

ABBREVIATIONS

SYMBOLS

A.D.R. ACCESS DOOR	K.E.C. KITCHEN EQUIPMENT CONTRACTOR
A.F.F. ABOVE FINISH FLOOR	L.P. LOW POINT
A.P. ACCESS PANEL	LAB. LABORATORY
A.S. ALUMINUM SADDLE	LAD. LADDER
A.V. AUDIO VISUAL	LAM. LAMINATED
AC. ACOUSTIC	LANG. LANGUAGE
AC.BD. ACOUSTICAL BOARD	L.A.S.S. LAND, AIR, SEA AND SPACE
AC.T. ACOUSTICAL TILE	LAV. LAVATORY
ADD. ADDITIONAL	LDR. LEADER
ADJ. ADJUSTABLE	L.F. LINEAR FEET
ALT. ALTERNATE	LKR. LOCKER
ALUM. ALUMINUM	LOC. LOCATION
APPROX. APPROXIMATE	LT. LIGHT
ARCH. ARCHITECTURAL	LTWT. LIGHTWEIGHT
ASST. ASSISTANT	
& AND	
	M.B. MARKERBOARD
B. B LABEL DOOR	M.E.R. MECHANICAL EQUIPMENT ROOM
B.M. BENCH MARK	M.I.O. MASONRY OPENING
B.U.R. BUILT-UP ROOF	MACH. RM. MACHINE ROOM
BD. BOARD	MAS. MASONRY
BIT. BITUMINOUS	MAX. MAXIMUM
BLDG. BUILDING	MATL. MATERIAL
BLK. BLOCKING	MECH. MECHANICAL
BLKG. BLOCKING	MET. METAL
BM. BEAM	MEZZ. MEZZANINE
BOT. BOTTOM	MFR. MANUFACTURER
BRK. BRICK	MIN. MINIMUM
	MISC. MISCELLANEOUS
	MLDG. MOULDING
	MTD. MOUNTED
	N. NORTH
C. TO C. CENTER TO CENTER	N.I.C. NOT IN CONTRACT
C.B. CHALKBOARD	N.T.S. NOT TO SCALE
C.J. CONTROL JOINT	N.A. NOT APPLICABLE
C.L. OR C. CENTER LINE	NO. OR # NUMBER
C.M.U. CONCRETE MASONRY UNIT	NOM. NOMINAL
CAB. CABINET	
CEM. CEMENT	OA. OVERALL
C.F.R.C. CEMENTITIOUS FIBER REINFORCED CONCRETE	OBSEV. OBSERVATION
C.F.R.G. CEMENTITIOUS FIBER REINFORCED GYPSUM	O.D. OUTSIDE DIAMETER
CHG. CHANGE	O.H. OPPOSITE HAND
CLG. CEILING	OFF. OFFICE
CLO. CLOSET	OPNG. OPENING
CNTR. COUNTER	OPP. OPPOSITE
COL. COLUMN	
COMM. COMMUNICATIONS	PASS. PASSAGE
CONC. CONCRETE	P.L. PROPERTY LINE
CONF. CONFERENCE	P.LAM. PLASTIC LAMINATE
CONN. CONNECTION	PH. PENTHOUSE
CONST. CONSTRUCTION	PLAS. PLASTER
CONT. CONTINUOUS, CONTINUE	PLYWB. PLYWOOD
CONTR. CONTRACTOR	PNL. PANEL
CORR. CORRIDOR	PREFAB. PREFABRICATED
CPT. CARPET	PRIN. PRINCIPAL
CTND. CONTAINED	PROD. PRODUCTION
CTR. CENTER	PROP. PROPERTY
CUST. CUSTODIAL	PRTN. PARTITION
	PTD. PAINTED
	QTR. QUARTER
	QTY. QUANTITY
DEPT. DEPARTMENT	
DET. DETAIL	R. RADIUS
DIA. DIAMETER	R.C.P. REFLECTED CEILING PLAN
DN. DOWN	R.CFT. ROOF
DNSPT. DOWNSPOUT	R.D. ROOF DRAIN
DR. DOOR	R.L. RAIN LEADER
DWG. DRAWING	R.O. ROUGH OPENING
	REC. RECESS
E. EAST	REF. REFRIGERATOR
E.A. EACH	REIN. REINFORCEMENT
E.D.C. EDUCATION	RELOC. RELOCATED
E.I.F.S. EXTERIOR INSULATION AND FINISH SYSTEM	REOD. REQUIRED
E.F.S. EXTERIOR FINISH SYSTEM	RESIL. RESILIENT
ELEC. ELEVATION	REV. REVISION
ELEV. ELEVATOR	RIS. RISER
ENCL. ENCLOSURE	RM. ROOM
ENT. ENTRANCE	RUB. RUBBER
EQ. EQUAL	
EQUIP. EQUIPMENT	S. SOUTH
EXIST. EXISTING	S.S. STAINLESS STEEL
EXP. EXPANSION	S.F. SQUARE FEET
EXP. JT. EXPANSION JOINT	SCHED. SCHEDULED
EXT. EXTERIOR	SECRETARIAL
	SECT. SECTION
F.E. FIRE EXTINGUISHER	SH. MT. SHEET METAL
F.E.C. FIRE EXTINGUISHER WITH CABINET	SHWR. SHOWER
F.H.C. FIRE HOSE CABINET	SIM. SIMILAR
F.SP. FIRE STANDPIPE	SK. SKETCH
F.D. FLOOR DRAIN	SPCL. SPECIAL
FDN. FOUNDATION	SPEC. SPECIFICATIONS
FIN. FINISH, FINISHED	ST. STREET
FIXT. FIXTURE	STD. STANDARD
FL. FLOOR	STL. STEEL
FLUOR. FLUORESCENT	STOR. STORAGE
FT. OR ' FEET OR FOOT	STRUCT. STRUCTURAL
FTG. FOOTING	SUPP. SUPPORT
FURR. FURRING	SUSP. SUSPENDED, SUSPENSION
FUT. FIRE VALVE CABINET	
FVC. FIRE VALVE CABINET	
	T. & G. TONGUE AND GROOVE
G.C. GENERAL CONTRACTOR	T.B. TACKBOARD
GA. GAGE	T.O.S. TOP OF STEEL
GALV. GALVANIZED	T.O.W. TOP OF WALL
GEN. GENERAL	TD. TREAD
G.F.R.C. GLASS FIBER REINFORCED CONCRETE	TELE. CAB. TELEPHONE CABINET
G.F.R.G. GLASS FIBER REINFORCED GYPSUM	TELE. TELEPHONE
GL. GLASS, GLAZE	THK. THICKNESS
GR. GRADE	THRES. THRESHOLD
GUID. GUIDANCE	THRU. THROUGH
GYP. GYPSUM	TLT. TOILET ROOM
GYP. BD. GYPSUM BOARD	TRANS. TRANSFER
	TV. TELEVISION
	TYP. TYPICAL
	U.N.O. UNLESS NOTED OTHERWISE
H.C. HANDICAP, HANDICAPPED	UR. URINAL
H.M. HOLLOW METAL	UR.H. URINAL HANDICAPPED
H.P. HIGH POINT	
HDWD. HARDWOOD	V.C.T. VINYL COMPOSITION TILE
HDWR. HARDWARE	V.I.F. VERIFY IN FIELD
HGT. HEIGHT	V.W.C. VINYL WALLCOVERING
HORIZ. HORIZONTAL, HORIZONTALLY	VEST. VESTIBULE
H.V.A.C. HEATING VENTILATING AIR CONDITIONING	VIT. VITREOUS
	W. WEST
ID. INSIDE DIAMETER	W. GL. WIRE GLASS
I.P.S. IRON PIPE SIZE	W.M. WIRE MESH
IN. OR' INCH OR INCHES	W. WITH
INCL. INCLUSIVE, INCLUDE, INCLUDING	WINS. WAINSCOT
INSTR. INSTRUCTION	WD. WOOD
INSUL. INSULATION	WKRM. WORKROOM
INT. INTERIOR	WC-XX CURTAIN WALL SYSTEM
INTER. INTERMEDIATE	WS-XX STOREFRONT SYSTEM
JAN. JANITOR	
JT. JOINT	

1	COLUMN CENTERLINE AND NUMBER
101	ROOM NUMBER
101	DOOR NUMBER
1 SIM A101	WALL SECTION NUMBER DRAWING NUMBER
1 SIM A101	DETAIL LETTER / NUMBER DRAWING NUMBER
1 SIM A101	BUILDING SECTION DRAWING NUMBER
WC-XX	CURTAIN WALL TYPE
WS-XX	STOREFRONT TYPE
1 A101	EXTERIOR ELEVATION
1 A101 2	INTERIOR ELEVATION
1	DEMOLITION ITEM
+	REFERENCE POINT
XX	ACCESSORIES
X	SIGNAGE TYPE / LOCATION REFER TO DWGS.
XX	WALL TYPE
XX	ALUMINUM FRAME TYPE

MATERIALS	
[Pattern]	CONCRETE
[Pattern]	CONCRETE MASONRY UNITS
[Pattern]	BRICK
[Pattern]	METALS
[Pattern]	SOIL
[Pattern]	WOOD BLOCKING
[Pattern]	FINISHED WOOD
[Pattern]	BATT INSULATION
[Pattern]	RIGID INSULATION
[Pattern]	E.I.F.S. (EXTERIOR INSULATION AND FINISH SYSTEM)
[Pattern]	PLASTIC LAMINATE OVER GYPSUM BOARD

WILLOW CREEK ADDITION - Phase 7

4500 Access Road Jonesboro, Arkansas

SHEET LIST

- ARCHITECTURAL: TIM COOPER ARCHITECT PA**
 C-1.0 COVER SHEET
 A-1.1 LIFE SAFETY PLAN/CODE INFORMATION
 A-1.2 FIRE CODE REVIEW SHEET (CITY OF FAYETTEVILLE)
 A-2.0 FLOOR PLAN / ENLARGED TOILET PLAN
 A-3.0 ELEVATIONS / WALL SECTION
 A-4.0 EQUIPMENT PLAN / REFLECTED CEILING PLAN
- CONSULTANT: SMITH ENGINEERING CO.**
 S1.1 FOUNDATION PLAN
 S1.2 FOUNDATION DETAILS
- CONSULTANT: CHARLES THARP PE**
 MEP-1 GENERAL ABBREVIATIONS & SYMBOLS
 MEP-2 GENERAL SPECIFICATIONS
 MEP-3 GENERAL SPECIFICATIONS
 MEP-4 GENERAL SPECIFICATIONS
 MEP-5 GENERAL SPECIFICATIONS
- Mechanical / ELECTRICAL**
 ME-1 MECHANICAL / PLUMBING / POWER & LIGHTING PLAN
 ME-2 SPECS / DETAILS
- FIRE PROTECTION**
 FP-1 POWER PLAN & DETAILS

ARCHITECT:
 TIM COOPER ARCHITECT
 PO BOX 16888
 JONESBORO, AR 72403
 CONTACT: TIM COOPER
 EMAIL: TWCARCH@MAC.COM
 PHONE: (479) 236-6629

Mechanical & Electrical (Engineering)
 CHARLES G. THARP, P.E.
 2733 E. Battlefield, #336
 Springfield, MO 65804
 CONTACT: Charles Tharp P.E.
 PHONE: (870) 739-5533
 EMAIL: chas_tharp@email.msn.com



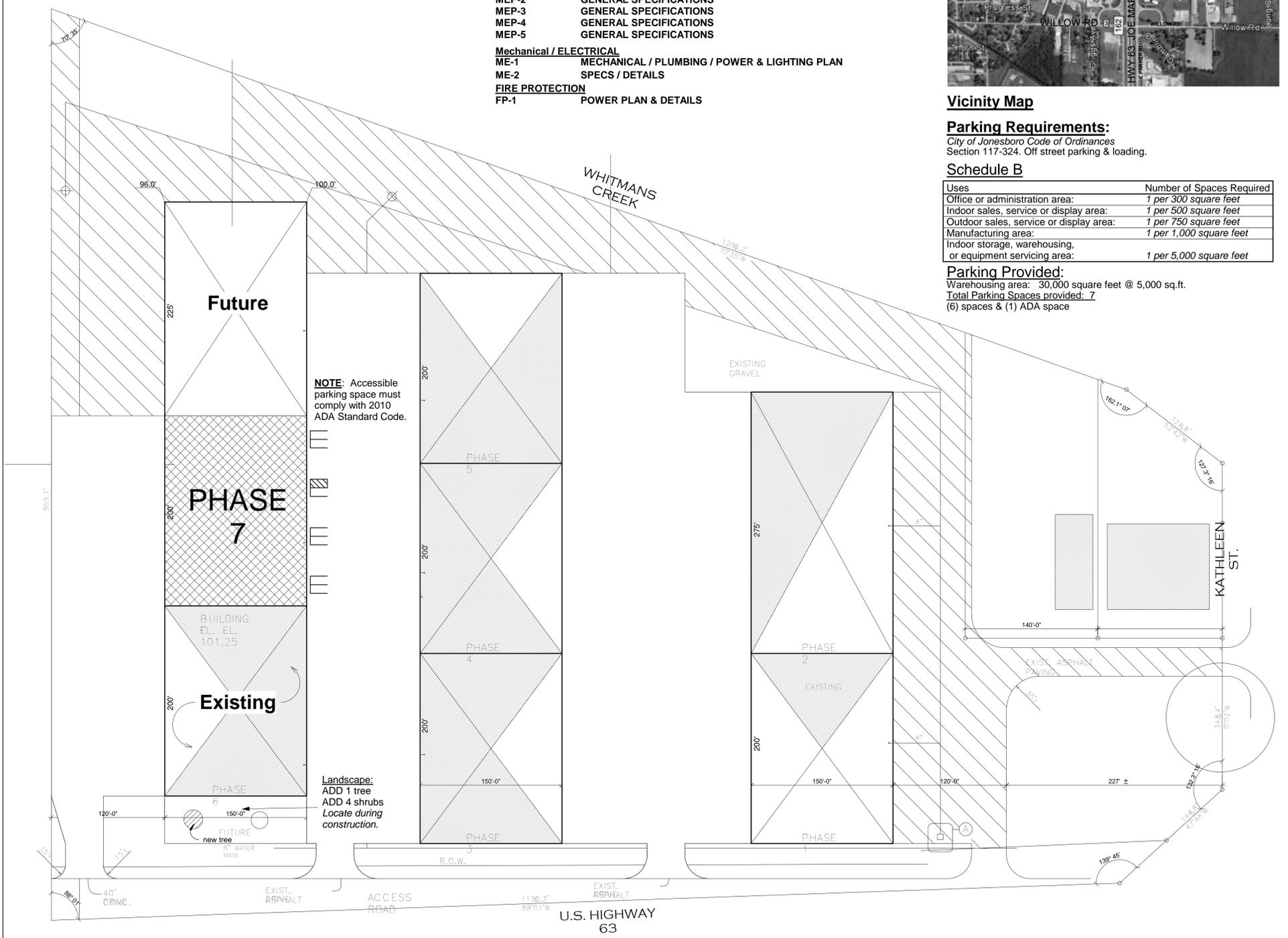
Vicinity Map

Parking Requirements:
 City of Jonesboro Code of Ordinances
 Section 117-324. Off street parking & loading.

Schedule B

Uses	Number of Spaces Required
Office or administration area:	1 per 300 square feet
Indoor sales, service or display area:	1 per 500 square feet
Outdoor sales, service or display area:	1 per 750 square feet
Manufacturing area:	1 per 1,000 square feet
Indoor storage, warehousing, or equipment servicing area:	1 per 5,000 square feet

Parking Provided:
 Warehousing area: 30,000 square feet @ 5,000 sq.ft.
 Total Parking Spaces provided: 7
 (6) spaces & (1) ADA space



NOTE: Accessible parking space must comply with 2010 ADA Standard Code.

Landscape:
 ADD 1 tree
 ADD 4 shrubs
 Locate during construction.

1 Architectural Site Plan
 1" = 60'-0"

Tim W Cooper Architect
 Jonesboro, AR 72403
 P.O. Box 16888
 Email: twcarch@mac.com Phone: 479.236.6629



PROJECT NUMBER	16-18
DATE	4/7/2017 2:14:44 PM
CONTENTS	COVER
SHEET NUMBER	C

ARKANSAS FIRE PREVENTION CODE DATA

BUILDING PLANNING & DESCRIPTION

PROJECT INFORMATION:

Willow Creek Addition - PHASE 7
(Shell Space)
4500 Access Road
Jonesboro, AR

CITY OF JONESBORO, AR

APPLICABLE CODES:

- 2010 ADA Standards for Accessibility
- 2012 Existing Building Code
- 2012 Arkansas Fire Prevention Code Vol. 1: Fire
- 2012 Arkansas Fire Prevention Code Vol. 2: Building
- 2012 Arkansas Fire Prevention Code Vol. 3: Residential
- 2006 APC: Arkansas Plumbing Codes
- 2010 AMC: Arkansas Mechanical Codes
- 2014 NEC: National Electrical Codes
- 2008 AFAG: Arkansas Fuel and Gas Codes
- 2004 IECC: International Energy Conservation Codes
- 2012 International Building Codes
- 2012 International Residential Codes
- 2003 ICC/ANSI A117.1: American National Standards

NEW CONSTRUCTION / ADDITION

PROJECT SF: 30,000 SF
OCCUPANCY TYPE: S-1 - Moderate Hazard Storage
TYPE OF CONSTRUCTION: VB - Sprinklered
OCCUPANCY LOAD FACTOR: Warehouses (500 gross) = 60 OCCUPANTS

NEW BUILDING AREA	AREA	HEIGHT	# OF STORIES
PROPOSED	30,000 SF	22'	1
ALLOWABLE <small>(TABLE 503 IBC 2012)</small>	9,000 SF	40'	2
ALLOWABLE WITH INCREASES <small>(SECTION 506 IBC 2012)</small>	36,000 SF	40'	2

BUILDING AREA MODIFICATIONS:

Equation 5-1:

$A = \{ A + [A \times I] + [A \times I] \}$
 $A = 9,000 \text{ SF}$ (Allowable building area per story in accordance with Table 503.)
 $I = 300\%$ (Area increase factor due to sprinkler protection as calculated in accordance with Section 506.3.)
 $A = \{ 9,000 + [9,000 \times 0] + [9,000 \times 300\%] \}$
 $A = 36,000 \text{ SF}$ (Total with sprinkler increase.)

MEANS OF EGRESS

	REQUIRED	PROVIDED
MINIMUM CORRIDOR WIDTH <small>(TABLE 1018.2 IBC 2012)</small>	44"	future
# OF REQUIRED EXITS <small>(SECTION 1021 IBC 2012)</small>	2	8
EGRESS SIZING <small>(SECTION 1005.3 IBC 2012)</small>	.2"/OCCUPANT 12"	272"
MAXIMUM TRAVEL DISTANCE <small>(TABLE 1016.2 IBC 2012)</small>	250'	166'
EXTERIOR EMERGENCY LIGHTING <small>(SECTION 1006 IBC 2012)</small>	YES	refer to sheet ME-1
EXIT SIGNS <small>(SECTION 1011 IBC 2012)</small>	YES	refer to sheet ME-1
PANIC HARDWARE ON EXIT DOORS <small>(SECTION 1008 IBC 2012)</small>	NO	NO

FIRE PROTECTION SYSTEM

PORTABLE FIRE EXTINGUISHERS	YES	YES
AUTOMATIC FIRE SPRINKLER SYSTEM: SYSTEM PROVIDED: NFPA 13	YES	YES

FIRE RESISTANCE RATING REQUIREMENTS

Structural Frame	0	
Exterior - Bearing Walls	0	
Exterior - Non-Bearing Walls	0	
Interior - Non-Bearing Walls & Partitions	0	
Floor Construction	0	
Roof Construction	0	

BUILDING DESIGN LOADS

Roof Live Load	20 psf
Dead Load	Actual Wt. of Materials
Collateral Load	7 psf
Wind Load	Per ASCE-7, Category C Exposure
Seismic Load	Per ASCE-7

Architect:

TIM COOPER ARCHITECT
234 Main S. Main St.
PO BOX 16888
JONESBORO, AR 72403
CONTACT: TIM COOPER
EMAIL: TWCARCH@MAC.COM
PHONE: (479) 236-6629

Architect's Certification Statement:

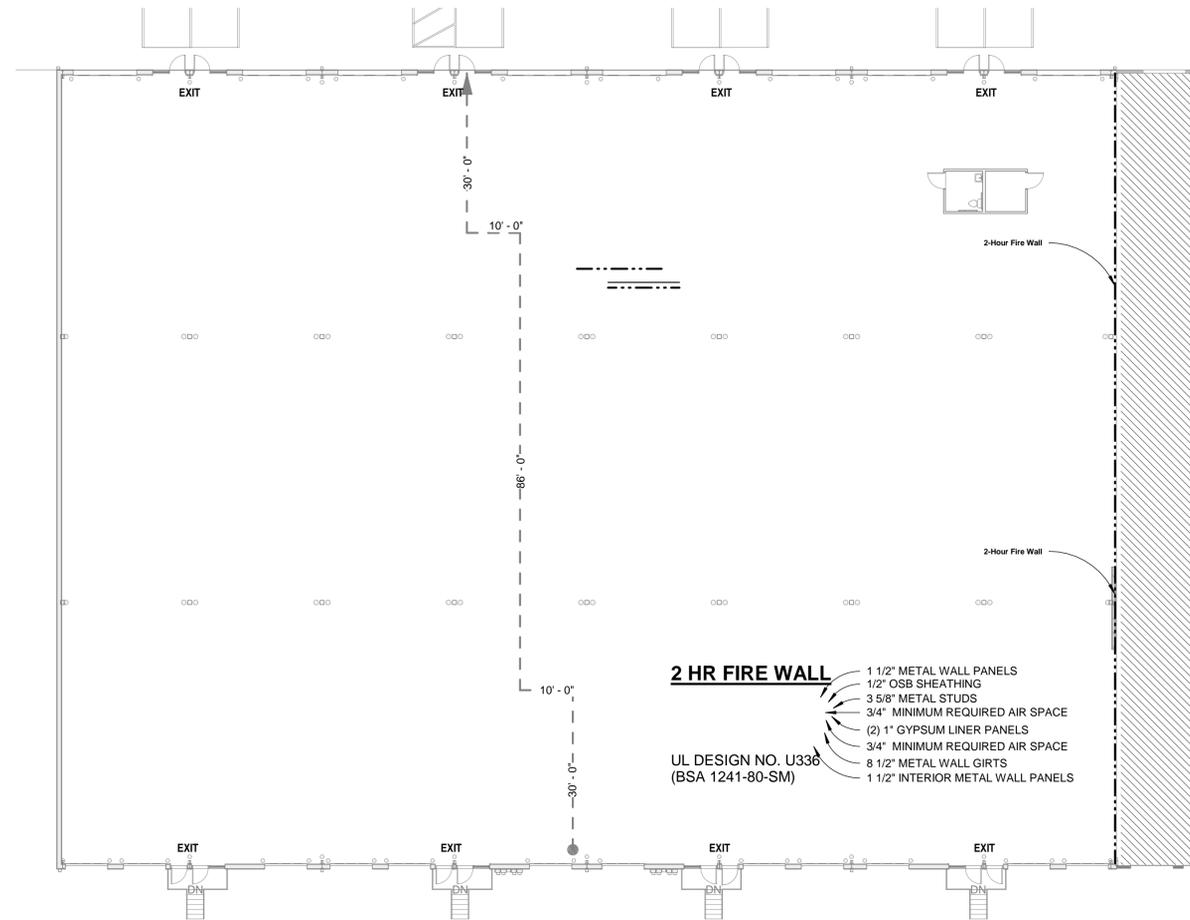
I, TIM W. COOPER, DO HEREBY CERTIFY THAT THESE PLANS AND SPECIFICATIONS HAVE BEEN PREPARED BY ME OR UNDER MY SUPERVISION. I FURTHER CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THESE PLANS AND SPECIFICATIONS ARE AS REQUIRED BY LAW AND IN COMPLIANCE WITH THE ARKANSAS FIRE PREVENTION CODE FOR THE STATE OF ARKANSAS.

TIM W. COOPER, ARCHITECT
Licence No. 3249
Date 4-7-17
2/28/2016

- 170
336
- EGRESS OCCUPANCY OF DOORS OR STAIRS
- MAXIMUM ALLOWABLE EGRESS OCCUPANCY OF DOORS AND STAIRS
- ROOM AREA IN SQUARE FEET
- $\frac{50}{100} = 1P$
- ROOM OCCUPANT LOAD
- OCCUPANCY LOAD
- ONE HOUR FIRE RATED PARTITION
- TWO HOUR FIRE RATED PARTITION
- DIRECTION OF TRAVEL WITH ACCUMULATED OCCUPANT LOAD
- PROPOSED INTERIOR LOT LINE

Code Legend

1/4" = 1'-0"

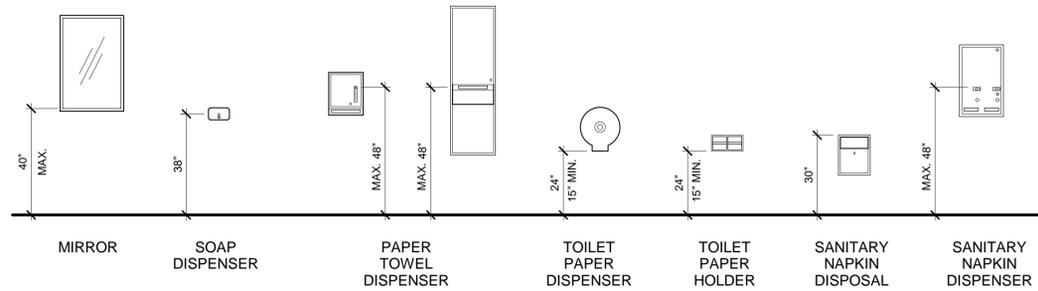


1 Life Safety Plan

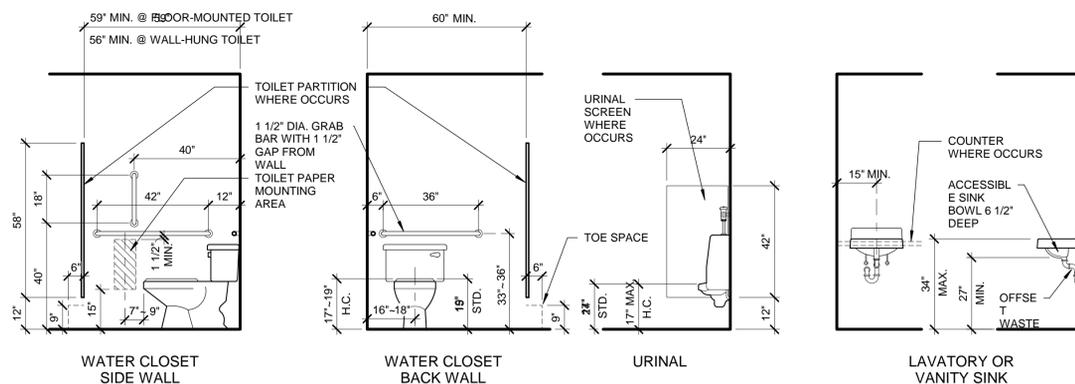
1/16" = 1'-0"

NOTE:

Engineered sprinkler drawings will be submitted to the Fire Marshall for review prior to any work on the fire protection system.



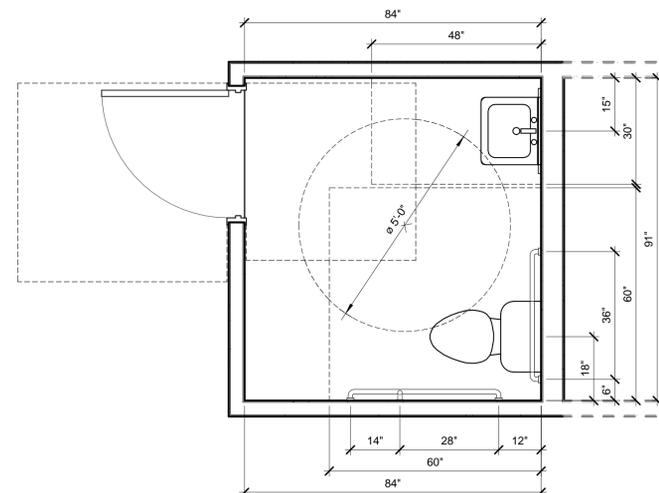
TYPICAL TOILET ACCESSORIES MOUNTING HEIGHTS



TYPICAL PLUMBING FIXTURES AND ACCESSORIES MOUNTING HEIGHTS

2 Typical Toilet Plan

1/2" = 1'-0"



PROJECT NUMBER

16-18

DATE

4/7/2017
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CONTENTS

Life Safety Plan /
Code Information

SHEET NUMBER

A1.0

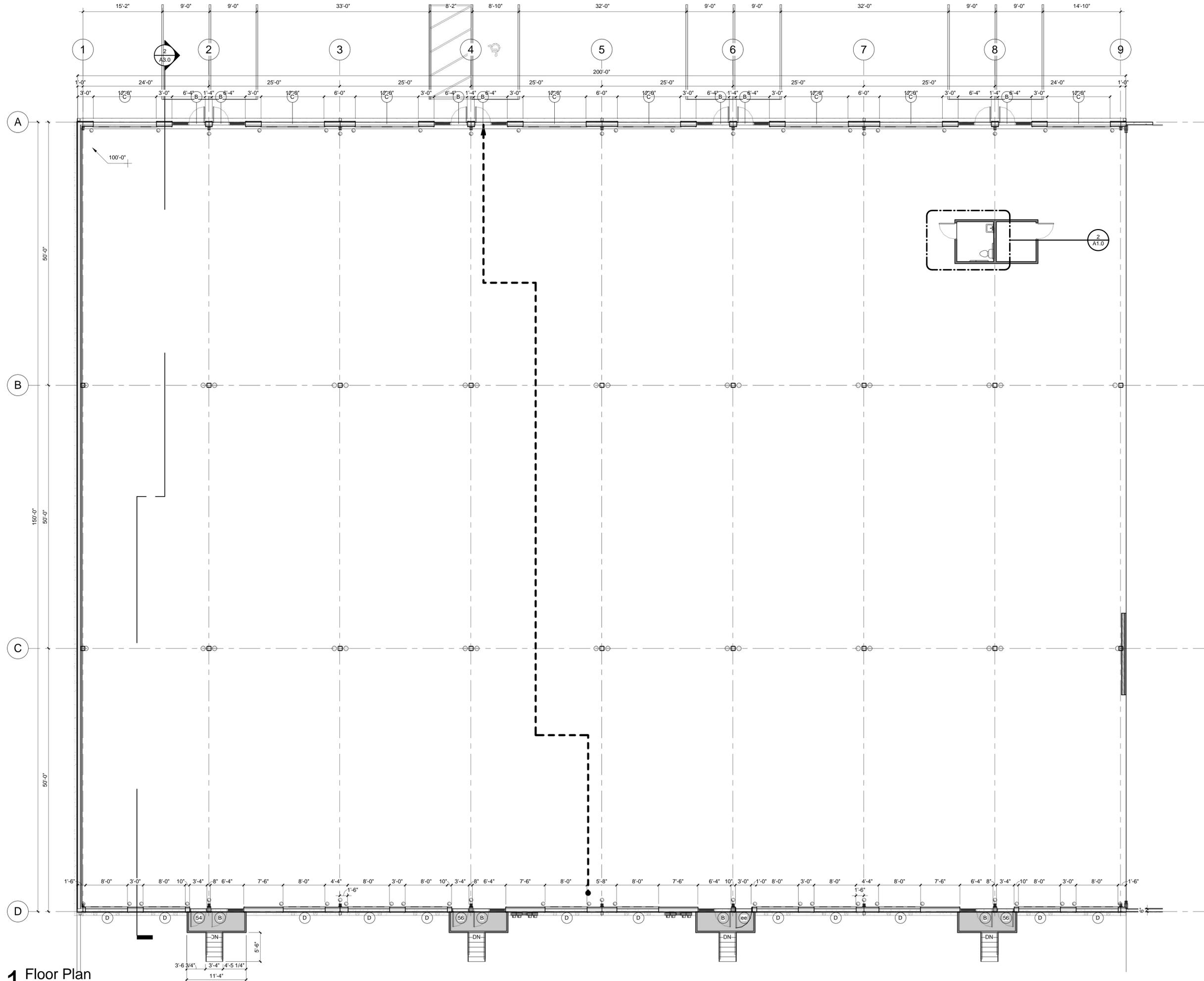
Tim W Cooper Architect

P.O. Box 16888 Jonesboro, AR 72403

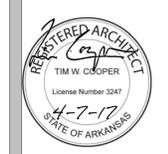
Email: twcarch@mac.com Phone: 479.236.6629

Willow Creek - Phase 7
4500 Access Rd Jonesboro, AR 72401

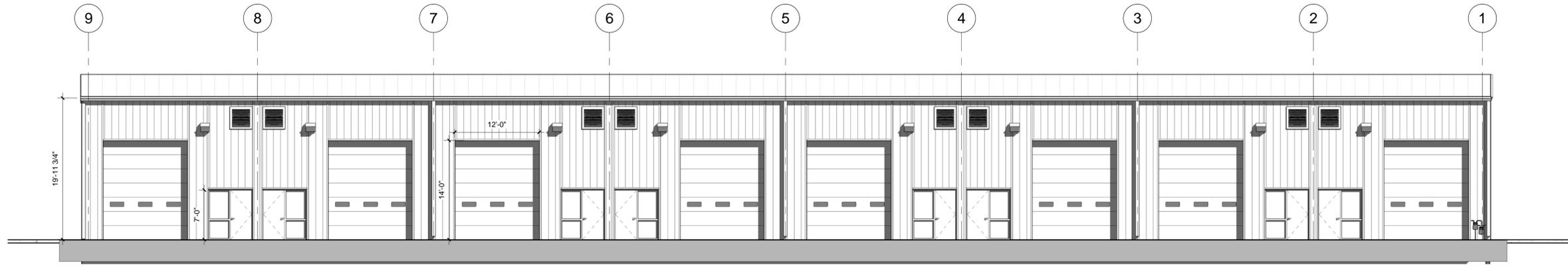
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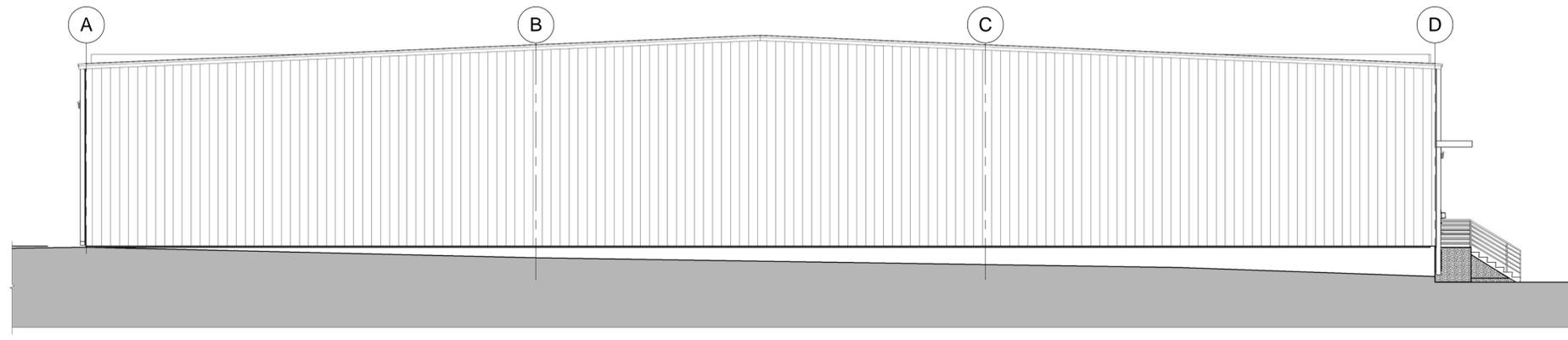
1 Floor Plan
1/8" = 1'-0"



