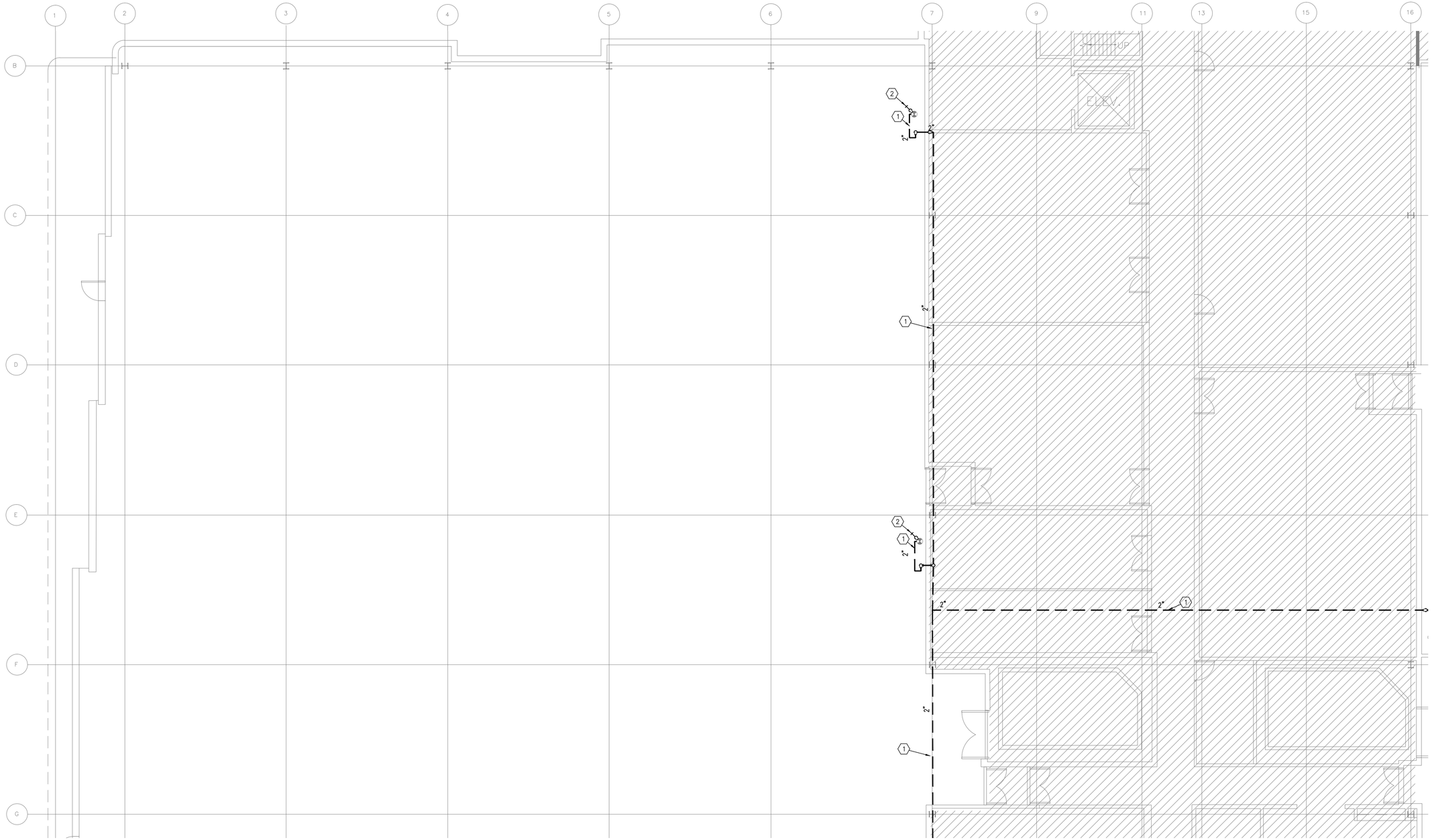
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F113.dwg	F-113	SHEET No. 57 of 137

DARRELL E. STEIN



FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT AS SHOWN. REFER TO SPECIFICATIONS FOR SEALING WALL PENETRATIONS.
2. REMOVE ALL TEST PORT PIPING AND VALVES.

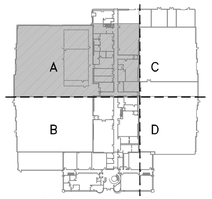
1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA A

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

N

0 4' 8' 12'

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



BUILDING 4840 KEYPLAN

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE

FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4840 AREA A

PROJECT TITLE

REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
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SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM–1719 F113A.dwg	F–113A	SHEET No. 58 of 137

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
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LENEXA, KS 66214
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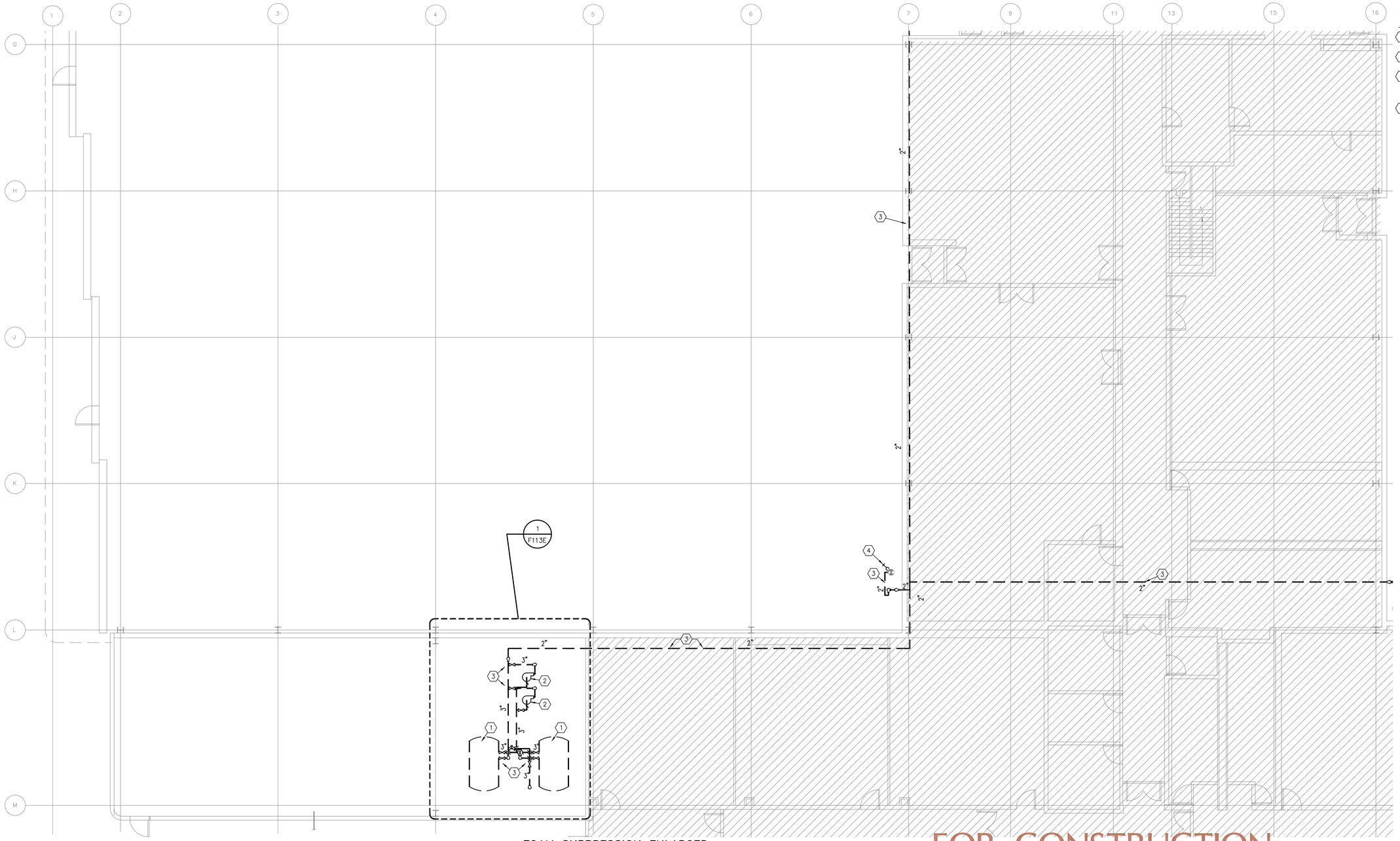
www.hei-eng.com
1250001459

DARRELL E. STEIN



FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE TWO EXISTING FOAM TANKS AND ASSOCIATED EQUIPMENT.
2. REMOVE TWO EXISTING FOAM PUMPS AND ASSOCIATED EQUIPMENT.
3. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT AS SHOWN. REFER TO SPECIFICATIONS FOR SEALING WALL PENETRATIONS.
4. REMOVE ALL TEST PORT PIPING AND VALVES.

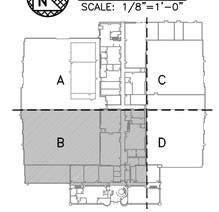
1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA B

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

N

0 4' 8' 12'

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



BUILDING 4840 KEYPLAN

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
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STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

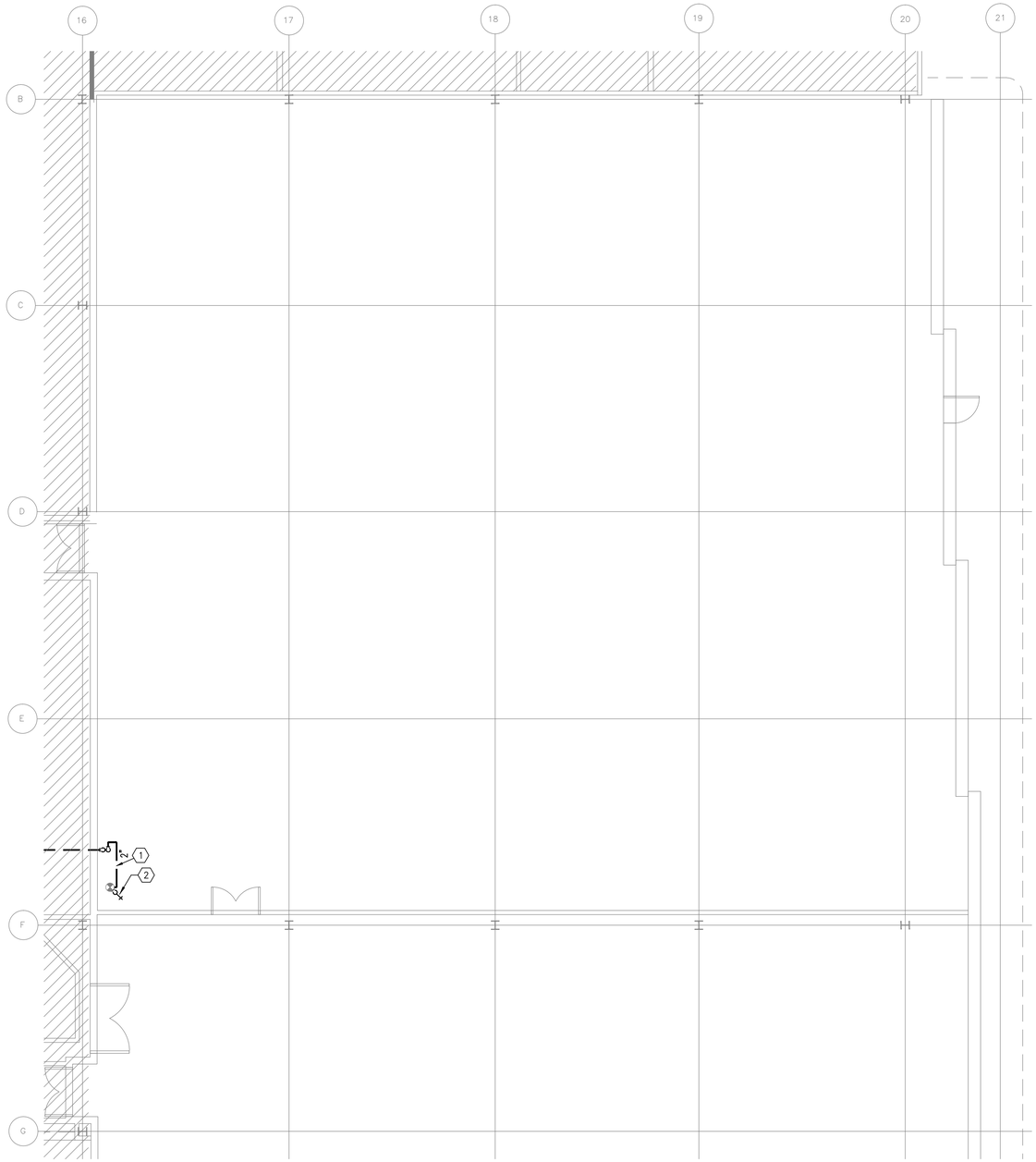
DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4840 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F113B.dwg	F-113B	SHEET No. 59 of 137

DARRELL E. STEIN



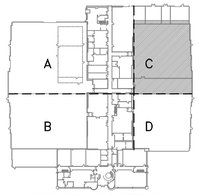
1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA C
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"

FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT AS SHOWN. REFER TO SPECIFICATIONS FOR SEALING WALL PENETRATIONS.
2. REMOVE ALL TEST PORT PIPING AND VALVES.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
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FIRE PROTECTION
STATE OF CALIFORNIA

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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4840 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

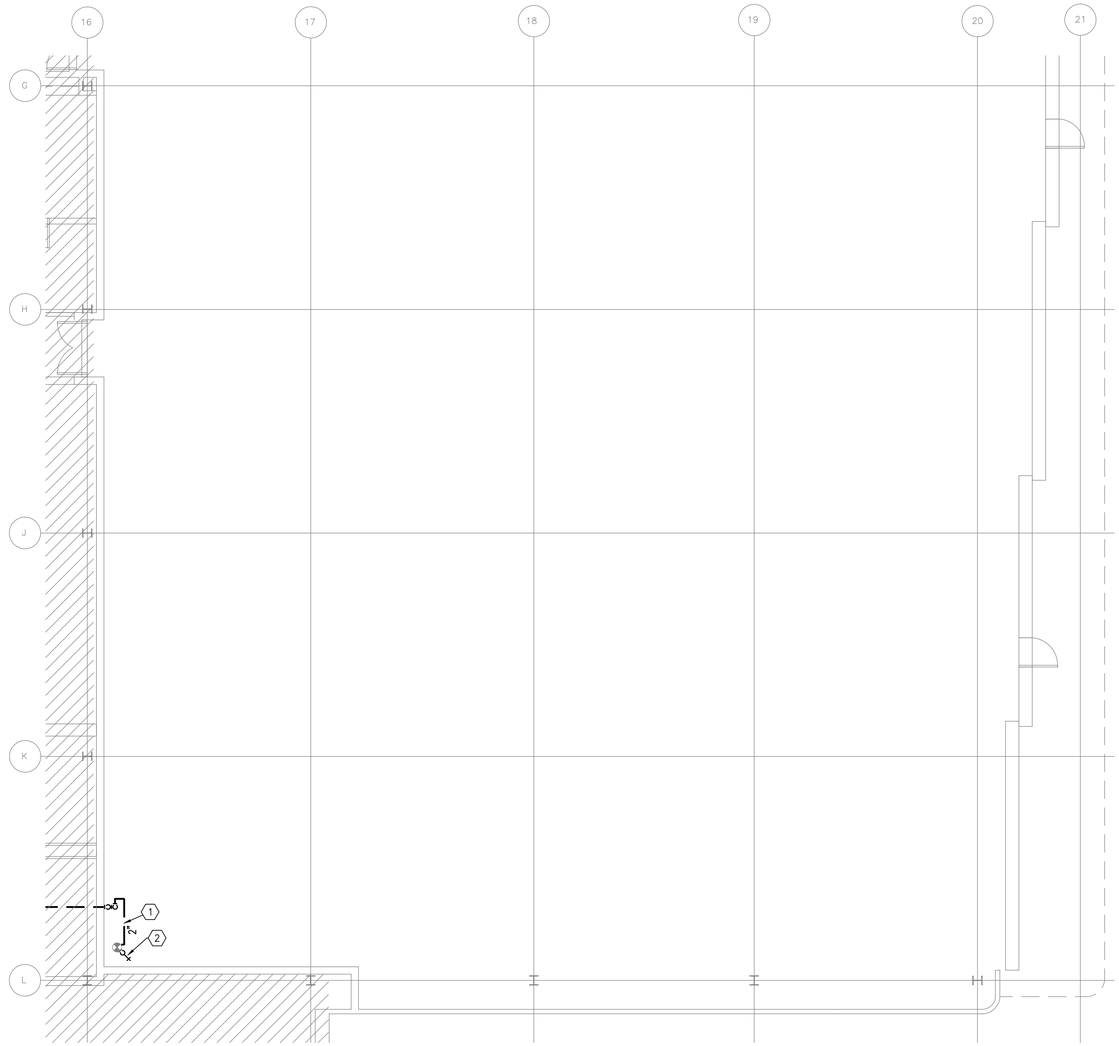
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F113C.dwg	F-113C	SHEET No. 60 of 137

DARRELL E. STEIN

FOAM SUPPRESSION DEMOLITION PLAN NOTES:

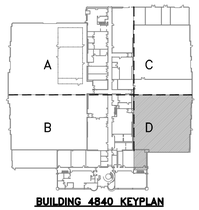
1. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT AS SHOWN. REFER TO SPECIFICATIONS FOR SEALING WALL PENETRATIONS.
2. REMOVE ALL TEST PORT PIPING AND VALVES.



1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA D
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BLDG. 4840 AREA D

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

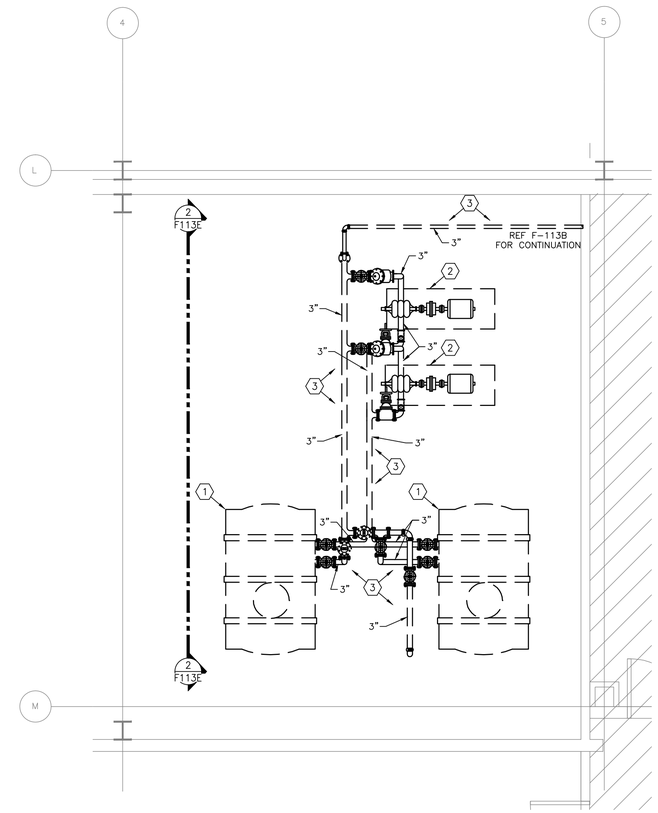
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE Sh. No.	
FILE NAME	EDM-1719 F1130.dwg	F-113D	SHEET No. 61 of 137

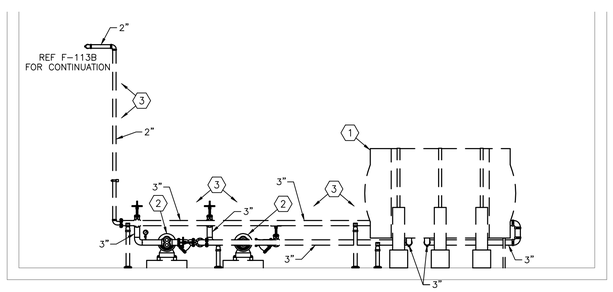
DARRELL E. STEIN

FOAM SUPPRESSION DEMOLITION PLAN NOTES:

1. REMOVE TWO EXISTING FOAM TANKS, CONCRETE BASES AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
2. REMOVE TWO EXISTING FOAM PUMPS, CONCRETE BASES AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR ADDITIONAL FLOOR REFINISHING INFORMATION.
3. REMOVE ALL FOAM PIPING, HANGERS, VALVES AND ASSOCIATED EQUIPMENT. REFER TO SPECIFICATIONS FOR SEALING WALL PENETRATIONS.

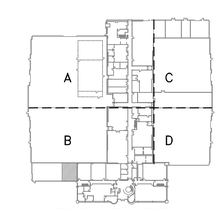


1 FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4840 PUMP ROOM
SCALE: 1/4"=1'-0"



2 DEMOLITION FOAM SUPPRESSION PUMP ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"



BUILDING 4840 KEYPLAN

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Jun 12 2014

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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED DEMOLITION PLAN – BUILDING 4840 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F113E.dwg	F-113E	SHEET No. 62 of 137

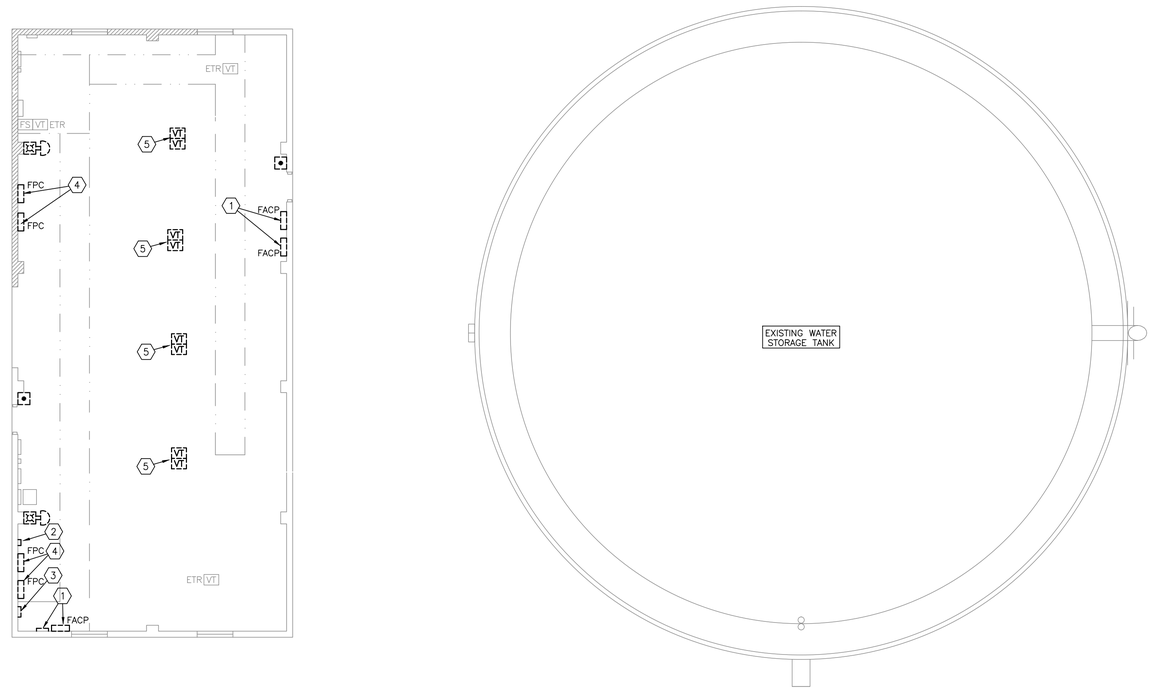
DARRELL E. STEIN

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE FIRE ALARM CONTROL PANELS.
2. REMOVE MAIN FUEL TANK CONTROLLER MONITORING.
3. REMOVE FIRE PUMP LOW SUCTION PRESSURE CONTROLLER MONITORING.
4. REMOVE FIRE PUMP CONTROLLERS MONITORING.
5. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.

NOTE: DEMOLITION OF ANY FIRE ALARM AND/OR FIRE PROTECTION DEVICES WITH ELECTRICAL CONNECTIONS SHALL BE PERFORMED BY DIVISION 26 CONTRACTOR

GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.



1 FIRE ALARM DEMOLITION PLAN – BUILDING 4853
SCALE: 1/8"=1'-0"

N 0 4' 8' 12'
SCALE: 1/8"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
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02-28-14		95% SUBMITTAL		
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM DEMOLITION PLAN
BUILDING 4853

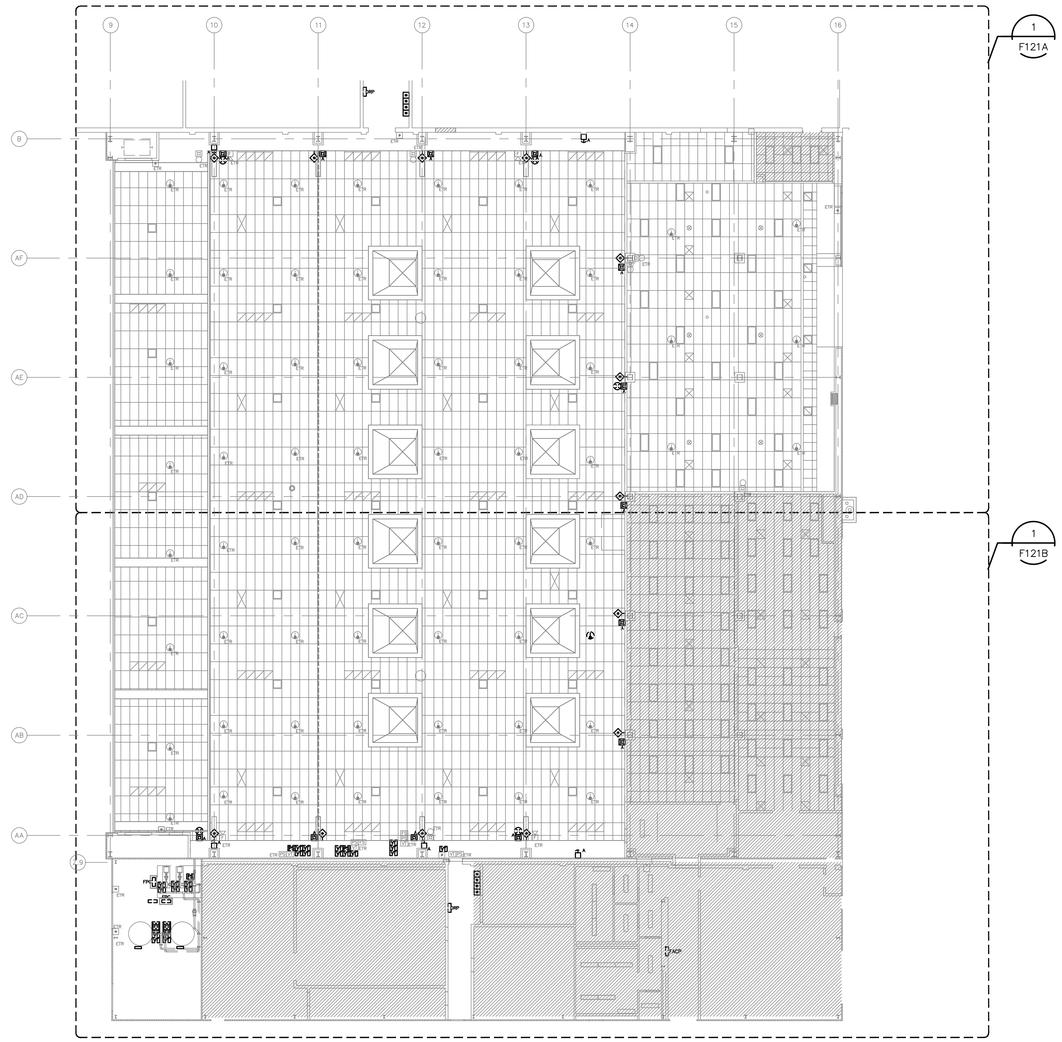
PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F120.dwg	F-120	SHEET No. 63 of 137

DARRELL E. STEIN

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.



1 FIRE ALARM OVERALL DEMOLITION PLAN – BUILDING 4801
SCALE: 1/16"=1'-0"

N

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

Jun 12 2014

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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM OVERALL DEMOLITION PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE Sh. No.	
FILE NAME	EDM-1719 F121.dwg	F-121	SHEET No. 64 of 137

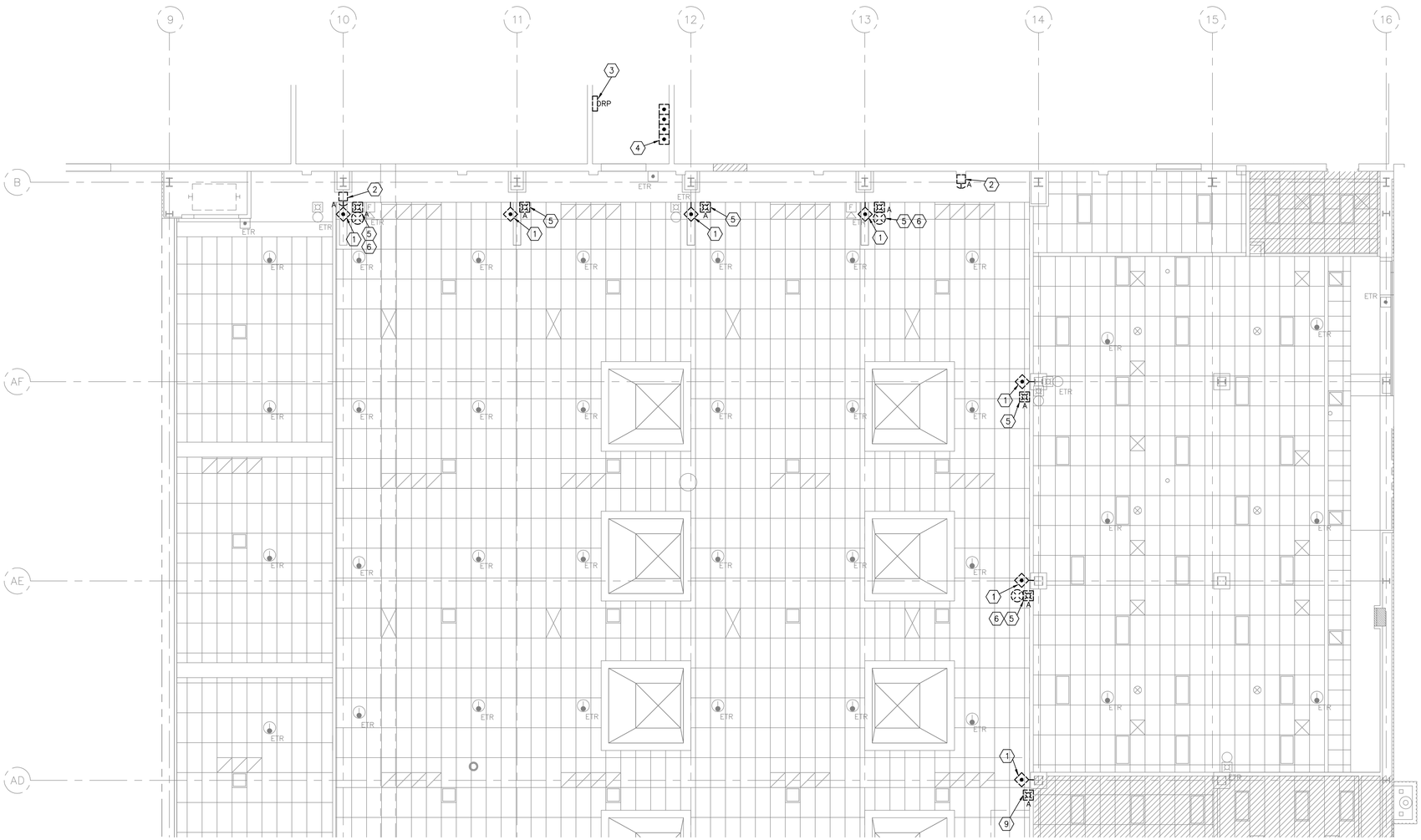
DARRELL E. STEIN

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE ABANDONED UV/IR DETECTORS.
2. REMOVE AFFF ABORT SWITCHES AND ASSOCIATED HARDWARE.
3. REMOVE DELUGE RELEASING PANEL AND ASSOCIATED HARDWARE.
4. REMOVE FOAM SYSTEM MANUAL RELEASE STATIONS.
5. REMOVE EXISTING AMBER STROBE.
6. REMOVE EXISTING RED BEACON LIGHT.

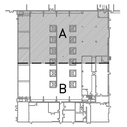
GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.



1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA A
SCALE: 1/8"=1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F121A.dwg	F-121A	SHEET No. 65 of 137

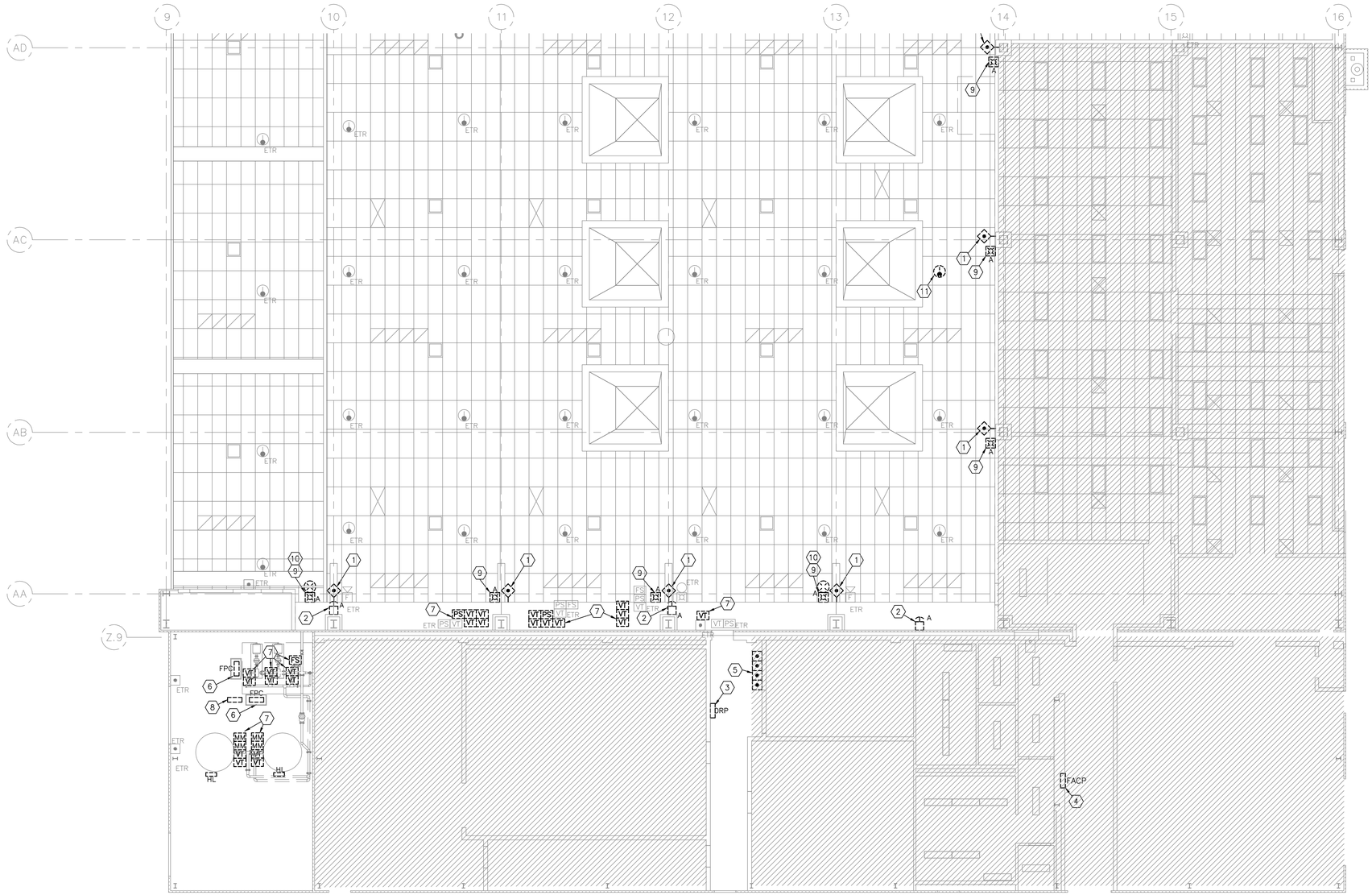
DARRELL E. STEIN

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE ABANDONED UV/IR DETECTORS
2. REMOVE AFFF ABORT SWITCHES
3. REMOVE DELUGE PANEL
4. REMOVE FIRE ALARM CONTROL PANEL
5. REMOVE FOAM SYSTEM MANUAL RELEASE STATIONS
6. REMOVE TWO (2) FIRE PUMP CONTROLLERS
7. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.
8. REMOVE FIRE ALARM INTERFACE PANEL.
9. REMOVE EXISTING AMBER STROBE.
10. REMOVE EXISTING RED BEACON LIGHT.
11. REMOVE HEAT DETECTOR FOR RELOCATION DUE TO NEW FOAM GENERATORS

GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.



1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA B

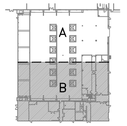
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

N

0 4' 8' 12'

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



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE

FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4801 AREA B

PROJECT TITLE

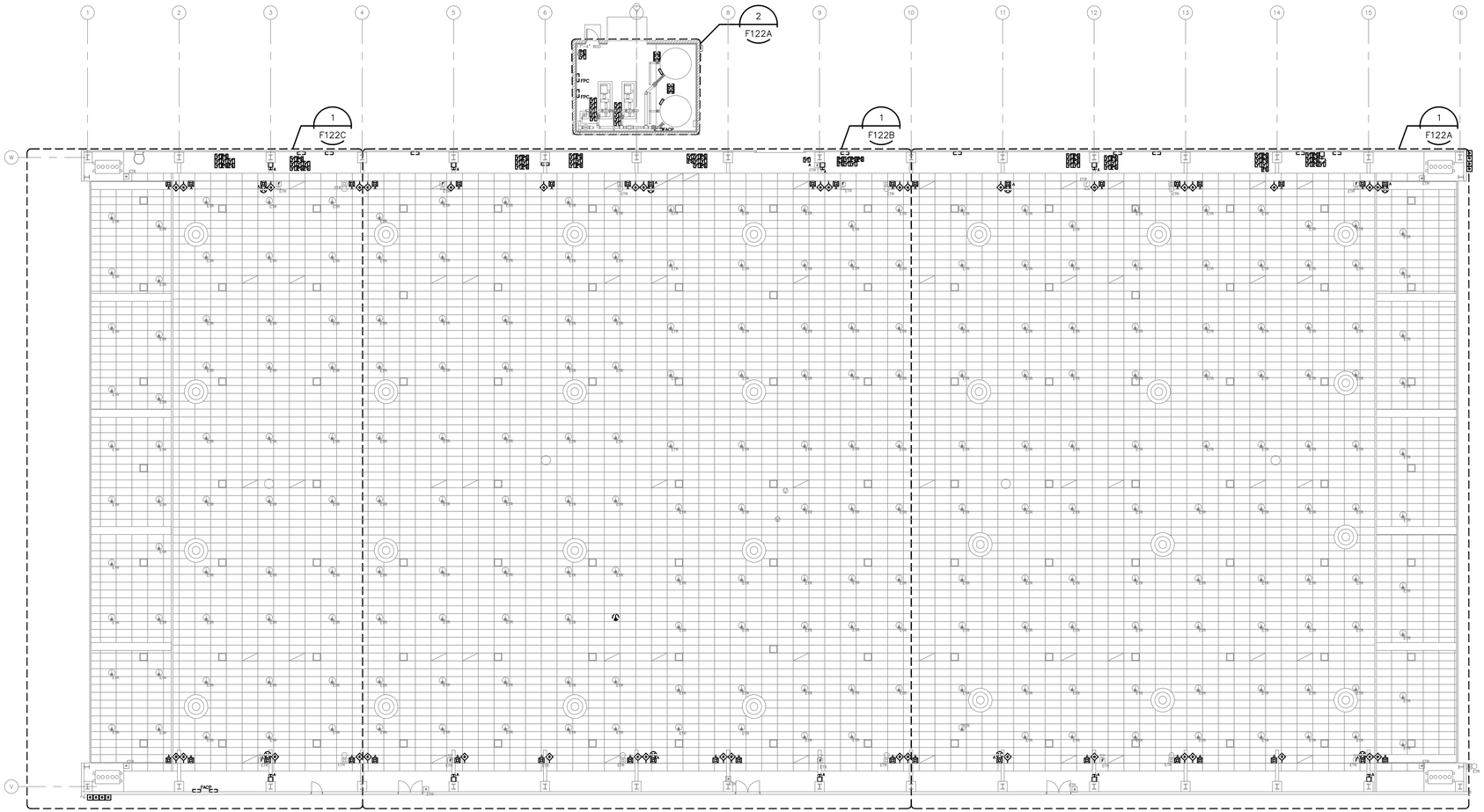
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F121B.dwg	F-121B	SHEET No. 66 of 137

DARRELL E. STEIN

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

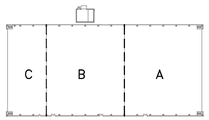


1 FIRE ALARM OVERALL DEMOLITION PLAN – BUILDING 4802
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
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www.hei-eng.com
1250001459

FOR CONSTRUCTION

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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

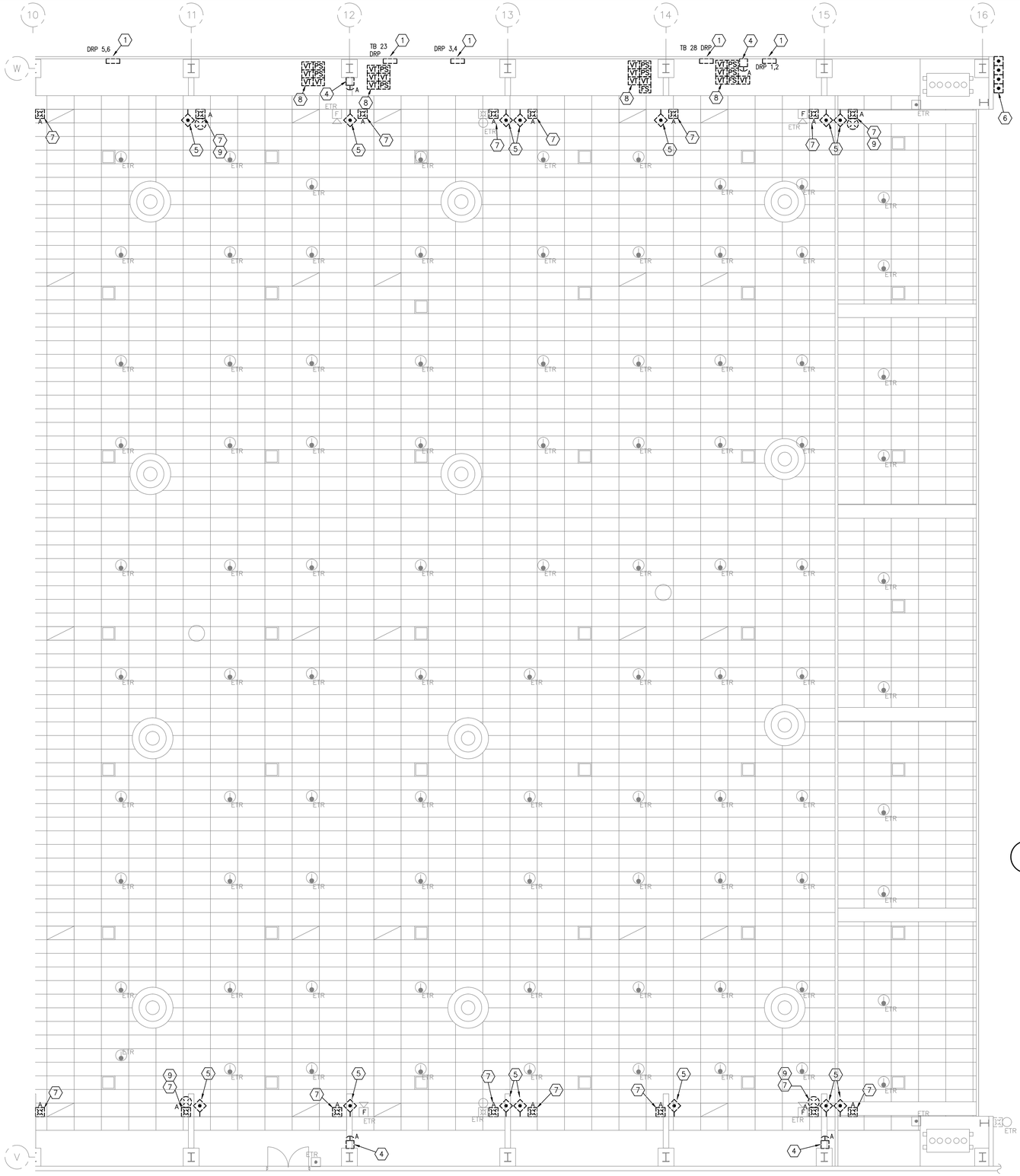
DRAWING TITLE
FIRE ALARM OVERALL DEMOLITION PLAN – BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	1/16"=1'-0"	TRADE SH. No.	EDM-1719
FILE NAME	EDM-1719 F122.dwg	F-122	SHEET No. 67 of 137

DARRELL E. STEIN



1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA A
SCALE: 1/8"=1'-0"

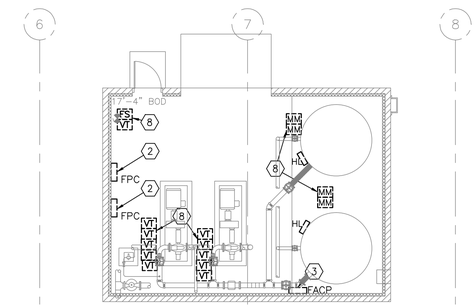
NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.

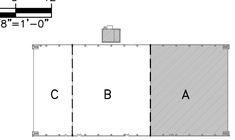
FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE DELUGE PANELS AND ASSOCIATED HARDWARE
2. REMOVE FIRE PUMP CONTROLLERS
3. REMOVE FIRE ALARM CONTROL PANEL
4. REMOVE AFFF ABORT SWITCHES
5. REMOVE ABANDONED UV/IR DETECTORS
6. REMOVE FOAM SYSTEM MANUAL RELEASE STATIONS
7. REMOVE EXISTING AMBER STROBE
8. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.
9. REMOVE EXISTING RED BEACON LIGHT



2 FIRE ALARM FOAM PUMP ROOM ENLARGED PLAN – BUILDING 4802 AREA A
SCALE: 1/8"=1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

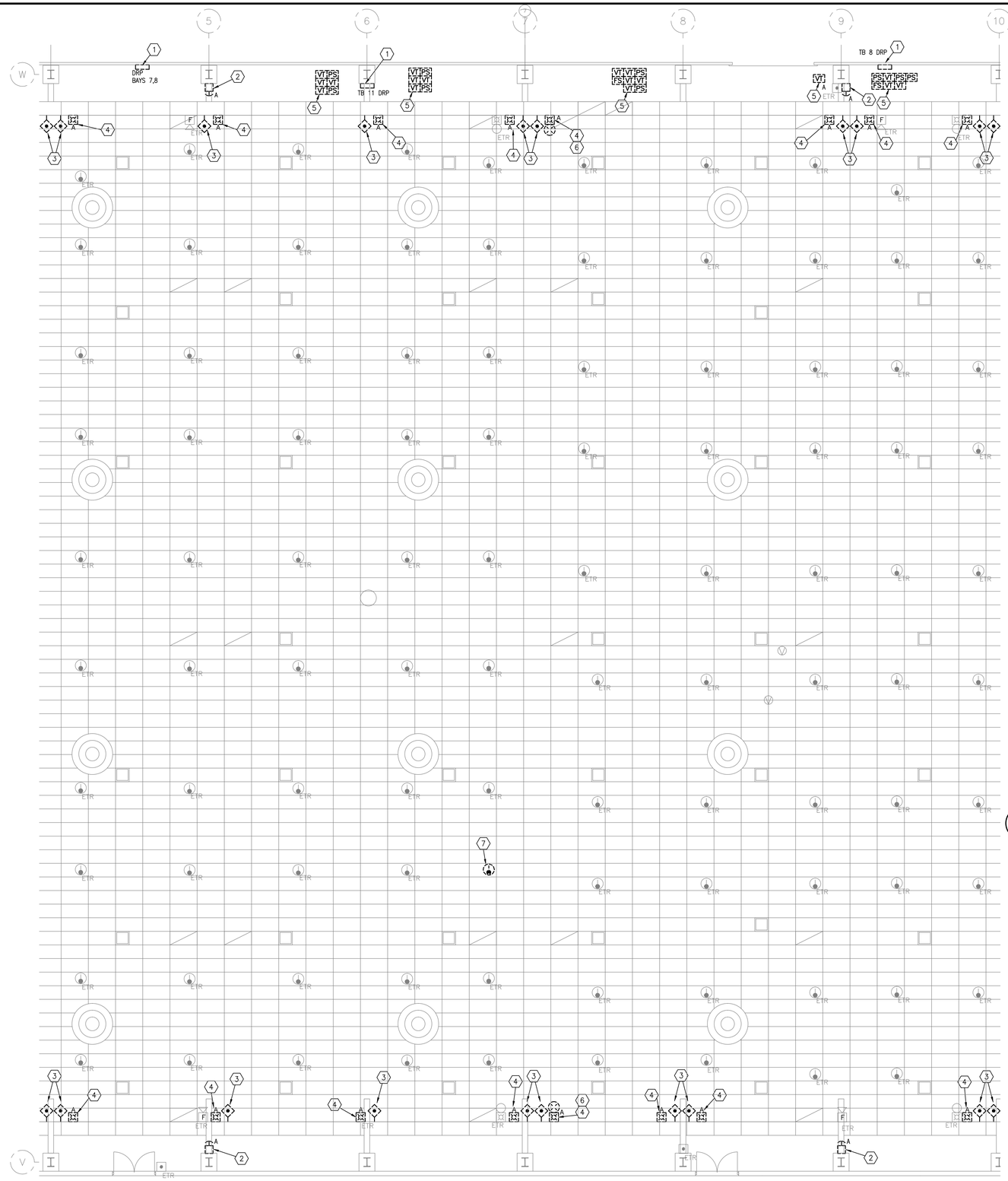
DRAWING TITLE
FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F122A.dwg	F-122A	SHEET No. 68 of 137

DARRELL E. STEIN



NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE DELUGE PANELS
2. REMOVE AFFF ABORT SWITCHES
3. REMOVE ABANDONED UV/IR DETECTORS
4. REMOVE EXISTING AMBER STROBE
5. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.
6. REMOVE EXISTING RED BEACON LIGHT
7. REMOVE HEAT DETECTOR FOR RELOCATION DUE TO NEW FOAM GENERATORS

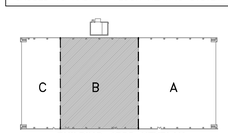
GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.

1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA B

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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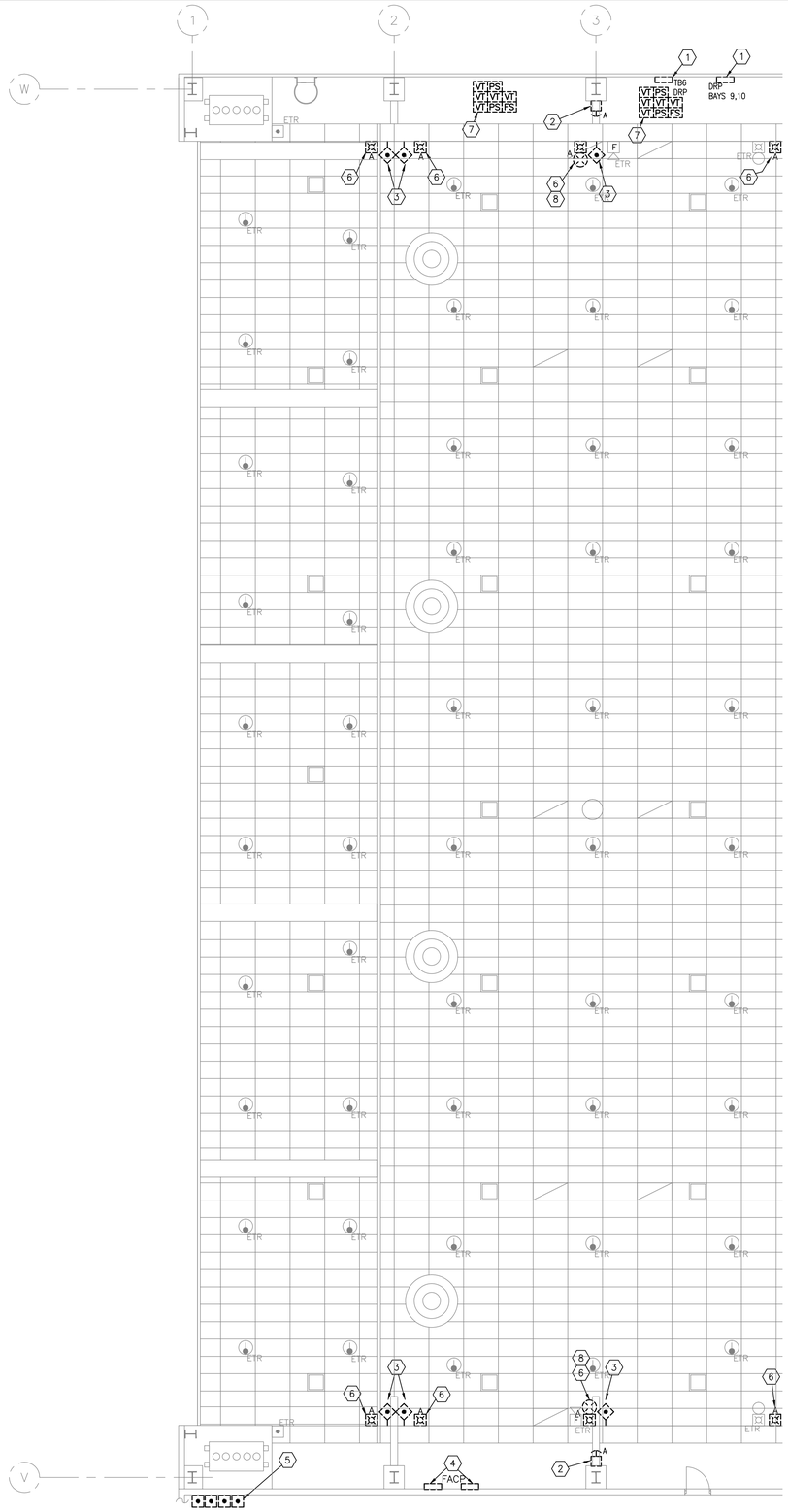
DARRELL E. STEIN



NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE DELUGE PANELS
2. REMOVE AFFF ABORT SWITCHES
3. REMOVE ABANDONED UV/IR DETECTORS
4. REMOVE FIRE ALARM CONTROL PANELS
5. REMOVE FOAM SYSTEM MANUAL RELEASE STATIONS
6. REMOVE EXISTING AMBER STROBE
7. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.
8. REMOVE EXISTING RED BEACON LIGHT.

