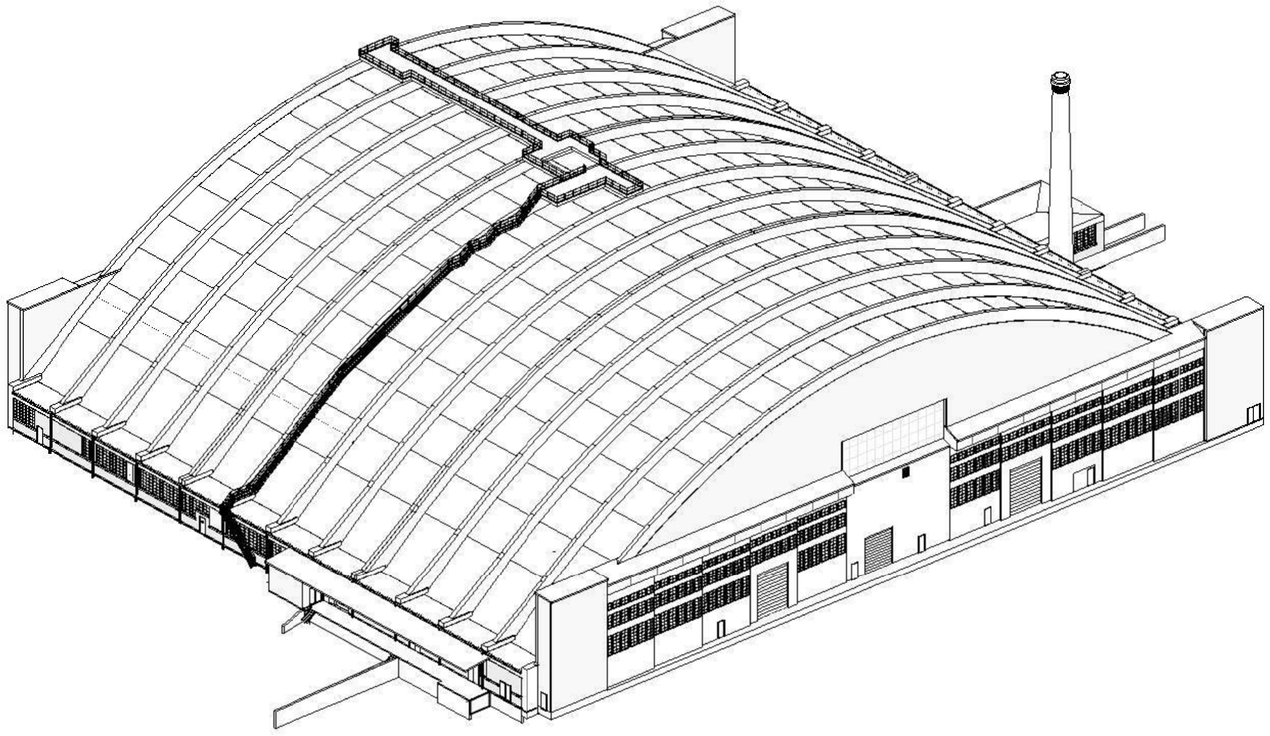
US Army Corps
of Engineers ®
OMAHA DISTRICT

B21: WEAPONS LOADER TRAINING FACILITY (WLT #1)
ELLSWORTH AIR FORCE BASE, SD
PROJECT NUMBER: FXBM231802, FY 2023



SOLICITATION NO.: W9128F23R0012

ISSUE DATE: 28 APRIL 2023

VOLUME 2 OF 2

Jacobs Project No.: D3558802

A/E STAMPS

KATHYRIYA H. KENNEDY 98244 04/28/23	ABRAHAM ABEL AVALOS 114070 LICENSED PROFESSIONAL ENGINEER 04/24/2023	MICHAEL J. HEMMER 001-021107 28 APRIL 2023	MACHELLE LARAE ABOVE 13047 REGISTERED INTERIOR DESIGNER 04-28-2023	REGISTERED PROFESSIONAL ENGINEER BRADY A. BUSS EXP 09/30/24 STATE OF CALIFORNIA
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PLUMBING & MECHANICAL ENGINEER OF RECORD:	ELECTRICAL ENGINEER OF RECORD:	COMMUNICATIONS & SECURITY ENGINEER OF RECORD:		

THIS PROJECT WAS DESIGNED BY THE OMAHA DISTRICT OF THE US ARMY CORPS OF ENGINEERS. THE INITIALS OR SIGNATURES AND REGISTRATION DESIGNATION OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY ER 1110-1-8152.

SIGNATURES AFFIXED BELOW INDICATE OFFICIAL RECOMMENDATION AND APPROVAL OF DRAWINGS IN THE SET.

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US Army Corps
of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: M. HEMMER
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SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
COVER SHEET

SHEET ID

G-001

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US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

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DRAWN BY: N. BOYER
CHECKED BY: R. YAW
SUBMITTED BY: B. DYSON
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

SHEET INDEX

SHEET ID

G-002

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DRAWING ABBREVIATIONS

A	
ABV	ABOVE
AC	AIR COMPRESSOR
AD	AIR DEVICE
ADA	AMERICANS WITH DISABILITIES ACT
ADMIN	ADMINISTRATION
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ARCH	ARCHITECT, ARCHITECTURAL
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY OF TESTING AND MATERIALS
AWS	AIRCRAFT WASH SYSTEM
B	
BFF	BELOW FINISH FLOOR
BFP	BACKFLOW PREVENTER
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STEEL
BTU	BRITISH THERMAL UNIT
C	
CD	CONDENSATE DRAIN
CFH	CUBIC FEET PER HOUR
CIRC	CIRCULATING
CLG	CEILING
CO	CLEAN OUT
CP	CIRCULATING PUMP
D	
DBL	DOUBLE
DCO	DOUBLE CLEANOUT
DCW	DOMESTIC COLD WATER
DFU	DRAINAGE FIXTURE UNIT(S)
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RETURN
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
E	
EA	EACH, EXHAUST AIR
EF	EXHAUST FAN
EFW	EYE/FACE WASH
EL	ELEVATION
ELEC	ELECTRICAL
ET	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
EX	EXHAUST
F	
FA	FROM ABOVE
FB	FROM BELOW
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FS	FLOW SWITCH, FLOOR SINK
FT	FEET
G	
G	NATURAL GAS
GALS	GALLONS
GCO	GROUND CLEANOUT
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPRV	GAS PRESSURE REGULATOR VALVE
GV	GATE VALVE
H	
HB	HOSE BIBB
HD	HUB DRAIN
HPW	HIGH PRESSURE WATER
HTG	HEATING
I	
IE	INVERT ELEVATION
IN	INCH
IN WC	INCHES OF WATER COLUMN
IPC	INTERNATIONAL PLUMBING CODE
J	
JAN	JANITOR

K	
K	CONDUCTIVITY (BTU/SF/IN)
KW	KILOWATT
KWH	KILOWATT-HOUR
L	
L, LAV	LAVATORY
LI	LINT INTERCEPTOR
LVR	LOUVER
M	
MECH	MECHANICAL
MFR	MANUFACTURER
MS	MOP SINK
N	
NC	NORMALLY CLOSED, NOISE CRITERIA
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CNTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
O	
OA	OVERALL, OUTDOOR AIR
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
ODN	OVERFLOW DRAIN NOZZLE
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
P	
PD	PRESSURE DROP
PERF	PERFORATED
PLBG	PLUMBING
PROVIDE	FURNISH AND INSTALL
PSI	POUNDS PER SQUARE INCH
Q	
QTY	QUANTITY
R	
RA	RETURN AIR
RD	ROOF DRAIN
RE:, REF	REFERENCE, REFER TO
REC	RECESSED
REQ	REQUIRED
REV	REVISED, REVISION
RTN	RETURN
S	
S	SINK
SA	SUPPLY AIR
SD	STORM DRAIN
SF	SQUARE FOOT (FEET)
SH	SHOWER
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SPEC	SPECIFICATION
SS	SANITARY SEWER
ST	STAIRS
STD	STANDARD
SV	COMBINATION WASTE AND VENT
T	
TD	TRENCH DRAIN
TP	TRAP PRIMER
TR	TEPID RETURN
TS	TEPID SUPPLY
TYP	TYPICAL
U	
U	URINAL
UF	UNDERFLOOR
UL	UNDERWRITERS LABORATORIES, INC.
UON	UNLESS OTHERWISE NOTED
V	
V	VENT
VTR	VENT THROUGH ROOF
W	
W	WATT
WB	WALL BOX
WC	WATER CLOSET
WCO	WALL CLEANOUT
WD	WALL DRAIN
WH	WATER HEATER

LEGEND

PIPING SYMBOLS

- PITCH DOWN IN DIRECTION OF ARROW
- DIRECTION OF FLOW
- PIPE ANCHOR
- PIPE GUIDE
- CONCENTRIC REDUCER
- BRANCH - SIDE CONNECTION
- BRANCH - TOP CONNECTION
- BRANCH - BOTTOM CONNECTION
- RISE OR DROP IN PIPE
- RISER DOWN (ELBOW)
- RISER UP (ELBOW)
- CAPPED PIPE
- BLIND FLANGE
- UNION (SCREWED)
- ORIFICE UNION
- FLANGED CONNECTION
- FLANGED ORIFICE
- TEMPERATURE & PRESSURE PORT
- STRAINER WITH BLOWDOWN VALVE
- FLEX PIPE
- FLEX CONNECTION
- PUMP
- LINE/WALL CLEANOUT
- CLEANOUT
- HOSE BIBB, WALL HYDRANT
- FLOOR DRAIN, FLOOR SINK
- P-TRAP
- PLUMBING FIXTURES AND EQUIPMENT
- METER
- X=W FOR WATER, X=G FOR GAS
- BACKFLOW PREVENTER
- RISER DESIGNATION DENOTING ASSOCIATED SANITARY OR DOMESTIC WATER RISER DIAGRAM
- PROCESS VACUUM CONNECTION
- BREATHING AIR CONNECTION
- PROCESS COMPRESSED AIR CONNECTION
- DEBRIS VACUUM CONNECTION
- COMPRESSED AIR DROP - "#" DENOTES TYPE
- KEYNOTE REFERENCE
- DEMO KEYNOTE REFERENCE
- POINT OF CONNECTION TO EXISTING
- POINT OF DISCONNECTION FROM EXISTING
- WATER HAMMER ARRESTOR
- FLOW SWITCH
- PRESSURE SWITCH
- THERMOMETER
- PRESSURE GAGE WITH COCK

VALVE SYMBOLS

- GATE VALVE
- GLOBE VALVE
- CHECK VALVE (NON SLAM)
- PLUG VALVE
- GAS PRESSURE REGULATOR VALVE
- PRESSURE REDUCING VALVE
- BUTTERFLY VALVE
- BALL VALVE
- NEEDLE VALVE
- VENTURI FLOW METER
- VALVE IN DROP
- VALVE IN CENTER DROP
- VALVE IN RISE
- GATE VALVE W/ 3/4" HOSE THREAD ADAPTER
- SOLENOID VALVE
- TWO-WAY CONTROL VALVE
- THREE-WAY CONTROL VALVE
- SAFETY VALVE OR PRESSURE RELIEF VALVE
- MANUAL BALANCING VALVE
- AUTOMATIC BALANCING VALVE
- TEMPERATURE WELL
- FLANGED VALVE (GATE VALVE SHOWN)

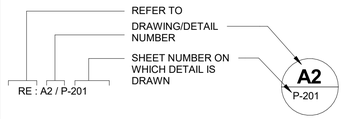
PIPING TYPES

SS	SANITARY SEWER
SV	COMBINATION WASTE AND VENT
SSD	SUBSOIL DRAIN
V	SANITARY VENT (V)
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RETURN
IW	INDUSTRIAL WASTE
TR	TEPID WATER RETURN
TS	TEPID WATER SUPPLY
NPW	NON POTABLE WATER
TP	TRAP PRIMER
G	NATURAL GAS
CD	CONDENSATE DRAIN
A	COMPRESSED AIR
DV	DEBRIS VACUUM (CLEANING)
VAC	VACUUM
OD	OVERFLOW DRAIN
SD	STORM DRAIN
PD	PUMP DISCHARGE
RV	RADON VENT

EQUIPMENT SYMBOLS

- NEW EQUIPMENT
- EXISTING TO BE REMOVED
- EQUIPMENT CLEARANCE

DRAWING/DETAIL REFERENCE KEY



NOTES

DESIGN CRITERIA

WATER SERVICE FLOW TEST DATA

WATER PIPE SIZES ARE BASED ON A MINIMUM WORKING PRESSURE OF 90 PSIG AT A FLOW RATE OF 70 GPM AT THE BUILDING ENTRANCE.

STORM DRAINAGE DATA

THE PRIMARY STORM DRAINAGE IS VIA SCUPPERS WITH DOWNSPOUTS. DOWNSPOUTS WILL DISCHARGE BELOW GRADE TO THE STORM SEWER RE: ARCHITECTURE AND CIVIL. RAINFALL RATE 2.5"/HR.

NATURAL GAS DATA

NATURAL GAS IS SUPPLIED TO THE SITE AT 45 PSIG. GAS PIPE SIZES ARE BASED ON A PRESSURE OF 2.0 PSI AFTER THE REGULATOR AND METER STATION, A MAXIMUM PRESSURE DROP OF 1.0 PSI AND A HEATING VALUE OF 1000 BTU PER CUBIC FOOT.

SANITARY DRAINAGE

THE ESTIMATED CONNECTED SANITARY DRAINAGE LOAD IS 75 DFU OR APPROXIMATELY 38 GPM.

CODE COMPLIANCE

THE PLUMBING EQUIPMENT IN THESE DRAWINGS ARE IN COMPLIANCE WITH THE 2018 INTERNATIONAL PLUMBING CODE AND 2018 INTERNATIONAL ENERGY CONSERVATION CODE.

GENERAL NOTES

A. REFER TO SPECIFICATIONS FOR MATERIALS AND METHODS FOR CONSTRUCTION.

B. COORDINATE THE EXACT LOCATION OF FLOOR DRAINS WITH THE ARCHITECTURAL DRAWINGS AND MECHANICAL EQUIPMENT LOCATIONS PRIOR TO INSTALLATION OF DRAINS. PROVIDE A RADIUS AROUND THE FLOOR DRAIN THAT SLOPES TOWARD THE FLOOR DRAIN FROM THE FINISHED FLOOR ELEVATION TO A TOP OF DRAIN ELEVATION BETWEEN 1/2" AND 3/4" BELOW FINISHED FLOOR, UNLESS OTHERWISE NOTED ON THE DRAWINGS. THE RADIUS AND RATE OF SLOPE IS TO BE FIELD COORDINATED.

C. FURNISH ACCESS DOORS FOR INSTALLATION IN WALLS AND CEILINGS WHERE ACCESS IS REQUIRED TO CONCEALED PLUMBING EQUIPMENT, VALVES, CONTROLS, AND OTHER DEVICES.

D. PERFORM WORK IN ACCORDANCE WITH THE LATEST EDITIONS, REVISIONS, AMENDMENTS OR SUPPLEMENTS OF APPLICABLE STATUTES, ORDINANCES, CODES, OR REGULATIONS OF FEDERAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION IN EFFECT ON THE DATE BIDS ARE RECEIVED.

E. WHERE APPROVAL CODES HAVE BEEN ESTABLISHED BY OSHA, UNDERWRITERS LABORATORY, AMERICAN CODES, ANSI, ASME, ASPE, ASA, ASSE, ASHRAE, ASTM, ARI, NEC, NFPA, SMACNA, OR THE STATE FIRE INSURANCE REGULATORY BODY, FOLLOW THESE STANDARDS WHETHER OR NOT INDICATED ON THE DRAWINGS.

F. COORDINATE WORK WITH ARCHITECTURAL FEATURES AND COORDINATE WORK SUCH THAT INTERFERENCES BETWEEN PIPING, DUCTWORK, EQUIPMENT, HVAC WORK, FIRE PROTECTION WORK, ELECTRICAL WORK, AND BUILDING STRUCTURE WILL BE AVOIDED.

G. PROVIDE THE ENTIRE SYSTEM AND ITS COMPONENT ITEMS OF EQUIPMENT IN OPERATING CONDITION WITHOUT OBJECTIONABLE VIBRATION OR NOISE. PROVIDE WATER HAMMER ARRESTORS AT RESTROOM PLUMBING CHASES. NOISE LEVELS IN OFFICES SHALL BE MAINTAINED AT OR BELOW NC35.

H. PROVIDE ALL WIRING AND ELECTRICAL CONTROLS IN ACCORDANCE WITH NFPA 70 (NEC).

I. VERIFY AND DOCUMENT EXISTING CONDITIONS AND DIMENSIONS ON THE JOB SITE PRIOR TO STARTING ANY WORK.

J. DO NOT SCALE THESE DRAWINGS FOR CONSTRUCTION PURPOSES.

K. INSTALL PIPING TO PROVIDE THE MAXIMUM POSSIBLE CLEAR HEIGHT UNDERNEATH. MAINTAIN A MINIMUM OF 6 INCHES ABOVE FINISHED CEILING TO PROVIDE CLEARANCE FOR LIGHTING FIXTURES.

L. CONTRACTOR TO MAKE ALL FINAL CONNECTIONS TO EQUIPMENT.

M. VENT TERMINALS SHALL EXTEND A MINIMUM OF 12" ABOVE THE FINISHED ROOF AND SHALL BE LOCATED A MINIMUM OF 10 FEET HORIZONTALLY FROM ANY DOOR, OPERABLE WINDOW, OR OTHER AIR INTAKE OF THE BUILDING OR ADJACENT BUILDING UNLESS THE VENT TERMINAL IS AT LEAST 2 FEET ABOVE THE TOP OF SUCH OPENING.

N. ALL VENT LINES ARE TO RISE VERTICALLY (45 DEG. ANGLE OR GREATER FROM HORIZONTAL) TO MINIMUM OF 6" ABOVE THE HIGHEST FLOOD LEVEL RIM OF THE HIGHEST FIXTURE SERVED BY VENT.

O. TO PREVENT FROST CLOSURE, ALL VENT EXTENSIONS THROUGH ROOF OR WALL SHALL BE A MINIMUM OF 3 INCHES IN DIAMETER. ANY INCREASE IN THE SIZE OF THE VENT SHALL BE MADE INSIDE THE STRUCTURE A MINIMUM OF 1 FOOT BELOW THE ROOF OR INSIDE THE WALL.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W912BF23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-001
SIZE: ANSI D 22x34

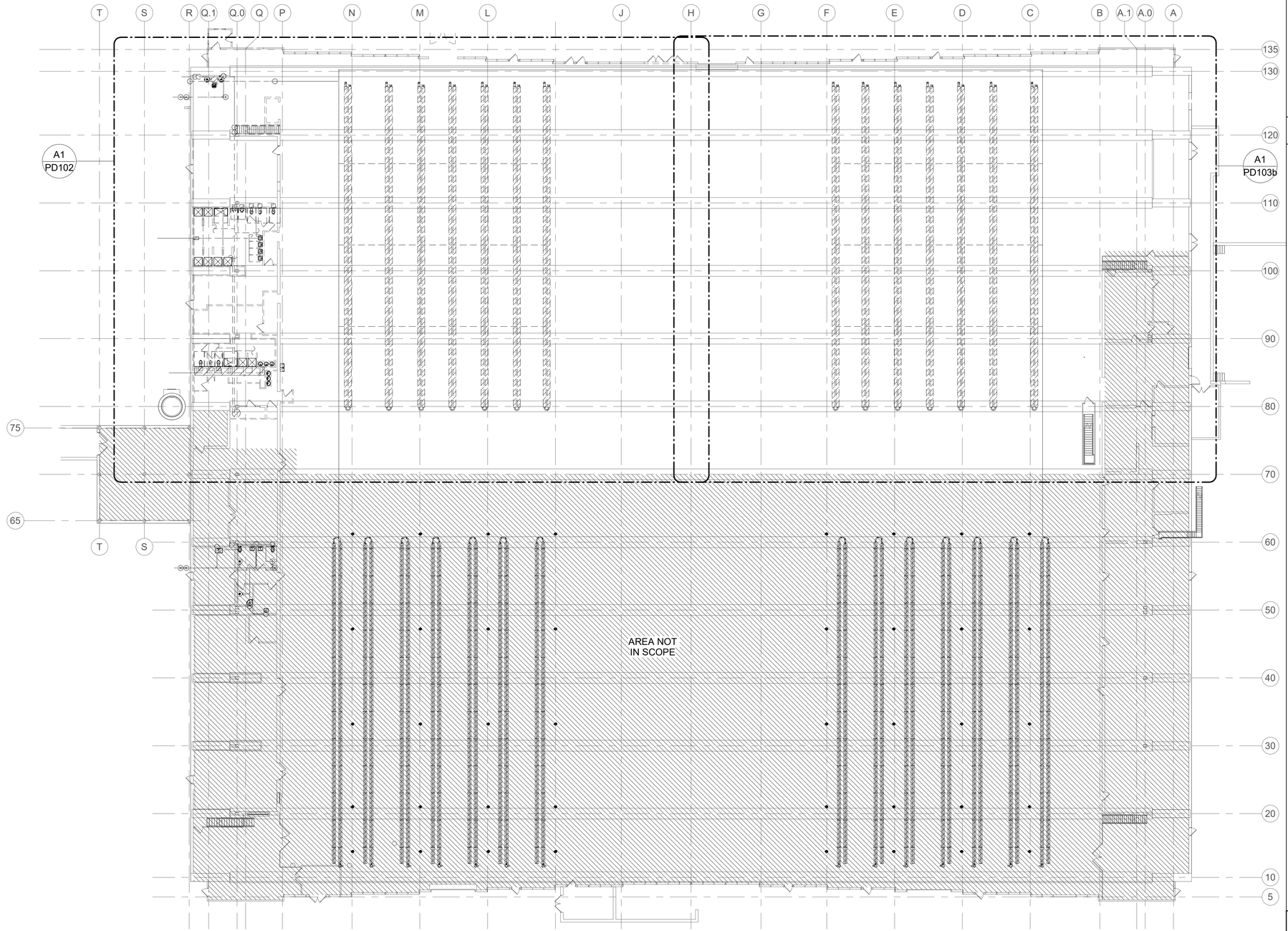
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
GENERAL NOTES, SYMBOLS AND ABBREVIATIONS

SHEET ID
P-001

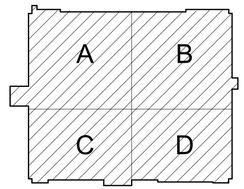
ADVERTISEMENT - 100% DESIGN



GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO CIVIL FOR CONTINUATION OF SERVICES OUT OF THE FACILITY.
3. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
4. REFER TO P-601 FOR PLUMBING SCHEDULES.
5. INVERT ELEVATIONS ARE RELATIVE TO FIRST FLOOR AT THE ELEVATION OF 100'-0".

SHEET KEYNOTES



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN
NORTH

TRUE N

A1 OVERALL DEMOLITION FLOOR PLAN - LEVEL 01

1" = 20'-0"

ADVERTISEMENT - 100% DESIGN

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY:	K. RHOTEN
DRAWN BY:	K. RHOTEN
CHECKED BY:	J. STAMPER
SUBMITTED BY:	B. DYSON
PROJECT SIZE:	ANSI D 22x34
ISSUE DATE:	28 APRIL 2023
SOLICITATION NO.:	W9128F23R0012
CONTRACT NO.:	
DRAWING CODE::	
FILE NAME:	FXBM231802PD101

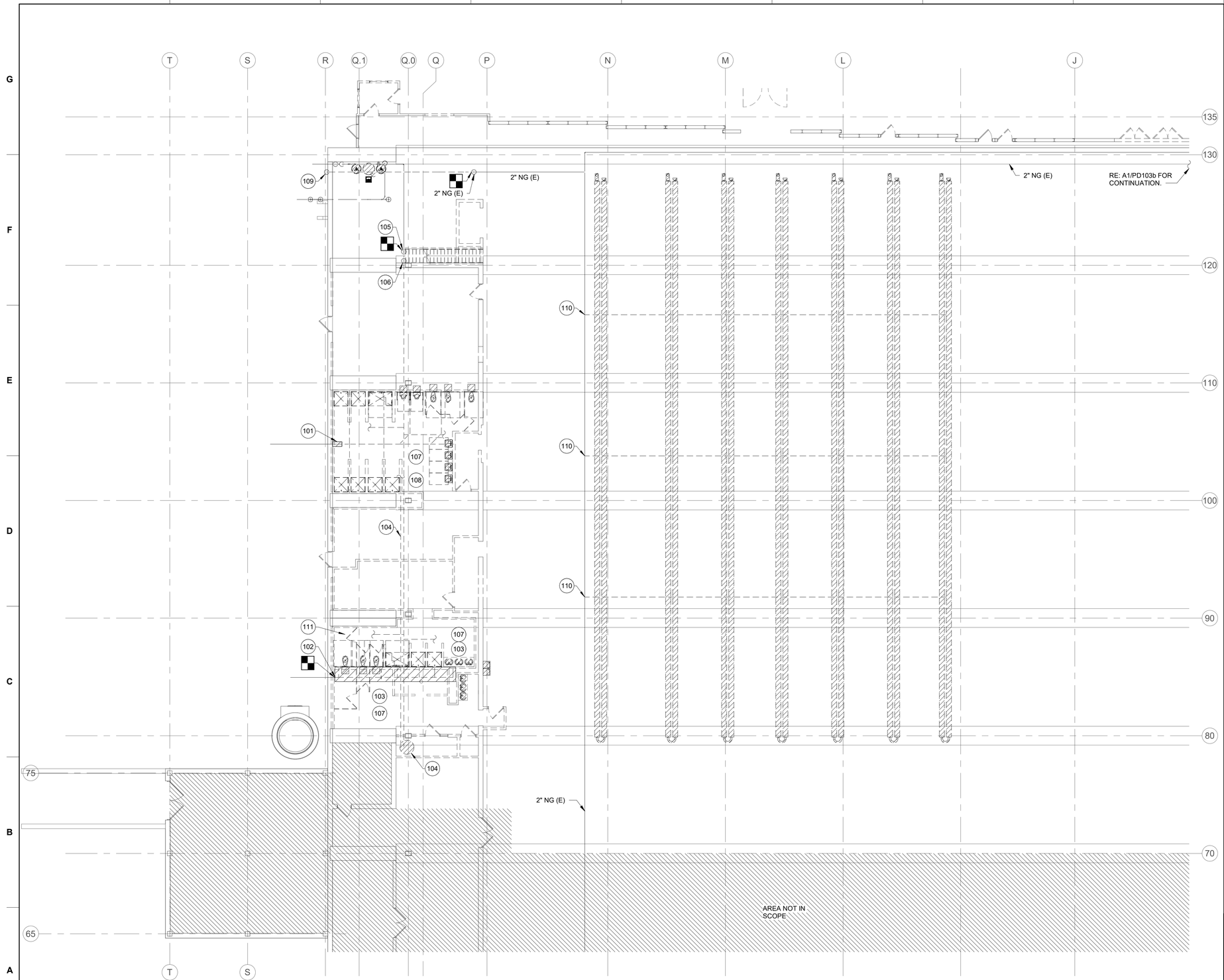
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL DEMOLITION PLUMBING PLAN - LEVEL 01

SHEET ID

PD101



A1 PARTIAL DEMOLITION PLUMBING PLAN - AREA A

3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO CIVIL FOR CONTINUATION OF SERVICES OUT OF THE FACILITY.
3. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
4. REFER TO P-601 FOR PLUMBING SCHEDULES.
5. INVERT ELEVATIONS ARE RELATIVE TO FIRST FLOOR AT THE ELEVATION OF 100'-0".

SHEET KEYNOTES

101 DEMOLISH SECTION OF 6" SS PIPING INDICATED TO BELOW SLAB. CUT, CAP AND ABANDON UPSTREAM SANITARY LINE BELOW SLAB AND PREPARE REMAINING PIPING FOR NEW CONNECTION WITH CLEAN OUT. RE: A1/P-102 FOR NEW CONNECTION.

102 DEMOLISH ENTIRE UPSTREAM 6" SS MAIN TO BELOW SLAB AND PREPARE REMAINING PIPING FOR CONNECTION TO NEW 4" SS MAIN. RE: A1/P-401 FOR NEW RESTROOM CONNECTION.

103 CUT, CAP AND ABANDON ALL SANITARY BRANCH CONNECTIONS FOR FIXTURES TO 6" SS MAIN BEING DEMOLISHED.

104 DEMOLISH EXISTING ELECTRIC WATER HEATER INCLUDING ALL ASSOCIATED HOT WATER PIPING ABOVE CEILING AND BRANCH PIPING TO ALL PLUMBING FIXTURES.

105 DISCONNECT COLD WATER PIPING AT POINT INDICATED AND DEMOLISH ALL PIPING DOWNSTREAM INCLUDING ALL ABOVE CEILING AND BRANCH PIPING TO PLUMBING FIXTURES.

106 EXISTING 2 1/2" DCW PIPE UP TO EQUIPMENT PLATFORM 02 SERVING RR GROUP IN AREA C.

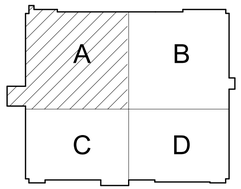
107 REMOVE ALL VENT PIPING FROM FIXTURES AND ABOVE CEILING IN ITS ENTIRETY. FIELD VERIFY LOCATION OF EXISTING VENTS THROUGH WALLS AND REMOVE. PATCH EXISTING WALL OPENING.

108 DEMOLISH ALL PLUMBING FIXTURES IN RESTROOM AND ALL PIPING IN WALL. CUT SANITARY PIPING BELOW SLAB, CAP, AND ABANDON LINE IN PLACE.

109 DISCONNECT AND REMOVE EXISTING 2" NG PIPING BETWEEN POINTS INDICATED AND BACK TO DISCHARGE OUTLET OF GAS METER AT BUILDING EXTERIOR. EXISTING GAS METER AND REGULATOR ASSEMBLY TO REMAIN. PREPARE REMAINING PIPING FOR NEW CONNECTION. PATCH EXISTING WALL OPENING.

110 DISCONNECT EXISTING NATURAL GAS BRANCH PIPING FROM RADIANT HEATERS AND REMOVE PIPING BACK TO MAIN AND CAP. REMOVE ALL PRESSURE REGULATORS AND EXISTING APPURTENANCES OF DEMOLISHED RADIANT HEATERS IN ITS ENTIRETY. RE: MECH FOR MORE INFORMATION.

111 DEMOLISH ALL PLUMBING FIXTURES IN RESTROOM AND ALL PIPING IN WALL TO BELOW SLAB.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802PD102

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

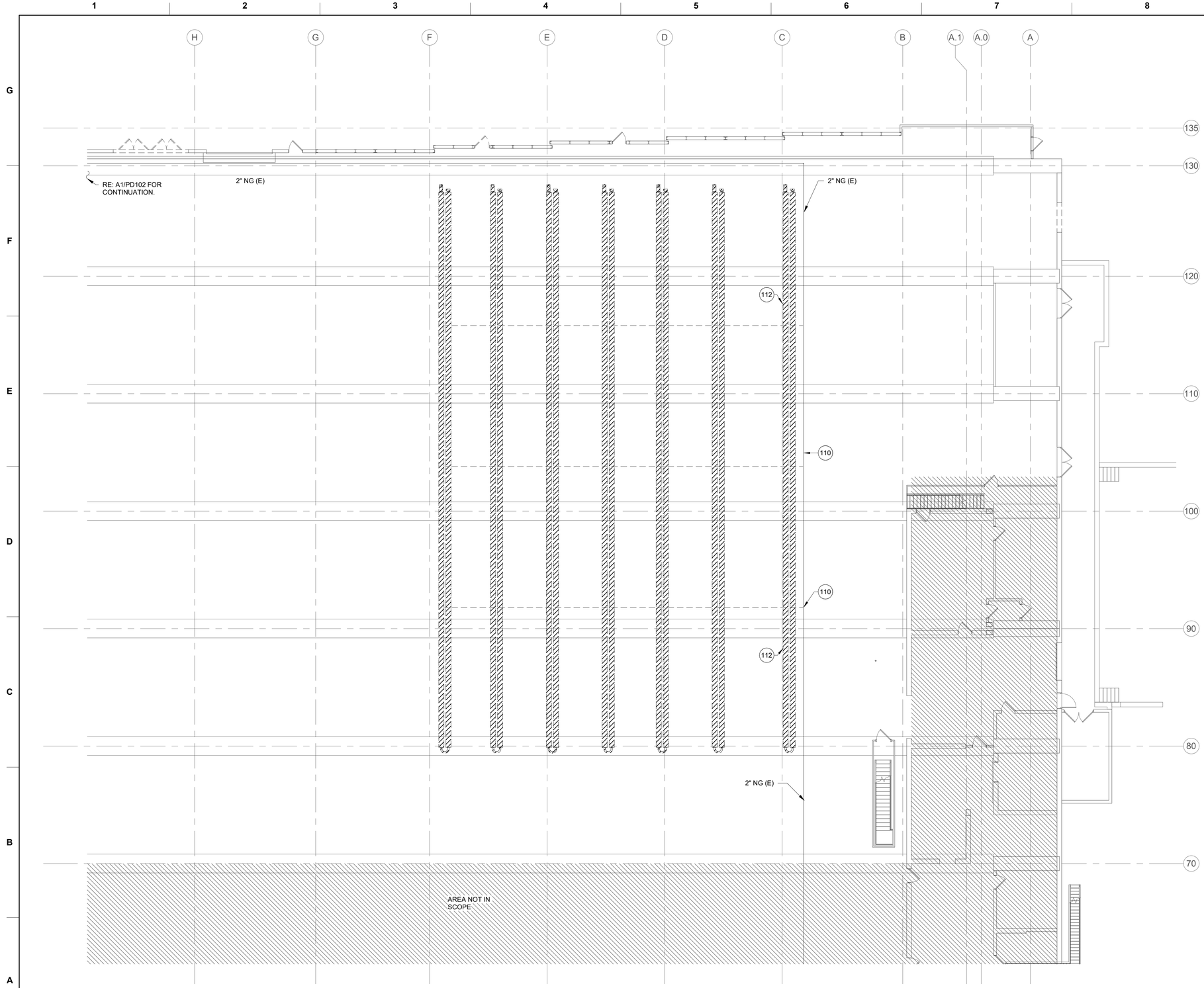
jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL DEMOLITION PLUMBING PLAN - AREA A

SHEET ID

PD102

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL DEMOLITION FLOOR PLAN - AREA B BID OPTION

3/32" = 1'-0"

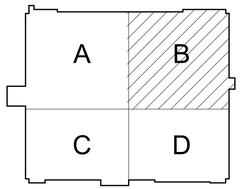
GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO CIVIL FOR CONTINUATION OF SERVICES OUT OF THE FACILITY.
3. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
4. REFER TO P-601 FOR PLUMBING SCHEDULES.
5. INVERT ELEVATIONS ARE RELATIVE TO FIRST FLOOR AT THE ELEVATION OF 100'-0".

SHEET KEYNOTES

110 DISCONNECT EXISTING NATURAL GAS BRANCH PIPING FROM RADIANT HEATERS AND REMOVE PIPING BACK TO MAIN AND CAP. REMOVE ALL PRESSURE REGULATORS AND EXISTING APPURTENANCES OF DEMOLISHED RADIANT HEATERS IN ITS ENTIRETY. RE: MECH FOR MORE INFORMATION.

112 EXISTING RADIANT HEATER TO BE RELOCATED. DISCONNECT EXISTING PRESSURE REGULATORS FOR THIS RADIANT HEATER ONLY AND STORE ON SITE FOR RELOCATION. RE: MECH FOR MORE INFORMATION.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802PD103b

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

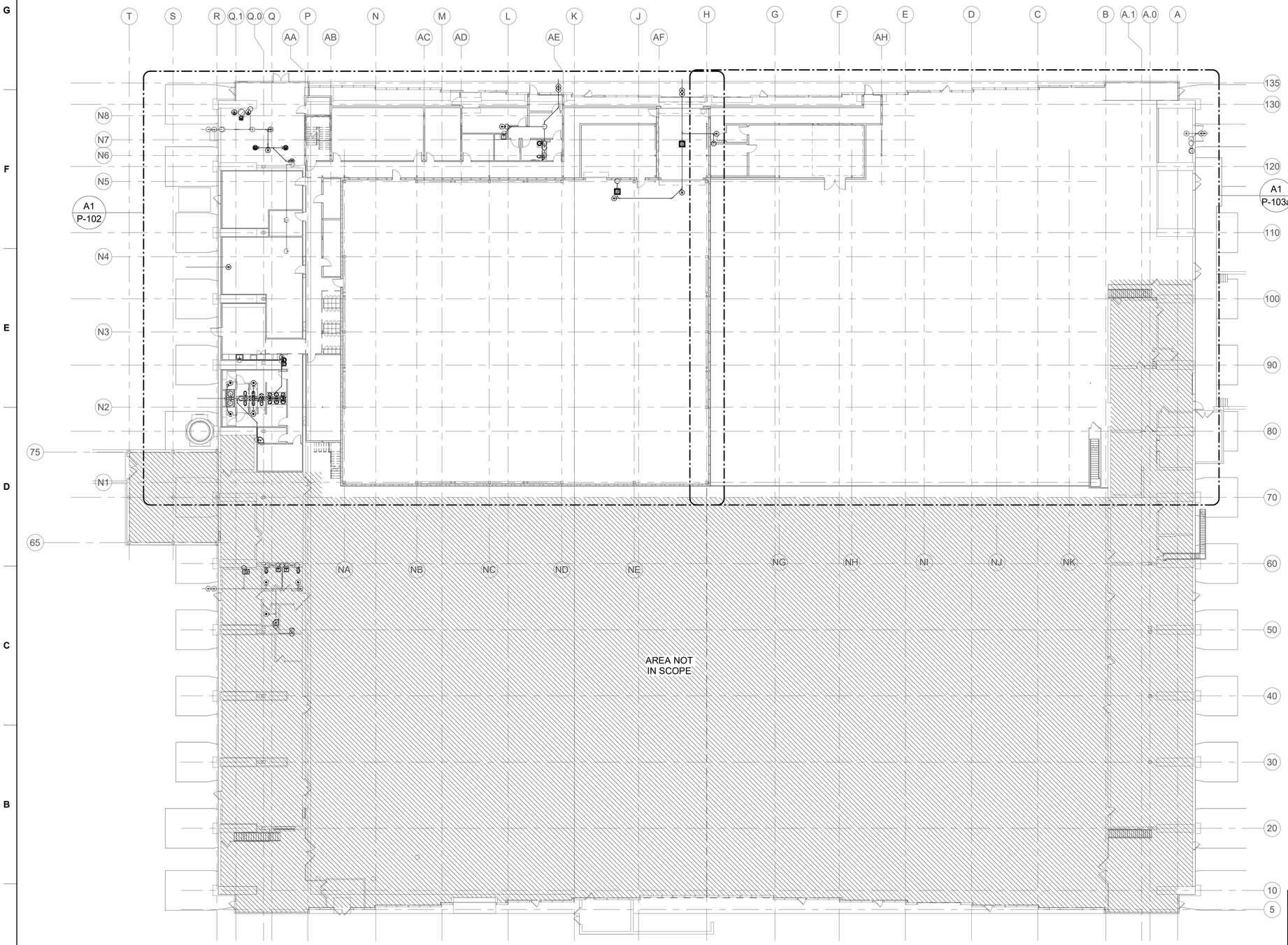
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL DEMOLITION PLUMBING PLAN - AREA B BID OPTION

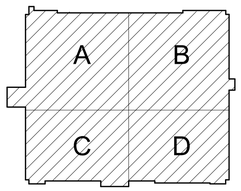
SHEET ID

PD103b

ADVERTISEMENT - 100% DESIGN



A1 OVERALL SANITARY WASTE/VENT PLAN - LEVEL 01
1" = 20'-0"



OVERALL
KEY PLAN

GRAPHIC SCALE
0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN
NORTH
TRUE N

US Army Corps
of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE:
28 APRIL 2023
SOLICITATION NO.:
W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME:
FXBM231802P-101

DESIGNED BY:
K. RHOTEN
DRAWN BY:
K. RHOTEN
CHECKED BY:
J. STAMPER
SUBMITTED BY:
B. DYSON
SPEC
ANSI D 22x34

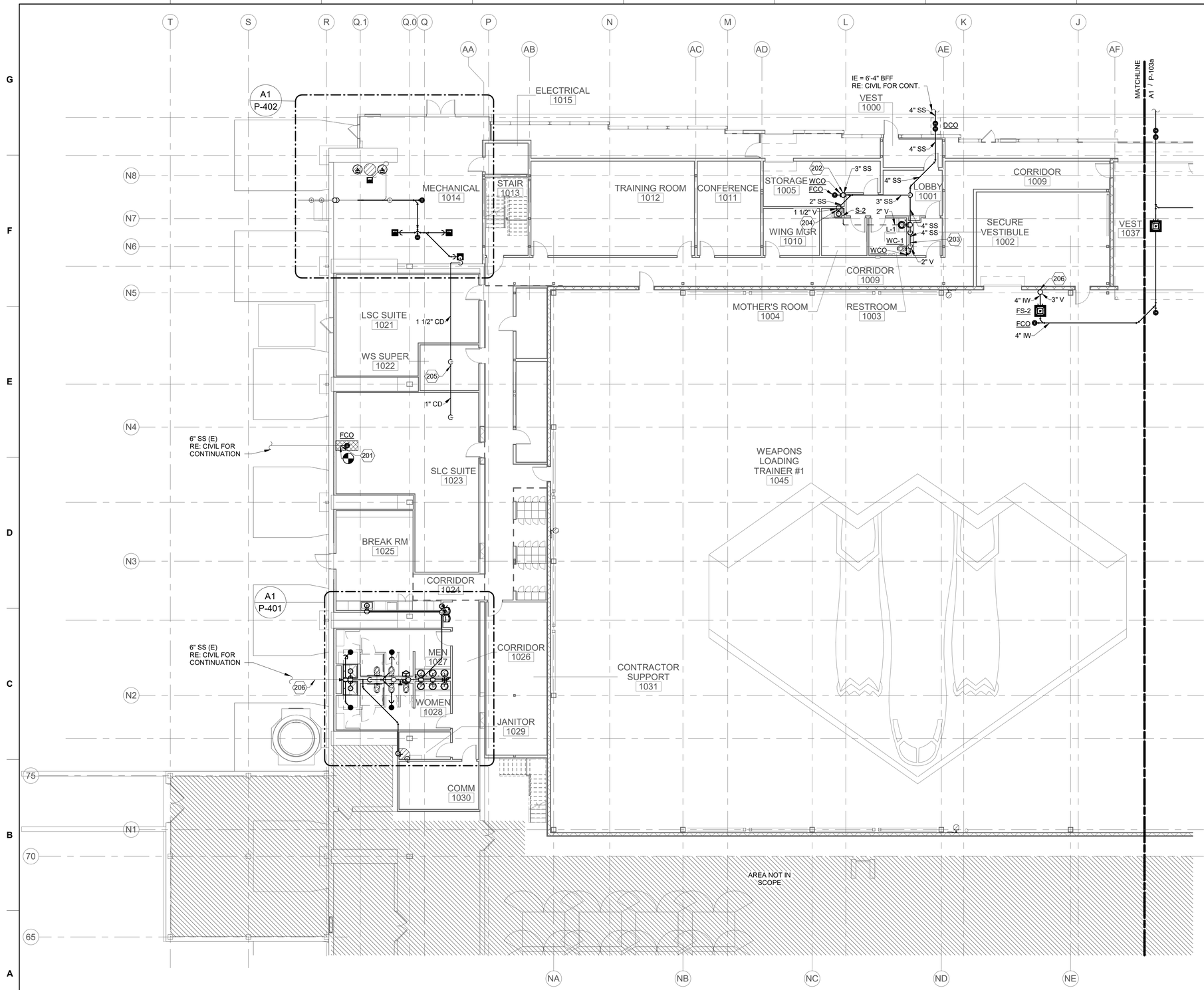
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL SANITARY WASTE/VENT PLAN -
LEVEL 01

SHEET ID
P-101

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL SANITARY WASTE/VENT PLAN - LEVEL 01 - AREA A

3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO CIVIL FOR CONTINUATION OF SERVICES OUT OF THE FACILITY.
3. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
4. REFER TO P-601 FOR PLUMBING SCHEDULES.
5. INVERT ELEVATIONS ARE RELATIVE TO FIRST FLOOR AT THE ELEVATION OF 100'-0".

SHEET KEYNOTES

201 CONNECT NEW 6" SS PIPING AT POINT INDICATED AND TERMINATE AT FLOOR CLEAN OUT.

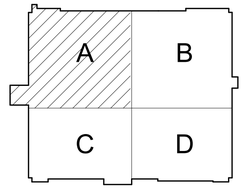
202 3" SS FROM ABOVE. RE: A1/P-122 FOR CONTINUATION.

203 4" SS UNDER 2" V.

204 COMBINE 1 1/2" V FROM MOTHERS ROOM SINK (S-2) WITH 2" V FROM RESTROOM 1003 AND ROUTE 2" V UP. RE: A1/P-122 FOR CONTINUATION.

205 COMBINE 1" CONDENSATE DRAIN LINES AND ROUTE ABOVE CEILING. TERMINATE 1 1/2" CD AT FLOOR SINK (FS-1) IN MECHANICAL ROOM WITH A 3" AIR GAP. RE: A1/P-402.

206 3" V UP. RE: P-122 FOR CONTINUATION.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-102

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

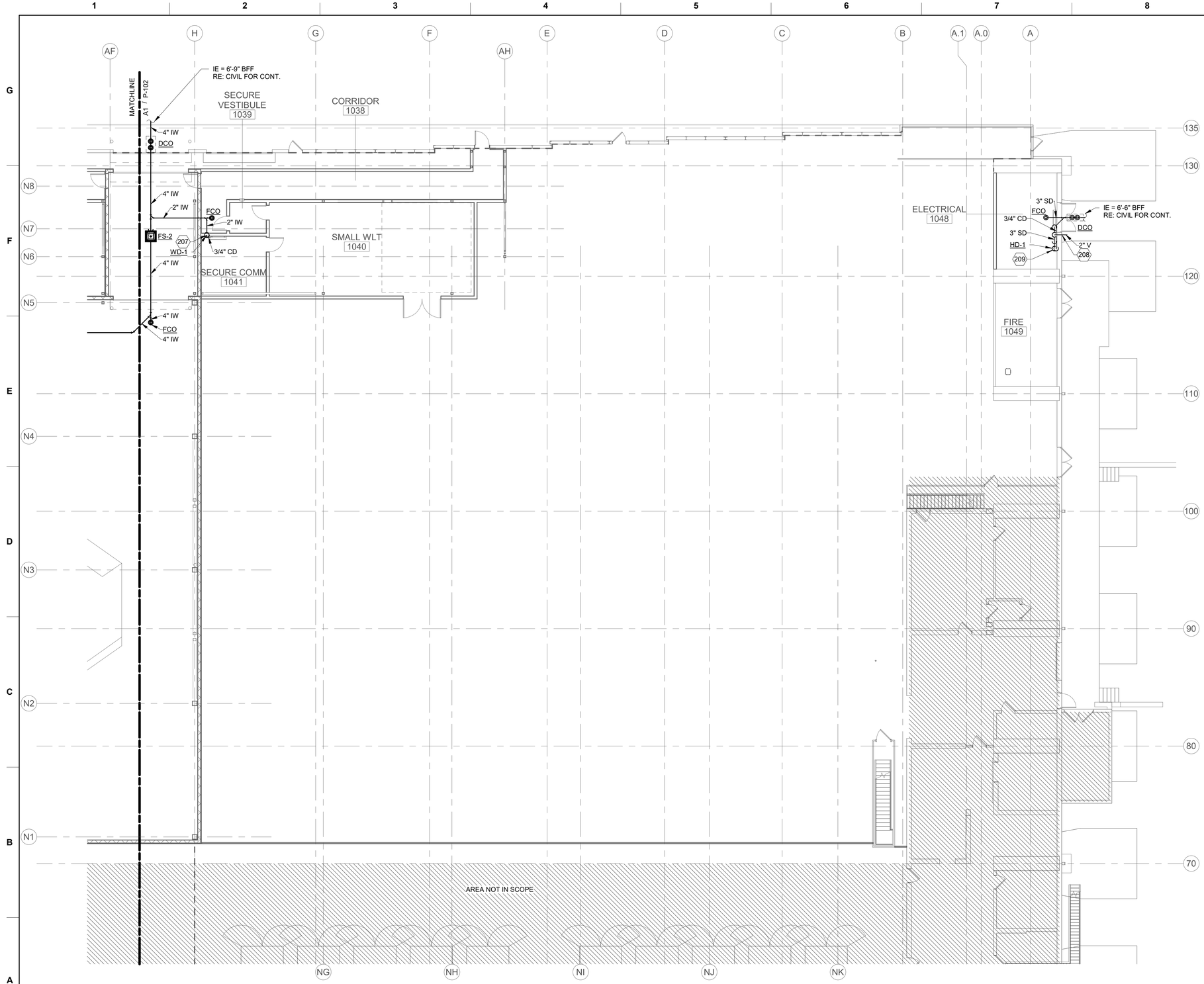
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL SANITARY WASTE/VENT PLAN - LEVEL 01 - AREA A

SHEET ID

P-102

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL SANITARY WASTE/VENT PLAN - LEVEL 01 - AREA B

3/32" = 1'-0"

GENERAL SHEET NOTES

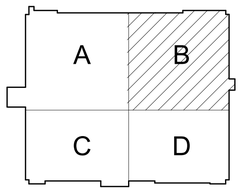
1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO CIVIL FOR CONTINUATION OF SERVICES OUT OF THE FACILITY.
3. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
4. REFER TO P-601 FOR PLUMBING SCHEDULES.
5. INVERT ELEVATIONS ARE RELATIVE TO FIRST FLOOR AT THE ELEVATION OF 100'-0".

SHEET KEYNOTES

207 TERMINATE 3/4" CD FROM SPLIT SYSTEM (SSAC-2) IN WALL BOX DRAIN (WD-1).

208 ROUTE NEW 2" VENT ALONG WALL AND TERMINATE AT A MINIMUM OF 10' 0" AFF. RE: A4/P-501 FOR SIDEWALL VENT DETAIL.

209 ROUTE 3/4" CONDENSATE FROM SPLIT SYSTEM ALONG WALL AND DOWN TO HUB DRAIN (HD-1). TERMINATE WITH A MINIMUM 2" AIR GAP. SECURE PIPE TO WALL AS REQUIRED.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4" 8" 16" 32"

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-103a

US ARMY CORPS OF ENGINEERS
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OMAHA, NEBRASKA

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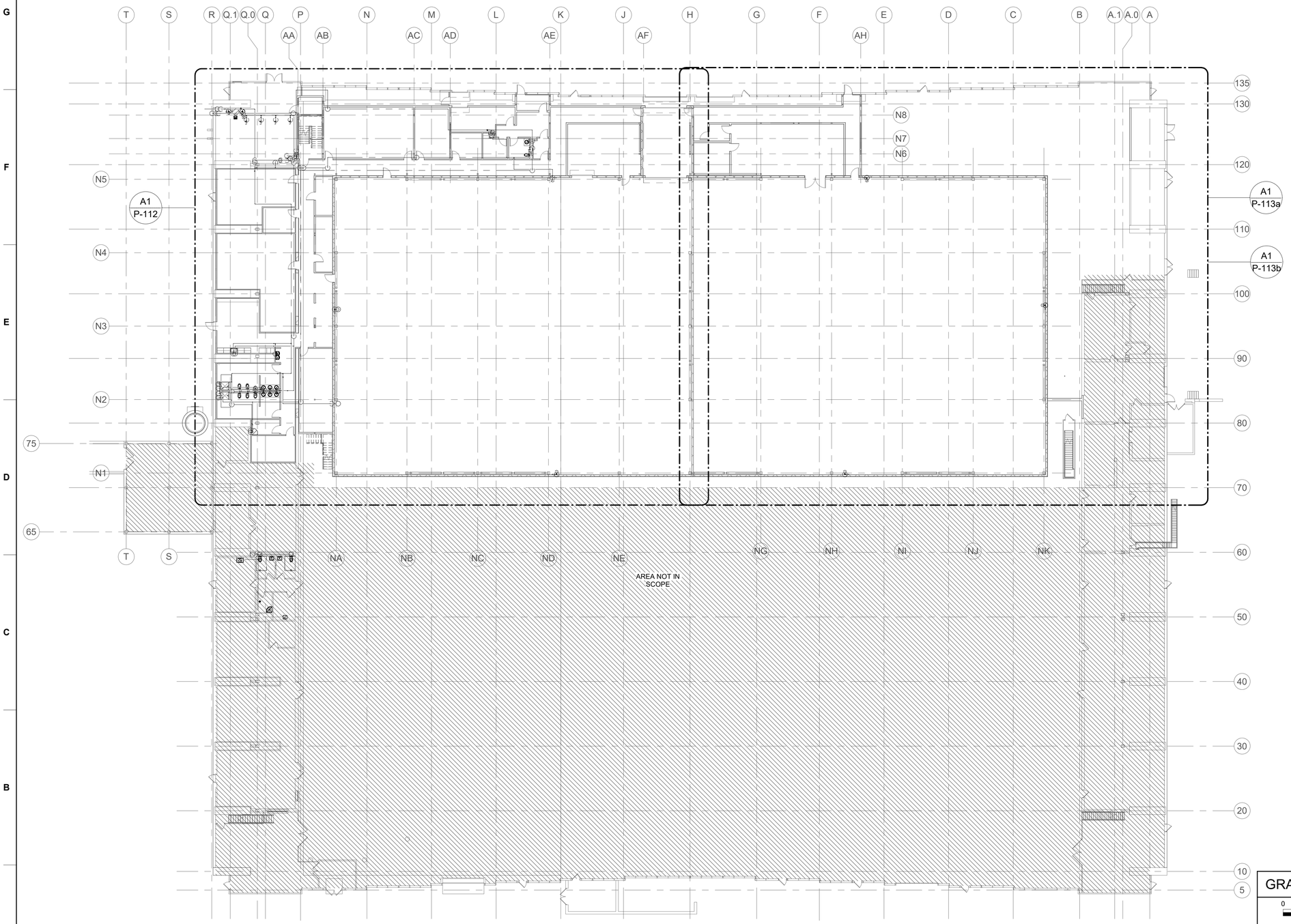
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL SANITARY WASTE/VENT PLAN - LEVEL 01 - AREA B

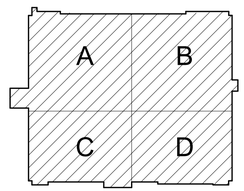
SHEET ID

P-103a

ADVERTISEMENT - 100% DESIGN



A1 OVERALL DOMESTIC WATER & GAS PLAN - LEVEL 01
1" = 20'-0"



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-111

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
QC BY:
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

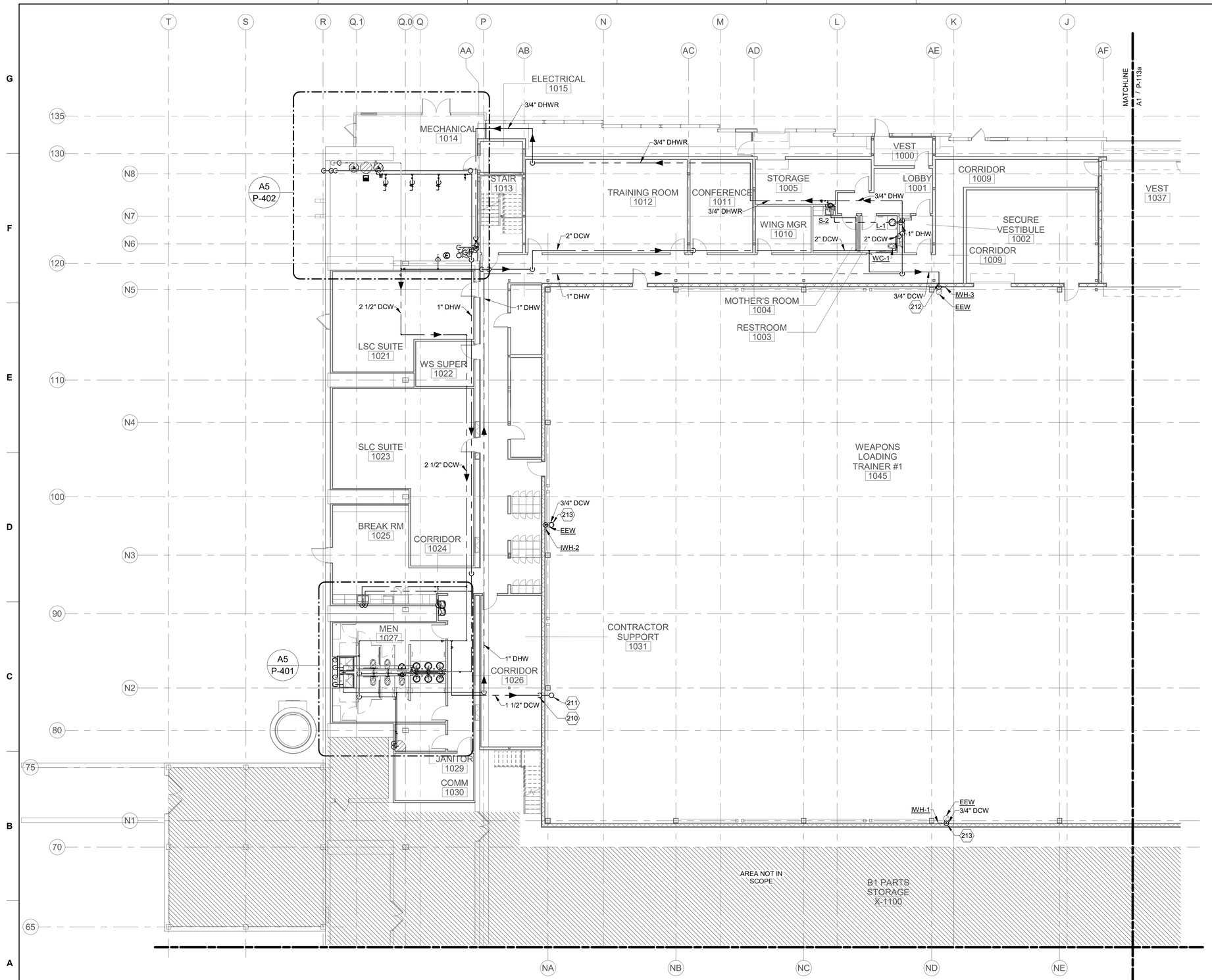
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL DOMESTIC WATER & GAS PLAN
- LEVEL 01

SHEET ID

P-111

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL DOMESTIC WATER & GAS PLAN - LEVEL 01 - AREA A

3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

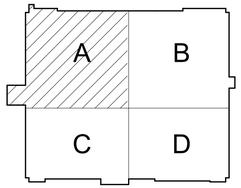
SHEET KEYNOTES

210 ROUTE 1 1/2" DCW BELOW SECURE BOUNDARY AND ENTER WLT AT 9' 0" AFF.

211 1 1/2" DCW UP. RE: A1/P-122 FOR CONTINUATION.

212 PROVIDE UL LISTED DIELECTRIC PIPE BREAK WITH NO. 4 WIRE (0.2043 DIAMETER COPPER WIRE) AT PIPE ENTRANCE TO SECURE AREA.

213 3/4" DCW FROM ABOVE. RE: A1/P-122 FOR CONTINUATION.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-112

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

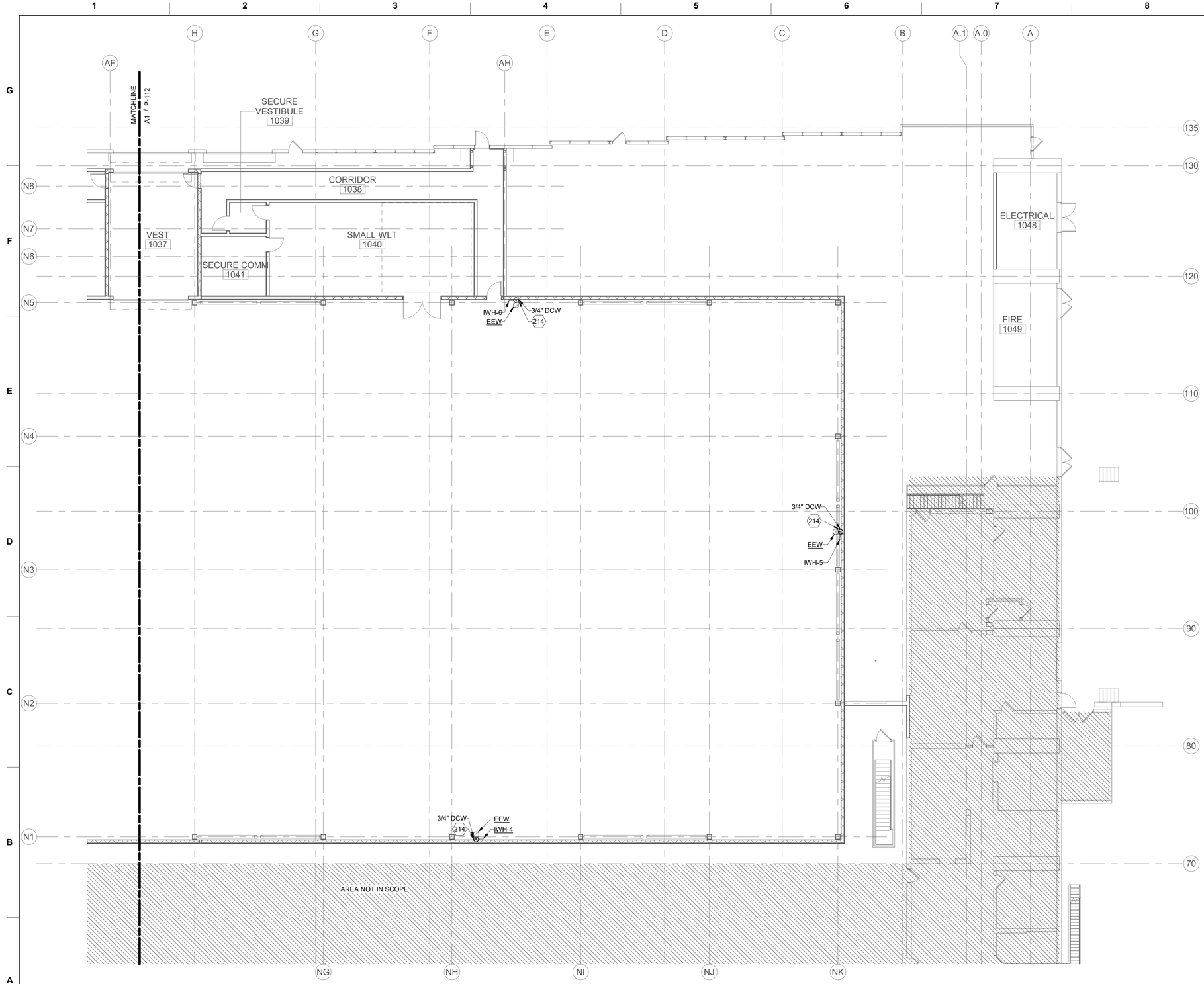
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL DOMESTIC WATER & GAS PLAN - LEVEL 01 - AREA A

SHEET ID

P-112

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL DOMESTIC WATER & GAS PLAN - LEVEL 01 - AREA B BID OPTION

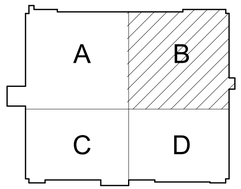
3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

SHEET KEYNOTES

214 3/4" DCW FROM ABOVE. RE: A1/P-123b FOR CONTINUATION.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4" 8" 16" 32"

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-113b

US ARMY CORPS OF ENGINEERS
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OMAHA, NEBRASKA

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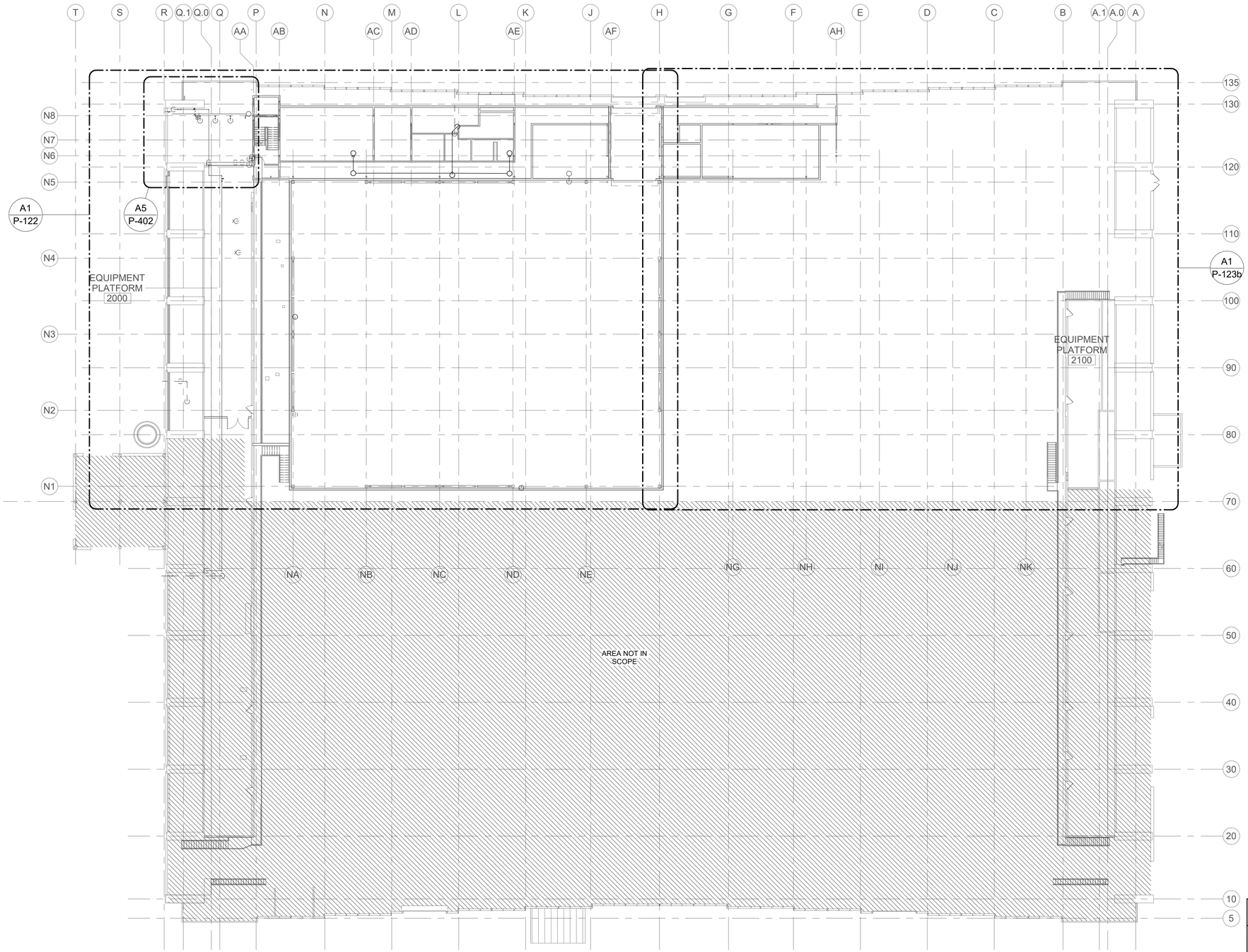
ST. LOUIS, MISSOURI 63110

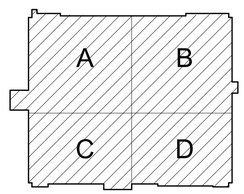
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL DOMESTIC WATER & GAS PLAN - LEVEL 01 - AREA B BID OPTION

SHEET ID

P-113b

ADVERTISEMENT - 100% DESIGN





OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN
NORTH

TRUE N

A1 OVERALL FLOOR PLAN - EQUIPMENT PLATFORM 01

1" = 20'-0"

ADVERTISEMENT - 100% DESIGN

US Army Corps
of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE:
28 APRIL 2023
SOLICITATION NO.:
W9128P23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME:
FXBM231802P-121

DESIGNED BY:
K. RHOTEN
DRAWN BY:
K. RHOTEN
CHECKED BY:
J. STAMPER
SUBMITTED BY:
B. DYSON
SCALE:
ANSI D 22x34

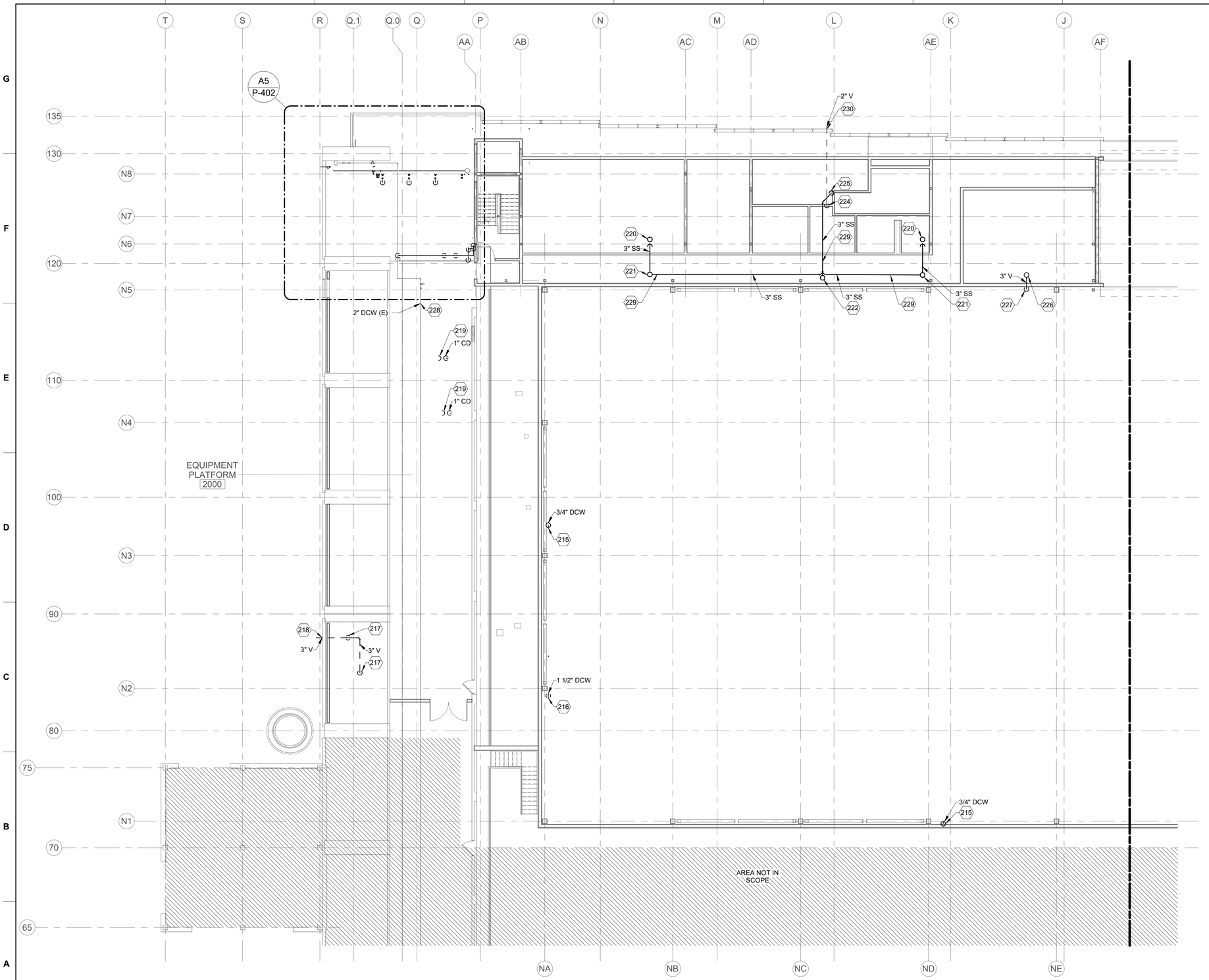
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL FLOOR PLAN - EQUIPMENT
PLATFORM 01

SHEET ID

P-121



A1 PARTIAL PLUMBING FLOOR PLAN - EQUIPMENT PLATFORM 01 - AREA A

3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

SHEET KEYNOTES

215 3/4" DCW FROM ABOVE. RE: A1/P-132 FOR CONTINUATION.

216 1 1/2" DCW UP. RE: A1/P-132 FOR CONTINUATION.

217 3" V FROM BELOW. RE: A1/P-401 FOR CONTINUATION.

218 INSTALL NEW 3" SIDEWALL VENT AT 11' 10" AFF. RE: A4/P-501 FOR VENT PIPE PENETRATION DETAIL.

219 ROUTE 1" CD THROUGH EQUIPMENT PLATFORM 1 FINISHED FLOOR TO ABOVE CEILING OF LEVEL 1. RE: P-102 FOR PIPE CONTINUATION.

220 3" SS FROM FLOOR SINK (FS-1) ABOVE. RE: A1/P-132 FOR CONTINUATION.

221 3" SS FROM ABOVE. RE: A1/P-132 FOR CONTINUATION.

222 3" SS FROM FLOOR CLEAN OUT (FCO) ABOVE. RE: A1/P-132 FOR CONTINUATION.

223 2" V FROM BELOW. RE: A1/P-102 FOR CONTINUATION.

224 2" V UP. RE: A1/P-102 FOR CONTINUATION.

225 3" SS DOWN. RE: A1/P-102 FOR CONTINUATION.

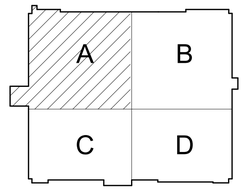
226 ROUTE 4" V THROUGH WALL AT 16' 0" AFF THEN UP TO EQUIPMENT PLATFORM 2. RE: A1/P-131a FOR CONTINUATION. RE: P-701 FOR RISER DIAGRAM.

227 3" V FROM BELOW. RE: A1/P-102 FOR CONTINUATION.

228 EXISTING 2" DCW ROUTED IN EQUIPMENT PLATFORM 01 TO REMAIN.

229 ROUTE 3" SS MAIN BELOW EQUIPMENT PLATFORM 2 DECK.

230 INSTALL NEW 2" SIDEWALL VENT AT 12' 6" AFF. RE: A4/P-501 FOR VENT PIPE PENETRATION DETAIL.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802P-122

US ARMY CORPS OF ENGINEERS
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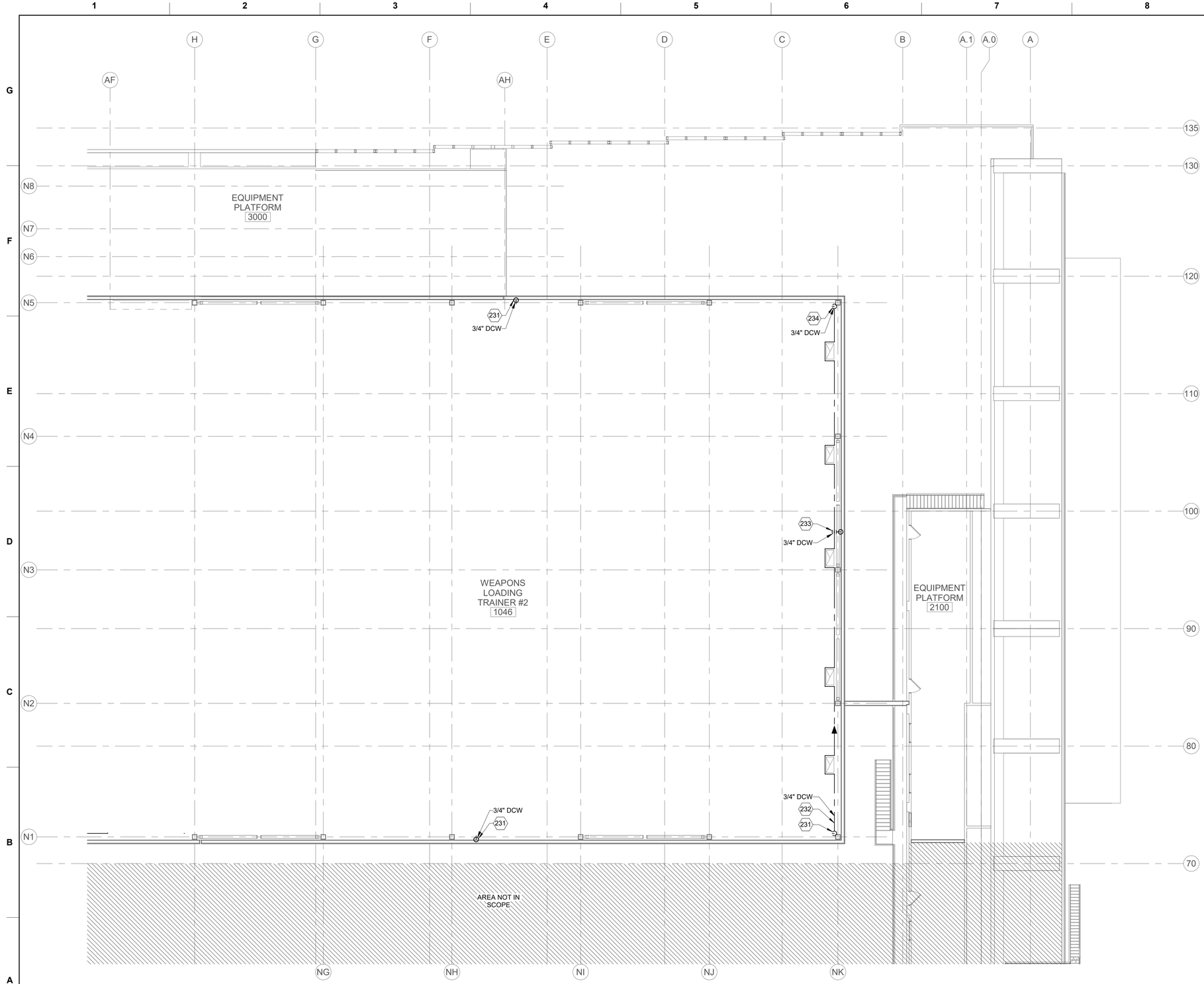
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL FLOOR PLAN - EQUIPMENT
PLATFORM 01 - AREA A

SHEET ID

P-122

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL PLUMBING FLOOR PLAN - EQUIPMENT PLATFORM 01 - AREA B BID OPTION

3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

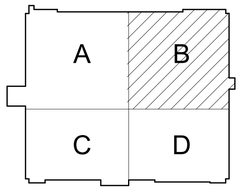
SHEET KEYNOTES

231 3/4" DCW FROM ABOVE. RE: A1/P-133b FOR CONTINUATION.

232 ROUTE 3/4" DCW MAIN AT 18' 0" AFF TIGHT TO WLT BAY WALL. OFFSET AROUND LOW WALL EXHAUST DUCTWORK AS SHOWN. SECURE PIPING TO WALL AS REQUIRED.

233 ROUTE 3/4" DCW DOWN TO INSTANTANEOUS WATER HEATER (IHW-5). RE: A1/P-113b FOR CONTINUATION.

234 3/4" DCW UP. RE: A1/P-133b FOR CONTINUATION.



AREA B
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-123b

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

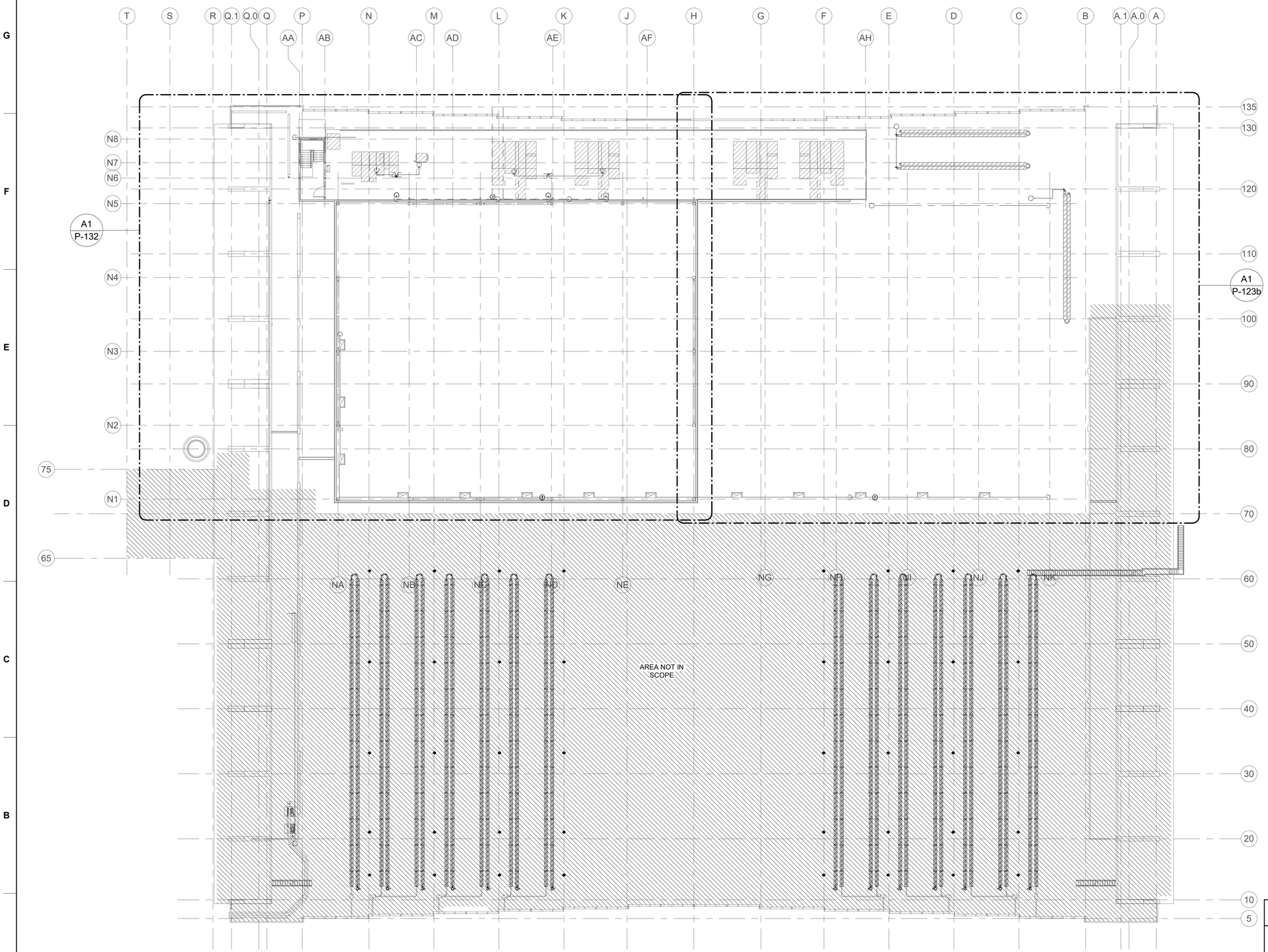
jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

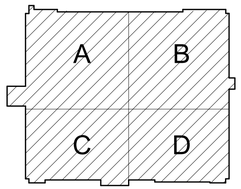
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL FLOOR PLAN - EQUIPMENT PLATFORM 01 - BID OPTION

SHEET ID

P-123b

ADVERTISEMENT - 100% DESIGN





OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN
NORTH

TRUE N

A1 OVERALL FLOOR PLAN - EQUIPMENT PLATFORM 02

1" = 20'-0"

ADVERTISEMENT - 100% DESIGN

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-131

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

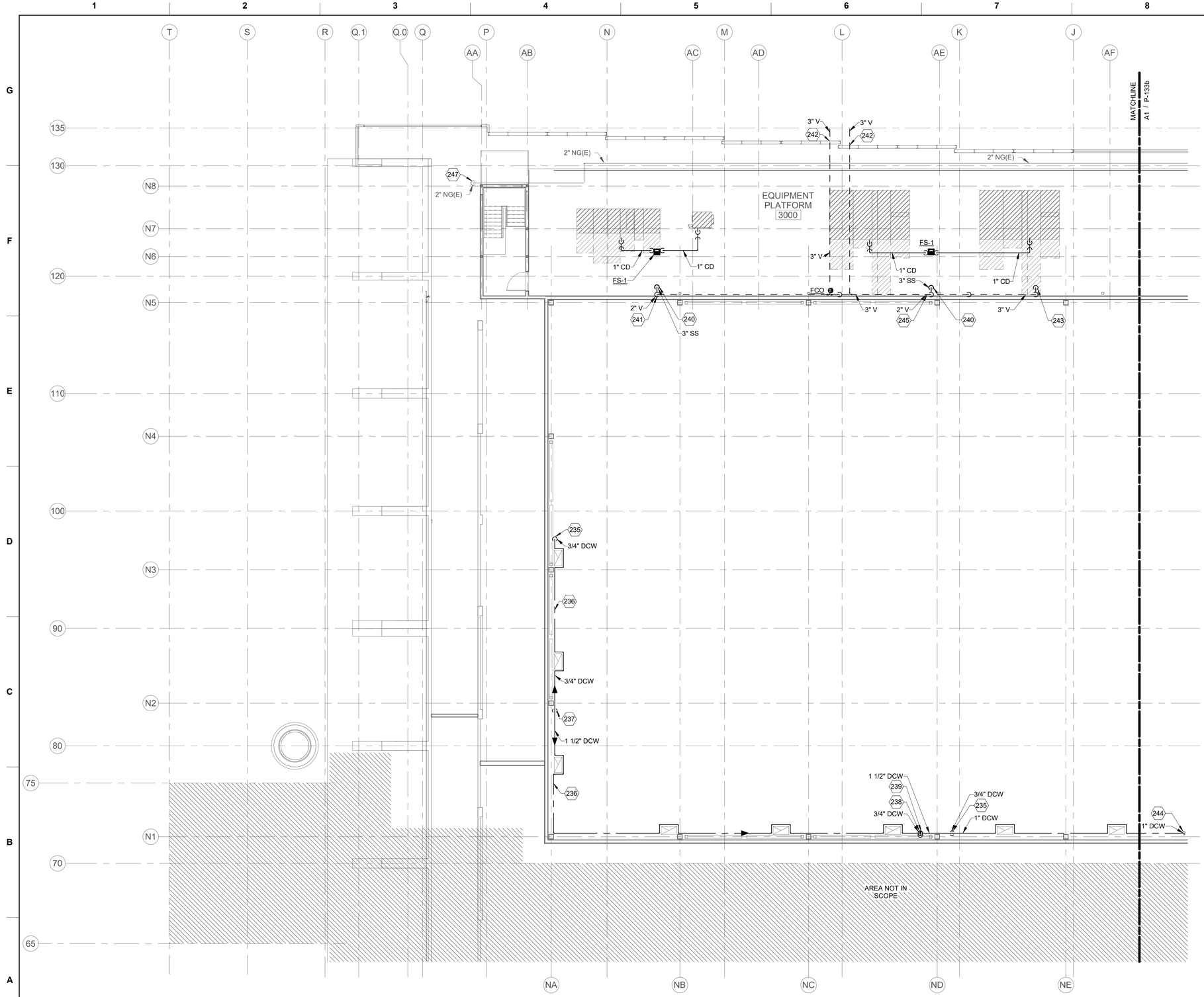
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL FLOOR PLAN - EQUIPMENT PLATFORM 02

SHEET ID

P-131



A1 OVERALL FLOOR PLAN - EQUIPMENT PLATFORM 02 - BASE BID

3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

SHEET KEYNOTES

235 3/4" DCW DOWN. OFFSET IN VERTICAL PIPE AROUND EXHAUST DUCT AS NECESSARY. RE: A1/P-122 FOR CONTINUATION.

236 ROUTE 1 1/2" DCW MAIN AT 20' 0" AFF TIGHT TO WLT BAY WALL. OFFSET AROUND LOW WALL EXHAUST DUCTWORK AS SHOWN. SECURE PIPING TO WALL AS REQUIRED.

237 1 1/2" DCW FROM BELOW. RE: A1/P122 FOR CONTINUATION.

238 3/4" DCW UP. INSTALL RPZ-1 VERTICALLY PER THE MANUFACTURER'S RECOMMENDATIONS AT A MINIMUM HEIGHT OF 35' 0" AFF. OFFSET AROUND EXHAUST DUCT AS NECESSARY.

239 PROVIDE AND INSTALL 3/4" CW LINE WITH VALVE AND CAP FOR CONNECTION BY DEVICE VENDOR TO SERVE HUMIDIFIER ON THE SELF-CONTAINED DEVICE HVAC UNIT. RE: A1/P133b FOR CONTINUATION.

240 3" SS DOWN. RE:A1/P-122 FOR CONTINUATION.

241 ROUTE 2" VENT UP AND TIGHT ALONG WALL. SECURE PIPE TO WALL AS REQUIRED.

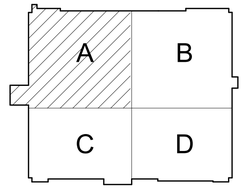
242 INSTALL NEW 3" SIDEWALL VENT AT 27' 6" AFF. RE: A4/P-501 FOR VENT PIPE PENETRATION DETAIL.

243 3" V UP THROUGH EQUIPMENT PLATFORM 2 DECK. ROUTE TIGHT TO WALL AND SECURE AS REQUIRED. RE: A1/P-122 FOR CONTINUATION.

244 ADD VALVE AND CAP FOR CONNECTION TO BID OPTION WORK. RE: A1/P133b FOR CONTINUATION.

245 ROUTE 2" SANITARY VENT UNDER 3" INDUSTRIAL WASTE VENT. ROUTE TIGHT TO WALL AND SECURE AS REQUIRED.

247 EXISTING TO REMAIN 2" NATURAL GAS FROM BELOW. RE: A5/P-402.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-132

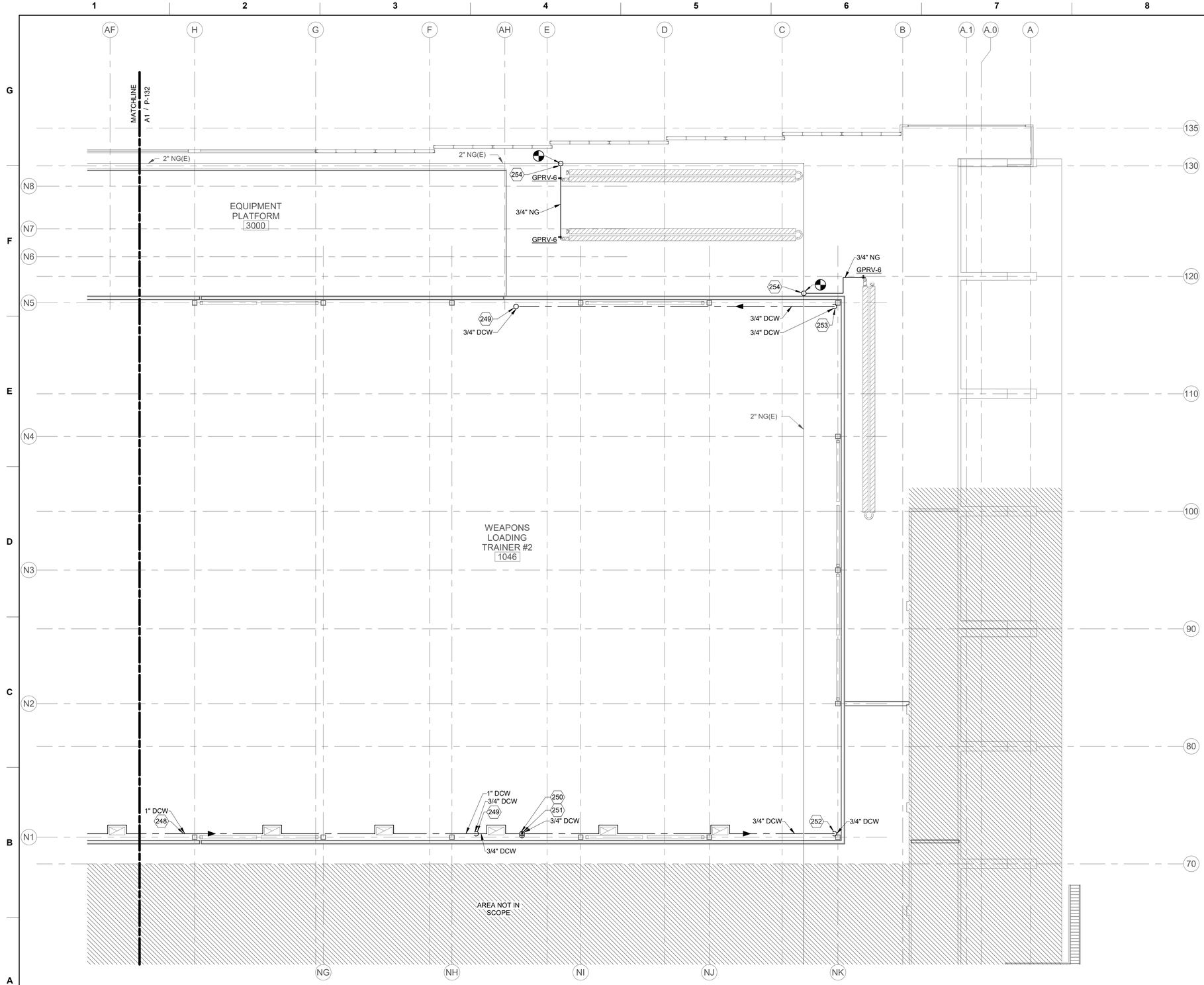
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL FLOOR PLAN - EQUIPMENT PLATFORM 02 - AREA A

SHEET ID
P-132

ADVERTISEMENT - 100% DESIGN



A1 OVERALL FLOOR PLAN - EQUIPMENT PLATFORM 02 - BID OPTION

3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

SHEET KEYNOTES

248 CONNECT BID OPTION 1" DCW MAIN TO BASE BID DCW MAIN AND ROUTE AT 20' 0" AFF TIGHT TO WLT BAY WALL. OFFSET AROUND LOW WALL EXHAUST DUCTWORK AS SHOWN. SECURE PIPING TO WALL AS REQUIRED.

249 3/4" DCW DOWN. OFFSET IN VERTICAL PIPE AROUND EXHAUST DUCT AS NECESSARY. RE: A1/P-123b FOR CONTINUATION.

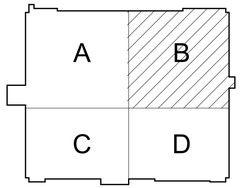
250 3/4" DCW UP. INSTALL RPZ-2 VERTICALLY PER THE MANUFACTURER'S RECOMMENDATIONS AT A MINIMUM HEIGHT OF 35' 0" AFF. OFFSET AROUND EXHAUST DUCT AS NECESSARY.

251 PROVIDE AND INSTALL 3/4" CW LINE WITH VALVE AND CAP FOR FUTURE CONNECTION BY DEVICE VENDOR TO SERVE HUMIDIFIER ON THE SELF-CONTAINED DEVICE HVAC UNIT.

252 3/4" DCW DOWN. RE: A1/P-123b FOR CONTINUATION

253 3/4" DCW FROM BELOW. RE: A1/P-123b FOR CONTINUATION.

254 CONNECT NEW 3/4" NG PIPE TO EXISTING 2" NG PIPE MAIN. ROUTE NEW 3/4" NG PIPE DOWN AND CONNECT TO IH-1(BO), IH-2 (BO) AND IH-3(BO) WITH NEW PRESSURE REGULATING VALVE AT EACH HEATER. RE: MECH FOR RADIANT HEATER ELEVATIONS.



AREA B
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	28 APRIL 2023
SOLICITATION NO.:	W9128F23R0012
CONTRACT NO.:	
DRAWING CODE:	-
FILE NAME:	FXBM231802P-133b
DESIGNED BY:	K. RHOTEN
DRAWN BY:	K. RHOTEN
CHECKED BY:	J. STAMPER
SUBMITTED BY:	B. DYSON
PLOT SIZE:	ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

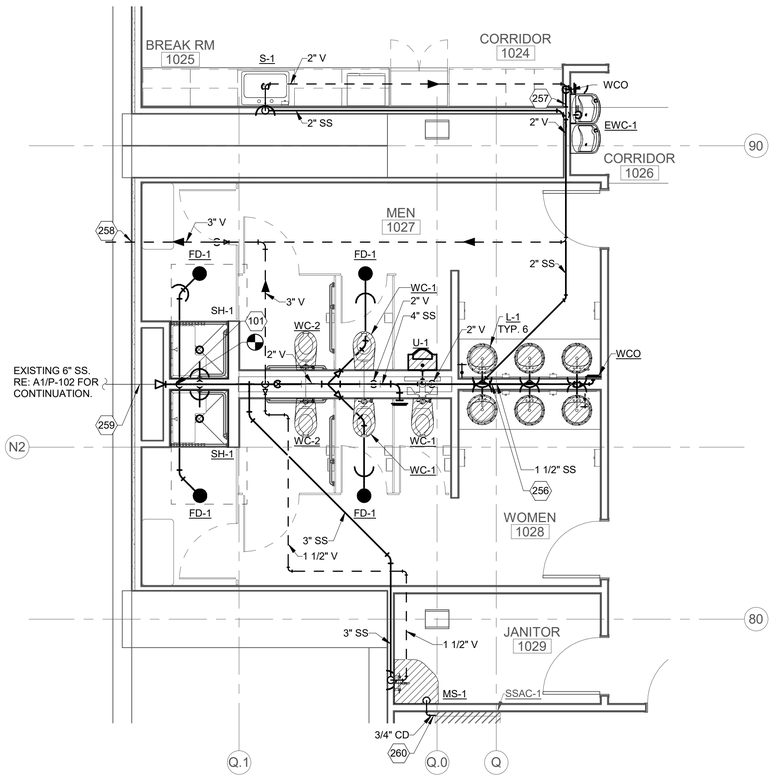
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL FLOOR PLAN - EQUIPMENT
PLATFORM 02 - BID OPTION

SHEET ID

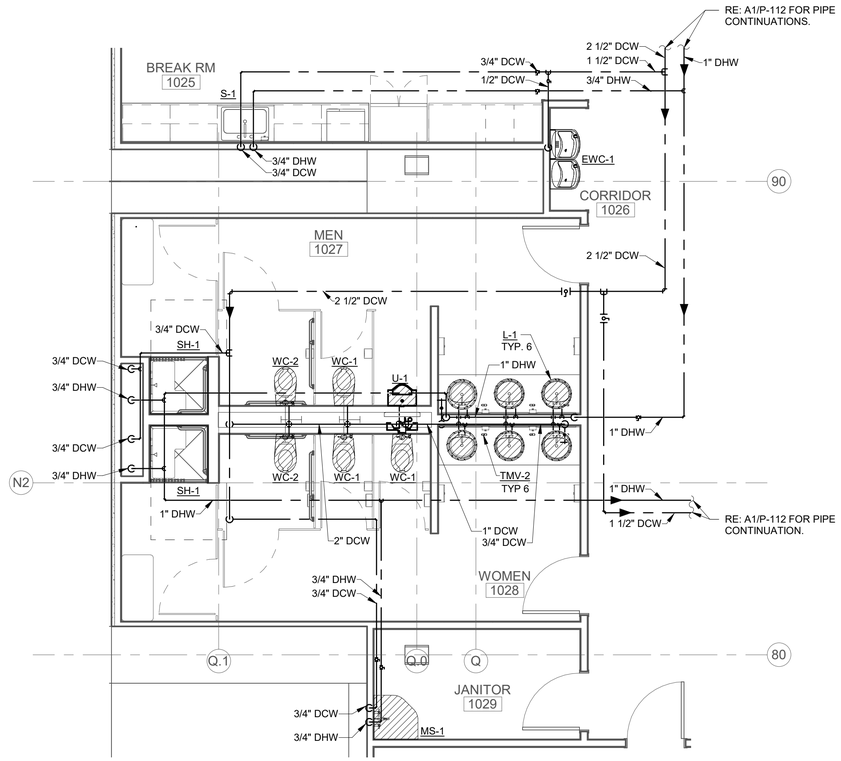
P-133b

ADVERTISEMENT - 100% DESIGN



A1 RESTROOM SANITARY ENLARGED PLAN

1/4" = 1'-0"



A5 RESTROOM DOMESTIC WATER ENLARGED PLAN

1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

SHEET KEYNOTES

101 DEMOLISH SECTION OF 6" SS PIPING INDICATED TO BELOW SLAB. CUT, CAP AND ABANDON UPSTREAM SANITARY LINE BELOW SLAB AND PREPARE REMAINING PIPING FOR NEW CONNECTION WITH CLEAN OUT. RE: A1/P-102 FOR NEW CONNECTION.

256 4" SS MAIN UNDER 1 1/2" SS.

257 2" SS UNDER 2"V.

258 INSTALL NEW 3" SIDEWALL VENT AT 11' 10" AFF. RE: A4/P-501 FOR SIDEWALL VENT PIPE PENETRATION DETAIL.

259 EXISTING 6" SS TO REMAIN FOR NEW CONNECTION INSIDE RESTROOM.

260 ROUTE 3/4" CONDENSATE PIPE SERVING SSAC-1 TO MOP SINK IN JANITORS CLOSET AND TERMINATE WITH A MINIMUM 3" AIR GAP.

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802P-401

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

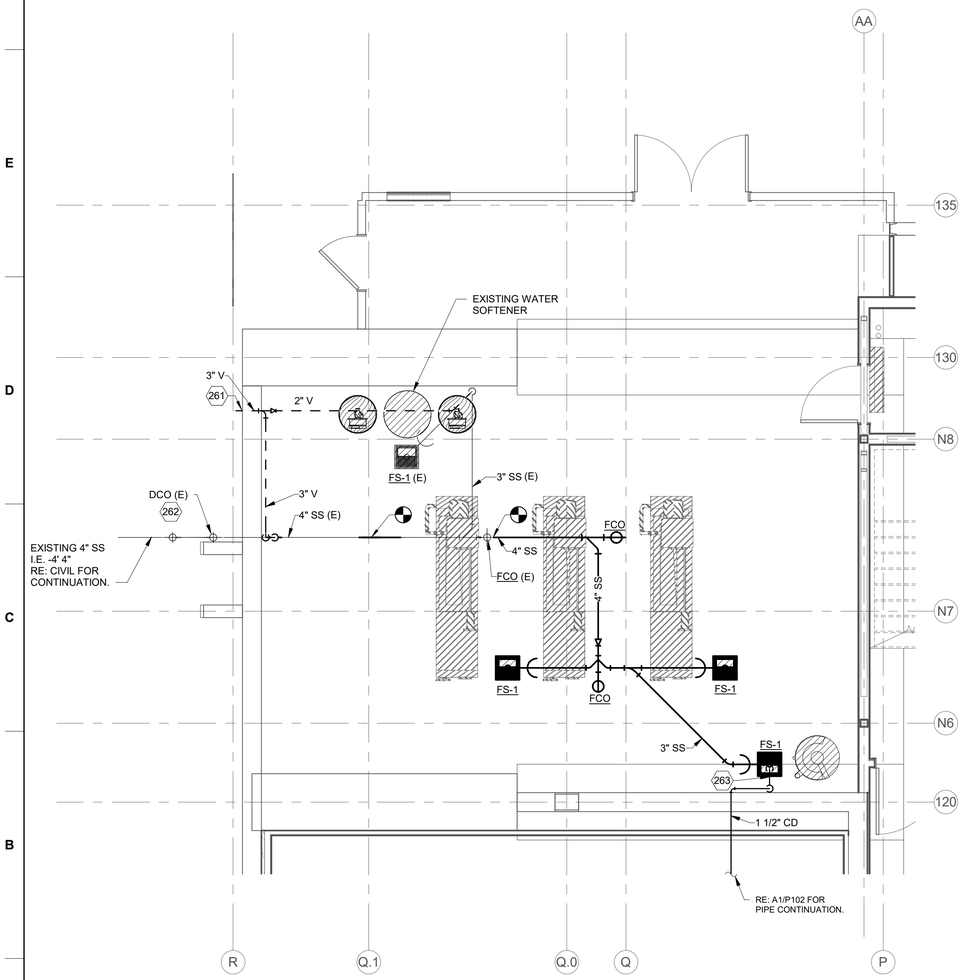
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PLUMBING ENLARGED PLANS

SHEET ID

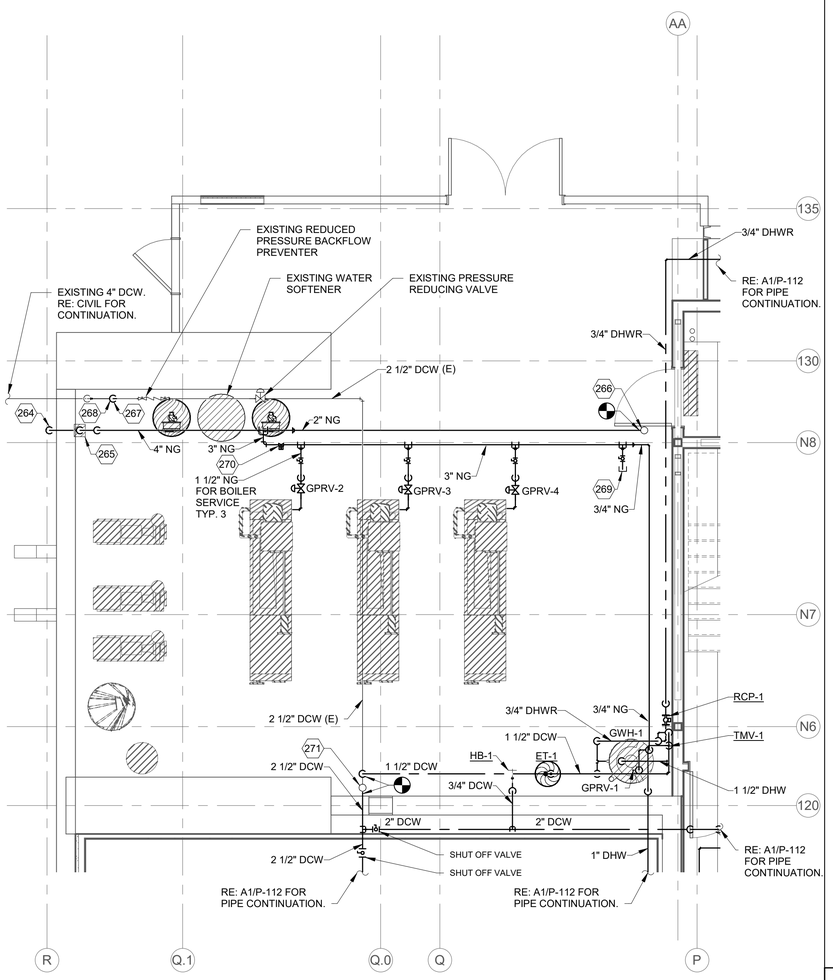
P-401

ADVERTISEMENT - 100% DESIGN



A1 MECH ROOM ENLARGED SANITARY WASTE VENT PLAN

1/4" = 1'-0"



A5 MECHANICAL ROOM DOMESTIC WATER & GAS ENLARGED PLAN - BASE BID

1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

SHEET KEYNOTES

261 INSTALL NEW 3" SIDEWALL VENT AT 11' 8" AFF. RE: A4/P-501 FOR SIDEWALL VENT PIPE PENETRATION DETAIL.

262 RE: D1/P-501 FOR TWO -WAY CLEANOUT DETAIL

263 ROUTE 1 1/2" CD LINE DOWN WALL AND TERMINATE WITH A MINIMUM 3" AIR GAP. SECURE PIPING TO WALL AS REQUIRED.

264 CONNECT NEW 4" GAS LINE TO EXISTING METER AND REGULATOR ASSEMBLY AND ENTER BUILDING AT 5' 8" AFF. ROUTE GAS PIPING UP ALONG WALL TO 11' 8" AFF. RE: A1/P-501 FOR PIPE PENETRATION DETAIL.

265 PROVIDE AND INSTALL VOLUMETRIC TYPE GAS METER ON WALL WITH DIGITAL READ OUT AND TIED INTO BAS FOR EAFB MONITORING.

266 EXISTING 2' NG UP. RE: A1/P-132 FOR CONTINUATION.

267 EXISTING 2 1/2" DCW MAIN UP THROUGH SLAB.

268 EXISTING DIGITAL DOMESTIC WATER METER PROVIDED UNDER B-1 PARTS PROJECT.

269 PROVIDE 1 1/2" NG PIPE WITH VALVE AND CAP IN BASE BID. RE: A1/P-403 FOR BID OPTION INFORMATION.

270 PROVIDE AND INSTALL NEW AUTOMATIC GAS SOLENOID SHUT-OFF VALVE. INTERLOCK WITH BOILER EPO SWITCH. REFERENCE MECHANICAL FOR SWITCH LOCATIONS.

271 EXISTING 2" DCW MAIN UP TO EQUIPMENT PLATFORM 1 TO SERVE RESTROOM IN AREA C. RE: A1/P-122 FOR CONTINUATION.

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPFER
SUBMITTED BY: B. DYSON
ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-402

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

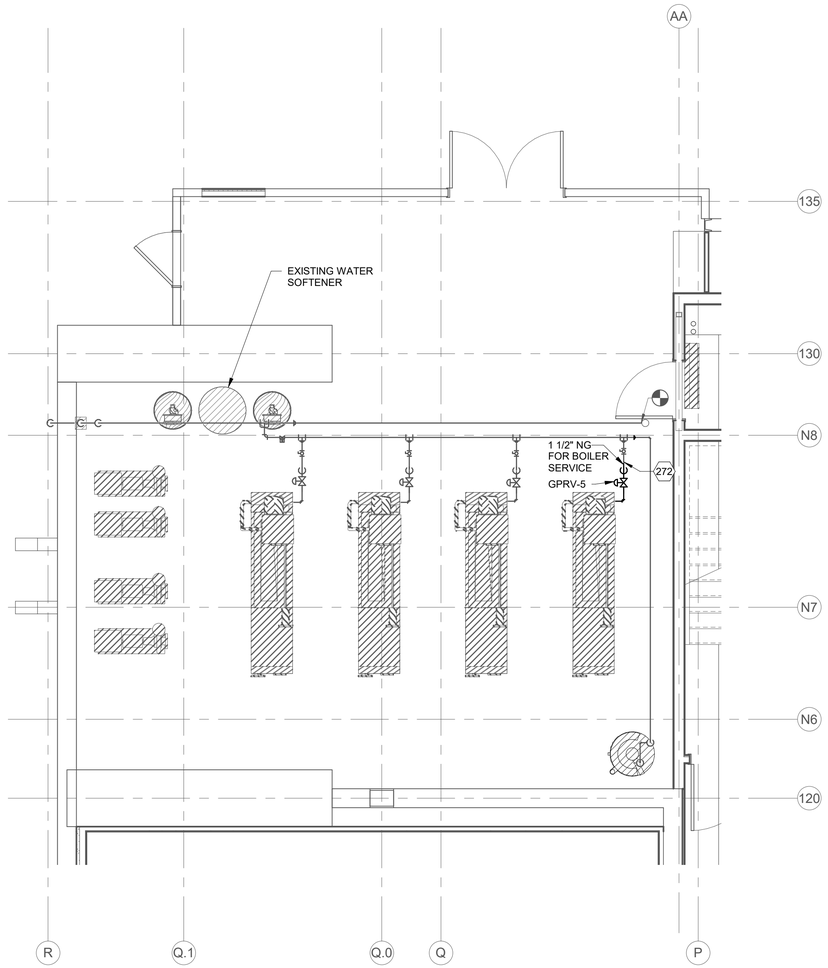
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PLUMBING ENLARGED PLANS - BASE BID

SHEET ID

P-402

ADVERTISEMENT - 100% DESIGN



A1 MECHANICAL ROOM GAS ENLARGED PLAN - BID OPTION

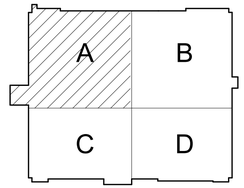
1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING LEGEND AND GENERAL NOTES.
2. REFER TO P-401, P-402 AND P-403 FOR ENLARGED PLANS.
3. REFER TO P-601 FOR PLUMBING SCHEDULES.
4. REFER TO ARCHITECTURE FOR PENETRATION DETAILS THROUGH THE BUILDING ENVELOPE.
5. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
6. REFER TO SECURITY DRAWINGS FOR LOCATIONS OF WALLS CONSTRUCTED TO ICD 705 REQUIREMENTS AND SPECIAL CONSTRUCTION FOR PROTECTION OF PENETRATIONS.

SHEET KEYNOTES

272 EXTEND NEW 1 1/2" NG PIPING AND MAKE CONNECTION TO BID OPTION BOILER.



AREA A
KEY PLAN

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DITSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-403
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

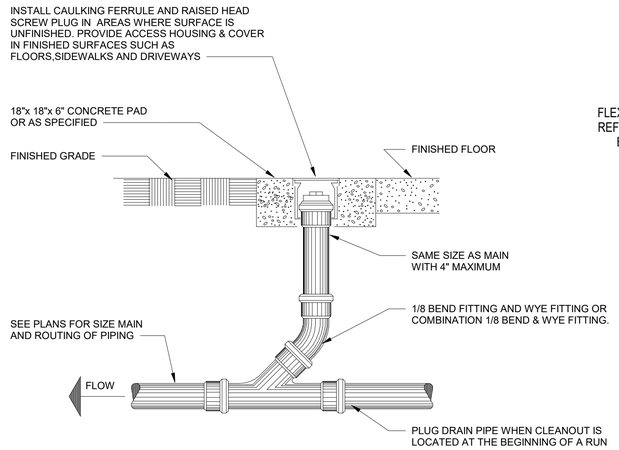
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PLUMBING ENLARGED PLANS - BID OPTION

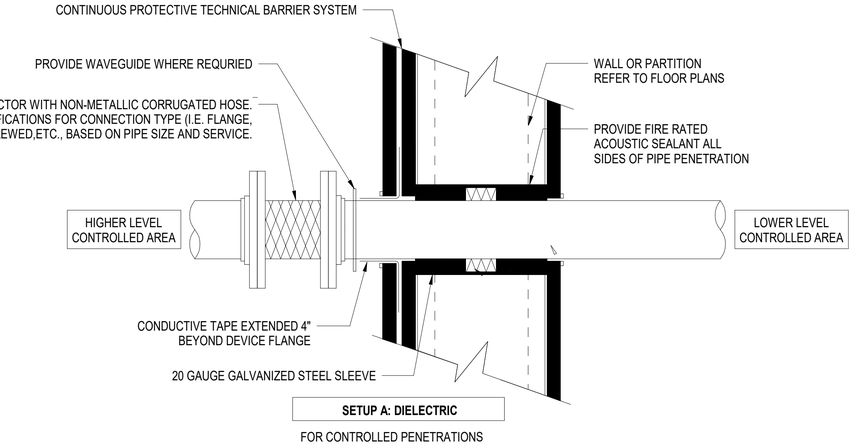
SHEET ID

P-403

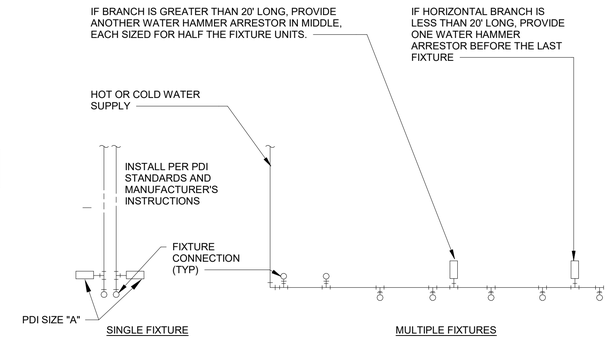
ADVERTISEMENT - 100% DESIGN



E1 FLOOR CLEANOUT DETAIL
NTS



E4 DIELECTRIC PIPE BREAK DETAIL
NTS



SINGLE FIXTURE

PDI SIZE	PIPE SIZE	FIXTURE UNIT LOAD
A	1/2"	1-11
B	3/4"	12-32
C	1"	33-60
D	1 1/4"	61-113
E	1-1/2"	114-154
F	2"	155-330

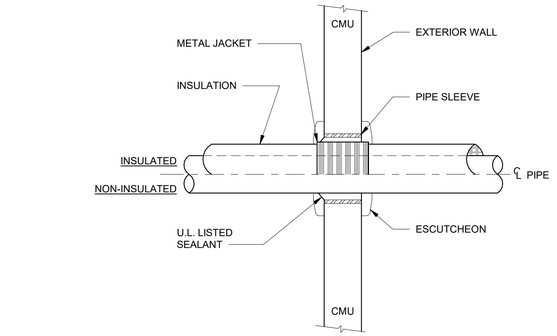
IF STATIC PRESSURE IS GREATER THAN 55 PSIG, USE NEXT LARGER SIZE.

MULTIPLE FIXTURES

FIXTURE UNIT TABULATION		
FIXTURE	COLD	HOT
FLUSH VALVE SERVICE SINK	10	--
FLUSH VALVE WATER CLOSET	8	--
URINAL	4	--
COUNTER SINK	1.5	1.5
LAVATORY	1.5	1.5
MOP BASIN	3	3
WATER COOLER (2 HEADS)	0.5	--
SHOWER	2	3

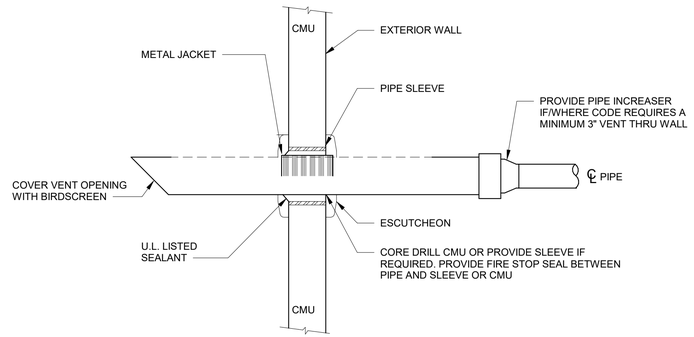
PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUAL WITH PISTON AND O-RING CONSTRUCTION, HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.1M CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN. INSTALL INLINE WITH WATER FLOW DIRECTION IF POSSIBLE. SIZE UNITS PER TABLES ABOVE.

D8 WATER HAMMER ARRESTOR DETAIL
NTS



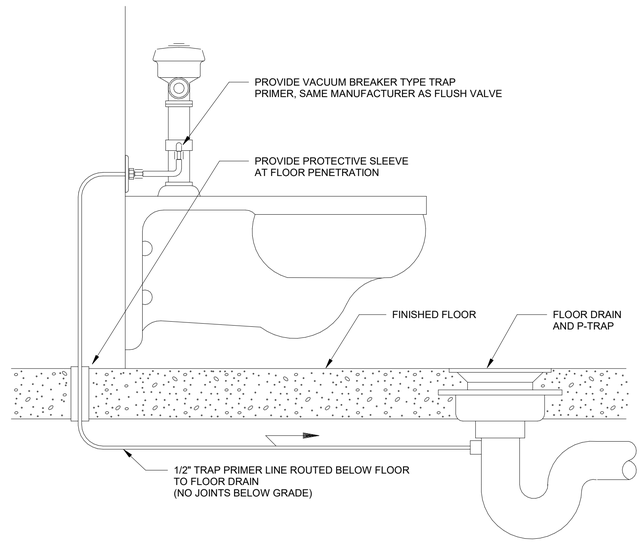
C1 TWO-WAY CLEANOUT DETAIL
NTS

A1 TYPICAL EXTERIOR WALL PIPE PENETRATION DETAIL
NTS



REFER TO PLANS FOR VTR PIPE SIZES AND LOCATIONS. LOCATE VTR MINIMUM THREE FEET FROM PROPERTY LINE, OR TEN FEET HORIZONTAL FROM ANY BUILDING OPENING OR FRESH AIR INTAKE. LOCATE VTR MINIMUM 18" FROM EXPANSION JOINT. OFFSET IN CEILING SPACE WHERE REQUIRED TO MEET THESE CONDITIONS.