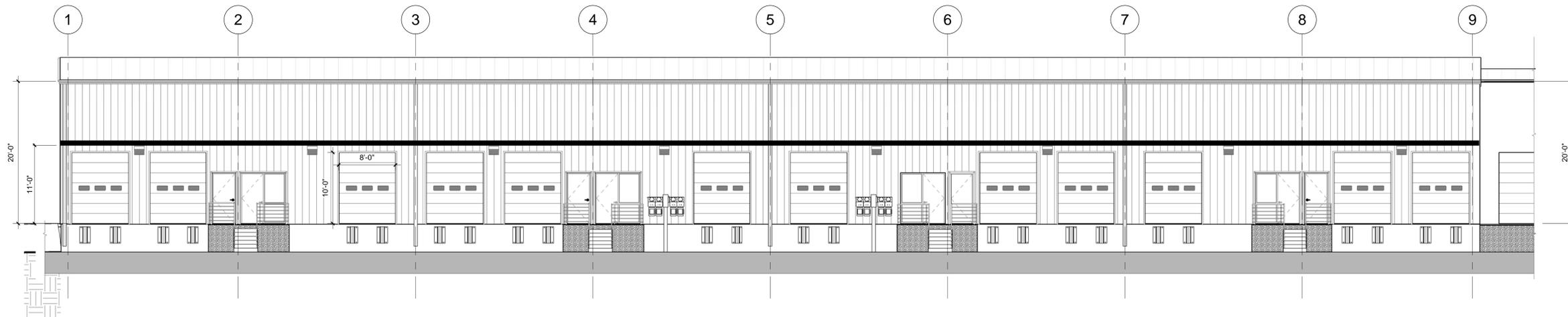
PROJECT NUMBER	16-18
DATE	4/7/2017 2:14:19 PM
CONTENTS	Floor Plan
SHEET NUMBER	A1.1



1 A - EL - East
1/8" = 1'-0"



2 A - EL - North
1/8" = 1'-0"



4 A - EL - West
1/8" = 1'-0"



PROJECT NUMBER

16-18

DATE

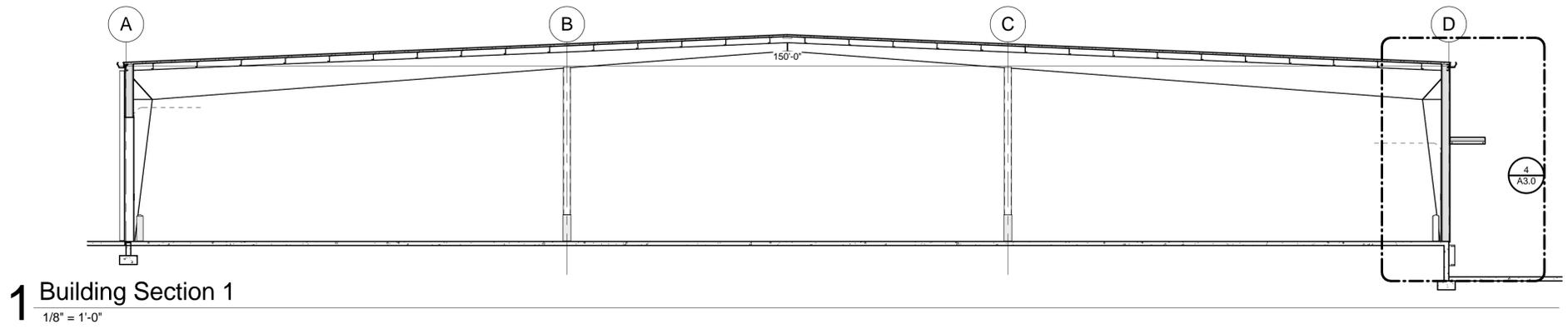
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CONTENTS

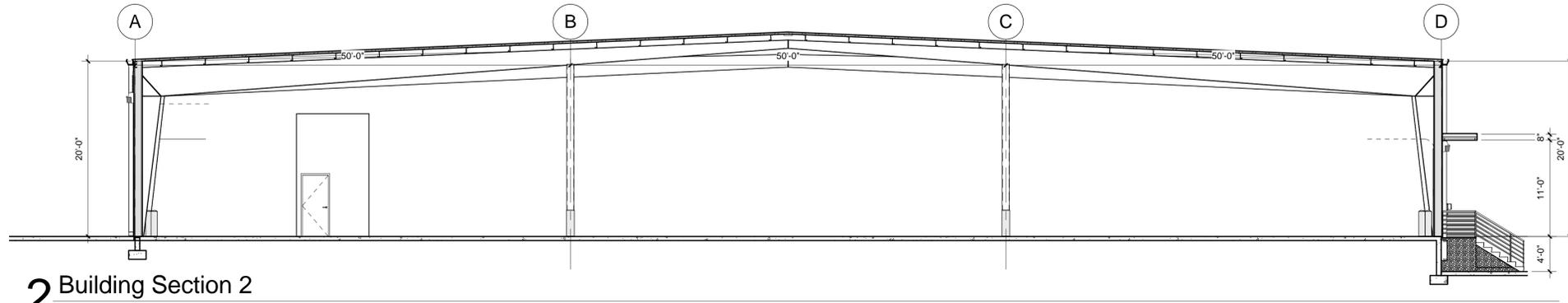
Elevations

SHEET NUMBER

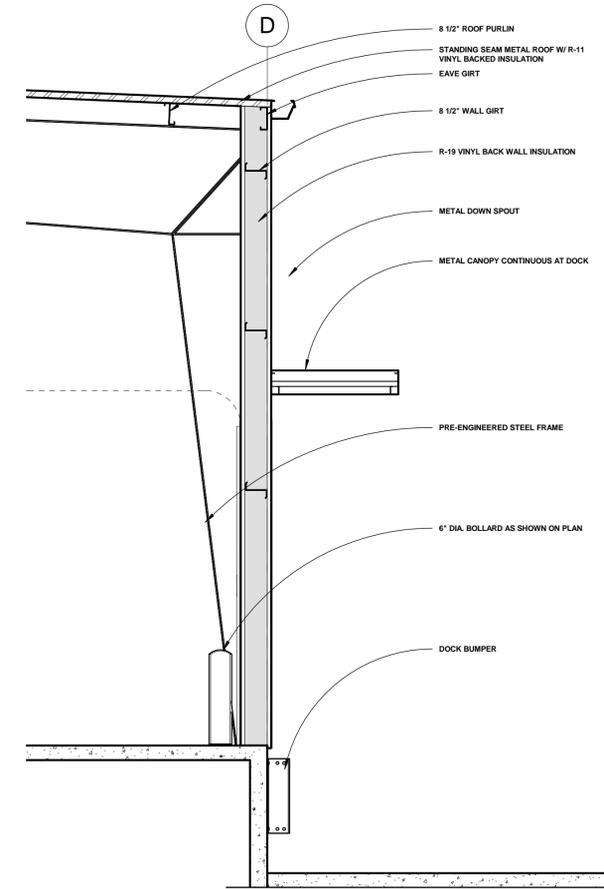
A2.0



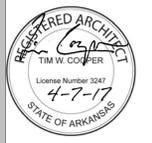
1 Building Section 1
1/8" = 1'-0"



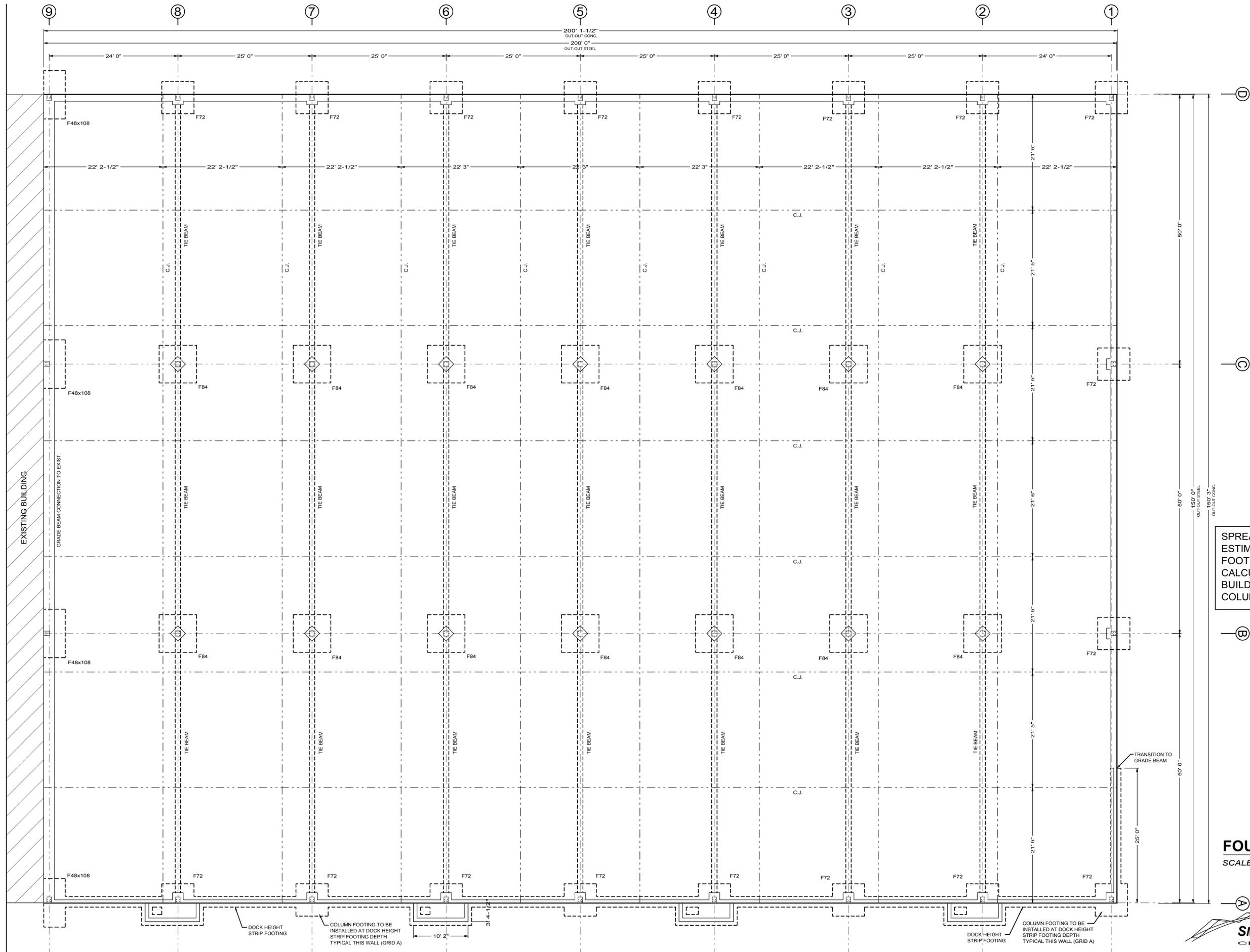
2 Building Section 2
1/8" = 1'-0"



4 Wall Section @ Dock
3/8" = 1'-0"



PROJECT NUMBER	16-18
DATE	4/7/2017 2:14:40 PM
CONTENTS	Building Sections/ Wall Sections
SHEET NUMBER	A3.0



SPREAD FOOTING SIZES FOR ESTIMATING ONLY. FINAL FOOTING SIZES SHALL BE CALCULATED BASED ON METAL BUILDING MANUFACTURER'S COLUMN REACTIONS.



FOUNDATION PLAN
SCALE 1/8"=1'



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TWARCH@MAC.COM 479.236.6629

Willow Creek - Phase 7
4502 Access Rd Jonesboro, AR 72401

PROJECT NUMBER	16-18
DATE	11/26/16
CONTENTS	FOUNDATION
SHEET NUMBER	S1.1

SMITH ENGINEERING CO.
CIVIL & STRUCTURAL
P.O. BOX 299 * MARION, AR 72364 * (870) 739-5533

CONCRETE NOTES:

GENERAL:

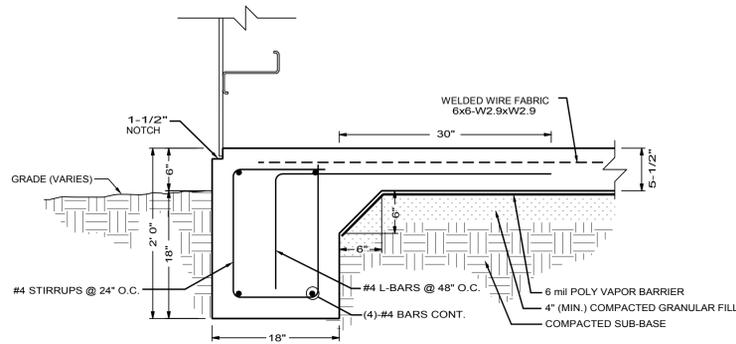
- All concrete shall have a minimum 28 day compressive strength, (f'), of 3,000 psi for foundations and 4,000 psi for slabs.
- All concrete work shall conform to the latest ACI specifications.
- Coarse aggregate for concrete shall not contain lignite, steel, or other materials that may be detrimental to the concrete.
- Fly ash in concrete mix shall not be permitted.
- Horizontal construction joints shall be permitted only where shown on the structural drawings. Horizontal or near horizontal joints shall be prepared by roughening the surface in an approved manner so that the aggregate is exposed uniformly, leaving no laitance, loosened particles, or damaged concrete.
- Contractor shall verify dimensions and locations of all openings, pipe sleeves, curbs, etc., as required by other trades before concrete is placed.
- Pipes or conduit placed in foundation and slabs shall not be placed closer than 3 diameters on center. Aluminum conduits shall not be placed in concrete.
- All footings shall bear on firm, undisturbed soil or an approved select fill material compacted to at least 95% of optimum density as determined by the Standard Compaction Test, ASTM D-698.
- The design bearing capacity, q = 1,500 psf.
- Location of slotted inserts, weld plates and all other items to be embedded in concrete shall be coordinated with architectural and mechanical drawings.

REINFORCEMENT:

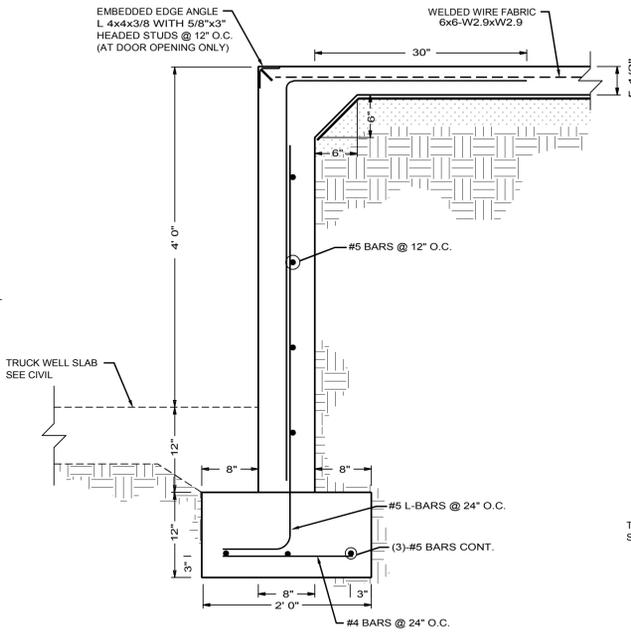
- All reinforcing steel shall conform to ASTM-615, Grade 60, f = 60 ksi.
- Minimum cover on all reinforcing steel shall be 3".
- All reinforcing bars splices shall be lap splices with a minimum overlap of 30".
- All reinforcing steel shall be fabricated and placed per the latest edition of the ACI Building Code (ACI-318).
- All reinforcement shall be securely held in place while placing concrete. If required, additional bars or stirrups shall be provided by the contractor to support all bars.
- Reinforcing bars shall not be welded, unless specifically noted on the drawing, as being welded, welded reinforcement shall conform to ASTM A-706.
- Provide corner bars in all walls and at wall intersections to match size and spacing of horizontal bars in those walls.

WELDED WIRE FABRIC:

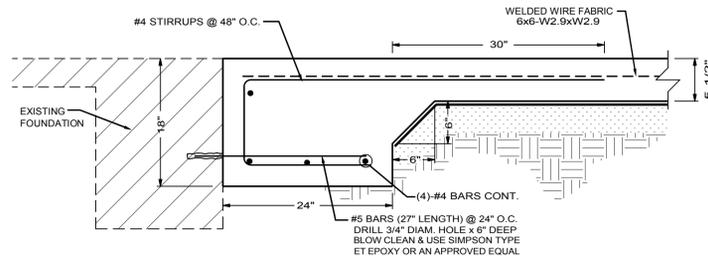
- All welded wire fabric shall conform to the latest edition of ASTM-185, Specifications for Welded Wire Fabric for Concrete Reinforcement.
- All laps in welded wire fabric shall be one mesh plus 2 inches at splice.
- Welded wire fabric shall be provided in flat sheets. Roll wire shall not be permitted.
- Welded wire fabric shall be properly supported by plastic chairs or any approved method during concrete placement to ensure that the welded wire fabric is properly located within the finished slab.



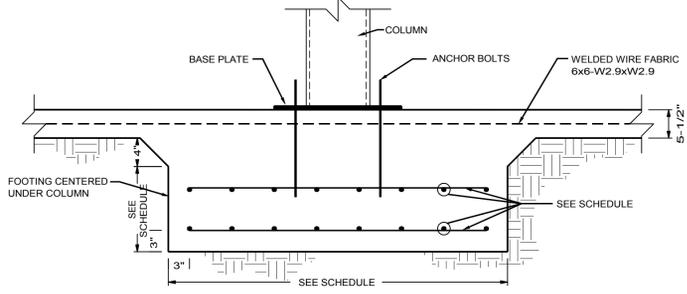
1 GRADE BEAM SECTION
SCALE 1"=1'



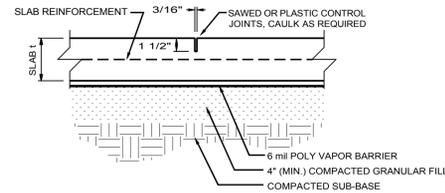
2 DOCK HEIGHT STRIP FOOTING
SCALE 1"=1'



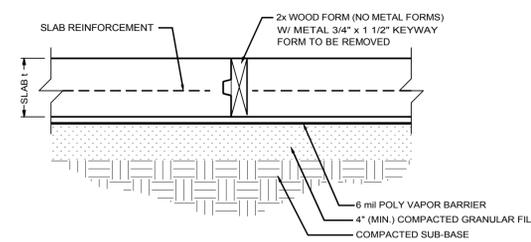
4 GRADE BEAM & CONNECTION TO EXISTING (W24)
SCALE 1"=1'



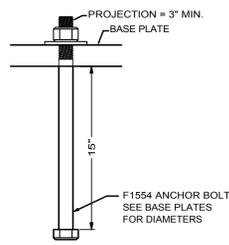
7 SPREAD FOOTING @ INTERIOR COLUMN
SCALE 1"=1'



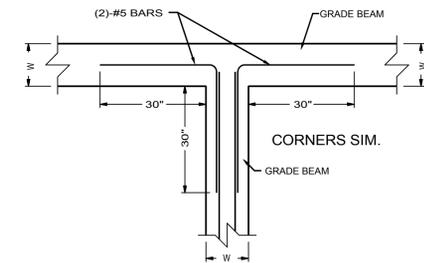
5 SLAB CONTROL JOINT DETAIL



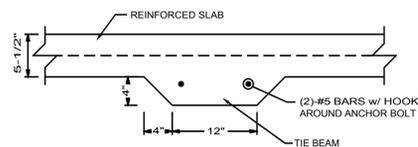
6 SLAB CONSTRUCTION JOINT DETAIL



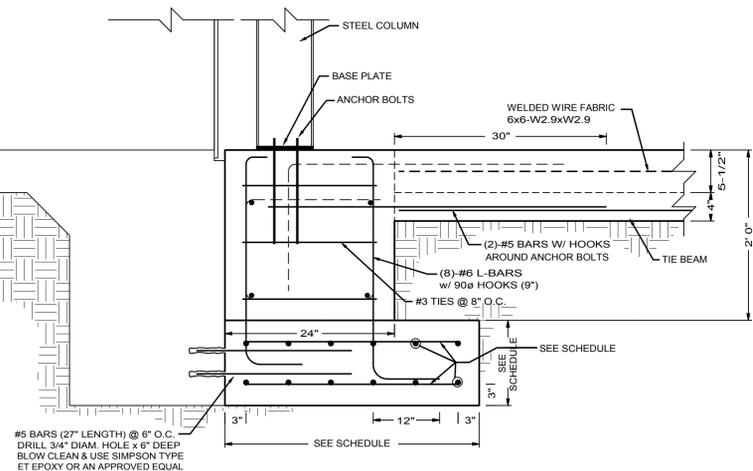
9 TYPICAL ANCHOR BOLT
N.T.S.



8 REINFORCEMENT INTERSECTION
SCALE 1/2"=1'

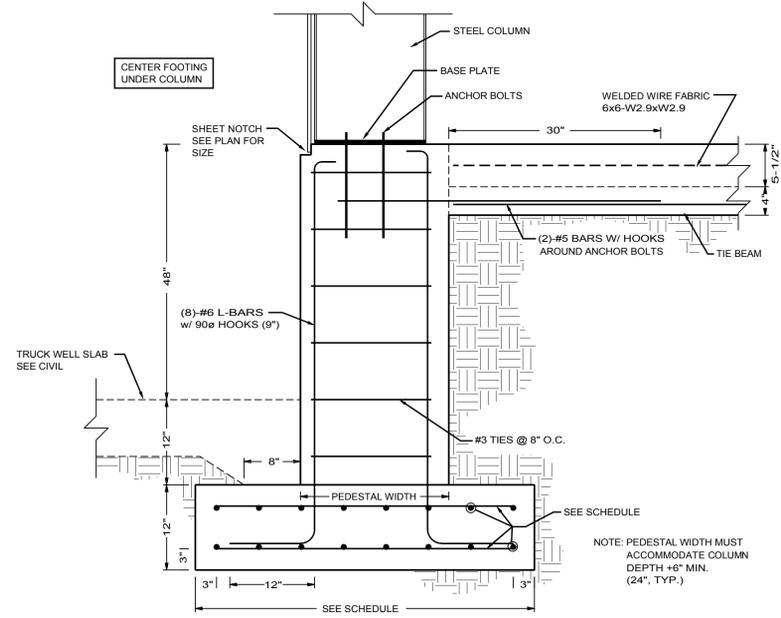


10 TIE BEAM SECTION

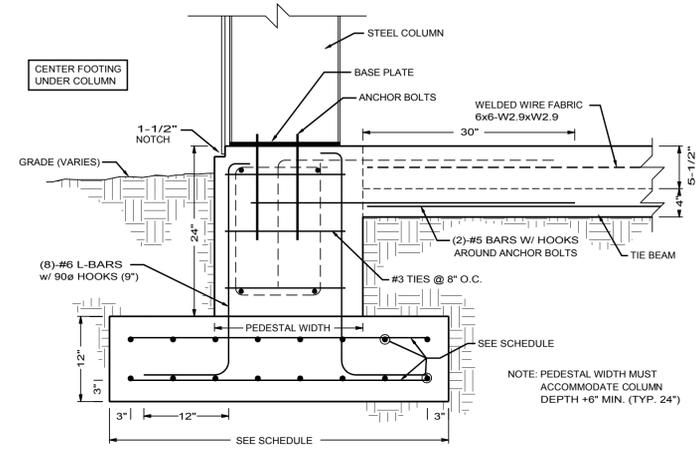


11 SPREAD FOOTING SECTION AT EXISTING BUILDING
SCALE 1"=1'

SPREAD FOOTING SCHEDULE		
FOOTING	DIMENSIONS	REINFORCEMENT DETAILS
F72	6'x6'x12"	(12) - #4 BARS @ 6" O.C. EACH WAY PER MAT
F84	7'x7'x12"	(14) - #4 BARS @ 6" O.C. EACH WAY PER MAT
F48x108	4'x9'x12"	(8)x(18) - #4 BARS @ 6" O.C. EACH WAY PER MAT



3 DOCK HEIGHT SPREAD FOOTING SECTION
SCALE 1"=1'



12 SPREAD FOOTING SECTION
SCALE 1"=1'



11/26/16

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PROJECT NUMBER
16-18

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CONTENTS
FOUNDATION DETAILS

SHEET NUMBER

S1.2

PIPE LABELS

CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER (110°F)
HWR	DOMESTIC HOT WATER RETURN
	SOIL PIPE
	VENT PIPE
180	180° DOMESTIC HOT WATER
HWS	HOT WATER HEATING SUPPLY
HWR	HOT WATER HEATING RETURN
HTWS	HIGH TEMPERATURE WATER SUPPLY
HTWR	HIGH TEMPERATURE WATER RETURN
HPWS	HEAT PUMP WATER SUPPLY
HPWR	HEAT PUMP WATER RETURN
C	CONDENSER WATER SUPPLY
CR	CONDENSER WATER RETURN
CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
A	COMPRESSED AIR
VAC	VACUUM
CD	CONDENSATE DRAIN
D	DRAIN
RL	RAIN LEADER
OSD	OVERFLOW STORM DRAIN
G	NATURAL GAS
LPG	LIQUEFIED PETROLEUM GAS
MPG	MEDIUM PRESSURE GAS
HPG	HIGH PRESSURE GAS
HA	HALON GAS
O	OXYGEN
FOF	FUEL OIL FILL
FOG	FUEL OIL GAUGE
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOV	FUEL OIL VENT
ACID	ACID WASTE
AV	ACID VENT
HPS	HIGH PRESSURE STEAM
MPS	MEDIUM PRESSURE STEAM
LPS	LOW PRESSURE STEAM
HPC	HIGH PRESSURE CONDENSATE
MPC	MEDIUM PRESSURE CONDENSATE
LPC	LOW PRESSURE CONDENSATE
PC	PUMPED CONDENSATE
CR	GRAVITY CONDENSATE RETURN
BBD	BOILER BLOW DOWN

ABBREVIATIONS

AD	ACCESS DOOR
VTR	VENT THROUGH ROOF
W	WASTE
V	VENT
CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER
FD	FLOOR DRAIN
DN	DOWN
AFF	ABOVE FINISHED FLOOR
FCU	FAN COIL UNIT
AHU	AIR HANDLING UNIT
UV	UNIT VENTILATOR
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
UH	UNIT HEATER
EF	EXHAUST FAN
BBH	BASEBOARD HEATER
VAV	VARIABLE AIR VOLUME

VALVES & FITTINGS

	GATE VALVE
	GLOBE VALVE
	BALL VALVE
	BUTTERFLY VALVE
	ANGLE GATE VALVE
	ANGLE GLOBE VALVE
TYPES OF ACTUATORS FOR ABOVE VALVES	
	NONRISING STEM
	OUTSIDE STEM & YOKE
	LEVER
	GEAR
	ELECTRIC MOTOR
	SOLENOID
	PNEUMATIC
	DIAPHRAGM
	STANDARD AUTOMATIC
	PRESSURE RELIEF VALVE
	SWING CHECK VALVE
	SPRING CHECK VALVE
	TRIPLE DUTY VALVE W/ PRESSURE PORTS
	GAS COCK
	BALANCING VALVE W/ PRESSURE PORTS
	Y TYPE STRAINER
	BASKET STRAINER
	DUPLEX BASKET STRAINER
	BLOW DOWN STRAINER
	BLOW DOWN STRAINER W/ VALVE
	BUCKET STEAM TRAP
	THERMOSTATIC STEAM TRAP
	FLOAT STEAM TRAP
	AIR SEPARATOR
	SHOCK ABSORBER
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	SLIDING EXPANSION JOINT
	BELLOWS EXPANSION JOINT
	SCREWED UNION
	FLANGED UNION
	PIPE ANCHOR
	PIPE GUIDE
	PRESSURE REDUCING VALVE
	POST INDICATOR VALVE
	CURB VALVE
	FIRE HOSE VALVE
	HEAT TRACE
	VACUUM BREAKER
	BACKFLOW PREVENTER
	LOW PRESSURE DRIP
	MEDIUM PRESSURE DRIP
	HIGH PRESSURE DRIP
	BALL DRIP
	PIPE UP
	PIPE DOWN
	TEE UP
	TEE DOWN
	PIPE UP - TEE INTERSECTION
	PIPE DOWN - TEE INTERSECTION
	TEE
	ELBOW
	PIPE CAP
	TAKE-OFF VERTICAL PIPE
	SQUARE/ROUND ROOF DRAIN
	SQUARE/ROUND FLOOR DRAIN
	SQUARE/ROUND AREA DRAIN

FIRE PROTECTION

	DRY PIPE VALVE
	PRE-ACTION VALVE
	ALARM CHECK VALVE
	UPRIGHT SPRINKLER HEAD
	PENDANT SPRINKLER HEAD
	SIDEWALL SPRINKLER HEAD
	NEW FIRE HYDRANT
	EXISTING FIRE HYDRANT
	SIAMESE CONNECTION
	ROOF MANIFOLD
	HOSE RACK
	FIRE HOSE CABINET
	FIRE VALVE CABINET
	CABINET FIRE EXTINGUISHER
	WALL MOUNT FIRE EXTINGUISHER
	FIRE ALARM STATION
	FIRE ALARM AUDIO/STROBE
	FIRE ALARM STROBE
	AUDIBLE ALARM
	FIRE ALARM CONTROL CABINET
	FIRE ALARM ANNUNCIATOR PANEL
	CEILING SMOKE DETECTOR - CENTRAL SYSTEM
	THERMAL (HEAT) DETECTOR
	CEILING SMOKE DETECTOR - INDEPENDENT OPERATION
	CEILING SMOKE DETECTOR - ELEVATOR CAPTURE
	CEILING SPEAKER
	CALL STATION
	FIREMAN'S TELEPHONE JACK
	TAMPERS SWITCH
	FLOW SWITCH
	BEAM DETECTOR

CONTROL SYSTEMS

	TEMPERATURE SENSOR (THERMOSTAT)
	THERMOSTAT & FAN SPEED SWITCH
	HUMIDISTAT
	STATIC PRESSURE SENSOR
	DIFFERENTIAL PRESSURE SENSOR
	PRESSURE GAUGE
	THERMOMETER
	TEST PLUG (PETE'S PLUG)
	FLOW SWITCH
	PRESSURE SWITCH
	VENTURI FLOWMETER
	ORIFICE FLOWMETER

ELECTRICAL

	CONDUIT ABOVE GRADE
	CONDUIT BELOW GRADE
	CIRCUIT NUMBER(S)
	ARROWS INDICATE NUMBER OF CIRCUIT HOMERUNS
	DESIGNATES PANELBOARD
	GROUND
	NEUTRAL
	HOT OR SWITCH LEG
	20 AMP DUPLEX, 125V, 2P, 3W, GROUNDING TYPE: STAINLESS STEEL COVERPLATE, WHITE PLUG.
	SPECIAL RECEPTACLE, SEE PANEL NOTES.
	20 AMP FOURPLEX, 125V, 2P, 3W, GROUNDING TYPE: STAINLESS STEEL COVERPLATE, WHITE PLUG.
	QUADPLEX RECEPTACLE
	RECESS MOUNTED FLOOR BOX W/ 20 AMP DUPLEX RECEPTACLE.
	20 AMP DUPLEX, GROUND FAULT INTERRUPTOR
	20 AMP DUPLEX, ISOLATED GROUND
	EQUIPMENT SPECIFIC RECEPTACLE - REFER TO MANUFACTURER FOR ADDITIONAL INFORMATION AND EXACT REQUIREMENTS.
	TELEVISION 120V/20A DUPLEX OUTLET AND CABLE CONNECTION PORT - VERIFY FINAL LOCATION PER THE ARCHITECTURAL DRAWINGS. OUTLETS AND PORTS SHALL BE LOCATED TO MINIMIZE VISUAL IMPACT OF CORDS.
	DISCONNECT SWITCH
	COMBINATION MAGNETIC MOTOR CONTROLLER
	MAGNETIC MOTOR CONTROLLER
	LIGHTING CONTACTOR
	WALL TELEPHONE OUTLET
	FLOOR MOUNTED TELEPHONE OUTLET
	INTERCOM OUTLET
	COMPUTER TERMINAL OUTLET
	PLUGMOLD
	20 AMP SINGLE POLE 120V/277V SWITCH
	20 AMP THREE-WAY 120V/277V SWITCH
	20 AMP FOUR-WAY 120V/277V SWITCH
	120V DIMMER SWITCH
	GROUND FAULT INTERRUPT SWITCH
	120V SWITCH WITH INTEGRAL OCCUPANCY SENSOR
	WATERPROOF SWITCH
	PILOT LIGHTED SWITCH
	PILOT LIGHTED 3-WAY SWITCH
	PILOT LIGHTED TIMER SWITCH
	JUNCTION BOX
	SURFACE MOUNT DOWNLIGHT
	RECESSED DOWNLIGHT
	WALL MOUNTED FIXTURE
	CEILING MOUNT EXIT LIGHT
	WALL MOUNT EXIT LIGHT
	FLOURESCENT LIGHT FIXTURE
	EMERGENCY FLOURESCENT FIXTURE
	TRACK LIGHTING
	LIGHTING PANELBOARD
	DISTRIBUTION FEEDER OR POWER PANELBOARD

HVAC DUCTWORK

	BRANCH DUCT W/ EXTRACTOR & MANUAL VOLUME DAMPER
	BRANCH DUCT W/ SPIN-IN W/ SCOOP AND VOLUME DAMPER
	ELBOW W/ TURNING VANES
	EQUIPMENT W/ FLEXIBLE DUCT CONNECTION
	SUPPLY AIR DIFFUSER
	RETURN AIR DIFFUSER
	DIFFUSER TAG - GIVES NECK SIZE, MARK, & CFM
	LINEAR SLOT DIFFUSER W/ FLEX DUCT
	ROUND DIFFUSER
	SIDEWALL SUPPLY/RETURN GRILLE OR REGISTER
	SUPPLY AIR DUCT UP
	SUPPLY AIR DUCT DOWN
	RETURN, EXHAUST, OR FRESH AIR DUCT UP
	RETURN, EXHAUST, OR FRESH AIR DUCT DOWN
	RECTANGULAR TO ROUND TRANSITION
	INSULATED FLEXIBLE DUCT
	DOOR UNDERCUT
	DOOR LOUVER
	VOLUME DAMPER
	FIRE DAMPER
	SMOKE DAMPER
	MOTORIZED DAMPER
	DUCT SIZE, FIRST DIMENSION IS THE DIMENSION WHICH YOU CAN SEE