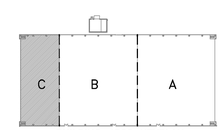
GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.

1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA C

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4802 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
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Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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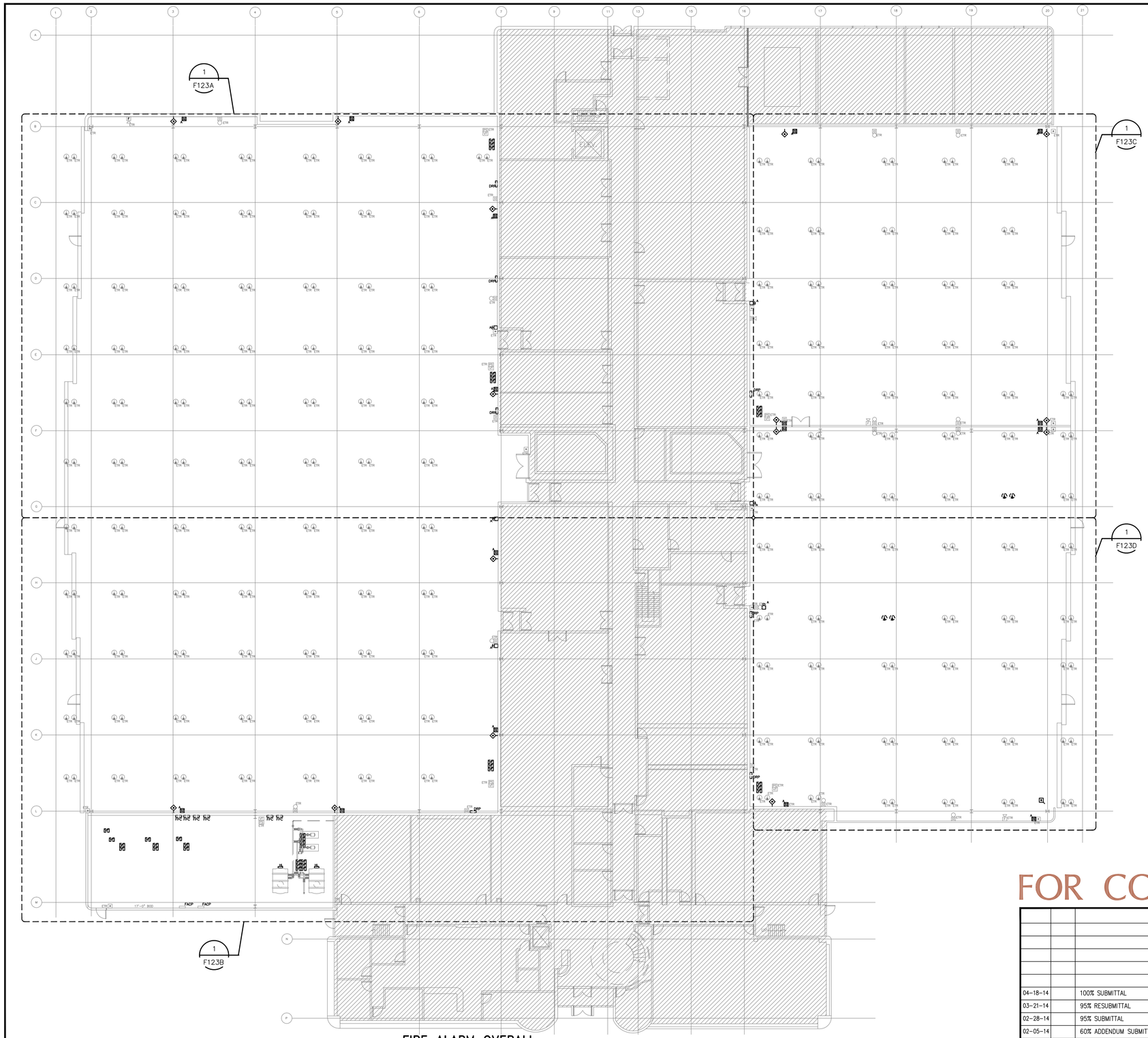
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F122C.dwg	F-122C	SHEET No. 70 of 137

DARRELL E. STEIN

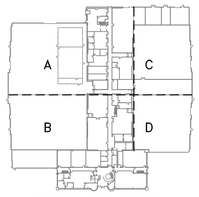
NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.



1 FIRE ALARM OVERALL DEMOLITION PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

N
0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
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TEL 913 742 5000 FAX 913 742 5001
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM OVERALL DEMOLITION PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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DRAWN BY	HEI	EDM-1719	
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F123.dwg	F-123	SHEET No. 71 of 137

DARRELL E. STEIN

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE DELUGE RELEASING PANELS
2. REMOVE ABANDONED UV/IR DETECTORS
3. REMOVE AFFF ABORT SWITCHES
4. REMOVE EXISTING AMBER STROBE
5. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA A

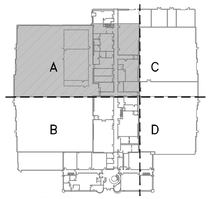
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'

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

GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.



BUILDING 4840 KEYPLAN

FOR CONSTRUCTION

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EDWARDS, CA

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FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA A

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SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F123A.dwg	F-123A	SHEET No. 72 of 137

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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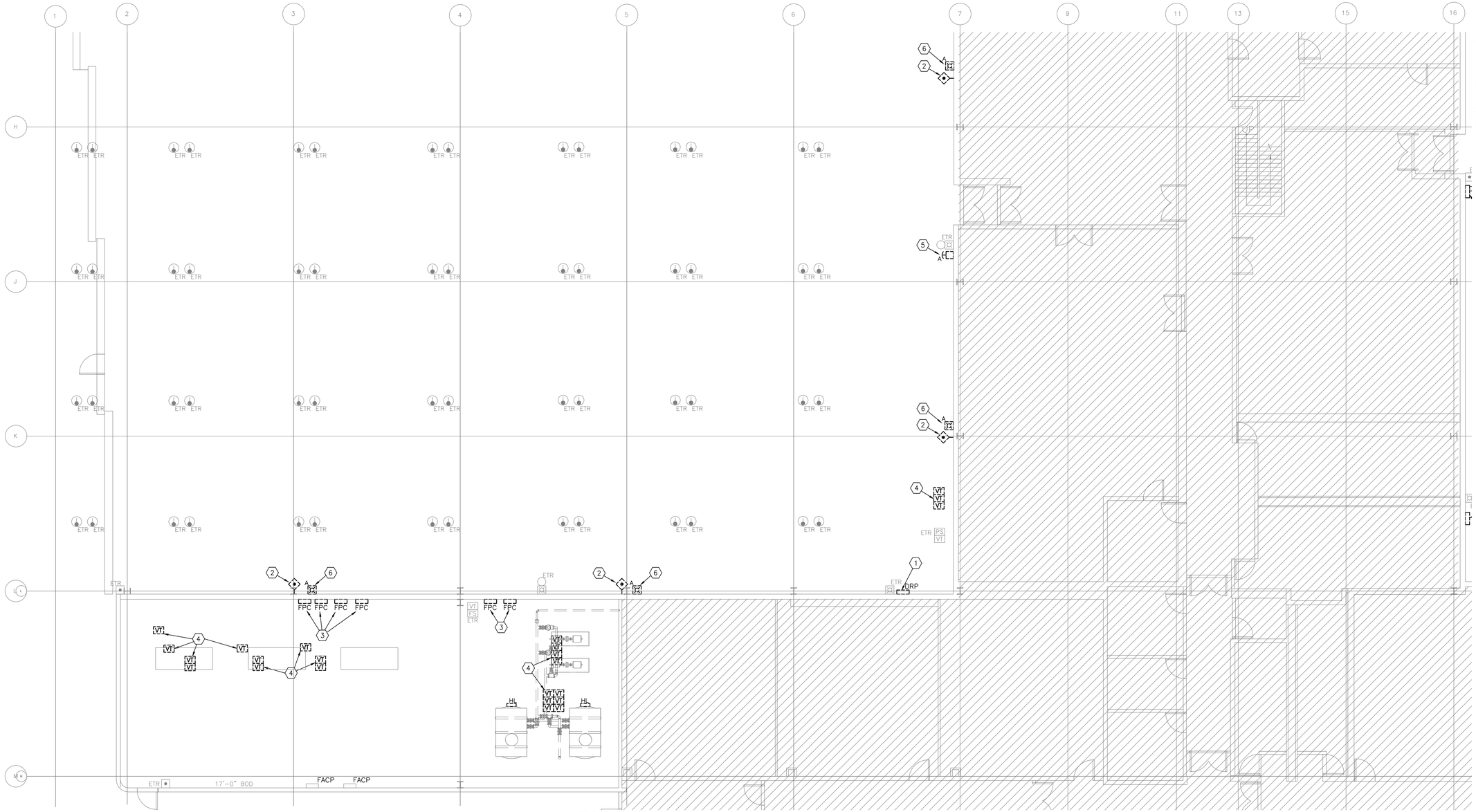
DARRELL E. STEIN



FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE DELUGE RELEASING PANELS
2. REMOVE ABANDONED UV/IR DETECTORS
3. REMOVE FIRE PUMP CONTROLLERS
4. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.
5. REMOVE AFFF ABORT SWITCHES
6. REMOVE EXISTING AMBER STROBE

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA B

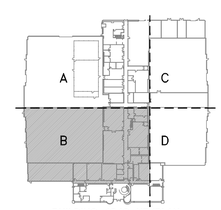
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'

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

GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.



BUILDING 4840 KEYPLAN

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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EDWARDS, CA

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Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 FT23B.dwg	F-123B	SHEET No. 73 of 137

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN
STEIN II
No. FP 1562
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
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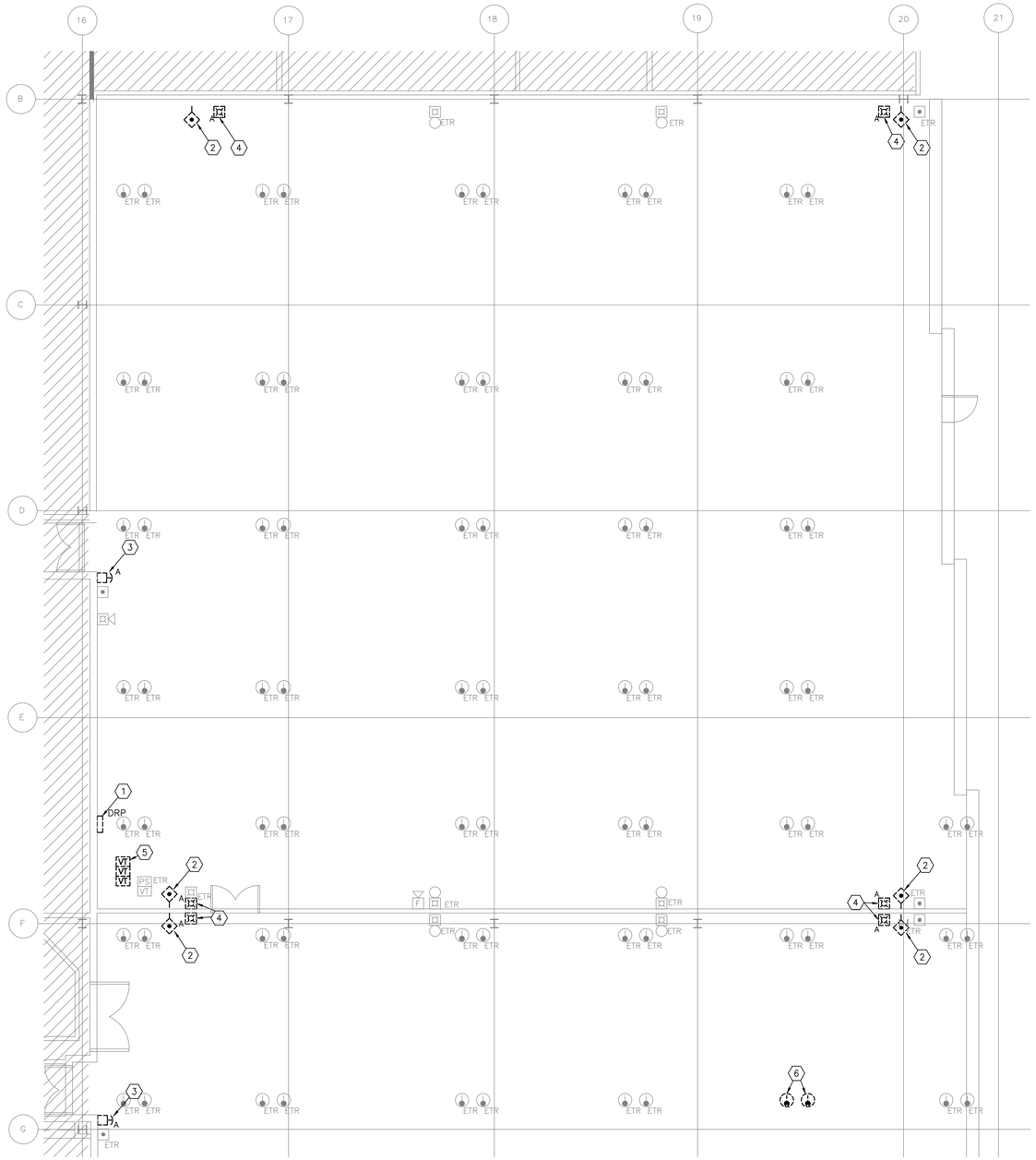
DARRELL E. STEIN



1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA C
SCALE: 1/8"=1'-0"

N

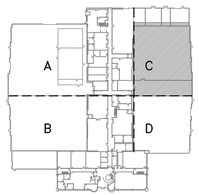
0 4' 8' 12'
SCALE: 1/8"=1'-0"

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE DELUGE RELEASING PANELS
2. REMOVE ABANDONED UV/IR DETECTORS
3. REMOVE AFFF ABORT SWITCHES
4. REMOVE EXISTING AMBER STROBE
5. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.
6. REMOVE HEAT DETECTORS FOR RELOCATION DUE TO NEW FOAM GENERATORS

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F123C.dwg	F-123C	SHEET No. 74 of 137

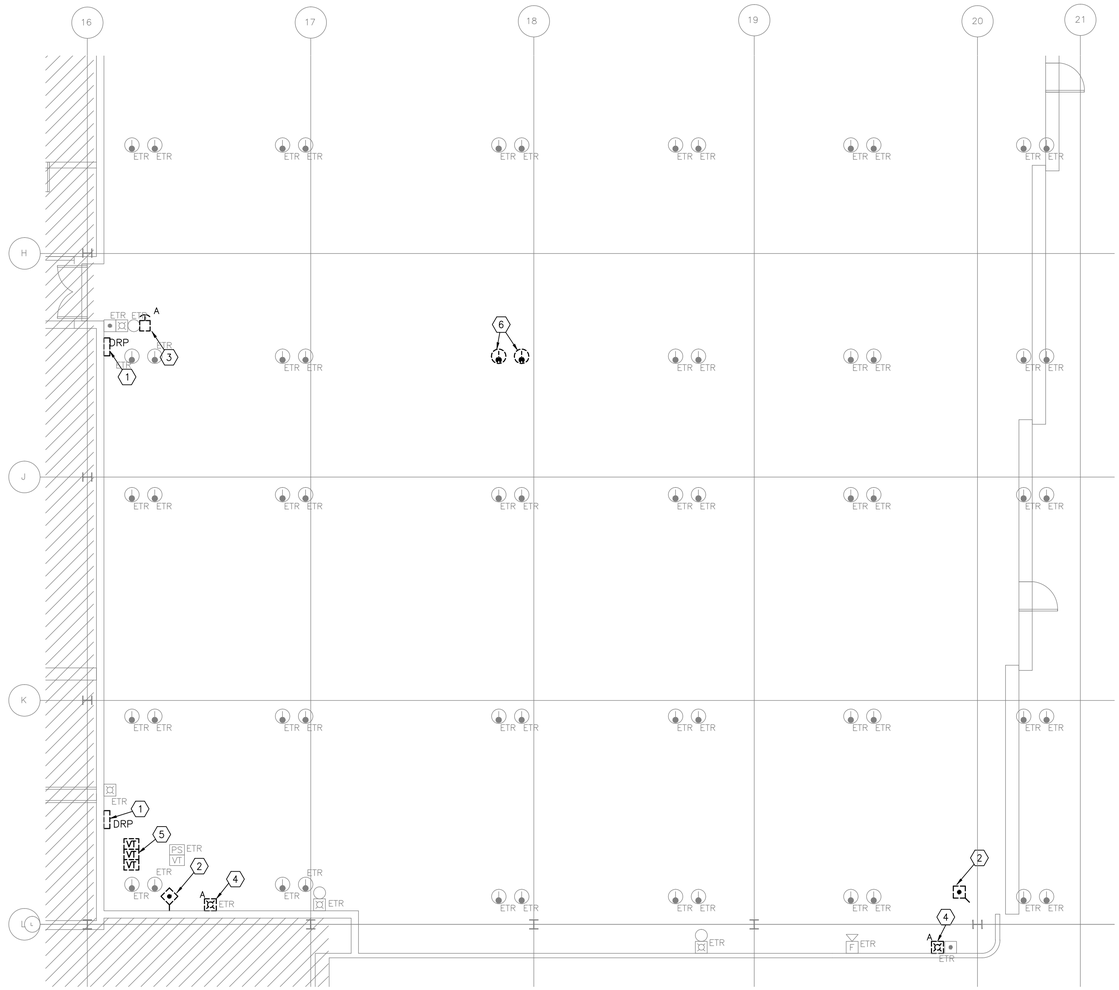
DARRELL E. STEIN

FIRE ALARM DEMOLITION PLAN NOTES:

1. REMOVE DELUGE RELEASING PANELS
2. REMOVE ABANDONED UV/IR DETECTORS
3. REMOVE AFFF ABORT SWITCHES
4. REMOVE EXISTING AMBER STROBE
5. REMOVE FIRE SPRINKLER MONITORING EQUIPMENT FOR SCOPE OF WORK. COORDINATE EXACT QUANTITY AND LOCATIONS.
6. REMOVE HEAT DETECTORS FOR RELOCATION DUE TO NEW FOAM GENERATORS

NOTE BID OPTION: DEMOLISH ALL SPOT TYPE HEAT DETECTORS, BACK BOXES, CONDUIT AND CONDUCTORS BACK TO SOURCE.

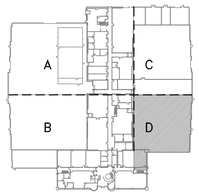
GENERAL DEMOLITION NOTE: PATCH AND REPAIR ALL WALLS, CEILING, ETC AFTER REMOVAL OF EQUIPMENT AS INDICATED AND IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE STAINLESS STEEL COVER PLATE AS NECESSARY WHERE DEVICES OR APPLIANCES ARE REMOVED. REMOVE CONDUCTORS BACK TO SOURCE AND/OR NEXT APPLIANCE AS REQUIRED TO KEEP EXISTING SYSTEM FULLY OPERATIONAL.



1 FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA D
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED DEMOLITION PLAN – BUILDING 4840 AREA D

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE Sh. No.	
FILE NAME	EDM-1719 F1230.dwg	F-1230	SHEET No. 75 of 137

DARRELL E. STEIN

BUILDING 4853 FIRE PUMP SCHEDULE

MARK	PUMP DRIVER	FUNCTION	RATED FLOW (GPM)	RATED PRESSURE (PSI)	MAX CHURN PRESSURE (PSI)	APPROX HORSEPOWER (HP)
P–1	ELECTRIC	PRIMARY	4000	145	160	600
P–2	ELECTRIC	PRIMARY	4000	145	160	600
P–3	ELECTRIC	PRIMARY	4000	145	160	600
P–4	ELECTRIC	BACKUP	4000	145	160	600
JP–1	ELECTRIC	JOCKEY	145	150	–	15

MAXIMUM CHURN CALCULATION

	STORAGE TANK BASE	STORAGE TANK FULL ELEVATION	PUMP DISCHARGE	LOWEST PORTION OF FIRE LOOP	LOWEST PORTION OF 165 PSIG PIPING
ELEVATION (FT AMSL)	2275	2300	2279	2270	2302

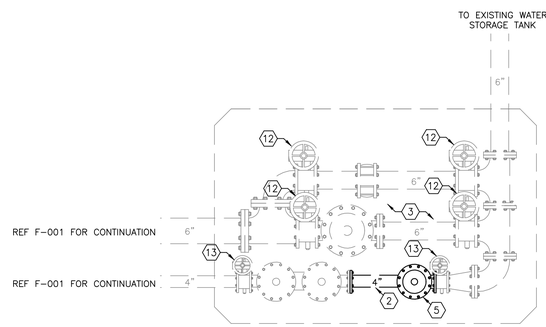
BASED ON PUMPS RATED AT 145 PSIG @ 4000 GPM AND 160 PSIG CHURN PRESSURE

PUMP INLET PRESSURE = (2300 FT – 2279 FT) X 0.4335 = 9.1 PSIG
PUMP OUTLET PRESSURE = 9.1 PSIG + 160 PSIG = 169.1 PSIG
MAX FIRE LOOP PIPING PRESSURE = 169.1 PSIG + [(2279 FT – 2270 FT) X 0.4335] = 173.1 PSIG
MAX 165 PSIG PIPING PRESSURE = 169.1 PSIG + [(2279 FT – 2302 FT) X 0.4335] = 159.2 PSIG

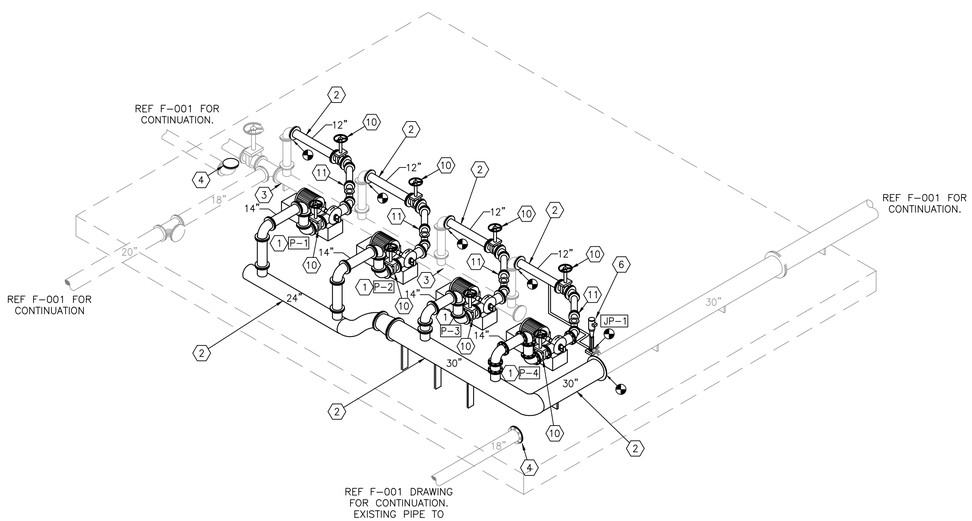
173.1 PSIG REPRESENTS MAXIMUM PRESSURE ENCOUNTERED IN ENTIRE FIRE LOOP
159.2 PSIG REPRESENTS MAXIMUM PRESSURE ENCOUNTERED IN 165 PSIG PIPING NETWORK

PUMP ROOM AND TANK PLAN NOTES:

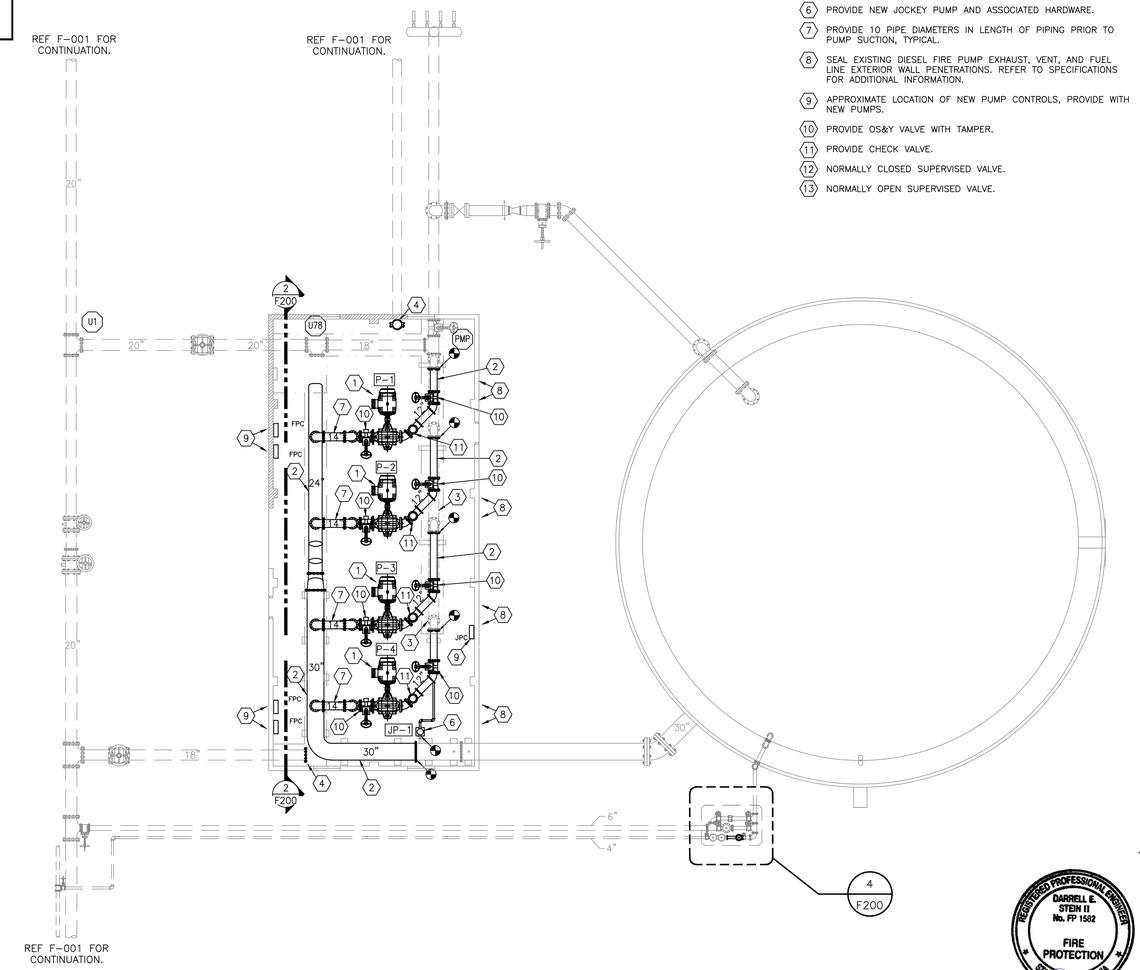
1. PROVIDE NEW 4000 GPM @ 145 PSI ELECTRIC FIRE PUMPS AND ALL ASSOCIATED HARDWARE. MAXIMUM PUMP CHURN PRESSURE NOT TO EXCEED UNDERGROUND PIPING LIMITATIONS. REFER TO SCHEDULE FOR ADDITIONAL INFORMATION.
2. PROVIDE NEW PIPING AND VALVES AS SHOWN.
3. EXISTING PIPING AND VALVES TO REMAIN.
4. CAP EXISTING PIPE
5. PROVIDE NEW 4" ALTITUDE VALVE
6. PROVIDE NEW JOCKEY PUMP AND ASSOCIATED HARDWARE.
7. PROVIDE 10 PIPE DIAMETERS IN LENGTH OF PIPING PRIOR TO PUMP SUCTION, TYPICAL.
8. SEAL EXISTING DIESEL FIRE PUMP EXHAUST, VENT, AND FUEL LINE EXTERIOR WALL PENETRATIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. APPROXIMATE LOCATION OF NEW PUMP CONTROLS, PROVIDE WITH NEW PUMPS.
10. PROVIDE OS&Y VALVE WITH TAMPER.
11. PROVIDE CHECK VALVE.
12. NORMALLY CLOSED SUPERVISED VALVE.
13. NORMALLY OPEN SUPERVISED VALVE.



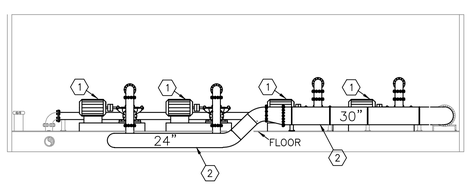
4 UNDERGROUND VAULT
SCALE: 1/2"=1'–0"



3 PUMP ROOM ISOMETRIC VIEW
SCALE: 3/32"=1'–0"



1 PUMP ROOM AND TANK PLAN – BUILDING 4853
SCALE: 3/32"=1'–0"



2 PUMP ROOM ELEVATION VIEW
SCALE: 3/32"=1'–0"

REGISTERED PROFESSIONAL ENGINEER
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No. FP 1582
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Jun 12 2014

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FOR CONSTRUCTION

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03–20–13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

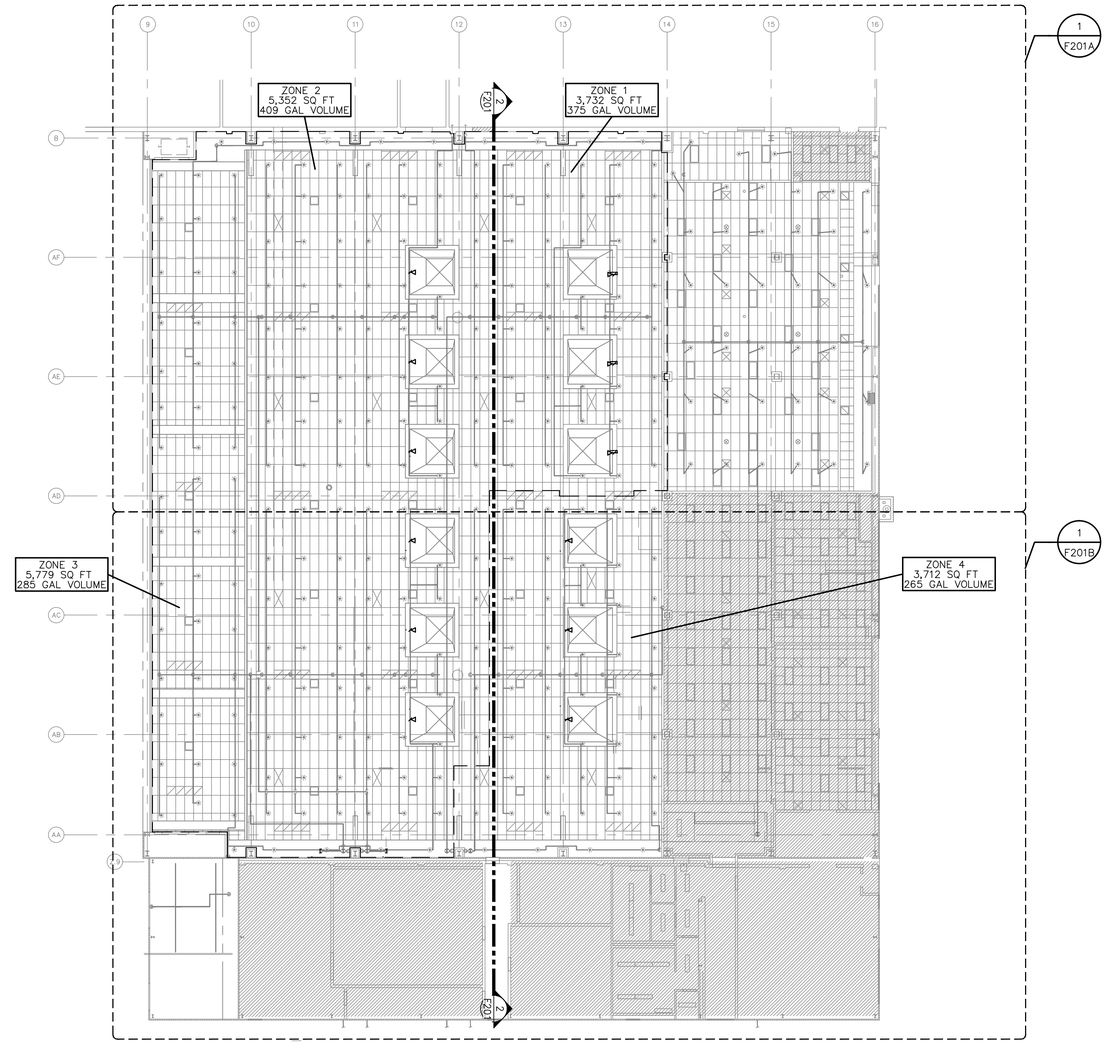
DRAWING TITLE
FIRE SPRINKLER OVERALL PLAN – BUILDING 4853

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM–1719
SCALE	VARIES	TRADE SH. No.	
FILE NAME	EDM–1719 F200.dwg	F–200	SHEET No. 76 of 137

DARRELL E. STEIN

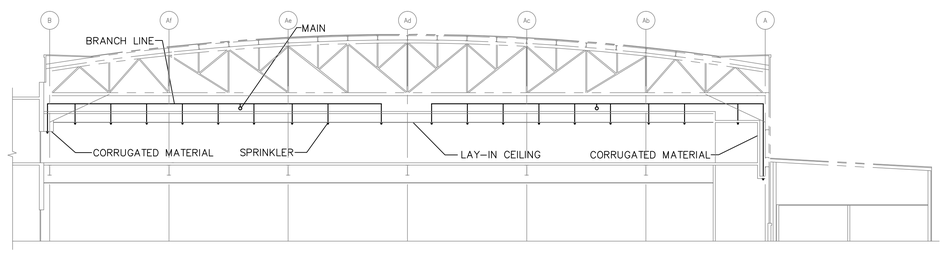


1 FIRE SPRINKLER OVERALL PLAN – BUILDING 4801
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



2 FIRE SPRINKLER SECTION VIEW – BUILDING 4801
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER OVERALL PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
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Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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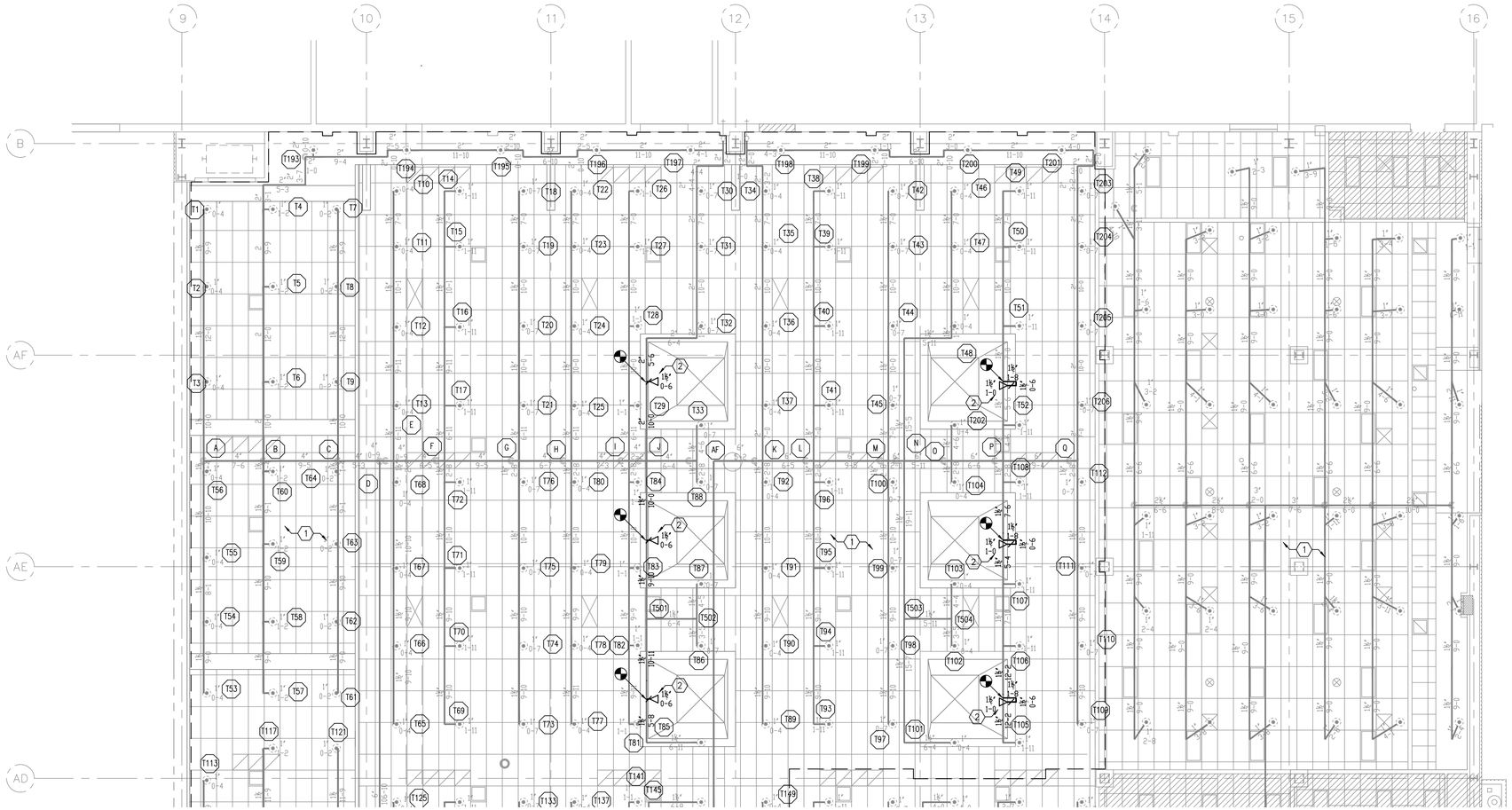
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F201.dwg	F-201	SHEET No. 77 of 137

DARRELL E. STEIN

FIRE SPRINKLER PLAN NOTES:

1. EXISTING SPRINKLERS AND BRANCH LINES TO REMAIN.
2. PROVIDE NEW HIGH TEMPERATURE SPRINKLER IN SKYLIGHT. CONNECT TO EXISTING SPRINKLER PIPING.



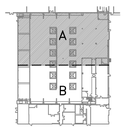
1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4801 AREA A
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

FIRE PROTECTION DESIGN	
BUILDING	4801
SPRINKLER DENSITY	0.17 GPM/SQ.FT.
SPRINKLER REMOTE AREA	15,080 SQ.FT.
NUMBER OF SPRINKLER HEADS	209
SPRINKLER SYSTEM DEMAND	5,243 GPM @104.7 PSI
SPRINKLER SYSTEM WITH FOAM DEMAND	6,892 GPM @127.1 PSI
SYSTEM SAFETY FACTOR	30.8 PSI



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4801 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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Chief, Office of Protective Services	
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SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F201A.dwg	F-201A	SHEET No. 78 of 137

DARRELL E. STEIN

FIRE SPRINKLER PLAN NOTES:

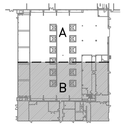
1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. PROVIDE NEW HIGH TEMPERATURE SPRINKLER IN SKYLIGHT. CONNECT TO EXISTING SPRINKLER PIPING.
3. CAP RISER MANIFOLD.

FIRE PROTECTION DESIGN	
BUILDING	4801
SPRINKLER DENSITY	0.17 GPM/SQ.FT.
SPRINKLER REMOTE AREA	15,080 SQ.FT.
NUMBER OF SPRINKLER HEADS	209
SPRINKLER SYSTEM DEMAND	5,243 GPM @104.7 PSI
SPRINKLER SYSTEM WITH FOAM DEMAND	6,892 GPM @127.1 PSI
SYSTEM SAFETY FACTOR	30.8 PSI

1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4801 AREA B
SCALE: 1/8"=1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
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FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4801 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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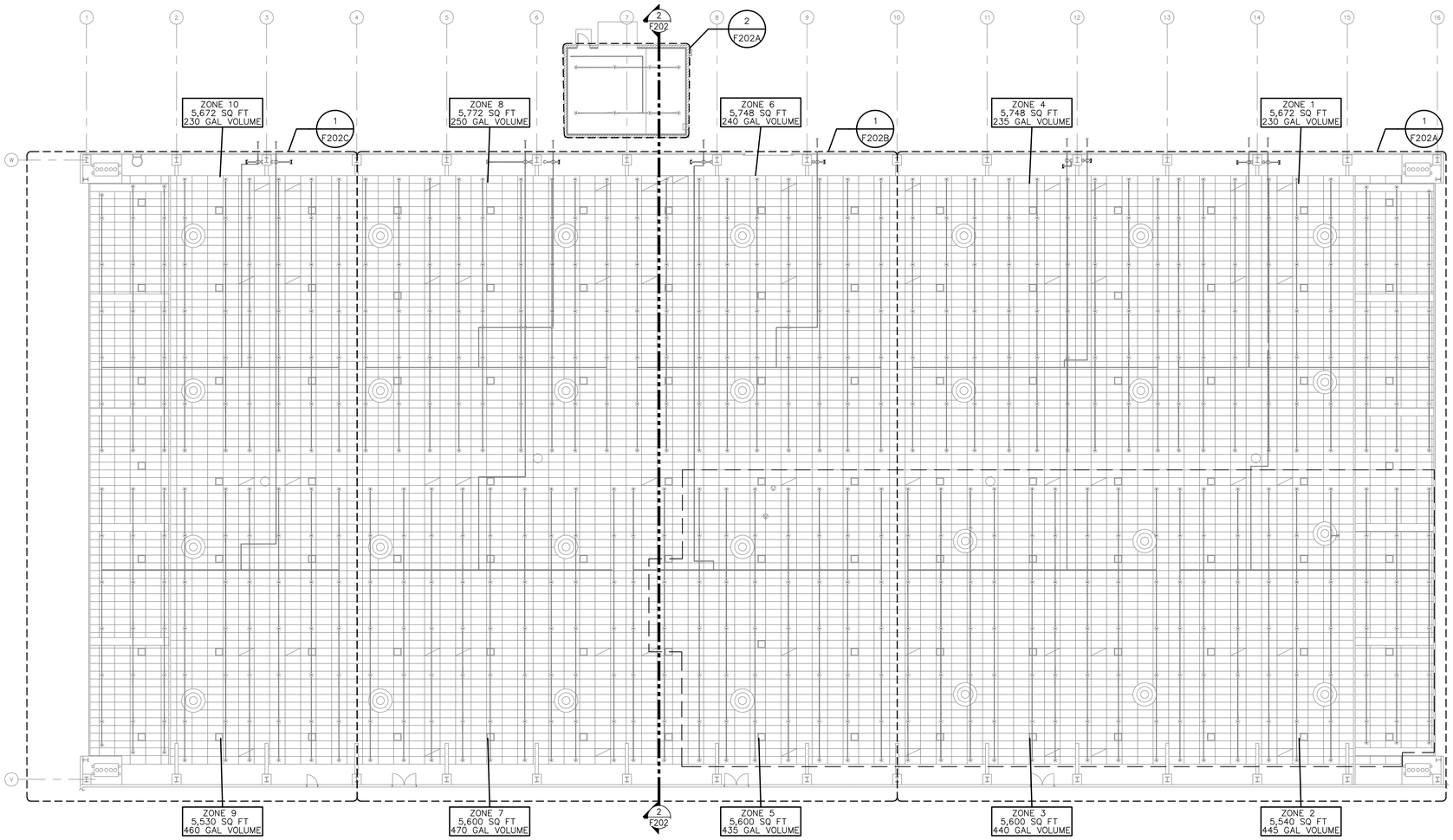
FILE NAME	EDM-1719 F201B.dwg	F-201B	SHEET No. 79 of 137

DARRELL E. STEIN



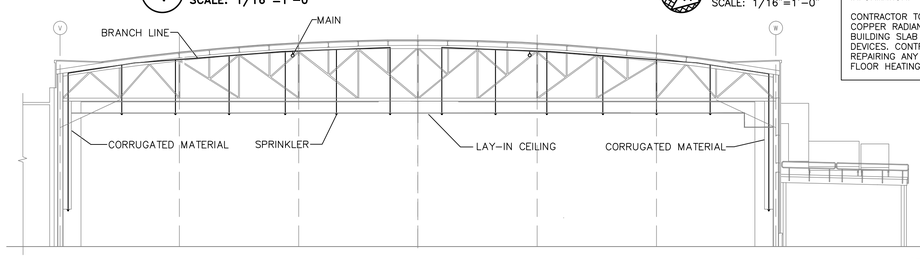
1 FIRE SPRINKLER OVERALL PLAN – BUILDING 4802

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

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

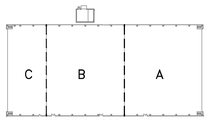
CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



2 FIRE SPRINKLER SECTION VIEW – BUILDING 4802

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

0 8' 16' 24'
SCALE: 1/16"=1'-0"



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
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1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

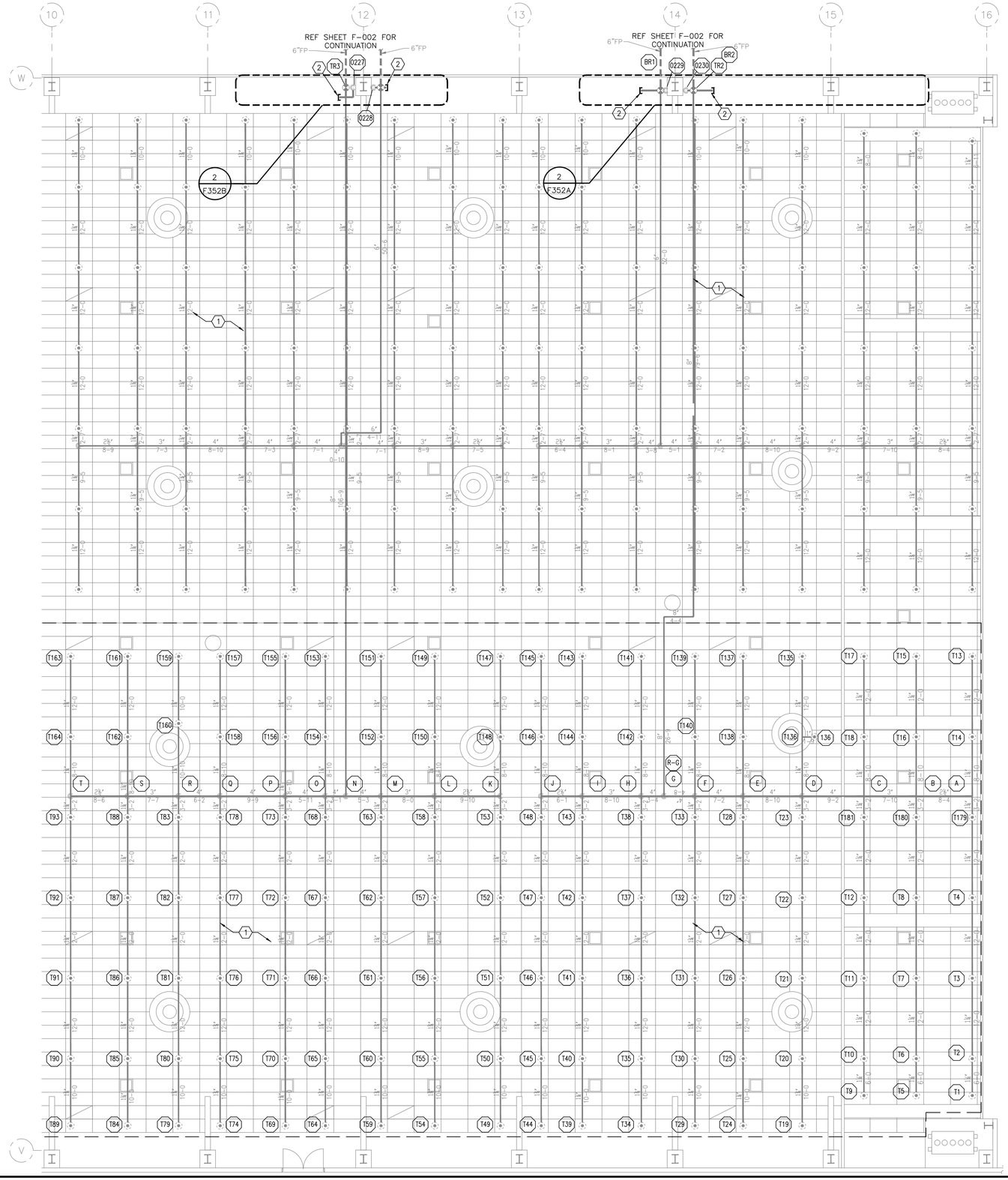
DRAWING TITLE
FIRE SPRINKLER OVERALL PLAN – BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

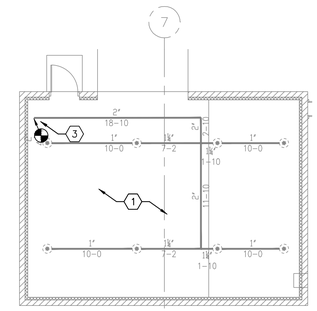
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F202.dwg	F-202	SHEET No. 80 of 137

DARRELL E. STEIN



FIRE SPRINKLER PLAN NOTES:

1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. CAP SHORTENED RISER MANIFOLD.
3. SPRINKLERS IN FOAM TANK ROOM TO BE CONNECTED TO NEW SERVICE ENTRY. RECONNECT ALL PREVIOUS RISER EQUIPMENT. REFER TO SHEET 212D FOR ADDITIONAL INFORMATION.



2 FIRE SPRINKLER FOAM PUMP ROOM ENLARGED PLAN – BUILDING 4802 AREA A

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

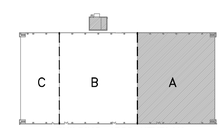
FIRE PROTECTION DESIGN	
BUILDING	4802
SPRINKLER DENSITY	0.17 GPM/SQ.FT.
SPRINKLER REMOTE AREA	15,054 SQ.FT.
NUMBER OF SPRINKLER HEADS	181
SPRINKLER SYSTEM DEMAND	4,966 GPM @113.6 PSI
SPRINKLER SYSTEM WITH FOAM DEMAND	7,772 GPM @141.4 PSI
SYSTEM SAFETY FACTOR	14.7 PSI

1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4802 AREA A

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
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FOR CONSTRUCTION

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

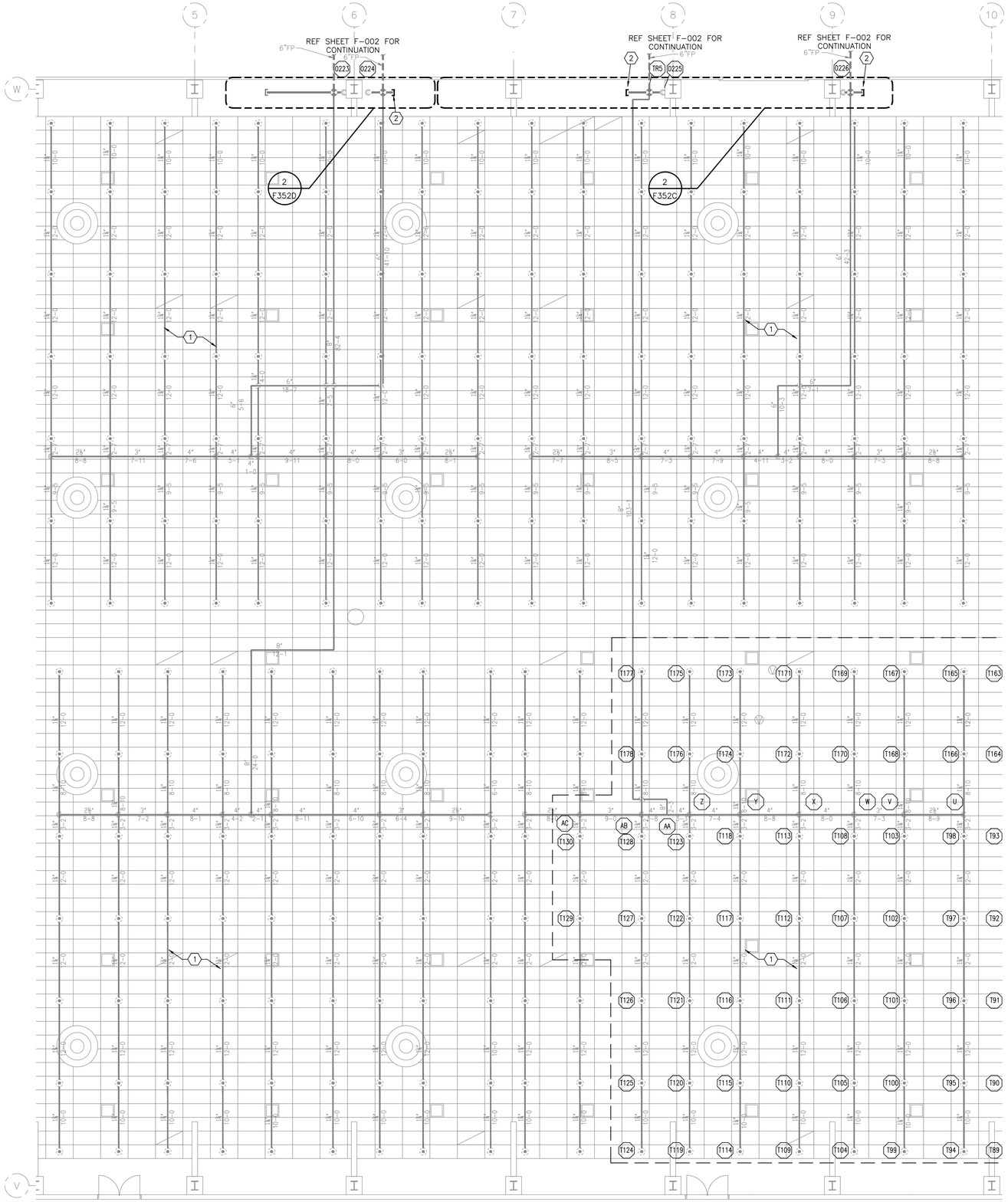
DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4802 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F202A.dwg	F-202A	SHEET No. 81 of 137

DARRELL E. STEIN



FIRE SPRINKLER PLAN NOTES:

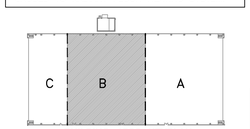
1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. CAP SHORTENED RISER MANIFOLD.