A4 TYPICAL SIDEWALL VENT PENETRATION DETAIL
NTS



A8 TRAP PRIMER - WC WALL HUNG
NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802P-501

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

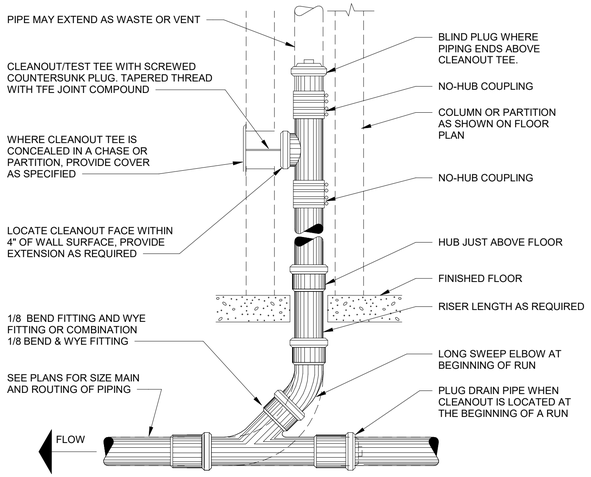
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PLUMBING DETAILS

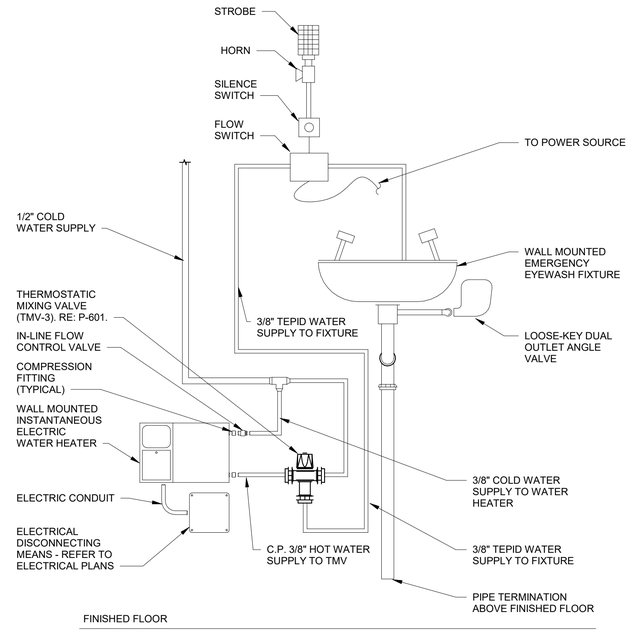
SHEET ID
P-501

ADVERTISEMENT - 100% DESIGN

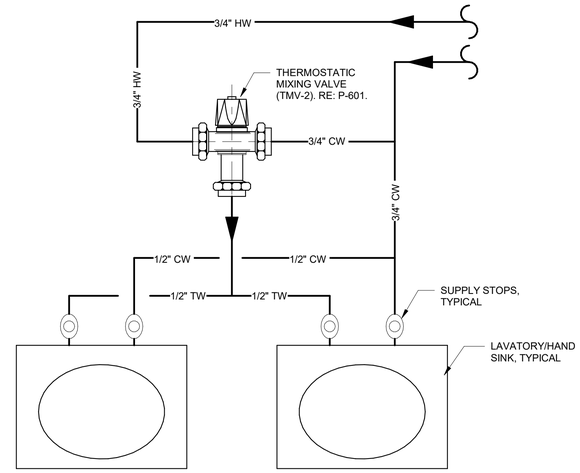


NOTES:
PROVIDE WCO ON SANITARY WASTE BRANCHES NOT SERVED WITH FLOOR CLEANOUT.
MAXIMUM HEIGHT ABOVE FINISHED FLOOR 4'-0" UNLESS OTHERWISE NOTED.

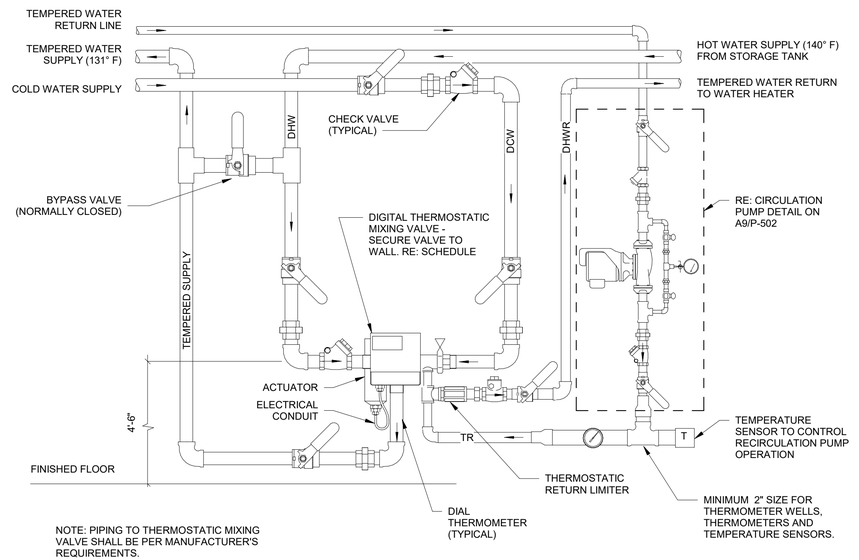
D1 TYPICAL WALL CLEANOUT DETAIL
NTS



D4 DOMESTIC INSTANEOUS ELECTRIC WATER HEATER
NTS

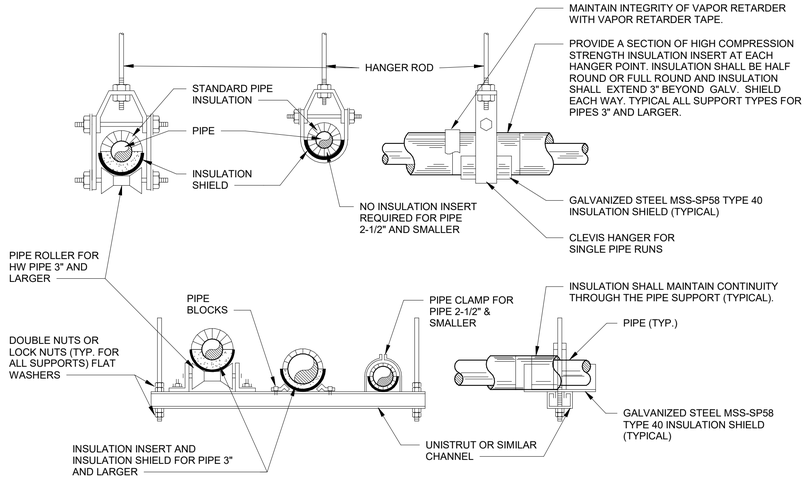


D7 LAVATORY THERMOSTATIC MIXING VALVE DETAIL
NTS



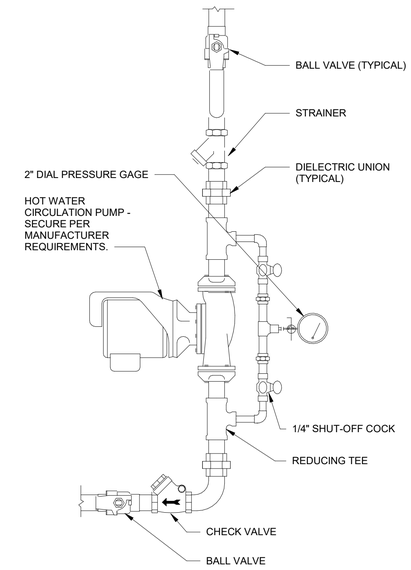
NOTE: PIPING TO THERMOSTATIC MIXING VALVE SHALL BE PER MANUFACTURER'S REQUIREMENTS.

A1 DIGITAL THERMOSTATIC MIXING VALVE
NTS



NOTES:
1. PROVIDE SPRING VIBRATION ISOLATORS ON ALL PIPING 3" OR LARGER (TYPICAL).
2. INSULATION INSERT LENGTH SHALL BE 6" LONGER THAN INSULATION SHIELD.
3. INSULATION SYSTEM SHALL MAINTAIN CONTINUITY OF THERMAL INSULATION, VAPOR RETARDER, AND SPECIFIED JACKETING THROUGH ALL PIPE SUPPORTS.

A6 TYPICAL PIPE SUPPORT DETAIL
NTS



A9 CIRCULATION PUMP DETAIL
NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-502
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PLUMBING DETAILS

SHEET ID
P-502

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GAS WATER HEATER SCHEDULE

MARK	DESCRIPTION	RATED INPUT (MBH)	RECOVERY RATE (GPH)	TEMP. RISE (°F)	STORAGE CAPACITY (GAL)	LEAVING WATER TEMP. (°F)	EFFICIENCY	VOLTAGE/ PHASE
GWH-1	NATURAL GAS 60 GALLON STORAGE TANK WATER HEATER.	120	126	100	60	140	95	120/1

NOTES:
1. MINIMUM RECOVERY RATE (GPH) IS BASED OFF OF A TEMPERATURE RISE OF 100°F.
2. PROVIDE WITH 3" CONCENTRIC VENT KIT.

ELECTRIC WATER HEATER SCHEDULE

MARK	LOCATION	KW	ACTIVATION (GPM)	DESIGN FLOW (GPM)	DESIGN TEMP. RISE (°F)	MAX. LEAVING TEMP. (°F)	VOLTAGE/ PHASE	DESCRIPTION
IWH-1	WLT #1 (BASE BID)	3.5	0.25	5	46	85	208/1	INSTANTANEOUS POINT-OF-USE TANKLESS ELECTRIC WATER HEATER.
IWH-2	WLT #1 (BASE BID)	3.5	0.25	5	46	85	208/1	INSTANTANEOUS POINT-OF-USE TANKLESS ELECTRIC WATER HEATER.
IWH-3	WLT #1 (BASE BID)	3.5	0.25	5	46	85	208/1	INSTANTANEOUS POINT-OF-USE TANKLESS ELECTRIC WATER HEATER.
IWH-4	WLT #2 (BID OPTION)	3.5	0.25	5	46	85	208/1	INSTANTANEOUS POINT-OF-USE TANKLESS ELECTRIC WATER HEATER.
IWH-5	WLT #2 (BID OPTION)	3.5	0.25	5	46	85	208/1	INSTANTANEOUS POINT-OF-USE TANKLESS ELECTRIC WATER HEATER.
IWH-6	WLT #2 (BID OPTION)	3.5	0.25	5	46	85	208/1	INSTANTANEOUS POINT-OF-USE TANKLESS ELECTRIC WATER HEATER.

EXPANSION TANK SCHEDULE

MARK	DESCRIPTION	SERVICE	TANK VOLUME (GAL)	PRESSURE (PSIG)	DIAMETER	HEIGHT
ET-1	ASME RATED PRE-CHARGED DIAPHRAGM TANK	DOMESTIC HOT WATER	25	175	16	32

NOTES:
1. MAXIMUM WORKING PRESSURE = 175 PSI
2. NSF 61 COMPLIANT

PLUMBING PUMP SCHEDULE

MARK	DESCRIPTION	TOTAL FLOW RATE (GPM)	SIZE		PUMP HEAD (FT)	HORSEPOWER	RPM	V/P/HZ	FLA
			INLET	OUTLET					
RCP-1	INLINE RECIRCULATION PUMP FOR DOMESTIC HOT WATER RETURN	4	3/4"	3/4"	10	1/8	3250	115/1/60	1.33

NOTES:
1. INSTALL IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
2. NSF 61 COMPLIANT

THERMOSTATIC MIXING VALVE SCHEDULE

MARK	DESCRIPTION	SERVICE	LOCATION	MINIMUM FLOW	DESIGN FLOW	DESIGN PRESSURE DROP	INLET COLD TEMPERATURE (°F)	INLET HOT TEMPERATURE (°F)	OUTLET TEMPERATURE (°F)	VOLTAGE/ PHASE
TMV-1	ASSE 1017 MASTER MIXING VALVE	DOMESTIC HOT WATER	MECHANICAL 1014	0.50 GPM	16.00 GPM	5.00 psi	34	140	131 °F	120/1
TMV-2	ASSE 1070 LOCAL LAVATORY MIXING VALVE	DOMESTIC HOT WATER	RESTROOM	0.25 GPM	1.00 GPM	15.00 psi	34	131	105 °F	---
TMV-3	ASSE 1071 LOCAL EMERGENCY MIXING VALVE	DOMESTIC TEPID WATER	WLT BAYS (BASE & BO)	0.25 GPM	5.00 GPM	15.00 psi	34	131	85 °F	---

PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	DCW	DHW	WASTE	VENT	VOLT/PHASE	DESCRIPTION
EEW	EMERGENCY EYE/FACE WASH	3/4"	3/4"	---	---	120/1	5 GPM INTEGRAL FLOW CONTROL @30 PSIG. TYPE 304 STAINLESS STEEL SELF CONTAIN EMERGENCY EYE/FACE WASH WITH TYPE 304 STAINLESS STEEL DUST BOWL COVER. PROVIDE WITH ALARM AND STROBE LIGHT AND CONNECT TO BAS. PROVIDE WITH TMV-3.
EWC-1	ELECTRIC WATER COOLER	1/2"	---	1 1/2"	1 1/2"	120/1	ABA COMPLIANT, STAINLESS STEEL, 8 GPH FILTERED & REFRIGERATED WALL-HUNG BI-LEVEL ELECTRIC WATER COOLER, 2-STATIONS, WITH BOTTLE FILLER. RE: ARCH FOR MOUNTING HEIGHTS.
FD-1	FLOOR DRAIN	---	---	3"	1 1/2"	---	3" FLOOR DRAIN, DURA-COATED CAST IRON BODY WITH BOTTOM OUTLET. COMBINATION INVERTIBLE MEMBRANE CLAMP AND ADJUSTABLE COLLAR WITH SEEPAGE SLOTS. TYPE B POLISHED NICKLE BRONZE, LIGHT-DUTY STRAINER. PROVIDE WITH ASSE 1072 TRAP GUARD, VANDAL-PROOF SECURED TOP, AND SEDIMENT BUCKET.
FS-1	3" FLOOR SINK	---	---	3"	1 1/2"	---	3" FLOOR SINK, 12"x12" SQUARE TOP, GALVANIZED CAST IRON BODY WITH BOTTOM OUTLET WITH HEAVY-DUTY GRATE. SEEPAGE PAN AND COMBINATION MEMBRANE CLAMP AND FRAME. PROVIDE WITH ASSE 1072 TRAP GUARD, VANDAL-PROOF SECURED TOP, AND SEDIMENT BUCKET.
FS-2	4" FLOOR SINK	---	---	4"	2"	---	4" FLOOR SINK. 24"X24"X17" DEEP, 316 STAINLESS STEEL AND HEAVY DUTY GRATE WITH BOTTOM OUTLET. ANCHOR FLANGE WITH SEEPAGE HOLES AND CLAMP COLLAR. PROVIDE WITH ASSE 1072 TRAP GUARD, VANDAL-PROOF SECURED TOP, AND SEDIMENT BUCKET.
HB-1	HOSE BIB	3/4"	---	---	---	---	WALL CASING, PLATE AND FLANGE, FURNISHED WITH POLYCARBONATE WHEEL HANDLE AND LOOSE TEE KEY, VACUUM BREAKER.
L-1	LAVATORY	1/2"	1/2"	1 1/2"	1 1/2"	120/1	UNDERCOUNTER MOUNT ROUND BATHROOM SINK WITH D-SHAPED BOWLS AND GLAZED UNDERSIDE. CENTER DRAIN. VITREOUS CHINA, ABA & WATERSENSE COMPLIANT, 18"x18" INCH SINK (16"x14" BOWL), SINGLE CENTER HOLE. PROVIDE FAUCET HARDWIRED WITH BATTERY BACKUP. PROVIDE WITH TMV-2.
MS-1	MOP SINK	3/4"	3/4"	3"	2"	---	CORNER TERRAZZO MOP BASIN. 12" DEPTH WITH 6" DROP FRONT AND STAINLESS STEEL CAPS ON THRESHOLDS. CHROME-PLATED, WALL MOUNTED FAUCET, 8" CENTER SET, SOLID BRASS BODY, 6" SPOUT WITH VACUUM BREAKER, 3/4" HOSE THREAD OUTLET. PROVIDE WITH WALL BRACE AND PAIL HOOK. PROVIDE WITH 5' LONG VINYL HOSE, 3/4" CHROME COUPLING, STAINLESS STEEL WALL BRACKET, 20 GA STAINLESS STEEL BACK SPLASH PANELS, AND STRAINER. PROVIDE WITH SCALD WARNING SIGNAGE READING "SCALD WARNING: HOT WATER IS 120°F - VERY HOT".
S-1	BREAKROOM SINK	1/2"	1/2"	1 1/2"	1 1/2"	---	30"x21" SINK - SINGLE BOWL, UNDERMOUNT, 304 STAINLESS STEEL, ABA COMPLIANT, 27"x15"x5-3/8" BOWL. FAUCET - ABA, SINGLE LEVER, LOW ARCHED SWIVEL GOOSENECK SPOUT WITH PULL-OUT SPRAY, 1.5 GPM.
S-2	MOTHER'S ROOM SINK	1/2"	1/2"	1 1/2"	1 1/2"	---	21"x21" SINK - SINGLE BOWL, UNDERMOUNT, 304 STAINLESS STEEL, ABA COMPLIANT, 18"X15"x5-1/2" BOWL. FAUCET - ABA, SINGLE LEVER, LOW ARCHED SWIVEL GOOSENECK SPOUT WITH PULL-OUT SPRAY, 1.5 GPM.
SH-1	SHOWER	3/4"	3/4"	2"	2"	---	ABA AND WATERSENSE COMPLIANT SHOWER COLUMN. ASSE 1016 SINGLE HANDLE PRESSURE BALANCING MIXING UNIT WITH A 2-WAY DIVERTER VALVE, HAND/WALL SHOWER HEAD. 59" FLEXIBLE METAL HOSE, 36" SLIDE BAR WALL CONNECTION, ASSE 1014 VACUUM BREAKER HAND SHOWER WITH NON-POSITIVE SHUT-OFF, ARM AND WALL FLANGES, 1.5 GPM. RE: ARCH FOR MOUNTING HEIGHTS. PROVIDE WITH FD-1.
U-1	URINAL	3/4"	---	2"	2"	120/1	ABA AND WATERSENSE COMPLIANT. WALL-HUNG, VIRTEOUS CHINA, WASHDOWN ACTION, 3/4" TOP SPUD URINAL, 0.125 GPF. CHROME-PLATED, HARDWIRED SENSORED FLUSH VALVE WITH MANUAL OVERRIDE. PROVIDE WITH CARRIER. RE: ARCH FOR MOUNTING HEIGHTS.
WC-1	WATER CLOSET	1"	---	4"	2"	120/1	WATERSENSE COMPLIANT. WALL-HUNG, WALL-OUTLET, WHITE VIRTEOUS CHINA, ELONGATED BOWL. 1-1/2" TOP SPUD WATER CLOSET. SIPHON JET. CHROME-PLATED, 1.28 GPF HARDWIRED FLUSH VALVE WITH MANUAL OVERRIDE; PROVIDE REVERSE OPERATOR WHERE REQUIRED FOR WIDE SIDE OF STALL. PROVIDE WITH BACK TO BACK OR NARROW CARRIER. PROVIDE WITH ELONGATED SOLID WHITE PLASTIC SEAT WITH OPEN FRONT AND STAINLESS STEEL CHECK HINGE. RE: ARCH FOR MOUNTING HEIGHTS.
WC-2	ABA WATER CLOSET	1"	---	4"	2"	120/1	ABA AND WATERSENSE COMPLIANT. WALL-HUNG, WALL-OUTLET, WHITE VIRTEOUS CHINA, ELONGATED BOWL. 1-1/2" TOP SPUD WATER CLOSET. SIPHON JET. CHROME-PLATED, 1.28 GPF HARDWIRED FLUSH VALVE WITH MANUAL OVERRIDE; PROVIDE REVERSE OPERATOR WHERE REQUIRED FOR WIDE SIDE OF STALL. PROVIDE WITH BACK TO BACK CARRIER. PROVIDE WITH ELONGATED SOLID WHITE PLASTIC SEAT WITH OPEN FRONT AND STAINLESS STEEL CHECK HINGE. RE: ARCH FOR MOUNTING HEIGHTS.
WD-1	WALL BOX DRAIN	---	---	2"	---	---	WALL BOX DRAIN FOR INDIRECT CONDENSATE 1" AIR GAP CONNECTION. WALL STUD MOUNTED. PVC OUTLET BOX, FUNNEL, AND BRACKETS. STAINLESS STEEL RETENTION RING. 10 GPM MAX FLOW RATE. 250°F MAX TEMPERATURE.

GAS PRESSURE REGULATING VALVE SCHEDULE

MARK	SERVICE	DESCRIPTION	MAX WORKING PRESSURE	MIN WORKING PRESSURE	MAXIMUM WORKING TEMPERATURE	PIPE SIZE	SET PRESSURE (PSIG)	MAX OUTLET PRESSURE	PRESSURE FALL-OFF (PSI)	DESIGN FLOW (MBH)
GPRV-1	WATER HEATER	LEVER-ACTING REGULATOR W/ OVER PRESSURE VENT	5.0 psig	1.0 psig	105 °F	3/4"-3/4"	10 IN WC	14.0 in-wg	1/2	100
GPRV-2	BOILER	LEVER-ACTING REGULATOR W/ OVER PRESSURE VENT	5.0 psig	1.0 psig	105 °F	1 1/2"-1 1/2"	10 IN WC	11.0 in-wg	1/2	3000
GPRV-3	BOILER	LEVER-ACTING REGULATOR W/ OVER PRESSURE VENT	5.0 psig	1.0 psig	105 °F	1 1/2"-1 1/2"	10 IN WC	11.0 in-wg	1/2	3000
GPRV-4	BOILER	LEVER-ACTING REGULATOR W/ OVER PRESSURE VENT	5.0 psig	1.0 psig	105 °F	1 1/2"-1 1/2"	10 IN WC	11.0 in-wg	1/2	3000
GPRV-5	BOILER (BO)	LEVER-ACTING REGULATOR W/ OVER PRESSURE VENT	5.0 psig	1.0 psig	105 °F	1 1/2"-1 1/2"	10 IN WC	11.0 in-wg	1/2	3000
GPRV-6	IH-1 (BO), IH-2 (BO), IH-3 (BO)	LEVER-ACTING REGULATOR W/ OVER PRESSURE VENT	5.0 psig	1.0 psig	105 °F	3/4"-3/4"	10 IN WC	14.0 in-wg	1/2	200

NOTES:
1. LOCAL ATMOSTOHERIC PRESSURE IS 14.5 PSIA FOR 3278 FEET ALTITUDE.
2. REGULATORS SHALL BE VENTED TO ATMOSPHERE.
3. REGULATORS SHALL COMPLY WITH ANSI Z21-80 AND SHALL MAINTAIN THE REDUCED PRESSURE UNDER "LOCK-UP" (NO FLOW) CONDITIONS.

CLEANOUT SCHEDULE

MARK	DESCRIPTION
DCO	REFER TO LINE SIZE. DOUBLE FLOOR CLEANOUT WITH HEAVY-DUTY SECURED COVER AND FRAME. NON-ADJUSTABLE WITH DURA-COATED CAST IRON BODY. GAS AND WATER TIGHT ABS TAPERED THREAD PLUG. PROVIDE WITH TWO-WAY CLEANOUT SERVICE FITTING AND VANDAL-PROOF SCREWS.
FCO	REFER TO LINE SIZE. FLOOR CLEANOUT WITH "TYPE B" LIGHT DUTY COVER. DURA-COATED CAST IRON BODY WITH BOTTOM OUTLET. GAS AND WATER TIGHT THREADED ABS TAPERED PLUG. TOP ASSEMBLY. PROVIDE VANDAL-PROOF SCREWS.
GCO	REFER TO LINE SIZE. ADJUSTABLE GROUND CLEANOUT WITH DURA-COATED CAST IRON BODY WITH GAS AND WATERTIGHT ABS TAPERED THREAD PLUG AND ROUND POLISHED STAINLESS STEEL EXTRA-HEAVY-DUTY SECURED TOP ADJUSTABLE TO FINISHED FLOOR OR GROUND. PROVIDE WITH VANDAL-PROOF SCREWS.
WCO	REFER TO LINE SIZE. WALL CLEANOUT WITH SMOOTH, STAINLESS STEEL ACCESS COVER WITH SECURING SCREW. DURA-COATED CAST IRON BODY WITH GAS AND WATER TIGHT ABS TAPERED THREADED PLUG. PROVIDE VANDAL-PROOF SCREWS.

BACKFLOW PREVENTER SCHEDULE

MARK	SERVICE	TYPE	ASSE STANDARD	MAXIMUM WORKING PRESSURE (PSI)	MAXIMUM WORKING TEMPERATURE (°F)	NOMINAL DIAMETER	PRESSURE DROP (PSI)	RATED FLOW (GPM)	DESIGN FLOW (GPM)
RPZ-1	DEVICE HVAC SYSTEM (BASE BO)	REDUCED PRESSURE ZONE BACKFLOW PREVENTER	1013	175	180	3/4"	13	13	10
RPZ-2	DEVICE HVAC SYSTEM (BID OPTION)	REDUCED PRESSURE ZONE BACKFLOW PREVENTER	1013	175	180	3/4"	13	13	10

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802P-601

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PLUMBING SCHEDULES

SHEET ID
P-601

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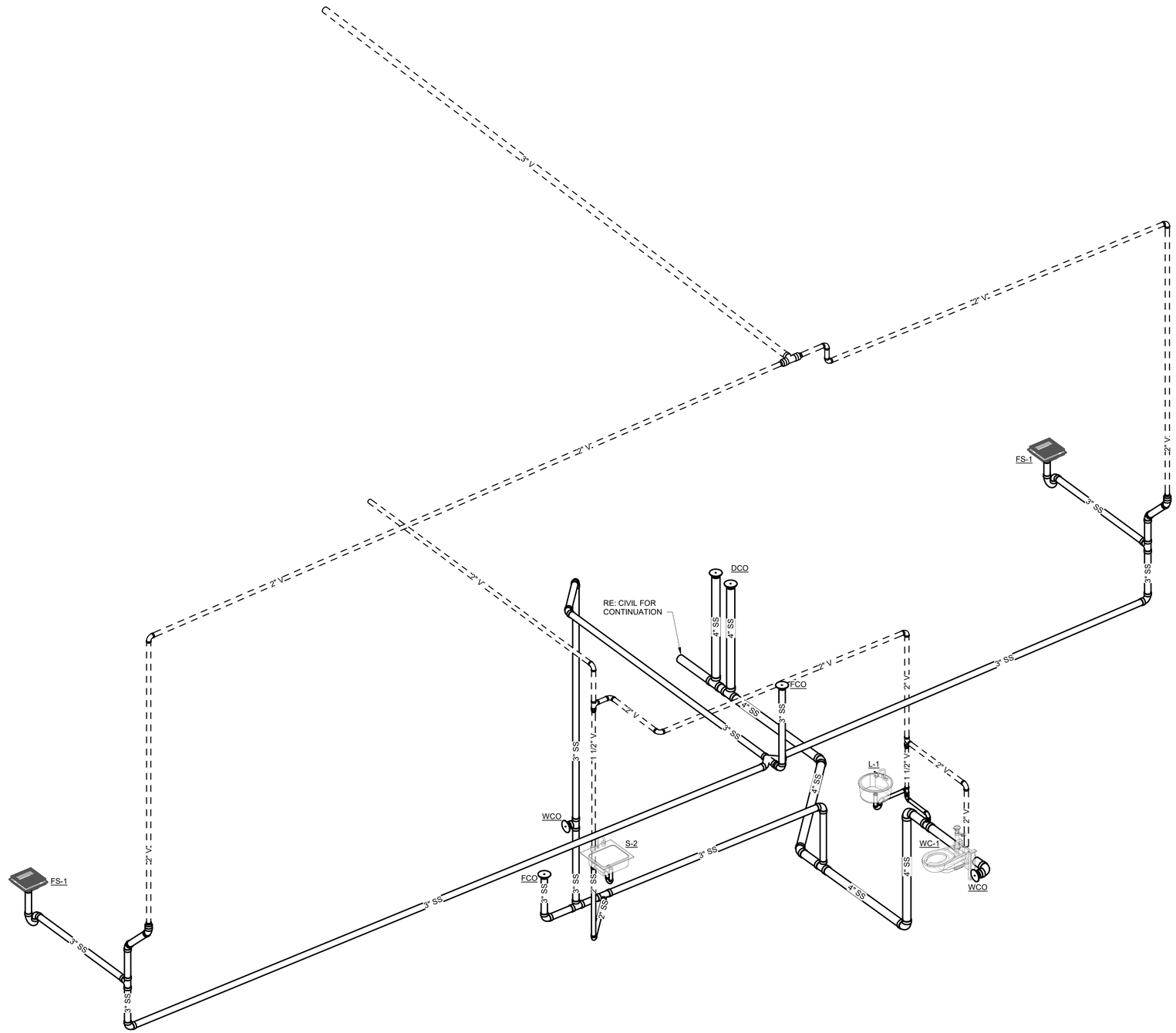

A1 SANITARY RISER DIAGRAM_NORTH SANITARY

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: M. HEMMER
DRAWN BY: N. BOYER
CHECKED BY: R. YAW
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-701
ANSI D 22x34

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OMAHA DISTRICT
OMAHA, NEBRASKA

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PROJECT NUMBER: FXBM231802
RISER DIAGRAMS

SHEET ID
P-701

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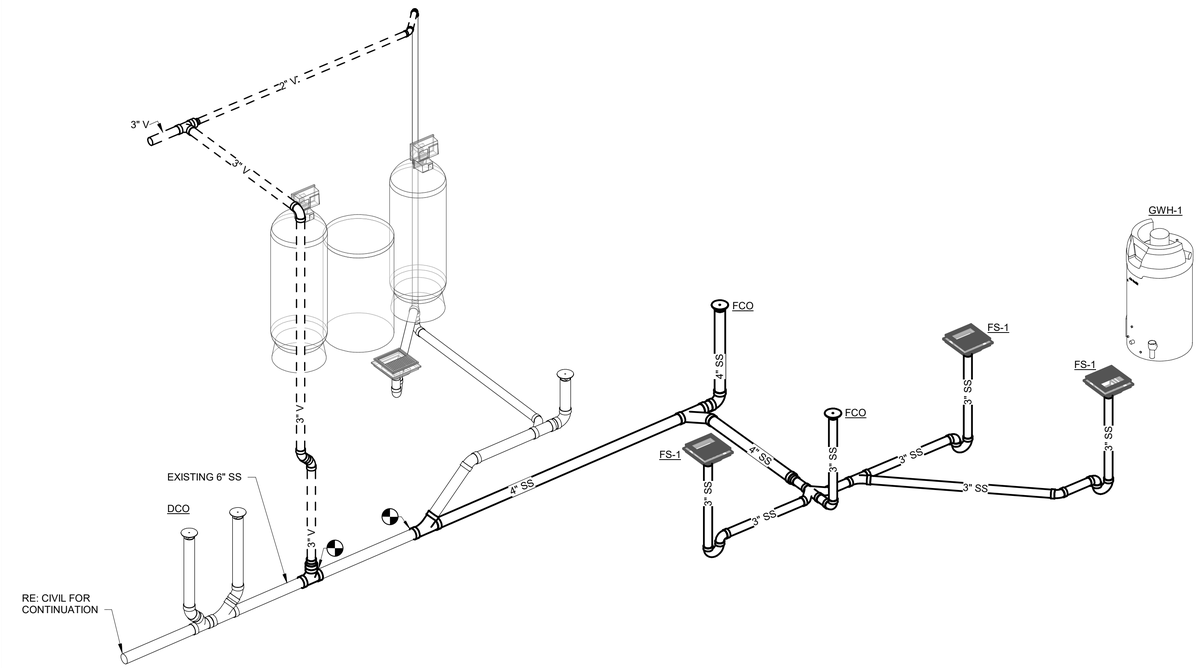
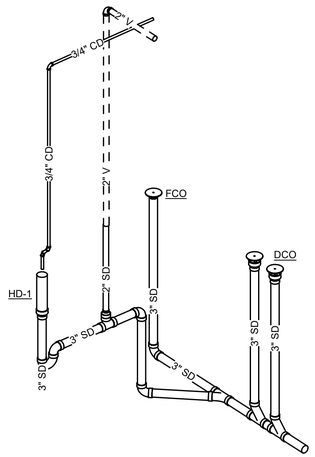
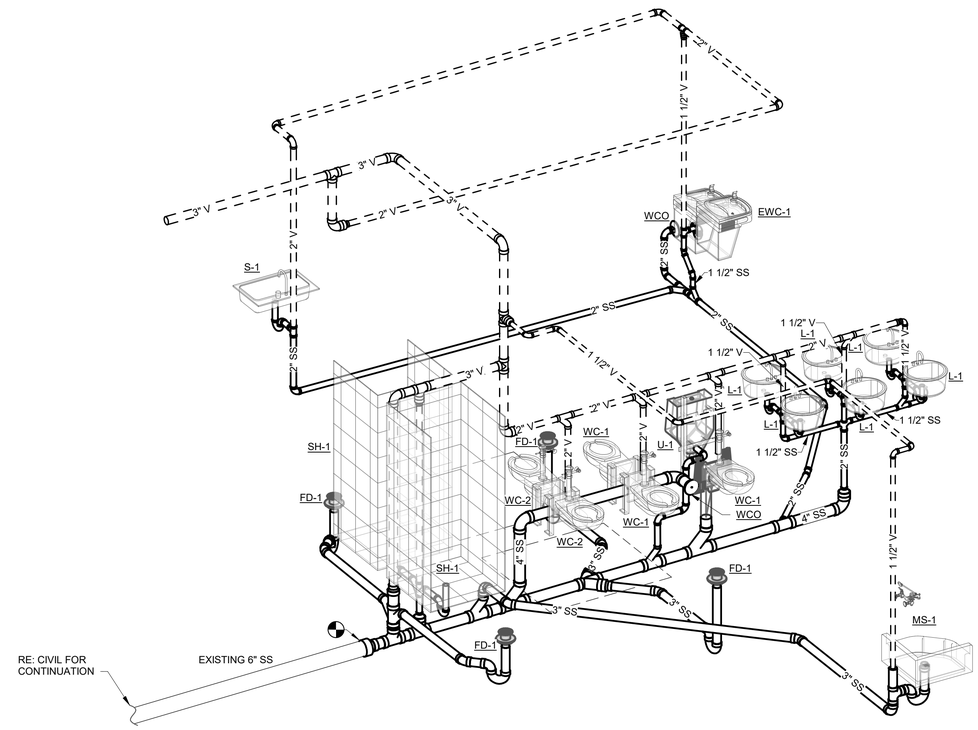


D1 SANITARY RISER DIAGRAM_MECHANICAL ROOM 1014



A1 STORM DRAIN RISER DIAGRAM_ELECTRICAL ROOM 1048



A6 SANITARY RISER DIAGRAM_NEW WEST RR

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802P-702

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

RISER DIAGRAMS

SHEET ID

P-702

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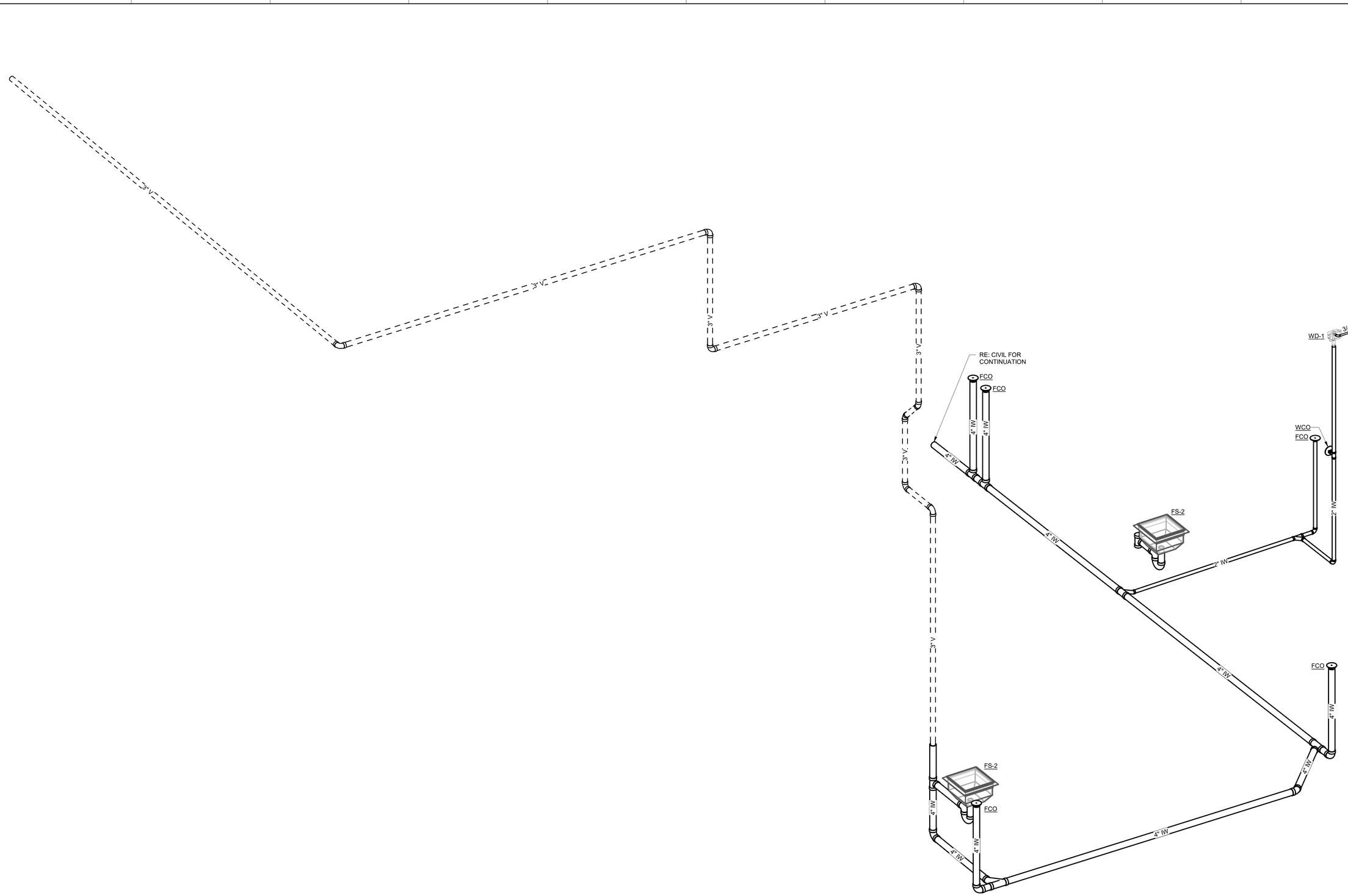

G1 SANITARY RISER DIAGRAM_INDUSTRIAL WASTE

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: M. HEMMER
DRAWN BY: N. BOYER
CHECKED BY: R. YAW
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-703
SIZE: ANSI D 22x34

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OMAHA DISTRICT
OMAHA, NEBRASKA

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
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PROJECT NUMBER: FXBM231802

RISER DIAGRAMS

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P-703

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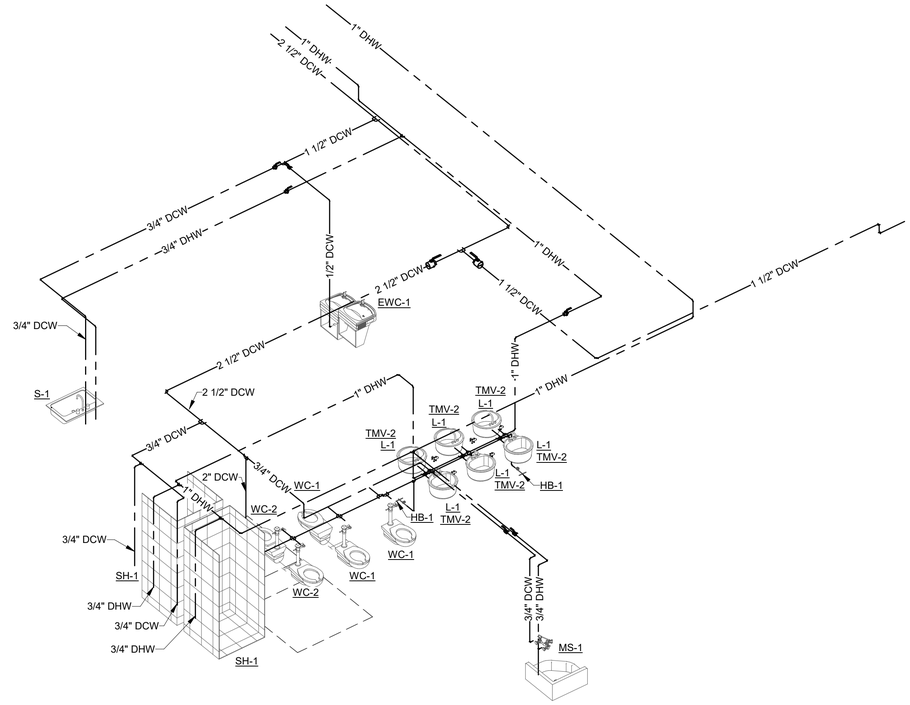
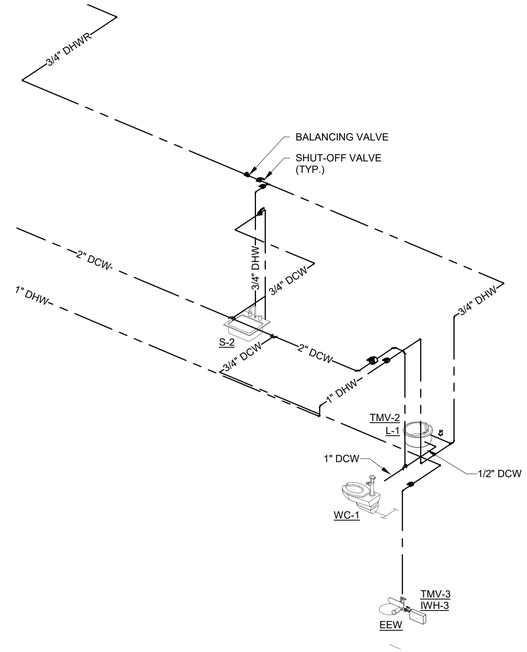


B1 DOMESTIC WATER RISER DIAGRAM_NEW WEST RR



B7 DOMESTIC WATER RISER DIAGRAM_NORTH RR

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY:	K. RHOTEN
DRAWN BY:	K. RHOTEN
CHECKED BY:	J. STAMPER
SUBMITTED BY:	B. DYSON
SIZE:	ANSI D 22x34
ISSUE DATE:	28 APRIL 2023
SOLICITATION NO.:	W9128F23R0012
CONTRACT NO.:	
DRAWING CODE::	
FILE NAME:	FXBM231802P-704

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OMAHA DISTRICT
OMAHA, NEBRASKA

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

RISER DIAGRAMS

SHEET ID

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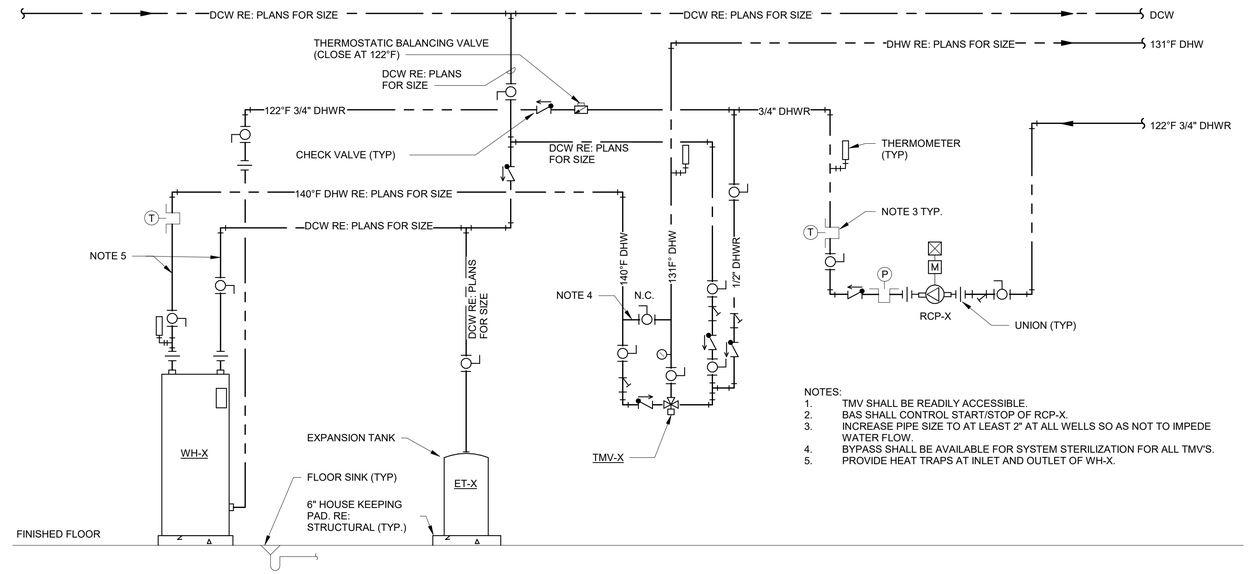
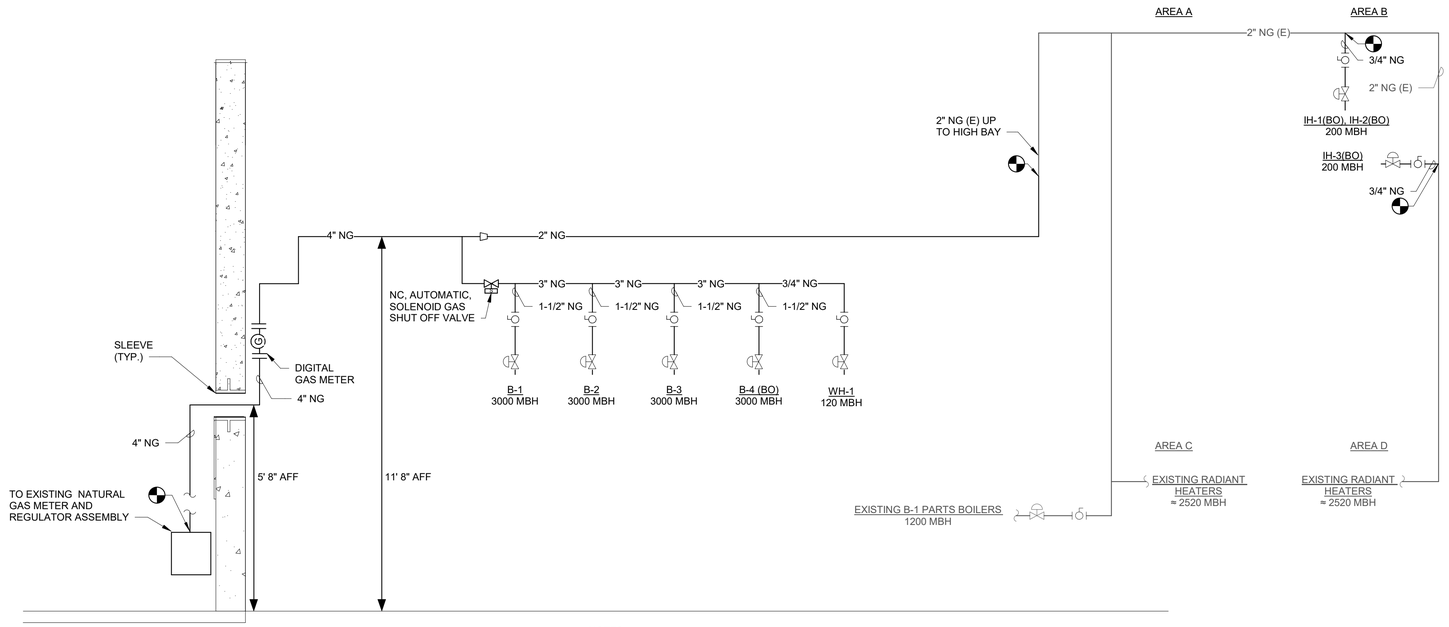


E4 TYPICAL WATER HEATER SCHEMATIC

NTS



A4 NATURAL GAS PIPING DIAGRAM SCHEMATIC

NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DITSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-801
SIZE: ANSI D 22x34

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PLUMBING SCHEMATICS

SHEET ID
P-801

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DOMESTIC HOT WATER RECIRCULATING SYSTEM OPERATION

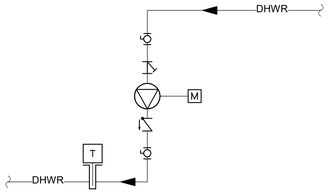
GENERAL:

THIS SYSTEM IS DESIGNED TO OPERATE IN ACCORDANCE WITH ARTICLE C404.6.1 OF THE 2015 OR LATER INTERNATIONAL ENERGY CONSERVATION CODE AND ARTICLE 7.4.4.2 OF 2013 OR LATER ASHRAE 90.1 STANDARD. THIS IS A HOT WATER RECIRCULATION SYSTEM WITH A DEDICATED DOMESTIC HOT WATER RETURN PIPING SYSTEM. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY OR IF THE HOT WATER SUPPLY TEMPERATURE FALLS BELOW SETPOINT. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.

THIS SYSTEM CONSISTS OF THE FOLLOWING:
1. SIMPLEX DOMESTIC HOT WATER RECIRCULATION PUMP
2. ONE DOMESTIC HOT WATER RETURN TEMPERATURE SENSOR.

SEQUENCE OF OPERATION – RECIRCULATING PUMPS:

EACH PUMP WILL BE PROVIDED WITH AN OPERATING SCHEDULE THAT MATCHES ITS ASSOCIATED THERMOSTATIC MIXING VALVE (TMV) SCHEDULE. GENERALLY, THE PUMPS WILL OPERATE CONTINUOUSLY TO MAINTAIN A HOT WATER SUPPLY TEMPERATURE OF 131 DEG F.



E1 DOMESTIC HOT WATER CIRCULATOR PUMP CONTROL
NTS

SELF-CONTAINED WATER THERMOSTATIC MIXING VALVES

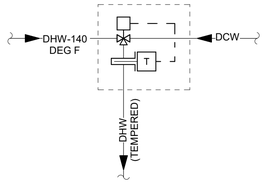
GENERAL

THIS SYSTEM IS PROVIDED TO MEET THE REQUIREMENTS OF THE 2015/2018 INTERNATIONAL PLUMBING CODE ARTICLE 613.1 THAT REQUIRES SYSTEMS NEEDING TO REDUCE THE STORAGE TANK DOMESTIC HOT WATER TEMPERATURE TO DEFINED LIMITS FOR DISTRIBUTION TO THE DOMESTIC HOT WATER SYSTEM TO INCLUDE THERMOSTATIC MIXING VALVES (TMV'S) CONFORMING TO ASSE 1017. THESE SYSTEMS NORMALLY WORK IN CONJUNCTION WITH DOMESTIC HOT WATER RECIRCULATING SYSTEMS THAT PRODUCE A MINIMUM FLOW RATE THROUGH THE VALVE.

THIS SYSTEM CONSISTS OF THE FOLLOWING EQUIPMENT AND DEVICES:
1. ONE (1) SELF-CONTAINED ASSE 1017 THERMOSTATIC MIXING VALVE WITH PARAFFIN-BASED ACTUATION TECHNOLOGY. REFER TO MIXING VALVE SCHEDULE FOR OUTLET TEMPERATURE SETPOINT.

SEQUENCE OF OPERATION:
THE RECIRCULATION PUMP IS GENERALLY OPERATED CONTINUOUSLY TO ENSURE THE SENSOR IN THE MIXING VALVE IS CONTINUOUSLY EXPOSED TO THE DESIRED HOT WATER TEMPERATURE.

THE SELF-CONTAINED ASSE 1017 THERMOSTATIC MIXING VALVE PERFORMS THE FOLLOWING FUNCTIONS:
1. THE TMV SHALL BE CAPABLE OF SUPPLYING THE REQUIRED DISCHARGE WATER TEMPERATURE PROVIDED THE HOT WATER TEMPERATURE IS AT LEAST 20 DEG F WARMER THAN THE REQUIRED SUPPLY WATER TEMPERATURE.
2. THE VALVE MUST BE ABLE TO OPERATE UNDER A WIDE RANGE OF FLOWS.



E6 SELF-CONTAINED ASSE 1017 MASTER MIXING VALVE CONTROL DIAGRAM & SEQUENCE
NTS

GAS METER SEQUENCE OF OPERATION

ENERGY METERING IS A REQUIREMENT OF GUIDING PRINCIPLES AND A REQUIREMENT OF THE IGCC AND ASHRAE 189.1.

THE PURPOSE OF METERING IS TO MONITOR UTILITY USE AND DEMAND DATA TO:
1. MEASURE AND VERIFY ACTUAL USE AGAINST EXPECTED USE
2. TREND SEASONAL AND YEAR OVER YEAR POWER AND ENERGY USE

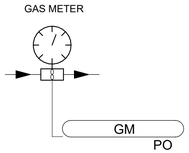
THE FOLLOWING ENERGY SOURCES SHALL BE METERED:
1. NATURAL GAS

BAS MONITORING:
A METER DATA MANAGEMENT SYSTEM SHALL BE PROVIDED. THE METER DATA MANAGEMENT SYSTEM SHALL BE CAPABLE OF ELECTRONICALLY STORING ENERGY METER, OUTDOOR TEMPERATURE, MONITORING SYSTEMS, AND SUBMETER DATA AND CREATING USER REPORTS SHOWING CALCULATED HOURLY, DAILY, MONTHLY, AND ANNUAL ENERGY CONSUMPTION FOR EACH MEASUREMENT DEVICE AND SUBMETER.

MAINTAIN HOURLY AND DAILY DATA FOR 36-MONTHS; OLDER DATA MAY BE PURGED. MAINTAIN MONTHLY AND ANNUAL DATA, INDEFINITELY. PROVIDE A METHOD FOR MANUALLY ARCHIVING DATA AND REMOVING IT FROM THE SYSTEM. MAINTAIN MONTHLY AND ANNUAL DATA ON-LINE FOR A PERIOD OF 10 YEARS.

COMPARE NATURAL GAS USE TO OUTDOOR DRY BULB TEMPERATURE AND TO HEATING DEGREE-DAYS WITH VARIABLE COMPARISON TEMPERATURE.

REFER TO MECHANICAL CONTROLS SHEETS FOR POINT SCHEDULE.



A1 GAS METER CONTROL DIAGRAM & SEQUENCE
NTS

NATURAL GAS STORAGE WATER HEATER SEQUENCE OF OPERATION

GENERAL:
THE PURPOSE OF THIS SYSTEM IS TO PROVIDE HEATING FOR THE DOMESTIC HOT WATER SYSTEM SERVING THE BUILDING RESTROOMS AND WORK BAYS IN ADEQUATE SUPPLY AND AT CONSTANT TEMPERATURE.

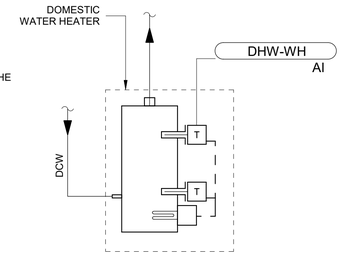
THE WATER HEATERS THEMSELVES ON THIS PROJECT ARE SIMPLE COMMERCIAL NATURAL GAS STORAGE WATER HEATERS WITH SELF-CONTAINED CONTROLS. WATER TEMPERATURE SETPOINT IS ADJUSTED ON THE WATER HEATER CONTROLLER. THERE ARE NO EXTERNAL OPERATING CONTROL REQUIREMENTS. THE BAS SYSTEM IS INVOLVED ONLY WITH MONITORING THE OPERATION.

BUILDING AUTOMATION MONITORING:
THE WATER HEATER CONTROL PANEL WILL MONITOR AND ALARM TO THE BAS AS FOLLOWS:

MONITOR
1. DOMESTIC HOT WATER DISCHARGE TEMPERATURE

ALARM
1. ALARM WITH WATER TEMPERATURE 10 DEG F HIGHER (ADJUSTABLE) THAN SETPOINT (SEE SCHEDULE).
2. ALARM WITH WATER TEMPERATURE 20 DEG F COOLER (ADJUSTABLE) THAN SETPOINT (SEE SCHEDULE).

REFER TO MECHANICAL CONTROLS SHEETS FOR POINT SCHEDULE.



A6 NATURAL GAS STORAGE WATER HEATER CONTROL DIAGRAM
NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: K. RHOTEN
DRAWN BY: K. RHOTEN
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802P-802

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

CONTROLS DIAGRAMS

SHEET ID
P-802

ADVERTISEMENT - 100% DESIGN

LEGEND

DUCTWORK SYMBOLS

- XX/XX — DUCT WITH ACOUSTICAL LINING
- MANUAL VOLUME DAMPER (SEE BELOW FOR OTHER TYPES)
- DAMPER TYPE:
  - FD - FIRE DAMPER
  - SD - SMOKE DAMPER
  - FSD - COMBINATION FIRE/SMOKE DAMPER
  - BD - GRAVITY BACKDRAFT DAMPER
  - CD - CONTROL DAMPER
  - *NO MARK INDICATES MANUAL VOLUME DAMPER
- VERTICAL DAMPER IN DUCT (OR OPENING) AT FIRE-RATED PARTITION
- HORIZONTAL FIRE DAMPER AT FLOOR PENETRATION
- CONNECT NEW DUCT TO EXISTING
- VANED ELBOW (PROVIDE VANES IN ALL SQUARE OR RECTANGULAR ELBOWS, UNLESS NOTED OTHERWISE)
- FAN POWERED TERMINAL UNIT
- TYPICAL SUPPLY AIR TEE WITH SPLITTER DAMPER
- STANDARD ROUND BRANCH DUCT (SPIN-IN)
- STANDARD ROUND BRANCH DUCT (CONICAL)
- STANDARD RECTANGULAR BRANCH DUCT (45° TAKE-OFF)
- STANDARD CONCENTRIC DUCT TRANSITION
- STANDARD ECCENTRIC DUCT TRANSITION
- RECTANGULAR-TO-ROUND DUCT TRANSITION
- SECTION THROUGH ROUND DUCT, SUPPLY OR EXHAUST AS NOTED
- DUCT TO BE DEMOLISHED AS NOTED
- SECTION THROUGH RECTANGULAR SUPPLY DUCT
- SECTION THROUGH RECTANGULAR RETURN DUCT
- SECTION THROUGH RECTAN-GULAR EXHAUST DUCT
- A.D. — ACCESS DOOR IN CEILING
- A.D. — DUCT ACCESS DOOR
- CEILING SUPPLY AIR DIFFUSER, ARROWS INDICATE PATTERN. NO PATTERN SHOWN EQUALS 4-WAY
- CEILING RETURN AIR GRILLE OR RETURN REGISTER
- CEILING EXHAUST AIR GRILLE OR EXHAUST REGISTER
- SIDEWALL SUPPLY OR RETURN REGISTER OR GRILLE
- SUPPLY OR OUTSIDE AIR DUCT UP
- SUPPLY OR OUTSIDE AIR DUCT DOWN
- RETURN AIR DUCT UP
- RETURN AIR DUCT DOWN
- RELIEF OR EXHAUST AIR DUCT UP
- RELIEF OR EXHAUST AIR DUCT DOWN
- IN-LINE 90 DEGREE DROP (RISE) IN DUCT
- UP — INCLINE RISE IN DUCT
- DOWN — INCLINE DROP IN DUCT
- VAV TERMINAL UNIT
- FLEXIBLE DUCT, SIZE AS SHOWN
- CEILING SUPPLY AIR DIFFUSER AND RETURN AIR GRILLE TO BE DEMOLISHED AS NOTED
- POINT OF DISCONNECT FROM EXISTING DUCT

EQUIPMENT SYMBOLS

- NEW EQUIPMENT
- EQUIPMENT CLEARANCE

MISCELLANEOUS

- 001 — KEYNOTE
- POINT OF CONNECTION - NEW TO EXISTING
- FTR - A - B
  - A = SCHEDULE TYPE
  - B = FEET OF ACTIVE LENGTH

CONTROLS SYMBOLS

- T — ROOM THERMOSTAT
- H — ROOM HUMIDISTAT
- T — TEMPERATURE SENSOR/TRANSMITTER
- H — HUMIDITY SENSOR/TRANSMITTER
- S — DUCT SMOKE DETECTOR
- R — RELAY
- ST — SLAB SENSOR
- VIBRATION SWITCH
- HT — DUCT HUMIDITY SENSOR/TRANSMITTER
- PT — PRESSURE TRANSMITTER
- MOTOR STARTER (LOCAL OR MCC)
- SP — STATIC PRESSURE SENSOR/TRANSMITTER
- DT — DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER
- DP — DIFFERENTIAL PRESSURE SWITCH (DIGITAL)
- T — DUCT AVERAGING TEMPERATURE ELEMENT
- F — FLOW SENSOR
- FR — FREEZESTAT
- FS — FLOW SWITCH
- M — ELECTRIC MOTOR

NORMAL OPEN	NORMAL CLOSED	
		GATE VALVE
		VALVE W/ REDUCERS (GATE VALVE SHOWN)
		GLOBE VALVE
		BUTTERFLY VALVE
		NEEDLE VALVE/ INSTRUMENT VALVE
		3-WAY VALVE
		BALL VALVE
		PLUG VALVE
		ANGLE VALVE

- RS — REFRIGERANT SENSOR
- LIQUID FLOW METER
- RECEIVER PRESSURE GAUGE (PANEL MTD.)
- CT — CURRENT SENSING RELAY
- DA — ELECTRIC DAMPER ACTUATOR
- CD — CARBON DIOXIDE (CO_2) SENSOR
- CM — CARBON MONOXIDE (CO) SENSOR
- F — FIRESTAT
- HS — MANUALLY ACTIVATED SWITCH (PULL STAT., PUSH STAT., ETC)
- AQ — AQUASTAT
- LWCO — LOW WATER CUTOFF

CONTROL VALVE SYMBOLS:

- M — ELECTRIC ACTUATOR
- S — SOLENOID ACTUATOR

CONTROL DEFINITIONS:

NORMAL POSITION: INDICATES DEVICE POSITION WHEN THE SYSTEM IS DISABLED OR NOT ENERGIZED

FAIL POSITION: INDICATES DEVICE POSITION WHEN THE CONTROL SIGNAL IS LOST OR UPON A LOSS OF POWER.

NO - NORMALLY OPEN
NC - NORMALLY CLOSED
FO - FAIL OPEN
FC - FAIL CLOSED

EQUIPMENT TAG SYMBOLS

AIR DEVICE TAG

- AD - X | 380 — TAG; MAXIMUM AIRFLOW (CFM)
- 24/12 — INDICATES A 24"x12" RECTANGULAR DUCT (NET FREE AREA)
- 20"ø — INDICATES A 20" ROUND DUCT (NET FREE AREA)

VALVE SYMBOLS

- GATE VALVE
- GLOBE VALVE
- CHECK VALVE (NON SLAM)
- PLUG VALVE
- PRESSURE REDUCING VALVE (PRV)
- BUTTERFLY VALVE
- BALL VALVE
- NEEDLE VALVE
- VENTURI FLOW METER
- VALVE IN DROP
- VALVE IN CENTER DROP
- VALVE IN RISE
- S — SOLENOID VALVE
- GATE VALVE W/ 3/4" HOSE THREAD ADAPTER
- TWO-WAY CONTROL VALVE
- THREE-WAY CONTROL VALVE
- SAFETY VALVE OR PRESSURE RELIEF VALVE
- MANUAL BALANCING VALVE
- AUTOMATIC BALANCING VALVE
- TEMPERATURE WELL
- FLANGED VALVE (GATE VALVE SHOWN)
- P — PRESSURE INDEP. CONTROL VALVE (PICV)

HATCHED AREA ON PLANS IDENTIFIES AREAS THAT ARE NOT IN SCOPE

DETAIL ITEMS

REFER TO DRAWING/DETAIL NUMBER; SHEET NUMBER ON WHICH DETAIL IS DRAWN

RE : 2 / M-201 — 2 / M-201

PIPING LABELS

CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
CD	CONDENSATE DRAIN
D	DRAIN
GS	GLYCOL SUPPLY
GR	GLYCOL RETURN
MU	MAKE-UP WATER
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RFR	RADIANT FLOOR HEATING WATER RETURN
RFS	RADIANT FLOOR HEATING WATER SUPPLY
SMR	SNOW MELT HEATING WATER RETURN
SMS	SNOW MELT HEATING WATER SUPPLY
~~xx AAA xx~~	PIPE TO BE REMOVED, "AAA" DENOTES TYPE
AAA	EXISTING PIPE, "AAA" DENOTES TYPE
AAA	UNDERGROUND PIPE, "AAA" DENOTES TYPE

PIPING SYMBOLS

- PITCH DOWN IN DIRECTION OF ARROW
- DIRECTION OF FLOW
- PIPE ANCHOR
- PIPE GUIDE
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- STRAINER WITH BLOWDOWN VALVE
- BRANCH - SIDE CONNECTION
- BRANCH - TOP CONNECTION
- BRANCH - BOTTOM CONNECTION
- RISE OR DROP IN PIPE
- RISER DOWN (ELBOW)
- RISER UP (ELBOW)
- CAPPED PIPE
- BLIND FLANGE
- UNION (SCREWED)
- PUMP
- FLANGED CONNECTION
- TEMPERATURE & PRESSURE PORT
- FLEX PIPE
- FLEX CONNECTION
- BELLOWS CONNECTION (DOUBLE SPHERE NEOPRENE TYPE)
- THERMOMETER
- PRESSURE GAGE WITH COCK
- PS — PRESSURE SWITCH
- FS — FLOW SWITCH
- MANUAL AIR VENT
- AUTOMATIC AIR VENT
- PIPING TO BE DEMOLISHED AS NOTED
- WELDED CONNECTION
- FLANGED CONNECTION
- SOLDERED CONNECTION
- THREADED OR "PRESS" CONNECTION
- BELL & SPIGOT CONNECTION
- SOLVENT CONNECTION

HVAC DESIGN CRITERIA

PROJECT: ELLSWORTH PRIDE AFB - B-21 WEAPONS LOADER TRAINING FACILITY

DESIGN CONDITIONS PER UFC 3-400-02, 3-410-01

WEATHER STATION - ELLSWORTH AFB, SOUTH DAKOTA
STATION #: 726625
ELEVATION: 3278 FEET; LATITUDE: 44.15°N; LONGITUDE: 103.1°W
ASHRAE CLIMATE ZONE 6A

WINTER: -2.8°F DB (99%)

SUMMER:	DRY BULB CONDITIONS:	WET BULB CONDITIONS:	HUMIDITY RATIO:
	91.4°F DB (1.0%)	65.7°F WB (1.0%)	75.8°F DB (1.0%) 135.0 gr/lb

INDOOR DESIGN CONDITIONS

WINTER: 68°F & 40-60% RH (OFFICE SPACES)
72°F MAINTAINED & 40-60% RH (TELECOM ROOMS)
55°F (WAREHOUSE)
BY TRANSFER AIR ONLY (TOILETS, JANITORIAL AREAS)

SUMMER: 78°F & 40-60% RH (OFFICE SPACES)
72°F MAINTAINED & 40-60% RH (TELECOM ROOMS)
NO MECHANICAL COOLING (WAREHOUSE)
BY TRANSFER AIR ONLY (TOILETS, JANITORIAL AREAS)

ENERGY CODE COMPLIANCE
THE MECHANICAL AND PLUMBING EQUIPMENT IN THESE DRAWINGS ARE IN COMPLIANCE WITH ASHRAE 90.1-2013. THE HVAC LOADS WERE PERFORMED IN ACCORDANCE WITH ASHRAE FUNDAMENTALS. ENERGY CALCULATIONS WERE PERFORMED IN ACCORDANCE WITH ASHRAE 90.1-2013.

GENERAL NOTES

1. REFER TO ARCHITECTURAL DRAWINGS FOR LIFE SAFETY RATED WALLS. PROVIDE RATED DAMPER AT PENETRATION TO MAINTAIN RATING.
2. REFER TO SPECIFICATIONS FOR MATERIALS AND METHODS FOR CONSTRUCTION.
3. COORDINATE LOCATION OF ALL PENETRATIONS WITH THE BUILDING STRUCTURE.
4. COORDINATE ALL SLAB PENETRATIONS AND SLEEVES PRIOR TO EACH CONCRETE POUR.
5. COORDINATE UNDERGROUND SITE PIPING AND TRENCH WITH SITE CIVIL INCLUDING FOUNDATIONS, SWALES, RETAINING WALLS, AND ANY OTHER POTENTIAL OBSTRUCTION.
6. PERFORM WORK IN ACCORDANCE WITH THE LATEST EDITIONS, REVISIONS, AMENDMENTS OR SUPPLEMENTS OF APPLICABLE STATUTES, ORDINANCES, CODES, OR REGULATIONS OF FEDERAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION IN EFFECT ON THE DATE BIDS ARE RECEIVED.
7. WHERE APPROVAL CODES HAVE BEEN ESTABLISHED BY OSHA, UNDERWRITERS LABORATORY, AMERICAN CODES, ANSI, ASME, ABAAG, ASHRAE, ASTM, ARI, NEC, NFPA SMACNA, OR THE STATE FIRE INSURANCE REGULATORY BODY, FOLLOW THESE STANDARDS WHETHER OR NOT INDICATED ON THE DRAWINGS.
8. COORDINATE WORK WITH ARCHITECTURAL FEATURES AND COORDINATE WORK SUCH THAT INTERFERENCES BETWEEN PIPING, DUCTWORK, EQUIPMENT, PLUMBING WORK, ELECTRICAL WORK, AND BUILDING STRUCTURE WILL BE AVOIDED.
9. PROVIDE THE ENTIRE SYSTEM AND ITS COMPONENT ITEMS OF EQUIPMENT IN OPERATING CONDITION WITHOUT OBJECTIONABLE VIBRATION OR NOISE IN ACCORDANCE WITH UFC-3-450-01 AND ASHRAE APPLICATIONS HANDBOOK .
10. PROVIDE ALL WIRING AND ELECTRICAL CONTROLS IN ACCORDANCE WITH NFPA 70 (NEC).
11. DO NOT SCALE THESE DRAWINGS FOR CONSTRUCTION PURPOSES.
12. REFER TO STRUCTURAL DRAWINGS FOR FRAMING REQUIRED AROUND PIPES PENETRATING WALLS AND FLOORS.
13. ALL DUCTWORK SIZES ARE CLEAR INSIDE DIMENSIONS.
14. PAINT ANY ABOVE CEILING ITEMS, WHICH CAN BE SEEN THROUGH AIR SLOTS OR GRILLES, FLAT BLACK.
15. PROVIDE PLENUM RATED CABLE, DEVICES, PIPING, ETC. IN PLENUM SPACE.
16. PROVIDE TEMPORARY 30% EFFICIENT, 2" THICK FILTERS OVER RETURN AIR OPENINGS OF ANY AHU'S WHICH ARE PLACED IN SERVICE PRIOR TO COMPLETION OF CONSTRUCTION. REMOVE FILTERS FOR TEST & BALANCE.
17. PROVIDE ACCESS PANELS FOR ALL DAMPER ACTUATORS AND MOTORS LOCATED INSIDE DUCT OR FAN HOUSING.
18. COORDINATE LOCATION OF THERMOSTATS AND HUMIDITY SENSORS WITH FURNITURE, FIXTURES, AND EQUIPMENT PLANS.
19. REFER TO APPENDIX D IN SPEC SECTION 23 05 93 FOR DUCT CONSTRUCTION TABLES, PRESSURE CLASSES, ETC.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W912BF23R0012
CONTRACT NO.:
DRAWING CODE:: SIZE: ANSI D 22x34
FILE NAME: FXBM231802M-001

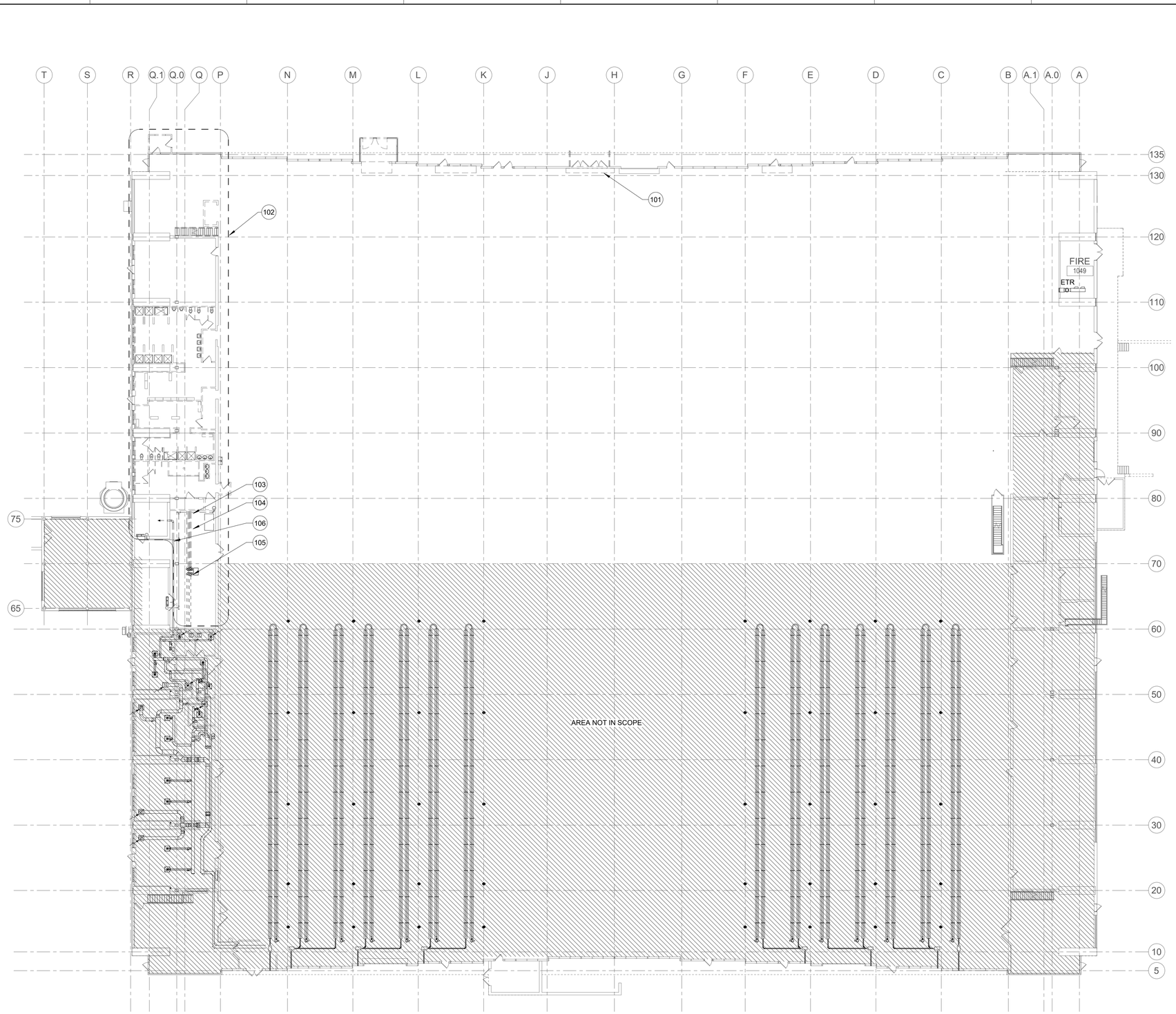
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
GENERAL NOTES, SYMBOLS AND ABBREVIATIONS

SHEET ID
M-001

ADVERTISEMENT - 100% DESIGN



A1 OVERALL HVAC DEMOLITION PLAN - LEVEL 01
SCALE 1" = 20'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES

101. DEMOLISH AND REMOVE THE EXISTING VEHICLE EXHAUST FAN AND ASSOCIATED DUCTWORK AND LOUVER. TEMPORARILY PATCH EXISTING OPENING.

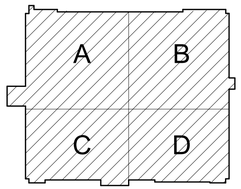
102. DEMOLISH AND REMOVE THE EXISTING VRF CONDENSING UNITS ON EQUIPMENT PLATFORMS.

103. DEMOLISH AND REMOVE THE ENTIRE EXISTING ERV SYSTEM EQUIPMENT AND ASSOCIATED DUCTWORK AND DIFFUSERS. BLANK OFF EXISTING LOUVERS WITH INSULATED SHEET METAL PANELS AS REQUIRED.

104. DEMOLISH AND REMOVE THE ENTIRE EXISTING VRF SYSTEM EQUIPMENT AND PIPING.

105. DEMOLISH EXISTING VRF BRANCH CONTROLLER AND ALL ASSOCIATED PIPING AND WIRING CONNECTIONS.

106. DEMOLISH EXISTING 6x6 DUCT TO POINT INDICATED.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

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DESIGNED BY: A. RAMOS
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1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
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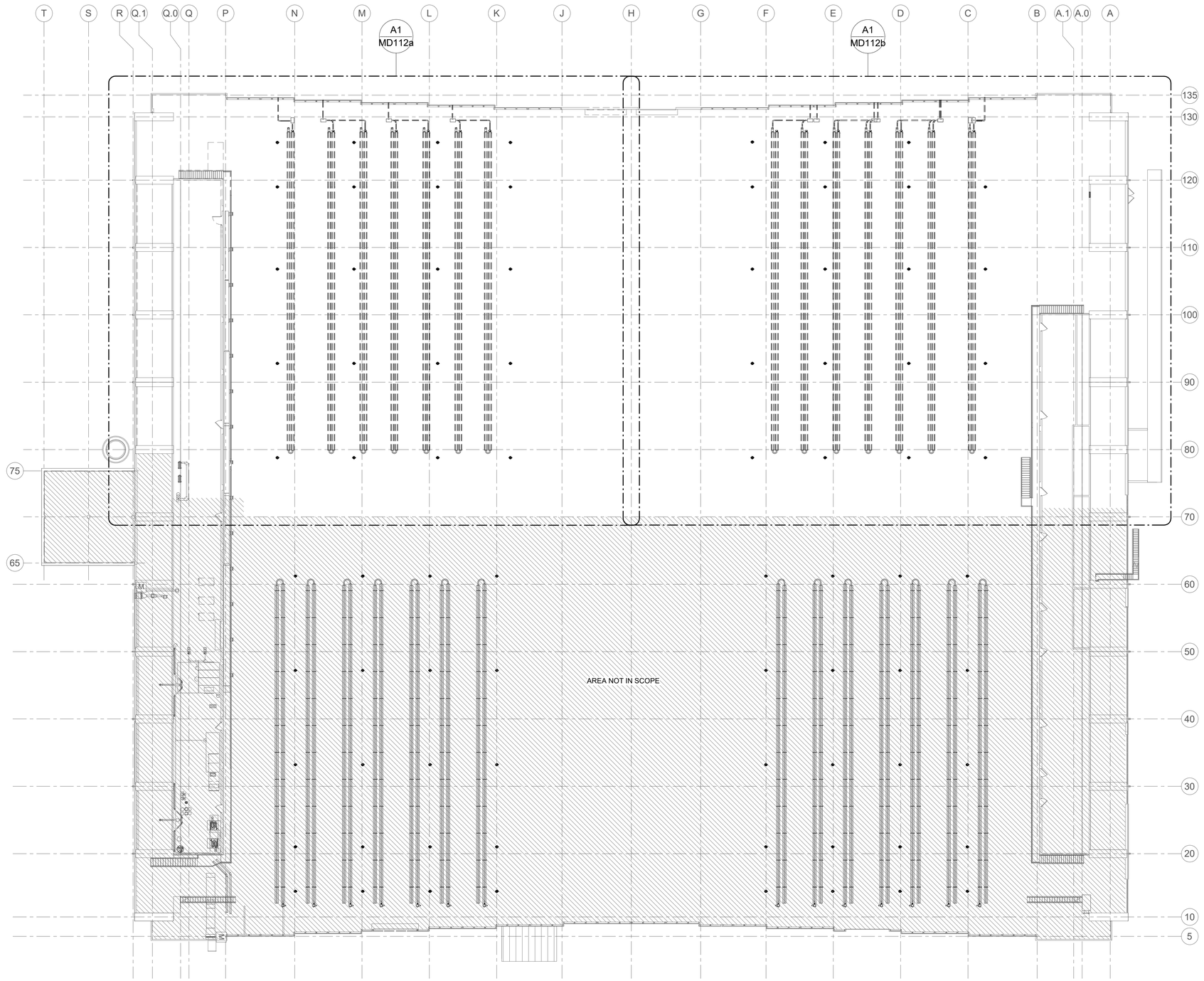
OVERALL HVAC DEMOLITION PLAN - LEVEL 01

SHEET ID
MD101

ADVERTISEMENT - 100% DESIGN

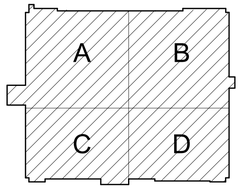


A1 OVERALL HVAC DEMOLITION PLAN - EQUIPMENT PLATFORMS
SCALE 1" = 20'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES



OVERALL
KEY PLAN

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TRUE N

US Army Corps of Engineers
Omaha District ®

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CONTRACT NO.:	
DRAWING CODE:	
FILE NAME:	FXBM231802MD111

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

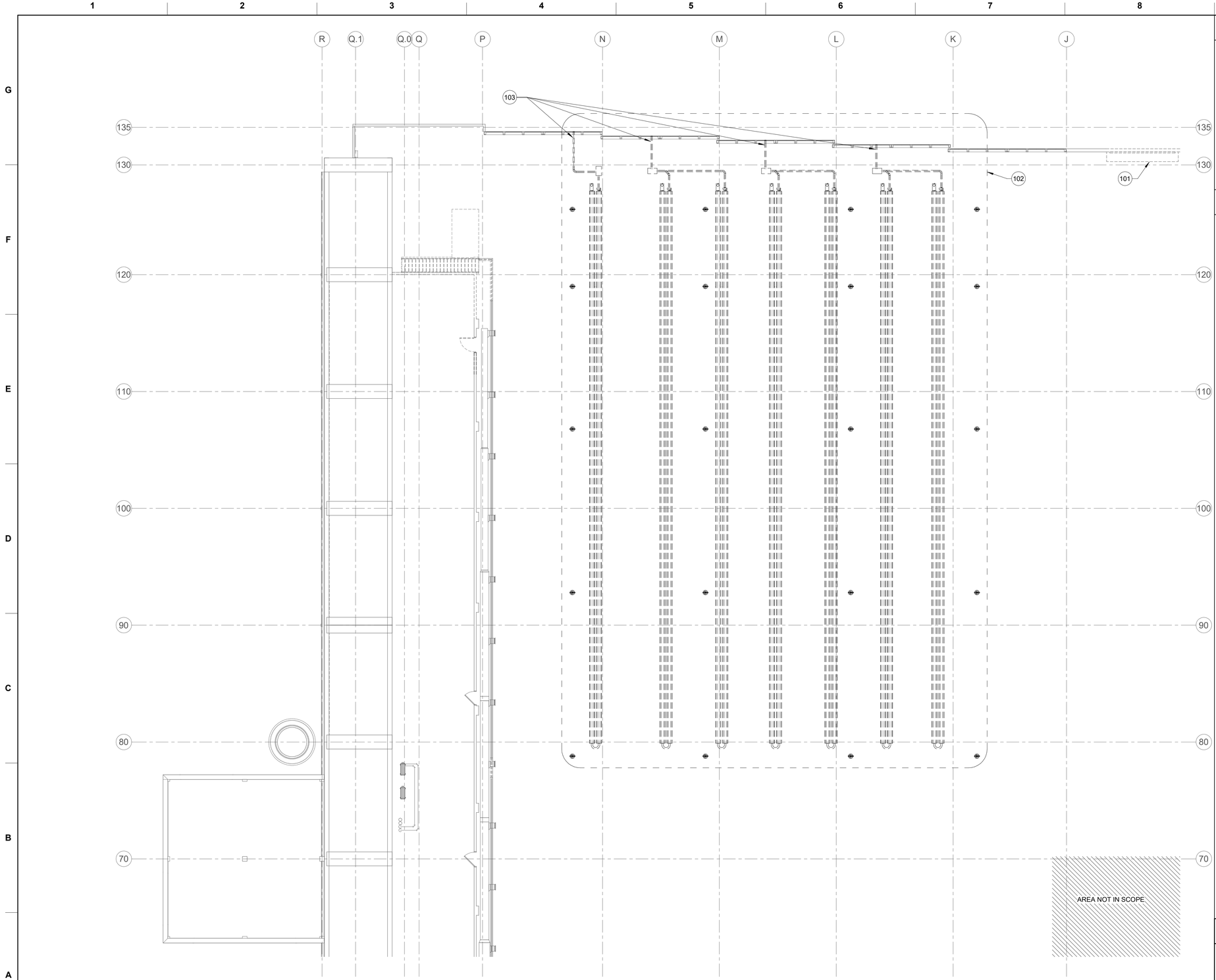
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL HVAC DEMOLITION PLAN - EQUIPMENT PLATFORMS

SHEET ID

MD111

ADVERTISEMENT - 100% DESIGN



A1 HVAC DEMOLITION PLAN - EQUIPMENT PLATFORMS - AREA A - BID OPTION
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

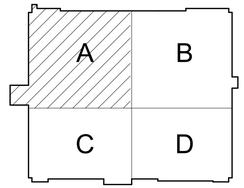
1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES

101. DEMOLISH AND REMOVE THE EXISTING VEHICLE EXHAUST FAN AND ASSOCIATED DUCTWORK AND LOUVER.

102. DEMOLISH AND REMOVE THE EXISTING INFRARED RADIANT HEATERS AND DESTRATIFICATION FANS IN THIS QUADRANT.

103. DEMOLISH EXISTING VENT PIPING TO POINT INDICATED. CAP AND SEAL AT INTERIOR SIDE OF VENT PIPING.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802MD112a

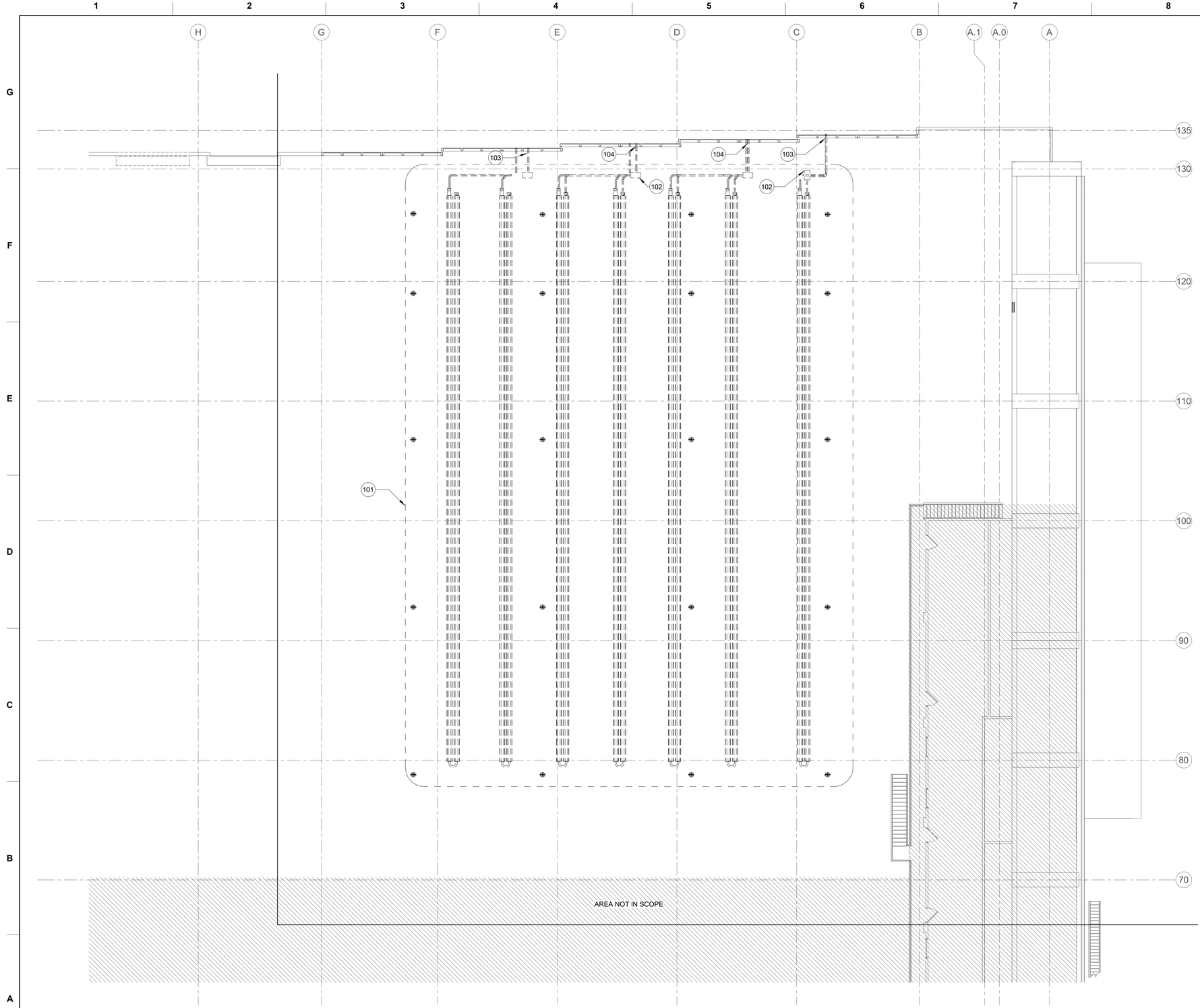
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL HVAC DEMOLITION PLAN - EQUIPMENT PLATFORMS - AREA A

SHEET ID
MD112a

ADVERTISEMENT - 100% DESIGN



A1 HVAC DEMOLITION PLAN - EQUIPMENT PLATFORMS - AREA B - BID OPTION
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

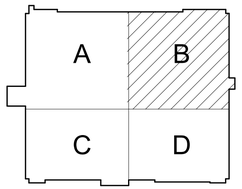
SHEET KEYNOTES

101. DISCONNECT AND REMOVE EXISTING DESTRATIFICATION FANS, RADIANT HEATERS, AND MOUNTING ACCESSORIES IN ITS ENTIRETY.

102. RELOCATE EXISTING VACUUM PUMP TO NEW LOCATION SHOWN ON SHEET MH112b.

103. DISCONNECT AND REMOVE EXISTING EXHAUST PIPE TO POINT INDICATED. PREPARE VENT PIPE FOR NEW CONNECTION.

104. DEMOLISH VENT PIPING TO POINT INDICATED. CAP AND SEAL INTERIOR SIDE OF VENT PIPING.



AREA B
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MD112b

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DITSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PARTIAL HVAC DEMOLITION PLAN - EQUIPMENT PLATFORMS - BID OPTION

SHEET ID
MD112b

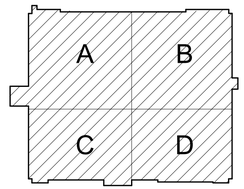
ADVERTISEMENT - 100% DESIGN

A1 OVERALL HVAC FLOOR PLAN - LEVEL 01
SCALE 1" = 20'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MH101
ANSI D 22x34

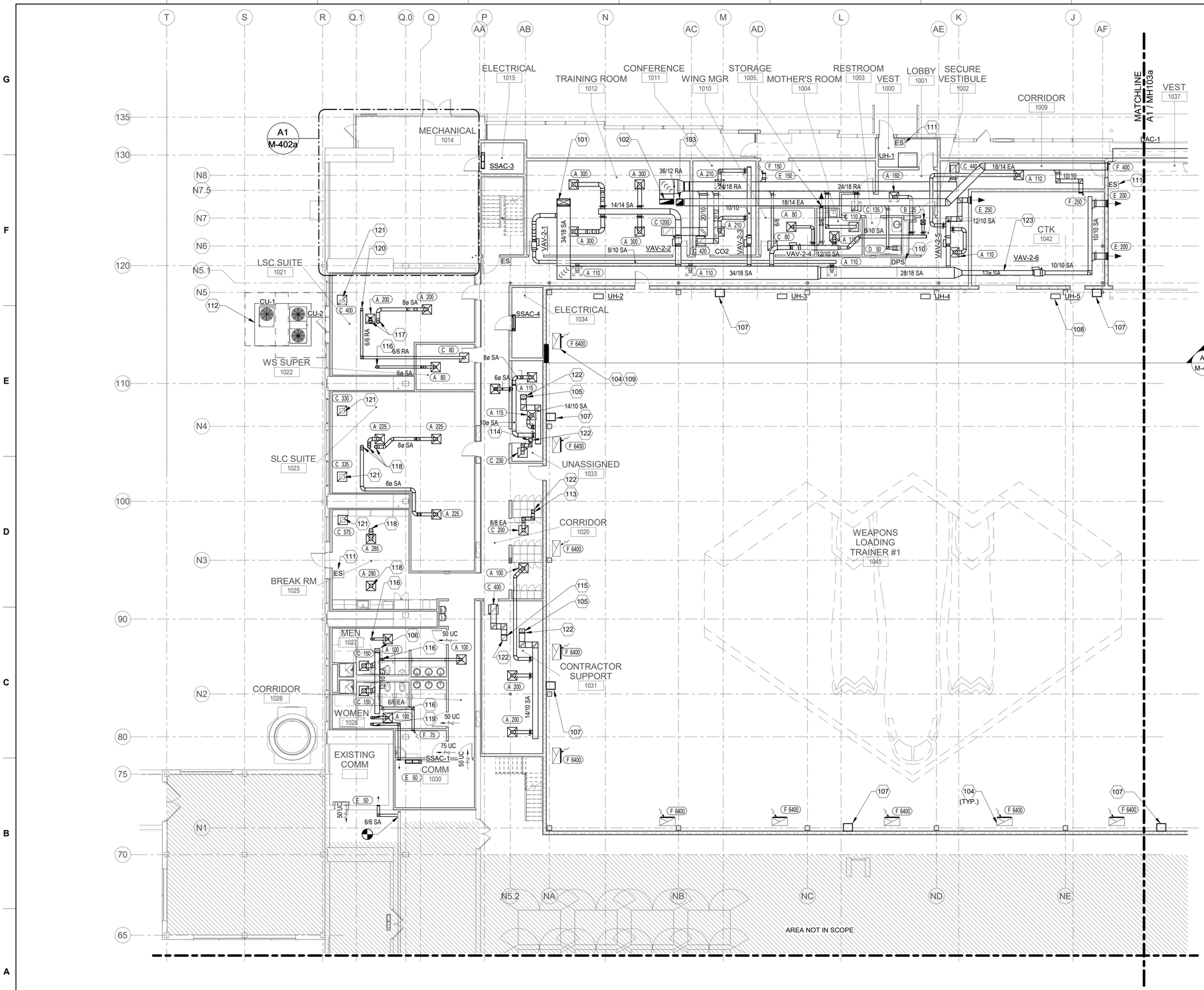
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL HVAC PLAN - LEVEL 01

SHEET ID
MH101

ADVERTISEMENT - 100% DESIGN



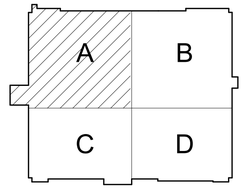
A1 PARTIAL HVAC PLAN - LEVEL 01 - AREA A
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. 32x12 SA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
102. 36x12 RA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
103. 18x14 EA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
104. LOW WALL EXHAUST DUCTWORK. MOUNT BOTTOM OF GRILLE AT 1'-0". (TYP.) REFERENCE DETAIL E5/M-502.
105. 14x10 SA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
106. 12x10 EA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
107. PROVIDE CO/NOx SENSOR MOUNTED 4-5 FEET A.F.F. ADJUST SENSOR HEIGHT HIGHER AS NECESSARY TO AVOID ANY OBSTRUCTIONS SO AS TO BE IN FREE FLOW AIR CIRCULATION. IF SENSOR REGISTERS A CO CONCENTRATION HIGHER THAN 50 PPM (ADJUSTABLE) OR NO2 CONCENTRATION HIGHER THAN 1 PPM (ADJUSTABLE), AUDIBLE AND VISUAL ALARMS SHALL BE INITIATED BOTH LOCALLY AND AT THE B.A.S.
108. HOT WATER UNIT HEATER. REFER TO SCHEDULE ON SHEET M602 FOR MOUNTING HEIGHT.
109. 40x20 EA TAP FROM HIGH EXHAUST (TYP.)
110. DUCT STATIC PRESSURE SENSOR.
111. EMERGENCY AIR DISTRIBUTION SHUTOFF SWITCH WITH HINGED CLEAR COVER, WARNING SIGN AND TAG. WHEN SWITCH IS ACTIVATED, ALL MECHANICAL EQUIPMENT CONTROLLED BY THE BAS SHALL SHUTDOWN, AND ALL ASSOCIATED EA AND OA DAMPERS SHALL CLOSE. MOUNT AT 48" A.F.F. REFERENCE DETAIL E1/M-501.
112. REFER TO STRUCTURAL DRAWINGS FOR CONDENSING UNIT SLAB.
113. 8x8 EA UP TO EQUIPMENT PLATFORM ABOVE.
114. 8x8 RA UP TO EQUIPMENT PLATFORM ABOVE.
115. 14x14 RA UP TO EQUIPMENT PLATFORM ABOVE.
116. 6" SA UP TO EQUIPMENT PLATFORM ABOVE.
117. 8" SA UP TO EQUIPMENT PLATFORM ABOVE.
118. 10" SA UP TO EQUIPMENT PLATFORM ABOVE.
119. 6x6 SA UP TO EQUIPMENT PLATFORM ABOVE.
120. 6x6 RA UP TO EQUIPMENT PLATFORM ABOVE.
121. 12x12 RA UP TO EQUIPMENT PLATFORM ABOVE.
122. PROVIDE Z-BOOT FITTING IN DUCTWORK TO COMPLY WITH ICD-705 GUIDELINES. PROVIDE SECURITY MAN BARS AND ACCESS DOOR IN DUCTWORK AT WALL PENETRATION. PROVIDE WITH FIRE DAMPER ACCESSIBLE FROM EQUIPMENT PLATFORM. REFERENCE DETAIL E6/M-M501, A4/M-504.
123. ALL HVAC IN THIS SPACE SHALL BE CLEAR THE OVERHEAD DOOR HEIGHT.



AREA A
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802MH102

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DITSON
ANSI D 22x34

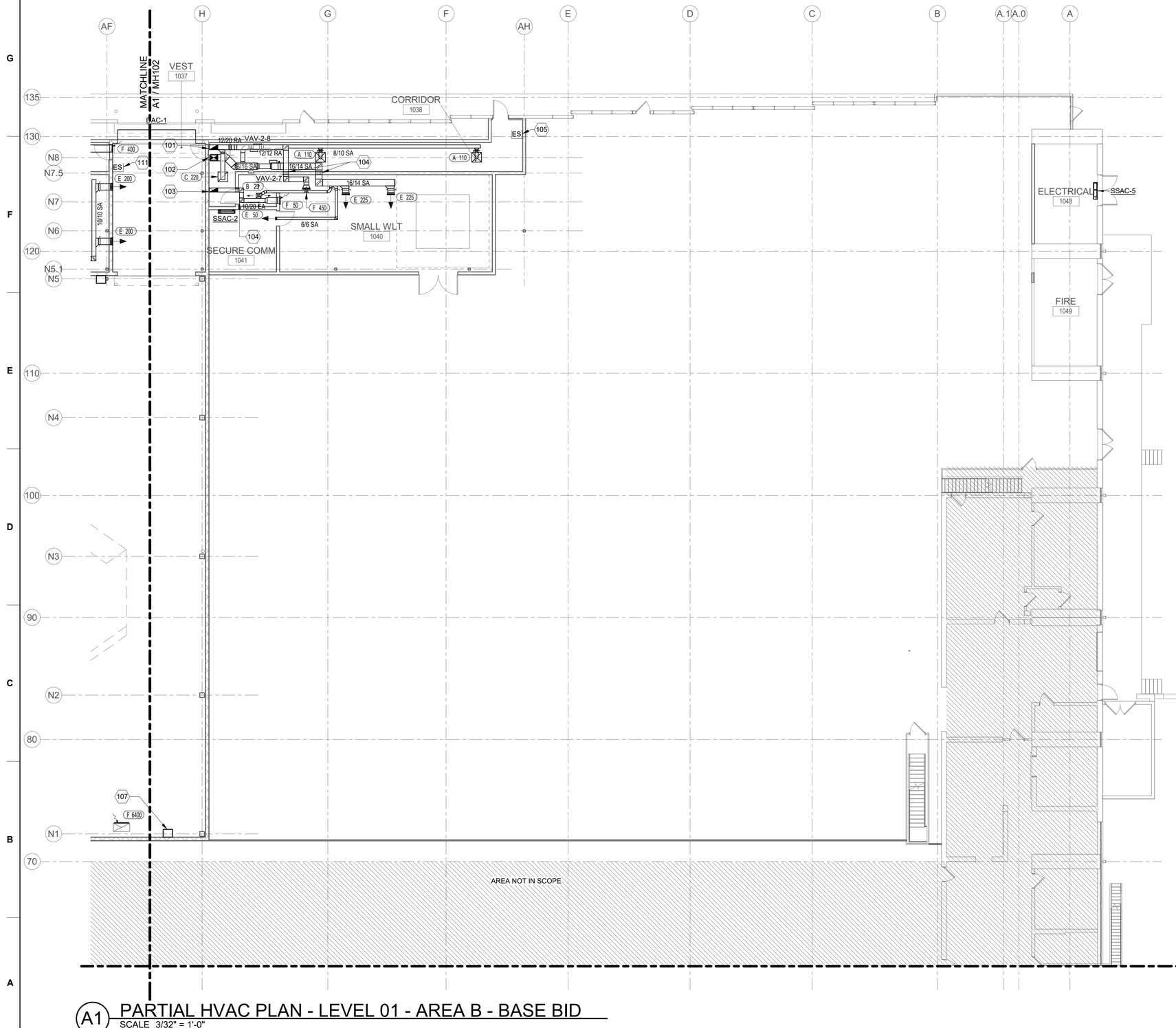
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL HVAC PLAN - LEVEL 01 - AREA A

SHEET ID
MH102

ADVERTISEMENT - 100% DESIGN



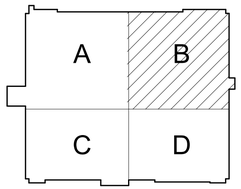
A1 PARTIAL HVAC PLAN - LEVEL 01 - AREA B - BASE BID
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. 12x20 RA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
102. 12x12 SA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
103. 10x20 EA DUCT UP TO EQUIPMENT PLATFORM 01 ABOVE.
104. PROVIDE Z-BOOT FITTING IN DUCTWORK TO COMPLY WITH ICD-705 GUIDELINES. PROVIDE SECURITY MAN BARS AND ACCESS DOOR IN DUCTWORK AT WALL PENETRATION. REFERENCE DETAIL E6/M-M501, A4/M-504.
105. EMERGENCY AIR DISTRIBUTION SHUTOFF SWITCH WITH HINGED CLEAR COVER, WARNING SIGN AND TAG. WHEN SWITCH IS ACTIVATED, ALL MECHANICAL EQUIPMENT CONTROLLED BY THE BAS SHALL SHUTDOWN, AND ALL ASSOCIATED EA AND OA DAMPERS SHALL CLOSE. MOUNT AT 48" A.F.F. REFERENCE DETAIL E1/M-501.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4" 8" 16" 32"

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MH103a

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

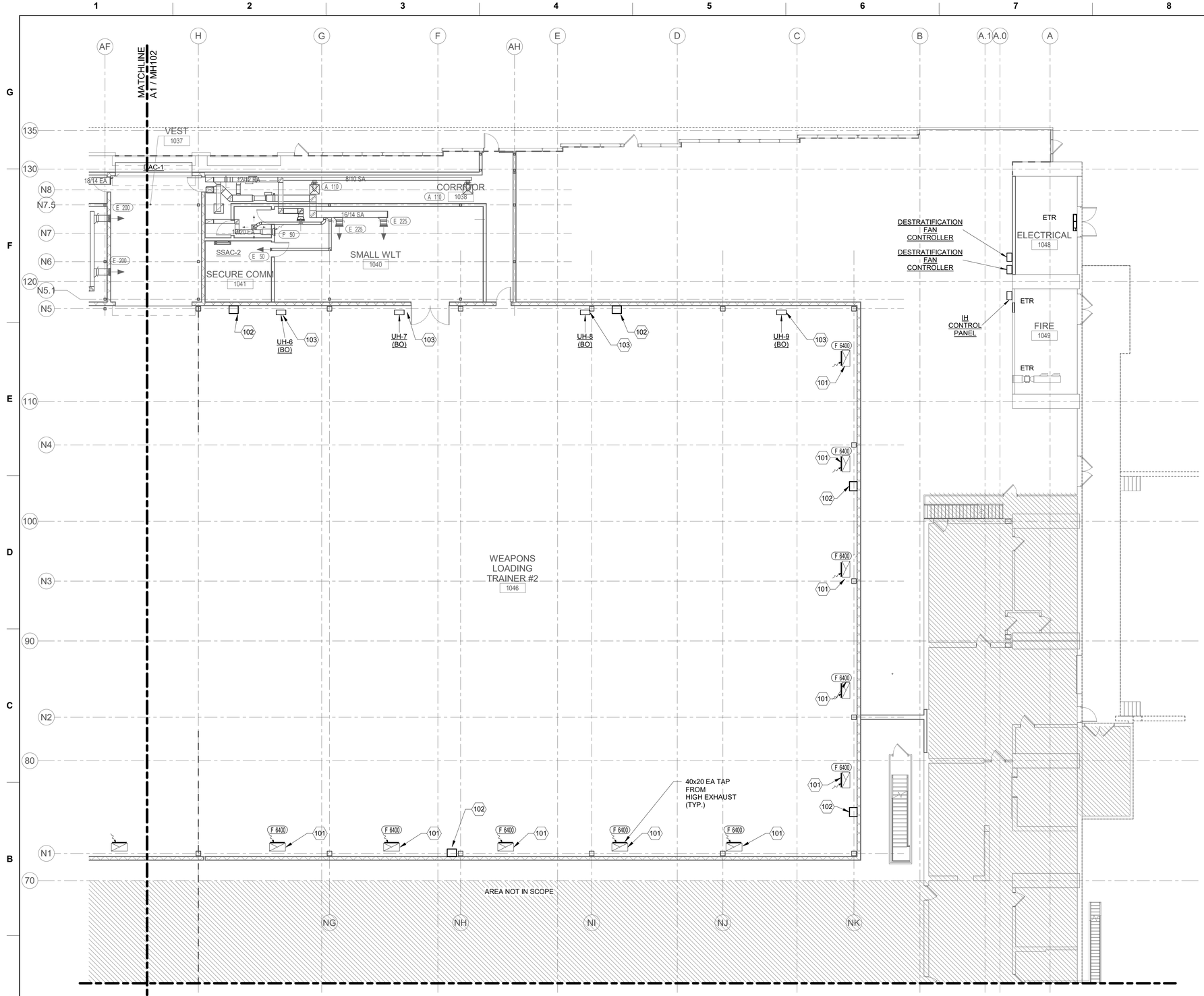
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL HVAC PLAN - LEVEL 01 - AREA B - BASE BID

SHEET ID
MH103a

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL HVAC PLAN - LEVEL 01 - AREA B - BID OPTION
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
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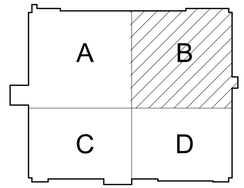
SHEET KEYNOTES

101. LOW WALL EXHAUST DUCTWORK. MOUNT BOTTOM OF GRILLE AT 1'-0"AFF REFERENCE DETAIL E5/M-502.
102. PROVIDE CO/NOx SENSOR MOUNTED 4-5 FEET A.F.F. ADJUST SENSOR HEIGHT HIGHER AS NECESSARY TO AVOID ANY OBSTRUCTIONS SO AS TO BE IN FREE FLOW AIR CIRCULATION. IF SENSOR REGISTERS A CO CONCENTRATION HIGHER THAN 50 PPM (ADJUSTABLE) OR NO2 CONCENTRATION HIGHER THAN 1 PPM (ADJUSTABLE), AUDIBLE AND VISUAL ALARMS SHALL BE INITIATED BOTH LOCALLY AND AT THE B.A.S.
103. HOT WATER UNIT HEATER. REFER TO SCHEDULE ON SHEET M602 FOR MOUNTING HEIGHT.