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16-18

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11/28/2016

CONTENTS

MEP
SYMBOLS
AND
ABBREVIATIONS

SHEET NUMBER

MEP-1



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GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. PROVIDE MECHANICAL AND PLUMBING SYSTEMS INCLUDING, BUT NOT LIMITED TO:
 - 1. PLUMBING EQUIPMENT, PIPING AND DRAINAGE SYSTEMS INCLUDING DISTRIBUTION WATER SYSTEMS, PLUMBING EQUIPMENT, WASTEWATER PUMPS AND ACCESSORIES.
 - 2. INSTALLATION OF PIPING SYSTEMS AND EQUIPMENT.
 - 3. SYSTEM COMMISSIONING, TESTING, ADJUSTING, BALANCING, AND DOCUMENTATION.
 - 4. PROPER LABELING FOR ALL SYSTEMS, PIPING, AND OTHER COMPONENTS.
 - B. PAINTING RELATED TO THIS SECTION, INCLUDING REPAIR OF DAMAGED FINISHES AND TOUCH-UP OF INSTALLED EQUIPMENT FINISHES.
 - 6. SITE CLEAN-UP AND LEGAL DISPOSAL OF ALL CONSTRUCTION DEBRIS, ALL EXCESS EQUIPMENT, MATERIALS, OR OTHER ITEMS SHALL BE REMOVED FROM THE SITE.
 - 7. COORDINATION WITH THE OWNER AND THE OTHER TRADES WORKING IN THE AREA.
- 1.02 BIDD SECTIONS AND DOCUMENTS
 - B. PROJECT SPECIFICATIONS, DOCUMENTS, CONTRACTS, WRITTEN INSTRUCTIONS, BIDDING ADDENDUMS, WRITTEN PRE-BID INSTRUCTIONS AND AGREEMENTS, AND ANY OTHER ITEMS AS DOCUMENTED IN OTHER PORTIONS OF THIS DOCUMENT.
 - C. PROJECT DRAWINGS THAT RELATE TO THIS WORK AND THE FURNISHING, METHODS, INSTALLATION, PROCEDURES, LIMITATIONS, RESTRICTIONS, AND INSTRUCTIONS AS SPECIFIED IN THE SPECIFICATION DOCUMENTS AS A WHOLE.
 - D. ALL OTHER SPECIFICATIONS, WHETHER ITEMIZED ABOVE OR NOT. DRAWINGS AND WORK AS REPRESENTED ON THE DRAWINGS, INCLUDING THE MANUFACTURER'S INSTRUCTIONS AND DETAILS REQUIRED FOR THE CORRECT INSTALLATION OF THE EQUIPMENT AS SPECIFIED AND COMMON TO THE TRADES, LABOR, MATERIALS, AND METHODS FOR THE COMPLETION OF THE SPECIFIED WORK.
- 1.03 REFERENCES (LATEST EDITIONS UNLESS OTHERWISE NOTED)
 - A. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS REFERENCED HEREIN:
 - 1. B1.20.1 - PIPE THREADS, GENERAL PURPOSE.
 - 2. B16.3 - BALL BEARING FLANGED FITTINGS.
 - 3. B16.5 - PIPE FLANGES AND FLANGED FITTINGS.
 - 4. B16.11 - FORGED STEEL FITTINGS, SOCKET WELDING AND THREADED.
 - 5. B16.21 - NONMETALLIC FLAT GASKETS FOR PIPE FLANGES.
 - 6. B16.31 - MALLEABLE IRON THREADED PIPE UNIONS.
 - 7. B18.2.1 - SQUARE AND HEX BOLTS AND SCREWS, INCLUDING HEX CAP SCREWS AND LAG SCREWS.
 - 8. B18.2.2 - SQUARE AND HEX NUTS.
 - 9. B36.10 - WELDED AND SEAMLESS WROUGHT STEEL PIPE.
 - B. AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM) STANDARDS REFERENCED HEREIN:
 - 1. A53 - TYPE S PIPE, STEEL, BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS.
 - 2. A105 - FORGINGS, CARBON STEEL, FOR PIPING COMPONENTS.
 - 3. A194 - CARBON AND ALLOY STEEL NUTS FOR BOLTS FOR HIGH-PRESSURE AND HIGH TEMPERATURE SERVICE.
 - 4. A201 - CARBON AND ALLOY STEEL, FOR HIGH-PRESSURE AND HIGH TEMPERATURE SERVICE.
 - 5. A283 - LOW AND INTERMEDIATE STRENGTH CARBON STEEL PLATES, SHEETS AND BARS.
 - 6. A307 - CARBON STEEL EXTERNALLY THREADED STANDARD FASTENERS.
 - 7. A563 - CARBON AND ALLOY STEEL NUTS.
 - 8. A563 - STEEL BARS, CARBON, MERCHANT QUALITY, MECHANICAL PROPERTIES.
 - 9. C584 - RUBBER GASKETS FOR CAST IRON SOIL PIPE AND FITTINGS.
 - 10. D1784 - RIGID PVC AND CPVC COMPOUNDS.
 - 11. D1785 - PVC PLASTIC PIPE, SCHEDULE 40, 80 AND 120.
 - 12. D2665 - PVC PLASTIC DRAIN, WASTE AND VENT PIPE AND FITTINGS.
 - 13. D2664 - SOLVENT CEMENTS FOR PVC PLASTIC PIPE AND FITTINGS.
 - 14. D2665 - PVC PLASTIC DRAIN, WASTE AND VENT PIPE AND FITTINGS.
 - 15. D4101 - PROPYLENE PLASTIC INJECTION AND EXTRUSION MATERIALS.
 - C. MANUFACTURERS STANDARDS INSTITUTE (MSS) STANDARDS REFERENCED HEREIN:
 - 1. SP-58 - PIPE HANGERS AND SUPPORTS - MATERIALS, DESIGN AND MANUFACTURE.
 - 2. SP-69 - PIPE HANGERS AND SUPPORTS - SELECTION AND APPLICATION.
 - 3. SP-83 - CARBON STEEL PIPE UNIONS, SOCKET WELDING AND THREADED.
 - 4. SP-89 - PIPE HANGERS AND SUPPORTS - FABRICATION AND INSTALLATION PRACTICES.
 - D. MISCELLANEOUS STANDARDS REFERENCED HEREIN:
 - 1. ASSE 1011 - HOSE CONNECTION VACUUM BREAKERS.
 - 2. PFI E53 - FABRICATING TOLERANCES.
 - E. BUILDING OFFICIALS AND CODE ADMINISTRATORS (BOCA) STANDARDS REFERENCED HEREIN:
 - 1. NMC - NATIONAL MECHANICAL CODE.
 - 2. NPC - NATIONAL PLUMBING CODE.
 - F. INTERNATIONAL BUILDING CODES REFERENCED HEREIN:
 - 1. IMC - INTERNATIONAL MECHANICAL CODE.
 - 2. IPC - INTERNATIONAL PLUMBING CODE.
- 1.04 SUBMITTALS FOR REVIEW
 - A. PRIOR TO ORDERING EQUIPMENT OR STARTING ANY INSTALLATION WORK, SUBMIT SEVEN (7) COPIES OF ITEMS PROPOSED FOR THIS WORK WITH NECESSARY ILLUSTRATIONS, DRAWINGS, AND ENGINEERING DATA FOR REVIEW BY THE OWNER AND/OR ENGINEER. SUBMIT IN TIME TO ALLOW NO LESS THAN SEVEN (7) WORKING DAYS FOR REVIEW, CHECKING, COMMENTING AND TRANSMITTAL WITHOUT DELAYING THE CONSTRUCTION SCHEDULE. SUBMIT ALL ITEMS AT ONE TIME NO LESS THAN TWENTY (20) DAYS AFTER AWARD OF THE CONTRACT.
 - B. SUBMITTALS SHALL BE CLEARLY MARKED TO SHOW THE INTENDED ITEM, WITH IDENTIFICATION AS TO THE EQUIPMENT NUMBER OR OTHER MARKING TO SHOW LOCATION, SERVICE, AND FUNCTION. ALL OTHER EXTRANEOUS AND INAPPLICABLE INFORMATION SHALL BE MARKED OUT BEFORE SUBMITTAL. SUBMITTALS NOT CLEARLY MARKED TO PROPERLY IDENTIFY THE EQUIPMENT AND APPLICATION WILL BE REJECTED AND RETURNED FOR IMMEDIATE RE-SUBMITTAL BY THE CONTRACTOR.
 - C. THE CONTRACTOR AGREES THAT SUBMITTALS REVIEWED AND APPROVED BY THE OWNER AND/OR ENGINEER ARE NOT CHANGE ORDERS; THE PURPOSE OF SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE OWNER AND/OR ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE PROJECT DESIGN, AND THAT THIS UNDERSTANDING IS DEMONSTRATED BY INDICATING THE EQUIPMENT AND MATERIALS HE OR SHE INTENDS TO FURNISH AND INSTALL AND/OR BY THE FABRICATION AND INSTALLATION METHODS HE OR SHE INTENDS TO USE.
 - D. THE CONTRACTOR FURTHER AGREES THAT IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SUBMITTALS AND CONTRACT DOCUMENTS ARE DISCOVERED, EITHER PRIOR TO OR AFTER, SUBMITTALS ARE TO BE PROCESSED BY THE OWNER AND THE CONTRACT DOCUMENTS SHALL CONTROL AND SHALL BE FOLLOWED. SUBMITTALS ARE REQUIRED OF ALL EQUIPMENT AND MATERIALS FURNISHED ON THE PROJECT AND SHALL INCLUDE AND BE CLEARLY MARKED AS FOLLOWS:
 - 1. THE NAME OF THE PROJECT.
 - 2. SUBMITTAL DATE.
 - 3. NAMES OF CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, AND MANUFACTURERS OF MATERIALS AND SUPPLIES.
 - 4. ALL PERFORMANCE DATA FOR EQUIPMENT, INCLUDING INFORMATION, WEIGHTS, PERFORMANCE, AND OTHER INFORMATION PERTAINING TO SPECIFIC EQUIPMENT.
 - 5. IF APPLICABLE, VOLTAGE, PHASE, OPERATING AND NAMEPLATE AMPERAGE OF EACH ELECTRICAL ITEM SUCH AS MOTORS, HEATERS, OR OTHER ITEMS. FOR MOTORS, PROVIDE THE MANUFACTURERS NAMEPLATE INFORMATION FOR REVIEW AND APPROVAL.
 - 6. IF APPLICABLE, ALL AUXILIARY EQUIPMENT, INCLUDING VARIOUS DETAILS TO ASSURE THE INTENT OF THE WORK WILL BE MET.
 - 7. INCLUDE MANUFACTURERS INFORMATION ON ADHESIVES, MOUNTING MATERIALS, PAINTS, JACKETING AND OTHER DESCRIPTIVE INFORMATION.
 - 8. FULL DESCRIPTION OF CAPACITIES OF EQUIPMENT, INCLUDING BUT NOT LIMITED TO THE MANUFACTURERS DRAWINGS, CUT SHEETS, DATA SHEETS, AND OTHER DESCRIPTIVE INFORMATION.
 - 9. MSDS INFORMATION FOR ALL POTENTIALLY HAZARDOUS CHEMICALS AND MATERIALS. ALSO, POST A COPY OF THE MSDS AT THE JOBSITE AS REQUIRED INDICATING THE REQUIRED PROPER HANDLING TECHNIQUES AND SAFETY PROCEDURES FOR THE MATERIALS.
 - 10. DOCUMENTATION PROVING COMPATIBILITY AND COMPLIANCE WITH THE COMING YEAR 2000 CALENDAR DATE INPUT EVENT.
 - E. USE WELDERS, FITTERS, LABORERS, TECHNICIANS, ETC. QUALIFIED FOR THE WORK TO BE DONE. WRITTEN CERTIFICATION AND DOCUMENTATION IS REQUIRED.
- 1.05 SITE CONDITIONS
 - A. THE CONTRACTOR MUST INSPECT THE WORK AREAS, DRAWINGS AND SPECIFICATIONS AND BECOME THOROUGHLY ACQUAINTED WITH THE CONDITIONS WHICH MAY BE ENCOUNTERED DURING THE INSTALLATION OF THE WORK. NO EXTRA COMPENSATION OR INVOICING WILL BE ALLOWED TO COVER THE WORK WHICH HAS NOT BEEN INCLUDED IN THE BID DUE TO FAILURE OF THE CONTRACTOR TO THOROUGHLY EXAMINE THE PREMISES.
 - B. THE CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR PROPER NOTIFICATION OF ARKANSAS ONE CALL SYSTEM, DIG RITE, AT LEAST TWO (2) WORKING DAYS PRIOR TO THE NEED TO DO ANY EXPLORATORY OR OTHER PROJECT EXCAVATION WORK AS IT PERTAINS TO THIS WORK. THE CONTRACTOR SHALL NOT EXCAVATE UNTIL THE ARKANSAS ONE CALL SYSTEM HAS PROPERLY SURVEYED THE SITE CONDITIONS AND HAS RESPONDED ACCORDINGLY. IF THE WORK PROCEEDS BEFORE THE ONE CALL SYSTEM REVIEW IS COMPLETED, THE CONTRACTOR SHALL PAY FOR THE COST TO REPAIR OR REPLACE ANY DAMAGES.
 - C. ARRANGEMENT OF SYSTEMS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC, AND INDICATES THE MINIMUM REQUIREMENTS FOR THE WORK. SITE CONDITIONS MAY DETERMINE THE ACTUAL ARRANGEMENT OF SYSTEMS. FIELD MEASUREMENTS SHALL BE TAKEN AND CONFIRMED. THE CONTRACTOR SHALL CONFIRM ACCURACY OF DIMENSIONS BEFORE FABRICATION AND SHALL BE RESPONSIBLE FOR ALL EQUIPMENT AND COMPONENT LAYOUTS. OVERHEAD WORK SHALL BE LAID OUT TO OBTAIN THE MAXIMUM HEAD ROOM.
 - D. COORDINATE THE LOCATION OF ALL MECHANICAL SYSTEMS TO AVOID INTERFERENCE WITH THE LOCATION OF OTHER SYSTEMS OR WITH TRAFFIC FLOW WITHIN THE BUILDING. CONFIRM LOCATIONS WITH THE OWNER PRIOR TO INSTALLATION.
 - E. THE CONTRACTOR IS RESPONSIBLE FOR THE DAILY INSPECTION OF THE PROJECT WORK SITE FOR THE PRESENCE OF ASBESTOS MATERIALS OR FOR MATERIALS THAT MAY BE ASBESTOS CONTAMINATED. IT IS BELIEVED THAT THERE ARE NO KNOWN ASBESTOS MATERIALS ON THE WORK SITE. THE OWNER KNOWS OF NO OTHER POTENTIALLY CONTAMINATED AREAS, PIPING SYSTEM, DUCT SYSTEM, ETC. THAT MIGHT CONTAIN SUCH MATERIALS. THE CONTRACTOR SHALL NOT ALLOW EMPLOYEES OR OWNER'S PERSONNEL TO BE EXPOSED IN ANY FASHION TO ANY UNKNOWN MATERIALS THAT MAY CONTAIN ASBESTOS MATERIALS. EXPOSURE TO MATERIALS IN QUESTION SHALL BE COMPLETELY AVOIDED IMMEDIATELY. THE CONTRACTOR SHALL CORDON OFF THE AREA WITH "SAFETY TAPE" TO IDENTIFY THE POTENTIAL RISK AND THEREFORE LIMIT EXPOSURE FOR OTHERS. THE OWNER SHALL BE CONTACTED IMMEDIATELY. THE OWNER WILL MAKE IMMEDIATE ARRANGEMENTS FOR THE INSPECTION OF MATERIALS IN QUESTION AND, IF NECESSARY, FOR REMOVAL OF SAME MATERIALS BY AN OUTSIDE CONSULTING FIRM. THE ENGINEER HAS NOT BEEN RETAINED BY THE OWNER TO INSPECT THE SITE FOR THE PRESENCE OF ASBESTOS MATERIALS AND THEREFORE HAS NO SPECIFIC KNOWLEDGE OF THE PRESENCE OF SUCH MATERIALS.
 - F. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE TEMPERATURE IN THE WORK AREAS AND OTHER ENVIRONMENTAL CONDITIONS ARE FAVORABLE DURING THE PROGRESS OF THE WORK.
- 1.06 QUALITY ASSURANCE
 - A. COMPLY WITH ALL GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR TEN (10) YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
 - B. THE CONTRACT DRAWINGS FOR THIS WORK ARE IN PART SCHEMATIC, INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE THE GENERAL LAYOUT, DESIGN AND ARRANGEMENT. THE CONTRACTOR SHALL FOLLOW THESE DRAWINGS IN THE LAYOUT OF HIS WORK AND SHALL CONSULT WITH THE DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT TO DETERMINE ALL CONDITIONS AFFECTING THE WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE EQUIPMENT INSTALLATION LAYOUTS, ORIENTATION, CLEARANCES FOR ACCESS AND MAINTENANCE, INSPECTION, TESTING, FINISHING, SAFETY, AND OTHER ITEMS FOR ANY EQUIPMENT FURNISHED.
 - C. THE CONTRACTOR SHALL BARE ALL ADDITIONAL COSTS PERTAINING TO ANY CONTRACTOR REQUESTED ALTERNATE/CHANGES AND SHALL NOT ASK FOR ADDITIONS MONIES, OR CAUSE OTHER CONTRACTORS OR TRADES TO REQUEST ADDITIONAL MONIES FROM THE OWNER AS A DIRECT OR INDIRECT RESULT OF THE USE OF THE ALTERNATE/CHANGES RESULTING FROM AN ALTERNATE ACCEPTED BY THE OWNER OR ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACCURACY OF DIMENSIONS AND LAYOUT.
 - D. A REPRESENTATIVE MAY BE APPOINTED AS THE OWNER'S PROJECT INSPECTOR AND MAY INSPECT THE WORK AS IT PROGRESSES. ANY WORK OR MATERIAL REJECTED BY THE INSPECTOR SHALL BE REMOVED AND REPLACED WITH WORK OR MATERIALS AS SPECIFIED OR AS SHOWN ON THE DRAWINGS OR AS REQUIRED BY CODES OR INDUSTRY STANDARDS AT NO ADDITIONAL COST TO THE OWNER.
 - E. SUBMIT DOCUMENTATION OF ALL WELDER CERTIFICATIONS AND WELDING PROCEDURES TO THE OWNER PRIOR TO THE START OF ANY WORK. PERFORM WELDING OF METALLIC PIPING SYSTEMS WITH QUALIFIED WELDERS AND WELDING OPERATORS. QUALIFY WELDS AND WELDING OPERATORS IN ACCORDANCE WITH THE APPLICABLE CODE.
 - F. PERFORM ALL BONDING WITH QUALIFIED BONDERS OR BONDING OPERATORS. QUALIFY BONDERS AND BONDING OPERATORS IN ACCORDANCE WITH THE APPLICABLE CODE. MAINTAIN QUALIFICATION RECORDS IN ACCORDANCE WITH THE APPLICABLE CODE. GIVE THE OWNER A COPY OF THE QUALIFICATION RECORDS. KEEP RECORDS CURRENT AT ALL TIMES.
- 1.07 REGULATORY REQUIREMENTS
 - A. SPECIAL PART OF WORK: THE CONTRACTOR SHALL STRICTLY COMPLY WITH ALL OSHA SAFETY RULES AND REGULATIONS AND USE ONLY APPROVED EQUIPMENT REQUIRED FOR THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL ALSO STRICTLY COMPLY WITH ALL SAFETY AND HEALTH REGULATIONS AND USE ONLY APPROVED METHODS OF EXCAVATION, TRENCHING, AND SHORING METHODS AS DESCRIBED IN OSHA 29 CFR SUBPART P. EXCAVATIONS. ALL EQUIPMENT USED IN THE ACTIVITIES OF THE WORK SHALL BE CURRENTLY APPROVED BY OSHA FOR THE USES SPECIFICALLY DESIGNED FOR BY THE EQUIPMENT MANUFACTURER. THE CONTRACTOR SHALL MAINTAIN AND CLOSELY SUPERVISE SAFETY PRACTICES AND CODES. PROVIDE AND USE PERSONAL RESTRAINT DEVICES. EXTREME CARE SHALL BE TAKEN TO SAFEGUARD THE SAFETY OF THE PUBLIC, THE OWNER'S EMPLOYEES, AND THE CONTRACTOR'S EMPLOYEES.
 - B. FALL PROTECTION ON THE JOB SITE MUST COMPLY WITH PROVISIONS OF OSHA STANDARDS FOUND IN 29 CFR 1926 SUBPART M, AND AS SPECIFICALLY DEFINED BY 1926.501(B), SUBSECTIONS (1) THROUGH (15).
 - C. REMOVE VERIFIABLE THE OWNER'S RECORDS AND COMMUNICATE WITH THE OWNER AND VERIFY THE DISPOSITION PLAN WITH THE OWNER. DISPOSE OF ALL MATERIAL IN A LEGAL, ACCEPTABLE, AND PROPER FASHION.
 - D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BECOMING FAMILIAR WITH LOCAL GOVERNING AUTHORITIES HAVING JURISDICTION, CODES, AND STATUTES AND, IF REQUIRED, SHALL OBTAIN THE REQUIRED PERMITS, PAY ALL RELATED FEES INCLUDING INSPECTION FEES, AND OBTAIN INSPECTIONS AS REQUIRED TO COMPLETE AND FINISH HIS WORK. THE FOLLOWING CODES SHALL BE STRICTLY ADHERED TO:
 - 1. ALL OSHA REQUIREMENTS AND GUIDELINES INCLUDING OSHA 29 CFR 1926 AND 1910.
 - 2. INTERNATIONAL STATE AND LOCAL MECHANICAL CODES.
 - 3. INTERNATIONAL STATE AND LOCAL MECHANICAL CODES.
 - 4. NFPA STANDARDS.
 - 5. LIFE SAFETY CODES AND STANDARDS.
 - 6. ADA REQUIREMENTS.

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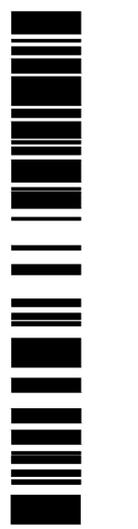
THIS SHEET IS PART OF THE CONSTRUCTION DOCUMENTS, OTHER SHEETS INCLUDING THE SPECIFICATIONS SHALL ALSO BE INCORPORATED. THIS DRAWING IS SCHEMATIC IN NATURE AND SHALL NOT BE USED AS A SHOP DRAWING. THEREFORE, ALL MODIFICATIONS REQUIRED TO CONFORM TO THE SITE CONDITIONS AND THE EQUIPMENT AND MATERIALS USED SHALL BE INCLUDED. VERIFY LOCATIONS AND DIMENSIONS OF ALL ARCHITECTURAL, CIVIL AND STRUCTURAL ELEMENTS AS SHOWN ON THEIR RESPECTIVE DOCUMENTS, THESE ELEMENTS ARE SHOWN FOR REFERENCE AND SHALL BE VERIFIED PRIOR TO CONSTRUCTION AND THE ENGINEER ASSUMES NO LIABILITY FOR THE ACCURACY OF THESE ELEMENTS. NO DESIGN RESPONSIBILITY IS ASSUMED FOR ANY PORTION OF THE WORK THAT THIS PROFESSIONAL ENGINEER HAS NOT SIGNED AND SEALED PER STATE REQUIREMENTS.



11/28/2016

THIS DRAWING HAS BEEN PREPARED BY CHARLES G. THARP, P.E. AND IS AN INSTRUMENT OF SERVICE SPECIFIC TO THIS PROJECT. CHARLES G. THARP, P.E., RETAINS OWNERSHIP AND ALL COMMON LAW, STATUTORY LAW AND OTHER RESERVED RIGHTS INCLUDING COPYRIGHTS. THE DESIGN INTENT SHALL NOT BE MODIFIED WITHOUT WRITTEN CONSENT OF CHARLES G. THARP, P.E. IF ANY MODIFICATIONS TO THIS DESIGN IS MADE, CHARLES G. THARP, P.E. SHALL BE HELD HARMLESS FOR ANY DAMAGES, LIABILITIES OR COSTS RESULTING DIRECTLY OR INDIRECTLY FROM SUCH MODIFICATIONS TO THE FULLEST EXTENT OF THE LAW.