FIRE PROTECTION DESIGN	
BUILDING	4802
SPRINKLER DENSITY	0.17 GPM/SQ.FT.
SPRINKLER REMOTE AREA	15,054 SQ.FT.
NUMBER OF SPRINKLER HEADS	181
SPRINKLER SYSTEM DEMAND	4,966 GPM @113.6 PSI
SPRINKLER SYSTEM WITH FOAM DEMAND	7,772 GPM @141.4 PSI
SYSTEM SAFETY FACTOR	14.7 PSI

1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4802 AREA B
SCALE: 1/8"=1'-0"

N
0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

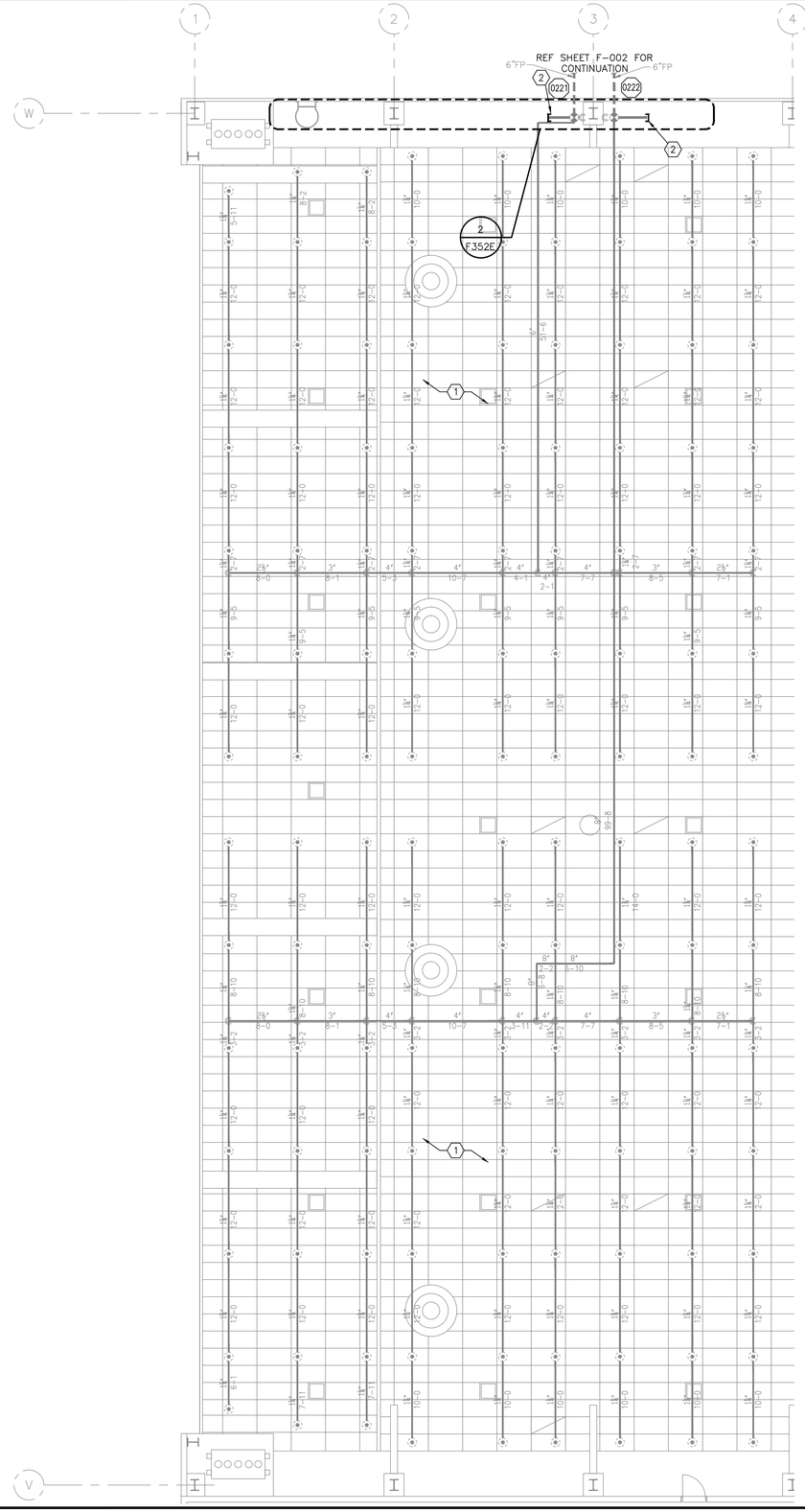
DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4802 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F202B.dwg	F-202B	SHEET No. 82 of 137

DARRELL E. STEIN



FIRE SPRINKLER PLAN NOTES:

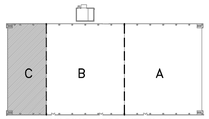
1. EXISTING SPRINKLERS AND BRANCHLINES TO REMAIN.
2. CAP SHORTENED RISER MANIFOLD.

1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4802 AREA C

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

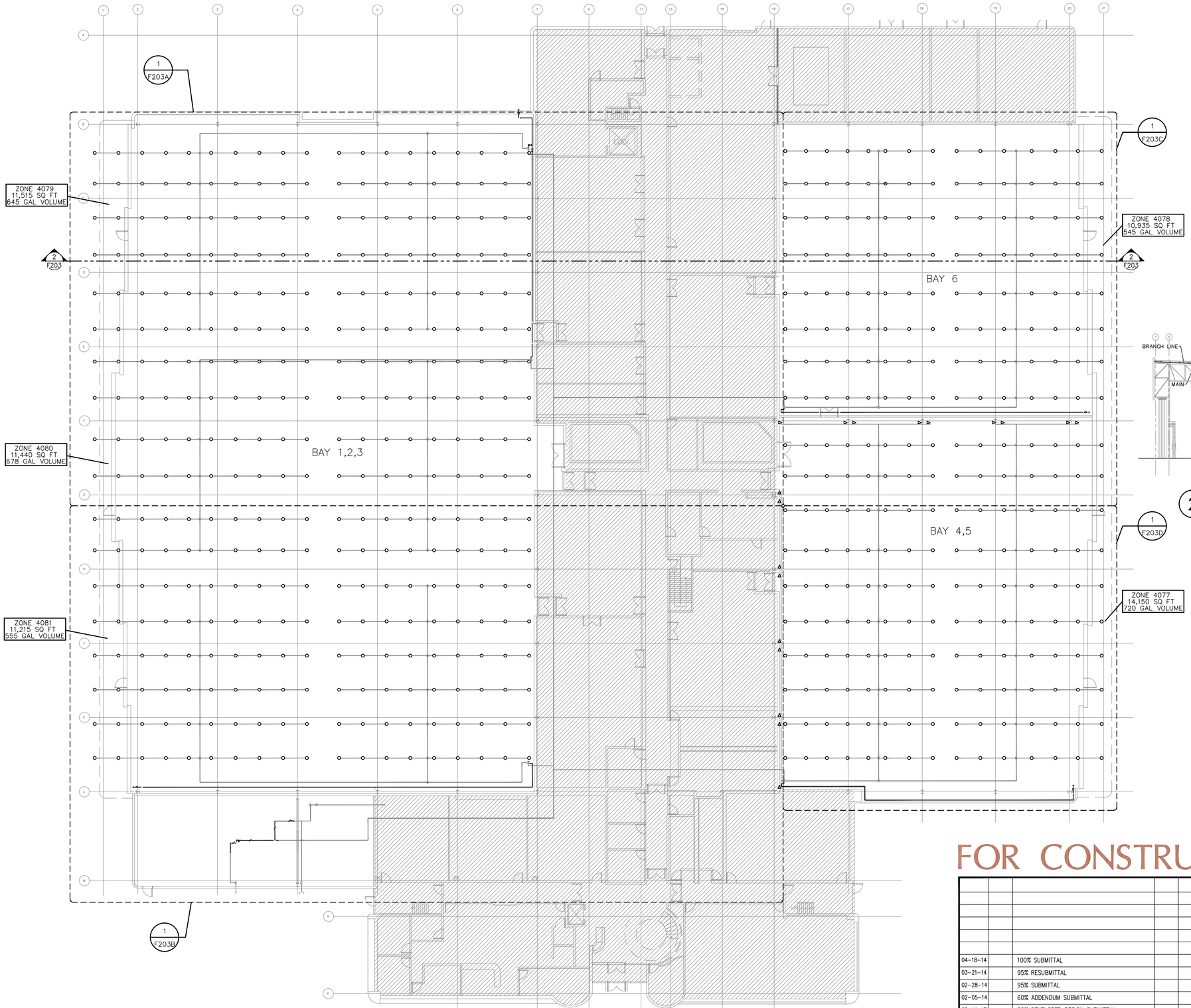
DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4802 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F202C.dwg	F-202C	SHEET No. 83 of 137

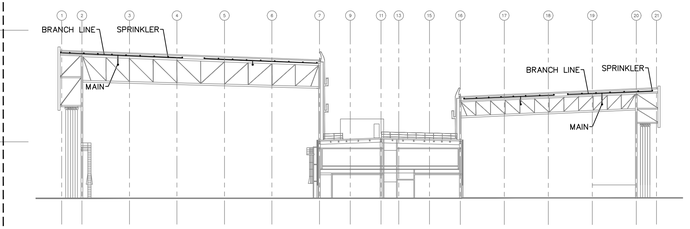
DARRELL E. STEIN



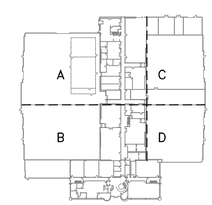
1 FIRE SPRINKLER OVERALL PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.



2 FIRE SPRINKLER SECTION VIEW – BUILDING 4840
SCALE: NTS



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. PP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
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FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

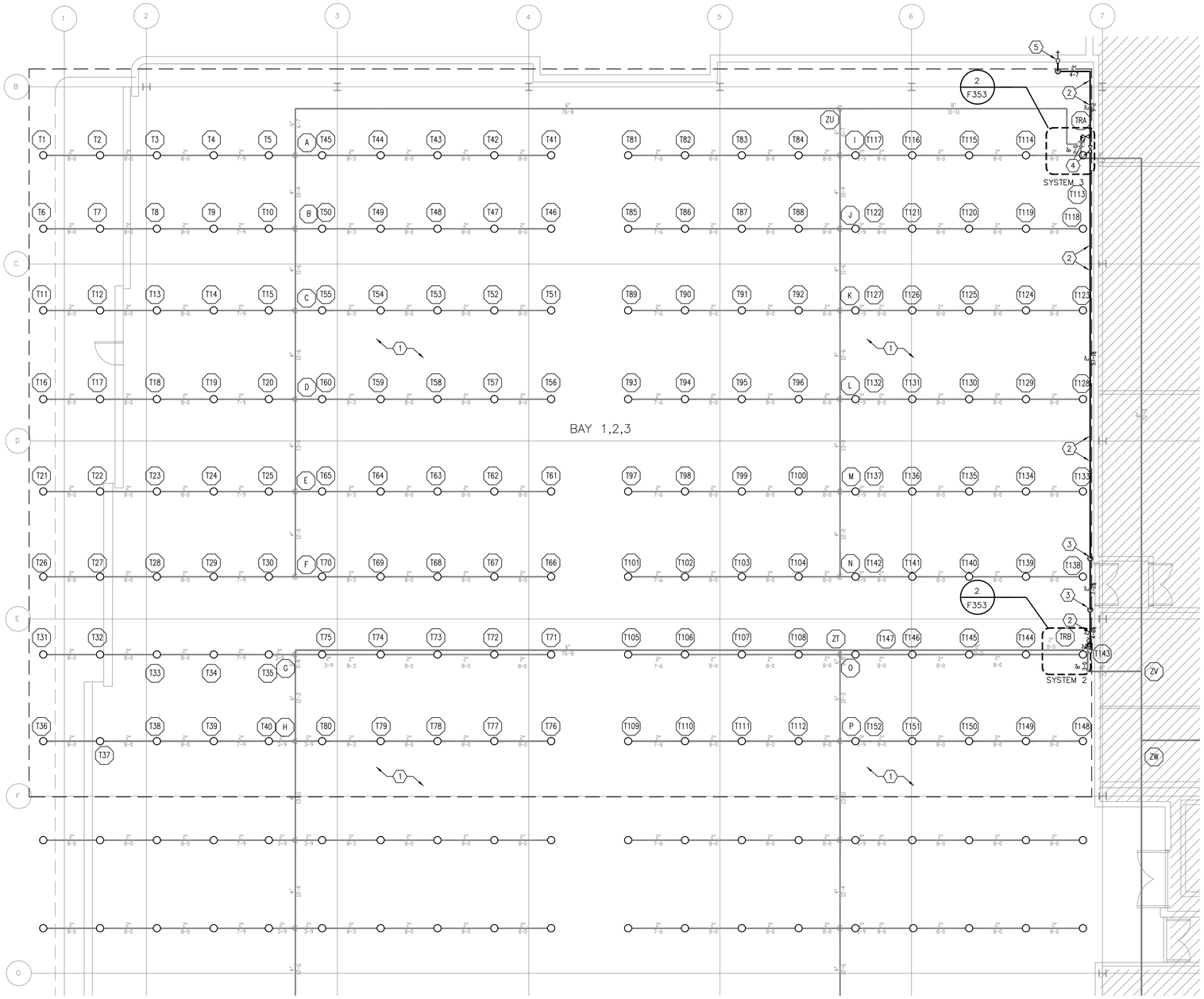
DRAWING TITLE
FIRE SPRINKLER OVERALL PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	VARIES	TRADE SH. No.	EDM-1719
FILE NAME	EDM-1719 F203.dwg	F-203	SHEET No. 84 of 137

DARRELL E. STEIN



1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA A
SCALE: 1/8"=1'-0"

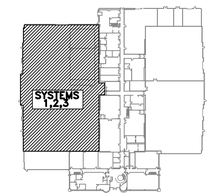
N

0 4' 8' 12'
SCALE: 1/8"=1'-0"

FIRE PROTECTION DESIGN	
BUILDING	4840, AREA #1
SPRINKLER DENSITY	0.17 GPM/SQ.FT.
SPRINKLER REMOTE AREA	15,330 SQ.FT.
NUMBER OF SPRINKLER HEADS	152
SPRINKLER SYSTEM DEMAND	3,914 GPM @110.9 PSI
SPRINKLER SYSTEM WITH FOAM DEMAND	5,651 GPM @132.8 PSI
SYSTEM SAFETY FACTOR	26.7 PSI

FIRE SPRINKLER PLAN NOTES:

1. PROVIDE NEW CLOSED-ORIFICE SPRINKLERS THROUGHOUT HANGAR AREAS.
2. PROVIDE MAIN DRAIN TEST PIPING AS SHOWN. PIPING TO BE ROUTED AROUND OBSTRUCTIONS AND PITCHED APPROPRIATELY TO ENSURE PROPER DRAINAGE. PIPING TO BE SUPPORTED PER NFPA 13 REQUIREMENTS.
3. ROUTE PIPING AROUND DOOR. PROVIDE BALL DRIP VALVE TO ALLOW FOR DRAINAGE.
4. PROVIDE GATE VALVES AS SHOWN.
5. MAIN DRAIN DISCHARGE LOCATION. PROVIDE THREADED MALE OUTLET FOR CONNECTION OF 1-1/2" HOSE.



REFERENCE PLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
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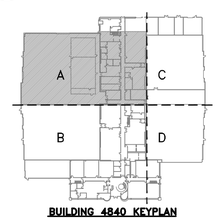

BUILDING 4840 KEYPLAN

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
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02-28-14		95% SUBMITTAL		
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

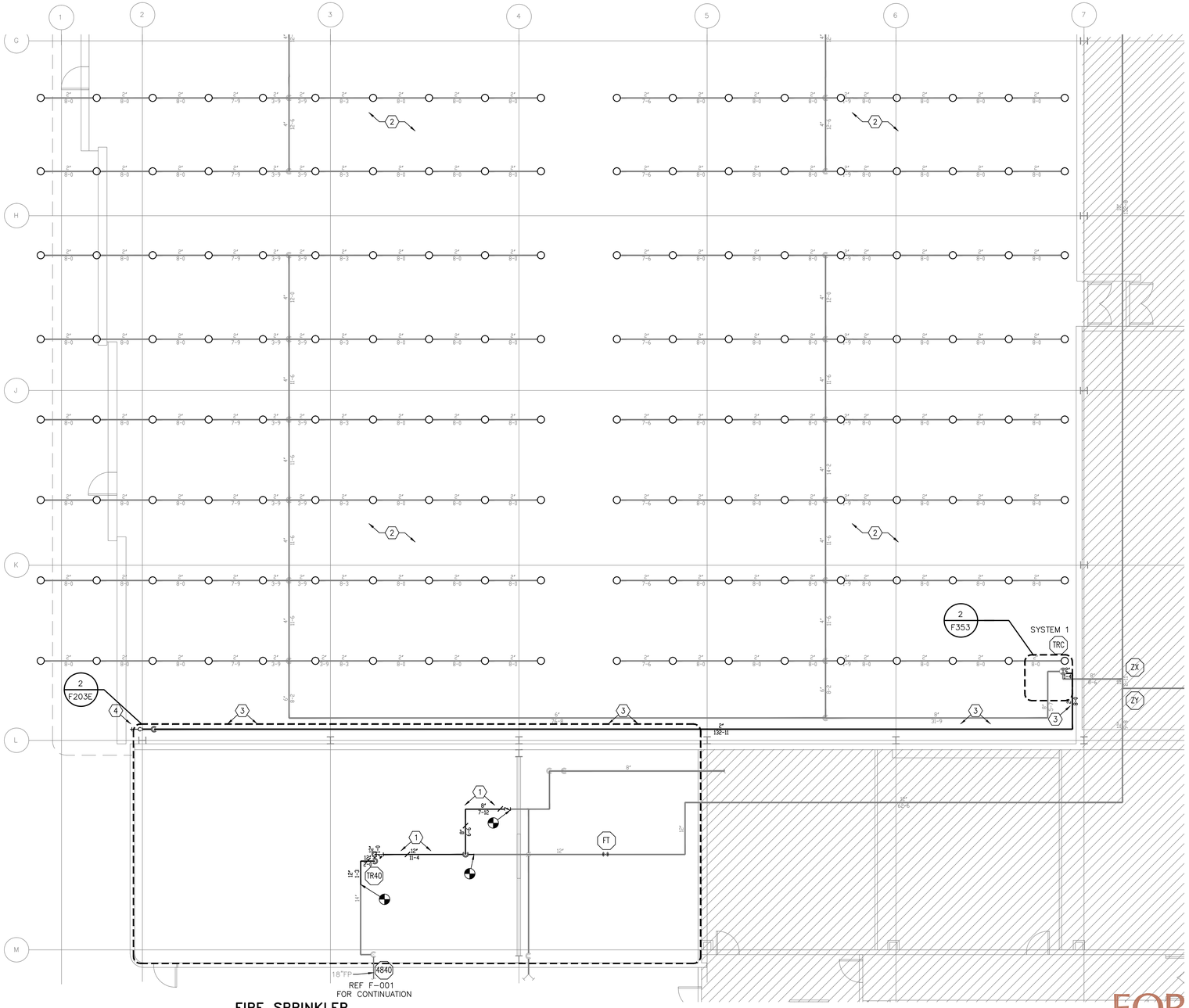
DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F203A.dwg	F-203A	SHEET No. 85 of 137

DARRELL E. STEIN



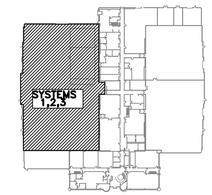
1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA B

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

N

0 4' 8' 12'

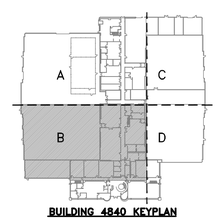
SCALE: 1/8"=1'-0"



REFERENCE PLAN

FIRE SPRINKLER PLAN NOTES:

1. PROVIDE NEW PIPING.
2. PROVIDE NEW CLOSED-ORIFICE SPRINKLERS THROUGHOUT HANGAR AREAS.
3. PROVIDE MAIN DRAIN TEST PIPING AS SHOWN. PIPING TO BE ROUTED AROUND OBSTRUCTIONS AND PITCHED APPROPRIATELY TO ENSURE PROPER DRAINAGE. PIPING TO BE SUPPORTED PER NFPA 13 REQUIREMENTS.
4. MAIN DRAIN DISCHARGE LOCATION. PROVIDE THREADED MALE OUTLET FOR CONNECTION OF 1-1/2" HOSE.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1562
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC

8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
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1250001459

FOR CONSTRUCTION

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
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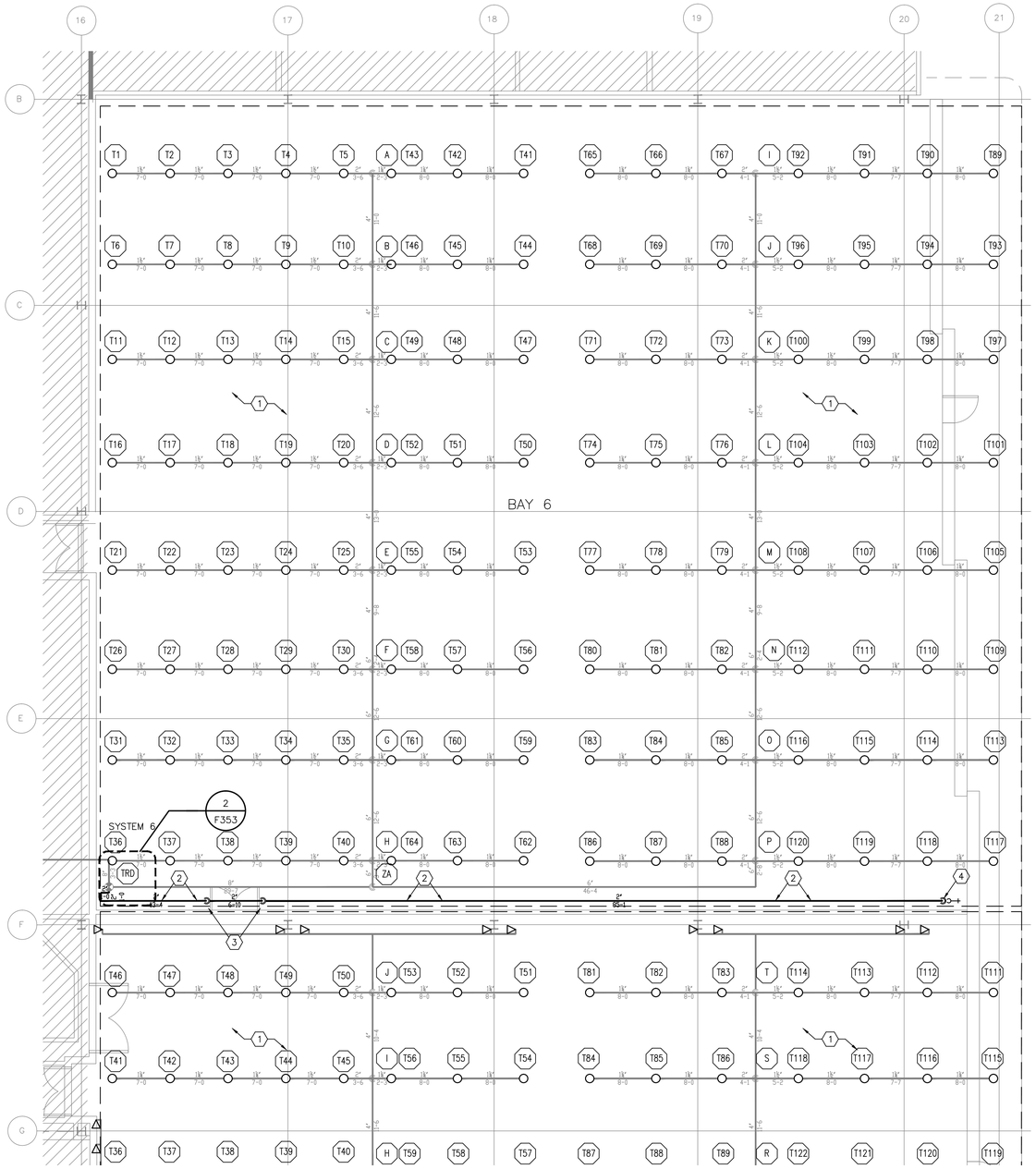
FILE NAME	EDM-1719 F203B.dwg	F-203B	SHEET No. 86 of 137

DARRELL E. STEIN



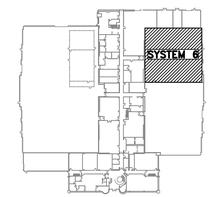
1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA C
SCALE: 1/8"=1'-0"

N

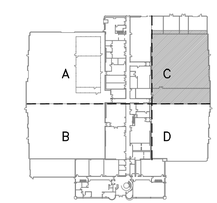
0 4' 8' 12'
SCALE: 1/8"=1'-0"

FIRE SPRINKLER PLAN NOTES:

1. PROVIDE NEW CLOSED-ORIFICE SPRINKLERS THROUGHOUT HANGAR AREAS.
2. PROVIDE MAIN DRAIN TEST PIPING AS SHOWN. PIPING TO BE ROUTED AROUND OBSTRUCTIONS AND PITCHED APPROPRIATELY TO ENSURE PROPER DRAINAGE. PIPING TO BE SUPPORTED PER NFPA 13 REQUIREMENTS.
3. ROUTE PIPING AROUND DOOR. PROVIDE BALL DRIP VALVE TO ALLOW FOR DRAINAGE.
4. MAIN DRAIN DISCHARGE LOCATION. PROVIDE THREADED MALE OUTLET FOR CONNECTION OF 1-1/2" HOSE.



REFERENCE PLAN



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. PP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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FOR CONSTRUCTION

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04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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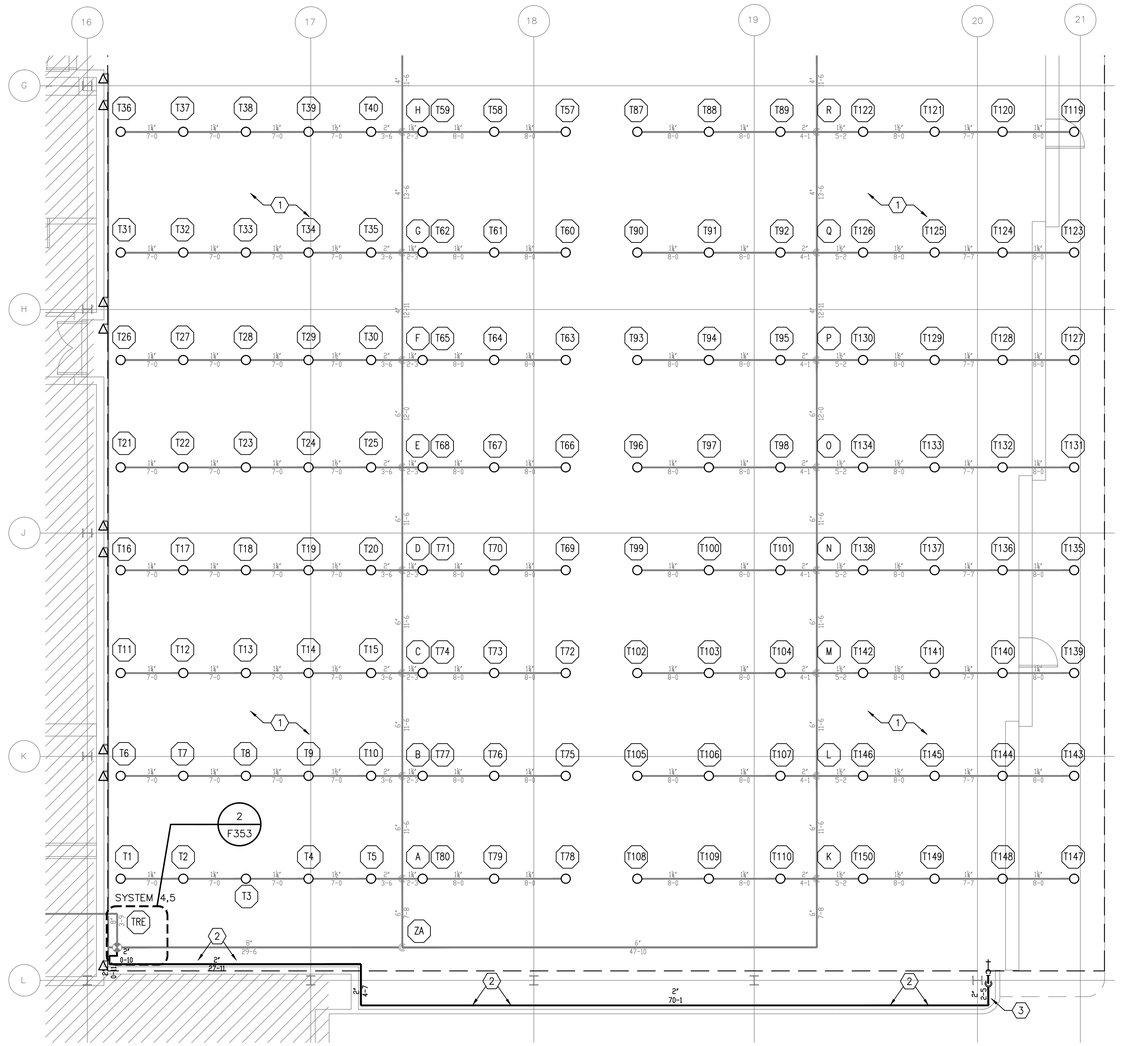
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F203C.dwg	F-203C	SHEET No. 87 of 137

DARRELL E. STEIN

FIRE SPRINKLER PLAN NOTES:

1. PROVIDE NEW CLOSED-ORIFICE SPRINKLERS THROUGHOUT HANGAR AREAS.
2. PROVIDE MAIN DRAIN TEST PIPING AS SHOWN. PIPING TO BE ROUTED AROUND OBSTRUCTIONS AND PITCHED APPROPRIATELY TO ENSURE PROPER DRAINAGE. PIPING TO BE SUPPORTED PER NFPA 13 REQUIREMENTS.
3. MAIN DRAIN DISCHARGE LOCATION. PROVIDE THREADED MALE OUTLET FOR CONNECTION OF 1-1/2" HOSE.

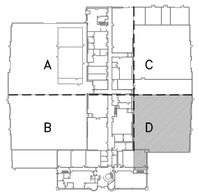


1 FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA D
SCALE: 1/8"=1'-0"

N
0 4' 8' 12'
SCALE: 1/8"=1'-0"

FIRE PROTECTION DESIGN	
BUILDING	4840, AREA #3
SPRINKLER DENSITY	0.17 GPM/SQ.FT.
SPRINKLER REMOTE AREA	13,983 SQ.FT.
NUMBER OF SPRINKLER HEADS	150
SPRINKLER SYSTEM DEMAND	3,532 GPM @107.3 PSI
SPRINKLER SYSTEM WITH FOAM DEMAND	4,649 GPM @125.0 PSI
SYSTEM SAFETY FACTOR	34.5 PSI

REFERENCE PLAN



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 AREA D

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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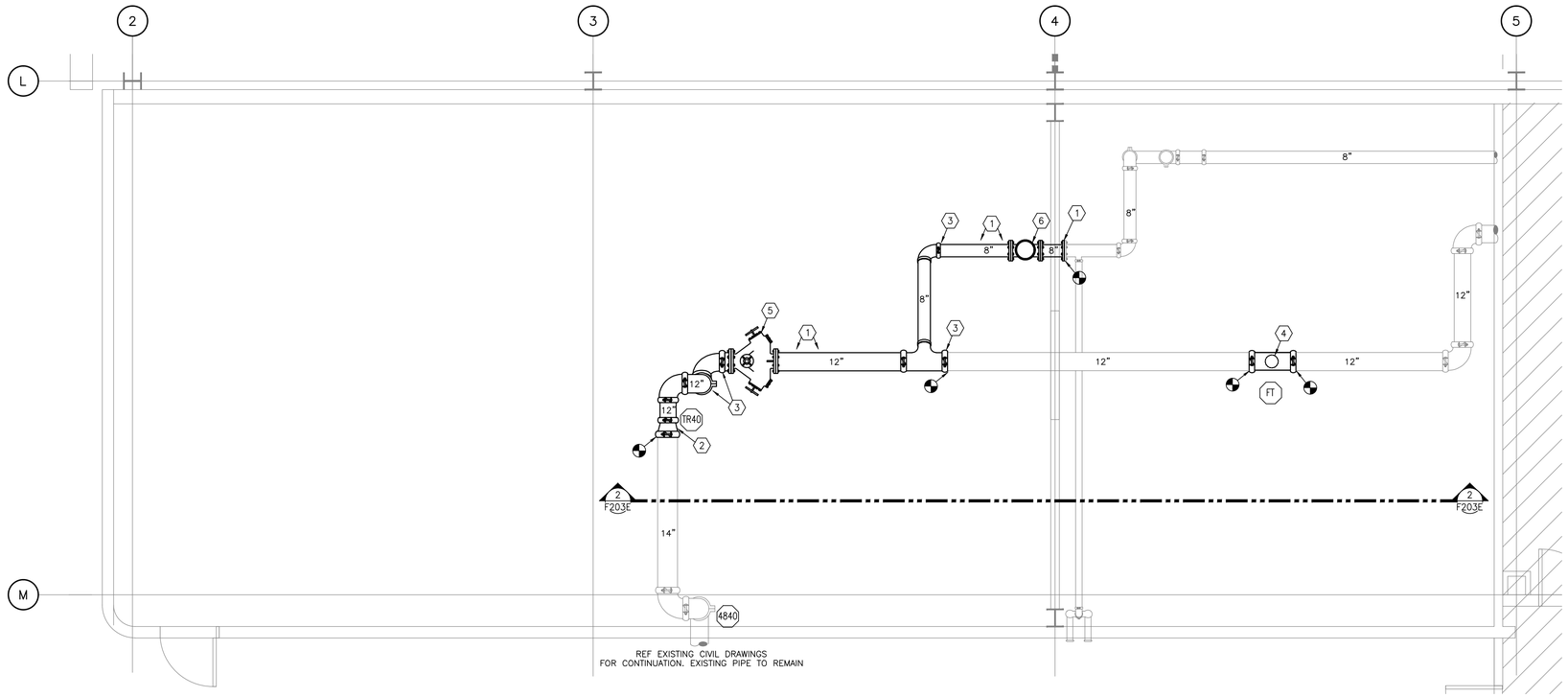
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE Sh. No.	
FILE NAME	EDM-1719 F2030.dwg	F-2030	SHEET No. 88 of 137

DARRELL E. STEIN

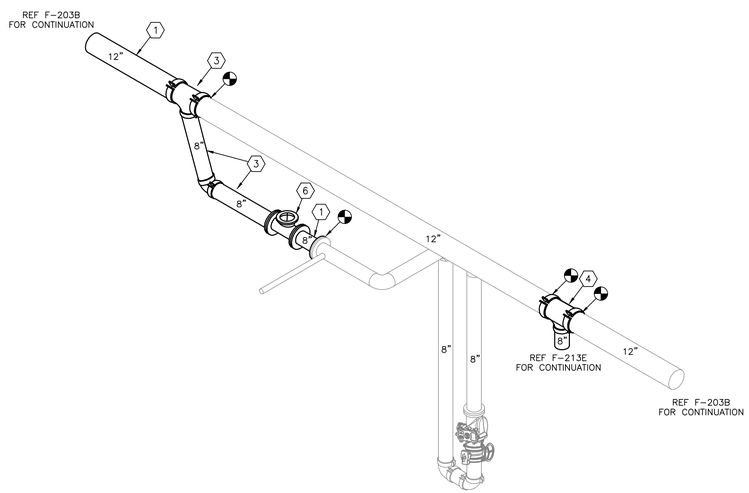


1 BUILDING 4840 PUMP ROOM PLAN VIEW

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

N

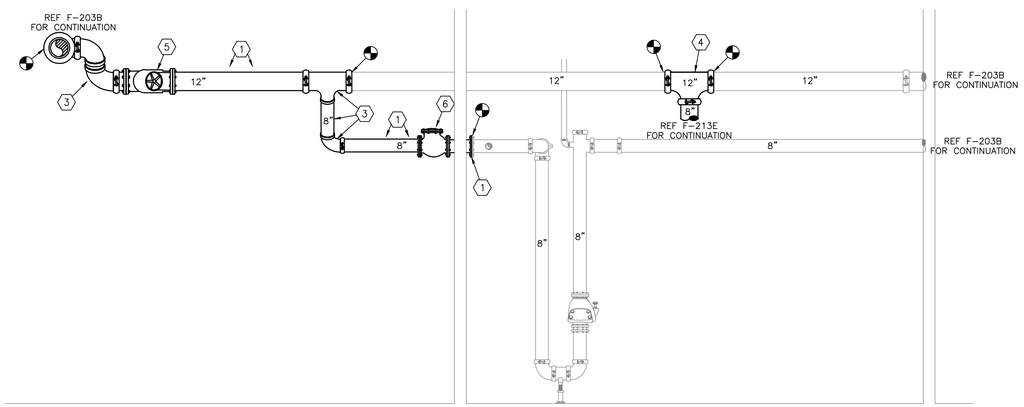
0 2' 4' 6'
SCALE: 1/4"=1'-0"



3 BUILDING 4840 PUMP ROOM ISOMETRIC VIEW

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

0 2' 4' 6'
SCALE: 1/4"=1'-0"



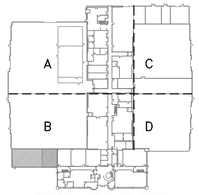
2 BUILDING 4840 PUMP ROOM ELEVATION VIEW

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

0 2' 4' 6'
SCALE: 1/4"=1'-0"

PUMP ROOM PLAN NOTES:

1. PROVIDE NEW PIPING AS SHOWN. HANGING METHOD TO COMPLY WITH NFPA 13 REQUIREMENTS.
2. PROVIDE 14" X 12" REDUCER.
3. ANGLE FITTINGS AND ADJUST CONNECTING SPOOL PIECE LENGTH AS NECESSARY TO MAKE CONNECTION BETWEEN PIPING AT DIFFERENT ELEVATIONS.
4. PROVIDE NEW CONNECTION FOR FOAM SYSTEM.
5. PROVIDE NEW STRAINER.
6. RELOCATE CHECK VALVE TO ACCOMMODATE NEW WALL INSTALLATION.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER ENLARGED PLAN – BUILDING 4840 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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SCALE	1/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F203E.dwg	F-203E	SHEET No. 89 of 137

DARRELL E. STEIN

FOAM CALULATION METHOD

REQUIRED CUFT = AREA OF HANGER X 3.28 FT (MINIMUM DEPTH OF FOAM)

SPRINKLER BREAKDOWN FACTOR PER ETL 02-15 = ((0.2 GPM/SQFT X 5000 SQFT) X 15% OVERAGE) X 10 CFM/GPM

LEAKAGE FACTORS	HANGER AREA	FACTOR
	UP TO 15,000 SQFT	2.0
	UP TO 30,000 SQFT	2.5
	OVER 30,000 SQFT	3.0

REQUIRED CFM HIGH EXPANSION FOAM

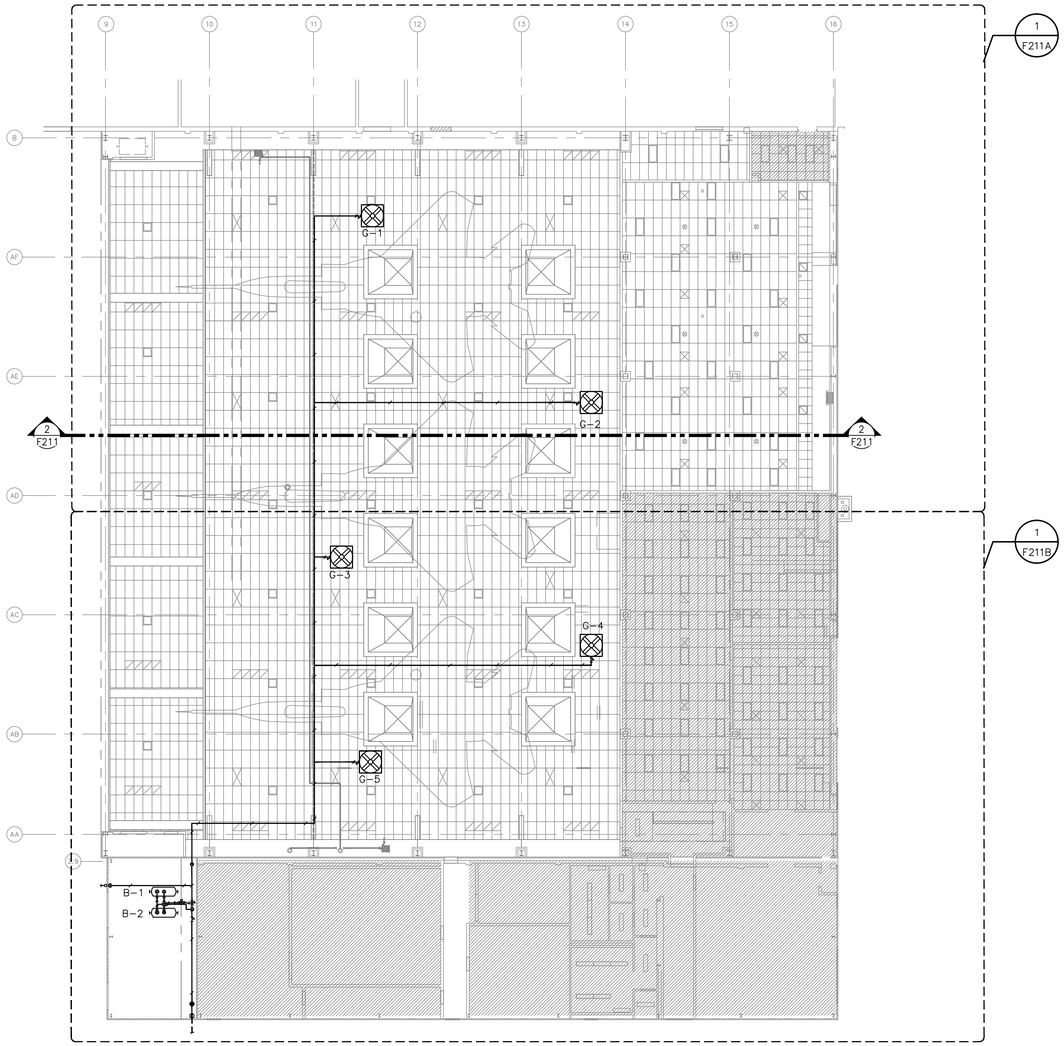
((REQUIRED CUFT / 4 MINUTES) + BREAKDOWN CFM) X 1.15 (SHRINKAGE) X (LEAKAGE FACTOR)

BUILDING 4801 BLADDER TANK SCHEDULE

MARK	ORIENTATION	NOMINAL CAPACITY (GAL)
B-1	HORIZONTAL	400
B-2	HORIZONTAL	400

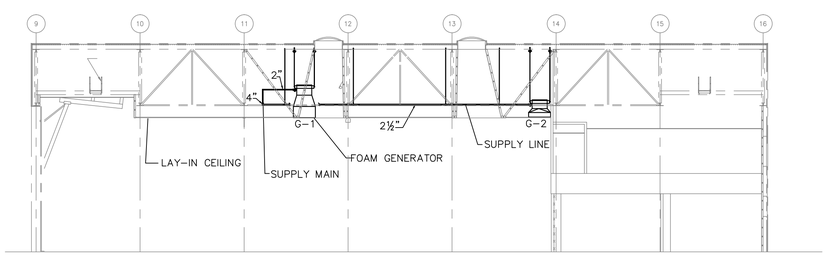
BUILDING 4801 FOAM GENERATOR SCHEDULE

MARK	INLET PRESSURE (PSI)	FOAM OUTPUT (CFM)	SOLUTION FLOW (GPM)	APPROX WEIGHT (LB)
G-1	50	23,965	205	720
G-2	50	14,491	122	397
G-3	50	23,965	213	720
G-4	50	14,491	126	397
G-5	50	23,965	213	720



1 FOAM SUPPRESSION OVERALL PLAN – BUILDING 4801
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"



2 FOAM SUPPRESSION SECTION VIEW – BUILDING 4801
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION OVERALL PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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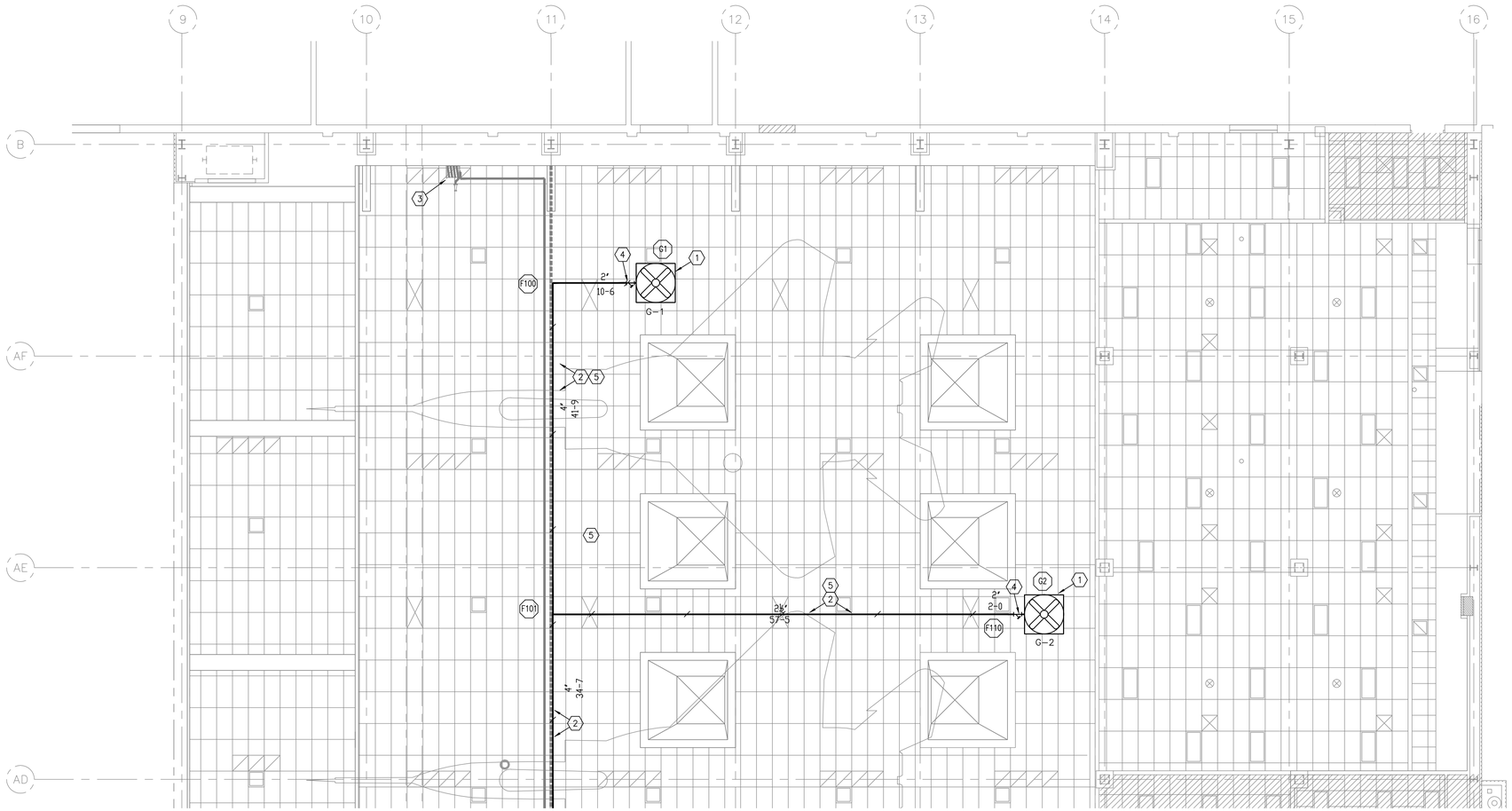
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F211.dwg	F211	SHEET No. 90 of 137

DARRELL E. STEIN

FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATORS AND ASSOCIATED EQUIPMENT. MOUNT GENERATOR FLUSH WITH CEILING. REF 4 F-400
2. PROVIDE NEW PIPING AND HANGERS TO FEED FOAM GENERATORS.
3. EXISTING HAND HOSE STATION TO REMAIN IN THIS AREA.
4. 2" INLINE STRAINER. LOCATE CLOSE TO CEILING FOR ACCESSIBILITY.
5. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.



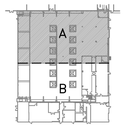
1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4801 AREA A
SCALE: 1/8"=1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

HIGH EXPANSION FOAM DESIGN	
BUILDING	4801
REQUIRED CU FT	72,872 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	2.5
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	5
FOAM GENERATOR OUTPUT	3 @ 23,965 CFM 2 @ 14,491 CFM
TOTAL CFM FOR HANGER	85,439 CFM
FOAM SOLUTION	879 GPM
TOTAL SOLUTION FOR 15 MINUTES	13,185 GAL
QUANTITY OF FOAM	334 GAL EA
BLADDER TANK SIZE	400 GAL EA

SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BLDG. 4801 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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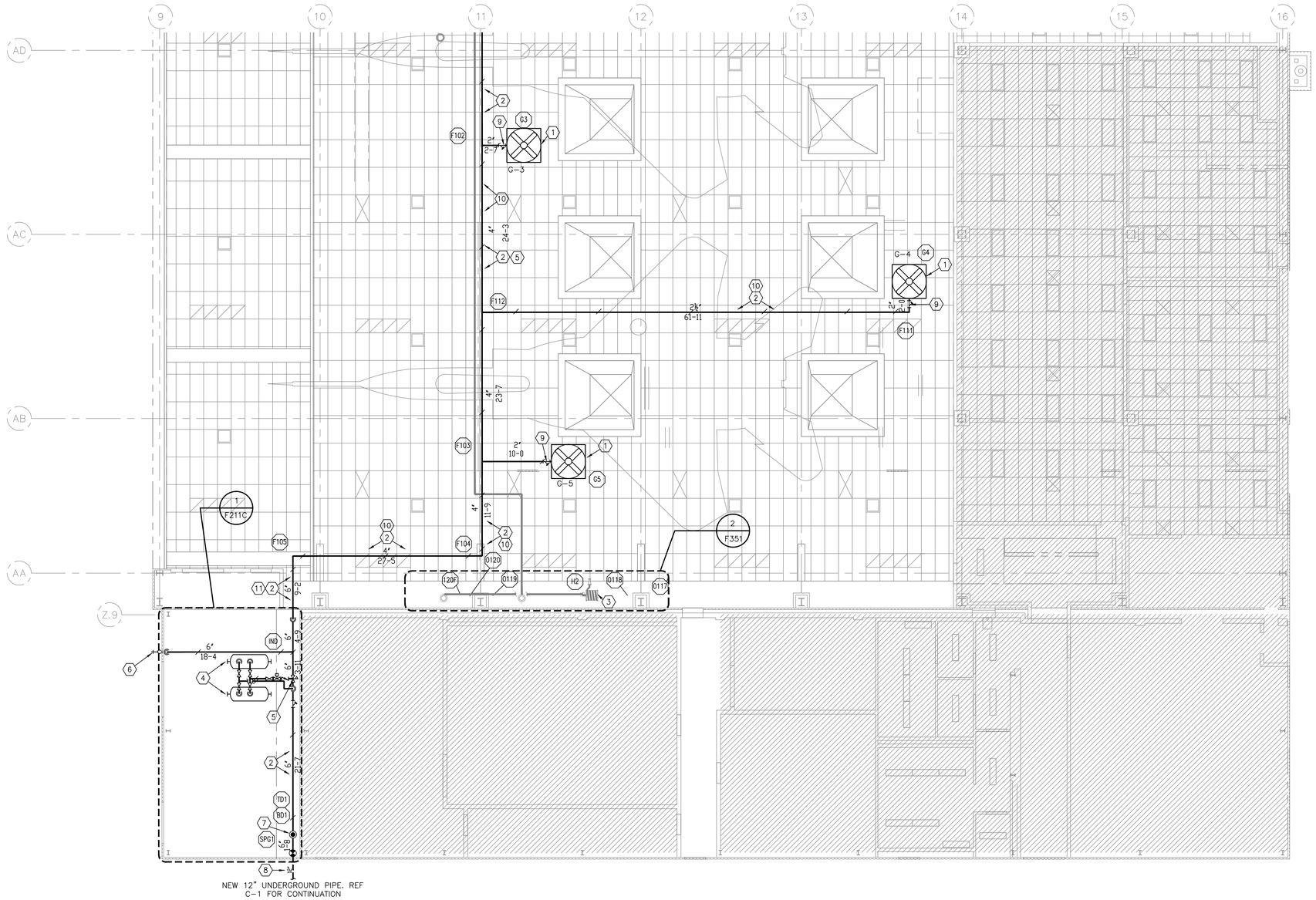
DRAWN BY	HEI	EDM-1719	
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F211A.dwg	F-211A	SHEET No. 91 of 137

DARRELL E. STEIN



FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATORS AND ASSOCIATED EQUIPMENT. MOUNT GENERATOR FLUSH WITH CEILING. REF 4 F-400
2. PROVIDE NEW PIPING AND VALVES FOR NEW HIGH EXPANSION FOAM SYSTEM.
3. EXISTING HAND HOSE STATION TO REMAIN IN THIS AREA.
4. PROVIDE TWO NEW HORIZONTAL 400 GAL FOAM BLADDER TANKS.
5. PROVIDE 6" 2% FLANGED PROPORTIONER.
6. PROVIDE 6" TEST HEADER.
7. PROVIDE NEW DELUGE VALVE AND ASSOCIATED EQUIPMENT. VALVE TRIM SHALL BE CONFIGURED SO THE FOAM SYSTEM PRIOR TO DISCHARGE AND TOO CLOSE THE DELUGE VALVE FOLLOWING FOAM DISCHARGE WHEN THE ABORT SWITCH IS PUSHED.
8. NEW 12" WATER ENTRY. REFER TO CIVIL FOR ADDITIONAL DETAILS.
9. 2" INLINE STRAINER. LOCATE CLOSE TO CEILING FOR ACCESSIBILITY.
10. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
11. REMOVAL AND INSTALLATION OF CORRUGATED METAL REQUIRED TO COMPLETE WORK.