AREA B
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MH103b

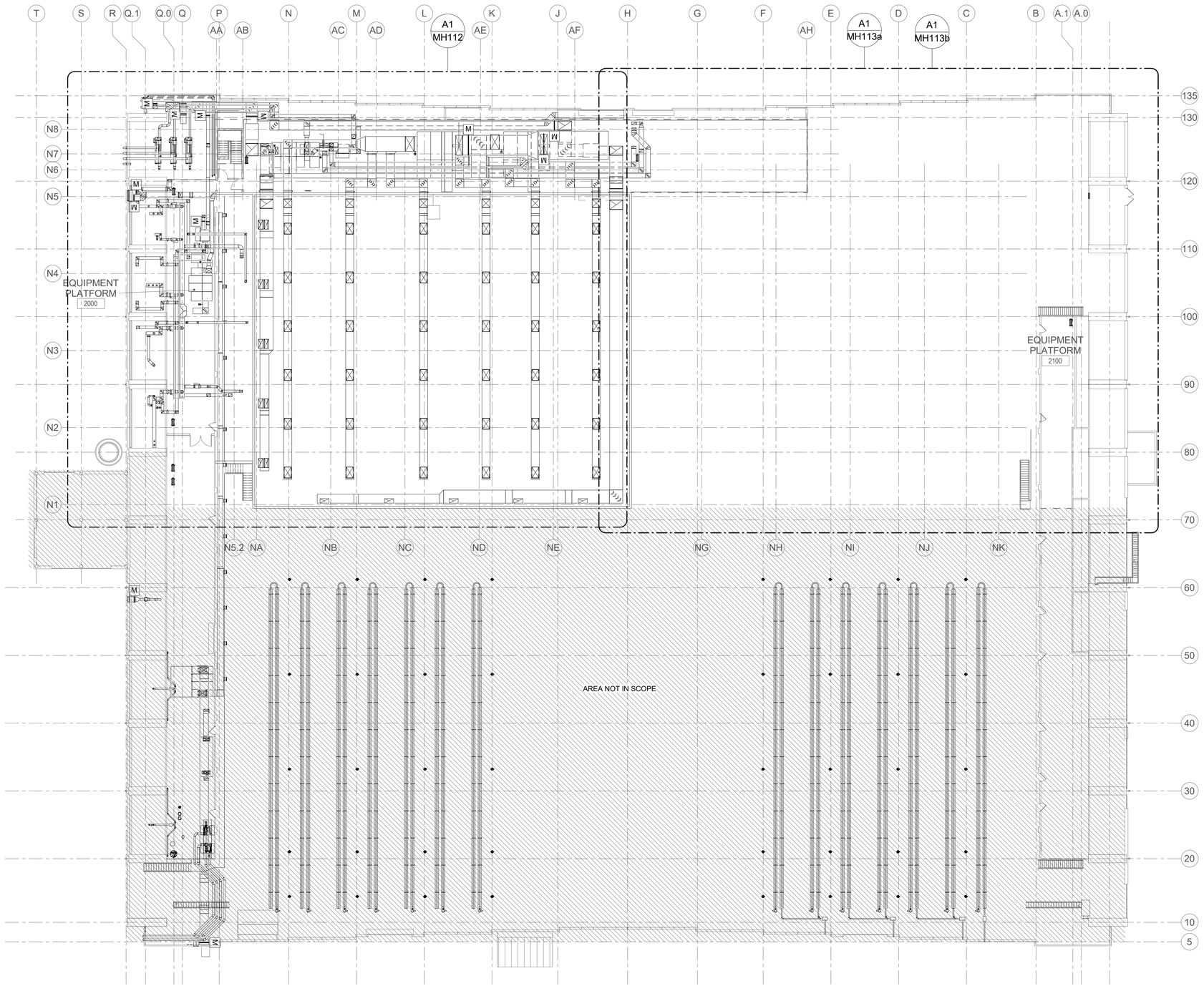
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL HVAC PLAN - LEVEL 01 - AREA B
- BID OPTION

SHEET ID
MH103b

ADVERTISEMENT - 100% DESIGN



A1 OVERALL HVAC PLAN - EQUIPMENT PLATFORMS
SCALE 1" = 20'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
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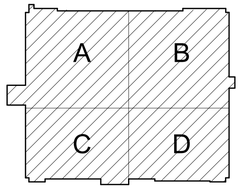
SHEET KEYNOTES



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN
NORTH

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	28 APRIL 2023
SOLICITATION NO.:	W9128F23R0012
CONTRACT NO.:	
DRAWING CODE::	
FILE NAME:	FXBM231802MH111

DESIGNED BY:	A. RAMOS
DRAWN BY:	A. RAMOS
CHECKED BY:	J. STAMPFER
SUBMITTED BY:	B. DYSON
SCALE:	ANSI D 22x34

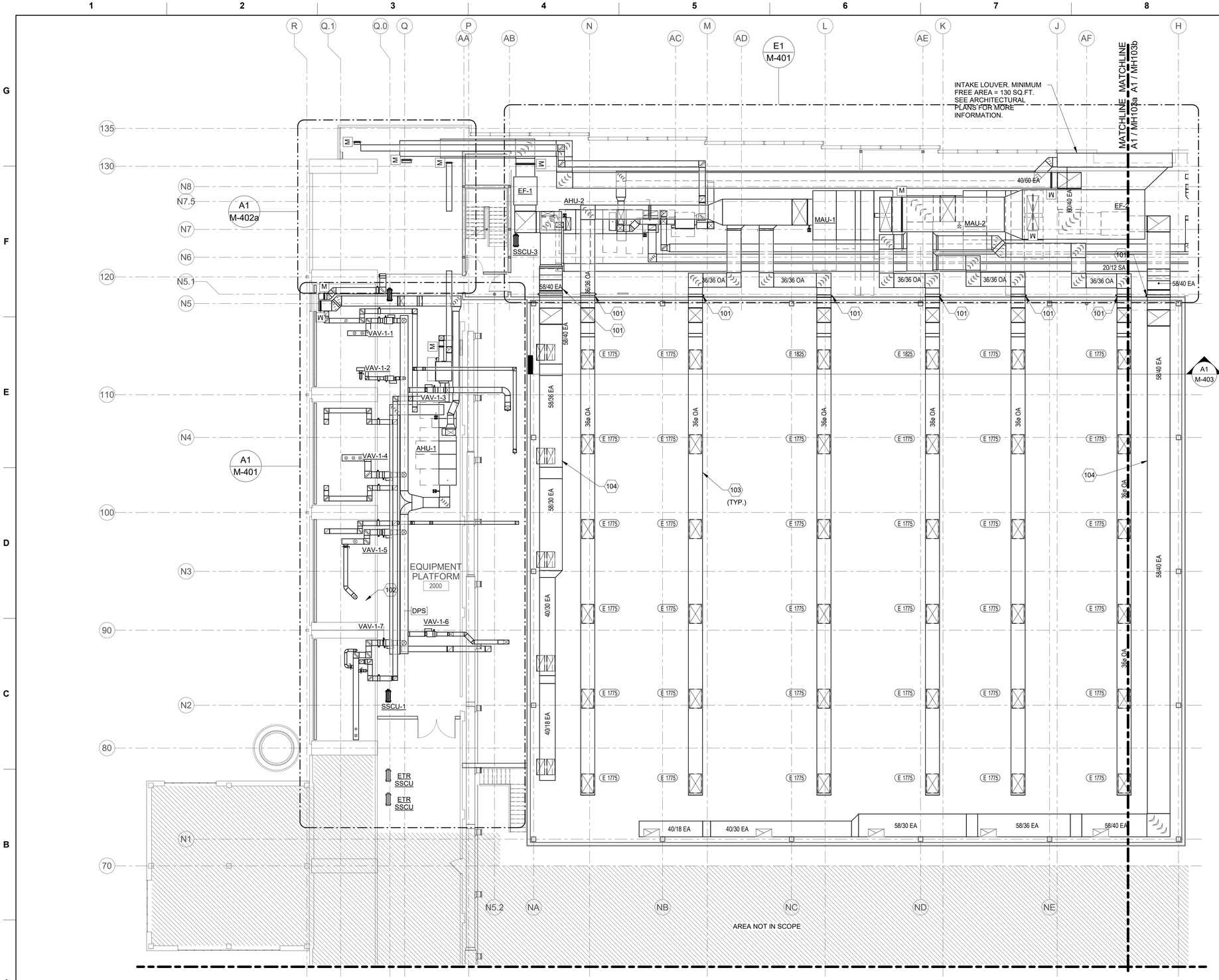
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL HVAC PLAN - EQUIPMENT PLATFORMS

SHEET ID
MH111

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL HVAC PLAN - EQUIPMENT PLATFORMS - AREA A

SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
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4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
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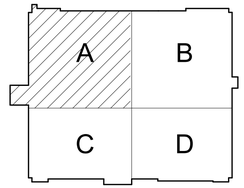
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. PROVIDE Z-BOOT FITTING (VERTICAL ASSEMBLY) IN DUCTWORK INSIDE OF THE WLT BAY TO COMPLY WITH ICD-705 GUIDELINES. PROVIDE SECURITY MAN BARS AND ACCESS DOOR IN DUCTWORK AT WALL PENETRATION. PROVIDE FIRE DAMPER AT RATED WALL PENETRATION. FIRE DAMPER ACCESS TO BE MECHANICAL PLATFORM SIDE. REFERENCE DETAIL E6/M-M501, A4/M-504.
102. DUCT STATIC PRESSURE SENSOR.
103. ROUTE OA DUCTWORK BETWEEN JOISTS AND AS HIGH AS POSSIBLE.
104. ROUTE EA DUCTWORK TIGHT TO BOTTOM OF JOISTS.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MH112
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

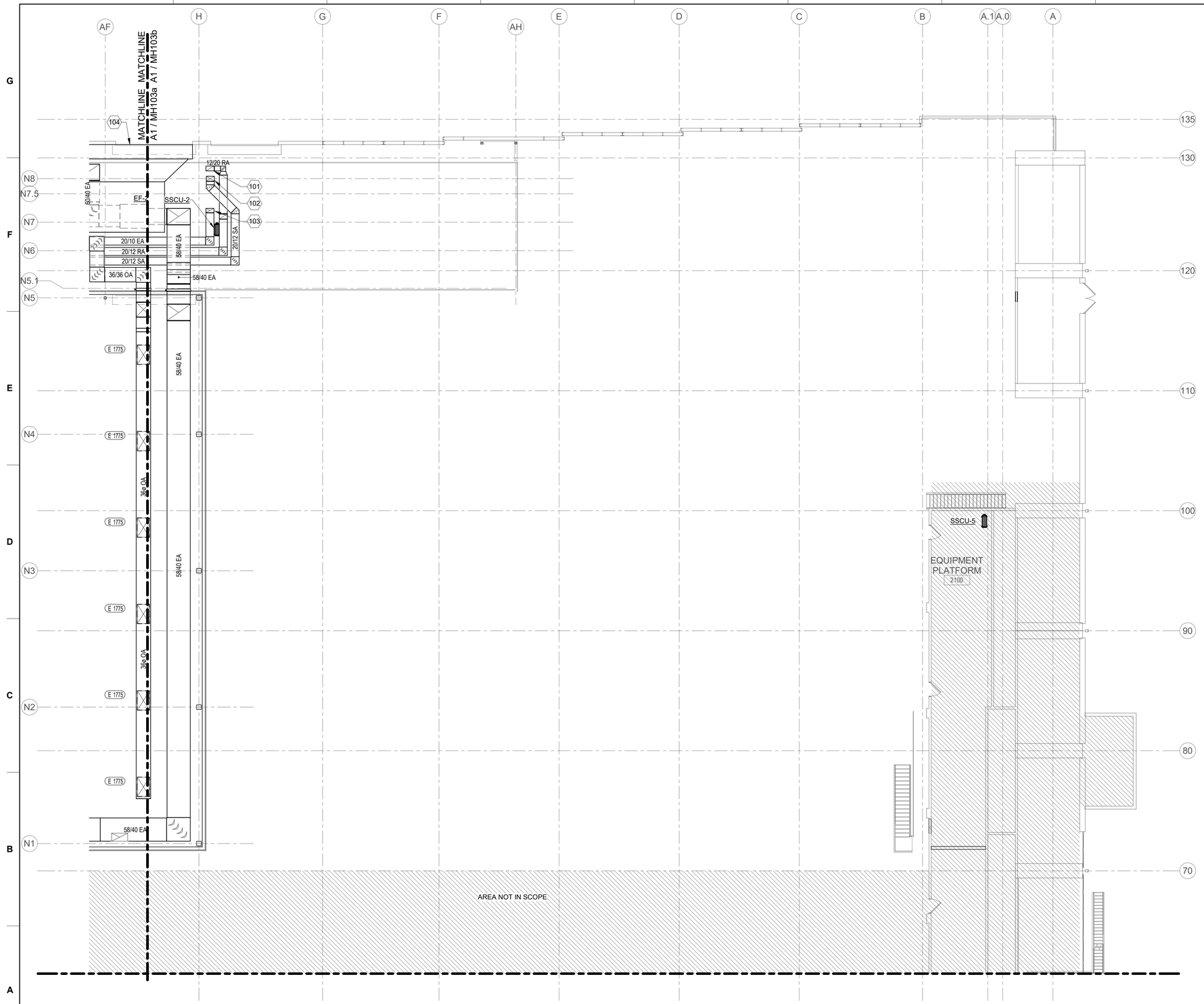
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL HVAC PLAN - EQUIPMENT
PLATFORMS - AREA A

SHEET ID

MH112

ADVERTISEMENT - 100% DESIGN



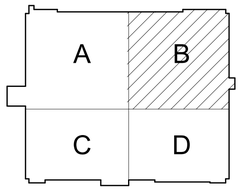
A1 PARTIAL HVAC PLAN - EQUIPMENT PLATFORMS - AREA B - BASE BID
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. 20x12 RA DUCT DOWN TO LEVEL 01.
102. 20x12 SA DUCT DOWN TO LEVEL 01.
103. 20x10 EA DUCT DOWN TO LEVEL 01.
104. INTAKE LOUVER. MINIMUM FREE AREA = 130 SQ.FT. SEE ARCHITECTURAL PLANS FOR MORE INFORMATION.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4" 8" 16" 32"

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MH113a

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

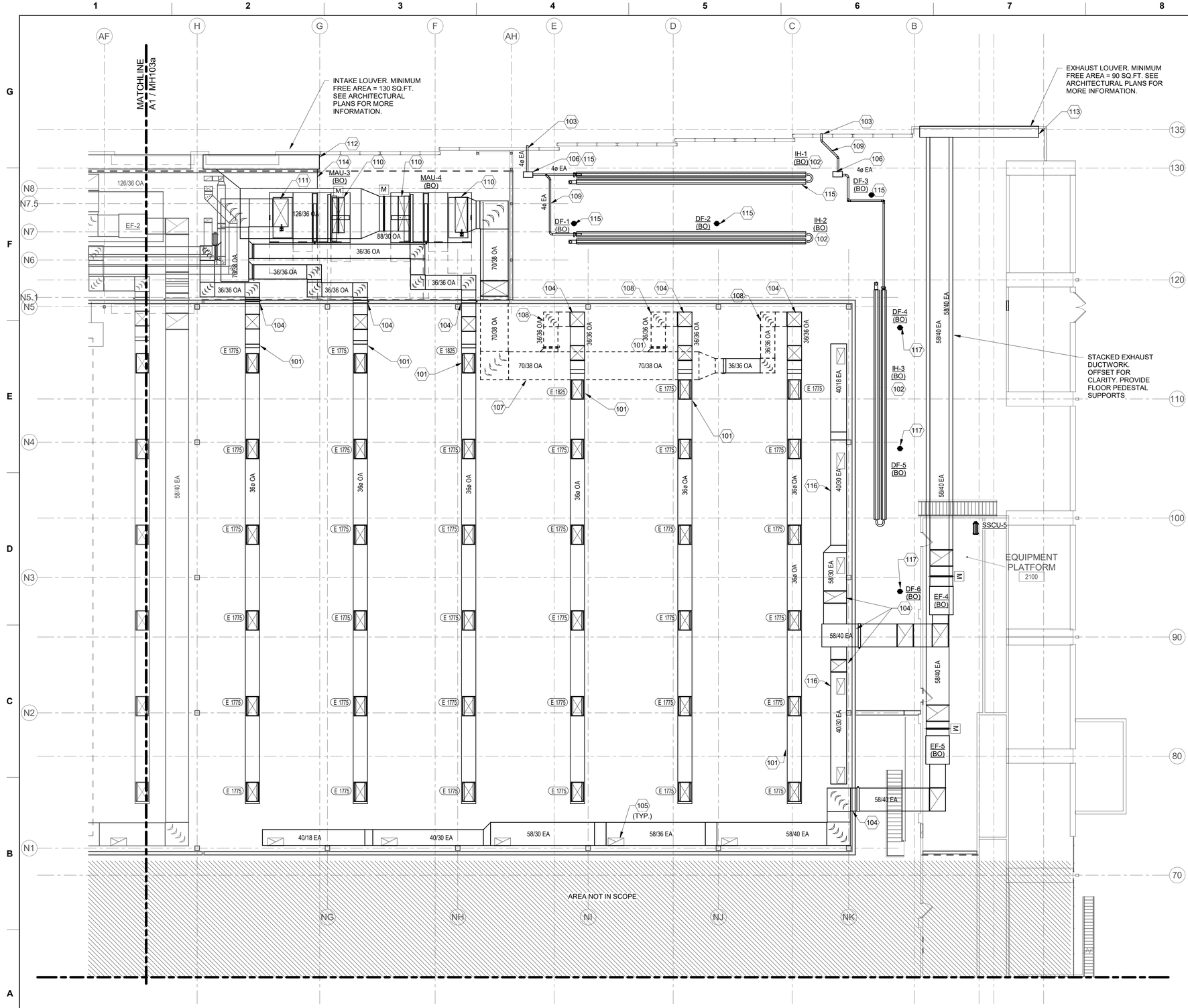
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PARTIAL HVAC PLAN - EQUIPMENT PLATFORMS - AREA B - BASE BID

SHEET ID
MH113a

ADVERTISEMENT - 100% DESIGN



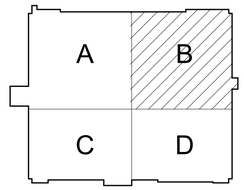
A1 PARTIAL HVAC PLAN - EQUIPMENT PLATFORMS - AREA B - BID OPTION
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. ROUTE OA DUCTWORK BETWEEN JOIST AND AS HIGH AS POSSIBLE.
102. INFRARED HEATER MOUNTED AT 40'-10" A.F.F. CONTRACTOR TO FIELD VERIFY DIMENSION IN FIELD AS TO NOT CONFLICT WITH EXISTING CONDITIONS.
103. CONNECT NEW 4" FLUE VENT TO EXISTING VENT PENETRATION.
104. PROVIDE Z-BOOT FITTING (VERTICAL ASSEMBLY) IN DUCTWORK INSIDE OF THE WLT BAY TO COMPLY WITH ICD-705 GUIDELINES. PROVIDE SECURITY MAN BARS AND ACCESS DOOR IN DUCTWORK AT WALL PENETRATION. PROVIDE FIRE DAMPER AT RATED WALL PENETRATION. FIRE DAMPER ACCESS TO BE OUTSIDE OF THE WLT BAY. REFERENCE DETAIL E6/M-M501, A4/M-504.
105. LOW WALL EXHAUST DUCTWORK. MOUNT BOTTOM OF GRILLE AT 1'-0". (TYP.) REFERENCE DETAIL E5/M-502.
106. RELOCATE EXISTING VACUUM PUMP AND EXTEND EXISTING ELECTRICAL CONNECTION TO NEW LOCATION.
107. OUTSIDE AIR MAIN ROUTED ABOVE WLT BAY.
108. 36x36 BRANCH DUCTWORK ROUTED ABOVE WLT BAY DOWN TO WLT BAY. PROVIDE FIRE DAMPER AT PENETRATION.
109. 4" CAST IRON FLUE VENT.
110. 80x30 DUCT CONNECTION TO MAU. TRANSITION TO MAU INLET/OUTLET AS REQUIRED. PROVIDE WITH FLEX CONNECTION.
111. 70x38 DUCT CONNECTION TO MAU. TRANSITION TO MAU OUTLET AS REQUIRED. PROVIDE WITH FLEX CONNECTION.
112. FIELD FABRICATED INSULATED 3'-0" PLENUM BOX (FULL AREA OF LOUVER) WITH PLENUM ATTACHMENT TO OUTSIDE AIR DUCTWORK.
113. FIELD FABRICATED 3'-0" PLENUM BOX (FULL AREA OF LOUVER) WITH PLENUM ATTACHMENT TO EXHAUST AIR DUCTWORK.
114. CUSTOM INSULATED SHEET METAL CONNECTION TO OA PLENUM.
115. EQUIPMENT SUSPENDED FROM BOTTOM OF STRUCTURE. MOUNT BOTTOM AT 40'-10" A.F.F. SEE MANUFACTURER'S INSTALLATION GUIDELINES FOR MORE INFORMATION.
116. ROUTE EA DUCTWORK TIGHT TO BOTTOM OF JOISTS.
117. EQUIPMENT SUSPENDED FROM BOTTOM OF STRUCTURE. MOUNT BOTTOM AT 35'-0" A.F.F. SEE MANUFACTURER'S INSTALLATION GUIDELINES FOR MORE INFORMATION.



AREA B
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MH113b
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL HVAC PLAN - EQUIPMENT PLATFORMS - AREA B - BID OPTION

SHEET ID
MH113b

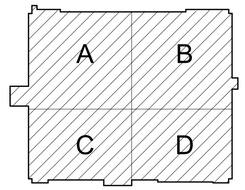
ADVERTISEMENT - 100% DESIGN

A1 OVERALL HVAC PIPING PLAN - LEVEL 01
SCALE 1" = 20'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
DATE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MP101

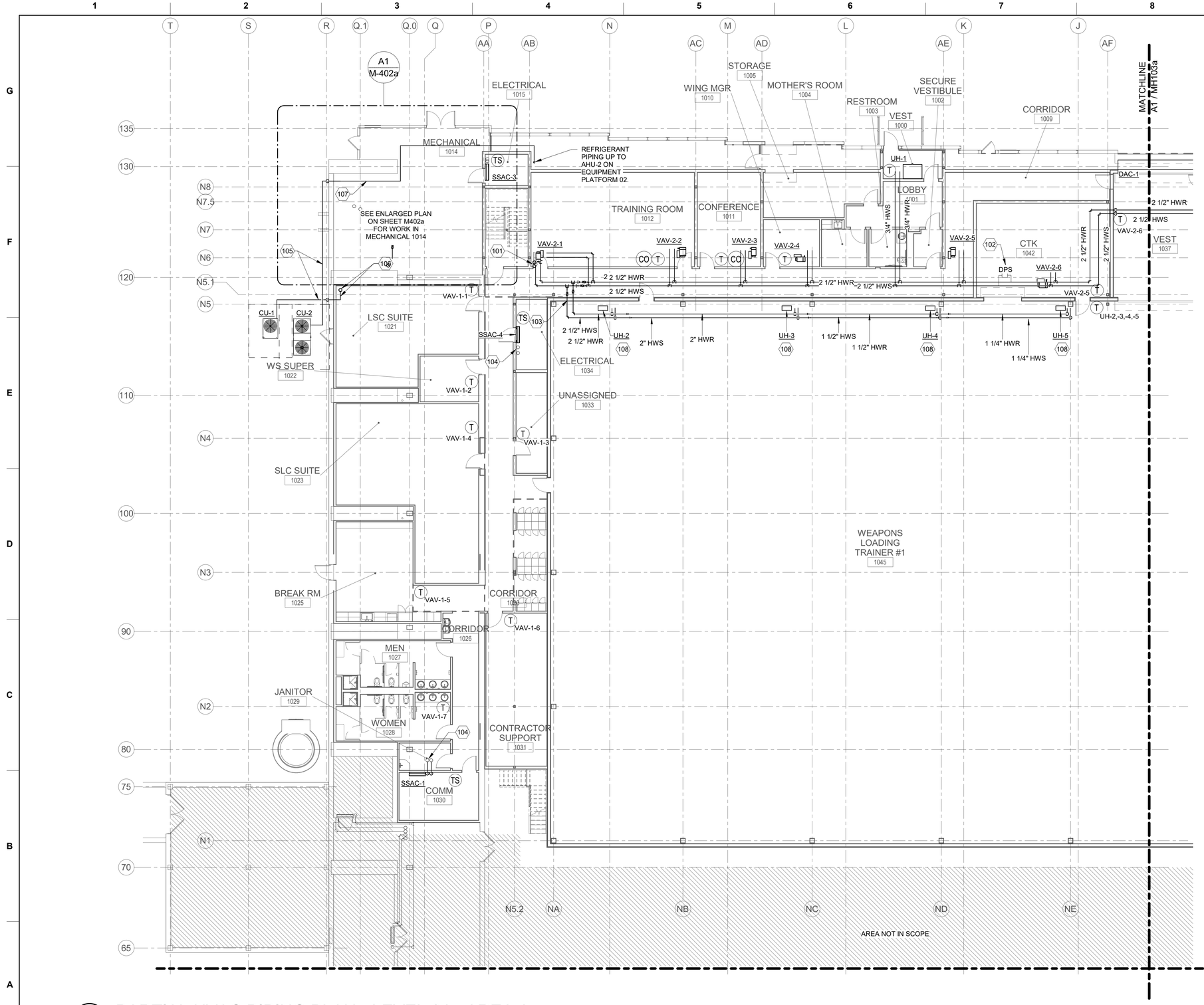
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL HVAC PIPING PLAN - LEVEL 01

SHEET ID
MP101

ADVERTISEMENT - 100% DESIGN



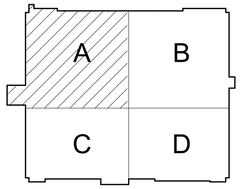
A1 PARTIAL HVAC PIPING PLAN - LEVEL 01 - AREA A
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. 4" HWS&R PIPING UP TO EQUIPMENT PLATFORM 02 ABOVE.
102. DIFFERENTIAL PRESSURE SENSOR FOR HW SYSTEM.
103. BOTTOM OF PIPING MOUNTED AT 14'-10" A.F.F. PROVIDE DI-ELECTRIC PIPE FITTINGS AT WLT BAY WALL PENETRATION IN ACCORDANCE WITH ICD 705. REFER TO E4/P-501 FOR MORE INFORMATION.
104. REFRIGERANT PIPING UP TO MECHANICAL PLATFORM ABOVE. ROUTE AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S GUIDELINES.
105. TWO LINE SET GENERAL ROUTING ABOVE GRADE AND ROUTED ALONG EXTERIOR WALL. ROUTE AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S GUIDELINES. (TYP.)
106. ROUTE REFRIGERANT PIPING ABOVE CEILING IN LSC SUITE. ROUTE REFRIGERANT PIPING UP TO AHU-1 ON EQUIPMENT PLATFORM 01.
107. FIELD ROUTE REFRIGERANT PIPING THROUGH MECHANICAL ROOM AS ABOVE OTHER UTILITIES OVER TO EQUIPMENT PLATFORM 02.
108. WALL MOUNTED UNIT HEATER. SEE HW UNIT HEATER SCHEDULE ON SHEET M-601 FOR MOUNTING HEIGHTS AND ADDITIONAL INFORMATION.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPFER
SUBMITTED BY: B. DYSON
ANSI D 22x34

FILE NAME: FXBM231802MP102

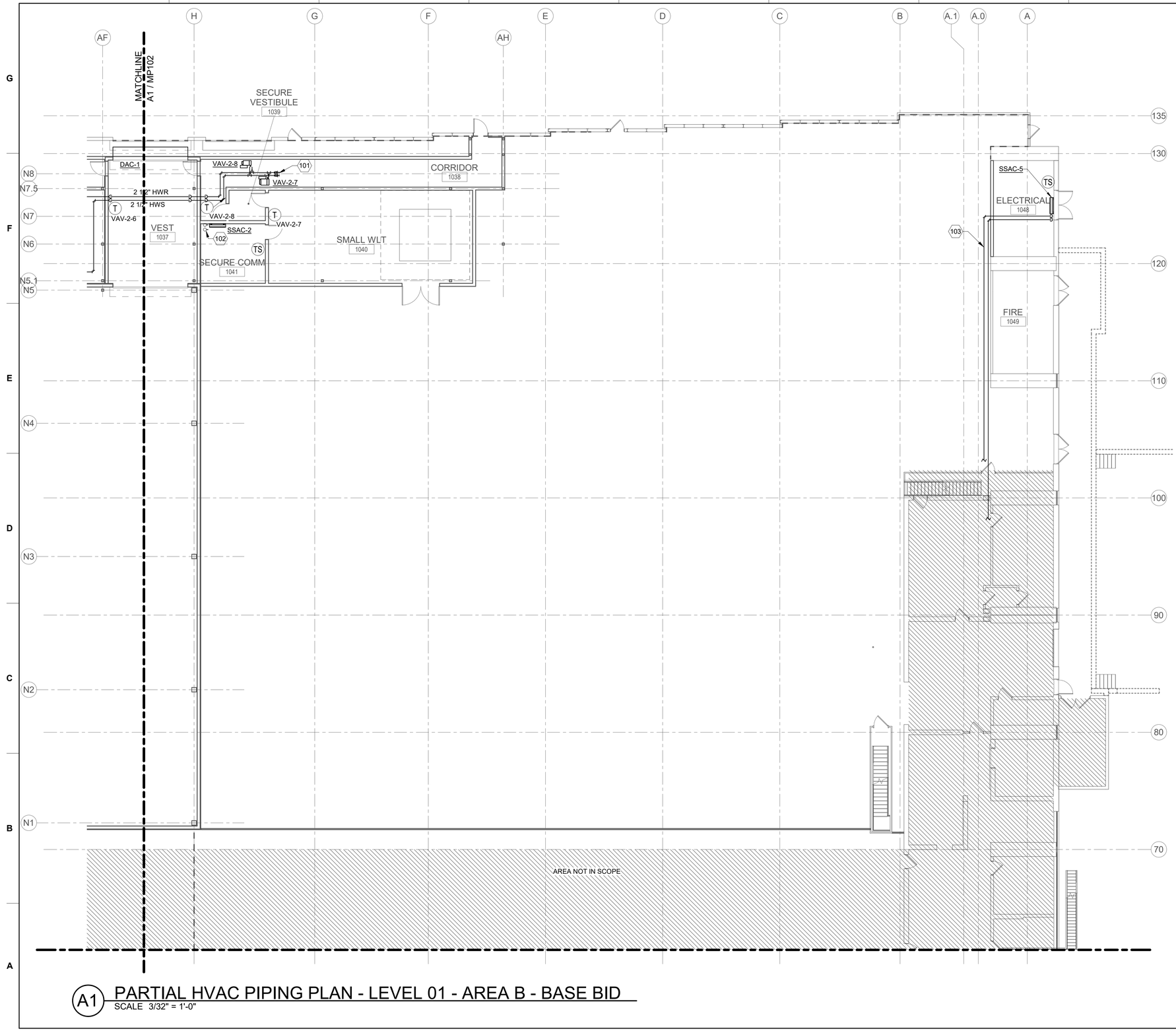
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL PIPING PLAN - LEVEL 01 - AREA A

SHEET ID
MP102

ADVERTISEMENT - 100% DESIGN



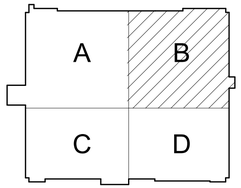
A1 PARTIAL HVAC PIPING PLAN - LEVEL 01 - AREA B - BASE BID
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. PROVIDE AND INSTALL 2-1/2" SHUT-OFF VALVE AND CAP AT LOCATION SHOWN IN HWS&R PIPING FOR CONNECTION TO BID OPTION WORK. REFERENCE MP-103b FOR MORE INFORMATION.
102. REFRIGERANT PIPING UP TO MECHANICAL PLATFORM ABOVE. ROUTE AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S GUIDELINES.
103. REFRIGERANT PIPING ROUTED TO SSCU-5 ON EXISTING EQUIPMENT PLATFORM. ROUTE AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S GUIDELINES.



AREA B
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802MP103a

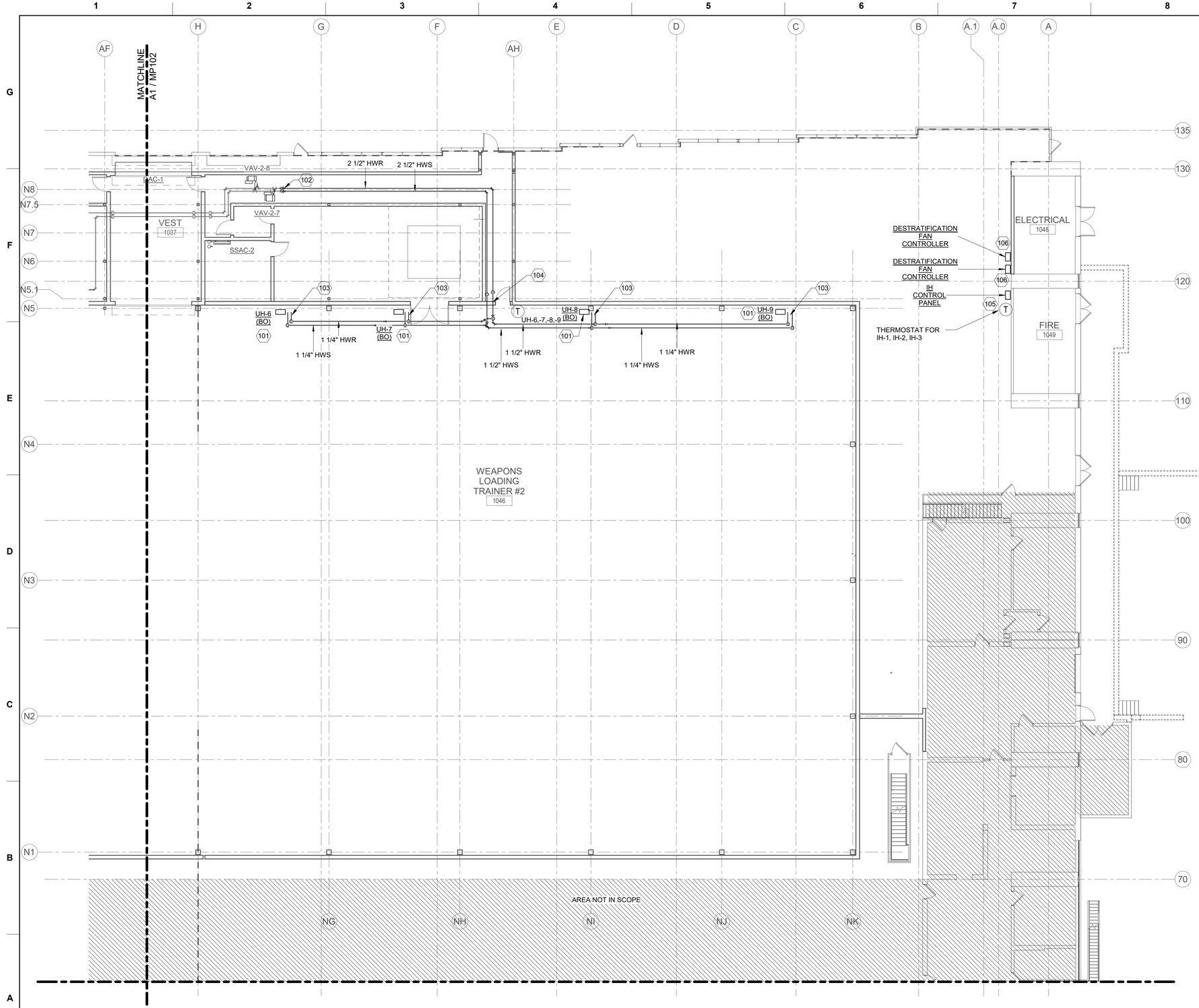
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL PIPING PLAN - LEVEL 01 - AREA
B - BASE BID

SHEET ID
MP103a

ADVERTISEMENT - 100% DESIGN



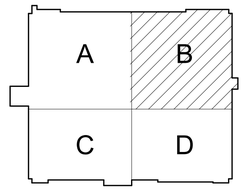
A1 PARTIAL HVAC PIPING PLAN - LEVEL 01 - AREA B - BID OPTION
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. HOT WATER UNIT HEATER. REFER TO SCHEDULE ON SHEET M602 FOR MOUNTING HEIGHT.
102. EXTEND 2-1/2" HWS&R AT THIS LOCATION TO SERVE UNIT HEATERS IN WLT BAY #2.
103. 1-1/4" HWS&R CONNECTION TO UNIT HEATER. COORDINATE INLET/OUTLET CONNECTION LOCATIONS WITH MANUFCACTURER'S DRAWINGS.
104. BOTTOM OF PIPING MOUNTED AT 14'-10" A.F.F. PROVIDE DI-ELECTRIC PIPE FITTINGS AT WLT BAY WALL PENETRATION IN ACCORDANCE WITH ICD 705. REFER TO E4/P-501 FOR MORE INFORMATION.
105. CONTROL PANEL AND THERMOSTAT LOCATION FOR INFRARED HEATERS.
106. PROVIDE AND INSTALL NEW DESTRATIFICATION FAN CONTROLLER ON WALL AT LOCATION SHOWN.



AREA B
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MP-103b
SIZE: ANSI D 22x34

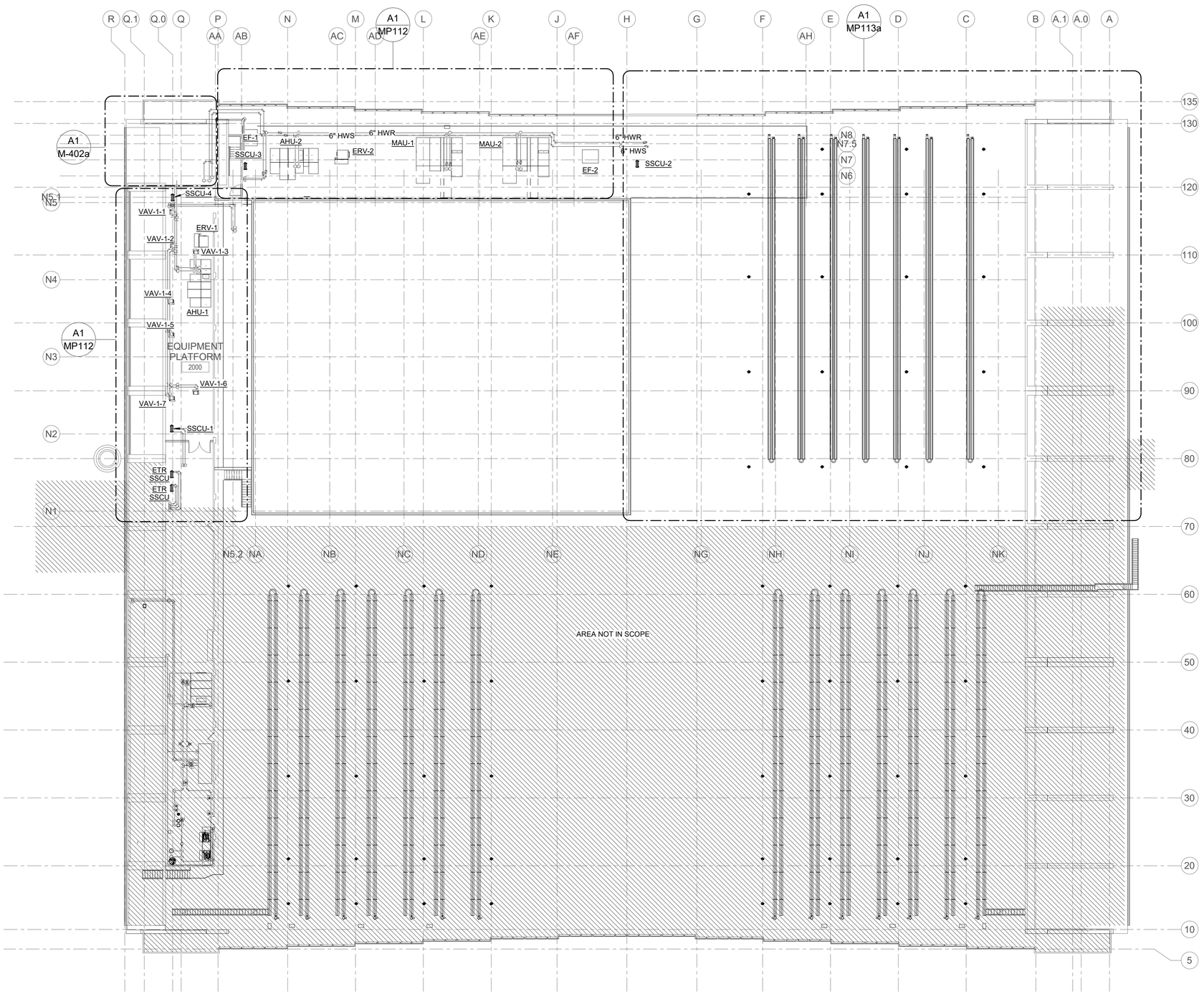
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL PIPING PLAN - LEVEL 01 - AREA
B - BID OPTION

SHEET ID
MP103b

ADVERTISEMENT - 100% DESIGN

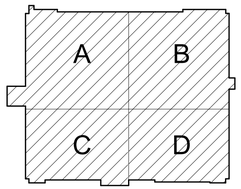


A1 OVERALL HVAC PIPING PLAN - EQUIPMENT PLATFORMS
SCALE 1" = 20'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES



AREA B
KEY PLAN

GRAPHIC SCALE
0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
DATE: ISSUE DATE: 28 APRIL 2023
ANSI D 22x34
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802MP111

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

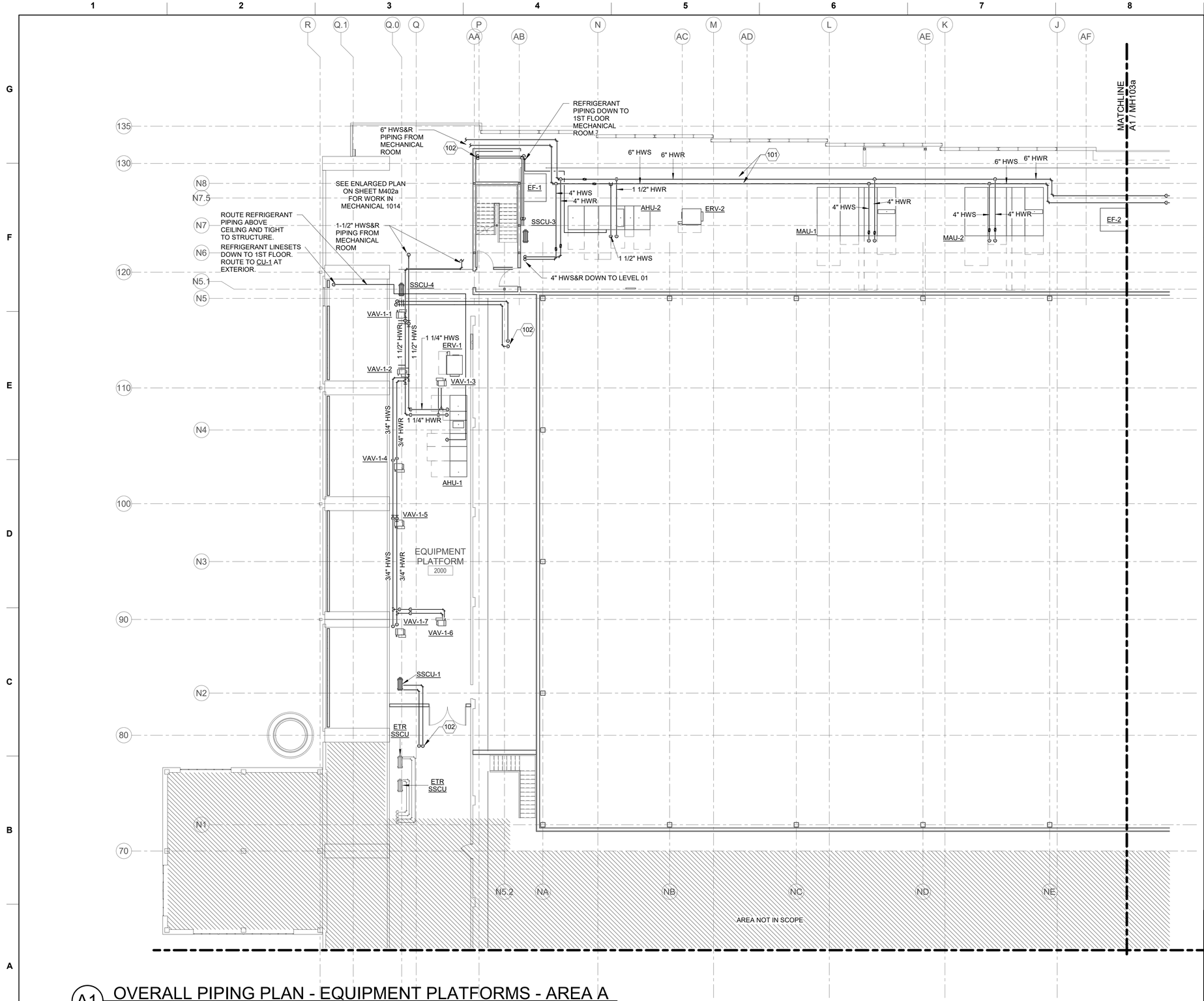
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL HVAC PIPING PLAN - EQUIPMENT PLATFORMS

SHEET ID
MP111

ADVERTISEMENT - 100% DESIGN



A1 OVERALL PIPING PLAN - EQUIPMENT PLATFORMS - AREA A
SCALE 3/32" = 1'-0"

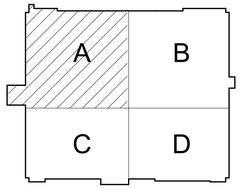
GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. MOUNT BOTTOM OF PIPING 5'-8" ABOVE FINISHED EQUIPMENT PLATFORM. SUPPORT ALL PIPING WITH FLOOR PEDESTALS. DO NOT SUPPORT FROM CEILING OF HANGAR BAY. OFFSET PIPING AS REQUIRED TO AVOID OTHER UTILITIES IN PATH.

102. REFRIGERANT PIPING DOWN TO FIRST FLOOR. ROUTE AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S GUIDELINES.



AREA A
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DITSON
DATE ISSUED: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MP112
ANSI D 22x34

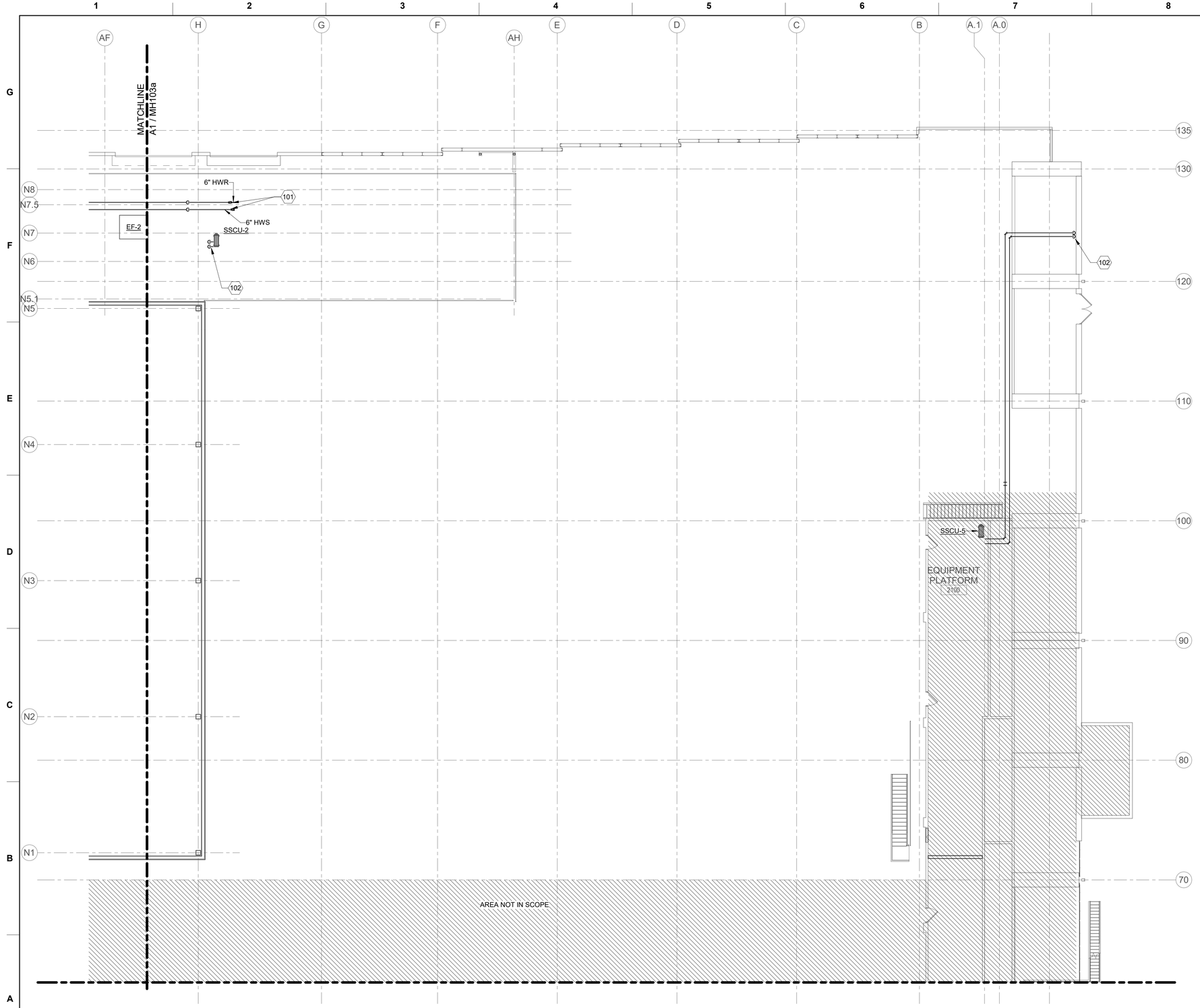
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL PIPING PLAN - EQUIPMENT PLATFORMS - AREA A

SHEET ID
MP112

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL PIPING PLAN - EQUIPMENT PLATFORMS - AREA B - BASE BID
SCALE 3/32" = 1'-0"

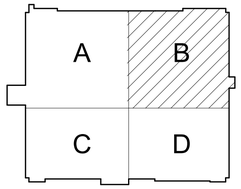
GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. PROVIDE AND INSTALL 6" SHUT-OFF VALVE AND CAP AT LOCATION SHOWN IN HWS&R PIPING FOR CONNECTION TO BID OPTION WORK. REFERENCE MP-113b FOR MORE INFORMATION.

102. REFRIGERANT PIPING DOWN TO SSAC-2 IN SECURE COMM ROOM BELOW. PROVIDE DI-ELECTRIC FITTINGS AT PENETRATION. ROUTE AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S GUIDELINES.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MP113a

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

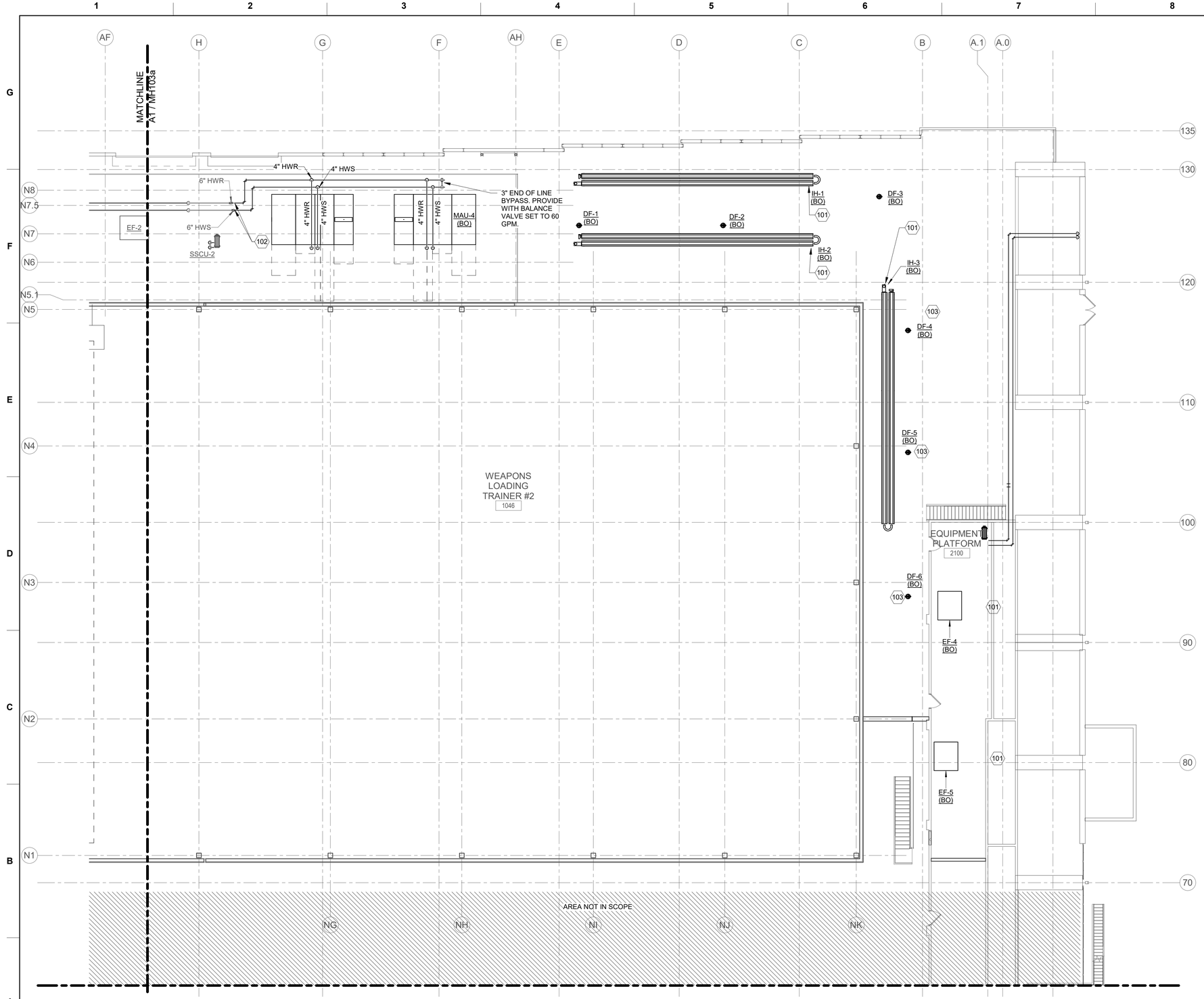
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PARTIAL PIPING PLAN - EQUIPMENT PLATFORMS - AREA B - BASE BID

SHEET ID

MP113a

ADVERTISEMENT - 100% DESIGN



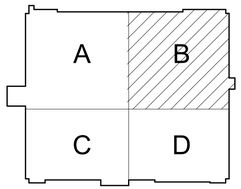
A1 PARTIAL PIPING PLAN - EQUIPMENT PLATFORMS - AREA B - BID OPTION
SCALE 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. COORDINATE THERMOSTATS WITH FURNISHINGS. LOCATE THERMOSTATS 6" ON CENTER FROM LIGHT SWITCH. MOUNT TOP OF THERMOSTAT AS SHOWN AT ADA APPROVED MOUNTING HEIGHT.
6. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
7. ALL BRANCH TAPS TO VAV TERMINAL UNITS SHALL BE 3/4" UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. INFRARED HEATER MOUNTED AT 40'-10" A.F.F. CONTRACTOR TO FIELD VERIFY DIMENSION IN FIELD AS TO NOT CONFLICT WITH EXISTING CONDITIONS.
102. EXTEND 6" HWS&R PIPING AT POINT INDICATED FOR CONNECTION TO EQUIPMENT PROVIDED AS PART OF THE BID OPTION WORK.
103. MOUNT DESTRATIFICATION FAN AT 35'-4" A.F.F.



AREA B
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802MP113b
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

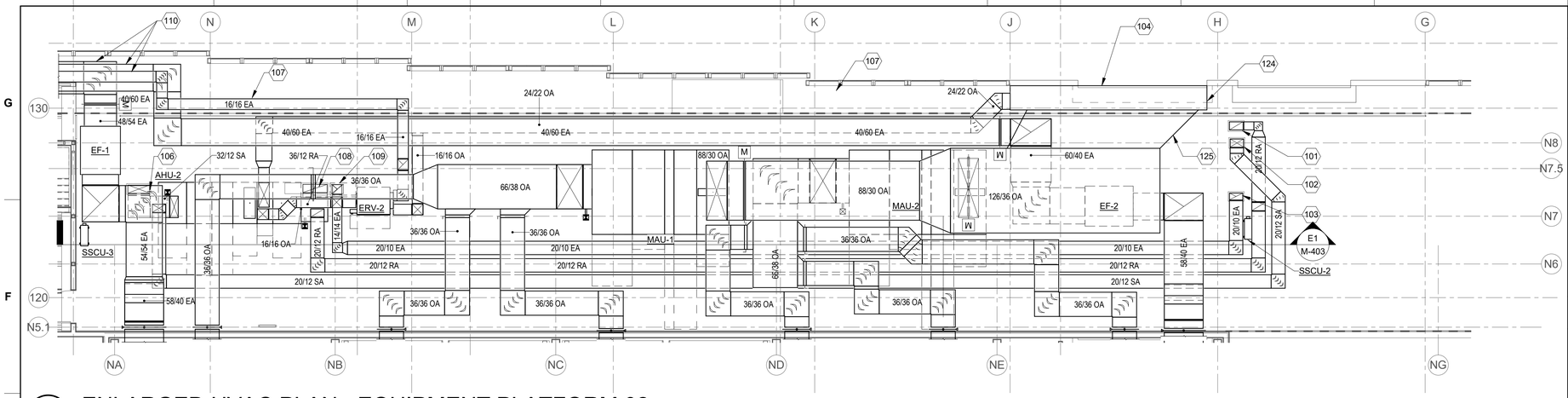
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PARTIAL PIPING PLAN - EQUIPMENT PLATFORMS - AREA B - BID OPTION

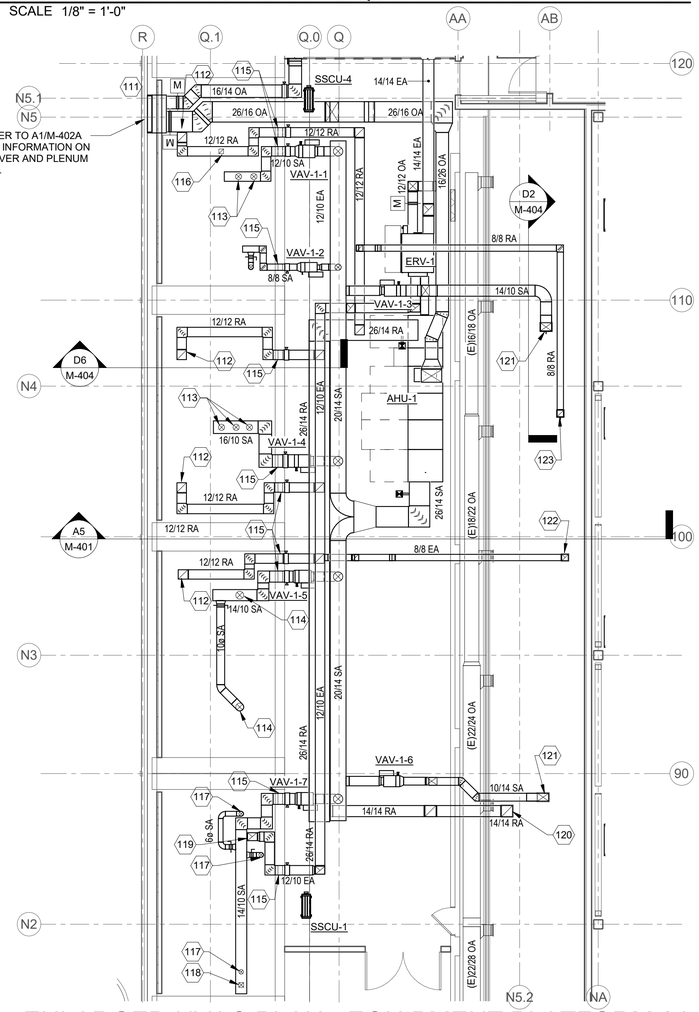
SHEET ID
MP113b

ADVERTISEMENT - 100% DESIGN



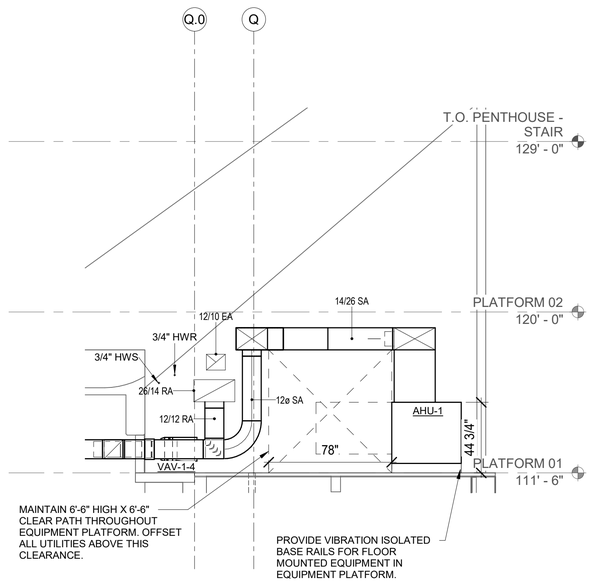
E1 ENLARGED HVAC PLAN - EQUIPMENT PLATFORM 02

SCALE 1/8" = 1'-0"



A1 ENLARGED HVAC PLAN - EQUIPMENT PLATFORM 01

SCALE 1/8" = 1'-0"



A5 EQUIPMENT PLATFORM 01 SECTION

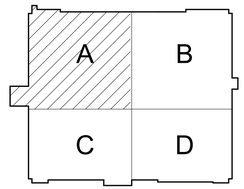
SCALE 1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. 20x12 RA DUCT DOWN TO LEVEL 01.
102. 20x12 SA DUCT DOWN TO LEVEL 01.
103. 20x10 EA DUCT DOWN TO LEVEL 01.
104. INTAKE LOUVER. MINIMUM FREE AREA = 130 SQ.FT. SEE ARCHITECTURAL PLANS FOR MORE INFORMATION.
105. BLANK OFF LOUVER WITH INSULATED SHEET METAL PANELS.
106. 32x12 SA DUCT DOWN TO LEVEL 01.
107. DUCTWORK SHOWN OFFSET FOR CLARITY. ROUTE ABOVE THE MECHANICAL PLATFORM AND SUPPORT WITH FLOOR MOUNTED PEDESTALS.
108. 36x12 RA DUCT DOWN TO LEVEL 01.
109. 18x14 EA DUCT DOWN TO LEVEL1.
110. ROUTE EA DUCTWORK OVER TO EXHAUST LOUVER PLENUM. SUPPORT WITH FLOOR MOUNTED PEDESTALS.
111. INTAKE LOUVER. MIN. FREE AREA = 10 SQ.FT. BOTTOM OF LOUVER SHALL BE AT MIN. 10'-0" ABOVE FINISHED GRADE. COORDINATE HEIGHT AND LOCATION WITH ARCHITECTURAL DRAWINGS.
112. 12x12 RA DOWN TO LEVEL 01 IN PLENUM SPACE.
113. 8" SA DOWN TO LEVEL 01 IN PLENUM SPACE.
114. 10" SA DOWN TO LEVEL 01 IN PLENUM SPACE.
115. PROVIDE Z-BOOT FITTING IN DUCTWORK TO COMPLY WITH ICD-705 GUIDELINES. PROVIDE SECURITY MAN BARS AND ACCESS DOOR IN DUCTWORK AT WALL PENETRATION. PROVIDE WITH FIRE DAMPER ACCESSIBLE FROM EXISTING EQUIPMENT PLATFORM.
116. 6x6 RA DOWN TO LEVEL 01 IN PLENUM SPACE.
117. 6" SA DOWN TO LEVEL 01 IN PLENUM SPACE.
118. 6x6 SA DOWN TO LEVEL 01 IN PLENUM SPACE.
119. 12x10 EA DOWN TO LEVEL 01 IN PLENUM SPACE.
120. 14x14 RA DOWN TO LEVEL 01 THROUGH SLAB. PROVIDE FIRE DAMPER AT SLAB PENETRATION.
121. 14x10 SA DOWN TO LEVEL 01 THROUGH SLAB. PROVIDE FIRE DAMPER AT SLAB PENETRATION.
122. 8x8 EA DOWN TO LEVEL 01 THROUGH SLAB. PROVIDE FIRE DAMPER AT SLAB PENETRATION.
123. 8x8 RA DOWN TO LEVEL 01 THROUGH SLAB. PROVIDE FIRE DAMPER AT SLAB PENETRATION.
124. FIELD FABRICATED INSULATED 3'-0" PLENUM BOX (FULL AREA OF LOUVER) WITH PLENUM ATTACHMENT TO OUTSIDE AIR DUCTWORK. COORDINATE WITH LOUVER DIMENSIONS SHOWN ON ARCHITECTURAL DRAWINGS.
125. CUSTOM INSULATED SHEET METAL CONNECTION TO OA PLENUM.



AREA A
KEY PLAN

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-401

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON

ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

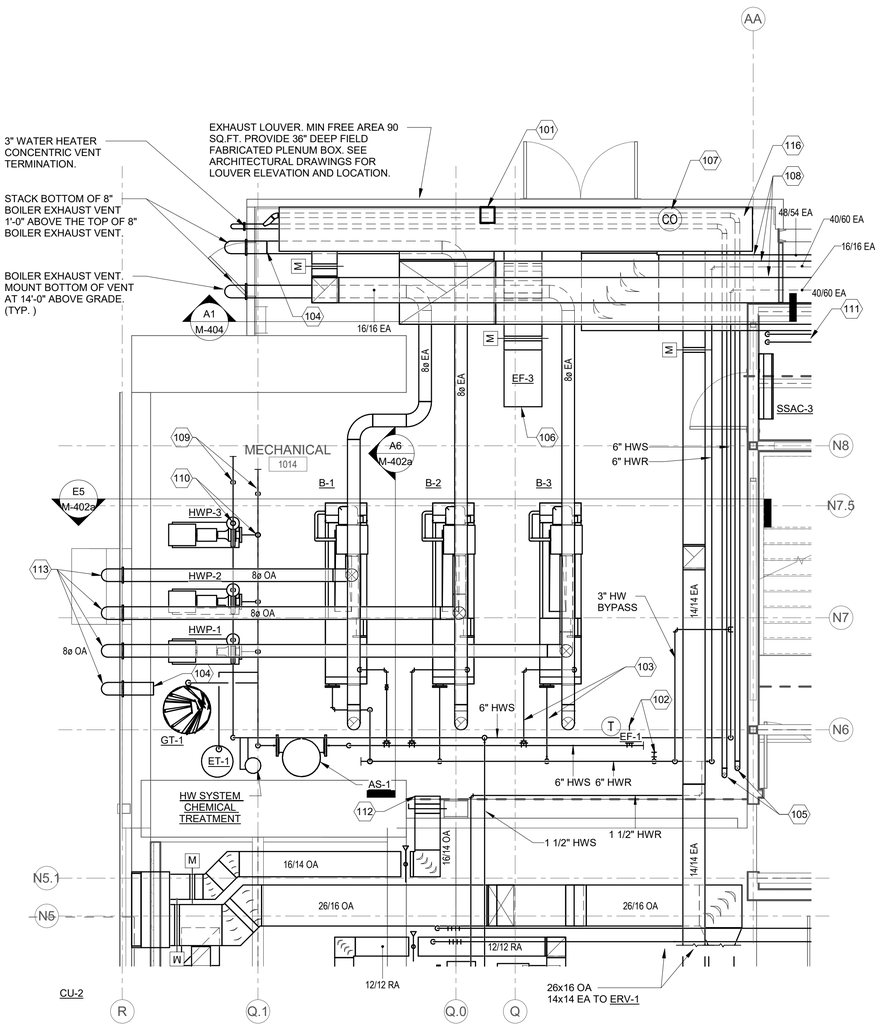
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HVAC ENLARGED PLANS - BASE BID

SHEET ID

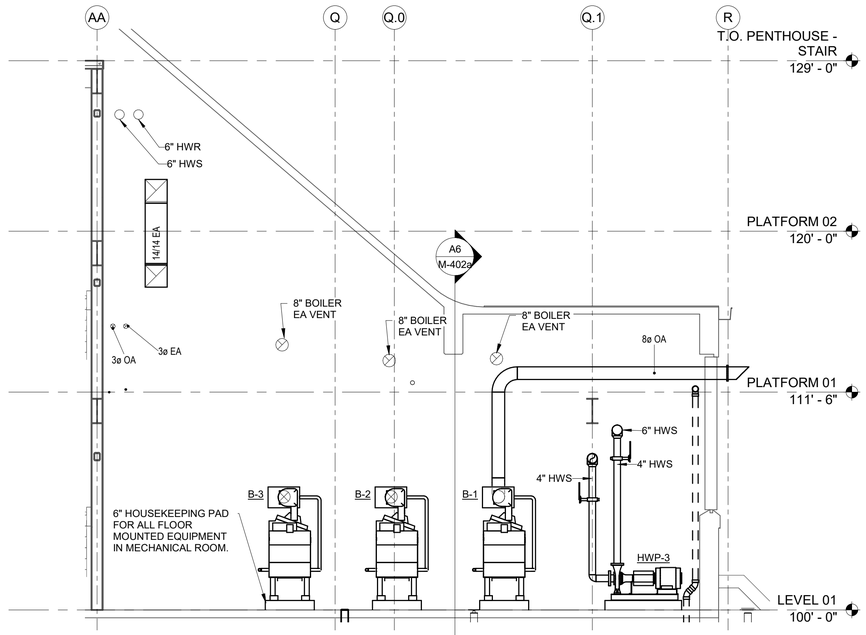
M-401

ADVERTISEMENT - 100% DESIGN



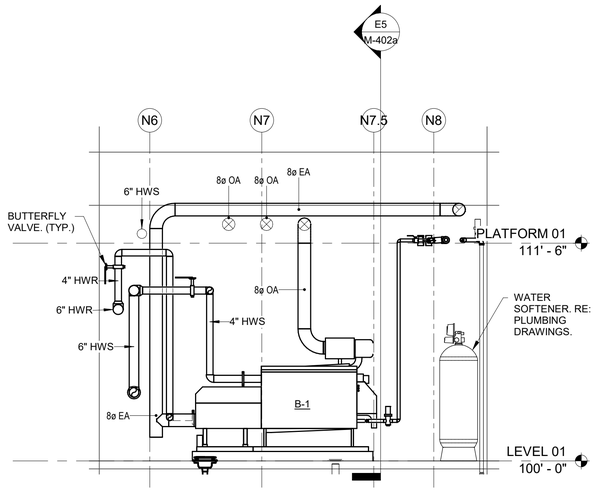
A1 ENLARGED HVAC PLAN - MECHANICAL ROOM 1014 - BASE BID

SCALE 1/4" = 1'-0"



E5 MECHANICAL ROOM BOILER SECTION

SCALE 1/4" = 1'-0"



A6 MECHANICAL ROOM BOILER PIPING SECTION

SCALE 1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. EMERGENCY POWER OFF SWITCH (PUSH BUTTON TYPE WITH HINGED CLEAR COVER) FOR BOILER AND WATER HEATER GAS CUT OFF. UPON ACTIVATION OF SWITCH THE NATURAL GAS TO THE BOILERS AND WATER HEATER SHALL BE CUT OFF AND SHALL GENERATE AN ALARM TO THE BAS.
102. PROVIDE AND INSTALL 4" SHUT-OFF VALVE AND CAP AT LOCATION SHOWN IN HWS&R PIPING FOR CONNECTION TO BID OPTION WORK. REFERENCE M-402b FOR MORE INFORMATION.
103. 4" HWS&R CONNECTION WITH ISOLATION VALVE. (TYP. FOR EACH BOILER).
104. PROVIDE AND INSTALL BOILER EXHAUST VENT AND CAP AT LOCATION SHOWN FOR CONNECTION TO BID OPTION WORK. REFERENCE SHEET M-402b FOR MORE INFORMATION.
105. 3" STAINLESS STEEL VENT CONNECTIONS FROM WATER HEATER. ROUTE VENT THROUGH BOILER ROOM AND TERMINATE AT EXTERIOR WALL WITH CONCENTRIC VENT FITTING.
106. PROVIDE WIRE MESH SCREEN AT INLET OF INLINE EXHAUST FAN.
107. CARBON MONOXIDE AND NO2 SENSOR MOUNTED ON WALL. IF SENSOR REGISTERS A CO CONCENTRATION HIGHER THAN 50 PPM (ADJUSTABLE) OR NO2 CONCENTRATION HIGHER THAN 1 PPM (ADJUSTABLE), AUDIBLE AND VISUAL ALARMS SHALL BE INITIATED BOTH LOCALLY AND AT THE B.A.S.
108. THREE EXHAUST DUCTS STACKED ABOVE EACH OTHER.
109. PROVIDE AND INSTALL 4" SHUT-OFF VALVE AND CAP AT LOCATION SHOWN IN 6" HEADER FOR CONNECTION TO BID OPTION WORK. REFERENCE M-402b FOR MORE INFORMATION.
110. 4" HWP CONNECTIONS WITH ISOLATION VALVES IN RISER. (TYP. FOR ALL HWP CONNECTIONS.)
111. REFRIGERANT PIPING UP TO MECHANICAL PLATFORM 02 ABOVE. ROUTE AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S GUIDELINES. REFERENCE SHEET MP-212 FOR CONTINUATION.
112. PROVIDE WIRE MESH SCREEN AT OUTLET OF OA DUCTWORK.
113. CATEGORY 4 STAINLESS STEEL BOILER INTAKE VENT. MOUNT BOTTOM OF VENT AT 11'-0" ABOVE GRADE. (TYP. 4)
114. INTAKE LOUVER. MIN. FREE AREA = 10 SQ.FT. BOTTOM OF LOUVER SHALL BE AT MIN. 10'-0" ABOVE FINISHED GRADE. COORDINATE HEIGHT AND LOCATION WITH ARCHITECTURAL DRAWINGS. PROVIDE 18" INSULATED SHEET METAL PLENUM BOX FOR LOUVER.
115. CATEGORY 4 STAINLESS STEEL BOILER EXHAUST VENT. SLOPE TOWARD BOILER AT MINIMUM 1/4" PER FOOT. MOUNT BOTTOM OF VENT AT 14'-0" ABOVE GRADE. (TYP.)
116. LOCATE OPERATOR WORKSTATION AT THIS LOCATION.

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-402a
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

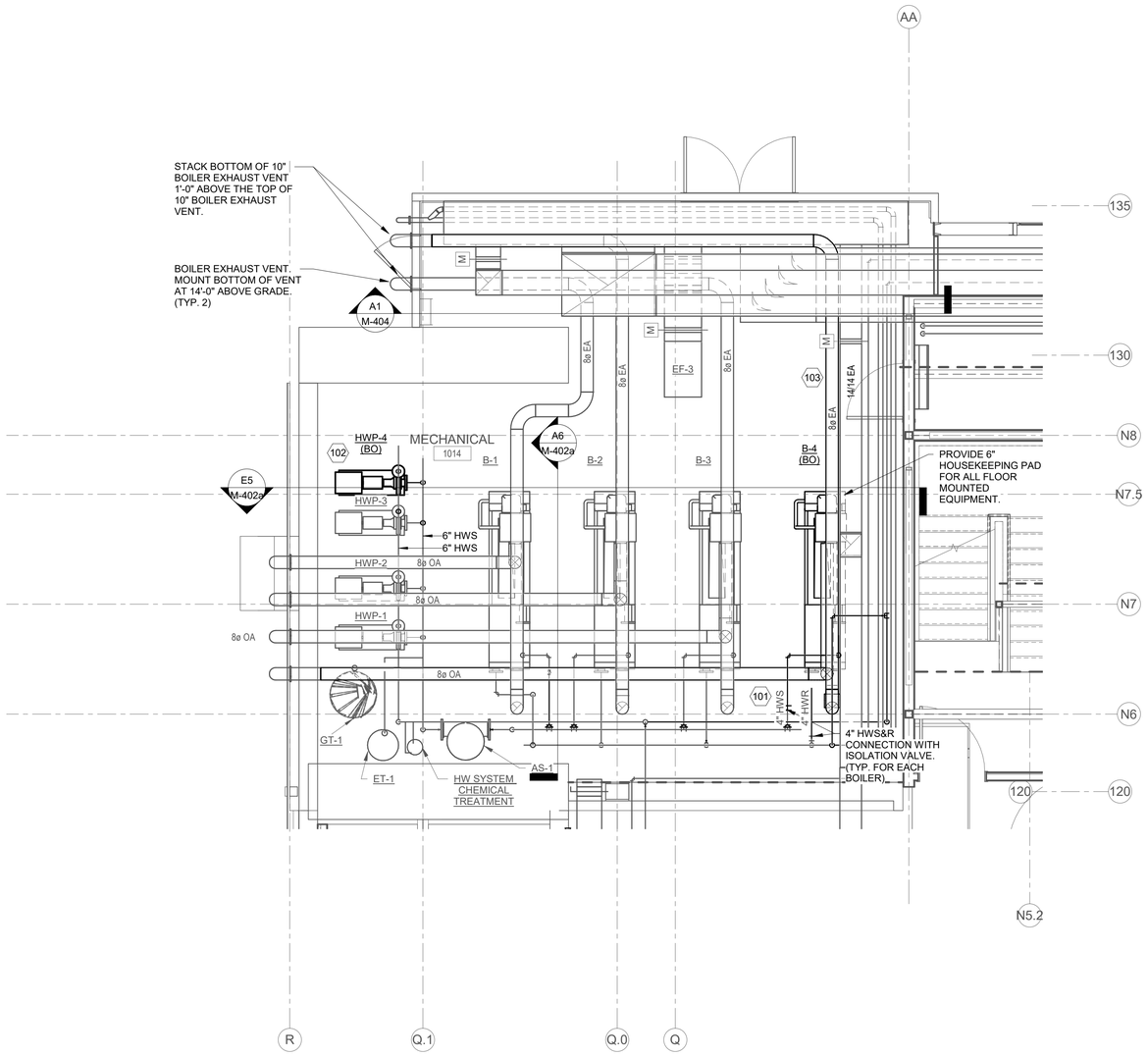
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HVAC ENLARGED PLANS - BASE BID

SHEET ID

M-402a

ADVERTISEMENT - 100% DESIGN



A1 ENLARGED HVAC PLAN - MECHANICAL ROOM 1014 - BID OPTION

SCALE 1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. EXTEND 4" HWS&R LINES FROM POINT INDICATED AND CONNECT TO BOILER, B-4 (BO), AS REQUIRED AS PART OF THE BID OPTION WORK.
102. EXTEND 4" HWS&R LINES FROM HEADER TO POINT INDICATED AND CONNECT TO HWP-4 AS REQUIRED AS PART OF THE BID OPTION WORK.
103. EXTEND CATEGORY 4 8" EA/OA BOILER VENTS FROM POINT INDICATED AND CONNECT TO BOILER, B-4, AS REQUIRED AS PART OF BID OPTION WORK. SLOPE EA VENT TOWARD BOILER AT MINIMUM 1/4" PER FOOT.

4 3 2 1 0 4 8
SCALE: 1/4"=1'-0"

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
DATE: ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-402b
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HVAC ENLARGED PLAN - BID OPTION

SHEET ID
M-402b

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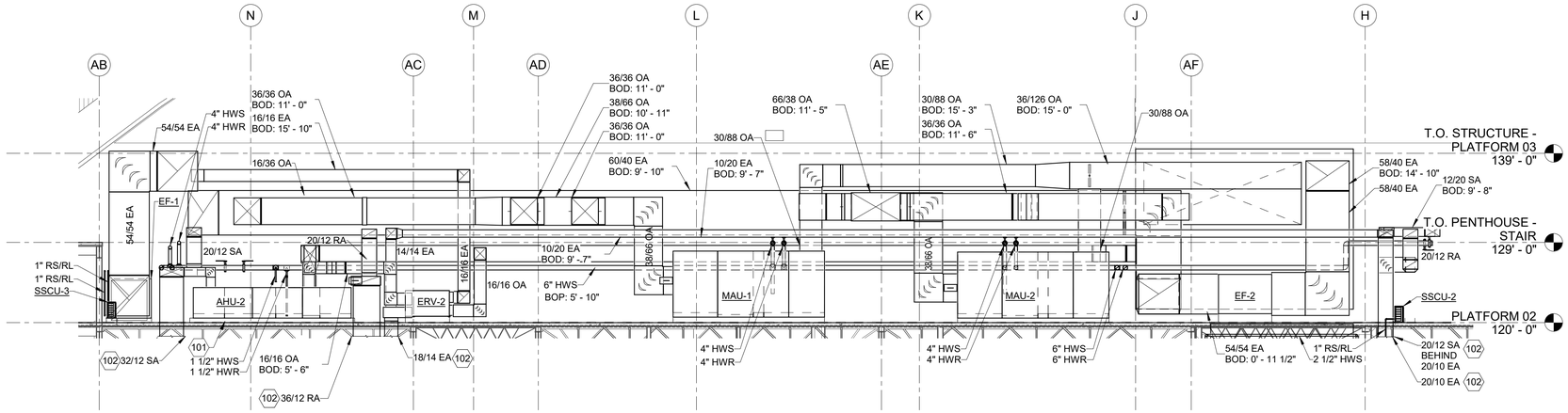
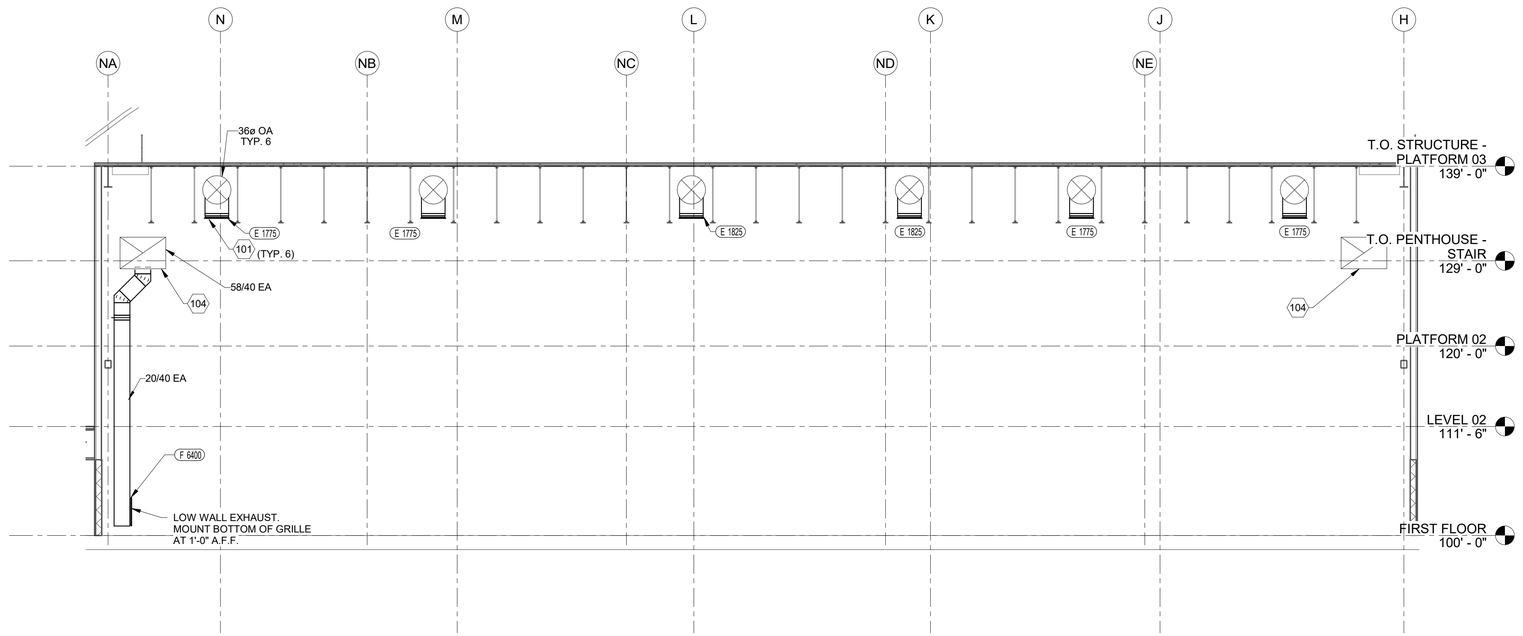


E1 EQUIPMENT PLATFORM 02 MECHANICAL SECTION

SCALE 1/8" = 1'-0"



A1 WLT BAY #1 MECHANICAL SECTION

SCALE 1/8" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

101. BASE RAIL WITH VIBRATION ISOLATION ATTACHED TO SLAB. (TYP. FLOOR MOUNTED EQUIPMENT ON EQUIPMENT PLATFORMS.
102. RE: A1/MH-102 FOR DUCT CONTINUATION.
103. ALL OUTSIDE AIR DUCTWORK AND ASSOCIATED DIFFUSERS IN WLT BAY MUST BE MIN. 35'-0" ABOVE FINISHED FLOOR.
104. EXHAUST DUCTWORK SHALL BE MOUNTED TIGHT TO JOISTS AS HIGH AS POSSIBLE.

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DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802M-403
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HVAC SECTIONS

SHEET ID

M-403

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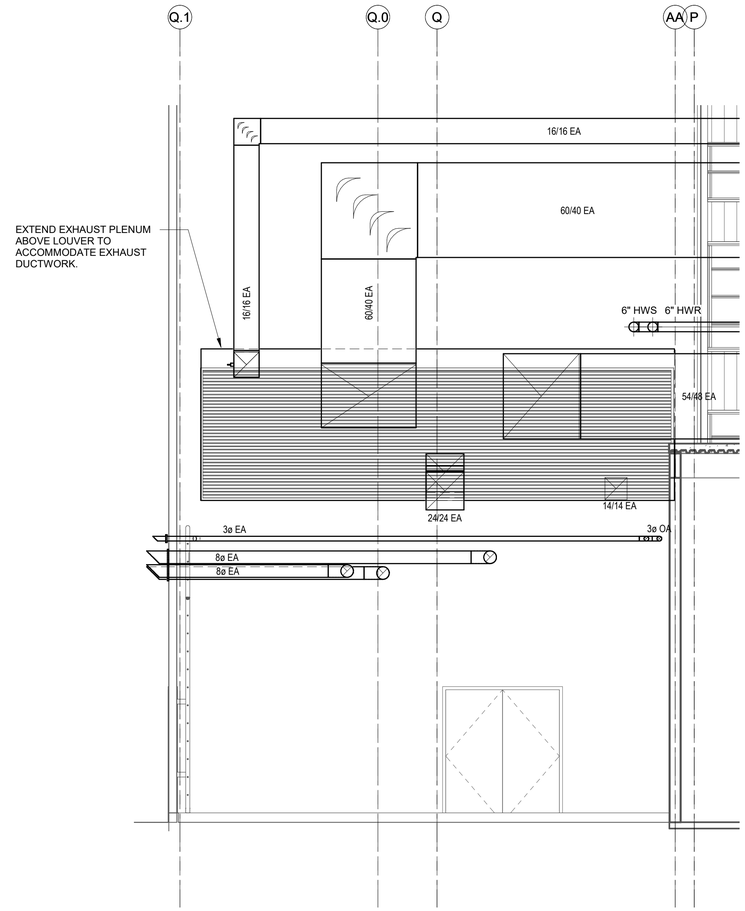
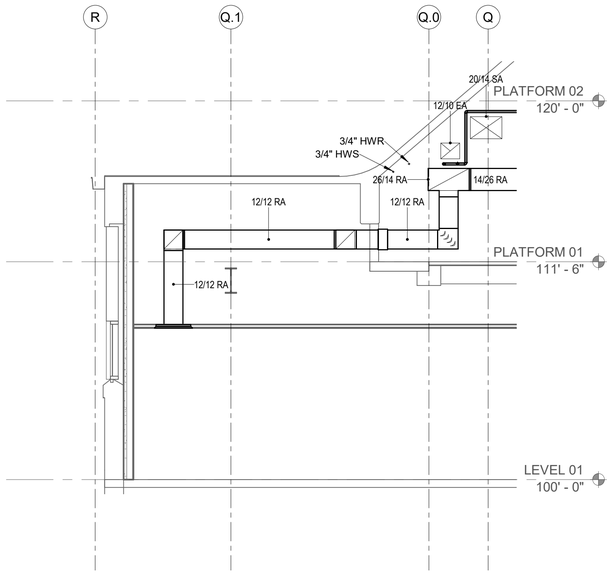
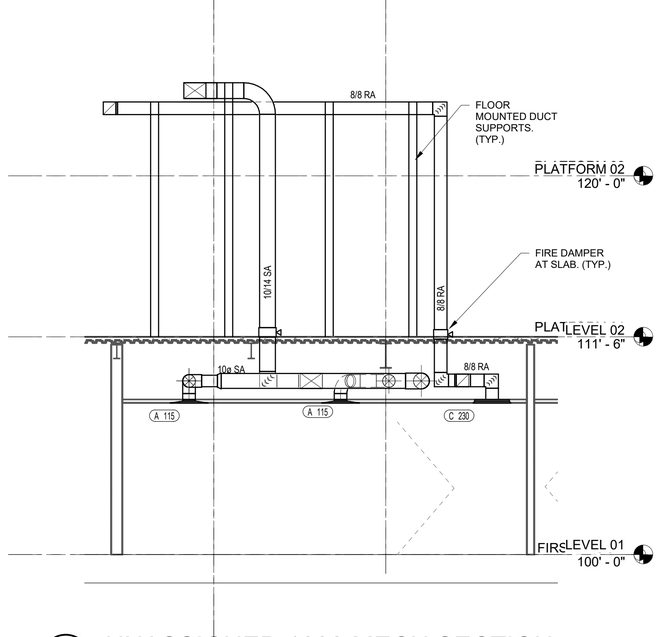


A1 MECHANICAL ROOM EXHAUST PLENUM SECTION
SCALE 1/4" = 1'-0"



D6 EQUIPMENT PLATFORM TO OFFICE SECTION
SCALE 1/4" = 1'-0"



D2 UNASSIGNED 1033 MECH SECTION
SCALE 1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
3. PROVIDE CLEARANCES FOR ALL ELECTRICAL AND CONTROL PANELS PER NEC.
4. PROVIDE BRACING FOR EQUIPMENT WEIGHING MORE THAN 31 LBS PER UFC 4-010-01.
5. PROVIDE U.L. RATED THROUGH-PENETRATION FIRE STOP SYSTEMS AT ALL PENETRATIONS BETWEEN THE HANGAR/SHOP DEMISING WALL.
6. PROVIDE REMOTE DAMPER ACTUATORS OR ACCESS PANEL FOR ALL DAMPERS LOCATED ABOVE HARD CEILINGS.
7. PROVIDE BALANCING DAMPER AT EACH LOW PRESSURE TAKEOFF.
8. PROVIDE SECURITY BARS AT ALL SECURED WALL DUCT PENETRATIONS, AND SOUND RATED DAMPERS AT ALL RATED PENETRATIONS.
9. DUCT TAP DIAMETERS TO VAV'S ARE EQUAL TO VAV INLET UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HVAC SECTIONS

SHEET ID
M-404

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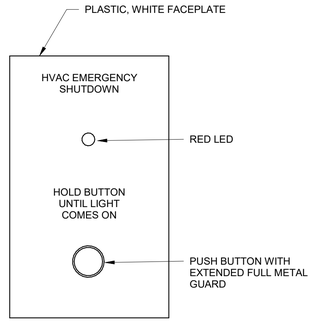
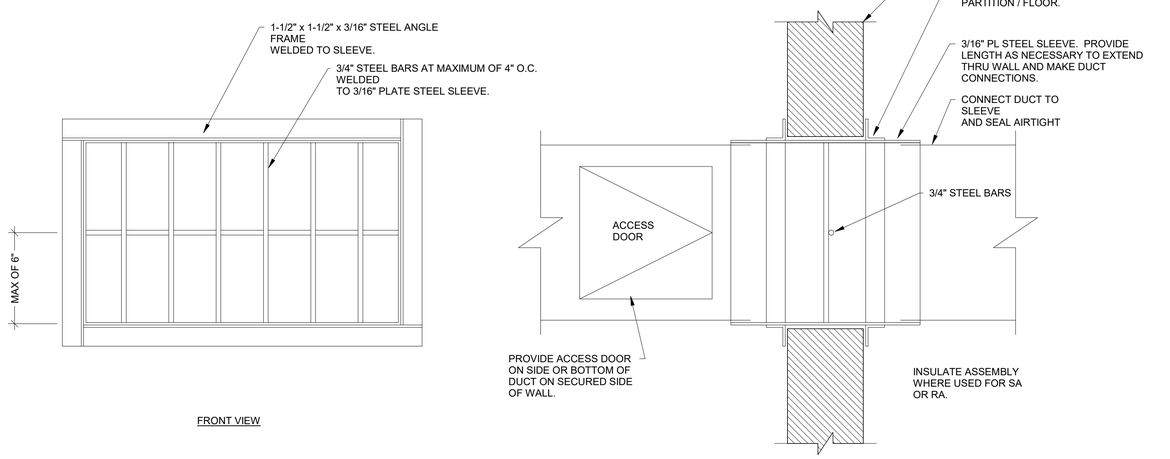
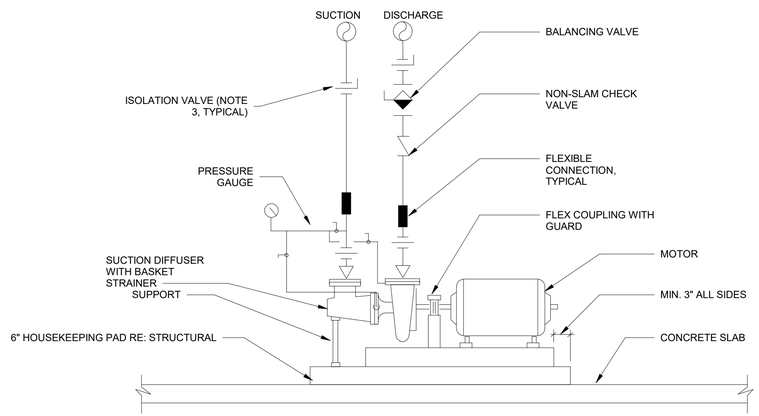


NOTE:
ALL TEXT SHALL BE ENGRAVED INTO THE FACEPLATE.

E1 EMERGENCY STOP BUTTON DETAIL
SCALE NOT TO SCALE

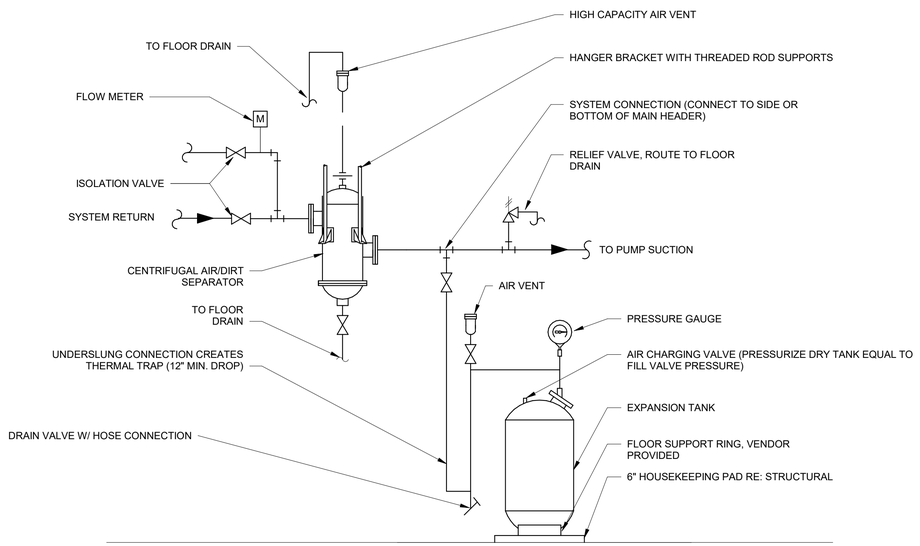


E6 DUCT SECURITY PENETRATION DETAIL
SCALE 12" = 1'-0"



NOTES:
1. ALLOW CLEARANCE FOR REMOVAL OF STRAINER.
2. PROVIDE SPOOL BETWEEN BUTTERFLY VALVE AND ADJACENT FLANGES.
3. FOR LINE SIZES 2" AND SMALLER USE BALL VALVES.
4. PROVIDE REDUCER AT SUCTION DIFFUSER AND PUMP DISCHARGE REQUIRED.

A3 BASE MOUNTED PUMP PIPING DETAIL
SCALE NTS



A7 AIR SEPARATOR AND EXPANSION TANK PIPING DETAIL
SCALE NTS

US Army Corps of Engineers
Omaha District ®

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DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-501

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HVAC DETAILS

SHEET ID
M-501

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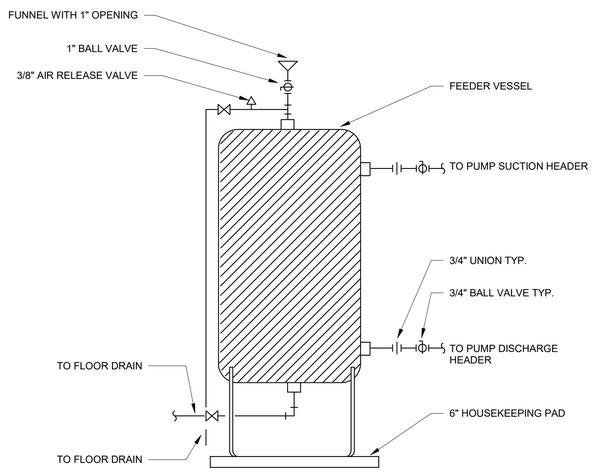
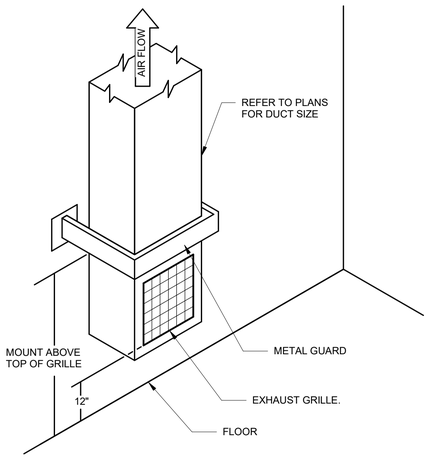
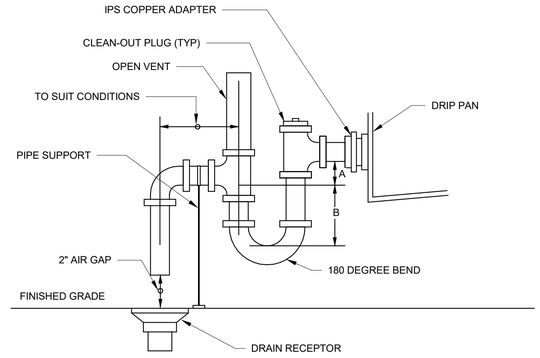


NOTE:
MANUFACTURER TO PROVIDE THE FOLLOWING:
THREADED TAPS, FEEDER VESSEL (5 GALLON) WITH FILTER, FUNNEL WITH 1" OPENING, AND 3/8" AIR RELEASE VALVE

D1 CHEMICAL FEEDER DETAIL
SCALE NTS



E5 EXHAUST DUCT DETAIL
SCALE NTS

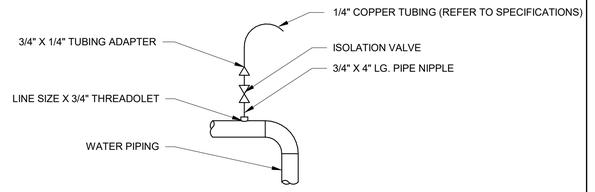


PIPE SUPPORT: SPLIT PIPE CLAMP, 3/8" THREADED ROD

UNIT TYPE	A	B
DRAW THRU	2" PLUS X	X
BLOW THRU	2" MINIMUM	2X

WHERE X = STATIC PRESSURE (AHU TOTAL STATIC PRESSURE) IN DRAIN PAN

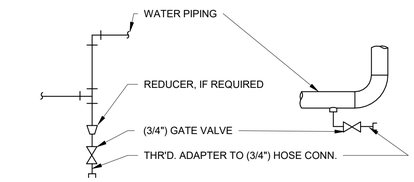
E8 AHU CONDENSATE DRAIN DETAIL
SCALE NTS



NOTES:

1. PROVIDE AUTOMATIC AIR VENTS AT THE HIGH POINTS OF THE PIPING SYSTEM AND OTHER LOCATIONS WHERE SHOWN AND WHERE CHANGES IN DIRECTION REQUIRES VENTING OF AIR.
2. PIPE AUTOMATIC AIR VENT DRAIN TO THE NEAREST FLOOR DRAIN OR OTHER LOCATION AS INDICATED ON THE PLANS.
3. ADAPTER AND TUBING NOT REQUIRED FOR HYDROSTATIC VENTS. PLUG VALVE AFTER HYDROTEST.

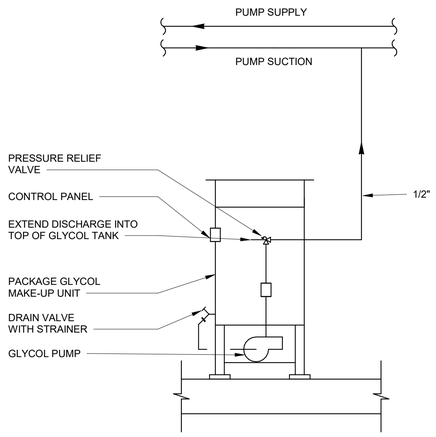
C8 VENT PIPING DETAIL
SCALE NTS



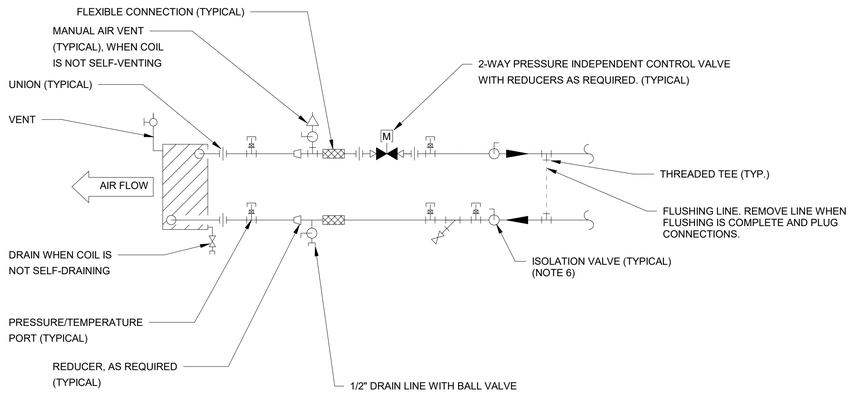
NOTES:

1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.
2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.

A8 TYPICAL DRAIN PIPING DETAIL
SCALE NTS



A1 GLYCOL MAKE-UP DETAIL
SCALE NTS



NOTES:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST TWO (2) HANGERS FOR EACH PIPE SHALL BE SPRING AND NEOPRENE TYPE.
2. PIPING SHALL BE INSTALLED WITH REMOVABLE SPOOLS AT EQUIPMENT AND SHALL NOT BLOCK ACCESS DOORS, PANELS, OR SERVICE AREA FOR FILTERS, VALVES, OR EQUIPMENT.
3. PROVIDE DI-ELECTRIC WATER WAYS WHERE DISSIMILAR PIPES JOIN, PER SPECIFICATIONS.
4. LOCATE ISOLATION VALVES IN SUCH A MANNER THAT THEY WILL NOT BLOCK FUTURE REMOVAL OF THE ENTIRE UNIT.
5. USE BALL VALVE FOR LINES 2" AND SMALLER. USE BUTTERFLY VALVES FOR LINES OVER 2".

A3 TYPICAL COIL PIPING DETAIL
SCALE NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802M-502

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

HVAC DETAILS

SHEET ID
M-502

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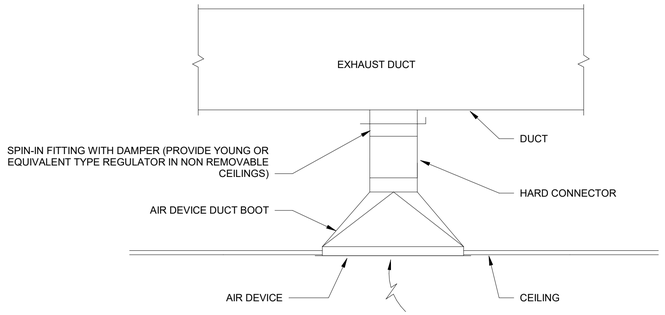
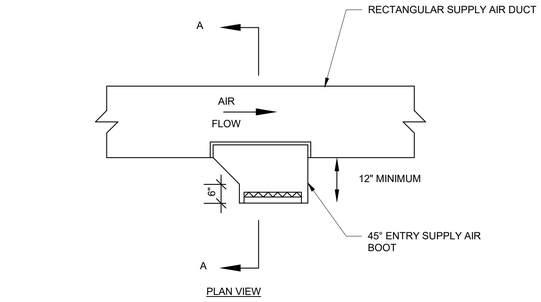
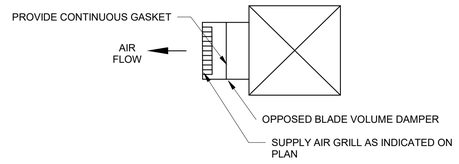


NECK SIZE	CFM RANGE
6" ø	0-50
8" ø	50-90
10" ø	90-165
12" ø	165-270

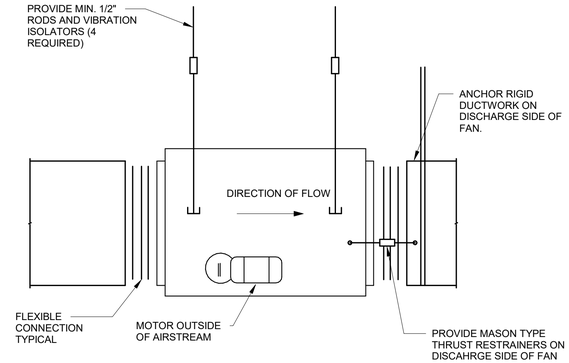
D1 EXHAUST AIR DEVICE CONNECTION DETAIL
SCALE NTS





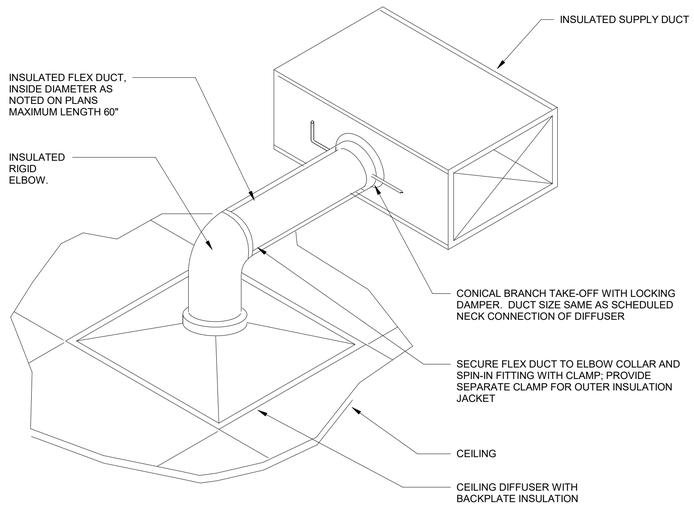
SECTION A-A

D4 SIDEWALL DIFFUSER DETAIL
SCALE NTS

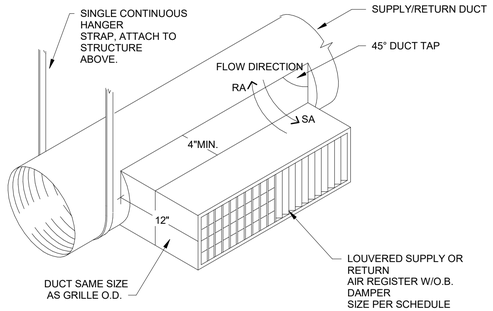


NOTE: PROVIDE LONGITUDINAL AND TRANSVERSE BRACING

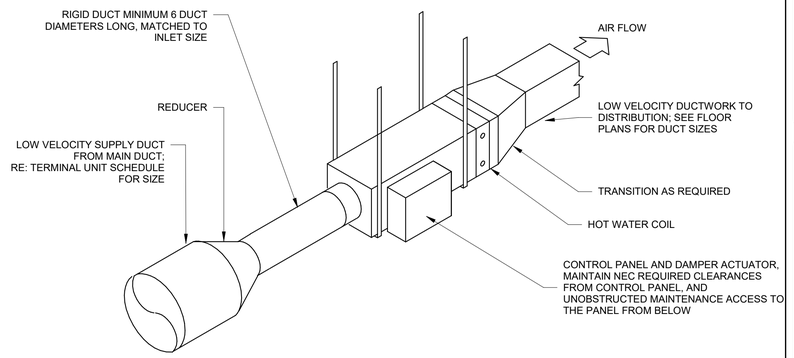
D7 INLINE FAN - LARGE
SCALE NTS



A1 CEILING DIFFUSER DETAIL
SCALE NTS



A4 EXPOSED DUCT SUPPLY/RETURN GRILLE DETAIL
SCALE NTS



NOTES:
1. DO NOT SUPPORT UNIT WITH DUCTWORK (SUPPORT SEPARATELY).
2. SEE VAV BOX SCHEDULE WITH REHEAT COILS
3. ATFP BRACING IS REQUIRED (NOT SHOWN IN DETAIL)

A7 AIR TERMINAL CONNECTION DETAIL
SCALE NTS

US Army Corps of Engineers
Omaha District ®

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DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-503

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HVAC DETAILS

SHEET ID
M-503

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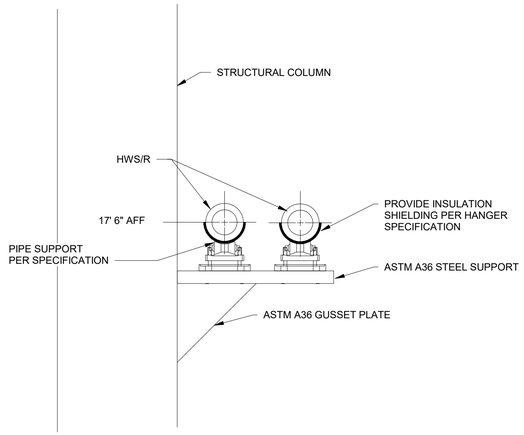
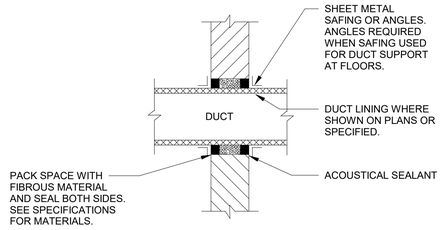
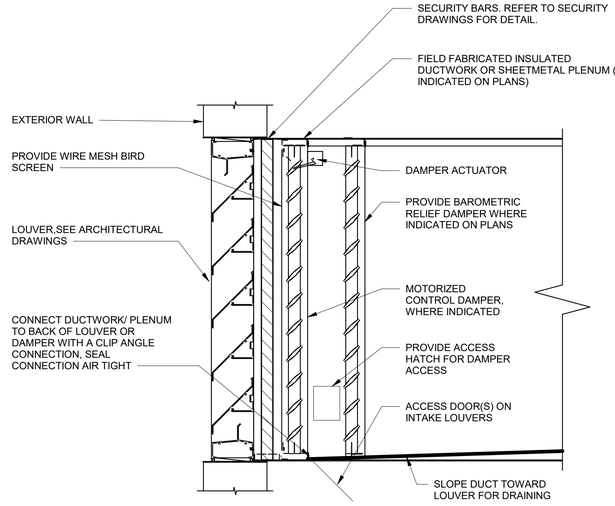


NOTE:
1. COORDINATE WITH STRUCTURAL BUILDING CONTRACTOR FOR ATTACHING PIPE SUPPORT TO COLUMN.
2. REFER TO PLANS FOR FINAL PIPE SIZING.

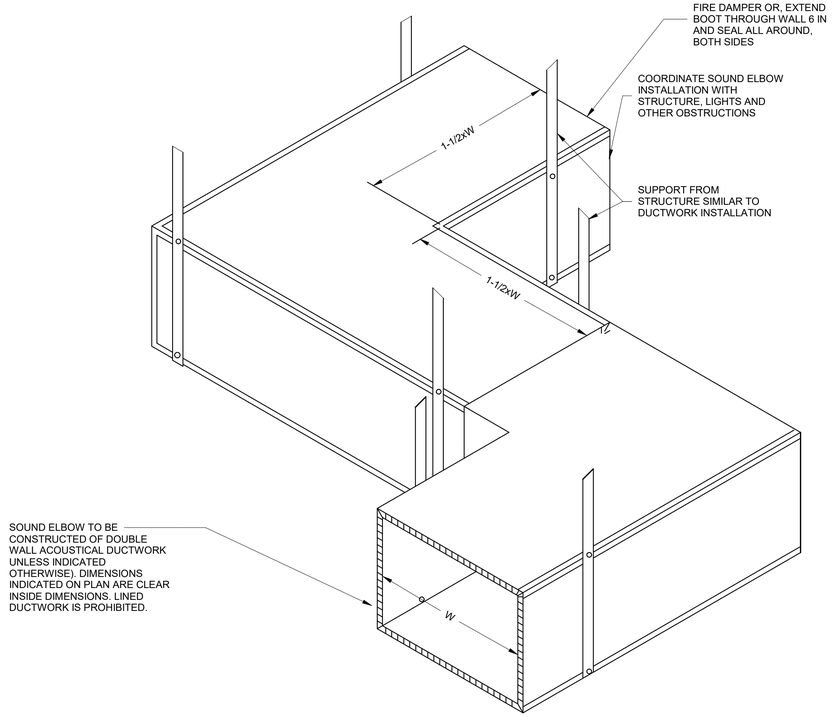
E1 HANGAR BAY PIPING SUPPORT DETAIL
SCALE NTS



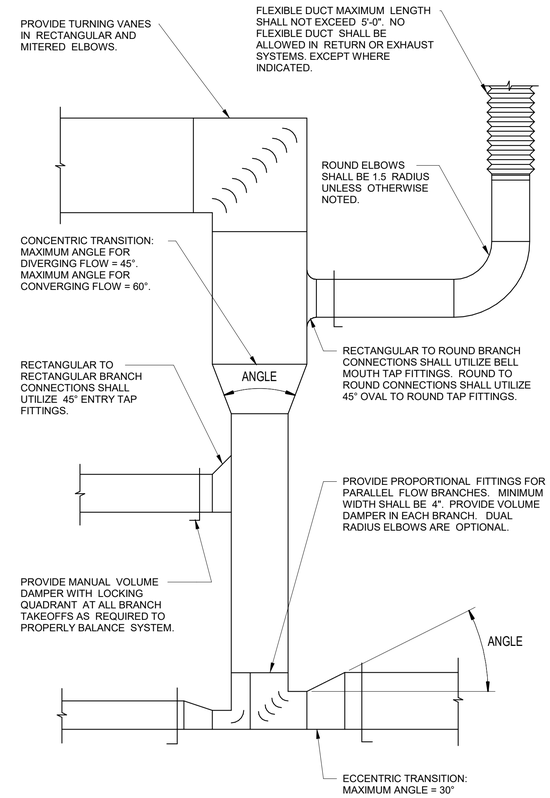
F4 TYPICAL INTERIOR WALL OR FLOOR SLAB PENETRATION DETAIL
SCALE N.T.S



E7 LOUVER WITH DAMPER DETAIL
SCALE NTS



A4 TYPICAL Z DUCT DETAIL
SCALE NTS



NOTE:
DUCT, FITTINGS, MATERIAL AND SUPPORT SHALL BE AS SPECIFIED AND IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

A8 TYPICAL DUCT DETAIL
SCALE N.T.S

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
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FILE NAME: FXBM231802M-504

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CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ST. LOUIS, MISSOURI 63110

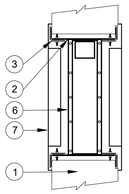
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

HVAC DETAILS

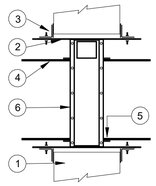
SHEET ID

M-504

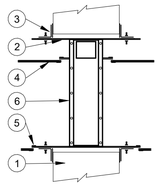
ADVERTISEMENT - 100% DESIGN



GRILLE CONNECTION



DUCT CONNECTION:
STYLE C
ROUND OR OVAL DUCT



DUCT CONNECTION:
STYLE B
RECTANGULAR DUCT

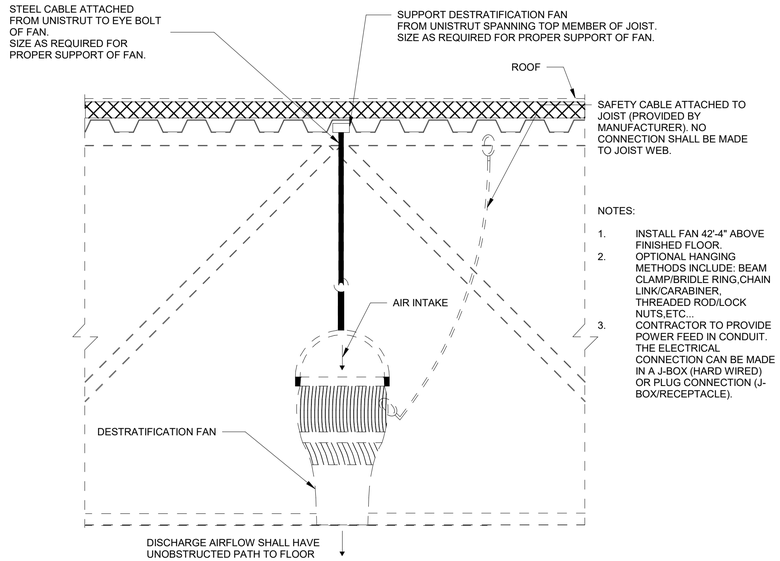
NOTES BY SYMBOL

1. FIRE SEPARATION
2. SLEEVE
3. MOUNTING ANGLE
4. DUCT
5. DUCT CONNECTION
6. FIRE DAMPER
7. SIDEWALL GRILLE

FIRE DAMPER INSTALLATION NOTES:

1. INSTALL ALL FIRE DAMPERS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS, AND IN COMPLETE COMPLIANCE WITH UL 555 FIRE DAMPERS, NFPA 80A & 80B.
2. PROVIDE DUCT ACCESS DOORS OR REMOVABLE DUCT SECTION DOWN STREAM OF ALL FIRE DAMPER LOCATIONS OF SUFFICIENT SIZE TO ALLOW INSPECTION AND TO RESET LINKAGE.
3. PROVIDE ACCESS DOORS IN ALL FIXED CEILINGS FOR ACCESS TO DUCT DOORS.

E4 TYPICAL VERTICAL FIRE DAMPER DETAILS
SCALE NTS

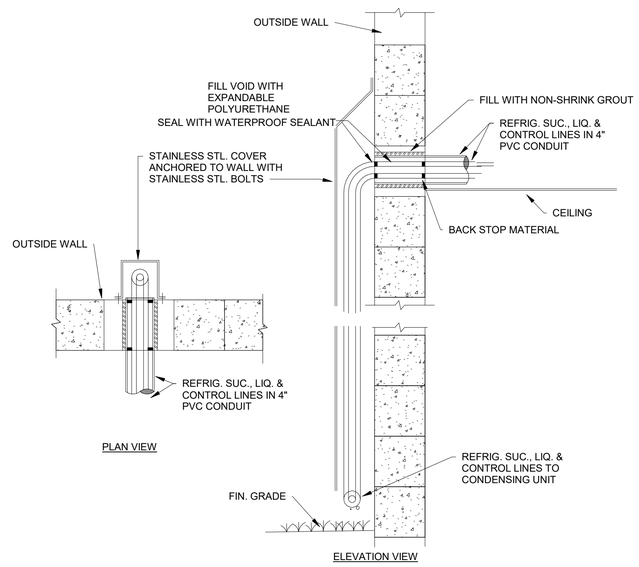


NOTES:

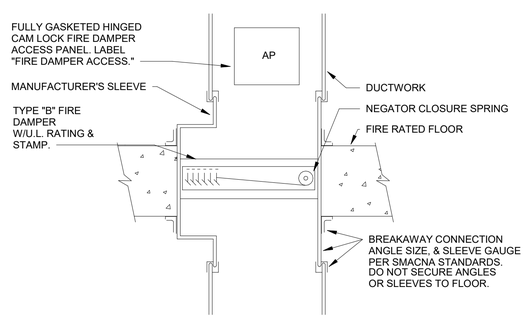
1. INSTALL FAN 42'-4" ABOVE FINISHED FLOOR.
2. OPTIONAL HANGING METHODS INCLUDE: BEAM CLAMP/BRIDLE RING,CHAIN LINK/CARABINER, THREADED ROD/LOCK NUTS,ETC...
3. CONTRACTOR TO PROVIDE POWER FEED IN CONDUIT. THE ELECTRICAL CONNECTION CAN BE MADE IN A J-BOX (HARD WIRED) OR PLUG CONNECTION (J-BOX/RECEPTACLE).

E7 DESTRATIFICATION FAN DETAIL
SCALE N.T.S

A1 CONDENSING UNIT REFRIGERANT PIPING
SCALE NTS



B4 TYPICAL REFRIGERANT PIPE WALL PENETRATION
SCALE 12" = 1'-0"



FIRE DAMPER NOTES:

1. FIELD FABRICATED SLEEVE MAY BE PERMITTED. SUBMIT DETAIL TO ARCHITECT/ ENGINEER FOR REVIEW.
2. DETAIL FOR TYPE "A" FIRE DAMPER (BLADES IN THE AIRSTREAM) IS SIMILAR WITH BREAKAWAY ("S" SLIP) CONNECTIONS AT SLEEVE.
3. THIS DETAIL DOES NOT APPLY TO CEILING FIRE DAMPERS (RADIATION DAMPERS), REFER TO SPECIFICATIONS.
4. MANUFACTURER'S U.L. APPROVED INSTALLATION INSTRUCTIONS (CONFORMING TO UL 555 & NFPA 90A) GOVERN.