- 1.08 MATERIAL DELIVERY, STORAGE AND PROTECTION
 - A. DELIVER, STORE, PROTECT AND HANDLE PRODUCTS TO THE SITE. OBTAIN MSDS SHEETS ON CHEMICALS AND OTHER MATERIALS UPON DELIVERY AND PROVIDE TRAINING AND DOCUMENTATION FOR ALL WORKERS ON CONSTRUCTION SITE.
 - B. ALL MATERIALS AND EQUIPMENT SHALL BE INSPECTED UPON RECEIPT FOR DAMAGE AND MANUFACTURING FLAWS. ANY DAMAGE OR FLAWS SHALL BE DULY NOTED AND ITEMS RETURNED TO THE SUPPLYING VENDOR OR MANUFACTURER OR REPAIRED SATISFACTORILY. SHIPMENT OF THE EQUIPMENT SHALL BE SCHEDULED TO AVOID ANY DELAY AS THE CONSTRUCTION SCHEDULE SHALL NOT BE CHANGED. AS REQUIRED, ACCEPT THE MATERIAL ON SITE IN SHIPPING CONTAINERS WITH THE LABELING IN PLACE. DOCUMENT THE CONDITION OF MATERIALS UPON RECEIPT.
 - C. STORE ALL MATERIALS ON PALLETS, SHORING, OR TIMBERS AS REQUIRED TO PREVENT THE MATERIALS FROM RESTING ON THE GROUND OR FINISHED SURFACES WHERE DAMAGE TO THE MATERIALS OR FINISHED SURFACES MAY OCCUR. PROTECT, STORE, AND HANDLE ALL MATERIALS SUCH THAT NO SPILL MAY OCCUR THAT CAN DAMAGE THE ENVIRONMENT IN ANY FASHION. STORE MATERIALS SUCH THAT NO DANGER EXISTS FROM THE POTENTIAL OF STACKED MATERIALS FALLING ON PERSONNEL OR OTHER MATERIALS. PROVIDE TEMPORARY PROTECTIVE COVERING OR COATINGS FOR FERROUS MATERIALS SUCH AS CAST IRON, STEEL VALVES, AND OTHER SURFACES. PROTECT MATERIALS THAT MAY BE DAMAGED BY STORAGE IN THE AREA.
 - D. PROVIDE TEMPORARY END CAPS OR CLOSURES ON PIPING, FITTINGS AND EQUIPMENT OPENINGS. MAINTAIN THE CAPS IN PLACE UNTIL INSTALLATION. DURING HANDLING AND INSTALLATION OF THE MATERIALS, PROTECT PIPING SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY UTILIZING TEMPORARY COVERS, COMPLETING AND CLOSING SECTIONS OF THE WORK, AND ISOLATING PARTS OF THE COMPLETED SYSTEM.
 - E. DAMAGED, LOST OR STOLEN MATERIALS SHALL BE REPLACED BY THE CONTRACTOR AT THE EXPENSE OF THE CONTRACTOR.
 - F. THE CONTRACTOR SHALL PROTECT THE EQUIPMENT FROM DAMAGE AND KEEP THE EQUIPMENT IN AN "AS NEW" CONDITION FOR ALL THE FURNISHED MATERIALS AND EQUIPMENT UNTIL FINAL ACCEPTANCE BY THE OWNER.
- 1.09 BIDDING AND SCOPE OF WORK COORDINATION
 - A. THE CONTRACTORS SHALL BE RESPONSIBLE FOR INCLUDING THE FOLLOWING IN THEIR BIDDING ACTIVITIES AND WORK ACTIVITIES:
 - 1. LABOR AND MATERIAL FOR THE INSTALLATION OF ALL MECHANICAL AND PLUMBING SYSTEMS.
 - B. COORDINATION
 - A. CONTRACTORS AND SUB-CONTRACTORS OBTAIN CONFIRMATION OF PROJECT WORK SCHEDULE PRIOR TO BIDDING WORK.
 - B. COORDINATE WORK AND ACTIVITIES AT THE SITE WITH THE OWNER DURING ALL WORK TO PROVIDE ADEQUATE AND TIMELY ACCESS TO ALL CONTRACT WORK AREAS WITH A MINIMAL DISRUPTION OF THE OWNER'S ACTIVITIES AND BUSINESS NEEDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR A SCHEDULED SEQUENCE IN PERFORMING THE WORK SO THAT IT WILL NOT INTERFERE WITH THE OWNER'S OPERATION. BEFORE ANY WORK IS STARTED, THE CONTRACTOR SHALL CONSULT WITH THE OWNER AND ARRANGE A SATISFACTORY WORK SCHEDULE. THE CONTRACTOR SHALL MAKE TEMPORARY ALTERATIONS AS REQUIRED TO EXECUTE THE WORK SO THAT ALL OPERATIONS AND SERVICES IN THE FACILITY ARE MAINTAINED WITH THE MINIMUM POSSIBLE INTERRUPTION. TEMPORARY SHUT-DOWNS SHALL BE MINIMIZED AND SHALL BE OF THE SHORTEST POSSIBLE DURATION. ALL FACILITIES SHALL BE KEPT IN CONTINUOUS OPERATION UNLESS SPECIFIC PERMISSION TO THE CONTRARY IS GRANTED IN WRITING BY THE OWNER. DAILY SCHEDULING AND WORK LOCATION IS A PART OF THE CONTRACTORS WORK INCLUDED HEREIN.
 - C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION AND COOPERATION WITH THE OTHER TRADES SO THAT THE INSTALLATION IS PERFORMED WITH MINIMUM OF INTERFERENCE AND CONFLICT. PARTICULAR ATTENTION MUST BE PAID TO COMMUNICATION WITH THE VARIOUS TRADES REGARDING THE PLANNED INSTALLATION OF THIS WORK.
 - D. THE CONTRACTOR SHALL BE PREPARED TO START, PROGRESS WITH, AND COMPLETE THE WORK AS PER THE OWNER'S PROJECT SCHEDULE AND COORDINATING THE ACTIVITY OF OTHERS PERFORMING PROJECT WORK.
 - E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TIMELY PROCUREMENT OF MATERIALS AS SPECIFIED IN THIS SPECIFICATION. THE CONTRACTOR SHALL SCHEDULE PROCUREMENT OF ALL MATERIALS SO THAT THEY MAY BE DELIVERED AND INSTALLED WITHIN THE TERMS OF THE PROJECT SCHEDULE. ANY DIFFICULTIES IN PROCUREMENT AFFECTING THE INTENDED SCHEDULE SHOULD BE PROMPTLY REPORTED TO THE OWNER IN WRITING.
 - 1.11 WARRANTY
 - A. ALL MATERIALS, LABOR AND SYSTEM COMPONENTS SHALL BE GUARANTEED FOR A MINIMUM PERIOD OF TWO (2) YEARS FROM DATE OF ACCEPTANCE OF WORK BY THE OWNER, UNLESS SPECIFIED OTHERWISE. ALL EQUIPMENT SHALL BE COVERED BY A SEPARATE WARRANTY. CONFLICTS IN STATED WARRANTY PERIODS SHALL AUTOMATICALLY DEFAULT TO THE LONGEST STATED PERIOD. SHOULD ANY MECHANICAL OR OTHER RELATED PROBLEM DUE TO FAULTY MATERIALS OR WORKMANSHIP OCCUR, THE PROBLEM SHALL BE CORRECTED TO THE SATISFACTION OF THE OWNER AT NO COST TO THE OWNER. ANY DEFECTIVE MATERIALS OR INFERIOR WORKMANSHIP DISCOVERED AT THE TIME OF INSTALLATION AND/OR DURING THE GUARANTEE PERIOD SHALL BE CORRECTED IMMEDIATELY TO THE COMPLETE SATISFACTION OF THE OWNER.
 - 1.12 PROJECT CLOSEOUT
 - A. ADEQUATELY INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF EACH SYSTEM AND EQUIPMENT ITEM.
 - B. PROVIDE THE OWNER WITH THREE (3) SETS OF OPERATION AND MAINTENANCE MANUALS WITH APPROPRIATELY DIVIDED SECTIONS FOR EACH SYSTEM OR EQUIPMENT ITEM. FOR ALL ITEMS FURNISHED BY THE RESPECTIVE TRADES, SUBCONTRACTORS AND CONTRACTORS, PROVIDE SETS OF MANUFACTURERS OPERATING, MAINTENANCE, INSTRUCTIONS AND SPARE PARTS MANUALS IN A SINGLE COMB BOUND MANUAL OR HEAVY DUTY THREE RING BINDER FORMAT FOR THE OWNER'S USE. WORK OF ALL TRADES, SUBCONTRACTORS AND CONTRACTORS SHALL BE IN THIS ONE BINDER WITH DIVIDERS FOR THE RESPECTIVE SECTIONS OF WORK.
 - C. PROVIDE FOR THE REUSE BY THE OWNER AND LEGAL DISPOSAL OF EXCESS MATERIALS AS REQUIRED TO APPROVED LOCATIONS ON THE SITE OR FOR LEGAL DISPOSAL AS REQUIRED IF NO ACCEPTABLE PLACE FOR DISPOSAL EXISTS ON THE SITE. THE HAULING, HANDLING, CONFIRMATION, COORDINATION, AND MANAGEMENT OF THIS ACTIVITY IS WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR.
 - D. FURNISH RECORD DRAWINGS OF THE FINAL INSTALLATION NOTING IMPORTANT DATA, SUCH AS COVERED OR ENCLOSED PIPE OR OTHER MATERIALS ETC. DURING AND AFTER THE FINAL INSTALLATION IS COMPLETE AND SYSTEMS ARE OPERATIONAL. RECORD DRAWINGS SHALL BE THOROUGH WITH ATTENTION TO DETAILS. THE OWNER RETAINS THE RIGHT TO REQUEST MORE INFORMATION TO BE ADDED TO DRAWINGS AS NEEDED. RECORD DRAWINGS SHALL BE CLEARLY MARKED WITH AN ERASABLE RED LEAD PENCIL.
 - E. COPIES OF ALL PROJECT CLOSE-OUT DOCUMENTS SHALL BE FORWARDED TO THE OWNER FOR REVIEW, APPROVAL, AND USE.
- PART 2 - PRODUCTS AND MATERIALS
 - 2.01 MATERIAL STANDARDS
 - A. ALL PRODUCTS SHALL BE FIRST-LINE QUALITY, NEW AND UNUSED OF THE GRADE AND TYPE AS SHOWN ON THE DRAWINGS AND AS SPECIFIED, OR THE EQUIVALENTS AS APPROVED BY THE OWNER IN WRITING.
 - B. ALL PRODUCTS SHALL BE IN CURRENT PRODUCTION WITH NO NOTICE HAVING BEEN GIVEN THAT THIS PRODUCT IS TO BE DRASTICALLY CHANGED, MODIFIED, OR DISCONTINUED FROM PRODUCTION.
 - C. WHEN ANY MATERIAL OR EQUIPMENT IS IDENTIFIED ON THE PLANS OR IN THE SPECIFICATIONS BY REFERENCE TO ONE MANUFACTURER'S NAME OR MODEL NUMBER, IT IS INTENDED TO ESTABLISH THE REQUIRED STANDARD OF DESIGN AND QUALITY, AND IT IS NOT INTENDED TO LIMIT COMPETITION. THAT, WHETHER PRESENT OR NOT, THE PHRASE "OR EQUAL" OR "OR AN APPROVED EQUAL" APPLIES TO ALL FURNISHED MATERIALS AND IS MEANT TO MEAN AN "ACCEPTED" EQUIVALENT IF APPROVED BY THE OWNER AND ENGINEER PRIOR TO BIDDING PROJECT.
 - 2.02 MATERIAL ALTERNATIVES
 - A. IF THE CONTRACTOR DESIRES TO SUGGEST CHANGES, MODIFICATIONS OR ALTERNATIVES, THE CONTRACTOR SHALL SUBMIT, IN WRITING, A DESCRIPTION OF THE PROPOSED CHANGES OR MODIFICATIONS FOR REVIEW BY THE OWNER AND ENGINEER.
 - B. THE CONTRACTOR SHALL SUBMIT TO THE OWNER FOR APPROVAL THREE (3) COPIES OF DESCRIPTIVE INFORMATION FOR ANY MATERIALS PROPOSED BY THE CONTRACTOR WHICH ARE NOT EXACTLY AS SPECIFIED AND ARE INTENDED TO BE EQUAL OR BETTER IN QUALITY OR PERFORMANCE. THE INFORMATION SHALL INCLUDE, AS A MINIMUM, CATALOG DATA SHEETS AND SHOP DRAWINGS, SAMPLES AND OTHER SUPPORTIVE INFORMATION AS NECESSARY FOR THE OWNER TO EVALUATE THE PROPOSED MATERIALS OR EQUIPMENT.
 - C. THE OWNER SHALL HAVE THE FINAL SELECTIVE MATERIAL AND EQUIPMENT RECOMMENDATIONS AND SHALL BE THE SOLE JUDGE IN DETERMINING WHETHER THE PROPOSED MATERIAL, ACCESSORY, OR ITEM MEETS THE STATED CRITERIA FOR THE SERVICE AND CONDITIONS IMPOSED. THE OWNER MAY REQUEST THE ENGINEER TO PROVIDE AN OPINION REGARDING SUCH ISSUES.
 - D. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PROPOSED CHANGES OR MODIFICATIONS UNTIL AUTHORIZED TO DO SO BY THE OWNER IN WRITING. THE COST OF ANY WORK PERFORMED ON PROPOSED CHANGES OR MODIFICATIONS WITHOUT THE OWNER'S WRITTEN APPROVAL WILL BE AT THE CONTRACTOR'S EXPENSE, AS WELL AS ANY COST FOR UNDOING SUCH UNAUTHORIZED WORK.
 - E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTRACTOR SHALL NOT INCUR OTHER TRADE COSTS OR EXPENSES TO THE OWNER AND ANY RESULTANT COSTS ARISING OUT OF THE ACCEPTANCE OF ANY REQUESTED CHANGE SHALL BE PAID FOR BY THE CONTRACTOR.
 - F. ACCEPTANCE OF REQUESTS FOR SUBSTITUTIONS OF EQUIPMENT, MATERIALS OR PROCESSES SPECIFIED WILL BE CONTINGENT UPON SUBMISSION OF PROOF, SATISFACTORY TO THE OWNER AND ENGINEER THAT:
 - 1. THEY ARE SATISFACTORY IN TERMS OF QUALITY AND SERVICEABILITY.
 - 2. THEIR USE WILL NOT CAUSE AN INCREASED RISK OF LEAK OR RELATED WORK.
 - 3. THEY ARE ACCEPTABLE IN CONSIDERATION OF THE REQUIRED DESIGN. THE BURDEN OF PROOF SHALL BE UPON THE PARTY PROPOSING THE SUBSTITUTION. NO CONSIDERATION WILL BE GIVEN TO INCOMPLETE SUBMITTALS.
 - G. THE CONTRACTOR IS ENCOURAGED TO SUGGEST ALTERNATES COVERING EACH OF THE FOLLOWING SUBJECTS:
 - 1. ALTERNATIVE MATERIALS.
 - 2. EXCEPTIONS TO THE SPECIFICATIONS COVERING MATERIALS AND EQUIPMENT, MANNER OF APPLICATION, OR OTHER DETAILS.
- PART 3 - EXECUTION OF WORK
 - 3.01 FABRICATION AND INSTALLATION
 - A. PRIOR TO BIDDING THE WORK, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FULLY FAMILIAR WITH ALL CONDITIONS SUCH AS OVERHEAD OBSTRUCTIONS, STRUCTURES, EQUIPMENT, AND OTHER ITEMS THAT PERTAIN TO THE WORK DESCRIBED HEREIN. FAILURE TO UNDERSTAND OR HAVE KNOWLEDGE OF ISSUES THAT COULD HAVE BEEN DETERMINED PRIOR TO BIDDING WILL NOT CONSTITUTE GROUNDS FOR ASKING FOR WORK CHANGE ORDERS OR EXTRA WORK.
 - B. VERIFY THE DIMENSIONS, ROUTING, CLEARANCES, ACCESS, HEIGHTS, SCHEDULES, AND OTHER TIMES BY FIELD INSPECTION AND SITE ASSESSMENT PRIOR TO BEGINNING THE WORK.
 - C. ARRANGEMENT OF SYSTEMS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC, AND INDICATES THE MINIMUM REQUIREMENTS FOR MECHANICAL WORK. SITE CONDITIONS MAY DETERMINE THE ACTUAL ARRANGEMENT OF SYSTEMS. FIELD MEASUREMENTS SHALL BE TAKEN BEFORE FABRICATION. CONTRACTOR SHALL BE RESPONSIBLE FOR ACCURACY OF DIMENSIONS AND LAYOUT. OVERHEAD WORK SHALL BE LAID OUT IN A JOINT COORDINATION AND COOPERATION WITH THE OTHER TRADES. FINISHED WORK SHALL PROVIDE MAXIMUM HEAD ROOM, UNLESS SPECIFIED OR REQUIRED OTHERWISE. COORDINATE THE LOCATION OF ALL SYSTEMS TO AVOID INTERFERENCE WITH THE LOCATION OF OTHER SYSTEMS, WORK OF OTHER TRADES OR WITH TRAFFIC FLOW WITHIN THE AREAS.
 - D. WHERE SPECIFIC DETAILS AND DIMENSIONS FOR THE WORK ARE NOT SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL TAKE MEASUREMENTS AND MAKE LAYOUTS AS REQUIRED FOR THE PROPER INSTALLATION OF THE WORK AND SHALL PROVIDE COORDINATION WITH ALL OTHER WORK ON THE PROJECT. IN CASE OF ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE SPECIFICATIONS THAT HAVE NOT BEEN CLARIFIED BY ADDENDUM PRIOR TO BIDDING, IT SHALL BE ASSUMED BY THE SIGNING OF THE CONTRACT THAT THE HIGHER COST (IF THERE IS ANY DIFFERENCE IN COSTS) IS INCLUDED IN THE CONTRACT PRICE, AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE WORK ACCORDING TO THE DRAWINGS AND WITH THE SPECIFICATIONS, AS DETERMINED AND APPROVED BY THE OWNER, AND NO ADDITIONAL COSTS SHALL BE ADDED TO THE CONTRACT PRICE.
 - E. THE CONTRACTOR SHALL EXAMINE THE AREAS AND CONDITIONS UNDER WHICH THIS WORK IS TO BE INSTALLED. DO NOT PROCEED WITH THE WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED. THE STARTING OF WORK IS ACCEPTANCE OF THE CONDITIONS WITHIN ANY PARTICULAR AREA.
 - 3.02 INSTALLATION
 - A. COMPLY WITH ALL APPLICABLE REGULATIONS AND BUILDING CODE REQUIREMENTS.
 - B. WORK UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL CONSIST OF THE FURNISHING OF ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETE INSTALLATION OF ALL MECHANICAL AND PLUMBING SYSTEMS AS SHOWN ON THE DRAWINGS AND/OR AS SPECIFIED HEREIN. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MINOR ITEMS WHICH ARE OBVIOUSLY REQUIRED AND REASONABLY NECESSARY FOR THE WORK. SUCH ITEMS ARE ANCHORS, BOLTS, SLEEVES, BRACKETS, VENTS, OFFSETS, AND OTHER COMPONENTS TO PROVIDE AN OPERATING SYSTEM. THE CONTRACTOR SHALL DRILL, CUT, OR OTHERWISE ATTACH COMPONENTS FOR THE INSTALLATION OF THE WORK WITH THE FULL UNDERSTANDING THAT THE CONTRACTOR IS RESPONSIBLE FOR THE FINISHED AREA IN AN ORIGINAL CONDITION. LEAVE THE FINISHED AREA IN TOUCH-UP PAINTING, AND OTHER SURFACE FINISH AROUND THE CONTRACTOR'S WORK AND WORK AREA IS THEREFORE WITHIN THE SCOPE OF WORK OF THIS SPECIFICATION. ALL WORK SHALL BE COMPLETED AND READY FOR FULL OPERATION.
 - C. INSTALL ALL MATERIALS AND SYSTEMS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND AS PER THE APPROVED SUBMITTALS. INSTALL MATERIALS IN PROPER RELATIONSHIP WITH ADJACENT CONSTRUCTION AND WITH A UNIFORM APPEARANCE FOR EXPOSED WORK. COORDINATION OF THE INSTALLATION WITH THE WORK OF OTHER TRADES AND SECTIONS IS A SIGNIFICANT AND IMPORTANT PORTION OF THE WORK FOR THE PROJECT.
 - D. PROPERLY SUPPORT ALL PIPING. PITCH THE PIPING TO THE DRAIN PIPES. INSTALL PIPING WITH PROPER EXPANSION LOOPS, FLEXIBLE CONNECTORS, MECHANICAL EXPANSION JOINTS, HANGER SYSTEMS, VIBRATION ISOLATION SYSTEMS, AND ANCHORS.
 - E. LABEL ALL COMPONENTS, EQUIPMENT, ACCESS DOORS, SYSTEM MAIN VALVES, FILTER LOCATIONS, INCLUDING WATER SERVICE VALVES, AND ALL OTHER COMPONENTS ACCORDING TO THE DRAWINGS AND SPECIFICATIONS.
 - F. CLEAN, WASH, LUBRICATE, TEST AND BALANCE, AS REQUIRED, ALL SYSTEMS AS PER THE MANUFACTURER'S INSTRUCTIONS FOR PROPER OPERATION PRIOR TO PLACING THE SYSTEMS INTO SERVICE.
 - G. RESTORE DAMAGED FINISHES. CLEAN AND PROTECT THE WORK FROM DAMAGE DURING CONSTRUCTION AND CLEAN THE FINAL WORK AT PROJECT COMPLETION. ANY DAMAGED, SCRATCHED, MARRED, OR OTHERWISE DEFAECED PAINTED SURFACES, WALLS, CEILINGS, ROOFS, FLOORS, DOORS, INSULATED SURFACES OR INSULATION COVERINGS OR FINISHES, OR OTHER ITEMS SHALL BE SO REPAIRED TO RESTORE THE FINISH TO ORIGINAL CONDITION BY PERSONNEL WORKING IN THE REQUIRED RESPECTIVE TRADE.
 - H. IF REQUIRED, INSTALL APPROVED FIRE STOP MATERIALS AROUND ALL PIPE AND DUCT MATERIAL PENETRATION THROUGH FIRE RATED WALLS AND FLOORS.
 - I. IT IS THE INTENT THAT ALL MATERIALS AND MATERIAL SURFACES HAVE A PROTECTIVE FINISH WHEN IN PLACE. ALL NON-GALVANIZED FERROUS METAL ITEMS INSIDE THE BUILDING, EXPOSED TO WEATHER OR OTHER AREA SUBJECT TO RUSTING SHALL BE GIVEN ONE HEAVY COAT OF RUST PREVENTIVE PRIMER AT THE TIME OF FINAL INSTALLATION TO PREVENT RUSTING OR CORROSION PRIOR TO FINAL PAINTING.
 - J. PENETRATIONS THROUGH THE EXTERIOR WALL SHALL BE GASKET SEALED AND WATER TIGHT, AND ALLOW FOR THE NORMAL DUCT OR PIPE MOVEMENTS. PACK AROUND BOTH PIPE AND DUCT SLEEVES WITH GROUT TO CREATE A WATERTIGHT SEAL.
 - K. IF POSSIBLE, SLEEVES SHALL BE EMBEDDED IN THE STRUCTURAL SLAB CONCRETE.
 - L. HOLES IN REINFORCED CAST IN PLACE CONCRETE PANELS OR PRECAST PANELS SHALL NOT CUT ANY REINFORCING STEEL WITHIN THE PANEL. IN GENERAL, THE PENETRATIONS HOLES SHALL BE AT THE PANEL EDGE AREA FROM THE REINFORCING STEEL. MASONRY SHALL BE DRILLED WITH A SUITABLE DIAMOND CORE BIT ROTARY DRILL.
 - M. HOLES IN MASONRY SHALL BE DRILLED WITH A SUITABLE DIAMOND CORE BIT ROTARY DRILL. WALL SLEEVES THROUGH CONCRETE SHALL BE GROUTED AND INSTALLED WITH FOUR (4) 1/2 INCH ANCHORING LUGS. AIR HAMMERS SHALL NOT BE USED. OPENINGS SHALL BE MADE BY CORING, SAWING, OR OTHER METHODS AS APPROVED BY THE OWNER.
 - N. PERMISSION TO PATCH ANY AREAS OR ITEMS OF WORK SHALL NOT CONSTITUTE A WAIVER OF THE OWNER'S RIGHT TO REQUIRE COMPLETE REMOVAL AND REPLACEMENT OF SAID AREAS OR ITEMS OF WORK, IF IN THE OWNER'S OPINION, SAID PATCHING DOES NOT SATISFACTORILY RESTORE THE QUALITY AND APPEARANCE OF SAME.
 - 3.03 PENETRATIONS, CUTTING AND PATCHING
 - A. FOR ALL MECHANICAL AND PLUMBING WORK, THIS SPECIFICATION GOVERNS THE MINIMUM REQUIREMENTS FOR THE MATERIAL PROCUREMENT, LABOR, SUPERVISION, TOOLS, AND EQUIPMENT NECESSARY FOR PENETRATION OF THE BUILDING ELEMENTS. WORK TO BE PERFORMED SHALL INCLUDE THE COMPLETE AND PROPER PENETRATION OF BUILDING ELEMENTS AS SHOWN ON THE DRAWINGS AND AS NECESSARY TO PROPERLY INSTALL AN OPERATING SYSTEM.
 - B. PIPE SLEEVES AND OPENINGS SHALL BE PROVIDED WHERE DUCTS, PIPES, HANGERS, AND VALVE OPERATOR STEMS PASS THROUGH FLOORS, ROOFS, WALLS, PARTITIONS, OR OTHER BUILDING ELEMENTS.
 - C. SLEEVES AND OPENINGS SHALL BE LOCATED, AS CLOSELY AS POSSIBLE, CONCENTRIC WITH THE CENTERLINE AXIS OF THE PENETRATING PIPE. CONCENTRICITY OF PIPE, SLEEVE AND OPENING CENTERLINES SHALL NOT VARY MORE THAN ONE-EIGHTH OF THE TOTAL CLEARANCE.
 - D. PENETRATIONS THROUGH THE EXTERIOR WALL SHALL BE GASKET SEALED AND WATER TIGHT, AND ALLOW FOR THE NORMAL DUCT OR PIPE MOVEMENTS. PACK AROUND BOTH PIPE AND DUCT SLEEVES WITH GROUT TO CREATE A WATERTIGHT SEAL.
 - E. IF POSSIBLE, SLEEVES SHALL BE EMBEDDED IN THE STRUCTURAL SLAB CONCRETE.
 - F. HOLES IN REINFORCED CAST IN PLACE CONCRETE PANELS OR PRECAST PANELS SHALL NOT CUT ANY REINFORCING STEEL WITHIN THE PANEL. IN GENERAL, THE PENETRATIONS HOLES SHALL BE AT THE PANEL EDGE AREA FROM THE REINFORCING STEEL. MASONRY SHALL BE DRILLED WITH A SUITABLE DIAMOND CORE BIT ROTARY DRILL.
 - G. HOLES IN MASONRY SHALL BE DRILLED WITH A SUITABLE DIAMOND CORE BIT ROTARY DRILL. WALL SLEEVES THROUGH CONCRETE SHALL BE GROUTED AND INSTALLED WITH FOUR (4) 1/2 INCH ANCHORING LUGS. AIR HAMMERS SHALL NOT BE USED. OPENINGS SHALL BE MADE BY CORING, SAWING, OR OTHER METHODS AS APPROVED BY THE OWNER.
 - H. PERMISSION TO PATCH ANY AREAS OR ITEMS OF WORK SHALL NOT CONSTITUTE A WAIVER OF THE OWNER'S RIGHT TO REQUIRE COMPLETE REMOVAL AND REPLACEMENT OF SAID AREAS OR ITEMS OF WORK, IF IN THE OWNER'S OPINION, SAID PATCHING DOES NOT SATISFACTORILY RESTORE THE QUALITY AND APPEARANCE OF SAME.
 - 3.04 CLEANING AND TREATING OF SYSTEMS
 - A. ALL SYSTEMS SHALL BE CAREFULLY FLUSHED DURING INSTALLATION WITH AIR OR WATER TO REMOVE DIRT, SCALE, FOREIGN MATTER AND OTHER CONTAMINANTS. IF ANY SYSTEM FAILS TO FUNCTION OR SYSTEM SEALS FAIL DUE TO DIRT IN THE SYSTEM, THE NECESSARY REPAIRS AND ADJUSTMENTS SHALL BE MADE AT THE CONTRACTOR'S EXPENSE.
 - B. ALL PIPING AND EQUIPMENT SHALL BE FLUSHED AND CLEANED AS REQUIRED.
 - C. PROVIDE ALL NECESSARY PUMPS, HIGH PRESSURE SPRAYERS, TEMPORARY PIPING CONNECTIONS, SPOOL PICES, VALVES, HOSES, CHEMICALS, DETERGENTS, SPONGES, PIGS, BRUSH BALLS, AND OTHER ITEMS AS REQUIRED. DISCONNECTION OF THE ITEMS FOR TESTING IS PART OF THE WORK UNDER THIS SECTION. COMPLETE AND SUBMIT TO THE OWNER A COPY OF THE PIPING CLEANING REPORT FOR EACH SYSTEM CLEANED UNDER THIS SECTION.
 - D. PROVIDE POSITIVE ISOLATION OF SYSTEMS BEING CLEANED OR DISINFECTED TO PREVENT THE BACKFLOW OF CHEMICALS OR DETERGENTS INTO OTHER SYSTEMS OR PIPING LOOPS.
 - E. FLUSH ALL NEW PIPING AND EQUIPMENT OF EACH SYSTEM WITH WATER. HYDROSTATICALLY TESTED PIPING SYSTEMS SHALL BE FLUSHED WITH WATER. ALL SYSTEMS SHALL BE FLUSHED BEFORE PRESSURE TESTING.
 - F. DO NOT EXCEED THE WORKING PRESSURE OF ANY SYSTEM WHILE PERFORMING WORK UNDER THIS SECTION. THE WORKING PRESSURE FOR PIPING IS DETERMINED BY USING TWO THIRDS OF THE HYDROSTATIC TEST PRESSURE. REFER TO THE SPECIFICATIONS FOR EACH PIPING SYSTEM FOR SPECIFICS OF PIPING SYSTEM TESTING, INCLUDING TEST PRESSURES.
 - G. AFTER VISUALLY INSPECTING AND VERIFYING ALL SYSTEM COMPONENTS, VESSELS, AND OTHER ITEMS ARE CLEAN, POTABLE WATER AT AMBIENT TEMPERATURE SHALL BE USED FOR ALL FLUSHING. MAINTAIN A HIGH FLUID VELOCITY TO ENSURE COMPLETE REMOVAL OF ALL SCALE, WELD SPLATTER AND OTHER DEBRIS. DRAIN THE WATER TO THE SEWER OR OTHER APPROVED LOCATION. THE OWNER SHALL OBSERVE THE INITIAL DISCHARGE AND INTERMITTENTLY OBSERVE THE FLUSHING PROCESS.
 - H. ALL RESIDUAL MATTER DEPOSITED ON FLOORS, ROOFS, WALLS AND OTHER SURFACES AS A RESULT OF THE SYSTEM INSTALLATION SHALL BE COMPLETELY REMOVED. IF NECESSARY, THE FINISH SHALL BE RESTORED TO THE SATISFACTION OF THE OWNER.



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REPRODUCING OR TRANSMITTING IN ANY FORM OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM THE ARCHITECT, IS PROHIBITED. THESE DRAWINGS MUST BE APPROVED BY THE ARCHITECT.

PROJECT NUMBER
16-18

DATE
11/28/2016

CONTENTS
MEP SPECIFICATIONS

SHEET NUMBER

MEP-2

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

WORK INCLUDED

- 1. THE FURNISHING OF ALL ADMINISTRATION, LABOR, EQUIPMENT, AND MATERIALS REQUIRED FOR THE INSTALLATION OF COMPLETE ELECTRICAL SYSTEMS.
2. REFERENCES (LATEST ISSUE SHALL APPLY UNLESS OTHERWISE NOTED)
3. COMPLY WITH THE FOLLOWING STANDARDS:
A. ANSI AMERICAN NATIONAL STANDARDS INSTITUTE.
B. FS FEDERAL SPECIFICATION.
C. ICEA INDUSTRIAL CABLE ENGINEERS ASSOCIATION.
D. IEEE INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS.
E. IES ILLUMINATING ENGINEERING SOCIETY.
F. ISA INSTRUMENT SOCIETY OF AMERICA.
G. NEC NATIONAL ELECTRICAL CODE.
H. NEMA NATIONAL ELECTRICAL MANUFACTURERS'S ASSOCIATION.
I. NESC NATIONAL ELECTRICAL SAFETY CODE.
J. NFPA NATIONAL FIRE PROTECTION ASSOCIATION.
K. OSHA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.
L. UBC UNDERWRITERS BUILDING CODE.
M. UNDERWRITERS LABORATORIES, INC.
N. FEDERAL, STATE AND LOCAL CODES.

SUBMITTALS FOR REVIEW

- 1. PRIOR TO ORDERING EQUIPMENT OR STARTING ANY INSTALLATION WORK, SUBMIT THREE (3) COPIES OF ITEMS PROPOSED FOR THIS WORK WITH NECESSARY ILLUSTRATIONS, DRAWINGS, AND ENGINEERING DATA FOR REVIEW BY THE OWNER AND/OR ENGINEER. SUBMIT IN TIME TO ALLOW NO LESS THAN SEVEN (7) WORKING DAYS FOR REVIEW, CHECKING, COMMENTING AND TRANSMITTAL WITHOUT DELAYING THE CONSTRUCTION SCHEDULE. SUBMIT ALL ITEMS AT ONE TIME NOT LESS THAN TWENTY (20) DAYS AFTER AWARD OF THE CONTRACT.
2. SUBMITTALS SHALL BE CLEARLY MARKED TO SHOW THE INTENDED ITEM, WITH IDENTIFICATION AS TO THE EQUIPMENT NUMBER OR OTHER MARKING TO SHOW LOCATION, SERVICE, AND FUNCTION. ALL OTHER EXTRANEOUS AND NONAPPLICABLE INFORMATION SHALL BE MARKED OUT BEFORE SUBMITTAL. SUBMITTALS NOT CLEARLY MARKED TO PROPERLY IDENTIFY THE EQUIPMENT AND APPLICATION WILL BE REJECTED AND RETURNED FOR IMMEDIATE RE-SUBMITTAL BY THE CONTRACTOR.
3. THE CONTRACTOR AGREES THAT SUBMITTALS REVIEWED AND APPROVED BY THE OWNER AND/OR ENGINEER ARE NOT CHANGE ORDERS. THE PURPOSE OF SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE OWNER AND/OR ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE PROJECT DESIGN, AND THAT THIS UNDERSTANDING IS DEMONSTRATED BY IDENTIFYING THE EQUIPMENT AND MATERIALS HE OR SHE INTENDS TO FURNISH AND INSTALL, AND/OR BY THE FABRICATION AND INSTALLATION METHODS HE OR SHE INTENDS TO USE.
4. CONTRACTOR FURTHER AGREES THAT IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SUBMITTALS AND CONTRACT DOCUMENTS ARE DISCOVERED, EITHER PRIOR TO OR AFTER SUBMITTALS ARE TO BE PROCESSED BY THE OWNER AND/OR ENGINEER, THE CONTRACTOR SHALL CONTROL AND SHALL BE FOLLOWED. SUBMITTALS ARE REQUIRED OF ALL EQUIPMENT AND MATERIALS FURNISHED ON THE PROJECT AND SHALL INCLUDE AND BE CLEARLY MARKED AS FOLLOWS:
5. THE NAME OF THE PROJECT.
6. SUBMITTAL DATE.
7. NAMES OF CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, AND MANUFACTURERS OF MATERIALS AND SUPPLIES.
8. ALL PERFORMANCE DATA FOR ELECTRICAL EQUIPMENT, INCLUDING DIMENSIONAL INFORMATION AND VOLTAGE, PHASE, OPERATING AND NAMEPLATE AMPERAGE OF EACH ELECTRICAL ITEM SUCH AS MOTORS, HEATERS, OR OTHER ITEMS. FOR MOTORS, PROVIDE THE MANUFACTURER'S NAMEPLATE INFORMATION FOR REVIEW AND APPROVAL.
9. IF APPLICABLE, ALL AUXILIARY EQUIPMENT, INCLUDING VARIOUS DETAILS TO ASSURE THE INTENT OF THE WORK WILL BE MET.
10. FULL DESCRIPTION OF CAPABILITIES AND CAPACITIES OF EQUIPMENT, INCLUDING BUT NOT LIMITED TO THE MANUFACTURER'S DRAWINGS, CUT SHEETS, DATA SHEETS, AND OTHER DESCRIPTIVE INFORMATION.
11. MSDS INFORMATION FOR ALL POTENTIALLY HAZARDOUS CHEMICALS AND MATERIALS. ALSO, POST A COPY OF THE MSDS AT THE JOBSITE AS REQUIRED INDICATING THE REQUIRED PROPER HANDLING TECHNIQUES AND SAFETY PROCEDURES FOR THE MATERIALS.

SITE CONDITIONS

- 1. THE CONTRACTOR MUST INSPECT THE WORK AREAS, DRAWINGS AND SPECIFICATIONS AND BECOME THOROUGHLY ACQUAINTED WITH THE CONDITIONS WHICH MAY BE ENCOUNTERED DURING THE INSTALLATION OF THE WORK. NO EXTRA COMPENSATION OR INVOICING WILL BE ALLOWED TO COVER THE WORK WHICH HAS NOT BEEN INCLUDED IN THE BID DUE TO FAILURE OF THE CONTRACTOR TO THOROUGHLY EXAMINE THE PREMISES.
2. ARRANGEMENT OF SYSTEMS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC. FIELD MEASUREMENTS SHALL BE TAKEN AND CONFIRMED. THE CONTRACTOR SHALL CONFIRM ACCURACY OF DIMENSIONS BEFORE FABRICATION AND SHALL BE RESPONSIBLE FOR ALL EQUIPMENT AND COMPONENT LAYOUTS. OVERHEAD WORK SHALL BE LAID OUT TO OBTAIN THE MAXIMUM HEAD ROOM. COORDINATE THE LOCATION OF ALL ELECTRICAL SYSTEMS TO AVOID INTERFERENCE WITH THE LOCATION OF OTHER SYSTEMS OR WITH TRAFFIC FLOW WITHIN THE WORK LOCATIONS WITH THE OWNER PRIOR TO INSTALLATION.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE DAILY INSPECTION OF THE PROJECT WORK SITE FOR THE PRESENCE OF ASBESTOS MATERIALS OR FOR MATERIALS THAT MAY BE ASBESTOS CONTAMINATED. IT IS BELIEVED THAT THERE ARE NO KNOWN ASBESTOS MATERIALS ON THE WORK SITE. ALL KNOWN MATERIALS ARE MARKED INDICATING THE PRESENCE OF ASBESTOS MATERIALS. THE OWNER KNOWS OF NO POTENTIALLY CONTAMINATED AREAS, PIPING SYSTEM, DUCT SYSTEM, ETC. THAT MIGHT CONTAIN SUCH MATERIALS. CONTRACTOR SHALL NOT ALLOW EMPLOYEES OR OWNERS PERSONNEL TO BE EXPOSED IN ANY FASHION TO ANY UNKNOWN MATERIALS THAT MAY CONTAIN ASBESTOS MATERIALS. EXPOSURE TO MATERIALS IN QUESTION SHALL BE COMPLETELY AVOIDED IMMEDIATELY. CONTRACTOR SHALL CORDON OFF THE AREA WITH "SAFETY TAPE" TO IDENTIFY THE POTENTIAL RISK AND THEREFORE LIMIT EXPOSURE FOR OTHERS. THE OWNER SHALL BE CONTACTED IMMEDIATELY. THE OWNER WILL MAKE IMMEDIATE ARRANGEMENTS FOR THE INSPECTION OF MATERIALS IN QUESTION AND, IF NECESSARY, FOR REMOVAL OF SAME MATERIALS BY AN OUTSIDE CONSULTING FIRM. THE ENGINEER HAS BEEN ADVISED BY THE OWNER TO INSPECT THE SITE FOR THE PRESENCE OF ASBESTOS MATERIALS AND THEREFORE HAS NO SPECIFIC KNOWLEDGE OF THE PRESENCE OF SUCH MATERIALS.
4. QUALITY ASSURANCE
1. COMPLY WITH ALL GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR TEN (10) YEARS. DELIVER, HANDLE AND STORE MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S CORRECT HANDRAILS, TOE PLATES, AND OTHER ARRANGEMENT. THE CONTRACTOR SHALL FOLLOW THESE DRAWINGS IN THE LAYOUT OF HIS WORK AND SHALL CONSULT GENERAL CONSTRUCTION DRAWINGS, MECHANICAL DRAWINGS AND ALL OTHER DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT TO DETERMINE ALL CONDITIONS AFFECTING THE ELECTRICAL WORK.
2. THE CONTRACTOR SHALL MAINTAIN THE SAFETY PRACTICES AND CODES. EXTREME CARE SHALL BE TAKEN TO SAFEGUARD THE SAFETY OF THE PUBLIC, THE OWNER'S EMPLOYEES, AND THE CONTRACTOR'S EMPLOYEES.
3. FALL PROTECTION ON THE JOB SITE MUST COMPLY WITH PROVISIONS OF OSHA STANDARDS FOUND IN 29 CFR 1926 SUBPART M, AND AS SPECIFICALLY DEFINED BY 1926.501(B), SUBSECTIONS (1) THROUGH (15).
4. REMOVE MATERIALS AS SPECIFIED OR AS REQUIRED DURING THE COURSE OF THE WORK. COMMUNICATE WITH THE OWNER AND VERIFY THE DISPOSITION PLAN WITH OWNER. DISPOSE OF ALL MATERIALS IN A LEGAL, ACCEPTABLE, AND PROPER FASHION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELATED FAMILIAR WITH LOCAL GOVERNING AUTHORITIES HAVING JURISDICTION, CODES, AND STATUTES AND, IF REQUIRED, SHALL OBTAIN THE REQUIRED PERMITS. PAY ALL RELATED FEES INCLUDING INSPECTION FEES, AND OBTAIN INSPECTIONS AS REQUIRED TO COMPLETE AND FINISH HIS WORK.
6. THE FOLLOWING CODES SHALL BE ADHERED TO:
ALL OSHA REQUIREMENTS AND GUIDELINES INCLUDING OSHA 29 CFR 1926 AND 1910.
STATE AND LOCAL BUILDING CODES.
STATE AND LOCAL MECHANICAL CODES.
NFPA STANDARDS.
LIFE SAFETY CODES AND STANDARDS.
11. ADA REQUIREMENTS.
5. REGULATORY REQUIREMENTS
1. SPECIAL PART OF WORK: THE CONTRACTOR SHALL STRICTLY COMPLY WITH ALL OSHA SAFETY RULES AND REGULATIONS AND USE ONLY APPROVED HOISTS, SCAFFOLDS, RIGGING, RUNWAYS, AND EQUIPMENT REQUIRED FOR THE PERFORMANCE OF THE WORK. SAFETY MOVABLE SCAFFOLDS WITH CORRECT HANDRAILS, TOE PLATES, AND OTHER FEATURES SHALL BE PROVIDED AND USED FOR OVERHEAD WORK. THE CONTRACTOR SHALL ALSO STRICTLY COMPLY WITH ALL OSHA SAFETY RULES AND REGULATIONS AND USE ONLY APPROVED METHODS OF EXCAVATION, TRENCHING, AND SHORING METHODS AS DESCRIBED IN OSHA 29 CFR SUBPART P. EXCAVATIONS, ALL EQUIPMENT USED IN THE ACTIVITIES OF THE WORK SHALL BE CURRENTLY APPROVED BY OSHA FOR THE USES SPECIFICALLY DESIGNED FOR BY THE EQUIPMENT MANUFACTURER. THE CONTRACTOR SHALL MAINTAIN ALL NECESSARY SAFETY PRACTICES AND CODES. EXTREME CARE SHALL BE TAKEN TO SAFEGUARD THE SAFETY OF THE PUBLIC, THE OWNER'S EMPLOYEES, AND THE CONTRACTOR'S EMPLOYEES.
2. FALL PROTECTION ON THE JOB SITE MUST COMPLY WITH PROVISIONS OF OSHA STANDARDS FOUND IN 29 CFR 1926 SUBPART M, AND AS SPECIFICALLY DEFINED BY 1926.501(B), SUBSECTIONS (1) THROUGH (15).
3. REMOVE MATERIALS AS SPECIFIED OR AS REQUIRED DURING THE COURSE OF THE WORK. COMMUNICATE WITH THE OWNER AND VERIFY THE DISPOSITION PLAN WITH OWNER. DISPOSE OF ALL MATERIALS IN A LEGAL, ACCEPTABLE, AND PROPER FASHION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELATED FAMILIAR WITH LOCAL GOVERNING AUTHORITIES HAVING JURISDICTION, CODES, AND STATUTES AND, IF REQUIRED, SHALL OBTAIN THE REQUIRED PERMITS. PAY ALL RELATED FEES INCLUDING INSPECTION FEES, AND OBTAIN INSPECTIONS AS REQUIRED TO COMPLETE AND FINISH HIS WORK.
5. THE FOLLOWING CODES SHALL BE ADHERED TO:
ALL OSHA REQUIREMENTS AND GUIDELINES INCLUDING OSHA 29 CFR 1926 AND 1910.
STATE AND LOCAL BUILDING CODES.
STATE AND LOCAL MECHANICAL CODES.
NFPA STANDARDS.
LIFE SAFETY CODES AND STANDARDS.
11. ADA REQUIREMENTS.
6. MATERIAL DELIVERY, HANDLING, STORAGE AND PROTECTION
1. DELIVER, STORE, PROTECT AND HANDLE PRODUCTS TO THE SITE. OBTAIN MSDS SHEETS ON CHEMICALS AND OTHER MATERIALS UPON DELIVERY AND PROVIDE TRAINING AND DOCUMENTATION FOR ALL WORKERS ON CONSTRUCTION SITE.
2. ALL ELECTRICAL MATERIALS AND RELATED ELECTRICAL EQUIPMENT SHALL BE INSPECTED UPON RECEIPT FOR DAMAGE AND MANUFACTURING FLAWS. ANY DAMAGE OR FLAWS SHALL BE IMMEDIATELY RETURNED TO THE SUPPLIER OR MANUFACTURER OR REPAIRED SATISFACTORILY. SHIPMENT OF THE EQUIPMENT SHALL BE SCHEDULED TO AVOID ANY DELAY IN THE CONSTRUCTION SCHEDULE AS THE CONSTRUCTION SCHEDULE SHALL NOT BE CHANGED. AS REQUIRED, ACCEPT THE MATERIALS ON SITE IN SHIPPING CONTAINERS WITH THE LABELING IN PLACE. DOCUMENT THE CONDITION OF MATERIALS UPON RECEIPT.
3. STORE MATERIALS SUCH THAT NO DANGER EXISTS FROM THE POTENTIAL OF STACKED MATERIALS FALLING ON PERSONNEL OR OTHER MATERIALS.
4. STORE ALL MATERIALS ON PALLETS, SHORING, OR TIMBERS AS REQUIRED TO PREVENT THE MATERIALS FROM RESTING ON THE GROUND OR FINISHED SURFACES WHERE DAMAGE TO THE MATERIALS OR FINISHED SURFACES MAY OCCUR. PROTECT, STORE, AND HANDLE ALL MATERIALS SUCH THAT NO SPILL MAY OCCUR THAT CAN DAMAGE THE ENVIRONMENT IN ANY FASHION. PROVIDE TEMPORARY PROTECTIVE COVERING OR COATINGS FOR FERROUS MATERIALS SUCH AS CAST IRON, STEEL VALVES, AND OTHER SURFACES. PROTECT MATERIALS THAT MAY BE DAMAGED FROM FREEZING BY STORING IN HEATED AREAS.
5. PROVIDE TEMPORARY END CAPS OR CLOSURES ON CONDUIT, FITTINGS AND EQUIPMENT OPENINGS. MAINTAIN AND CAPS IN PLACE UNTIL INSTALLATION. DURING HANDLING AND INSTALLATION OF THE MATERIALS, PROTECT ELECTRICAL SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY UTILIZING TEMPORARY COVERS, COMPLETING AND CLOSING SECTIONS OF THE WORK, AND ISOLATING PARTS OF THE COMPLETED SYSTEM.
6. DAMAGED, LOST OR STOLEN MATERIALS SHALL BE REPLACED BY THE CONTRACTOR AT THE EXPENSE OF THE CONTRACTOR.