HIGH EXPANSION FOAM DESIGN	
BUILDING	4801
REQUIRED CU FT	72,872 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	2.5
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	5
FOAM GENERATOR OUTPUT	3 @ 23,965 CFM 2 @ 14,491 CFM
TOTAL CFM FOR HANGER	85,439 CFM
FOAM SOLUTION	879 GPM
TOTAL SOLUTION FOR 15 MINUTES	13,185 GAL
QUANTITY OF FOAM	334 GAL EA
BLADDER TANK SIZE	400 GAL EA

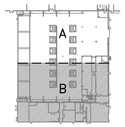
SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)

1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4801 AREA B
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
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FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BLDG. 4801 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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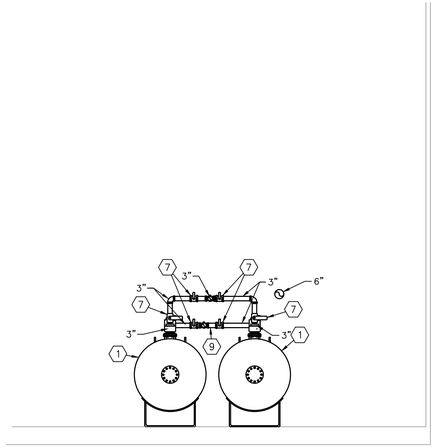
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F211B.dwg	F-211B	SHEET No. 92 of 137

DARRELL E. STEIN

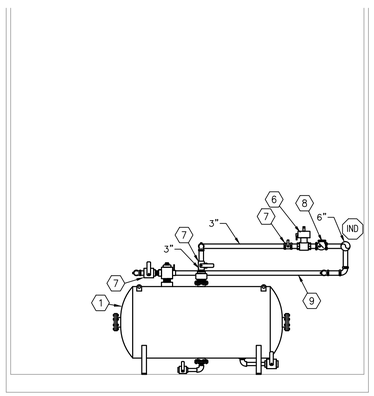
FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE TWO NEW HORIZONTAL 400 GAL FOAM BLADDER TANKS.
2. PROVIDE 6" 2% FLANGED PROPORTIONER.
3. PROVIDE 6" TEST HEADER.
4. PROVIDE NEW DELUGE VALVE AND ASSOCIATED EQUIPMENT. VALVE TRIM SHALL BE CONFIGURED SO THE FOAM SYSTEM PRIOR TO DISCHARGE, AND TOO CLOSE THE DELUGE VALVE FOLLOWING FOAM DISCHARGE WHEN THE ABORT SWITCH IS PUSHED.
5. NEW 12" WATER ENTRY. REFER TO CIVIL C-1 DRAWING FOR ADDITIONAL INFORMATION.
6. PROVIDE NEW HYDRAULIC CONCENTRATE CONTROL VALVE.
7. PROVIDE NEW CONTROL VALVE.
8. PROVIDE NEW CHECK VALVE.
9. PROVIDE NEW PIPING FOR HIGH EXPANSION FOAM SYSTEM.
10. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
11. PROVIDE NEW STRAINER.
12. PROVIDE NEW PIPE SUPPORT STAND.



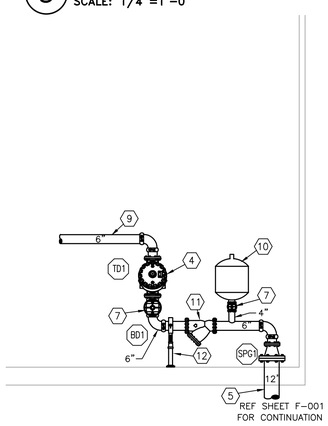
2 FOAM ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"



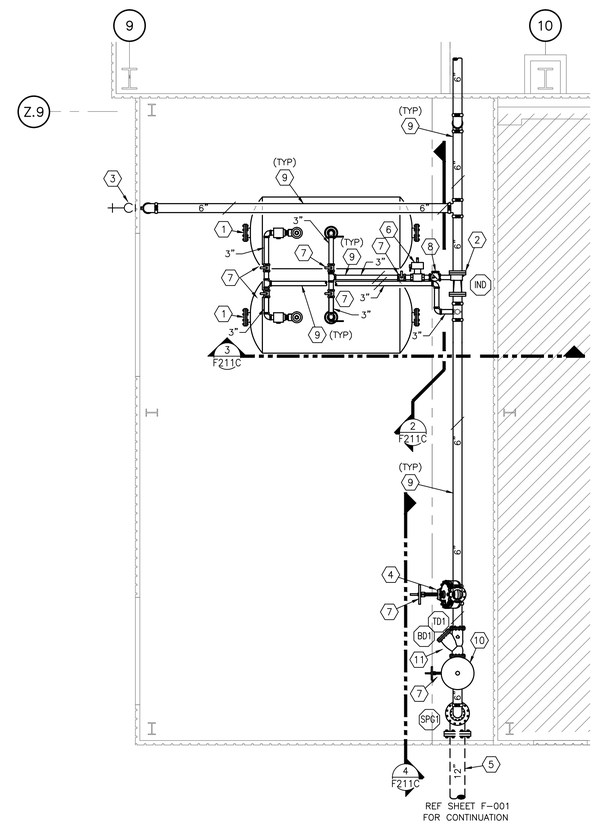
3 FOAM ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"



4 FOAM ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"



1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4801 FOAM ROOM
SCALE: 1/4"=1'-0"

N

0 2' 4' 6'
SCALE: 1/4"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
www.hei-eng.com
1250001459

FOR CONSTRUCTION

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04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

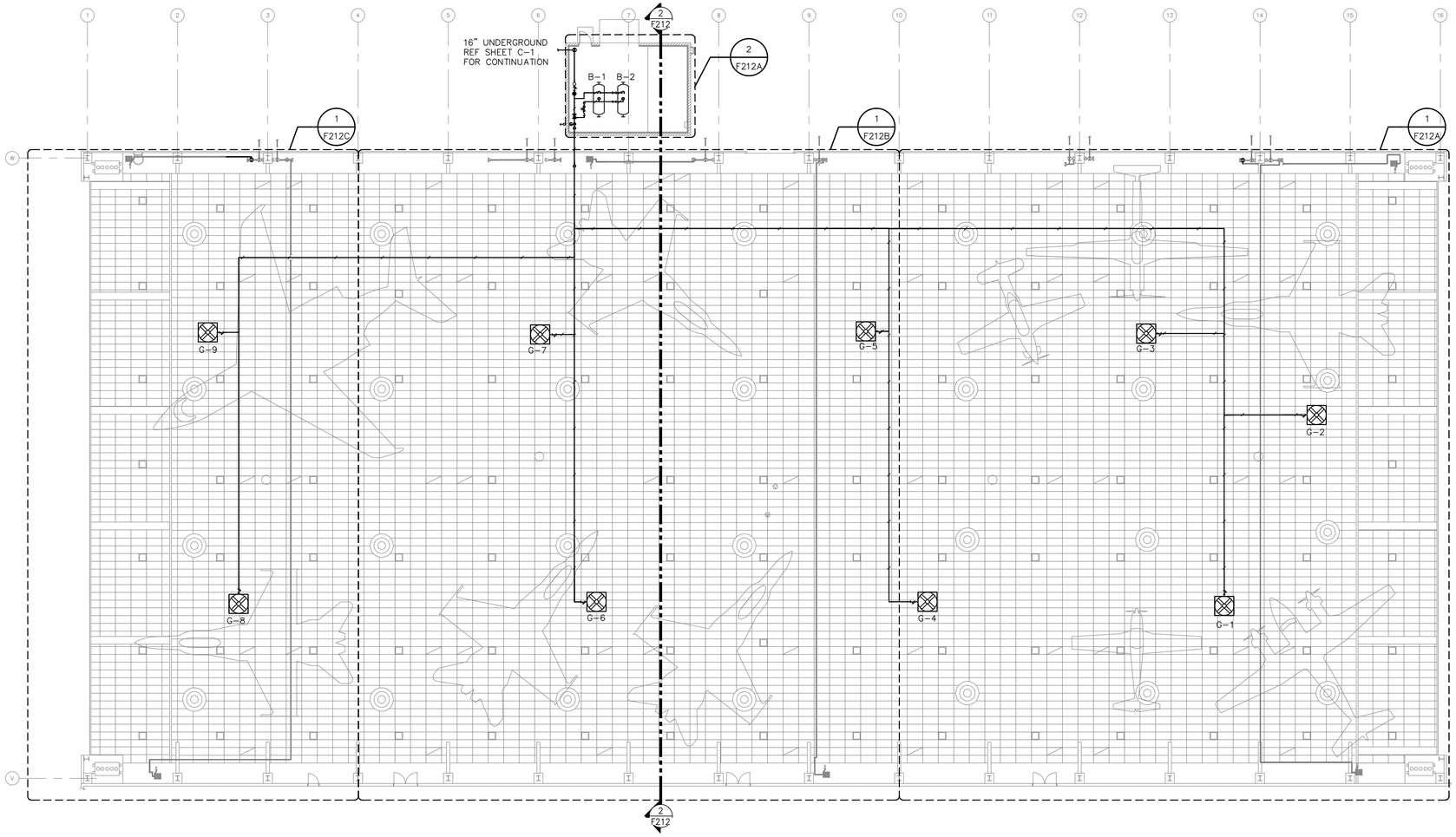
DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4801 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F211C.dwg	F-211C	SHEET No. 93 of 137

DARRELL E. STEIN



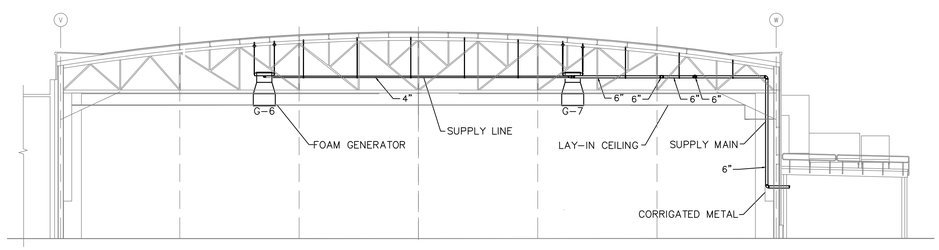
1 FOAM SUPPRESSION OVERALL PLAN – BUILDING 4802

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

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



2 FOAM SUPPRESSION SECTION VIEW – BUILDING 4802

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

0 8' 16' 24'
SCALE: 1/16"=1'-0"

FOAM CALULATION METHOD

REQUIRED CUFT = AREA OF HANGER X 3.28 FT (MINIMUM DEPTH OF FOAM)

SPRINKLER BREAKDOWN FACTOR PER ETL 02-15 = ((0.2 GPM/SQFT X 5000 SQFT) X 15% OVERAGE) X 10 CFM/GPM

LEAKAGE FACTORS	HANGER AREA	FACTOR
	UP TO 15,000 SQFT	2.0
	UP TO 30,000 SQFT	2.5
	OVER 30,000 SQFT	3.0

REQUIRED CFM HIGH EXPANSION FOAM

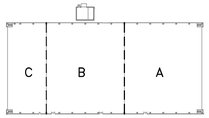
((REQUIRED CUFT / 4 MINUTES) + BREAKDOWN CFM) X 1.15 (SHRINKAGE) X (LEAKAGE FACTOR)

BUILDING 4802 BLADDER TANK SCHEDULE

MARK	ORIENTATION	NOMINAL CAPACITY (GAL)
B-1	HORIZONTAL	800
B-2	HORIZONTAL	800

BUILDING 4802 FOAM GENERATOR SCHEDULE

MARK	INLET PRESSURE (PSI)	FOAM OUTPUT (CFM)	SOLUTION FLOW (GPM)	APPROX WEIGHT (LB)
G-1	50	23,965	211	720
G-2	50	14,491	125	397
G-3	50	23,965	205	720
G-4	50	23,965	209	720
G-5	50	23,965	206	720
G-6	50	23,965	213	720
G-7	50	23,965	214	720
G-8	50	23,965	221	720
G-9	50	23,965	212	720



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

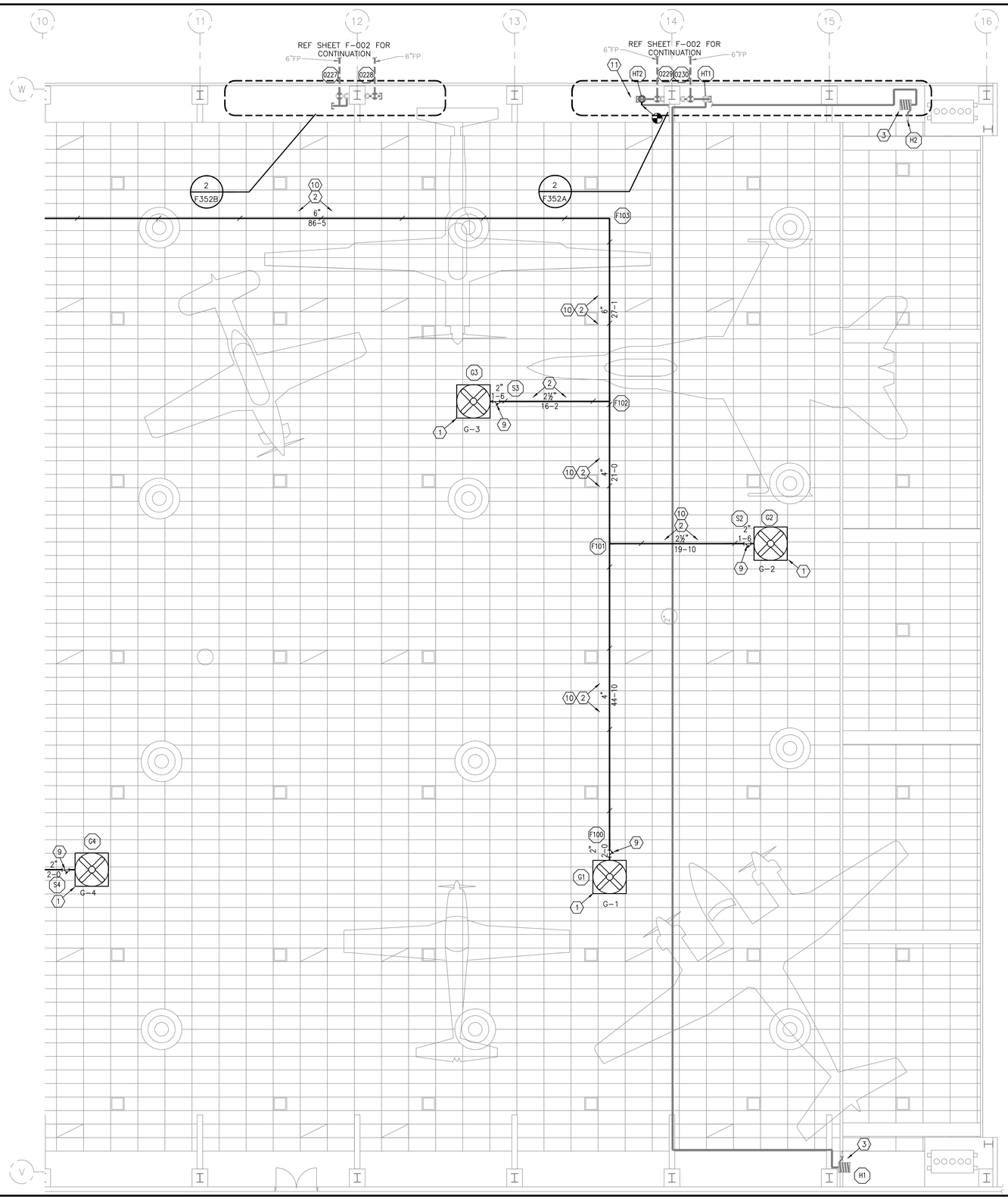
DRAWING TITLE
FOAM SUPPRESSION OVERALL PLAN – BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F212.dwg	F-212	SHEET No. 94 of 137

DARRELL E. STEIN

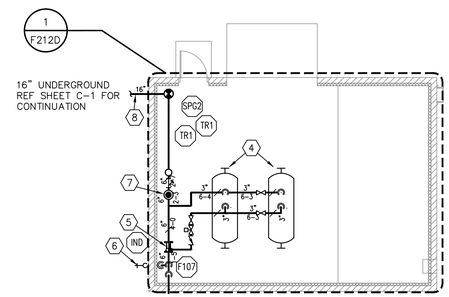


FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATORS AND ASSOCIATED EQUIPMENT. MOUNT GENERATOR FLUSH WITH CEILING.
2. PROVIDE NEW PIPING AND VALVES FOR NEW HIGH EXPANSION FOAM SYSTEM.
3. EXISTING HAND HOSE STATION TO REMAIN IN THIS AREA.
4. PROVIDE TWO NEW HORIZONTAL 800 GAL FOAM BLADDER TANKS.
5. PROVIDE 6" 2% FLANGED PROPORTIONER.
6. PROVIDE 6" TEST HEADER.
7. PROVIDE NEW DELUGE VALVE AND ASSOCIATED EQUIPMENT. VALVE TRIM SHALL BE CONFIGURED SO THE FOAM SYSTEM PRIOR TO DISCHARGE AND TOO CLOSE THE DELUGE VALVE FOLLOWING FOAM DISCHARGE WHEN THE ABORT SWITCH IS PUSHED.
8. NEW 16" WATER ENTRY. REFER TO CIVIL FOR ADDITIONAL DETAILS.
9. 2" INLINE STRAINER. LOCATE CLOSE TO CEILING FOR ACCESSIBILITY.
10. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
11. EXTEND HAND HOSE PIPING AT THIS LOCATION AND CONNECT TO EXISTING RISER.

HIGH EXPANSION FOAM DESIGN	
BUILDING	4802
REQUIRED CU FT	185,199 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	3
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	9
FOAM GENERATOR OUTPUT	8 @ 23,965 CFM 1 @ 14,491 CFM
TOTAL CFM FOR HANGER	206,211 CFM
FOAM SOLUTION	1,816 GPM
TOTAL SOLUTION FOR 15 MINUTES	27,240 GAL
QUANTITY OF FOAM	689 GAL EA
BLADDER TANK SIZE	800 GAL EA

SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)



2 FOAM SUPPRESSION FOAM PUMP ROOM ENLARGED PLAN – BUILDING 4802 AREA A

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

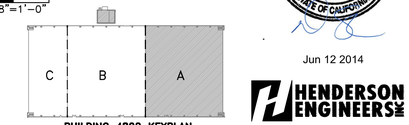
0 4' 8' 12'
SCALE: 1/8"=1'-0"

1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4802 AREA A

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



Jun 12 2014

BUILDING 4802 KEYPLAN

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
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www.hei-eng.com
1250001459

FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

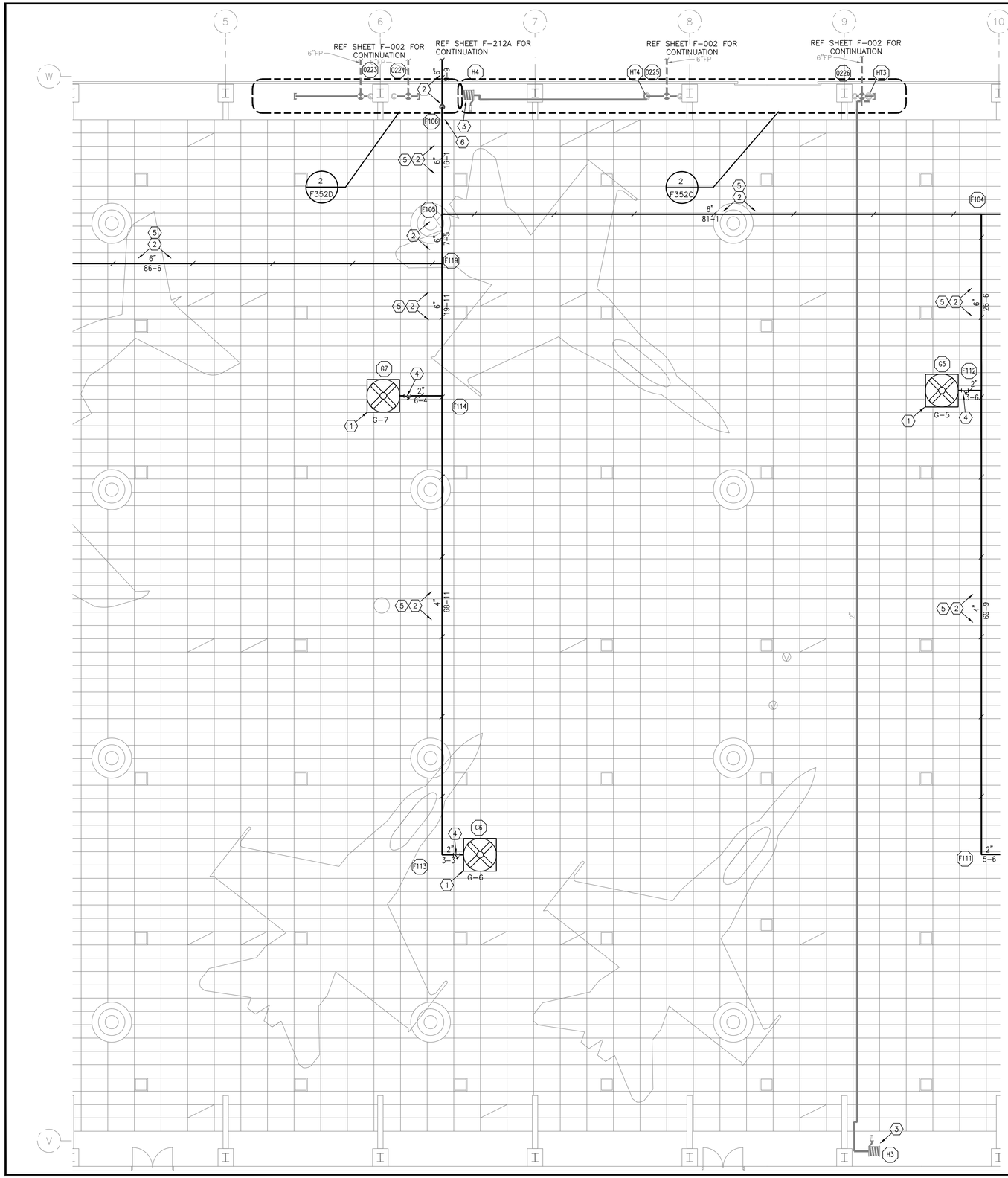
DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BLDG. 4802 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F212A.dwg	F-212A	SHEET No. 95 of 137

DARRELL E. STEIN



FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATOR AND ASSOCIATED EQUIPMENT. MOUNT GENERATOR FLUSH WITH CEILING.
2. PROVIDE NEW PIPING AND HANGERS TO FEED FOAM GENERATORS.
3. EXISTING HAND HOSE STATION AND PIPING TO REMAIN.
4. 2" INLINE STRAINER. LOCATE CLOSE TO CEILING FOR ACCESSIBILITY.
5. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.
6. REMOVAL AND INSTALLATION OF CORRUGATED METAL REQUIRED TO COMPLETE WORK.

HIGH EXPANSION FOAM DESIGN	
BUILDING	4802
REQUIRED CU FT	185,199 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	3
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	9
FOAM GENERATOR OUTPUT	8 @ 23,965 CFM 1 @ 14,491 CFM
TOTAL CFM FOR HANGER	206,211 CFM
FOAM SOLUTION	1,816 GPM
TOTAL SOLUTION FOR 15 MINUTES	27,240 GAL
QUANTITY OF FOAM	689 GAL EA
BLADDER TANK SIZE	800 GAL EA

SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)

1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4802 AREA B

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

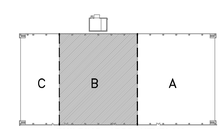
NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

N 0 4' 8' 12'
SCALE: 1/8"=1'-0"

"WORK IN PROGRESS"

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014



BUILDING 4802 KEYPLAN

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
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FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BLDG. 4802 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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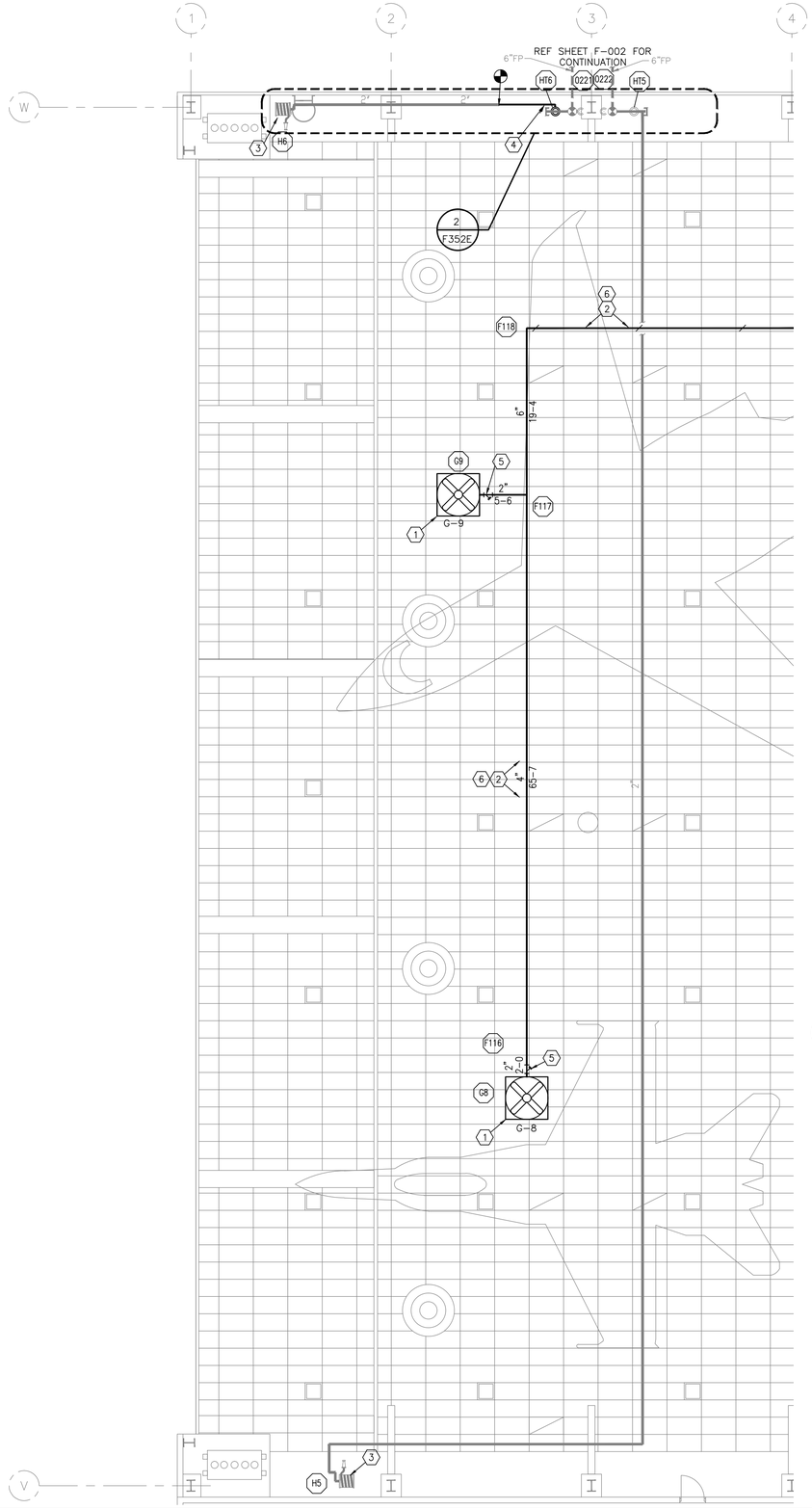
FILE NAME	EDM-1719 F212B.dwg	F-212B	SHEET No. 96 of 137

DARRELL E. STEIN



1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4802 AREA C
SCALE: 1/8"=1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATOR AND ASSOCIATED EQUIPMENT. MOUNT GENERATOR FLUSH WITH CEILING.
2. PROVIDE NEW PIPING AND HANGERS TO FEED FOAM GENERATORS.
3. EXISTING HAND HOSE STATION AND PIPING TO REMAIN.
4. EXTEND HAND HOSE PIPING AT THIS LOCATION AND CONNECT TO EXISTING RISER.
5. 2" INLINE STRAINER. LOCATE CLOSE TO CEILING FOR ACCESSIBILITY.
6. REMOVAL AND INSTALLATION OF CEILING TILE REQUIRED TO COMPLETE WORK.

HIGH EXPANSION FOAM DESIGN	
BUILDING	4802
REQUIRED CU FT	185,199 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	3
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	9
FOAM GENERATOR OUTPUT	8 @ 23,965 CFM 1 @ 14,491 CFM
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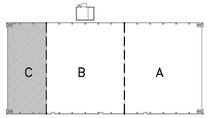
QUANTITY OF FOAM	689 GAL EA
BLADDER TANK SIZE	800 GAL EA

SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)

"WORK IN PROGRESS"

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014



BUILDING 4802 KEYPLAN

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BLDG. 4802 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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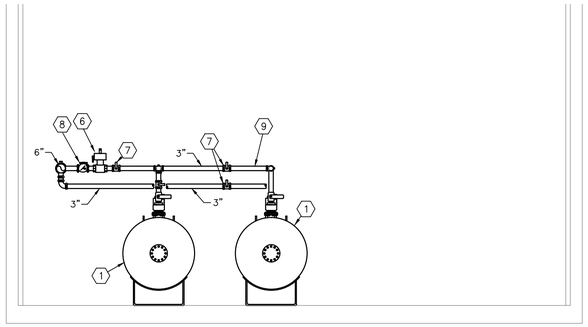
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F212C.dwg	F-212C	SHEET No. 97 of 137

DARRELL E. STEIN

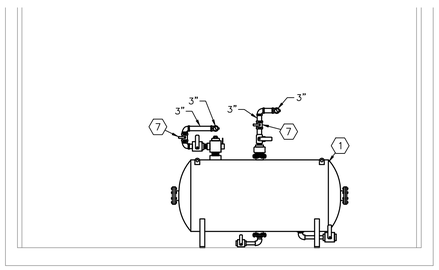
FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE TWO NEW HORIZONTAL 800 GAL FOAM BLADDER TANKS.
2. PROVIDE 6" 2% FLANGED PROPORTIONER.
3. PROVIDE 6" TEST HEADER.
4. PROVIDE NEW DELUGE VALVE AND ASSOCIATED EQUIPMENT. VALVE TRIM SHALL BE CONFIGURED SO THE FOAM SYSTEM PRIOR TO DISCHARGE, AND TOO CLOSE THE DELUGE VALVE FOLLOWING FOAM DISCHARGE WHEN THE ABORT SWITCH IS PUSHED.
5. NEW 16" WATER ENTRY. REFER TO CIVIL FOR ADDITIONAL DETAILS.
6. PROVIDE NEW HYDRAULIC CONCENTRATE CONTROL VALVE.
7. PROVIDE NEW CONTROL VALVE.
8. PROVIDE NEW CHECK VALVE.
9. PROVIDE NEW PIPING FOR HIGH EXPANSION FOAM SYSTEM.
10. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
11. PROVIDE NEW STRAINER.
12. RECONNECT 2" SPRINKLER RISER AT THIS LOCATION. PIPE RISER DRAIN TO EXTERIOR.
13. PROVIDE NEW PIPE SUPPORT STAND.



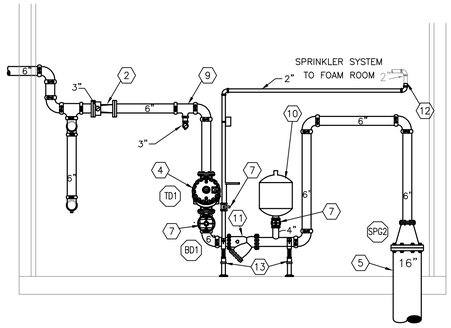
2 FOAM TANK ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"



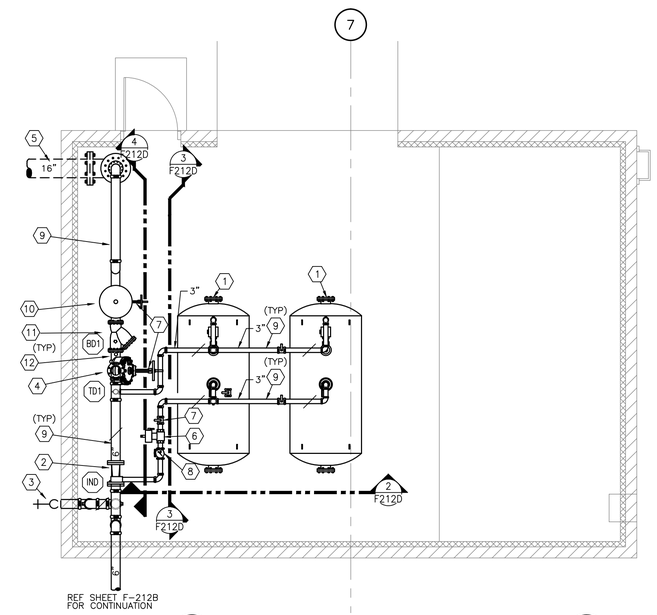
3 FOAM TANK ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"



4 FOAM TANK ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"

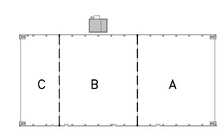


1 FOAM TANK ROOM ENLARGED PLAN
SCALE: 1/4"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

N

0 2' 4' 6'
SCALE: 1/4"=1'-0"



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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8345 LENEXA DRIVE, SUITE 300
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FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

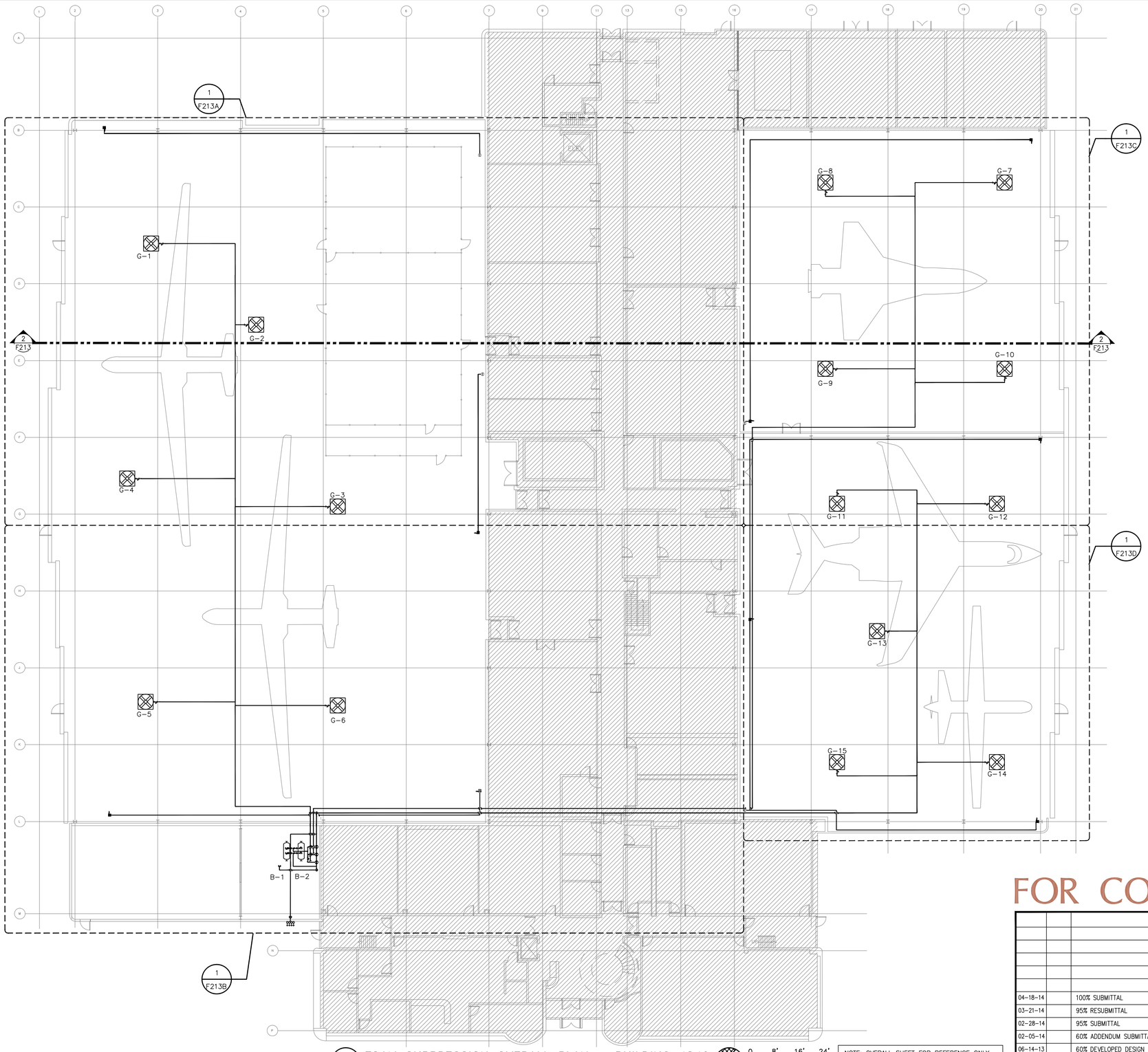
DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4802 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/4"	TRADE SH. No.	
FILE NAME	EDM-1719 F212D.dwg	F-212D	SHEET No. 98 of 137

DARRELL E. STEIN



1 FOAM SUPPRESSION OVERALL PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

FOAM CALULATION METHOD

REQUIRED CUFT = AREA OF HANGER X 3.28 FT (MINIMUM DEPTH OF FOAM)

SPRINKLER BREAKDOWN FACTOR PER ETL 02-15 = ((0.2 GPM/SQFT X 5000 SQFT) X 15% OVERAGE) X 10 CFM/GPM

LEAKAGE FACTORS

HANGER AREA	FACTOR
UP TO 15,000 SQFT	2.0
UP TO 30,000 SQFT	2.5
OVER 30,000 SQFT	3.0

REQUIRED CFM HIGH EXPANSION FOAM

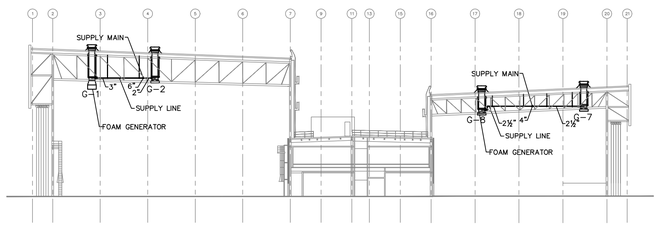
((REQUIRED CUFT / 4 MINUTES) + BREAKDOWN CFM) X 1.15 (SHRINKAGE) X (LEAKAGE FACTOR)

BUILDING 4840 BLADDER TANK SCHEDULE

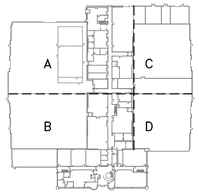
MARK	ORIENTATION	NOMINAL CAPACITY (GAL)
B-1	HORIZONTAL	500
B-2	HORIZONTAL	500

BUILDING 4840 FOAM GENERATOR SCHEDULE

MARK	INLET PRESSURE (PSI)	FOAM OUTPUT (CFM)	SOLUTION FLOW (GPM)	APPROX WEIGHT (LB)
SYSTEM 1				
G-1	50	23,965	205	720
G-2	50	14,491	125	397
G-3	50	14,491	126	397
G-4	50	23,965	206	720
G-5	50	23,965	209	720
G-6	50	23,965	209	720
SYSTEM 2				
G-7	50	14,491	121	397
G-8	50	14,491	120	397
G-9	50	14,491	122	397
G-10	50	14,491	122	397
SYSTEM 3				
G-11	50	14,491	120	397
G-12	50	14,491	121	397
G-13	50	14,491	123	397
G-14	50	14,491	124	397
G-15	50	14,491	124	397



2 FOAM SUPPRESSION SECTION VIEW – BUILDING 4840
SCALE: NTS



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

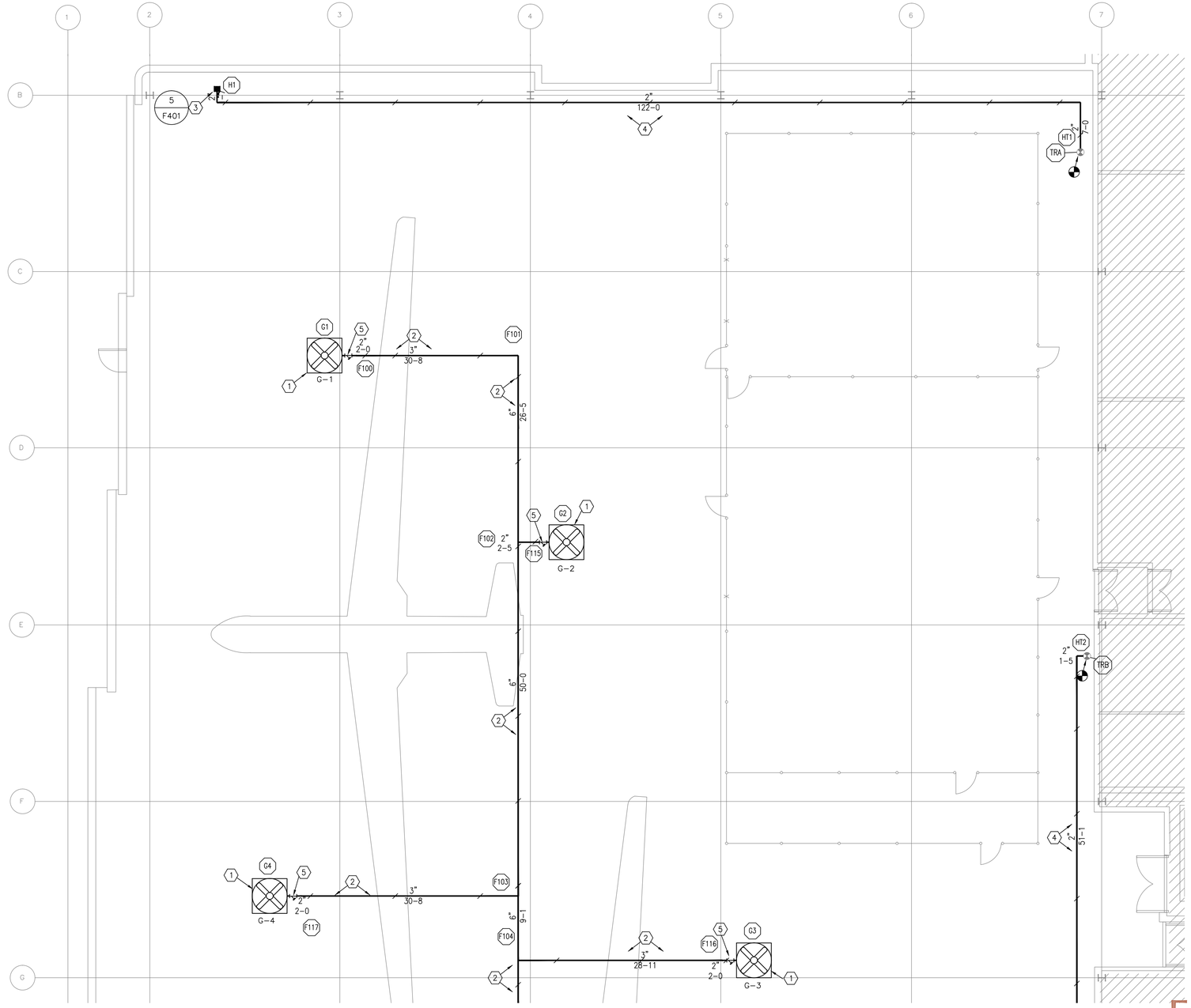
DRAWING TITLE
FOAM SUPPRESSION OVERALL PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	VARIES	TRADE SH. No.	
FILE NAME	EDM-1719 F213.dwg	F-213	SHEET No. 99 of 137

DARRELL E. STEIN

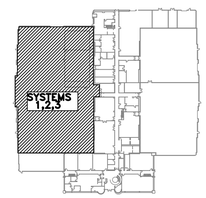


1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 AREA A
SCALE: 1/8"=1'-0"

N
0 4' 8' 12'
SCALE: 1/8"=1'-0"

HIGH EXPANSION FOAM DESIGN	
BUILDING	4840 SYSTEM #1,2,3
REQUIRED CU FT	97,737 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	3
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	6
FOAM GENERATOR OUTPUT	4 @ 23,965 CFM 2 @ 14,491 CFM
TOTAL CFM FOR HANGER	124,842 CFM
FOAM SOLUTION	1,080 GPM
TOTAL SOLUTION FOR 15 MINUTES	16,200 GAL
QUANTITY OF FOAM	410 GAL EA
BLADDER TANK SIZE	500 GAL EA

SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)



HYDRAULIC REFERENCE PLAN

FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATOR AND ASSOCIATED EQUIPMENT.
2. PROVIDE NEW PIPING AND HANGERS TO FEED FOAM GENERATORS.
3. PROVIDE NEW FOAM–WATER HAND HOSE STATION AT THIS LOCATION.
4. PROVIDE NEW PIPING AND HANGERS TO FEED HAND HOSE STATIONS. CONNECT TO EXISTING WET FIRE SPRINKLER RISERS.
5. PROVIDE NEW 2" IN–LINE STRAINER.

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

Jun 12 2014

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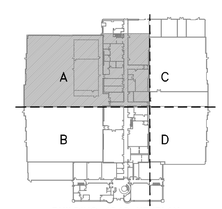

BUILDING 4840 KEYPLAN

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

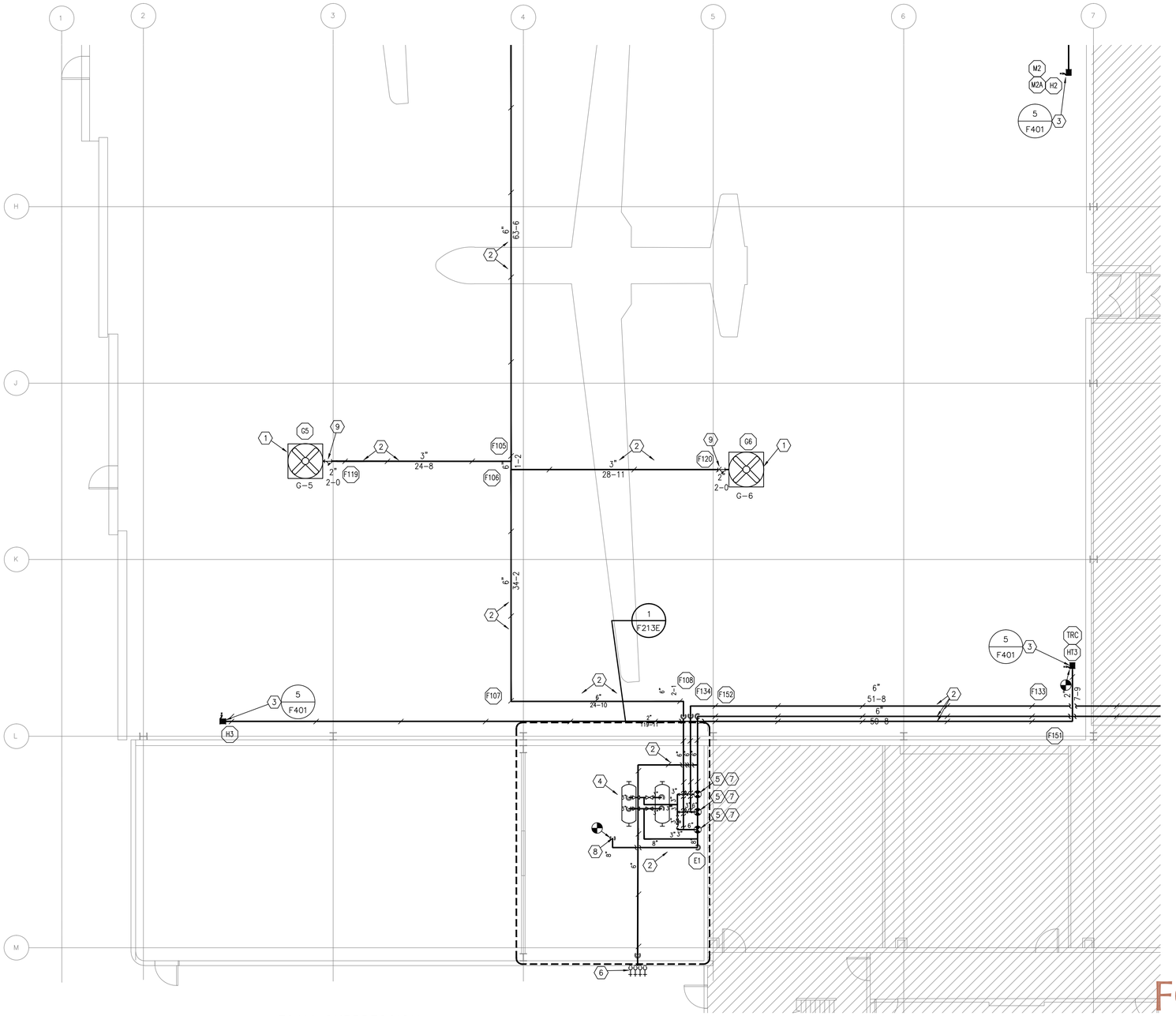
DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM–1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM–1719 F213A.dwg	F–213A	SHEET No. 100 of 137

DARRELL E. STEIN



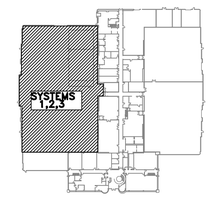
FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 AREA B

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

N 0 4' 8' 12'
SCALE: 1/8"=1'-0"

HIGH EXPANSION FOAM DESIGN	
BUILDING	4840 SYSTEM #1,2,3
REQUIRED CU FT	97,737 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	3
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	6
FOAM GENERATOR OUTPUT	4 @ 23,965 CFM 2 @ 14,491 CFM
TOTAL CFM FOR HANGER	124,842 CFM
FOAM SOLUTION	1,080 GPM
TOTAL SOLUTION FOR 15 MINUTES	16,200 GAL
QUANTITY OF FOAM	410 GAL EA
BLADDER TANK SIZE	500 GAL EA

SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)



HYDRAULIC REFERENCE PLAN

FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATOR AND ASSOCIATED EQUIPMENT.
2. PROVIDE NEW PIPING, VALVES AND HANGERS FOR NEW HIGH EXPANSION FOAM SYSTEM.
3. PROVIDE NEW FOAM–WATER HAND HOSE STATION AT THIS LOCATION.
4. PROVIDE TWO NEW HORIZONTAL 500 GAL FOAM BLADDER TANKS.
5. PROVIDE 6" 2% FLANGED PROPORTIONER.
6. PROVIDE 6" TEST HEADER.
7. PROVIDE NEW DELUGE VALVE AND ASSOCIATED EQUIPMENT. VALVE TRIM SHALL BE CONFIGURED SO THE FOAM SYSTEM PRIOR TO DISCHARGE AND TOO CLOSE THE DELUGE VALVE FOLLOWING FOAM DISCHARGE WHEN THE ABORT SWITCH IS PUSHED.
8. CONNECT TO EXISTING 12" FIRE MAIN TO FEED NEW HIGH EXPANSION FOAM SYSTEM.
9. PROVIDE NEW 2" IN–LINE STRAINER.