B7 FIRE DAMPER IN FLOOR DETAIL
SCALE 12" = 1'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM23180ZM-505

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

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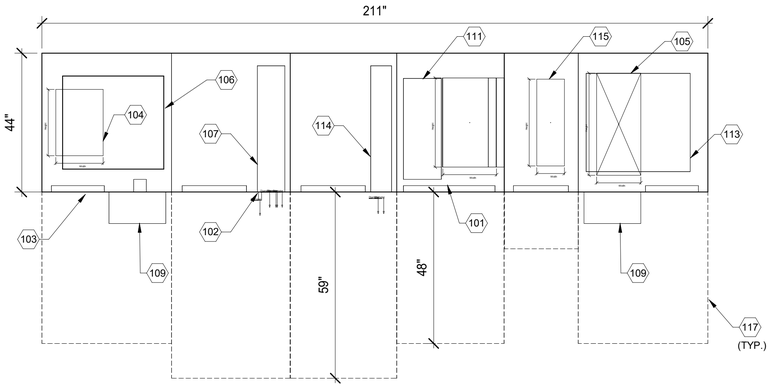
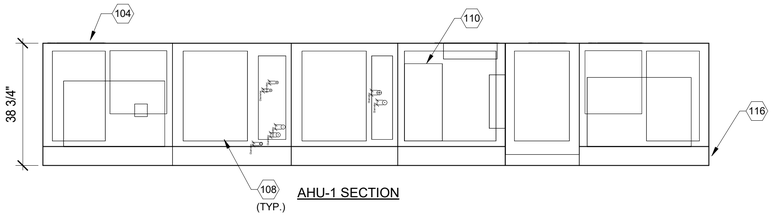
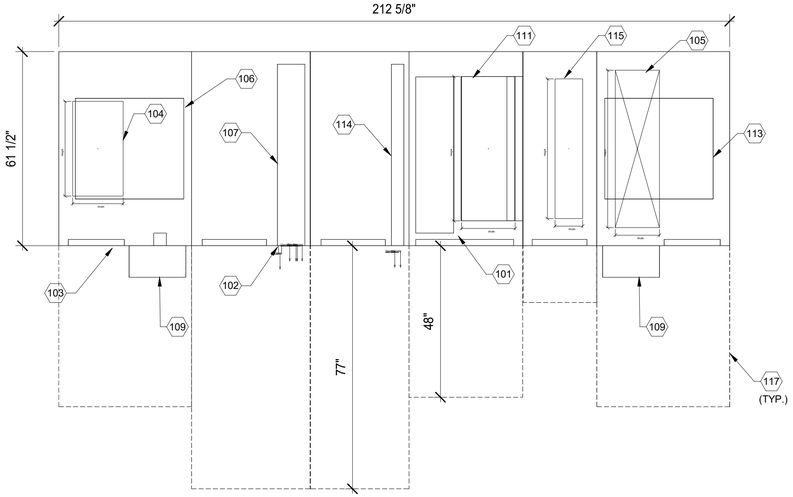


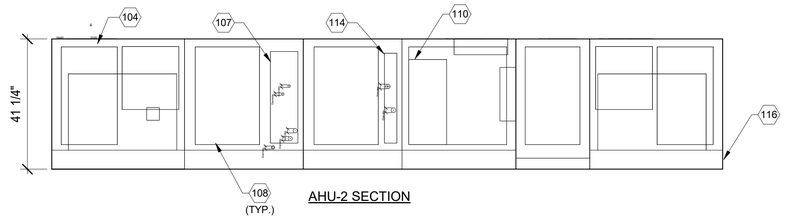
AHU-1 PLAN VIEW



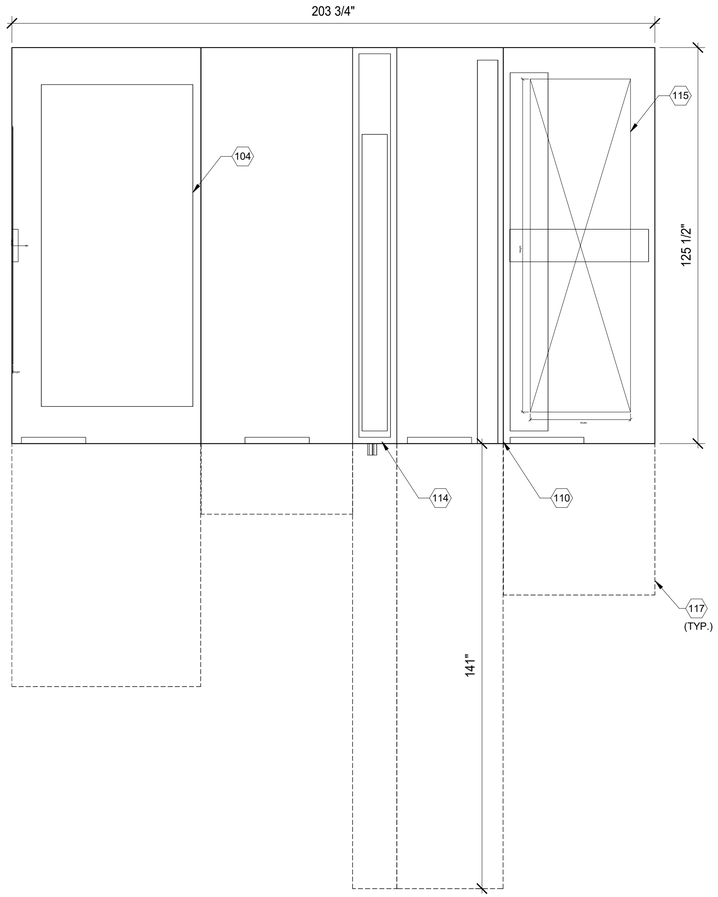
AHU-1 SECTION



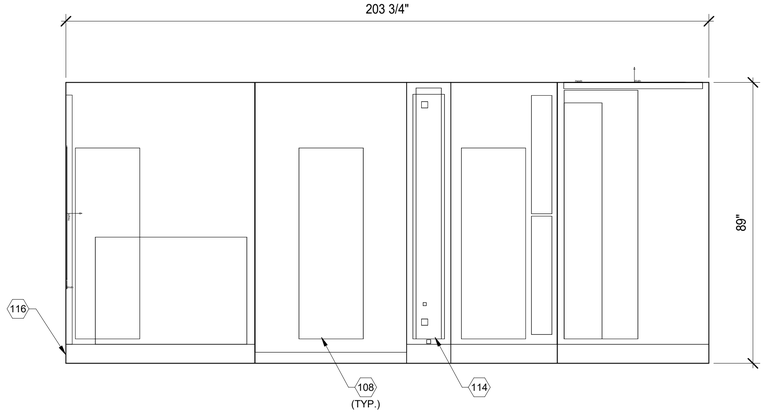
AHU-2 PLAN VIEW



AHU-2 SECTION



MAU-1, -2, -3(BO), -4(BO) PLAN VIEW



MAU-1, -2, -3(BO), -4(BO) SECTION

(MAU-4 (BO) IS A MIRRORED CONFIGURATION)

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES

101. AIR MIXING SECTION
102. COIL SECTION
103. FAN SECTION.
104. SUPPLY AIR OPENING.
105. RETURN AIR OPENING.
106. SUPPLY FAN.
107. COOLING COIL.
108. ACCESS DOOR.
109. EXTERNAL VFD.
110. COMBO FILTERS.
111. TOP DAMPER OPENING.
112. BACK DAMPER OPENING.
113. RETURN FAN
114. HEATING HOT WATER COIL
115. OUTSIDE AIR OPENING
116. BASE RAIL
117. EQUIPMENT CLEARANCE

US Army Corps of Engineers
Omaha District ®

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AHU DETAILS

SHEET ID

M-506

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AIR HANDLING UNIT SCHEDULE

PLAN MARK	SERVING	REFRIG. TYPE	OPERATING WEIGHT (LBS.)	SUPPLY FAN DATA								DX R-410A COOLING COIL PERFORMANCE						35% PROPYLENE GLYCOL HEATING HOT WATER COIL PERFORMANCE								ELECTRICAL				
				SA CFM	OA CFM	E.S.P. (IN. W.G.)	TOT. S.P. (IN. W.G.)	DRIVE TYPE	FAN RPM	MOTOR HP	VFD	TOT. CAP. (MBH)	SENS. CAP. (MBH)	FACE VEL. (FPM)	APD (IN. W.G.)	EAT (DB/WB °F)	LAT (DB/WB °F)	TOT. CAP. (MBH)	FACE VEL. (FPM)	APD (IN. W.G.)	EAT (DB °F)	LAT (DB °F)	EWT (°F)	LWT (°F)	DESIGN FLOW (GPM)	WPD (FT.HD)	VOLT/ PHASE	Hz	FLA	MCA	MAX FUSE
AHU-1	ADMIN WEST	R-410A	1500	3000	600	2.5	5.2	DIRECT	2968	5	YES	110	88	475	0.9	80.7/65.2	54/53	88	475	0.18	28	55	140	110	6	5	480/3	60	8.2	10.25	15
AHU-2	ADMIN NORTH	R-410A	2000	4200	1050	2.5	5.2	DIRECT	2435	5	YES	212	150	475	0.9	81.3/65.2	52.7/51.5	123	475	0.18	28	55	140	110	9	5	480/3	60	8.2	10.25	15

NOTES:

1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. PROVIDE 2" PRE-FILTERS, MERV 8 MINIMUM.
3. PROVIDE 4" FINAL FILTER, MERV 13 MINIMUM.
4. PROVIDE TEMPERATURE COMPENSATED AIRFLOW MEASURING DEVICE IN THE OUTSIDE AIR INTAKE.
5. PROVIDE DISCONNECT SWITCH WITH OCP FOR EACH VFD.
6. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE(S). VFD(S) MUST BE PROGRAMMED TO OPERATE UP TO FULL LOAD AMPERAGE OF MOTOR AT 60 HZ).
7. PERFORMANCE CAPACITIES SHOWN ARE MINIMUM.
8. COIL, AIR, AND WATER PRESSURE DROPS SHOWN ARE MAXIMUM.
9. MAXIMUM FIN SPACING MUST BE 12 FINS/INCH (144 FINS/FT) FOR COILS UP TO 6 ROWS AND 10 FINS/INCH (120 FINS/FT) FOR COILS OVER 6 ROWS.
10. FANS MUST BE SELECTED WITH ALLOWANCE FOR END OF LIFE FILTER AIR PRESSURE DROP.
11. PROVIDE STAINLESS STEEL COIL CASING AND DRAIN PAN.
12. COORDINATE PIPING AND DUCT CONNECTION ORIENTATIONS WITH PLANS.
13. PROVIDE DUCT SMOKE DETECTORS AND FIRE ALARM SHUTDOWN WITH INTERLOCK WITH ASSOCIATED EXHAUST FANS.
14. ALL FAN MOTORS MUST BE INVERTER DUTY AND MANUFACTURER'S HIGHEST "PREMIUM" EFFICIENCY.
15. FLUID IS 35% PROPYLENE GLYCOL.
16. PROVIDE HOT GAS REHEAT.
17. PROVIDE AIRSIDE ECONOMIZER.
18. MAX AHU-1 DIMENSIONS: 39" x 44" x 211" (H x W x L)
19. MAX AHU-1 DIMENSIONS: 42" x 62" x 213" (H x W x L)

AIR COOLED CONDENSING UNIT SCHEDULE

PLAN MARK	TOT. CAP. (MBH)	WEIGHT (LBS.)	EER	CONDENSER							ELECTRICAL				SERVICE
				AMBIENT TEMP. (ºF)	REFRIG. TYPE	COMPRESSORS			CONDENSER FANS		MCA	MOCP	VOLT/ PHASE	HZ	
						QTY	RLA (EA.)	LRA (EA.)	QTY	FLA (EA.)					
CU-1	110	400	12.9	96.4	R-410A	2	7.6	52	1	2.5	25	25	480/3	60	AHU-1
CU-2	240	750	11.6	96.4	R-410A	2	16.5	140	2	2.5	40	50	480/3	60	AHU-2

NOTES:

1. INSTALL AS DETAILED AND PER MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
2. PROVIDE ALL BUILDING CODE AND MANUFACTURER REQUIRED CLEARANCES.
3. PROVIDE 6" EQUIPMENT PAD FOR OUTDOOR FLOOR MOUNTED UNITS.
4. PROVIDE RANDOM START DELAY AND ANTI-SHORT CYCLE TIME DELAY RELAY.
5. PROVIDE KIT FOR LOW AMBIENT OPERATION DOWN TO -20ºF.
6. PROVIDE WITH FACTORY DISCONNECT

ENERGY RECOVERY VENTILATOR SCHEDULE

PLAN MARK	LOCATION	DESCRIPTION	OUTSIDE AIR SIDE							EXHAUST AIR SIDE				OUTSIDE AIR FAN		EXHAUST AIR FAN		ELECTRICAL			
			OA CFM	OA PRESSURE DROP (IN. W.G.)	SUMMER			WINTER			EA CFM	EA PRESSURE DROP (IN. W.G.)	EAT COOLING (DB/WB)	EAT HEATING (DB/WB)	ESP (IN.WG")	HP	ESP (IN.WG")	HP	VOLT/ PHASE	Hz	FLA	MAX FUSE
					EAT (DB/WB)	LAT (DB/WB)	TOTAL EFFICIENCY	EAT (DB)	LAT (DB/WB)	TOTAL EFFICIENCY %												
ERV-1	EQUIPMENT PLATFORM	STATIC PLATE	600	0.5	91.4/65.7	80.6/63.8	67%	-3	57.3/44	80	600	0.6	78/65	68/56.8	1.5	1.5	1.5	1.5	480/3	60	2.4	15
ERV-2	EQUIPMENT PLATFORM	STATIC PLATE	1050	0.5	91.4/65.7	82/63.5	50%	-3	48.3/38.4	80	1050	0.6	78/65	68/56.8	1.5	1.5	1.5	1.5	480/3	60	2.4	15

NOTES:

1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. PROVIDE 2" FILTERS, MERV 8 MINIMUM ON BOTH AIRSTREAMS. FILTER LOCATION UPSTREAM OF PLATE HEAT EXCHANGER.
3. PROVIDE TEMPERATURE COMPENSATED AIRFLOW MEASURING DEVICE IN THE OUTSIDE AIR INTAKE.
4. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE(S). VFD(S) MUST BE PROGRAMMED TO OPERATE UP TO FULL LOAD AMPERAGE OF MOTOR AT 60 HZ.
5. PERFORMANCE CAPACITIES SHOWN ARE MINIMUM.
6. AIR PRESSURE DROPS SHOWN ARE MAXIMUM.
7. FANS MUST BE SELECTED WITH ALLOWANCE FOR END OF LIFE FILTER AIR PRESSURE DROP.
8. COORDINATE DUCT CONNECTION ORIENTATIONS WITH PLANS.
9. PROVIDE FIRE ALARM SHUTDOWN WITH INTERLOCK WITH ASSOCIATED OUTSIDE AIR AND EXHAUST AIR FANS.
10. ALL FAN MOTORS MUST BE VFD RATED AND HAVE MANUFACTURER'S HIGHEST "PREMIUM" EFFICIENCY.
11. PROVIDE DISCONNECT SWITCH WITH OCP FOR EACH VFD.
12. ERV MUST BE FIXED PLATE, TOTAL HEAT, AIR TO AIR TYPE HEAT EXCHANGER.

MAKE UP AIR UNIT SCHEDULE

PLAN MARK	SERVING	OPERATING WEIGHT (LBS)	SUPPLY FAN DATA									35% PROPYLENE GLYCOL HEATING HOT WATER COIL DATA										ELECTRICAL		
			MAX DESIGN (CFM)	MIN. DESIGN (CFM)	E.S.P. (IN.WG)	TOT. S.P. (IN.WG)	DRIVE TYPE	FAN RPM	FAN QUANTITY	MOTOR HP (EACH)	VFD (PER FAN)	% GLYCOL	GLYCOL TYPE	TOTAL CAPACITY (MBH)	FACE VELOCITY (FPM)	EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)	FLOW (GPM)	MAX AIR PD. (IN.WG)	MAX WATER PD. (FT.HD)	VOLT/ PHASE	FLA	MOCP
MAU-1	WLT BAY 1	7,000	32,000	11,000	2	4.5	DIRECT	1880	2	20	YES	35	PROPYLENE	1850	450	-3	60	140	110	135	0.5	5	480V/3	48	70
MAU-2	WLT BAY 1	7,000	32,000	11,000	2	4.5	DIRECT	1880	2	20	YES	35	PROPYLENE	1850	450	-3	60	140	110	135	0.5	5	480V/3	48	70
MAU-3 (BO)	WLT BAY 2	7,000	32,000	11,000	2	4.5	DIRECT	1880	2	20	YES	35	PROPYLENE	1850	450	-3	60	140	110	135	0.5	5	480V/3	48	70
MAU-4 (BO)	WLT BAY 2	7,000	32,000	11,000	2	4.5	DIRECT	1880	2	20	YES	35	PROPYLENE	1850	450	-3	60	140	110	135	0.5	5	480V/3	48	70

NOTES:

(BO) DESIGNATES EQUIPMENT TO BE INCLUDED AS PART OF A BID OPTION.
1. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE(S). VFD(S) MUST BE PROGRAMMED TO OPERATE UP TO FULL LOAD AMPERAGE OF MOTOR(S).
2. PROVIDE 2" PRE-FILTERS, MERV 8 MINIMUM. PROVIDE 4" FINAL FILTER, MERV 13 MINIMUM.
3. PROVIDE THERMAL DISPERSION TYPE AIRFLOW MEASURING STATION AT THE SUPPLY FAN INTAKE.
4. PROVIDE BASE RAIL. COORDINATE LENGTH AND WIDTH WITH AHU DIMENSIONS.
5. EXTERIOR OF UNIT MUST BE GALVANIZED STEEL.
6. PROVIDE FIRE ALARM SHUTDOWN WITH HARDWIRE INTERLOCK WITH ASSOCIATED EXHAUST FANS.
7. PROVIDE DISCONNECT SWITCH WITH OCP FOR EACH VFD.
8. PROVIDE WITH LOW LEAKAGE MOTORIZED CONTROL DAMPER. DAMPER MAXIMUM LEAKAGE RATE SHALL BE 3 CFM/S.F. AT 1" WG STATIC PRESSURE.
9. PROVIDE WITH AUTOMATIC BALANCING AND BALL VALVES WITH "Y" STRAINER HOSE KIT. AUTOMATIC BALANCING VALVES MUST BE PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVES.
10. ALL CONTROLS MUST BE FACTORY MOUNTED FOR COMPLETE UNIT CONTROL.
11. MAX UNIT DIMENSIONS 89" x 126" x 204" (HxWxL)

DESTRATIFICATION FAN SCHEDULE

PLAN MARK	TYPE	MAX. COVERAGE AREA (SQ.FT)	MAX. COVERAGE HEIGHT (FT)	POWER (W)	FLA	VOLT/ PHASE	FAN SERVICE
DF-01 (BO)	INLINE TUBE AXIAL	1500	45	154	1.9	120/1	MAIN HANGAR BAY
DF-02 (BO)	INLINE TUBE AXIAL	1500	45	154	1.9	120/1	MAIN HANGAR BAY
DF-03 (BO)	INLINE TUBE AXIAL	1500	45	154	1.9	120/1	MAIN HANGAR BAY
DF-04 (BO)	INLINE TUBE AXIAL	1500	45	154	1.9	120/1	MAIN HANGAR BAY
DF-05 (BO)	INLINE TUBE AXIAL	1500	45	154	1.9	120/1	MAIN HANGAR BAY
DF-06 (BO)	INLINE TUBE AXIAL	1500	45	154	1.9	120/1	MAIN HANGAR BAY

NOTES:

1. PEARL SHAPED NOZZLE STYLE.
2. PROVIDE WALL MOUNTED SPEED CONTROLLER (BACNET COMPATIBLE) TIED TO BAS WITH 0-10Vdc. GROUP UP TO FOUR UNITS TO A COMMON SPEED CONTROLLER....
3. HOUSING MATERIAL; PC/ABS, 5VA FLAME RESISTANCE.
4. FANS MUST BE PROVIDED WITH EC MOTORS.

AIR DISTRIBUTION SCHEDULE

MARK	CFM	NECK SIZE	FACE SIZE LENGTH	DESCRIPTION
A	000-110 111-240 241-420 421-620 621-750 751-980	6Ø 8Ø 10Ø 12Ø 14Ø 16Ø	24x24 24x24 24x24 24x24 24x24 24x24	SUPPLY DIFFUSER COLOR: WHITE MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: NO
B	000-110 111-240 241-420	6Ø 8Ø 10Ø	12x12 12x12 12x12	SUPPLY DIFFUSER COLOR: WHITE MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: NO
C	000-110 111-220 221-350 351-530 531-730 731-970 971-1240 1241-1540 1541-2050	6x6 8x8 10x10 12x12 14x14 16x16 18x18 20x20 22x22	24x24 24x24 24x24 24x24 24x24 24x24 24x24 24x24 24x24	RETURN/EXHAUST GRILLE STAGGERED CENTERS COLOR: WHITE MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: NO 1/2"x1/2"x1/2" GRID
D	000-110 111-220 221-350	6x6 8x8 10x10	12x12 12x12 12x12	RETURN/EXHAUST GRILLE STAGGERED CENTERS COLOR: WHITE MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: NO 1/2"x1/2"x1/2" GRID
E	000-190 191-260 261-410 411-500 501-890 891-1450 1451-1710	6x6 8x6 12x6 18x6 18x10 24x12 24x14	SEE PLANS	SUPPLY SIDEWALL DIFFUSER COLOR: WHITE MATERIAL: EXTRUDED ALUMINUM OPPOSED BLADE DAMPERS: YES DOUBLE DEFLECTION 3/4" SPACING
F	000-190 191-210 211-330 331-500 501-780 781-1275 1276-1650	6x6 8x6 12x6 18x6 18x10 24x12 24x14	SEE PLANS	RETURN/EXHAUST SIDEWALL GRILLE COLOR: WHITE MATERIAL: EXTRUDED ALUMINUM OPPOSED BLADE DAMPERS: YES 0º FIXED DEFLECTION 3/4" SPACING

NOTES:

1. AIR DISTRIBUTION DEVICES LOCATED WITHIN ACOUSTICAL TILE CEILINGS SHALL BE PROVIDED WITH BORDER TYPE FOR LAY-IN MOUNTING. AIR DISTRIBUTION DEVICES LOCATED WITHIN GYPSUM BOARD CEILINGS OR WALLS SHALL BE PROVIDED WITH BORDER TYPE FOR SURFACE MOUNTING. REFER TO ARCHITECTURAL DOCUMENTS FOR CEILING TYPES.
2. AIR DISTRIBUTION DEVICES LOCATED IN SMALL ROOMS WHERE FULL 24"x24" GRID ARE NOT AVAILABLE SHALL BE PROVIDED WITH SURFACE MOUNTING BORDERS IN LIEU OF LAY-IN. SECURE EACH DEVICE TO CEILING GRID WITH FIELD-FABRICATED SUPPORTS.
3. PROVIDE ALL MATERIALS AND EQUIPMENT REQUIRED FOR A COMPLETE INSTALLATION OF ALL LINEAR AND MODULAR SLOT AIR DISTRIBUTION SYSTEMS AS SHOWN ON THE ARCHITECTURAL AND MECHANICAL DRAWINGS AND/OR INDICATED IN THE SPECIFICATIONS. THE SYSTEMS SHALL BE COMPLETE IN EVERY RESPECT AND SHALL INCLUDE ALL REQUIRED APPURTENANCES. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL PLENUMS, BLANK-OFFS, AND ASSOCIATED SHEET METAL COMPONENTS INCLUDING ALL DUCT CONNECTIONS THERETO.
4. BRANCH TAP DUCTWORK CONNECTION SHALL MATCH NECK SIZE OF DIFFUSER/GRILLE.

GENERAL SHEET NOTES:

A. PROVIDE FACTORY DISCONNECT FOR ALL EQUIPMENT.

B. ALL VFDS SHALL BE BY ONE MANUFACTURER.

C. ALL VFDS SHALL HAVE BYPASS.

D. ALL VFDS SHALL HAVE INTEGRAL DISCONNECT.

US Army Corps of Engineers
Omaha District ®

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DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
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ELLSWORTH AIR FORCE BASE, SD
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TRAINING FACILITY
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SCHEDULES

SHEET ID
M-601

ADVERTISEMENT - 100% DESIGN

GAS FIRED CAST IRON CONDENSING WATER BOILER SCHEDULE

PLAN MARK	WEIGHT (LBS.)	EWT/LWT (ºF)	DESIGN MAX FLOWRATE (GPM)	DESIGN MIN. FLOWRATE (GPM)	OPERATING PRESSURE (PSI)	GAS TYPE		MAX INLET PRESSURE (IN. W.G.)	INPUT (MBH)	OUTPUT (MBH)	CSA EFFICIENCY	CONNECTION SIZES					ELECTRICAL		
						FUEL	INLET SIZE					EXHAUST	AIR INLET	HW SUPPLY	HW RETURN	COND. DRAIN	VOLT/ PHASE	HZ	FLA
B-1	4250	110/140	215	60	100	NATURAL GAS	1-1/2"	11	3000	2856	95%	8"	8"	4"	4"	1"	460/3	60	9.06
B-2	4250	110/140	215	60	100	NATURAL GAS	1-1/2"	11	3000	2856	95%	8"	8"	4"	4"	1"	460/3	60	9.06
B-3	4250	110/140	215	60	100	NATURAL GAS	1-1/2"	11	3000	2856	95%	8"	8"	4"	4"	1"	460/3	60	9.06
B-4 (BO)	4250	110/140	215	60	100	NATURAL GAS	1-1/2"	11	3000	2856	95%	8"	8"	4"	4"	1"	460/3	60	9.06

NOTES:
(BO) DESIGNATES EQUIPMENT TO BE INCLUDED AS PART OF A BID OPTION.
1. BURNER MUST BE MODULATING WITH 10:1 TURN DOWN.
2. PROVIDE LOW NOX GAS BURNER WITH AUTOMATIC PILOT IGNITION.
3. PROVIDE COMPLETE TRIM AND GAS TRAIN.
4. PROVIDE WITH EXHAUST MUFFLER AND AIR INLET ATTENUATOR.
5. PROVIDE WITH CONDENSATE ACID NEUTRALIZATION KIT.
6. PROVIDE CONDENSATE DRAIN TO VENT FLUES PER MANUFACTURER'S RECOMMENDATIONS.
7. CATEGORY IV STAINLESS STEEL INTAKE AND EXHAUST FLUE VENTING TO BE PROVIDED BY BOILER MANUFACTURER.
8. BOILER MANUFACTURER MUST PROVIDE EXTERIOR WALL VENTS FOR FLUE AND OUTSIDE AIR INTAKE FOR EACH BOILER.
9. PROVIDE GAS PRESSURE REGULATOR.GAS PRESSURE 3"-14" W.C.
10. PROVIDE UNIT WITH MANUFACTURER'S PACKAGED CONTROLS INCLUDING BACNET COMPATIBLE DDC CONTROLLER OR UNIT CONTROLLER WITH BACNET INTERFACE/GATEWAY. EACH BOILER MUST BE CONNECTED TO AND INTEGRATED INTO THE BAS. WIRELESS FEATURES MUST BE CAPABLE OF BEING DISABLED.
11. PROVIDE WITH INTERNAL CIRCULATOR PUMP TO MAINTAIN MINIMUM FLOW RATE ON BOILER. PUMP MUST BE POWERED FROM THE BOILER.
12. BOILER HEAT EXCHANGER CONSTRUCTION MUST BE CAST IRON WITH INSULATED STAINLESS STEEL JACKET
13. 35% PROPYLENE GLYCOL
14. PROVIDE WITH AUTOMATIC ISOLATION CONTROL VALVE.

PUMP SCHEDULE

PLAN MARK	SYSTEM	FLUID DATA			PUMP DATA			PIPING DATA		ELECTRICAL			
		FLOW (GPM)	HEAD (FT. W.G.)	FLUID TEMP. (ºF)	TYPE	IMPELLER SIZE	% EFF.	SUCT. SIZE	DISCH. SIZE	VFD	MOTOR HP	MOTOR RPM	VOLT/ PHASE
HWP-1	HW	215	110	140	END SUCTION	10.75	65	3	3	YES	15	1800	480/3
HWP-2	HW	215	110	140	END SUCTION	10.75	65	3	3	YES	15	1800	480/3
HWP-3	HW	215	110	140	END SUCTION	10.75	65	3	3	YES	15	1800	480/3
HWP-4 (BO)	HW	215	110	140	END SUCTION	10.75	65	3	3	YES	15	1800	480/3

NOTES:
(BO) DESIGNATES EQUIPMENT TO BE INCLUDED AS PART OF A BID OPTION.
1. PROVIDE SUCTION DIFFUSER WITH STRAINER FOR ALL.
2. FLUID IS 35% PROPYLENE GLYCOL.
3. MOTORS SHALL BE HIGH EFFICIENCY AND TEFC TYPE.
4. PROVIDE PROPER TRANSITION TO PUMP INLET/OUTLET AS REQUIRED.
5. PROVIDE FULL IMPELLER SIZE FOR ALL VFD DRIVEN PUMPS.
6. VFD DRIVEN PUMPS MUST BE INVERTER DUTY.

EXPANSION SYSTEM SCHEDULE

PLAN MARK	SYSTEM	SYSTEM TEMP.		INITIAL PRESS. (PSIG)	TANK SIZE (GAL.)	MAX PRESS. (PSIG)	AIR SEPARATOR			
		MIN	MAX				PLAN MARK	INLET SIZE	GPM	MAX. PD (FT. W.G.)
ET-1	HEATING HOT WATER	40	150	40	80	150	AS-1	6	800	0.5

NOTES:
1. TANK PRESSURE MUST BE ADJUSTABLE TO MEET ACTUAL SYSTEM CONDITIONS.
2. PROVIDE AIR SEPARATOR WITH AUTOMATIC AIR VENT.
3. DIAPHRAGM TYPE.
4. PROVIDE STRAINER AND FLANGED CONNECTIONS FOR AIR SEPARATOR.

EXHAUST FAN SCHEDULE

PLAN MARK	TYPE	CFM	S.P. (IN. W.G.)	FAN RPM	MOTOR		VOLT/ PHASE	DRIVE TYPE	FAN SERVICE	ACCESSORIES
					RPM	HP				
EF-1	INLINE	32000	2	1770	1725	25	480/3	DIRECT	WLT BAY 1	1,5,7,12,34,35,40
EF-2	INLINE	32000	2	1770	1725	25	480/3	DIRECT	WLT BAY 1	1,5,7,12,34,35,40
EF-3	INLINE	2000	1.2	1252	1725	1	120/1	DIRECT	MECHANICAL ROOM	1,2,5,7,12,42
EF-4 (BO)	INLINE	32000	2	1770	1725	25	480/3	DIRECT	WLT BAY 2	1,5,7,12,34,35,40
EF-5 (BO)	INLINE	32000	2	1770	1725	25	480/3	DIRECT	WLT BAY 2	1,5,7,12,34,35,40

NOTES:
1. REFER TO DUCTWORK DRAWINGS FOR FINAL FAN BALANCE AIRFLOW.
2. PROVIDE SPEED CONTROLLER ON ALL DIRECT DRIVE FANS.
3. ALL MOTORS MUST BE PREMIUM EFFICIENCY.
4. ALL MOTORS WITH VFD MUST HAVE MOTOR SHAFT GROUNDINGS.
(BO) DESIGNATES EQUIPMENT TO BE INCLUDED AS PART OF A BID OPTION.

ACCESSORIES:
1) BACKDRAFT DAMPER
2) THERMOSTAT
3) BIRDSCREEN
4) ROOF CURB
5) DISCONNECT SWITCH
6) DRAIN
7) EQUIPMENT SUPPORTS
8) FAN GUARD
9) CURB MOUNT ROOF JACK
10) SPEED CONTROLLER
11) WALL SHUTTER
12) VIBRATION ISOLATORS
13) WALL CAP
14) WALL SHUTTER - MOTORIZED
15) WEATHER COVER
16) 2 SPEED / 1 WINDING
17) FILTERS
18) WALL COLLAR
19) WEATHER PROTECTION COATING
20) COMPANION FLANGES
21) INSULATED HOUSING FOR SOUND CONTROL
22) HINGED FRAMES
23) MOTOR LOCATED OUTSIDE OF AIR STREAM
24) UL RATED FOR SMOKE CONTROL
25) BAG-IN/BAG-OUT FILTER ASSEMBLY
26) NEMA 4 DISCONNECT
27) BELT TUNNEL
28) MOTOR HEAT SHIELD
29) STEEL WHEEL CONSTRUCTION
30) BOLTED ACCESS DOOR
31) STAINLESS STEEL UL-762 LISTING
32) FACTORY GREASE CONTAINMENT RESERVOIR
33) SIDE OR BOTTOM ACCESS MOTOR
34) PROVIDE VFD
35) CORROSION RESISTANT INTERNAL COMPONENTS
36) SIDE DISCHARGE
37) PROVIDE VENTED ROOF CURB
38) INTEGRAL PLENUM INLET
39) CONTINUOUS OPERATION
40) TYPE B SPARK RESISTANT CONSTRUCTION AND EXPLOSION PROOF MOTOR
41) VIBRATION RAILS
42) EC MOTOR WITH VARIABLE SPEED CONTROLLER

DOOR AIR CURTAIN SCHEDULE

PLAN MARK	SERVICE	WEIGHT (LBS.)	DIMENSIONS		ELECTRICAL					
			DOOR OPENING WIDTH (INCHES)	MOUNTING HEIGHT (INCHES)	MOTORS/ UNIT	MOTOR HP (EACH)	VOLT/ PHASE	HZ	TOTAL UNIT FLA	CONTROLS
DAC-1	VESTIBULE	1650	192	192	2	20	480/3	60	51	AUTOMATIC

NOTES:
1. PROVIDE WITH REMOTE MOUNTED ROOM...
2. PROVIDE WITH DOOR SWITCH AND CONTROL PANEL. COORDINATE 120V CONNECTION TO CONTROL PANEL WITH ELECTRICAL CONTRACTOR.
3. AIR CURTAINS MUST BE PROVIDED WITH ADJUSTABLE AIR VELOCITY CONTROL.
4. UNIT RATINGS TO BE CERTIFIED PER AMCA AIR CURTAIN TEST PROCEDURE STANDARD NO. 220; BEAR THE AMCA SEAL; PROVIDED WITH FACTORY MOUNTED, FACTORY WIRED CONTROL PANELS INCLUDING A STARTER FOR EACH MOTOR AND TERMINAL STRIP IN A NEMA TYPE 1 ENCLOSURE; REMOTE DOOR LIMIT SWITCH TO ENERGIZE THE UNIT WHENEVER THE ASSOCIATED DOOR IS OPEN.
5. PROVIDE FACTORY DISCONNECT.

GAS FIRED INFRARED HEATER SCHEDULE (BID OPTION)

PLAN MARK	SERVICE	DIMENSIONS (LxWxH)	OPERATING WEIGHT (LBS.)	FUEL TYPE	INPUT (MBH)	ΔT (ºF)	GAS CONNECTION SIZE (IN.)	MIN. NATURAL GAS INLET PRESSURE (" WC)	COMBUSTION AIR INLET SIZE (IN.)	VENT DIAMETER (IN.)	ELECTRICAL		NOTES
											FLA	VOLTAGE/ PHASE	
IH-1 (BO)	MAIN HANGAR BAY	600"x21"x13"	175	NATURAL GAS	200	50	1/2	5	NA	4	1	120V/1	1,2,3,4
IH-2 (BO)	MAIN HANGAR BAY	600"x21"x13"	175	NATURAL GAS	200	50	1/2	5	NA	4	1	120V/1	1,2,3,4
IH-3 (BO)	MAIN HANGAR BAY	600"x21"x13"	175	NATURAL GAS	200	50	1/2	5	NA	4	1	120V/1	1,2,3,4

NOTES:
1. PROVIDE WITH REMOTE MOUNTED ROOM THERMOSTAT. ELECTRICAL CLASSIFICATION SHALL MATCH THE HEATER.
2. PROVIDE HIGH EFFICIENCY HOT ROLLED ALUMINUM REFLECTOR.
3. PROVIDE WITH STAINLESS STEEL VENT KIT. MATCH CATEGORY CRITERIA OF BURNER.
4. PROVIDE WITH CONTROL PANEL.
(BO) DESIGNATES EQUIPMENT TO BE INCLUDED AS PART OF A BID OPTION.

AIR TERMINAL UNIT SCHEDULE

PLAN MARK	DESIGN CFM	MIN CFM	INLET SIZE	MAX APD (IN. W.G.)	HEATER COIL DATA					
					WATER TEMP		GPM	EAT (ºF)	LAT (ºF)	HEATING CFM
					ENT.	LVG.				
VAV-1-1	400	120	8	0.25	140	110	0.5	55	85	120
VAV-1-2	80	70	4	0.25	140	110	0.5	55	85	70
VAV-1-3	330	100	8	0.25	140	110	0.5	55	85	100
VAV-1-4	675	205	10	0.25	140	110	0.5	55	85	205
VAV-1-5	575	175	10	0.25	140	110	0.5	55	85	175
VAV-1-6	500	150	8	0.25	140	110	0.5	55	85	150
VAV-1-7	350	105	8	0.25	140	110	0.5	55	85	105
VAV-2-1	330	100	8	0.25	140	110	0.5	55	85	100
VAV-2-2	1200	360	14	0.25	140	110	1	55	85	360
VAV-2-3	420	130	8	0.25	140	110	0.5	55	85	130
VAV-2-4	525	160	10	0.25	140	110	0.5	55	85	160
VAV-2-5	470	145	8	0.25	140	110	0.5	55	85	145
VAV-2-6	400	120	8	0.25	140	110	0.5	55	85	120
VAV-2-7	550	165	10	0.25	140	110	0.5	55	85	165
VAV-2-8	220	70	6	0.25	140	110	0.5	55	85	70

NOTES:

1. CONTRACTOR MUST COORDINATE LEFT/RIGHT HAND UNIT CONFIGURATION TO MAINTAIN 36" NEC CLEARANCE .
2.. MAINTAIN MINIMUM OF 4'-0" STRAIGHT DUCT ON DISCHARGE SIDE OF BOX BEFORE ANY DUCT TAPS.
3. ALL BOXES MUST BE CAPABLE OF VAV OPERATION.
4. PROVIDE HW PIPING MINIMUM CONNECTION SIZE OF 3/4".
5. MAX AIR PRESSURE DROP INDICATED IS AT FULL OPEN POSITION AND INCLUDES HEATING COIL PRESSURE DROP.
6. PROVIDE PRESSURE INDEPENDENT, NORMALLY OPEN UNITS.
7. PROVIDE SOUND DATA OBTAINED FROM TESTS CONDUCTED IN ACCORDANCE WITH ARI STANDARD 880
8. MAX. NC-30 AT 1" W.C. INLET STATIC PRESSURE. PROVIDE FACTORY SOUND ATTENUATOR AS REQUIRED.
9. PROVIDE WITH 1" SCRIM REINFORCED FOIL FACE INSULATION TOWARD AIRSTREAM MEETING ASTM C1136 REQUIREMENTS
10. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
11. FLUID IS 35% PROPYLENE GLYCOL.

HOT WATER UNIT HEATER SCHEDULE

PLAN MARK	SERVICE	MOUNTING HEIGHT (FT)	OPERATING WEIGHT (LBS.)	CAPACITY (BTU/HR)	AIRFLOW (CFM)	FLOW (GPM)	MAX WATER PD (FT.HD)	EWT	LWT	ELECTRICAL		NOTES
										HP	VOLTAGE/ PHASE	
UH-1	VESTIBULE RM 1000	MATCH CEILING HT	150	12,544	160	2	0.8	140	110	1/4	120V/1	1,2,3,7,8
UH-2	WLT BAY 1	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7
UH-3	WLT BAY 1	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7
UH-4	WLT BAY 1	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7
UH-5	WLT BAY 1	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7
UH-6 (BO)	WLT BAY 2	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7
UH-7 (BO)	WLT BAY 2	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7
UH-8 (BO)	WLT BAY 2	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7
UH-9 (BO)	WLT BAY 2	11	150	104,204	1,830	10.7	4.8	140	110	1/3	120V/1	1,2,3,4,5,6,7

NOTES:
(BO) DESIGNATES EQUIPMENT TO BE INCLUDED AS PART OF A BID OPTION.
1. PROVIDE WITH REMOTE MOUNTED ROOM THERMOSTAT. ELECTRICAL CLASSIFICATION SHALL MATCH THE HEATER.
2. PROVIDE EC MOTOR
3. PROVIDE WITH CONTROL PANEL.
4. HORIZONTAL DISCHARGE HYDRONIC HEATER WITH FAN. PROVIDE WALL MOUNTING BRACKET.
5. PROVIDE CORROSION RESISTANT COATING.
6. PROVIDE EXPLOSION PROOF MOTOR. SHALL BE CLASS 1 DIVISION 2 COMPLIANT.
7. FLUID IS 35% PROPYLENE GLYCOL.
8. CABINET STYLE IN RECESSED CEILING MOUNTED CONFIGURATION.

SPLIT SYSTEM AIR CONDITIONING UNIT SCHEDULE

PLAN MARK	CFM	COOLING COIL			HEATING CAPACITY		ELECTRICAL DATA				SERVICE	NOTES
		TOT. CAP. (MBH)	EAT (DB/WB)	LAT (DB/WB)	TOT. CAP. (MBH)	LAT (DB/WB)	FLA	SYSTEM MCA	VOLT/ PHASE	HZ		
SSAC-1	915	34.4	80/67	55/55	22,800	70/60	0.37	19.8	208/1	60	1030 COMM	1,2,3,4,5,6,7
SSAC-2	915	34.4	80/67	55/55	22,800	70/60	0.37	19.8	208/1	60	1041 SECURE COMM	1,2,3,4,5,6,7
SSAC-3	915	34.4	80/67	55/55			0.37	19.8	208/1	60	1015 ELEC	1,2,3,4,6,7
SSAC-4	915	34.4	80/67	55/55			0.37	19.8	208/1	60	1034 ELEC	1,2,3,4,6,7
SSAC-5	915	34.4	80/67	55/55	22,800	70/60	0.37	19.8	208/1	60	1048 ELEC	1,2,3,4,5,6,7

NOTES:
1. INSTALL PER MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
2. PROVIDE ALL BUILDING CODE AND MANUFACTURER REQUIRED CLEARANCES.
3. ALL REFRIGERATION PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS.
4. PROVIDE CONDENSATE PUMP.
5. PROVIDE HEAT PUMP.
6. PROVIDE UNIT WITH SELF-CONTAINED, PACKAGED CONTROLS INCLUDING WALL-MOUNTED THERMOSTAT
7. WALL MOUNTED UNIT.

SPLIT SYSTEM CONDENSING UNIT SCHEDULE

PLAN MARK	TOT. CAP. (MBH)	SEER	CONDENSER		ELECTRICAL					SERVICE	NOTES
			AMBIENT TEMP. (ºF)	REFRIG. TYPE	SYSTEM MCA	RLA	FLA	VOLT/ PHASE	HZ		
SSCU-1	34.4	15.9	96.4	R-410A	19.8	18.25	0.83	208/1	60	SSAC-1	1,2,3,4,5
SSCU-2	34.4	15.9	96.4	R-410A	19.8	18.25	0.83	208/1	60	SSAC-2	1,2,3,4,5
SSCU-3	34.4	15.9	96.4	R-410A	19.8	18.25	0.83	208/1	60	SSAC-3	1,2,4,5
SSCU-4	34.4	15.9	96.4	R-410A	19.8	18.25	0.83	208/1	60	SSAC-4	1,2,4,5
SSCU-5	34.4	15.9	96.4	R-410A	19.8	18.25	0.83	208/1	60	SSAC-5	1,2,3,4,5

NOTES:
1. INSTALL AS DETAILED AND PER MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
2. PROVIDE ALL BUILDING CODE AND MANUFACTURER REQUIRED CLEARANCES.
3. PROVIDE HEAT PUMP.
4. PROVIDE SINGLE POINT ELECTRICAL CONNECTION TO CONDENSING UNIT. INDOOR UNIT IS POWERED BY CONDENSING UNIT.
5. PROVIDE KIT FOR LOW AMBIENT OPERATION DOWN TO 0ºF.

GLYCOL TANK SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	SERVICE	UNIT SIZE (GAL.)	INLET SIZE	OPERATING WEIGHT (LBS.)	MOTOR HP	VOLT/ PHASE	HZ
GT-1	BELL & GOSSETT	GMU-30	TOWER/BOILER WATER LOOP	55	3/4"	500	1/2	120/1	60

NOTES:
1. AUTOMATIC FEED TYPE. PROVIDE WITH PRESSURE SWITCH AND BRONZE ROTARY GEAR PUMP.
2. PROVIDE WITH SELF CONTAINED CONTROL PANEL MOUNTED ON TANK TO BE CONFIGURED BY UNIT MANUFACTURER WITH SET OF ALARM/TROUBLE CONTACTS FOR MONITORING BY THE BAS.
3. 35% PROPYLENE GLYCOL

GENERAL SHEET NOTES:

A. PROVIDE FACTORY DISCONNECT FOR ALL EQUIPMENT.

B. ALL VFDS SHALL BE BY ONE MANUFACTURER.

C. ALL VFDS SHALL HAVE BYPASS.

D. ALL VFDS SHALL HAVE INTEGRAL DISCONNECT.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
FILE NAME: FXBM231802M-602

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
SCHEDULES

SHEET ID
M-602

ADVERTISEMENT - 100% DESIGN

CONTROL VALVE SCHEDULE

EQUIPMENT SERVED	FUNCTION	TYPE	PIPE SIZE (IN)	VALVE SIZE (IN)	FLOW RATE (GPM)	PD (FT.HD)	MIN. VALVE Cv	POWER REQUIREMENT (VOLT/PHASE)	NORMAL OPERATING POSITION	FAIL POSITION
B-1	HW ISOLATION	2-WAY/2-POSITION	4	4	215	5	96.15	120V/1	NORMALLY OPEN	FAIL OPEN
B-2	HW ISOLATION	2-WAY/2-POSITION	4	4	215	5	96.15	120V/1	NORMALLY OPEN	FAIL OPEN
B-3	HW ISOLATION	2-WAY/2-POSITION	4	4	215	5	96.15	120V/1	NORMALLY OPEN	FAIL OPEN
B-4(BO)	HW ISOLATION	2-WAY/2-POSITION	4	4	215	5	96.15	120V/1	NORMALLY OPEN	FAIL OPEN
HW-BYPASS	HW BYPASS	2-WAY/MODULATING	3	3	60	5	26.83	120V/1	NORMALLY CLOSED	FAIL CLOSED
VAV-1-1	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-1-2	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-1-3	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-1-4	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-1-5	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-1-6	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-1-7	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-1	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-2	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	1	5	0.45	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-3	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-4	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-5	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-6	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-7	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
VAV-2-8	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	0.5	5	0.22	24V	NORMALLY OPEN	FAIL OPEN
UH-1	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	2	5	0.89	24V	NORMALLY OPEN	FAIL OPEN
UH-2	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
UH-3	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
UH-4	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
UH-5	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
UH-6 (BO)	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
UH-7 (BO)	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
UH-8 (BO)	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
UH-9 (BO)	HW ISOLATION	2-WAY/2-POSITION	1 1/4	1 1/4	10.7	5	4.79	24V	NORMALLY OPEN	FAIL OPEN
AHU-1	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	6	5	2.68	24V	NORMALLY OPEN	FAIL OPEN
AHU-2	HW ISOLATION	2-WAY/2-POSITION	3/4	3/4	9	5	4.02	24V	NORMALLY OPEN	FAIL OPEN
MAU-1	HW ISOLATION	2-WAY/2-POSITION	4	4	135	5	60.37	24V	NORMALLY OPEN	FAIL OPEN
MAU-2	HW ISOLATION	2-WAY/2-POSITION	4	4	135	5	60.37	24V	NORMALLY OPEN	FAIL OPEN
MAU-3 (BO)	HW ISOLATION	2-WAY/2-POSITION	4	4	135	5	60.37	24V	NORMALLY OPEN	FAIL OPEN
MAU-4 (BO)	HW ISOLATION	2-WAY/2-POSITION	4	4	135	5	60.37	24V	NORMALLY OPEN	FAIL OPEN

NOTES:
(BO) DESIGNATES EQUIPMENT TO BE INCLUDED AS PART OF A BID OPTION.
1. COORDINATE POWER CONNECTION TO EACH CONTROL VALVE WITH ELECTRICAL CONTRACTOR.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-603

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

SCHEDULES

SHEET ID

M-603

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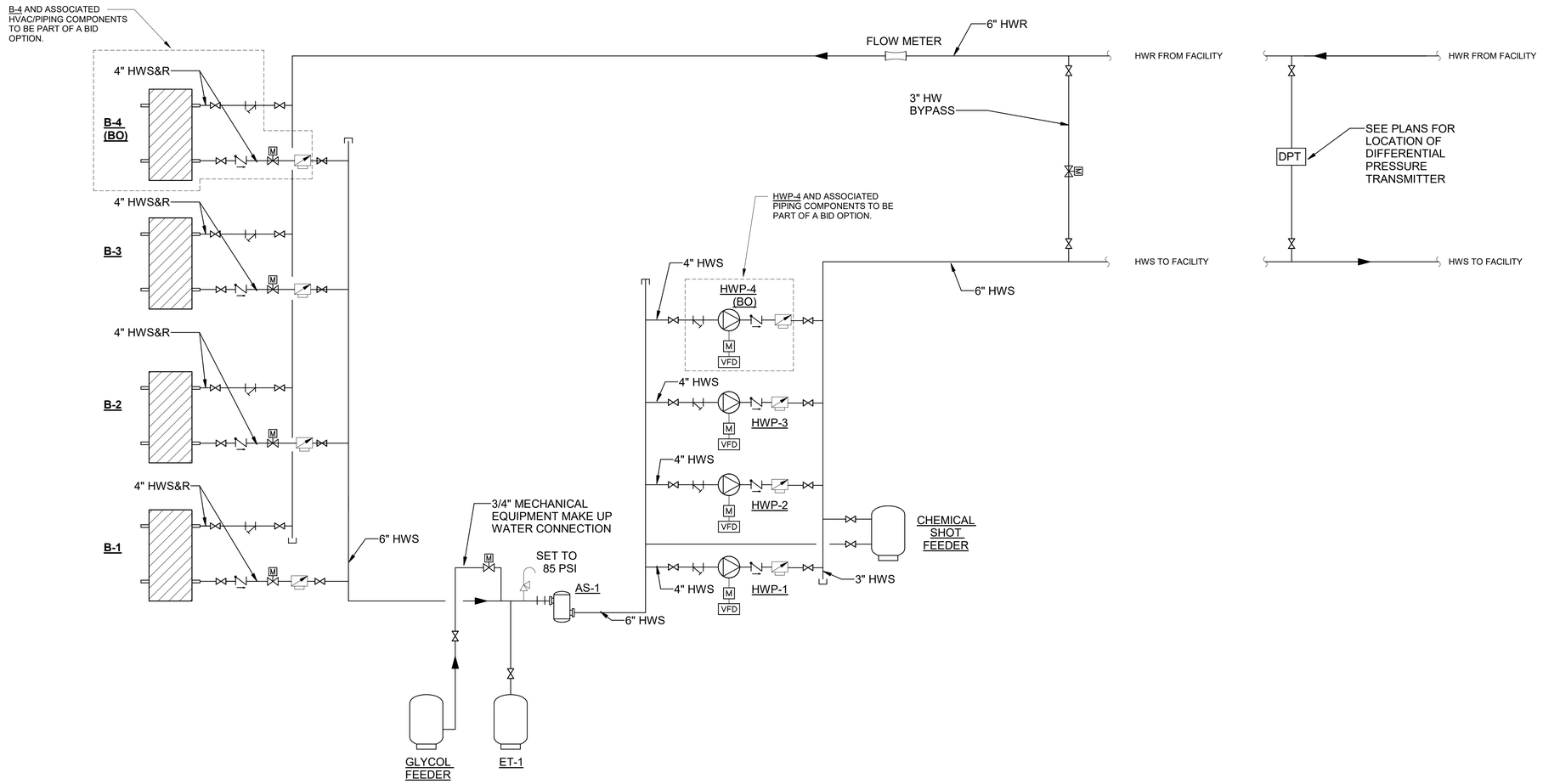

A1 HEATING WATER FLOW DIAGRAM
SCALE NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802M-701

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HEATING WATER FLOW DIAGRAM

SHEET ID
M-701

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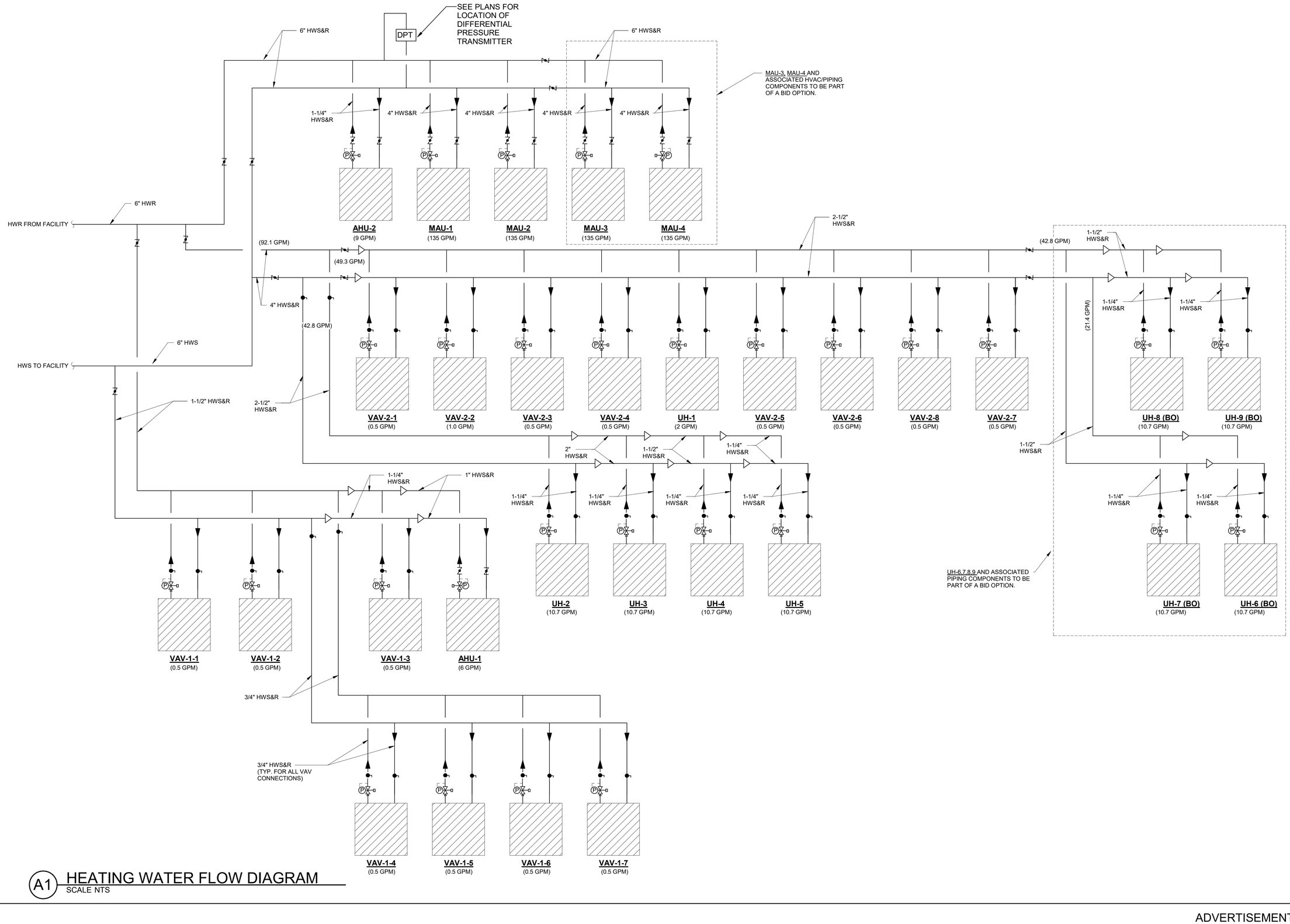

A1 HEATING WATER FLOW DIAGRAM
SCALE NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-702
DEFAULT: ANSI D 22x34

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
HEATING WATER FLOW DIAGRAM

SHEET ID
M-702

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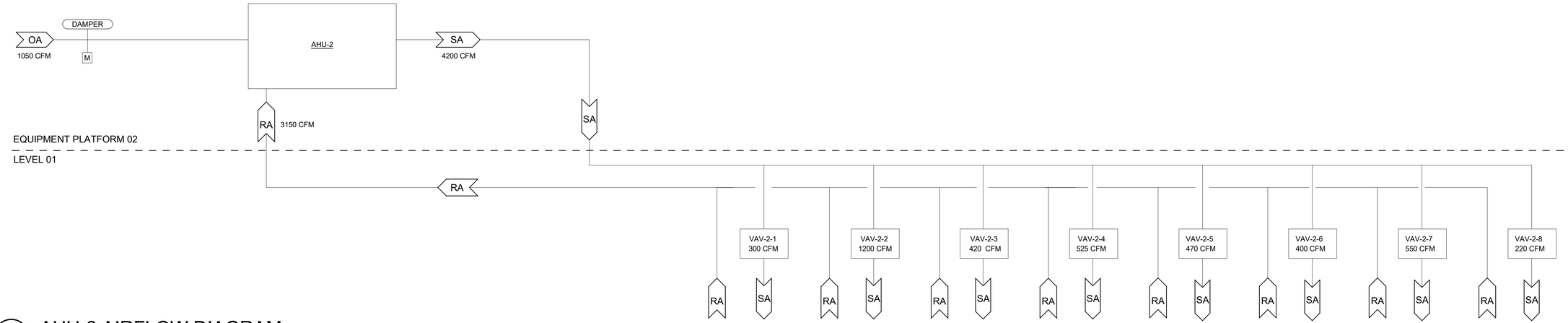
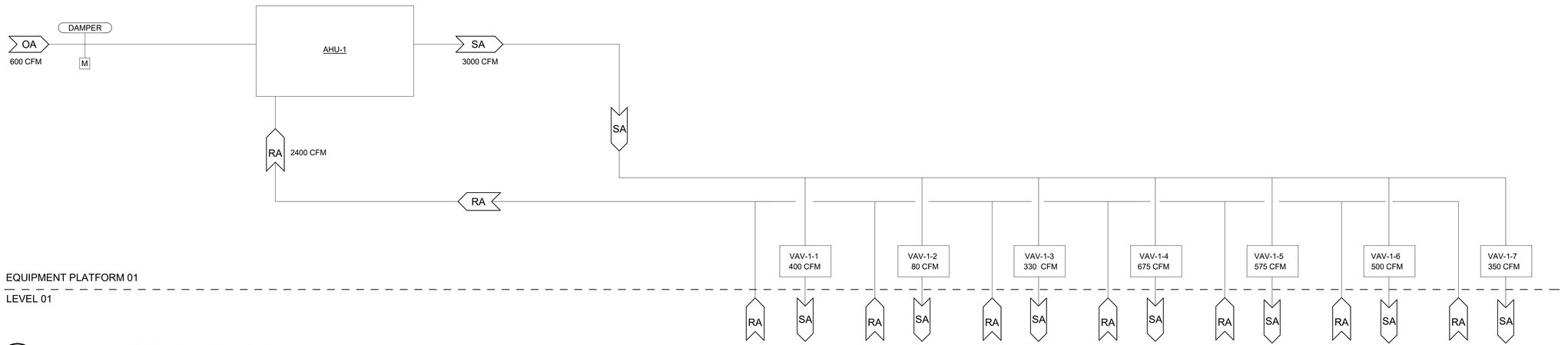


C1 AHU-2 AIRFLOW DIAGRAM
SCALE NTS



A1 AHU-1 AIRFLOW DIAGRAM
SCALE NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-703

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ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
AIRFLOW DIAGRAMS

SHEET ID
M-703

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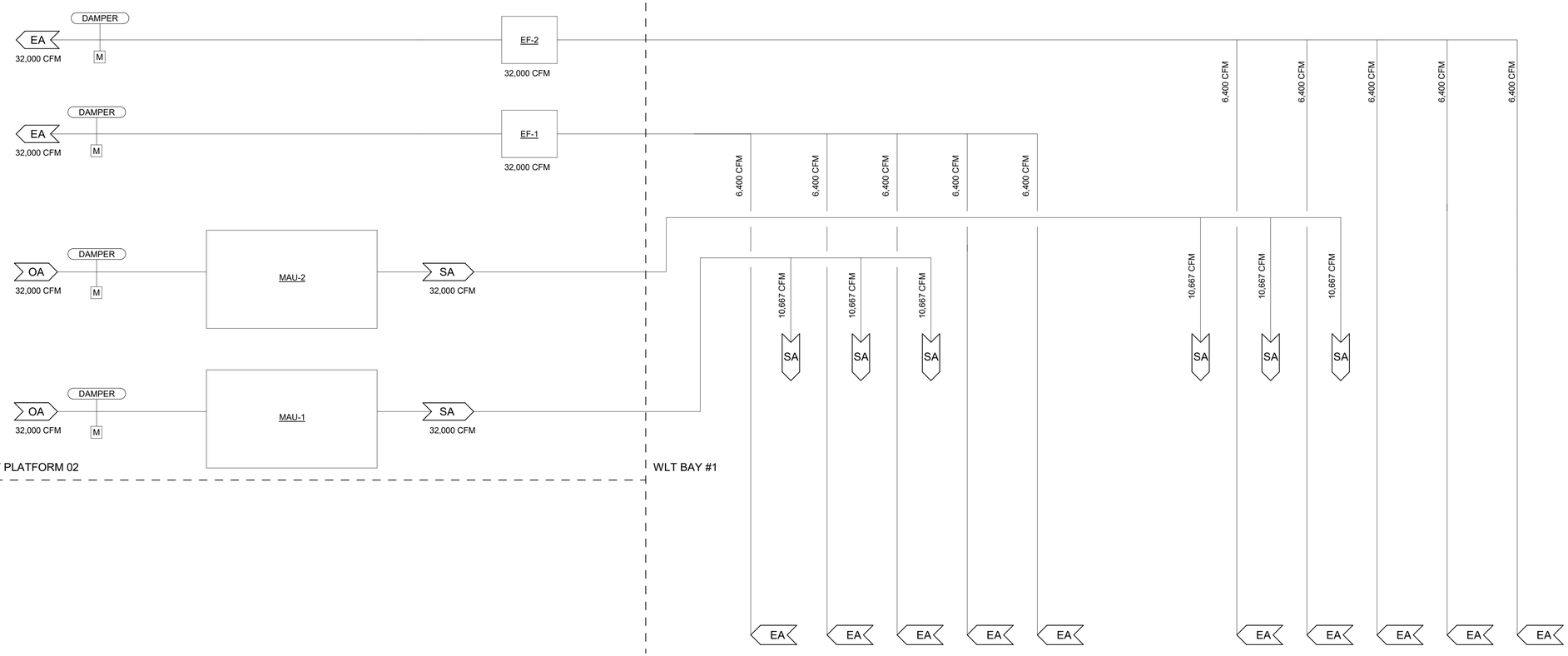

C1 MAU AIRFLOW DIAGRAM
SCALE NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY:	A. RAMOS
DRAWN BY:	A. RAMOS
CHECKED BY:	J. STAMPER
SUBMITTED BY:	B. DYSON
DATE:	ISSUE DATE: 28 APRIL 2023
	SOLICITATION NO.: W9128F23R0012
	CONTRACT NO.:
	DRAWING CODE::
	FILE NAME: FXBM231802M-704
ANSI D 22x34	

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OMAHA DISTRICT
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ELLSWORTH AIR FORCE BASE, SD
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PROJECT NUMBER: FXBM231802

AIRFLOW DIAGRAMS

SHEET ID

M-704

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GENERAL ABBREVIATIONS

(ALL SYMBOLS SHOWN ARE NOT NECESSARILY USED ON THE DRAWINGS)

CONTROLS SYMBOLS

- CENTRIFUGAL FAN
- PLENUM FAN
- PUMP
- HYDRONIC COIL
- GAS COIL
- DX COIL
- ELECTRIC COIL
- EVAPORATIVE COOLING COIL
- DIFFERENTIAL PRESSURE SWITCH
- DIFFERENTIAL PRESSURE TRANSMITTER
- LOUVER
- DAMPER
- DAMPER OPPOSED BLADE
- FILTER
- WALL THERMOSTAT
- TEMPERATURE SENSOR
- PIPE WELL TEMPERATURE SENSOR
- AIRFLOW SENSOR
- AIRFLOW MEASURING STATION
- SMOKE DETECTOR
- FREEZE STAT
- HUMIDIFIER
- DX WITH CONDENSER REHEAT
- ROOM THERMOSTAT
- ROOM HUMIDISTAT
- TEMPERATURE SENSOR
- HUMIDITY SENSOR
- DUCT SMOKE DETECTOR
- FLOW SENSOR
- FREEZESTAT
- FLOW SWITCH
- RELAY
- ELECTRIC MOTOR
- LEVEL TRANSMITTER
- VIBRATION SWITCH
- DUCT HUMIDITY SENSOR/TRANSMITTER
- PRESSURE TRANSMITTER
- MOTOR STARTER (LOCAL OR MCC)
- STATIC PRESSURE SENSOR/TRANSMITTER
- DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER
- DIFFERENTIAL PRESSURE SWITCH (DIGITAL)
- AQUASTAT
- DUCT AVERAGING TEMPERATURE ELEMENT
- LIQUID FLOW METER
- VENTURI FLOW METER
- RECEIVER PRESSURE GAUGE (PANEL MTD.)
- CURRENT SENSING RELAY
- ELECTRIC DAMPER ACTUATOR
- CARBON DIOXIDE (CO2) SENSOR
- CARBON MONOXIDE (CO) SENSOR
- FIRESTAT
- REFRIGERANT DETECTOR/SENSOR
- MANUALLY ACTIVATED SWITCH (PULL STAT., PUSH STAT., ETC)
- ANALOG ELEMENT
- DIGITAL ELEMENT
- VARIABLE FREQUENCY DRIVE
- SILICON CONTROLLED RECTIFIER HEAT CONTROL

NORMAL OPEN	NORMAL CLOSED	
		GATE VALVE
		VALVE W/ REDUCERS (GATE VALVE SHOWN)
		GLOBE VALVE
		BUTTERFLY VALVE
		NEEDLE VALVE/INSTRUMENT VALVE
		3-WAY VALVE
		BALL VALVE
		PLUG VALVE
		ANGLE VALVE

CONTROL VALVE SYMBOLS:

- ELECTRIC ACTUATOR
- PNEUMATIC ACTUATOR
- SOLENOID ACTUATOR

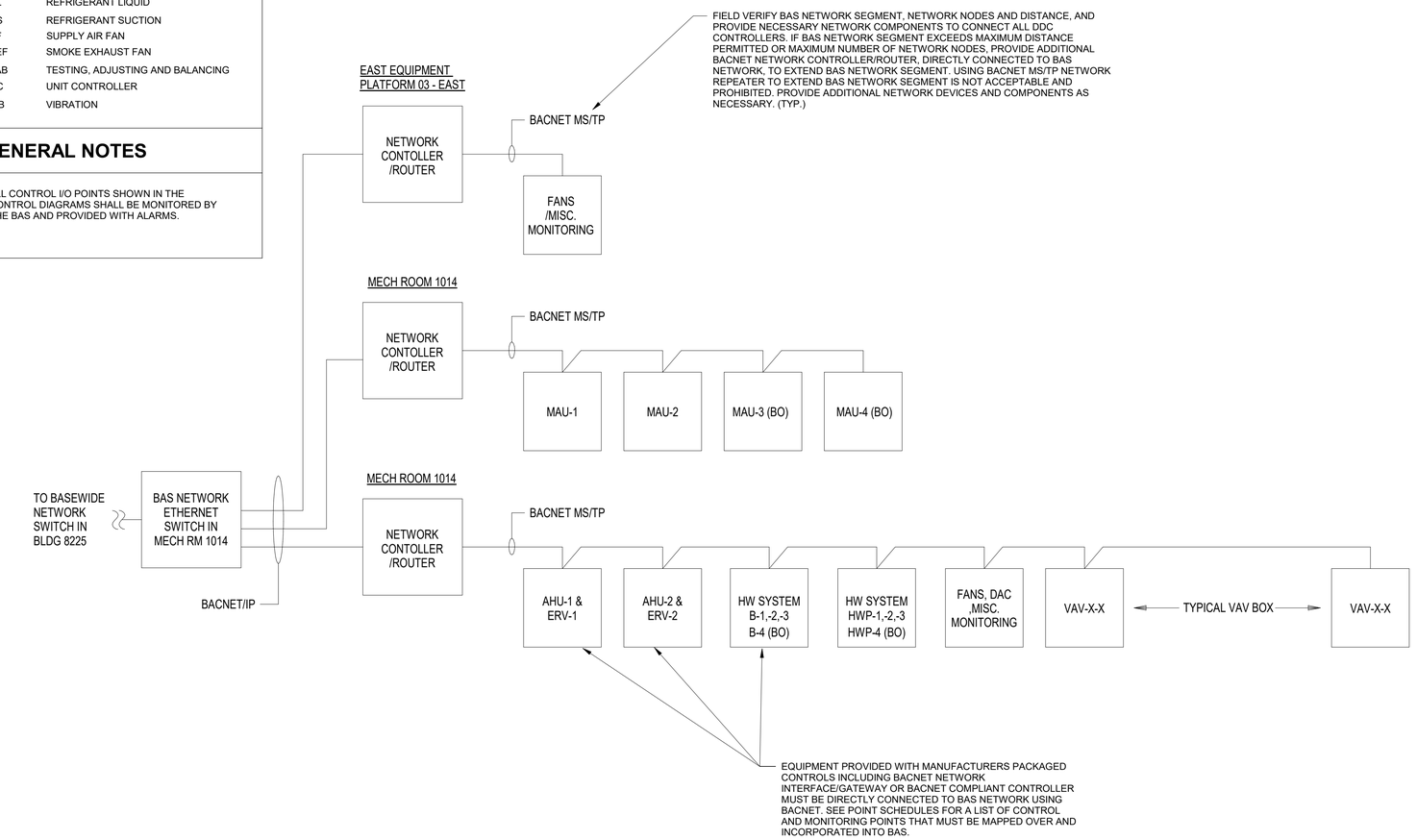
αα-## DO/DI — FEEDBACK; CONTROL POINT TYPE IDENTIFIER

ABBREVIATIONS

ADJ	ADJUSTABLE
AI	ANALOG INPUT
AO	ANALOG OUTPUT
CO2	CARBON DIOXIDE
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
DDC	DIRECT DIGITAL CONTROL
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
EMS	ENERGY MANAGEMENT SYSTEM
ERU	ENERGY RECOVERY UNIT
ETR	EXISTING TO REMAIN
FFCP	FIREFIGHTER CONTROL PANEL
HX	HEAT EXCHANGER
HMI	HUMAN MACHINE INTERFACE
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
ICI	INDUSTRIAL COMMUNICATION
MCI	MICRO CONTROLLER INTERFACE
MS	MOTOR STARTER
MVD	MANUAL VOLUME DAMPER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
PCU	PROCESS CONTROL UNIT
R	RELAY
RF	RETURN AIR FAN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
SF	SUPPLY AIR FAN
SEF	SMOKE EXHAUST FAN
TAB	TESTING, ADJUSTING AND BALANCING
UC	UNIT CONTROLLER
VIB	VIBRATION

GENERAL NOTES

ALL CONTROL I/O POINTS SHOWN IN THE CONTROL DIAGRAMS SHALL BE MONITORED BY THE BAS AND PROVIDED WITH ALARMS.



A4 BAS NETWORK RISER DIAGRAM
SCALE NOT TO SCALE

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802A-801

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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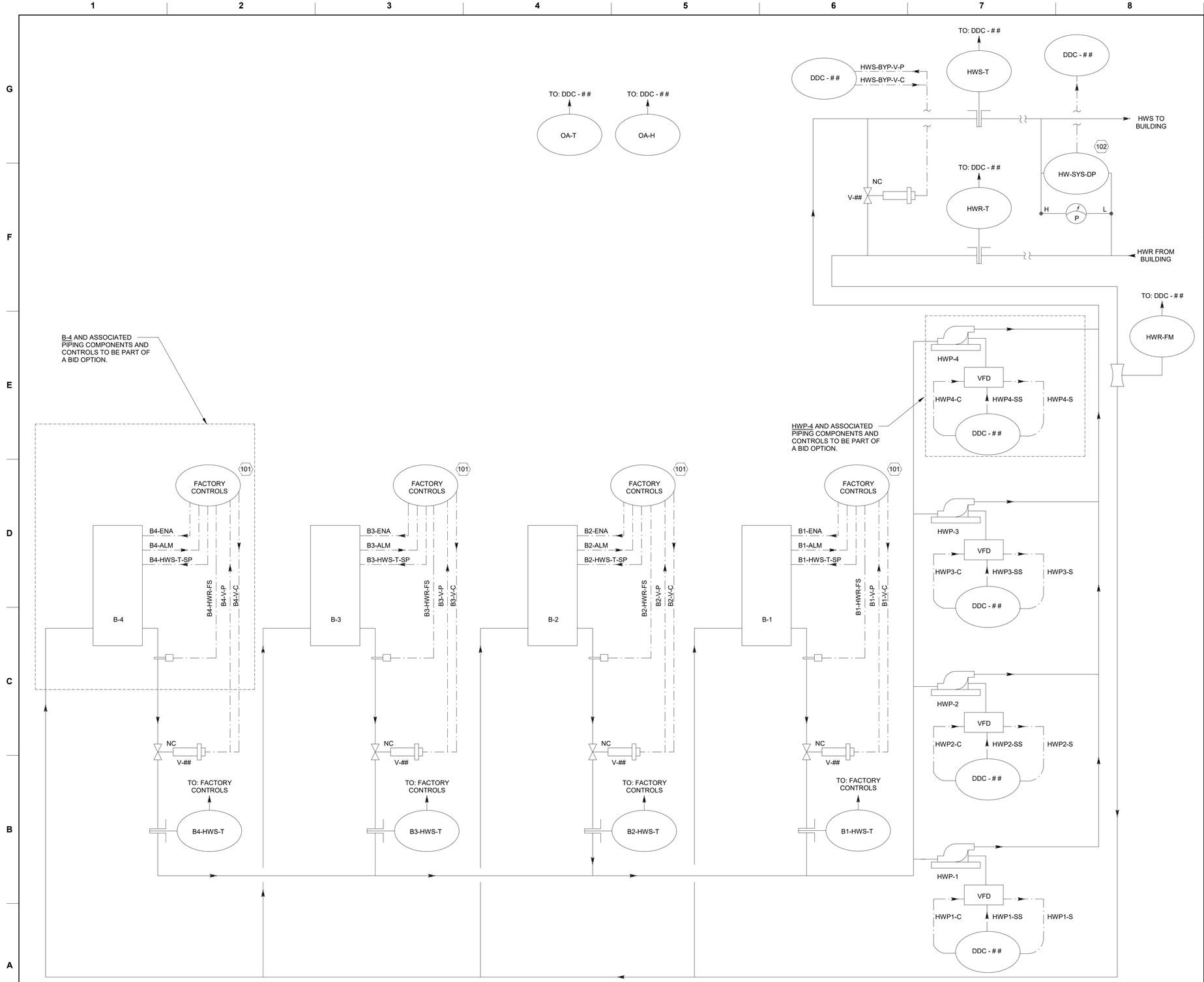
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21; WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
CONTROL SYSTEMS SYMBOLS, ABBREVIATIONS, & NOTES

SHEET ID
M-801



A1 HOT WATER SYSTEM - CONTROL DIAGRAM WLT
SCALE NTS

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 AND M-801 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES

101. BOILERS MUST BE PROVIDED WITH UNIT MANUFACTURER'S PACKAGED CONTROLS INCLUDING BACNET NETWORK INTERFACE, SENSORS AND OTHER CONTROL DEVICES FOR REMOTE CONTROL AND MONITORING. CONNECT TO BAS NETWORK AND INCORPORATE CONTROL AND MONITORING POINTS LISTED IN POINTS SCHEDULE INTO BAS.

102. SEE MP212a FOR LOCATION OF HOT WATER LOOP DIFFERENTIAL PRESSURE SENSOR.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-802
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
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OMAHA, NEBRASKA

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ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
CONTROLS DIAGRAMS

SHEET ID
M-802

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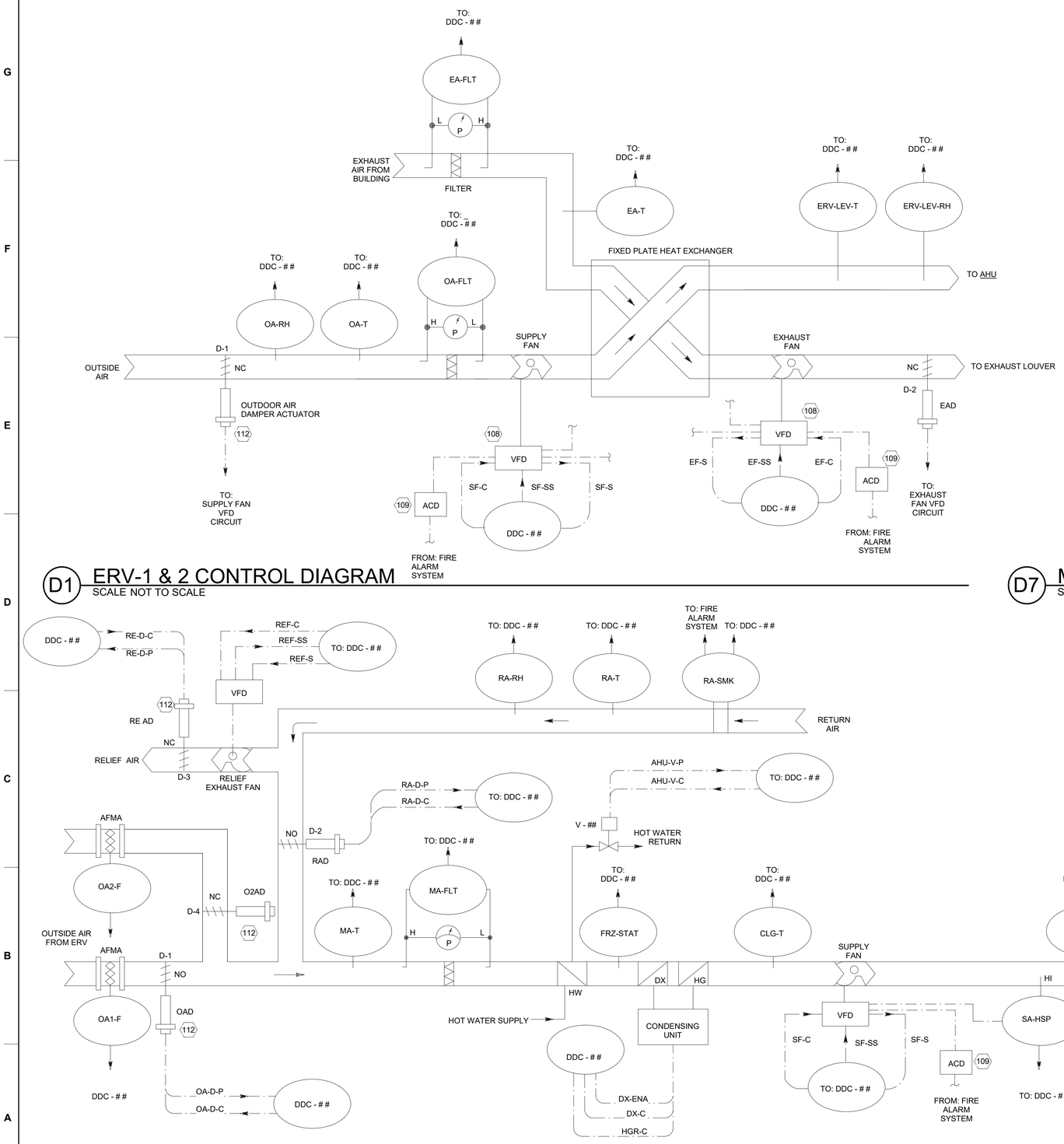
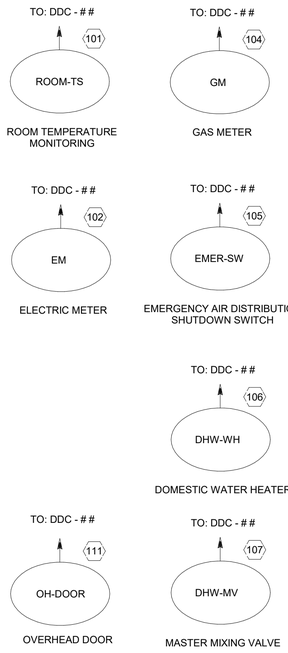
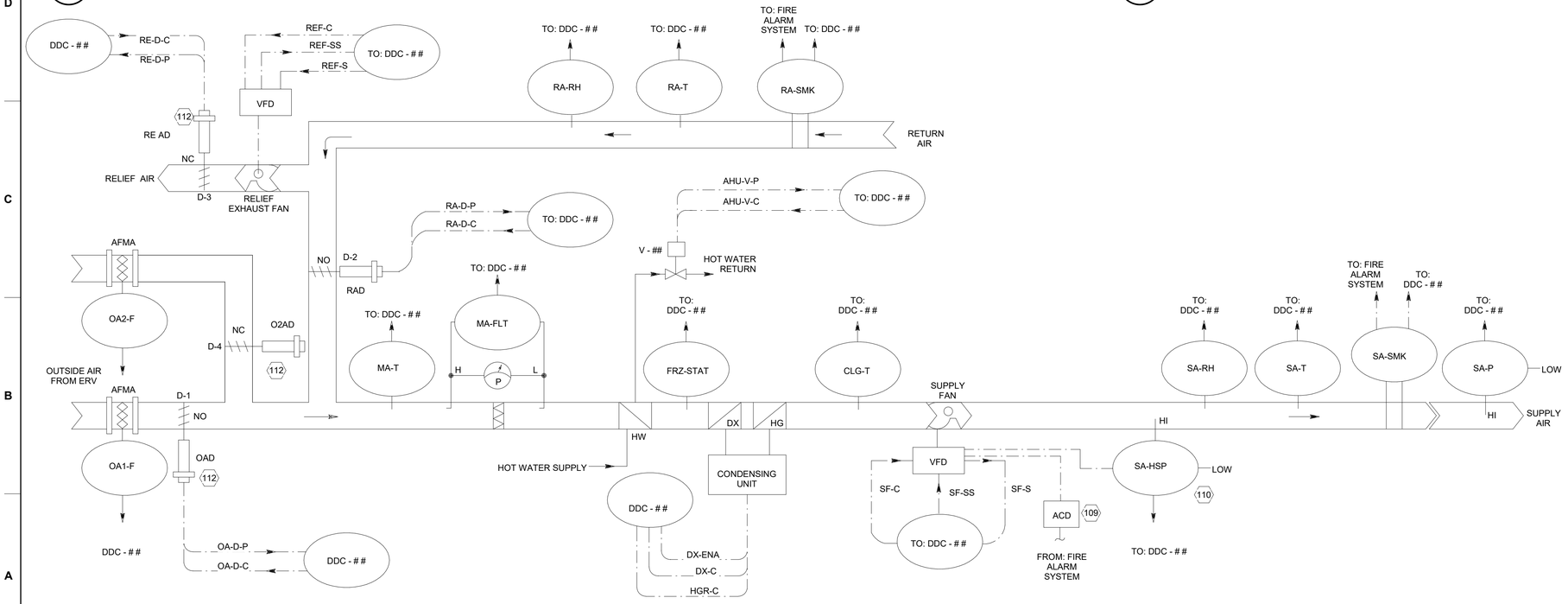


D1 ERV-1 & 2 CONTROL DIAGRAM
SCALE NOT TO SCALE



D7 MISC. POINTS CONTROL DIAGRAM
SCALE NTS



A1 AIR HANDLING UNIT (AHU-1 & 2)
SCALE NOT TO SCALE

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 AND M-801 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES

101. PROVIDE SPACE TEMPERATURE SENSORS IN COMM ROOMS AND ELECTRICAL ROOMS, AND CONNECT TO BAS FOR SPACE TEMPERATURE MONITORING AND ALARM.
102. CONNECT ELECTRIC METER PULSE OUTPUT TO BAS FOR METERING.
103. RESERVED.
104. CONNECT NATURAL GAS METER PULSE OUTPUT TO BAS FOR METERING.
105. TYPICAL EMERGENCY AIR DISTRIBUTION SHUT DOWN SWITCH. WHEN SWITCH IS ACTIVATED, AIR HANDLING UNITS, OUTSIDE AIR INTAKE MOTORIZED DAMPERS AND EXHAUST FANS CONTROLLED BY BAS MUST BE SHUT DOWN. ONCE EMERGENCY CONDITION IS CLEARED AND SWITCH IS RESET, ALL EQUIPMENT MUST RETURN TO NORMAL OPERATION.
106. DOMESTIC HOT WATER SYSTEM MUST BE PROVIDED WITH AND CONTROLLED BY SELF-CONTAINED, PACKAGED CONTROLS. FIELD COORDINATE AND CONNECT RELAY OUTPUTS/CONTACTS FOR DOMESTIC WATER HIGH AND LOW TEMPERATURE ALARM TO BAS FOR ALARM MONITORING.
107. CONNECT TEMPERATURE SENSOR AT DOMESTIC WATER MASTER MIXING VALVE OUTLET FOR HIGH AND LOW TEMPERATURE ALARM. CONNECT TO BAS FOR MONITORING.
108. VARIABLE FREQUENCY DRIVE.
109. INTERLOCK FAN WITH FIRE ALARM SYSTEM THROUGH CONTROL MODULE (CM) TO STOP AHU WHEN ANY DUCT SMOKE DETECTOR ASSOCIATED WITH FAN SENSES PARTICLES OF COMBUSTION. THIS INTERLOCK SHALL BE HARD WIRED AND NOT PERFORMED THROUGH BAS. CM AND DUCT SMOKE DETECTOR FURNISHED AND INSTALLED UNDER DIVISION 28.
110. INTERLOCK FAN WITH HIGH DUCT PRESSURE SWITCH TO STOP FAN WHEN SWITCH IS ACTIVATED.
111. CONNECT OVERHEAD DOOR SWITCH TO BAS FOR MONITORING OPEN/CLOSED POSITION OF DOOR.
112. PROVIDE INTERLOCK WIRING BETWEEN FAN AND ASSOCIATED DAMPERS. WHEN FAN IS COMMANDED TO START IN EITHER HAND OR AUTO MODE, DAMPER SHALL OPEN. ONCE DAMPER IS PROVEN OPEN BY ASSOCIATED END SWITCH, FAN SHALL START. DAMPER SHALL CLOSE WHEN THE FAN STOPS.

US Army Corps of Engineers
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MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-803

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY:
SUBMITTED BY: J. STAMPFER
B. DYSON
DATE:
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
CONTROLS DIAGRAMS

SHEET ID
M-803

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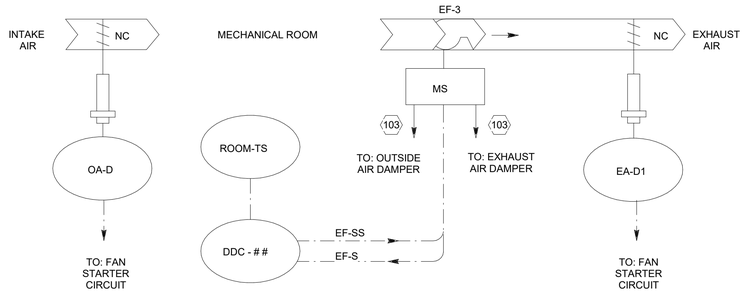
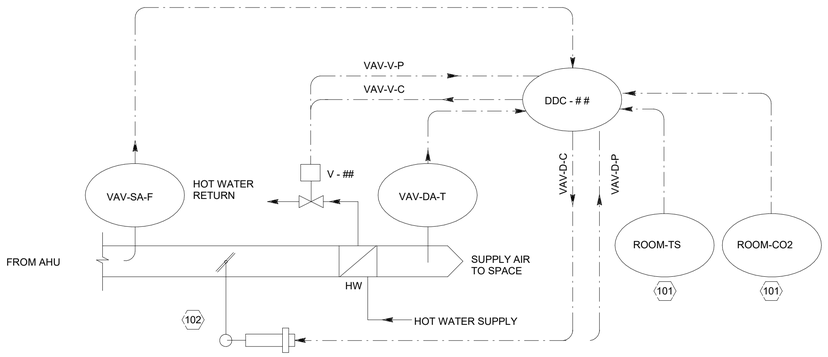
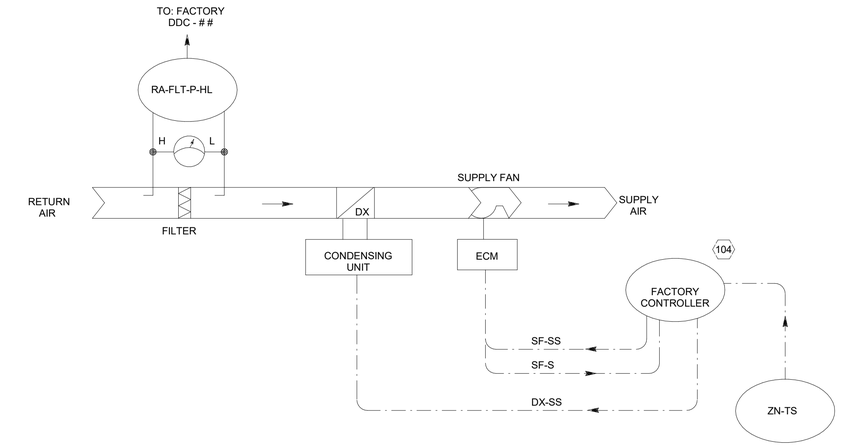


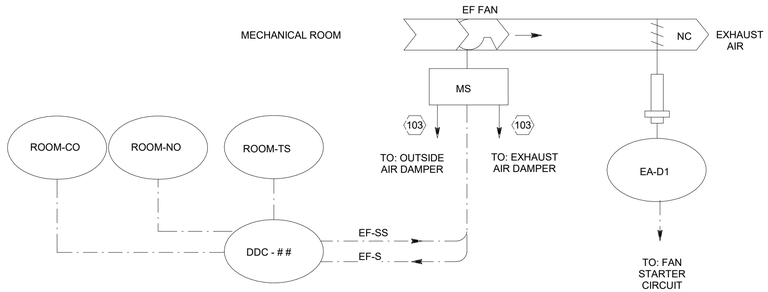
F1 EXHAUST FAN CONTROL DIAGRAM (EF-3 MECHANICAL ROOM)
SCALE NOT TO SCALE



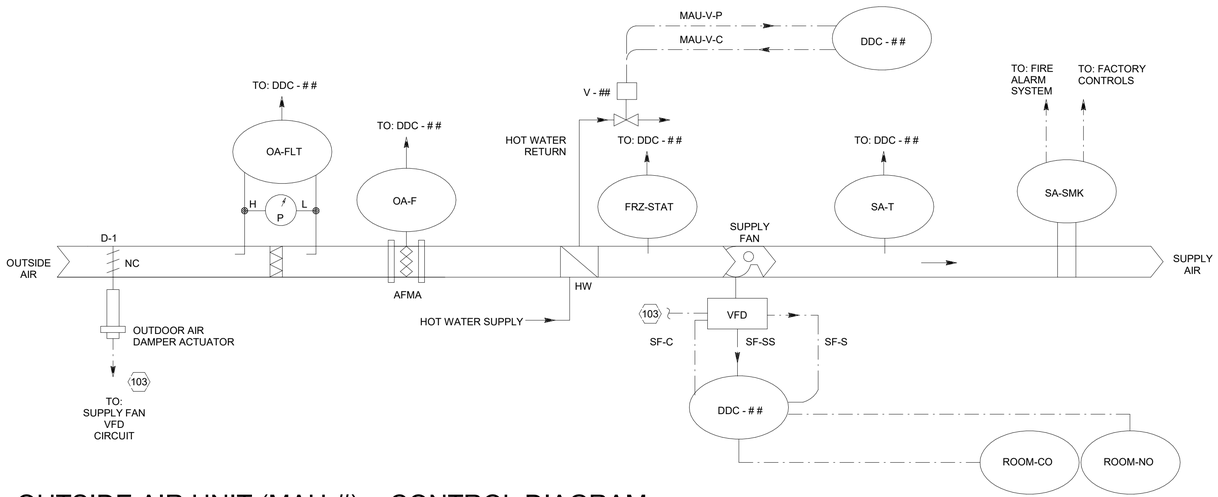
D1 VAV BOX WITH HW REHEAT CONTROL DIAGRAM
SCALE NOT TO SCALE



E5 SPLIT AC UNIT CONTROL DIAGRAM (SSAC)
SCALE NOT TO SCALE



D5 EXHAUST FAN CONTROL DIAGRAM EF-1, EF-2, EF-4(BO), EF-5(BO)
SCALE NOT TO SCALE



A1 OUTSIDE AIR UNIT (MAU-#) - CONTROL DIAGRAM
SCALE NTS

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 AND M-801 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES

101. TYPICAL SPACE TEMPERATURE AND CO2 SENSORS FOR VAV BOX. SEE FLOOR PLANS FOR LOCATIONS OF SENSORS.

102. TYPICAL SINGLE DUCT VAV BOXES. SEE MECHANICAL EQUIPMENT SCHEDULE AND FLOOR PLANS.

103. PROVIDE INTERLOCK WIRING BETWEEN FAN AND ASSOCIATED DAMPERS. WHEN FAN IS COMMANDED TO START IN EITHER HAND OR AUTO MODE, DAMPER SHALL OPEN. ONCE DAMPER IS PROVEN OPEN BY ASSOCIATED END SWITCH, FAN SHALL START. DAMPER SHALL CLOSE WHEN THE FAN STOPS.

104. SPLIT SYSTEM AC UNIT MUST BE CONTROLLED BY PACKAGED CONTROLS INCLUDING WALL MOUNTED THERMOSTAT AS REQUIRED, NOT BY BAS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DITSON
ISSUE DATE: 28 APRIL 2023
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
CONTROLS DIAGRAMS

SHEET ID
M-804

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THERMOSTAT SCHEDULE

UNIT IDENTIFIER	SPACES SERVED	STAT LOCATION	ROOM-T	ROOM-T-SP ADJUST	UNOCC OVERRIDE PUSHBUTTON	UNOCC OVERRIDE TIME	OCC SENSOR
VAV-# (TYPICAL)	ADMIN. SPACES	ADMIN. SPACES	X	X	X	1 HR	--
SSAC-# (TYPICAL)	COMM ROOMS/ ELEC ROOMS	COMM ROOMS/ ELEC ROOMS	X	X	--	--	--
EF-1	MECHANICAL ROOM	MECHANICAL ROOM	X	X	--	--	--

OCCUPANCY SCHEDULE

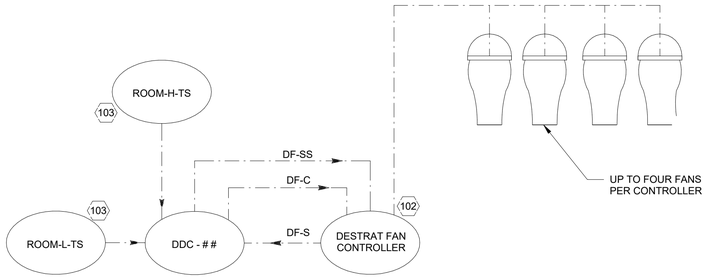
OCCUPIED	UN-OCCUPIED	WARM-UP/ COOL-DOWN	WARM-UP/COOL-DOWN TIME (BAS & LOCAL DEFAULT)		OCCUPIED TIME (BAS & LOCAL DEFAULT)		UNOCCUPIED TIME (BAS & LOCAL DEFAULT)	
			MON-FRI	WEEKEND/ HOLIDAY	MON-FRI	WEEKEND/ HOLIDAY	MON-FRI	WEEKEND/ HOLIDAY
X	X	X	0600-0700	--	0700-1700	--	1700-0600	0000-2400
X	--	--	--	--	0000-2400	0000-2400	--	--
X	--	--	--	--	0700-1700	--	--	--

NOTES

1. LISTED SCHEDULES ARE INITIAL SETTINGS ONLY AND MUST BE USER ADJUSTABLE. ACTUAL SETTINGS MAY DIFFER DEPENDING ON ACTUAL OPERATING SCHEDULES AND CONDITIONS.COORDINATE SETTINGS WITH FACILITY.

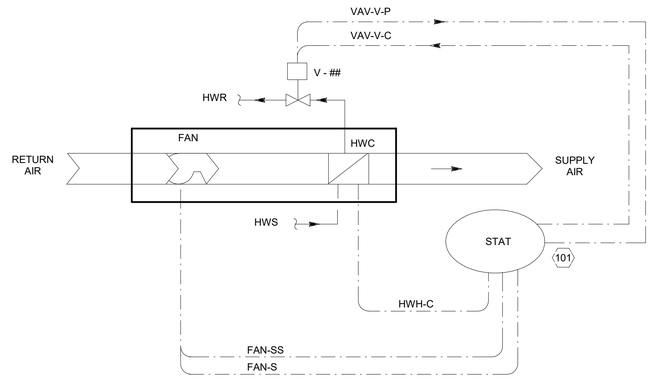
E1 THERMOSTAT AND OCCUPANCY SCHEDULE

SCALE NTS



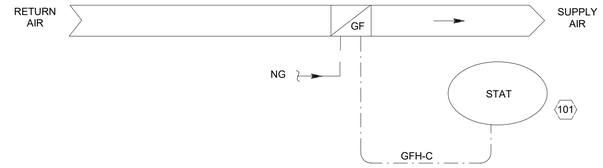
D1 DESTRATIFICATION FAN CONTROL DIAGRAM (DF-01,-02,-03,-04,-05,-06 (BO)

SCALE NOT TO SCALE



A1 HW UNIT HEATER - CONTROL DIAGRAM

SCALE NTS



A5 GAS FIRED INFRARED HEATER - CONTROL DIAGRAM

SCALE NTS

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 AND M-801 FOR ADDITIONAL GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

SHEET KEYNOTES

101. UNIT HEATERS AND RADIANT HEATERS MUST BE CONTROLLED BY WALL MOUNTED THERMOSTAT/ CONTROLLER PROVIDED WITH UNIT, NOT BY BAS.

102. ALL DESTRATIFICATION FANS IN MAIN HANGAR BAY SHALL BE CONTROLLED BY A SINGLE COMMAND FROM THE BAS. DESTRATIFICATION FANS WILL BE POWERED BY A SINGLE CIRCUIT. COORDINATE WITH DIVISION 26 AND PROVIDE NECESSARY CONTROL DEVICES AND WIRING FOR FAN SPEED CONTROL AS NECESSARY.

103. PROVIDE SPACE TEMPERATURE SENSORS IN MAIN HANGAR BAY WHERE INDICATED ON FLOOR PLANS. INSTALL ONE SENSOR (LOW) 5FT ABOVE FINISHED FLOOR AND THE OTHER SENSOR (HIGH) 35FT ABOVE FINISHED FLOOR.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
SIZE: ANSI D 22x34
FILE NAME: FXBM231802M-805

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

CONTROLS DIAGRAMS

SHEET ID

M-805

ADVERTISEMENT - 100% DESIGN

HEATING HOT WATER SYSTEM: B-1, B-2, B-3, B-4 (BO), HWP-1, HWP-2, HWP-3, HWP-4 (BO)

													ALARMING		PRIMARY POINT INFORMATION	NETWORK DATA EXCHANGE		OVERRIDES		ALARM INFORMATION	
FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARM CONNECTION	ALARM PRIORITY	OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	DATA FROM	DATA TO	OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM TYPE	NOTIFICATION CLASS OBJECT INSTANCE NUMBER	EVENT ENROLLMENT OBJECT INSTANCE NUMBER
PROOFS & SAFETIES	*HWP1-S	HWP-1 STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	HWP-1 ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP2-S	HWP-2 STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	HWP-2 ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP3-S	HWP-3 STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	HWP-3 ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*B1-ALM	B-1 ALARM	<_>	~	ALM/NOR	NET-IN	N/A	~	V	N/A	Y	B-1 ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B2-ALM	B-2 ALARM	<_>	~	ALM/NOR	NET-IN	N/A	~	V	N/A	Y	B-2 ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B3-ALM	B-3 ALARM	<_>	~	ALM/NOR	NET-IN	N/A	~	V	N/A	Y	B-3 ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*B1-HWR-FS	B-1 FLOW SWITCH	<_>	~	YES/NO	AI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B2-HWR-FS	B-2 FLOW SWITCH	<_>	~	YES/NO	AI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B3-HWR-FS	B-3 FLOW SWITCH	<_>	~	YES/NO	AI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
START/ STOP	SYS-ENA	SYSTEM ENABLE	~	~	ENA/DIS	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*HWP1-SS	HWP-1 START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP2-SS	HWP-2 START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP3-SS	HWP-3 START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*B1-ENA	B-1 ENABLE/DISABLE	<_>	~	ON/OFF	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B2-ENA	B-2 ENABLE/DISABLE	<_>	~	ON/OFF	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B3-ENA	B-3 ENABLE/DISABLE	<_>	~	ON/OFF	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
HW PUMP SPEED CONTROL	HW-SYS-DP	HW SYSTEM PRESSURE	<_>	~	<__PSI>	AI	N/A	~	V	N/A	Y	HWS PRESS. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HW-SYS-P-SP	HW SYSTEM PRESSURE SETPOINT	~	15 PSI	+/- 2 PSI	NET-OUT	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*HWP1-C	HWP-1 SPEED COMMAND	<_>	~	0-100%	AO	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP2-C	HWP-2 SPEED COMMAND	<_>	~	0-100%	AO	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP3-C	HWP-3 SPEED COMMAND	<_>	~	0-100%	AO	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*HWP-1 SPEED CONTROL	PROPORTIONAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		INTEGRAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		BIAS	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MAX. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MIN. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP-2 SPEED CONTROL	PROPORTIONAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		INTEGRAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		BIAS	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MAX. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MIN. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWP-3 SPEED CONTROL	PROPORTIONAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		INTEGRAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		BIAS	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MAX. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MIN. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
HWS VALVE CONTROL	*B1-V-C	B-1 ISOLATION VALVE COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*B1-V-P	B-1 ISOLATION VALVE POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	B-1 ISO VALVE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B2-V-C	B-2 ISOLATION VALVE COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B2-V-P	B-2 ISOLATION VALVE POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	B-2 ISO VALVE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B3-V-C	B-3 ISOLATION VALVE COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B3-V-P	B-3 ISOLATION VALVE POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	B-3 ISO VALVE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
HWS TEMP. CONTROL	HWS-T	HW SUPPLY TEMPERATURE	<_>	__ DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	HWS TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWS-T-SP	HW SUPPLY TEMPERATURE SETPOINT	~	__ DEG F	+/- 3 DEG F	NET-OUT	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*B1-HWS-T	B-1 HW SUPPLY TEMPERATURE	<_>	__DEG F	<__DEG F>	NET-IN	N/A	C	~	N/A	Y	B-1 HWS TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	*B1-HWS-T-SP	B-1 HW SUPPLY TEMPERATURE SETPOINT	~	140 DEG F	+/- 10 DEG F	NET-OUT	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B2-HWS-T	B-2 HW SUPPLY TEMPERATURE	<_>	__DEG F	<__DEG F>	NET-IN	N/A	C	~	N/A	Y	B-2 HWS TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B2-HWS-T-SP	B-2 HW SUPPLY TEMPERATURE SETPOINT	~	140 DEG F	+/- 10 DEG F	NET-OUT	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B3-HWS-T	B-3 HW SUPPLY TEMPERATURE	<_>	__DEG F	<__DEG F>	NET-IN	N/A	C	~	N/A	Y	B-3 HWS TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	B3-HWS-T-SP	B-3 HW SUPPLY TEMPERATURE SETPOINT	~	140 DEG F	+/- 10 DEG F	NET-OUT	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWR-T	HW RETURN TEMPERATURE	<_>	__ DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWR-FM	HW RETURN FLOW	<_>	__ GPM	<__GPM>	AI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-T	OUTDOOR AIR TEMPERATURE	<_>	__ DEG F	<__DEG F>	AI	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-H	OUTDOOR AIR HUMIDITY	<_>	__RH	<__RH>	AI	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWS-BYP-V-P	HOT WATER BYPASS VALVE POSITION	<_>	~	OPEN/CLOSE	AI	N/A	~	V	N/A	Y	B-1 ISO VALVE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HWS-BYP-V-C	HOT WATER BYPASS VALVE COMMAND	<_>	~	OPEN/CLOSE	AO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

LEGEND

"<_>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"N/A" INDICATES NO VALID ENTRY AVAILABLE.

NOTES

*** PROVIDE ASSOCIATED POINT FOR B-4 (BO) AND HWP-4 (BO) AS PART OF BID OPTION.**

1. LISTED RANGES ARE INITIAL SETTINGS ONLY AND SHALL BE USER ADJUSTABLE. ACTUAL LIMITS AND SETTINGS MAY DIFFER DEPENDING ON ACTUAL OPERATING CONDITIONS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802M-806

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

POINT SCHEDULES

SHEET ID

M-806

ADVERTISEMENT - 100% DESIGN

AIR HANDLING UNIT (AHU-1 AND AHU-2)

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER
PROOFS & SAFETIES	SF-S	SUPPLY FAN STATUS	<_>	~	ON/OFF	NET-IN	N/A	~	V	N/A	Y	FAN PROOF ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-D-C	OUTSIDE AIR DAMPER COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-D-P	OUTSIDE AIR DAMPER POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	OUTSIDE AIR DAMPER ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA2-D-C	OUTSIDE AIR DAMPER 2 COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA2-D-P	OUTSIDE AIR DAMPER 2 POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	OUTSIDE AIR DAMPER ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	RA-D-C	RETURN AIR DAMPER COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	RA-D-P	RETURN AIR DAMPER POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	RETURN AIR DAMPER ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	RE-D-C	RELIEF AIR DAMPER COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	RE-D-P	RELIEF AIR DAMPER POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	RETURN AIR DAMPER ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SA-HSP	SUPPLY AIR HIGH STATIC PRESSURE SWITCH	<_>	2.5 IN-WC	<__IN-WC>	NET-IN	N/A	H	V	N/A	~	HIGH PRESS. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SA-P	SUPPLY AIR STATIC PRESSURE TRANSMITTER	<_>	1.0 IN-WC	<__IN-WC>	NET-IN	N/A	H	V	N/A	~	HIGH PRESS. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SA-SMK	SA DUCT SMOKE	<_>	~	ALM/NOR	NET-IN	N/A	~	V	N/A	Y	SA SMOKE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	RA-SMK	RA DUCT SMOKE	<_>	~	ALM/NOR	NET-IN	N/A	~	V	N/A	Y	RA SMOKE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	FRZ-STAT	FREEZE STAT	<_>	__DEG F	<__DEG F>	NET-IN	N/A	~	V	N/A	Y	FREEZE TEMP ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
SCHEDULING	SYS-OCC-SCHED	SYSTEM OCCUPANCY SCHEDULE	~	~	OCC/UNOCC	NET-IN	N/A	OC	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
START/ STOP	SYS-OCC-C	SYSTEM OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SYS-OCC	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCC/UNOCC	NET-OUT	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SF-SS	SUPPLY FAN START/STOP	<_>	~	ON/OFF	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	REF-SS	RELIEF AIR FAN START/STOP	<_>	~	ON/OFF	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
REF/SF SPEED CONTROL	REF-C	RELIEF AIR FAN SPEED COMMAND	<_>	~	0-100%	NET-OUT	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	REF-SPD	RELIEF AIR FAN SPEED FEEDBACK	<_>	~	0-100%	AI	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SF-C	SUPPLY FAN SPEED COMMAND	<_>	~	0-100%	NET-OUT	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SF-SPD	SUPPLY FAN SPEED FEEDBACK	<_>	~	0-100%	AI	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
DE-HUMIDIFICATION COTNROL	SA-T	SUPPLY AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	NET-IN	N/A	~	V	N/A	Y	SA TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SA-T-SP	SUPPLY AIR TEMPERATURE SETPOINT	~	__DEG F	+/- 3 DEG F	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	DX-ENA	DX COIL ENABLE/DISABLE	<_>	~	ENA/DIS	NET-OUT	N/A	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	DX-C	DX COIL COMMAND	<_>	~	0-100%	NET-OUT	N/A	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	COOLING CONTROL	PROPORTIONAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		INTEGRAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		BIAS	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MAX. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MIN. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	AHU-V-C	AHU HW CONTROL VALVE COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	AHU-V-P	AHU HW CONTROL VALVE POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	CONTROL VALVE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
SUPPLY AIR TEMPERATURE CONTROL	SA-RH	SUPPLY AIR RELATIVE HUMIDITY	<_>	__%	<__%>	NET-IN	N/A	~	V	N/A	Y	SA HUMIDITY ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	RA-RH	RETURN AIR RELATIVE HUMIDITY	<_>	__%	<__%>	NET-IN	N/A	~	V	N/A	Y	RA HUMIDITY ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	RA-RH-SP	RETURN AIR RELATIVE HUMIDITY SETPOINT	~	60 %	+/- 5 %	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	DEHUM-ENA	DEHUMIDIFICATION MODE ENABLE/DISABLE	~	~	ENA/DIS	NET-OUT	N/A	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	HGR-C	HOT GAS REHEAT COMMAND	<_>	~	0-100%	NET-OUT	N/A	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
OTHER POINTS	RA-T	RETURN AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	NET-IN	N/A	~	V	N/A	Y	RA TEMP. ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	MA-T	MIXED AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	NET-IN	N/A	~	V	N/A	Y	MA TEMP. ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	CLG-T	DX COIL LEAVING AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	NET-IN	N/A	~	V	N/A	Y	DX LEV TEMP. ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-T	OUTDOOR AIR TEMPERATURE	<_>	__ DEG F	<__DEG F>	NET-IN	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-H	OUTDOOR AIR HUMIDITY	<_>	__RH	<__RH>	NET-IN	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-F	OUTDOOR AIR FLOW	<_>	__CFM	<__CFM>	NET-IN	N/A	~	V	N/A	Y	LO/HI OA FLOW ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	MA-FLT	MIXED AIR FILTER PRESSURE	<_>	<_>	ALM/NOR	NET-IN	N/A	~	V	N/A	Y	MA FILTER ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SA-SMK	SA DUCT SMOKE DETECTOR	<_>	<_>	ALM/NOR	BI	N/A	~	V	N/A	Y	SMOKE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

LEGEND

"<_>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"N/A" INDICATES NO VALID ENTRY AVAILABLE.

NOTES

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US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-807

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
POINT SCHEDULES

SHEET ID
M-807

ADVERTISEMENT - 100% DESIGN

WLT BAY EXHAUST FANS (EF-1, EF-2, EF-4(BO), EF-5(BO))

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER
PROOFS & SAFETIES	EF-S	EXHAUST FAN STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	FAN PROOF ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
START/STOP	EF-SS	EXHAUST FAN START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EF-SPD	EXHAUST FAN SPEED FEEDBACK	<_>	__%	<__%>	BI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
ROOM CO/NO2 ALARM	ROOM-CO	ROOM CARBON MONOXIDE SENSOR	<_>	__PPM	<__PPM>	AI	N/A	~	V	N/A	Y	ROOM HIGH CO ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-CO-SP	ROOM CARBON MONOXIDE SETPOINT	~	15 PPM	<15 PPM>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-NO2	ROOM NITROGEN DIOXIDE SENSOR	<_>	__PPM	<__PPM>	AI	N/A	~	V	N/A	Y	ROOM HIGH NO2 ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-NO2-SP	ROOM NITROGEN DIOXIDE SETPOINT	~	3 PPM	<3 PPM>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

LEGEND

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NOTES

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MECHANICAL ROOM EXHAUST FAN (EF-3)

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER
PROOFS & SAFETIES	EF-S	EXHAUST FAN STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	FAN PROOF ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
START/STOP	EF-SS	EXHAUST FAN START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SYS-OCC-SCHED	SYSTEM OCCUPANCY SCHEDULE	~	~	OCC/UNOCC	NET-IN	N/A	OC	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
ROOM TEMPERATURE CONTROL	ROOM-TS	ROOM TEMPERATURE SENSOR	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-T-SP	ROOM TEMPERATURE SETPOINT	~	85 DEG F	<85 DEG F>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

LEGEND

"<_>" INDICATES ENTRY MADE BY BUILDING CONTRACTOR.
" ~ " INDICATES NO ENTRY REQUIRED.
"N/A" INDICATES NO VALID ENTRY AVAILABLE.

NOTES

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DESTRATIFICATION FAN (DF-01, -02, -03, -04, -05, -06 (BO))

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER
PROOFS & SAFETIES	OF-S	DESTRATIFICATION FAN STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	FAN PROOF ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
START/STOP	SYS-OCC-SCHED	SYSTEM OCCUPANCY SCHEDULE	~	~	OCC/UNOCC	NET-IN	N/A	OC	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OF-SS	DESTRATIFICATION FAN START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
ROOM TEMPERATURE CONTROL	OF-C	DESTRATIFICATION FAN SPEED COMMAND	<_>	~	0-100%	AO	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-TS	FLOOR LEVEL ROOM TEMPERATURE SENSOR	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-TS	CEILING LEVEL ROOM TEMPERATURE SENSOR	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-T-SP	DIFFERENTIAL ROOM TEMPERATURE SETPOINT	~	3 DEG F	<3 DEG F>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

LEGEND

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NOTES

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US Army Corps of Engineers
Omaha District ®

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DRAWN BY: A. RAMOS
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ISSUE DATE: 28 APRIL 2023
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
POINTS SCHEDULE

SHEET ID

M-808

ADVERTISEMENT - 100% DESIGN

ENERGY RECOVERY VENTILATOR - (ERV1 & ERV-2)

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER
PROOFS & SAFETIES	SF-S	SUPPLY FAN STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	FAN PROOF ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EF-S	EXHAUST FAN STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	FAN PROOF ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
START/ STOP	SF-SS	SUPPLY FAN START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EF-SS	EXHAUST FAN START/STOP	<_>	~	ON/OFF	BO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
SF/EF SPEED CONTROL	SF-C	SUPPLY FAN SPEED COMMAND	<_>	~	0-100%	AO	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EF-C	EXHAUST FAN SPEED COMMAND	<_>	~	0-100%	AO	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
OTHER POINTS	SA-T	SUPPLY AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	SA TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EA-T	EXHAUST AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	EA TEMP. ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ERV-LEV-T	ERV LEAVING AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ERW LEV TEMP. ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ERV-LEV-RH	ERV LEAVING AIR RELATIVE HUMIDITY	<_>	__RH	<__RH>	AI	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-T	OUTDOOR AIR TEMPERATURE	<_>	__ DEG F	<__DEG F>	AI	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-RH	OUTDOOR AIR RELATIVE HUMIDITY	<_>	__RH	<__RH>	AI	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-FLT	OUTDOOR AIR FILTER PRESSURE	<_>	<_>	ALM/NOR	BI	N/A	~	V	N/A	Y	OA FILTER ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EA-FLT	EXHAUST AIR FILTER PRESSURE	<_>	<_>	ALM/NOR	BI	N/A	~	V	N/A	Y	EA FILTER ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-D-C	OUTSIDE AIR DAMPER COMMAND	<_>	~	OPEN/CLOSE	NET-OUT	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-D-P	OUTSIDE AIR DAMPER POSITION	<_>	~	OPEN/CLOSE	NET-IN	N/A	~	V	N/A	Y	OUTSIDE AIR DAMPER ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

LEGEND

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VAV BOX (TYPICAL)

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER
PROOFS & SAFETIES	VAV-D-P	VAV BOX DAMPER POSITION	<_>	~	0-100%	AI	N/A	~	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
SCHEDULING	SYS-OCC-SCHED	SYSTEM OCCUPANCY SCHEDULE	~	~	OCC/UNOCC	NET-IN	N/A	OC	V	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SYS-OCC-C	SYSTEM OCCUPANCY COMMAND	~	~	OCC/UNOCC	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-OCC	ROOM OCCUPANCY/OVERRIDE (ACTUAL)	~	~	OCC/UNOCC	NET-OUT	N/A	~	VO	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	UNIT-S	UNIT MODE STATUS	~	~	HTG/CLG/OFF	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
ROOM TEMPERATURE AND CO2 CONTROL	ROOM-TS	ROOM TEMPERATURE SENSOR	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-T-SP	OCCUPIED ROOM TEMPERATURE SETPOINT	~	68-76 DEG F	<68-76 DEG F>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-T-SP-DB	OCCUPIED ROOM TEMPERATURE SETPOINT DEADBAND	~	+/- 2 DEG F	<+/- 2 DEG F>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-T-SP-UNOCC	UNOCCUPIED ROOM TEMPERATURE SETPOINT	~	62-82 DEG F	<62-82 DEG F>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-CO2	ROOM CO2 SENSOR	<_>	__PPM	<__PPM>	AI	N/A	~	V	N/A	Y	ROOM CO2 ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-CO2-SP	ROOM CO2 SETPOINT	~	__PPM	<__PPM>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	VAV-V-C	VAV CONTROL VALVE COMMAND	<_>	~	OPEN/CLOSE	AO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	VAV-V-P	VAV CONTROL VALVE POSITION	<_>	~	OPEN/CLOSE	AI	N/A	~	V	N/A	Y	CONTROL VALVE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	VAV-SA-F	VAV SUPPLY AIR FLOW	<_>	__CFM	<__CFM>	AI	N/A	~	V	N/A	Y	LO/HI AIR FLOW ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	VAV-SA-F-SP	VAV SUPPLY AIR FLOW SETPOINT	~	__CFM	<__CFM>	NET-IN	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	VAV-D-C	VAV BOX DAMPER COMMAND	<_>	~	0-100%	AO	N/A	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	VAV BOX DAMPER CONTROL	PROPORTIONAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		INTEGRAL CONSTANT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		BIAS	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MAX. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
		MIN. OUTPUT	~	<_>	<__>	NET-IN	N/A	C	~	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
OTHER POINTS	VAV-DA-T	VAV BOX DISCHARGE AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	VAV DA TEMP. ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

LEGEND

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US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802M-809
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
POINT SCHEDULES

SHEET ID
M-809

ADVERTISEMENT - 100% DESIGN

MAKE-UP AIR UNIT: MAU-1, MAU-2, MAU-3 (BO), MAU-4 (BO)

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER	CONFIGURATION INFORMATION
PROOFS & SAFETIES	SF-SS	SUPPLY FAN START/STOP	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	FRZ-STAT	FREEZE STAT	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	FREEZE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SF-S	SUPPLY FAN STATUS	<_>	~	ON/OFF	BI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
SUPPLY AIR TEMPERATURE CONTROL	SA-T	SUPPLY AIR TEMPERATURE	<_>	__DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	SA TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SA-T-SP	SUPPLY AIR TEMPERATURE SETPOINT	~	__DEG F	+/- 3 DEG F	AI	N/A	OC	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	MAU-V-C	MAU HW CONTROL VALVE COMMAND	<_>	~	OPEN/CLOSE	AO	Y	~	VO	N/A	~	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	MAU-V-P	MAU HW CONTROL VALVE POSITION	<_>	~	OPEN/CLOSE	AI	N/A	~	V	N/A	Y	CONTROL VALVE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
OTHER POINTS	SF-SPD	SUPPLY FAN SPEED FEEDBACK	<_>	__%	<__%>	AI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-F	OUTDOOR AIR FLOW	<_>	__CFM	<__CFM>	AI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OA-FLT	OUTDOOR AIR FILTER PRESSURE	<_>	<_>	ALM/NOR	BI	N/A	~	V	N/A	Y	OA FILTER ALARM	INFO	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SF-C	SUPPLY FAN SPEED COMMAND	<_>	__%	<__%>	BI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	SA-SMK	SA DUCT SMOKE DETECTOR	<_>	<_>	ALM/NOR	BI	N/A	~	V	N/A	Y	SMOKE ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

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MISCELLANEOUS POINTS

FUNCTION	POINT NAME	DESCRIPTION	DDC H/W ID	SETTINGS W/ UNITS	RANGE W/ UNITS	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	LDP VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONNECTION	ALARMING: ALARM PRIORITY	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER/ PROPERT ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECTY TYPE AND INSTANCE NUMBER/ COMMANDABLE	TREND OBJECT LOCATION, TYPE AND INSTANCE NUMBER	ALARM INFORMATION: ALARM TYPE	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER
OTHER POINTS	ROOM-TS	COMM ROOM 1031 TEMPERATURE SENSOR	<_>	80 DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-TS	SECURE COMM ROOM 1041 TEMPERATURE SENSOR	<_>	80 DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-TS	ELECTRIC ROOM 1015 TEMPERATURE SENSOR	<_>	80 DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-TS	ELECTRIC ROOM 1034 TEMPERATURE SENSOR	<_>	80 DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	ROOM-TS	ELECTRIC ROOM 1048 TEMPERATURE SENSOR	<_>	80 DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	ROOM TEMP. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	DHW-WH	DOMESTIC WATER HEATER DISCHARGE TEMPERATURE	<_>	145 DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	STORAGE WATER TEMP.	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	DHW-MV	MASTER MIXING VALVE DISCHARGE TEMPERATURE	<_>	145 DEG F	<__DEG F>	AI	N/A	~	V	N/A	Y	MIXING TEMPERATURE	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EM	ELECTRIC METER	<_>	~	<__KWH>	PULSE	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	WM	WATER METER	<_>	~	<__GPM>	PULSE	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	GM	GAS METER	<_>	~	<__CCF>	PULSE	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	EMER-SW	EMERGENCY AIR DISTRIBUTION SHUT DOWN	<_>	<_>	ALM/NOR	BI	N/A	~	VO	N/A	Y	EMER. AIR DIST. ALARM	CRIT	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>
	OH-DOOR	OVERHEAD DOOR OPEN/CLOSED	<_>	~	OPEN/CLOSED	BI	N/A	~	V	N/A	Y	~	~	<_>	<_>	<_>	<_>	<_>	<_>	<_>	<_>

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TRAINING FACILITY
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POINT SCHEDULES

SHEET ID

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ADVERTISEMENT - 100% DESIGN

SEQUENCE OF OPERATION:

HEATING HOT WATER SYSTEM:

GENERAL:
THE HEATING WATER SYSTEM SHALL SERVE HOT WATER TO THE HYDRONIC HEATING COILS FROM AHUS, MAUS, UNIT HEATERS, AND VAV TERMINAL UNITS. FOR THE BASE BID, THE SYSTEM CONSISTS OF THREE CONDENSING BOILERS OPERATING IN A LEAD-LAG CONFIGURATION (B-1, B-2 & B-3). THE SYSTEM EMPLOYS A VARIABLE PRIMARY PUMPING SCHEME.

SHARED POINTS
1. OUTSIDE AIR TEMPERATURE FROM THE WEATHER STATION.
2. HOT WATER TEMPERATURE CONTROL VALVE POSITIONS

RUN CONDITIONS:
THE HEATING WATER SYSTEM SHALL BE ENABLED TO RUN WHEN ANY OF THE FOLLOWING CONDITIONS ARE MET:
1. VALVE FOR AHU OR MAU CALLS FOR HEATING AND ITS RESPECTIVE CONTROL VALVE IS GREATER THAN 20% (ADJUSTABLE) OPEN FOR GREATER THAN 3 MINUTES (ADJUSTABLE).
2. ANY 3 (ADJUSTABLE) VALVES FOR UNIT HEATERS OR TERMINAL UNITS, CALL FOR HEATING AND ITS RESPECTIVE CONTROL VALVE IS GREATER THAN 20% (ADJUSTABLE) OPEN FOR GREATER THAN 3 MINUTES (ADJUSTABLE).
3. ACTIVATED BY DDC SYSTEM SCHEDULING.
4. INITIATION OF BOILER START SEQUENCE AT THE BAS WORKSTATION OR THE NETWORK CONTROLLER OR THE LOCAL BOILER CONTROL PANEL.

THE HEATING WATER SYSTEM SHALL BE DISABLED BY THE DDC SYSTEM WHEN ONE OF THE FOLLOWING CONDITIONS ARE MET:
1. NO HOT WATER CONTROLLERS ARE CALLING FOR HEATING.
2. DEACTIVATED BY DDC SYSTEM SCHEDULING.
3. MANUALLY COMMANDED BY THE OPERATOR.
4. UPON ACTIVATION OF THE BOILER/WATER HEATER EMERGENCY SHUTDOWN SWITCH. THE EMERGENCY SHUTDOWN SWITCH SHALL COMMAND THE NATURAL GAS SUPPLY CONTROL VALVE TO CLOSE.

TO PREVENT SHORT CYCLING, THE BUILDING HEATING WATER SYSTEM SHALL RUN FOR AND BE OFF FOR A MINIMUM TIME OF 30 MINUTES (ADJUSTABLE) UNLESS SHUT DOWN ON SAFETIES. THE BUILDING HEATING WATER SYSTEM SHALL BE AUTOMATICALLY ACTIVATED FOR FREEZE PROTECTION WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN 35°F (ADJUSTABLE).

BOILER OPERATION:
WHEN THE HEATING WATER SYSTEM IS ENABLED TO OPERATE, THE LEAD BOILER SHALL BE COMMANDED TO START AND SHALL ACTIVATE USING ITS OWN INTERNAL STARTUP CONTROL SEQUENCE. UPON ACTIVATION OF THE BOILER, THE ASSOCIATED CONTROL VALVE (B#-V-C) SHALL BE COMMANDED OPEN. AS PART OF THE STARTUP SEQUENCE FOR ANY BOILER, FLOW THROUGH THE BOILER MUST BE VERIFIED (DETECTED AT THE FLOW SWITCH AT THE BOILER, B#-HWR-FS) TO BE ABOVE THE MINIMUM BOILER FLOW REQUIREMENT (AS PROVIDED BY THE BOILER MANUFACTURER).