COORDINATION

- 1. COORDINATE WORK AND ACTIVITIES AT THE SITE WITH THE OWNER DURING ALL WORK TO PROVIDE ADEQUATE AND TIMELY ACCESS TO ALL CONTRACT WORK AREAS WITH A MINIMAL DISRUPTION OF THE OWNER'S ACTIVITIES AND BUSINESS NEEDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR A SCHEDULED SEQUENCE IN PERFORMING THE WORK SO THAT IT WILL NOT INTERFERE WITH THE OWNER'S OPERATION. BEFORE ANY WORK IS STARTED, THE CONTRACTOR SHALL CONSULT WITH THE OWNER AND ARRANGE A SATISFACTORY WORK SCHEDULE. THE CONTRACTOR SHALL MAKE TIME TO COORDINATE WITH THE OWNER'S OPERATIONS TO ENSURE THAT ALL OPERATIONS AND SERVICES IN THE FACILITY ARE MAINTAINED WITH THE MINIMUM POSSIBLE INTERRUPTION. TEMPORARY SHUT-DOWNS SHALL BE MINIMIZED AND SHALL BE OF THE SHORTEST POSSIBLE DURATION. ALL FACILITIES SHALL BE KEPT IN CONTINUOUS OPERATION UNLESS SPECIFIC PERMISSION TO THE CONTRARY IS GRANTED IN WRITING BY THE OWNER. DAILY SCHEDULING AND WORK LOCATION IS A PART OF THE CONTRACTOR'S WORK INCLUDED HEREIN.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION AND COOPERATION WITH THE OWNER AND OTHER TRADES SO THAT THE INSTALLATION IS PERFORMED WITH MINIMUM OF INTERFERENCE AND CONFLICT. PARTICULAR ATTENTION MUST BE PAID TO COMMUNICATION WITH THE VARIOUS TRADES REGARDING THE PLANNED INSTALLATION OF THIS WORK.
3. THE CONTRACTOR SHALL BE PREPARED TO START, PROGRESS WITH, AND COMPLETE THE WORK AS PER THE OWNER'S PROJECT SCHEDULE AND COORDINATING THE ACTIVITIES OF THE CONTRACTOR'S WORK SCHEDULE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TIMELY PROCUREMENT OF MATERIALS AS SPECIFIED IN THIS SPECIFICATION. THE CONTRACTOR SHALL SCHEDULE PROCUREMENT OF ALL MATERIALS SO THAT THEY MAY BE DELIVERED AND INSTALLED WITHIN THE TERMS OF THE PROJECT SCHEDULE. ANY DIFFICULTIES IN PROCUREMENT AFFECTING THE INTENDED SCHEDULE SHOULD BE PROMPTLY REPORTED TO THE OWNER IN WRITING.

WARRANTY

- 1. ALL MATERIALS, LABOR AND SYSTEM COMPONENTS SHALL BE GUARANTEED FOR A MINIMUM PERIOD OF ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE OF WORK BY THE OWNER, UNLESS SPECIFIED OTHERWISE IN OTHER SPECIFICATION. ALL EQUIPMENT SHALL BE COVERED BY A SEPARATE WARRANTY. CONFLICTS IN STATED WARRANTY PERIODS SHALL AUTOMATICALLY DEFAULT TO THE LONGEST STATED PERIOD. SHOULD ANY MECHANICAL OR OTHER RELATED PROBLEM DUE TO FAULTY MATERIALS OR WORKMANSHIP OCCUR, THE PROBLEM SHALL BE CORRECTED TO THE SATISFACTION OF THE OWNER AT NO COST TO THE OWNER. ANY DEFECTIVE MATERIALS OR INFERIOR WORKMANSHIP DISCOVERED AT THE TIME OF INSTALLATION AND/OR DURING THE GUARANTEE PERIOD SHALL BE CORRECTED IMMEDIATELY TO THE COMPLETE SATISFACTION OF THE OWNER.
2. THE CONTRACTOR SHALL FURTHER AGREE TO REPAIR OR RENEW, FREE OF CHARGE TO THE OWNER ANY PART OF THE EQUIPMENT WHICH SHALL PROVE TO BE DEFECTIVE WITHIN TWO (2) YEARS AFTER THE DATE OF ACCEPTANCE BY THE OWNER.
3. ELECTRICAL EQUIPMENT SUCH AS TRANSFORMERS AND PANELBOARDS SHALL HAVE A MINIMUM EXTENDED WARRANTY PERIOD OF FIVE (5) YEARS FROM DATE OF FINAL ACCEPTANCE BY THE OWNER.
4. THE CONTRACTOR SHALL PROTECT THE EQUIPMENT FROM DAMAGE AND KEEP THE EQUIPMENT IN AN "AS NEW" CONDITION FOR ALL THE FURNISHED MATERIALS AND EQUIPMENT UNTIL FINAL ACCEPTANCE BY THE OWNER.

TEST AND REPORTS

- 1. INSTRUCT THE OWNER IN THE OPERATION AND MAINTENANCE OF THE ELECTRICAL SYSTEM.
2. PERFORM OPERATIONAL TESTS ON ALL LIGHTING AND 120 VOLT RECEPTACLE CIRCUITS AND AS REQUIRED IN THE SPECIFICATIONS.
3. INSPECT ALL GROUND CONNECTIONS FOR CONTINUITY AND TIGHT CONNECTIONS. TEST RESISTANCE AT VARIOUS POINTS ON THE GROUNDING ELECTRODE SYSTEM USING A BIDDER METER. REPORT ANY READING GREATER THAN 5 OHMS TO THE OWNER.
4. CHECK ALL CONTROL AND INTERLOCKING WIRING FOR PROPER OPERATION. PERFORM OPERATIONAL TESTS WITH THE OWNER TO ASSURE THAT CONTROL WIRING HAS BEEN PROPERLY INSTALLED.
5. SUBMIT A LIST OF MOTORS THAT REQUIRE AN OVERLOAD HEATER WITH THE FOLLOWING DATA:
6. MOTOR DESIGNATION.
7. HORSEPOWER, VOLTAGE, PHASE, AND SERVICE FACTOR.
8. NAMEPLATE FULL LOAD AMPERES.
9. MANUFACTURER'S CATALOG NUMBER OF HEATER SELECTED.
10. DURING THIS WORK, VERIFY THAT OVERLOAD RELAYS ARE SET ON "MANUAL" RESET.
11. BEFORE ENERGIZING ANY PANELBOARD OR SWITCHBOARD.
12. REMOVE ALL CONSTRUCTION DIRT AND DEBRIS.
13. CHECK THAT WIRING IS NOT RESTING AGAINST SHARP EDGES OF THE ENCLOSURE.
14. CONDUCT INSULATION TESTS BETWEEN BUSES AND BETWEEN BUS AND GROUND.
15. VERIFY THAT OVERCURRENT DEVICES HAVE PROPER RATINGS AND SETTINGS.
16. TEST GROUND-NEUTRAL SEPARATION, IN THE PRESENCE OF THE OWNER.
17. SUBMIT THE CONTINUITY TESTING AS REQUIRED BY NEC 250-95C.
18. CHECK ROTATION ON ALL MOTORS AND REVERSE ROTATION IF NECESSARY.
19. CHECK ROTATION OF ALL UTILITY SERVICES AND BUILDING GENERATOR SOURCES TO ASSURE PROPER PHASE ROTATION.

CLOSEOUT

- 1. STANDARILY INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF EACH SYSTEM AND EQUIPMENT ITEM.
2. PROVIDE THE OWNER THREE (3) SETS OF OPERATION AND MAINTENANCE MANUALS FOR EACH SYSTEM OR EQUIPMENT ITEM. THE VARIOUS ITEMS FOR EACH MANUAL SHALL BE BOUND TOGETHER IN ONE PLASTIC COMB BOUND BOOKLET OR HEAVY DUTY THREE (3) RING BINDER.
3. PROVIDE FOR THE REUSE BY THE OWNER OR PROPER DISPOSAL OF EXCESS MATERIALS AS REQUIRED TO APPROVED LOCATIONS ON THE SITE OR FOR DISPOSAL AS DISCONTINUED OR UNNECESSARY CHANGES TO THE WORK ON THE SITE. THE HAULING, HANDLING, CONFIRMATION, COORDINATION, AND MANAGEMENT OF THIS ACTIVITY ARE WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR.
4. FURNISH RECORD DRAWINGS OF THE FINAL INSTALLATION NOTING IMPORTANT DATA DURING AND AFTER THE FINAL INSTALLATION IS COMPLETE AND SYSTEMS ARE OPERATIONAL. RECORD DRAWINGS SHALL BE THOROUGH WITH ATTENTION TO DETAILS. THE OWNER RETAINS THE RIGHT TO REQUEST MORE INFORMATION TO BE ADDED TO DRAWINGS AS REQUIRED FOR FUTURE MAINTENANCE.
5. COPIES OF ALL PROJECT CLOSE-OUT DOCUMENTS SHALL BE FORWARDED TO THE OWNER FOR REVIEW, APPROVAL, AND USE.

PART 2 - PRODUCTS AND MATERIALS

MATERIAL

- 1. ALL PRODUCTS SHALL BE FIRST-LINE QUALITY, NEW AND UNUSED OF THE GRADE AND TYPE AS SHOWN ON THE DRAWINGS AND AS SPECIFIED, OR THE EQUIVALENTS AS APPROVED BY THE OWNER IN WRITING.
2. ALL PRODUCTS SHALL BE IN CURRENT PRODUCTION WITH NO NOTICE HAVING BEEN GIVEN THAT THIS PRODUCT IS TO BE DRASTICALLY CHANGED, MODIFIED, OR DISCONTINUED WITHOUT NOTICE TO THE OWNER FOR APPROVAL.
3. WHEN ANY MATERIAL OR EQUIPMENT IS IDENTIFIED ON THE PLANS OR IN THE SPECIFICATIONS BY REFERENCE TO ONE MANUFACTURER'S NAME OR MODEL NUMBER, IT IS INTENDED TO ESTABLISH THE REQUIRED STANDARD OF DESIGN AND QUALITY, AND IT IS NOT INTENDED TO LIMIT COMPETITION, IT IS UNDERSTOOD THAT, WHETHER PRESENT OR NOT, THE PHRASE "OR EQUAL" OR "OR AN APPROVED EQUIVALENT" APPLIES TO ALL FURNISHED MATERIALS AND IS MEANT TO MEAN AN "ACCEPTED" ITEM IF APPROVED BY THE OWNER AND ENGINEER PRIOR TO BIDDING PROJECT.
4. MATERIAL ALTERNATIVES
1. IF THE CONTRACTOR DESIRES TO SUGGEST CHANGES, MODIFICATIONS OR ALTERNATIVES, THE CONTRACTOR SHALL SUBMIT, IN WRITING, A DESCRIPTION OF THE PROPOSED CHANGES OR MODIFICATIONS FOR REVIEW BY THE OWNER AND ENGINEER.
2. THE CONTRACTOR SHALL SUBMIT THREE (3) COPIES OF DESCRIPTIVE INFORMATION FOR ANY MATERIALS PROPOSED BY THE CONTRACTOR WHICH ARE NOT EXACTLY AS SPECIFIED AND ARE INTENDED TO BE EQUAL OR BETTER IN QUALITY OR PERFORMANCE. THE INFORMATION SHALL INCLUDE, AS A MINIMUM, CATALOG DATA SHEETS AND SHOP DRAWINGS, SAMPLES AND OTHER SUPPORTIVE INFORMATION AS NECESSARY FOR THE OWNER TO EVALUATE THE PROPOSED MATERIALS OR EQUIPMENT.
3. THE CONTRACTOR SHALL REVIEW ALTERNATIVE MATERIAL AND EQUIPMENT RECOMMENDATIONS AND SHALL BE THE SOLE JUDGE IN DETERMINING WHETHER THE PROPOSED MATERIAL, ACCESSORY, OR ITEM MEETS THE STATED CRITERIA FOR THE SERVICE AND CONDITIONS IMPOSED. THE OWNER MAY REQUEST THE ENGINEER TO PROVIDE AN OPINION REGARDING SUCH ISSUES.
4. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PROPOSED CHANGES OR MODIFICATIONS UNTIL AUTHORIZED TO DO SO BY THE OWNER IN WRITING. THE COST OF ANY SUCH CHANGES OR MODIFICATIONS SHALL BE BORNE BY THE CONTRACTOR UNLESS OTHERWISE SPECIFIED IN WRITING. APPROVAL WILL BE AT THE CONTRACTOR'S EXPENSE, AS WELL AS ANY COST FOR UNDOING SUCH UNAUTHORIZED WORK.
5. ACCEPTANCE OF REQUESTS FOR SUBSTITUTIONS OF EQUIPMENT, MATERIALS OR PROCESSES SPECIFIED WILL BE CONTINGENT UPON SUBMISSION OF PROOF, SATISFACTORY TO THE OWNER THAT (1) THEY ARE SATISFACTORY IN TERMS OF QUALITY AND SERVICEABILITY; (2) THEIR USE WILL NOT ENTAIL CHANGES IN DETAILS AND CONSTRUCTION OF THE WORK OR INCREASE THE BURDEN OF PROOF ON THE CONTRACTOR; (3) THEY ARE IN CONFORMANCE WITH THE DESIGN. THE BURDEN OF PROOF SHALL BE UPON THE PARTY PROPOSING THE SUBSTITUTION. NO CONSIDERATION WILL BE GIVEN TO INCOMPLETE SUBMITTALS.
6. THE CONTRACTOR IS ENCOURAGED TO SUGGEST ALTERNATES COVERING EACH OF THE FOLLOWING SUBJECTS:
7. ALTERNATIVE MATERIALS AND EQUIPMENT TO IMPROVE QUALITY, SCHEDULE OR REDUCE PRICING.
8. EXCEPTIONS TO THE SPECIFICATIONS COVERING MATERIALS AND EQUIPMENT, MANNER OF APPLICATION, OR OTHER DETAILS.

PART 3 - EXECUTION OF WORK

3.01 EXAMINATION AND INSPECTION

- 1. PRIOR TO BIDDING THE WORK, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FULLY FAMILIAR WITH ALL CONDITIONS SUCH AS OVERHEAD OBSTRUCTIONS, STRUCTURES, EQUIPMENT, AND OTHER ITEMS THAT PERTAIN TO THE WORK DESCRIBED HEREIN. FAILURE TO UNDERSTAND OR HAVE KNOWLEDGE OF ISSUES THAT COULD HAVE BEEN DETERMINED PRIOR TO BIDDING WILL NOT CONSTITUTE GROUNDS FOR ASKING FOR WORK CHANGE ORDERS OR EXTRA WORK.
2. VERIFY FIELD DIMENSIONS, ROUTING, CLEARANCES, ACCESS, HEIGHTS, SCHEDULES, AND OTHER TIMES BY FIELD INSPECTION AND SITE ASSESSMENT PRIOR TO BEGINNING WORK.
3. ARRANGEMENT OF SYSTEMS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC, AND INDICATES THE MINIMUM REQUIREMENTS FOR THE ELECTRICAL WORK. SITE CONDITIONS MAY DETERMINE THE ACTUAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL BE RESPONSIBLE FOR ACCURACY OF DIMENSIONS AND LAYOUT. OVERHEAD WORK SHALL BE LAID OUT TO OBTAIN MAXIMUM HEAD ROOM, COORDINATE THE LOCATION OF ALL SYSTEMS TO AVOID INTERFERENCE WITH THE LOCATION OF OTHER SYSTEMS, WORK OF OTHER TRADES OR WITH TRAFFIC FLOW WITHIN THE AREAS.
4. WHERE SPECIFIC DETAILS AND DIMENSIONS FOR THE WORK ARE NOT SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL TAKE MEASUREMENTS AND MAKE LAYOUTS AS REQUIRED FOR THE PROPER INSTALLATION OF THE WORK AND SHALL PROVIDE COORDINATION WITH ALL OTHER WORK ON THE PROJECT. IN CASE OF ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE SPECIFICATIONS THAT HAVE NOT BEEN CLARIFIED BY ADDENDUM PRIOR TO BIDDING, IT SHALL BE ASSUMED BY THE SIGNING OF THE CONTRACT THAT THE HIGHER COST, IF THERE IS ANY CLEARLY IN COSTS) IS INCLUDED IN THE CONTRACT PRICE, AND THE CONTRACTOR SHALL PERFORM THE WORK IN ACCORDANCE WITH THE DRAWINGS AND WITH THE SPECIFICATIONS, AS DETERMINED AND APPROVED BY THE OWNER/ENGINEER, AND NO ADDITIONAL COSTS SHALL BE ADDED TO THE CONTRACT PRICE.
5. THE CONTRACTOR SHALL EXAMINE THE AREAS AND CONDITIONS UNDER WHICH THIS WORK IS TO BE INSTALLED. DO NOT PROCEED WITH THE WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED. THE STARTING OF WORK IS ACCEPTANCE OF THE CONDITIONS WITHIN ANY PARTICULAR AREA.
6. THE CONTRACTOR SHALL TAKE EXTRA PRECAUTIONS TO PROTECT THE FLOORS, ROOFS, AND GROUND FROM OIL SPILLAGE AND DRIPPING. ANY OPERATION, SUCH AS CUTTING AND THREADING OF PIPE, THAT CAN RESULT IN DRIPPING OF OIL AND THREAD CUTTINGS SHALL BE DONE OVER A DRAIN PAN THAT WILL COLLECT ALL DRIPPINGS. TAPRULINS, PLYWOOD OR DROP CLOTHS SHALL BE USED AROUND SUCH PIPING TO PREVENT WORKERS FROM TRACKING OIL OVER THE AREA. WORKERS SHALL BE CAUTIONED ABOUT CLEANING THEIR SHOES. ANY LIQUIDS, SUCH AS OIL, THAT WILL BE USED IN THIS WORK SHALL BE KEPT IN TIGHTLY STOPPED CONTAINERS, AND EXTREME CARE SHALL BE USED WHEN CHARGING EQUIPMENT WITH THESE MATERIALS SO AS TO AVOID ANY SPILLS.

3.02 INSTALLATION

- 1. WORK UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL CONSIST OF THE FURNISHING OF ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETE INSTALLATION OF ALL ELECTRICAL AND CONTROL SYSTEMS AS SHOWN ON THE DRAWINGS AND/OR AS SPECIFIED HEREIN. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MINOR ITEMS WHICH ARE OBVIOUSLY REQUIRED AND REASONABLY NECESSARY FOR THE WORK. THE CONTRACTOR SHALL DRILL, CUT, OR OTHERWISE ATTACH COMPONENTS FOR INSTALLATION OF THE WORK WITH THE FULL UNDERSTANDING THAT THE CONTRACTOR IS RESPONSIBLE FOR LEAVING THE FINISHED AREAS IN AN "AS ORIGINAL" CONDITION. CAULKING, FILLING, TOUCH-UP PAINTING, AND OTHER SURFACE FINISH AROUND THE CONTRACTOR'S WORK AND WORK AREA IS THEREFORE WITHIN THE SCOPE OF WORK OF THIS SPECIFICATION. ALL WORK SHALL BE COMPLETED AND READY FOR FULL OPERATION.
2. INSTALL ALL MATERIALS AND SYSTEMS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND AS PER THE APPROVED SUBMITTALS. INSTALL MATERIALS IN PROPER RELATIONSHIP WITH ADJACENT CONSTRUCTION AND WITH A UNIFORM APPEARANCE FOR EXPOSED WORK. COORDINATE THE INSTALLATION WITH THE WORK OF OTHER SECTIONS, COMPLY WITH ALL APPLICABLE REGULATIONS AND BUILDING CODE REQUIREMENTS.
3. RESTORE DAMAGED FINISHES, CLEAN AND PROTECT THE WORK FROM DAMAGE DURING CONSTRUCTION AND CLEAN THE FINAL WORK AT PROJECT COMPLETION. ANY DAMAGED, SCRATCHED, MARRED, OR OTHERWISE DEFACED PAINTED SURFACES, WALLS, CEILINGS, ROOFS, FLOORS, DOORS, INSULATED SURFACES OR INSULATION COVERINGS OR FINISHES, OR OTHER ITEMS SHALL BE SO REPAIRED TO RESTORE THE FINISH TO ORIGINAL CONDITION BY PERSONNEL WORKING IN THE REQUIRED RESPECTIVE TRADE.
4. IF REQUIRED, INSTALL APPROVED FIRE STOP MATERIALS AROUND ALL PIPE AND DUCT MATERIAL PENETRATIONS THROUGH FIRE RATED WALLS AND FLOORS.
5. IT IS THE INTENT THAT ALL MATERIALS AND MATERIAL SURFACES HAVE A PROTECTIVE FINISH WHEN IN PLACE. ALL NON-GALVANIZED FERROUS METAL ITEMS INSIDE THE BUILDING EXPOSED TO WEATHER OR OTHER AREA SUBJECT TO RUSTING SHALL BE GIVEN ONE HEAVY COAT OF RUST PREVENTIVE PRIMER AT THE TIME OF INITIAL INSTALLATION TO PREVENT RUSTING OR CORROSION PRIOR TO FINAL PAINTING.
6. PENETRATIONS THROUGH THE EXTERIOR WALL SHALL BE FLASHED AND WATER TIGHT, AND ALLOW FOR THE NORMAL CONDUIT MOVEMENT. FOR NON-FIRE RATED WALLS, PACK AROUND BOTH CONDUIT WITH FIBERGLASS AND CAULK WITH A COMPOUND TO CREATE WATER TIGHT SEAL. FOR FIRE RATED WALLS, SEAL AS REQUIRED TO PROVIDE THE FULL FIRE RATING CAPACITY OF THE FIRE RATED ASSEMBLY. IF APPLICABLE, THE LOCATION OF FIRE RATED WALLS AND FLOORS WILL BE PROVIDED BY THE OWNER.
7. PENETRATIONS OF INSULATION PANELS ARE TO BE PROPERLY INSULATED TO PREVENT FORMION OF CONDENSATION ON THE WARM SIDE. WHERE CONDUITS PASS THROUGH INSULATED PANELS, THE PANELS SHALL BE NEATLY CUT TO FIT AROUND THE PIPE, WITH OPENINGS FILLED TIGHTLY WITH INSULATION. OPENINGS FILLED WITH POLYURETHANE FOAM SHALL BE COVERED WITH THE FINISH SIMILAR TO ADJACENT PANELS.
8. STAINLESS STEEL ENSCOUTCHEON PLATES SHALL BE PLACED AROUND PIPE SLEEVES IN WALLS, PARTITIONS, AND CEILINGS TO ENCLOSE AND SEAL-OFF THE OPENING.
9. HOLES IN MASSIVE CONCRETE SHALL BE DRILLED WITH A SPLIT-POINT DIAMOND-CORE-BIT ROTARY DRILL. WALL SLEEVES THROUGH CONCRETE SHALL BE GROUDED AND INSTALLED WITH FOUR (4) 1/2" ANCHORING LUGS. AIR HAMMERS SHALL NOT BE USED. OPENINGS SHALL BE MADE BY CORING, SAWING, OR OTHER METHODS AS APPROVED BY THE OWNER.
6. PERMISSION TO PATCH ANY AREAS OR ITEMS OF WORK SHALL NOT CONSTITUTE A WAIVER OF THE OWNER'S RIGHT TO REQUIRE COMPLETE REMOVAL AND REPLACEMENT OF SAID AREAS OR ITEMS OF WORK, IF, IN THE OWNER'S OPINION, SAID PATCHING DOES NOT SATISFACTORILY RESTORE THE QUALITY AND APPEARANCE OF SAME.

3.04 GROUNDING

- 1. ALL EQUIPMENT SHALL BE GROUNDED BY CONNECTING THE EQUIPMENT GROUND OR HOUSING TO THE BUILDING GROUNDING SYSTEM WITH A PROPERLY SIZED CONDUCTOR.
2. ALL CURRENT CARRYING EQUIPMENT SHALL BE CONNECTED TO THE GROUND SYSTEM. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, TRANSFORMERS, PANELS, MOTOR FRAMES, MOTOR CONTROL CENTERS, MOTOR CONTROLLERS, AND STARTERS.
3. EVERY CONDUIT CARRYING POWER CIRCUITS SHALL HAVE SEPARATE GROUND WIRE(S) RUN WITH THE POWER WIRES REGARDLESS OF CONDUIT MATERIAL.
4. UNLESS OTHERWISE SHOWN, A SEPARATE GROUNDING WIRE SHALL NOT BE REQUIRED IN CONTROL CIRCUIT RACEWAYS.

SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- 1. SECTION INCLUDES:
2. SERVICE AND DISTRIBUTION SWITCHBOARDS RATED 600 V AND LESS.
3. TRANSIENT VOLTAGE SUPPRESSION DEVICES.
4. DISCONNECTED AND OVERCURRENT PROTECTIVE DEVICES.
5. INSTRUMENTATION.
6. CONTROL POWER.
7. ACCESSORY COMPONENTS AND FEATURES.
8. IDENTIFICATION.
9. MIMIC BUS.
ACTION SUBMITTALS

- 1. FURNISH DATA: FOR EACH TYPE OF SWITCHBOARD, OVERCURRENT PROTECTIVE DEVICE, TRANSIENT VOLTAGE SUPPRESSION DEVICE, GROUND-FAULT PROTECTOR, ACCESSORY AND COMPONENT INDICATED. INCLUDE DIMENSIONS AND MANUFACTURER'S TECHNICAL DATA ON FEATURES, PERFORMANCE, ELECTRICAL CHARACTERISTICS, RATINGS, ACCESSORIES, AND FINISHES.
2. SHOP DRAWINGS: FOR EACH SWITCHBOARD AND RELATED EQUIPMENT.
3. INCLUDE SCHEMATIC AND WIRING DIAGRAMS FOR TESTING AND ADJUSTING OVERCURRENT PROTECTIVE DEVICES.
4. DETAIL ENCLOSURE TYPES FOR TYPES OTHER THAN NEMA 250, TYPE 1.
5. DETAIL BUS CONFIGURATION, CURRENT, AND VOLTAGE RATINGS.
6. SUBMIT A LIST OF MOTORS, CURRENT RATINGS OF SWITCHBOARDS AND OVERCURRENT PROTECTIVE DEVICES.
7. INCLUDE DESCRIPTIVE DOCUMENTATION OF OPTIONAL BARRIERS SPECIFIED FOR ELECTRICAL INSULATION AND ISOLATION.
8. DETAIL UTILITY COMPANY'S METERING PROVISIONS WITH INDICATION OF APPROVAL BY UTILITY COMPANY.
9. INCLUDE EVIDENCE OF NRTL LISTING FOR SERIES RATING OF INSTALLED DEVICES.
10. DETAIL FEATURES, METERING INSTRUCTIONS FOR TESTING AND ADJUSTING OVERCURRENT PROTECTIVE DEVICES AND AUXILIARY COMPONENTS.
11. INCLUDE TIME-CURRENT COORDINATION CURVES FOR EACH TYPE AND RATING OF OVERCURRENT PROTECTIVE DEVICE INCLUDED IN SWITCHBOARDS. SUBMIT ON TRANSLUCENT LOG-LOG GRAPH PAPER; INCLUDE SELECTABLE RANGES FOR EACH TYPE OF OVERCURRENT PROTECTIVE DEVICE.
12. INCLUDE DIAGRAM AND DETAILS OF PROPOSED MIMIC BUS.
13. INCLUDE SCHEMATIC AND WIRING DIAGRAMS FOR POWER, SIGNAL, AND CONTROL WIRING.
14. SAMPLES: REPRESENTATIVE PORTION OF MIMIC BUS WITH SPECIFIED MATERIAL AND FINISH, FOR COLOR SELECTION.

INFORMATIONAL SUBMITTALS

- 1. QUALIFICATION DATA: FOR QUALIFIED INSTALLER.
2. FIELD QUALITY CONTROL REPORTS.
3. TEST PROCEDURES USED.
4. TEST RESULTS THAT COMPLY WITH REQUIREMENTS.
5. RESULTS OF FAILED TESTS AND CORRECTIVE ACTION TAKEN TO ACHIEVE TEST RESULTS THAT COMPLY WITH REQUIREMENTS.

CLOSEOUT

- 1. OPERATION AND MAINTENANCE DATA: FOR SWITCHBOARDS AND COMPONENTS TO INCLUDE IN EMERGENCY, OPERATION, AND MAINTENANCE MANUALS. IN ADDITION TO ITEMS SPECIFIED IN SECTION 017823 "OPERATION AND MAINTENANCE DATA," INCLUDE THE FOLLOWING:
2. ROUTINE MAINTENANCE REQUIREMENTS FOR SWITCHBOARDS AND ALL INSTALLED COMPONENTS.
3. MANUFACTURER'S WRITTEN INSTRUCTIONS FOR TESTING AND ADJUSTING OVERCURRENT PROTECTIVE DEVICES.
4. TIME-CURRENT COORDINATION CURVES FOR EACH TYPE AND RATING OF OVERCURRENT PROTECTIVE DEVICE INCLUDED IN SWITCHBOARDS. SUBMIT ON TRANSLUCENT LOG-LOG GRAFT PAPER; INCLUDE SELECTABLE RANGES FOR EACH TYPE OF OVERCURRENT PROTECTIVE DEVICE.

MAINTENANCE MATERIAL SUBMITTALS

- 1. FURNISH EXTRA MATERIALS THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENT.
2. POTENTIAL TRANSFORMER FUSES: EQUAL TO 10 PERCENT OF QUANTITY INSTALLED FOR EACH SIZE AND TYPE, BUT NO FEWER THAN TWO OF EACH SIZE AND TYPE.
3. CONTROL-POWER FUSES: EQUAL TO 10 PERCENT OF QUANTITY INSTALLED FOR EACH SIZE AND TYPE, BUT NO FEWER THAN TWO OF EACH SIZE AND TYPE.
4. FUSES AND FUSIBLE DEVICES FOR FUSED CIRCUIT BREAKERS: EQUAL TO 10 PERCENT OF QUANTITY INSTALLED FOR EACH SIZE AND TYPE, BUT NO FEWER THAN THREE OF EACH SIZE AND TYPE.
5. FUSES FOR FUSED SWITCHES: EQUAL TO 10 PERCENT OF QUANTITY INSTALLED FOR EACH SIZE AND TYPE, BUT NO FEWER THAN THREE OF EACH SIZE AND TYPE.
6. FUSES FOR FUSED POWER-CIRCUIT DEVICES: EQUAL TO 10 PERCENT OF QUANTITY INSTALLED FOR EACH SIZE AND TYPE, BUT NO FEWER THAN THREE OF EACH SIZE AND TYPE.
7. FUSES AND INSTALIGHTS: EQUAL TO 10 PERCENT OF QUANTITY INSTALLED FOR EACH SIZE AND TYPE, BUT NO FEWER THAN ONE OF EACH SIZE AND TYPE.

QUALITY ASSURANCE

- 1. INSTALLER QUALIFICATIONS: AN EMPLOYER OF WORKERS QUALIFIED AS DEFINED IN NEMA PB 2.1 AND TRAINED IN ELECTRICAL SAFETY AS REQUIRED BY NFPA 70E.
2. TESTING AGENCY QUALIFICATIONS: MEMBER COMPANY OF NETA OR AN NRTL.
3. FIELD QUALITY CONTROL: CURRENTLY CERTIFIED BY NETA TO SUPERVISE ON-SITE TESTING.
4. SOURCE LIMITATIONS: OBTAIN SWITCHBOARDS, OVERCURRENT PROTECTIVE DEVICES, COMPONENTS, AND ACCESSORIES FROM SINGLE SOURCE FROM SINGLE MANUFACTURER.
5. PRODUCT SELECTION FOR RESTRICTED SPACE: DRAWINGS INDICATE MAXIMUM DIMENSIONS FOR SWITCHBOARDS INCLUDING CLEARANCES BETWEEN SWITCHBOARDS AND ADJACENT SURFACES AND OTHER ITEMS. COMPLY WITH INDICATED MAXIMUM DIMENSIONS.
6. IDENTIFY COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
7. COMPLY WITH NEMA PB 2.
8. COMPLY WITH NFPA 70.

DELIVERY, STORAGE, AND HANDLING

- 1. DELIVER SWITCHBOARDS IN SECTIONS OR LENGTHS THAT CAN BE MOVED PAST OBSTRUCTIONS IN DELIVERY PATH.
2. REMOVE LOOSE PACKING AND FLAMMABLE MATERIALS FROM INSIDE SWITCHBOARDS AND CONNECT FACTORY-INSTALLED SPACE HEATERS TO TEMPORARY ELECTRICAL SERVICE TO PREVENT OVERHEATING.
3. HANDLE AND PREPARE SWITCHBOARDS FOR INSTALLATION ACCORDING TO [NECA 400] [NEMA PB 2.1].