REGISTERED PROFESSIONAL ENGINEER
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FIRE PROTECTION
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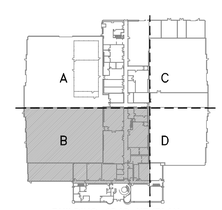

BUILDING 4840 KEYPLAN

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM–1719
SCALE	1/8"=1'–0"	TRADE SH. No.	
FILE NAME	EDM–1719 F213B.dwg	F–213B	SHEET No. 101 of 137

DARRELL E. STEIN

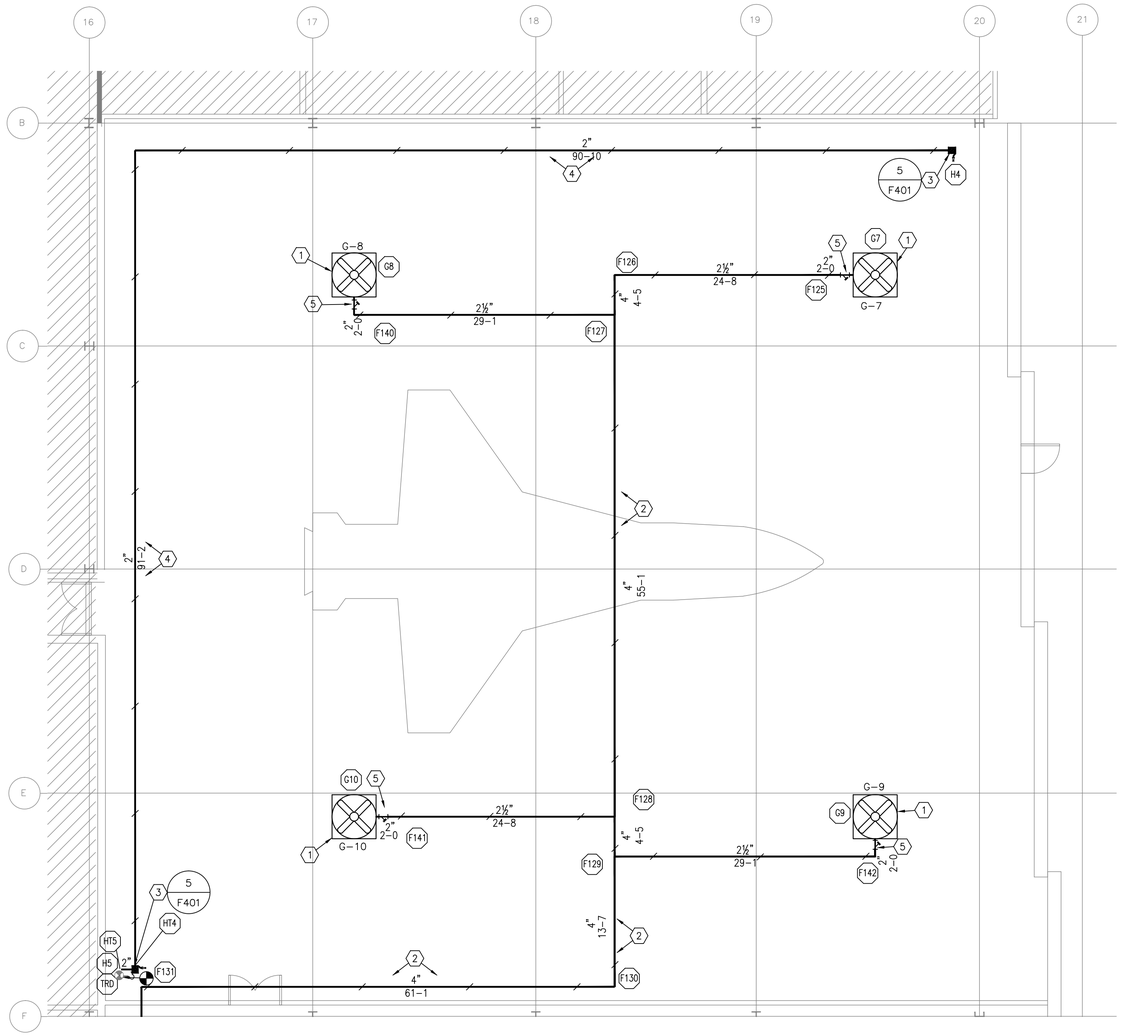
HIGH EXPANSION FOAM DESIGN	
BUILDING	4840, SYSTEM #6 AREA C
REQUIRED CU FT	32,452 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	2
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	4
FOAM GENERATOR OUTPUT	14,491 CFM
TOTAL CFM FOR HANGER	57,964 CFM
FOAM SOLUTION	485 GPM
TOTAL SOLUTION FOR 15 MINUTES	7,275 GAL
QUANTITY OF FOAM	184 GAL EA
BLADDER TANK SIZE	500 GAL EA

500 GALLON BLADDER TANKS WILL BE USED BASED ON THE DEMAND FOR SYSTEM 1

SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)

FOAM SUPPRESSION PLAN NOTES:

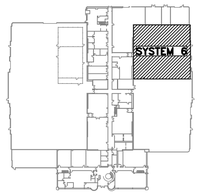
1. PROVIDE NEW HIGH EXPANSION FOAM GENERATOR AND ASSOCIATED EQUIPMENT.
2. PROVIDE NEW PIPING AND HANGERS TO FEED FOAM GENERATORS.
3. PROVIDE NEW FOAM–WATER HAND HOSE STATION AT THIS LOCATION.
4. PROVIDE NEW PIPING AND HANGERS TO FEED HAND HOSE STATIONS. CONNECT TO EXISTING WET RISERS.
5. PROVIDE NEW 2" IN–LINE STRAINER.



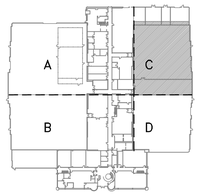
1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 AREA C
SCALE: 1/8"=1'–0"

N

0 4' 8' 12'
SCALE: 1/8"=1'–0"



HYDRAULIC REFERENCE PLAN



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
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Chief, Office of Protective Services	
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DFRC Chief Information Officer	

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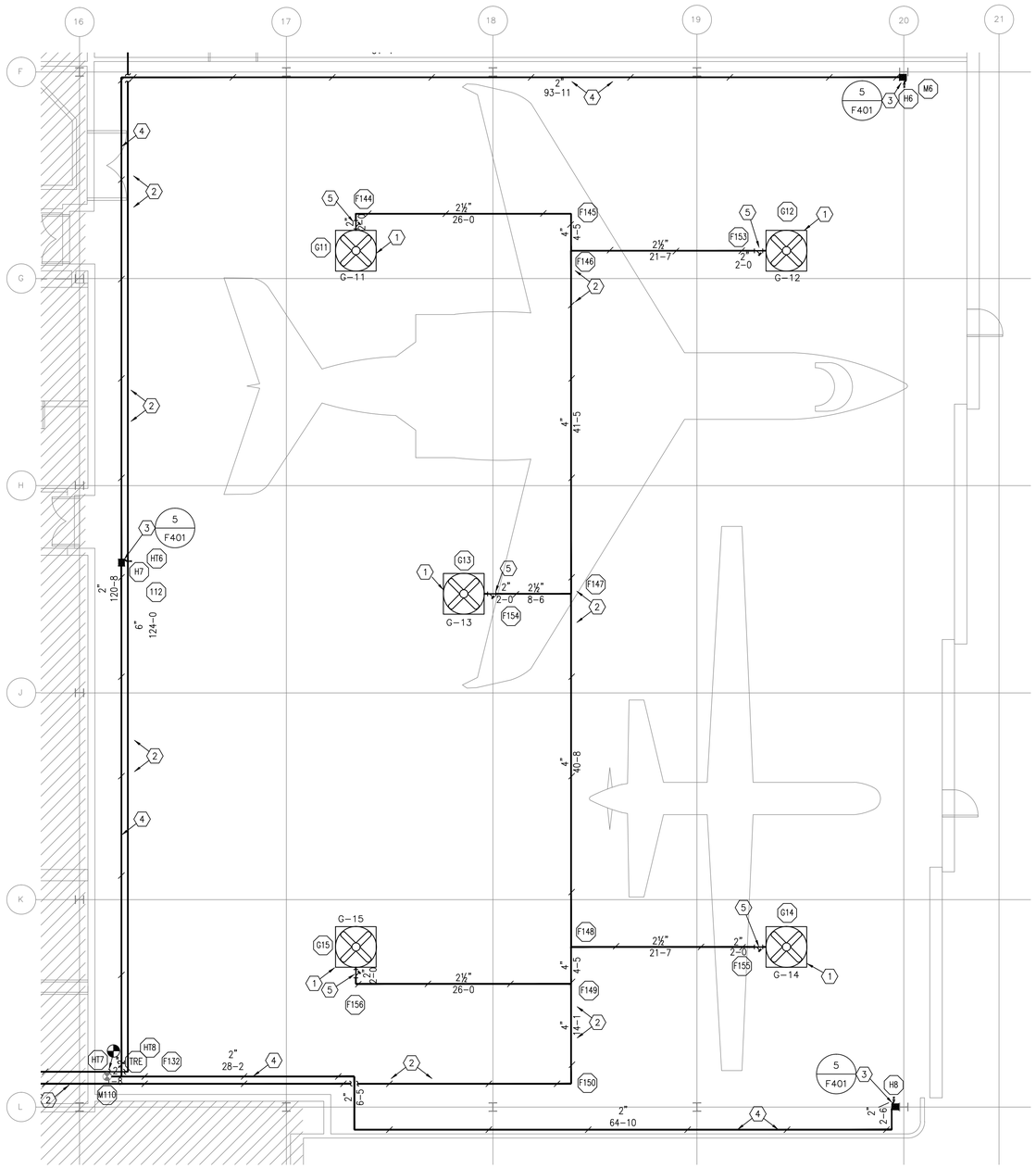
DRAWN BY	HEI		EDM–1719
SCALE	1/8"=1'–0"	TRADE SH. No.	
FILE NAME	EDM–1719 F213C.dwg	F–213C	SHEET No. 102 of 137

DARRELL E. STEIN



1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 AREA D

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

N

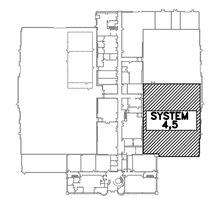
0 4' 8' 12'

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

HIGH EXPANSION FOAM DESIGN	
BUILDING	4840, SYSTEM #6 AREA D
REQUIRED CU FT	43,158 CU FT
SPRINKLER BREAKDOWN	11,500 CFM
COMPENSATION FOR LEAKAGE FACTOR	2.5
FOAM GENERATOR PRESSURE	50 PSI
NUMBER OF GENERATORS	5
FOAM GENERATOR OUTPUT	14,491 CFM
TOTAL CFM FOR HANGER	72,455 CFM
FOAM SOLUTION	615 GPM
TOTAL SOLUTION FOR 15 MINUTES	9,225 GAL
QUANTITY OF FOAM	223 GAL EA
BLADDER TANK SIZE	500 GAL EA

500 GALLON BLADDER TANKS WILL BE USED BASED ON THE DEMAND FOR SYSTEM 1

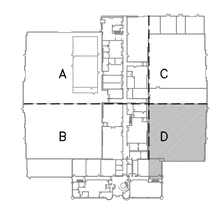
SPRINKLER BREAKDOWN BASED ON ETL SPRINKLER SYSTEM REQUIREMENTS (0.2 GPM / 5000 SQ FT)



HYDRAULIC REFERENCE PLAN

FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE NEW HIGH EXPANSION FOAM GENERATOR AND ASSOCIATED EQUIPMENT.
2. PROVIDE NEW PIPING AND HANGERS TO FEED FOAM GENERATORS.
3. PROVIDE NEW FOAM–WATER HAND HOSE STATION AT THIS LOCATION.
4. PROVIDE NEW PIPING AND HANGERS TO FEED HAND HOSE STATIONS. CONNECT TO EXISTING WET RISERS.
5. PROVIDE NEW 2" IN–LINE STRAINER.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BLDG. 4840 AREA D

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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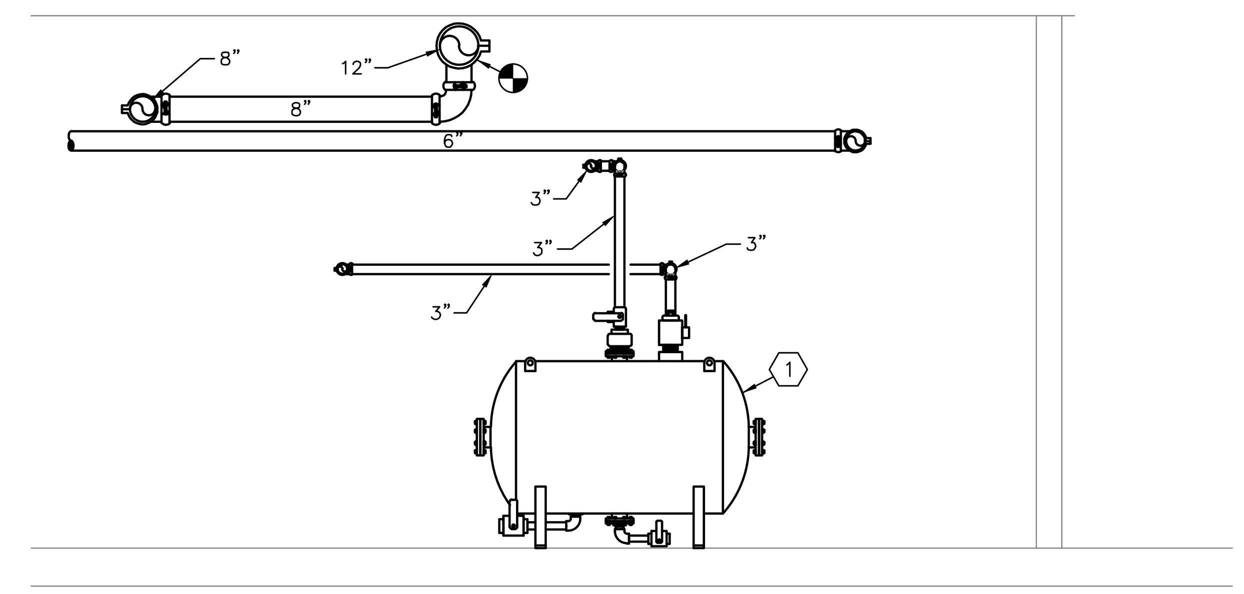
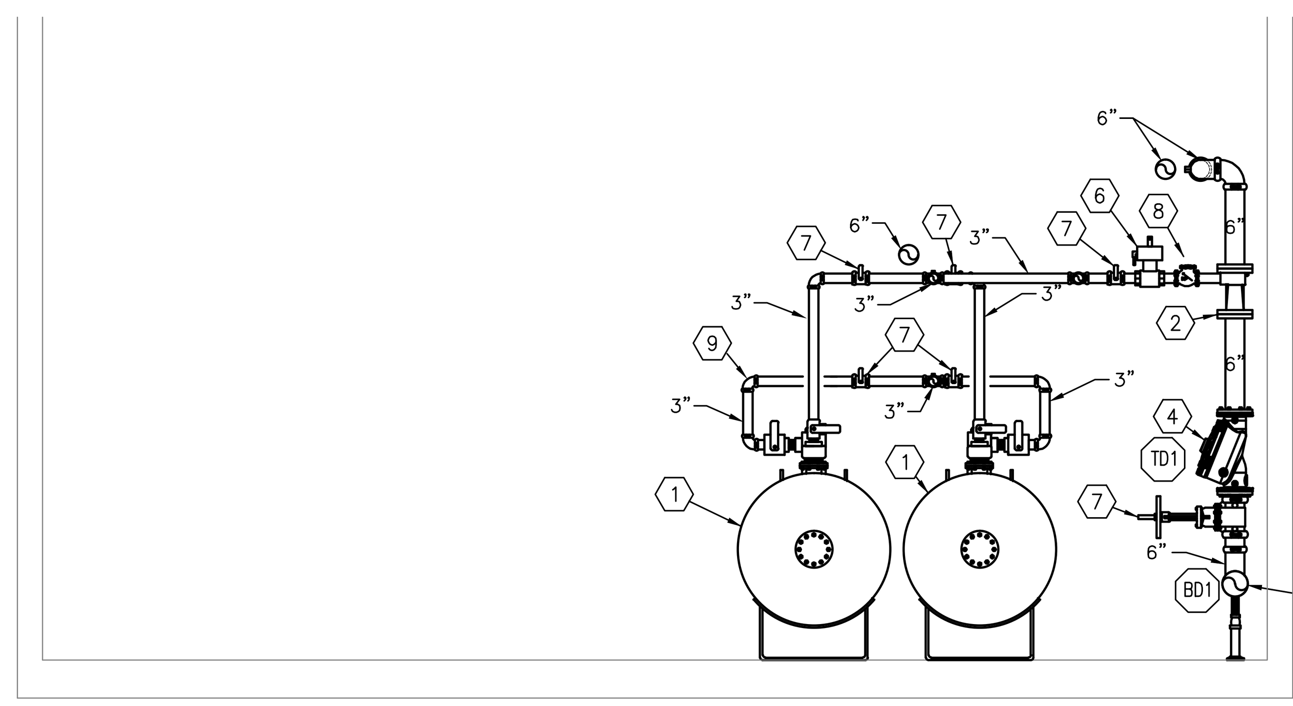
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM–1719 F2130.dwg	F–2130	SHEET No. 103 of 137

DARRELL E. STEIN



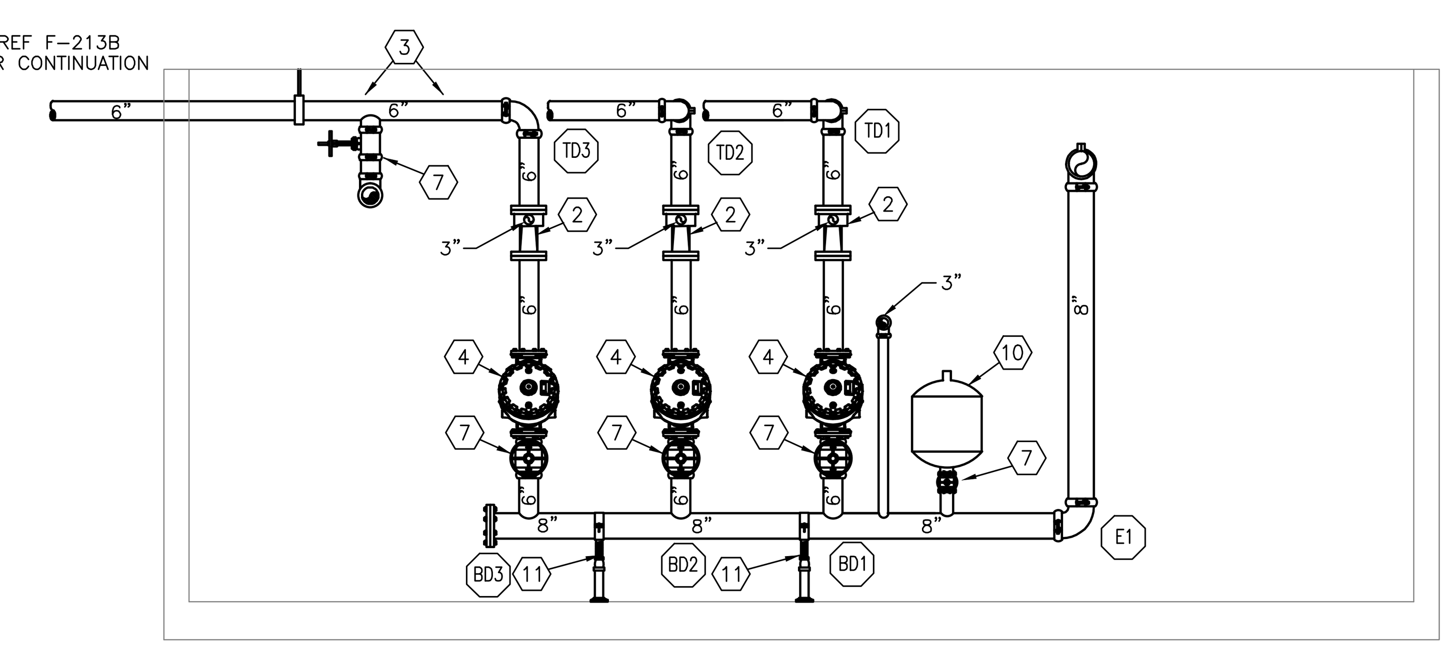
2 PUMP ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6' SCALE: 1/4"=1'-0"



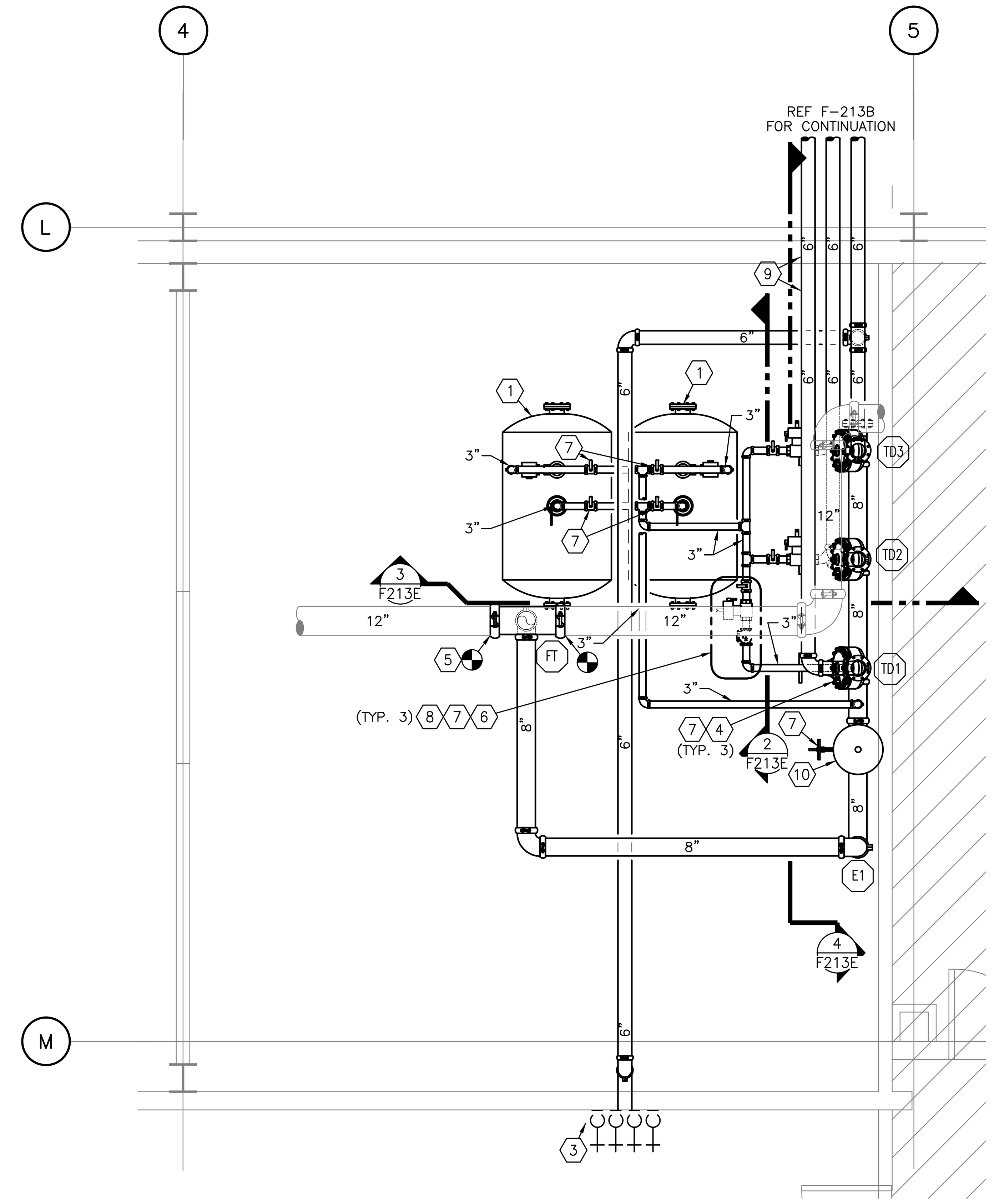
3 PUMP ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6' SCALE: 1/4"=1'-0"



4 PUMP ROOM ELEVATION VIEW
SCALE: 1/4"=1'-0"

0 2' 4' 6' SCALE: 1/4"=1'-0"



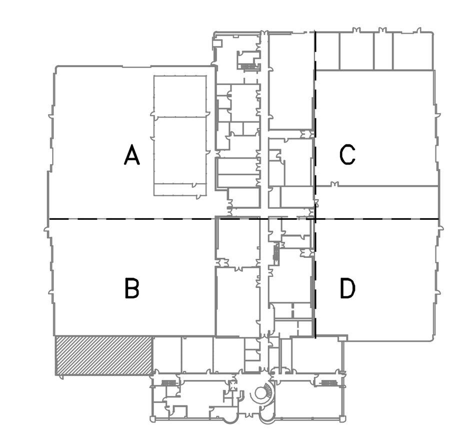
1 FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 PUMP ROOM
SCALE: 1/4"=1'-0"

N

0 2' 4' 6' SCALE: 1/4"=1'-0"

FOAM SUPPRESSION PLAN NOTES:

1. PROVIDE TWO NEW HORIZONTAL 500 GAL FOAM BLADDER TANKS. BLADDER TANKS SHOWN IN FINAL LOCATION. DURING CONSTRUCTION AND PHASING ONE BLADDER TANK WILL BE CONNECTED TO SYSTEMS AT A LOCATION DETERMINED BY CONTRACTING OFFICER.
2. PROVIDE 6" 2% FLANGED PROPORTIONER.
3. PROVIDE 6" TEST HEADER.
4. PROVIDE NEW DELUGE VALVE AND ASSOCIATED EQUIPMENT. VALVE TRIM SHALL BE CONFIGURED SO THE FOAM SYSTEM PRIOR TO DISCHARGE AND TOO CLOSE THE DELUGE VALVE FOLLOWING FOAM DISCHARGE WHEN THE ABORT SWITCH IS PUSHED.
5. CONNECT TO EXISTING 12" MAIN.
6. PROVIDE NEW HYDRAULIC CONCENTRATE CONTROL VALVE.
7. PROVIDE NEW CONTROL VALVE.
8. PROVIDE NEW CHECK VALVE.
9. PROVIDE NEW PIPING FOR HIGH EXPANSION FOAM SYSTEM.
10. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
11. PROVIDE NEW PIPE SUPPORT STAND.



BUILDING 4840 KEYPLAN

Jun 12 2014

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FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FOAM SUPPRESSION ENLARGED PLAN – BUILDING 4840 PUMP ROOM

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

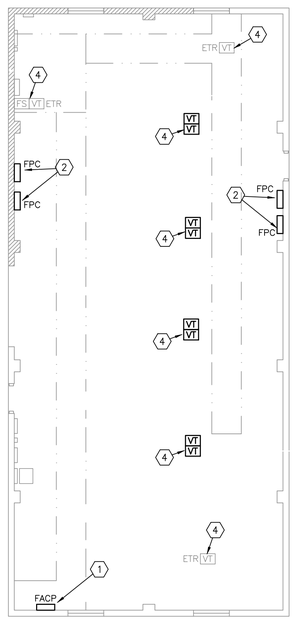
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

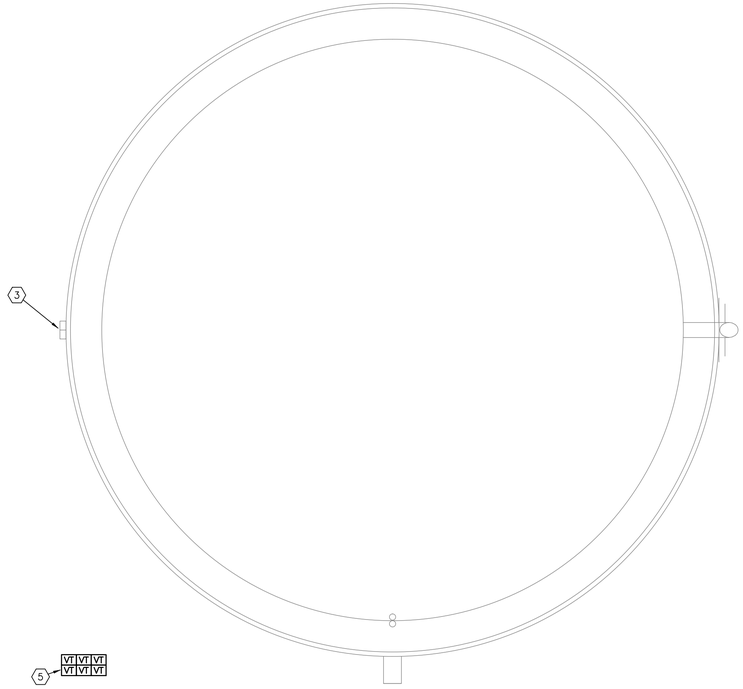
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F213E.dwg	F-213E	SHEET No. 104 of 137

DARRELL E. STEIN

FIRE ALARM PLAN NOTES:

1. PROVIDE NEW FIRE ALARM CONTROL PANEL.
2. PROVIDE EQUIPMENT AND CONNECTIONS REQUIRED TO MONITOR NEW FIRE PUMP CONTROLLERS.
3. CONNECT EXISTING HIGH/LOW LEVEL TANK AND AUTOFILL/REFILL SENSORS TO NEW FIRE ALARM PANEL.
4. CONNECT FIRE SPRINKLER MONITORING DEVICES TO NEW FIRE ALARM CONTROL PANEL. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
5. CONNECT FIRE SPRINKLER MONITORING DEVICES LOCATED IN BELOW GROUND VAULT TO NEW FIRE ALARM CONTROL PANEL. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.





1 FIRE ALARM PLAN – BUILDING 4853
SCALE: 1/8"=1'-0"

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"

SYSTEM OUTPUTS

	SYSTEM INPUTS	A REPORT TO FIRE ALARM CONTROL PANEL	B SIGNAL SUPERVISING STATION	C ACTIVATE AUDIBLE NOTIFICATION	D ACTIVATE VISIBLE NOTIFICATION	E ACTIVATE ICE NOTIFICATION APPLIANCE	F START 3 FIRE PUMPS SEQUENTIALLY	
1	MANUAL PULL STATION	●	●	●	●			1
2	SMOKE DETECTOR – SPOT TYPE	●	●	●	●			2
3	HEAT DETECTOR– SPOT TYPE	●	●	●	●			3
4	WATERFLOW ALARM SWITCH	●	●	●	●	●		4
5	VALVE TAMPER SWITCH	●	●					5
6	FIRE PUMP RUNNING	●	●					6
7	FIRE PUMP PHASE REVERSAL	●	●					7
8	FIRE PUMP LOSS OF POWER	●	●					8
9	HIGH EXPANSION FOAM DISCHARGE FROM B4801, B4802, B4840	●	●				●	9
10	HIGH EXPANSION FOAM DISCHARGE FROM B4833 (OPTION 1)	●	●				●	10
11	HIGH EXPANSION FOAM DISCHARGE FROM B4826 (OPTION 2)	●	●				●	11
		A	B	C	D	E	F	

2 FIRE ALARM SEQUENCE OF OPERATIONS
NO SCALE

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

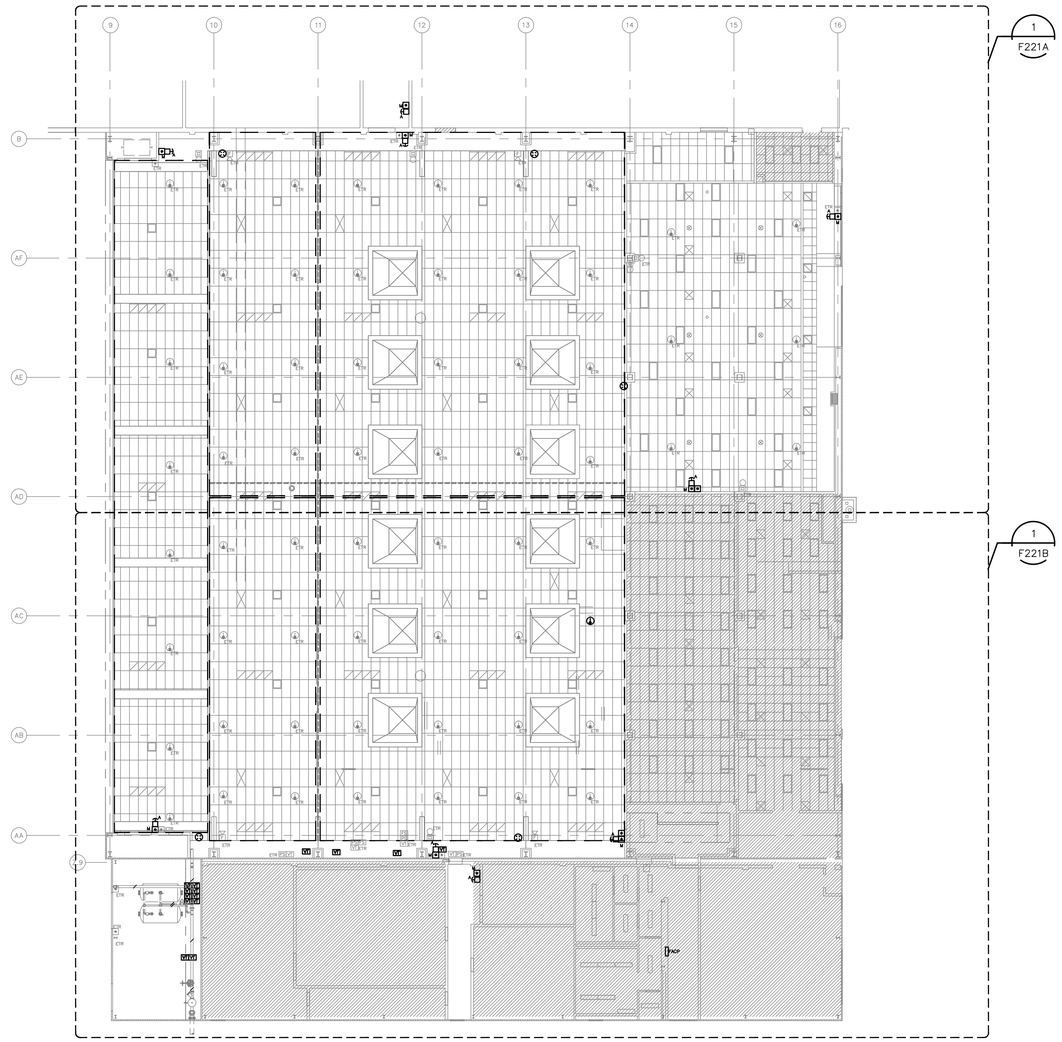
DRAWING TITLE
FIRE ALARM PLAN
BUILDING 4853

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F220.dwg	F-220	SHEET No. 105 of 137

DARRELL E. STEIN



1 FIRE ALARM PLAN – BUILDING 4801
SCALE: 1/16"=1'-0"

N

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4-WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

SYSTEM OUTPUTS

	SYSTEM INPUTS	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	MANUAL PULL STATION – FIRE ALARM	●	●	●	●		●	●							1
2	MANUAL RELEASE STATION – FOAM/PREACTION SYSTEM	●	●	●	●			●	●	●	●			●	2
3	ABORT SWITCH (PRE-FOAM SYSTEM DISCHARGE)	●	●									●			3
4	ABORT SWITCH (POST-FOAM SYSTEM DISCHARGE)	●	●										●		4
5	FIRST HEAT DETECTOR – SPOT TYPE	●	●	●	●		●	●							5
6	SECOND HEAT DETECTOR – SPOT TYPE	●	●	●	●		●	●			●				6
7	PRESSURE SWITCH – WATERFLOW	●	●	●	●	●	●	●			●				7
8	VALVE TAMPER SWITCH	●	●												8
9	CROSS ZONE DETECTION & PRESSURE SWITCH/WATERFLOW	●	●	●	●		●	●	●	●	●			●	9
		A	B	C	D	E	F	G	H	I	J	K	L	M	

SYSTEM OUTPUTS
REPORT TO FIRE ALARM CONTROL PANEL
SIGNAL SUPERVISORY STATION
ACTIVATE AUDIBLE NOTIFICATION
ACTIVATE VISUAL NOTIFICATION APPLIANCE
RELEASE ASSOCIATED DOOR HOLDERS
SHUT DOWN AIR HANDLING EQUIPMENT THROUGHOUT THE HANGER
DISCHARGE ASSOCIATED FOAM SYSTEM (DELAY UP TO 30 SECONDS)
ACTIVATE BLACK BEACON LIGHT NOTIFICATION (1 SECOND)
ACTIVATE PREACTION SYSTEM (DELAY UP TO 30 SECONDS)
CAUSE DISCHARGE SYSTEM ALARM (PRE-DISCHARGE)
TEMPORARILY ARM OF FOAM SYSTEM (ABORT SWITCH)
FOAM SYSTEM WILL DEPRESSURIZE VALVE AND STOP DISCHARGE FOR
START 5 MIN PUMP SECONDARY (BUILDING 4853)

SEQUENCE OF OPERATIONS INDICATED IS SCHEMATIC AND SHALL MATCH THAT OF THE EXISTING SYSTEM ALONG WITH THE ABOVE AT A MINIMUM. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS.

2 FIRE ALARM SEQUENCE OF OPERATIONS
NO SCALE

BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
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FIRE PROTECTION
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Jun 12 2014

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FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM OVERALL PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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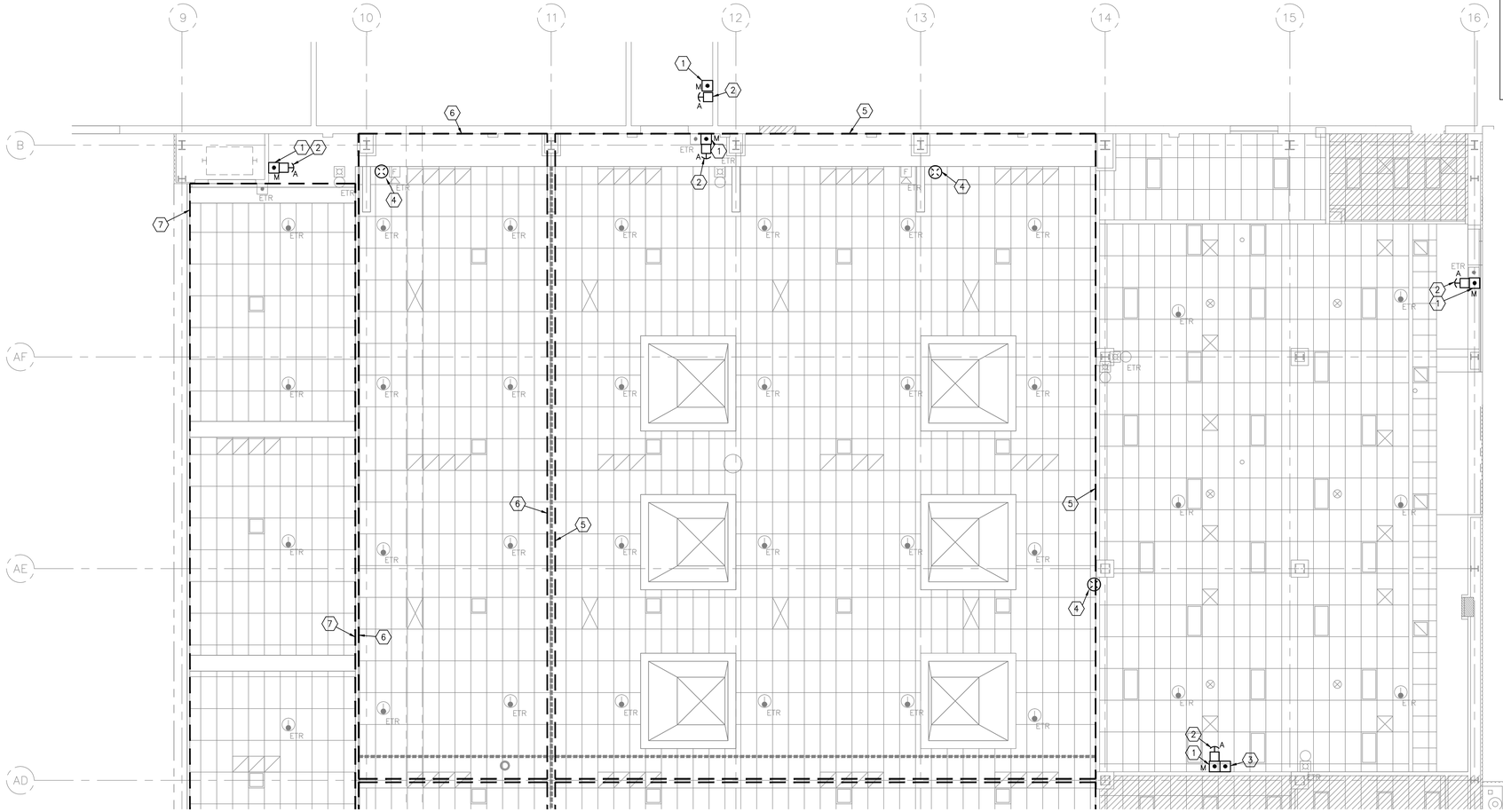
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F221.dwg	F-221	SHEET No. 106 of 137

DARRELL E. STEIN



NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4-WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

FIRE ALARM PLAN NOTES:

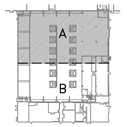
1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW ABORT SWITCH FOR FOAM SYSTEM.
3. PROVIDE NEW MANUAL PULL STATION FOR FIRE ALARM SYSTEM.
4. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
5. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 1 AND ZONE 2 PREACTION SYSTEMS.
6. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 2 PREACTION SYSTEM.
7. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 2 AND ZONE 3 PREACTION SYSTEMS.

1 FIRE ALARM ENLARGED PLAN – BUILDING 4801 AREA A

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
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Jun 12 2014

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FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

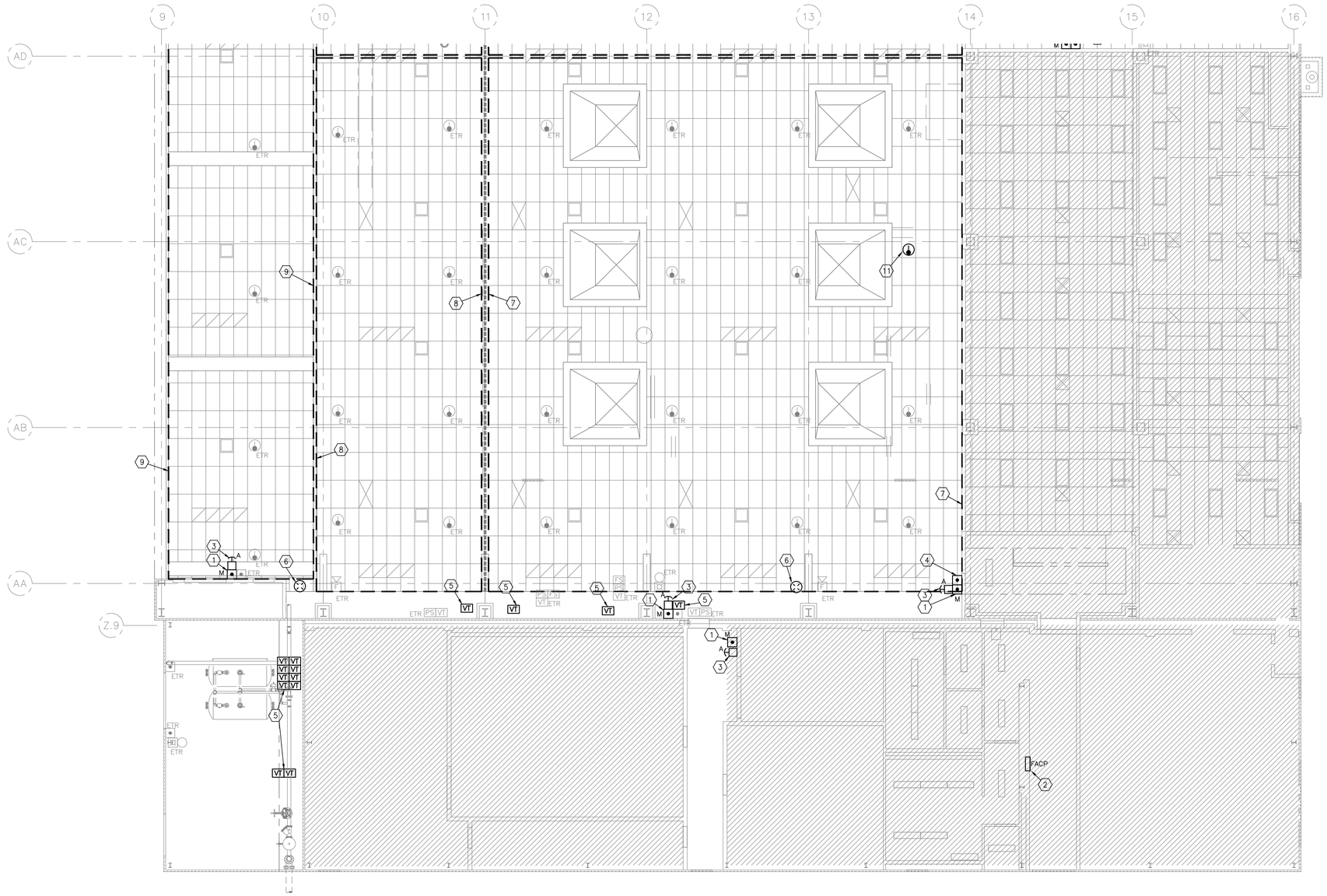
DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4801 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		
SCALE	1/8"=1'-0"	TRADE Sh. No.	EDM-1719
FILE NAME	EDM-1719 F221A.dwg	F-221A	SHEET No. 107 of 137

DARRELL E. STEIN



NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4–WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

FIRE ALARM PLAN NOTES:

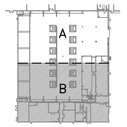
1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW FIRE ALARM CONTROL PANEL.
3. PROVIDE NEW ABORT SWITCH FOR FOAM SYSTEM.
4. PROVIDE NEW MANUAL PULL STATION FOR FIRE ALARM SYSTEM.
5. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
6. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
7. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4 AND ZONE 3 PREACTION SYSTEMS.
8. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 3 PREACTION SYSTEM.
9. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 2 AND ZONE 3 PREACTION SYSTEMS.
10. RELOCATE EXISTING HEAT DETECTOR AS REQUIRED TO AVOID NEW FOAM GENERATOR AND DUCTWORK.
10. RELOCATE EXISTING HEAT DETECTOR AS REQUIRED TO AVOID NEW FOAM GENERATOR AND DUCTWORK.

1 FIRE ALARM ENLARGED PLAN – BUILDING 4801 AREA B

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

0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

Jun 12 2014

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02–28–14		95% SUBMITTAL		
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4801 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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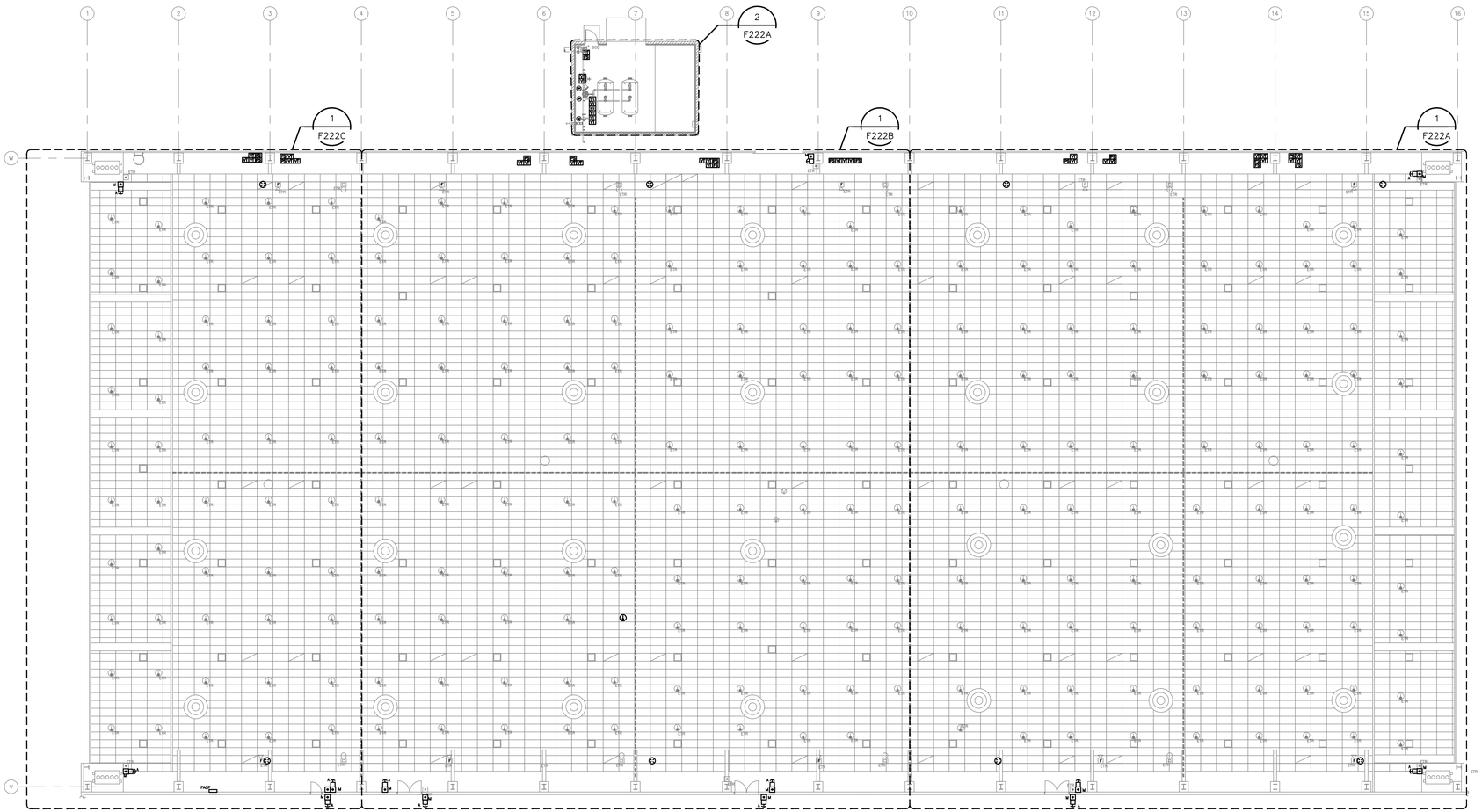
FILE NAME	EDM–1719 F221B.dwg	F–221B	SHEET No. 108 of 137

DARRELL E. STEIN

NOTE: BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4-WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.



NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

1 FIRE ALARM OVERALL PLAN – BUILDING 4802

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

N

0 8' 16' 24'

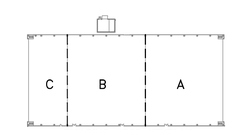
SCALE: 1/16"=1'-0"

SYSTEM INPUTS	A	B	C	D	E	F	G	H	I	J	K	L	M	SYSTEM OUTPUTS
1 MANUAL PULL STATION – FIRE ALARM	●	●	●	●		●	●							1 REPORT TO FIRE ALARM CONTROL PANEL
2 MANUAL RELEASE STATION – FOAM/PREACTION SYSTEM	●	●	●	●		●	●	●	●	●			●	2 SIGNAL SUPERVISING STATION ACTUATE AUDIBLE NOTIFICATION ACTUATE VISUAL NOTIFICATION RELEASE ASSOCIATED DOOR HOLDERS SHUT DOWN AIR HANDLING EQUIPMENT THROUGHOUT THE HANGER DISCHARGE OF FOAM SYSTEM DELAYED 30 SECONDS ACTUATE BLUE BEACON SIGNAL ON FOAM SYSTEM CANCEL DISCHARGE OF FOAM SYSTEM (DELAY OF 15 SECONDS) TEMPORARILY REACT FOAM SYSTEM TO DELUGE WHILE DEPRESSED STOP SYSTEM WHILE DELUGE VALVE IS DEPRESSED START SYSTEM WHEN DELUGE VALVE AND STOP DISCHARGE FOR STARTS FIRE PUMPS SEQUENTIALLY (BUILDING 4853)
3 ABORT SWITCH (PRE-FOAM SYSTEM DISCHARGE)	●	●									●			3
4 ABORT SWITCH (POST-FOAM SYSTEM DISCHARGE)	●	●										●		4
5 FIRST HEAT DETECTOR – SPOT TYPE	●	●	●	●		●	●							5
6 SECOND HEAT DETECTOR – SPOT TYPE	●	●	●	●		●	●			●				6
7 PRESSURE SWITCH – WATERFLOW	●	●	●	●	●	●	●			●				7
8 VALVE TAMPER SWITCH	●	●												8
9 CROSS ZONE DETECTION & PRESSURE SWITCH/WATERFLOW	●	●	●	●		●	●	●	●	●			●	9
	A	B	C	D	E	F	G	H	I	J	K	L	M	

SEQUENCE OF OPERATIONS INDICATED IS SCHEMATIC AND SHALL MATCH THAT OF THE EXISTING SYSTEM ALONG WITH THE ABOVE AT A MINIMUM. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS.