THE BOILERS SHALL RUN SUBJECT TO THEIR OWN INTERNAL SAFETIES AND CONTROLS. THE BOILERS SHALL VARY THEIR LEVEL OF FIRE AS REQUIRED TO MAINTAIN THE LEAVING WATER TEMPERATURE AS INDICATED IN THE BOILER SUPPLY WATER TEMPERATURE (RESETABLE AS NOTED BELOW).

THE BOILERS SHALL BE CONTROLLED IN A LEAD-LAG OPERATION. ONE BOILER SHALL BE DESIGNATED AS THE LEAD UNIT. THE BAS SHALL DESIGNATE WHICH LAG BOILER SHALL BE ENABLED FIRST. THE BAS SHALL HAVE THE CAPABILITY TO DESIGNATE ANY BOILER AS LEAD OR LAG AS DESIRED AND TO ROTATE THE SEQUENCE AUTOMATICALLY BASED ON THE FOLLOWING:
1. MANUALLY THROUGH A SOFTWARE SWITCH.
2. BOILER RUNTIME.
3. SCHEDULING, SUCH AS ROTATING THE SEQUENCE ONCE PER DAY, WEEK, MONTH, SEASON, ETC.

THE MANUFACTURER SUPPLIED BOILER SEQUENCER SHALL ENABLE, MODULATE, AND DISABLE THE BOILERS TO OPERATE THEM BY THE MOST EFFICIENT MEANS POSSIBLE BY MONITORING BOILER FIRE RATE, SYSTEM FLOW RATE, AND WATER TEMPERATURES.

THE BAS SHALL ENABLE/DISABLE THE BOILERS AND MONITOR AVAILABLE BOILER CONTROL POINTS THROUGH A BAS INTERFACE CARD FURNISHED BY THE BOILER MANUFACTURER.

WHEN THE HEATING WATER SYSTEM IS DISABLED, BOILERS SHALL BE COMMANDED TO STOP IN SEQUENCE AND SHALL DEACTIVATE USING THEIR OWN INTERNAL SHUTDOWN CONTROL SEQUENCE. IF ALL BOILERS ARE RUNNING WHEN THE HEATING WATER SYSTEM IS DISABLED, THE LAG BOILERS SHALL BE SHUTDOWN IN ORDER FIRST, THEN THE LEAD BOILER SHALL BE SHUTDOWN.

THE BOILER MANUFACTURER REPRESENTATIVE SHALL PROVIDE INFORMATION TO THE BAS PROVIDER TO ASSURE THAT THE SEQUENCE OF OPERATION IS COMPLETELY DEFINED SO THAT ACTIVATION OR DEACTIVATION OF A LAG BOILER DOES NOT SUFFICIENTLY IMBALANCE FLOW THROUGH THE LEAD BOILER SO AS TO CAUSE THE LEAD BOILER TO TRIP OFFLINE. IN ADDITION TO THE SEQUENCE OF OPERATION ABOVE, EMPLOY ADDITIONAL STRATEGIES SUCH AS:
1. REDUCE LEAD BOILER LOAD SLOWLY BEFORE ACTIVATING THE LAG BOILER.
2. ANY OTHER STRATEGIES ACCEPTABLE TO THE BOILER MANUFACTURER. THE INTENT IS FOR LAG BOILERS ACTIVATION AND DEACTIVATION TO BE DONE IN A STABLE MANNER.

BOILER SAFETIES:
THE FOLLOWING SAFETIES SHALL BE MONITORED THROUGH THE BAS:
1. BOILER ALARM.
2. LOW WATER LEVEL.

ALARMS SHALL BE PROVIDED TO THE BAS OPERATOR INTERFACE AS FOLLOWS:
1. BOILER ALARM.
2. LOW WATER LEVEL ALARM.
3. NO FLOW SIGNAL.
4. HIGH DIFFERENTIAL PRESSURE ACROSS BOILER.
5. ACTIVATION OF THE BOILER/WATER HEATER EMERGENCY SHUTDOWN SWITCH.

BUILDING HEATING WATER TEMPERATURE CONTROL:
THE BUILDING HEATING WATER TEMPERATURE SETPOINT SHALL BE MAINTAINED BY THE BOILER'S OWN INTERNAL CONTROLS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. BUILDING HIGH HEATING WATER SUPPLY TEMP: IF GREATER THAN 5°F (ADJUSTABLE) ABOVE SETPOINT.
2. BUILDING LOW HEATING WATER SUPPLY TEMP: IF GREATER THAN 10°F (ADJUSTABLE) BELOW SETPOINT.

BOILER SUPPLY WATER TEMPERATURE (HWS-T) RESET:
BOILER LEAVING WATER TEMPERATURE SHALL BE RESET BASED ON OUTDOOR TEMPERATURE. LEAVING WATER TEMPERATURE SETPOINT SHALL BE LINEARLY DERIVED BETWEEN THE FOLLOWING LIMITS:
1. AT AN OUTSIDE TEMPERATURE OF 35ºF OR BELOW (ADJUSTABLE), LEAVING WATER TEMPERATURE SHALL BE 140ºF (ADJUSTABLE).
2. AT AN OUTSIDE TEMPERATURE OF 55ºF OR ABOVE (ADJUSTABLE), LEAVING WATER TEMPERATURE SHALL BE 110ºF (ADJUSTABLE).

HOT WATER PUMP OPERATION:
THE HOT WATER PUMPS SHALL OPERATE IN A LEAD/LAG FASHION. ONE PUMP SHALL BE DESIGNATED AS THE LEAD UNIT. THE BAS SHALL DESIGNATE WHICH LAG PUMP SHALL BE ENABLED FIRST. THE BAS SHALL HAVE THE CAPABILITY TO DESIGNATE ANY PUMP AS LEAD OR LAG AS DESIRED AND TO ROTATE THE SEQUENCE AUTOMATICALLY BASED ON THE FOLLOWINGS:
1. MANUALLY THROUGH A SOFTWARE SWITCH.
2. PUMP RUNTIME.
3. SCHEDULING, SUCH AS ROTATING THE SEQUENCE ONCE PER DAY, WEEK, MONTH, SEASON, ETC.

WHEN THE HYDRONIC HEATING SYSTEM IS ENABLED THE LEAD PUMP SHALL BE STARTED IMMEDIATELY.
WHEN THE HEATING WATER SYSTEM IS DEACTIVATED, THE PUMPS SHALL BE STOPPED AFTER A SUITABLE TIME DELAY (INITIAL SETTING: 5 MINUTES, ADJUSTABLE).
UPON FAILURE OF THE LEAD PUMP THE LAG PUMP SHALL BE STARTED AND THE LEAD PUMP SHALL BE COMMANDED OFF. PUMP FAILURE SHALL BE DETERMINED BY THAT DESCRIBED IN THE PUMP FAILURE ALARM SECTION.

WHEN A PUMP IS COMMANDED TO START IT SHALL BE ENERGIZED AT MINIMUM VFD SPEED THEN RAMP AS REQUIRED BY THE DIFFERENTIAL PRESSURE CONTROL SYSTEM. WHEN A PUMP IS COMMANDED TO STOP IT SHALL FIRST CONTINUE TO RUN FOR A SUITABLE TIME DELAY PERIOD (INITIAL SETTING: 5 MINUTES, ADJUSTABLE), THEN SHALL RAMP TO MINIMUM VFD SPEED THEN BE DEENERGIZED.

THE CONTROLLER SHALL MONITOR THE SYSTEM DIFFERENTIAL PRESSURE SENSORS (HW-SYS-DP) AND VARY THE PUMP'S VFD SPEED TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINTS AT EACH SENSOR (INITIAL SETPOINTS OF 10 FT W.C. (ADJUSTABLE), FINAL SETPOINTS TO BE DETERMINED DURING TEST AND BALANCE). ON A DROP IN SYSTEM DIFFERENTIAL PRESSURE, THE PUMP SPEED SHALL BE APPROPRIATELY INCREASED. ON A RISE IN SYSTEM DIFFERENTIAL PRESSURE, THE PUMP SPEED SHALL BE APPROPRIATELY DECREASED. THE PUMP VFD WILL BE CONTROLLED BETWEEN MINIMUM VFD SPEED SETTING PLUS 2 HZ AND MAXIMUM SPEED SETTING.

WHEN THE LEAD PUMP'S VFD IS AT 95% MAXIMUM SPEED, THE LAG PUMP SHALL BE ENABLED AND RAMPED TO MINIMUM SPEED. THE LEAD PUMP & LAG PUMPS VFD'S SHALL BE RAMPED TO MEET AT THE SAME OPERATING SPEED THEN OPERATE IN UNISON TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE. IF THE PUMPS ARE OPERATING AT MINIMUM SPEED FOR 5 MINUTES (ADJUSTABLE), THE LAG PUMP(S) SHALL BE DISABLED AND ITS VFD SLOWLY RAMPED DOWN. WHILE THE LAG PUMP RUNS THROUGH ITS SHUT DOWN, THE OTHER OPERATING PUMP VFD SHALL MODULATE TO MAINTAIN SYSTEM DIFFERENTIAL PRESSURE.

FAILURE ALARMS: PUMPS SHALL BE COMMANDED OFF. AN ALARM SHALL BE PROVIDED TO THE BAS OPERATOR INTERFACE AS FOLLOWS:
1. SYSTEM FAILURE: IF ALL PUMPS FAIL TO START, THE BAS SHALL REMOVE THE HYDRONIC HEATING SYSTEM START COMMAND.
2. FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
3. RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
4. VFD FAULT.

NON-FAILURE ALARMS: PUMPS SHALL NOT BE COMMANDED OFF. AN ALARM SHALL BE PROVIDED TO THE BAS OPERATOR INTERFACE AS FOLLOWS:
1. RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.

DIFFERENTIAL PRESSURE RESET:
THE DIFFERENTIAL PRESSURE SETPOINTS SHALL BE RESET DOWN TO MAINTAIN A MAXIMUM OF 1 (ADJUSTABLE) HOT WATER TEMPERATURE CONTROL VALVE FROM ANY MECHANICAL SYSTEM/UNIT AT A MAXIMUM OF 90% (ADJUSTABLE) OPEN. AS MORE CONTROL VALVES OPEN THE DIFFERENTIAL PRESSURE SETPOINTS SHALL RESET UP TO THE PRESSURE SETPOINTS ESTABLISHED DURING BALANCING.

MINIMUM FLOW BYPASS:
THE MINIMUM FLOW BYPASS CONTROL VALVE (HW-BP-C) SHALL MODULATE OPEN UPON A DROP IN FLOW THROUGH THE FLOW SENSOR (HWR-F) BELOW THE SUM OF MINIMUM FLOWS OF OPERATING BOILERS. THE MINIMUM FLOW BYPASS CONTROL VALVE SHALL REMAIN CLOSED WHEN THE FLOW IS ABOVE THE SUM OF OPERATION BOILERS' MINIMUM FLOW.

THE DESIGNED MINIMUM FLOW FOR EACH BOILER IS SCHEDULED (FINAL VALUE TO BE VERIFIED WITH BOILER MANUFACTURER).

BOILER/WATER HEATER EMERGENCY SHUTDOWN SWITCH:
UPON ACTIVATION OF BOILER/WATER HEATER EMERGENCY SHUTDOWN SWITCH THE BOILER/WATER HEATER SHALL SHUT DOWN, AND ASSOCIATED NATURAL GAS SUPPLY SHALL AUTOMATICALLY SHUT OFF AND AN ALARM SIGNAL SHALL BE SENT TO THE BAS.

SEQUENCE OF OPERATION - AIR HANDLING UNITS:

GENERAL:
COOLING CONTROL IS PROVIDED BY THE AHU. THE UNITS ARE VARIABLE AIR VOLUME TO MEET DESIGN AIRFLOW REQUIREMENTS.

SHARED POINTS:
1. OA DB TEMPERATURE FROM WEATHER STATION
2. OA ENTHALPY FROM THE WEATHER STATION
3. OUTSIDE AIR LOUVER DAMPER.

SYSTEM OPERATION:
THE BAS SHALL ALLOW THE AHU TO BE PROGRAMMED FOR START AND STOP BASED ON A USER DEFINABLE SCHEDULE UNIQUE TO EACH DAY OF THE WEEK (SUNDAY THROUGH SATURDAY PLUS HOLIDAYS). THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE FAN SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 30 MINUTES (ADJUSTABLE). UPON RECEIVING A START COMMAND, THE RETURN AIR DAMPER SHALL OPEN AND THE STATUS SHALL BE CONFIRMED. IF DAMPER STATUS IS NOT CONFIRMED OPEN AFTER 1 MINUTE (ADJUSTABLE) AN ALARM SHALL BE GENERATED AT THE BAS AND THE AHU SHALL BE DISABLED.

SYSTEM START:
THE UNIT SHALL EMPLOY AN OPTIMAL START STRATEGY AND SHALL START PRIOR TO SCHEDULED OCCUPANCY BASED ON THE TIME NECESSARY FOR THE ZONES TO REACH THEIR OCCUPIED SETPOINT. THE START TIME SHALL AUTOMATICALLY ADJUST BASED ON CHANGES IN OUTSIDE AIR TEMPERATURE AND ZONE TEMPERATURES. WHEN THE BAS CALLS FOR THE UNIT TO START, THE FOLLOWING SEQUENCES SHALL BE ACTIVATED:
1. SUPPLY FAN COMMANDED ON.
2. OUTSIDE AIR LOUVER DAMPER OPEN
3. OUTSIDE AIR ECONOMIZER DAMPER CLOSED.
4. RETURN AIR DAMPER (RA-D) OPEN.
5. DX COOLING COIL ENABLED.

SUPPLY FAN OPERATION:
WHEN THE AHU IS ENABLED:
THE OUTSIDE AIR DAMPER SHALL BE OPENED, THE RETURN AIR DAMPER SHALL BE OPENED, AND THE SUPPLY FAN SHALL BE ENERGIZED AT THE MINIMUM VFD SPEED. THE BAS SHALL MEASURE SUPPLY DUCT STATIC PRESSURE AT A DUCT MOUNTED STATIC PRESSURE SENSOR (SA-P) AND MODULATE THE SUPPLY FAN VFD SPEED TO MINIMIZE THE DUCT STATIC PRESSURE SETPOINT NECESSARY TO MAINTAIN ONE VAV TERMINAL UNIT INLET CONTROL DAMPER AT THE FULL OPEN (MAXIMUM COOLING DEMAND) WITH A TIME-OUT FEATURE (CRITICAL ZONE RESET STRATEGY). THE BAS SHALL ALSO HAVE THE CAPABILITY OF MANUAL STATIC PRESSURE SETPOINT ADJUSTMENT AS A USER OVERRIDE FUNCTION.

WHEN THE AHU IS DISABLED:
THE SUPPLY FAN SHALL SHALL RAMP DOWN TO ITS MINIMUM VFD SPEED AND THEN DEENERGIZE. THE OUTSIDE AIR DAMPER SHALL BE CLOSED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. IF THE RETURN AIR DAMPER STATUS IS NOT CONFIRMED AFTER 1 MINUTE (ADJUSTABLE).
2. HIGH SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJUSTABLE) GREATER THAN THE SETPOINT.
3. LOW SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJUSTABLE) LESS THAN THE SETPOINT.
4. SUPPLY FAN FAILURE: COMMANDED ON, BUT STATUS IS OFF.
5. SUPPLY FAN IN HAND: COMMANDED OFF, BUT STATUS IS ON.
6. VFD FAULT.

ECONOMIZER OPERATION:
THE AHU ECONOMIZER SHALL BE ENABLED WHENEVER ALL OF THE FOLLOWINGS ARE MET:
1. OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
2. THE AHU STATUS IS ON.
3. A MINIMUM OUTSIDE AIR REQUIREMENT OF THE TOTAL AIRFLOW IS DEMANDED UP TO A MAXIMUM OF 100% OF THE AIR IS OUTSIDE AIR.
4. ASSOCIATED ERV MOTORIZED DAMPER IS CLOSED AND ASSOCIATED ERV IS NOT ENERGIZED.

THE AHU ECONOMIZER SHALL BE DISABLED WHENEVER ONE OF THE FOLLOWINGS IS MET:
1. OUTSIDE AIR ENTHALPY IS GREATER THAN THE RETURN AIR ENTHALPY.
2. THE MIXED AIR TEMPERATURE (MA-T) IS LESS THAN 50°F (ADJUSTABLE) AND THE ECONOMIZER OUTSIDE AIR DAMPER (ECO-D) IS CLOSED FOR 30 MINUTES (ADJUSTABLE).
3. LOSS OF SUPPLY FAN STATUS.

WHEN CONDITIONS ARE MET TO DISABLE THE ECONOMIZER, THE ECONOMIZER MOTORIZED DAMPER SHALL CLOSE AND THE ASSOCIATED ERV MOTORIZED DAMPER SHALL OPEN AND INITIATE THE ERV SEQUENCE.

WHEN THE ECONOMIZER IS ENABLED, THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE (T-03) AND MODULATE THE OUTSIDE AIR ECONOMIZER DAMPER, AND THE RETURN AIR DAMPER (OUTSIDE AIR DAMPERS SHALL BE FULLY OPEN BEFORE THE RETURN AIR DAMPER IS CLOSED) TO MAINTAIN THE UNIT SUPPLY AIR TEMPERATURE (SA-T) AT 55°F (ADJUSTABLE). WHEN THE OUTSIDE AIR AND RETURN AIR DAMPER ARE NOT ABLE TO MAINTAIN THE SUPPLY AIR TEMPERATURE, THE DX COOLING COIL IS TO MAINTAIN THE SUPPLY AIR TEMPERATURE AS A SECOND STAGE OF COOLING. THE OUTSIDE AIR DAMPER SHALL BE OPEN.

WHEN ALL VAV BOXES ARE AT THE MINIMUM DAMPER POSITION, THE UNIT SUPPLY AIR TEMPERATURE SETPOINT (SA-T) SHALL BE RESET BETWEEN 55°F AND 65°F TO MINIMIZE VAV HEATING, WHILE MAINTAINING ALL BOXES AT MINIMUM FLOW.

DX COOLING COIL OPERATION:
THE BAS SHALL ENABLE THE DX COOLING COIL WHENEVER THE MIXED AIR TEMPERATURE (MA-T) RISES ABOVE 55ºF (ADJUSTABLE). THE DX COOLING COIL SHALL OPERATE UNDER MANUFACTURER SUPPLIED SAFETIES AND CONTROLS TO MAINTAIN THE UNIT SUPPLY AIR TEMPERATURE (SA-T) AT 55ºF (ADJUSTABLE) (SENSIBLE COOLING CONTROL).

AN ALARM SHALL BE PROVIDED FOR HIGH SUPPLY AIR TEMPERATURE IF THE UNIT SUPPLY AIR TEMPERATURE IS 5ºF (ADJUSTABLE) GREATER THAN SUPPLY AIR TEMPERATURE SETPOINT.

FREEZE PROTECTION: IF THE MIXED AIR DROPS BELOW 35°F (ADJUSTABLE), OR THE FREEZE STAT IS ON, THE DX COOLING COIL WILL BE DISABLED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. HIGH SUPPLY AIR TEMPERATURE: IF THE SUPPLY AIR IS 5°F (ADJUSTABLE) GREATER THAN THE COIL DISCHARGE SETPOINT.
2. COOLING COIL FREEZE STAT: IF THE FREEZE STAT HAS SENSED FREEZING CONDITIONS.

SUPPLY AIR TEMPERATURE SET POINT RESET CONTROL: THE BAS MUST MONITOR THE VAV BOX CONTROLLERS AND SEND A SUPPLY AIR TEMPERATURE SET POINT RESET SIGNAL TO THE UNIT CONTROLLER TO RESET THE SUPPLY AIR TEMPERATURE BASED ON THE VAV BOX WITH THE HIGHEST DEMAND FOR COOLING. THE SUPPLY AIR TEMPERATURE SET POINT MUST BE RESET BETWEEN 53 °F AND 60°F, TO THE HIGHEST POSSIBLE VALUE WHILE MAINTAINING ALL VAV ZONE TEMPERATURES AT THE REQUIRED SET POINT.

HOT WATER HEATING COIL OPERATION:
HEATING MODE CONTROL SHALL BE ENABLED WHENEVER:
1. MIXED OUTSIDE AIR TEMPERATURE (MA-T) IS BELOW 55°F (ADJUSTABLE) MINUS 2°F (ADJUSTABLE);
2. SUPPLY FAN STATUS IS ON.

THE BAS SHALL MODULATE THE HOT WATER CONTROL VALVE (AHU-V-C) TO MAINTAIN THE UNIT SUPPLY AIR TEMPERATURE SETPOINT (SA-T) AT 55°F (ADJUSTABLE).

THE BAS SHALL MODULATE THE HOT WATER CONTROL VALVE CLOSED WHEN OUTSIDE AIR TEMPERATURE (OA-T) IS ABOVE 55°F (ADJUSTABLE).

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. LOW SUPPLY AIR TEMPERATURE: IF THE SUPPLY AIR IS 5°F (ADJUSTABLE) LOWER THAN THE COIL DISCHARGE SETPOINT.

FREEZE PROTECTION: IF THE MIXED AIR DROPS BELOW 38°F (ADJUSTABLE), OR THE FREEZE STAT IS ON, THE HEATING WATER COIL TEMPERATURE CONTROL VALVE SHALL OPEN FULLY (ADJUSTABLE)

FREEZE PROTECTION:
THE BAS SHALL MONITOR THE MIXED AIR TEMP (MA-T) TO ENSURE COILS DO NOT FREEZE. A HARD-WIRED FREEZESTAT LOCATED AFTER THE HEATING COIL WILL SIGNAL AN AUTOMATIC SHUTDOWN OF THE UNIT AND GENERATE ALARM AT THE BAS IF THE MIXED AIR TEMPERATURE IS LESS THAN 35°F (ADJUSTABLE).

OUTSIDE AIR FLOW:
THE BAS SHALL MONITOR THE OUTSIDE AIR VOLUME THROUGH THE AIR FLOW MEASURING STATION (OA-F) TO ENSURE ADEQUATE VENTILATION SUPPLY AIR FLOW. ALARMS SHALL BE PROVIDED PER THE FOLLOWINGS:
1. HIGH OUTSIDE AIR FLOW: OUTSIDE AIR VOLUME IS 15% (ADJUSTABLE) GREATER THAN THE MAXIMUM DESIGN AIR FLOW SETPOINT.
2. LOW OUTSIDE AIR FLOW: OUTSIDE AIR VOLUME IS 15% (ADJUSTABLE) LESS THAN THE MINIMUM DESIGN AIR FLOW SETPOINT.

FILTER DIFFERENTIAL PRESSURE MONITOR:
THE BAS SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER BANK (MA-FLT). ALARM SHALL BE PROVIDED WHEN FILTER DIFFERENTIAL PRESSURE EXCEEDS SETPOINT (ADJUSTABLE).

UNIT FAULT AND SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE ALARM AT THE BAS IF ONE OF THE FOLLOWING CONDITIONS OCCURS:
1. SUPPLY AIR SMOKE DETECTION: SA DUCT DETECTOR SHALL BE HARD WIRED TO SHUTDOWN THE UNIT. SA SMOKE ALARM UPON DETECTION OF SMOKE IN THE SUPPLY AIR DISCHARGE. THE SA SMOKE DETECTOR SHALL ALSO ADDRESS THE FIRE ALARM CONTROL PANEL, RE: FIRE PROTECTION.
2. RETURN AIR SMOKE DETECTION: RA DUCT DETECTOR SHALL BE HARD WIRED TO SHUTDOWN THE UNIT. RA SMOKE ALARM UPON DETECTION OF SMOKE IN THE RETURN AIR. THE RA SMOKE DETECTOR SHALL ALSO ADDRESS THE FIRE ALARM CONTROL PANEL, RE: FIRE PROTECTION.
3. SUPPLY FAN FAILURE: COMMANDED ON, BUT STATUS IS OFF.
4. SUPPLY FAN IN HAND: COMMANDED OFF, BUT STATUS IS ON.
5. HIGH STATIC: THE SUPPLY FAN DIFFERENTIAL PRESSURE SWITCH (SA-P) SHALL BE HARDWIRED TO SHUT DOWN THE UNIT WHEN THE FAN STATIC PRESSURE REACHES THE HIGH LIMIT SETPOINT (ADJUSTABLE).
6. AT/FP EMERGENCY SHUTDOWN: AN EMERGENCY SHUTDOWN SIGNAL FROM A PUSH BUTTON SWITCH WHERE INDICATED ON PLANS.
7. COMMANDED OFF BY BAS.

UNIT SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWINGS:
1. SUPPLY FAN OFF.
2. DX COOLING COIL DE-ENERGIZED.
3. OUTSIDE AIR DAMPER CLOSED.
4. RETURN AIR DAMPER OPEN.

ERV-# SEQUENCE OF OPERATIONS:

1. OUTSIDE AIR/ EXHAUST FAN HAND-OFF-AUTO OPERATION: HAND-OFF-AUTO OPERATION SWITCH ON EACH MOTOR STARTER SHALL CONTROL THE FAN.

IN THE OFF MODE, THE FAN SHALL BE STOPPED AND THE ASSOCIATED OUTDOOR AND EXHAUST AIR DAMPERS SHALL BE CLOSED.

IN THE HAND MODE THE ASSOCIATED OUTDOOR AND EXHAUST AIR DAMPERS SHALL OPEN, AND THE ASSOCIATED DAMPER POSITION SWITCHES SHALL START THE RESPECTIVE FAN WHEN THE DAMPERS ARE FULLY OPEN.

IN THE AUTO POSITION THE BAS WILL START/STOP THE UNIT THROUGH THE UNIT CONTROLLER AS DESCRIBED BELOW. PROVIDE AN ADJUSTABLE DELAY-ON-MAKE RELAY, WIRED IN BOTH THE HAND AND AUTO MODES TO STAGGER THE RESTART OF THE UNIT, AFTER A POWER FAILURE, TO PREVENT CREATING A SPIKE IN THE FACILITY ELECTRICAL DEMAND. SAFETIES SHALL BE HARD WIRED TO STOP THE SUPPLY FAN.

2. AUTOMATIC MODE START/STOP CONTROL:

THE BAS SHALL START AND STOP THE UNIT. TO START THE UNIT, THE BAS SHALL SEND A START SIGNAL TO THE OUTSIDE AIR FAN MOTOR STARTER AND THE EXHAUST FAN MOTOR STARTER, WHICH WILL OPEN THE OUTDOOR AND EXHAUST AIR DAMPERS. WHEN THE DAMPERS ARE FULLY OPEN, AS SENSED BY THE DAMPER POSITION SWITCHES, THE RESPECTIVE OUTSIDE AIR AND EXHAUST FANS SHALL START. IF THE FAN DOES NOT START AFTER 60 SECOND (ADJUSTABLE) TIME DELAY, A FAILURE ALARM SHALL BE ISSUED AND THE START COMMAND SHALL BE CANCELED. TO STOP A UNIT, THE BAS SHALL SEND A STOP SIGNAL TO EACH MOTOR STARTER, WHICH WILL CLOSE THE RESPECTIVE ISOLATION DAMPERS AND DE-ENERGIZE THE RESPECTIVE SUPPLY AND EXHAUST FANS. THE UNIT SHALL BE SOFTWARE INTERLOCKED WITH AHU-1 AND THE UNIT SHALL BE STARTED WHEN AHU-1 IS IN THE OCCUPIED MODE. THE UNIT SHALL BE DISABLED WHEN AHU-1 IS STARTED IN THE UNOCCUPIED MODE.

3. DIRTY FILTER ALARM: DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE PRESSURE DROP AT THE FILTERS. WHEN THE PRESSURE EXCEEDS AND ADJUSTABLE LIMIT, AN ALARM SIGNAL WILL BE SENT TO THE UNIT CONTROLLER AND THE BAS. A PRESSURE DIFFERENCE INDICATOR LOCATED AT THE FILTERS SHALL INDICATE THE DIFFERENTIAL PRESSURE ACROSS THE FILTERS.

4. FAN STATUS: CURRENT SWITCHES SHALL BE USED TO MONITOR THE STATUS OF THE UNIT OUTISDE AIR AND EXHAUST FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM SHALL BE GENERATED AT THE UNIT CONTROLLER AND THE BAS.

5. FAILURE MODE: UPOS LOSS OF CONTROL SIGNAL OR ELECTRICAL POWER THE CONTROL DEVICES SHALL FAIL IN THE MANNER INDICATED IN THE "ERV POINT SCHEDULE" ON THE MECHANICAL SHEETS.

6. ADDITIONAL MONITORING: IN ADDITION TO THE POINTS MENTIONED IN THE SEQUENCES PROVIDE THE ADDITIONAL MONITORING POINTS LISTED IN THE "ERV POINT SCHEDULE".

SEQUENCE OF OPERATION - MAKE-UP AIR UNIT (MAU-#):

NORMAL OPERATION: FANS SHALL OPERATE AT 50% CAPACITY DURING NORMAL OPERATION AND SHALL RAMP UP TO 100% IF THE WLT BAY REACHES NO2 OR CO LIMIT AS SENSED BY ANY OF THE NO2 OR CO SENSORS LOCATED IN THE WLT BAY(S).

HEATING CONTROL: WHEN THE SUPPLY AIR TEMPERATURE DROPS BELOW THE HEATING SET POINT, INITIALLY SET AT 55°F (ADJUSTABLE) WHILE THE SUPPLY FAN IS RUNNING, THE BAS MUST ENABLE AND MODULATE THE HOT WATER VALVE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE SET POINT. WHEN THE SUPPLY FAN IS OFF, THE HEATING MUST BE OFF.

DIRTY FILTER ALARM: WHEN THE PRESSURE AT THE FILTER EXCEEDS A LIMIT SET BY THE UNIT MANUFACTURER, A FILTER ALARM SIGNAL MUST BE SENT TO THE BAS.

GAS UNIT HEATERS (TYPICAL):

WHEN THE TEMPERATURE DROPS BELOW THE SET POINT, INITIALLY SET AT 55°F (ADJUSTABLE), THE UNIT HEATER MUST BE ENABLED. WHEN THE TEMPERATURE RISES ABOVE THE SET POINT, THE UNIT HEATER MUST BE DISABLED AND THE FAN MUST STOP. THE UNIT HEATER MUST BE CONTROLLED BY A WALL MOUNTED THERMOSTAT, NOT THROUGH THE BAS.

HW UNIT HEATERS (TYPICAL):

WHEN THE TEMPERATURE DROPS BELOW THE SET POINT, INITIALLY SET AT 55°F (ADJUSTABLE), THE UNIT HEATER HW CONTROL VALVE SHALL OPEN TO THE SET DESIGN FLOWRATE. WHEN THE TEMPERATURE RISES ABOVE THE SET POINT, THE UNIT HEATER HW CONTROL VALVE MUST CLOSE AND THE FAN MUST STOP. THE UNIT HEATER MUST BE CONTROLLED BY A WALL MOUNTED THERMOSTAT, NOT THROUGH THE BAS.

SPLIT SYSTEM AC/HP UNITS (TYPICAL):

EACH SPLIT SYSTEM AC UNIT MUST BE CONTROLLED BY A UNIT CONTROLLER PROVIDED BY THE UNIT MANUFACTURER, NOT THROUGH THE BAS.

THE BAS MUST MONITOR THE SPACE TEMPERATURE IN THE COMM AND ELEC ROOMS. WHEN THE SPACE TEMPERATURE RISES ABOVE THE SET POINT, INITIALLY SET AT 80°F, THE BAS MUST GENERATE THE HIGH TEMPERATURE ALARM TO THE BAS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
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FILE NAME: FXBM231802-811
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
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OMAHA, NEBRASKA

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
SEQUENCES OF OPERATION

SHEET ID
M-811

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SEQUENCE OF OPERATION - VARIABLE AIR VOLUME UNITS:

GENERAL:

VAV BOX DAMPER CONTROL: THE VAV BOX CONTROLLER MUST MODULATE THE VAV BOX DAMPER TO MAINTAIN THE AMOUNT OF AIR SUPPLIED TO THE SPACE AT THE SPACE AIRFLOW SET POINT. THE SPACE AIRFLOW SET POINT MUST BE RESET BY THE SPACE TEMPERATURE BETWEEN THE BOX MINIMUM AIRFLOW AND BOX MAXIMUM AIRFLOW. AS THE SPACE TEMPERATURE INCREASES ABOVE THE SPACE TEMPERATURE SET POINT, THE VAV BOX MUST INCREASE AIRFLOW SET POINT. AS THE SPACE TEMPERATURE DECREASES BELOW THE SPACE TEMPERATURE SET POINT, THE VAV BOX MUST DECREASE AIRFLOW SET POINT. SEE VAV TERMINAL SCHEDULE ON THE MECHANICAL SHEETS FOR VAV BOX MINIMUM AND MAXIMUM AIR FLOW SET POINTS.

VAV BOX HOT WATER RE-HEAT COIL CONTROL: UPON A FURTHER DROP IN SPACE TEMPERATURE, AS SENSED BY THE LOCAL SPACE TEMPERATURE SENSOR, AFTER THE VAV BOX IS DELIVERING THE MINIMUM AIR FLOW, THE VAV BOX ASC MUST MODULATE OPEN THE VAV BOX HOT WATER VALVE. UPON AN INCREASE IN TEMPERATURE, THE REVERSE MUST OCCUR. WHEN THE AIR HANDLING UNIT IS OFF, THE HOT WATER VALVE MUST CLOSE.

VAV BOX SET POINT CONTROL: THE BAS MUST AUTOMATICALLY SWITCH THE VAV BOX TEMPERATURE SET POINT ACCORDING TO THE FOLLOWING (ALL SET POINT MUST BE ADJUSTABLE):

OCCUPIED HEATING SET POINT - 68 F.
OCCUPIED COOLING SET POINT - 78 F.
UNOCCUPIED HEATING SET POINT - 60 F.
UNOCCUPIED COOLING SET POINT - 80 F.

UNOCCUPIED MODE OVERRIDE: DURING THE UNOCCUPIED MODE, IT MUST BE POSSIBLE TO RETURN THE VAV BOX AND THE ASSOCIATED AIR HANDLING UNIT TO THE OCCUPIED MODE BY ACTIVATING A SWITCH ON THE SPACE TEMPERATURE SENSOR. ONCE THE AFTER-HOUR OVERRIDE SWITCH IS ACTIVATED, THE SYSTEM MUST RUN FOR A PREDETERMINED TIME PERIOD (ADJUSTABLE) AND AUTOMATICALLY RETURN TO THE UNOCCUPIED MODE.

ADDITIONAL MONITORING: IN ADDITION TO THE POINTS MENTIONED IN THESE SEQUENCES PROVIDE THE ADDITIONAL MONITORING POINTS LISTED IN THE POINT SCHEDULE.

WLY BAY EXHAUST FANS (EF-1,EF-2,EF-4,EF-5):

EXHAUST FAN HAND-OFF-AUTO OPERATION: A HAND-OFF-AUTO SWITCH MUST BE PROVIDED AS PART OF THE MOTOR STARTER FOR THE EXHAUST FAN. IN THE OFF MODE, THE ISOLATION DAMPER MUST BE CLOSED AND THE EXHAUST FAN MUST BE STOPPED. IN THE HAND MODE, THE ISOLATION DAMPER MUST BE OPENED AND THE EXHAUST FAN MUST START. IN THE AUTO MODE, THE EXHAUST FAN AND ISOLATION DAMPER MUST BE CONTROLLED BY THE BAS AS DESCRIBED BELOW.

AUTOMATIC MODE START/STOP CONTROL:

SPACE TEMPERATURE OPERATION: THE BAS MUST START AND STOP THE FAN BASED ON THE SPACE TEMPERATURE. WHEN THE SPACE TEMPERATURE RISES ABOVE THE SET POINT, INITIALLY SET AT 85°F (ADJUSTABLE), THE BAS MUST START THE FAN. TO START THE FAN, THE BAS MUST SEND A START SIGNAL TO THE FAN MOTOR STARTER. THIS MUST ENABLE THE HARD WIRE INTERLOCK THAT OPENS THE OUTDOOR AIR INTAKE AND ISOLATION DAMPERS. TO STOP A FAN, THE BAS MUST SEND A STOP COMMAND TO THE FAN MOTOR STARTER WHICH WILL DE-ENERGIZES THE FAN AND CLOSE THE OUTDOOR AIR INTAKE AND ISOLATION DAMPERS.

SPACE CO/NO2 AND MANUAL OPERATION: THE BAS MUST START AND STOP THE FAN BY THE MANUAL SWITCH, OR BASED ON THE SPACE CARBON MONOXIDE LEVEL AND NITROGEN DIOXIDE LEVEL. WHEN THE MANUAL SWITCH IS ACTIVATED BY THE OCCUPANTS, OR THE SPACE CARBON MONOXIDE LEVEL RISES ABOVE THE SET POINT, INITIALLY SET AT 15 PPM (ADJUSTABLE), OR SPACE NITROGEN DIOXIDE LEVEL RISES ABOVE THE SET POINT, INITIALLY SET AT 3 PPM (ADJUSTABLE), THE BAS MUST SEND A START SIGNAL TO THE FAN MOTOR STARTER. THIS MUST ENABLE THE HARD WIRE INTERLOCK THAT OPENS THE OUTDOOR AIR INTAKE AND ISOLATION DAMPERS. TO STOP A FAN, THE BAS MUST SEND A STOP COMMAND TO THE FAN MOTOR STARTER WHICH WILL DE-ENERGIZES THE FAN AND CLOSE THE OUTDOOR AIR INTAKE AND ISOLATION DAMPERS.

FAN STATUS: A CURRENT SWITCH MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.

MECHANICAL ROOM EXHAUST FAN (EF-3):

EXHAUST FAN HAND-OFF-AUTO OPERATION: A HAND-OFF-AUTO SWITCH MUST BE PROVIDED AS PART OF THE MOTOR STARTER FOR THE EXHAUST FAN. IN THE OFF MODE, THE ISOLATION DAMPER MUST BE CLOSED AND THE EXHAUST FAN MUST BE STOPPED. IN THE HAND MODE, THE ISOLATION DAMPER MUST BE OPENED AND THE EXHAUST FAN MUST START. IN THE AUTO MODE, THE EXHAUST FAN AND ISOLATION DAMPER MUST BE CONTROLLED BY THE BAS AS DESCRIBED BELOW.

AUTOMATIC MODE START/STOP CONTROL:

SPACE TEMPERATURE OPERATION: THE BAS MUST START AND STOP THE FAN BASED ON THE SPACE TEMPERATURE. WHEN THE SPACE TEMPERATURE RISES ABOVE THE SET POINT, INITIALLY SET AT 85°F (ADJUSTABLE), THE BAS MUST START THE FAN. TO START THE FAN, THE BAS MUST SEND A START SIGNAL TO THE FAN MOTOR STARTER. THIS MUST ENABLE THE HARD WIRE INTERLOCK THAT OPENS THE OUTDOOR AIR INTAKE AND ISOLATION DAMPERS. TO STOP A FAN, THE BAS MUST SEND A STOP COMMAND TO THE FAN MOTOR STARTER WHICH WILL DE-ENERGIZES THE FAN AND CLOSE THE OUTDOOR AIR INTAKE AND ISOLATION DAMPERS.

FAN STATUS: A CURRENT SWITCH MUST BE USED TO MONITOR THE STATUS OF THE FAN. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AND SENT TO THE BAS AND THE FAN START COMMAND MUST BE CANCELED.

SEQUENCE OF OPERATIONS - DESTRATIFICATION FANS:

AUTOMATIC MODE START/STOP CONTROL:
THE BAS SHALL START AND STOP THE FANS. TO START THE FANS, THE BAS CONTROLLER SHALL SEND A START SIGNAL, WHICH WILL START THE FANS IN THE MAIN HANGAR BAY. TO STOP THE FANS, THE BAS CONTROLLER SHALL SEND A STOP COMMAND, WHICH WILL DE-ENERGIZE THE FANS. THE BAS SHALL CYCLCE THE FANS ON AND OFF TO MAINTAIN THE DIFFERENTIAL TEMPERATURE BETWEEN FLOOR LEVEL AND CEILING LEVEL, AS SENSED BY TEMPERATURE SENSORS, ROOM-H-TS AND ROOM-L-TS, AT SET POINT, INITIALLY SET AT 5 DEGREES F (ADJUSTABLE). IF THE DIFFERENTIAL TEMPERATURE RISES ABOVE THE SET POINT, THE FAN SHALL BE ENERGIZED. IF THE DIFFERENTIAL TEMPERATURE DROPS BELOW THE SET POINT MINUS 2F (ADJUSTABLE), THE FAN SHALL BE DE-ENERGIZED. THE FAN SHALL CYCLE ON AND OFF TO MAINTAIN THE DIFFERENTIAL TEMPERATURE YEAR ROUND, REGARDLESS OF THE SEASON.

EMERGENCY AIR DISTRIBUTION SHUT DOWN SWITCH (TYPICAL):

EMERGENCY AIR DISTRIBUTION SHUT DOWN SWITCH: PROVIDE EMERGENCY AIR DISTRIBUTION SHUT DOWN SWITCHES WHERE INDICATED. WHEN THE SWITCH IS ACTIVATED, THE BAS MUST SEND A SIGNAL TO FIRE ALARM SYSTEM, WHICH WILL SHUT DOWN THE AIR HANDLING UNITS AND MAKEUP AIR UNITS AND ASSOCIATED EXHAUST FANS VIA A RESPECTIVE CONTROL MODULE. WHEN THE EMERGENCY CONDITION HAS BEEN CLEARED AND THE MANUAL SWITCH HAS BEEN RESET, THE MECHANICAL EQUIPMENT MUST RETURN TO NORMAL OPERATION.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS
DRAWN BY: A. RAMOS
CHECKED BY: J. STAMPER
SUBMITTED BY: B. DYSON
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ELLSWORTH AIR FORCE BASE, SD
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SEQUENCES OF OPERATION

SHEET ID

M-812

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POINT SCHEDULE INSTRUCTIONS FOR BUILDING CONTROLS:

POINT SCHEDULE INSTRUCTIONS FOR THE BUILDING CONTROLS

GENERAL:

1) THE CONTRACT DRAWING POINTS SCHEDULES ASSUME THAT THE ENTIRE SEQUENCE OF OPERATION IS PERFORMED IN A SINGLE PIECE OF DDC HARDWARE. IN CASES WHERE MULTIPLE PIECES OF DDC HARDWARE ARE USED (INCLUDING CEA-709.1 NETWORKED SENSORS AND ACTUATORS), SEPARATE THE POINTS SCHEDULE INTO SEPARATE TABLES EACH WITH ITS OWN HEADER INFORMATION (SEE BELOW) SO THAT EACH PIECE OF DDC HARDWARE HAS A TABLE DEDICATED TO IT. ALL TABLES FOR A SINGLE SEQUENCE OF OPERATION SHALL BE ON A SINGLE DRAWING WHICH MAY SPAN MULTIPLE SHEETS. SHOW COMMUNICATION BETWEEN MULTIPLE PIECES OF DDC HARDWARE PERFORMING A COMMON SEQUENCE THROUGH THE USE OF NVI AND NVO ENTRIES IN THE I/O COLUMN (SEE I/O COLUMN INSTRUCTIONS BELOW), ADDING ROWS TO THE TABLE(S) AS NEEDED.

2) ENTRIES SHOWN BRACKETED AS: <___> ARE REQUIRED ENTRIES UNDER UFGS-23 09 23. SOME ENTRIES WITHOUT BRACKETS MAY BE REQUIRED IN SOME INSTANCES AS DESCRIBED IN THESE INSTRUCTIONS.

SPACES WHERE NO ENTRY IS ORDINARILY REQUIRED CONTAINS A TILDE: " ~ " (EQUIVALENT TO AN "N/A" OR NULL VALUE)

WHEN AN ENTRY APPEARS INSIDE OF BRACKETS, IT IS A RECOMMENDED ENTRY THAT MUST BE VERIFIED OR CHANGED BY THE APPROPRIATE PARTY (AS INDICATED BY THE BRACKET TYPE). WHEN EDITING THE POINT SCHEDULES, DELETE THE BRACKETS AFTER VERIFYING/PROVIDING THE ENTRY. DO NOT LEAVE CELLS BLANK, INSTEAD SHOW THE TILDE ("~") TO INDICATE A NULL VALUE OR THAT NO FURTHER ENTRY IS REQUIRED.

HEADER INFORMATION INSTRUCTIONS:

1) DDC HARDWARE IDENTIFIER: SHOW THE IDENTIFIER FOR EACH PIECE OF DDC HARDWARE. MAINTAIN CONSISTENCY AND UNIQUENESS OF DDC HARDWARE IDENTIFIERS BETWEEN ALL DRAWINGS.

2) DDC HARDWARE LOCATION: SHOW THE PHYSICAL LOCATION OF THE DEVICE. LOCATION SHALL INCLUDE THE BUILDING AND ROOM NUMBER AND MAY ALSO INCLUDE FURTHER INFORMATION SUCH AS ENCLOSURE/PANEL IDENTIFICATION.

3) NODE ADDRESS: SHOW THE DOMAIN, SUBNET AND NODE ADDRESSES FOR ALL DEVICES ON THE NETWORK.

4) NODE ID: SHOW THE MANUFACTURER SUPPLIED NODE ID (ALSO CALLED THE NEURONID) FOR EACH DEVICE.

"GENERAL" COLUMNS:

1) NAME COLUMN: SHOW POINT NAMES AS NEEDED AND AS INDICATED BY BRACKETS (<___>). THE NAME SHALL BE CONSISTENT WITH POINT NAMES SHOWN ON ALL OTHER DRAWINGS AND SHALL USE THE ESTABLISHED POINT ABBREVIATIONS.

2) SETTING COLUMN: CONFIGURE DEVICES TO USE THE SETPOINTS AND SETTINGS SHOWN. WHEN A SETPOINT OR SETTING IS NOT SHOWN, USE VALUES IN ACCORDANCE WITH THE SPECIFICATION AND SHOW THE SETPOINT OR SETTING USED. INCLUDE THE APPROPRIATE ENGINEERING UNITS FOR ENTRIES IN THIS COLUMN.

3) RANGE COLUMN: CONFIGURE DEVICES TO USE THE RANGES SHOWN. WHEN A RANGE IS NOT SHOWN, USE VALUES IN ACCORDANCE WITH THE SPECIFICATION AND SHOW THE RANGE USED. FOR SENSORS SHOW THE ACTUAL SENSOR RANGE (THIS RANGE MUST AT LEAST ENCOMPASS THE RANGE SPECIFIED IN SECTION 23 09 23). FOR DAMPER ACTUATORS SHOW THE ACTUAL RANGE OVER WHICH THE VALVE OR DAMPER IS ACTUATED. INCLUDE THE APPROPRIATE ENGINEERING UNITS FOR ENTRIES IN THIS COLUMN.

4) NCI/CP NAME COLUMN: ENTRIES IN THIS COLUMN ARE ONLY REQUIRED FOR GENERAL PURPOSE PROGRAMMABLE CONTROLLERS (GPPC) OR APPROVED APPLICATION SPECIFIC CONTROLLERS (ASC) LACKING LONWORKS NETWORK SERVICES (LNS) PLUG-INS. SHOW ALL NETWORK CONFIGURATION INPUTS (NCI) OR CONFIGURATION PROPERTIES (CP) THAT RELATE TO THE POINT. FOR CPS OF A USER-DEFINED NETWORK CONFIGURATION PARAMETER TYPE (UCPT), PROVIDE EITHER THE STANDARD NETWORK VARIABLE TYPE (SNVT) THAT RELATES TO THE CP, OR (FOR UCPTS NOT BASED ON A SNVT) PROVIDE DETAILED DESCRIPTIONS OF THE FIELDS AND UNITS OF EACH CP. EXPAND ROWS AND USE ADDITIONAL SHEETS AS REQUIRED TO PROVIDE CONFIGURATION PROPERTY DESCRIPTIONS.

5) I/O TYPE COLUMN: SHOW THE I/O TYPE FOR EACH POINT AS ONE (OR MORE) OF THE FOLLOWING:

* AI FOR ANALOG INPUTS
* AO FOR ANALOG OUTPUTS
* BI FOR BINARY INPUTS
* BO FOR BINARY OUTPUTS
* NVO FOR NETWORK VARIABLE OUTPUTS (BOUND TO ANOTHER PIECE OF DDC HARDWARE)
* NVI FOR NETWORK VARIABLE INPUTS (BOUND FROM ANOTHER PIECE OF DDC HARDWARE)

IF MORE THAN ONE PIECE OF DDC HARDWARE IS USED TO IMPLEMENT A SEQUENCE AND THE VALUE OF A PHYSICAL INPUT TO ONE IS NEEDED BY THE OTHER, SHOW THE POINT AS BOTH A HARDWARE INPUT (AI OR BI) AND A NETWORK VARIABLE OUTPUT (NVO) ON THE FIRST AND AS A NETWORK VARIABLE INPUT (NVI) TO THE OTHER DDC HARDWARE. SIMILARLY FOR OUTPUTS SHOW A NETWORK VARIABLE OUTPUT (NVO) ON ONE CONTROLLER, AND A NETWORK VARIABLE INPUT (NVI) AND HARDWARE OUTPUT (AO OR BO) ON THE OTHER.

AN ENTRY OF NVO IS ONLY REQUIRED FOR OUTPUTS THAT ARE USED BY ANOTHER PIECE OF DDC HARDWARE; POINTS THAT HAVE SNVT OUTPUTS ONLY FOR DISPLAY OR TRENDING AT AN LDP OR BY THE M&C SOFTWARE ARE ASSUMED TO BE NVOS AND DO NOT NEED AN NVO ENTRY IN THE I/O COLUMN.

FOR EVERY ENTRY OF NVO OR NVI SHOW THE SNVT NAME AND TYPE IN THE SNVT NAME AND SNVT TYPE COLUMNS UNDER LDP AND M & C DISPLAY. SEE "SNVT TYPE COLUMN"INSTRUCTIONS BELOW.

6) HOA REQ'D COLUMN: FOR EACH OUTPUT WITH AN "X"IN THIS COLUMN PROVIDE A HARDWARE MANUAL OVERRIDE FOR THAT OUTPUT:

A. THE MANUAL OVERRIDE SWITCH FOR BINARY OUTPUTS SHALL PROVIDE FOR OVERRIDING THE OUTPUT OPEN OR CLOSED
B. THE MANUAL OVERRIDE SWITCH FOR ANALOG OUTPUTS SHALL EITHER:
I. PROVIDE FOR OVERRIDING THE OUTPUT TO 0% OR 100%
II. PROVIDE FOR OVERRIDING THROUGH THE RANGE OF 0% TO 100%.
C. THE MANUAL OVERRIDE SHALL BE INTEGRATED WITH THE CONTROLLER HARDWARE OR AN EXTERNAL OVERRIDE CO-LOCATED WITH (IN THE SAME ENCLOSURE AS) THE CONTROLLER.

LDP AND M & C DISPLAY COLUMNS:

1) LDP VIEW REQ'D COLUMN: PROVIDE AN LDP AND CONFIGURE THE BUILDING CONTROL NETWORK AND THE LDP TO DISPLAY POINTS MARKED WITH AN "X". SHOW THE SNVT NAME AND SNVT TYPE FOR EACH POINT SHOWN. (SEE INSTRUCTIONS FOR THE "SNVT TYPE" COLUMN)

2) M & C DISP REQ'D: AN "X" IN THIS COLUMN INDICATES THAT A SNVT FOR THIS POINT MUST BE AVAILABLE FROM THE DDC HARDWARE PERFORMING THE SEQUENCE FOR THIS SYSTEM. PROVIDE A SNVT OUTPUT FOR THESE POINTS AND SHOW THE SNVT NAME AND SNVT TYPE. (SEE INSTRUCTIONS FOR THE "SNVT TYPE" COLUMN)

3) M & C TREND REQ'D COLUMN: FOR ALL POINTS WITH AN X IN THIS COLUMN A SNVT FOR THIS POINT SHALL BE AVAILABLE. PROVIDE A SNVT OUTPUT FOR THESE POINTS AND SHOW THE SNVT NAME AND SNVT TYPE. (SEE INSTRUCTIONS FOR THE "SNVT TYPE" COLUMN)

4) SNVT TYPE COLUMNS: WHEN A SNVT TYPE IS SHOWN ON THE POINT SCHEDULE CONTRACT DRAWING, USE THE SHOWN SNVT TYPE FOR THE PROVIDED SNVT. IF NECESSARY, A SNVT TYPE TRANSLATOR MAY BE USED TO CONVERT TO THIS SNVT TYPE. IF THE USE OF A TYPE TRANSLATOR RESULTS IN THE SHARING OF A SNVT BETWEEN DDC HARDWARE, DOCUMENT IT ON THE POINTS SCHEDULE AS DESCRIBED IN THE "GENERAL"PORTION OF THESE INSTRUCTIONS. WHERE NO SNVT TYPE IS SHOWN, SHOW THE SNVT TYPE USED.

OVERRIDES COLUMNS:

1) LDP OVRD REQ'D COLUMN: FOR EACH POINT WITH AN "X"IN THIS COLUMN, PROVIDE A SNVT INPUT FOR THE POINT BY WHICH THE VALUE OF THE POINT CAN BE OVERRIDDEN AND PROVIDE AN LDP (IF NOT ALREADY PROVIDED) AND CONFIGURE THE BUILDING CONTROL NETWORK AND THE LDP TO ALLOW AN OPERATOR TO OVERRIDE (WRITE TO) THE POINT FROM THE LDP. SHOW THE OVERRIDE INPUT SNVT NAME AND TYPE FOR EACH POINT REQUIRING AN OVERRIDE. IF THE OVERRIDE IS RELEASED BY A MEANS OTHER THAN WRITING THE "NULL VALUE"FOR THE SNVT TYPE (AS DEFINED IN THE LONMARK MASTER SNVT LIST), PROVIDE A DESCRIPTION OF HOW THE OVERRIDE IS USED AND RELEASED.

2) M & C OVRD REQ'D COLUMN: FOR EACH POINT WITH AN "X"IN THIS COLUMN, PROVIDE A SNVT INPUT FOR THE POINT BY WHICH THE VALUE OF THE POINT CAN BE OVERRIDDEN AND SHOW THE SNVT NAME AND TYPE FOR EACH.

ALARMS COLUMNS:

1) ALARM CONDITION COLUMN: FOR EACH POINT WITH AN ENTRY IN THIS COLUMN PROVIDE A SNVT OUTPUT FOR THE POINT AND SHOW THE SNVT NAME AND SNVT TYPE IN THE SNVT NAME AND SNVT TYPE COLUMNS UNDER LDP AND M & C DISPLAY. SEE "SNVT TYPE COLUMN" INSTRUCTIONS ABOVE.

OTHER:

1) SYSTEM RESET BUTTON (RST-BUT): IF THE "I/O TYPE" COLUMN CONTAINS "BI", THE SYSTEM SHALL BE CAPABLE OF BEING RESET VIA A LOCAL HARDWARE PUSH-BUTTON.

IF THERE IS AN "X" IN THE LDP OVRD REQ'D OR M & C OVRD REQ'D COLUMN, THE SYSTEM SHALL ALSO BE CAPABLE OF BEING RESET VIA SNVT INPUT (SEE INSTRUCTIONS FOR M & C OVRD REQ'D AND LDP OVRD REQ'D COLUMNS)

2) SYSTEM OCCUPANCY (SYS-OCC): SHOW OCC, UNOCC, WUCD (WARM-UP/COOL-DOWN) IN THE RANGE COLUMN BASED ON THE SYSTEM-SPECIFIC SEQUENCE OF OPERATIONS AND OCCUPANCY SCHEDULE.

3) MINIMUM OUTSIDE AIR (MINOA) FLOW: FOR SYSTEMS CONTROLLING TO A MINOA SETPOINT, USE THE MINOA-F-SP SHOWN WHEN CONFIGURING THE DDC HARDWARE PERFORMING THE SEQUENCE OF OPERATION. FOR OTHER SYSTEMS SET THE MINIMUM OUTSIDE AIR FLOW TO THE MINIMUM OUTSIDE AIR FLOW SETTING SHOWN AS SPECIFIED.

4) PID LOOP SETTINGS: SHOW ALL PID LOOP SETTINGS IN THE SETTINGS COLUMN, INCLUDING ENGINEERING UNITS FOR EACH SETTING. ADJUST ROW HEIGHT AS NEEDED TO SHOW ALL PID SETTINGS.

5) FILTERS: WHEN FILTER PRESSURES ARE SHOWN, INSTALL FILTER PRESSURE SWITCHES. SHOW LOADED FILTER (HIGH-LIMIT) SETPOINT FOR EACH FILTER.

6) OTHER POINTS: INSTALL SENSORS FOR MONITORING PURPOSES ONLY.

POINT SCHEDULE INSTRUCTIONS FOR THE FACILITY MONITORING AND CONTROL (FMCS) SYSTEM INTEGRATION

1) SPACES WHERE NO ENTRY IS ORDINARILY REQUIRED CONTAINS A TILDE: " ~ " (EQUIVALENT TO AN "N/A" OR NULL VALUE)

2) NAME COLUMN: USE THE POINT NAMES SHOWN ON THE POINTS SCHEDULE FOR ALL GRAPHIC DISPLAYS

3) M & C DISP REQ'D: FOR EACH "X" IN THIS COLUMN CONFIGURE THE GRAPHICAL DISPLAY FOR THIS SYSTEM TO DISPLAY THE VALUE OF THE POINT. UNLESS OTHERWISE SPECIFIED OR APPROVED, USE THE POINT NAME, AS SHOWN IN THE "NAME" COLUMN, TO LABEL THE GRAPHICAL DISPLAY.

4) M & C TREND REQ'D COLUMN: FOR ALL POINTS WITH AN "X" IN THIS COLUMN, SET UP A TREND AT THE M & C SOFTWARE AS SPECIFIED.

5) M & C OVRD REQ'D COLUMN: FOR ALL POINTS WITH AN X IN THIS COLUMN USE THE SNVT NAME AND TYPE SHOWN TO PROVIDE OVERRIDE CAPABILITY. CONFIGURE THE M & C SYSTEM DISPLAYS TO ALLOW AN OPERATOR TO OVERRIDE (AND RELEASE THE OVERRIDE) THESE POINTS AS SPECIFIED.

6) ALARM CONDITION COLUMN: FOR EACH POINT WITH AN ENTRY IN THIS COLUMN USE THE ALARM LIMITS SHOWN TO CONFIGURE ALARM GENERATION FOR THE POINT AT THE M&C SOFTWARE.

7) ALARM PRIORITY COLUMN: WHEN CONFIGURING THE ALARM HANDLING AT THE M&C SOFTWARE, USE THE ALARM PRIORITY SHOWN TO DETERMINE IF THE ALARM IS CRITICAL (CRIT) OR INFORMATIONAL (INFO).

8) M&C ROUTING NAME COLUMN: CONFIGURE ALARM HANDLING AT THE M&C SERVER ACCORDING TO THE ALARM ROUTING SHOWN ON THE POINTS SCHEDULE, THE ALARM ROUTING SCHEDULES AND AS SPECIFIED.

9) SYSTEM RESET BUTTON (RST-BUT): IF THERE IS AN AN "X" IN M & C OVRD REQ'D COLUMN, CONFIGURE M & C SOFTWARE GRAPHIC DISPLAYS TO PROVIDE SYSTEM RESET CAPABILITY.

US Army Corps of Engineers
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MARK	DESCRIPTION	DATE

DESIGNED BY: A. RAMOS	ISSUE DATE: 28 APRIL 2023
DRAWN BY: A. RAMOS	SOLICITATION NO.: W9128F23R0012
CHECKED BY: J. STAMPER	CONTRACT NO.:
SUBMITTED BY: B. DYSON	DRAWING CODE:
SIZE: ANSI D 22x34	FILE NAME: FXBM231802M-813

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

POINTS SCHEDULE INSTRUCTIONS

SHEET ID

M-813

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ONE-LINE DIAGRAM

- THERMAL MAGNETIC CIRCUIT BREAKER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- DISCONNECT SWITCH
- SWITCH
- FUSED SWITCH
- GROUND
- (M) METER
- PANEL NAME RM XXX — PANELBOARD WITH LOCATION
- SPD — SURGE PROTECTION DEVICE
- SURGE ARRESTER
- TRANSFORMER
- MOTOR

GROUNDING

- GROUNDING ROD
- GROUND ROD TEST WELL
- STATIC GROUNDING RECEPTACLE
- BOND
- —G— GROUNDING CONDUCTOR
- GROUND BAR
  - -MGB: MAIN GROUND BAR
  - -EGB: ELECTRICAL GROUND BAR
  - -PBB: PRIMARY BONDING BUSBAR
  - -SBB: SECONDARY BONDING BUSBAR

GENERAL

- AREA NOT IN SCOPE, UNLESS OTHERWISE NOTED (UON)

HALFTONE SYMBOLS AND LINE WORK INDICATE EXISTING CONDITIONS.

WIRING

A-12 CONDUCTORS IN CONDUIT, UNLESS NOTED OTHERWISE ON PLAN. ARROW INDICATES HOMERUN TO PANEL "A", CIRCUIT 12.

1#12 PHASE CONDUCTOR, 1#12 GROUNDED (NEUTRAL) CONDUCTOR AND 1 #12 GREEN EQUIPMENT GROUND IN 1/2" CONDUIT UNLESS OTHERWISE NOTED.

REFERENCE KEY

REFER TO DRAWING / DETAIL NUMBER

RE: A1/E-401

SHEET NUMBER ON WHICH DETAIL IS DRAWN

A1

POWER

- T — DRY TYPE TRANSFORMER
- WALL MOUNTED NEMA 5-20 DUPLEX RECEPTACLE
  - * = COUNTER OR ELEVATED HEIGHT. RE: A3/EP501 FOR MOUNTING HEIGHT
  - ** = TV. RE: A3/EP501 FOR MOUNTING HEIGHT
  - GFI = GROUND FAULT CIRCUIT INTERRUPTING
  - EXT = EXTERIOR RECEPTACLE INCLUDING GFI, WEATHERPROOF (WITH "IN-USE" COVER), EXTRA HEAVY DUTY RATING
  - COLORED TOP = SPLIT YOKE CONTROLLED RECEPTACLE WITH TOP CONTROLLED AND BOTTOM CONSTANT
- NEMA 5-20 QUADRUPLEX RECEPTACLE
  - * = COUNTER OR ELEVATED HEIGHT. RE: A3/EP501 FOR MOUNTING HEIGHT
  - ** = TV. RE: A3/EP501 FOR MOUNTING HEIGHT
  - GFI = GROUND FAULT CIRCUIT INTERRUPTING
  - EXT = EXTERIOR RECEPTACLE INCLUDING GFI, WEATHERPROOF (WITH "IN-USE" COVER), EXTRA HEAVY DUTY RATING
  - COLORED TOP = SPLIT YOKE CONTROLLED RECEPTACLE WITH TOP CONTROLLED AND BOTTOM CONSTANT
- SPECIAL RECEPTACLE. NEMA TYPE AS NOTED.
  - * = MOUNT TOP OF RECEPTACLE AT 4'
- FLOOR BOX - DATA AND QUADRUPLEX
- (J) ELECTRICAL JUNCTION BOX
- S_M MOTOR RATED SWITCH.
- DISCONNECT SWITCH IN ENCLOSURE MOUNTED 5' AFF UON. NON-FUSED UON. AAA/B/CCC INDICATES RATINGS FOR "VOLTAGE" / "POLES" / "AMPERAGE". EXAMPLE 600/3/100
- SURFACE MOUNTED PANELBOARD
- VFD — VARIABLE FREQUENCY DRIVE
- APPROXIMATE WORKING CLEARANCE. CONFORM TO NEC REQUIREMENTS. AREAS SHOWN FOR PLANNING PURPOSES ONLY.

LIGHTING

- A / AE — 2' X 2' LENSED FIXTURE. LETTER INDICATES TYPE PER FIXTURE SCHEDULE. SHADING OR TYPE MARK "XE" INDICATES BATTERY BACK-UP (TYPICAL ALL FIXTURES).
- A / AE — LENSED STRIP FIXTURE. LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE.
- A / AE — HIGHBAY FIXTURE. LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE.
- A / A — WALL MOUNTED LED FIXTURE. LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE.
- A / AE — ROUND FIXTURE, LETTER INDICATES TYPE PER FIXTURE SCHEDULE.
- L-810 RED OBSTRUCTION LIGHT FIXTURE
- X — EXIT SIGN WITH DIRECTIONAL ARROWS AS INDICATED, CEILING MOUNTING.
- X — EXIT SIGN WITH DIRECTIONAL ARROWS AS INDICATED, WALL MOUNTING.
- S_{LVXa} — DIGITAL CONTROL SWITCH. X DENOTES NUMBER OF BUTTONS (2-BUTTON IF NONE SPECIFIED) OR DIMMING. LOWER CASE LETTER DENOTES LIGHTING ZONES.
- S_{VS} VACANCY SENSOR SWITCH
- M X# — CEILING MOUNTED MOTION SENSOR
  - X =
    - O = OCCUPANCY SENSOR
    - V = VACANCY SENSOR
  - # =
    - 1 = NORMAL RANGE
    - 2 = EXTENDED RANGE
- LIGHTING CIRCUIT

GENERAL NOTES - ELECTRICAL

1	PERFORM ELECTRICAL WORK IN ACCORDANCE WITH 2020 NEC, APPLICABLE UFC AND BASE STANDARDS. IN THE EVENT OF CONFLICT, THE ORDER OF PRECEDENCE IS BASE STANDARDS, APPLICABLE UFC, AND THEN 2020 NEC.
2	EXISTING SITE CONDITIONS SHOWN ARE BASED ON TOPICAL SURVEY. STUDY AVAILABLE REFERENCE DRAWINGS AND VERIFY EXISTING CONDITIONS. ADJUST ARRANGEMENT AND LOCATION OF NEW ELECTRICAL WORK SHOWN TO AVOID CONFLICT WITH EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION. WHERE EXISTING UTILITIES CANNOT BE AVOIDED, COORDINATE WITH THE CONTRACTING OFFICER TO INCLUDE ALL WORK FOR REMOVAL AND RELOCATION OF EXISTING UTILITIES AND ADDITIONAL WORK NECESSARY TO ACCOMMODATE UPDATE/REPAIR.
3	ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND MAY NOT SHOW ALL DETAILS AND COMPONENTS. INCLUDE IN BID ALL ELECTRICAL WORK INCLUDING ALL COMPONENTS, MATERIALS, AND EQUIPMENT IN COORDINATION WITH ALL TRADES FOR A COMPLETE AND OPERABLE SYSTEM WITHIN THE INTENT INDICATED.
4	RESTORE ALL DAMAGED AREAS (TO MATCH SURROUNDINGS) INCLUDING LANDSCAPING AND GRASS, UTILITIES, AND STRUCTURES AFTER COMPLETION OF WORK.
5	WORKING SPACES ABOUT ELECTRICAL EQUIPMENT MUST BE IN COMPLIANCE WITH NEC 110.26.
6	FLUSH MOUNT ALL SWITCHES AND RECEPTACLES IN FINISHED AREAS. SWITCHES AND RECEPTACLES MUST BE SURFACE MOUNTED IN EXPOSED SPACES. UNLESS OTHERWISE NOTED, CONCEAL ALL CONDUIT IN WALLS OR ABOVE ACCESSIBLE CEILING. CONDUIT IN ROOMS WITH NO CEILING THAT ARE EXPOSED TO STRUCTURE MAY BE EXPOSED, MOUNTED TO BUILDING STRUCTURE. DO NOT INSTALL CONDUITS IN CONCRETE FLOORS. CONDUITS MUST BE ROUTED PARALLEL OR PERPENDICULAR TO BUILDING LINES.
7	PROVIDE ALL SUPPLEMENTAL SUPPORTING DEVICES REQUIRED FOR ELECTRICAL EQUIPMENT WHERE THE BUILDING STRUCTURE IS NOT SUITABLE FOR DIRECT MOUNTING.
8	UNLESS OTHERWISE NOTED, ALL CONDUCTORS ARE SIZED FOR COPPER TYPE THWN, THHN, AND RATED FOR 60 DEGREE C FOR CIRCUITS RATED 100A OR LESS AND 75 DEGREE C FOR CIRCUITS OVER 100A..
9	PROVIDE A DEDICATED EQUIPMENT GROUNDING CONDUCTOR, SIZED PER THE NEC, WITH EACH BRANCH CIRCUIT. CONDUIT MAY NOT SUBSTITUTE AS AN EQUIPMENT GROUND.
11	INSTALL ALL WIRING IN RACEWAYS.
12	SEAL ALL CONDUIT PENETRATIONS USING A LISTED SEALANT (INCLUDING FIRESTOPPING) FOR THE APPROPRIATE APPLICATION ON WALLS, PARTITIONS, FLOORS, ROOF, ETC.
13	UTILIZE COMPRESSION FITTINGS FOR CONDUIT CONNECTIONS. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
14	PROVIDE LOCKABLE BREAKERS FOR ALL FIRE PROTECTION/ALARM DEVICES. PAINT ENCLOSURES, BREAKERS, AND PAD-LOCKING MECHANISMS RED. AT THE DISTRIBUTION EQUIPMENT, PROVIDE A LABEL INSCRIBED "FIRE PROTECTION/LIFE SAFETY EQUIPMENT." USE RED LAMINATED PLASTIC WITH WHITE CORE FOR THE LABEL.
15	ALL WIRING AND EQUIPMENT MUST BE UL LISTED & LABELED, NEW, AND INSTALLED IN CONFORMANCE WITH THE UFC AND NFPA 70.
16	UNLESS OTHERWISE INDICATED, ALL WIRING MUST BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS. CONDUIT MUST BE 1/2" MINIMUM.
17	PROVIDE EACH 120V, 20A BRANCH CIRCUIT FROM APPLIANCE TO PANELBOARDS WITH A SEPARATE NEUTRAL FOR EACH PHASE CONDUCTOR. NO SHARED NEUTRALS ARE PERMITTED UNLESS OTHERWISE INDICATED. BRANCH CIRCUIT HOME RUN WIRING MAY BE COMBINED UP TO A MAXIMUM OF (9) CURRENT CARRYING CONDUCTORS IN A CONDUIT SIZED PER NFPA 70. NEUTRAL MUST BE INCLUDED AS CURRENT CARRYING CONDUCTORS.
18	PROVIDE NO. 12 AWG PHASE, NEUTRAL AND GROUND CONDUCTOR FOR 120V, 20A BRANCH CIRCUITS NOT EXCEEDING 100 FEET. PROVIDE 10 AWG PHASE, NEUTRAL, AND GROUND CONDUCTORS FOR 120V, 20A BRANCH CIRCUIT EXCEEDING 100 FEET AND FOR 277V, 20A CIRCUITS EXCEEDING 200 FEET.
19	PROVIDE A CONCRETE HOUSEKEEPING PAD FOR ALL FLOOR MOUNTED ELECTRICAL EQUIPMENT.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802E-001

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
GENERAL NOTES AND LEGENDS

SHEET ID
E-001

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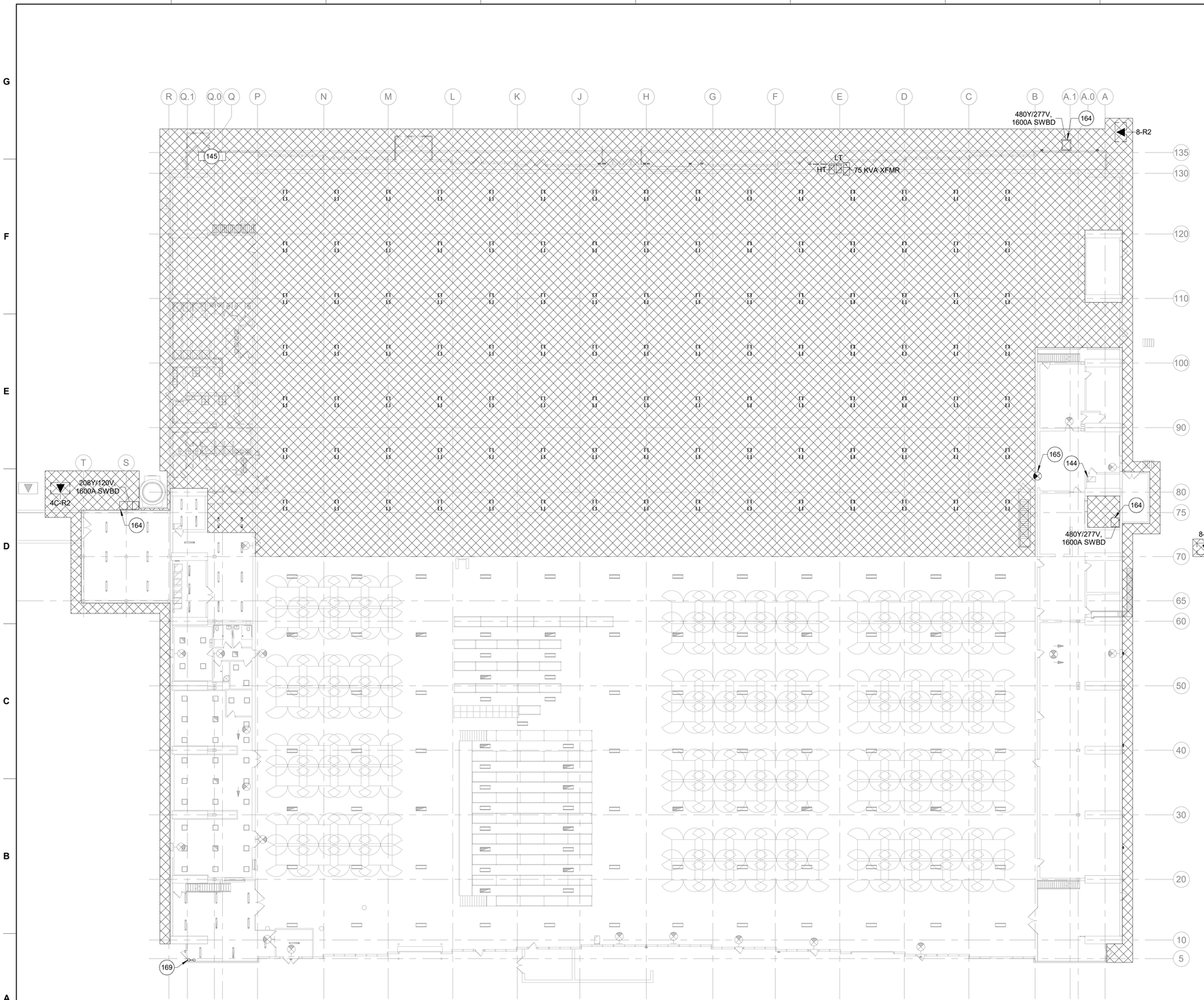


A1 OVERALL DEMOLITION FLOOR PLAN - LEVEL 01
1" = 20'-0"

GENERAL SHEET NOTES - DEMOLITION

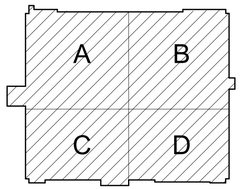
1. REMOVE CIRCUITS ASSOCIATED WITH HVAC EQUIPMENT FOR IN SCOPE AREAS. COORDINATE DEMOLITION WITH MECHANICAL CONTRACTOR TO ENSURE EXISTING TO REMAIN EQUIPMENT IS NOT ALTERED WITH THE EXCEPTION OF REMOVAL OF EXISTING CABLING AND CONDUITS.
2. ABANDON IN PLACE CONDUITS EMBEDDED IN THE FLOOR, BURIED OUTSIDE, OR IN EXISTING TO REMAIN WALLS. REMOVE CONDUCTORS.
3. EXISTING ELECTRICAL COMPONENT LOCATION AND QUANTITY ARE SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXACT QUANTITY AND LOCATION.

DEMOLITION LEGEND

HATCH	DESCRIPTION
	REMOVE ALL EXISTING ELECTRICAL EQUIPMENT, LIGHTING, AND RECEPTACLES. DEMOLISH RELATED CONDUIT AND CABLING BACK TO SOURCE, UNLESS OTHERWISE NOTED. RE-FEED EXISTING LOADS AS NOTED ON THE POWER SHEETS. REFER TO PANEL SCHEDULES.
	NOT IN SCOPE.

SHEET KEYNOTES

144 PANEL "B" IS EXISTING TO REMAIN. RE: E-601 FOR NEW FEEDER INFORMATION.
145 PROTECT IN PLACE FUEL ISLAND EQUIPMENT INSTALLED AS PART OF A SEPARATE PROJECT.
164 REMOVE MULTIPLE SERVICE ENTRANCE IDENTIFICATION PLAQUE.
165 DEMOLISH EXISTING EXIT SIGN FOR BID OPTION ONLY.
169 EXISTING OBSTRUCTION LIGHT ON ROOF. DEMOLISH ALL EXISTING OBSTRUCTION LIGHTS.



OVERALL
KEY PLAN

GRAPHIC SCALE
0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN
NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
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FILE NAME: FXBM231802ED101

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL DEMOLITION PLAN - LEVEL 01

SHEET ID
ED101

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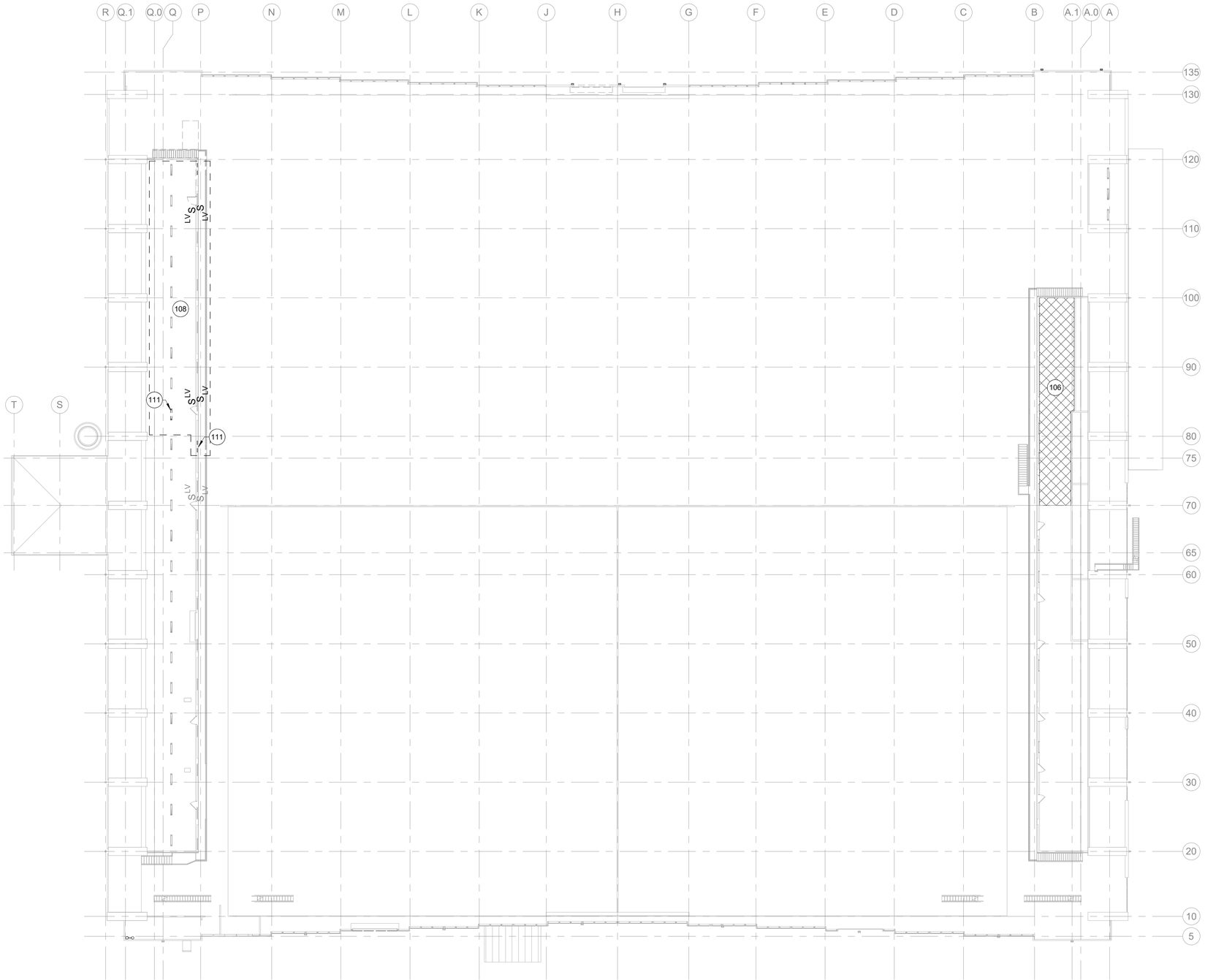


A1 OVERALL DEMOLITION FLOOR PLAN - EQUIPMENT PLATFORM 01

1" = 20'-0"

GENERAL SHEET NOTES - DEMOLITION

1. REMOVE CIRCUITS ASSOCIATED WITH HVAC EQUIPMENT FOR IN SCOPE AREAS. COORDINATE DEMOLITION WITH MECHANICAL CONTRACTOR TO ENSURE EXISTING TO REMAIN EQUIPMENT IS NOT ALTERED WITH THE EXCEPTION OF REMOVAL OF EXISTING CABLING AND CONDUITS.
2. ABANDON IN PLACE CONDUITS EMBEDDED IN THE FLOOR, BURIED OUTSIDE, OR IN EXISTING TO REMAIN WALLS. REMOVE CONDUCTORS.
3. EXISTING ELECTRICAL COMPONENT LOCATION AND QUANTITY ARE SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXACT QUANTITY AND LOCATION.

DEMOLITION LEGEND

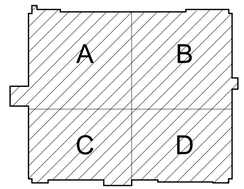
HATCH	DESCRIPTION
	REMOVE ALL EXISTING ELECTRICAL EQUIPMENT, LIGHTING, AND RECEPTACLES. DEMOLISH RELATED CONDUIT AND CABLING BACK TO SOURCE, UNLESS OTHERWISE NOTED. RE-FEED EXISTING LOADS AS NOTED ON THE POWER SHEETS. REFER TO PANEL SCHEDULES.
	NOT IN SCOPE.

SHEET KEYNOTES

106 DEMOLITION IS A PART OF THE BID OPTION ONLY.

108 REMOVE EXISTING LIGHTING CONTROLS AND CIRCUITRY FOR LUMINAIRES WITHIN THE DASHED BOUNDARY.

111 RELOCATE LUMINAIRE 2' PLAN NORTH. COORDINATE FINAL LOCATION WITH WALL INSTALLATION.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802ED111

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL DEMOLITION PLAN - EQUIPMENT PLATFORM 01

SHEET ID

ED111

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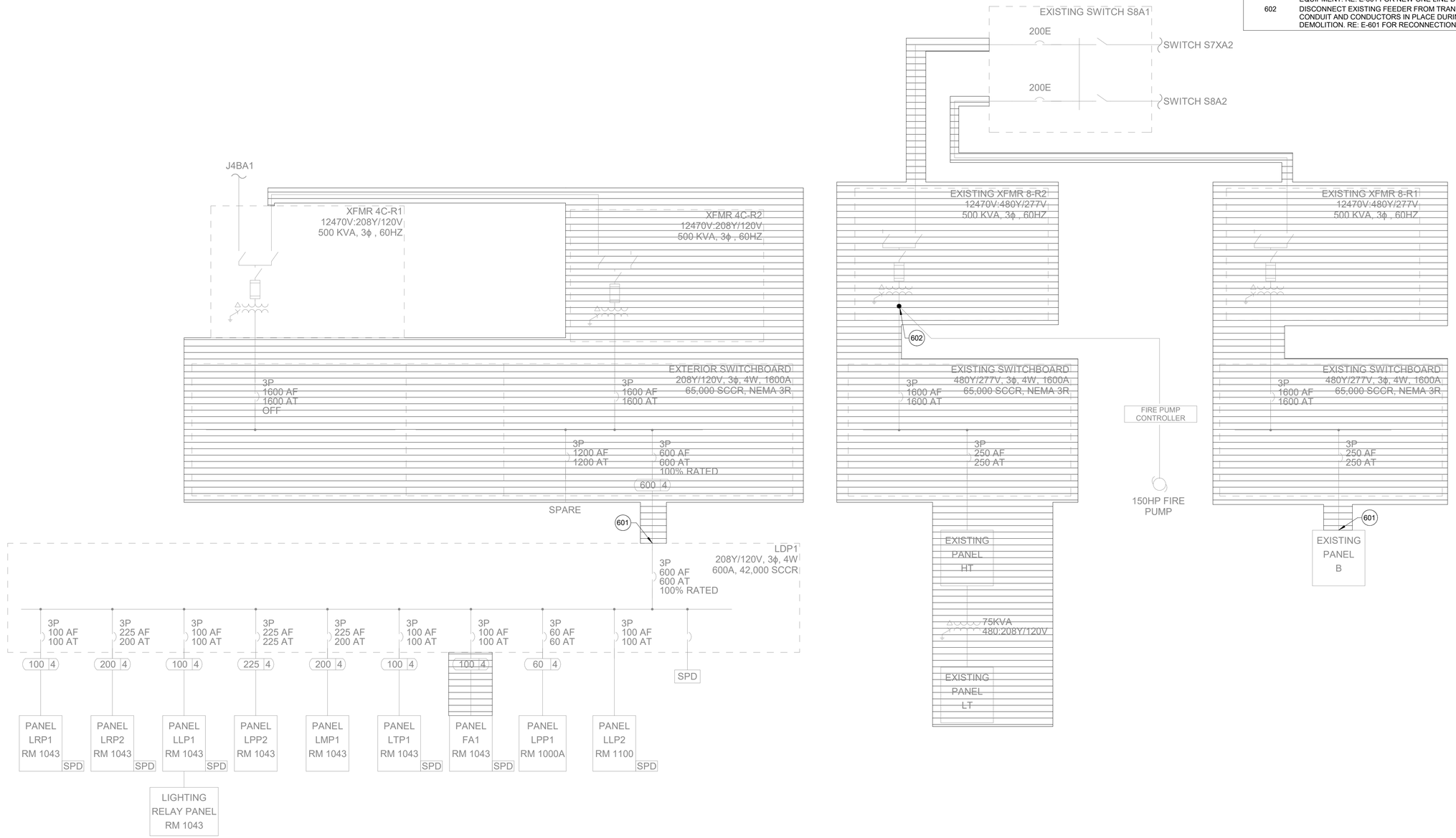
ONE-LINE DEMOLITION LEGEND

HATCH	DESCRIPTION
	DEMOLISH
	EXISTING TO REMAIN

SHEET KEYNOTES

601	DEMOLISH EXISTING FEEDERS. RE-FEED FROM NEW DISTRIBUTION EQUIPMENT. RE: E-601 FOR NEW ONE LINE DIAGRAM.
602	DISCONNECT EXISTING FEEDER FROM TRANSFORMER 8-R2. PROTECT CONDUIT AND CONDUCTORS IN PLACE DURING TRANSFORMER DEMOLITION. RE: E-601 FOR RECONNECTION INFORMATION.



A1 DEMOLITION ONE LINE DIAGRAM
NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
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US ARMY CORPS OF ENGINEERS
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ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DEMOLITION ONE LINE DIAGRAM

SHEET ID
ED601

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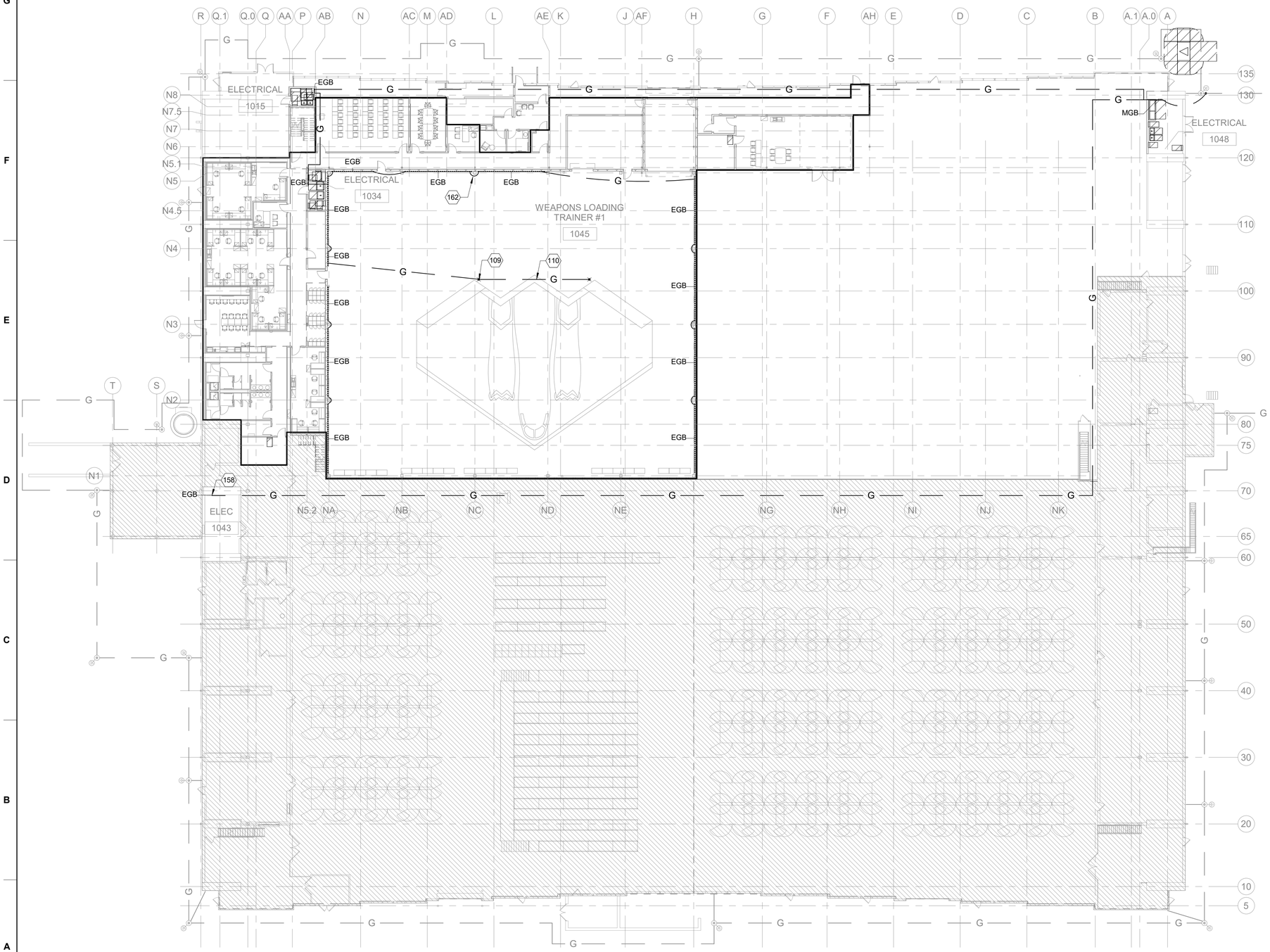
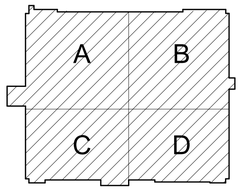


GENERAL SHEET NOTES - GROUNDING

1. FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2. THE DESIGN IS INTENDED TO SHOW THE BASIC GROUNDING ELECTRODE SYSTEM. VERIFY THE DIMENSIONS AND SITE CONDITIONS.
3. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

109	PROVIDE STATIC GROUNDING RECEPTACLE. TYPICAL. RE: A3/EP502.
110	PROVIDE #4 BARE COPPER FOR INTERCONNECTION OF AIRCRAFT STATIC GROUNDING POINTS. BOND TO NEARBY ELECTRICAL GROUND BAR WHERE INDICATED. TYPICAL.
158	BOND EXISTING GROUND BAR TO NEW MGB IN ELEC 1048.
162	MOUNT GROUND BARS AT 4' IN WLT BAY(S). BOND WLT BAY GROUND BARS TOGETHER USING 3/0 AWG. TYPICAL.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

A1 OVERALL GROUNDING PLAN - LEVEL 01 - BASE BID

1" = 20'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EG101a
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

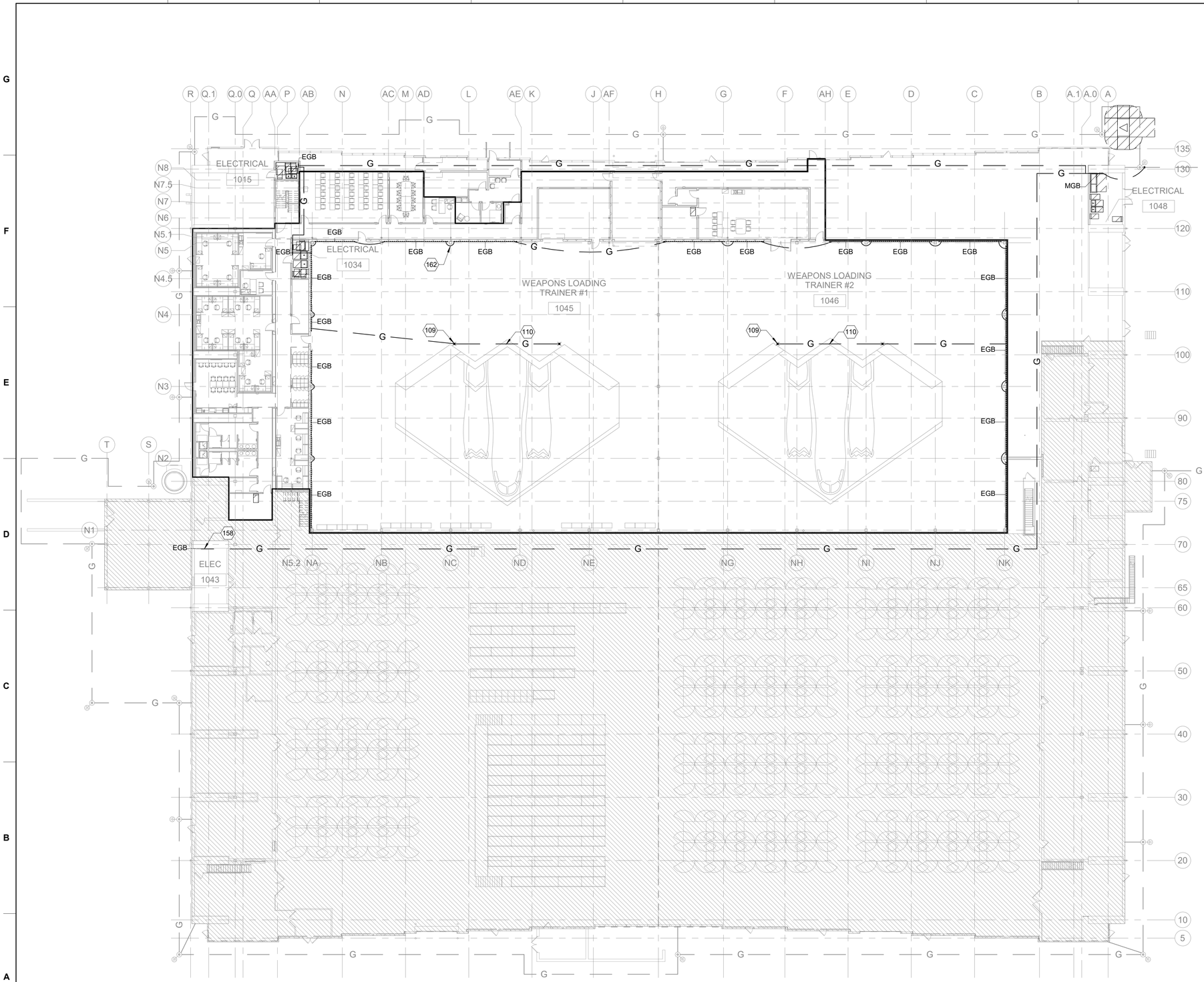
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL GROUNDING PLAN - LEVEL 01 - BASE BID

SHEET ID

EG101a

ADVERTISEMENT - 100% DESIGN

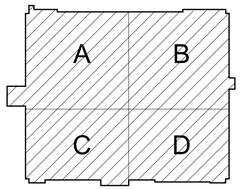


GENERAL SHEET NOTES - GROUNDING

1. FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2. THE DESIGN IS INTENDED TO SHOW THE BASIC GROUNDING ELECTRODE SYSTEM. VERIFY THE DIMENSIONS AND SITE CONDITIONS.
3. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

109	PROVIDE STATIC GROUNDING RECEPTACLE. TYPICAL. RE: A3/EP502.
110	PROVIDE #4 BARE COPPER FOR INTERCONNECTION OF AIRCRAFT STATIC GROUNDING POINTS. BOND TO NEARBY ELECTRICAL GROUND BAR WHERE INDICATED. TYPICAL.
158	BOND EXISTING GROUND BAR TO NEW MGB IN ELEC 1048.
162	MOUNT GROUND BARS AT 4' IN WLT BAY(S). BOND WLT BAY GROUND BARS TOGETHER USING 3/0 AWG. TYPICAL.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

A1 OVERALL GROUNDING PLAN - LEVEL 01 - BID OPTION

1" = 20'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EG101b
ANSI D 22x34

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OMAHA, NEBRASKA

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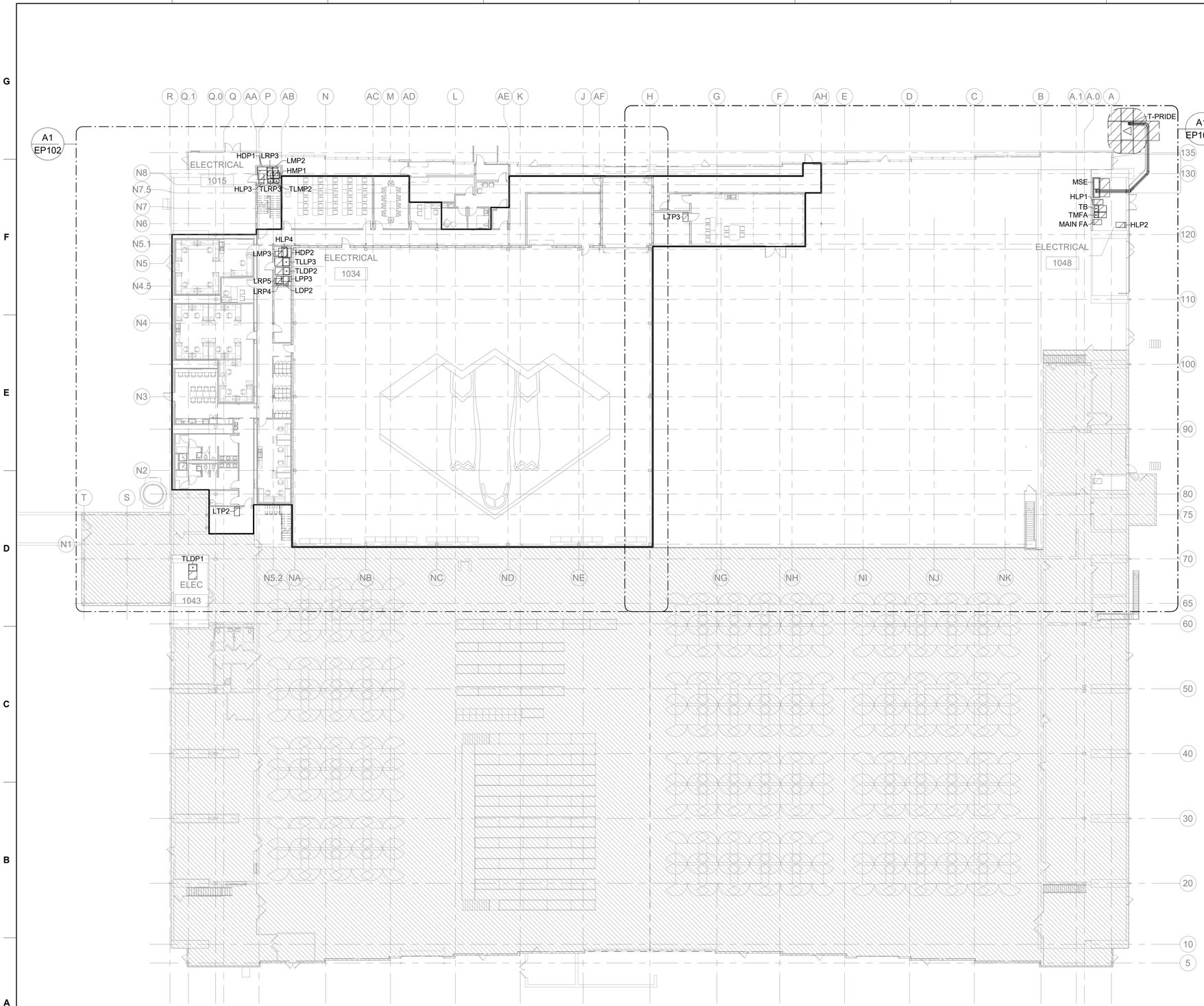
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL GROUNDING PLAN - LEVEL 01 - BID OPTION

SHEET ID
EG101b

ADVERTISEMENT - 100% DESIGN

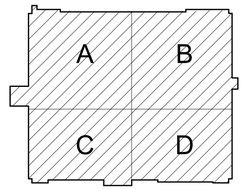


A1 OVERALL POWER PLAN - LEVEL 01

1" = 20'-0"

GENERAL SHEET NOTES - POWER

1. FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3. SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802EP101

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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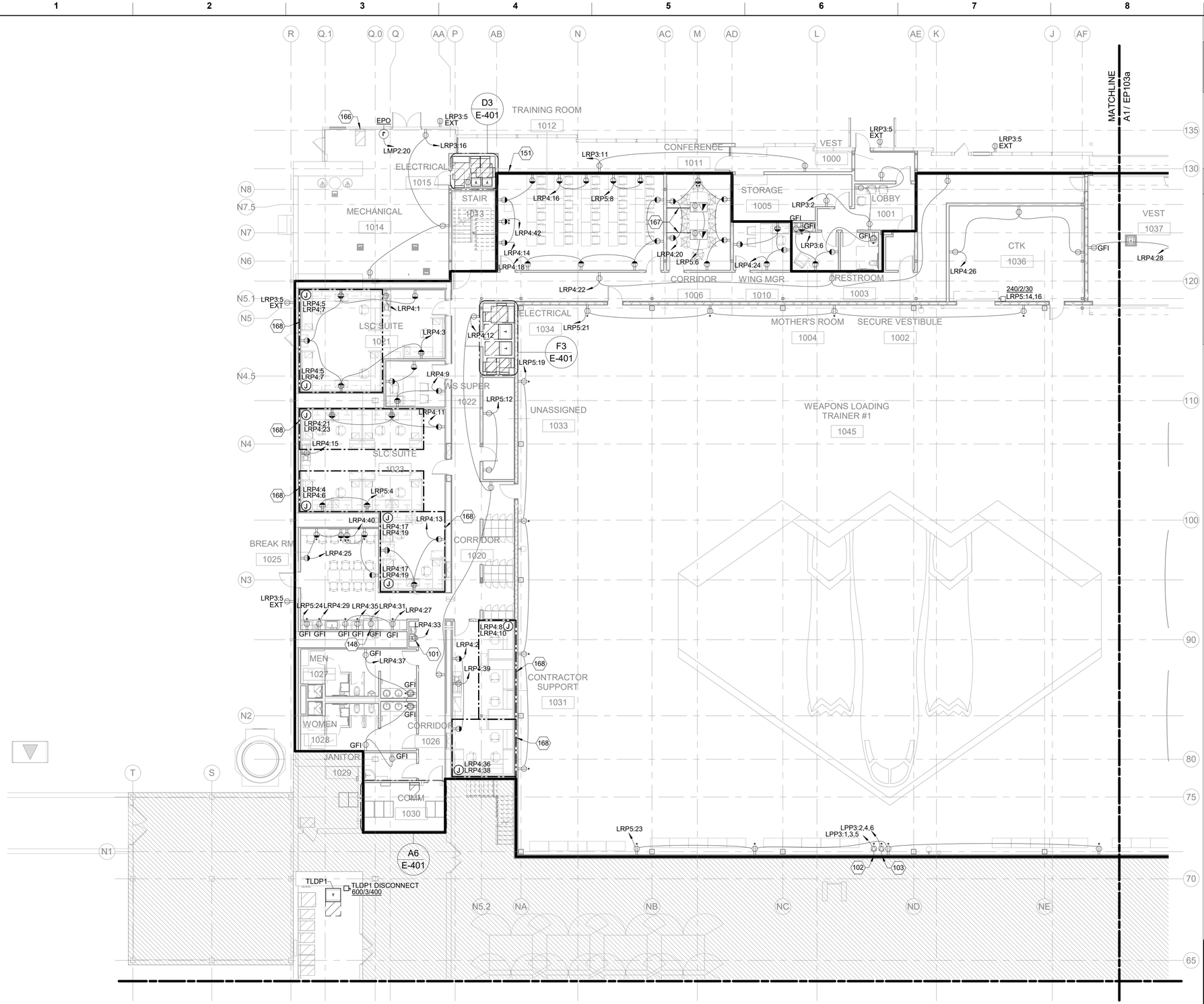
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL POWER PLAN - LEVEL 01

SHEET ID

EP101

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL POWER PLAN - LEVEL 01 - AREA A

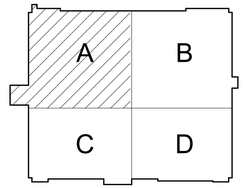
3/32" = 1'-0"

GENERAL SHEET NOTES - POWER

1	FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2	DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3	SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.

SHEET KEYNOTES

101	COORDINATE RECEPTACLE INSTALLATION LOCATION WITH ELECTRIC WATER COOLER PROVIDER. INSTALL RECEPTACLE SO THAT IT IS HIDDEN FROM VIEW. PROVIDE GFI CIRCUIT BREAKER.
102	PROVIDE A 120/208 VAC, 200A, 3P+N+G CONNECTION TYPE, DS200 INLET, FOR POWERING WLT DEVICE.
103	PROVIDE A PIN AND SLEEVE 208/120V, 200A RECEPTACLE FOR PORTABLE 400 HZ CONVERTER.
148	PROVIDE REMOTE GFI PUSHBUTTON ABOVE COUNTER. PROVIDE LABEL "REFRIGERATOR GFI" ON COVER PLATE.
151	PENETRATE THROUGH WALL WITH FEEDER FOR HDP2 AND GROUNDING CONDUCTOR FOR EGB IN ELEC 1034. RE: E3/EP502 FOR PENETRATION DETAIL.
166	EXISTING FUEL ISLAND EQUIPMENT.
167	ROUTE 1"C FROM PLAN WEST WALL TO FLOOR BOX. COORDINATE FINAL INSTALLATION OF FLOOR BOX WITH THE TELECOMMUNICATIONS CONTRACTOR.
168	CIRCUIT SYSTEMS FURNITURE IN DASHED BOX TO JUNCTION BOX CIRCUITS SHOWN.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: ANSI D 22x34
FILE NAME: FXBM231802EP102

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

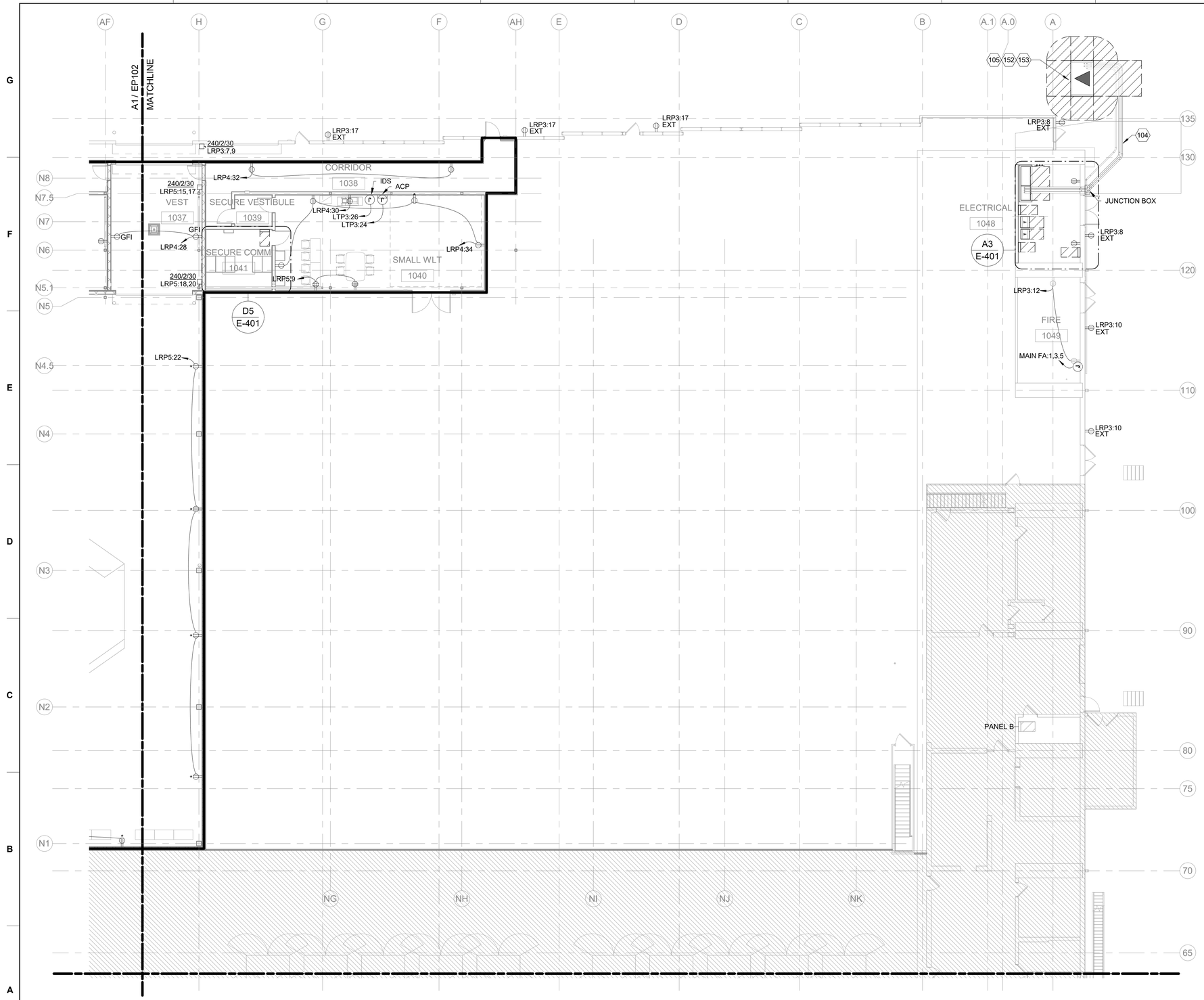
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL POWER PLAN - LEVEL 01 - AREA A

SHEET ID

EP102

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL POWER PLAN - LEVEL 01 - AREA B - BASE BID

3/32" = 1'-0"

GENERAL SHEET NOTES - POWER

1. FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3. SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.

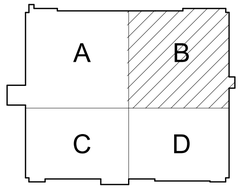
SHEET KEYNOTES

104 RE: E-601 FOR CONDUIT AND CABLE SIZE.

105 CONDUIT PATHWAY FROM THE SWITCH S8A1 TO T-PRIDE MAY BE REUSED, PROVIDED THAT THE CONDUIT IS RODDED AND CLEANED PRIOR TO THE INSTALLATION OF NEW MEDIUM VOLTAGE CABLING. RE: CU101 FOR EXISTING ROUTE. IF THE CONDUIT IS FOUND TO BE IN POOR CONDITION REQUIRING REPLACEMENT, CONTACT THE CONTRACTING OFFICER FOR INSTRUCTIONS ON HOW TO PROCEED.

152 PROVIDE A FIBERGLASS BOX PAD BELOW TRANSFORMER. CUT CONDUITS FROM EXISTING SWITCH S8A1 AFTER REMOVING EXISTING CABLES SO THAT THE PAD CAN BE INSTALLED.

153 PROVIDE NEW CONDUIT INTO THE FIBERGLASS BOX PAD. CONNECT TO EXISTING CONDUITS THAT WERE CUT. MATCH EXISTING TYPE AND SIZE.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802EP103a

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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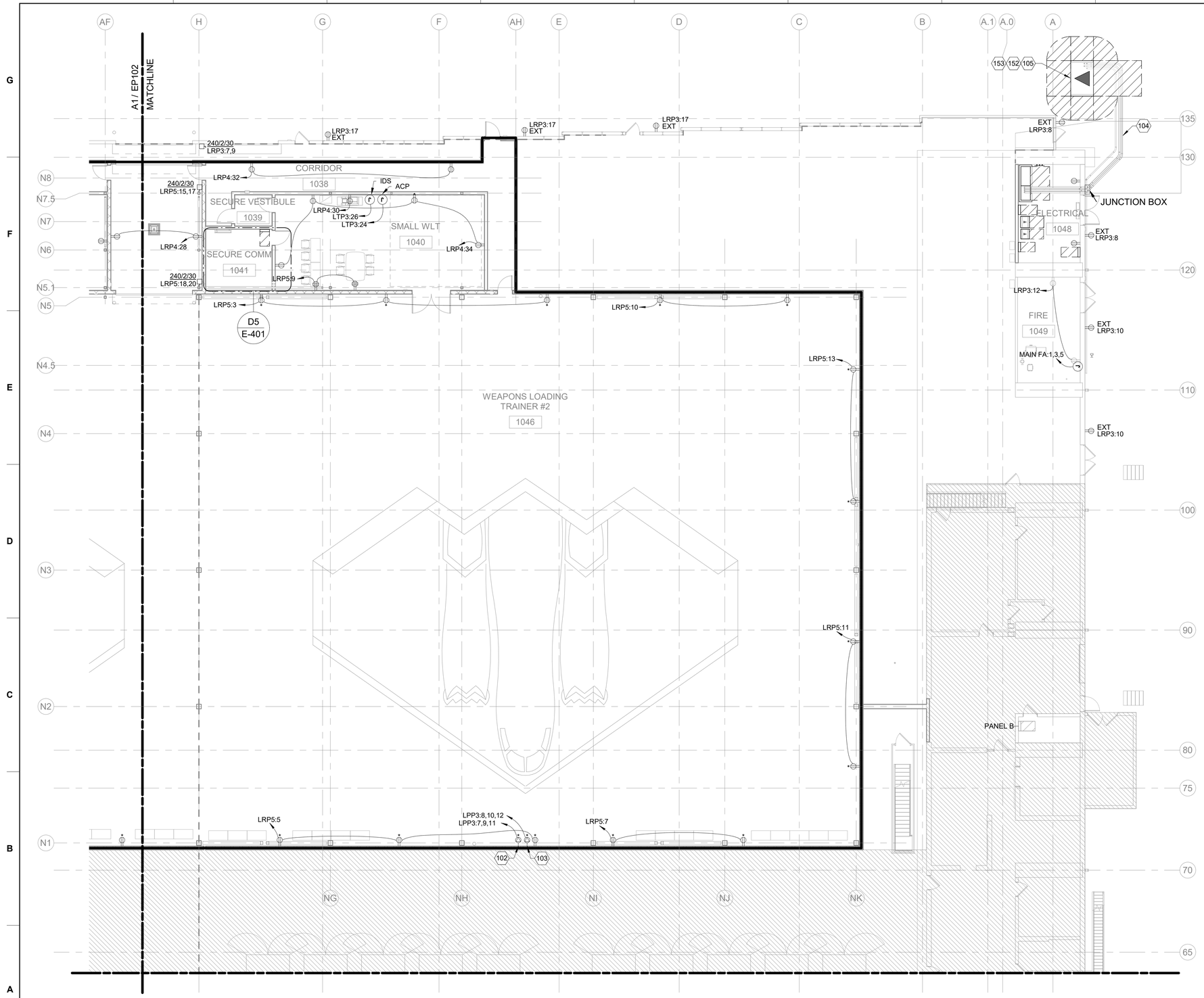
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL POWER PLAN - LEVEL 01 - AREA
B - BASE BID

SHEET ID

EP103a

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL POWER PLAN - LEVEL 01 - AREA B - BID OPTION

3/32" = 1'-0"

GENERAL SHEET NOTES - POWER

1. FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3. SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.

SHEET KEYNOTES

102 PROVIDE A 120/208 VAC, 200A, 3P+N+G CONNECTION TYPE, DS200 INLET, FOR POWERING WLT DEVICE.

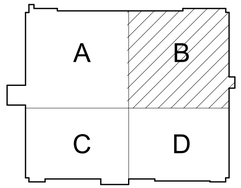
103 PROVIDE A PIN AND SLEEVE 208/120V, 200A RECEPTACLE FOR PORTABLE 400 HZ CONVERTER.

104 RE: E-601 FOR CONDUIT AND CABLE SIZE.

105 CONDUIT PATHWAY FROM THE SWITCH S8A1 TO T-PRIDE MAY BE REUSED, PROVIDED THAT THE CONDUIT IS RODDED AND CLEANED PRIOR TO THE INSTALLATION OF NEW MEDIUM VOLTAGE CABLING. RE: CU101 FOR EXISTING ROUTE. IF THE CONDUIT IS FOUND TO BE IN POOR CONDITION REQUIRING REPLACEMENT, CONTACT THE CONTRACTING OFFICER FOR INSTRUCTIONS ON HOW TO PROCEED.

152 PROVIDE A FIBERGLASS BOX PAD BELOW TRANSFORMER. CUT CONDUITS FROM EXISTING SWITCH S8A1 AFTER REMOVING EXISTING CABLES SO THAT THE PAD CAN BE INSTALLED.