PROJECT CONDITIONS

- 1. INSTALLATION PATHWAY: REMOVE AND REPLACE ACCESS FENCING, DOORS, LIFT-OUT PANELS, AND STRUCTURES TO PROVIDE PATHWAY FOR MOVING SWITCHBOARDS INTO PLACE.
2. NOTIFY OWNER NOT LESS THAN SEVEN DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF ELECTRIC SERVICE.
3. DO NOT DELIVER OR INSTALL SWITCHBOARDS UNTIL SPACES ARE ENCLOSED AND WEATHERTIGHT, WET WORK IN SPACES IS COMPLETE AND DRY, WORK ABOVE SWITCHBOARDS IS COMPLETE, AND TEMPORARY HVAC SYSTEM IS OPERATING AND MAINTAINING AMBIENT TEMPERATURE AND HUMIDITY CONDITIONS AT OCCUPANCY LEVELS DURING THE REMAINDER OF THE CONSTRUCTION PERIOD.
4. RATE EQUIPMENT FOR CONTINUOUS OPERATION UNDER THE FOLLOWING CONDITIONS UNLESS OTHERWISE INDICATED:
5. AMBIENT TEMPERATURE: NOT EXCEEDING 104 DEG F (40 DEG C).
6. ALTITUDE: NOT EXCEEDING 6600 FEET (2000 M).
7. SERVICE CONDITIONS: NEMA PB 2.1, USUAL SERVICE CONDITIONS, AS FOLLOWS:
8. AMBIENT TEMPERATURE: WITHIN LIMITS SPECIFIED.
9. ALTITUDE NOT EXCEEDING 6600 FEET (2000 M).
10. INTERRUPTION OF EXISTING ELECTRIC SERVICE: DO NOT INTERRUPT ELECTRIC SERVICE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY ELECTRIC SERVICE ACCORDING TO REQUIREMENTS INDICATED:
11. NOTIFY OWNER NOT LESS THAN SEVEN DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF ELECTRIC SERVICE.
12. INDICATE METHOD OF PROVIDING TEMPORARY ELECTRIC SERVICE.
13. DO NOT PROCEED WITH INTERRUPTION OF ELECTRIC SERVICE WITHOUT OWNER'S WRITTEN PERMISSION.
14. COMPLY WITH NFPA 70E.

1.9 COORDINATION

- 1. COORDINATE LAYOUT AND INSTALLATION OF SWITCHBOARDS AND COMPONENTS WITH OTHER CONSTRUCTION THAT PENETRATES WALLS OR IS SUPPORTED BY THEM, INCLUDING ELECTRICAL AND OTHER TYPES OF EQUIPMENT, RACEWAYS, PIPING, ENCUMBRANCES TO WORKSPACE CLEARANCE REQUIREMENTS, AND ADJACENT SURFACES. MAINTAIN REQUIRED WORKSPACE CLEARANCES AND REQUIRED CLEARANCES FOR EQUIPMENT ACCESS DOORS AND PANELS.
2. COORDINATE SIZES AND LOCATIONS OF CONCRETE BANDS WITH ACTUAL EQUIPMENT PROVIDED. CAST ANCHOR-BOLT INSERTS INTO BASES. CONCRETE, REINFORCEMENT, AND FORMWORK REQUIREMENTS ARE SPECIFIED WITH CONCRETE.

1.10 WARRANTY

- 1. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE TRANSIENT VOLTAGE SUPPRESSION DEVICES THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.
2. WARRANTY PERIOD: FIVE YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS.
2. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
A. EATON ELECTRICAL, INC., CUTLER-HAMMER BUSINESS UNIT.
B. GENERAL ELECTRIC COMPANY, GE CONSUMER & INDUSTRIAL - ELECTRICAL DISTRIBUTION.
C. SIEMENS ENERGY & AUTOMATION, INC.
D. SQUARE D, A BRAND OF SCHNEIDER ELECTRIC.
3. FRONT-CONNECTED, FRONT-ACCESSIBLE SWITCHBOARDS:
4. MAIN DEVICES: PANEL MOUNTED.
5. BRANCH DEVICES: PANEL MOUNTED.
6. SECTIONS FRONT AND REAR ALIGNED.
7. FRONT- AND SIDE-ACCESSIBLE SWITCHBOARDS:
8. MAIN DEVICES: FIXED, INDIVIDUALLY MOUNTED.
9. BRANCH DEVICES: PANEL MOUNTED.
10. SECTIONS FRONT AND REAR ALIGNED.
11. FRONT- AND REAR-ACCESSIBLE SWITCHBOARDS:
12. MAIN DEVICES: FIXED, INDIVIDUALLY MOUNTED.
13. BRANCH DEVICES: PANEL AND FIXED, INDIVIDUALLY MOUNTED.
14. SECTIONS FRONT AND REAR ALIGNED.
15. NOMINAL SYSTEM VOLTAGE: [480V/277 V] [208V/120 V].
16. MAIN-BUS CONTINUOUS: 1200 A.
17. SEISMIC REQUIREMENTS: FABRICATE AND TEST SWITCHBOARDS ACCORDING TO IEEE 344 TO WITHSTAND SEISMIC FORCES DEFINED IN SECTION 260548 "VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS."
18. INDOOR ENCLOSURES: STEEL, NEMA 250, TYPE 1.
ENCLOSURE FINISH FOR INDOOR UNITS: FACTORY-APPLIED FINISH IN MANUFACTURER'S [STANDARD GRAY] [CUSTOM COLOR] FINISH OVER A RUST-INHIBITING PRIMER ON TREATED METAL SURFACE.
20. OUTDOOR ENCLOSURES: [TYPE 3R] [TYPE 3R WITH INTERIOR-LIGHTED WALK-IN AISLE].
21. FINISH: FACTORY-APPLIED FINISH IN MANUFACTURER'S [STANDARD] [CUSTOM COLOR] UNDERSURFACES TREATED WITH CORROSION-RESISTANT UNDERCOATING.
22. INTERIOR FLOOR PLAT (DOWNWARD, REARWARD SLOPING) ROOF (BOLT-ON REAR COVER) (REAR HINGED DOORS) FOR EACH SECTION, WITH PROVISIONS FOR PADLOCKING.
23. DOORS: PERSONNEL DOOR AT EACH END OF AISLE, MINIMUM WIDTH OF [30 INCHES (762 MM)] <INSERT VALUE>; OPENING OUTWARDS, WITH PAIN HARDWARE AND PROVISIONS FOR [PADLOCKING] [CYLINDER LOCK].
24. ACCESSORIES: FLUORESCENT LIGHTING FIXTURES, CEILING MOUNTED, WIRED TO A THREE-WAY LIGHT SWITCH AT EACH END OF AISLE; GROUND-FAULT CIRCUIT INTERRUPTER (GFCI) WITH REAR-ACCESSIBLE BATTERY BACK LIGHTING FIXTURE INSTALLED ON WALL OF AISLE MIDWAY BETWEEN PERSONNEL DOORS.
25. WALK-IN AISLE HEATING AND VENTILATING.
26. FACTORY-INSTALLED ELECTRIC UNIT HEATER(S), WALL OR CEILING MOUNTED, WITH INTEGRAL THERMOSTAT AND DISCONNECT AND WITH CAPACITIES TO MAINTAIN SWITCHBOARD INTERIOR TEMPERATURE OF 40 DEG F (5 DEG C) <INSERT TEMPERATURE> WITH OUTSIDE DESIGN TEMPERATURE OF 104 DEG F (40 DEG C).
27. INTERIOR TEMPERATURE OF 40 DEG F (5 DEG C) <INSERT TEMPERATURE> WITH OUTSIDE DESIGN TEMPERATURE OF 100 DEG F (38 DEG C) WITH OUT

POWER FOR SPACE HEATERS, VENTILATION, LIGHTING, AND RECEPTACLE PROVIDED BY A REMOTE SOURCE.
 BARRIERS: BETWEEN ADJACENT SWITCHBOARD SECTIONS.
 INSULATION AND ISOLATION FOR MAIN AND VERTICAL BUSES OF FEEDER SECTIONS.
 CUBICAL SPACE HEATERS: FACTORY-INSTALLED ELECTRIC SPACE HEATERS OF SUFFICIENT WATTAGE IN EACH VERTICAL SECTION TO MAINTAIN ENCLOSURE TEMPERATURE ABOVE EXPECTED DEW POINT.
 SPACE-HEATER CONTROL: THERMOSTATS TO MAINTAIN TEMPERATURE OF EACH SECTION ABOVE EXPECTED DEW POINT.
 SPACE-HEATER POWER SOURCE: TRANSFORMER, FACTORY INSTALLED IN SWITCHBOARD
 BUS TRANSITION AND INCOMING PULL SECTIONS: MATCHED AND ALIGNED WITH BASIC SWITCHBOARD.
 REMOVABLE, HINGED REAR DOORS AND COMPARTMENT COVERS: SECURED BY STANDARD BOLTS, FOR ACCESS TO REAR INTERIOR OF SWITCHBOARD. HINGED FRONT PANELS: ALLOW ACCESS TO CIRCUIT BREAKER, METERING, ACCESSORY, AND BLANK COMPARTMENTS.
 PULL BOX ON TOP OF SWITCHBOARD.
 ADEQUATE VENTILATION TO MAINTAIN TEMPERATURE IN PULL BOX WITHIN SAME LIMITS AS SWITCHBOARD.
 SET BACK FROM FRONT TO CLEAR CIRCUIT-BREAKER REMOVAL MECHANISM.
 REMOVABLE COVERS SHALL FORM TOP, FRONT, AND SIDES. TOP COVERS AT REAR SHALL BE EASILY REMOVABLE FOR DRILLING AND CUTTING. BOTTOM SHALL BE INSULATING, FIRE-RESISTIVE MATERIAL WITH SEPARATE HOLES FOR CABLE DROPS INTO SWITCHBOARD.
 CABLE SUPPORTS SHALL BE ARRANGED TO FACILITATE CABLING AND ADEQUATE TO SUPPORT CABLES INDICATED, INCLUDING THOSE FOR FUTURE INSTALLATION.
 BUSES AND CONNECTIONS: THREE PHASE, FOUR WIRE UNLESS OTHERWISE INDICATED.
 PHASE- AND NEUTRAL-BUS MATERIAL: HARD-DRAWN COPPER OF 98 PERCENT CONDUCTIVITY, WITH TIN-PLATED ALUMINUM OR COPPER FEEDER CIRCUIT-BREAKER LINE CONNECTIONS.
 PHASE- AND NEUTRAL-BUS MATERIAL: TIN-PLATED, HIGH-STRENGTH, ELECTRICAL-GRADE ALUMINUM ALLOY WITH TIN-PLATED ALUMINUM CIRCUIT-BREAKER LINE CONNECTIONS.
 PHASE- AND NEUTRAL-BUS MATERIAL: HARD-DRAWN COPPER OF 98 PERCENT CONDUCTIVITY, HIGH-STRENGTH, ELECTRICAL-GRADE ALUMINUM ALLOY. LOAD TERMINALS: INSULATED, RIGIDLY BRACED, RUNBACK BUS EXTENSIONS, OF SAME MATERIAL AS THROUGH BUSES, EQUIPPED WITH MECHANICAL CONNECTORS FOR OUTGOING CIRCUIT CONDUCTORS. PROVIDE LOAD TERMINALS FOR FUTURE CIRCUIT-BREAKER POSITIONS AT FULL-AMPERE RATING OF CIRCUIT-BREAKER POSITION.
 GROUND BUS: MINIMUM-SIZE REQUIRED BY UL 891, HARD-DRAWN COPPER OF 98 PERCENT CONDUCTIVITY, EQUIPPED WITH MECHANICAL CONNECTORS FOR FEEDER AND BRANCH-CIRCUIT GROUND CONDUCTORS. FOR BUSWAY FEEDERS, EXTEND INSULATED EQUIPMENT GROUNDING CABLE TO BUSWAY GROUND CONNECTION AND SUPPORT CABLE AT INTERVALS IN VERTICAL RUN.
 MAIN PHASE BUSES AND EQUIPMENT GROUND BUSES: UNIFORM CAPACITY FOR ENTIRE LENGTH OF SWITCHBOARD'S MAIN AND DISTRIBUTION SECTIONS. PROVIDE FOR FUTURE EXTENSIONS FROM BOTH ENDS.
 NEUTRAL BUSES: 50 PERCENT OF THE AMPACITY OF PHASE BUSES UNLESS OTHERWISE INDICATED. EQUIPPED WITH MECHANICAL [COMPRESSION] CONNECTORS FOR OUTGOING CIRCUIT NEUTRAL CABLES. BRACE BUS EXTENSIONS FOR BUSWAY FEEDER NEUTRAL BUS.
 NEUTRAL BUSES: 100 PERCENT OF THE AMPACITY OF PHASE BUSES UNLESS OTHERWISE INDICATED, EQUIPPED WITH [MECHANICAL] [COMPRESSION] CONNECTORS FOR OUTGOING CIRCUIT NEUTRAL CABLES. BRACE BUS EXTENSIONS FOR BUSWAY FEEDER NEUTRAL BUS.
 ISOLATION BARRIER ACCESS PROVISIONS: PERMIT CHECKING OF BUS-BOLT TIGHTNESS.
 INSULATION BARRIERS: EQUIP COMPARTMENTS WITH MOUNTING BRACKETS, SUPPORTS, BUS CONNECTIONS, AND APPURTENANCES AT FULL RATING OF CIRCUIT-BREAKER COMPARTMENT.
 BUS-BAR INSULATION: FACTORY-APPLIED, FLAME-RETARDANT, TAPE WRAPPING OF INDIVIDUAL BUS BARS OR FLAME-RETARDANT, SPRAY-APPLIED INSULATION. MINIMUM INSULATION TEMPERATURE RATING OF 105 DEG C.
 FLUNGIS PROOFING: PERMANENT FUNCTIONING TREATMENT FOR OVERCURRENT PROTECTIVE DEVICES AND OTHER COMPONENTS INCLUDING INSTRUMENTS AND INSTRUMENT TRANSFORMERS.

- 2.2 TRANSIENT VOLTAGE SUPPRESSION DEVICES**
1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 2. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
 3. EATON ELECTRICAL INC.; CUTLER-HAMMER BUSINESS UNIT.
 4. GENERAL ELECTRIC COMPANY; GE CONSUMER & INDUSTRIAL - ELECTRICAL DISTRIBUTION.
 5. SIEMENS ENERGY & AUTOMATION, INC.
 6. SQUARE D; A BRAND OF SCHNEIDER ELECTRIC.
 7. SURGE PROTECTION DEVICE DESCRIPTION: IEEE C62.41-COMPLIANT, INTEGRALLY MOUNTED, BOLT-ON, SOLID-STATE, PARALLEL-CONNECTED, MODULAR WITH FIELD-REPLACEABLE MODULES TYPE, WITH SINE-WAVE TRACKING SUPPRESSION AND FILTERING MODULES, UL 1449, SECOND EDITION, SHORT-CIRCUIT CURRENT RATING MATCHING OR EXCEEDING THE SWITCHBOARD SHORT-CIRCUIT RATING, AND WITH THE FOLLOWING FEATURES AND ACCESSORIES:
 8. FUSES, RATED AT 200-KA INTERRUPTING CAPACITY.
 9. FABRICATION USING BOLTED COMPRESSION LUGS FOR INTERNAL WIRING.
 10. INTEGRAL DISCONNECT SWITCH.
 11. REDUNDANT SUPPRESSION CIRCUITS.
 12. REDUNDANT REPLACEABLE MODULES.
 13. ARRANGEMENT WITH WIRE CONNECTIONS TO PHASE BUSES, NEUTRAL BUS, AND GROUND BUS.
 14. LED INDICATOR LIGHTS FOR POWER AND PROTECTION STATUS.
 15. AUDIBLE ALARM, WITH SILENCING SWITCH, TO INDICATE WHEN PROTECTION HAS FAILED.
 16. FORM-C CONTACTS RATED AT 5 A AND 250-V AC, ONE NORMALLY OPEN AND ONE NORMALLY CLOSED, FOR REMOTE MONITORING OF SYSTEM OPERATION. CONTACTS SHALL BE IN REVERSE POSITION ON FAILURE OF ANY SURGE DIVERSION MODULE OR ON OPENING OF ANY CURRENT-LIMITING DEVICE. COORDINATE WITH BUILDING POWER MONITORING AND CONTROL SYSTEM.
 17. FOUR-DIGIT, TRANSIENT-EVENT COUNTER SET TO TOTALIZE TRANSIENT SURGES.
 18. PEAK SINGLE-IMPULSE SURGE CURRENT RATING: 160 KA PER MODE/320 KA PER PHASE.
 19. WITHSTAND CAPABILITIES: 12,000 IEEE C62.41, CATEGORY C3 (10 KA), 8-BY-20-MIC-SEC. SURGES WITH LESS THAN 5 PERCENT CHANGE IN CLAMPING VOLTAGE.
 20. PROTECTION MODES AND UL 1449 SVR FOR GROUNDED WYE CIRCUITS WITH [480Y/277] [208Y/120]V, THREE-PHASE, FOUR-WIRE CIRCUITS SHALL BE AS FOLLOWS:
 21. LINE TO NEUTRAL: [800 V FOR 480Y/277] [400 V FOR 208Y/120]
 22. LINE TO GROUND: [800 V FOR 480Y/277] [400 V FOR 208Y/120]
 23. NEUTRAL TO GROUND: [800 V FOR 480Y/277] [400 V FOR 208Y/120]
 24. PROTECTION MODES AND UL 1449 SVR FOR 240/120-V, THREE-PHASE, FOUR-WIRE CIRCUITS WITH HIGH LEG SHALL BE AS FOLLOWS:
 25. LINE TO NEUTRAL: 400 V, 800 V FROM HIGH LEG.
 26. LINE TO GROUND: 400 V
 27. NEUTRAL TO GROUND: 400 V.
 28. PROTECTION MODES AND UL 1449 SVR FOR 240-, 480-, OR 600V, THREE-PHASE, THREE-WIRE, DELTA CIRCUITS SHALL BE AS FOLLOWS:
 29. LINE TO LINE: 200 V FOR 480 V.
 30. LINE TO GROUND: 150 V FOR 480 V.

- 2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES**
1. MOLDED-CASE CIRCUIT BREAKER (MCCB): COMPLY WITH UL 489, WITH SERIES-CONNECTED RATING TO MEET AVAILABLE FAULT CURRENTS.
 2. THERMAL-MAGNETIC CIRCUIT BREAKERS: INVERSE TIME-CURRENT ELEMENT FOR LOW-LEVEL OVERLOADS, AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT-BREAKER FRAME SIZES 250 A AND LARGER.
 3. ADJUSTABLE INSTANTANEOUS-TRIP CIRCUIT BREAKERS: MAGNETIC TRIP ELEMENT WITH FRONT-MOUNTED, FIELD-ADJUSTABLE TRIP SETTING.
 4. ELECTRONIC TRIP CIRCUIT BREAKERS WITH RMS SENSING; FIELD-REPLACEABLE RATING PLUG OR FIELD-REPLICABLE ELECTRONIC TRIP; AND THE FOLLOWING FIELD-ADJUSTABLE SETTINGS:
 5. INSTANTANEOUS TRIP.
 6. LONG- AND SHORT-TIME PICKUP LEVELS.
 7. LONG- AND SHORT-TIME TIME ADJUSTMENTS.
 8. GROUND-FAULT PICKUP LEVEL, TIME DELAY, AND I2T RESPONSE.
 9. CURRENT-LIMITING CIRCUIT BREAKERS: FRAME SIZES 400 A AND SMALLER; LET-THROUGH RATINGS LESS THAN NEMA FU 1, RK-5.
 10. INTEGRALLY FUSED CIRCUIT BREAKERS: THERMAL-MAGNETIC TRIP ELEMENT WITH INTEGRAL LIMITER-STYLE FUSE LISTED FOR USE WITH CIRCUIT BREAKER; TRIP ACTIVATION ON FUSE OPENING OR ON OPENING OF FUSE COMPARTMENT DOOR.
 11. GFCI CIRCUIT BREAKERS: SINGLE- AND TWO-POLE CONFIGURATIONS WITH CLASS A GROUND-FAULT PROTECTION (6MA TRIP).
 12. GROUND-FAULT EQUIPMENT PROTECTION (GFEP) CIRCUIT BREAKERS: CLASS B GROUND-FAULT PROTECTION (30-MA TRIP).
 13. MOLDED-CASE CIRCUIT-BREAKER (MCCB) FEATURES AND ACCESSORIES:
 14. STANDARD FRAME SIZES, TRIP RATINGS, AND NUMBER OF POLES.
 15. LUGS: MECHANICAL STYLE, SUITABLE FOR NUMBER, SIZE, TRIP RATINGS, AND CONDUCTOR MATERIAL.
 16. APPLICATION LISTING: APPROPRIATE FOR APPLICATION, TYPE SWD FOR SWITCHING FLUORESCENT LIGHTING LOADS; TYPE HID FOR FEEDING FLUORESCENT AND HIGH-INTENSITY DISCHARGE (HID) LIGHTING CIRCUITS.
 17. GROUND-FAULT PROTECTION: [INTEGRALLY MOUNTED] [REMOTE-MOUNTED] RELAY AND TRIP UNIT WITH ADJUSTABLE PICKUP AND TIME-DELAY SETTINGS, PUSH-TO-TEST FEATURE, AND GROUND-FAULT INDICATOR.
 18. ZONE-SELECTIVE INTERLOCKING: INTEGRAL WITH ELECTRONIC TRIP UNIT; FOR INTERLOCKING GROUND-FAULT PROTECTION FUNCTION.
 19. COMMUNICATION CAPABILITY: [CIRCUIT-BREAKER-MOUNTED] [UNIVERSAL-MOUNTED] [INTEGRAL] [DIN-RAIL-MOUNTED] COMMUNICATION MODULE WITH FUNCTIONS AND FEATURES COMPATIBLE WITH POWER MONITORING AND CONTROL SYSTEM SPECIFIED IN SECTION 260913 ELECTRICAL POWER MONITORING AND CONTROL.
 20. SHUNT TRIP: 120-V TRIP COIL ENERGIZED FROM SEPARATE CIRCUIT, SET TO TRIP AT [55] [75] PERCENT OF RATED VOLTAGE.
 21. UNDERVOLTAGE TRIP: SET TO OPERATE AT 35 TO 75 PERCENT OF RATED VOLTAGE WITHOUT INTENTIONAL TIME DELAY.
 22. AUXILIARY CONTACTS: [ONE SPDT SWITCH] [TWO SPDT SWITCHES] WITH "A" AND "B" CONTACTS; "A" CONTACTS MIMIC CIRCUIT-BREAKER CONTACTS; "B" CONTACTS OPERATE IN REVERSE OF CIRCUIT-BREAKER CONTACTS.
 23. KEY INTERLOCK KIT: EXTERNALLY MOUNTED TO PROHIBIT CIRCUIT-BREAKER OPERATION; KEY SHALL BE REMOVABLE ONLY WHEN CIRCUIT BREAKER IS IN OFF POSITION.
 24. INSULATED-CASE CIRCUIT BREAKER (ICCB): [80] [100] PERCENT RATED, SEALED, INSULATED-CASE POWER CIRCUIT BREAKER WITH INTERRUPTING CAPACITY RATING TO MEET AVAILABLE FAULT CURRENT.
 25. [FIXED] [DRAWOUT] CIRCUIT-BREAKER MOUNTING.
 26. TWO-STEP, STORED-ENERGY CLOSING.
 27. [STANDARD] [FULL] FUNCTION, MICROPROCESSOR-BASED TRIP UNITS WITH INTERCHANGEABLE RATING PLUG, TRIP INDICATORS, AND THE FOLLOWING FIELD-ADJUSTABLE SETTINGS:
 28. INSTANTANEOUS TRIP.
 29. LONG- AND SHORT-TIME TIME ADJUSTMENTS.
 30. GROUND-FAULT PICKUP LEVEL, TIME DELAY, AND I2T RESPONSE.
 31. ZONE-SELECTIVE INTERLOCKING: INTEGRAL WITH ELECTRONIC TRIP UNIT; FOR INTERLOCKING GROUND-FAULT PROTECTION FUNCTION.
 32. REMOTE TRIP INDICATION AND CONTROL.
 33. COMMUNICATION CAPABILITY: INTEGRAL COMMUNICATION MODULE WITH FUNCTIONS AND FEATURES COMPATIBLE WITH POWER MONITORING AND CONTROL SYSTEM SPECIFIED IN SECTION 260913 "ELECTRICAL POWER MONITORING AND CONTROL."
 34. KEY INTERLOCK KIT: EXTERNALLY MOUNTED TO PROHIBIT CIRCUIT-BREAKER OPERATION; KEY SHALL BE REMOVABLE ONLY WHEN CIRCUIT BREAKER IS IN OFF POSITION.
 35. CONTROL VOLTAGE: 120-V AC.
 36. BOLTED-PRESSURE CONTACT SWITCH: OPERATING MECHANISM USES ROTARY-MECHANICAL, BOLTING ACTION TO PRODUCE AND MAINTAIN HIGH CLAMPING PRESSURE ON THE SWITCH BLADE AFTER IT ENGAGES THE STATIONARY CONTACTS.
 37. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - A. BOLTSWITCH, INC.
 - B. EATON ELECTRICAL INC.; CUTLER-HAMMER BUSINESS UNIT.

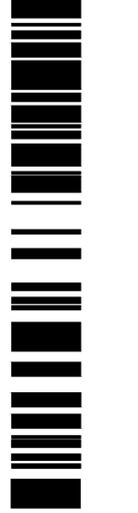
- A. PRINGLE ELECTRICAL MANUFACTURING COMPANY, INC.
- SIEMENS ENERGY & AUTOMATION, INC.
- SQUARE D; A BRAND OF SCHNEIDER ELECTRIC.
- MAIN-CONTACT INTERRUPTING CAPABILITY: MINIMUM OF 12 TIMES THE SWITCH CURRENT RATING.
- OPERATING MECHANISM: MANUAL HANDLE OPERATION TO CLOSE SWITCH; STORES ENERGY IN MECHANISM FOR OPENING AND CLOSING.
- ELECTRICAL TRIP: OPERATION OF LEVER OR PUSH-BUTTON TRIP SWITCH, OR TRIP SIGNAL FROM GROUND-FAULT RELAY OR REMOTE-CONTROL DEVICE, CAUSES SWITCH TO OPEN.
- MECHANICAL TRIP: OPERATION OF MECHANICAL LEVER, PUSH BUTTON, OR OTHER DEVICE CAUSES SWITCH TO OPEN.
- AUXILIARY SWITCHES: FACTORY INSTALLED, SINGLE POLE, DOUBLE THROW, WITH LEADS CONNECTED TO TERMINAL BLOCK, AND INCLUDING ONE SET MORE THAN QUANTITY REQUIRED FOR FUNCTIONAL PERFORMANCE INDICATED.
- SERVICE-RATED SWITCHES: LABELED FOR USE AS SERVICE EQUIPMENT.
- GROUND-FAULT RELAY: COMPLY WITH UL 1053, SELF-POWERED TYPE WITH MECHANICAL GROUND-FAULT INDICATOR, TEST FUNCTION, TRIPPING RELAY WITH INTERNAL MEMORY, AND THREE-PHASE CURRENT TRANSFORMER/SENSOR.
- CONFIGURATION: INTEGRALLY MOUNTED RELAY AND TRIP UNIT WITH ADJUSTABLE PICKUP AND TIME-DELAY SETTINGS, PUSH-TO-TEST FEATURE, AND GROUND-FAULT INDICATOR.
- INTERNAL MEMORY: INTEGRATES THE CUMULATIVE VALUE OF INTERMITTENT ARCING GROUND-FAULT CURRENTS AND USES THE EFFECT TO INITIATE TRIPPING.
- NO-TRIP RELAY TEST: PERMITS GROUND-FAULT SIMULATION TEST WITHOUT TRIPPING SWITCH.
- TEST CONTROL: SIMULATES GROUND FAULT TO TEST RELAY AND SWITCH (OR RELAY ONLY IF "NO-TRIP" MODE IS SELECTED).
- OPEN-FUSE TRIP DEVICE: ARRANGED TO TRIP SWITCH OPEN IF A PHASE FUSE OPENS.
- HIGH-PRESSURE, BUTT-TYPE CONTACT SWITCH: OPERATING MECHANISM USES BUTT-TYPE CONTACTS AND A SPRING-CHARGED MECHANISM TO PRODUCE AND MAINTAIN HIGH-PRESSURE CONTACT WHEN SWITCH IS CLOSED.
- MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - A. GENERAL ELECTRIC COMPANY; GE CONSUMER & INDUSTRIAL - ELECTRICAL DISTRIBUTION.
 - MAIN-CONTACT INTERRUPTING CAPABILITY: MINIMUM OF 12 TIMES THE SWITCH CURRENT RATING.
 - OPERATING MECHANISM: MANUAL HANDLE OPERATION TO CLOSE SWITCH; STORES ENERGY IN MECHANISM FOR OPENING AND CLOSING.
 - ELECTRICAL TRIP: OPERATION OF LEVER OR PUSH-BUTTON TRIP SWITCH, OR TRIP SIGNAL FROM GROUND-FAULT RELAY OR REMOTE-CONTROL DEVICE, CAUSES SWITCH TO OPEN.
 - MECHANICAL TRIP: OPERATION OF MECHANICAL LEVER, PUSH BUTTON, OR OTHER DEVICE CAUSES SWITCH TO OPEN.
 - AUXILIARY SWITCHES: FACTORY INSTALLED, SINGLE POLE, DOUBLE THROW, WITH LEADS CONNECTED TO TERMINAL BLOCK, AND INCLUDING ONE SET MORE THAN QUANTITY REQUIRED FOR FUNCTIONAL PERFORMANCE INDICATED.
 - SERVICE-RATED SWITCHES: LABELED FOR USE AS SERVICE EQUIPMENT.
 - GROUND-FAULT RELAY: COMPLY WITH UL 1053, SELF-POWERED TYPE WITH MECHANICAL GROUND-FAULT INDICATOR, TEST FUNCTION, TRIPPING RELAY WITH INTERNAL MEMORY, AND THREE-PHASE CURRENT TRANSFORMER/SENSOR.
 - CONFIGURATION: [INTEGRALLY MOUNTED] [REMOTE-MOUNTED] RELAY AND TRIP UNIT WITH ADJUSTABLE PICKUP AND TIME-DELAY SETTINGS, PUSH-TO-TEST FEATURE, AND GROUND-FAULT INDICATOR.
 - INTERNAL MEMORY: INTEGRATES THE CUMULATIVE VALUE OF INTERMITTENT ARCING GROUND-FAULT CURRENTS AND USES THE EFFECT TO INITIATE TRIPPING.
 - NO-TRIP RELAY TEST: PERMITS GROUND-FAULT SIMULATION TEST WITHOUT TRIPPING SWITCH.
 - TEST CONTROL: SIMULATES GROUND FAULT TO TEST RELAY AND SWITCH (OR RELAY ONLY IF "NO-TRIP" MODE IS SELECTED).
 - AD. OPEN-FUSE TRIP DEVICE: ARRANGED TO TRIP SWITCH OPEN IF A PHASE FUSE OPENS.
 - AE. FUSED SWITCH: NEMA KS 1, TYPE HD, CLIPS TO ACCOMMODATE SPECIFIED FUSES; LOCKABLE HANDLE.
 - AF. FUSES ARE SPECIFIED IN SECTION 262813 "FUSES."

- INSTRUMENTATION**
1. INSTRUMENT TRANSFORMERS: IEEE C57.13, NEMA E1 2.1.
 2. POTENTIAL TRANSFORMERS: IEEE C57.13, 120 V, 60 HZ, SINGLE SECONDARY; DISCONNECTING TYPE WITH INTEGRAL FUSE MOUNTINGS. BURDEN AND ACCURACY SHALL BE CONSISTENT WITH CONNECTED METERING AND RELAY DEVICES.
 3. CURRENT TRANSFORMERS: IEEE C57.13, 5 A, 60 HZ, SECONDARY WOUND TYPE; SINGLE SECONDARY WINDING AND SECONDARY SHORTING DEVICE. BURDEN AND ACCURACY SHALL BE CONSISTENT WITH CONNECTED METERING AND RELAY DEVICES.
 4. CONTROL-POWER TRANSFORMERS: DRY TYPE, MOUNTED IN SEPARATE COMPARTMENTS FOR UNITS LARGER THAN 3 KVA.
 5. CURRENT TRANSFORMERS FOR NEUTRAL AND GROUND-FAULT CURRENT SENSING: CONNECT SECONDARY WIRING TO GROUND OVERCURRENT RELAYS, VIA SHORTING TERMINALS, TO PROVIDE SELECTIVE TRIPPING OF MAIN AND THE CIRCUIT BREAKER. COORDINATE WITH FEEDER CIRCUIT-BREAKER, GROUND-FAULT PROTECTION.
 6. MULTIFUNCTION DIGITAL-METERING MONITOR: MICROPROCESSOR-BASED UNIT SUITABLE FOR THREE- OR FOUR-WIRE SYSTEMS AND WITH THE FOLLOWING FEATURES:
 7. SWITCH-SELECTABLE DIGITAL DISPLAY OF THE FOLLOWING VALUES WITH MAXIMUM ACCURACY TOLERANCES AS INDICATED:
 8. PHASE CURRENTS, EACH PHASE: PLUS OR MINUS 1 PERCENT.
 9. PHASE-TO-PHASE VOLTAGES, THREE PHASE: PLUS OR MINUS 1 PERCENT.
 10. PHASE-TO-NEUTRAL VOLTAGES, THREE PHASE: PLUS OR MINUS 1 PERCENT.
 11. MEGAWATTS: PLUS OR MINUS 2 PERCENT.
 12. MEGAVARS: PLUS OR MINUS 2 PERCENT.
 13. POWER FACTOR: PLUS OR MINUS 2 PERCENT.
 14. FREQUENCY: PLUS OR MINUS 0.5 PERCENT.
 15. ACCUMULATED ENERGY, MEGAWATT HOURS: PLUS OR MINUS 2 PERCENT; ACCUMULATED VALUES UNAFFECTED BY POWER OUTAGES UP TO 72 HOURS.
 16. MEGAWATT DEMAND: PLUS OR MINUS 2 PERCENT; DEMAND INTERVAL PROGRAMMABLE FROM FIVE TO 60 MINUTES.
 17. CONTACT DEVICES TO OPERATE REMOTE IMPULSE-TOTALIZING DEMAND METER.
 18. MOUNTING: DISPLAY AND CONTROL UNIT FLUSH OR SEMIFLUSH MOUNTED IN INSTRUMENT COMPARTMENT DOOR.
 19. AMMETERS, VOLTMETERS, AND POWER-FACTOR METERS: ANSI C39.1.
 20. METERS: 4-INCH (100-MM) DIAMETER OR 6 INCHES (150 MM) SQUARE, FLUSH OR SEMIFLUSH, WITH ANTIPARALLAX 250-DEGREE SCALES AND EXTERNAL ZERO ADJUSTMENT.
 21. VOLTMETERS: COVER AN EXPANDED-SCALE RANGE OF NOMINAL VOLTAGE PLUS 10 PERCENT.
 22. INSTRUMENT SWITCHES: ROTARY TYPE WITH OFF POSITION.
 23. VOLTMETER SWITCHES: PERMIT READING OF ALL PHASE-TO-PHASE VOLTAGES AND, WHERE A NEUTRAL IS INDICATED, PHASE-TO-NEUTRAL VOLTAGES.
 24. AMMETER SWITCHES: PERMIT READING OF CURRENT IN EACH PHASE AND MAINTAIN CURRENT-TRANSFORMER SECONDARIES IN A CLOSED-CIRCUIT CONDITION AT ALL TIMES.
 25. FEEDER AMMETERS: 2-1/2-INCH (64-MM) MINIMUM SIZE WITH 90- OR 120-DEGREE SCALE. METER AND TRANSFER DEVICE WITH OFF POSITION, LOCATED ON OVERCURRENT PROTECTION DEVICE DOOR FOR INDICATED FEEDER CIRCUITS ONLY.
 26. WATT-HOUR METERS AND WATTMETERS:
 27. COMPLY WITH ANSI C12.1.
 28. THREE-PHASE INDUCTION TYPE WITH TWO STATORS, EACH WITH CURRENT AND POTENTIAL COIL, RATED 5 A, 120 V, 60 HZ.
 29. SUITABLE FOR CONNECTION TO THREE- AND FOUR-WIRE CIRCUITS.
 30. POTENTIAL INDICATING LAMPS.
 31. ADJUSTMENTS FOR LIGHT AND FULL LOAD, PHASE BALANCE, AND POWER FACTOR.
 32. FOUR-DIAL CLOCK REGISTER.
 33. INTEGRAL DEMAND INDICATOR.
 34. CONTACT DEVICES TO OPERATE REMOTE IMPULSE-TOTALIZING DEMAND METER.
 35. RATCHETS TO PREVENT REVERSE ROTATION.
 36. REMOVABLE METER WITH DRAWOUT TEST PLUG.
 37. SEMIFLUSH MOUNTED CASE WITH MATCHING COVER.
 38. APPROPRIATE MULTIPLIER TAG.
 39. IMPULSE-TOTALIZING DEMAND METER.
 40. COMPLY WITH ANSI C12.1.
 41. SUITABLE FOR USE WITH SWITCHBOARD WATT-HOUR METER, INCLUDING TWO-CIRCUIT TOTALIZING RELAY.
 42. CYCLOMETER.
 43. FOUR-DIAL, TOTALIZING KILOWATT-HOUR REGISTER.
 44. POSITIVE CHART DRIVE MECHANISM.
 45. CAPILLARY PEN HOLDING A MINIMUM OF ONE MONTH'S INK SUPPLY.
 46. ROLL CHART WITH MINIMUM 31-DAY CAPACITY; APPROPRIATE MULTIPLIER TAG.
 47. CAPABLE OF INDICATING AND RECORDING FIVE MINUTE INTEGRATED DEMAND OF TOTALIZED SYSTEM.