2 FIRE ALARM SEQUENCE OF OPERATIONS

NO SCALE



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
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1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

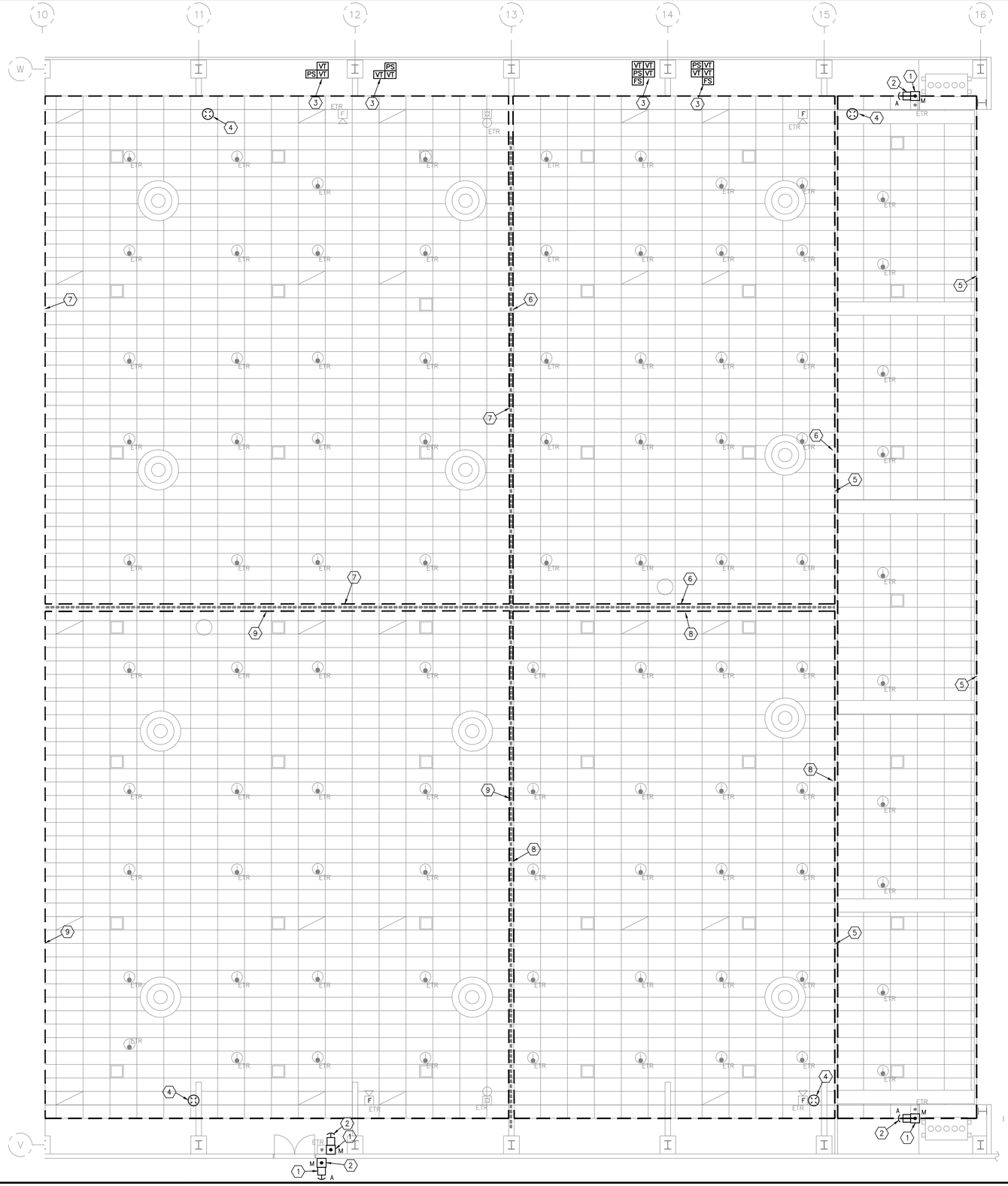
DRAWING TITLE
FIRE ALARM OVERALL PLAN – BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F222.dwg	F-222	SHEET No. 109 of 137

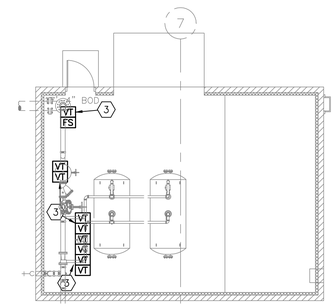
DARRELL E. STEIN



NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4–WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

FIRE ALARM PLAN NOTES:

1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW ABORT SWITCH FOR FOAM SYSTEM.
3. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
4. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
5. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 1 AND ZONE 2 PREACTION SYSTEMS.
6. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 1 PREACTION SYSTEM.
7. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4 PREACTION SYSTEM.
8. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 2 PREACTION SYSTEM.
9. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 3 PREACTION SYSTEM.



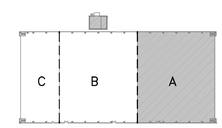
2 FIRE ALARM FOAM PUMP ROOM
ENLARGED PLAN – BUILDING 4802 AREA A
SCALE: 1/8"=1'–0"

N 0 4' 8' 12'
SCALE: 1/8"=1'–0"

1 FIRE ALARM
ENLARGED PLAN – BUILDING 4802 AREA A
SCALE: 1/8"=1'–0"

N 0 4' 8' 12'
SCALE: 1/8"=1'–0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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02–28–14		95% SUBMITTAL		
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03–20–13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

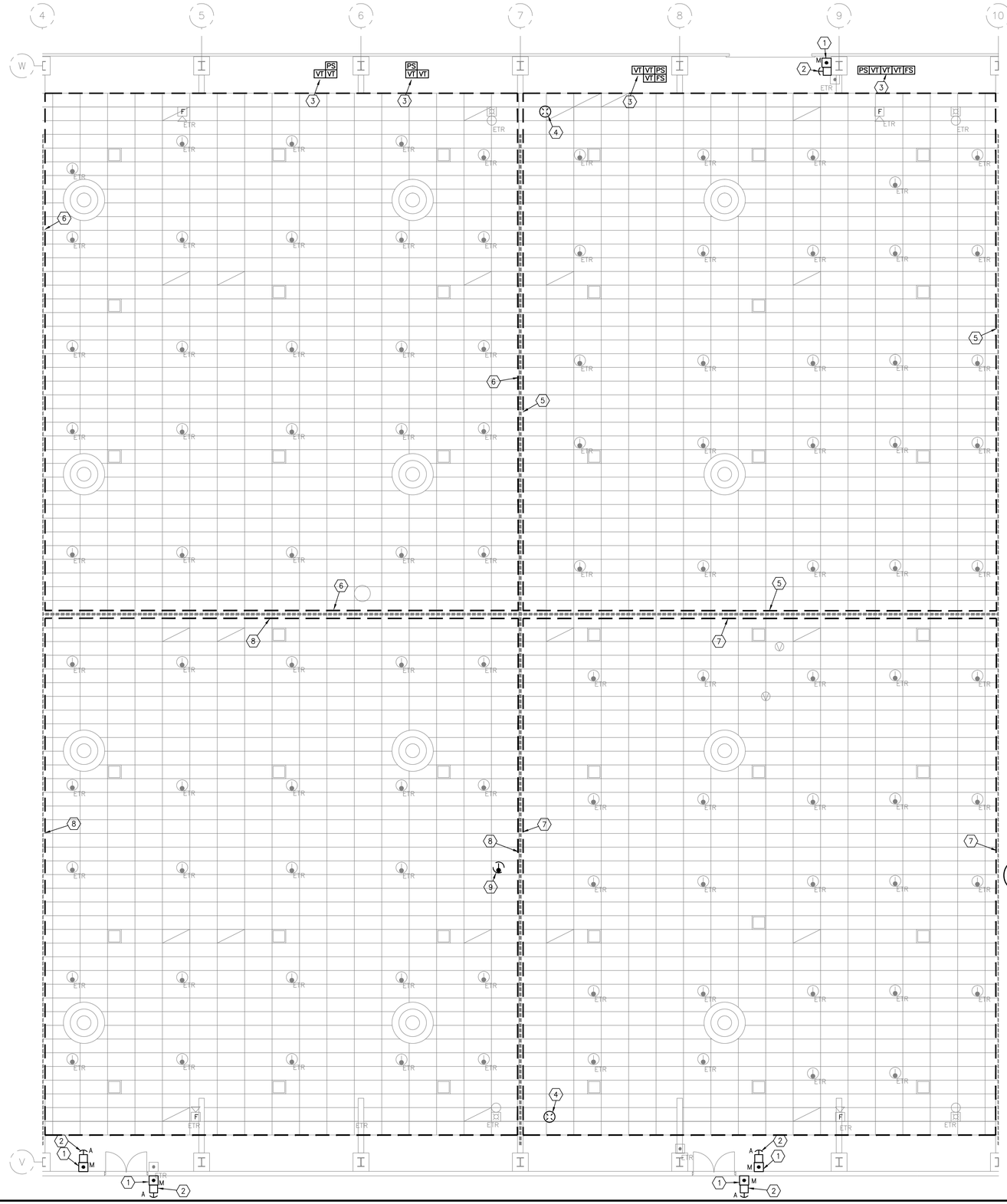
DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4802 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM–1719
SCALE	1/8"=1'–0"	TRADE SH. No.	
FILE NAME	EDM–1719 F222A.dwg	F–222A	SHEET No. 110 of 137

DARRELL E. STEIN



NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4-WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

FIRE ALARM PLAN NOTES:

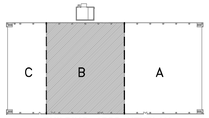
1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW ABORT STATION FOR FOAM SYSTEM.
3. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
4. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
5. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 6 PREACTION SYSTEM.
6. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 8 PREACTION SYSTEM.
7. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 5 PREACTION SYSTEM.
8. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 7 PREACTION SYSTEM.
9. RELOCATE EXISTING HEAT DETECTOR AS REQUIRED TO AVOID NEW FOAM GENERATOR AND DUCTWORK.

1 FIRE ALARM ENLARGED PLAN – BUILDING 4802 AREA B

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

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.

N — 0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

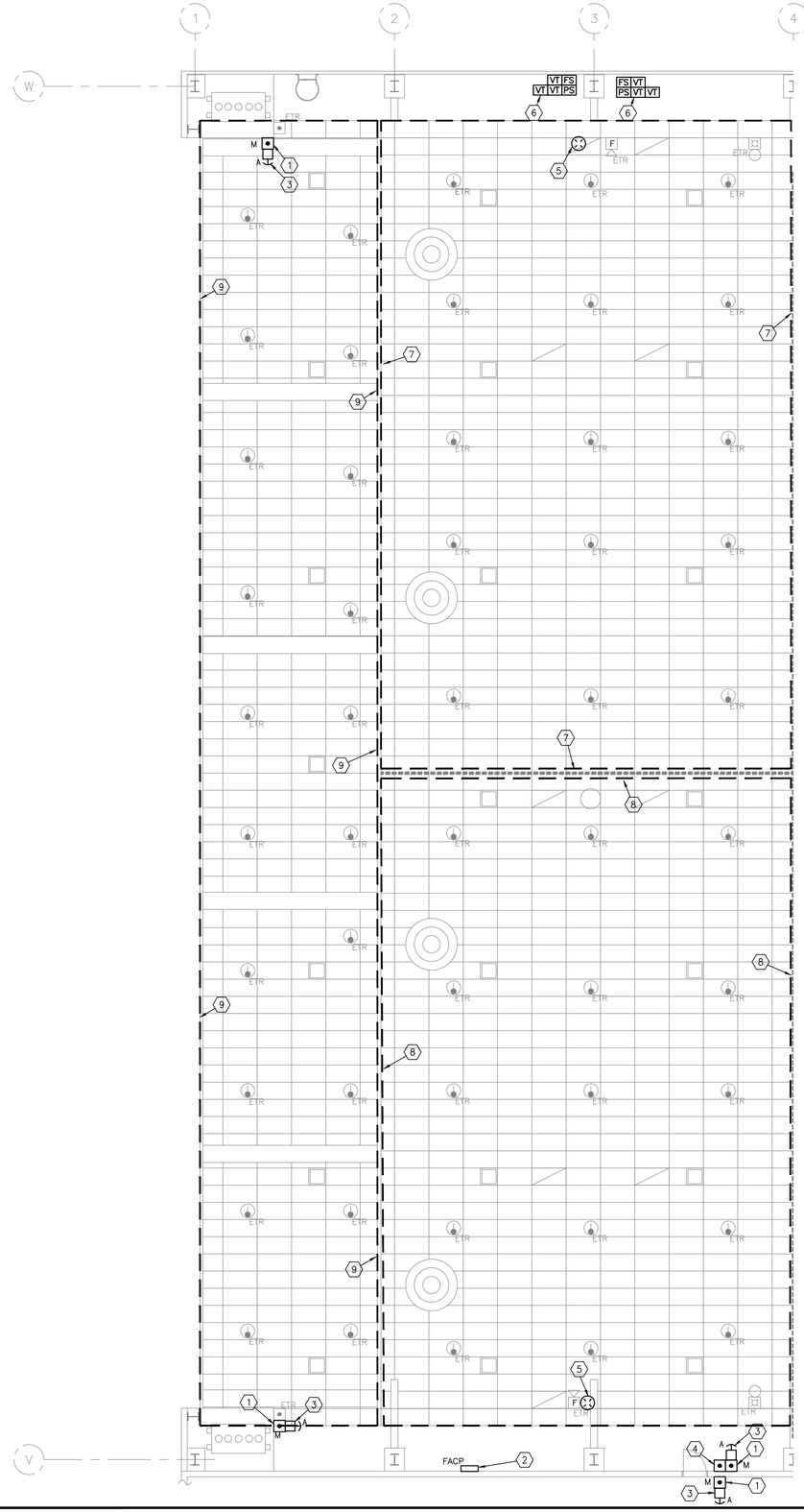
DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4802 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F222B.dwg	F-222B	SHEET No. 111 of 137

DARRELL E. STEIN



1 FIRE ALARM ENLARGED PLAN – BUILDING 4802 AREA C
SCALE: 1/8"=1'-0"

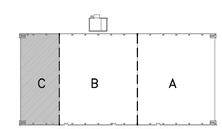
NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4–WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

FIRE ALARM PLAN NOTES:

1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW FIRE ALARM CONTROL PANEL.
3. PROVIDE NEW ABORT STATION FOR FOAM SYSTEM.
4. PROVIDE NEW PULL STATION FOR FIRE ALARM SYSTEM.
5. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
6. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
7. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 9 PREACTION SYSTEM.
8. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 10 PREACTION SYSTEM.
9. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 9 AND ZONE 10 PREACTION SYSTEMS.

N
0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE: CONTRACTOR TO PROTECT IN PLACE EXISTING COPPER RADIANT FLOOR HEATING SYSTEM IN BUILDING SLAB WHEN INSTALLING SUPPORTS AND DEVICES. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO RADIANT FLOOR HEATING SYSTEM.



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1502
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4802 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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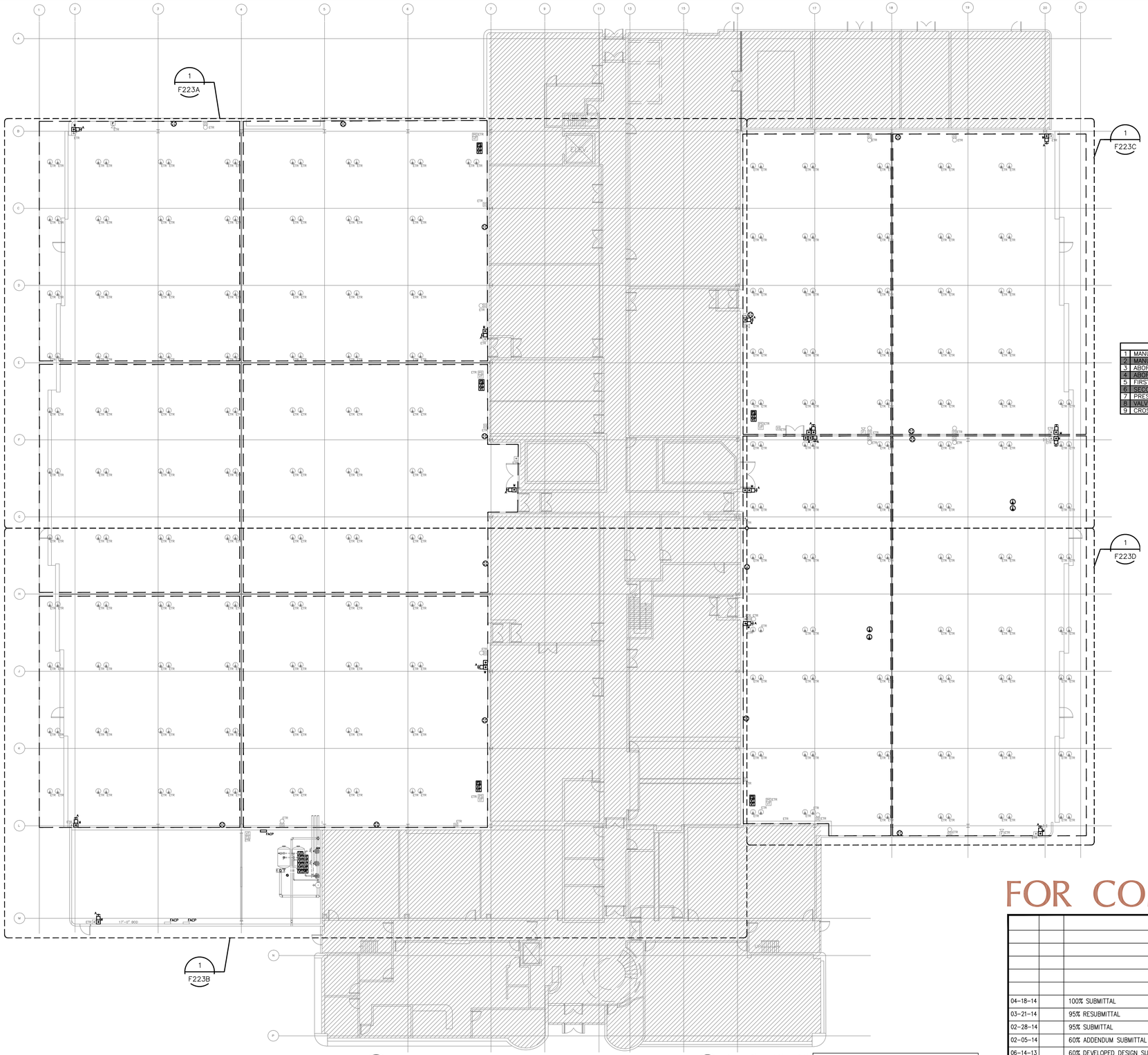
SCALE	1/8"=1'–0"	TRADE SH. No.	
FILE NAME	EDM–1719 F222C.dwg	F–222C	SHEET No. 112 of 137

DARRELL E. STEIN



1 FIRE ALARM OVERALL PLAN – BUILDING 4840
SCALE: 1/16"=1'-0"

N

0 8' 16' 24'
SCALE: 1/16"=1'-0"

NOTE: OVERALL SHEET FOR REFERENCE ONLY. PLEASE REFER TO ENLARGED PLAN FOR MORE INFORMATION.

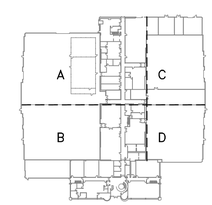
NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4–WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

	SYSTEM INPUTS	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	MANUAL PULL STATION – FIRE ALARM	●	●	●	●		●	●							1
2	MANUAL RELEASE STATION – FOAM/PREACTION SYSTEM	●	●	●	●		●	●	●	●	●			●	2
3	ABORT SWITCH (PRE–FOAM SYSTEM DISCHARGE)	●	●									●			3
4	ABORT SWITCH (POST–FOAM SYSTEM DISCHARGE)	●	●										●		4
5	FIRST HEAT DETECTOR – SPOT TYPE	●	●	●	●		●	●							5
6	SECOND HEAT DETECTOR – SPOT TYPE	●	●	●	●		●	●			●				6
7	PRESSURE SWITCH – WATERFLOW	●	●	●	●	●	●	●			●				7
8	VALVE TAMPER SWITCH	●	●												8
9	CROSS ZONE DETECTION & PRESSURE SWITCH/WATERFLOW	●	●	●	●		●	●	●	●	●			●	9
		A	B	C	D	E	F	G	H	I	J	K	L	M	

SYSTEM OUTPUTS:
1. REPORT TO FIRE ALARM CONTROL PANEL
2. SIGNAL SUPERVISING STATION
3. ACTIVATE AUDIBLE NOTIFICATION
4. ACTIVATE VISUAL NOTIFICATION
5. RELEASE NOTIFICATION APPLIANCE
6. SHUT FOAM AIR DANGER SIGNS
7. DISCHARGE OF FOAM SYSTEM DELAY OF 30 SECONDS
8. ACTIVATE BLUE BEACON LIGHT NOTIFICATION APPLIANCE
9. CANCEL DISCHARGE OF FOAM SYSTEM DELAY OF 15 SECONDS
10. TEMPORARILY RESET FOAM SYSTEM WHILE DEPRESSED
11. FOAM SYSTEM DELAY OF 15 SECONDS
12. START 2 FIRE PUMPS SEQUENTIALLY (BUILDING 4853)
13. VALVE AND STOP DISCHARGE FOR

SEQUENCE OF OPERATIONS INDICATED IS SCHEMATIC AND SHALL MATCH THAT OF THE EXISTING SYSTEM ALONG WITH THE ABOVE AT A MINIMUM. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS.

2 FIRE ALARM SEQUENCE OF OPERATIONS
NO SCALE



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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03–20–13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM OVERALL PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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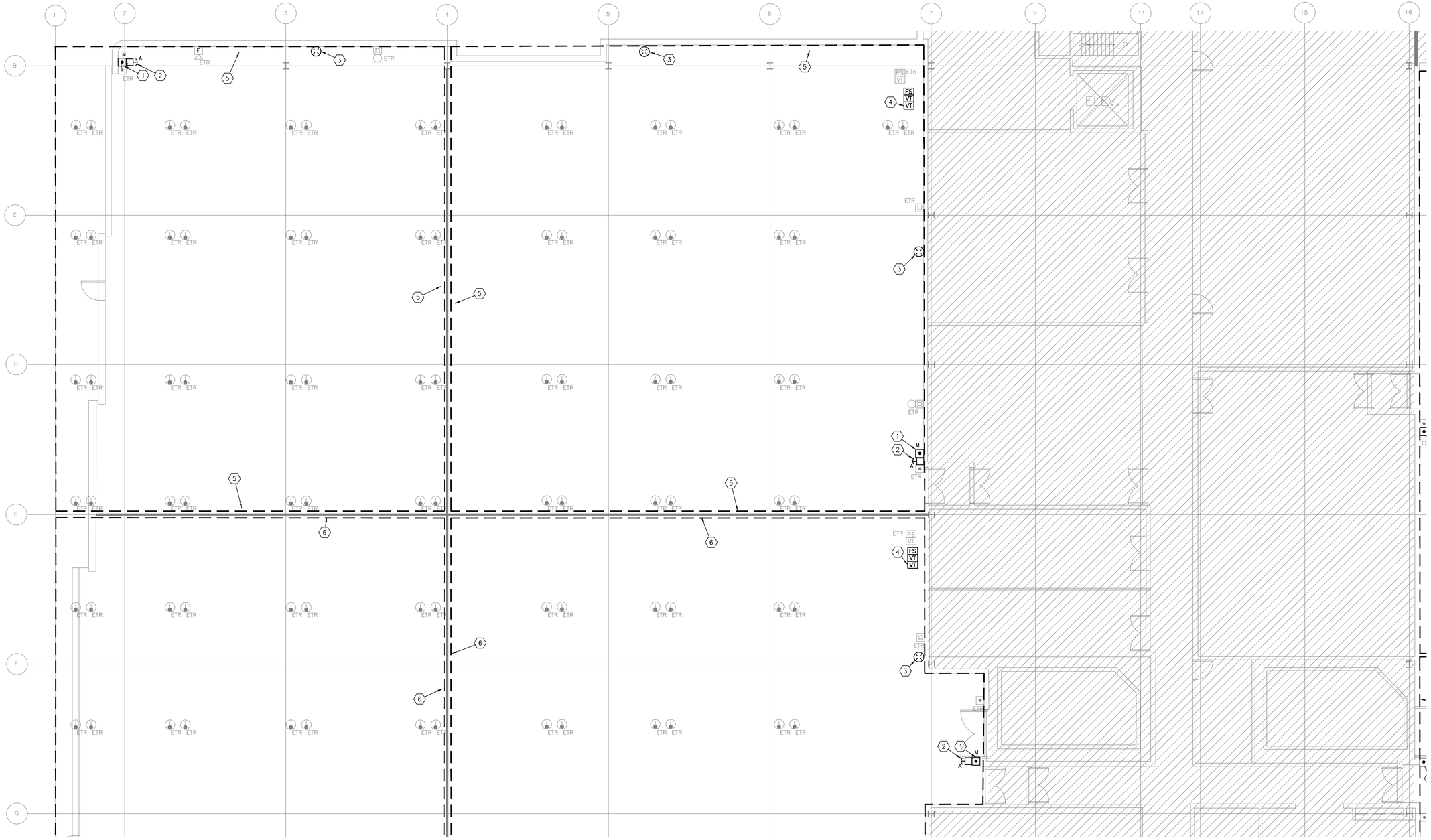
FILE NAME	EDM–1719 F223.dwg	F–223	SHEET No. 113 of 137

DARRELL E. STEIN



FIRE ALARM PLAN NOTES:

1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW ABORT STATION FOR FOAM SYSTEM.
3. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
4. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
5. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4079 PREACTION SYSTEM.
6. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4080 PREACTION SYSTEM.

NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4-WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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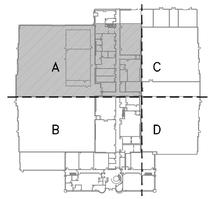
1 FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA A

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

N

0 4' 8' 12'
SCALE: 1/8"=1'-0"

FOR CONSTRUCTION



BUILDING 4840 KEYPLAN

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA A

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
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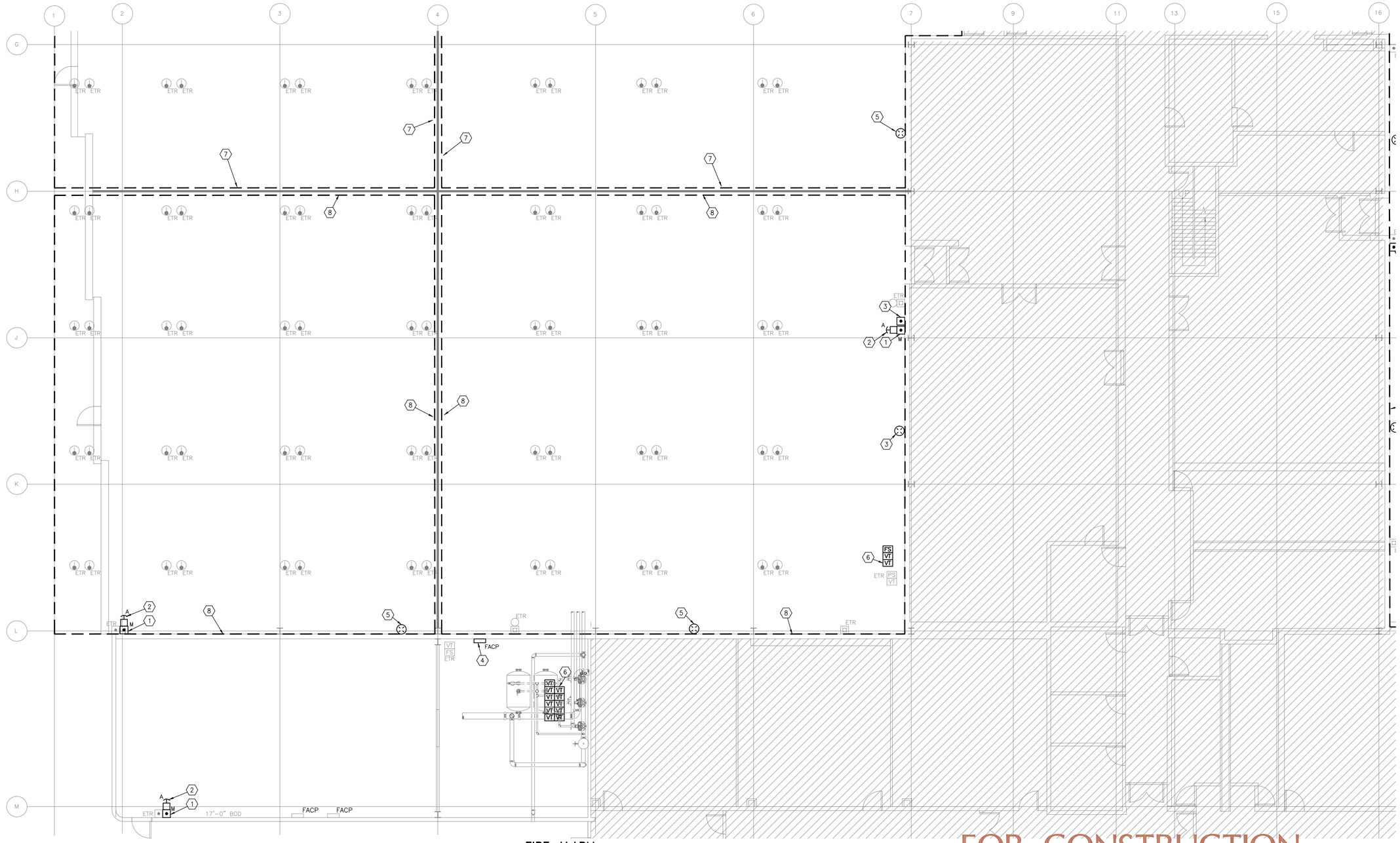
DARRELL E. STEIN



FIRE ALARM PLAN NOTES:

1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW ABORT STATION FOR FOAM SYSTEM.
3. PROVIDE NEW MANUAL RELEASE PULL STATION FOR FIRE ALARM SYSTEM.
4. PROVIDE NEW FIRE ALARM CONTROL PANEL. NEW PANEL TO MONITOR ALL FIRE ALARM, SPRINKLER AND FOAM SUPPRESSION EQUIPMENT PROTECTING BAYS 1, 2, 3, 4, 5, AND 6. CONNECT NEW PANEL TO EXISTING MAIN BUILDING FIRE ALARM CONTROL PANEL.
5. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
6. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
7. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4080 PREACTION SYSTEM.
8. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4081 PREACTION SYSTEM.

NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4-WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

REGISTERED PROFESSIONAL ENGINEER
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Jun 12 2014

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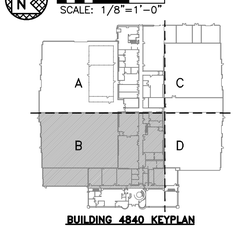
1 FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA B

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

N

0 4' 8' 12'

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



BUILDING 4840 KEYPLAN

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

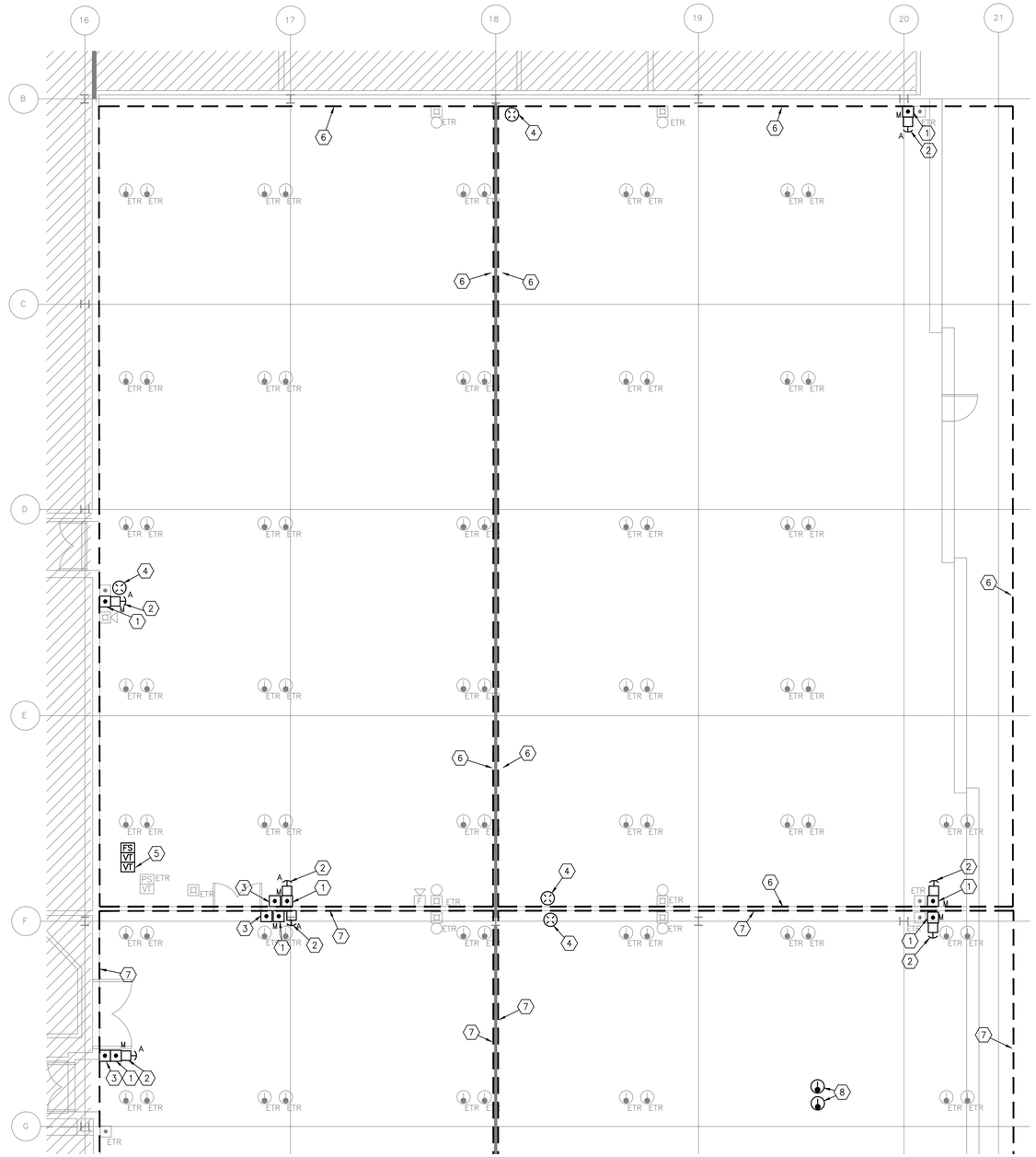
DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA B

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F223B.dwg	F-223B	SHEET No. 115 of 137

DARRELL E. STEIN



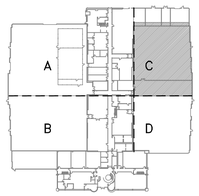
1 FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA C
SCALE: 1/8"=1'-0"

N 0 4' 8' 12'
SCALE: 1/8"=1'-0"

NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4–WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

FIRE ALARM PLAN NOTES:

1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM AND PREACTION SYSTEMS.
2. PROVIDE NEW ABORT STATION FOR FOAM SYSTEM.
3. PROVIDE NEW PULL STATION FOR FIRE ALARM SYSTEM.
4. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
5. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
6. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4078 PREACTION SYSTEM.
7. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4077 PREACTION SYSTEM.
8. RELOCATE EXISTING HEAT DETECTORS AS REQUIRED TO AVOID NEW FOAM GENERATOR AND DUCTWORK.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04–18–14		100% SUBMITTAL		
03–21–14		95% RESUBMITTAL		
02–28–14		95% SUBMITTAL		
02–05–14		60% ADDENDUM SUBMITTAL		
06–14–13		60% DEVELOPED DESIGN SUBMITTAL		
03–20–13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA C

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

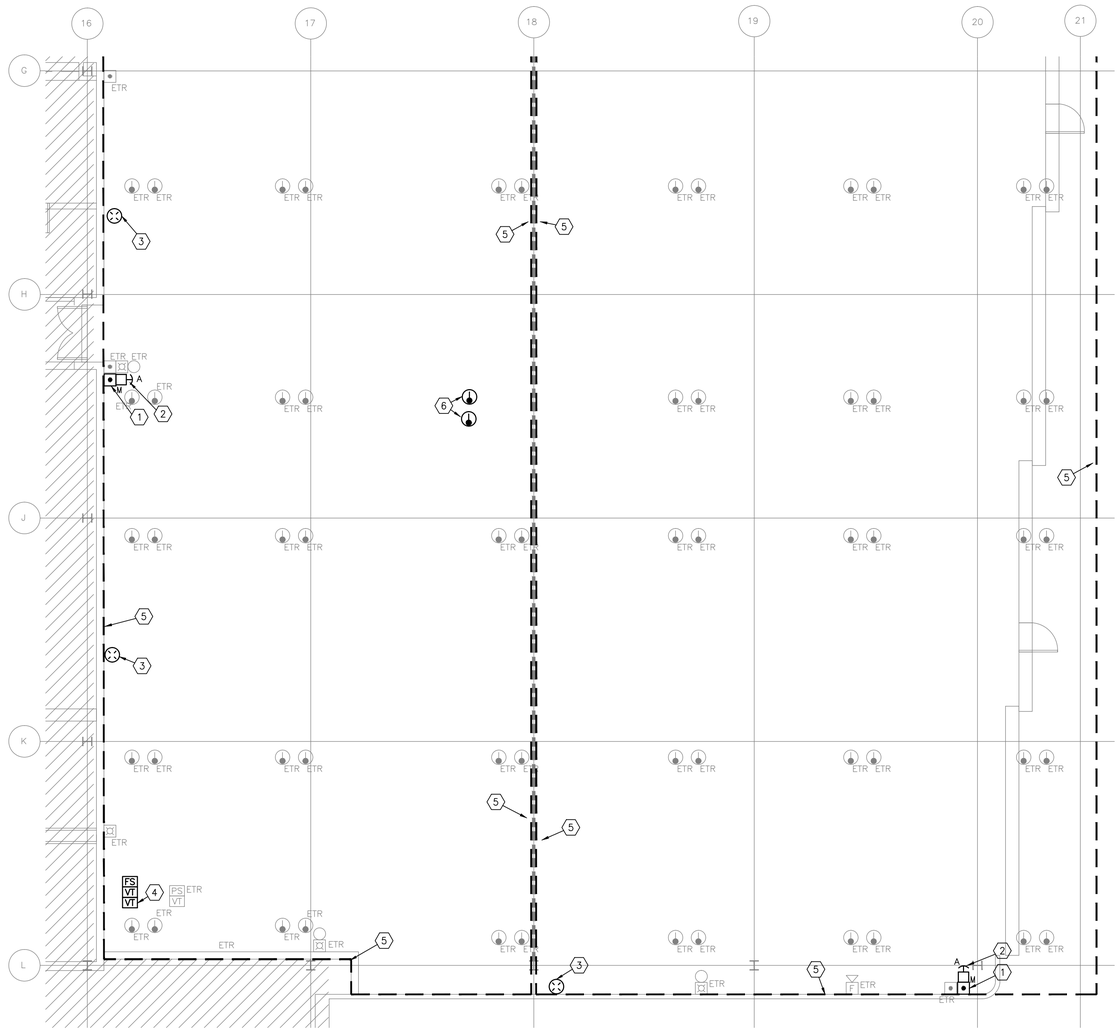
DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM–1719	
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM–1719 F223C.dwg	F–223C	SHEET No. 116 of 137

DARRELL E. STEIN

NOTE BID OPTION: PROVIDE CROSS ZONED LINEAR HEAT DETECTION SPACED AT 30 FT. ON CENTER, NOMINALLY. EACH LINEAR HEAT DETECTION ZONE TO PROTECT NOT MORE THAN 30,000 SF. PROVIDE 4-WIRE MODULE IN AN ACCESSIBLE LOCATION, NOT MORE THAN 60" ABOVE FINISHED FLOOR, TO PROVIDE POWER AND INTERFACE WITH SIGNALING LINE CIRCUIT. PROVIDE KEYED TEST SWITCH IN AN ACCESSIBLE LOCATION AT A REMOTE PORTION OF EACH LINEAR HEAT DETECTION ZONE FOR SYSTEM TESTING NOT MORE THAN 60" ABOVE FINISHED FLOOR. PROVIDE EQUIPMENT AND CONTROLS NECESSARY TO INTERFACE LINEAR HEAT DETECTION WITH FIRE ALARM CONTROL PANEL.

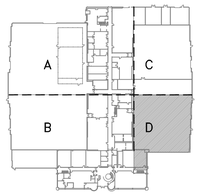
FIRE ALARM PLAN NOTES:

1. PROVIDE NEW MANUAL RELEASE PULL STATION WITH TAMPERPROOF COVER FOR FOAM PREACTION SYSTEMS.
2. PROVIDE NEW ABORT STATION FOR FOAM SYSTEM.
3. PROVIDE NEW BLUE BEACON LIGHT AT THIS LOCATION.
4. CONNECT FIRE SPRINKLER AND FOAM SUPPRESSION MONITORING DEVICES TO FIRE ALARM SYSTEM. COORDINATE QUANTITY AND LOCATION OF DEVICES WITH FIRE PROTECTION SYSTEMS.
5. INITIATION OF A DETECTOR LOCATED WITHIN THIS DRAFT CURTAIN SHALL ACTIVATE THE ZONE 4077 PREACTION SYSTEM.
6. RELOCATE EXISTING HEAT DETECTORS AS REQUIRED TO AVOID NEW FOAM GENERATOR AND DUCTWORK.



1 FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA D
SCALE: 1/8"=1'-0"

N
0 4' 8' 12'
SCALE: 1/8"=1'-0"



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

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03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE ALARM ENLARGED PLAN – BUILDING 4840 AREA D

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

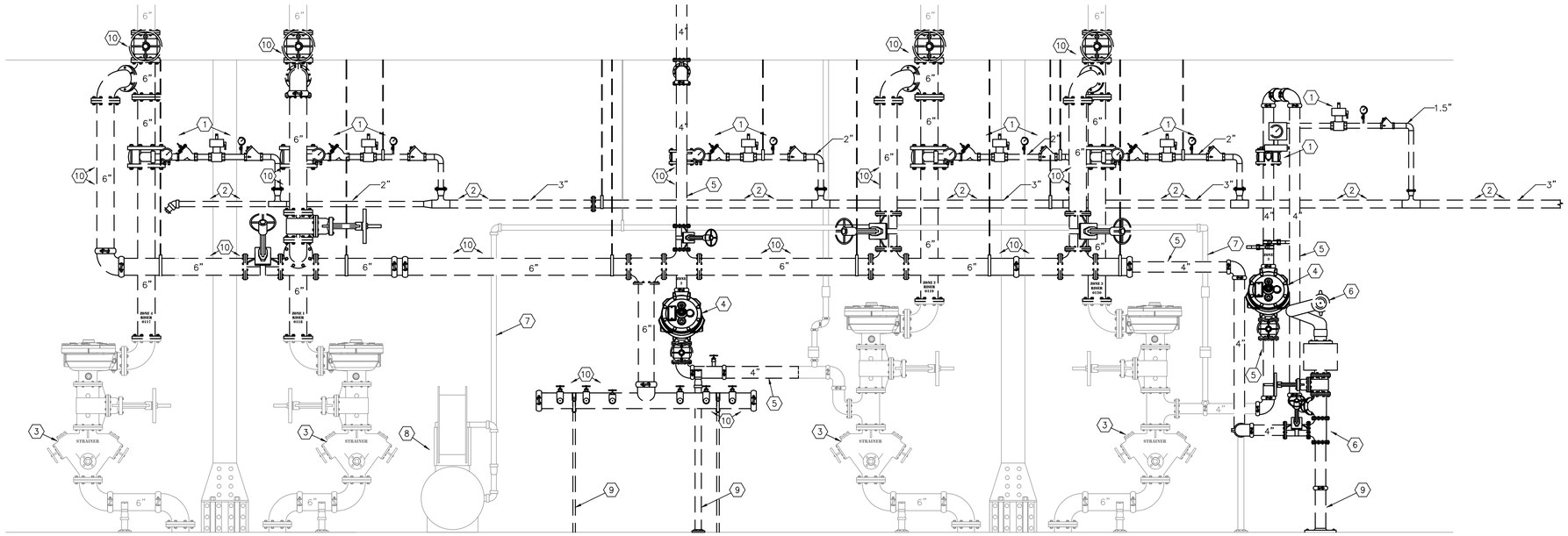
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/8"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F2230.dwg	F-2230	SHEET No. 117 of 137

DARRELL E. STEIN

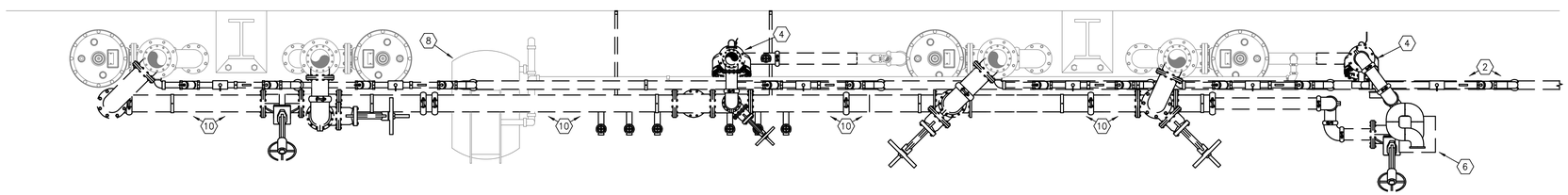
RISER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING FOAM PROPORTIONING EQUIPMENT AND ASSOCIATED PIPING.
2. REMOVE ALL EXISTING FOAM LINES, HANGERS AND ASSOCIATED EQUIPMENT BACK TO SOURCE.
3. EXISTING STRAINER TO REMAIN. CLEAN STRAINER PRIOR TO NEW WORK.
4. REMOVE EXISTING DELUGE VALVE AND ALL ASSOCIATED TRIM. ASSOCIATED DRAIN PIPING TO BE REMOVED AND CAPPED.
5. REMOVE EXISTING MONITOR SUPPLY PIPING, VALVES AND HANGERS.
6. REMOVE OSCILLATING MONITOR AND ASSOCIATED HARDWARE.
7. EXISTING HAND HOSE REEL SUPPLY PIPING, VALVES AND HANGERS TO REMAIN.
8. EXISTING HAND HOSE STATION TO REMAIN.
9. PIPE STAND TO BE REMOVED/RELOCATED.
10. REMOVE ALL FOAM TEST PORT EQUIPMENT, VALVES AND PIPE SUPPORTS.



1 ZONE 1 – ZONE 4 RISER
DEMOLITION PLAN – ELEVATION VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 ZONE 1 – ZONE 4 RISER
DEMOLITION PLAN – PLAN VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
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Jun 12 2014

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FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
DEMOLITION RISER PLAN
PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION
SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

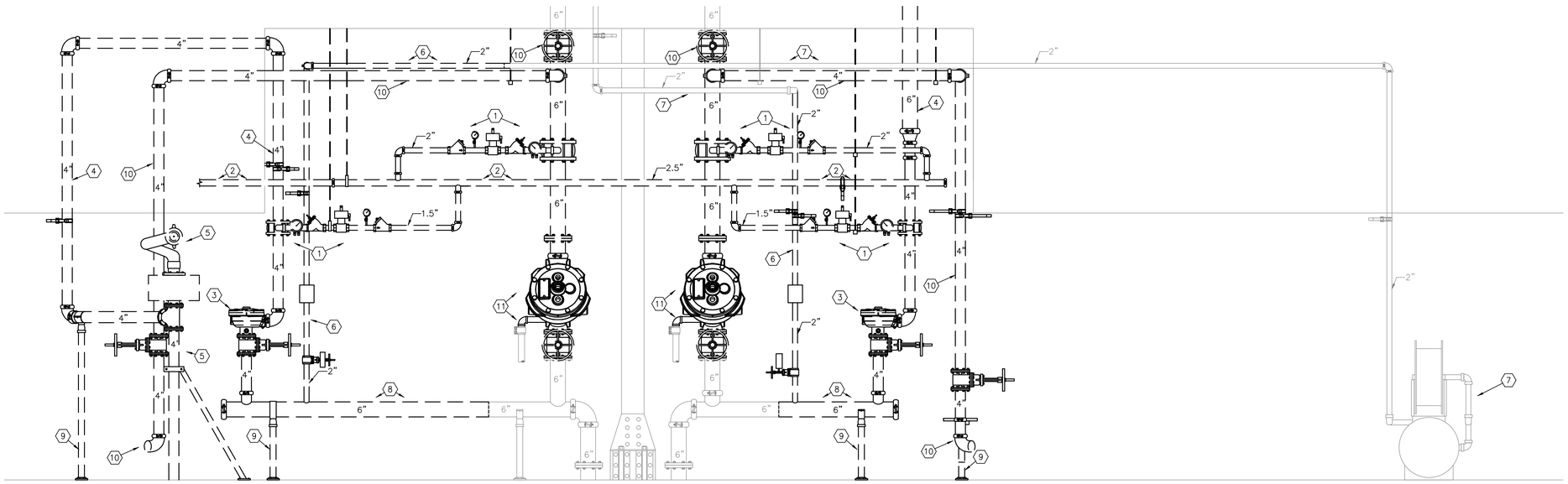
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F301.dwg	F-301	SHEET No. 118 of 137

DARRELL E. STEIN

RISER DEMOLITION PLAN NOTES:

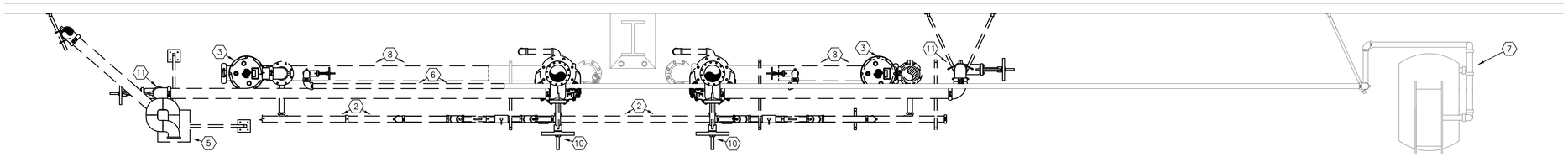
1. REMOVE ALL EXISTING FOAM PROPORTIONING EQUIPMENT AND ASSOCIATED PIPING.
2. REMOVE ALL EXISTING FOAM LINES, HANGERS AND ASSOCIATED EQUIPMENT BACK TO SOURCE.
3. REMOVE EXISTING DELUGE VALVE AND ALL ASSOCIATED TRIM. ASSOCIATED DRAIN PIPING TO BE REMOVED AND CAPPED.
4. REMOVE EXISTING MONITOR SUPPLY PIPING, VALVES AND PIPE SUPPORTS.
5. REMOVE OSCILLATING MONITOR AND ASSOCIATED HARDWARE.
6. REMOVE AS SHOWN HAND HOSE REEL SUPPLY PIPING, VALVES AND MONITORING EQUIPMENT.
7. EXISTING HAND HOSE REEL SUPPLY PIPING, VALVES AND HANGERS TO REMAIN WHERE SHOWN.
8. REMOVE RISER MANIFOLD PIPING AS SHOWN.
9. PIPE STAND TO BE REMOVED/RELOCATED.
10. REMOVE TEST PORT AND ASSOCIATED PIPING, VALVES AND PIPE SUPPORTS.
11. EQUIPMENT TO BE RAISED.



REF F-002
DRAWING FOR CONTINUATION.

1 ZONE 1 AND ZONE 2 RISER DEMOLITION PLAN – ELEVATION VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 ZONE 1 AND ZONE 2 RISER DEMOLITION PLAN – PLAN VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
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www.hei-eng.com
1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

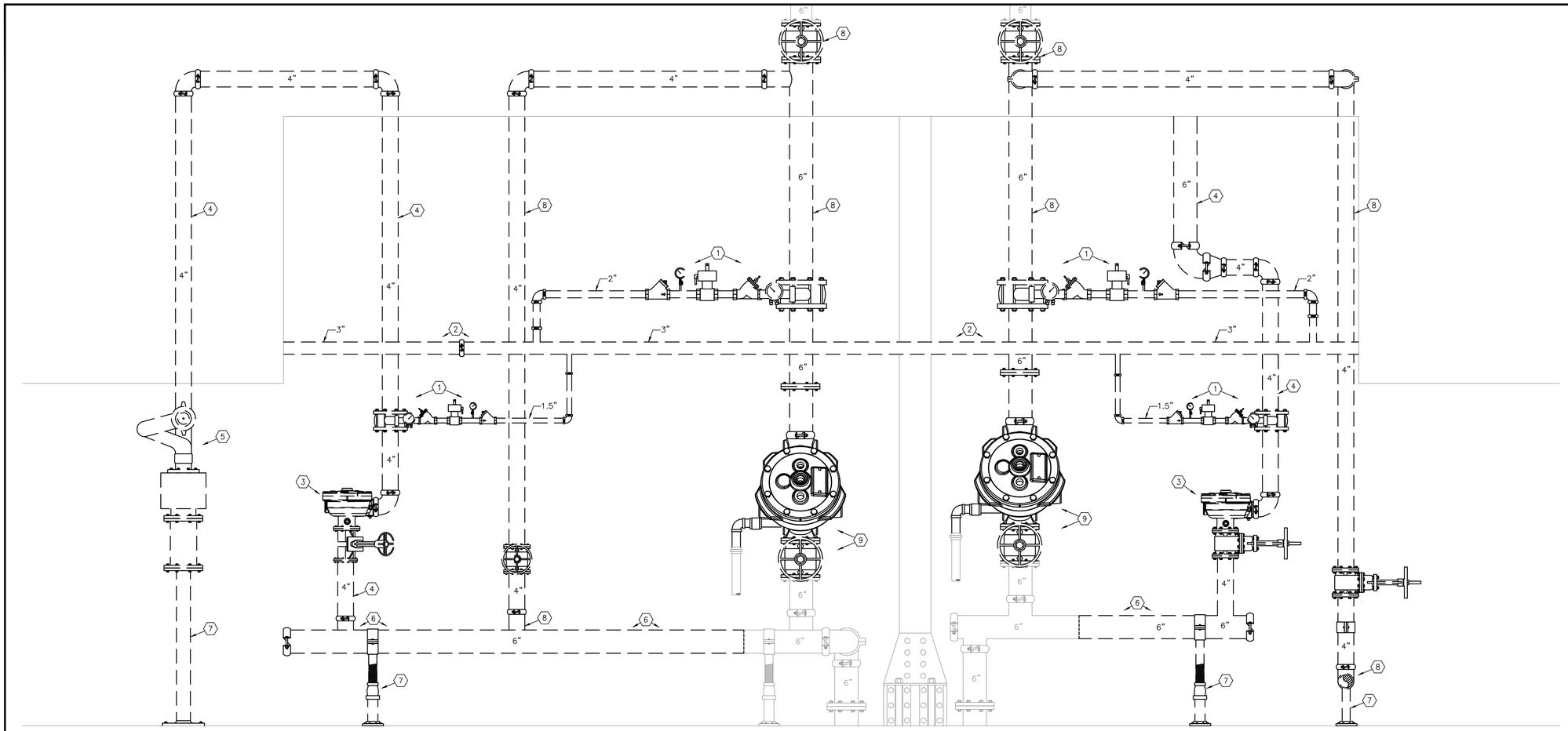
DRAWING TITLE
DEMOLITION RISER PLAN – BUILDING 4802 ZONE 1 AND ZONE 2

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	1/2"=1'-0"	TRADE SH. No.	F-302A
FILE NAME	EDM-1719 F302A.dwg	SHEET No. 119 of 137	

DARRELL E. STEIN

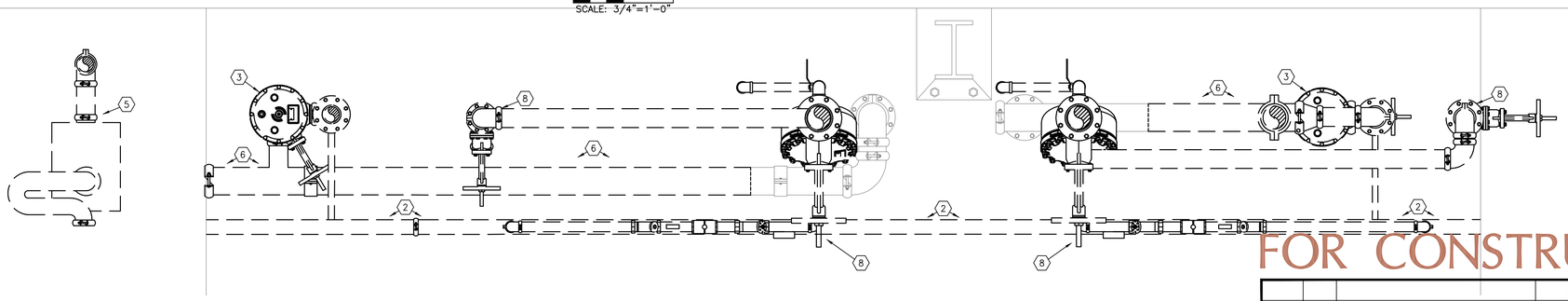


1 ZONE 3 AND ZONE 4 RISER DEMOLITION PLAN – ELEVATION VIEW

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

0 1' 2'
SCALE: 3/4"=1'-0"

REF F-002
DRAWING FOR CONTINUATION.