153 PROVIDE NEW CONDUIT INTO THE FIBERGLASS BOX PAD. CONNECT TO EXISTING CONDUITS THAT WERE CUT. MATCH EXISTING TYPE AND SIZE.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EP103b

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

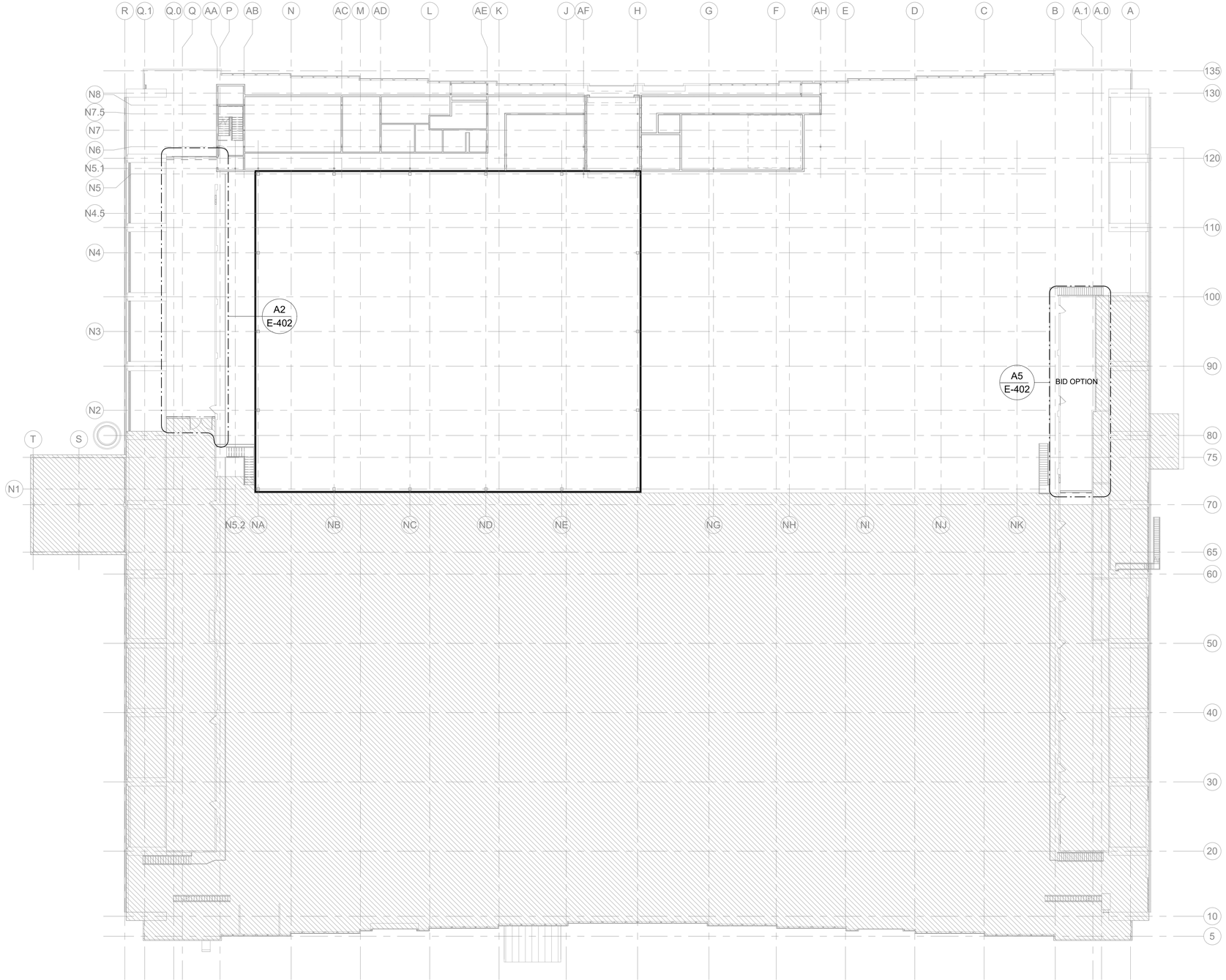
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL POWER PLAN - LEVEL 01 - AREA
B - BID OPTION

SHEET ID

EP103b

ADVERTISEMENT - 100% DESIGN

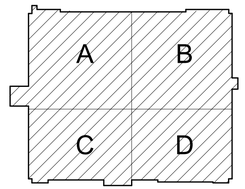


A1 OVERALL POWER PLAN - EQUIPMENT PLATFORM 01

1" = 20'-0"

GENERAL SHEET NOTES - POWER

1. FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3. SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802EP111

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

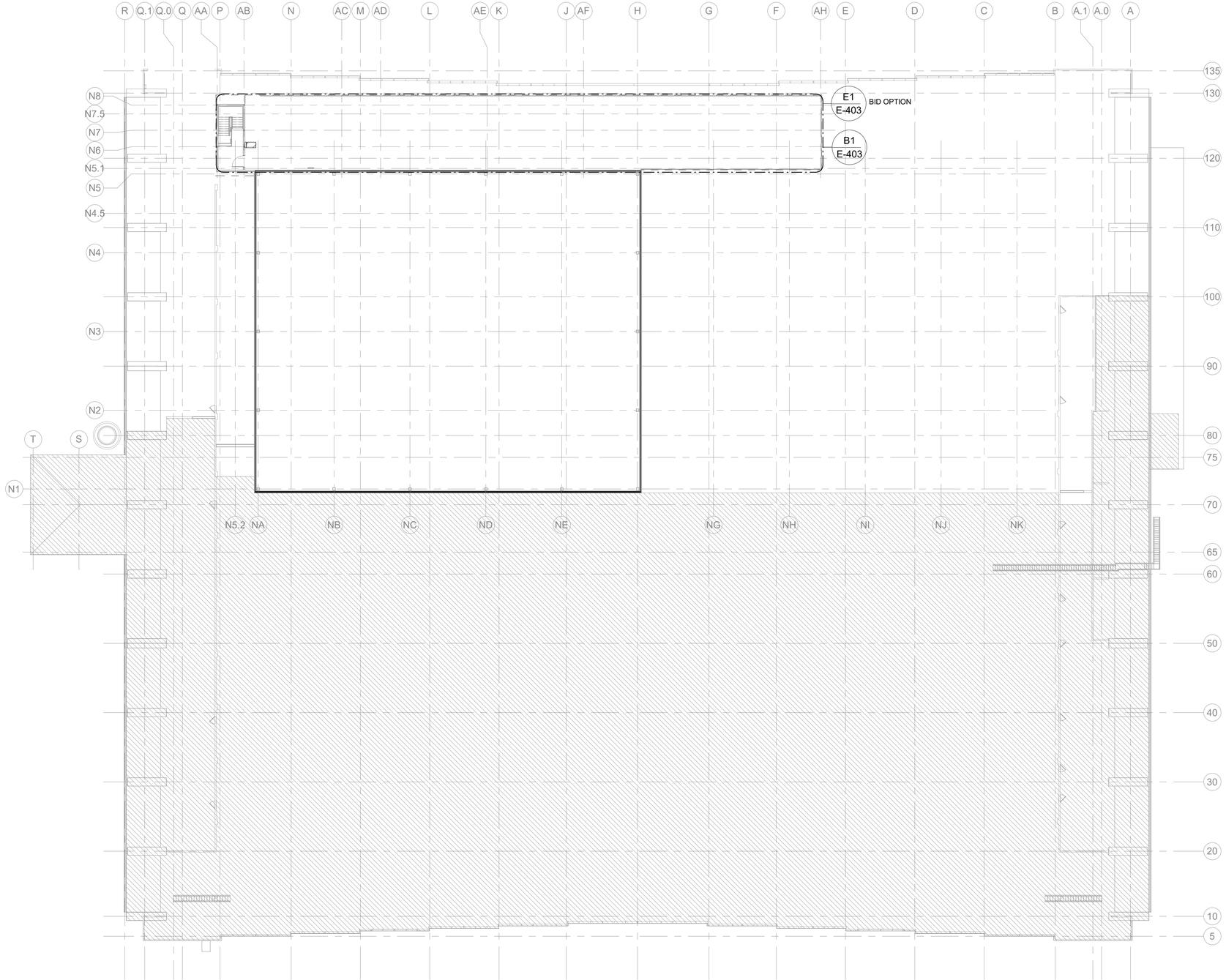
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL POWER PLAN - EQUIPMENT
PLATFORM 01

SHEET ID

EP111

ADVERTISEMENT - 100% DESIGN

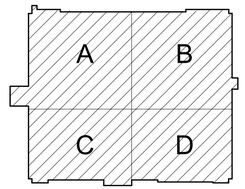


A1 OVERALL POWER PLAN - EQUIPMENT PLATFORM 02

1" = 20'-0"

GENERAL SHEET NOTES - POWER

1. FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3. SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802EP121

US ARMY CORPS OF ENGINEERS
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OMAHA, NEBRASKA

Jacobs
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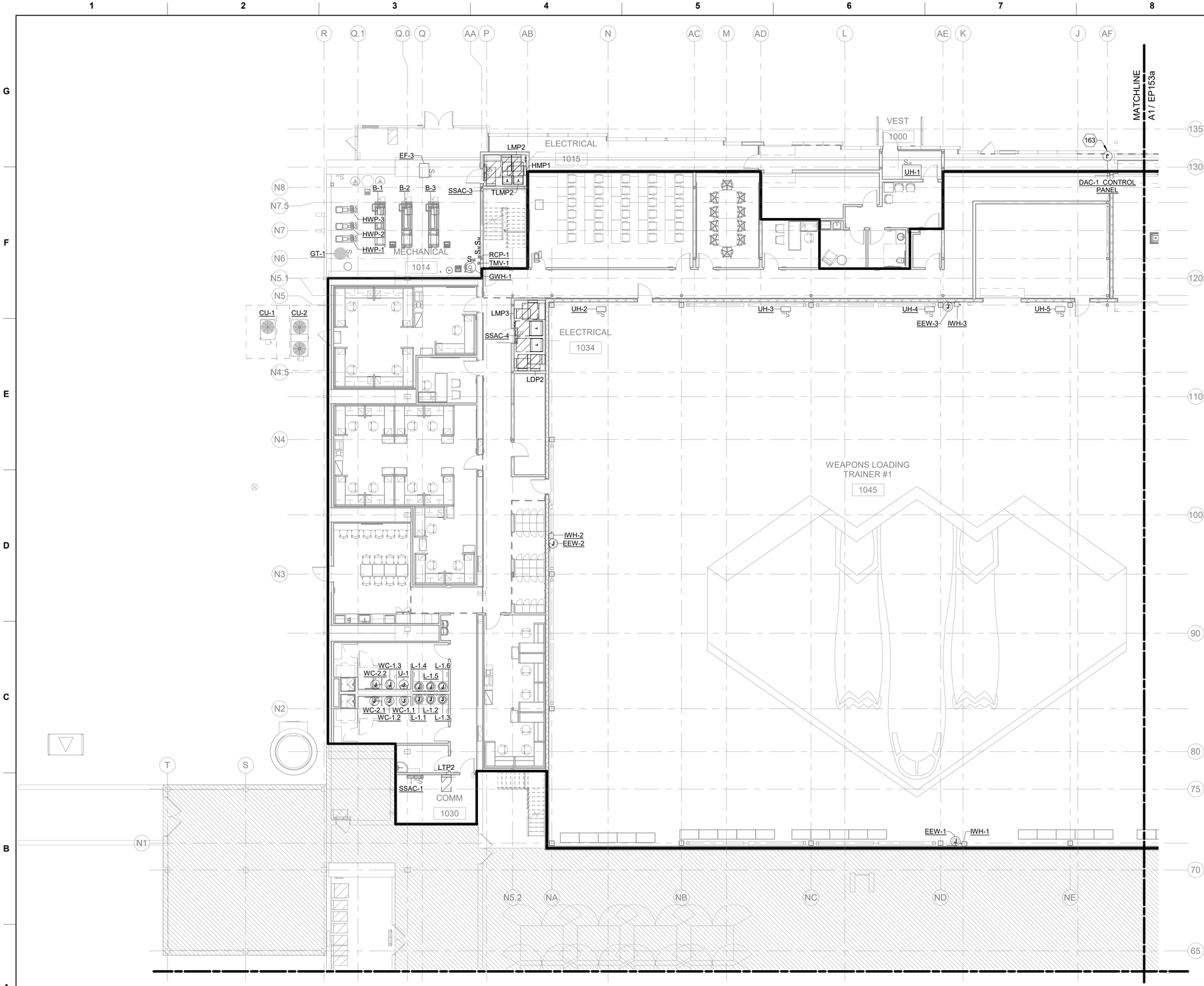
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL POWER PLAN - EQUIPMENT
PLATFORM 02

SHEET ID

EP121

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA A - BASE BID

3/32" = 1'-0"

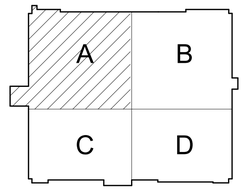
GENERAL SHEET NOTES - EQUIPMENT

1 REFER TO EP601 FOR EQUIPMENT CONNECTION INFORMATION.

2 DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

163 COORDINATE FINAL LOCATION OF CONTROL PANEL WITH MECHANICAL CONTRACTOR.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DITSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EP152a
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

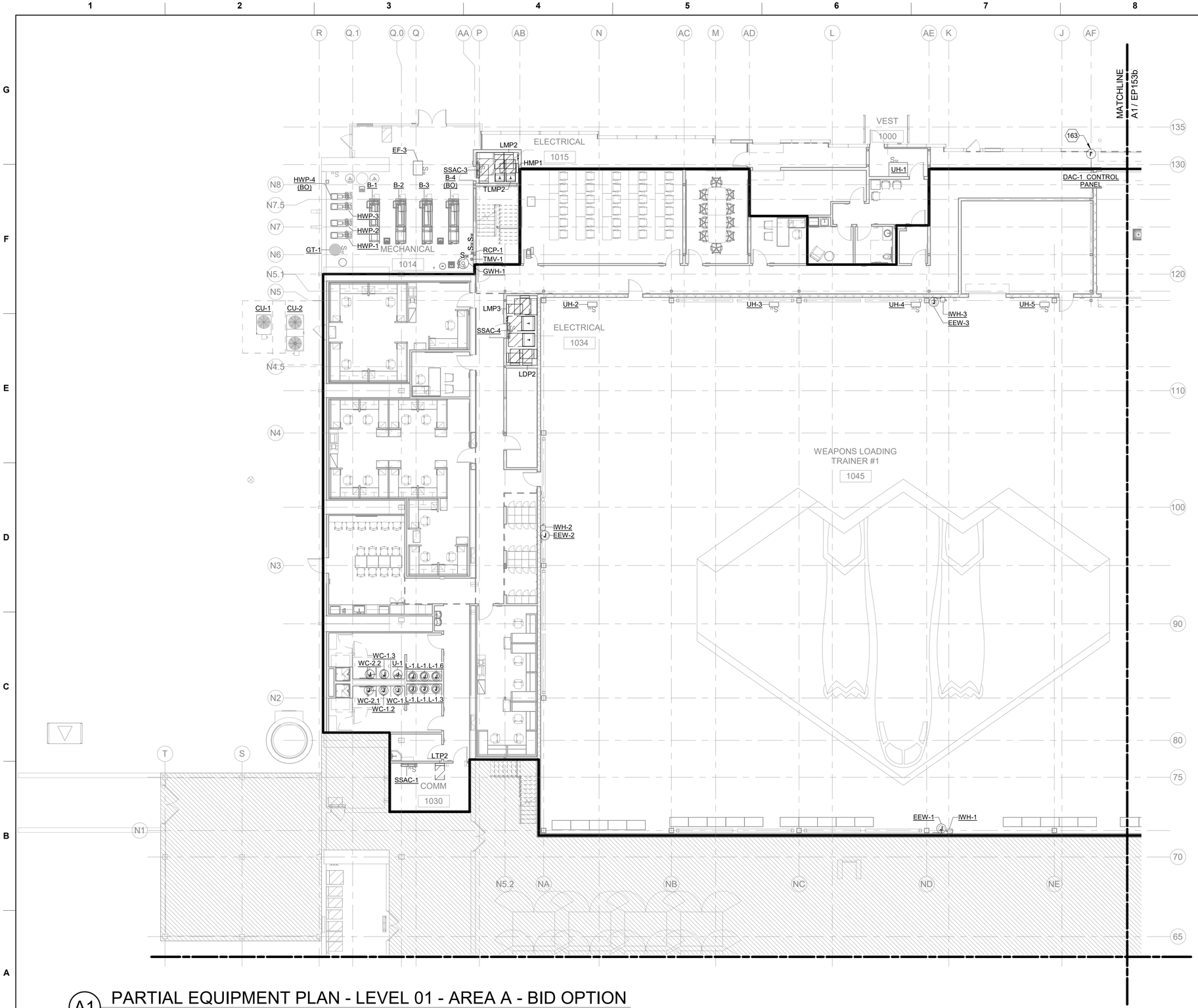
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA A - BASE BID

SHEET ID

EP152a

ADVERTISEMENT - 100% DESIGN

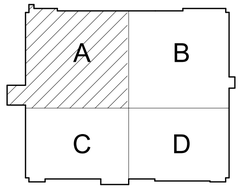


GENERAL SHEET NOTES - EQUIPMENT

1 REFER TO EP601 FOR EQUIPMENT CONNECTION INFORMATION.
2 DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

163 COORDINATE FINAL LOCATION OF CONTROL PANEL WITH MECHANICAL CONTRACTOR.



AREA A
KEY PLAN

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

PLAN NORTH
TRUE N

A1 PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA A - BID OPTION
3/32" = 1'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DITSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EP152b
ANSI D 22x34

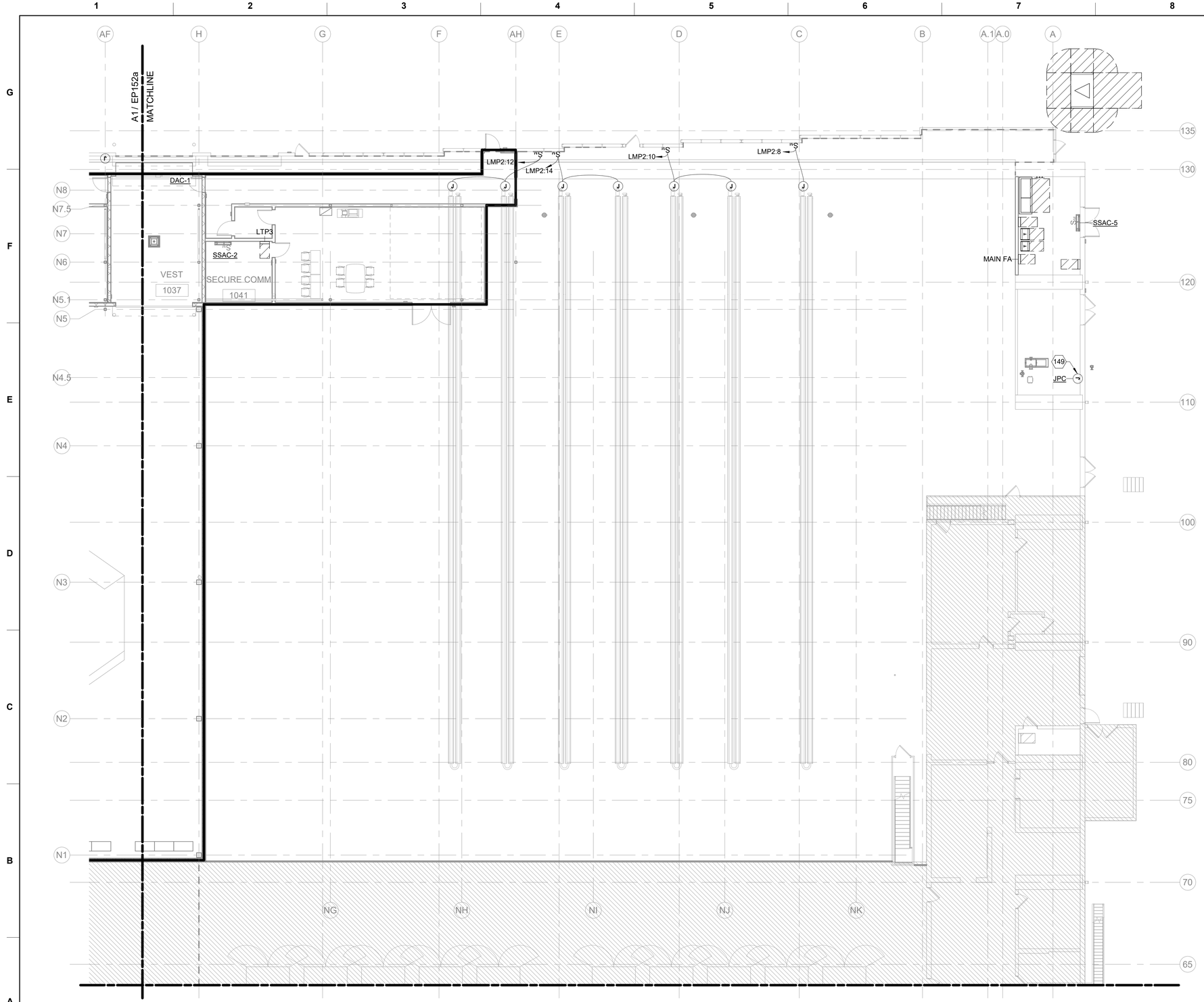
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA A - BID OPTION

SHEET ID
EP152b

ADVERTISEMENT - 100% DESIGN



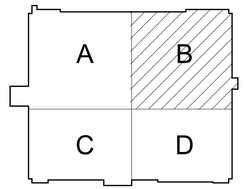
A1 PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA B - BASE BID
3/32" = 1'-0"

GENERAL SHEET NOTES - EQUIPMENT

1 FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2 DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3 SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.

SHEET KEYNOTES

149 RE-CIRCUIT THE JOCKEY PUMP CONTROLLER TO PANEL "MAIN FA." PROVIDE 3#10, 1#10G IN 3/4"C.



AREA B
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
SIZE: ANSI D 22x34
FILE NAME: FXBM231802EP153a

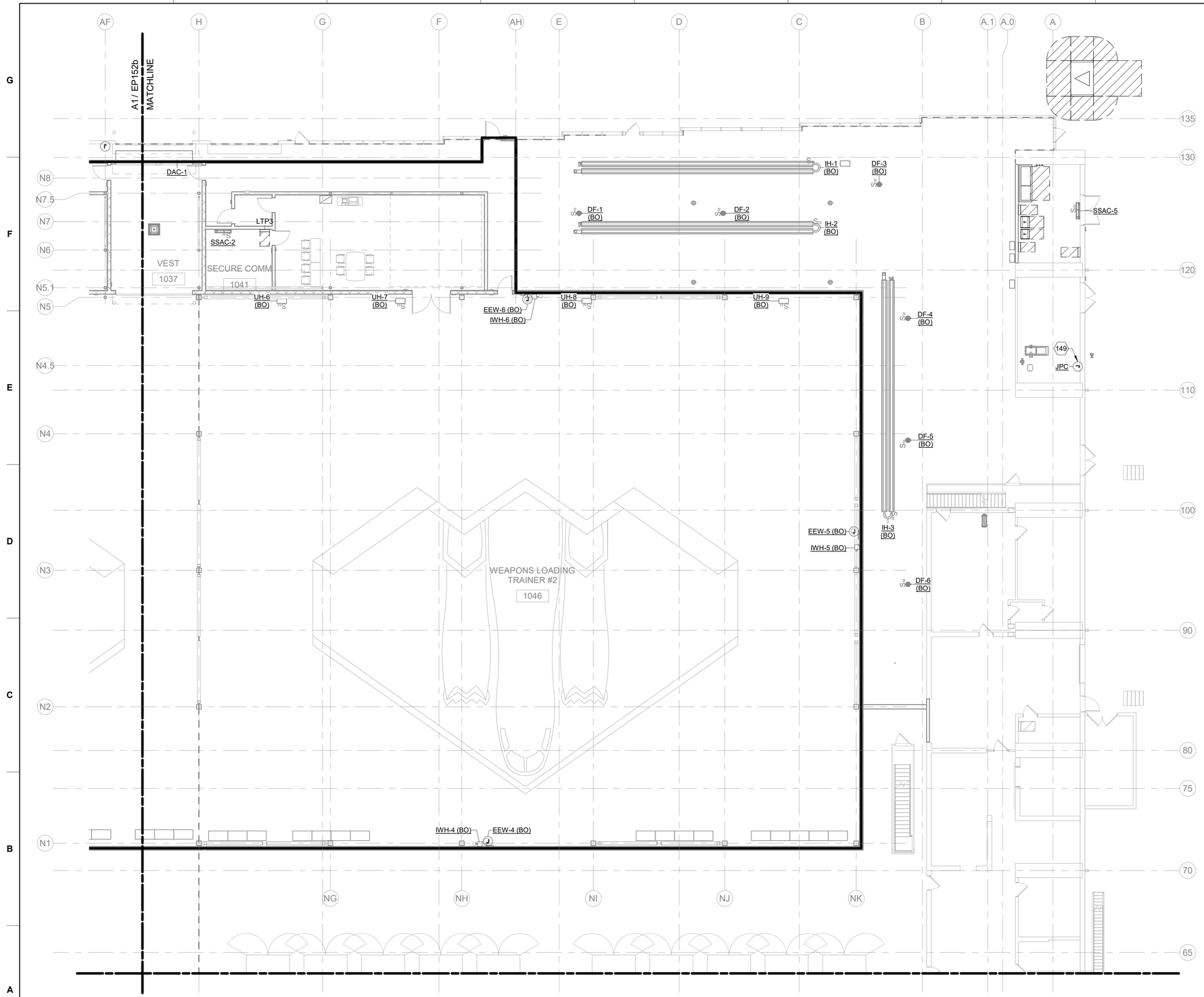
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA B - BASE BID

SHEET ID
EP153a

ADVERTISEMENT - 100% DESIGN



GENERAL SHEET NOTES - EQUIPMENT

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SHEET KEYNOTES

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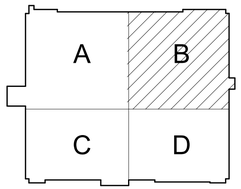

AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

A1 PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA B - BID OPTION

3/32" = 1'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FRUWIRTH
DRAWN BY: G. BUNKER
CHECKED BY: R. YARWISON
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
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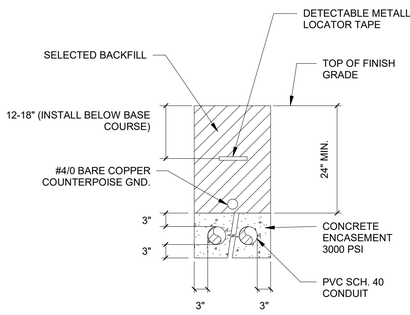
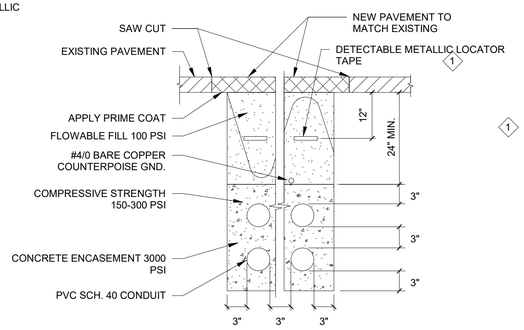
PARTIAL EQUIPMENT PLAN - LEVEL 01 - AREA B - BID OPTION

SHEET ID
EP153b

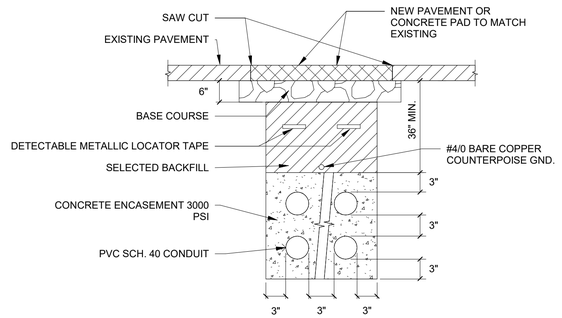
ADVERTISEMENT - 100% DESIGN



TYPE "A"



TYPE "C"- (ROADWAY AREA)



TYPE "D"- (PAVED PARKING AREA)

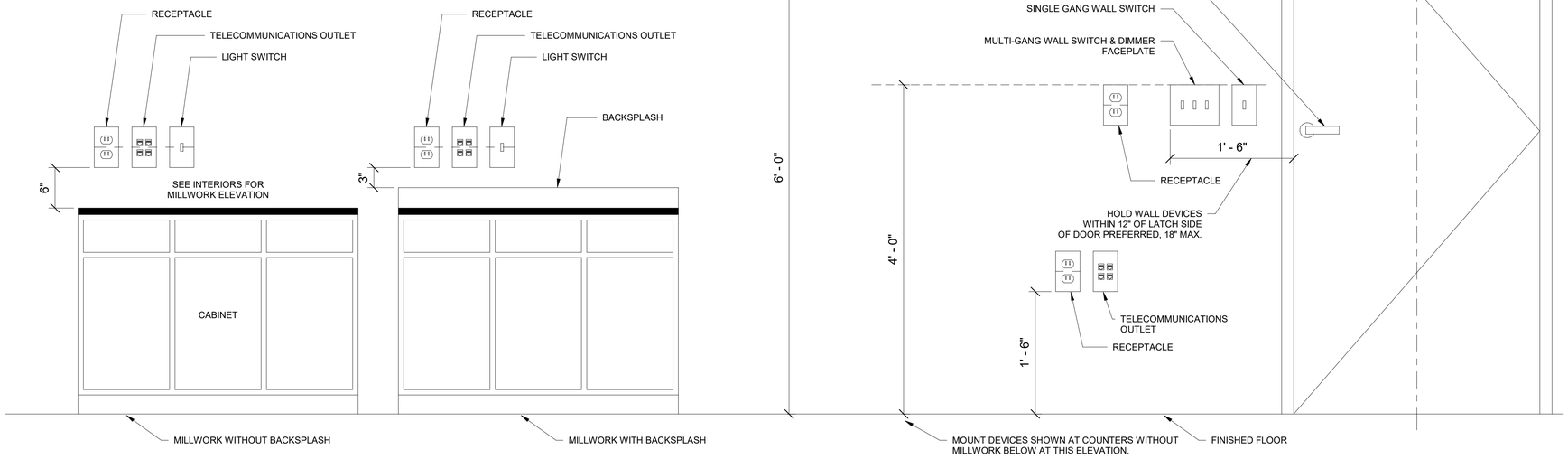
NOTES:

1 PROVIDE TWO WARNING TAPES SIMILAR TO TYPE "B" DUCT DETAIL WHEN DUCT IS WIDER THAN 36".

E3 TYPICAL DUCT SECTION

NTS

NOTES:
1. THESE MOUNTING HEIGHTS APPLY UNLESS SPECIFIED OR NOTED OTHERWISE ON DRAWINGS.
2. ADJUST MOUNTING HEIGHTS IN CMU CONSTRUCTION AS REQUIRED TO AVOID CUTTING MORE THAN ONE BLOCK.
3. COORDINATE DEVICE LOCATIONS WITH MILLWORK.
4. DO NOT INSTALL OUTLET DEVICES BACK TO BACK; MINIMUM 2" OFFSET.



A3 TYPICAL ELECTRICAL DEVICE MOUNTING HEIGHTS

NTS

US Army Corps of Engineers
Omaha District ®

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DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EP501

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID
EP501

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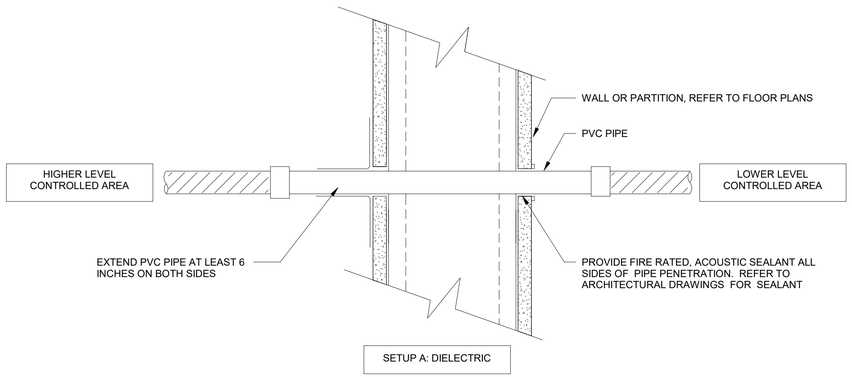
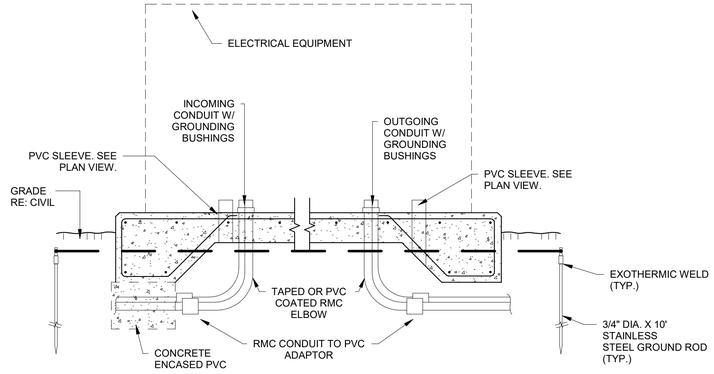
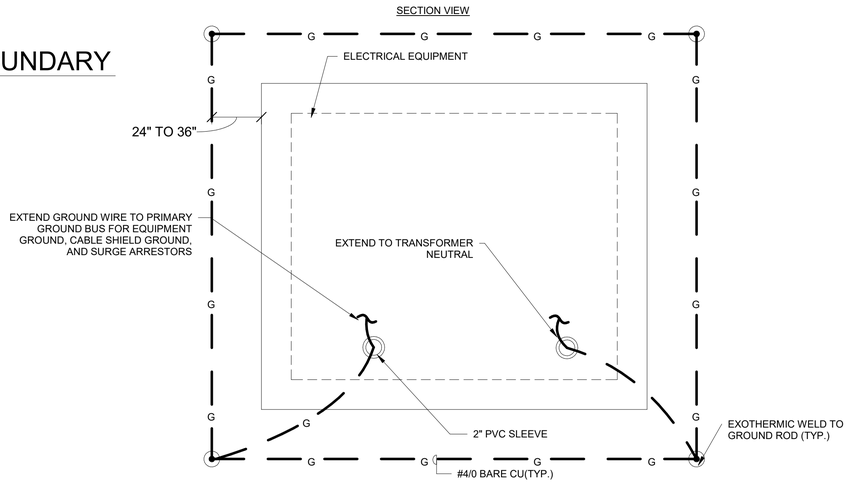


E3 NEW CONDUIT PENETRATION - SECURE TO UNSECURE BOUNDARY

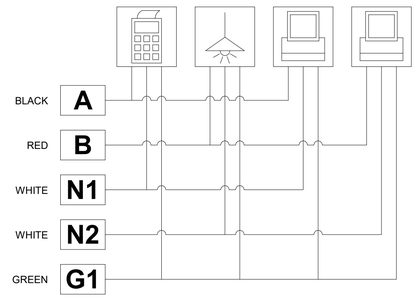
NOT TO SCALE





A8 EQUIPMENT PAD GROUNDING

NTS



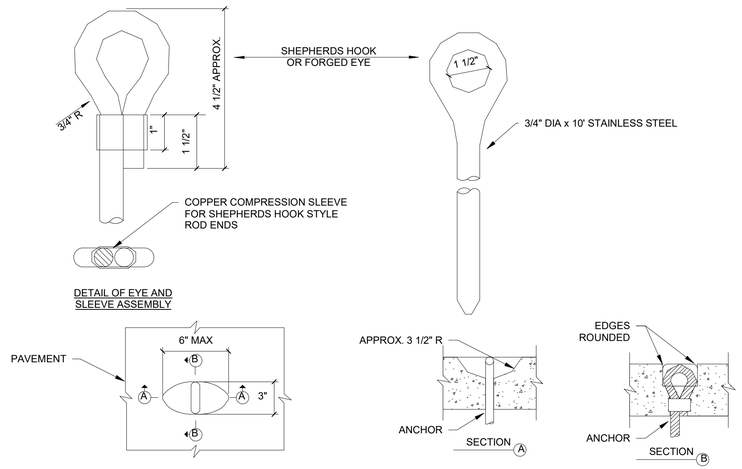
FURNITURE CONNECTIONS CONSIST OF TWO 20 AMP CIRCUITS IN A NONDIRECTIONAL 5-WIRE CONFIGURATION CONSISTING OF TWO BRANCH CIRCUIT CONDUCTORS, TWO NEUTRALS, AND ONE GROUND. USE HANDLE TIES TO JOIN EACH SET OF TWO CIRCUITS TOGETHER SO THAT NO CIRCUIT MAY REMAIN CLOSED WHILE OTHERS ARE BEING SERVICED.

COORDINATE WITH FURNITURE EQUIPMENT SUPPLIER FOR APPROPRIATE CONNECTION CABLES AND INTERIORS INSTALLER FOR BUILT-IN RACEWAY CONNECTIONS.

ENSURE 50% OF CIRCUITS ARE COORDINATED WITH THE ENERGY CODE WIRING DIAGRAM A1/EL503 TO PROVIDE 50% SWITCHED RECEPTACLES.

A7 FURNITURE SYSTEM 5-WIRE WIRING DIAGRAM

NTS



NOTE: AN APRON STATIC GROUNDING RECEPTACLE IS REQUIRED TO SIMULATE APRON CONDITIONS FOR WLT BAY.

A3 APRON AIRCRAFT STATIC GROUND

NTS

US Army Corps of Engineers
Omaha District ®

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DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EEP502
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID

EP502

ADVERTISEMENT - 100% DESIGN

EQUIPMENT CONNECTIONS - MECHANICAL

ID	EQUIPMENT	VOLT	PHASES	LOAD	FLA	MCA	OCPD RATING	D/S RATING	PANEL	CIRCUIT	WIRE/CONDUIT	COMMENTS
AHU-1 EF	AIR HANDLING UNIT 1 EXHAUST FAN	480 V	3	2823 VA	3.4 A	4.3 A	15 A		HMP2	31,33,35	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
AHU-1 SF	AIR HANDLING UNIT 1 SUPPLY FAN	480 V	3	6809 VA	8.2 A	10.3 A	15 A		HMP2	1,3,5	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
AHU-2 EF	AIR HANDLING UNIT 2 EXHAUST FAN	480 V	3	2823 VA	3.4 A	4.3 A	15 A		HMP2	32,34,36	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
AHU-2 SF	AIR HANDLING UNIT 2 SUPPLY FAN	480 V	3	6809 VA	8.2 A	10.3 A	15 A		HMP2	7,9,11	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
B-1	BOILER 1	480 V	3	7523 VA	9.1 A	11.3 A	20 A		HMP1	7,9,11	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
B-2	BOILER 2	480 V	3	7523 VA	9.1 A	11.3 A	20 A		HMP1	13,15,17	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
B-3	BOILER 3	480 V	3	7523 VA	9.1 A	11.3 A	20 A		HMP1	19,21,23	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
B-4 (BO)	BOILER 4 (BID OPTION)	480 V	3	7523 VA	9.1 A	11.3 A	20 A		HMP1	25,27,29	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
CU-1	CONDENSING UNIT 1	480 V	3	16627 VA	20.0 A	25.0 A	25 A		HMP1	2,4,6	3#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
CU-2	CONDENSING UNIT 2	480 V	3	26604 VA	32.0 A	40.0 A	50 A		HMP1	8,10,12	3#6, 1#10G, 1"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
DAC-1	DOOR AIR CURTAIN 1	480 V	3	42350 VA	51.0 A	63.8 A	100 A		HMP1	31,33,35	3#1, 1#8G, 1 1/2"C	MANUFACTURER CONTROL PANEL AND DISCONNECT.
DAC-1 CONTROL PANEL	DAC-1 CONTROL PANEL	120 V	1	240 VA	2.0 A	2.5 A	15 A		LMP2	22	2#12, 1#12G, 3/4"C	
DF-1 (BO)	DESTRAT FAN 1 (BID OPTION)	120 V	1	228 VA	1.9 A	2.4 A	15 A		LMP2	25	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
DF-2 (BO)	DESTRAT FAN 2 (BID OPTION)	120 V	1	228 VA	1.9 A	2.4 A	15 A		LMP2	27	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
DF-3 (BO)	DESTRAT FAN 3 (BID OPTION)	120 V	1	228 VA	1.9 A	2.4 A	15 A		LMP2	13	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
DF-4 (BO)	DESTRAT FAN 4 (BID OPTION)	120 V	1	228 VA	1.9 A	2.4 A	15 A		LMP2	15	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
DF-5 (BO)	DESTRAT FAN 5 (BID OPTION)	120 V	1	228 VA	1.9 A	2.4 A	15 A		LMP2	17	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
DF-6 (BO)	DESTRAT FAN 6 (BID OPTION)	120 V	1	228 VA	1.9 A	2.4 A	15 A		LMP2	19	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
EF-1	EXHAUST FAN 1	480 V	3	28267 VA	34.0 A	42.5 A	60 A		HMP2	25,27,29	3#4, 1#10G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
EF-2	EXHAUST FAN 2	480 V	3	28267 VA	34.0 A	42.5 A	60 A		HMP2	26,28,30	3#4, 1#10G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
EF-3	EXHAUST FAN 3	120 V	1	1920 VA	16.0 A	20.0 A	30 A		LMP2	4	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
EF-4 (BO)	EXHAUST FAN 4 (BID OPTION)	480 V	3	28267 VA	34.0 A	42.5 A	60 A		MSE	11	3#4, 1#10G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
EF-5 (BO)	EXHAUST FAN 5 (BID OPTION)	480 V	3	28267 VA	34.0 A	42.5 A	60 A		MSE	12	3#4, 1#10G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
ERV-1	ENERGY RECOVERY VENTILATOR 1	480 V	3	1995 VA	2.4 A	3.0 A	15 A		HMP2	2,4,6	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
ERV-2	ENERGY RECOVERY VENTILATOR 2	480 V	3	1995 VA	2.4 A	3.0 A	15 A		HMP2	8,10,12	3#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
GT-1	GLYCOL TANK	120 V	1	1176 VA	9.8 A	12.3 A	15 A		LMP2	23	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
HWP-1	HOT WATER PUMP 1	480 V	3	17459 VA	21.0 A	26.3 A	40 A		HMP1	14,16,18	3#8, 1#10G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
HWP-2	HOT WATER PUMP 2	480 V	3	17459 VA	21.0 A	26.3 A	40 A		HMP1	20,22,24	3#8, 1#10G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
HWP-3	HOT WATER PUMP 3	480 V	3	17459 VA	21.0 A	26.3 A	40 A		HMP1	26,28,30	3#8, 1#10G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
HWP-4 (BO)	HOT WATER PUMP 4 - BID OPTION	480 V	3	17459 VA	21.0 A	26.3 A	40 A		HMP1	32,34,36	3#8, 1#10G, 3/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
IH-1 (BO)	INFRARED HEATER 1 (BID OPTION)	120 V	1	120 VA	1.0 A	1.3 A	15 A		LMP2	16	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
IH-2 (BO)	INFRARED HEATER 2 (BID OPTION)	120 V	1	120 VA	1.0 A	1.3 A	15 A		LMP2	16	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
IH-3 (BO)	INFRARED HEATER 3 (BID OPTION)	120 V	1	120 VA	1.0 A	1.3 A	15 A		LMP2	21	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
MUA-1	MAKE UP AIR UNIT 1	480 V	3	39859 VA	48.0 A	60.0 A	70 A		HMP2	13,15,17	3#4, 1#8G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
MUA-2	MAKE UP AIR UNIT 2	480 V	3	39859 VA	48.0 A	60.0 A	70 A		HMP2	14,16,18	3#4, 1#8G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
MUA-3 (BO)	MAKE UP AIR UNIT 3 (BID OPTION)	480 V	3	39859 VA	48.0 A	60.0 A	70 A		HMP2	19,21,23	3#4, 1#8G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
MUA-4 (BO)	MAKE UP AIR UNIT 4 (BID OPTION)	480 V	3	39859 VA	48.0 A	60.0 A	70 A		HMP2	20,22,24	3#4, 1#8G, 1-1/4"C	MANUFACTURER PROVIDED VFD WITH DISCONNECT SWITCH.
SSAC-1	SPLIT SYSTEM AIR CONDITIONING 1	208 V	1	77 VA	0.4 A	0.5 A	30 A		LTP2	13,15	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSAC-2	SPLIT SYSTEM AIR CONDITIONING 2	208 V	1	77 VA	0.4 A	0.5 A	30 A		LTP3	7,9	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSAC-3	SPLIT SYSTEM AIR CONDITIONING 3	208 V	1	77 VA	0.4 A	0.5 A	30 A		LMP2	1,3	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSAC-4	SPLIT SYSTEM AIR CONDITIONING 4	208 V	1	77 VA	0.4 A	0.5 A	30 A		LMP2	5,7	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSAC-5	SPLIT SYSTEM AIR CONDITIONING 5	208 V	1	77 VA	0.4 A	0.5 A	30 A		LMP2	9,11	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSCU-1	SPLIT SYSTEM CONDENSING UNIT 1	208 V	1	3796 VA	18.3 A	22.8 A	30 A		LTP2	13,15	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSCU-2	SPLIT SYSTEM CONDENSING UNIT 2	208 V	1	3796 VA	18.3 A	22.8 A	30 A		LTP3	7,9	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSCU-3	SPLIT SYSTEM CONDENSING UNIT 3	208 V	1	3796 VA	18.3 A	22.8 A	30 A		LMP2	1,3	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSCU-4	SPLIT SYSTEM CONDENSING UNIT 4	208 V	1	3796 VA	18.3 A	22.8 A	30 A		LMP2	5,7	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
SSCU-5	SPLIT SYSTEM CONDENSING UNIT 5	208 V	1	3796 VA	18.3 A	22.8 A	30 A		LMP2	9,11	2#4, 1#4G, 1"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-1	UNIT HEATER 1	120 V	1	696 VA	5.8 A	7.3 A	15 A		LMP2	18	2#12, 1#12G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-2	UNIT HEATER 2	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	1	2#12, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-3	UNIT HEATER 3	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	2	2#12, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-4	UNIT HEATER 4	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	3	2#12, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-5	UNIT HEATER 5	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	4	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-6 (BO)	UNIT HEATER 6 (BID OPTION)	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	6	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-7 (BO)	UNIT HEATER 7 (BID OPTION)	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	8	2#10, 1#10G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-8 (BO)	UNIT HEATER 8 (BID OPTION)	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	5	2#8, 1#8G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.
UH-9 (BO)	UNIT HEATER 9 (BID OPTION)	120 V	1	864 VA	7.2 A	9.0 A	15 A		LMP3	10	2#8, 1#8G, 3/4"C	MANUFACTURER PROVIDED DISCONNECT SWITCH.

EQUIPMENT CONNECTIONS - PLUMBING

ID	EQUIPMENT	VOLT	PHASES	LOAD	FLA	MCA	OCPD RATING	D/S RATING	PANEL	CIRCUIT	WIRE/CONDUIT	COMMENTS
EEW-1	EMERGENCY EYE WASH 1	120 V	1	240 VA	2.0 A	2.5 A	15 A		LMP3	7	2#12, 1#12G, 3/4"C	
EEW-2	EMERGENCY EYE WASH 2	120 V	1	240 VA	2.0 A	2.5 A	15 A		LMP3	7	2#12, 1#12G, 3/4"C	
EEW-3	EMERGENCY EYE WASH 3	120 V	1	240 VA	2.0 A	2.5 A	15 A		LMP3	9	2#12, 1#12G, 3/4"C	
EEW-4 (BO)	EMERGENCY EYE WASH 4 - BID OPTION	120 V	1	240 VA	2.0 A	2.5 A	15 A		LMP3	17	2#12, 1#12G, 3/4"C	
EEW-5 (BO)	EMERGENCY EYE WASH 5 - BID OPTION	120 V	1	240 VA	2.0 A	2.5 A	15 A		LMP3	15	2#12, 1#12G, 3/4"C	
EEW-6 (BO)	EMERGENCY EYE WASH 6 - BID OPTION	120 V	1	240 VA	2.0 A	2.5 A	15 A		LMP3	11	2#12, 1#12G, 3/4"C	
GWH-1	GAS WATER HEATER 1	120 V	1	600 VA	5.0 A	6.3 A	20 A	MOTOR RATED SWITCH	LMP2	6	2#12, 1#12G, 3/4"C	
IWH-1	INSTANTANEOUS WATER HEATER 1	208 V	1	3500 VA	16.8 A	21.0 A	25 A	240/2/30	LDP2	16,17	2#12, 1#12G, 3/4"C	
IWH-2	INSTANTANEOUS WATER HEATER 2	208 V	1	3500 VA	16.8 A	21.0 A	25 A	240/2/30	LDP2	18,19	2#12, 1#12G, 3/4"C	
IWH-3	INSTANTANEOUS WATER HEATER 3	208 V	1	3500 VA	16.8 A	21.0 A	25 A	240/2/30	LDP2	20,21	2#12, 1#12G, 3/4"C	
IWH-4 (BO)	INSTANTANEOUS WATER HEATER 4 - BID OPTION	208 V	1	3500 VA	16.8 A	21.0 A	25 A	240/2/30	LDP2	24,25	2#12, 1#12G, 3/4"C	
IWH-5 (BO)	INSTANTANEOUS WATER HEATER 5 - BID OPTION	208 V	1	3500 VA	16.8 A	21.0 A	25 A	240/2/30	LDP2	22,23	2#12, 1#12G, 3/4"C	
IWH-6 (BO)	INSTANTANEOUS WATER HEATER 6 - BID OPTION	208 V	1	3500 VA	16.8 A	21.0 A	25 A	240/2/30	LDP2	26,27	2#12, 1#12G, 3/4"C	
L-1.1	LAVATORY 1.1	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
L-1.2	LAVATORY 1.2	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
L-1.3	LAVATORY 1.3	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
L-1.4	LAVATORY 1.4	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
L-1.5	LAVATORY 1.5	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
L-1.6	LAVATORY 1.6	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
RCP-1	RECIRCULATION PUMP 1	120 V	1	160 VA	1.3 A	1.7 A	15 A	MOTOR RATED SWITCH	LMP2	2	2#12, 1#12G, 3/4"C	
TMV-1	THERMOSTATIC MIXING VALVE 1	120 V	1	120 VA	1.0 A	1.3 A	15 A	MOTOR RATED SWITCH	LMP2	2	2#12, 1#12G, 3/4"C	
U-1	URINAL 1	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
WC-1.1	WATER CLOSET 1.1	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
WC-1.2	WATER CLOSET 1.2	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
WC-1.3	WATER CLOSET 1.3	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
WC-2.1	WATER CLOSET 2.1	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	
WC-2.2	WATER CLOSET 2.2	120 V	1	60 VA	0.5 A	0.6 A	15 A		LMP3	12	2#12, 1#12G, 3/4"C	

GENERAL SHEET NOTES - EQUIPMENT

1 FCUs ARE POWERED FROM CU's. EXTEND CONTROL WIRING IN CONDUIT FROM CU's TO FCU's.

2 VAVs AND LOUVERS RECEIVE CONTROL VOLTAGE POWER DIRECTLY FROM BMS PANELS.

3 COORDINATE INTEGRAL EQUIPMENT SHORT CIRCUIT, OVERLOAD, AND INTERRUPTING RATING WITH EQUIPMENT INSTALLERS. WHERE PROVIDED IN THE EQUIPMENT, ADDITIONAL PROTECTION IS NOT REQUIRED. USE MANUFACTURER'S EQUIPMENT RATINGS FOR OCPD AND OVERLOADS. THIS SCHEDULE IS INTENDED TO PROVIDE MINIMUM REQUIREMENTS. EQUIPMENT INSTALLATIONS MUST SATISFY REQUIREMENTS OF ELECTRICAL CODE.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802EP601

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

EQUIPMENT SCHEDULE

SHEET ID

EP601

ADVERTISEMENT - 100% DESIGN

SWITCHBOARD: MSE

LOCATION: ELECTRICAL 1048
SUPPLY FROM: T-PRIDE
MOUNTING: FLOOR MOUNTED
ENCLOSURE: NEMA 1

VOLTS: 480/277 WYE
PHASES: 3
WIRES: 4

A.I.C. RATING: 22000 A
MAINS TYPE: MCB
MAINS RATING: 1200 A
MCB RATING: 1200 A

NOTES:

CKT	CIRCUIT DESCRIPTION	# OF POLES	FRAME SIZE	TRIP RATING	A	B	C	REMARKS
1	TLDP1	3	400 A	400 A	65502 VA	63129 VA	61116 VA	
2	HLP1	3	100 A	100 A	2422 VA	1974 VA	1909 VA	
3	HLP2	3	100 A	100 A	189 VA	837 VA	231 VA	
4	TB	3	150 A	125 A	0 VA	0 VA	0 VA	
5	TMFA	3	100 A	50 A	2821 VA	2321 VA	2321 VA	
6	HDP1	3	600 A	600 A	153329 VA	154809 VA	154226 VA	
7	HDP2	3	600 A	600 A	114580 VA	114041 VA	112989 VA	
8	FUTURE B-21 PARTS	3	250 A	0 A	0 VA	0 VA	0 VA	BRKR BASED ON ANTICIPATED LOADS
9	SPARE	3	100 A	100 A	0 VA	0 VA	0 VA	
10	SPARE	3	100 A	100 A	0 VA	0 VA	0 VA	
11	EF-4 EQUIPMENT PLATFORM 2100 - BID OPTION	3	100 A	60 A	9422 VA	9422 VA	9422 VA	
12	EF-5 EQUIPMENT PLATFORM 2100 - BID OPTION	3	100 A	60 A	9422 VA	9422 VA	9422 VA	
13								
14								
15	SPD	3	100 A	60 A	0 VA	0 VA	0 VA	
				TOTAL CONN. LOAD:	357678 VA	355915 VA	351601 VA	
				TOTAL AMPS:	1294 A	1287 A	1269 A	

LEGEND:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
REC	93200 VA	55.36%	51600 VA		
LTG	78154 VA	100.00%	78154 VA	**TOTAL CONNECTED:**	1065194 VA
POW	341211 VA	100.00%	341211 VA	**TOTAL DEMAND:**	896448 VA
MOT	508583 VA	75.00%	381437 VA	**TOTAL CONNECTED:**	1281 A
FUTURE	10000 VA	100.00%	10000 VA	**TOTAL DEMAND:**	1078 A
TELECOM	34060 VA	100.00%	34060 VA		

NOTES:

BRANCH PANEL: HLP1

LOCATION: ELECTRICAL 1048
SUPPLIED FROM: MSE
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 480/277 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MLO
MAINS RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A		B		C		P	L	TRIP	DESCRIPTION	CKT
1	LTG RMS 1048, 1049	20 A		1	448 VA	1974 VA					1		20 A	LTG SHELL SPACE	2
3	LTG SHELL SPACE	20 A		1			987 VA	987 VA			1		20 A	LTG SHELL SPACE	4
5	LTG SHELL SPACE	20 A		1					987 VA	946 VA	1		20 A	LTG SHELL SPACE - BID OPTION	6
7	SPARE	20 A		1	0 VA	0 VA					1		20 A	SPARE	8
9	SPARE	20 A		1			0 VA	0 VA			1		20 A	SPARE	10
11	SPARE	20 A		1					0 VA	0 VA	1		20 A	SPARE	12
13	SPARE	20 A		1	0 VA	0 VA					1		20 A	SPARE	14
15	SPACE	--	--	1			--	--			1	--	--	SPACE	16
17	SPACE	--	--	1					--	--	1	--	--	SPACE	18
19	SPACE	--	--	1	--	--					1	--	--	SPACE	20
21	SPACE	--	--	1			--	--			1	--	--	SPACE	22
23	SPACE	--	--	1					--	--	1	--	--	SPACE	24
25					0 VA	--					1	--	--	SPACE	26
27	SPD	30 A		3			0 VA	--			1	--	--	SPACE	28
29									0 VA	--	1	--	--	SPACE	30
				TOTAL LOAD:	2422 VA		1974 VA		1909 VA						
				TOTAL AMPS:	9 A		7 A		7 A						

LEGEND:
* = GFI BREAKER, ** = AFCI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
LTG	6289 VA	100.00%	6289 VA		
				TOTAL CONNECTED:	6289 VA
				TOTAL DEMAND:	6289 VA
				TOTAL CONNECTED:	8 A
				TOTAL DEMAND:	8 A

NOTES:

BRANCH PANEL: HLP2

LOCATION: ELECTRICAL 1048
SUPPLIED FROM: MSE
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 480/277 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MLO
MAINS RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A		B		C		P	L	TRIP	DESCRIPTION	CKT
1	LTG SOUTH OUTSIDE	20 A		1	189 VA	0 VA					1		20 A	SPARE	2
3	LTG EAST OUTSIDE	20 A		1			837 VA	0 VA			1		20 A	SPARE	4
5	LTG NORTH OUTSIDE	20 A		1					231 VA	0 VA	1		20 A	SPARE	6
7	SPARE	20 A		1	0 VA	0 VA					1		20 A	SPARE	8
9	SPARE	20 A		1			0 VA	0 VA			1		20 A	SPARE	10
11	SPACE	--	--	1					--	--	1	--	--	SPACE	12
13	SPACE	--	--	1	--	--					1	--	--	SPACE	14
15	SPACE	--	--	1			--	--			1	--	--	SPACE	16
17	SPACE	--	--	1					--	--	1	--	--	SPACE	18
19	SPACE	--	--	1	--	--					1	--	--	SPACE	20
21	SPACE	--	--	1			--	--			1	--	--	SPACE	22
23	SPACE	--	--	1					--	--	1	--	--	SPACE	24
25					0 VA	--					1	--	--	SPACE	26
27	SPD	30 A		3			0 VA	--			1	--	--	SPACE	28
29									0 VA	--	1	--	--	SPACE	30
				TOTAL LOAD:	189 VA		837 VA		231 VA						
				TOTAL AMPS:	1 A		3 A		1 A						

LEGEND:
* = GFI BREAKER, ** = AFCI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
LTG	1257 VA	100.00%	1257 VA		
				TOTAL CONNECTED:	1257 VA
				TOTAL DEMAND:	1257 VA
				TOTAL CONNECTED:	2 A
				TOTAL DEMAND:	2 A

NOTES:

BRANCH PANEL: MAIN FA

LOCATION: ELECTRICAL 1048
SUPPLIED FROM: TMFA
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MCB
MAINS RATING: 100 A
MCB RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A		B		C		P	L	TRIP	DESCRIPTION	CKT
1					1321 VA	1500 VA									2
3	JOCKEY PUMP CONTROLLER FIRE 1049	25 A		3			1321 VA	1000 VA			3		100 A	FA1	4
5									1321 VA	1000 VA					6
7	SPARE	20 A		1	0 VA	0 VA					1		20 A	SPARE	8
9	SPARE	20 A		1			0 VA	0 VA			1		20 A	SPARE	10
11	SPARE	20 A		1					0 VA	0 VA	1		20 A	SPARE	12
13	SPACE	--	--	1	--	--					1	--	--	SPACE	14
15	SPACE	--	--	1			--	--			1	--	--	SPACE	16
17	SPACE	--	--	1					--	--	1	--	--	SPACE	18
19	SPACE	--	--	1	--	--					1	--	--	SPACE	20
21	SPACE	--	--	1			--	--			1	--	--	SPACE	22
23	SPACE	--	--	1					--	--	1	--	--	SPACE	24
25					0 VA	--					1	--	--	SPACE	26
27	SPD	30 A		3			0 VA	--			1	--	--	SPACE	28
29									0 VA	--	1	--	--	SPACE	30
				TOTAL LOAD:	2821 VA		2321 VA		2321 VA						
				TOTAL AMPS:	24 A		19 A		19 A						

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
POW	3500 VA	100.00%	3500 VA		
MOT	3963 VA	75.00%	2972 VA	**TOTAL CONNECTED:**	7463 VA
				TOTAL DEMAND:	6472 VA
				TOTAL CONNECTED:	21 A
				TOTAL DEMAND:	18 A

NOTES:

GENERAL SHEET NOTES - PANELS

A	PANEL A.I.C. RATINGS INDICATE MINIMUM VALUE REQUIRED. PROVIDE STANDARD PANEL RATINGS TO MEET INDICATED MINIMUMS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
DRAWING CODE: --
FILE NAME: FXBM231802EP610
ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PANEL SCHEDULES

SHEET ID

EP610

ADVERTISEMENT - 100% DESIGN

DISTRIBUTION PANEL: HDP1

LOCATION: ELECTRICAL 1015
SUPPLY FROM: MSE
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTS: 480/277 WYE
PHASES: 3
WIRES: 4

A.I.C. RATING: 22000 A
MAINS TYPE: MCB
MAINS RATING: 600 A
MCB RATING: 600 A

NOTES:

CKT	CIRCUIT DESCRIPTION	# OF POLES	FRAME	TRIP	A	B	C	REMARKS
1,2,3	HLP3	3	100 A	100 A	3233 VA	2777 VA	2511 VA	
4,5,6	HMP1	3	400 A	400 A	67466 VA	69214 VA	68938 VA	
7,8,9	HMP2	3	400 A	400 A	79742 VA	79742 VA	79742 VA	
10,11,12	TLRP3	3	100 A	50 A	2902 VA	3082 VA	3060 VA	
13,14,15	SPARE	3	100 A	100 A	0 VA	0 VA	0 VA	
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
				TOTAL CONN. LOAD:	153329 VA	154809 VA	154226 VA	
				TOTAL AMPS:	554 A	559 A	557 A	

LEGEND:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
REC	7920 VA	100.00%	7920 VA		
LTG	8516 VA	100.00%	8516 VA	**TOTAL CONNECTED:**	462364 VA
POW	79621 VA	100.00%	79621 VA	**TOTAL DEMAND:**	370778 VA
MOT	366346 VA	75.00%	274760 VA	**TOTAL CONNECTED:**	556 A
				TOTAL DEMAND:	446 A

NOTES:

BRANCH PANEL: HLP3

LOCATION: ELECTRICAL 1015
SUPPLIED FROM: HDP1
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 480/277 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MLO
MAINS RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1	LTG RM 1013, 1014, & 1015	20 A		1	645 VA	701 VA		1		20 A	LTG EQUIP PLAT 2100 - BID OPTION	2
3	LTG RM 1000, 1001, 1003, 1004, & 1005	20 A		1		259 VA	1022 VA	1		20 A	LTG EQUIP PLAT 2000	4
5	LTG SHELL SPACE	20 A		1			800 VA	1142 VA	1		20 A	LTG EQUIP PLAT 02 - SOUTH	6
7	LTG PLAT 03 - AREA A	20 A		1	980 VA	941 VA			1		20 A	LTG EQUIP PLAT 02 - NORTH	8
9	LTG PLAT 03 - AREA B - BID OPTION	20 A		1		980 VA	538 VA		1		20 A	LTG EQUIP PLAT 02 - BID OPTION	10
11								600 VA	1		20 A	LTG EQUIP PLAT 02 - BASE BID	12
13	SPARE	20 A		1	0 VA	0 VA			1		20 A	SPARE	14
15	SPARE	20 A		1		0 VA	0 VA		1		20 A	SPARE	16
17	SPACE	--	--	1			--	0 VA	1		20 A	SPARE	18
19	SPACE	--	--	1	--	0 VA			1		20 A	SPARE	20
21	SPACE	--	--	1		--	--		1	--	--	SPACE	22
23	SPACE	--	--	1			--	--	1	--	--	SPACE	24
25					0 VA	--			1	--	--	SPACE	26
27	SPD	30 A		3		0 VA	--		1	--	--	SPACE	28
29							0 VA	--	1	--	--	SPACE	30
		TOTAL LOAD:			3233 VA	2777 VA	2511 VA					
		TOTAL AMPS:			12 A	10 A	9 A					

LEGEND:
* = GFI BREAKER, ** = AFCI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
LTG	8516 VA	100.00%	8516 VA		
				TOTAL CONNECTED:	8516 VA
				TOTAL DEMAND:	8516 VA
				TOTAL CONNECTED:	10 A
				TOTAL DEMAND:	10 A

NOTES:

BRANCH PANEL: HMP1

LOCATION: ELECTRICAL 1015
SUPPLIED FROM: HDP1
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 480/277 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MCB
MAINS RATING: 400 A
MCB RATING: 400 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1					5629 VA	5542 VA						2
3	TLMP2	50 A		3			7377 VA	5542 VA	3		25 A	CU-1 OUTSIDE MECHANICAL 1014	4
5								7101 VA	5542 VA				6
7					2508 VA	8868 VA							8
9	B-1 MECHANICAL 1014	20 A		3			2508 VA	8868 VA	3		50 A	CU-2 OUTSIDE MECHANICAL 1014	10
11								2508 VA	8868 VA				12
13					2508 VA	5820 VA							14
15	B-2 MECHANICAL 1014	20 A		3			2508 VA	5820 VA	3		40 A	HWP-1 MECHANICAL 1014	16
17								2508 VA	5820 VA				18
19					2508 VA	5820 VA							20
21	B-3 MECHANICAL 1014	20 A		3			2508 VA	5820 VA	3		40 A	HWP-2 MECHANICAL 1014	22
23								2508 VA	5820 VA				24
25					2508 VA	5820 VA							26
27	B-4 MECHANICAL 1014 - BID OPTION	20 A		3			2508 VA	5820 VA	3		40 A	HWP-3 MECHANICAL 1014	28
29								2508 VA	5820 VA				30
31					14117 VA	5820 VA							32
33	DAC-1 VEST 1037	100 A		3			14117 VA	5820 VA	3		40 A	HWP-4 MECHANICAL 1014 - BID OPTION	34
35								14117 VA	5820 VA				36
37					0 VA	--			1	--	--	SPACE	38
39	SPARE	20 A		3			0 VA	--	1	--	--	SPACE	40
41								0 VA	--	1	--	--	SPACE	42
		TOTAL LOAD:			67466 VA		69214 VA		68938 VA				
		TOTAL AMPS:			244 A		251 A		250 A				

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
POW	79621 VA	100.00%	79621 VA		
MOT	125997 VA	75.00%	94498 VA	**TOTAL CONNECTED:**	205618 VA
				TOTAL DEMAND:	174118 VA
				TOTAL CONNECTED:	247 A
				TOTAL DEMAND:	209 A

NOTES:

BRANCH PANEL: HMP2

LOCATION: EQUIPMENT PLATFORM 3000
SUPPLIED FROM: HDP1
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 480/277 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MCB
MAINS RATING: 400 A
MCB RATING: 400 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1					2270 VA	665 VA						2
3	AHU-1 SF EQUIPMENT PLATFORM 2000	15 A		3			2270 VA	665 VA					4
5								2270 VA	665 VA	3		15 A	ERV-1 EQUIPMENT PLATFORM 2000	6
7					2270 VA	665 VA							8
9	AHU-2 SF EQUIPMENT PLATFORM 3000	15 A		3			2270 VA	665 VA					10
11								2270 VA	665 VA	3		15 A	ERV-2 EQUIPMENT PLATFORM 3000	12
13					13286 VA	13286 VA							14
15	MUA-1 EQUIPMENT PLATFORM 3000	70 A		3			13286 VA	13286 VA					16
17								13286 VA	13286 VA	3		70 A	MUA-1 EQUIPMENT PLATFORM 3000	18
19					13286 VA	13286 VA							20
21	MUA-3 EQUIPMENT PLATFORM 3000 - BID OPTION	70 A		3			13286 VA	13286 VA					22
23								13286 VA	13286 VA	3		70 A	MUA-4 EQUIPMENT PLATFORM 3000 - BID OPTION	24
25					9422 VA	9422 VA							26
27	EF-1 EQUIPMENT PLATFORM 3000	60 A		3			9422 VA	9422 VA					28
29								9422 VA	9422 VA	3		60 A	EF-2 EQUIPMENT PLATFORM 3000	30
31					941 VA	941 VA							32
33	AHU-1 EF EQUIPMENT PLATFORM 2000	15 A		3			941 VA	941 VA					34
35								941 VA	941 VA	3		15 A	AHU-1 EF EQUIPMENT PLATFORM 3000	36
37					0 VA	--			1	--	--	SPACE	38
39	SPARE	15 A		3			0 VA	--	1	--	--	SPACE	40
41								0 VA	--	1	--	--	SPACE	42
		TOTAL LOAD:			79742 VA		79742 VA		79742 VA				
		TOTAL AMPS:			288 A		288 A		288 A				

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
MOT	239226 VA	75.00%	179420 VA		
				TOTAL CONNECTED:	239226 VA
				TOTAL DEMAND:	179420 VA
				TOTAL CONNECTED:	288 A
				TOTAL DEMAND:	216 A

NOTES:

GENERAL SHEET NOTES - PANELS

A PANEL A.I.C. RATINGS INDICATE MINIMUM VALUE REQUIRED. PROVIDE STANDARD PANEL RATINGS TO MEET INDICATED MINIMUMS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802EP611
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PANEL SCHEDULES

SHEET ID
EP611

ADVERTISEMENT - 100% DESIGN

BRANCH PANEL: LMP2

LOCATION: ELECTRICAL 1015
SUPPLIED FROM: TLMP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 10000 A
MAINS TYPE: MCB
MAINS RATING: 100 A
MCB RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A		B		C		P	L	TRIP	DESCRIPTION	CKT
1	SSAC-3/SSCU-3 ROOMS 1015, 2000	30 A		2	1936 VA	280 VA					1		20 A	TMV-1, RCP-1 MECHANICAL 1014	2
3							1936 VA	1920 VA			1		30 A	EF-3 MECHANICAL 1014	4
5	SSCU-4 EQUIPMENT PLATFORM 3000	15 A		2					1936 VA	600 VA	1		20 A	GWH-1 MECHANICAL 1014	6
7					1936 VA	264 VA					1		20 A	RADIANT HTR 7 - BASE BID ONLY	8
9	SSAC-5/SSCU-5 ROOMS 1048, 2100	20 A		2			1937 VA	528 VA			1		20 A	RADIANT HTRS 5&6 - BASE BID ONLY	10
11									1937 VA	528 VA	1		20 A	RADIANT HTRS 1&2 - BASE BID ONLY	12
13	DF-3 SHELL SPACE - BID OPTION	15 A		1	228 VA	528 VA					1		20 A	RADIANT HTRS 3&4 - BASE BID ONLY	14
15	DF-4 SHELL SPACE - BID OPTION	15 A		1			228 VA	240 VA			1		15 A	IH-1/2 SHELL SPACE - BID OPTION	16
17	DF-5 SHELL SPACE - BID OPTION	15 A		1					228 VA	696 VA	1		15 A	UH-1 VEST 1000	18
19	DF-6 SHELL SPACE - BID OPTION	15 A		1	228 VA	0 VA					1		20 A	EPO MECHANICAL 1014	20
21	IH-3 SHELL SPACE - BID OPTION	15 A		1			120 VA	240 VA			1		20 A	DAC-1 CONTROL PANEL VEST 1037	22
23	GT-1 MECHANICAL 1014	20 A		1					1176 VA	0 VA	1		20 A	SPARE	24
25	DF-1 SHELL SPACE - BID OPTION	15 A		1	228 VA	0 VA					1		20 A	SPARE	26
27	DF-2 SHELL SPACE - BID OPTION	15 A		1			228 VA	0 VA			1		20 A	SPARE	28
29	SPARE	20 A		1					0 VA	0 VA	1		20 A	SPARE	30
31	SPACE	--	--	1	--	--					1	--	--	SPACE	32
33	SPACE	--	--	1			--	--			1	--	--	SPACE	34
35	SPACE	--	--	1					--	--	1	--	--	SPACE	36
37	SPACE	--	--	1	--	--					1	--	--	SPACE	38
39	SPACE	--	--	1			--	--			1	--	--	SPACE	40
41	SPACE	--	--	1					--	--	1	--	--	SPACE	42
		TOTAL LOAD:			5629 VA		7377 VA		7101 VA						
		TOTAL AMPS:			47 A		63 A		61 A						

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
POW	7177 VA	100.00%	7177 VA		
MOT	12930 VA	75.00%	9697 VA	**TOTAL CONNECTED:**	20107 VA
				TOTAL DEMAND:	16874 VA
				TOTAL CONNECTED:	56 A
				TOTAL DEMAND:	47 A

NOTES:

BRANCH PANEL: LRP3

LOCATION: ELECTRICAL 1015
SUPPLIED FROM: TLRP3
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 10000 A
MAINS TYPE: MCB
MAINS RATING: 100 A
MCB RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A		B		C		P	L	TRIP	DESCRIPTION	CKT
1	REC ELEC 1015	20 A		1	360 VA	720 VA					1		20 A	REC VEST 1000, LOBBY 1001, STOR 1005	2
3	REC ELECTRICAL 1048	20 A		1			360 VA	900 VA			1		20 A	REC EQUIPMENT PLATFORM 02	4
5	REC NW OUTSIDE	20 A		1					900 VA	900 VA	1		20 A	REC REST RM 1003, MOTHER RM 1004	6
7	OVERHEAD DOOR SHELL SPACE	20 A		2	562 VA	360 VA					1		20 A	REC OUTSIDE ELEC 1048	8
9							562 VA	360 VA			1		20 A	REC OUTSIDE FIRE 1049	10
11	REC SHELL SPACE	20 A		1					360 VA	360 VA	1		20 A	REC FIRE 1049	12
13	REC EQUIP PLAT 02 - BID OPTION	20 A		1	360 VA	540 VA					1		20 A	REC EQUIPMENT PLAT 2000	14
15	REC EQUIP PLAT 2100 - BID OPTION	20 A		1			360 VA	540 VA			1		20 A	REC MECHANICAL 1014	16
17	REC OUTSIDE CORRIDOR 1038	20 A		1					540 VA	0 VA	1		20 A	SPARE	18
19	SPARE	20 A		1	0 VA	0 VA					1		20 A	SPARE	20
21	SPARE	20 A		1			0 VA	0 VA			1		20 A	SPARE	22
23	SPARE	20 A		1					0 VA	0 VA	1		20 A	SPARE	24
25	SPARE	20 A		1	0 VA	0 VA					1		20 A	SPARE	26
27	SPACE	--	--	1			--	--			1	--	--	SPACE	28
29	SPACE	--	--	1					--	--	1	--	--	SPACE	30
31	SPACE	--	--	1	--	--					1	--	--	SPACE	32
33	SPACE	--	--	1			--	--			1	--	--	SPACE	34
35	SPACE	--	--	1					--	--	1	--	--	SPACE	36
37					0 VA	--					1	--	--	SPACE	38
39	SPD	30 A		3			0 VA	--			1	--	--	SPACE	40
41									0 VA	--	1	--	--	SPACE	42
		TOTAL LOAD:			2902 VA		3082 VA		3060 VA						
		TOTAL AMPS:			24 A		26 A		26 A						

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
REC	7920 VA	100.00%	7920 VA		
MOT	1123 VA	75.00%	842 VA	**TOTAL CONNECTED:**	9043 VA
				TOTAL DEMAND:	8762 VA
				TOTAL CONNECTED:	25 A
				TOTAL DEMAND:	24 A

NOTES:

DISTRIBUTION PANEL: HDP2

LOCATION: ELECTRICAL 1034
SUPPLY FROM: MSE
MOUNTING: Surface
ENCLOSURE: Type 1

VOLTS: 480/277 WYE
PHASES: 3
WIRES: 4

A.I.C. RATING: 22000 A
MAINS TYPE: MCB
MAINS RATING: 600 A
MCB RATING: 600 A

NOTES:

CKT	CIRCUIT DESCRIPTION	# OF POLES	FRAME	TRIP	A	B	C	REMARKS
1,2,3	HLP4	3	400 A	100 A	7786 VA	7458 VA	8803 VA	
4,5,6	TLPP3	3	400 A	400 A	65095 VA	65095 VA	65095 VA	
7,8,9	TLDP2	3	400 A	175 A	41699 VA	41488 VA	39091 VA	
10,11,12	SPARE	3	100 A	10 A	0 VA	0 VA	0 VA	
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
	TOTAL CONN. LOAD:				114580 VA	114041 VA	112989 VA	
	TOTAL AMPS:				414 A	412 A	408 A	

LEGEND:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
REC	42000 VA	61.90%	26000 VA		
LTG	29078 VA	100.00%	29078 VA	**TOTAL CONNECTED:**	341610 VA
POW	225356 VA	100.00%	225356 VA	**TOTAL DEMAND:**	322831 VA
MOT	11116 VA	75.00%	8337 VA	**TOTAL CONNECTED:**	411 A
TELECOM	34060 VA	100.00%	34060 VA	**TOTAL DEMAND:**	388 A

NOTES:

BRANCH PANEL: HLP4

LOCATION: ELECTRICAL 1034
SUPPLIED FROM: HDP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 480/277 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MLO
MAINS RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A		B		C		P	L	TRIP	DESCRIPTION	CKT
1	LTG RM 1021, 1022, 1023, & 1025	20 A		1	894 VA	1579 VA					1		20 A	LTG WLT #2 RM 1046 - BID OPTION	2
3	LTG RM 1027, 1028, 1029, 1030, & 1031	20 A		1			782 VA	1579 VA			1		20 A	LTG WLT #2 RM 1046 - BID OPTION	4
5	LTG RM 1002, 1006, 1020, 1032, 1033, 1034	20 A		1					686 VA	1584 VA	1		20 A	LTG RM 1038 & 1046 - BID OPTION	6
7	LTG RM 1010, 1011, & 1012	20 A		1	570 VA	1579 VA					1		20 A	LTG WLT #2 1046 - BID OPTION	8
9	LTG RM 1036 & 1037	20 A		1			360 VA	1579 VA			1		20 A	LTG WLT #2 1046 - BID OPTION	10
11	LTG WLT #1 1045	20 A		1					3163 VA	1579 VA	1		20 A	LTG WLT #2 1046 - BID OPTION	12
13	LTG WLT #1 1045	20 A		1	3163 VA	0 VA					1		20 A	SPARE	14
15	LTG WLT #1 1045	20 A		1			3158 VA	0 VA			1		20 A	SPARE	16
17	LTG RM 1037, 1038, 1039, 1040, & 1041	20 A		1					1790 VA	0 VA	1		20 A	SPARE	18
19	SPARE	20 A		1	0 VA	0 VA					1		20 A	SPARE	20
21	SPARE	20 A		1			0 VA	0 VA			1		20 A	SPARE	22
23	SPACE	--	--	1					--	--	1	--	--	SPACE	24
25	SPACE	--	--	1	--	--					1	--	--	SPACE	26
27	SPACE	--	--	1			--	--			1	--	--	SPACE	28
29	SPACE	--	--	1					--	--	1	--	--	SPACE	30
31	SPACE	--	--	1	--	--					1	--	--	SPACE	32
33	SPACE	--	--	1			--	--			1	--	--	SPACE	34
35	SPACE	--	--	1					--	--	1	--	--	SPACE	36
37					0 VA	--					1	--	--	SPACE	38
39	SPD	30 A		3			0 VA	--			1	--	--	SPACE	40
41									0 VA	--	1	--	--	SPACE	42
		TOTAL LOAD:			7786 VA		7458 VA		8803 VA						
		TOTAL AMPS:			28 A		27 A		32 A						

LEGEND:
* = GFI BREAKER, ** = AFCI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
LTG	24047 VA	100.00%	24047 VA		
				TOTAL CONNECTED:	24047 VA
				TOTAL DEMAND:	24047 VA
				TOTAL CONNECTED:	29 A
				TOTAL DEMAND:	29 A

NOTES:

GENERAL SHEET NOTES - PANELS

A	PANEL A.I.C. RATINGS INDICATE MINIMUM VALUE REQUIRED. PROVIDE STANDARD PANEL RATINGS TO MEET INDICATED MINIMUMS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EP612
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PANEL SCHEDULES

SHEET ID
EP612

ADVERTISEMENT - 100% DESIGN

BRANCH PANEL: LPP3

LOCATION: ELECTRICAL 1034
SUPPLIED FROM: TLLP3
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 22000 A
MAINS TYPE: MCB
MAINS RATING: 600 A
MCB RATING: 600 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1					19214 VA 13333 VA							2
3	REC WLT #1 1045	200 A		3		19214 VA 13333 VA		3		200 A	REC WLT #1 1045	4
5							19214 VA 13333 VA					6
7					19214 VA 13333 VA							8
9	REC WLT #2 1046 - BID OPTION	200 A		3		19214 VA 13333 VA		3		200 A	REC WLT #2 1046 - BID OPTION	10
11							19214 VA 13333 VA					12
13												14
15												16
17												18
19												20
21												22
23												24
25												26
27												28
29												30
31												32
33												34
35												36
37					0 VA							38
39	SPD	30 A		3		0 VA						40
41							0 VA					42
		TOTAL LOAD:			65095 VA	65095 VA	65095 VA					
		TOTAL AMPS:			542 A	542 A	542 A					

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
POW	195284 VA	100.00%	195284 VA		
				TOTAL CONNECTED:	195284 VA
				TOTAL DEMAND:	195284 VA
				TOTAL CONNECTED:	542 A
				TOTAL DEMAND:	542 A

NOTES:

DISTRIBUTION PANEL: LDP2

LOCATION: ELECTRICAL 1034
SUPPLY FROM: TLDP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTS: 120/208 WYE
PHASES: 3
WIRES: 4

A.I.C. RATING: 10000 A
MAINS TYPE: MCB
MAINS RATING: 400 A
MCB RATING: 400 A

NOTES:

CKT	CIRCUIT DESCRIPTION	# OF POLES	FRAME	TRIP	A	B	C	REMARKS
1,2,3	LRP4	3	100 A	100 A	10520 VA	10640 VA	10100 VA	
4,5,6	LRP5	3	100 A	100 A	7294 VA	6823 VA	5023 VA	
7,8,9	LMP3	3	100 A	100 A	3072 VA	3072 VA	2928 VA	
10,11,12	LTP2	3	100 A	100 A	6476 VA	6476 VA	7040 VA	
13,14,15	LTP3	3	100 A	100 A	7336 VA	7476 VA	7000 VA	
16,17	IWH-1 WLT #1 1045	2	100 A	25 A	1750 VA	1750 VA		
18,19	IWH-2 WLT #1 1045	2	100 A	25 A	1750 VA		1750 VA	
20,21	IWH-3 WLT #1 1045	2	100 A	25 A		1750 VA	1750 VA	
22,23	IWH-5 WLT #2 1046 - BID OPTION	2	100 A	25 A	1750 VA	1750 VA		
24,25	IWH-4 WLT #2 1046 - BID OPTION	2	100 A	25 A	1750 VA		1750 VA	
26,27	IWH-6 WLT #2 1046 - BID OPTION	2	100 A	25 A		1750 VA	1750 VA	
				TOTAL CONN. LOAD:	41699 VA	41488 VA	39091 VA	
				TOTAL AMPS:	351 A	349 A	326 A	

LEGEND:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
REC	42000 VA	61.90%	26000 VA		
LTG	5031 VA	100.00%	5031 VA	**TOTAL CONNECTED:**	122279 VA
POW	30072 VA	100.00%	30072 VA	**TOTAL DEMAND:**	103500 VA
MOT	11116 VA	75.00%	8337 VA	**TOTAL CONNECTED:**	339 A
TELECOM	34060 VA	100.00%	34060 VA	**TOTAL DEMAND:**	287 A

NOTES:

GENERAL SHEET NOTES - PANELS

A	PANEL A.I.C. RATINGS INDICATE MINIMUM VALUE REQUIRED. PROVIDE STANDARD PANEL RATINGS TO MEET INDICATED MINIMUMS.

BRANCH PANEL: LRP4

LOCATION: ELECTRICAL 1034
SUPPLIED FROM: LDP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 10000 A
MAINS TYPE: MLO
MAINS RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1	PRINTER LSC SUITE 1021	20 A		1	1200 VA 360 VA			1		20 A	REC CONTRACTOR SUPPORT 1031	2
3	REC LSC SUITE 1021	20 A		1		1440 VA 720 VA		1		20 A	WORKST, SLC SUITE 1023 - SOUTH WALL	4
5	WORKST, LSC SUITE 1021 - WEST WALL	20 A		1			1260 VA 720 VA	1		20 A	WORKST, SLC SUITE 1023 - SOUTH WALL	6
7	WORKST, LSC SUITE 1021 - WEST WALL	20 A		1	1080 VA 720 VA			1		20 A	WORKST, RM 1031 EAST WALL	8
9	REC WS SUPER 1022	20 A		1		900 VA 720 VA		1		20 A	WORKST, RM 1031 EAST WALL	10
11	REC SLC SUITE 1023 NORTH WALL	20 A		1			900 VA 540 VA	1		20 A	REC HALL 1026 & HALL 1020	12
13	REC SLC SUITE 1023 SOUTH WALL	20 A		1	900 VA 900 VA			1		20 A	REC TRAINING ROOM 1012 WEST WALL	14
15	PRINTER SLC SUITE 1023	20 A		1		1200 VA 1080 VA		1		20 A	REC TRAINING ROOM 1012 NORTH WALL	16
17	WORKST, SLC SUITE 1023 - S.WEST WALL	20 A		1			900 VA 900 VA	1		20 A	REC TRAINING ROOM 1012 EAST & S....	18
19	WORKST, SLC SUITE 1023 - S.WEST WALL	20 A		1	720 VA 1080 VA			1		20 A	REC CONFERENCE 1011	20
21	WORKST, SLC SUITE 1023 - WEST WALL	20 A		1		720 VA 540 VA		1		20 A	REC HALL 1006	22
23	WORKST, SLC SUITE 1023 - WEST WALL	20 A		1			720 VA 720 VA	1		20 A	REC WING MGR 1010	24
25	REC BREAK RM 1025	20 A		1	900 VA 540 VA			1		20 A	REC CTK 1036	26
27	REC BREAK RM 1025	20 A		1		360 VA 360 VA		1		20 A	REC VEST 1037	28
29	COFFEE BREAK RM 1025	20 A		1			500 VA 1200 VA	1		20 A	PRINTER SMALL WLT 1040	30
31	REFRIGERATOR BREAK RM 1025	20 A		1	500 VA 360 VA			1		20 A	REC CORRIDOR 1038	32
33	EWC CORRIDOR 1026	20 A		1		500 VA 720 VA		1		20 A	REC SMALL WLT 1040	34
35	MICROWAVE BREAK RM 1025	20 A		1			1200 VA 360 VA	1		20 A	WORKST, RM 1031 WEST WALL	36
37	REC MEN, WOMEN & JANITOR	20 A		1	900 VA 360 VA			1		20 A	WORKST, RM 1031 WEST WALL	38
39	PRINTER CONTRACTOR SUPPORT 1031	20 A		1		1200 VA 180 VA		1		20 A	TV BREAK RM 1025	40
41	SPARE	20 A		1			0 VA 180 VA	1		20 A	TV TRAINING ROOM 1012	42
43	SPARE	20 A		1	0 VA 0 VA			1		20 A	SPARE	44
45	SPARE	20 A		1		0 VA 0 VA		1		20 A	SPARE	46
47	SPARE	20 A		1			0 VA --	1	--	--	SPACE	48
49					0 VA --			1	--	--	SPACE	50
51	SPD	30 A		3		0 VA --		1	--	--	SPACE	52
53							0 VA --	1	--	--	SPACE	54
		TOTAL LOAD:			10520 VA	10640 VA	10100 VA					
		TOTAL AMPS:			88 A	89 A	84 A					

LEGEND:
* = GFI BREAKER, ** = AFCI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
REC	31260 VA	65.99%	20630 VA		
				TOTAL CONNECTED:	31260 VA
				TOTAL DEMAND:	20630 VA
				TOTAL CONNECTED:	87 A
				TOTAL DEMAND:	57 A

NOTES:

BRANCH PANEL: LRP5

LOCATION: ELECTRICAL 1034
SUPPLIED FROM: LDP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 10000 A
MAINS TYPE: MLO
MAINS RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1	REC ELECTRICAL 1034	20 A		1	180 VA 360 VA			1		20 A	REC ELECTRICAL 1034	2
3	REC WLT #2 1046 N.WALL - BID OPTION	20 A		1		540 VA 720 VA		1		20 A	REC SLC SUITE 1023	4
5	REC WLT #2 1046 S. WALL - BID OPTION	20 A		1			540 VA 720 VA	1		20 A	FLOOR BOX CONFERENCE 1011	6
7	REC WLT #2 1046	20 A		1	360 VA 1080 VA			1		20 A	REC TRAINING ROOM 1012	8
9	REC SMALL WLT 1040	20 A		1		720 VA 360 VA		1		20 A	REC WLT #2 1046 N.E. - BID OPTION	10
11	REC WLT #2 1046 S.E. WALL - BID OPTION	20 A		1			360 VA 360 VA	1		20 A	REC UNASSIGNED 1033	12
13	REC WLT #2 1046 E. WALL - BID OPTION	20 A		1	360 VA 562 VA			2		20 A	OVERHEAD DOOR CTK 1036	14
15	OVERHEAD DOOR VEST 1037	20 A		2		562 VA 562 VA						16
17							562 VA 562 VA	2		20 A	OVERHEAD DOOR VEST 1037	18
19	REC WLT #1 1045 NORTH WALL	20 A		1	720 VA 562 VA			1		20 A	REC SLC SUITE 1023	20
21	REC WLT #1 1045 NORTH WALL	20 A		1		720 VA 720 VA		1		20 A	REC WLT #1 1045 SOUTH WALL	22
23	REC WLT #1 1045 WEST WALL	20 A		1			720 VA 1200 VA	1		20 A	REC BREAK RM 1025	24
25	BLUE BEACON ADMIN - WEST	20 A		1	1536 VA 1575 VA			1		20 A	OBSTRUCTION LIGHTS - ROOF	26
27	BLUE BEACON ADMIN - NORTH	20 A		1		1920 VA 0 VA		1		20 A	SPARE	28
29	SPARE	20 A		1			0 VA 0 VA	1		20 A	SPARE	30
31	SPARE	20 A		1	0 VA 0 VA			1		20 A	SPARE	32
33	SPARE	20 A		1		0 VA --		1	--	--	SPACE	34
35	SPACE	--	--	1			-- --	1	--	--	SPACE	36
37	SPACE	--	--	1	-- --			1	--	--	SPACE	38
39	SPACE	--	--	1		-- --		1	--	--	SPACE	40
41	SPACE	--	--	1			-- --	1	--	--	SPACE	42
43	SPACE	--	--	1	-- --			1	--	--	SPACE	44
45	SPACE	--	--	1		-- --		1	--	--	SPACE	46
47	SPACE	--	--	1			-- --	1	--	--	SPACE	48
49					0 VA --			1	--	--	SPACE	50
51	SPD	30 A		3		0 VA --		1	--	--	SPACE	52
53							0 VA --	1	--	--	SPACE	54
		TOTAL LOAD:			7294 VA	6823 VA	5023 VA					
		TOTAL AMPS:			63 A	59 A	42 A					

LEGEND:
* = GFI BREAKER, ** = AFCI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
REC	10740 VA	96.55%	10370 VA		
LTG	5031 VA	100.00%	5031 VA	**TOTAL CONNECTED:**	19141 VA
MOT	3370 VA	75.00%	2527 VA	**TOTAL DEMAND:**	17928 VA
				TOTAL CONNECTED:	53 A
				TOTAL DEMAND:	50 A

NOTES:

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802EP613

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PANEL SCHEDULES

SHEET ID
EP613

ADVERTISEMENT - 100% DESIGN

BRANCH PANEL: LMP3

LOCATION: ELECTRICAL 1034
SUPPLIED FROM: LDP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 10000 A
MAINS TYPE: MLO
MAINS RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1	UH-2 WLT #1 1045	15 A		1	864 VA			1		15 A	UH-3 WLT #1 1045	2
3	UH-4 WLT #1 1045	15 A		1		864 VA		1		15 A	UH-5 WLT #1 1045	4
5	UH-8 WLT #2 1046 - BID OPTION	15 A		1			864 VA	1		15 A	UH-6 WLT #2 1046 - BID OPTION	6
7	EEW-1, 2 WLT #1 1045	20 A		1	480 VA			1		15 A	UH-7 WLT #2 1046 - BID OPTION	8
9	EEW-3, 6 WLT 1045, 1046	20 A		1		240 VA		1		15 A	UH-9 WLT #2 1046 - BID OPTION	10
11	EEW-6 WLT #2 1046 - BID OPTION	20 A		1			240 VA	1		20 A	BATHROOM SENSORS RMS 1028, 1027	12
13	SPARE	20 A		1	0 VA			1		20 A	SPARE	14
15	EEW-5 WLT #2 1046 - BID OPTION	20 A		1		240 VA		1		20 A	SPARE	16
17	EWS-4 WLT #2 1046 - BID OPTION	20 A		1			240 VA	1		20 A	SPARE	18
19	SPARE	20 A		1	0 VA			1		20 A	SPARE	20
21	SPACE	--	--	1		--		1	--	--	SPACE	22
23	SPACE	--	--	1			--	1	--	--	SPACE	24
25	SPACE	--	--	1	--			1	--	--	SPACE	26
27	SPACE	--	--	1		--		1	--	--	SPACE	28
29	SPACE	--	--	1			--	1	--	--	SPACE	30
31	SPACE	--	--	1	--			1	--	--	SPACE	32
33	SPACE	--	--	1		--		1	--	--	SPACE	34
35	SPACE	--	--	1			--	1	--	--	SPACE	36
37	SPACE	--	--	1	--			1	--	--	SPACE	38
39	SPACE	--	--	1		--		1	--	--	SPACE	40
41	SPACE	--	--	1			--	1	--	--	SPACE	42
	TOTAL LOAD:				3072 VA	3072 VA	2928 VA					
	TOTAL AMPS:				26 A	26 A	24 A					

LEGEND:
* = GFI BREAKER, ** = AFCI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
POW	9072 VA	100.00%	9072 VA		
				TOTAL CONNECTED:	9072 VA
				TOTAL DEMAND:	9072 VA
				TOTAL CONNECTED:	25 A
				TOTAL DEMAND:	25 A

NOTES:

BRANCH PANEL: LTP2

LOCATION: COMM 1030
SUPPLIED FROM: LDP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 10000 A
MAINS TYPE: MCB
MAINS RATING: 100 A
MCB RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1	C1 RACK COMM 1030	20 A		1	500 VA	1000 VA		1		20 A	ACP COMM 1030	2
3	C2 RACK COMM 1030	20 A		1			500 VA	1000 VA				
5	C4 RACK COMM 1030	30 A		2						2	30 A	C1 RACK COMM 1030
7					1000 VA	500 VA						
9	C2 RACK COMM 1030	30 A		2			1000 VA	1000 VA		2	30 A	C3 RACK COMM 1030
11												
13	SSCU-1/SSAC-1 ROOMS 1030, 2000	30 A		2	1936 VA	540 VA						
15							1936 VA	500 VA				
17	C5 RACK COMM 1030	30 A		2								
19					1000 VA	0 VA						
21	REC COMM 1030 NORTH WALL	20 A		1			540 VA	0 VA				
23	REC COMM 1030 SOUTH WALL	20 A		1								
25	SPARE	20 A		1	0 VA	0 VA						
27	SPARE	20 A		1			0 VA	0 VA				
29	SPACE	--	--	1								
31	SPACE	--	--	1	--	--						
33	SPACE	--	--	1			--	--				
35	SPACE	--	--	1								
37					0 VA	--						
39	SPD	30 A		3			0 VA	--				
41												
	TOTAL LOAD:				6476 VA	6476 VA	7040 VA					
	TOTAL AMPS:				54 A	54 A	59 A					

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
MOT	3873 VA	75.00%	2905 VA		
TELECOM	16120 VA	100.00%	16120 VA	**TOTAL CONNECTED:**	19993 VA
				TOTAL DEMAND:	19025 VA
				TOTAL CONNECTED:	55 A
				TOTAL DEMAND:	53 A

NOTES:

BRANCH PANEL: LTP3

LOCATION: SECURE COMM 1041
SUPPLIED FROM: LDP2
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTAGE: 120/208 WYE
PHASES: 3
WIRES: 4
FREQUENCY: 60 HZ

A.I.C. RATING: 10000 A
MAINS TYPE: MCB
MAINS RATING: 100 A
MCB RATING: 100 A

NOTES:

CKT	DESCRIPTION	TRIP	L	P	A	B	C	P	L	TRIP	DESCRIPTION	CKT
1	REC - EAST WALL SECURE COMM 1041	20 A		1	360 VA	540 VA		1		20 A	REC - SOUTH WALL SECURE COMM 1041	2
3	REC - NORTH WALL SECURE COMM 1041	20 A		1			540 VA	500 VA				
5	C1 RACK SECURE COMM 1041	20 A		1								
7					1936 VA	500 VA						
9	SSAC-2/SSCU-2 ROOMS 1041, 3000	30 A		2			500 VA	1000 VA		2	30 A	C1 RACK SECURE COMM 1041
11						1936 VA						
13	NIPR CABINET WLT 1040	20 A		1			1000 VA	1000 VA				
15	SPARE	20 A		1	0 VA	1000 VA						
17	C4 RACK SECURE COMM 1041	20 A		1			500 VA	1000 VA		2	30 A	C3 RACK SECURE COMM 1041
19												
21	C2 RACK SECURE COMM 1041	30 A		2	1000 VA	1000 VA						
23						1000 VA	1000 VA					
25	SPARE	20 A		1	0 VA	1000 VA						
27	SPARE	20 A		1			0 VA	0 VA				
29	SPARE	20 A		1								
31	SPACE	--	--	1	--	--						
33	SPACE	--	--	1			--	--				
35	SPACE	--	--	1								
37					0 VA	--						
39	SPD	30 A		3			0 VA	--				
41												
	TOTAL LOAD:				7336 VA	7476 VA	7000 VA					
	TOTAL AMPS:				62 A	63 A	58 A					

LEGEND:
* = GFI BREAKER, S = SHUNT TRIP BREAKER, F = PAINTED RED, L = LOCKABLE IN OPEN POSITION REQUIRED

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
MOT	3873 VA	75.00%	2905 VA		
TELECOM	17940 VA	100.00%	17940 VA	**TOTAL CONNECTED:**	21813 VA
				TOTAL DEMAND:	20845 VA
				TOTAL CONNECTED:	61 A
				TOTAL DEMAND:	58 A

NOTES:

GENERAL SHEET NOTES - PANELS

A	PANEL A.I.C. RATINGS INDICATE MINIMUM VALUE REQUIRED. PROVIDE STANDARD PANEL RATINGS TO MEET INDICATED MINIMUMS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EP614

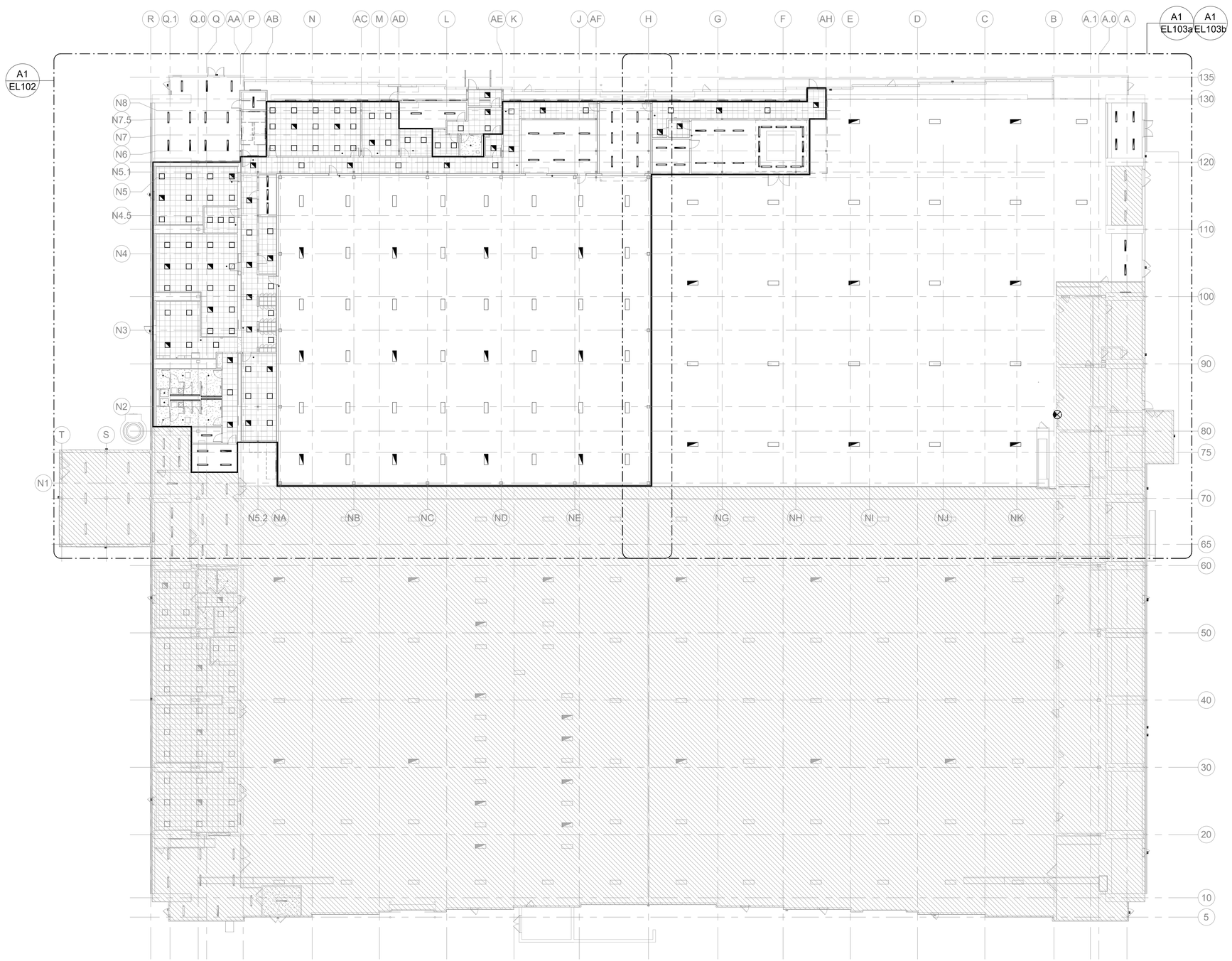
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PANEL SCHEDULES

SHEET ID
EP614

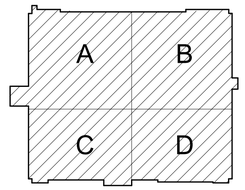
ADVERTISEMENT - 100% DESIGN



A1 OVERALL LIGHTING PLAN - LEVEL 01
1" = 20'-0"

GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY:	ISSUE DATE:
A. GARDNER	28 APRIL 2023
DRAWN BY:	SOLICITATION NO.:
C. KOHRMANN	W9128F23R0012
CHECKED BY:	CONTRACT NO.:
K. HOGAN	
SUBMITTED BY:	DRAWING CODE::
B. DYSON	SHEET
ANSI D 22x34	FILE NAME: FXBM231802EL101

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

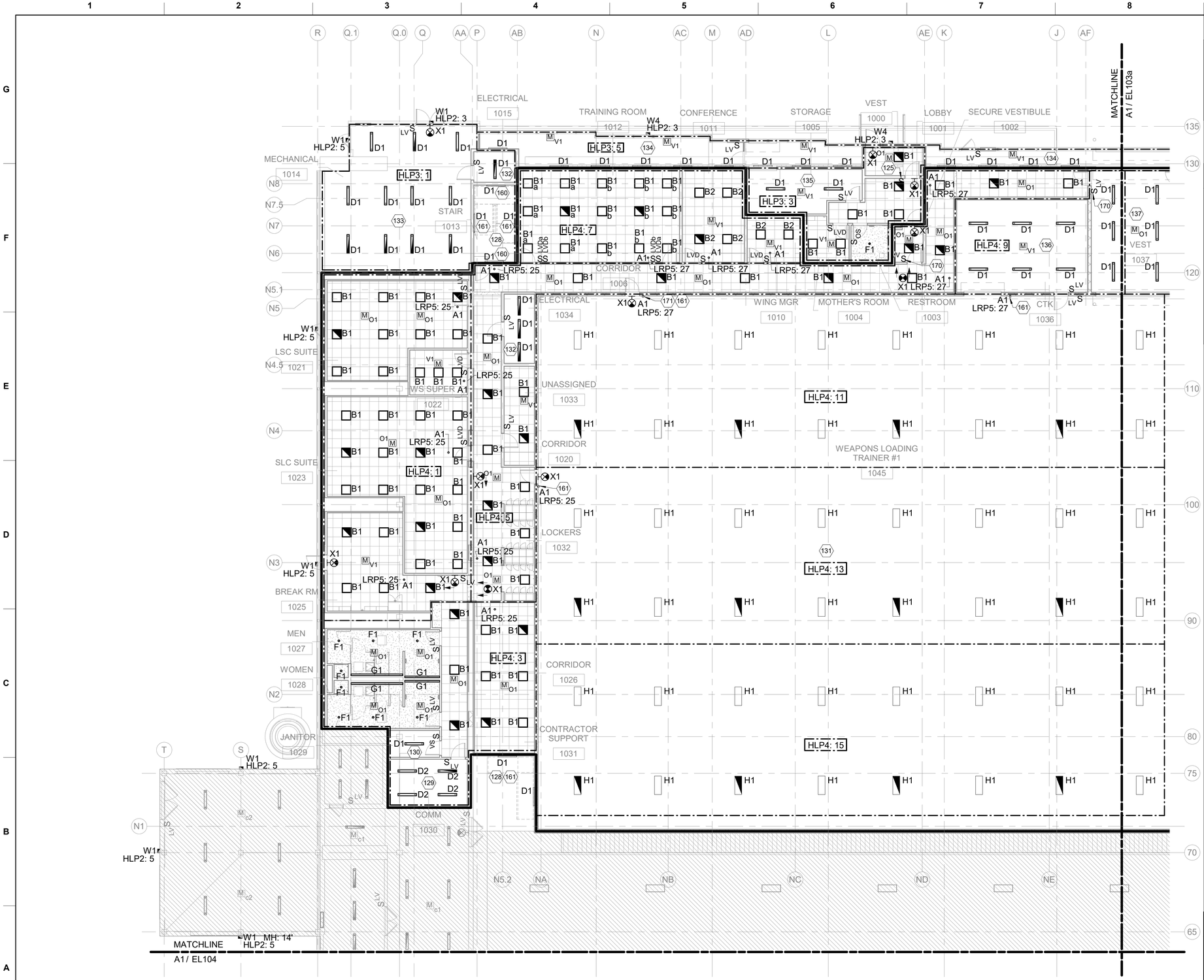
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL LIGHTING PLAN - LEVEL 01

SHEET ID

EL101

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL LIGHTING PLAN - LEVEL 01 - AREA A

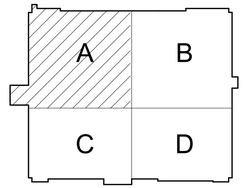
3/32" = 1'-0"

GENERAL SHEET NOTES - LIGHTING

1	SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2	FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3	SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4	DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

125	PROVIDE WALL STATION OVERRIDE FOR LOBBY LIGHTS. LABEL "LOBBY LIGHTING OVERRIDE, MAXIMUM OF 2 HOURS."
128	PROVIDE INTEGRAL OCCUPANCY SENSORS AND EMERGENCY BATTERY BACKUP FOR STAIRWELL LUMINARIES.
129	MOUNT LIGHT FIXTURES IN THIS ROOM AT 7' 10" AFF.
130	MOUNT LIGHT FIXTURES IN THIS ROOM AT 9' 0" AFF.
131	MOUNT LIGHT FIXTURES IN THIS ROOM AT 33' 0" AFF, FLUSH WITH THE STRUCTURAL RIBBING.
132	MOUNT LIGHT FIXTURES IN THIS ROOM AT 8' 6" AFF.
133	MOUNT LIGHT FIXTURES IN THIS ROOM AT 8' 9" AFF.
134	MOUNT LIGHT FIXTURES IN THIS ROOM AT 8' 0" AFF.
135	MOUNT LIGHT FIXTURES IN THIS ROOM AT 10' 0" AFF.
136	MOUNT LIGHT FIXTURES IN THIS ROOM AT 12' 0" AFF.
137	MOUNT LIGHT FIXTURES IN THIS ROOM AT 16' 0" AFF.
160	MOUNT LIGHT FIXTURES 7' 9" ABOVE NEAREST FLOOR OR LANDING.
161	MOUNT LIGHT FIXTURES 9' 0" ABOVE NEAREST FLOOR OR LANDING.
170	BLUE LIGHT SYSTEM.
171	BLUE LIGHT WARNING SYSTEM. TYP.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802EL102
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

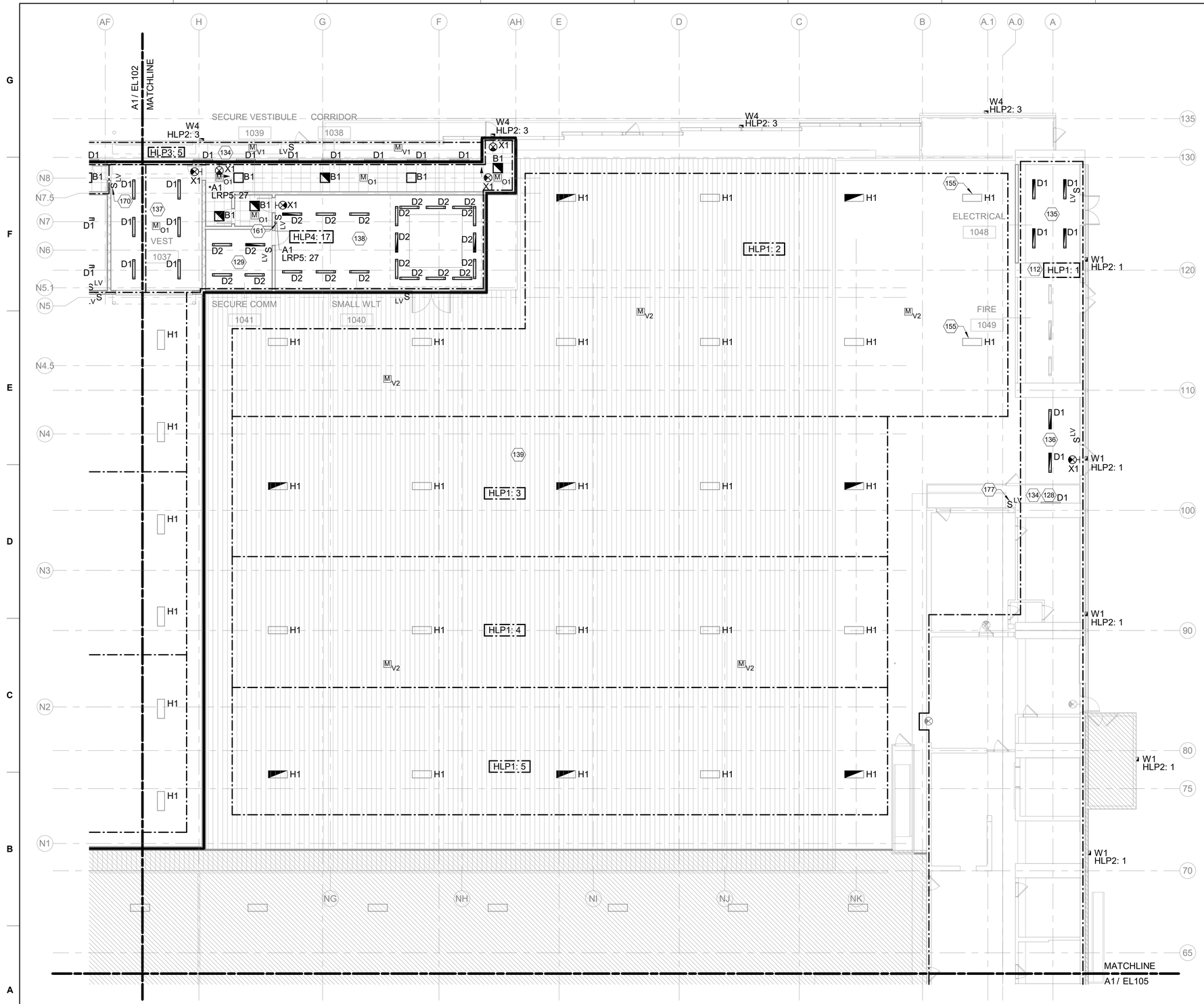
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - LEVEL 01 - AREA A

SHEET ID

EL102

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL LIGHTING PLAN - LEVEL 01 - AREA B - BASE BID

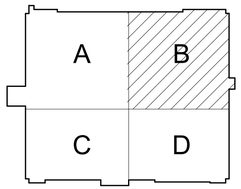
3/32" = 1'-0"

GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

112	CIRCUIT LUMINAIRES INSIDE DASHED ENCLOSURE TO PANEL AND CIRCUIT INDICATED. TYP.
128	PROVIDE INTEGRAL OCCUPANCY SENSORS AND EMERGENCY BATTERY BACKUP FOR STAIRWELL LUMINARIES.
129	MOUNT LIGHT FIXTURES IN THIS ROOM AT 7' 10" AFF.
134	MOUNT LIGHT FIXTURES IN THIS ROOM AT 8' 0" AFF.
135	MOUNT LIGHT FIXTURES IN THIS ROOM AT 10' 0" AFF.
136	MOUNT LIGHT FIXTURES IN THIS ROOM AT 12' 0" AFF.
137	MOUNT LIGHT FIXTURES IN THIS ROOM AT 16' 0" AFF.
138	MOUNT LIGHT FIXTURES IN THIS ROOM AT 16' 2" AFF.
139	MOUNT LIGHT FIXTURES IN THIS ROOM AT 40' 0" AFF.
155	MOUNT LIGHT FIXTURE AT 18' 3" AFF.
161	MOUNT LIGHT FIXTURES 9' 0" ABOVE NEAREST FLOOR OR LANDING.
170	BLUE LIGHT SYSTEM.
177	LIGHTING CONTROLS FOR EQUIPMENT PLATFORM WALKWAY. PROVIDE LOW VOLTAGE SWITCH AT BOTTOM OF STAIRS WITH A LABEL ON THE COVER PLATE TO IDENTIFY AREA SERVED, "PLATRFORM LTG".



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EL103a

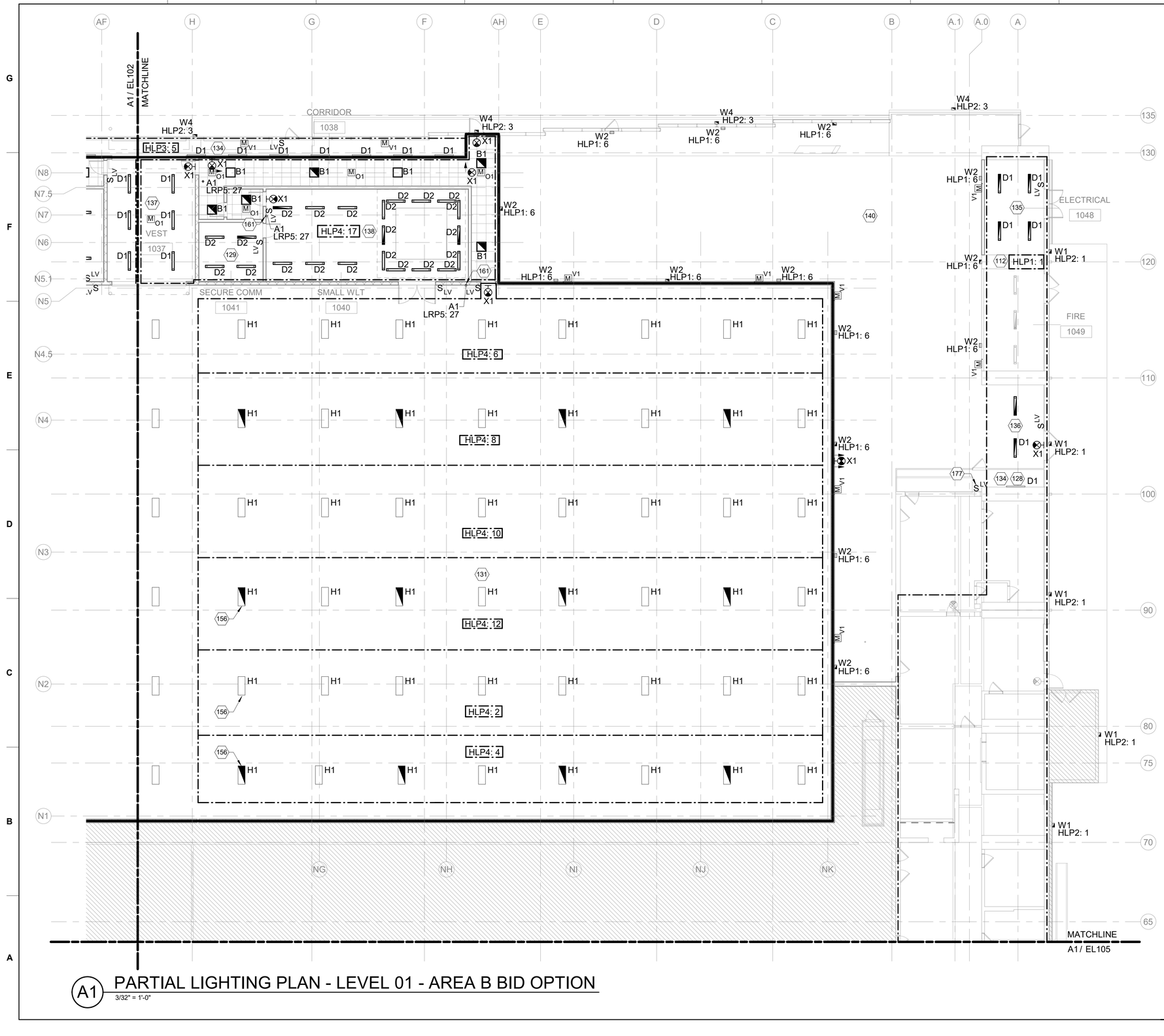
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - LEVEL 01 - AREA B - BASE BID

SHEET ID
EL103a

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL LIGHTING PLAN - LEVEL 01 - AREA B BID OPTION

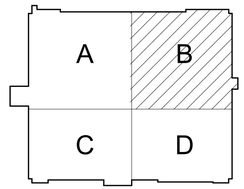
3/32" = 1'-0"

GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

112	CIRCUIT LUMINAIRES INSIDE DASHED ENCLOSURE TO PANEL AND CIRCUIT INDICATED. TYP.
128	PROVIDE INTEGRAL OCCUPANCY SENSORS AND EMERGENCY BATTERY BACKUP FOR STAIRWELL LUMINARIES.
129	MOUNT LIGHT FIXTURES IN THIS ROOM AT 7' 10" AFF.
131	MOUNT LIGHT FIXTURES IN THIS ROOM AT 33' 0" AFF, FLUSH WITH THE STRUCTURAL RIBBING.
134	MOUNT LIGHT FIXTURES IN THIS ROOM AT 8' 0" AFF.
135	MOUNT LIGHT FIXTURES IN THIS ROOM AT 10' 0" AFF.
136	MOUNT LIGHT FIXTURES IN THIS ROOM AT 12' 0" AFF.
137	MOUNT LIGHT FIXTURES IN THIS ROOM AT 16' 0" AFF.
138	MOUNT LIGHT FIXTURES IN THIS ROOM AT 16' 2" AFF.
140	MOUNT LIGHT FIXTURES IN THIS ROOM AT 15' 0" AFF.
156	PROVIDE 2#10, 1#10G IN 3/4"C FOR LIGHTING CIRCUIT.
161	MOUNT LIGHT FIXTURES 9' 0" ABOVE NEAREST FLOOR OR LANDING.
177	LIGHTING CONTROLS FOR EQUIPMENT PLATFORM WALKWAY. PROVIDE LOW VOLTAGE SWITCH AT BOTTOM OF STAIRS WITH A LABEL ON THE COVER PLATE TO IDENTIFY AREA SERVED, "PLATRFORM LTG".