- 2.5 CONTROL POWER**
- CONTROL CIRCUITS: 120-V AC, SUPPLIED THROUGH SECONDARY DISCONNECTING DEVICES FROM CONTROL-POWER TRANSFORMER. CONTROL CIRCUITS: 120-V AC, SUPPLIED FROM REMOTE BRANCH CIRCUIT. ELECTRICALLY INTERLOCKED MAIN AND THE CIRCUIT BREAKERS: TWO CONTROL-POWER TRANSFORMERS IN SEPARATE COMPARTMENTS, WITH INTERLOCKING RELAYS, CONNECTED TO THE PRIMARY SIDE OF EACH CONTROL-POWER TRANSFORMER AT THE LINE SIDE OF THE ASSOCIATED MAIN CIRCUIT BREAKER. 120-V SECONDARIES CONNECTED THROUGH AUTOMATIC TRANSFER RELAYS TO ENSURE A FAIL-SAFE AUTOMATIC TRANSFER SCHEME.
- CONTROL-POWER FUSES: PRIMARY AND SECONDARY FUSES FOR CURRENT-LIMITING AND OVERLOAD PROTECTION OF TRANSFORMER AND FUSES FOR PROTECTION OF CONTROL CIRCUITS.
- CONTROL WIRING: FACTORY INSTALLED, WITH BUNDLING, LACING, AND PROTECTION INCLUDED. PROVIDE FLEXIBLE CONDUCTORS FOR NO. 8 AWG AND SMALLER, FOR CONDUCTORS ACROSS HINGES, AND FOR CONDUCTORS FOR INTERCONNECTIONS BETWEEN SHIPPING UNITS.
- 2.6 ACCESSORY COMPONENTS AND FEATURES**
- ACCESSORY SET: INCLUDE TOOLS AND MISCELLANEOUS ITEMS REQUIRED FOR OVERCURRENT PROTECTIVE DEVICE TEST, INSPECTION, MAINTENANCE, AND OPERATION.
- PORTABLE TEST SET: FOR TESTING FUNCTIONS OF SOLID-STATE TRIP DEVICES WITHOUT REMOVING FROM SWITCHBOARD. INCLUDE RELAY AND METER TEST PLUGS SUITABLE FOR TESTING SWITCHBOARD METERS AND SWITCHBOARD CLASS RELAYS.
- PORTABLE CIRCUIT-BREAKER LIFTING DEVICE: FLOOR-SUPPORTED, ROLLER-BASED, ELEVATING CARRIAGE ARRANGED FOR MOVEMENT OF CIRCUIT BREAKERS IN AND OUT OF COMPARTMENTS FOR PRESENT AND FUTURE CIRCUIT BREAKERS.
- OVERHEAD CIRCUIT-BREAKER LIFTING DEVICE: MOUNTED AT TOP FRONT OF SWITCHBOARD, WITH HOIST AND LIFTING YOKES MATCHING EACH DRAWOUT CIRCUIT BREAKER.
- SPARE-FUSE CABINET: SUITABLY IDENTIFIED, WALL-MOUNTED, LOCKABLE, COMPARTMENTED STEEL BOX OR CABINET. ARRANGE FOR WALL MOUNTING.
- 2.7 IDENTIFICATION**
- MIMIC BUS: ENTIRE SINGLE-LINE SWITCHBOARD BUS WORK, AS DEPICED ON FACTORY RECORD DRAWING, ON A PHOTOENGRAVED NAMEPLATE. NAMEPLATE: AT LEAST 0.032-INCH- (0.813-MM-) THICK ANODIZED ALUMINUM, LOCATED AT EYE LEVEL ON FRONT COVER OF THE SWITCHBOARD INCOMING SERVICE SECTION.
- MIMIC BUS: ENTIRE SINGLE-LINE SWITCHBOARD BUS WORK, AS DEPICED ON FACTORY RECORD DRAWING, ON AN ENGRAVED LAMINATED-PLASTIC (GRAVOPLY) NAMEPLATE. NAMEPLATE: AT LEAST 0.0625-INCH- (1.588 MM-) THICK LAMINATED PLASTIC (GRAVOPLY), LOCATED AT EYE LEVEL ON FRONT COVER OF THE SWITCHBOARD INCOMING SERVICE SECTION.
- MIMIC BUS: CONTINUOUSLY INTEGRATED MIMIC BUS FACTORY APPLIED TO FRONT OF SWITCHBOARD. ARRANGE IN SINGLE-LINE DIAGRAM FORMAT, USING SYMBOLS AND LETTER DESIGNATIONS CONSISTENT WITH FINAL MIMIC-BUS DIAGRAM.
- COORDINATE MIMIC-BUS SEGMENTS WITH DEVICES IN SWITCHBOARD SECTIONS TO WHICH THEY ARE APPLIED. PRODUCE A CONCISE VISUAL PRESENTATION OF PRINCIPAL SWITCHBOARD COMPONENTS AND CONNECTIONS.
- PRESENTATION MEDIA: PAINTED GRAPHICS IN COLOR CONTRASTING WITH BACKGROUND COLOR TO REPRESENT BUS AND COMPONENTS, COMPLETE WITH LETTERED DESIGNATIONS.
- SERVICE EQUIPMENT LABEL: NRTL LABELED FOR USE AS SERVICE EQUIPMENT FOR SWITCHBOARDS WITH ONE OR MORE SERVICE DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES.

- PART 3 - EXECUTION**
- 3.1 EXAMINATION**
- RECEIVE, INSPECT, HANDLE, AND STORE SWITCHBOARDS ACCORDING TO NEMA PB 2.1
- EXAMINE SWITCHBOARDS BEFORE INSTALLATION. REJECT SWITCHBOARDS THAT ARE MOISTURE DAMAGED OR PHYSICALLY DAMAGED.
- EXAMINE ELEMENTS AND SURFACES TO RECEIVE SWITCHBOARDS FOR COMPLIANCE WITH INSTALLATION TOLERANCES AND OTHER CONDITIONS AFFECTING PERFORMANCE OF THE WORK.
- PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
- 3.2 INSTALLATION**
- INSTALL SWITCHBOARDS AND ACCESSORIES ACCORDING TO NEMA PB 2.1.
- EQUIPMENT MOUNTING: INSTALL SWITCHBOARDS ON CONCRETE BASE, 4-INCH (100-MM) NOMINAL THICKNESS.
- INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONCRETE FLOOR. UNLESS OTHERWISE INDICATED, INSTALL DOWEL RODS ON 18-INCH (450-MM) CENTERS FROM THE FACE OF THE CONCRETE BASE TO THE CONCRETE FLOOR.
- FOR SUPPORTED EQUIPMENT, INSTALL EPOXY-COATED ANCHOR BOLTS THAT EXTEND THROUGH CONCRETE BASE AND ANCHOR INTO STRUCTURAL CONCRETE FLOOR.
- PLACE AND SECURE ANCHORAGE DEVICES. USE SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
- INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SWITCHBOARDS.
- TEMPORARY LIFTING PROVISIONS: REMOVE TEMPORARY LIFTING EYES, CHANNELS, AND BRACKETS AND TEMPORARY BLOCKING OF MOVING PARTS FROM SWITCHBOARD UNITS AND COMPONENTS.
- COMPLY WITH MOUNTING AND ANCHORING REQUIREMENTS SPECIFIED IN SECTION 260548 "VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS."
- OPERATING INSTRUCTIONS: FRAME AND MOUNT THE PRINTED BASIC OPERATING INSTRUCTIONS FOR SWITCHBOARDS, INCLUDING CONTROL AND KEY INTERLOCKING SEQUENCES AND EMERGENCY PROCEDURES. FABRICATE FRAME OF FINISHED WOOD OR METAL AND COVER INSTRUCTIONS WITH CLEAR ACRYLIC PLASTIC. MOUNT ON FRONT OF SWITCHBOARDS.

- INSTALL FILLER PLATES IN UNUSED SPACES OF PANEL-MOUNTED SECTIONS.
- INSTALL OVERCURRENT PROTECTIVE DEVICES, TRANSIENT VOLTAGE SUPPRESSION DEVICES, AND INSTRUMENTATION.
- SET FIELD-ADJUSTABLE SWITCHES AND CIRCUIT-BREAKER TRIP RANGES.
- INSTALL SPARE-FUSE CABINET.
- COMPLY WITH NECA 1.
- 3.3 IDENTIFICATION**
- IDENTIFY FIELD-INSTALLED CONDUCTORS, INTERCONNECTING WIRING, AND COMPONENTS, PROVIDE WARNING SIGNS
- SWITCHBOARD NAMEPLATES: LABEL EACH SWITCHBOARD COMPARTMENT WITH A NAMEPLATE.
- DEVICE NAMEPLATES: LABEL EACH DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICE AND EACH METER AND CONTROL DEVICE MOUNTED IN COMPARTMENT DOORS WITH A NAMEPLATE.
- 3.4 FIELD QUALITY CONTROL**
- MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS.
- PERFORM TESTS AND INSPECTIONS.
- MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.
- ACCEPTANCE TESTING PREPARATION:
- TEST INSULATION RESISTANCE FOR EACH SWITCHBOARD BUS, COMPONENT, CONNECTING SUPPLY, FEEDER, AND CONTROL CIRCUIT.
- TEST CONTINUITY OF EACH CIRCUIT.
- TESTS AND INSPECTIONS:
- PERFORM EACH VISUAL AND MECHANICAL INSPECTION AND ELECTRICAL TEST STATED IN NETA ACCEPTANCE TESTING SPECIFICATION. CERTIFY COMPLIANCE WITH TEST PARAMETERS.
- CORRECT MALFUNCTIONING UNITS ON-SITE, WHERE POSSIBLE, AND RETEST TO DEMONSTRATE COMPLIANCE; OTHERWISE, REPLACE WITH NEW UNITS AND RETEST.
- PERFORM THE FOLLOWING INFRARED SCAN TESTS AND INSPECTIONS AND PREPARE REPORTS:
- INITIAL INFRARED SCANNING: AFTER SUBSTANTIAL COMPLETION, BUT NOT MORE THAN 60 DAYS AFTER FINAL ACCEPTANCE, PERFORM AN INFRARED SCAN OF EACH SWITCHBOARD. REMOVE FRONT AND REAR PANELS SO JOINTS AND CONNECTIONS ARE ACCESSIBLE TO PORTABLE SCANNER.
- FOLLOW-UP INFRARED SCANNING: PERFORM AN ADDITIONAL FOLLOW-UP INFRARED SCAN OF EACH SWITCHBOARD 11 MONTHS AFTER DATE OF SUBSTANTIAL COMPLETION.
- INSTRUMENTS AND EQUIPMENT:
- USE AN INFRARED SCANNING DEVICE DESIGNED TO MEASURE TEMPERATURE OR TO DETECT SIGNIFICANT DEVIATIONS FROM NORMAL VALUES.
- PROVIDE CALIBRATION RECORD FOR DEVICE.
- TEST AND ADJUST CONTROLS, REMOTE MONITORING, AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
- SWITCHBOARD WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.
- PREPARE TEST AND INSPECTION REPORTS, INCLUDING A CERTIFIED REPORT THAT IDENTIFIES SWITCHBOARDS INCLUDED AND THAT DESCRIBES SCANNING RESULTS. INCLUDE NOTATION OF DEFICIENCIES DETECTED, REMEDIAL ACTION TAKEN, AND OBSERVATIONS AFTER REMEDIAL ACTION.
- 3.5 ADJUSTING**
- ADJUST MOVING PARTS AND OPERABLE COMPONENTS TO FUNCTION SMOOTHLY, AND LUBRICATE AS RECOMMENDED BY MANUFACTURER.
- SET FIELD-ADJUSTABLE CIRCUIT-BREAKER TRIP RANGES.
- 3.6 PROTECTION**
- TEMPORARY HEATING: APPLY TEMPORARY HEAT, TO MAINTAIN TEMPERATURE ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS, UNTIL SWITCHBOARD IS READY TO BE ENERGIZED AND PLACED INTO SERVICE.
- 3.7 DEMONSTRATION**
- A. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN SWITCHBOARDS, OVERCURRENT PROTECTIVE DEVICES, INSTRUMENTATION, AND ACCESSORIES.



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PROJECT NUMBER

16-18

DATE

11/28/2016

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MEP SPECIFICATIONS

SHEET NUMBER

MEP-4

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PANELBOARDS

- PART 1 - GENERAL**
- 1.1 SUMMARY
- A. SECTION INCLUDES DISTRIBUTION PANELBOARDS AND LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS.
- 1.2 ACTION SUBMITTALS
- A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
- B. SHOP DRAWINGS: FOR EACH PANELBOARD AND RELATED EQUIPMENT.
1. INCLUDE DIMENSIONED PLANS, ELEVATIONS, SECTIONS, AND DETAILS. SHOW TABULATIONS OF INSTALLED DEVICES, EQUIPMENT FEATURES, AND RATINGS.
2. DETAIL ENCLOSURE TYPES AND DETAILS FOR TYPES OTHER THAN NEMA 250, TYPE 1.
3. DETAIL BUS CONFIGURATION, CURRENT, AND VOLTAGE RATINGS.
4. SHORT-CIRCUIT CURRENT RATING OF PANELBOARDS AND OVERCURRENT PROTECTIVE DEVICES.
5. INCLUDE EVIDENCE OF NRTL LISTING FOR SERIES RATING OF INSTALLED DEVICES.
6. DETAIL FEATURES, CHARACTERISTICS, RATINGS, AND FACTORY SETTINGS OF INDIVIDUAL OVERCURRENT PROTECTIVE DEVICES AND AUXILIARY COMPONENTS.
7. INCLUDE WIRING DIAGRAMS FOR POWER, SIGNAL, AND CONTROL WIRING.
8. INCLUDE TIME-CURRENT COORDINATION CURVES FOR EACH TYPE AND RATING OF OVERCURRENT PROTECTIVE DEVICE INCLUDED IN PANELBOARDS.
- 1.3 INFORMATIONAL SUBMITTALS
- A. FIELD QUALITY-CONTROL REPORTS.
- B. PANELBOARD SCHEDULES FOR INSTALLATION IN PANELBOARDS.
- 1.4 CLOSEOUT SUBMITTALS
- A. OPERATION AND MAINTENANCE DATA.
- 1.5 QUALITY ASSURANCE
- A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
- B. COMPLY WITH NEMA PB 1.
- C. COMPLY WITH NFPA 70.
- 1.6 WARRANTY
- A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE TRANSIENT VOLTAGE SUPPRESSION DEVICES THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.
1. WARRANTY PERIOD: [FIVE] <INSERT NUMBER> YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

- 2.1 GENERAL REQUIREMENTS FOR PANELBOARDS
- A. FABRICATE AND TEST PANELBOARDS ACCORDING TO IEEE 344 TO WITHSTAND SEISMIC FORCES DEFINED IN SECTION 260548 "VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS."
- B. ENCLOSURES: [FLUSH] [SURFACE] [FLUSH- AND SURFACE] MOUNTED CABINETS.
1. RATED FOR ENVIRONMENTAL CONDITIONS AT INSTALLED LOCATION.
- a. INDOOR DRY AND CLEAN LOCATIONS: NEMA 250, [TYPE 1] <INSERT TYPE>.
- b. OUTDOOR LOCATIONS: NEMA 250, [TYPE 3R] <INSERT TYPE>.
- c. KITCHEN [WASH-DOWN] AREAS: NEMA 250, [TYPE 4X] <INSERT TYPE>, [STAINLESS STEEL] <INSERT MATERIAL>.
- d. OTHER WET OR DAMP INDOOR LOCATIONS: NEMA 250, [TYPE 4] <INSERT TYPE>.
2. FRONT: SECURED TO BOX WITH CONCEALED TRIM CLAMPS. FOR SURFACE-MOUNTED FRONTS, MATCH BOX DIMENSIONS; FOR FLUSH-MOUNTED FRONTS, OVERLAP BOX.
3. HINGED FRONT COVER: ENTIRE FRONT TRIM HINGED TO BOX AND WITH STANDARD DOOR WITHIN HINGED TRIM COVER.
4. DIRECTORY CARD: INSIDE PANELBOARD DOOR, MOUNTED IN TRANSPARENT CARD HOLDER.
5. <INSERT OPTIONAL FEATURES>.
- C. INCOMING MAINS LOCATION: [TOP] [BOTTOM] [TOP AND BOTTOM].
- D. PHASE, NEUTRAL, AND GROUND BUSES: [TIN-PLATED ALUMINUM] [HARD-DRAWN COPPER, 98 PERCENT CONDUCTIVITY].
- E. CONDUCTOR CONNECTORS: SUITABLE FOR USE WITH CONDUCTOR MATERIAL AND SIZES.
1. MATERIAL: [TIN-PLATED ALUMINUM] [HARD-DRAWN COPPER, 98 PERCENT CONDUCTIVITY].
2. MAIN AND NEUTRAL LUGS: [COMPRESSION] [MECHANICAL] TYPE.
3. GROUND LUGS AND BUS CONFIGURED TERMINATORS: [COMPRESSION] [MECHANICAL] TYPE.
4. FEED-THROUGH LUGS: [COMPRESSION] [MECHANICAL] TYPE, SUITABLE FOR USE WITH CONDUCTOR MATERIAL. LOCATE AT OPPOSITE END OF BUS FROM INCOMING LUGS OR MAIN DEVICE.
5. SUBFED (DOUBLE) LUGS: [COMPRESSION] [MECHANICAL] TYPE SUITABLE FOR USE WITH CONDUCTOR MATERIAL. LOCATE AT SAME END OF BUS AS INCOMING LUGS OR MAIN DEVICE.
6. <INSERT OPTIONAL FEATURES>.
- F. SERVICE EQUIPMENT LABEL: NRTL LABELED FOR USE AS SERVICE EQUIPMENT FOR PANELBOARDS WITH ONE OR MORE MAIN SERVICE DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES.
- G. FUTURE DEVICES: MOUNTING BRACKETS, BUS CONNECTIONS, FILLER PLATES, AND NECESSARY APPURTENANCES REQUIRED FOR FUTURE INSTALLATION OF DEVICES.
- H. PANELBOARD SHORT-CIRCUIT CURRENT RATING: RATED FOR SERIES-CONNECTED SYSTEM WITH INTEGRAL OR REMOTE UPSTREAM OVERCURRENT PROTECTIVE DEVICES AND LABELED BY AN NRTL. INCLUDE SIZE AND TYPE OF ALLOWABLE UPSTREAM AND BRANCH DEVICES, AND LISTED AND LABELED FOR SERIES-CONNECTED SHORT-CIRCUIT RATING BY AN NRTL.
- I. PANELBOARD SHORT-CIRCUIT CURRENT RATING: FULLY RATED TO INTERRUPT SYMMETRICAL SHORT-CIRCUIT CURRENT AVAILABLE AT TERMINALS.
- 2.2 PERFORMANCE REQUIREMENTS
- A. SURGE SUPPRESSION: FACTORY INSTALLED AS AN INTEGRAL PART OF INDICATED PANELBOARDS, COMPLYING WITH UL 1449 SPD TYPE 1.
- 2.3 DISTRIBUTION PANELBOARDS
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, [PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
- B. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
1. EATON ELECTRICAL INC., CUTLER-HAMMER BUSINESS UNIT.
2. GENERAL ELECTRIC COMPANY; GE CONSUMER & INDUSTRIAL - ELECTRICAL DISTRIBUTION.
3. SIEMENS ENERGY & AUTOMATION, INC.
4. SQUARE D, A BRAND OF SCHNEIDER ELECTRIC.
- C. PANELBOARDS: NEMA PB 1, POWER AND FEEDER DISTRIBUTION TYPE.
- D. DOORS: SECURED WITH VAULT-TYPE LATCH WITH TUMBLER LOCK; KEYED ALIKE.
- E. MAINS: CIRCUIT BREAKER OR LUGS ONLY.
- F. BRANCH OVERCURRENT PROTECTIVE DEVICES: FOR CIRCUIT-BREAKER FRAME SIZES 125 A AND SMALLER: [PLUG-IN CIRCUIT BREAKERS.
- G. BRANCH OVERCURRENT PROTECTIVE DEVICES: FOR CIRCUIT-BREAKER FRAME SIZES LARGER THAN 125 A: BOLT-ON CIRCUIT BREAKERS; PLUG-IN CIRCUIT BREAKERS WHERE INDIVIDUAL POSITIVE-LOCKING DEVICE REQUIRES MECHANICAL RELEASE FOR REMOVAL.
- H. BRANCH OVERCURRENT PROTECTIVE DEVICES: FUSED SWITCHES.
- 2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
- B. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
1. EATON ELECTRICAL INC., CUTLER-HAMMER BUSINESS UNIT.
2. GENERAL ELECTRIC COMPANY; GE CONSUMER & INDUSTRIAL - ELECTRICAL DISTRIBUTION.
3. SIEMENS ENERGY & AUTOMATION, INC.
4. SQUARE D, A BRAND OF SCHNEIDER ELECTRIC.
- C. PANELBOARDS: NEMA PB 1, LIGHTING AND APPLIANCE BRANCH-CIRCUIT TYPE.
- D. MAINS: CIRCUIT BREAKER.
- E. BRANCH OVERCURRENT PROTECTIVE DEVICES: PLUG-IN CIRCUIT BREAKERS, REPLACEABLE WITHOUT DISTURBING ADJACENT UNITS.
- F. CONTACTORS IN MAIN BUS: NEMA ICS 2, CLASS A, ELECTRICALLY HELD, GENERAL-PURPOSE CONTROLLER, WITH SAME SHORT-CIRCUIT INTERRUPTING RATING AS PANELBOARD.
1. EXTERNAL CONTROL-POWER SOURCE: 120-V BRANCH CIRCUIT.
- G. DOORS: CONCEALED HINGES; SECURED WITH FLUSH LATCH WITH TUMBLER LOCK; KEYED ALIKE.
- H. COLUMN-TYPE PANELBOARDS: NARROW GUTTER EXTENSION, WITH COVER, TO OVERHEAD JUNCTION BOX EQUIPPED WITH GROUND AND NEUTRAL TERMINAL BUSES.
- 2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING.
- B. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
1. EATON ELECTRICAL INC., CUTLER-HAMMER BUSINESS UNIT.
2. GENERAL ELECTRIC COMPANY; GE CONSUMER & INDUSTRIAL - ELECTRICAL DISTRIBUTION.
3. SIEMENS ENERGY & AUTOMATION, INC.
4. SQUARE D, A BRAND OF SCHNEIDER ELECTRIC.
- C. MOLDED-CASE CIRCUIT BREAKER (MCCB): COMPLY WITH UL 489, WITH SERIES-CONNECTED RATING TO MEET AVAILABLE FAULT CURRENTS.
1. THERMAL-MAGNETIC CIRCUIT BREAKERS: INVERSE TIME-CURRENT ELEMENT FOR LOW-LEVEL OVERLOADS, AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT-BREAKER FRAME SIZES 250 A AND LARGER.
2. ADJUSTABLE INSTANTANEOUS-TRIP CIRCUIT BREAKERS: MAGNETIC TRIP ELEMENT WITH FRONT-MOUNTED, FIELD-ADJUSTABLE TRIP SETTING.
3. ELECTRONIC TRIP CIRCUIT BREAKERS WITH RMS SENSING; FIELD-REPLACEABLE RATING PLUG OR FIELD-REPLICABLE ELECTRONIC TRIP; AND THE FOLLOWING FIELD-ADJUSTABLE SETTINGS:
- a. INSTANTANEOUS TRIP.
- b. LONG- AND SHORT-TIME PICKUP LEVELS.
- c. LONG- AND SHORT-TIME TIME ADJUSTMENTS.
- d. GROUND-FAULT PICKUP LEVEL, TIME DELAY, AND I2T RESPONSE.
4. CURRENT-LIMITING CIRCUIT BREAKERS: FRAME SIZES 400 A AND SMALLER; LET-THROUGH RATINGS LESS THAN NEMA FU 1, RK-5.
5. GFCI CIRCUIT BREAKERS: SINGLE- AND TWO-POLE CONFIGURATIONS WITH CLASS A GROUND-FAULT PROTECTION (6-MA TRIP).
6. GROUND-FAULT EQUIPMENT PROTECTION (GFEF) CIRCUIT BREAKERS: CLASS B GROUND-FAULT PROTECTION (30-MA TRIP).
7. ARC-FAULT CIRCUIT INTERRUPTER (AFCI) CIRCUIT BREAKERS: COMPLY WITH UL 1699, 120/240-V, SINGLE-POLE CONFIGURATION.
8. MOLDED-CASE CIRCUIT-BREAKER (MCCB) FEATURES AND ACCESSORIES:
- a. STANDARD FRAME SIZES, TRIP RATINGS, AND NUMBER OF POLES.
- b. LUGS: MECHANICAL STYLE, SUITABLE FOR NUMBER, SIZE, TRIP RATINGS, AND CONDUCTOR MATERIALS.
- c. APPLICATION LISTING: APPROPRIATE FOR APPLICATION; TYPE SWD FOR SWITCHING FLUORESCENT LIGHTING LOADS; TYPE HID FOR FEEDING FLUORESCENT AND HIGH-INTENSITY DISCHARGE (HID) LIGHTING CIRCUITS.
- d. GROUND-FAULT PROTECTION: INTEGRALLY MOUNTED RELAY AND TRIP UNIT WITH ADJUSTABLE PICKUP AND TIME-DELAY SETTINGS, PUSH-TO-TEST FEATURE, AND GROUND-FAULT INDICATOR.
- e. COMMUNICATION CAPABILITY: CIRCUIT-BREAKER-MOUNTED COMMUNICATION MODULE WITH FUNCTIONS AND FEATURES COMPATIBLE WITH POWER MONITORING AND CONTROL SYSTEM SPECIFIED IN SECTION 260913 "ELECTRICAL POWER MONITORING AND CONTROL."
- f. SHUNT TRIP: 120-V TRIP COIL ENERGIZED FROM SEPARATE CIRCUIT, SET TO TRIP AT 55 PERCENT OF RATED VOLTAGE.
- g. HANDLE PADLOCKING DEVICE: FIXED ATTACHMENT, FOR LOCKING CIRCUIT-BREAKER HANDLE IN ON OR OFF POSITION.
- h. HANDLE CLAMP: LOOSE ATTACHMENT, FOR HOLDING CIRCUIT-BREAKER HANDLE IN ON POSITION.
- 2.6 ACCESSORY COMPONENTS AND FEATURES
- A. PORTABLE TEST SET: FOR TESTING FUNCTIONS OF SOLID-STATE TRIP DEVICES WITHOUT REMOVING FROM PANELBOARD. INCLUDE RELAY AND METER TEST PLUGS SUITABLE FOR TESTING PANELBOARD METERS AND SWITCHBOARD CLASS RELAYS.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- A. RECEIVE, INSPECT, HANDLE, STORE AND INSTALL PANELBOARDS AND ACCESSORIES ACCORDING TO NEMA PB 1.1.
- B. COMPLY WITH MOUNTING AND ANCHORING REQUIREMENTS SPECIFIED IN SECTION 260548 "VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS."
- C. MOUNT TOP OF TRIM [80 INCHES (2286 MM)] ABOVE FINISHED FLOOR UNLESS OTHERWISE INDICATED.
- D. MOUNT PANELBOARD CABINET PLUMB AND RIGID WITHOUT DISTORTION OF BOX. MOUNT RECESSED PANELBOARDS WITH FRONTS UNIFORMLY FLUSH WITH WALL FINISH AND MATING WITH BACK BOX.
- E. INSTALL OVERCURRENT PROTECTIVE DEVICES AND CONTROLLERS NOT ALREADY FACTORY INSTALLED.
1. SET FIELD-ADJUSTABLE CIRCUIT-BREAKER TRIP RANGES.
- F. INSTALL FILLER PLATES IN UNUSED SPACES.
- G. STUB FOUR 1-INCH (27-GR) EMPTY CONDUITS FROM PANELBOARD INTO ACCESSIBLE CEILING SPACE OR SPACE DESIGNATED TO BE CEILING SPACE IN THE FUTURE. STUB FOUR 1-INCH (27-GR) EMPTY CONDUITS INTO RAISED FLOOR SPACE OR BELOW SLAB NOT ON GRADE.
- H. ARRANGE CONDUCTORS IN GUTTERS INTO GROUPS AND BUNDLE AND WRAP WITH WIRE TIES.
- I. COMPLY WITH NECA 1.

3.2 IDENTIFICATION

- A. IDENTIFY FIELD-INSTALLED CONDUCTORS, INTERCONNECTING WIRING, AND COMPONENTS; PROVIDE WARNING SIGNS COMPLYING WITH SECTION 260553 "IDENTIFICATION FOR ELECTRICAL SYSTEMS."
- B. CREATE A DIRECTORY TO INDICATE INSTALLED CIRCUIT LOADS AND INCORPORATING OWNER'S FINAL ROOM DESIGNATIONS. OBTAIN APPROVAL BEFORE INSTALLING. USE A COMPUTER OR TYPEWRITER TO CREATE DIRECTORY; HANDWRITTEN DIRECTORIES ARE NOT ACCEPTABLE.
- C. PANELBOARD NAMEPLATES: LABEL EACH PANELBOARD WITH A NAMEPLATE COMPLYING WITH REQUIREMENTS FOR IDENTIFICATION SPECIFIED IN SECTION 260553 "IDENTIFICATION FOR ELECTRICAL SYSTEMS."
- D. DEVICE NAMEPLATES: LABEL EACH BRANCH CIRCUIT DEVICE IN DISTRIBUTION PANELBOARDS WITH A NAMEPLATE COMPLYING WITH REQUIREMENTS FOR IDENTIFICATION SPECIFIED IN SECTION 260553 "IDENTIFICATION FOR ELECTRICAL SYSTEMS."
- 3.3 FIELD QUALITY CONTROL
- A. PERFORM TESTS AND INSPECTIONS.
- B. ACCEPTANCE TESTING PREPARATION:
1. TEST INSULATION RESISTANCE FOR EACH PANELBOARD BUS, COMPONENT, CONNECTING SUPPLY, FEEDER, AND CONTROL CIRCUIT.
2. TEST CONTINUITY OF EACH CIRCUIT.
- C. TESTS AND INSPECTIONS:
1. PERFORM EACH VISUAL AND MECHANICAL INSPECTION AND ELECTRICAL TEST STATED IN NETA ACCEPTANCE TESTING SPECIFICATION. CERTIFY COMPLIANCE WITH TEST PARAMETERS.
2. CORRECT MALFUNCTIONING UNITS ON-SITE, WHERE POSSIBLE, AND RETEST TO DEMONSTRATE COMPLIANCE; OTHERWISE, REPLACE WITH NEW UNITS AND RETEST.
- D. PANELBOARDS WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS.
- E. PREPARE TEST AND INSPECTION REPORTS, INCLUDING A CERTIFIED REPORT THAT IDENTIFIES PANELBOARDS INCLUDED AND THAT DESCRIBES SCANNING RESULTS. INCLUDE NOTATION OF DEFICIENCIES DETECTED, REMEDIAL ACTION TAKEN, AND OBSERVATIONS AFTER REMEDIAL ACTION.



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11/28/2016

PLUMBING CONTRACT GENERAL NOTES

- THE PLUMBING CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS.
- ALL INSTALLATIONS SHALL CONFORM TO THE LATEST ADOPTED PLUMBING CODE AND ALL OF THE CURRENT ADOPTED ORDINANCES IN EFFECT FOR THE LOCATION WHERE THE PLUMBING IS TO BE INSTALLED. ALL MATERIALS IN DIRECT CONTACT WITH POTABLE WATER SYSTEMS SHALL BE LEAD FREE AS REQUIRED BY CODE.
- PLANS ARE DIAGRAMMATIC AND ARE NOT TO BE SCALED.
- ALL PIPING SHALL BE CONCEALED EXCEPT WHERE NOTED. WATER AND VENT PIPING SHALL BE ROUTED AS NEAR AS POSSIBLE TO THE CEILING AND IN THE WALLS. DRAIN AND WASTE PIPING SHALL BE BELOW THE FLOOR AND IN THE WALLS, EXCEPT WHERE NOTED.
- ALL FIXTURES SHALL BE INSTALLED WITH WATER STOPS, TRAPS AND ALL OTHER HARDWARE REQUIRED FOR A COMPLETE AND OPERABLE INSTALLATION.
- REFER TO THE ARCHITECTURAL DRAWINGS FOR THE EXACT LOCATION OF THE PLUMBING FIXTURES AND MOUNTING HEIGHTS.
- THE CONTRACTOR SHALL INSULATE THE HOT AND COLD WATER PIPING SYSTEMS AND PROVIDE METAL SHIELDS UNDER THE PIPE HANGERS.
- THE CONTRACTOR SHALL ISOLATE THE PIPE HANGERS FROM THE HOT AND COLD WATER PIPING SYSTEMS WITH NEOPRENE PADS.
- THE CONTRACTOR SHALL PLACE NEOPRENE PADS BETWEEN PIPE CLAMPS AND HOT AND COLD WATER SYSTEM PIPING.
- THE HOT AND COLD WATER PIPING SYSTEMS SHALL NOT MAKE DIRECT CONTACT WITH THE BUILDING STRUCTURE OR WALLS.
- ALL P-TRAPS ON THE LAVATORIES, BAR SINKS AND SERVICE SINKS SHALL HAVE CLEANOUT PLUGS.
- ALL PIPE PENETRATIONS THROUGH THE CONCRETE SHALL BE PROTECTED FROM CORROSION DUE TO DIRECT CONTACT WITH THE CONCRETE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FINAL LOCATION OF THE EQUIPMENT BASED ON THEIR APPROXIMATE LOCATIONS AS INDICATED ON THE DRAWINGS. THIS RESPONSIBILITY INCLUDES AVOIDING INTERFERENCES WITH THE BUILDING STRUCTURE, MECHANICAL, PLUMBING AND ELECTRICAL SYSTEMS.
- LINE SCHEDULE (UNLESS NOTE OTHERWISE ON THE DRAWING):
 - A) SUPPLIES TO A FIXTURE - 1/2"
 - B) WATER CLOSET WASTE CONNECTION - 4"
 - C) VENT - 1 1/2"
 - D) V.T.R. - 3"

MECHANICAL GENERAL NOTES

- THE PLANS ARE DIAGRAMMATIC AND NOT TO BE SCALED. REFER TO THE ARCHITECTURAL DRAWINGS AND FIELD MEASUREMENTS FOR FINAL DIMENSIONS.
- THESE DRAWINGS REPRESENT THE APPROXIMATE LOCATION OF THE DUCT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FINAL ROUTING OF THE DUCT. THIS RESPONSIBILITY INCLUDES AVOIDING INTERFERENCES WITH THE BUILDING STRUCTURE, PIPING SYSTEMS AND ELECTRICAL WORK.
- DUCT DIMENSIONS NEAR THE EQUIPMENT ARE APPROXIMATED. THE CONTRACTOR MUST FABRICATE THE DUCT TO FIT THE EQUIPMENT SUPPLIED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FINAL LOCATION OF THE EQUIPMENT BASED ON THE APPROXIMATE LOCATIONS AS INDICATED ON THE DRAWINGS. THIS RESPONSIBILITY INCLUDES AVOIDING INTERFERENCES WITH THE BUILDING STRUCTURE, PIPING SYSTEMS AND ELECTRICAL WORK.
- ALL INSTALLATIONS SHALL CONFORM TO THE LATEST MECHANICAL CODE AND ALL OF THE LOCAL ADOPTED ORDINANCES.
- ALL THERMOSTATS SHALL BE SUPPLIED BY THE MECHANICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL THE NECESSARY CONDUIT, WIRE, BOXES, ETC. FOR THE INSTALLATION OF THERMOSTATS. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING THE WIRING AT THE CONTROLS AND EQUIPMENT.
- COORDINATE THE AIR TERMINAL DEVICE LOCATIONS WITH THE CEILING GRID.