2 ZONE 3 AND ZONE 4 RISER DEMOLITION PLAN – PLAN VIEW

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

0 1' 2'
SCALE: 3/4"=1'-0"

RISER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING FOAM PROPORTIONING EQUIPMENT AND ASSOCIATED PIPING.
2. REMOVE ALL EXISTING FOAM LINES, HANGERS AND ASSOCIATED EQUIPMENT BACK TO SOURCE.
3. REMOVE EXISTING DELUGE VALVE AND ALL ASSOCIATED TRIM. ASSOCIATED DRAIN PIPING TO BE REMOVED AND CAPPED.
4. REMOVE EXISTING MONITOR SUPPLY PIPING, VALVES AND PIPE SUPPORTS.
5. REMOVE OSCILLATING MONITOR AND ASSOCIATED HARDWARE.
6. REMOVE RISER MANIFOLD PIPING AS SHOWN.
7. PIPE STAND TO BE REMOVED/RELOCATED.
8. REMOVE TEST PORT AND ASSOCIATED PIPING, VALVES AND PIPE SUPPORTS.
9. EQUIPMENT TO BE RAISED.

REGISTERED PROFESSIONAL ENGINEER
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FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
DEMOLITION RISER PLAN – BUILDING 4802 ZONE 3 AND ZONE 4

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

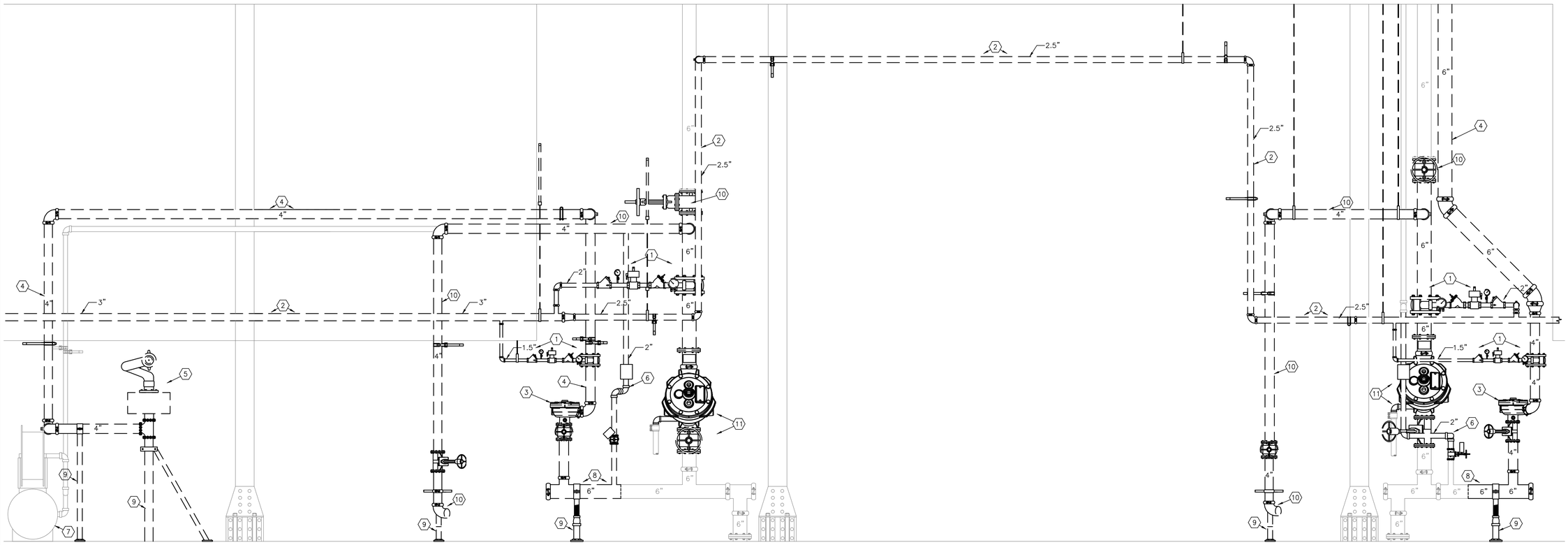
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	3/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F3028.dwg	F-3028	SHEET No. 120 of 137

DARRELL E. STEIN

RISER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING FOAM PROPORTIONING EQUIPMENT AND ASSOCIATED PIPING.
2. REMOVE ALL EXISTING FOAM LINES, HANGERS AND ASSOCIATED EQUIPMENT BACK TO SOURCE.
3. REMOVE EXISTING DELUGE VALVE AND ALL ASSOCIATED TRIM. ASSOCIATED DRAIN PIPING TO BE REMOVED AND CAPPED.
4. REMOVE EXISTING MONITOR SUPPLY PIPING, VALVES AND PIPE SUPPORTS.
5. REMOVE OSCILLATING MONITOR AND ASSOCIATED HARDWARE.
6. REMOVE AS SHOWN HAND HOSE REEL SUPPLY PIPING, VALVES AND MONITORING EQUIPMENT.
7. EXISTING HAND HOSE STATION TO REMAIN.
8. REMOVE RISER MANIFOLD PIPING AS SHOWN.
9. PIPE STAND TO BE REMOVED/RELOCATED.
10. REMOVE TEST PORT AND ASSOCIATED PIPING, VALVES AND PIPE SUPPORTS.
11. EQUIPMENT TO BE RAISED.

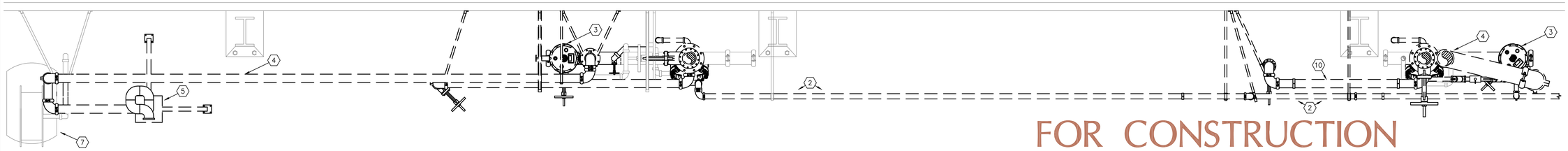


REF F-002
DRAWING FOR CONTINUATION.

REF F-002
DRAWINGS FOR CONTINUATION.

1 **ZONE 5 AND ZONE 6 RISER DEMOLITION PLAN – ELEVATION VIEW**
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 **ZONE 5 AND ZONE 6 RISER DEMOLITION PLAN – PLAN VIEW**
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
DEMOLITION RISER PLAN – BUILDING 4802 ZONE 5 AND ZONE 6

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

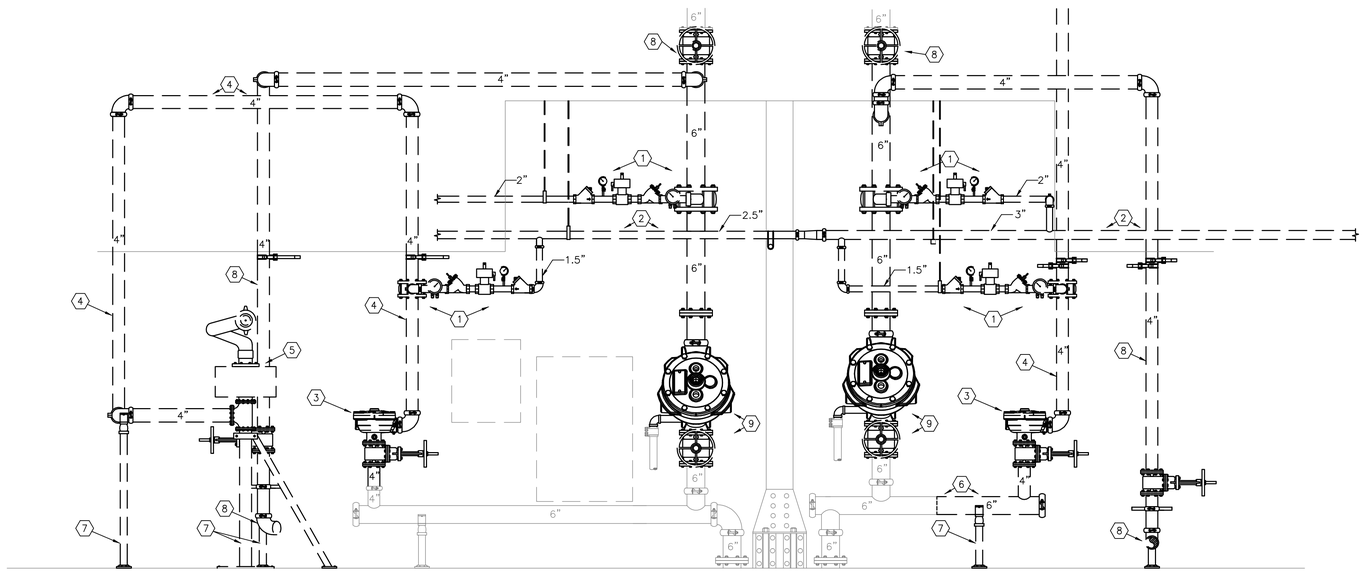
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI	EDM-1719	
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F302C.dwg	F-302C	SHEET No. 121 of 137

DARRELL E. STEIN

RISER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING FOAM PROPORTIONING EQUIPMENT AND ASSOCIATED PIPING.
2. REMOVE ALL EXISTING FOAM LINES, HANGERS AND ASSOCIATED EQUIPMENT BACK TO SOURCE.
3. REMOVE EXISTING DELUGE VALVE AND ALL ASSOCIATED TRIM. ASSOCIATED DRAIN PIPING TO BE REMOVED AND CAPPED.
4. REMOVE EXISTING MONITOR SUPPLY PIPING, VALVES AND PIPE SUPPORTS.
5. REMOVE OSCILLATING MONITOR AND ASSOCIATED HARDWARE.
6. REMOVE RISER MANIFOLD PIPING.
7. PIPE STAND TO BE REMOVED/RELOCATED.
8. REMOVE TEST PORT AND ASSOCIATED PIPING, VALVES AND PIPE SUPPORTS.
9. EQUIPMENT TO BE RAISED.

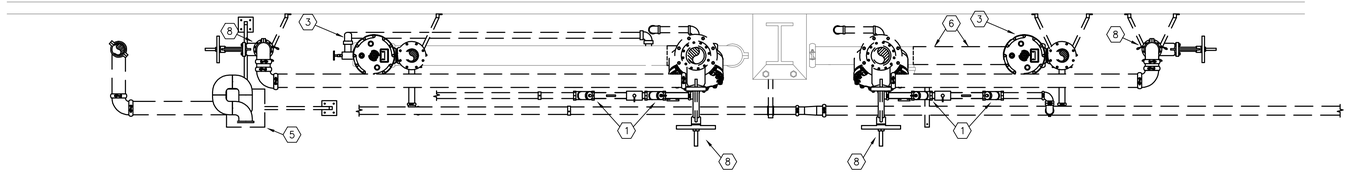


REF F-002
DRAWING FOR CONTINUATION.

1 ZONE 7 AND ZONE 8 RISER DEMOLITION PLAN – ELEVATION VIEW

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

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 ZONE 7 AND ZONE 8 RISER DEMOLITION PLAN – PLAN VIEW

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

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

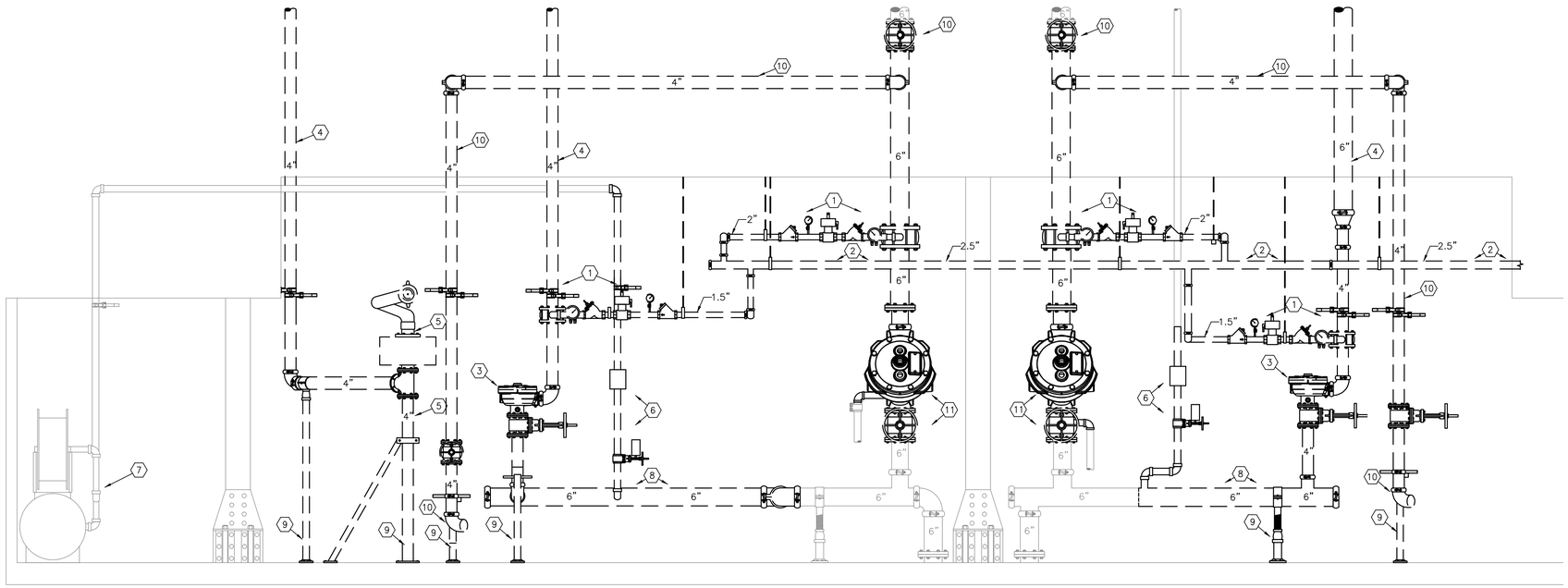
DRAWING TITLE
DEMOLITION RISER PLAN – BUILDING 4802 ZONE 7 AND ZONE 8

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F3020.dwg	F-3020	SHEET No. 122 of 137

DARRELL E. STEIN

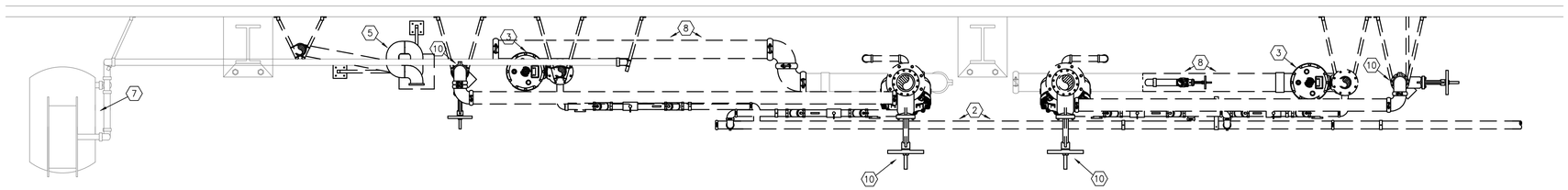


REF F-002
DRAWING FOR CONTINUATION.

1 ZONE 9 AND ZONE 10 RISER DEMOLITION PLAN – ELEVATION VIEW

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

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 ZONE 9 AND ZONE 10 RISER DEMOLITION PLAN – PLAN VIEW

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

0 1' 2' 3'
SCALE: 1/2"=1'-0"

RISER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING FOAM PROPORTIONING EQUIPMENT AND ASSOCIATED PIPING.
2. REMOVE ALL EXISTING FOAM LINES, HANGERS AND ASSOCIATED EQUIPMENT BACK TO SOURCE.
3. REMOVE EXISTING DELUGE VALVE AND ALL ASSOCIATED TRIM. ASSOCIATED DRAIN PIPING TO BE REMOVED AND CAPPED.
4. REMOVE EXISTING MONITOR SUPPLY PIPING, VALVES AND PIPE SUPPORTS.
5. REMOVE OSCILLATING MONITOR AND ASSOCIATED HARDWARE.
6. REMOVE AS SHOWN HAND HOSE REEL SUPPLY PIPING, VALVES AND MONITORING EQUIPMENT.
7. EXISTING HAND HOSE STATION TO REMAIN.
8. REMOVE RISER MANIFOLD PIPING.
9. PIPE STAND TO BE REMOVED/RELOCATED.
10. REMOVE TEST PORT AND ASSOCIATED PIPING, VALVES AND PIPE SUPPORTS.
11. EQUIPMENT TO BE RAISED.

REGISTERED PROFESSIONAL ENGINEER
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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
DEMOLITION RISER PLAN – BUILDING 4802 ZONE 9 AND ZONE 10

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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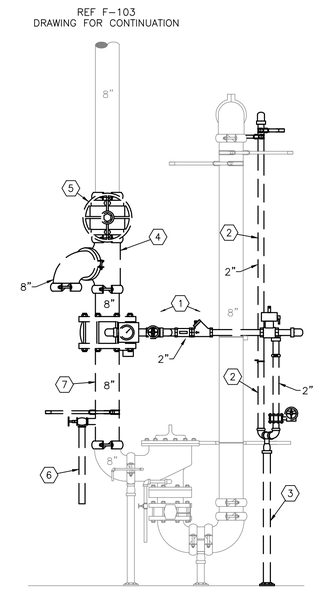
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F302E.dwg	F-302E	SHEET No. 123 of 137

DARRELL E. STEIN

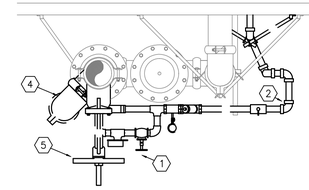
RISER DEMOLITION PLAN NOTES:

1. REMOVE ALL EXISTING FOAM PROPORTIONING EQUIPMENT AND ASSOCIATED PIPING.
2. REMOVE ALL EXISTING FOAM FEED LINES, HANGERS AND ASSOCIATED EQUIPMENT BACK TO SOURCE.
3. REMOVE PIPE STAND.
4. REMOVE TEST PORT AND ASSOCIATED PIPING AND VALVES.
5. REMOVE OS&Y VALVE.
6. REMOVE MAIN DRAIN VALVES AND PIPING NOT INTENDED FOR REUSE.
7. REMOVE PIPING AT THIS LOCATION.



1 TYPICAL ZONE RISER DEMOLITION PLAN – ELEVATION VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"



NOTE: TYPICAL DEMOLITION PLAN SHOWN SHALL APPLY TO ALL RISERS IN 4840 BUILDING AS INDICATED ON DRAWINGS. TYPICAL OF 5 RISERS.

2 TYPICAL ZONE RISER DEMOLITION PLAN – PLAN VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

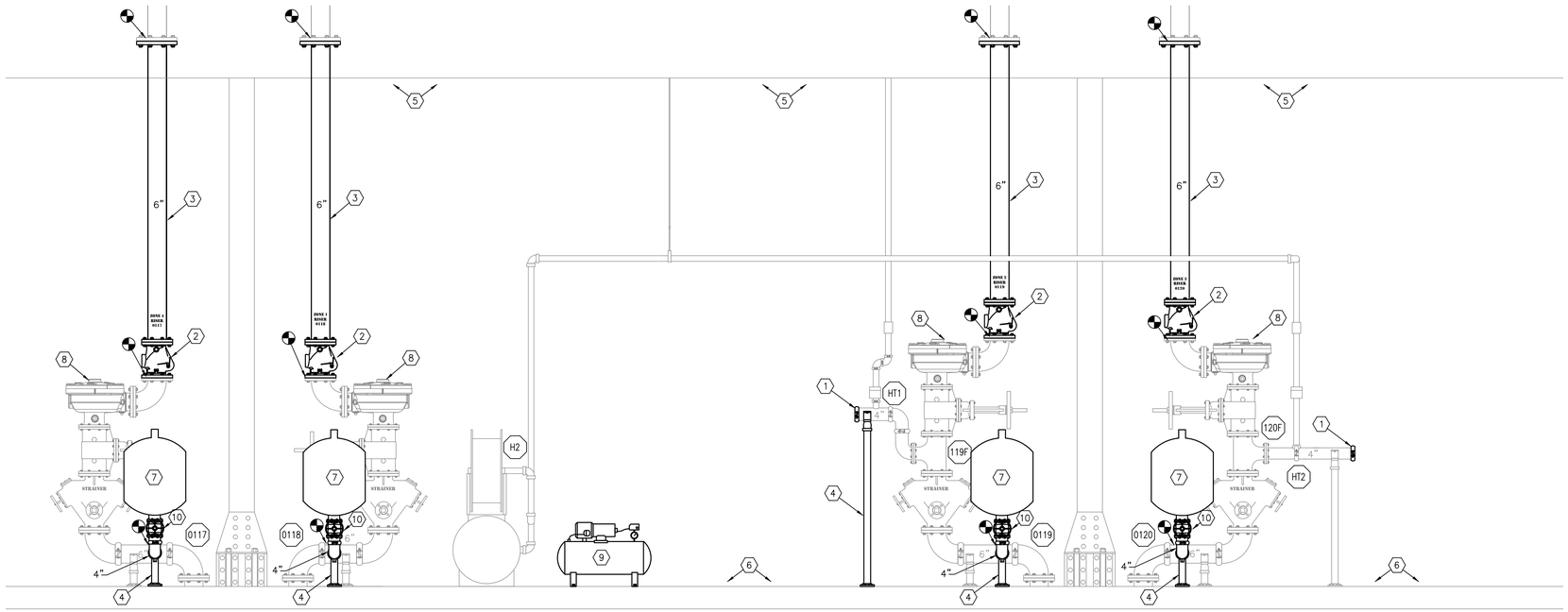
DRAWING TITLE
DEMOLITION RISER PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	3/4"	TRADE SH. No.	
FILE NAME	EDM-1719 F303.dwg	F-303	SHEET No. 124 of 137

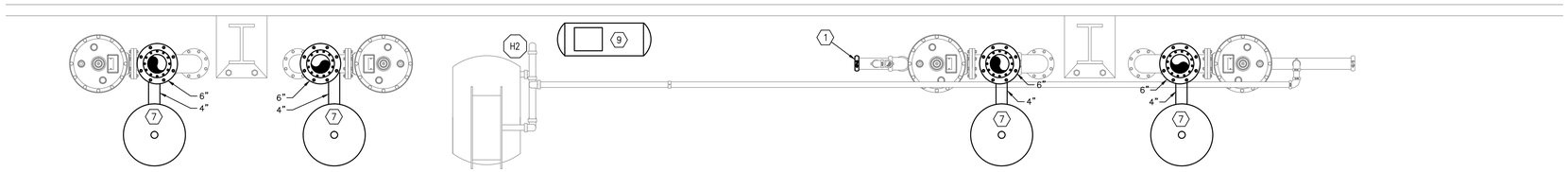
DARRELL E. STEIN



1 ZONE 1 – ZONE 4 RISER PLAN – ELEVATION VIEW

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

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 ZONE 1 – ZONE 4 RISER PLAN – PLAN VIEW

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

0 1' 2' 3'
SCALE: 1/2"=1'-0"

RISER PLAN NOTES:

1. ADD NEW CAP FOR MODIFIED RISER MANIFOLD.
2. PROVIDE CHECK VALVE AT THIS LOCATION.
3. PROVIDE NEW PIPE AND CONNECT TO EXISTING FLANGE.
4. INSTALL NEW/RELOCATED PIPE STAND.
5. SEAL ALL PREVIOUS PIPING PENETRATIONS IN CORRUGATED METAL. REFER TO SPECIFICATIONS.
6. SEAL ALL PREVIOUS FLOOR BOLT PENETRATIONS. REFER TO SPECIFICATIONS.
7. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
8. ADD/MODIFY VALVE TRIM AND EQUIPMENT AS NECESSARY FOR A FULLY OPERATIONAL ELECTRIC/PNEUMATIC RELEASE DOUBLE INTERLOCK PRE-ACTION SPRINKLER SYSTEM.
9. PROVIDE LISTED 1.5 HP AIR COMPRESSOR. CONNECT TO ALL PRE-ACTION SYSTEMS.
10. PROVIDE CONTROL VALVE.

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
RISER PLAN
PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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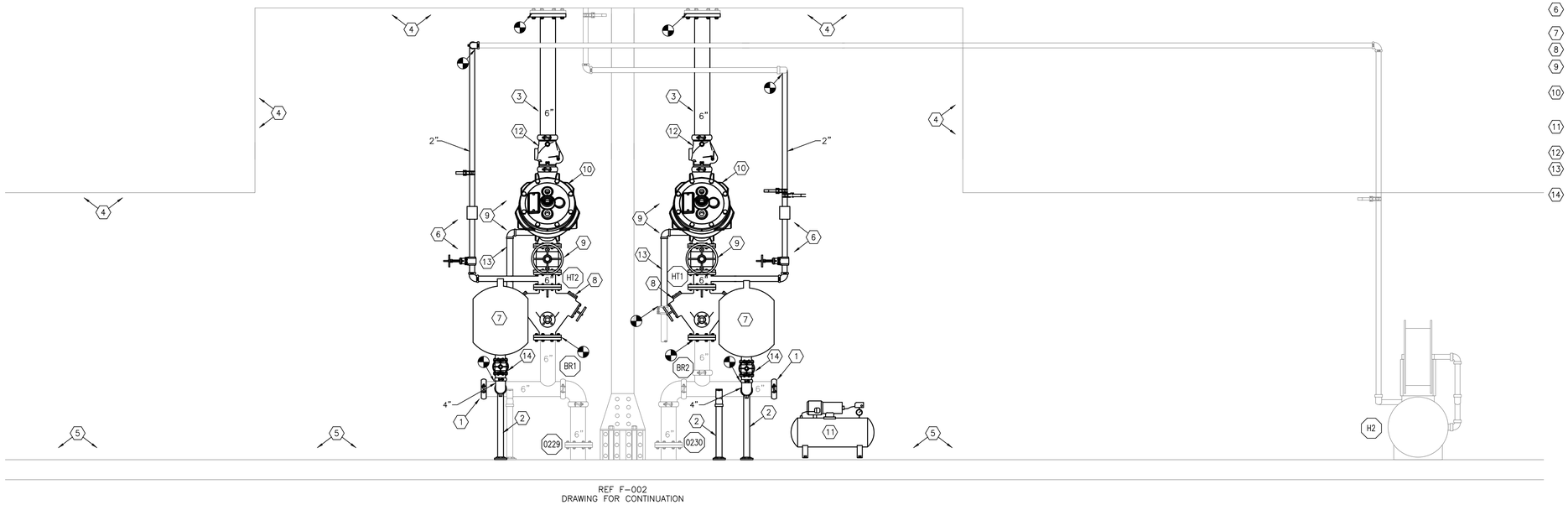
DRAWN BY	HEI	EDM-1719	
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F351.dwg	F-351	SHEET No. 125 of 137

DARRELL E. STEIN

RISER PLAN NOTES:

1. ADD NEW CAP FOR MODIFIED RISER MANIFOLD.
2. INSTALL NEW/RELOCATED PIPE STAND.
3. PROVIDE NEW PIPE AND CONNECT TO EXISTING FLANGE.
4. SEAL ALL PREVIOUS PIPING PENETRATIONS IN CORRUGATED METAL. REFER TO SPECIFICATIONS.
5. SEAL ALL PREVIOUS FLOOR BOLT PENETRATIONS. REFER TO SPECIFICATIONS.
6. RELOCATE HAND HOSE STATION RISER, VALVES, AND MONITORING EQUIPMENT.
7. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
8. PROVIDE NEW STRAINER.
9. RAISE EXISTING EQUIPMENT TO ACCOMMODATE INSTALLATION OF NEW STRAINERS.
10. ADD/MODIFY VALVE TRIM AND EQUIPMENT AS NECESSARY FOR A FULLY OPERATIONAL ELECTRIC/PNEUMATIC RELEASE DOUBLE INTERLOCK PRE-ACTION SPRINKLER SYSTEM.
11. PROVIDE LISTED 1.5 HP AIR COMPRESSOR. CONNECT TO ZONES 1 AND 2 PRE-ACTION SYSTEMS.
12. PROVIDE CHECK VALVE AT THIS LOCATION.
13. RECONNECT RISER DRAIN PIPING FOR RAISED EQUIPMENT. ROUTE AROUND OBSTRUCTIONS AS NECESSARY.
14. PROVIDE CONTROL VALVE.



REF F-002
DRAWING FOR CONTINUATION

1 ZONE 1 AND ZONE 2 RISER PLAN – ELEVATION VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

2 ZONE 1 AND ZONE 2 RISER PLAN – PLAN VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
RISER PLAN – BUILDING
4802 ZONE 1 AND ZONE 2

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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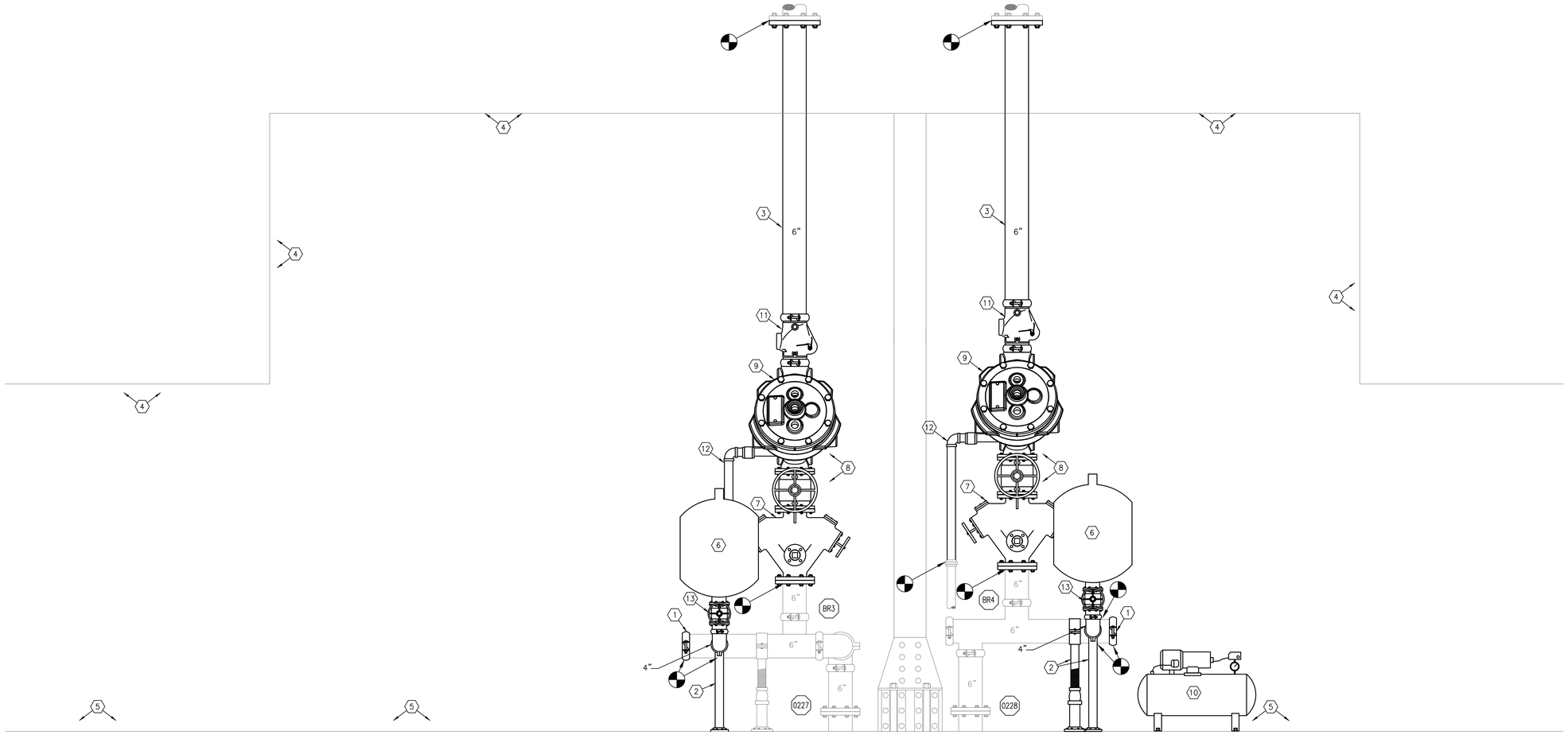
SCALE	1/2"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F352A.dwg	F-352A	SHEET No. 126 of 137

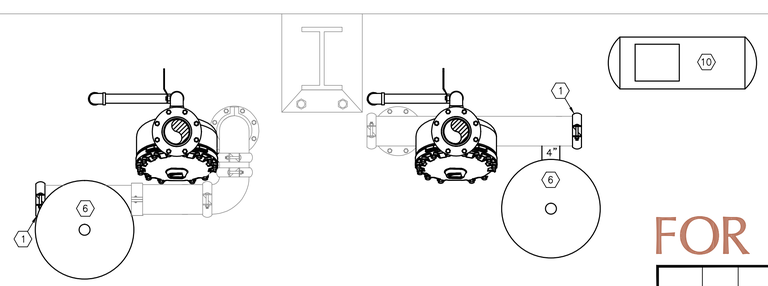
DARRELL E. STEIN



REF F-001
DRAWING FOR CONTINUATION

1 ZONE 3 AND ZONE 4 RISER PLAN – ELEVATION VIEW
SCALE: 3/4"=1'-0"

0 1' 2'
SCALE: 3/4"=1'-0"



2 ZONE 3 AND ZONE 4 RISER PLAN – PLAN VIEW
SCALE: 3/4"=1'-0"

0 1' 2'
SCALE: 3/4"=1'-0"

RISER PLAN NOTES:

1. ADD NEW CAP FOR MODIFIED RISER MANIFOLD.
2. INSTALL NEW/RELOCATED PIPE STAND.
3. PROVIDE NEW PIPE AND CONNECT TO EXISTING FLANGE.
4. SEAL ALL PREVIOUS PIPING PENETRATIONS IN CORRUGATED METAL. REFER TO SPECIFICATIONS.
5. SEAL ALL PREVIOUS FLOOR BOLT PENETRATIONS. REFER TO SPECIFICATIONS.
6. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
7. PROVIDE NEW STRAINER.
8. RAISE EXISTING EQUIPMENT TO ACCOMMODATE INSTALLATION OF NEW STRAINERS.
9. ADD/MODIFY VALVE TRIM AND EQUIPMENT AS NECESSARY FOR A FULLY OPERATIONAL ELECTRIC/PNEUMATIC RELEASE DOUBLE INTERLOCK PRE-ACTION SPRINKLER SYSTEM.
10. PROVIDE LISTED 1.5 HP AIR COMPRESSOR. CONNECT TO ZONES 3 AND 4 PRE-ACTION SYSTEMS.
11. PROVIDE CHECK VALVE AT THIS LOCATION.
12. RECONNECT RISER DRAIN PIPING FOR RAISED EQUIPMENT. ROUTE AROUND OBSTRUCTIONS AS NECESSARY.
13. PROVIDE CONTROL VALVE.

REGISTERED PROFESSIONAL ENGINEER
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
RISER PLAN – BUILDING
4802 ZONE 3 AND ZONE 4

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION
SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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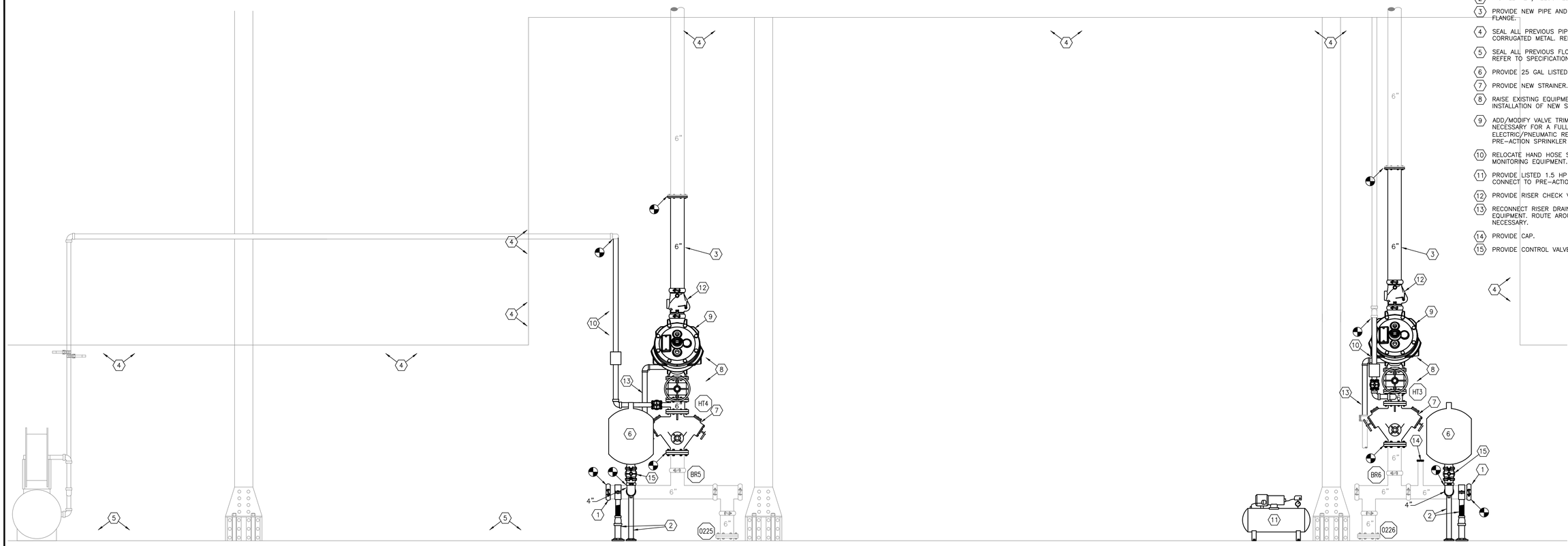
SCALE	3/4"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 F3528.dwg	F-3528	SHEET No. 127 of 137

DARRELL E. STEIN

RISER PLAN NOTES:

1. ADD NEW CAP FOR MODIFIED RISER MANIFOLD.
2. INSTALL NEW/RELOCATED PIPE STAND.
3. PROVIDE NEW PIPE AND CONNECT TO EXISTING FLANGE.
4. SEAL ALL PREVIOUS PIPING PENETRATIONS IN CORRUGATED METAL. REFER TO SPECIFICATIONS.
5. SEAL ALL PREVIOUS FLOOR BOLT PENETRATIONS. REFER TO SPECIFICATIONS.
6. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
7. PROVIDE NEW STRAINER.
8. RAISE EXISTING EQUIPMENT TO ACCOMMODATE INSTALLATION OF NEW STRAINERS.
9. ADD/MODIFY VALVE TRIM AND EQUIPMENT AS NECESSARY FOR A FULLY OPERATIONAL ELECTRIC/PNEUMATIC RELEASE DOUBLE INTERLOCK PRE-ACTION SPRINKLER SYSTEM.
10. RELOCATE HAND HOSE STATION RISER, VALVES, AND MONITORING EQUIPMENT.
11. PROVIDE LISTED 1.5 HP AIR COMPRESSOR. CONNECT TO PRE-ACTION ZONES 5 AND 6.
12. PROVIDE RISER CHECK VALVE AT THIS LOCATION.
13. RECONNECT RISER DRAIN PIPING FOR RAISED EQUIPMENT. ROUTE AROUND OBSTRUCTIONS AS NECESSARY.
14. PROVIDE CAP.
15. PROVIDE CONTROL VALVE.

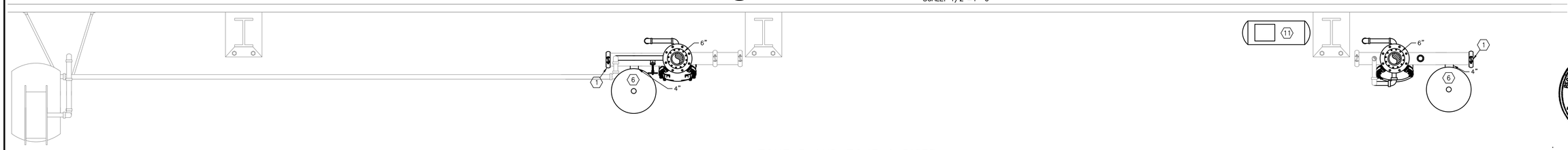


REF F-002
DRAWING FOR CONTINUATION

1 ZONE 5 AND ZONE 6 RISER PLAN – ELEVATION VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REF F-002
DRAWING FOR CONTINUATION



2 ZONE 5 AND ZONE 6 RISER PLAN – PLAN VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
www.hei-eng.com
1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
RISER PLAN – BUILDING
4802 ZONE 5 AND ZONE 6

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

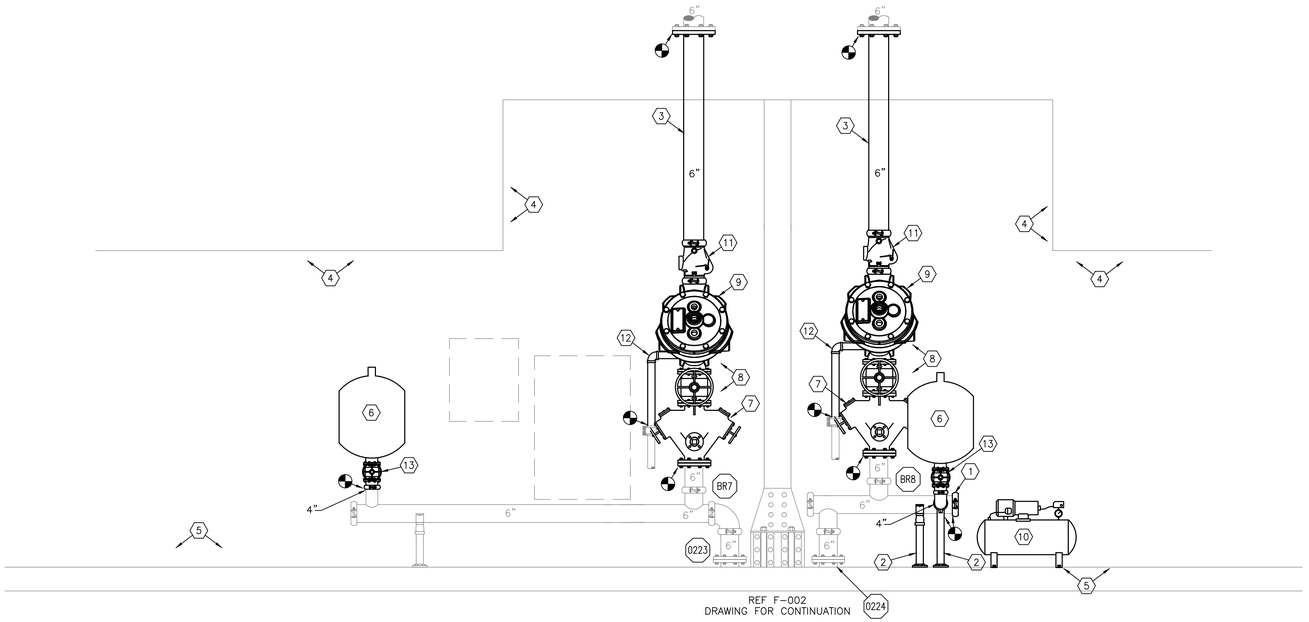
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F352C.dwg	F-352C	SHEET No. 128 of 137

DARRELL E. STEIN

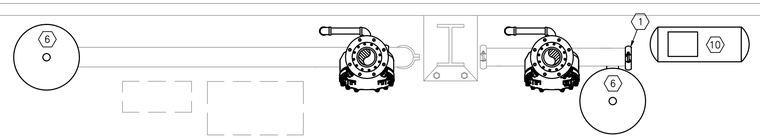
RISER PLAN NOTES:

1. ADD NEW CAP FOR MODIFIED RISER MANIFOLD.
2. INSTALL NEW/RELOCATED PIPE STAND.
3. PROVIDE NEW PIPE AND CONNECT TO EXISTING FLANGE.
4. SEAL ALL PREVIOUS PIPING PENETRATIONS IN CORRUGATED METAL. REFER TO SPECIFICATIONS.
5. SEAL ALL PREVIOUS FLOOR BOLT PENETRATIONS. REFER TO SPECIFICATIONS.
6. PROVIDE 25 GAL LISTED SURGE SUPPRESSION TANK.
7. PROVIDE NEW STRAINER.
8. RAISE EXISTING EQUIPMENT TO ACCOMMODATE INSTALLATION OF NEW STRAINERS.
9. ADD/MODIFY VALVE TRIM AND EQUIPMENT AS NECESSARY FOR A FULLY OPERATIONAL ELECTRIC/PNEUMATIC RELEASE DOUBLE INTERLOCK PRE-ACTION SPRINKLER SYSTEM.
10. PROVIDE LISTED 1.5 HP AIR COMPRESSOR. CONNECT TO PRE-ACTION ZONES 7 AND 8.
11. PROVIDE CHECK VALVE AT THIS LOCATION.
12. RECONNECT RISER DRAIN PIPING FOR RAISED EQUIPMENT. ROUTE AROUND OBSTRUCTIONS AS NECESSARY.
13. PROVIDE CONTROL VALVE.



1 ZONE 7 AND ZONE 8 RISER PLAN – ELEVATION VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 ZONE 7 AND ZONE 8 RISER PLAN – PLAN VIEW
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
RISER PLAN – BUILDING
4802 ZONE 7 AND ZONE 8

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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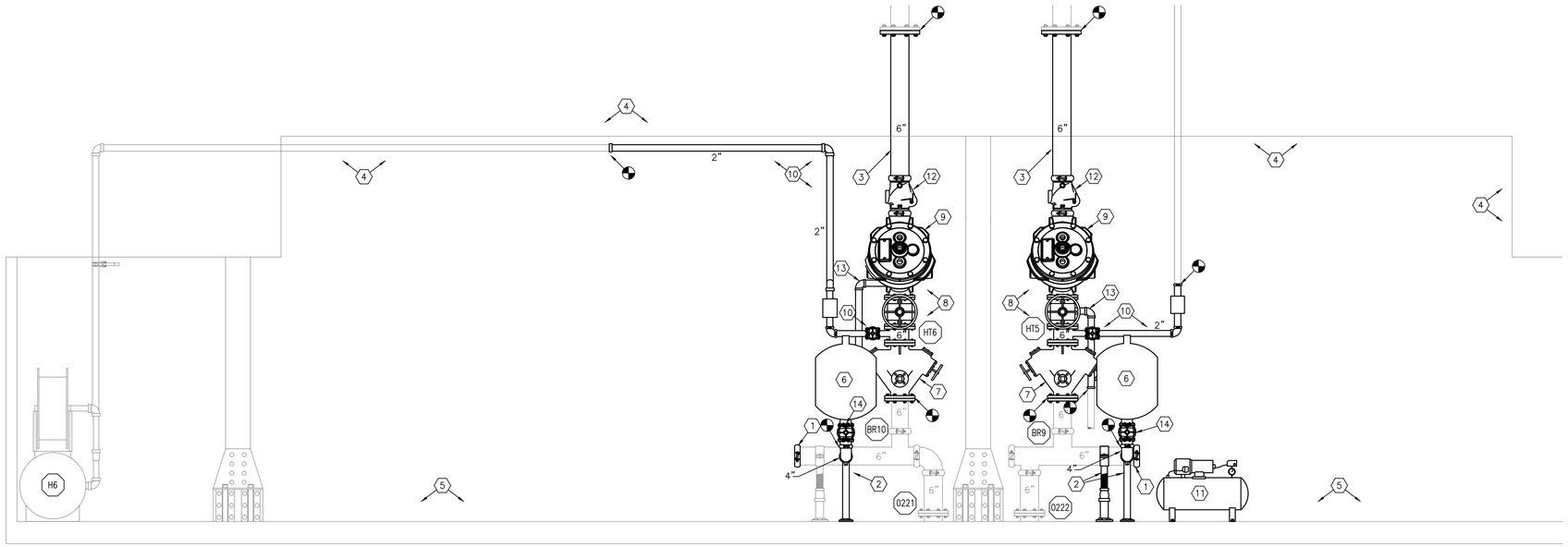
DRAWN BY	HEI		EDM-1719
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F3520.dwg	F-3520	SHEET No. 129 of 137

DARRELL E. STEIN

RISER PLAN NOTES:

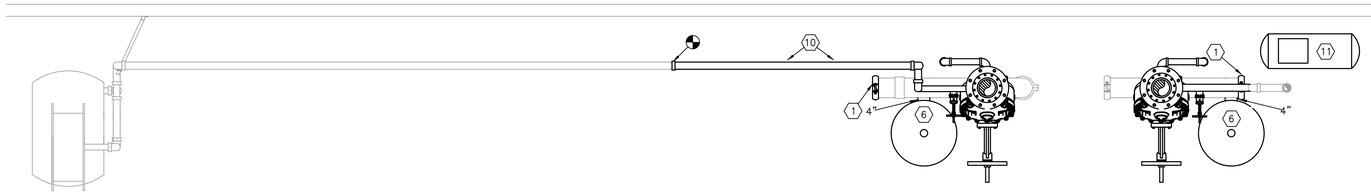
1. ADD NEW CAP FOR MODIFIED RISER MANIFOLD.
2. INSTALL NEW/RELOCATED PIPE STAND.
3. PROVIDE NEW PIPE AND CONNECT TO EXISTING FLANGE.
4. SEAL ALL PREVIOUS PIPING PENETRATIONS IN CORRUGATED METAL. REFER TO SPECIFICATIONS.
5. SEAL ALL PREVIOUS FLOOR BOLT PENETRATIONS. REFER TO SPECIFICATIONS.
6. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
7. PROVIDE NEW STRAINER.
8. RAISE EXISTING EQUIPMENT TO ACCOMMODATE INSTALLATION OF NEW STRAINERS.
9. ADD/MODIFY VALVE TRIM AND EQUIPMENT AS NECESSARY FOR A FULLY OPERATIONAL ELECTRIC/PNEUMATIC RELEASE DOUBLE INTERLOCK PRE-ACTION SPRINKLER SYSTEM.
10. RELOCATE HAND HOSE STATION RISER, VALVES, AND MONITORING EQUIPMENT.
11. PROVIDE LISTED 1.5 HP AIR COMPRESSOR. CONNECT TO ZONES 9 AND 10 PRE-ACTION SYSTEMS.
12. PROVIDE CHECK VALVE AT THIS LOCATION.
13. RECONNECT RISER DRAIN PIPING FOR RAISED EQUIPMENT. ROUTE AROUND OBSTRUCTIONS AS NECESSARY.
14. PROVIDE CONTROL VALVE.