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER	ISSUE DATE: 28 APRIL 2023
DRAWN BY: C. KOHRMANN	SOLICITATION NO.: W9128F23R0012
CHECKED BY: K. HOGAN	CONTRACT NO.:
SUBMITTED BY: B. DYSON	DRAWING CODE::
SIZE: ANSI D 22x34	FILE NAME: FXBM231802EL103b

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

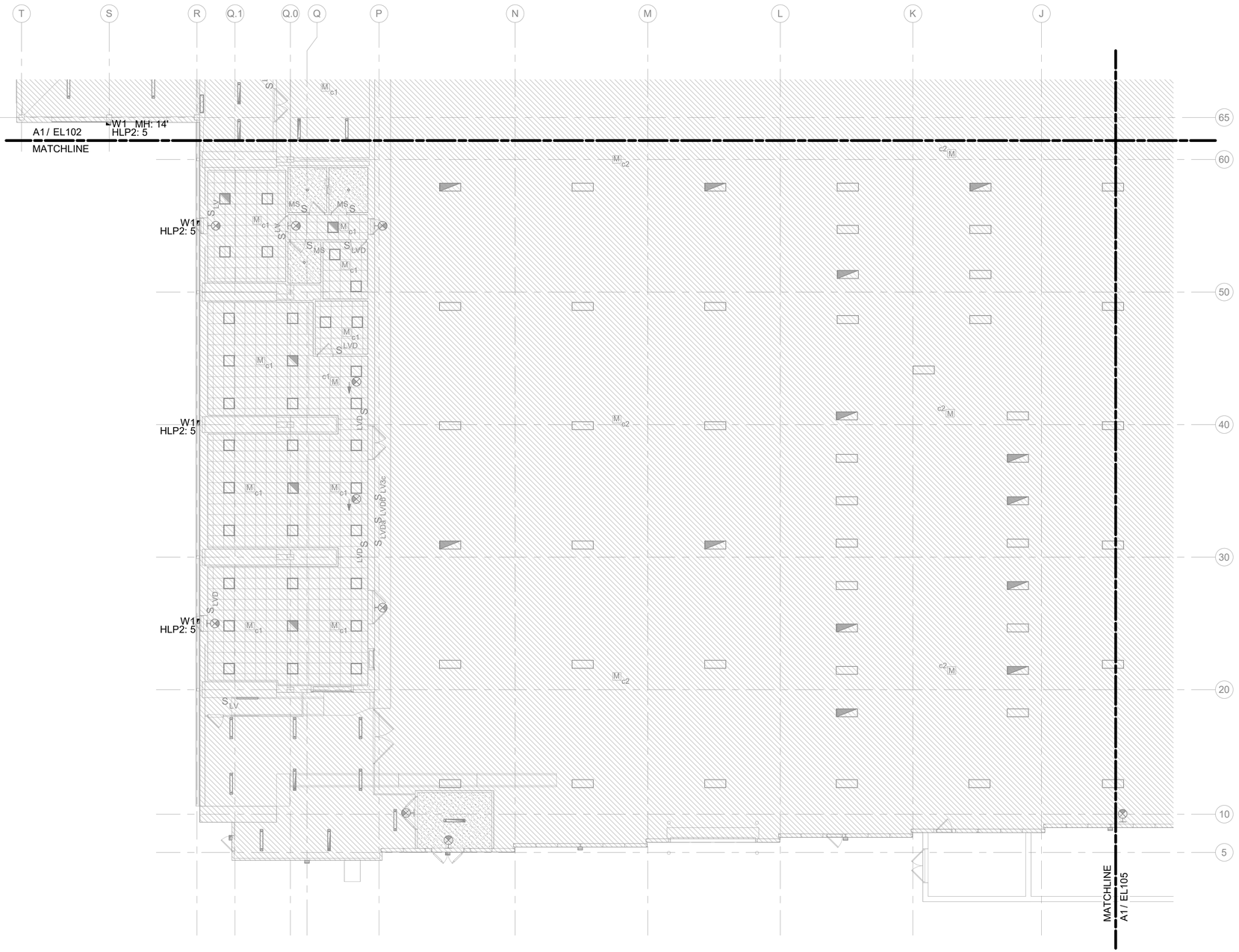
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - LEVEL 01 - AREA B - BID OPTION

SHEET ID

EL103b

ADVERTISEMENT - 100% DESIGN



GENERAL SHEET NOTES - LIGHTING

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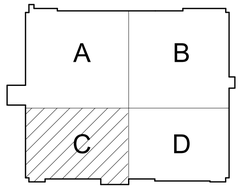
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

A1 PARTIAL LIGHTING PLAN - LEVEL 01 - AREA C
3/32" = 1'-0"



AREA C
KEY PLAN

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

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802EL104

US ARMY CORPS OF ENGINEERS
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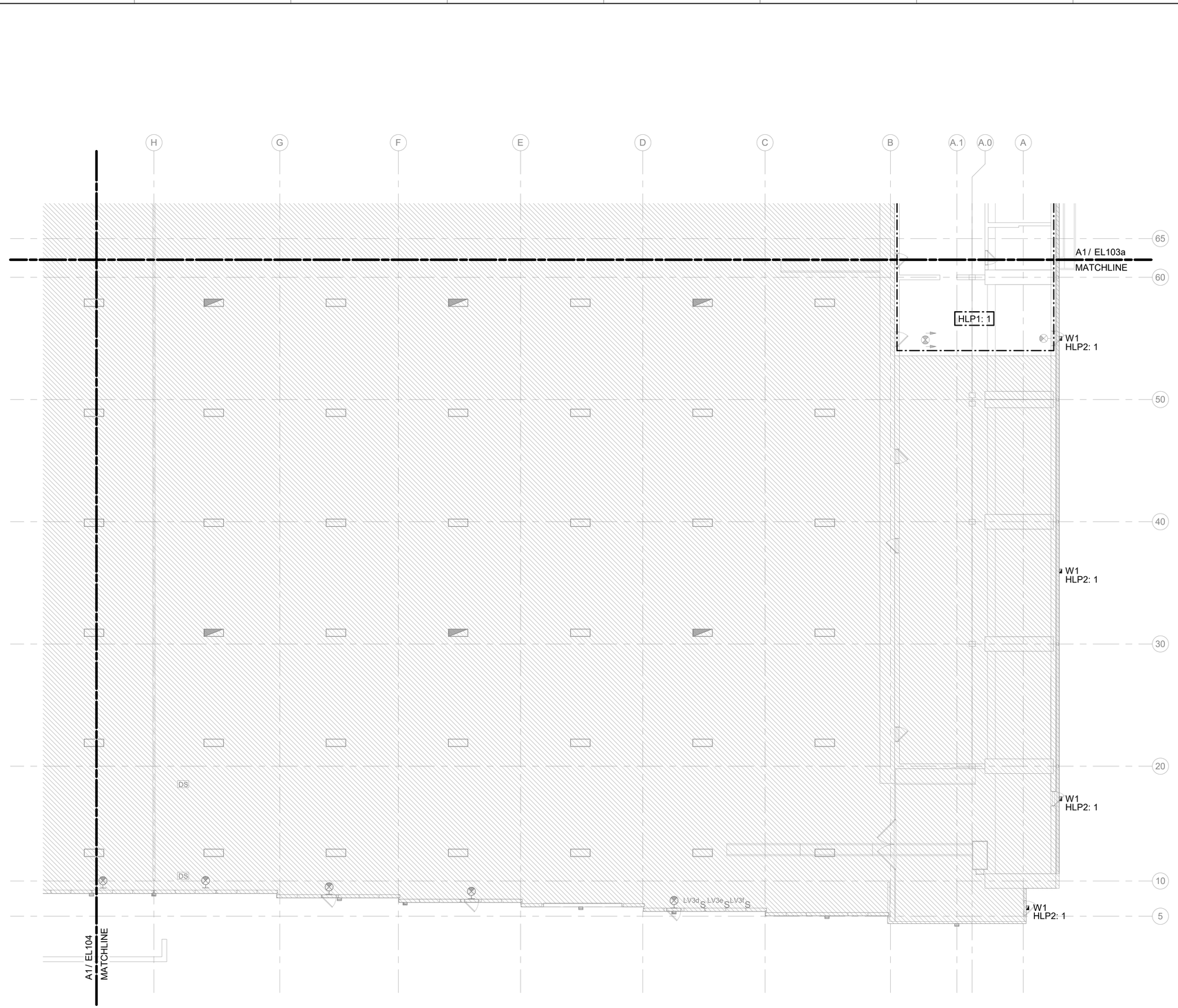
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - LEVEL 01 - AREA C

SHEET ID
EL104

ADVERTISEMENT - 100% DESIGN

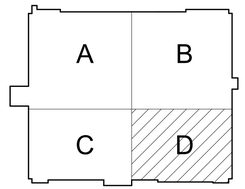


A1 PARTIAL LIGHTING PLAN - LEVEL 01 - AREA D

3/32" = 1'-0"

GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.



AREA D
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EL105
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
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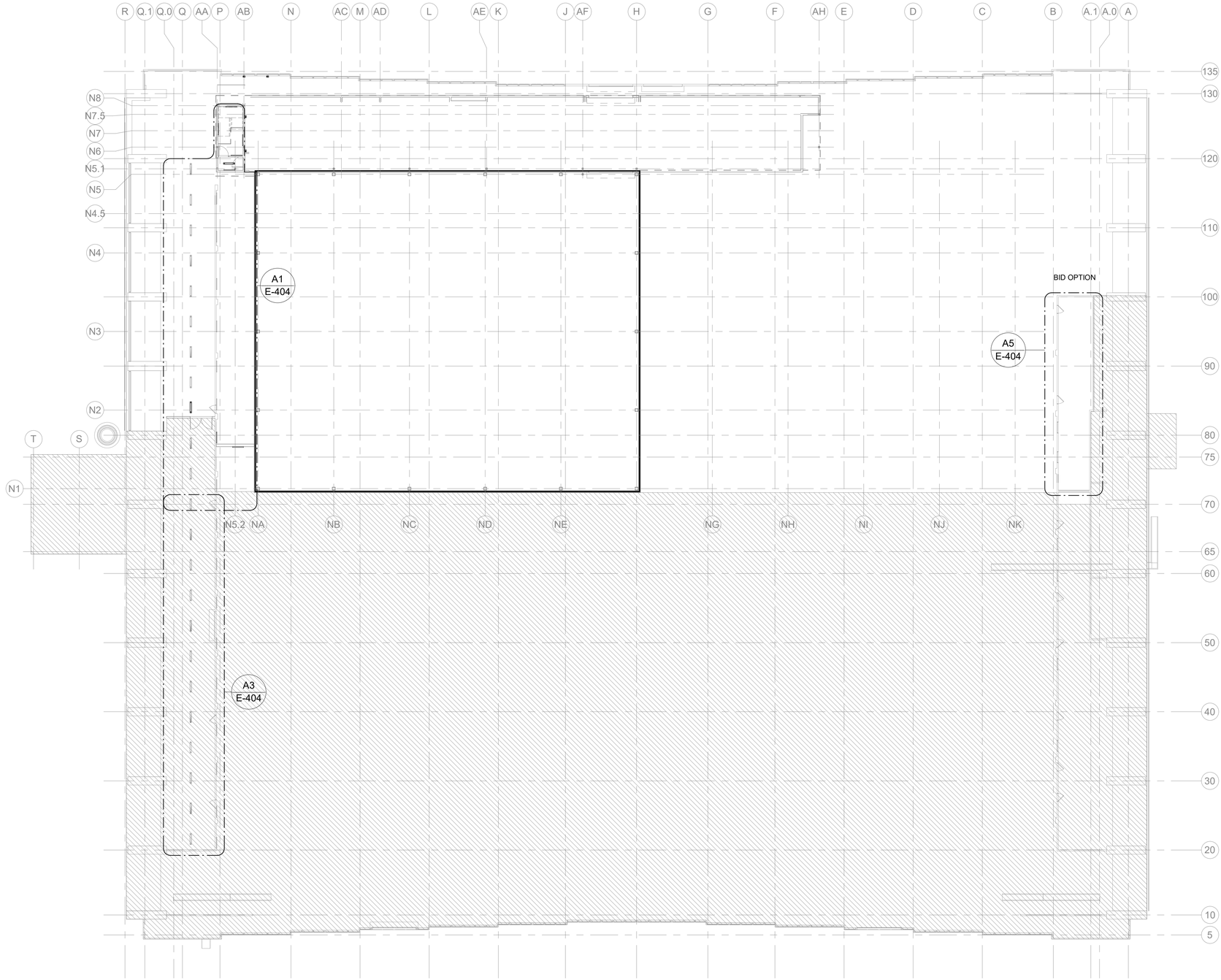
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - LEVEL 01 - AREA D

SHEET ID

EL105

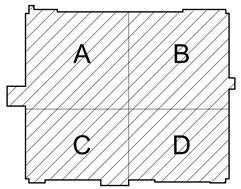
ADVERTISEMENT - 100% DESIGN



A1 OVERALL LIGHTING PLAN - EQUIPMENT PLATFORM 01
1" = 20'-0"

GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'
SCALE: 1"=20'

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802EL111

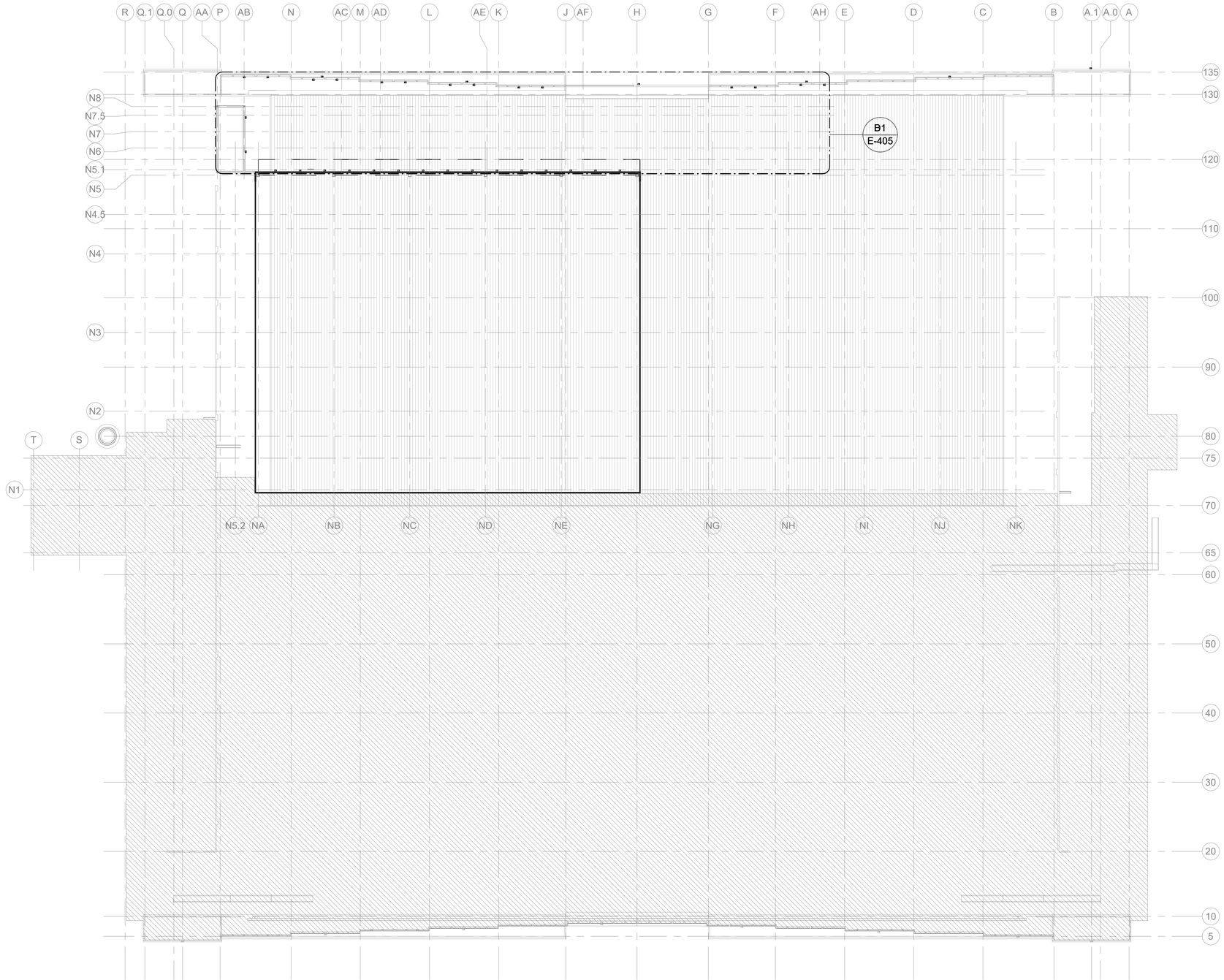
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL LIGHTING PLAN - EQUIPMENT
PLATFORM 01

SHEET ID
EL111

ADVERTISEMENT - 100% DESIGN



GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
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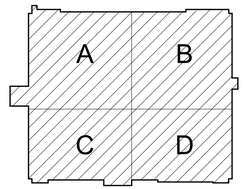
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

A1 OVERALL LIGHTING PLAN - EQUIPMENT PLATFORM 02
1" = 20'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802EL121

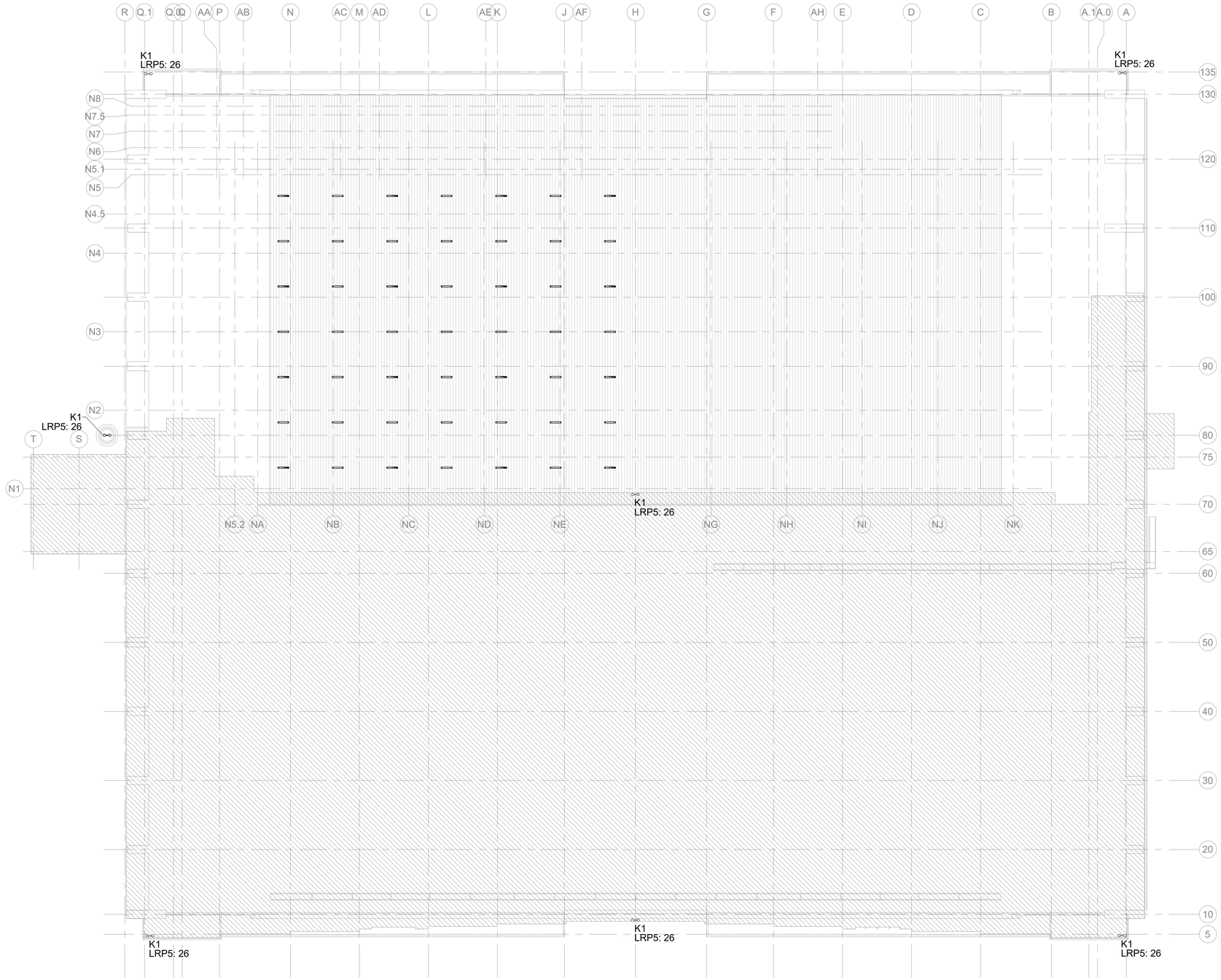
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL LIGHTING PLAN - EQUIPMENT
PLATFORM 02

SHEET ID
EL121

ADVERTISEMENT - 100% DESIGN

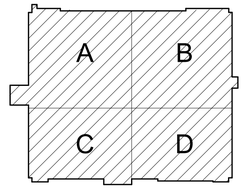


A1 OVERALL LIGHTING PLAN - PLATFORM 03

1" = 20'-0"

GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EL131

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

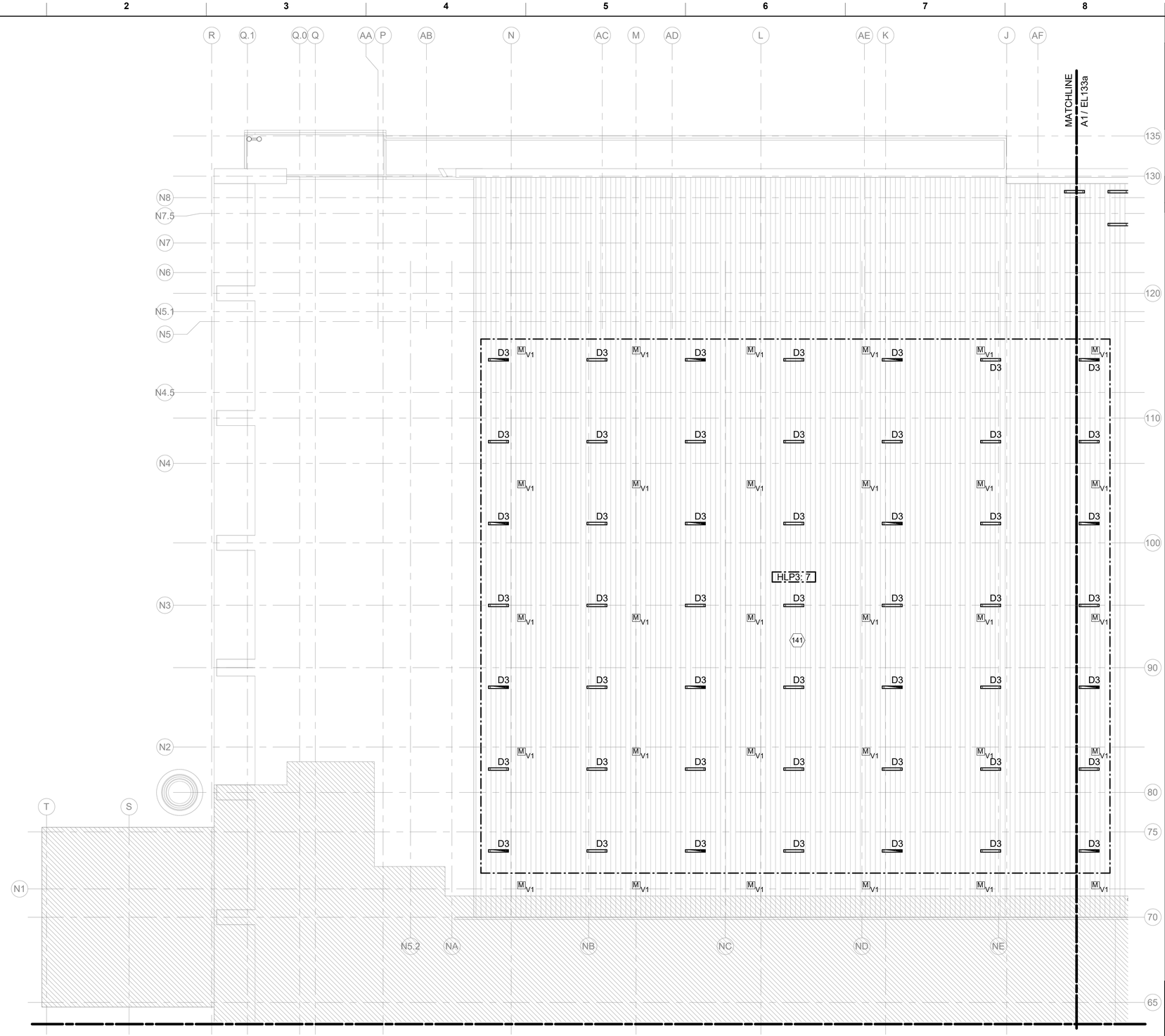
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL LIGHTING PLAN - PLATFORM 03

SHEET ID

EL131

ADVERTISEMENT - 100% DESIGN



GENERAL SHEET NOTES - LIGHTING

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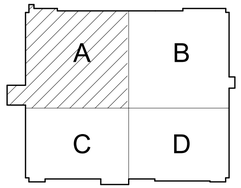
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

141 SURFACE MOUNT LIGHT FIXTURES TO CEILING.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

A1 PARTIAL LIGHTING PLAN - PLATFORM 03 - AREA A

3/32" = 1'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EL132

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

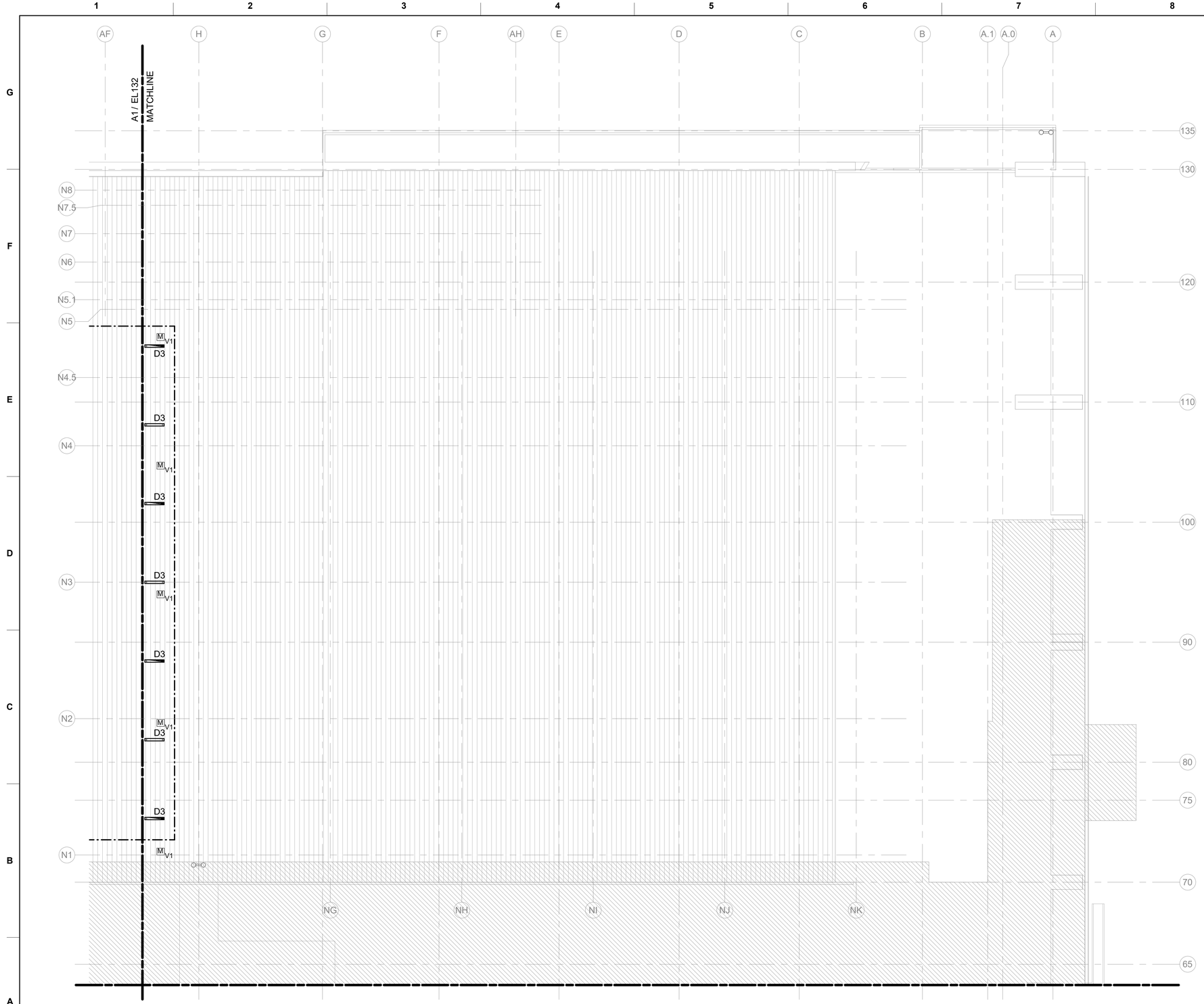
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - PLATFORM 03 - AREA A

SHEET ID

EL132

ADVERTISEMENT - 100% DESIGN



A1 PARTIAL LIGHTING PLAN - PLATFORM 03 - AREA B - BASE BID

3/32" = 1'-0"

GENERAL SHEET NOTES - LIGHTING

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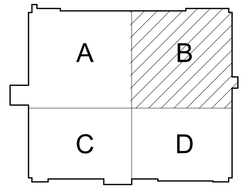

AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EL133a

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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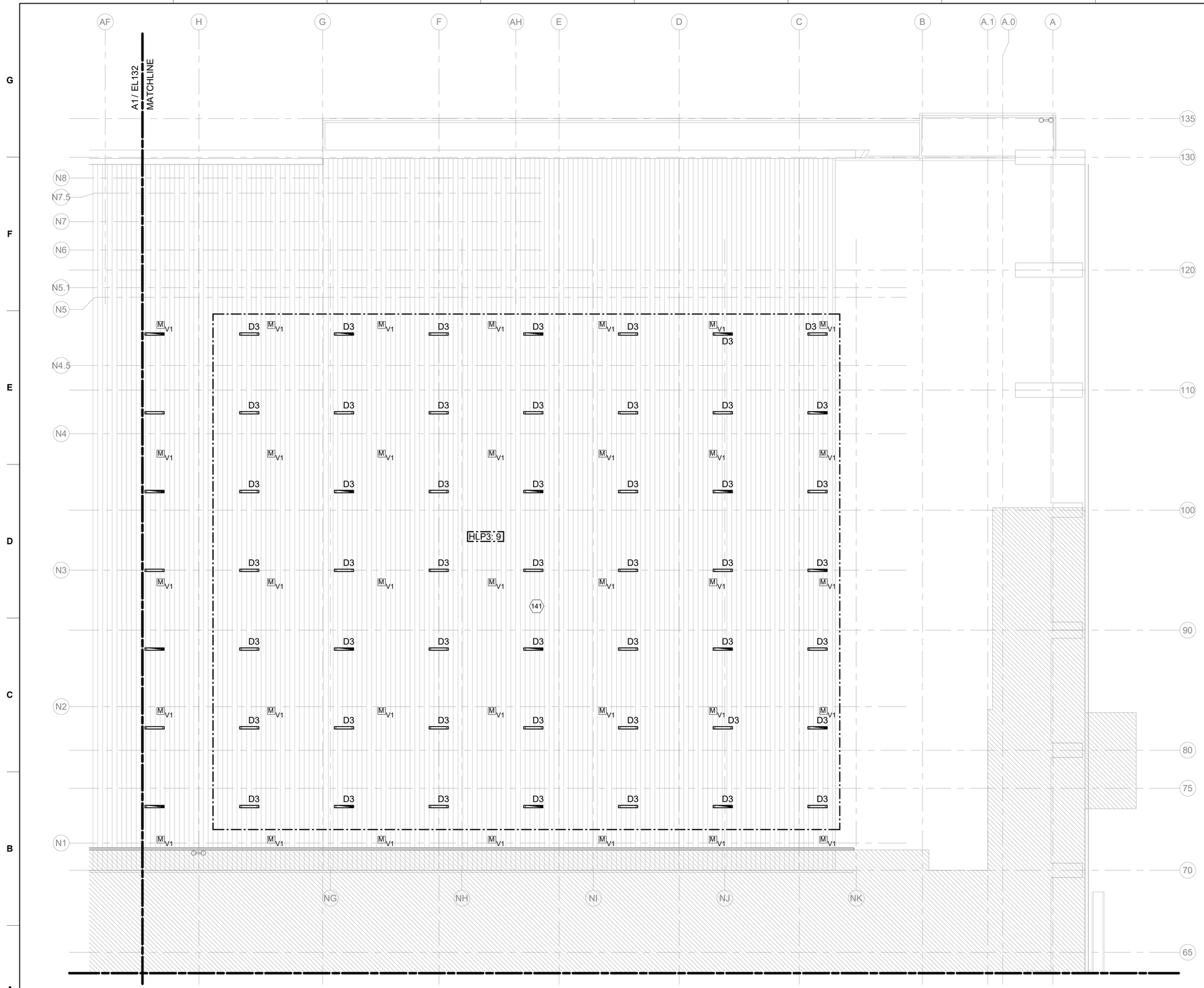
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - PLATFORM 03 - AREA B - BASE BID

SHEET ID
EL133a

ADVERTISEMENT - 100% DESIGN

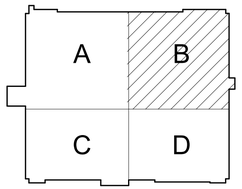


GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

141 SURFACE MOUNT LIGHT FIXTURES TO CEILING.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

A1 PARTIAL LIGHTING PLAN - PLATFORM 03 - AREA B - BID OPTION

3/32" = 1'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EL133b

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

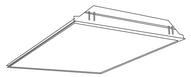
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL LIGHTING PLAN - PLATFORM 03 - AREA B - BID OPTION

SHEET ID

EL133b

ADVERTISEMENT - 100% DESIGN

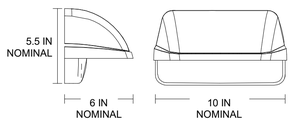


LUMINAIRE REQUIREMENTS

1. HOUSING - EDGE-LIT FLAT PANEL, HOUSING PAINTED AFTER FABRICATION, EXTRUDED ALUMINUM FRAME, HIGH REFLECTANCE, WHITE POLYESTER POWDER-COATED FINISH. 2FT X 2FT.
2. LIGHT SOURCE - LED BOARD OR ARRAY WITH MINIMUM 50K HOURS RATED LIFE AT L70, 4000K COLOR TEMPERATURE UON, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY, MINIMUM EFFICACY OF 100 LUMENS/WATT, WITH A MINIMUM CRI OF 80. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
3. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. FULLY DIMMABLE AS INDICATED IN LUMINAIRE SCHEDULE.
4. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP. IC RATED WHEN INDICATED.
5. MOUNTING - RECESSED IN SUSPENDED ACOUSTICAL TILE OR HARD CEILING.
6. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

FLAT PANEL LED TROFFER

TYPE MARK: B1, B2 | LIGHTING PLATE: NL-3

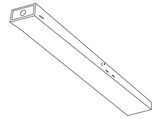


LUMINAIRE REQUIREMENTS:

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

LED WALL PACK

TYPE MARK: W1, W2 | LIGHTING PLATE: XL-17

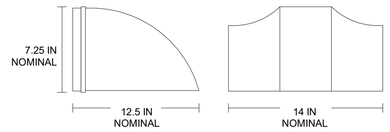


LUMINAIRE REQUIREMENTS:

1. HOUSING - DIE-FORMED, CURVED COLD-ROLLED STEEL, WITH REINFORCEMENT RIBS FOR RIGIDITY AND SPECULAR ALUMINUM OR HIGHLY-REFLECTIVE PAINTED STEEL REFLECTORS. OPTIONAL LENGTHS OF 48 INCH OR 96 INCH.
2. FINISH - FROSTED ACRYLIC LENS WITH MULTI-STAGE PHOSPHATE BONDING TREATMENT FINISHED WITH HIGH-REFLECTANCE, WHITE POLYESTER POWDER COAT, PAINTED AFTER FABRICATION.
3. LIGHT SOURCE - SOLID STATE LEDS WITH MINIMUM 50K HOURS RATED LIFE AT L70, TOLERANCE FOR COLOR CONSISTENCY. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
4. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. ON-OFF CONTROL, STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED.
5. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
6. MOUNTING - SURFACE ON CEILING OR SUSPENDED.
7. OPTIONS - WIRE GUARD, CHAIN, STEM OR SWIVEL STEM HANGERS.
8. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

LED INDUSTRIAL STRIP

TYPE MARK: D1, D2, D3 | LIGHTING PLATE: NL-7

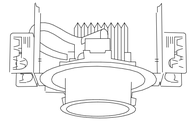


LUMINAIRE REQUIREMENTS:

1. HOUSING - DIE-CAST OR EXTRUDED ALUMINUM WITH INTEGRAL PASSIVE COOLING MECHANISM. HEAT SINK SHALL BE INCORPORATED DIRECTLY INTO HOUSING OR DRIVER COMPARTMENT TO ENSURE MAXIMUM HEAT TRANSFER AND DISSIPATION.
2. FINISH - MULTI-STAGE PRE-TREATMENT, FINISHED WITH BAKED-ON POLYESTER POWDER COAT. FINISH SHALL PASS 2500 HOUR SALT SPRAY TEST PER ASTM B117. STANDARD FINISH IS DARK BRONZE, WITH OTHER CUSTOM COLORS AVAILABLE.
3. POWER SUPPLY/LED DRIVER - CLASS 1 DRIVER SHALL OPERATE AT 208 VOLTS, 50/60 HZ, WITH OTHER VOLTAGES OPTIONAL; POWER FACTOR GREATER THAN 0.9 AND THD LESS THAN 20% AT FULL LOAD.
4. LED OPTICAL ASSEMBLY - PRECISION MOLDED ACRYLIC LENS PROVIDED FOR MULTIPLE HIGH-POWERED LEDS PRODUCING NEMA TYPE IV DISTRIBUTION OR AS OTHERWISE INDICATED. BUG UPLIGHT RATING OF U0, WITH GLARE RATING AS DETERMINED BY LIGHTING ZONE INSTALLED. MINIMUM COLOR RENDERING INDEX (CRI) SHALL BE 70.
5. CERTIFICATION - UL AND/OR ETL LISTED FOR WET LOCATIONS AS INDICATED, AND RoHS COMPLIANT.
6. OPTIONS - VARIOUS LUMEN OUTPUT RATING AS INDICATED, PHOTOCELL, AND 0-10 VOLT DIMMING DRIVER.
7. OTHER - THE ABOVE SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS AND IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER'S PREFERENCE. ALL DIMENSIONS ARE NOMINAL AND VARY PER MANUFACTURER.

LED WALL PACK

TYPE MARK: W4 | LIGHTING PLATE: XL-17

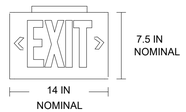


LUMINAIRE REQUIREMENTS:

1. HOUSING - DIE-CAST OR EXTRUDED, COLD-ROLLED STEEL, OR FORGED ALUMINUM WITH HEAT SINK. DRIVER MUST BE ACCESSIBLE FROM BOTTOM OF LUMINAIRE. PROVIDE T-BAR HANGERS FOR INSTALLATION IN ACOUSTICAL TILE CEILINGS OR TABS WHEN MOUNTING IN HARD CEILINGS.
2. REFLECTOR AND TRIM - SPECIFICATION GRADE, LOW IRIDESCENT, SPECULAR ALUMINUM REFLECTOR WITH METALLIC OR PAINTED TRIM RING.
3. LIGHT SOURCE - SOLID STATE LEDS WITH MINIMUM 50K HOURS RATED LIFE AT L70, MINIMUM 80 CRI, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
4. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. ON-OFF CONTROL, STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED.
5. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
6. MOUNTING - RECESSED IN HARD OR ACOUSTICAL TILE CEILING.
7. OPTIONS - EMERGENCY BATTERY BACK-UP, WALL-WASH TRIM, IC RATED FOR DIRECT CONTACT WITH INSULATION, VARIOUS APERTURE DIAMETERS, AND VARIOUS GLASS LENSES.
8. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

LED RECESSED DOWNLIGHT

TYPE MARK: F1 | LIGHTING PLATE: NL-19

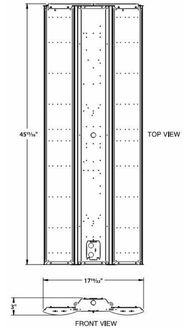


LUMINAIRE REQUIREMENTS:

1. HOUSING - MIRROR BACKGROUND OR HIGH-IMPACT, UV-STABILIZED, INJECTION-MOLDED CLEAR THERMOPLASTIC. SINGLE OR DOUBLE-FACED AS INDICATED.
2. FINISH - EDGE LIT CLEAR OR MIRROR BACKGROUND WITH MAINTENANCE FREE SEALED NICKEL CADMIUM BATTERY.
3. LETTERS/CHEVRONS - MINIMUM 6 INCH HIGH WITH 3/4 INCH STROKE. RED OR GREEN LETTERS AS INDICATED. PROVIDE CHEVRONS AS INDICATED EITHER LEFT, RIGHT OR BOTH DIRECTIONS AS INDICATED. CHEVRONS PUNCHED OUT THROUGH HOUSING AS REQUIRED. AC-ON INDICATOR LAMP AND TEST SWITCH.
4. MOUNTING - UNIVERSAL MOUNTING KIT FOR CEILING, WALL OR END-OF-FIXTURE MOUNTING.
5. ILLUMINATION - PROVIDED BY RED LETTERS ON CLEAR OR MIRROR BACKGROUND. PROVIDE POLYSTYRENE DIFFUSER IN COLOR INDICATED WITH FREQUENCY-MATCHED SILKSCREEN COATING FOR MAXIMUM LED LIGHT OUTPUT.
6. CERTIFICATION - UL LISTED AND CERTIFIED FOR DAMP LOCATIONS.

LED EXIT SIGN

TYPE MARK: X1 | LIGHTING PLATE: NL-63

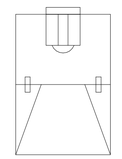


LUMINAIRE REQUIREMENTS:

1. DRIVER HOUSING - CODE GAUGE COLD-ROLLED STEEL MOUNTING BOX WITH DIE CAST ALUMINUM HEAT SINK. FROSTED ACRYLIC LENS.
2. LIGHT SOURCE - SOLID STATE LEDS WITH MINIMUM 60K HOURS RATED LIFE AT L80, 4000K CCT UON, MINIMUM 80 CRI, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY, AND MINIMUM EFFICACY OF 150 LUMENS/WATT. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
3. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. FULLY DIMMABLE.
4. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
5. MOUNTING - PENDANT MOUNT WITH SWIVEL STEM HANGERS.
6. OPTIONS - EMERGENCY BATTERY BACK-UP, TWIST-LOCK PLUG ON HOOK AND CORD MODELS, SAFETY CABLE OR CHAIN.
7. THIS SKETCH IS A NON-PROPRIETY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS AND IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER'S PREFERENCE. ALL DIMENSIONS ARE NOMINAL AND VARY PER MANUFACTURER.

LED HIGH BAY INDUSTRIAL

TYPE MARK: H1 | LIGHTING PLATE: NL-21



LUMINAIRE REQUIREMENTS:

1. HOUSING - DIE-FORMED STEEL, HIGH REFLECTANCE, WHITE POLYESTER POWDER-COATED MATTE WHITE FINISH. CUSTOMIZABLE ROW LENGTH SPECIFIABLE TO 3 INCH INCREMENTS, TELESCOPING END MODULES FOR CONTINUOUS LIGHT.
2. LIGHT SOURCE - SOLID STATE LEDS WITH MINIMUM 50K HOURS RATED LIFE AT L70, MINIMUM 80 CRI, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
3. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED IN LUMINAIRE SCHEDULE.
4. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
5. MOUNTING - RECESSED IN SUSPENDED ACOUSTICAL TILE OR HARD CEILING.
6. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

LED HIGH BAY INDUSTRIAL

TYPE MARK: G1 | LIGHTING PLATE: RF13

US Army Corps of Engineers
Omaha District ®

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

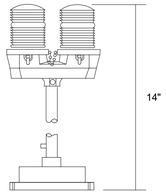
MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802EL501

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID
EL501

ADVERTISEMENT - 100% DESIGN

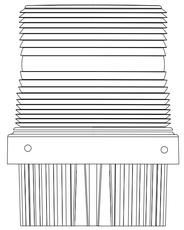


LUMINAIRE REQUIREMENTS:

1. HOUSING - CAST ALUMINUM. ONE PIECE 360 DEGREE RED, HEAT RESISTANT GLASS FRESNEL GLOBE. PROVIDE TOGGLE TYPE LATCHES AND CLAMPING TO SECURE GLOBES. PROVIDE SAFETY CHAINS ON GLOBES.
2. LIGHT SOURCE - INCANDESCENT. 2 LAMP. MEETING FAA REQUIREMENTS AND SPECIFICATIONS FOR OBSTRUCTION LIGHTING (L-810)
3. MOUNTING - SURFACE MOUNT LUMINAIRE ON 1" RIGID STEEL CONDUIT. PROVIDE JUNCTION BOX AND MOUNTING PLATE AT BASE UNLESS INDICATED OTHERWISE.
4. PROVIDE INTERNAL PROVISIONS FOR GROUNDING.
5. PROVIDE PHOTOELECTRIC CONTROL.
6. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

OBSTRUCTION LIGHT

TYPE MARK: K1	LIGHTING PLATE: XL-20



LUMINAIRE REQUIREMENTS:

1. LIGHT SOURCE - LED. DOME COLOR - BLUE.
2. DRIVER - OPERATING VOLTAGE OF 120V.
3. CERTIFICATION - UL LISTED FOR WET LOCATION, ROHS COMPLIANT. COMPLIES WITH IES LM79, LM80 AND TM21 TESTING STANDARDS.
4. MOUNTING - 1/2-INCH NPT PIPE MOUNT AND THREE HOLES REQUIRED FOR SURFACE MOUNT ON CEILING AND WALL.
5. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

BLUE LED WARNING LIGHT

TYPE MARK: A1	

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: M. HEIMMER
DRAWN BY: N. BOYER
CHECKED BY: R. YAW
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802EL502

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

DETAILS

SHEET ID

EL502

File Path: C:\Users\Public_Revit_Local_Models\2021\FXBM231802_ELEC_v21_kohrmac.rvt
Plot Date: 4/24/2023 6:48:33 PM

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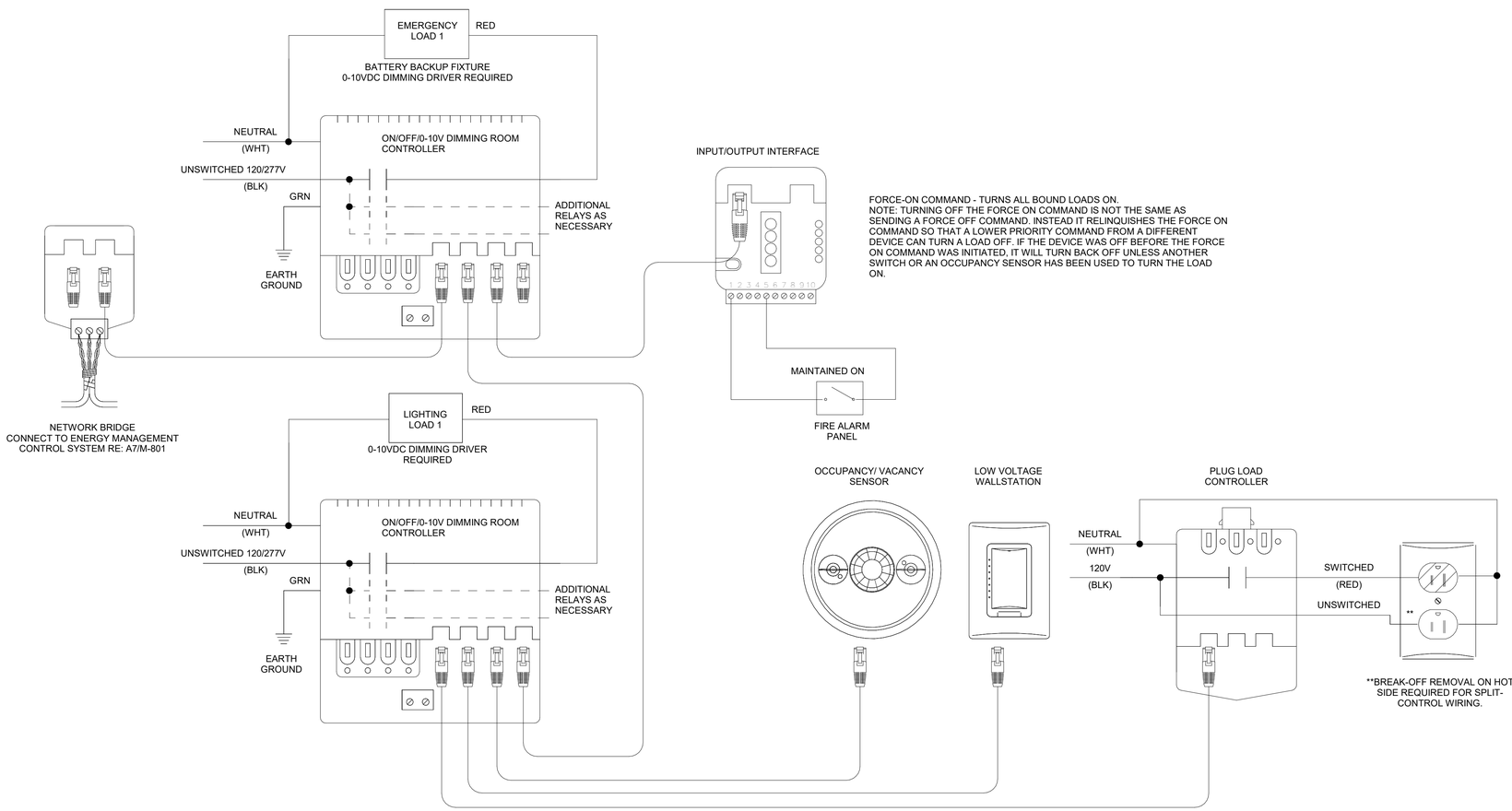

FORCE-ON COMMAND - TURNS ALL BOUND LOADS ON.
NOTE: TURNING OFF THE FORCE ON COMMAND IS NOT THE SAME AS SENDING A FORCE OFF COMMAND. INSTEAD IT RELINQUISHES THE FORCE ON COMMAND SO THAT A LOWER PRIORITY COMMAND FROM A DIFFERENT DEVICE CAN TURN A LOAD OFF. IF THE DEVICE WAS OFF BEFORE THE FORCE ON COMMAND WAS INITIATED, IT WILL TURN BACK OFF UNLESS ANOTHER SWITCH OR AN OCCUPANCY SENSOR HAS BEEN USED TO TURN THE LOAD ON.

OCCUPANCY SENSOR SHALL TURN ALL ROOM LIGHTING AND CONTROLLED RECEPTACLES OFF WHEN MOTION IS NOT DETECTED FOR A PERIOD OF TIME. REFER TO EL601 FOR ADDITIONAL CONTROL REQUIREMENTS.

THIS DIAGRAM IS REPRESENTATIVE OF A TYPICAL LIGHTING CONTROL SYSTEM. FURNISH A COMPLETE SYSTEM THAT PERFORMS AS INDICATED ON SHEETS EL101-105, EL111, EL121, EL131-133b. SELECTED EQUIPMENT MAY REQUIRE A DIFFERENT TOPOLOGY AT NO ADDITIONAL COST TO THE GOVERNMENT AND WILL REQUIRE AN APPROVED SUBMITTAL SHOWING INTENDED CONTROL DEVICE LAYOUTS BEFORE PRODUCTS ARE PURCHASED.

A1 ENERGY CODE WIRING DIAGRAM

NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
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SIZE: ANSI D 22x34
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
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ELLSWORTH AIR FORCE BASE, SD
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PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID
EL503

ADVERTISEMENT - 100% DESIGN

LUMINAIRE SCHEDULE

TYPE MARK	DESCRIPTION	DELIVERED LUMENS	LAMP TYPE	COLOR TEMPERATURE	VOLTAGE	WATTAGE	MOUNTING	MOUNTING HEIGHT
A1	BLUE BEACON WARNING LIGHT, LED STROBE BULB, BLUE DOME.	--	LED	--	120	192	WALL/CEILING	SEE FLOOR PLANS
B1	2FT X 2FT EDGE-LIT, FLAT PANEL LED TROFFER, 0-10V DIMMING DRIVER.	3477	LED	4000K	UNIVERSAL (277V)	26	RECESSED	--
B2	2FT X 2FT EDGE-LIT, FLAT PANEL LED TROFFER, 0-10V DIMMING DRIVER.	3905	LED	4000K	UNIVERSAL (277V)	30	RECESSED	--
D1	4FT LENSED LED STRIPLIGHT, CURVED, FROSTED ACRYLIC LENS, WIDE DISTRIBUTION, 0-10V DIMMING DRIVER.	4613	LED	4000K	UNIVERSAL (277V)	40	PENDANT	
D2	4FT LENSED LED STRIPLIGHT, CURVED, FROSTED ACRYLIC LENS, WIDE DISTRIBUTION, FIXED DRIVER.	8149	LED	4000K	UNIVERSAL (277V)	66.5	PENDANT	SEE FLOOR PLANS
D3	4FT LENSED LED STRIPLIGHT, CURVED, FROSTED ACRYLIC LENS, WIDE DISTRIBUTION, 0-10V DIMMING DRIVER.	2606	LED	4000K	UNIVERSAL (277V)	20	SURFACE	SEE FLOOR PLANS
F1	4.5 INCH DOWNLIGHT, CLEAR DIFFUSE COLOR, WET LOCATION LISTED.	1106	LED	4000K	UNIVERSAL (277V)	11.4	RECESSED	--
G1	LENGTH AS REQUIRED. LOW PROFILE, LED WALL WASH WITH 6IN SLOT, ASYMMETRIC DIRECT DISTRIBUTION, SOFT DIFFUSE LENS.	450 / FT	LED	4000K	UNIVERSAL (277V)	3.9 / FT.	RECESSED	--
H1	4 FT LED HIGH BAY, FROSTED ACRYLIC LENS, WIDE DISTRIBUTION, 0-10V DIMMING DRIVER.	29887	LED	4000K	UNIVERSAL (277V)	197.4	PENDANT	SEE FLOOR PLANS
K1	RED GLOBE, DOUBLE OBSTRUCTION LIGHT, ALARM/TRANSFER RELAY, PHOTOCELL. FAA L-810.	--	INCANDESCENT	RED	120	116	SURFACE	--
W1	LED FULL CUTOFF WALL PACK, POWDER PAINT FINISH IN DARK BRONZE, WET LOCATION LABEL, TYPE 3 DISTRIBUTION, INTEGRAL PHOTOCELL, OCCUPANCY SENSOR, AND BATTERY PACK.	1962	LED	4000K	UNIVERSAL (277V)	21	WALL MOUNT	10'
W2	LED FULL CUTOFF WALL PACK, POWDER PAINT FINISH IN DARK BRONZE, TYPE 4 DISTRIBUTION.	9462	LED	4000K	UNIVERSAL (277V)	67.2	WALL MOUNT	SEE FLOOR PLANS
W4	HIGH OUTPUT LED WALL PACK, DIE-CAST ALUMINUM HOUSING, POWDER PAINT FINISH IN DARK BRONZE, WET LOCATION LABEL, TYPE 4 DISTRIBUTION.	15840	LED	4000K	UNIVERSAL (277V)	136	WALL MOUNT	38'
X1	EDGE-LIT EXIT SIGN, SINGLE/DOUBLE FACE, MAINTENANCE FREE SEALED NICKEL CADMIUM BATTERY, RED LETTERS ON CLEAR OR MIRROR BACKGROUND.	--	LED	--	UNIVERSAL (277V)	5	UNIVERSAL	--

LIGHTING CONTROL MATRIX

ROOM/AREA CONTROLLED	WALLSTATION/ SWITCH	OCC SENSOR	VAC SENSOR	RECEPTACLE CONTROL	TIMECLOCK	DAYLIGHT/PHOTO SENSOR	CONTROL SEQUENCE
CORRIDORS, VESTIBULES, STAIRWAYS		X					OCCUPANCY SENSOR TURNS LIGHTS "ON" WHEN OCCUPIED AND DIM TO 50% LIGHT OUTPUT AFTER 15 MINUTES OF NO OCCUPANCY.
ELECTRICAL, MECHANICAL, TELECOMMUNICATIONS, WEAPONS LOADER TRAINING	X						MANUAL ON/OFF AT SWITCH.
STORAGE, JANITOR, SHELL SPACE, BREAK ROOM	X		X				MANUAL ON AT WALLSTATION. VACANCY SENSOR TURNS LIGHTS "OFF" AFTER 15 MINUTES OF NO OCCUPANCY.
OPEN OFFICE	X	X		X			OCCUPANCY SENSOR TURNS LIGHTS "ON" TO 50% LIGHT OUTPUT WHEN OCCUPIED AND "OFF" AFTER 15 MINUTES OF NO OCCUPANCY. MANUAL OVERRIDE WALLSTATION WITH 3 BUTTON DIMMING SWITCH PROGRAMMED TO 0%/50%/100% LIGHT OUTPUT WITH RAISE LOWER OPTIONS.
PRIVATE OFFICE, TRAINING, CONFERENCE, MOTHER'S ROOM	X		X	X			MANUAL ON AT WALLSTATION WITH 3 BUTTON DIMMING SWITCH PROGRAMMED TO 0%/50%/100% LIGHT OUTPUT WITH RAISE LOWER OPTIONS. VACANCY SENSOR TURNS LIGHTS "OFF" AFTER 15 MINUTES OF NO OCCUPANCY.
RESTROOMS	X	X					OCCUPANCY SENSOR TURNS LIGHTS "ON" WHEN OCCUPIED AND "OFF" AFTER 15 MINUTES OF NO OCCUPANCY. OVERRIDE WALLSTATION TURNS LIGHTS "ON".
BUILDING MOUNTED EXTERIOR LIGHTS		X			X	X	LIGHTS "ON/OFF" VIA PHOTOCELL. 30% REDUCTION OF LIGHT OUTPUT VIA TIMECLOCK FROM MIDNIGHT UNTIL 6AM OR WHEN NO ACTIVITY HAS BEEN DETECTED FOR 15 MINUTES.
LOBBY	X				X		TIMECLOCK TURNS LIGHTS "ON" 15 MINUTES BEFORE OPENING AND "OFF" 15 MINUTES AFTER CLOSING. WALLSTATION OVERRIDE FOR A MAXIMUM OF 2 HOURS.
SECURITY ABOVE WEAPONS LOADER TRAINING		X					OCCUPANCY SENSOR TURNS LIGHTS "ON" WHEN OCCUPIED AND "OFF" AFTER 15 MINUTES OF NO OCCUPANCY.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802EL601
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
LUMINAIRE SCHEDULE

SHEET ID

EL601

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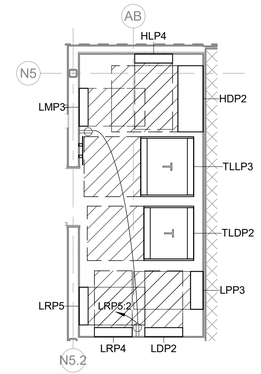
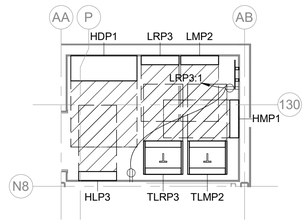


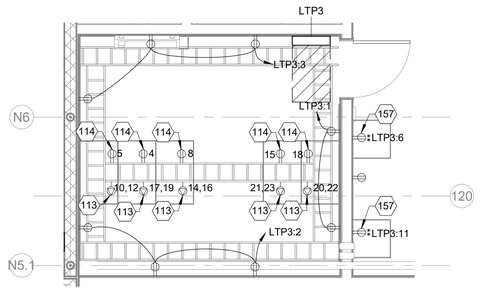
F3 POWER PLAN - LEVEL 01 - ELECTRICAL 1034

1/4" = 1'-0"



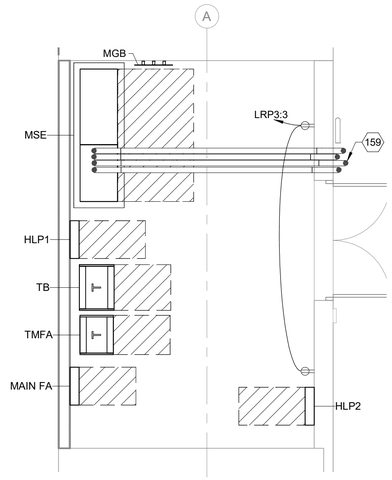
D3 POWER PLAN - LEVEL 01 - ELECTRICAL 1015

1/4" = 1'-0"



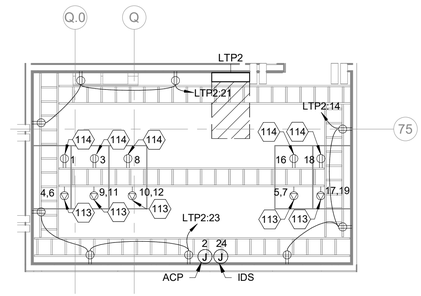
D5 POWER PLAN - LEVEL 01 - SECURE COMM 1041

1/4" = 1'-0"



A3 POWER PLAN - LEVEL 01 - ELECTRICAL 1048

1/4" = 1'-0"



A6 POWER PLAN - LEVEL 01 - COMM 1030

1/4" = 1'-0"

GENERAL SHEET NOTES - POWER

1	FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2	DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3	SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.

SHEET KEYNOTES

113	PROVIDE NEMA L6-30 RECEPTACLE. MOUNT RECEPTACLE TO CABLE TRAY ABOVE RACK.
114	PROVIDE NEMA L5-20 RECEPTACLE. MOUNT RECEPTACLE TO CABLE TRAY ABOVE RACK.
157	PROVIDE NEMA L5-20 RECEPTACLE. MOUNT RECEPTACLE ABOVE CABINET.
159	STUB UP CONDUITS FROM TRANSFORMER AND ROUTE OVERHEAD TO MSE.

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
DATE:
ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802E-401

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

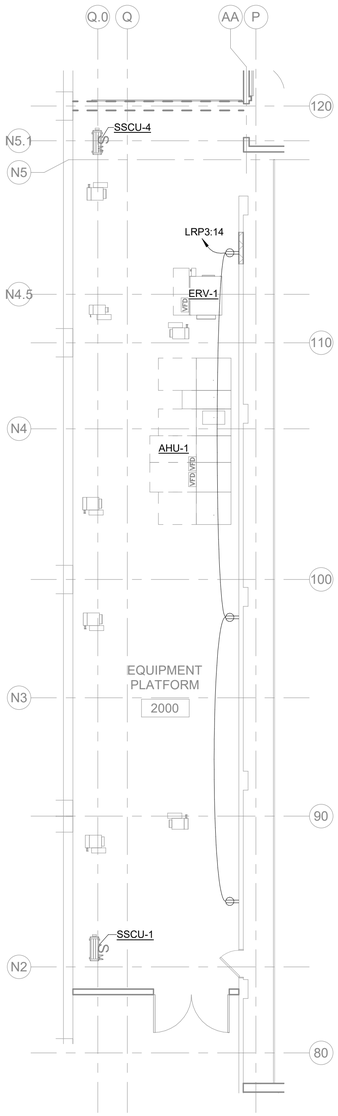
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

ENLARGED PLANS

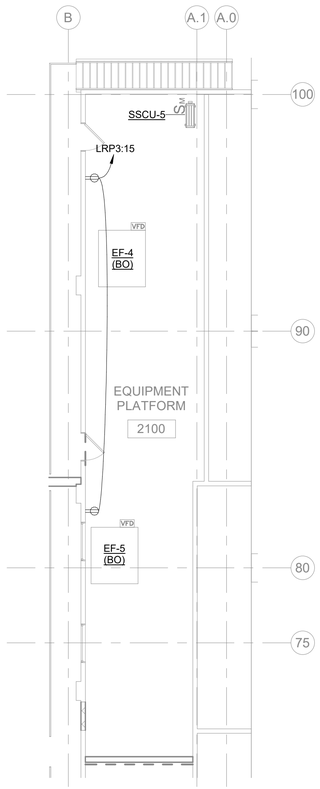
SHEET ID

E-401

ADVERTISEMENT - 100% DESIGN



A2 POWER PLAN - EQUIPMENT PLATFORM 2000
1/8" = 1'-0"



A5 POWER PLAN - EQUIPMENT PLATFORM 2100 - BID OPTION
1/8" = 1'-0"

GENERAL SHEET NOTES - POWER

1 FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2 DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3 SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.

GENERAL SHEET NOTES - EQUIPMENT

1 REFER TO EP601 FOR EQUIPMENT CONNECTION INFORMATION.
2 DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

GRAPHIC SCALE
8 6 4 2 0 8 16
SCALE: 1/8"=1'-0"

PLAN NORTH
TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802E-402

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

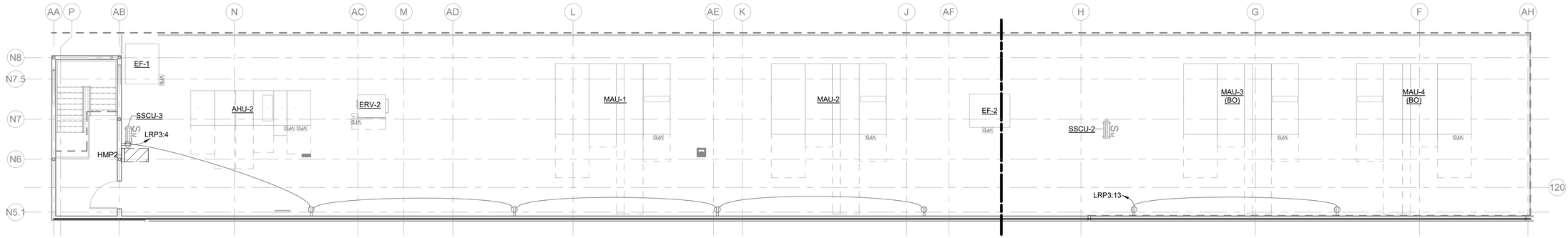
ENLARGED PLANS

SHEET ID
E-402

ADVERTISEMENT - 100% DESIGN

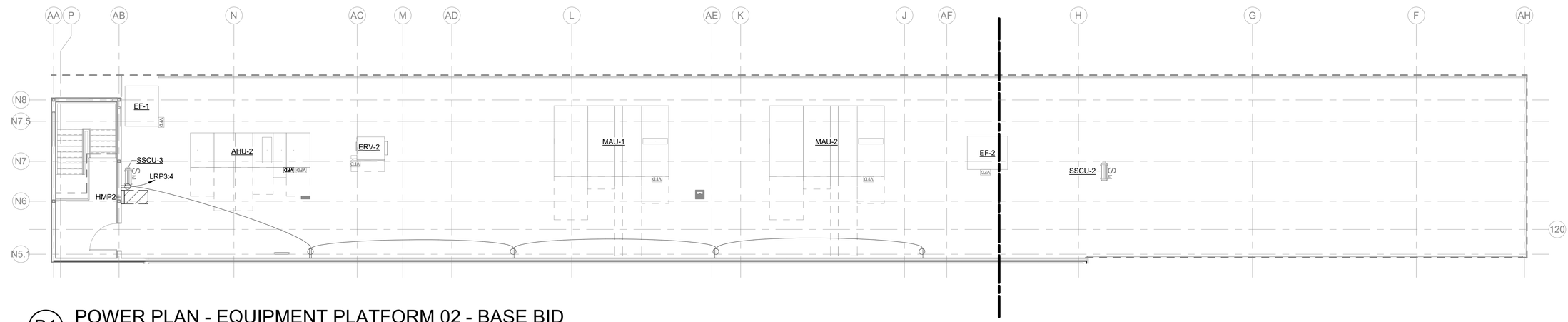
GENERAL SHEET NOTES - POWER

1	FOR ADDITIONAL GROUNDING REQUIREMENTS, REFER TO GROUNDING RISER ON E5/E-602.
2	DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.
3	SURFACE MOUNT ELECTRICAL EQUIPMENT TO THE WEAPONS LOADING TRAINER WALLS. ALL CONDUIT IN BAY MUST BE RIGID GALVANIZED STEEL.



E1 POWER PLAN - EQUIPMENT PLATFORM 02 - BID OPTION

1/8" = 1'-0"



B1 POWER PLAN - EQUIPMENT PLATFORM 02 - BASE BID

1/8" = 1'-0"

GRAPHIC SCALE

8 6 4 2 0 8 16

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

PLAN NORTH

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Omaha District ®

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SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802E-403

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ST. LOUIS, MISSOURI 63110

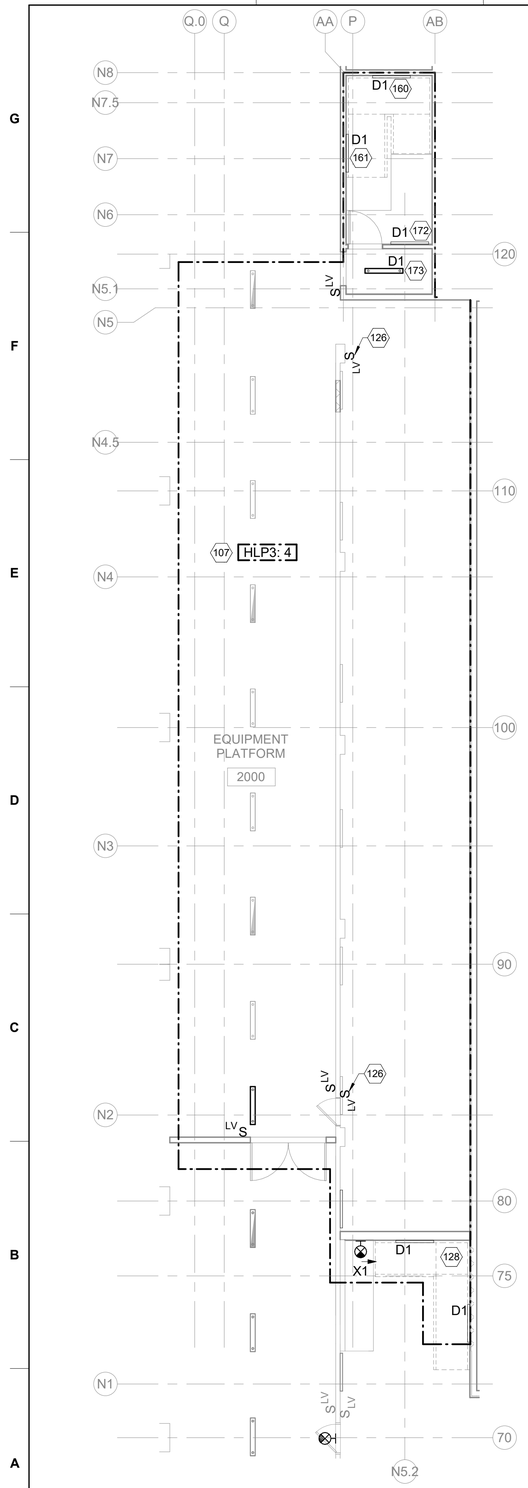
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

ENLARGED PLANS

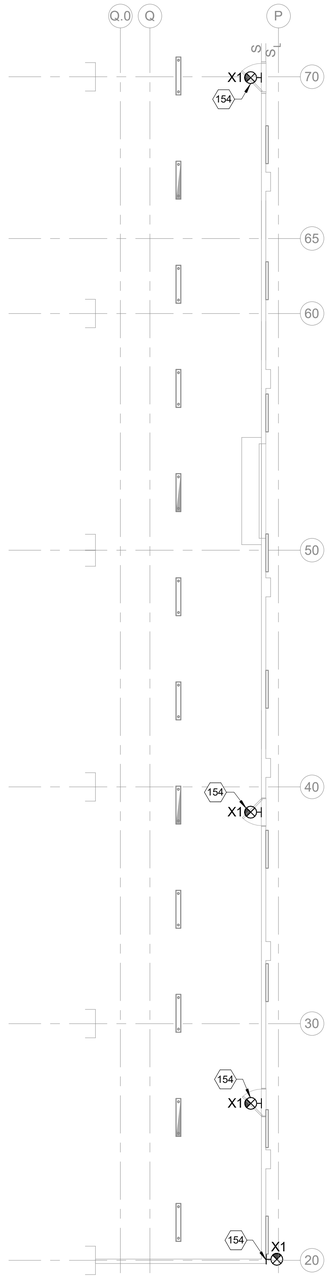
SHEET ID

E-403

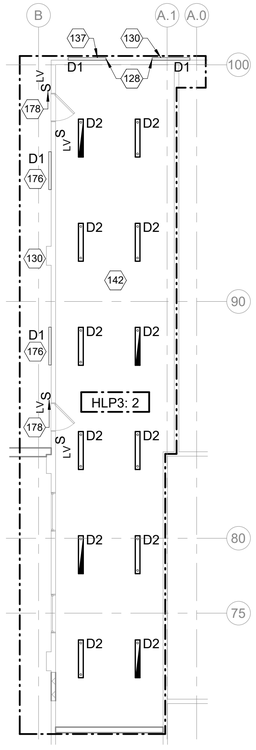
ADVERTISEMENT - 100% DESIGN



A1 LIGHTING PLAN - EQUIPMENT PLATFORM 2000
1/8" = 1'-0"



A3 LIGHTING PLAN - EQUIPMENT PLATFORM 2000
1/8" = 1'-0"



A5 LIGHTING PLAN - EQUIPMENT PLATFORM 2100 - BID OPTION
1/8" = 1'-0"

GENERAL SHEET NOTES - LIGHTING

1. SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2. FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3. SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4. DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES

- 107 RE-CIRCUIT EXISTING LUMINAIRES ON THE WLT SIDE OF EQUIPMENT PLATFORM 2000.
- 126 LIGHTING CONTROLS FOR THE WLT SIDE OF EQUIPMENT PLATFORM WALKWAY. PROVIDE LOW VOLTAGE SWITCH.
- 128 PROVIDE INTEGRAL OCCUPANCY SENSORS AND EMERGENCY BATTERY BACKUP FOR STAIRWELL LUMINARIES.
- 130 MOUNT LIGHT FIXTURES IN THIS ROOM AT 9' 0" AFF.
- 137 MOUNT LIGHT FIXTURES IN THIS ROOM AT 16' 0" AFF.
- 142 MOUNT LIGHT FIXTURES IN THIS ROOM AT 9' 6" AFF.
- 154 SERVE EXIT SIGN FROM NEARBY BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG. NEARBY LIGHTING IS SERVED AT 120V.
- 160 MOUNT LIGHT FIXTURES 7' 9" ABOVE NEAREST FLOOR OR LANDING.
- 161 MOUNT LIGHT FIXTURES 9' 0" ABOVE NEAREST FLOOR OR LANDING.
- 172 MOUNT LIGHT FIXTURES 6' 5" ABOVE NEAREST FLOOR OR LANDING.
- 173 MOUNT LIGHT FIXTURES IN THIS ROOM AT 7' 0" AFF.
- 176 PROVIDE BATTERY BACK-UP FOR LIGHT FIXTURE.
- 178 LIGHTING CONTROLS FOR EQUIPMENT PLATFORM WALKWAY. PROVIDE LOW VOLTAGE SWITCH.

GRAPHIC SCALE

8 6 4 2 0 8 16

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802E-404

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DITSON
QSET: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

ENLARGED PLANS

SHEET ID
E-404

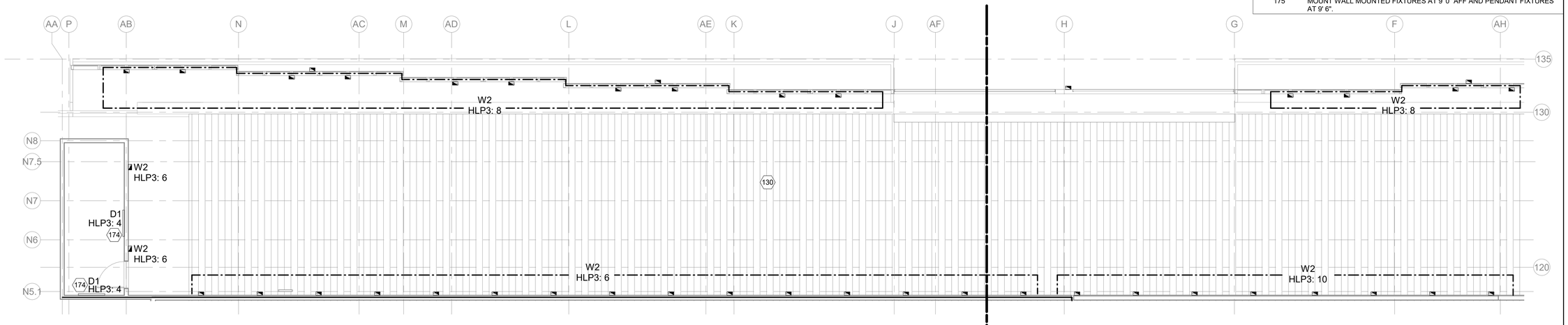
ADVERTISEMENT - 100% DESIGN

GENERAL SHEET NOTES - LIGHTING

1	SENSOR LOCATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. COORDINATE SENSOR LOCATIONS AND QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER OPERATION.
2	FIXTURES INSIDE OR TOUCHING A DAYLIGHTING ZONE ARE CONNECTED TO A DAYLIGHT SENSOR. DAYLIGHT SENSOR DIMS FIXTURES TO MAINTAIN THE TARGET FOOT-CANDLE LEVELS.
3	SERVE EXIT SIGNS FROM THE NEAREST NORMAL BRANCH LIGHTING CIRCUIT AHEAD OF LOCAL LIGHTING ON A NON-SWITCHED LEG.
4	DO NOT PENETRATE WALLS MARKED WITH A DARK BLACK OUTLINE UNLESS OTHERWISE NOTED.

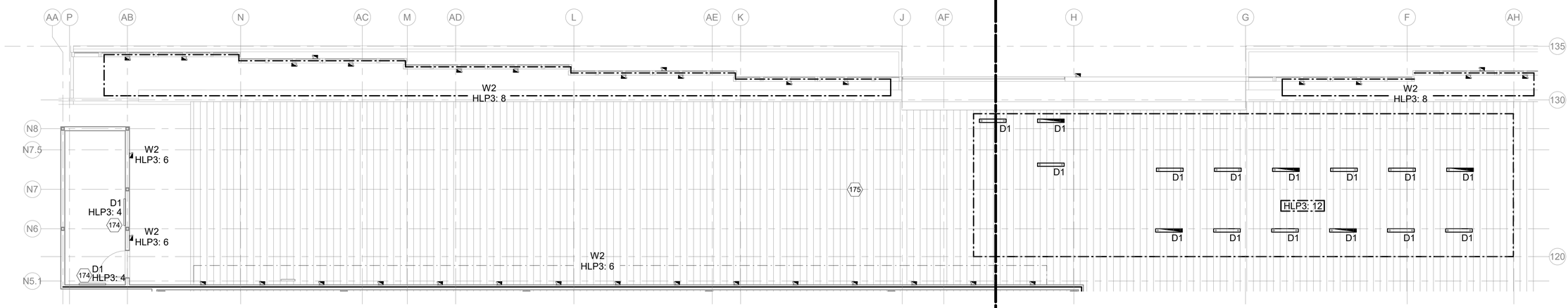
SHEET KEYNOTES

130	MOUNT LIGHT FIXTURES IN THIS ROOM AT 9' 0" AFF.
174	MOUNT LIGHT FIXTURES 6' 8" ABOVE NEAREST FLOOR OR LANDING.
175	MOUNT WALL MOUNTED FIXTURES AT 9' 0" AFF AND PENDANT FIXTURES AT 9' 6".



D1 LIGHTING PLAN - ENLARGED EQUIPMENT PLATFORM 02 - BID OPTION

1/8" = 1'-0"



B1 LIGHTING PLAN - ENLARGED EQUIPMENT PLATFORM 02 - BASE BID

1/8" = 1'-0"

GRAPHIC SCALE

8 6 4 2 0 8 16

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

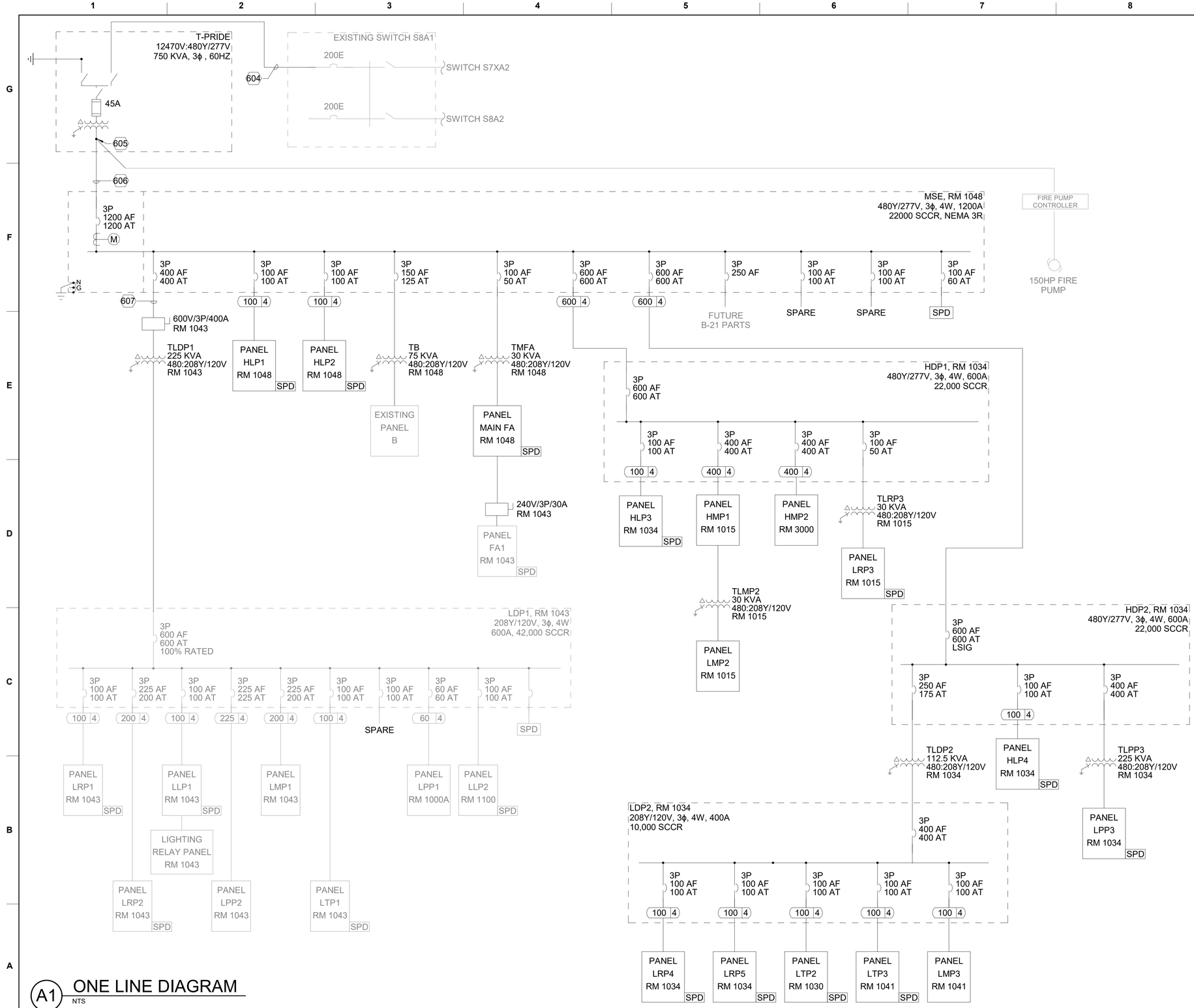
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

ENLARGED PLANS

SHEET ID

E-405

ADVERTISEMENT - 100% DESIGN



A1 ONE LINE DIAGRAM
NTS

GENERAL SHEET NOTES - ONE LINE

1	PROVIDE ARC FLASH WARNING SIGNS ON THE SWITCHBOARDS, SWITCHGEAR, PANELBOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, AND MOTOR CONTROL CENTERS AS REQUIRED PER NFPA 70 (NEC) ARTICLE 110.16. REFERENCE NFPA 70 ARTICLE 110.16; NFPA 70E ARTICLE 130.3; AND UFC 3-560-01, ELECTRICAL SAFETY, O & M.
2	ONE-LINE DIAGRAMS DEPICT INTERCONNECTION OF ELECTRICAL INFRASTRUCTURE. COORDINATE WITH PANEL SCHEDULES FOR THE BALANCE OF ADDITIONAL CONNECTIONS AND DEVICES.
3	PROVIDE EQUIPMENT WITH FULLY BUSSED SPACE FOR FUTURE DEVICES.
4	FOR SPDS, PROVIDE BREAKER AND WIRE SIZED PER SPD MANUFACTURER'S RECOMMENDATION. LENGTH OF WIRE FROM BUS TO SPD SHOULD BE KEPT TO A MINIMUM AND MAY NOT EXCEED 3FT. SPD MUST BE EXTERNALLY INSTALLED IN A SEPARATE NEMA 1 ENCLOSURE.

SHEET KEYNOTES

604	PROVIDE (3) #1/0 15KV ALUMINUM, (1) #2G 600V IN EXISTING CONDUIT. IF EXISTING CONDUIT IS NOT IN GOOD CONDITION, PROVIDE WIRING IN 5"C WITH (1) 5"C SPARE.
605	RE-CONNECT FIRE PUMP CONTROLLER TO TRANSFORMER. WIRES SHOULD NOT BE SPLICED. RE-PULL NEW WIRE IF THE EXISTING WIRES ARE NOT LONG ENOUGH TO RE-CONNECT TO NEW TRANSFORMER.
606	PROVIDE 4 SETS OF [(4) 350 KCMIL IN 3"C] AND (1) 3"C SPARE.
607	PROVIDE 2 SETS OF [(4) 500 KCMIL, 3/0G IN 3"C].

TRANSFORMER SCHEDULE

KVA	PRIMARY (480V) CB	PRIMARY (480V) FEEDER	SECONDARY (208/120V) CB	SECONDARY (208/120V) FEEDER
15	30/3	3#10, 1#10G, 3/4" C	50/3	4#6, 1#10G, 1" C
30	50/3	3#6, 1#10G, 1" C	100/3	4#1, 1#8G, 1-1/2" C
45	70/3	3#4, 1#8G, 1" C	150/3	4#1/0, 1#6G, 1-1/2" C
75	125/3	3#1/0, 1#6G, 1-1/2" C	225/3	4#4/0, 1#2G, 2-1/2" C
112.5	175/3	3#2/0,1 #6G, 2" C	400/3	(2) SETS OF 4#3/0, #2G, 2" C
225	400/3	(2) SETS OF 3#3/0, 1#2G, 2"C	600/3	(2) SETS OF 4#350KCMIL, #1G, 3" C

FEEDER SCHEDULE NOTES

1	THIS SCHEDULE IS BASED ON INTERNAL AREA OF EMT, RGS, OR SCHEDULE 40 PVC CONDUIT AND THE AMPACITIES FOR THHN OR THWN INSULATION.
2	FEEDER MARK "XXXXX" INDICATES FEEDER RATING AND NUMBER OF PHASE CONDUCTORS INCLUDING NEUTRAL. PROVIDE GROUND AS INDICATED ON FEEDER SCHEDULE.
3	UNDERGROUND SERVICE ENTRANCE FEEDERS CONSIST OF THREE PHASE WIRES AND NEUTRAL. NUMBER OF CONDUCTORS PER PHASE ARE CALCULATED VALUES BASED ON SPECIFIC DUCT BANK ARRANGEMENTS, LOAD FACTORS, AND SOIL CONDITIONS.
4	SECONDARY FEEDERS ARE AS SCHEDULED UON.

FEEDER SCHEDULE

FEEDER MARK	PHASE &NEUTRAL	GROUND	# OF SET	CONDUIT SIZE 3C+G	CONDUIT SIZE 4C+G
15	12	12	1	3/4"	3/4"
20	12	12	1	3/4"	3/4"
30	10	10	1	3/4"	3/4"
40	8	10	1	3/4"	3/4"
50	6	10	1	3/4"	1"
60	4	10	1	1"	1 1/4"
70	4	8	1	1"	1 1/4"
80	3	8	1	1 1/4"	1 1/4"
90	2	8	1	1 1/4"	1 1/2"
100	1	8	1	1 1/2"	1 1/2"
110	1	6	1	1 1/2"	1 1/2"
125	1	6	1	1 1/2"	2"
150	1/0	6	1	1 1/2"	2"
175	2/0	6	1	2"	2"
200	3/0	6	1	2"	2 1/2"
225	4/0	4	1	2"	2 1/2"
250	250	4	1	2 1/2"	3"
300	350	4	1	3"	3"
350	500	2	1	3"	4"
400	3/0	2	2	2"	2"
450	4/0	2	2	2"	2 1/2"
500	250	2	2	2 1/2"	3"
600	350	1/0	2	3"	3"
700	500	1/0	2	3"	4"
800	300	1/0	3	2 1/2"	3"
1000	400	2/0	3	3"	3"
1200	350	3/0	4	3"	3"
1600	400	4/0	5	3"	3 1/2"
2000	500	250	6	3 1/2"	4"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE::
FILE NAME: FXBM231802E-601

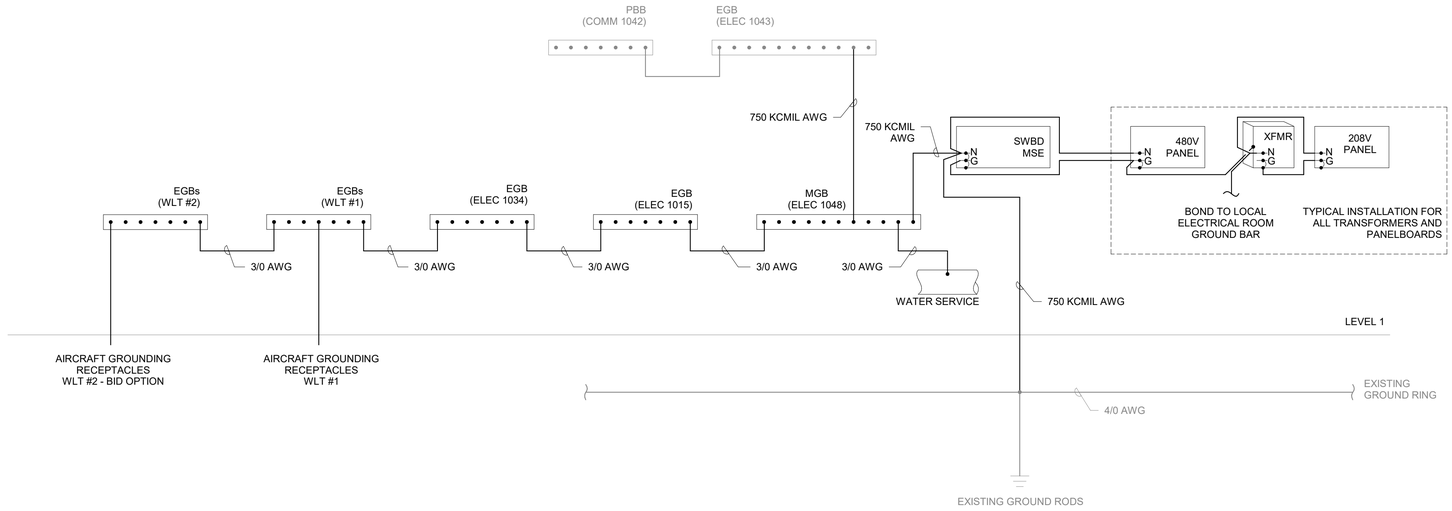
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST , SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
ONE LINE DIAGRAM

SHEET ID
E-601

ADVERTISEMENT - 100% DESIGN



C3 GROUNDING RISER DIAGRAM
NTS

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: A. GARDNER
DRAWN BY: C. KOHRMANN
CHECKED BY: K. HOGAN
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802E-602

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
GROUNDING RISER DIAGRAM

SHEET ID
E-602

ADVERTISEMENT - 100% DESIGN

TELECOMMUNICATIONS SYMBOLS

TELEPHONE AND DATA COMMUNICATIONS

———	FIRE RATE PLYWOOD BAKBOARD
□	TELECOM CABINET
$\triangleleft_{2N}$	WALL DATA OUTLET 2N = 2 GREEN MMF DUPLEX LC NIPR PORTS 6N = 6 GREEN MMF DUPLEX LC NIPR PORTS 2S = 2 RED MMF DUPLEX LC SIPR PORTS 6S = 6 RED MMF DUPLEX LC SIPR PORTS 2N2S = 2 GREEN MMF DUPLEX LC NIPR PORTS AND 2 RED MMF DUPLEX LC SIPR PORTS 2S2PS/COL = 2 RED MMF DPLEX LC SIPR PORTS AND 2 ORANGE MMF DUPLEX LC PORTS CONFIGURED FOR PROGRAM S/COL (PS/COL PORTS OUTSIDE OF THE SMALL WLT ORIGINATE AT THE CLOSEST DISTIBUTION ROOM PROGRAM CABINET, PS/COL PORTS IN THE SMALL WLT ORIGINATE IN THE CLASSIFIED WALL MOUNT CABINET LOCATED IN ROOM) 6PTS/SAR = 6 ORANGE MMF DUPLEX LC PORTS CONFIGURED FOR PROGRAM TS/SAR (SMALL WLT ONLY) 6PS/SAR = 6 ORANGE MMF DUPLEX LC PORTS CONFIGURED FOR PROGRAM S/SAR (SMALL WLT ONLY) 6PS/COL = 6 ORANGE MMF DUPLEX LC PORTS CONFIGURED FOR PROGRAM S/COL (SMALL WLT ONLY) AV = AUDIO VISUAL FOR TV COAX FEED M = MODULAR FURNITURE
$\triangleleft_{M}^{2N}$	PHONE 1 BLUE PORT CAT 6A AND DATA 2 GREEN MMF DUPLEX LC NIPR PORTS MODULAR FURNITURE OUTLET
◀	DESK PHONE 1 BLUE PORT CAT 6A
$\blacktriangleleft_{W}$	WALL PHONE 1 BLUE PORT CAT 6A
$\blacktriangleleft_{WP}$	WALL PHONE 1 BLUE PORT CAT 6A IN WEATHERPROOF ENCLOSURE
◀	TELEPHONE OUTLET IN COMMON FLOOR BOX WITH ELECTRICAL OUTLET
◁	DATA OUTLET IN COMMON FLOOR BOX WITH ELECTRICAL OUTLET
J	6"x 6" x 6" JUNCTION BOX WITH (2) 2" CONDUIT STUBS. EXTEND CABLES TO FURNITURE WHIP. COORDINATE WITH FURNITURE CONTRACTOR FOR EXACT LOCATION OF FURNITURE WHIP
TV	TELEVISION OUTLET
⊓	PRIMARY BONDING BUSBAR (PBB) OR SECONDARY BONDING BUSBAR (SBB)
FODP	FIBER OPTIC DISTRIBUTION PANEL
▭	BASKET TRAY
▭	LADDER RACK
▭	CONDUIT SLEEVE
—SRW—	SURFACE RACEWAY WITH VENTED PARALLEL OPENINGS ON SIDEWALLS, FOR VIEWING SECURE CABLES

TELECOMMUNICATIONS ABBEVIATIONS

ACS	ACCESS CONTROL SYSTEM
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ARCH	ARCHITECTURAL
AV	AUDIO AND VISUAL
AWG	AMERICAN WIRE GAGE
BAS	BUILDING AUTOMATION SYSTEM
BATT	BATTERY
BB	BACKBONE
BFPP	BACKBONE FIBER PATCH PANEL
BBV	BACKBONE VOICE
BEP	BUILDING ENTRANCE PROTECTION
BLDG	BUILDING
BMS	BALANCED MAGNETIC SWITCH
BOT	BOTTOM OF TRAY
BVPP	BACKBONE VOICE PATCH PANEL
C	CONDUIT
CAB	CABINET
CAT	CATEGORY
CCTV	CLOSED CIRCUIT TELEVISION
CLG	CEILING
COB	CENTER OF BOX
COMM	COMMUNICATIONS
CONST	CONSTRUCTION
CONT	CONTINUATION
CT	COUNTER TOP
DIA	DIAMETER
DIST	DISTRIBUTION
DWG	DRAWING
EF	ENTRANCE FACILITY
EL	ELEVATION
ELEC	ELECTRICAL
EMER	EMERGENCY
EQPT	EQUIPMENT
EX	EXISTING
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FIXT	FIXTURE
FLR	FLOOR
FO	FIBER OPTIC
FOC	FIBER OPTIC CABLE
GFGI	GOVERNMENT FURNISHED GOVERNMENT INSTALLED
HCPP	HORIZONTAL COPPER PATCH PANEL
HFPP	HORIZONTAL FIBER PATCH PANEL
HOV	HORIZONTAL VOICE
HVPP	HORIZONTAL VOICE PATCH PANEL
IDS	INTRUSION DETECTION SYSTEM
JB	JUNCTION BOX
MFR	MANUFACTURER
MH	MOUNTING HEIGHT
MMF	MULTI MODE FIBER
MTD	MOUNTED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OH	OVERHEAD
OSP	OUTSIDE PLANT
PA	PUBLIC ADDRESS
PBB	PRIMARY BONDING BUSBAR
PB	PULL BOX
PBX	PRIVATE BRANCH EXCHANGE
PC	PERSONAL COMPUTER
PLAS	PLASTIC
PP	PATCH PANEL
PR	PAIR
PS/COL	PROGRAM SECURE COLLATERAL
PWR	POWER
QTY	QUANTITY
RAF	RAISED ACCESS FLOOR
RBB	RACK BONDING BUSBAR
RECP	RECEPTACLE
REQD	REQUIRED
RGS	RIGID GALVANIZED STEEL
RM	ROOM
RSC	RIGID STEEL CONDUIT
SBB	SECONDARY BONDING BUSBAR
SCI	SENSITIVE COMPARTMENTED INFORMATION
S/COL	SECURE COLLATERAL
SCRT	SECURITY
SECT	SECTION
SPEC	SPECIFICATION
SM	SINGLE MODE
SMF	SINGLE MODE FIBER
SP	SERVICE PROVIDER
STR	STRAND
SURF	SURFACE
SW	SWITCH
SYM	SYMMETRICAL
SYS	SYSTEMS
TEL	TELEPHONE
TELECOM	TELECOMMUNICATIONS
TEF	TELECOMMUNICATIONS ENTRANCE FACILITY
TEBC	TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR
TER	TELECOMMUNICATIONS EQUIPMENT ROOM
TR	TELECOMMUNICATIONS ROOM
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
WP	WEATHERPROOF

TELECOMMUNICATIONS GENERAL NOTES

1. ALL SYMBOLS AND ABBREVIATIONS SHOWN ARE NOT NECESSARILY USED ON THIS PROJECT.
2. SEE ONE-LINE DIAGRAM FOR CABLE SIZES AND DEVICES NOT SHOWN ON PLANS.
3. MOUNTING HEIGHTS FOR CEILING MOUNTED DEVICES ARE TO THE BOTTOM OF THE DEVICE, UNLESS OTHERWISE NOTED.
4. MOUNTING HEIGHTS ABOVE FINISHED FLOOR, TO CENTERLINE OF DEVICE, ARE AS FOLLOWS, UNLESS OTHERWISE NOTED:

DATA OUTLETS	18-INCHES
COUNTER TOP OUTLETS (CT)	8-INCHES ABOVE COUNTER
AV OUTLETS	72-INCHES
DESK PHONE OUTLETS	18-INCHES
WALL PHONE OUTLETS	48-INCHES
TELEVISION OUTLET (COAX)	72-INCHES

5. TELECOMMUNICATIONS WORK AND MATERIAL ARE NEW AND MUST BE PROVIDED BY THE CONTRACTOR, UON. LIGHT LINE TYPE DEPICTS EXISTING OR BY OTHERS.
6. MMF DUPLEX LC PORTS WILL BE UNKEYED, BOTH CONNECTOR MODULES AND OPTICAL CABLE MUST MATCH THE DESIGNATED NETWORK COLOR.
7. SURFACE MOUNT ALL OUTLETS, UNLESS OTHERWISE NOTED.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802-T-001

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

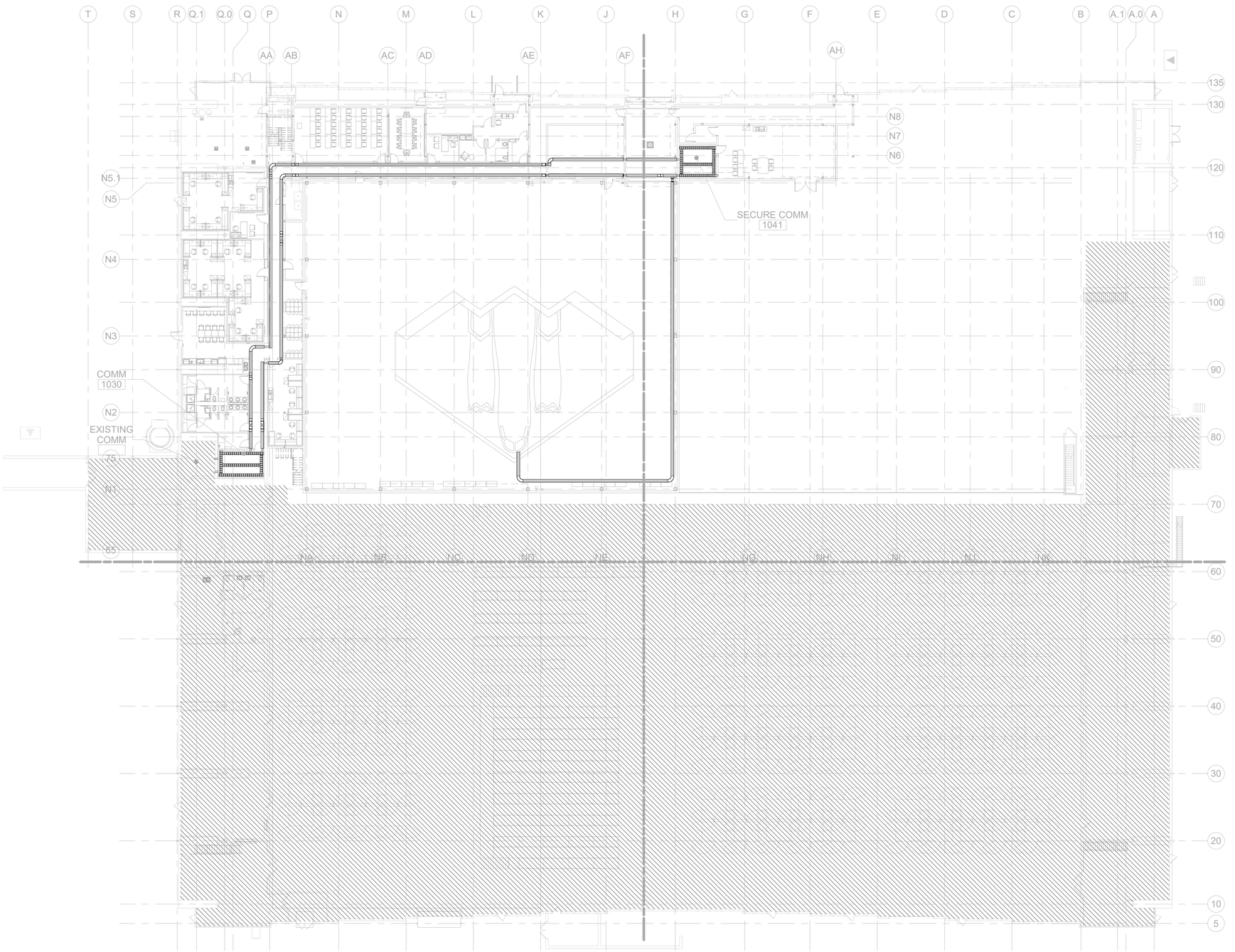
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
LEGENDS, NOTES, AND ABBREVIATIONS

SHEET ID
T-001

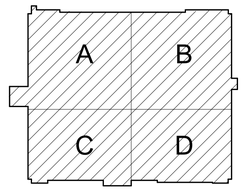
ADVERTISEMENT - 100% DESIGN

GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET TY001.



A1 OVERALL TELECOMMUNICATION PLAN- LEVEL 01
1" = 20'-0"



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN
NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
FILE NAME: FXBM231802T-101

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
OVERALL TELECOMMUNICATIONS PLAN-LEVEL 01

SHEET ID
T-101

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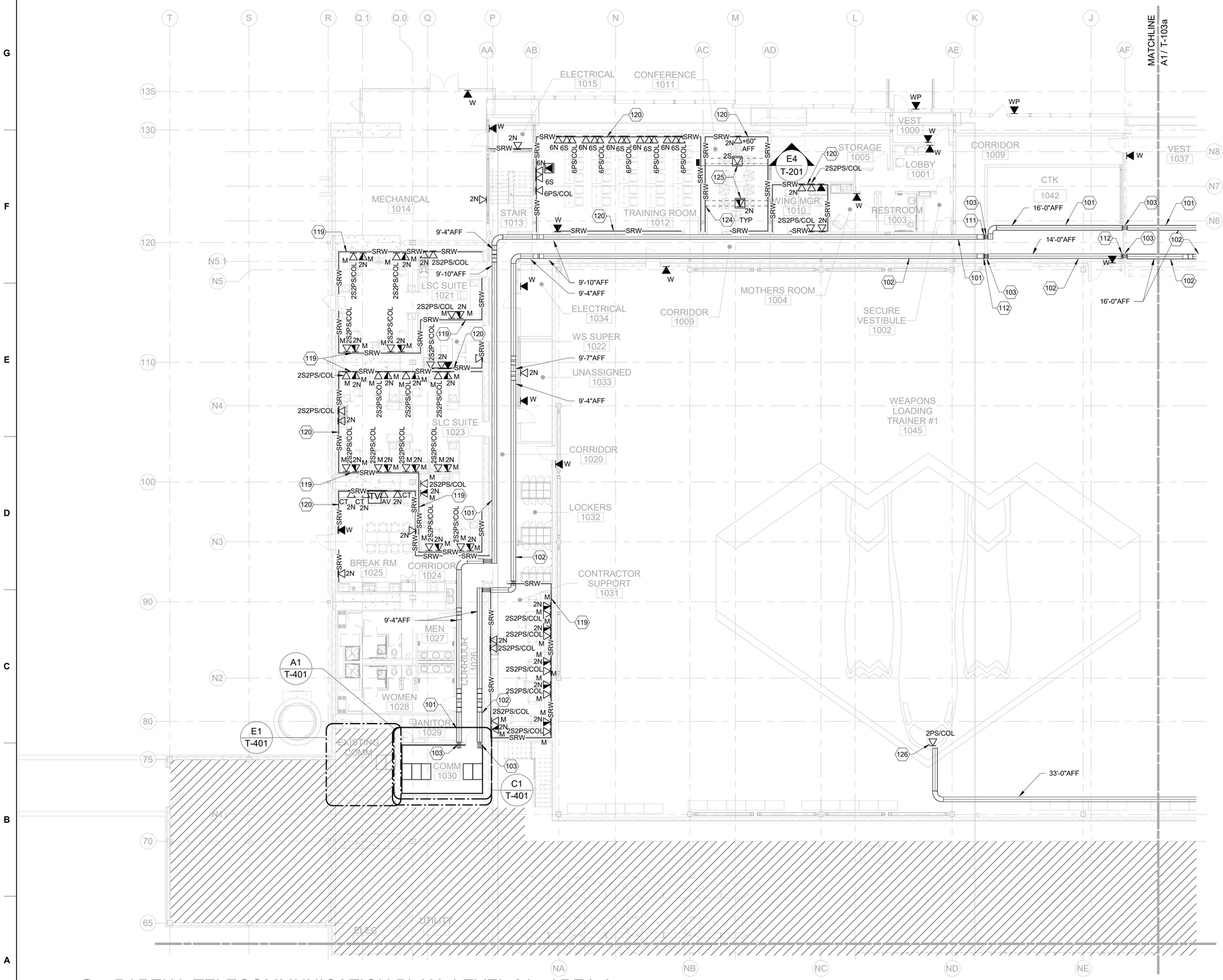


A1 PARTIAL TELECOMMUNICATION PLAN- LEVEL 01 - AREA A

3/32" = 1'-0"

GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET T-001.
2. REFER TO SHEET T-601 FOR PATHWAY ROUTING DETAILS.

SHEET KEYNOTES

101 PROVIDE 12-INCH WIDE x 4-INCH DEEP UNCLASSIFIED BASKET TRAY.

102 PROVIDE 12-INCH WIDE x 4-INCH DEEP CLASSIFIED BASKET TRAY.

103 PROVIDE (2) 4-INCH SLEEVED CORES AND FIRESTOP UPON COMPLETION OF CONSTRUCTION TO MATCH FIRE RATING.

111 PROVIDE 12-INCH WIDE X 4-INCH DEEP VERTICAL UNCLASSIFIED BASKET TRAY.

112 PROVIDE 12-INCH WIDE X 4-INCH DEEP VERTICAL CLASSIFIED BASKET TRAY.

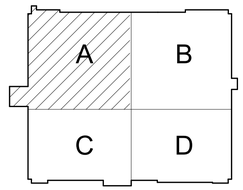
119 PROVIDE SURFACE RACEWAY WITH VENTED SIDEWALLS OF COVER PLATES FOR VIEWING SECURE CABLE ALONG THE ENTIRE RUN, (TRAY TO WORKSTATION) MOUNT 6-INCHES ABOVE THE MODULAR FURNITURE. THE CABLE WILL FEED DOWN INTO THE POWERED FURNITURE WHIP AT THE WALL-BASE. COORDINATE PATHWAY WITH MONITORS AND WHITEBOARD LOCATIONS.

120 PROVIDE SURFACE RACEWAY WITH VENTED SIDEWALLS OF COVER PLATES FOR VIEWING SECURE CABLE ALONG THE ENTIRE RUN, (TRAY TO OUTLETS) 18-INCHES ABOVE FINISHED FLOOR. THE CABLE WILL FEED INTO THE OUTLETS. COORDINATE PATHWAY WITH MONITORS AND WHITEBOARD LOCATIONS.

124 POWER WILL FEED FROM THE TROUGH FROM PLAN WEST; COMMUNICATIONS WILL FEED FROM THE PLANS EAST WALL TO SURFACE RACEWAY. REFER TO DETAIL ON T-503 FOR ADDITIONAL INFORMATION.

125 FLOOR MOUNTED BOXES REFER TO DETAILS ON T-502.

126 TERMINATE AND TEST PROGRAM SECURE COLLATERAL CABLE WITH THE NOSE CONE AREA. ALLOW 15-FEET OF CABLE SLACK AT THIS LOCATION FOR FUTURE MOUNTING TO THE WLT TRAINING MODULE (MOUNTING TO MODULE BY OTHERS).



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
FILE NAME: FXBM231802T-102

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL TELECOMMUNICATIONS PLAN - LEVEL 01 - AREA A

SHEET ID

T-102

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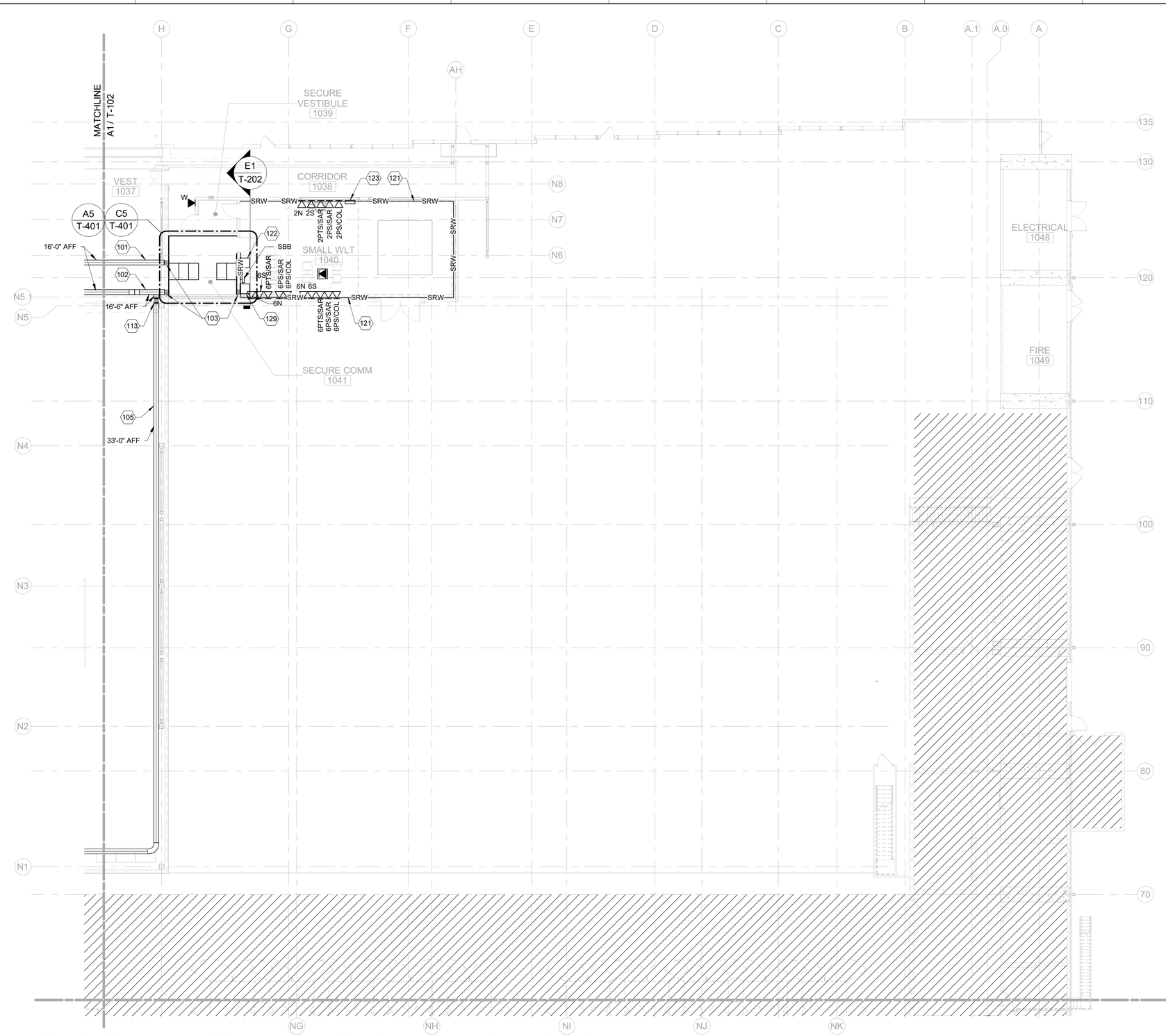


A1 PARTIAL TELECOMMUNICATION PLAN- LEVEL 01 - AREA B

3/32" = 1'-0"

GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET T-001.
2. REFER TO SHEET T-601 FOR PATHWAY ROUTING DETAILS.

SHEET KEYNOTES

101 PROVIDE 12-INCH WIDE x 4-INCH DEEP UNCLASSIFIED BASKET TRAY.

102 PROVIDE 12-INCH WIDE x 4-INCH DEEP CLASSIFIED BASKET TRAY.

103 PROVIDE (2) 4-INCH SLEEVED CORES AND FIRESTOP UPON COMPLETION OF CONSTRUCTION TO MATCH FIRE RATING.

105 PROVIDE 12-INCH WIDE x 4-INCH DEEP CLASSIFIED BASKET TRAY TO NOSE CONE FOR COMMUNICATIONS CABLE.

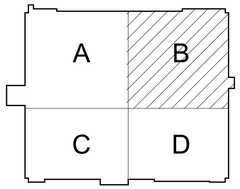
113 CUT BASKET TRAY IN THIS AREA WHERE TRAY CLASHES WITH STRUCTURAL BEAM.

121 PROVIDE SURFACE RACEWAY FOR PROGRAM NETWORK CABLES. MOUNT SURFACE RACEWAY USING VENTED PARALLEL OPENINGS ON SIDEWALLS FOR VIEWING SECURE CABLE ALONG THE ENTIRE RUN, (CABINET TO OUTLETS). THE CABLE WILL FEED INTO THE OUTLETS.

122 PROVIDE CLASSIFIED WALL MOUNT CABINET FOR SIPR AND PROGRAM NETWORK EQUIPMENT, REFER TO T-202 FOR ADDITIONAL INFORMATION.

123 LOCATION OF SECURITY PANEL, REFER TO ELECTRONIC SECURITY SYSTEMS PLANS FOR ADDITIONAL INFORMATION.

129 PROVIDE WALL MOUNT CABINET FOR NIPR, REFER TO T-202 FOR ADDITIONAL INFORMATION.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802f1-103a

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

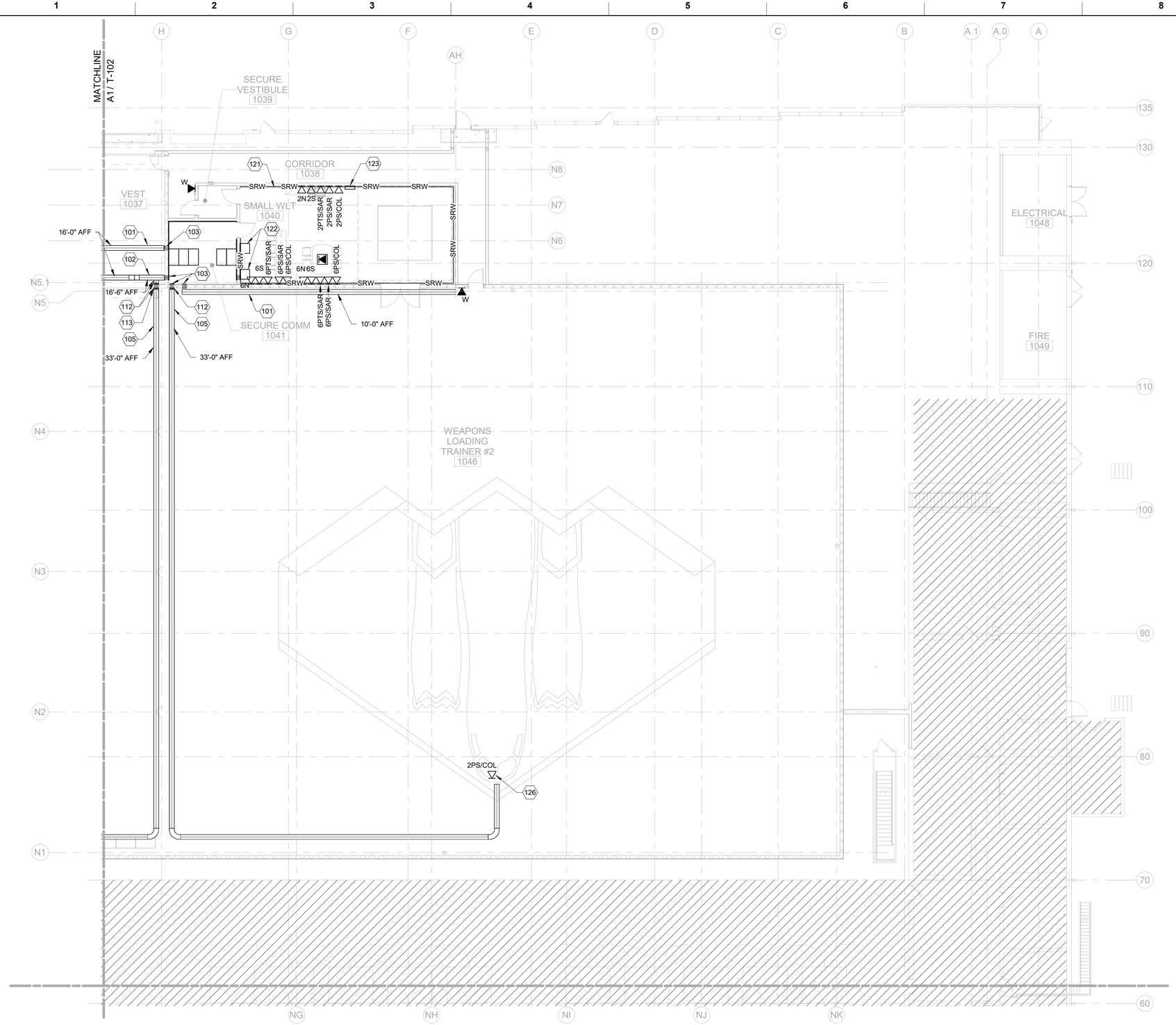
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL TELECOMMUNICATIONS PLAN - LEVEL 01 - AREA B

SHEET ID

T-103a

ADVERTISEMENT - 100% DESIGN



PARTIAL TELECOMMUNICATION PLAN- LEVEL 01 - AREA B - BID OPTION

A1 — 3/32" = 1'-0"

GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET T-001.
2. REFER TO SHEET T-601 FOR PATHWAY ROUTING DETAILS.

SHEET KEYNOTES

101 PROVIDE 12-INCH WIDE x 4-INCH DEEP UNCLASSIFIED BASKET TRAY.

102 PROVIDE 12-INCH WIDE x 4-INCH DEEP CLASSIFIED BASKET TRAY.

103 PROVIDE (2) 4-INCH SLEEVED CORES AND FIRESTOP UPON COMPLETION OF CONSTRUCTION TO MATCH FIRE RATING.

105 PROVIDE 12-INCH WIDE x 4-INCH DEEP CLASSIFIED BASKET TRAY TO NOSE CONE FOR COMMUNICATIONS CABLE.

112 PROVIDE 12-INCH WIDE X 4-INCH DEEP VERTICAL CLASSIFIED BASKET TRAY.

113 CUT BASKET TRAY IN THIS AREA WHERE TRAY CLASHES WITH STRUCTURAL BEAM.

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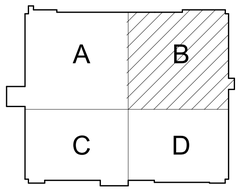
122 PROVIDE CLASSIFIED WALL MOUNT CABINET FOR SIPR AND PROGRAM NETWORK EQUIPMENT, REFER TO T-202 FOR ADDITIONAL INFORMATION.

123 LOCATION OF SECURITY PANEL, REFER TO ELECTRONIC SECURITY SYSTEMS PLANS FOR ADDITIONAL INFORMATION.

126 TERMINATE AND TEST PROGRAM SECURE COLLATERAL CABLE WITH THE NOSE CONE AREA. ALLOW 15-FEET OF CABLE SLACK AT THIS LOCATION FOR FUTURE MOUNTING TO THE WLT TRAINING MODULE (MOUNTING TO MODULE BY OTHERS).



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: S. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W912BF23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802T-103b

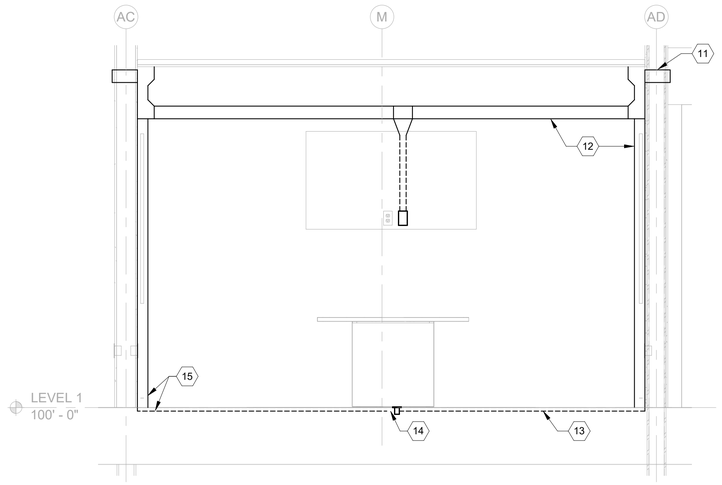
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL TELECOMMUNICATIONS PLAN - LEVEL 01 - AREA B - BID OPTION

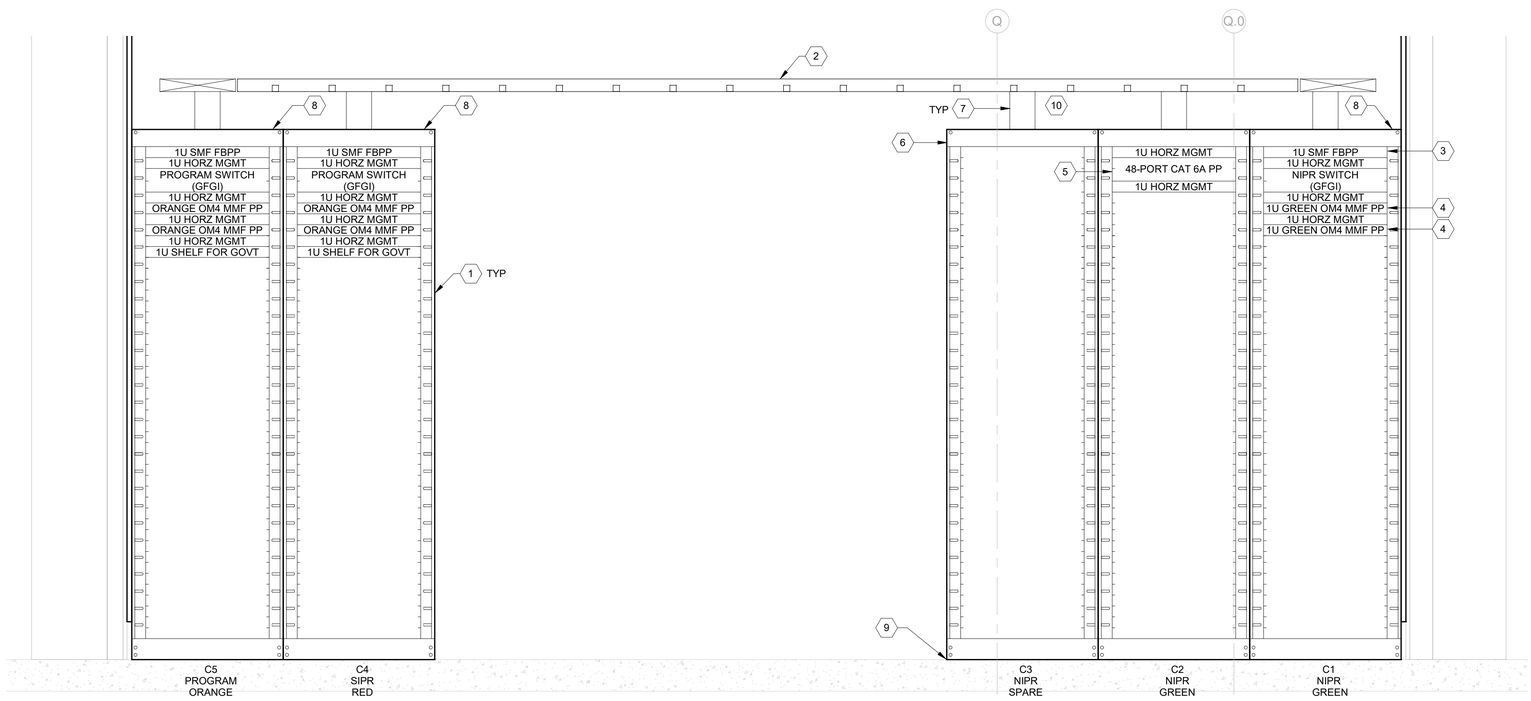
SHEET ID
T-103b

ADVERTISEMENT - 100% DESIGN



E4 CONFERENCE 1011 NORTH ELEVATION

NOT TO SCALE



A1 COMM ROOM 1030 CABINET ELEVATIONS

NOT TO SCALE

SHEET KEYNOTES

1. PROVIDE LOCKABLE CABINET IN IN-LINE CONFIGURATION FROM THE OPPOSITE WALL.
2. PROVIDE LADDER CABLE TRAY MOUNTED ABOVE CABINETS WITH STAND-OFF BRACKETS.
3. PROVIDE 1RU FIBER SPLICE ENCLOSURE WITH 6-PORT DUPLEX (12-FIBER) LC ADAPTER PANELS FOR OS2 SINGLE-MODE FIBER CROSS CONNECTS. INCLUDE ADAPTER PANELS, ADAPTERS, CERAMIC ALIGNMENT SLEEVES, 12-FIBER SPLICE TRAYS, LOOSE TUBE BREAKOUT KIT, HEAT SHRINK TUBES, AND 12-FIBER PIGTAILS FOR ALL STRANDS REQUIRED.
4. PROVIDE 1RU FIBER SPLICE ENCLOSURE WITH 6-PORT DUPLEX (12-FIBER) LC ADAPTER PANELS FOR OM4 MULTIMODE FIBER CROSS CONNECTS. INCLUDE KIT FROM ABOVE BUT FOR OM4 TO SUPPORT ALL STRANDS REQUIRED.
5. PROVIDE 2RU 48-PORT CAT 6A PATCH PANEL WITH FULLY LOADED CAT 6A SHIELDED JACKS, BOND SHIELD AS REQUIRED. ALL CAT 6A SHIELDED JACKS AND CABLES TO MATCH COLOR FOR THE NETWORK.
6. PROVIDE RBB TO REAR OF ALL CABINETS.
7. PROVIDE STAND-OFF BRACKET.
8. PROVIDE A MINIMUM OF (2) VERTICALLY ALIGNED MULTI-OUTLET POWER STRIPS ON THE REAR OF EACH NETWORK CABINET (C1, C4 AND C5). ONE POWER STRIP MUST BE 120V, 1 PHASE AND THE OTHER 208V, 1-PHASE.
9. SECURE ALL CABINETS ON ALL FOUR CORNERS.
10. ELECTRICAL MUST PROVIDE A TWIST-LOCK TYPE RECEPTACLE MOUNTED ABOVE EACH CABINET, REFER TO E-401 FOR ADDITIONAL INFORMATION.
11. PROVIDE 4-INCH PENETRATION FROM CABLE TRAY TO SURFACE RACEWAY, TYPICAL.
12. PROVIDE SURFACE RACEWAY FOR COMMUNICATIONS CABLES, REFER TO DETAIL ON T-503.
13. FLOOR TRENCH RATED FOR CONCRETE FOR COMMUNICATIONS CABLES TO COMBINATION FLOOR BOX, REFER TO PLAN FOR LOCATIONS.
14. PROVIDE A COMBINATION FLOOR BOX, ELECTRICAL AND COMMUNICATIONS SEPARATED BY A METAL BARRIER, REFER TO PLAN FOR LOCATIONS.
15. PATHWAY FOR POWER CABLES ONLY.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802-201

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
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ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

CABINET ELEVATIONS

SHEET ID

T-201

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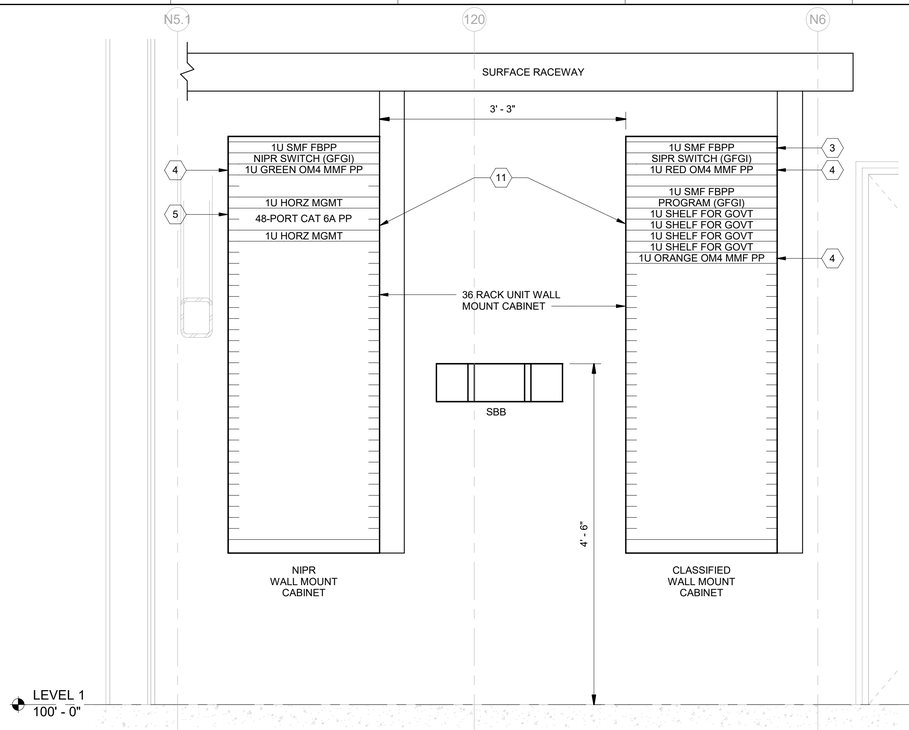
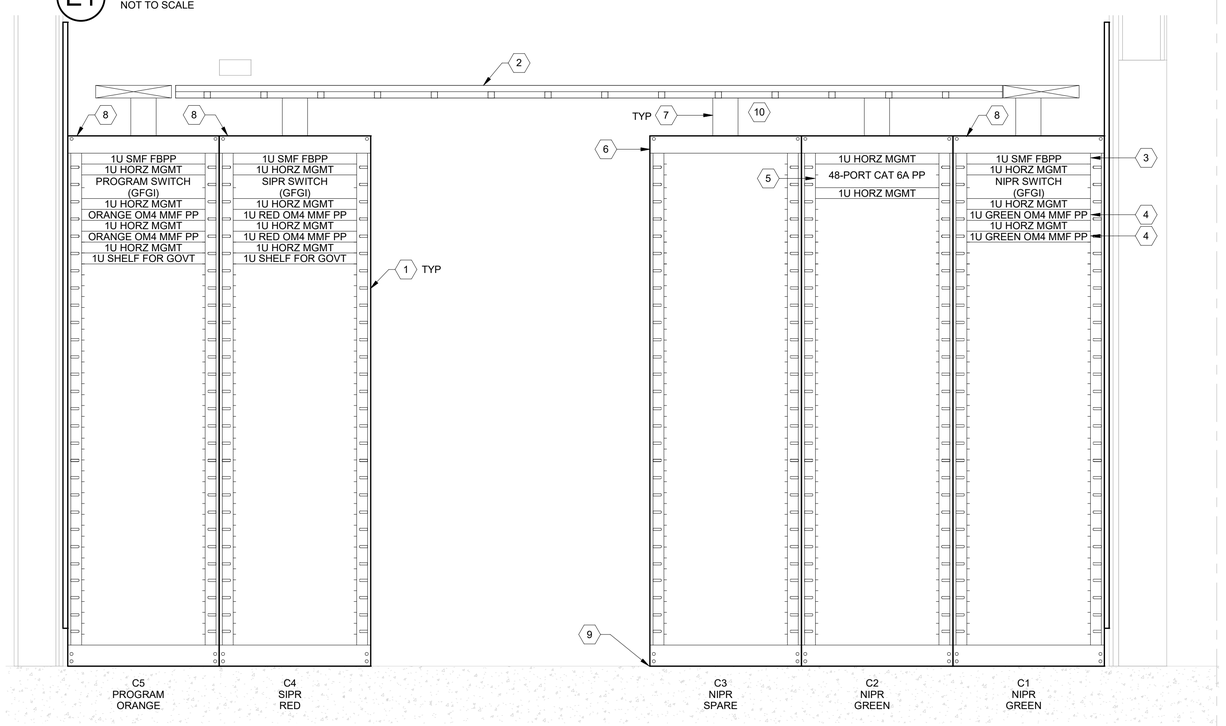


E1 SMALL WLT 1040 - WEST WALL ELEVATION

NOT TO SCALE



A1 SECURE COMM 1041 CABINET ELEVATIONS

NOT TO SCALE

SHEET KEYNOTES

1. PROVIDE LOCKABLE CABINET IN IN-LINE CONFIGURATION FROM THE OPPOSITE WALL.
2. PROVIDE LADDER CABLE TRAY MOUNTED ABOVE CABINETS WITH STAND-OFF BRACKETS.
3. PROVIDE 1RU FIBER SPLICE ENCLOSURE WITH 6-PORT DUPLEX (12-FIBER) LC ADAPTER PANELS FOR OS2 SINGLE-MODE FIBER CROSS CONNECTS. INCLUDE ADAPTER PANELS, ADAPTERS, CERAMIC ALIGNMENT SLEEVES, 12-FIBER SPLICE TRAYS, LOOSE TUBE BREAKOUT KIT, HEAT SHRINK TUBES, AND 12-FIBER PIGTAILS FOR ALL STRANDS REQUIRED.
4. PROVIDE 1RU FIBER SPLICE ENCLOSURE WITH 6-PORT DUPLEX (12-FIBER) LC ADAPTER PANELS FOR OM4 MULTIMODE FIBER CROSS CONNECTS. INCLUDE KIT FROM ABOVE BUT FOR OM4 TO SUPPORT ALL STRANDS REQUIRED.
5. PROVIDE 2RU 48-PORT CAT 6A PATCH PANEL WITH FULLY LOADED CAT 6A SHIELDED JACKS, BOND SHIELD AS REQUIRED. ALL CAT 6A SHIELDED JACKS AND CABLES MUST MATCH COLOR FOR THE NETWORK.
6. PROVIDE RBB TO REAR OF ALL CABINETS.
7. PROVIDE STAND-OFF BRACKET.
8. PROVIDE A MINIMUM OF (2) VERTICALLY ALIGNED MULTI-OUTLET POWER STRIPS ON THE REAR OF EACH NETWORK CABINET (C1, C4 AND C5). ONE POWER STRIP MUST BE 120V, 1 PHASE AND THE OTHER 208V, 1-PHASE.
9. SECURE ALL CABINETS ON ALL FOUR CORNERS.
10. ELECTRICAL MUST PROVIDE A TWIST-LOCK TYPE RECEPTACLE MOUNTED ABOVE EACH CABINET, REFER TO E-401 FOR ADDITIONAL INFORMATION.
11. PROVIDE (1) POWER STRIP WITH INDICATOR LIGHT, BUT NO INTERNAL ON/OFF SWITCH ON CABINET. ELECTRICAL TO PROVIDE NEMA CONFIGURED TWIST-LOCK RECEPTACLES FOR POWER STRIPS.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: S. DYSON
SIZE: ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
FILE NAME: FXBM231802\T-202

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

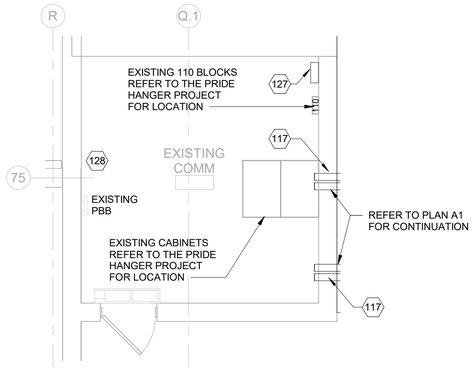
Jacobs
1001 HIGHLANDS PLAZA DR. WEST., SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

CABINET ELEVATIONS

SHEET ID

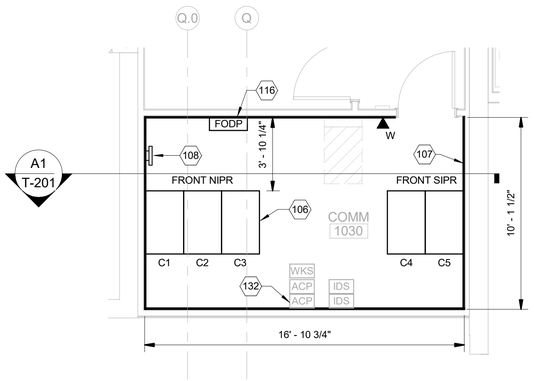
T-202



E1 ENLARGED EXISTING COMM 1042

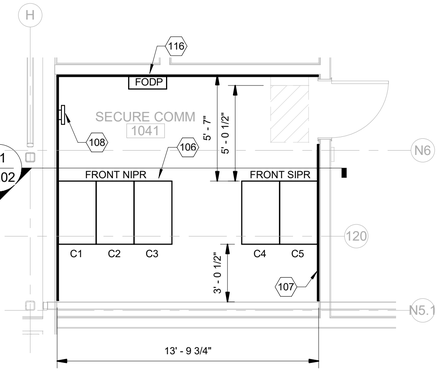
1/4" = 1'-0"

PART OF PRIDE HANGER PROJECT, FOR B-21 WLT REFERENCE ONLY.



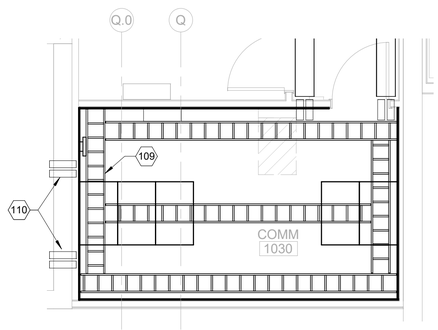
C1 ENLARGED COMM ROOM 1030 - EQUIPMENT PLAN

1/4" = 1'-0"



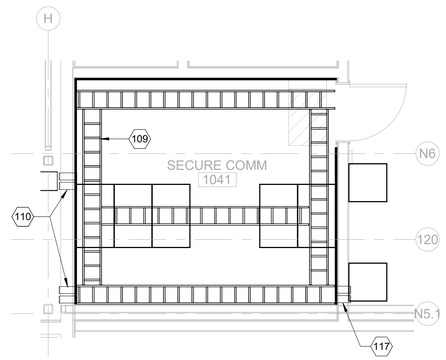
C5 ENLARGED SECURE COMM 1041 - EQUIPMENT PLAN

1/4" = 1'-0"



A1 ENLARGED COMM ROOM 1030 - LADDER RACK PLAN

1/4" = 1'-0"



A5 ENLARGED SECURE COMM 1041 - LADDER RACK PLAN

1/4" = 1'-0"

GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET T-001.
2. REFER TO SHEET T-601 FOR PATHWAY ROUTING DETAILS.

SHEET KEYNOTES

106 2'-0"WIDE x 2'-0"DEEP x 7'-0"HIGH CABINETS. (TYP)

107 3/4-INCH FIRE RETARDANT PLYWOOD. (TYP)

108 SECONDARY BUSBAR (SBB) MOUNTED 6'-6"AFF TO TOP OF SBB.

109 12-INCH WIDE x 1.5-INCH DEEP LADDER TRAY.

110 (2) 4-INCH CONDUIT SLEEVES. (TYP)

116 WALL MOUNTED FODP FOR PATCHING (BY OTHERS) TO THE SECURITY PANEL, REFER TO T-601 FOR ADDITIONAL INFORMATION.

117 PROVIDE NEW CONDUIT PENETRATION (SECURE TO UNSECURE BOUNDARY) USING 4-INCH PVC, REFER TO T-504 FOR ADDITIONAL INFORMATION.

127 PROVIDE 1RU RG 6 COAX PANEL ADJACENT TO RESEVED SPACE FOR CARRIER DEMARCATION EQUIPMENT (BY OTHERS).

128 OSP FEED CABLE ARE PROVIDED BY OTHERS AN TERMINATE IN EXISTING COMMUNICATIONS ROOM 1042.

132 WALL MOUNTED SECURITY PANEL, REFER TO T-601 FOR ADDITIONAL INFORMATION.

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
FILE NAME: FXBM231802T-401

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

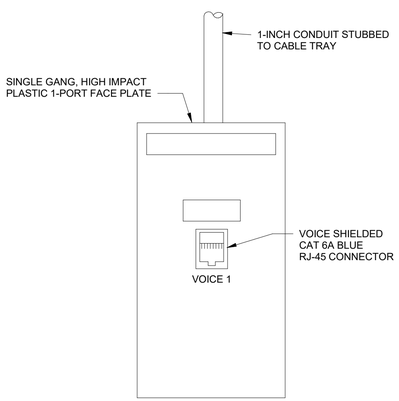
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

ENLARGED PLANS

SHEET ID

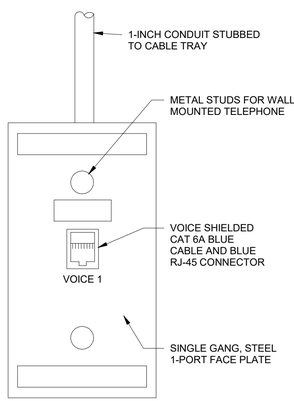
T-401

ADVERTISEMENT - 100% DESIGN



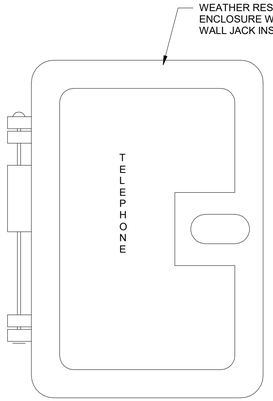
DESK PHONE OUTLET

▼



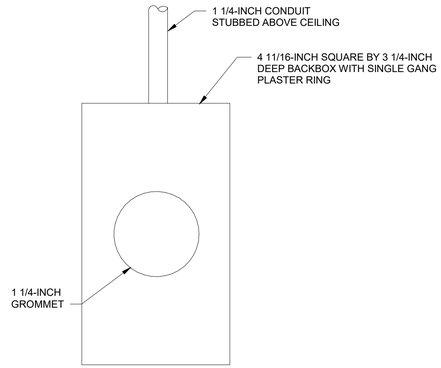
WALL PHONE OUTLET

▼ W



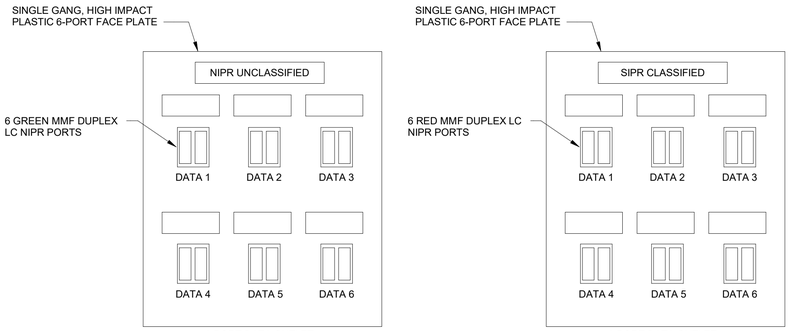
WEATHER PROOF WALL PHONE OUTLET

▼ WP



AV OUTLET

▽ AV

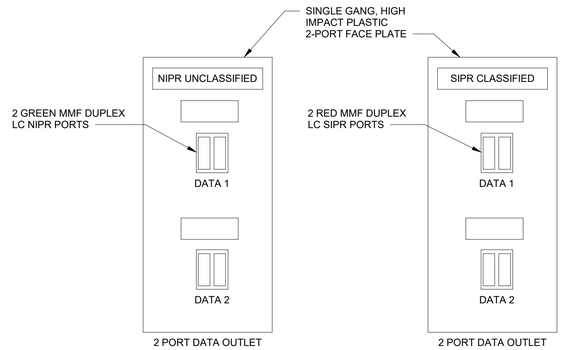


6 PORT DATA OUTLET

▽ 6N

6 PORT DATA OUTLET

▽ 6S

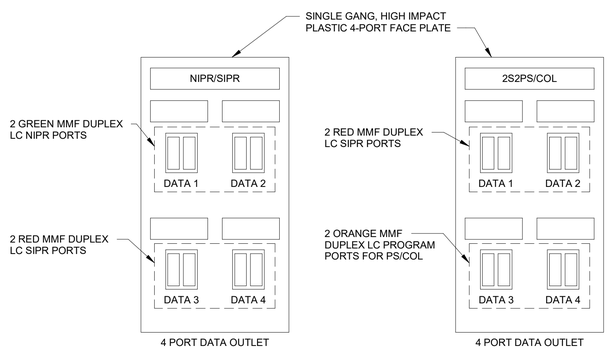


2 PORT DATA OUTLET

▽ 2N

2 PORT DATA OUTLET

▽ 2S



4 PORT DATA OUTLET

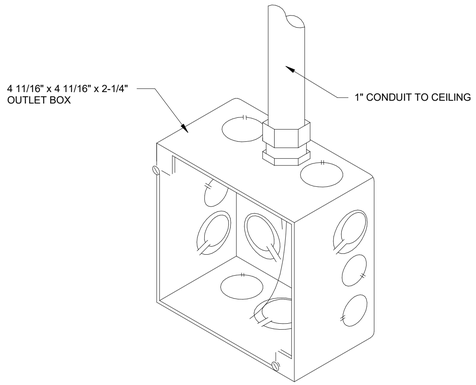
▽ 2N2S

4 PORT DATA OUTLET

▽ 2S2PS/COL

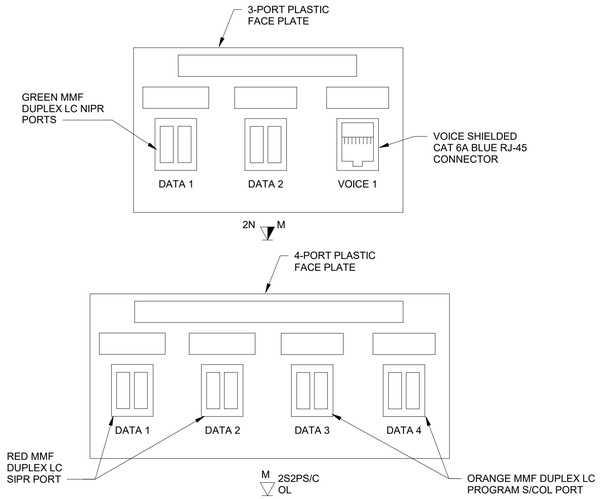
A1 VOICE AND DATA WALL OUTLETS

NOT TO SCALE



D7 TYPICAL ROUGH-IN BACKBOX DETAIL

NOT TO SCALE



A7 MODULAR FURNITURE OUTLET

NOT TO SCALE

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W912BF23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802T-501

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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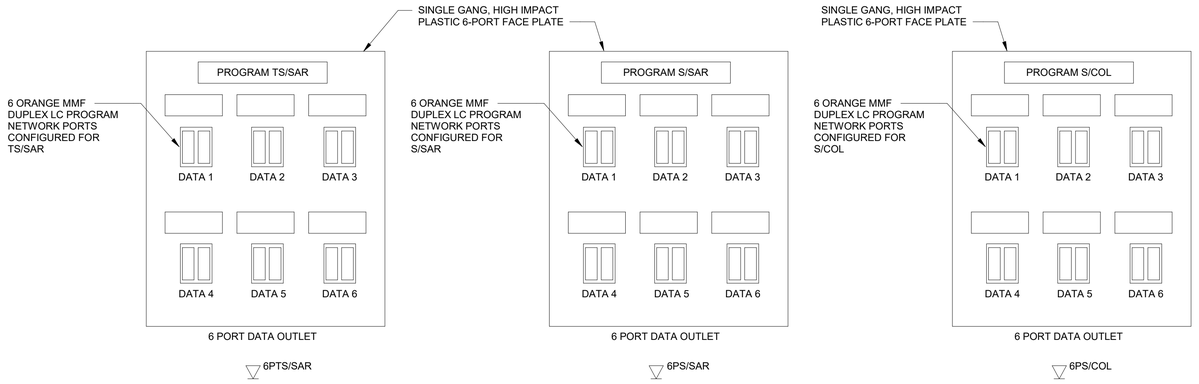
1001 HIGHLANDS PLAZA DR. WEST., SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID

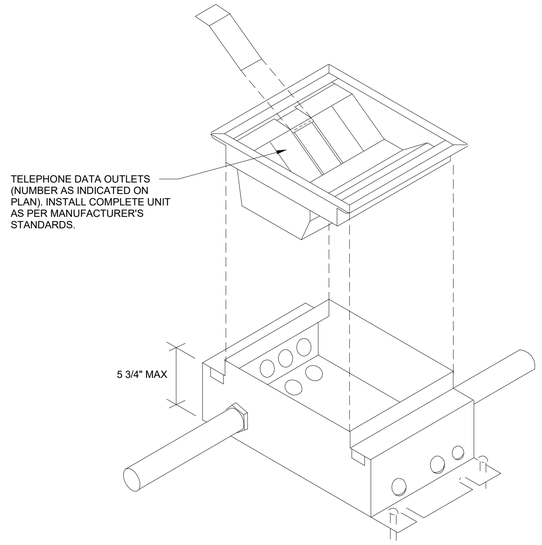
T-501

ADVERTISEMENT - 100% DESIGN



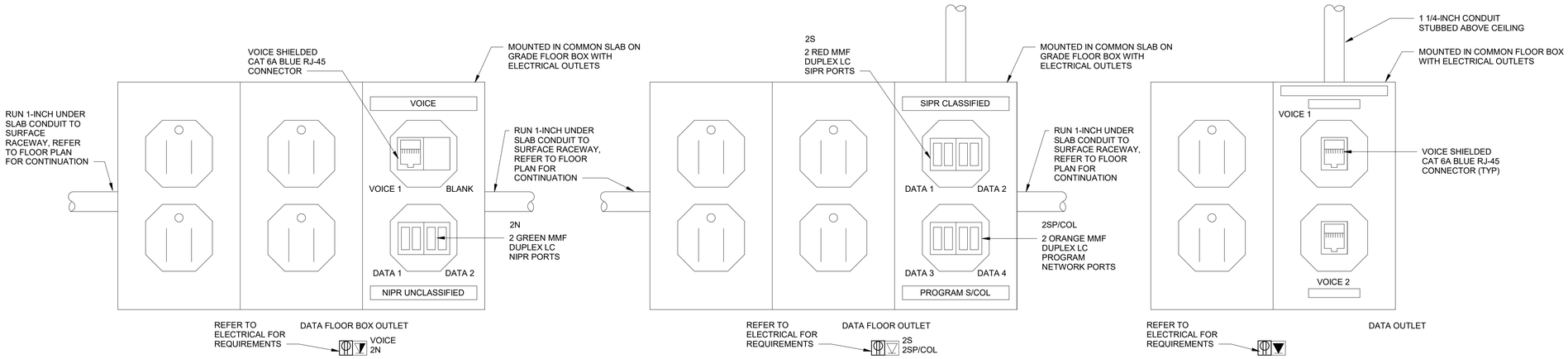
D1 VOICE AND DATA (SMALL WLT) WALL OUTLETS

NOT TO SCALE



D7 FLOOR BOX DETAIL

6" = 1'-0"



A1 COMBINATION FLOOR OUTLET DETAILS

NOT TO SCALE

GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET T-001.
2. ALL HORIZONTAL CABLE WILL ORIGINATE FROM SWITCHES INSIDE THE WLT. EACH CABLE WILL MATCH THE COLOR OF ITS CLASSIFICATION: NIPR=GREEN, SIPR=RED, AND PROGRAM=ORANGE.

SHEET KEYNOTES

US Army Corps of Engineers
Omaha District ®

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DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: S. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
SIZE: ANSI D 22x34
FILE NAME: FXBM231802T-502

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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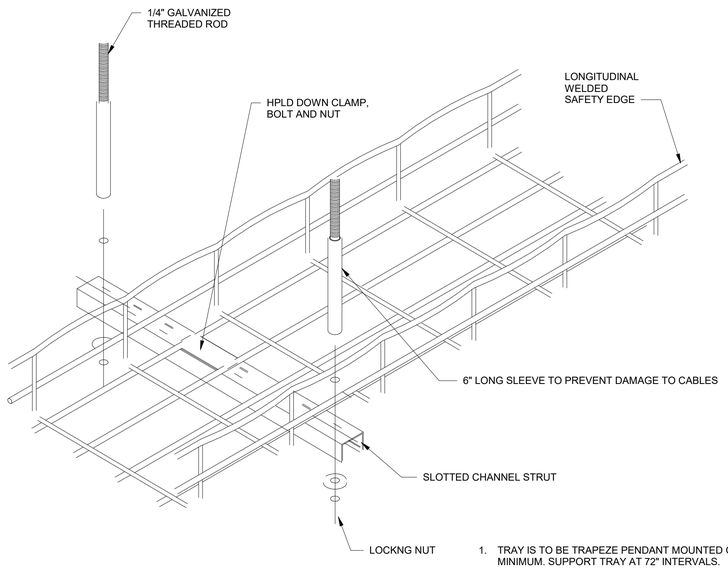
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID
T-502

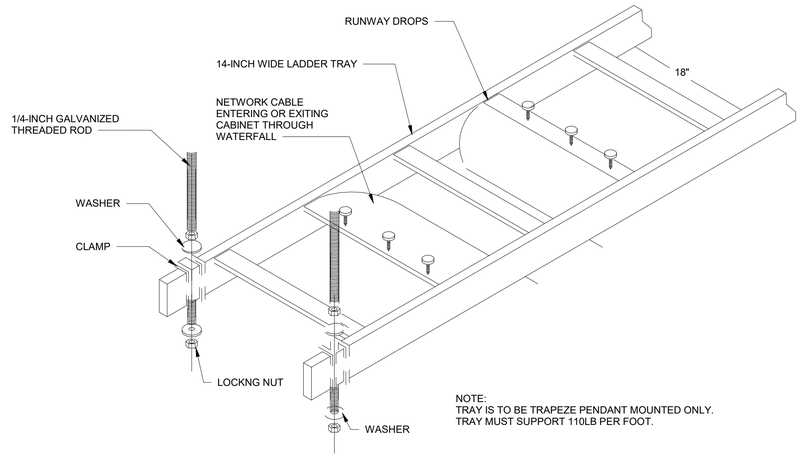
ADVERTISEMENT - 100% DESIGN



1. TRAY IS TO BE TRAPEZE PENDANT MOUNTED ONLY AT MINIMUM. SUPPORT TRAY AT 72" INTERVALS.
2. BOND CABLE TO PBB/SBB WITH #6 AWG BONDING JUMPER.

D1 BASKET TYPE CABLE TRAY

NOT TO SCALE

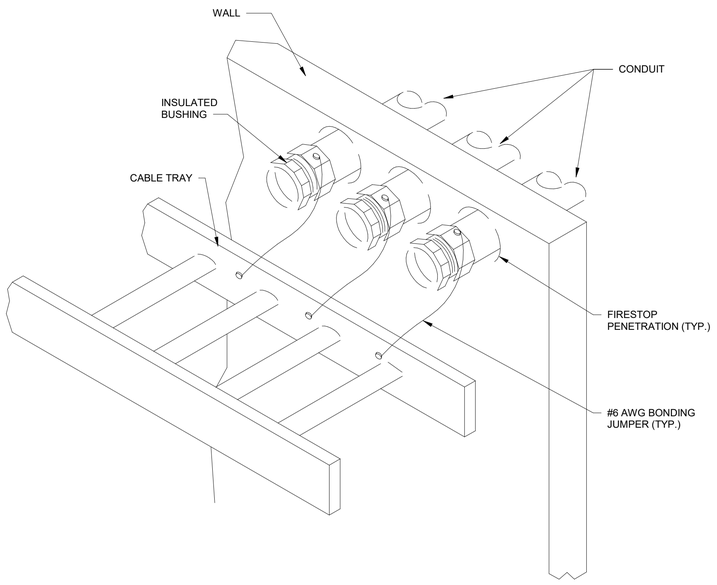


NOTE:
TRAY IS TO BE TRAPEZE PENDANT MOUNTED ONLY.
TRAY MUST SUPPORT 110LB PER FOOT.

D5 RUNWAY TYPE CABLE TRAY

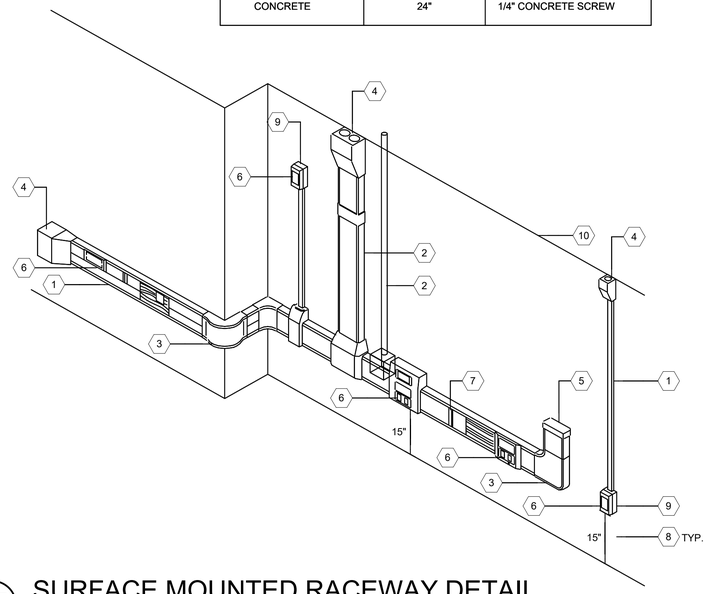
NOT TO SCALE

SURFACE MOUNTED RACEWAY MOUNTING INDEX		
WALL TYPE	MAX. SPACING	FASTENER TYPE
WOOD	24"	12/24 WOOD SCREW
CONCRETE	24"	1/4" CONCRETE SCREW



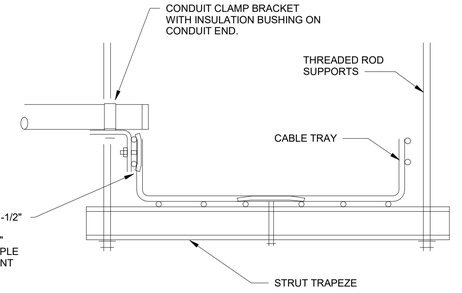
A1 SLEEVE THRU WALL TO CONDUIT DETAIL

NOT TO SCALE



A5 SURFACE MOUNTED RACEWAY DETAIL

NOT TO SCALE



A8 CONDUIT TO CABLE TRAY CONNECTION DETAIL

NOT TO SCALE

GENERAL SHEET NOTES

1. BOND IN COMPLIANCE WITH ANSI/TIA 607-D.
2. CONDUITS MUST BE 1-INCH MINIMUM.
3. CABLE TRAY MUST HAVE A MINIMUM OF 12-INCH CLEARANCE ABOVE TRAY FREE OF CONDUIT, PIPING OR DUCTWORK TO ALLOW PLACEMENT OF CABLES WITHIN CABLE TRAY PER ANSI/TIA 569B.
4. FOR SURFACE RACEWAY THE CONTRACTOR IS RESPONSIBLE FOR THE FURNISHING OF ALL MATERIAL, LABOR, EQUIPMENT, AND SERVICES IN CONNECTION WITH THE INSTALLATION OF A COMPLETE ANDFULLY FUNCTIONSING AND CODE COMPLIANT INSTALLATION.
5. FOR THE SURFACE RACEWAY IT IS THE INTENT OF THE CONTRACT DOCUMENTS, WHICH ARE PRESENTED IN A DIAGRAMMATIC FORMAT. TO PROVIDE CONTRACTOR INFORMATION THAT SUPPLEMENTS AND ENHANCES THE GENERALLY ACCEPTED CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES EMPLOYED IN CONNECTION WITH INSTALLATION OF THIS TYPE OF PRODUCT/SYSTEM.
6. FOR THE SURFACE RACEWAY THE CONTRACTOR MUST ALSO INCORPORATE THE REQUIREMENTS OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS/WARRANTY REQUIREMENTS AS PART OF THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS. IN THE EVENT OF A CONFLICT BETWEEN THE CONTRACT DOCUMENT REQUIREMENTS AND THE MANUFACTURER'S INSTALLATION REQUIREMENTS, THE MORE STRINGENT REQUIREMENTS MUST APPLY, UNLESS THE MORE STRINGENT REQUIREMENT VOIDS APPLICABLE WARRANTIES OR VIOLATES THE REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JUISDICTION, ANY SUCH CONFLICT MUST IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN WIRING THROUGHT THE FORMAL RFI PROCESS.
7. FOR SURFACE RACEWAY REFER TO THE ASSOCIATED SCHEUDLES, SCHEMATICS, DARWINGS AND SPECIFICATIONS FOR DETAILED INFORMATION/REQUIREMENTS ON THIS PRODUCT/SYSTEM.

SHEET KEYNOTES

1 PROVIDE SURFACE MOUNTED RACEWAY SYSTEM FOR CLASSIFIED AND UNCLASSIFIED CABLE (SIPR, NIPR,AND PROGRAM), CABLE MUST BE VISIBLE.

2 PROVIDE POWER AND/OR LOW VOLTAGE FEEDS - CONCEALED OR SURFACE MOUNTED.

3 PERPENDICULAR JOINING RACEWAY MUST BE FITTED WITH THE APPROPRIATE 2-INCH RADIUS ELBOW FITTING.

4 ENTRANCE END FITTINGS, KNOCKED OUT FOR THE CORRECT SIZE OF CABLING INSTALLED, AND SECURELY INSTALLED, END FITTINGS AT CEILINGS TO BE LOCATED BELOW AND FLUSH TO CEILING TILE WITH THREADED CONDUIT NIPPLES WITH SUITABLE ANTI-ABRASION BUSHINGS EXTENDING THROUGH CEILING TILE.

5 RACEWAY END CAP KNOCKOUTS ARE TO BE INTACT, UNLESS OTHERWISE NOTED.

6 DEVICES, FACEPLATES AND LABELING AS REQUIRED PER PLANS AND SPECIFICATIONS. EXACT LABELING STANDARDS VARY BY OWNER, VERIFY EXACT REQUIREMENTS PRIOR TO ORDERING LABELS.

7 LOCATIONS WHERE RACEWAYS JOINS MUST BE FITTED WITH THE APPROPRIATE COVER CLIP.

8 DEPICTED MOUNTING HEIGHTS MUST BE VERIFIED PRIOR TO ROUGH-IN PER REQUIREMENTS OF THE DEVICE ALIGNMENT AND MOUNTING HEIGHT DETAILS.

9 SINGLE GANG SURFACE MOUNT BOX TO BE USED WHEN INSTALLED IN SMALL SURFACE MOUNTED RACEWAY. REFER TO PLAN AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

10 CEILING LINE.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W912BF23R0012
CONTRACT NO.:
DRAWING CODE.:
FILE NAME: FXBM231802-503

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

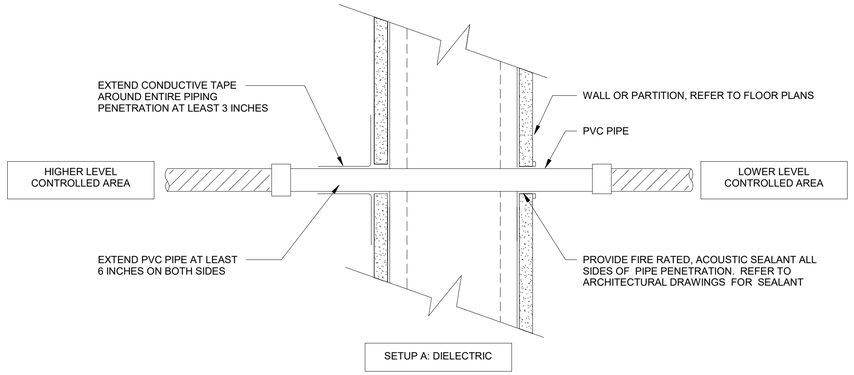
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID

T-503

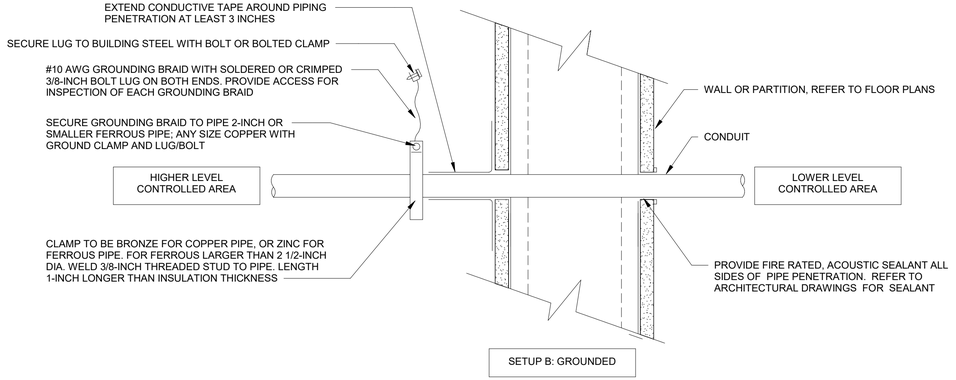
ADVERTISEMENT - 100% DESIGN



F1 NEW CONDUIT PENETRATION - SECURE TO UNSECURE BOUNDARY

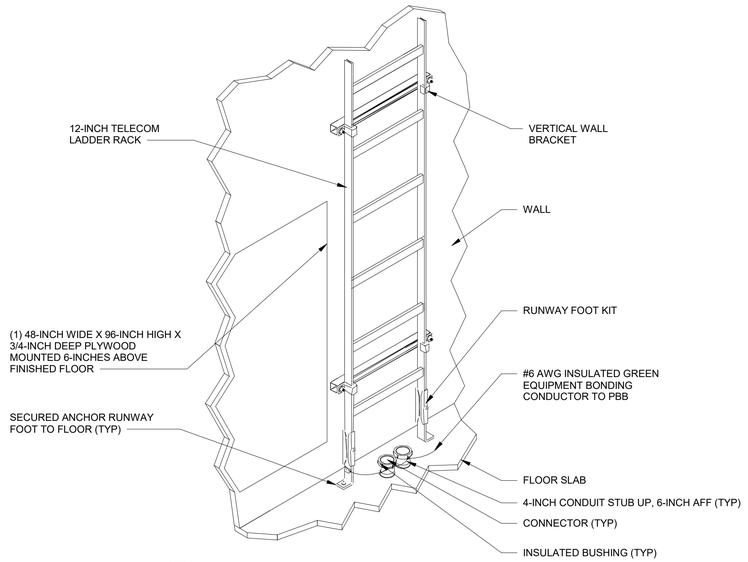
NOT TO SCALE

NOTE: CONTRACTOR MAY SELECT EITHER SETUP A OR SETUP B.
REFER TO SECURITY PLANS FOR LEVEL OF PROTECTION.



C1 EXISTING CONDUIT PENETRATION - SECURE TO UNSECURE BOUNDARY

NOT TO SCALE

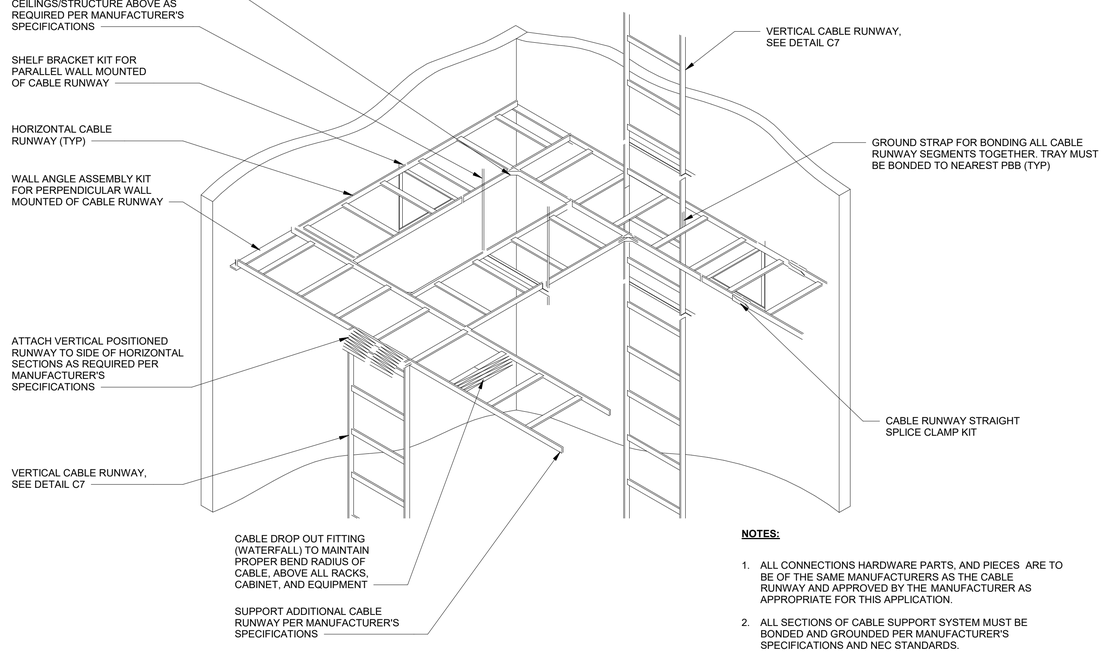


NOTES:

1. FIRE STOP ALL PENETRATIONS THRU SLAB, OCCUPIED OR ABANDONED, AS REQUIRED BY THE NEC AND ANSI/TIA STANDARD.

C7 TYPICAL VERTICAL CABLE RUNWAY DETAIL

NOT TO SCALE



NOTES:

1. ALL CONNECTIONS HARDWARE PARTS, AND PIECES ARE TO BE OF THE SAME MANUFACTURERS AS THE CABLE RUNWAY AND APPROVED BY THE MANUFACTURER AS APPROPRIATE FOR THIS APPLICATION.
2. ALL SECTIONS OF CABLE SUPPORT SYSTEM MUST BE BONDED AND GROUNDED PER MANUFACTURER'S SPECIFICATIONS AND NEC STANDARDS.

A6 TYPICAL CABLE RUNWAY CONNECTION DETAIL

NOT TO SCALE

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: S. DYSON
SIZE: ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802f-504

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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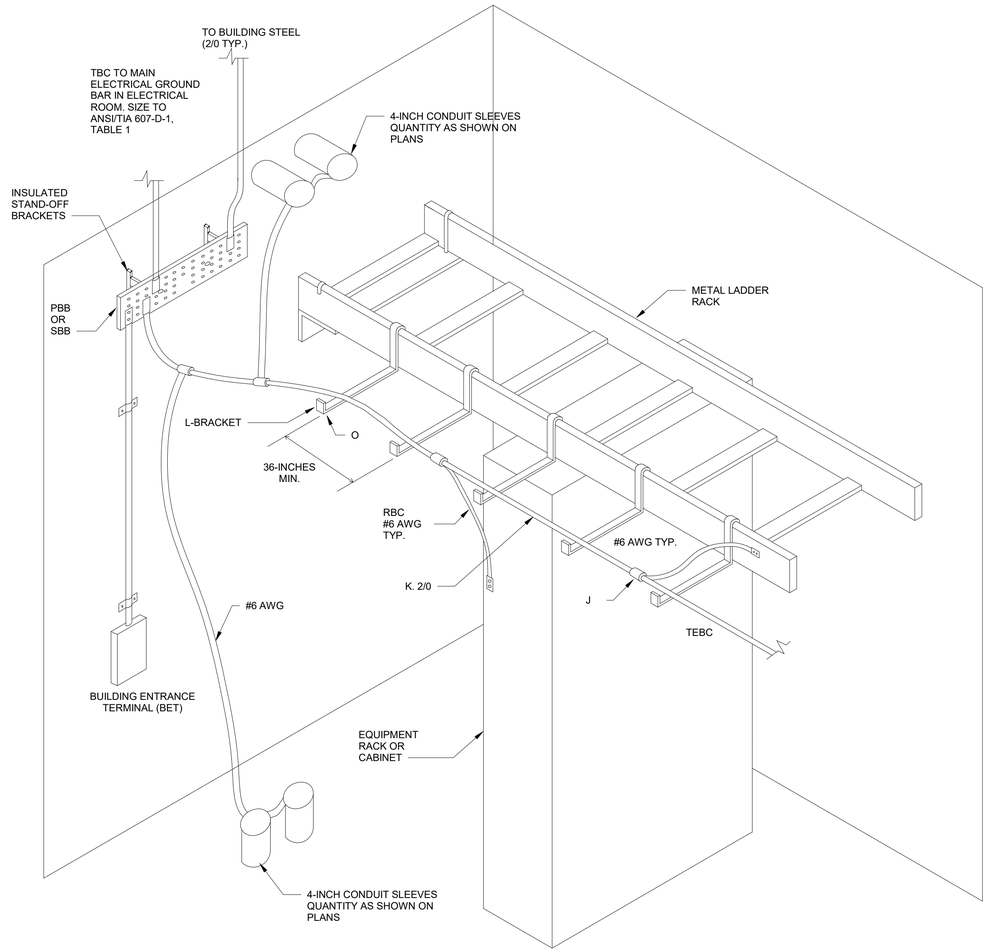
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

DETAILS

SHEET ID

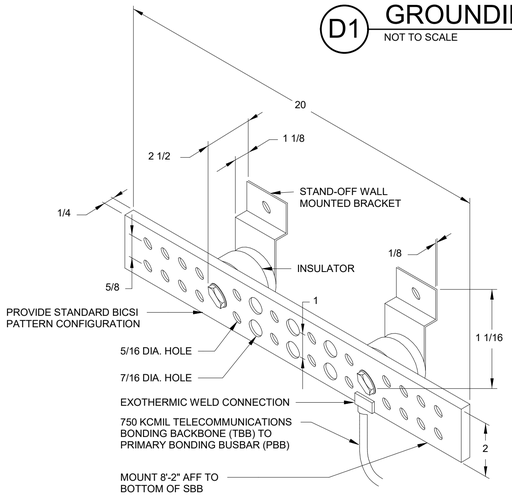
T-504

ADVERTISEMENT - 100% DESIGN



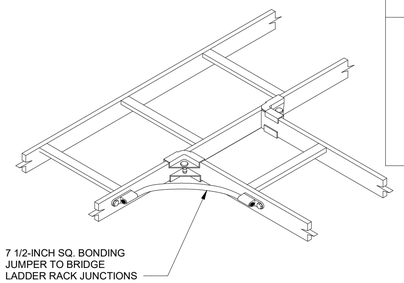
D1 GROUNDING AND BONDING INSTALLATION DETAIL

NOT TO SCALE



A1 SECONDARY BONDING BUSBAR (SBB) DETAIL

NOT TO SCALE

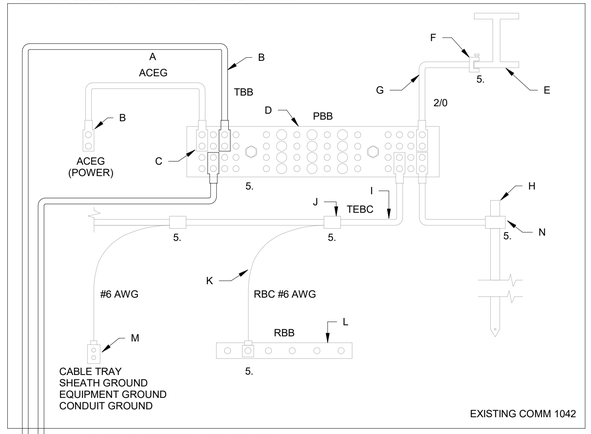


A4 LADDER RACK INTERSECTION GROUNDING

NOT TO SCALE

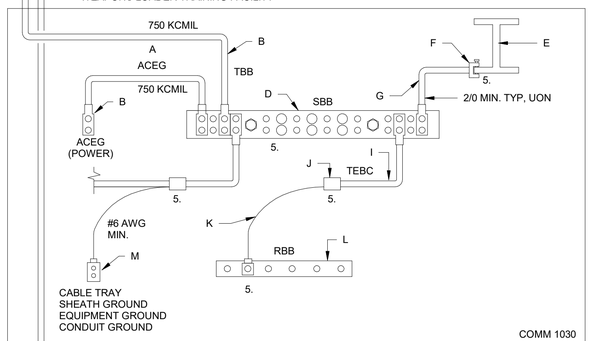
ANSI / TIA 607-D-1
BONDING AND GROUNDING ONE-LINE

WEAPONS LOADER TRAINING FACILITY/PRIDE HANGAR

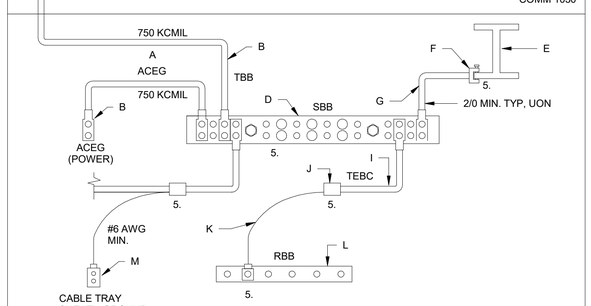


EXISTING COMM 1042

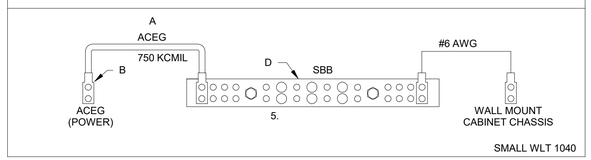
WEAPONS LOADER TRAINING FACILITY



COMM 1030



SECURE COMM 1041



SMALL WLT 1040

GENERAL SHEET NOTES

1. COMPLY WITH ANSI / TIA-607-D-1 6.2.1 FOR PBB'S.
2. COMPLY WITH ANSI / TIA-607-D-1 6.2.2 FOR SBB'S.
3. COMPLY WITH ANSI / TIA-607-D-1 6.2.3 FOR RBB'S.
4. SIZE TBB / BBC CONDUCTORS TO ANSI / TIA-607-D-1, TABLE 1, UON, CONDUCTORS MUST BE THE SAME SIZE WHEN CONNECTED.
5. BONDING CONNECTIONS ARE EITHER LISTED EXOTHERMIC WELDS, LISTED IRREVERSIBLE COMPRESSION CONNECTORS, OR LISTED MECHANICAL CONNECTORS. CONNECTORS, LUGS, AND COMPONENTS MUST BE LISTED FOR THE PURPOSE.

DETAIL SHEET KEYED NOTES

A. IF PANELBOARD IS LOCATED IN SAME SPACE, BOND PBB TO ACEG BUS. MAINTAIN 12-INCHES SEPARATION.

B. THIS CONDUCTOR MUST BE CONTINUOUS AND AS SHORT AS POSSIBLE IN A STRAIGHT-LINE PATH.

C. UTILIZE EXOTHERMIC WELDING OR LISTED TWO-HOLE COMPRESSION LUGS FOR CONNECTIONS TO THE PBB/SBB.

D. PBB OR SBB, SEE GENERAL NOTES ABOVE FOR REQUIREMENTS.

E. BUILDING STEEL (STRUCTURAL METAL) VERIFIED ELECTRONICALLY CONTINUOUS VIA TWO-POINT TEST OR EQUIPMENT.

F. LISTED BONDING CONNECTOR. LISTED EXOTHERMIC, COMPRESSION, OR MECHANICAL CONNECTION.

G. SIZE THIS BONDING CONDUCTOR TO TIA 607-D-1, TABLE 1. THIS CONDUCTOR MUST BE NO SMALLER THAN ANY OTHER CONDUCTOR IN THE TELECOM BONDING BACKBONE SYSTEM. USE 2/0, UNLESS OTHERWISE NOTED.

H. MINIMUM GROUND ELECTRODE IS 3/4-INCH DIAMETER BY 8'-0" LONG WITH A 1/2-INCH COPPER PLATING THICKNESS, BURIED 24-INCHES FOR A SUM OF 10'-0" DRIVEN DEPTH.

I. SIZE TEBC TO LARGEST-SIZE GROUNDING CONDUCTOR. USE 2/0, UNLESS OTHERWISE NOTED.

J. USE IRREVERSIBLE COMPRESSION CONNECTORS TO BOND TEBC TO RBC'S OR OTHER GROUNDING CONDUCTORS.

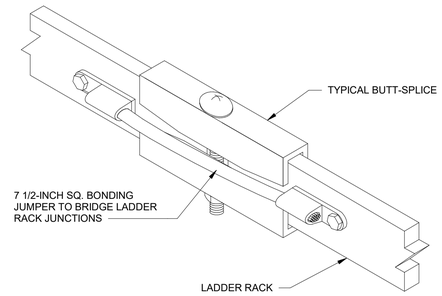
K. USE #6 AWG AS A MINIMUM RBC SIZE, UNLESS OTHERWISE NOTED.

L. WHEN USING RBBS, SEE GENERAL NOTES ABOVE FOR REQUIREMENTS.

M. BOND EQUIPMENT TO TEBC VIA IRREVERSIBLE COMPRESSION CONNECTORS AND #6 AWG.

N. BOND GROUND CABLE TO GROUND ELECTRODE.

O. STAND-OFF BRACKET TO MAINTAIN SEPARATION (MINIMUM 2-INCHES) FROM OTHER CABLE SPACE BRACKETS NO GREATER THAN 36-INCHES CENTER TO CENTER.



A8 LADDER RACK SPLICE GROUNDING

NOT TO SCALE

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYDSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802-505

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

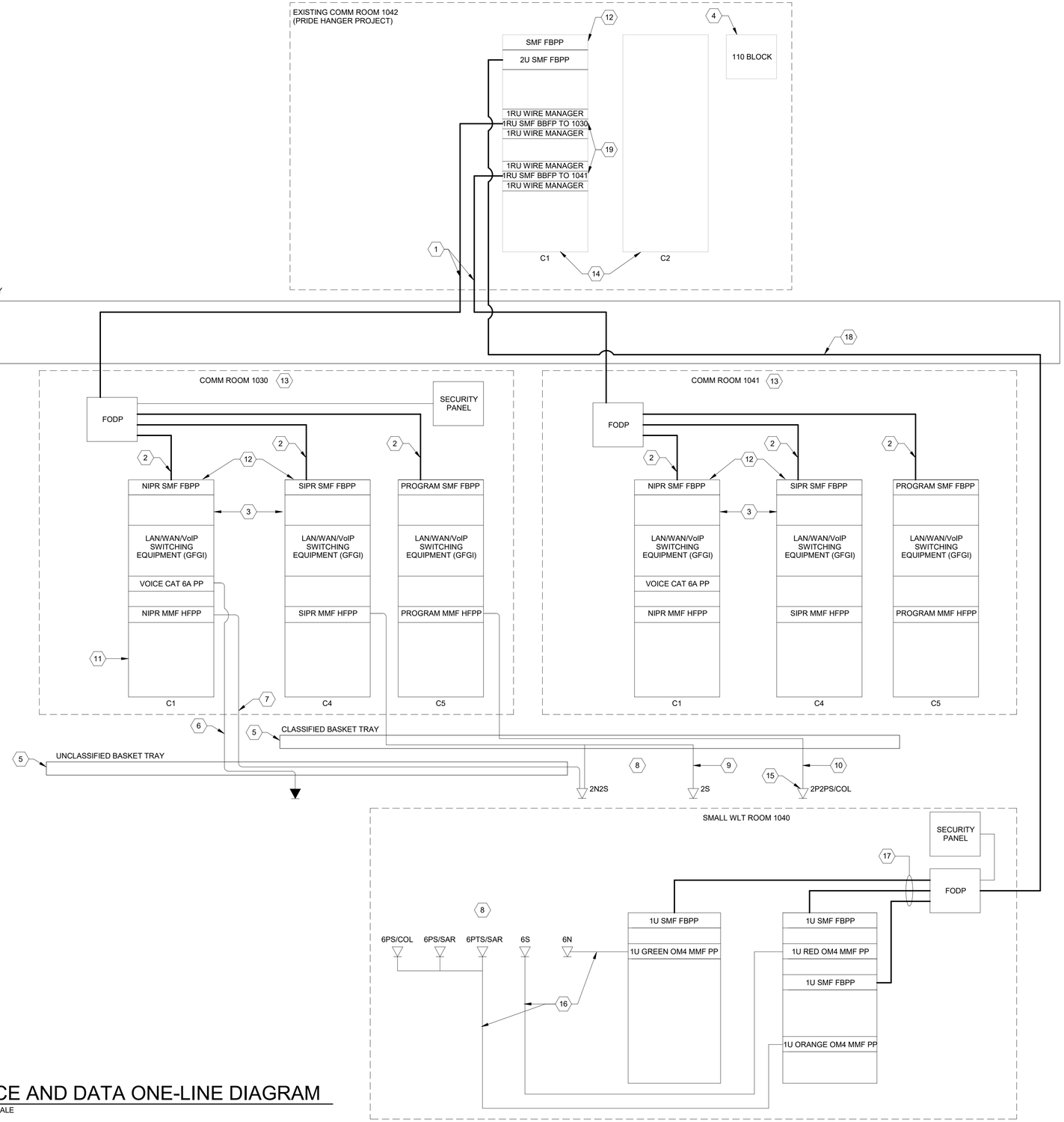
Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID
T-505

ADVERTISEMENT - 100% DESIGN

WEAPONS LOADER TRAINING FACILITY



A1 VOICE AND DATA ONE-LINE DIAGRAM
NOT TO SCALE

SHEET KEYNOTES

1 24-STRAND OS2 SMF BACKBONE CABLE.

2 12-STRAND OS2 SMF BACKBONE CABLE TO FBPP FOR EACH CLASSIFICATION.

3 NIPR AND SIPR CABINETS MUST BE SEPARATED BY A MINIMUM OF 39-INCHES.

4 EXISTING 110 BLOCK.

5 EACH CABLE CLASSIFICATION (NIPR AND SIPR/PROGRAM) WILL HAVE ITS OWN SEPARATE TRAY FOR DISTRIBUTION. MAINTAIN 39-INCHES OF SEPARATION BETWEEN HORIZONTAL CABLE TRAY THROUGHOUT THE ENTIRE PATHWAY.

6 HORIZONTAL CAT 6A BLUE CABLE AND BLUE TERMINATION JACK.

7 HORIZONTAL GREEN MMF OM4 CABLE AND CONNECTOR.

8 HORIZONTAL CABLE WILL ENTER SURFACE RACEWAY UPON LEAVING BASKET TRAY AND ENTERING THE OFFICE AREAS. ALL THREE CLASSIFICATIONS WILL USE THE SAME SURFACE RACEWAY. PROVIDE ADDITIONAL SURFACE RACEWAY TO MEET FILL RATIO REQUIREMENTS.

9 HORIZONTAL RED MMF OM4 CABLE AND CONNECTOR.

10 HORIZONTAL ORANGE MMF OM4 CABLE AND CONNECTOR.

11 TELECOM CABINET (TYPICAL).

12 FIBER PATCH PANEL.

13 THIS ROOM HAS FIVE CABINETS. C1 HAS NIPR SMF FIBER BACKBONE PATCH PANEL AND EQUIPMENT. C2 AND C3 (NOT SHOWN) ARE FOR NIPR AND WIRING. C4 HAS SIPR SMF FIBER AND EQUIPMENT. C5 HAS PROGRAM SMF FIBER AND EQUIPMENT.

14 EXISTING TELECOM CABINET.

15 ALL PS/COL DROPS ARE ORANGE OM4 MMF HORIZONTAL CABLE FEEDING FROM THE PROGRAM CABINET IN THE CLOSEST COMMUNICATIONS CABINET.

16 ALL HORIZONTAL CABLE IN THE SMALL WLT ORIGINATES FROM TWO WALL MOUNT CABINETS, REFER TO T-202 FOR ADDITIONAL INFORMATION.

17 SMF OPTICAL CABLE PATCHES BETWEEN THE WALL MOUNT FODP TO THE SECURITY PANEL AND SMF BBFP IN EACH CABINET THROUGH SMF PATCH CABLES.

18 12-STRAND OS2 SMF BACKBONE CABLE. PATCH CORDS AND NETWORK SYSTEM CROSS CONNECTS ARE PROVIDED BY OTHERS.

19 CONNECTING HARDWARE (FODP AND MANAGEMENT PANELS) FOR CONNECTIONS TO THE WLT PROJECT ARE PROVIDED AS PART OF THE WLT PROJECT. CABINETS IN COMM ROOM 1042 ARE PART OF THE PRIDE HANGER PROJECT.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. FAUVELLE
DRAWN BY: C. TINKER
CHECKED BY: M. ADKISON
SUBMITTED BY: B. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802f-601

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
TELECOMMUNICATIONS ONE LINE DIAGRAM

SHEET ID
T-601

ADVERTISEMENT - 100% DESIGN

SECURITY DEVICE SCHEDULE

DEVICE NUMBER	DOOR NUMBER	ROOM NUMBER	PANEL	DETAIL NUMBER	AREA	BID OPTION
ACP1		1030		C6/TY502	A	
ACP2		1030		C6/TY502	A	
ACP3		1040		C6/TY502	B	
IDS1		1030			A	
IDS2		1030			A	
IDS3		1040			B	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1045		A1/TY502	A	
M1		1046		A1/TY502	B	BID OPTION
M1		1046		A1/TY502	B	BID OPTION
M1		1046		A1/TY502	B	BID OPTION
M1		1046		A1/TY502	B	BID OPTION
M1		1046		A1/TY502	B	BID OPTION
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M2		1040		E6/TY502	B	
M2		1040		E6/TY502	B	
M2		1041		E6/TY502	B	
M3		1031		E6/TY502	A	
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M3		1010		E6/TY502	A	
M3		1042		E6/TY502	A	
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M3		1006		E6/TY502	A	
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M3		1037		E6/TY502	A	
M3		1037		E6/TY502	A	
M3		1038		E6/TY502	B	
M3		1038		E6/TY502	B	
M3		1031		E6/TY502	A	
M3		1030		E6/TY502	A	
M3		1006		E6/TY502	A	
R7	1013	1013	D3	A1/TY501	A	
R10	1030	1030	D6	A1/TY501	A	
R11	1041	1041	D7	A1/TY501	B	

SECURITY DEVICE SCHEDULE

DEVICE NUMBER	DOOR NUMBER	ROOM NUMBER	PANEL	DETAIL NUMBER	AREA	BID OPTION
R12	1002B	1002	D9	A1/TY501	A	
R15	1039B	1039	D13	A1/TY501	B	
S3	1037C	1037		D6/TY501	A	
S3	1037C	1037		D6/TY501	B	
S8	1038	1038		A1/TY501	B	
S12	1013	1013	D3	A1/TY501	A	
S15	1025	1025	D6	A1/TY501	A	
S16	1030	1030	D6	A1/TY501	A	
S17	1040	1040	D7	D1/TY501	B	
S17	1040	1040	D7	D1/TY501	B	
S19	1041	1041	D7	A1/TY501	B	
S20	1002A	1002	D9	A1/TY501	A	
S21	1002B	1002		A1/TY501	A	
S28	1039A	1039	D13	A1/TY501	B	
S29	1039B	1039	D7	A1/TY501	B	
S30	2000	2000		D1/TY501	A	
S30	2000	2000		D1/TY501	A	

DIB SCHEDULE

DIB NUMBER	DOOR NUMBER	PANEL	DETAIL NUMBER
D9	1002A		C6/TY501
D3	1013		C6/TY501
D6	1030		C6/TY501
D13	1039A		C6/TY501
D7	1041		C6/TY501

LEGEND

- —# — HID RP40 CARD READER
- CR # — HID RPK40 CARD READER WITH KEYPAD
- HSS # — HIGH SECURITY SWITCH (PROVIDED BY DIV. 8)
- EL — 24 VDC ELECTRIC LOCK WITH INTEGRAL REQUEST-TO-EXIT (REX) SENSOR (PROVIDED BY DIV. 8)
- X10 — DIAL COMBINATION LOCK (PROVIDED BY DIV. 8)
- ACP # — INTELLIGENT FIELD CONTROLLER PANEL
- # — PANORAMIC PIR
- KP — ALARM KEYPAD
- DIB # — DOOR INTERFACE BOX
- J — 120VAC POWER (PROVIDED BY DIV. 26)
- DATA CONNECTION (PROVIDED BY DIV. 27)
- # — DEVICE NUMBER
- WKS — WORKSTATION
- IDS — PREMISE CONTROL UNIT
- SECURED SPACE BOUNDARY

GENERAL NOTES

1. CONTRACTOR MUST FIELD VERIFY EQUIPMENT LOCATIONS PRIOR TO THE START OF INSTALLATION. ANY CONFLICTS MUST BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT.
2. MINIMUM CONDUIT SIZE MUST BE 3/4" WITH THE EXCEPTION OF "DROP CONDUITS" AT DOOR LOCATIONS, WHICH MAY BE 1/2". ALL CONDUITS MUST BE EMT; EXCEPTIONS INCLUDE:
   - 2.1. RIGID STEEL FOR EXPOSED AREAS OR AREAS ACCESSIBLE TO UNSCREENED PERSONS
   - 2.2. PVC FOR BURIED OR CAST-IN-PLACE CONDUITS
   - 2.3. GALVANIZED RIGID STEEL FOR EXTERIOR CONDUITS
   - 2.4. FLEXIBLE CONDUIT FOR CONCEALED DROPS TO DOOR DEVICES
3. CONDUIT FILL MUST NOT EXCEED 40%. INSTALLATION OF CONDUIT AND WIRING MUST BE IN COMPLIANCE WITH NATIONAL ELECTRICAL CODE (NEC). ALL WIRING MUST BE HOMERUN, UNLESS OTHERWISE NOTED. ANY SPLICES MUST BE APPROVED BY THE DESIGNER.
4. SECURITY CONTROL CONDUCTORS MUST BE SHIELDED COPPER AND MINIMUM 18 AWG, UNLESS OTHERWISE NOTED. SECURITY CONDUCTORS MUST NOT SHARE CONDUIT WITH CONDUCTORS OF OTHER TRADES. SECURITY CONTRACTOR MUST BE RESPONSIBLE FOR ENSURING THAT HIGH VOLTAGE (120 VAC) POWER CONDUCTORS ARE NOT ROUTED WITHIN 12 INCHES OF SECURITY CONTROL WIRING. ALL CONDUCTORS MUST BE COLOR CODED AND TAGGED AS DESCRIBED IN THE WRITTEN SPECIFICATIONS AND APPROVED BY THE DESIGNER.
5. THE CONTRACTOR MUST INSTALL ALL COMPONENTS USING MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES. ALL MATERIALS MUST BE NEW AND UNUSED.
6. CONDUITS PENETRATING FIRE RATED WALLS OR FLOORS MUST USE U.L. APPROVED DEVICES IN ORDER TO MAINTAIN FIRE & ICD -705 RATING OF THE WALL OR FLOOR.
7. ALL CABLING MUST BE INSTALLED IN CONDUIT WITH THE EXCEPTION OF CABLING INSTALLED IN CABLE TRAYS/LADDER RACKS AND WITHIN COMM ROOMS.
8. THE CONTRACTOR MUST MAINTAIN ALL CABLE MINIMUM BENDING RADII ACCORDING TO THE CABLE MANUFACTURER.
9. THE CONTRACT DOCUMENTS REFLECT THE FIELD CONDITIONS OBSERVED/VERIFIED AT THE TIME OF OUR SITE AND BUILDING SURVEYS; THERE MAY BE DIFFERING FIELD CONDITIONS AT THE START OF CONSTRUCTION AND/OR BID PHASE. CONTRACTOR MUST BE RESPONSIBLE TO FIELD VERIFY ALL EXISTING CONDITIONS OF BUILDING SYSTEM AND PHYSICAL CHARACTERISTICS OF THE BUILDING/FACILITY PRIOR TO START OF WORK TO ENSURE THERE ARE NO CONFLICTS WITH THE CONSTRUCTION DOCUMENTS AND THE EXISTING FIELD CONDITIONS.
10. THE CONTRACTOR MUST COORDINATE THE WORK OF THEIR TRADE WITH THAT OF THE OTHER TRADES ON THE JOB. CONFLICTS WITH OTHER TRADES MUST BE BROUGHT TO THE ATTENTION OF THE GOVERNMENT PRIOR TO INSTALLATION. WORK MUST ALSO BE COORDINATED AROUND PORTABLE AND MOBILE EQUIPMENT.
11. ALL WORK MUST COMPLY WITH ALL APPLICABLE CODES, AMENDMENTS, RULES, REGULATIONS, ORDINANCES, LAWS, ORDERS, APPROVALS, ETC. THAT ARE REQUIRED BY PUBLIC AUTHORITIES. IN THE EVENT OF CONFLICT, THE MOST STRINGENT REQUIREMENTS MUST GOVERN.
12. THE CONTRACTOR MUST SUPERVISE AND DIRECT THE WORK USING HIS BEST SKILL AND ATTENTION. HE MUST BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: S. DYSON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W912BF23R0012
CONTRACT NO.:
DRAWING CODE:
SIZE: ANSI D 22x34
FILE NAME: FXBM231802TY001

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

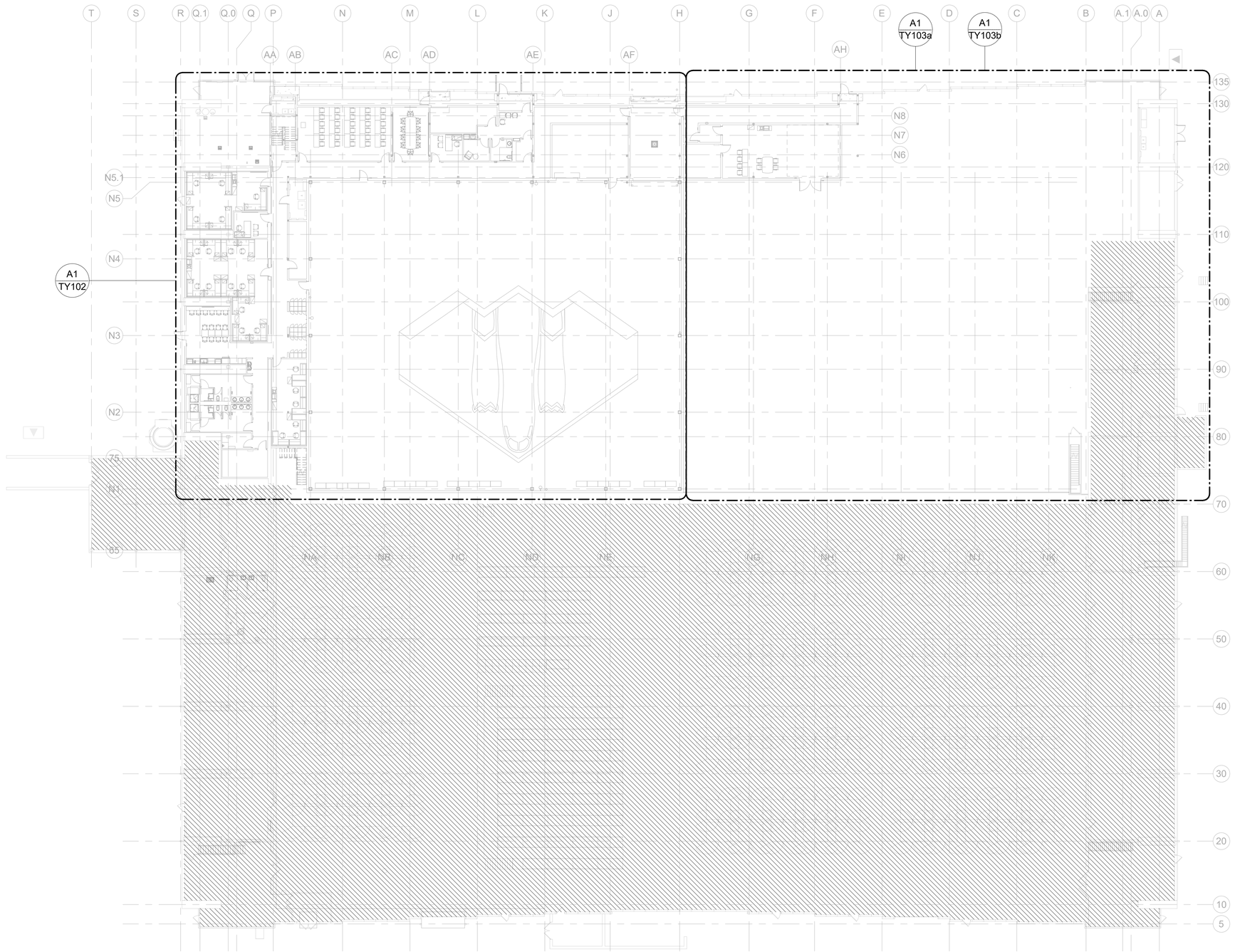
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

ELECTRONIC SECURITY SYSTEM
LEGENDS, NOTES, AND SCHEDULES

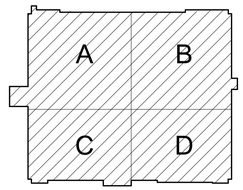
SHEET ID

TY001

ADVERTISEMENT - 100% DESIGN



A1 OVERALL ELECTRONIC SECURITY SYSTEM PLAN - LEVEL 01
1" = 20'-0"



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN
NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

ISSUE DATE:
28 APRIL 2023
SOLICITATION NO.:
W9128F23R0012
CONTRACT NO.:

DRAWING CODE:

FILE NAME:
FXBM231802TY101

DESIGNED BY:
R. CRAIG
DRAWN BY:
C. TINKER
CHECKED BY:
J. HIMES
SUBMITTED BY:
B. DYSON
SIZE:
ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

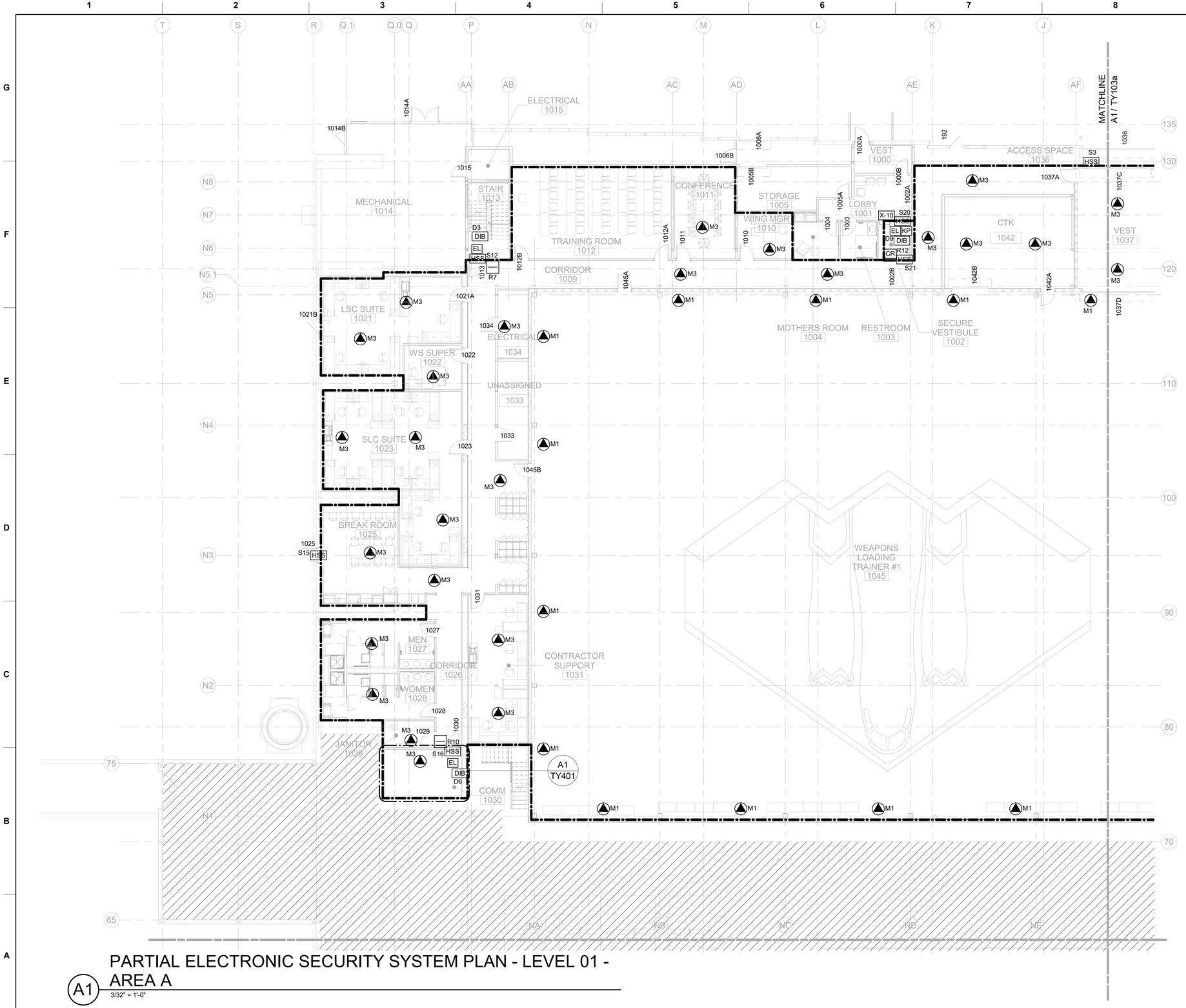
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL ELECTRONIC SECURITY
SYSTEM PLAN - LEVEL 01

SHEET ID

TY101

ADVERTISEMENT - 100% DESIGN

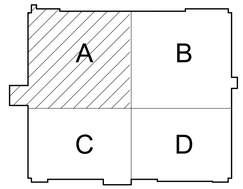


PARTIAL ELECTRONIC SECURITY SYSTEM PLAN - LEVEL 01 - AREA A

A1 — 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO TY001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.



AREA A
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYESON
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802TY102
SIZE: ANSI D 22x34

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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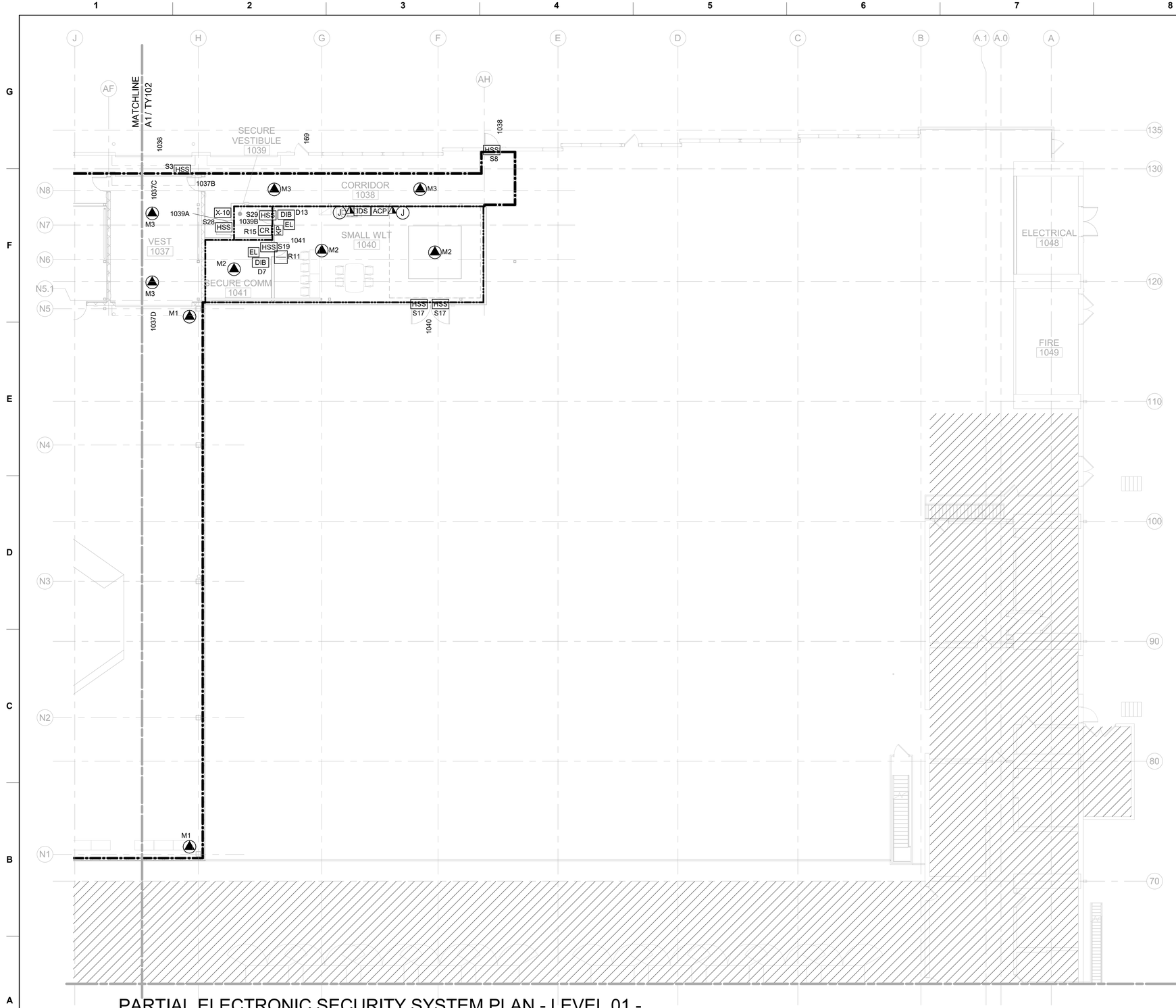
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL ELECTRONIC SECURITY SYSTEM PLAN - LEVEL 01 - AREA A

SHEET ID
TY102

ADVERTISEMENT - 100% DESIGN

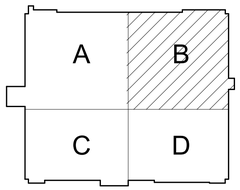


PARTIAL ELECTRONIC SECURITY SYSTEM PLAN - LEVEL 01 - AREA B

A1 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO TY001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802TY103a

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OMAHA DISTRICT
OMAHA, NEBRASKA

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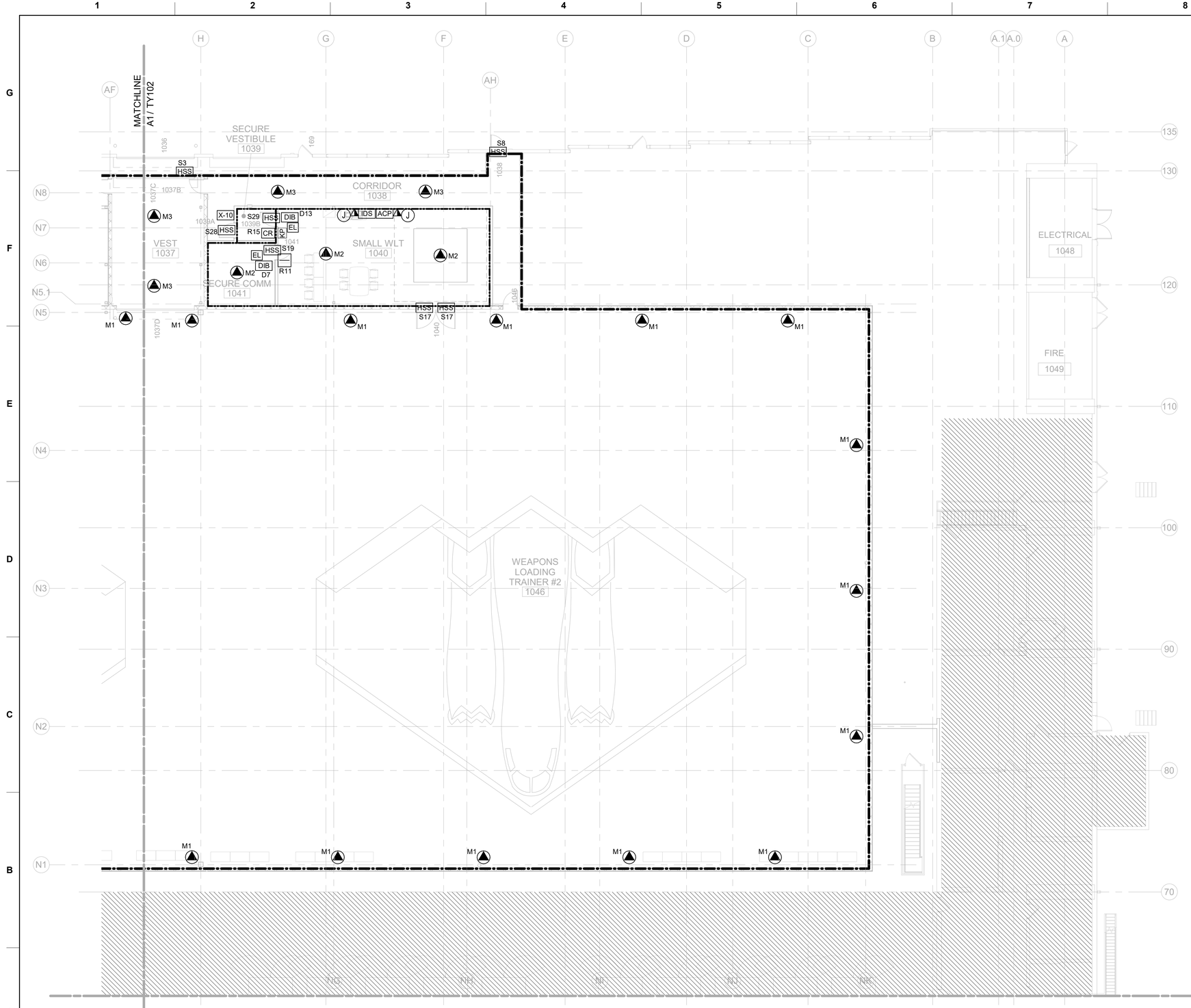
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
PARTIAL ELECTRONIC SECURITY SYSTEM PLAN - LEVEL 01 - AREA B

SHEET ID

TY103a

ADVERTISEMENT - 100% DESIGN

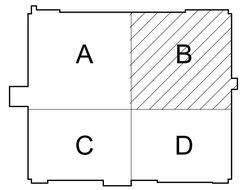


PARTIAL ELECTRONIC SECURITY SYSTEM PLAN - LEVEL 01 - AREA B - BID OPTION

A1 3/32" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO TY001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.



AREA B
KEY PLAN

GRAPHIC SCALE

0 4' 8' 16' 32'

SCALE: 3/32"=1'-0"

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
FILE NAME: FXBM231802TY103b

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ST. LOUIS, MISSOURI 63110

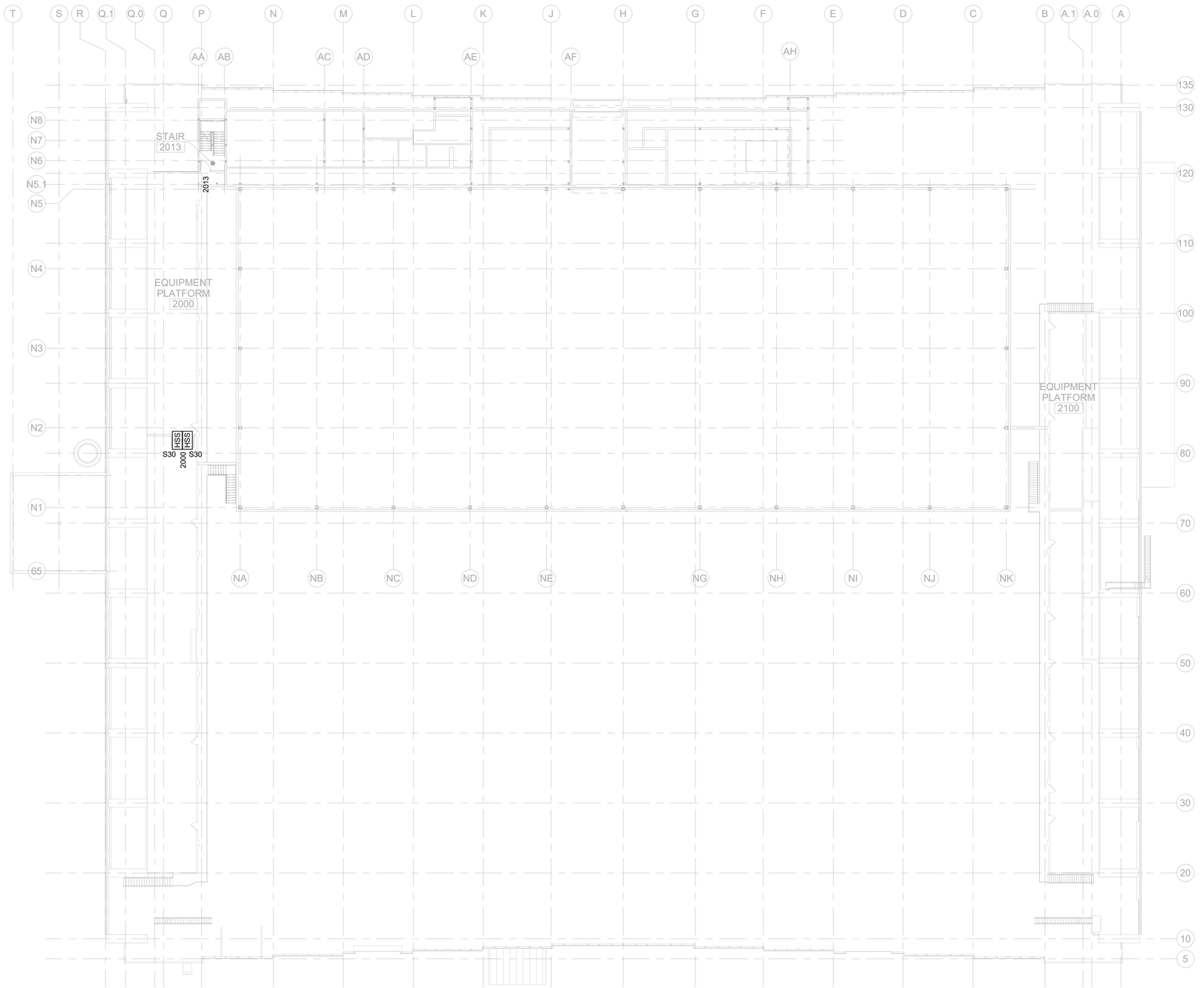
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

PARTIAL ELECTRONIC SECURITY SYSTEM PLAN - LEVEL 01 - AREA B - BID OPTION

SHEET ID

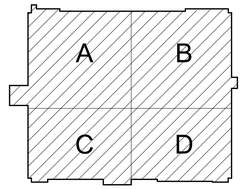
TY103b

ADVERTISEMENT - 100% DESIGN



GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET TY001.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN
NORTH

TRUE N

A1 OVERALL ELECTRONIC SECURITY SYSTEM PLAN - EQUIPMENT PLATFORM 01

1" = 20'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE:
FILE NAME: FXBM231802TY111

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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ST. LOUIS, MISSOURI 63110

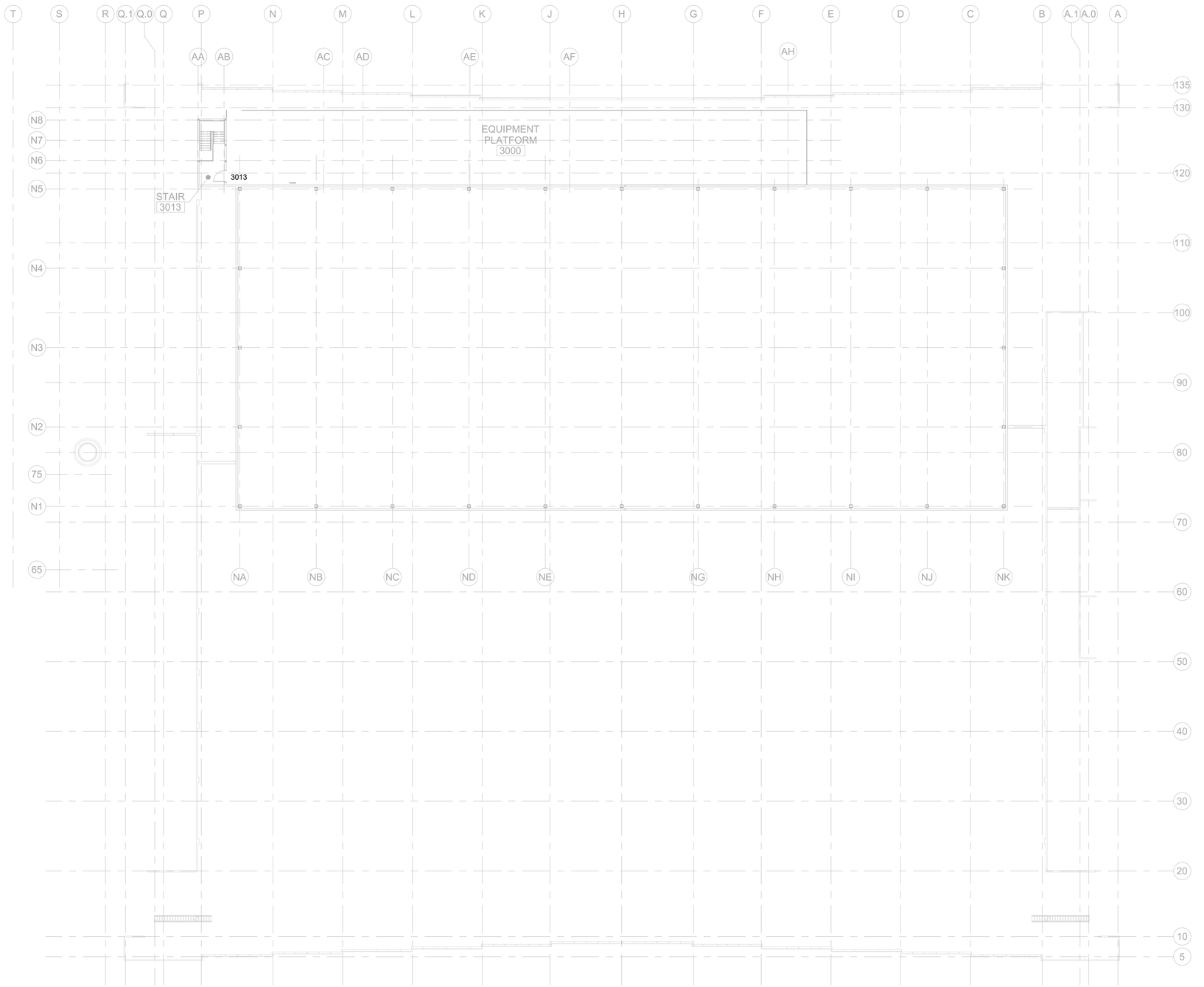
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL ELECTRONIC SECURITY SYSTEM PLAN - EQUIPMENT PLATFORM 01

SHEET ID

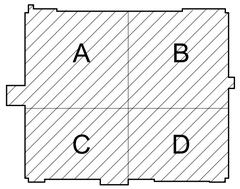
TY111

ADVERTISEMENT - 100% DESIGN



GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET TY001.



OVERALL
KEY PLAN

GRAPHIC SCALE

0 10' 20' 40' 60'

SCALE: 1"=20'

PLAN
NORTH

TRUE N

A1 OVERALL ELECTRONIC SECURITY SYSTEM PLAN - EQUIPMENT PLATFORM 02

1" = 20'-0"

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34

ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.:
FILE NAME: FXBM231802TY121

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

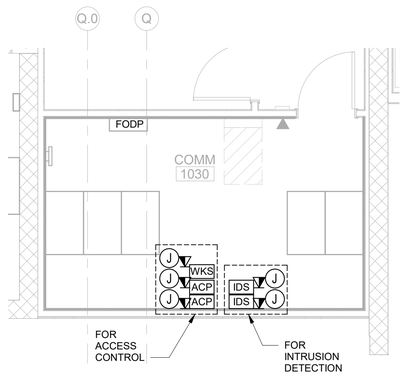
ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802

OVERALL ELECTRONIC SECURITY SYSTEM PLAN - EQUIPMENT PLATFORM 02

SHEET ID

TY121

ADVERTISEMENT - 100% DESIGN



A1 ENLARGED COMM ROOM 1030 - SECURITY PLAN

1/4" = 1'-0"

GENERAL SHEET NOTES

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES REFER TO SHEET T-001.
2. REFER TO SHEET T-601 FOR PATHWAY ROUTING DETAILS.

SHEET KEYNOTES

GRAPHIC SCALE

4 3 2 1 0 4 8

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

PLAN NORTH

TRUE N

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802TY401

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802

ENLARGED SECURITY PLANS

SHEET ID

TY401

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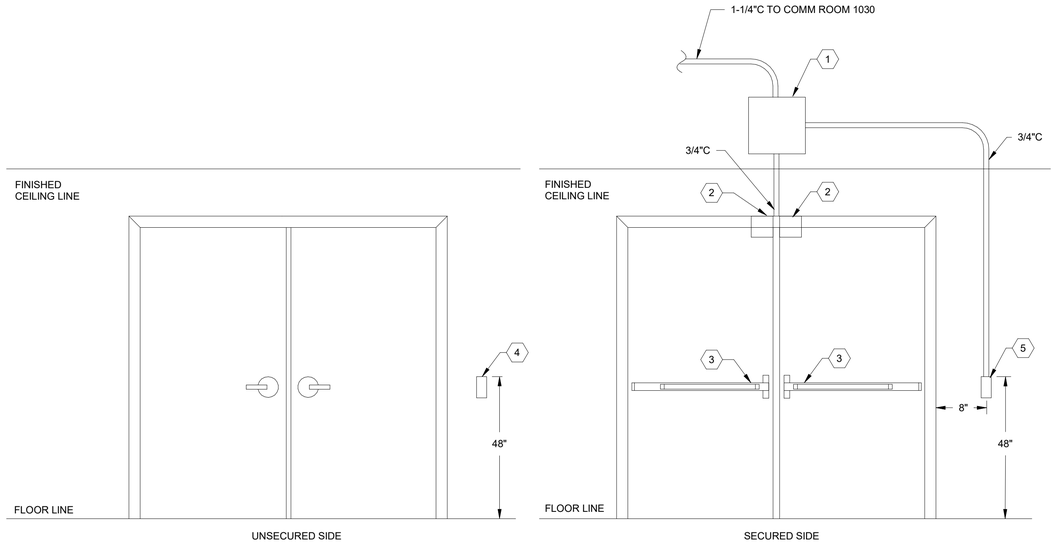
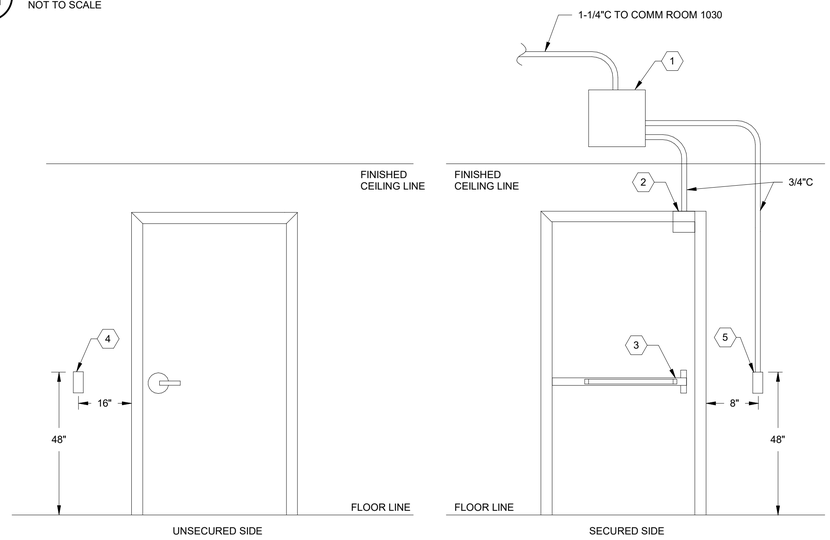


1. DOOR INTERFACE BOX
2. HIGH SECURITY SWITCH
3. 24VDC ELECTRIFIED LOCKING HARDWARE (PROVIDED BY DIV. 8)
4. CARD READER
5. SINGLE GANG BOX

D1 DOUBLE DOOR WITH CARD READER

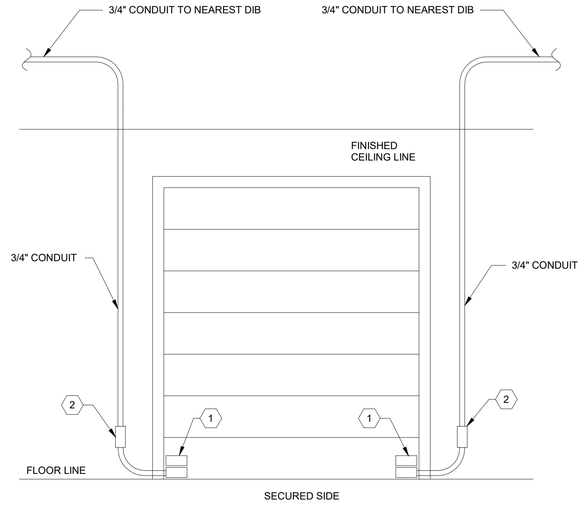
NOT TO SCALE



1. DOOR INTERFACE BOX
2. HIGH SECURITY SWITCH
3. 24VDC ELECTRIFIED LOCKING HARDWARE (PROVIDED BY DIV. 8)
4. CARD READER
5. SINGLE GANG BOX

A1 SINGLE DOOR WITH CARD READER

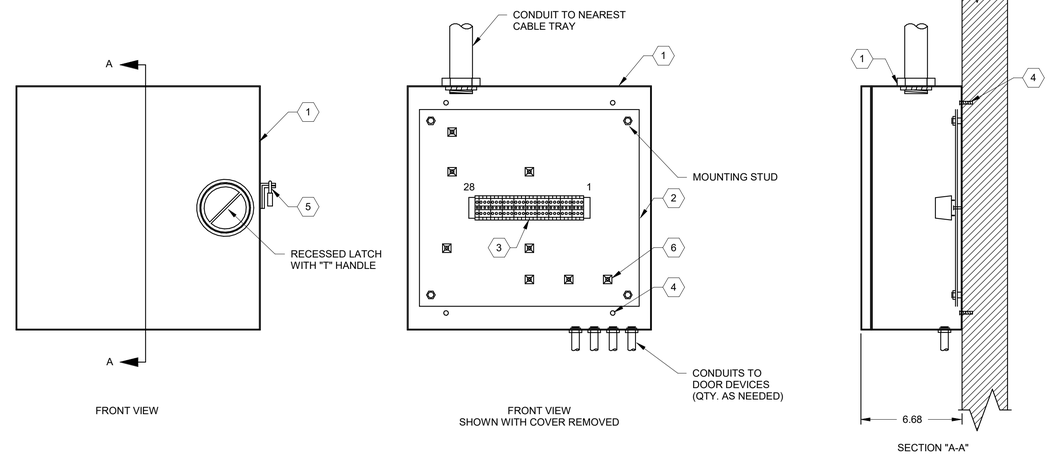
NOT TO SCALE



1. MAGNETIC CONTACT
2. SINGLE GANG BOX FOR CONNECTION OF BMS FLEX CONDUIT

D6 OVERHEAD DOOR INTRUSION DETECTION

NOT TO SCALE



NOTES:

1. 16"X16"X6" ENCLOSURE
2. BACK PLATE, ORDERED WITH ENCLOSURE.
3. 9 (27 TERMINATIONS POINTS), 3 POSITION TERMINAL BLOCKS AND 1 (1 TERMINATION POINT) 1 POSITION TERMINAL BLOCK FOR THE TERMINATION OF CABLES FROM ACP AND DOOR DEVICES (REFER TO CABLE TERMINATIONS SCHEDULE ON SHEET TY001). NOTE: CARD READER CABLES DO NOT TERMINATE IN THIS CABINET AND PASS DIRECTLY THROUGH TO THE CARD READER(S) MOUNTED BELOW.
4. 1/4" MOUNTING HARDWARE, SELECTED AND SIZED PER MOUNTING SURFACE (QTY. AS REQUIRED).
5. PADLOCK KIT AND PADLOCK
6. SCREW MOUNT CABLE TIE HOLDER AND #6 SELF-TAPPING SCREW (QTY AS REQUIRED)

A6 DOOR INTERFACE BOX (DIB) DETAIL

NOT TO SCALE

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE: -
FILE NAME: FXBM231802TY501

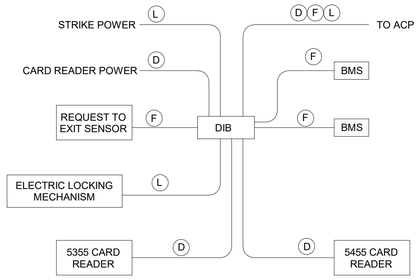
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

Jacobs
1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER
TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID
TY501

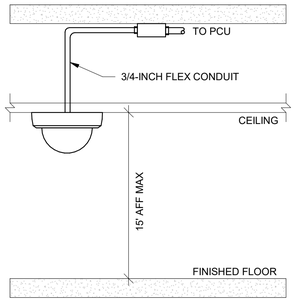
ADVERTISEMENT - 100% DESIGN



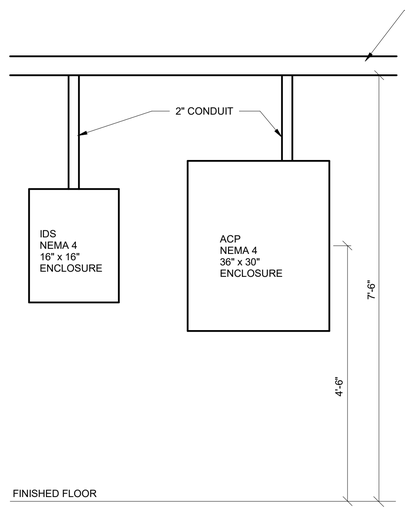
F1 ACS DOOR BLOCK DIAGRAM
NOT TO SCALE

CABLE SCHEDULE		
CABLE TYPE	DESCRIPTION	USE
A	4 COND. 22 GA.	DOOR INTERFACE BOX
B	2 PAIR 24 AWG	RS485
C	2 PAIR 18 AWG	OSDP
D	6-22 AWG	CARD READER
E	2 COND. 20 AWG	TAMPER
F	3 COND. 20 AWG	REX/BMS
G	#20-4c	SENSOR
H	2 COND. 18 AWG	TAMPER
J	2-18 AWG	REX/BMS
K	3-18 AWG	SENSOR
L	2 COND. 16 AWG	LOW VOLTAGE POWER
M	3 COND. 12 AWG	120 VAC
N	PLENUM 12F, SINGLE-MODE	COMMUNICATION
O	PLENUM 6F, 62.5um MULTIMODE	COMMUNICATION
P	CAT5e CABLE, 4 PAIR	CAMERA

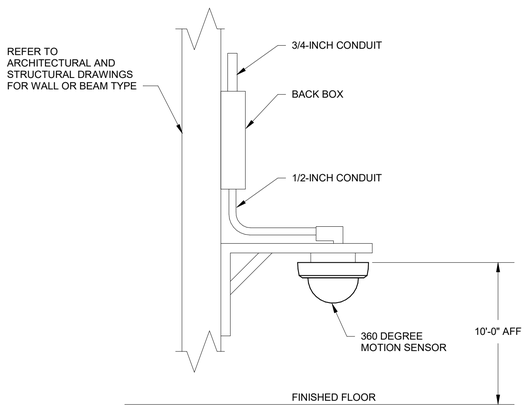
* OR EQUIVALENT



E6 CEILING MOUNTED MOTION SENSOR
NOT TO SCALE



C6 IDS/ACP ELEVATION
NOT TO SCALE



A1 WALL MOUNTED MOTION SENSOR
NOT TO SCALE

US Army Corps of Engineers
Omaha District ®

MARK	DESCRIPTION	DATE

DESIGNED BY: R. CRAIG
DRAWN BY: C. TINKER
CHECKED BY: J. HIMES
SUBMITTED BY: B. DYSON
SIZE: ANSI D 22x34
ISSUE DATE: 28 APRIL 2023
SOLICITATION NO.: W9128F23R0012
CONTRACT NO.:
DRAWING CODE.: -
FILE NAME: FXBM231802TY502

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

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1001 HIGHLANDS PLAZA DR. WEST, SUITE 400
ST. LOUIS, MISSOURI 63110

ELLSWORTH AIR FORCE BASE, SD
DESIGN B-21: WEAPONS LOADER TRAINING FACILITY
PROJECT NUMBER: FXBM231802
DETAILS

SHEET ID
TY502

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