REF F-002
DRAWING FOR CONTINUATION

1 **ZONE 9 AND ZONE 10 RISER PLAN – ELEVATION VIEW**
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"



2 **ZONE 9 AND ZONE 10 RISER PLAN – PLAN VIEW**
SCALE: 1/2"=1'-0"

0 1' 2' 3'
SCALE: 1/2"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1582
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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1250001459

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02-28-14		95% SUBMITTAL		
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06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
RISER PLAN – BUILDING
4802 ZONE 9 AND ZONE 10

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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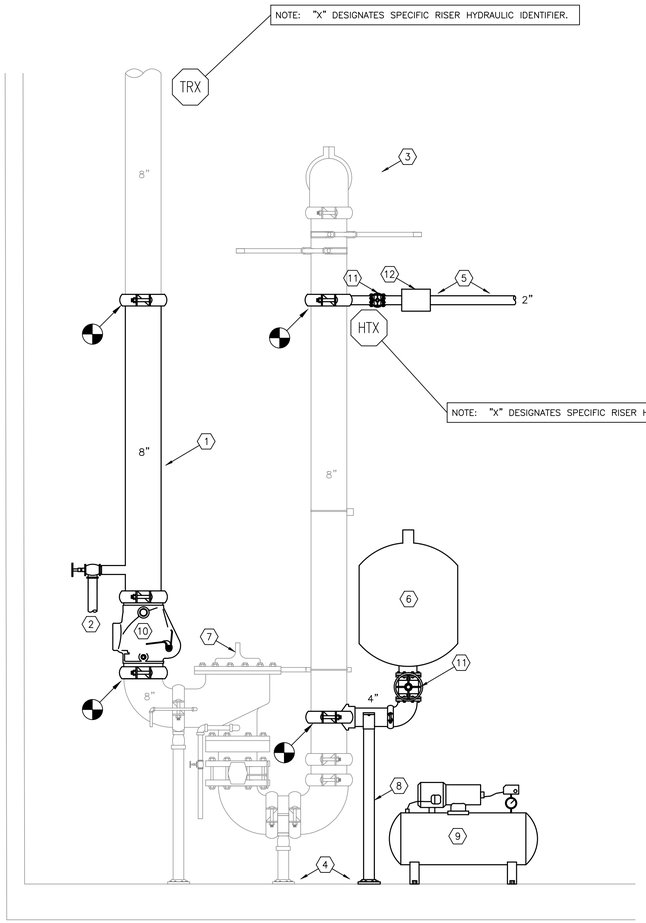
DRAWN BY	HEI		EDM-1719
SCALE	1/2"	TRADE SH. No.	
FILE NAME	EDM-1719 F352E.dwg	F-352E	SHEET No. 130 of 137

DARRELL E. STEIN

RISER PLAN NOTES:

1. PROVIDE NEW PIPE AND ASSOCIATED FITTINGS.
2. PIPE MAIN DRAIN TO EXTERIOR. SEE DRAWINGS FOR DETAILS.
3. SEAL ALL PREVIOUS PIPING PENETRATIONS IN WALL. REFER TO SPECIFICATIONS.
4. SEAL ALL PREVIOUS FLOOR BOLT PENETRATIONS. REFER TO SPECIFICATIONS.
5. PROVIDE NEW CONNECTION TO FEED HOSE STATIONS.
6. PROVIDE 25 GAL LISTED SURGE SUPPRESSOR TANK.
7. ADD/MODIFY VALVE TRIM AND ALL EQUIPMENT AS NECESSARY FOR A FULLY OPERATIONAL ELECTRIC/PNEUMATIC RELEASE DOUBLE INTERLOCK PRE-ACTION SPRINKLER SYSTEM.
8. PROVIDE PIPE STAND AT THIS LOCATION.
9. PROVIDE LISTED 1.5 HP AIR COMPRESSOR PER PRE-ACTION ZONE. CONNECT TO EACH PRE-ACTION SYSTEM.
10. PROVIDE CHECK VALVE AT THIS LOCATION.
11. PROVIDE CONTROL VALVE.
12. FLOW SWITCH FOR HAND HOSE REEL.

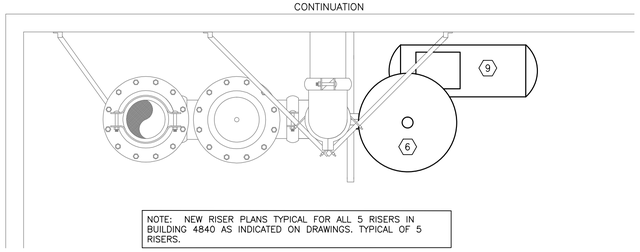
NOTE: PLAN NOTES TYPICAL FOR ALL 5 RISERS IN BUILDING 4840 AS INDICATED ON DRAWINGS. TYPICAL OF 5 RISERS.



1 TYPICAL ZONE RISER PLAN – ELEVATION VIEW
3/4" = 1'-0"

0 1' 2'
SCALE: 3/4"=1'-0"

REF F103 AND F203 SERIES FOR CONTINUATION



2 TYPICAL ZONE RISER PLAN – PLAN VIEW
3/4" = 1'-0"

0 1' 2'
SCALE: 3/4"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1562
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

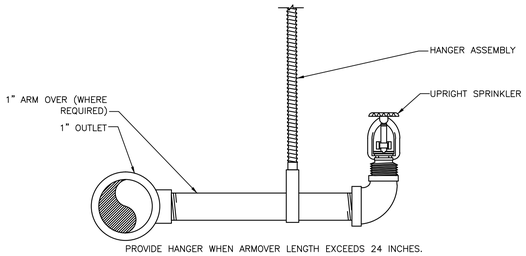
DRAWING TITLE
RISER PLAN – BUILDING 4840

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	3/4"	TRADE Sh. No.	
FILE NAME	EDM-1719 F353.dwg	F-353	SHEET No. 131 of 137

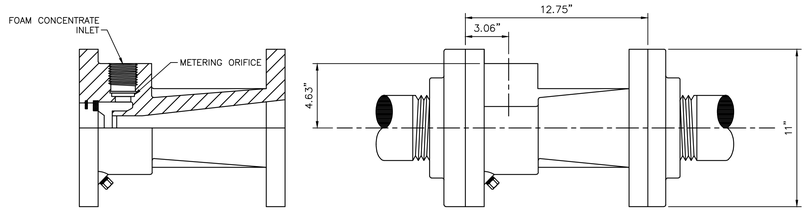
DARRELL E. STEIN



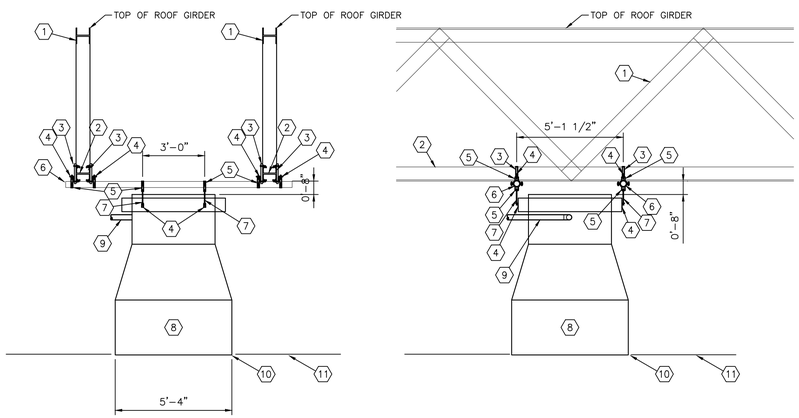
PROVIDE HANGER WHEN ARMOVER LENGTH EXCEEDS 24 INCHES.

ARRANGEMENT SHOWN IS SCHEMATIC. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS.

6 UPRIGHT SPRINKLER
NO SCALE



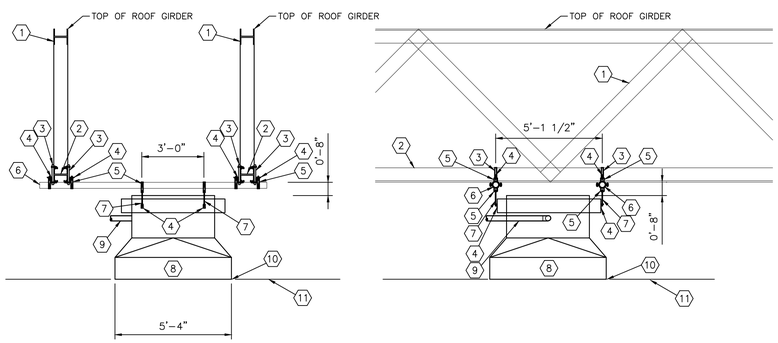
5 FLANGED 6" 2% FOAM PROPORTIONER DETAIL
NO SCALE



23,965 CFM FOAM GENERATOR DETAIL

HIGH-EXPANSION DETAIL NOTES:

1. EXISTING GRIDER TRUSS
2. BOTTOM CHORD OF (E) GIRDER TRUSS.
3. ATTCHMENT TO STEEL BEAM.
4. SIDE BEAM BRACKET WITH 1/2" BOLTS.
5. PIPE CLAMP.
6. 3'-6" LONG SCHEDULE 40 PIPE.
7. 1/2" ALL THREAD ROD.
8. 23,965 CFM HIGH-EXPANSION FOAM GENERATOR.
9. FOAM SOLUTION SUPPLY MAIN.
10. BOTTOM OF GENERATOR ABOVE TOP ELEVATION OF HANGAR DOOR.
11. LAY-IN CEILING (WHERE APPLICABLE).

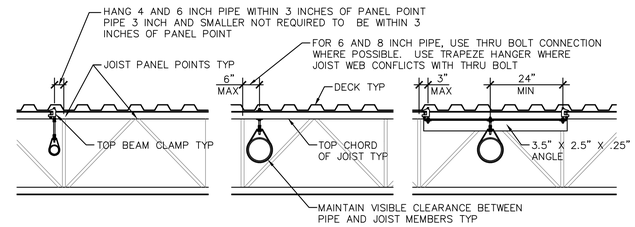


14,941 CFM FOAM GENERATOR DETAIL

HIGH-EXPANSION DETAIL NOTES:

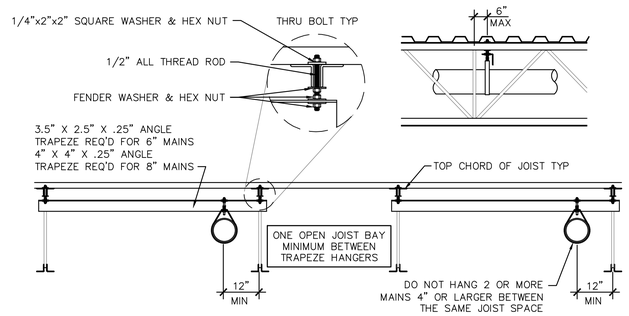
1. EXISTING GRIDER TRUSS
2. BOTTOM CHORD OF (E) GIRDER TRUSS.
3. ATTCHMENT TO STEEL BEAM.
4. SIDE BEAM BRACKET WITH 1/2" BOLTS.
5. PIPE CLAMP.
6. 3'-6" LONG SCHEDULE 40 PIPE.
7. 1/2" ALL THREAD ROD.
8. 14,491 CFM HIGH-EXPANSION FOAM GENERATOR.
9. FOAM SOLUTION SUPPLY MAIN.
10. BOTTOM OF GENERATOR ABOVE TOP ELEVATION OF HANGAR DOOR.
11. LAY-IN CEILING (WHERE APPLICABLE).

4 FOAM GENERATOR DETAIL
NO SCALE



MAXIMUM HANGER SPACING FOR PIPING PERPENDICULAR TO JOISTS		
BEAM CLAMP NOT TRAPEZED	THRU-BOLT NOT TRAPEZED	BEAM CLAMP TRAPEZED
4" PIPE EVERY 12'-0" EVERY OTHER JOIST	4" PIPE EVERY 12'-0" EVERY OTHER JOIST	4" PIPE NOT NECESSARY
6" PIPE EVERY 6'-0" EVERY JOIST	6" PIPE EVERY 12'-0" EVERY OTHER JOIST	6" PIPE NOT NECESSARY
8" PIPE NOT ALLOWED	8" PIPE EVERY 6'-0" EVERY JOIST	8" PIPE EVERY 6'-0" EVERY JOIST

PIPE RUNNING PERPENDICULAR TO JOISTS



MAXIMUM HANGER SPACING FOR PIPES PARALLEL TO JOISTS		
4" PIPE EVERY 12'-0" NOT TRAPEZED BEAM CLAMP	6" PIPE EVERY 12'-0" TRAPEZED THRU BOLT	8" PIPE EVERY 12'-0" TRAPEZED THRU BOLT

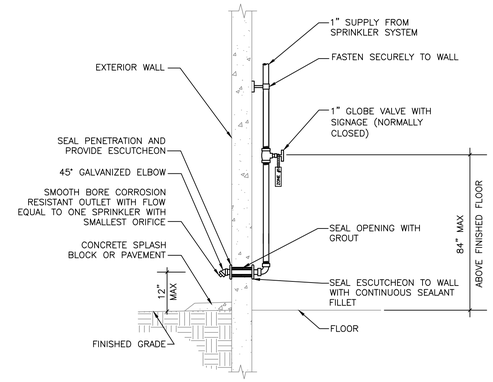
PIPE RUNNING PARALLEL TO JOIST

CONTRACTOR MAY SUBSTITUTE ANGLE IRON TRAPEZE MEMBER WITH PIPE MEMBER. SIZE PIPE MEMBER IN ACCORDANCE WITH NFPA-13 AND MAINTAIN 12 INCH MAXIMUM DEFLECTOR DISTANCE

UTILIZE THESE HANGING METHODS FOR ALL SPRINKLER PIPING. SPACE TRAPEZE HANGERS IN ACCORDANCE WITH SCHEDULE. LOCATE HANGERS WITHIN 3 INCHES OF JOIST PANEL POINTS U.N.O.

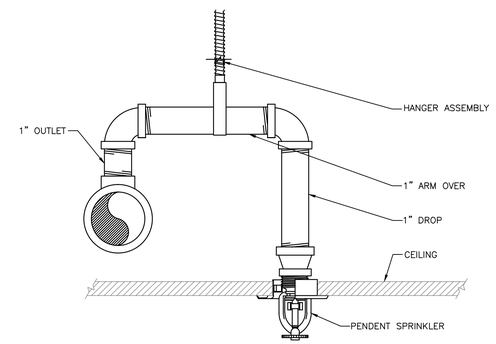
NOTE: DO NOT SUPPORT SPRINKLER PIPING FROM BOTTOM CHORD OF BAR JOISTS

3 PIPE SUPPORT
NO SCALE



ARRANGEMENT SHOWN IS SCHEMATIC. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS. OBTAIN ARCHITECT'S APPROVAL FOR FINAL LOCATION. EXTERIOR PIPING AND FITTINGS SHALL BE GALVANIZED.

2 INSPECTOR'S TEST/AUXILIARY DRAIN
NO SCALE



PROVIDE HANGER ASSEMBLY THAT PREVENTS UPWARD MOVEMENT OF THE PIPE WHEN ARMOVER LENGTH EXCEEDS 12-INCHES AND SYSTEM STATIC PRESSURE AT THE SPRINKLER EXCEEDS 100 PSI. PROVIDE HANGER WHEN ARMOVER LENGTH EXCEEDS 24-INCHES AND SYSTEM STATIC PRESSURE AT THE SPRINKLER DOES NOT EXCEED 100 PSI.

ARRANGEMENT SHOWN IS SCHEMATIC. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS.

1 PENDENT SPRINKLER
NO SCALE

Jun 12 2014

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03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ADDITIONAL DETAILS

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
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Facilities Project Manager	
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Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

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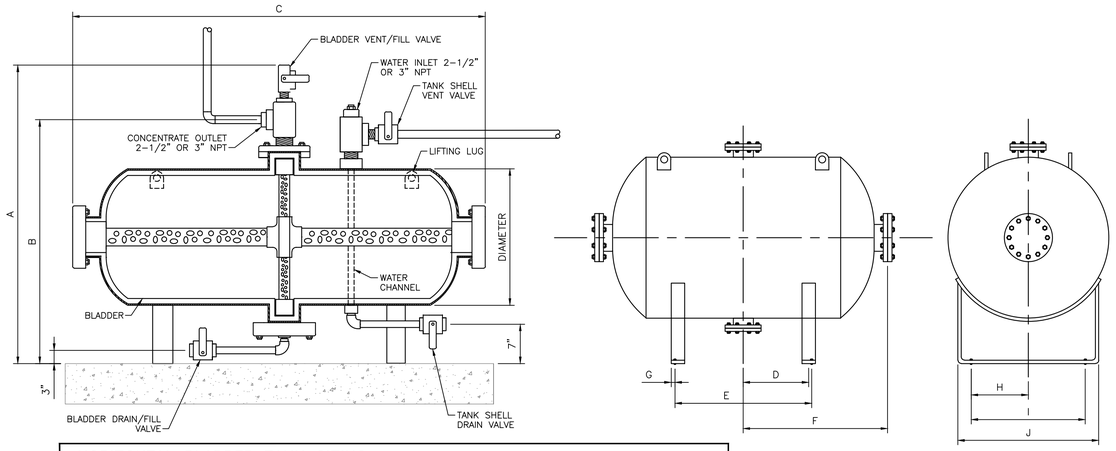
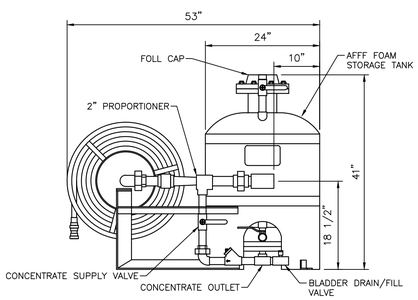
DRAWN BY	HEI		EDM-1719
SCALE	NTS	TRADE SH. No.	F-400
FILE NAME	EDM-1719 F400.dwg	SHEET No. 132 of 137	

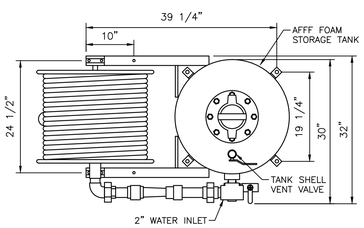
DARRELL E. STEIN



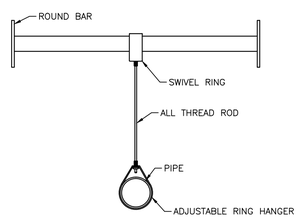
HORIZONTAL BLADDER TANK SIZING											
NOMINAL CAPACITY (gal.)	DIA. (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H (in.)	I (in.)	J (in.)
400	48	76	68	77	15.8	33.75	36.5	0.88	17	34	42
500	48	76	68	90	19.5	41.25	43.0	0.88	17	34	42
700	48	76	68	117	26	54.25	56.5	0.88	17	34	42
800	48	76	68	145	29.5	68.25	63.5	0.88	17	34	42

6 BLADDER TANK DETAIL
NO SCALE

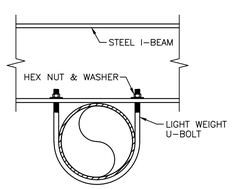




5 HAND HOSE STATION
NO SCALE

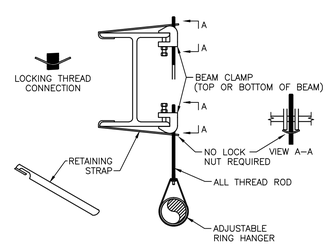


4 FIRE SPRINKLER SYSTEM SUPPORT
NO SCALE

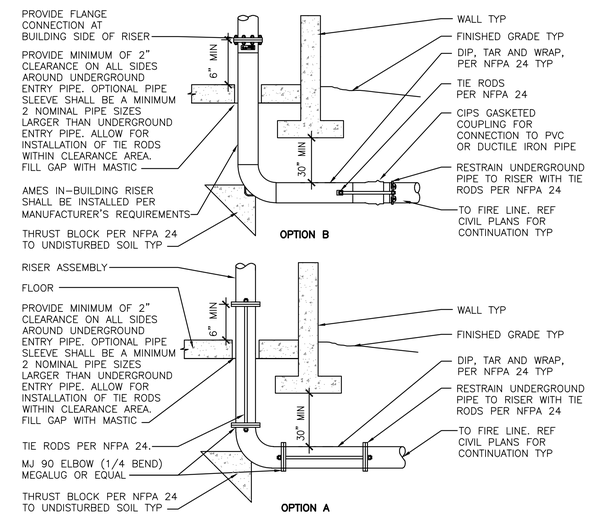


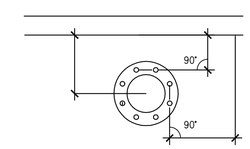
NOTES:
THIS HANGER ALSO PROVIDE LATERAL BRACING.

3 FIRE SPRINKLER SYSTEM SUPPORT
NO SCALE



2 FIRE SPRINKLER SYSTEM SUPPORT
NO SCALE





DISSIMILAR METAL PIPE TYPES SHALL HAVE INSULATION KIT INSTALLED IN BETWEEN PIPING.

ALL BOLTS SHALL BE TAR-COATED AND ALL DUCTILE IRON PIPING SHALL BE PROTECTED BY BAGS FOR ADDITIONAL CORROSION PROTECTION.

1 FIRE LEAD-IN
NO SCALE

REGISTERED PROFESSIONAL ENGINEER
DARRELL E. STEIN II
No. FP 1562
FIRE PROTECTION
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
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1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
ADDITIONAL DETAILS

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	N.T.S.	TRADE SH. No.	
FILE NAME	EDM-1719 F401.dwg	F-401	SHEET No. 133 of 137

DARRELL E. STEIN

MECHANICAL SYMBOLS

NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

PIPING

- CD — CONDENSATE DRAIN (CD)
- ACD — AUXILIARY CONDENSATE DRAIN (ACD)
- RL — REFRIGERANT LIQUID (RL)
- RD — REFRIGERANT DISCHARGE (HOT GAS) (RD)
- RS — REFRIGERANT SUCTION (RS)
- HWS — HEATING HOT WATER SUPPLY (HWS)
- HWR — HEATING HOT WATER RETURN (HWR)
- CHWS — CHILLED WATER SUPPLY (CHWS)
- CHWR — CHILLED WATER RETURN (CHWR)
- HPWS — HEAT PUMP WATER SUPPLY (HPWS)
- HPSR — HEAT PUMP WATER RETURN (HPWR)
- LPS — LOW PRESSURE STEAM SUPPLY (LPS)
- LPC — LOW PRESSURE STEAM CONDENSATE (LPC)
- EXISTING PIPING TO BE REMOVED
- EXISTING PIPING TO REMAIN
- DIRECTION OF FLOW
- BALL VALVE
- CONTROL VALVE
- THREE-WAY CONTROL VALVE
- SHUTOFF VALVE
- CHECK VALVE
- BALANCING VALVE WITH PRESSURE PORTS
- TRIPLE DUTY VALVE WITH PRESSURE PORTS
- WATER METER
- STRAINER
- SOLENOID VALVE
- PRESSURE GAUGE
- THERMOMETER
- PRESSURE AND TEMPERATURE TEST PLUG
- UNION
- FLANGE CONNECTION
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- REDUCER

HVAC EQUIPMENT & DUCTWORK

NOTE: ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE DIMENSIONS. SEE SECTION 15250 OF THE SPECIFICATION FOR DUCTWORK TO RECEIVE INSULATION OR LINER.

- EXISTING DUCTWORK OR EQUIPMENT TO REMAIN
- EXISTING DUCTWORK OR EQUIPMENT TO BE REMOVED
- BRANCH DUCT WITH 45° RECTANGLE-ROUND BRANCH FITTING AND MANUAL VOLUME DAMPER
- ELBOW WITH TURNING VANES
- RETURN, EXHAUST, OR OUTSIDE AIR DUCT UP
- RETURN, EXHAUST, OR OUTSIDE AIR DUCT DOWN
- SUPPLY AIR DUCT UP
- SUPPLY AIR DUCT DOWN
- EQUIPMENT WITH FLEXIBLE DUCT CONNECTION
- 10" CSD-1 300 CFM — NECK SIZE, TYPE, CFM OF SUPPLY DIFFUSER OR REGISTER
- MANUAL VOLUME DAMPER
- SQUARE TO ROUND TRANSITION
- RD — DUCT MOUNTED SMOKE DETECTOR (SD=SUPPLY/RD=RETURN)
- FD — FIRE DAMPER
- FSD — FIRE SMOKE DAMPER
- SD — SMOKE DAMPER
- VD — VOLUME DAMPER
- MD — MOTORIZED DAMPER
- BD — BACKDRAFT DAMPER
- CO2 — CARBON DIOXIDE SENSOR
- HS — HUMIDITY SENSOR
- PS — PULL STATION
- SP — STATIC PRESSURE SENSOR
- TS — TEMPERATURE SENSOR
- H — HUMIDISTAT
- T — THERMOSTAT

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MC	MECHANICAL CONTRACTOR
BAS	BUILDING AUTOMATION SYSTEM	MIN	MINIMUM
BD	BACKDRAFT DAMPER	NC	NOISE CRITERIA
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
DDC	DIRECT DIGITAL CONTROL	RA	RETURN AIR
DX	DIRECT EXPANSION	SA	SUPPLY AIR
EA	EXHAUST AIR	SD	SMOKE DUCT DETECTOR
ETR	EXISTING TO REMAIN	TFA	TO FLOOR ABOVE
FFA	FROM FLOOR ABOVE	TFB	TO FLOOR BELOW
FFB	FROM FLOOR BELOW	TYP	TYPICAL
GPM	GALLONS PER MINUTE	UNO	UNLESS NOTED OTHERWISE
IN WC	INCHES OF WATER COLUMN	W/	WITH
MAX	MAXIMUM	W/O	WITHOUT
MBH	1000 BTU PER HOUR		

STANDARD MOUNTING HEIGHTS

MECHANICAL	(AFF, AFG, UNLESS NOTED OTHERWISE)
THERMOSTATS (USER ADJUSTABLE)(TOP OF DEVICE)	48"
CONTROLS (TOP OF DEVICE)	48"

ANNOTATION

- 1 — MECHANICAL PLAN CALLOUT
- CU 1 — MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 M1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1 M1 — SECTION CUT DESIGNATION

ABBREVIATIONS

(ALL ABBREVIATIONS SHOWN ARE NOT NECESSARILY USED ON THE DRAWINGS.)

A

A	AMPERES
A	AIR (COMPRESSED)
A/C	AIR CONDITIONING
ACC	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
ADA	AMERICANS WITH DISABILITIES ACT
AF	AMPERE FUSE
AFC	ABOVE FINISHED CEILING
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFEA	AREA FOR EVACUATION ASSISTANCE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AIC	AMPERE INTERRUPTING CURRENT
AL	ALUMINUM
AO	ANALOG OUTPUT
AP	ACCESS PANEL
AP	ACCESS POINT
ATL	ACROSS-THE-LINE
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAUGE

B

B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
BB	BACKBONE
BD	BACKDRAFT DAMPER
BD	BLOWDOWN
BD	BUILDING DISTRIBUTOR
BDF	BUILDING DISTRIBUTION FRAME
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BFP	BOILER FEED PUMP
BI	BINARY INPUT
BKR	BREAKER
BO	BINARY OUTPUT
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STRUCTURE
BTU	BRITISH THERMAL UNIT

C

C	CONDUIT
CAT	CATEGORY
CATV	CABLE TELEVISION SYSTEM
CD	CANDELA
CD	CAMPUS DISTRIBUTOR
CT	CURRENT TRANSFORMER
CCTV	CLOSED CIRCUIT TELEVISION
CH	CHILLER
CFM	CUBIC FEET PER MINUTE
CKT	CIRCUIT
CMP	COMMUNICATIONS PLENUM CABLE
CMR	COMMUNICATIONS RISER CABLE
CP	CONDENSATE PUMP
CPT	CONTROL POWER TRANSFORMER
CPVC	CHLORINATED POLYVINYL CHLORIDE
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
CRU	COMPUTER ROOM UNIT
CT	COOLING TOWER
CWP	COOLING TOWER PUMP
CU	COPPER
CU	CONDENSING UNIT
CVD	CUMULATIVE VOLTAGE DROP
CHP	CHILLED WATER PUMP

D

DB	DECIBELS
DDC	DIRECT DIGITAL CONTROL
DFU	DRAINAGE FIXTURE UNIT
DI	DIGITAL INPUT
DI	DUCTILE IRON
DN	DOWN
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPI	DIFFERENTIAL PRESSURE INDICATOR
DPST	DOUBLE-POLE, SINGLE-THROW
DS	DOWNSPOUT
DS	DUCT SILENCER
DX	DIRECT EXPANSION

E

(E)	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EIA	ELECTRONIC INDUSTRIES ASSOCATIONS
EL	ELECTRIFIED LOCK OR LATCH
EM	EMERGENCY
EMI	ELECTROMAGNETIC INTEFERENCE
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
EPO	EMERGENCY POWER OFF
ER	EQUIPMENT ROOM
ESFR	EARLY SUPPRESSION FAST RESPONSE
ETR	EXISTING TO REMAIN
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE

F

FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS/OWNER
FCA	FAULT CURRENT AMPS
FCU	FAN COIL UNIT
FD	FLOOR DISTRIBUTOR
FD	FLOOR DRAIN
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FF	FINISHED FLOOR
FHC	FIRE HOSE CABINET
FL	FLOW LINE
FLA	FULL LOAD AMPS
FLR	FLOOR
FU	FURNACE
FVNR	FULL-VOLTAGE, NON-REVERSING

G

GC	GENERAL CONTRACTOR
GE	GROUNDING EQUALIZER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
G	GROUND
GND	GROUND
GPM	GALLONS PER MINUTE
GRS	GALVANIZED RIGID STEEL
GYP	GYPSUM BOARD

H

HC	HORIZONTAL CROSS-CONNECT
HD	HEAD
HD	HUB DRAIN
HOA	HAND-OFF-AUTOMATIC
HTG	HEATING
HTR	HEATER
HVU	HEATING AND VENTILATING UNIT
HWP	HEATING WATER PUMP
HZ	HERTZ

I

IC	INTERMEDIATE CROSS-CONNECT
IE	INVERT ELEVATION
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IN WC	INCHES OF WATER COLUMN
IP	INTERNET PROTOCOL
ISC	SHORT CIRCUIT CURRENT
ISDN	INTEGRATED SERVICES DIGITAL NETWORK
ISP	INTERNET SERVICE PROVIDER
ISP	INSIDE PLANT CABLE

J

JB	JUNCTION BOX
J-BOX	JUNCTION BOX

K

kcmil	1000 CIRCULAR MILS
KK	KIRK KEY
kV	KILOVOLT
kVA	KILOVOLT-AMPS
kVAR	KILOVOLT-AMPS REACTIVE
kW	KILOWATT
kWH	KILOWATT-HOUR

L

L	LOUVER
LAN	LOCAL AREA NETWORK
LAT	LEAVING AIR TEMPERATURE
LCC	LIMITED COMBUSTIBLE CABLE
LDB	LEAVING DRY BULB
LEC	LOCAL EXCHANGE CARRIER
LED	LIGHT-EMITTING DIODE
LF	LINEAR FEET
LP	LOW PRESSURE
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE

M

M-M	MULTIMODE
MAN	METROPOLITAN AREA NETWORK
MATV	MASTER ANTENNA TELEVISION SYSTEM
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MC	MAIN CROSS-CONNECT
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MDF	MAIN DISTRIBUTION FRAME
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MG	MOTOR GENERATOR
MH	MAINTENANCE HOLE
MH	MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MPOE	MAIN POINT OF ENTRANCE
MPOP	MAIN POINT OF PRESENCE
MSB	MAIN SWITCHBOARD
MSWB	MAIN SWITCHBOARD
MS/TP	MASTER SLAVE/TOKEN PASSING – COMMUNICATION TRUNK
MTD	MOUNTED
MU	MAKE-UP

N

N/A	NOT APPLICABLE
N/C	NORMALLY CLOSED
N/O	NORMALLY OPEN
NC	NOISE CRITERIA
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION, INC.
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NM	NANO METER

O

OA	OUTSIDE AIR
OC	ON CENTER
ORD	OVERFLOW ROOF DRAIN
OS	OCCUPANCY SENSOR
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OSP	OUTSIDE PLANT

P

P	POLE
PBX	PRIVATE BRANCH EXHANGE
PCR	PUMPED CONDENSATE RETURN
PDI	PLUMBING DRAINAGE INSTITUTE
PDU	POWER DISTRIBUTION UNIT
PH	PHASE
ø	PHASE
PIV	POST INDICATOR VALVE
PNL	PANEL
PNLBD	PANELBOARD
POE	POWER OVER ETHERNET
POTS	STANDARD ANALOG TELEPHONE LINE
POTS	PLAIN OLD TELEPHONE SERVICE
PROVIDE	FURNISH AND INSTALL
PRV	PRESSURE REDUCING VALVE
PSTN	PUBLIC SWITCHED TELELPHONE NETWORK
PT	POTENTIAL TRANSFORMER
PTP	POINT-TO-POINT
PTZ	PAN, TILT, ZOOM
PVC	POLYVINYL CHLORIDE

Q

QTY	QUANTITY

R

RA	RETURN AIR
RC	ROOM CRITERIA
RCP	REINFORCED CONCRETE PIPE
RCPT	RECEPTACLE
RD	ROOF DRAIN
RD	RETURN DUCT
REV	REVISION
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RH	ROOF HOOD
RHG	REFRIGERANT HOT GAS
RLA	RUNNING LOAD AMPS
RMC	RIGID METAL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
RU	RACK UNIT

S

SA	SUPPLY AIR
SATV	SYNCHRONOUS OPTICAL NETWORK
SCP	STEAM CONDENSATE PUMP
SD	SMOKE DUCT DETECTOR
SD	SUPPLY DUCT
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SQUARE FEET
SF	SUPPLY FAN
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SP	STATIC PRESSURE
SP	SUMP PUMP
SS	STAINLESS STEEL
SS	SANITARY SEWER
SS	SOIL STACK
ST	SHUNT TRIP
ST	STEAM TRAP
STC	SOUND TRANSMISSION CLASS
STM	STEAM
SWBD	SWITCHBOARD

T

TBB	TELECOMMUNICATIONS BONDING BACKBONE
TBD	TO BE DETERMINED
TC/C	TEMPERATURE CONTROLS CONTRACTOR
TDH	TOTAL DYNAMIC HEAD
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TGB	TELECOMMUNICATIONS GROUND BUS BAR
TIA	TELECOMMUNICATIONS INDUSTRY ASSOCIATION
TL	TWISTLOCK
TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
TR	TAMPER RESISTANT
TR	TELECOMMUNICATIONS ROOM
TT	TEMPERATURE TRANSMITTER
TWU	THROUGH WALL AIR CONDITIONING UNIT
TX	TRANSFORMER
TYP	TYPICAL

U

U/F	UNDERFLOOR
U/G	UNDERGROUND
U/S	UNDERSLAB
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES, INC.
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTP	UNSHIELDED TWISTED PAIR

V

V	VOLT(S)
VAC	VOLTS ALTERNATING CURRENT
VD	VOLTAGE DROP
VDC	VOLTS DIRECT CURRENT
VAV	VARIABLE AIR VOLUME
VCP	VITRIFIED CLAY PIPE
VFD	VARIABLE FREQUENCY DRIVE
VS	VENT STACK
VTR	VENT THROUGH ROOF

W

W	WIRE
W/	WITH
W/O	WITHOUT
WAN	WIDE AREA NETWORK
WAP	WIRELESS ACCESS POINT
WB	WET BULB
WC	WATER COLUMN
WG	WATER GONG
WPD	WATER PRESSURE DROP
WP	WEATHER PROOF COVER
WR	WEATHER RESISTANT
WS	WASTE STACK
WSFU	WATER SUPPLY FIXTURE UNIT
WT	WATERTIGHT
WT	WEIGHT

X

XP	EXPLOSION-PROOF

GENERAL

- NOT IN SCOPE

GENERAL NEW NOTES:

1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL REQUIREMENTS WHICH MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ENGINEER AND/OR OWNER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
2. EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS AND SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY EXISTING CONDITIONS. COORDINATE NEW WORK AND DEMOLITION WITH OTHER DISCIPLINES AND EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
3. COORDINATE THE INSTALLATION OF THE MECHANICAL SYSTEMS WITH OTHER TRADES TO ENSURE A NEAT AND ORDERLY INSTALLATION. INSTALL DUCTWORK AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE INSTALLATION OF DUCTWORK TO AVOID CONFLICTS WITH ELECTRICAL PANELS, LIGHTING FIXTURES, ETC. ANY MODIFICATIONS REQUIRED DUE TO LACK OF COORDINATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AT NO EXTRA COST TO THE OWNER.
4. DURING INSTALLATION OF NEW WORK, AVOID DAMAGING EXISTING SURFACES AND EQUIPMENT TO REMAIN. REPAIR DAMAGE CAUSED DURING CONSTRUCTION AT NO EXTRA COST TO THE OWNER.
5. ALL MECHANICAL EQUIPMENT SHOWN ON THE MECHANICAL PLANS SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
6. NEW MECHANICAL EQUIPMENT, AND DUCTWORK ARE SHOWN AT APPROXIMATE LOCATIONS. FIELD MEASURE FINAL DUCTWORK LOCATIONS PRIOR TO FABRICATION AND MAKE ADJUSTMENTS AS REQUIRED TO FIT THE DUCTWORK AND PIPING WITHIN THE AVAILABLE SPACE. VERIFY THAT FINAL EQUIPMENT LOCATIONS MEET MANUFACTURER'S RECOMMENDATIONS REGARDING SERVICE CLEARANCE AND PROPER AIRFLOW CLEARANCE AROUND EQUIPMENT.
7. COORDINATE LOCATION OF ROOF MOUNTED HVAC EQUIPMENT AND ROOF PENETRATIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
8. OVERHEAD HANGERS AND SUPPORTS FOR EQUIPMENT AND DUCTWORK SHALL BE FASTENED TO BUILDING JOISTS OR BEAMS. DO NOT ATTACH HANGERS AND SUPPORTS TO THE ROOF.
9. SEAL PENETRATIONS THROUGH THE BUILDING COMPONENTS IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. FIREPROOF PENETRATIONS THROUGH FIRE RATED COMPONENTS IN ACCORDANCE WITH U.L. REQUIREMENTS.
10. ADJUST LOCATION OF CEILING GRILLES AS REQUIRED TO ACCOMMODATE FINAL CEILING GRID AND LIGHTING LOCATIONS.
11. PROVIDE WALL MOUNTED LOUVERS AND DAMPERS WITH SUITABLE MOUNTING FRAME TO MATCH WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL DRAWINGS.
12. PROVIDE FIRE DAMPERS, AS APPLICABLE, IN DUCTWORK AT WALLS AT LOCATIONS SHOWN ON THE PLANS. FIRE DAMPERS SHALL CONFORM TO NFPA AS APPLICABLE. COORDINATE SLEEVE LENGTH WITH REQUIREMENTS OF INSTALLED LOCATION.
13. PROTECT IN PLACE ALL PROJECT AREAS THAT WILL REMAIN OCCUPIED DURING CONSTRUCTION. PROTECT ALL FURNITURE AND SURFACES FROM DUST AND DAMAGE DURING CONSTRUCTION, AND RESTORE WORKSPACE TO PRIOR CONDITION AFTER EVERY WORK SHIFT.
14. REFER TO STRUCTURAL DRAWINGS FOR DETAILS OF SEISMIC BRACING FOR ALL MECHANICAL EQUIPMENT AND DUCTWORK.

ROOF HOOD SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	CFM RANGE	MAX. PD. (IN)	THROAT (L" x W")	CURB (L" x W")	NOTES
RH-1	INTAKE	---	---	14,000 – 28,800	0.254	60"x60"	66"x66"	A,B,C
RH-2	RELIEF	---	---	24000	0.114	60"x60"	66"x66"	A,B,C

REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED.

NOTES:

A. PROVIDE 1/4"ALUMINUM BIRDSCREEN.
B. PROVIDE INSULATED ROOF CURB WITH TRAY.
C. PROVIDE COUNTERBALANCE BACKDRAFT DAMPER.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	MODEL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX. NC	MAX. PRESS. DROP (IN. W.C.)	NOTES
RG-1	---	---	EGG CRATE	CEILING	46"x22"	40	0.095	A, B

REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED.

NOTES:

A. BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
B. ALUMINUM CONSTRUCTION.

NOTE:

EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS & SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY ALL EXISTING CONDITIONS. CAREFULLY COORDINATE NEW WORK AND DEMOLITION WITH ALL OTHER DISCIPLINES AND EXISTING CONDITIONS.

REGISTERED PROFESSIONAL ENGINEER
JASON D. ZOELLER
No. M-34600
MECHANICAL
STATE OF CALIFORNIA

Jun 12 2014

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FOR CONSTRUCTION

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ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
MECHANICAL LEGEND, GENERAL NOTES, AND DETAILS

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
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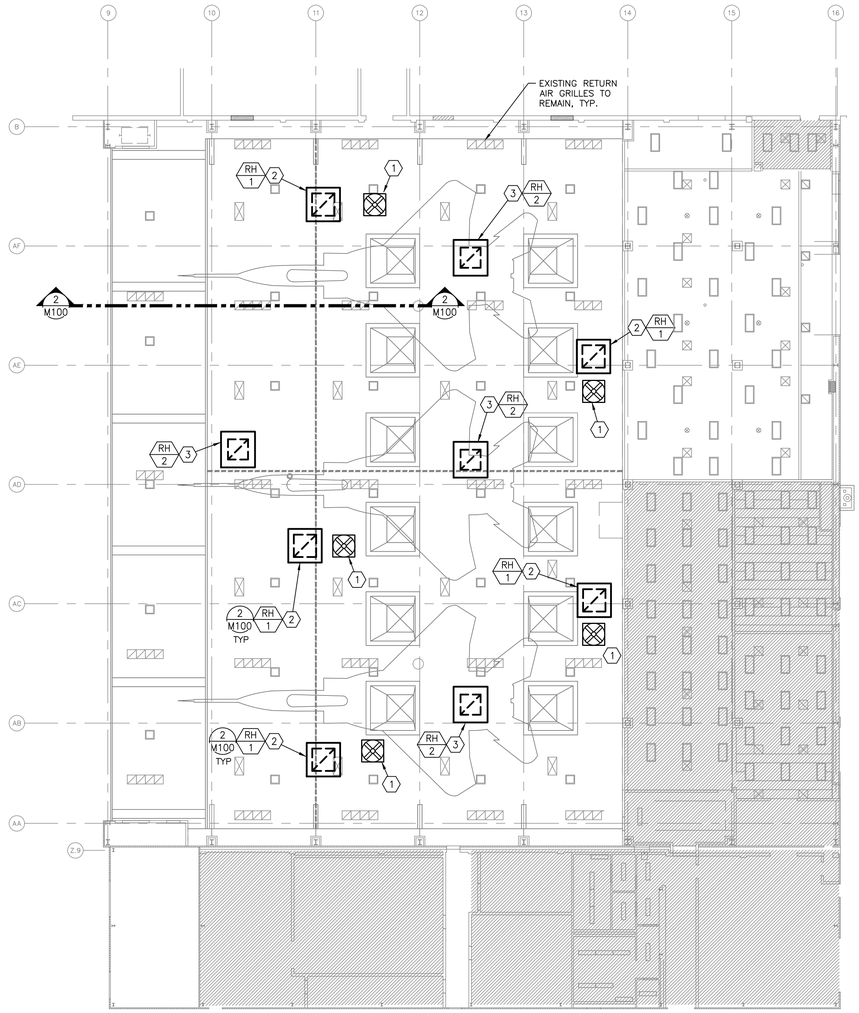
FILE NAME	EDM-1719 M000.dwg	M-000	SHEET No. 134 of 137

JASON D. ZOELLER

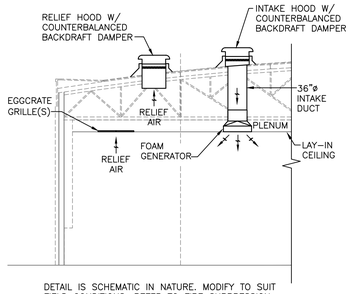


1 **MECHANICAL PLAN – BUILDING 4801**
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"

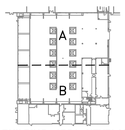
MECHANICAL PLAN NOTES:

1. HIGH EXPANSION FOAM GENERATOR MOUNTED BELOW CEILING. REFERENCE FOAM SUPPRESSION DRAWINGS FOR EXACT LOCATION.
2. PROVIDE ROOF INTAKE HOOD AND COUNTERBALANCE DAMPER ASSEMBLY ON ROOF DIRECTLY OVER THE FOAM GENERATOR. ROUTE APPROXIMATELY 5'-0" OF 36" ROUND DUCT FROM INTAKE DAMPER ASSEMBLY TO THE FOAM GENERATOR. ROOF INTAKE IS SHOWN OFFSET FOR CLARITY.
3. PROVIDE ROOF RELIEF HOOD AND COUNTERBALANCE DAMPER ASSEMBLY ON ROOF.



DETAIL IS SCHEMATIC IN NATURE. MODIFY TO SUIT FIELD CONDITIONS. REFER TO FIRE SUPPRESSION DRAWINGS FOR COMPLETE SECTION VIEW.

2 **HANGAR INTAKE/RELIEF AIR DETAIL**
NOT TO SCALE



BUILDING 4801 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
JASON D. ZOELLER
No. M-36600
MECHANICAL
STATE OF CALIFORNIA

Jun 12 2014

HENDERSON ENGINEERS INC
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913 742 5000 FAX 913 742 5001
www.hei-eng.com
1250001459

FOR CONSTRUCTION

DATE	SYM	REVISION	BY	A'PD
04-18-14		100% SUBMITTAL		
03-21-14		95% RESUBMITTAL		
02-28-14		95% SUBMITTAL		
02-05-14		60% ADDENDUM SUBMITTAL		
06-14-13		60% DEVELOPED DESIGN SUBMITTAL		
03-20-13		30% PRELIMINARY DESIGN SUBMITTAL		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
MECHANICAL
PLAN – BUILDING 4801

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 M100.dwg	M-100	SHEET No. 135 of 137

JASON D. ZOELLER

MECHANICAL PLAN NOTES:

1. HIGH EXPANSION FOAM GENERATOR MOUNTED BELOW CEILING. REFERENCE FOAM SUPPRESSION DRAWINGS FOR EXACT LOCATION.
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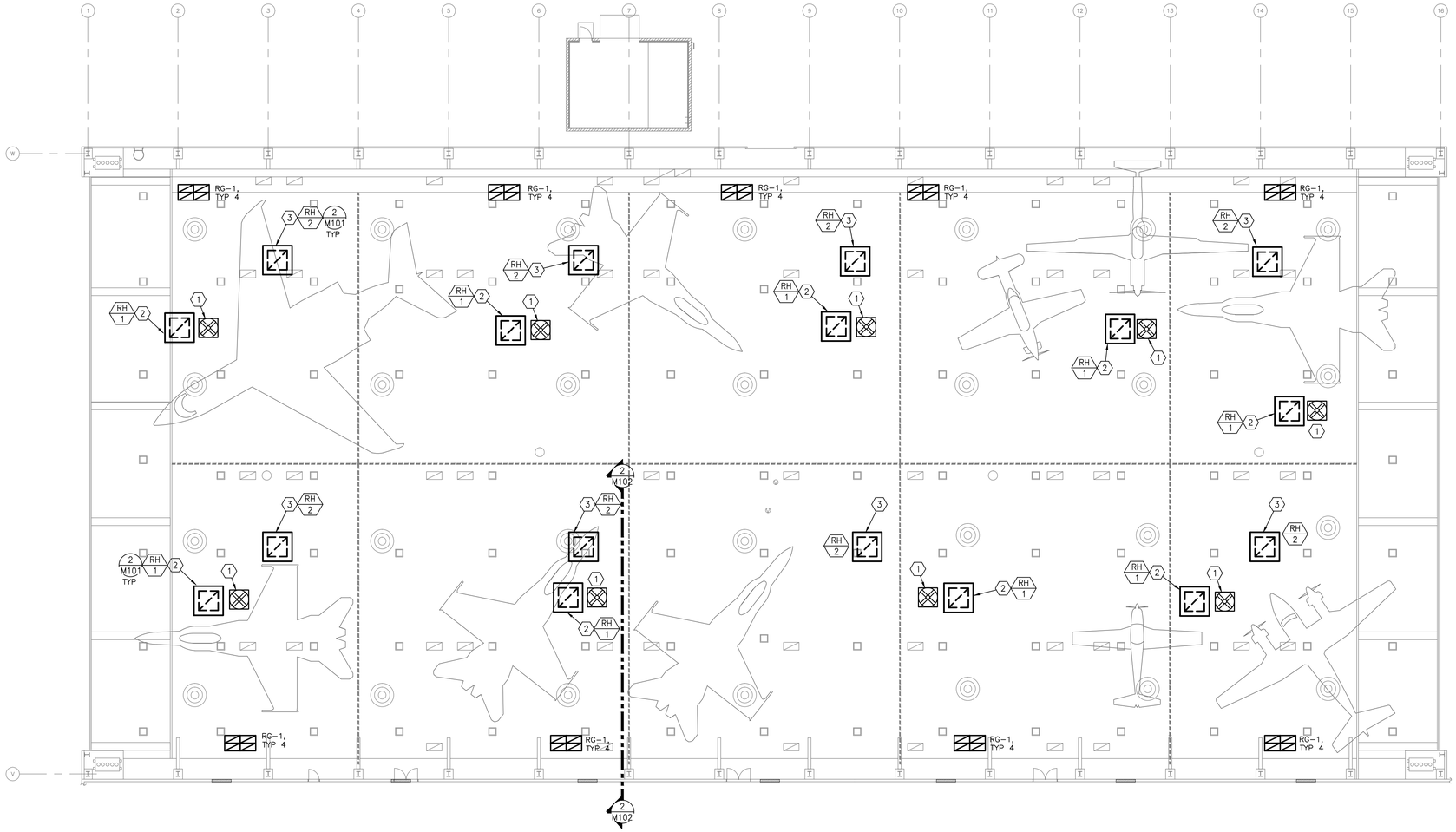
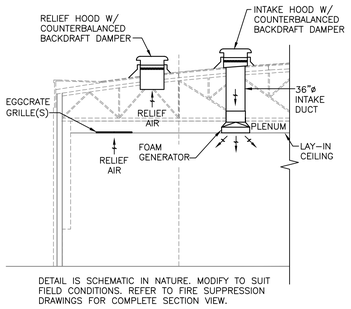
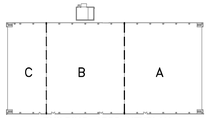


1 MECHANICAL PLAN – BUILDING 4802
SCALE: 1/16"=1'-0"

0 8' 16' 24'
SCALE: 1/16"=1'-0"



2 HANGAR INTAKE/RELIEF AIR DETAIL
NOT TO SCALE



BUILDING 4802 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
JASON D. ZOELLER
No. M-34600
MECHANICAL
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
EDWARDS, CA

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	
Project Requestor/Customer	
Facilities Project Manager	
Chief, Office of Protective Services	
Chief, Safety, Health & Environmental Office	
DFRC Chief Information Officer	

DRAWING TITLE
MECHANICAL
PLAN – BUILDING 4802

PROJECT TITLE
REPAIR AIRCRAFT HANGAR FIRE PROTECTION SYSTEMS 100% FINAL DESIGN
PRIMARY SCOPE 4801,4802,4840,4853

DATE STRTD	02/28/2012	DATE PRNTD	4/18/2014
DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 M101.dwg	M-101	SHEET No. 136 of 137

JASON D. ZOELLER

1 MECHANICAL PLAN – BUILDING 4840

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

N

0 8' 16' 24'

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

MECHANICAL PLAN NOTES:

1. HIGH EXPANSION FOAM GENERATOR MOUNTED BELOW STRUCTURE. REFERENCE FOAM SUPPRESSION DRAWINGS FOR EXACT LOCATION.
2. PROVIDE ROOF INTAKE HOOD AND COUNTERBALANCE DAMPER ASSEMBLY ON ROOF DIRECTLY OVER THE FOAM GENERATOR. ROUTE APPROXIMATELY 5'-0" OF 36" ROUND DUCT FROM INTAKE DAMPER ASSEMBLY TO THE FOAM GENERATOR. ROOF INTAKE IS SHOWN OFFSET FOR CLARITY.
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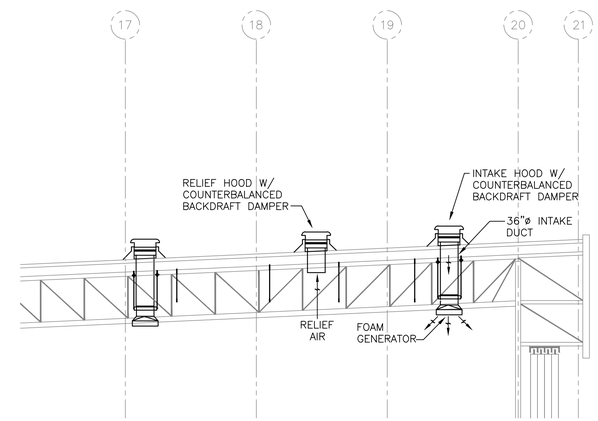
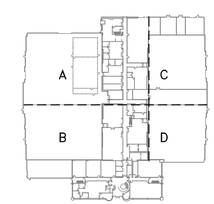


2 HANGAR INTAKE/RELIEF AIR DETAIL

NOT TO SCALE

NOTE: DETAIL IS SCHEMATIC IN NATURE. MODIFY TO SUIT FIELD CONDITIONS. REFER TO FIRE SUPPRESSION DRAWINGS FOR COMPLETE SECTION VIEW.



BUILDING 4840 KEYPLAN

REGISTERED PROFESSIONAL ENGINEER
JASON D. ZOELLER
No. M-24600
MECHANICAL
STATE OF CALIFORNIA

Jun 12 2014

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ARMSTRONG FLIGHT RESEARCH CENTER
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DRAWING TITLE
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PLAN – BUILDING 4840

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DRAWN BY	HEI		EDM-1719
SCALE	1/16"=1'-0"	TRADE SH. No.	
FILE NAME	EDM-1719 M102.dwg	M-102	SHEET No. 137 of 137

JASON D. ZOELLER