SYSTEM DESIGN NOTES

- LOW PRESSURE DUCT SHALL BE SIZED AT A PRESSURE DROP OF 0.08" W.C. PER 100 FT.
- EACH SUPPLY AND RETURN TERMINAL DEVICE SHALL HAVE A MEANS TO BALANCE THE AIR FLOWS AS INDICATED ON THE PLANS. THE DAMPERS SHALL BE LOCATED EITHER IMMEDIATELY DOWNSTREAM OF A BRANCH TAKE-OFF, AT THE TERMINAL DEVICE OR WHERE LOCATED ON THE PLANS.

LIGHTING PLAN GENERAL NOTES

- THE PLANS ARE DIAGRAMMATIC AND SHALL NOT BE SCALED. THE ELECTRICAL CONTRACTOR SHALL REFER TO THE ENTIRE SET OF PLANS AS WELL AS FIELD MEASUREMENTS FOR FINAL DIMENSIONS.
- INSTALL AND WIRE ALL CONTROLS FURNISHED BY THE PLUMBING AND HVAC CONTRACTORS
- PROVIDE ALL HARDWARE AND ACCESSORIES NECESSARY FOR A COMPLETE ELECTRICAL INSTALLATION
- WIRING TO THE EMERGENCY LIGHTS AND EXIT LIGHT FIXTURES ARE NOT SHOWN FOR CLARITY

LIGHTING LEGEND

REFER TO LEGEND SHEET FOR ADDITIONAL INFORMATION

DESCRIPTION	RATED AMPS	SWITCH/PLATE SPECIFICATIONS/ REQUIREMENTS
§ SINGLE POLE SWITCH	20	WHITE PLASTIC
§ THREE-WAY SWITCH	20	WHITE PLASTIC
§ FOUR-WAY SWITCH	20	WHITE PLASTIC
§ DIMMER SWITCH	20	WHITE PLASTIC
§ SINGLE POLE SWITCH W/ MOTION SENSOR	20	WHITE PLASTIC

© REFERS TO FIXTURE MARK ON THE LIGHT FIXTURE SCHEDULE

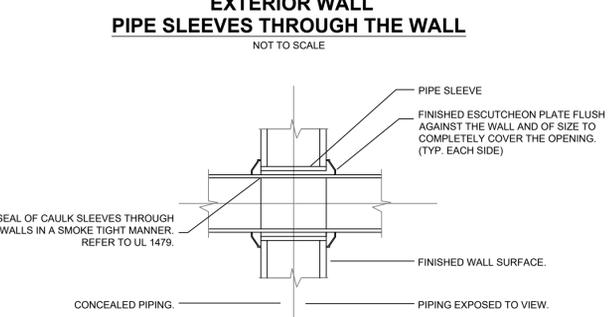
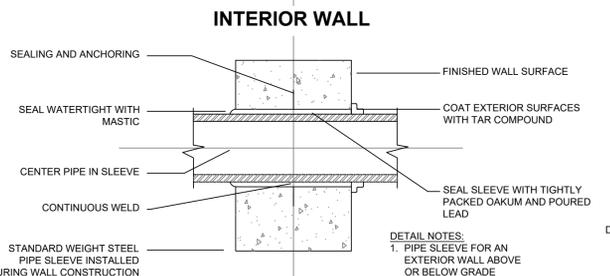
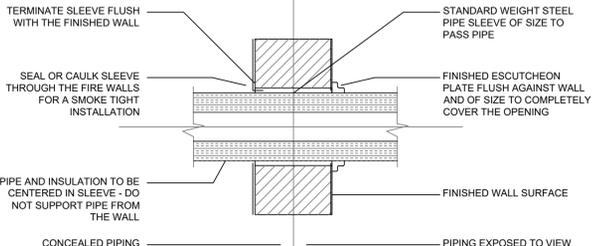
POWER PLAN GENERAL NOTES

- PLANS ARE DIAGRAMMATIC AND ARE NOT TO BE SCALED. THE ELECTRICAL CONTRACTOR SHALL REFER TO THE ENTIRE SET OF CONSTRUCTION DOCUMENTS AS WELL AS FIELD MEASUREMENTS FOR FINAL DIMENSIONS.
- THE MINIMUM WIRE SIZE IS #12 AWG. PROVIDE #10 AWG CONDUCTOR FOR ALL 20 AMP CIRCUITS WITH HOMERUNS THAT EXCEED 50 FEET IN LENGTH.
- INSTALL AND WIRE ALL CONTROLS FURNISHED BY THE PLUMBING AND MECHANICAL CONTRACTORS.
- PROVIDE ALL HARDWARE AND ACCESSORIES NECESSARY FOR A COMPLETE AND OPERABLE ELECTRICAL INSTALLATION
- PROVIDE MATERIAL AND EQUIPMENT AS REQUIRED BY THE LOCAL UTILITY FOR THE SERVICE ENTRANCE.
- THE CONTRACTOR SHALL VERIFY ALL EQUIPMENT CONNECTIONS OF EQUIPMENT PROVIDED BY THOSE OTHER THAN THE ELECTRICAL CONTRACTOR AND PROVIDE AND INSTALL APPROPRIATE SERVICES FOR EACH FOR A COMPLETE AND OPERABLE SYSTEM. ALL INSTALLATIONS SHALL BE PER THE LATEST ADOPTED NEC.

PIPE HANGER SCHEDULE - EXCLUDING FIRE PROTECTION PIPING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING - FT.	MAXIMUM VERTICAL SPACING - FT.
CAST IRON PIPE (REFER TO NOTE a)	5 ^b	15
COPPER OR COPPER-ALLOY PIPE	12	10
COPPER OR COPPER-ALLOY PIPE, 1 1/4" DIAMETER AND SMALLER	6	10
COPPER OR COPPER-ALLOY PIPE, 1 1/2" DIAMETER AND LARGER	2.67 (32 IN.)	10
CPVC PIPE OR TUBING, 1 1/4" OR SMALLER	CONTINUOUS	10 ^b
CPVC PIPE OR TUBING, 1" OR LARGER	12	10 ^b
PVC PIPE	4	10 ^b

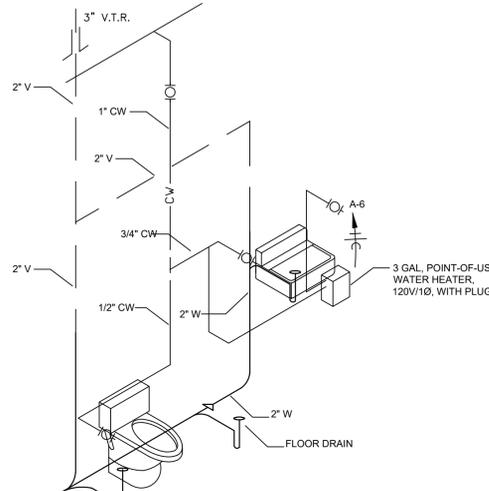
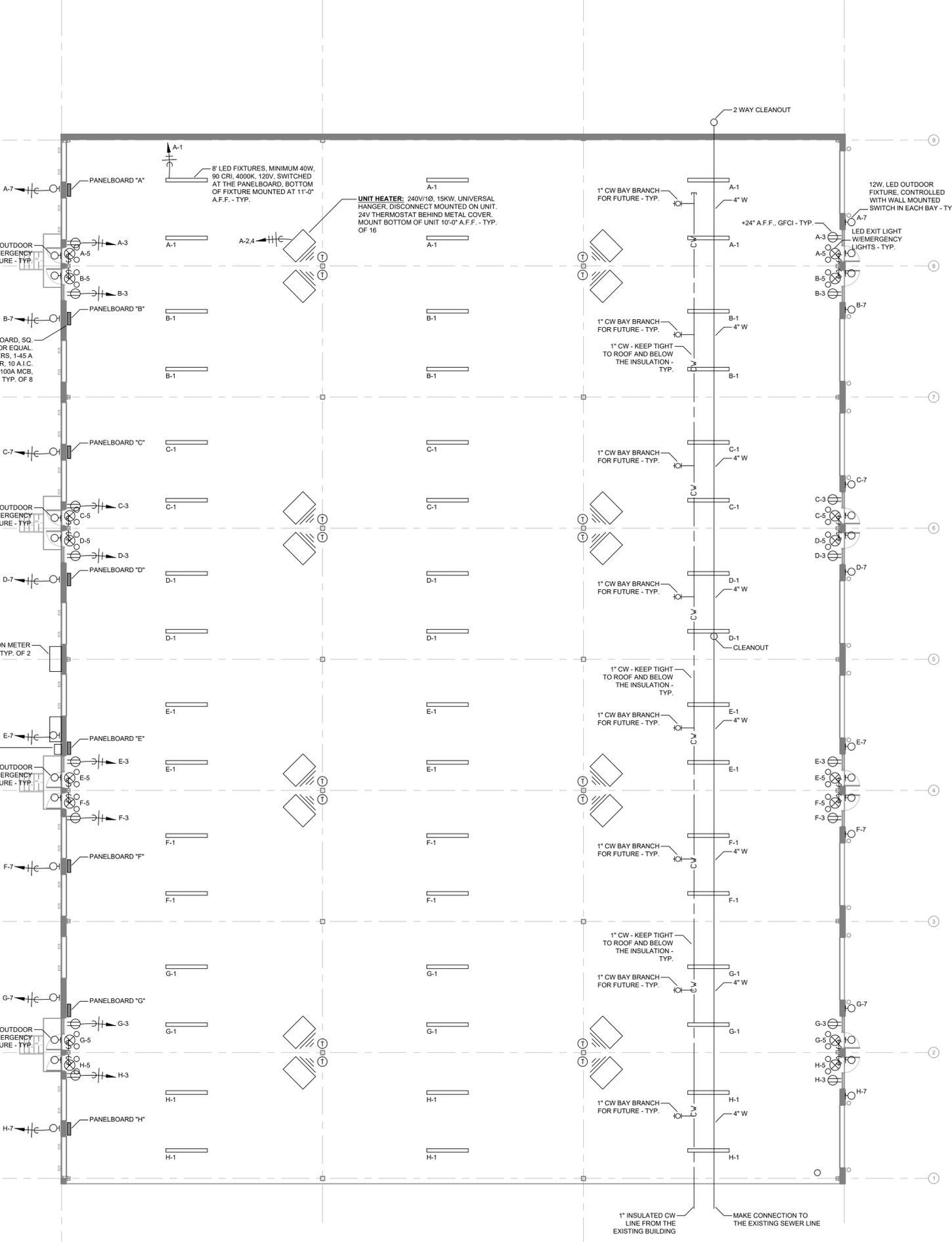
Schedule Notes - for St: 1 Inch=25.4 mm, 1 Foot=304.8 mm.
 a. THE MAXIMUM HORIZONTAL SPACING OF CAST-IRON PIPE HANGERS SHALL BE INCREASE TO 10 FEET WHERE 10-FOOT LENGTHS OF PIPE ARE INSTALLED.
 b. MID-STORY GUIDE.



TYPICAL DETAIL OF PIPE THROUGH RATED WALL
 NOT TO SCALE

SLEEVES AND ESCUTCHEONS
 A. SLEEVES FOR PIPING THROUGH WALL SHALL BE SCHEDULE 40, STANDARD GALVANIZED STEEL PIPE, BE 20 GA SHEETMETAL. THE SPACE BETWEEN THE PIPE AND ITS SLEEVE SHALL NOT EXCEED 1/2". THE SLEEVE SHALL HAVE A SUFFICIENT LENGTH TO BE FLUSH WITH THE FINISHED WALL SURFACE.
 B. EXPOSED PIPING PASSING THROUGH WALLS, FLOORS, OR CEILINGS SHALL BE FITTED WITH CHROMIUM-PLATED CAST BRASS ESCUTCHEONS WITH FASTENING SET SCREWS.

CUTTING AND PATCHING
 C. PIPING PASSING THROUGH WALLS SHALL HAVE A TRIM OPENING CUT NO GREATER THAN NECESSARY FOR THE INSULATION OF A SLEEVE SECURED THEREIN.
 D. PIPING PASSING THROUGH CONCRETE WALLS SHALL HAVE AN OPENING DRILLED SO THAT THE SPACE BETWEEN THE OPENING AND THE PIPE SHALL NOT EXCEED 1/2".
 E. EXPOSED PIPING PASSING THROUGH WALLS, FLOORS OR CEILINGS SHALL CONFORM TO UL 1479 FOR THE SPECIFIC MATERIAL AND WALL CONSTRUCTION.



PLUMBING WASTE/VENT RISER DIAGRAM
 NOT TO SCALE

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11/28/2016

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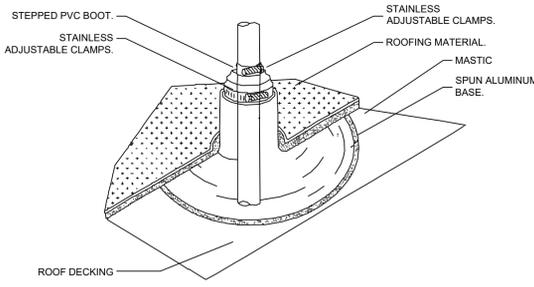
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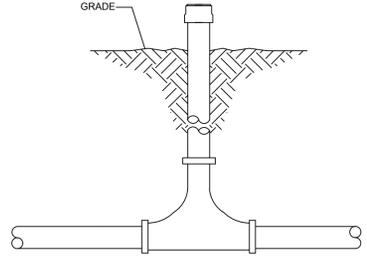
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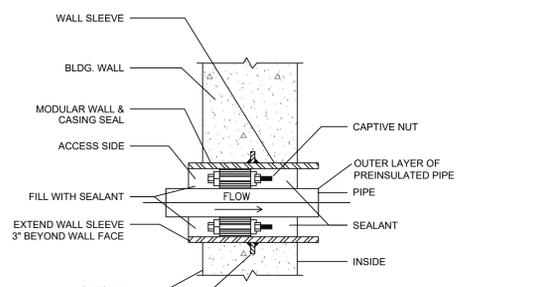
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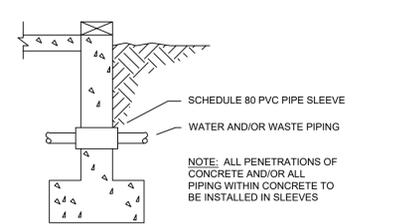
VENT THROUGH THE ROOF PLUMBING DETAIL
NOT TO SCALE



2-WAY CLEANOUT DETAIL
NOT TO SCALE

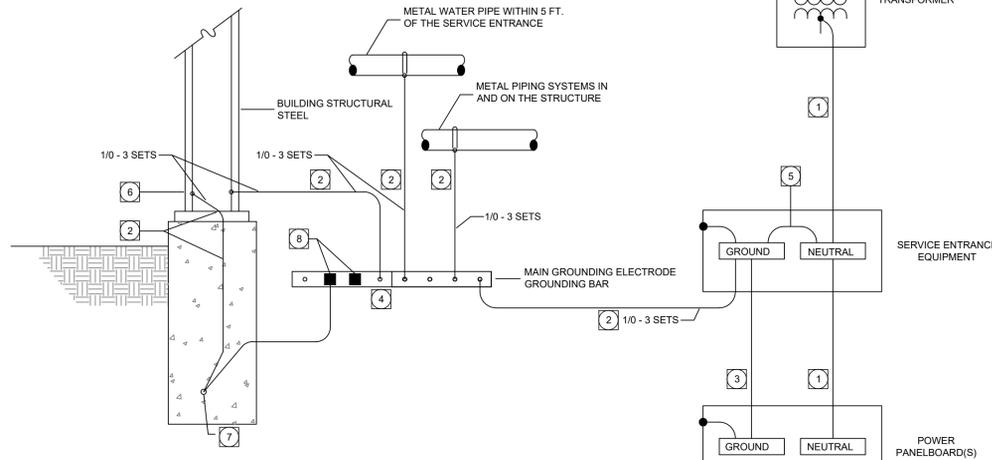


PIPE SLEEVE BELOW GRADE DETAIL
NOT TO SCALE



FOOTING SLEEVE DETAIL
NOT TO SCALE

- GENERAL NOTES**
- CONDUCTOR SIZES SHOWN ARE MINIMUM AND MAY BE LARGER THAN THE MINIMUM SIZES REQUIRED BY THE NEC.
 - INSTALL GROUNDING CONNECTIONS TO THE BUILDING STRUCTURE AND WATER PIPES AT LOCATIONS THAT ARE VISIBLE AND ACCESSIBLE FOR INSPECTION, MAINTENANCE AND TESTING.
 - INSTALL AN INSULATED THROAT GROUNDING BUSHING ON EACH METALLIC SERVICE ENTRANCE CONDUIT. BOND TO THE GROUND BUS USING CONDUCTORS THAT ARE SIZED BASED ON NEC TABLE 250-88 USING THE SERVICE PHASE CONDUCTOR SIZE.
 - INSTALL AN INSULATED THROAT GROUNDING BUSHING ON EACH METALLIC FEED CONDUIT. BOND TO THE GROUND BUS USING CONDUCTORS THAT ARE SIZED BASED ON NEC TABLE 250-122 USING THE FEEDER CIRCUIT OVERCURRENT DEVICE SIZE.
 - BOND HOT AND COLD WATER PIPING SYSTEMS.



GROUNDING DETAIL
NOT TO SCALE

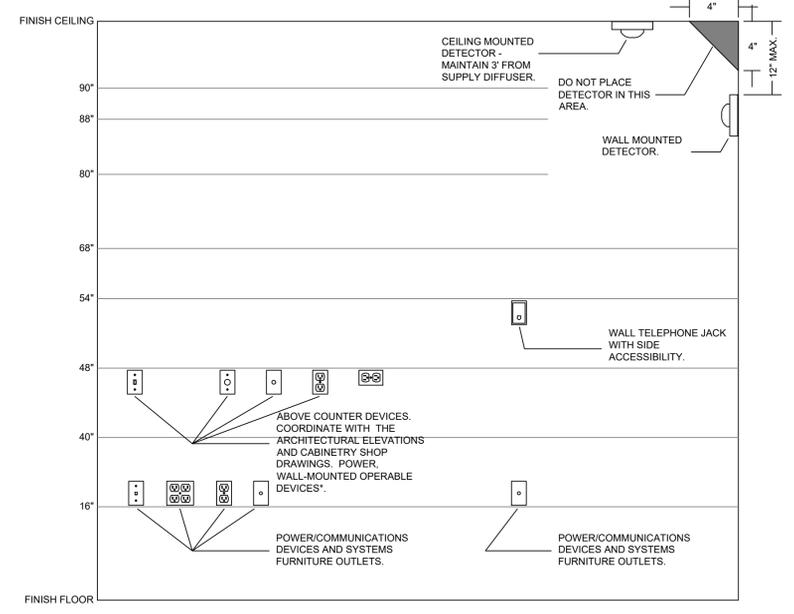
- DETAIL NOTES**
- INSTALL GROUNDED (NEUTRAL) CONDUCTOR THE SAME SIZE AS THE LARGEST PHASE CONDUCTOR IF THE LINE-TO-NEUTRAL LOAD EXCEEDS 5% OF THE CONNECTED LOAD. IF THE NEUTRAL LOAD IS SMALLER, INSTALL THE NEC MINIMUM GROUNDED CONDUCTOR.
 - INSTALL GROUNDING ELECTRODE CONDUCTOR, SIZED BASED ON THE NEC TABLE 250-66 USING THE SERVICE PHASE CONDUCTOR SIZE, BUT NOT SMALLER THAN NO. 4.
 - INSTALL EQUIPMENT GROUNDING CONDUCTOR SIZED BASED ON NEC TABLE 250-122 USING THE FEEDER OVERCURRENT DEVICE SIZE.
 - INSTALL A "MAIN GROUND ELECTRODE GROUND BAR" FOR SINGLE POINT GROUNDING. LOCATED AT AN ACCESSIBLE POINT NEAR THE SERVICE ENTRANCE EQUIPMENT. MAKE CONNECTIONS TO THE GROUND ELECTRODE CONDUCTOR USING IRREVERSIBLE CONNECTORS OR EXOTHERMIC WELDS. MAKE OTHER CONNECTIONS TO THE GROUND BAR USING TWO-HOLE COMPRESSION SPADE LUGS THAT MEET IEEE 837 REQUIREMENTS. LABEL EACH CONNECTION TO THE GROUND BAR.
 - INSTALL A BONDING JUMPER WIRE THAT IS SIZED BASED ON NEC TABLE 250-66 USING THE SERVICE OR SEPARATELY DERIVED SYSTEM PHASE CONDUCTOR SIZE.
 - BOND EACH PERIMETER STRUCTURAL STEEL COLUMN TO THE CONCRETE ENCASED MAIN GROUNDING ELECTRODE. USE COMPRESSION CONNECTORS THAT MEET IEEE 837 REQUIREMENTS OR USE EXOTHERMIC WELDS.
 - INSTALL GROUNDING ELECTRODE CONDUCTOR THAT IS SIZED BASED ON NEC TABLE 250-66 USING THE SEPARATELY DERIVED SYSTEM PHASE CONDUCTOR SIZE.
 - INSTALL IRREVERSIBLE COMPRESSION CONNECTOR WITH TAMPERPROOF HARDWARE OR INSTALL EXOTHERMIC WELD.

CONDUCTOR AND CONDUIT SIZE SCHEDULE

Mark	Amps	Copper Conductor Size - THWN																Conduit Size			Ground	No. of Sets	
		#12	#10	8	6	4	3	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	3-Wire	4-Wire			5-Wire
1	0 - 16																		3/4"	3/4"	3/4"	#12	1
2	17 - 30																		3/4"	3/4"	3/4"	#10	1
3	31 - 43																		3/4"	3/4"	3/4"	#10	1
4	44 - 58																		3/4"	3/4"	1"	#10	1
5	59 - 79																		1"	1"	1 1/4"	#8	1
6	80 - 90																		1"	1 1/4"	1 1/4"	#8	1
7	91 - 105																		1"	1 1/4"	1 1/4"	#8	1
8	106 - 121																		1 1/4"	1 1/4"	1 1/2"	#6	1
9	122 - 145																		1 1/4"	1 1/2"	2"	#6	1
10	146 - 166																		1 1/2"	2"	2"	#4	1
11	167 - 189																		1 1/2"	2"	2"	#4	1
12	190 - 223																		2"	2 1/2"	2 1/2"	#2	1
13	224 - 245																		2"	2 1/2"	2 1/2"	#2	1
14	246 - 281																		2"	2 1/2"	2 1/2"	#2	1
15	282 - 305																		2 1/2"	3"	3"	#2	1
16	306 - 328																		2 1/2"	3"	3"	1/0	1
17	329 - 378																		2 1/2"	3"	3"	1/0	1
18	600 A																		2 1/2"	3"	3"	1/0	2
19	800 A																		2 1/2"	3"	3"	1/0	2
20	1000 A																		2 1/2"	3"	3"	1/0	2
21	1200 A																		2 1/2"	3"	3"	1/0	3
22	1400 A																		2 1/2"	3"	3"	1/0	4
23	1600 A																		2 1/2"	3"	3"	1/0	4
24	2000 A																		2 1/2"	3"	3"	1/0	5

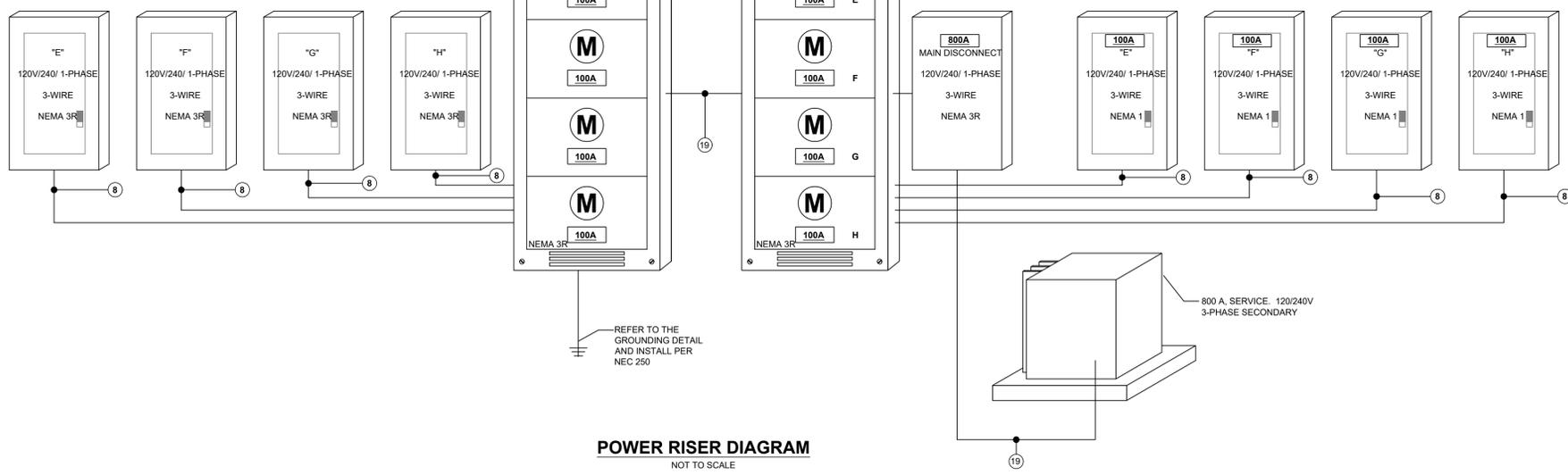
Schedule Notes:

- The contractor shall comply with the latest NEC Codes and Appendices
- A ground shall not be included as a part of the service entrance



- GENERAL NOTES:**
- MOUNTING HEIGHTS SHOWN IN THIS DETAIL ARE TYPICAL UNLESS OTHERWISE NOTED ON THE PLANS.
 - SEE THE ARCHITECTURAL ELEVATIONS FOR SPECIAL CONDITIONS. NOTIFY THE ARCHITECT IMMEDIATELY OF ANY CONFLICTS.
- POWER/COMMUNICATION DEVICES:**
- OUTLETS SHALL BE LOCATED AT 16" A.F.F. TO THE BOTTOM OF THE BOX. ABOVE COUNTER DEVICES SHALL BE LOCATED AT 2" ABOVE THE BACKSPASH OF THE COUNTER TO THE BOTTOM OF THE DEVICES. VERIFY WITH ARCHITECTURAL DETAILS.
- *WALL-MOUNTED OPERABLE DEVICES INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:
ADJUSTABLE THERMOSTATS
LIGHT SWITCHES, DIMMERS, CONTROLS, ETC.
PUSH BUTTONS,
OTHER CONTROL OR "CALL" DEVICES.

MOUNTING HEIGHTS FOR WALL-MOUNTED DEVICES
NOT TO SCALE



POWER RISER DIAGRAM
NOT TO SCALE



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FIRE PROTECTION SYSTEM SPECIFICATIONS

SAFETY
ADHERE TO ALL OSHA REGULATIONS AND TO ALL STANDARD TRADE SAFETY PRACTICES AS WELL AS ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND/OR ORDINANCES.

PERMITS, FEES AND LICENSES
SECURE AND PAY FOR ALL NECESSARY FEES, PERMITS AND INSPECTIONS.

GUARANTEE
THE CONTRACTOR SHALL GUARANTEE ALL OF THE EQUIPMENT, MATERIAL AND WORKMANSHIP FOR ONE YEAR FROM THE DATE OF OWNER ACCEPTANCE FOR ALL MATERIALS PROVIDED AND INSTALLED BY SAID CONTRACTOR.

EQUIPMENT SUBMITTALS
PROVIDE SIX (6), SETS OF SUBMITTALS FOR APPROVAL ON ALL EQUIPMENT PROVIDED WITHIN THESE DOCUMENTS INCLUDING: SPRINKLER HEAD, VALVES, PIPING AND FIRE DEPARTMENT CONNECTIONS.

SHOP DRAWINGS: SHOP DRAWINGS SHALL BE PREPARED IN ACCORDANCE WITH NFPA 13 AS IT PERTAINS TO "WORKING PLAN" AND WHICH HAVE BEEN APPROVED BY THE AUTHORITY HAVING JURISDICTION AND STAMPED BY A LICENSED PROFESSIONAL ENGINEER.

TEST REPORTS AND CERTIFICATES: TEST REPORTS AND CERTIFICATES SHALL INCLUDE "CONTRACTOR'S MATERIAL AND TEST CERTIFICATES FOR ALL ABOVE GROUND PIPING" AND "CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ALL UNDERGROUND PIPING" AS DESCRIBED IN NFPA 13.

SUBMITTALS MUST BE COMPLETE AND SUBMITTED SIMULTANEOUSLY. AT A MINIMUM, THE SUBMITTAL DATA SHALL INCLUDE ALL DATA SPECIFIED IN THE SPECIFIC EQUIPMENT SCHEDULE.

THE CONTRACTOR SHALL NOT PURCHASE ANY MATERIAL OR EQUIPMENT UNTIL THE SPECIFIC EQUIPMENT HAS BEEN APPROVED.

GENERAL
ALL EQUIPMENT SHALL BE INSTALLED IN COMPLIANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

QUALITY ASSURANCE:
INSTALLATION OF THE FIRE PROTECTION PIPING, EQUIPMENT, SPECIALTIES, AND ACCESSORIES, AND REPAIR AND SERVICING OF EQUIPMENT SHALL BE PERFORMED ONLY BY A QUALIFIED INSTALLER. THE TERM QUALIFIED MEANS EXPERIENCED IN SUCH WORK (EXPERIENCED SHALL MEAN HAVING A MINIMUM OF 5 PREVIOUS PROJECTS SIMILAR IN SIZE AND SCOPE TO THIS PROJECT), FAMILIAR WITH ALL PRECAUTIONS REQUIRED, AND HAS COMPLIED WITH ALL THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. UPON REQUEST, SUBMIT EVIDENCE OF SUCH QUALIFICATIONS TO THE ENGINEER.

SCOPE OF WORK:
WORK SHALL CONSIST OF A TOTAL FIRE PROTECTION SYSTEM. THE CONTRACTOR SHALL MAINTAIN AT THE SITE ONE COPY OF ALL DRAWINGS IN GOOD ORDER AND MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION. THE CONTRACTOR SHALL DELIVER ONE SET OF REPRODUCIBLE DOCUMENTS TO THE ARCHITECT UPON COMPLETION OF THE WORK.

REGULATORY REQUIREMENTS:
SYSTEMS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE LATEST ADOPTED BUILDING CODE(S) AND SHALL MEET THE REQUIREMENTS OF NFPA 13.

PRODUCTS:
SPRINKLER HEAD CABINET:
FURNISH AND INSTALL A CABINET, WHERE INDICATED ON THE DRAWING(S), CONTAINING SPRINKLER HEADS OF TYPE AND TEMPERATURE RATINGS ASSORTED ON THE BASIS OF THE NUMBERS OF EACH ACTUALLY INSTALLED IN ACCORDANCE WITH NFPA 13. PROVIDE ALL WRENCHES REQUIRED FOR THE SPARE HEADS AND MOUNTED IN CABINET.

FLOW ALARMS:
FLOW ALARM SWITCHES SHALL BE FURNISHED AND INSTALLED ALL IN ACCORDANCE WITH NFPA 13.

ELECTRICALLY SUPERVISED O.S. & Y VALVES:
VALVE SUPERVISORS SHALL BE FURNISHED AND INSTALLED ALL IN ACCORDANCE WITH NFPA 13.

FIRE DEPARTMENT CONNECTIONS:
FIRE DEPARTMENT CONNECTIONS SHALL BE PROVIDED WITH TWO, (2), INLETS, CAPS, CHAINS, CHECK VALVE, BALL DRIP AND LETTERING TO INDICATE "FIRE DEPARTMENT CONNECTIONS" AND "STANDPIPE". CONNECTIONS SHALL BE 2 1/2" X 2 1/2" X 4" AND SHALL BE PROVIDED WITH LOCAL FIRE DEPARTMENT THREADS.

INSPECTOR'S TEST:
INSPECTOR'S TEST CONNECTIONS, CONSISTING OF ONE INCH (1") PIPING, ONE INCH, (1") GLOBE VALVE AND 1/2" SPECIAL DISCHARGE NOZZLE, SHALL BE PROVIDED AND CONNECTED TO THE SYSTEMS AT REQUIRED POINTS. PIPE DRAINS TO THE FLOOR DRAINS THROUGH EXTERIOR WALLS OR OTHER POINTS AS INDICATED ON THE DRAWINGS OR AS DIRECTED.

DRAINS:
CONTRACTOR SHALL FURNISH AND INSTALL TWO (2") DRAIN VALVES AT THE SYSTEM VALVES AND SHALL EXTEND TWO INCH (2") DRAIN LINES THROUGH THE WALL OF THE BUILDING OR TO THE FLOOR.

CEILING WALL AND FLOOR PLATES:
PROVIDE NICKEL PLATED STEEL PLATES ON ALL EXPOSED PIPES PASSING THROUGH THE WALL, CEILINGS OR FLOORS. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE SAFING ALL PIPES, DUCTS, CONDUITS, ETC., PENETRATIONS CREATED BY OR FOR THIS CONTRACTOR THROUGH ANY FIRE SEPARATION OF FLOORS, WALLS, ETC. FIRE SAFING RATING SHALL MEET THE FIRST RATING OF THE SEPARATIONS THEY PENETRATE. MANUFACTURERS SHALL MEET THE UL TESTS FOR EACH RESPECTIVE CONDITION.

VALVES:
ALL VALVES SHALL BE UNDERWRITER APPROVED, OUTSIDE SCREW AND YOKE (O.S. & Y.) AND BE DESIGNED FOR OPERATION WITH NOT LESS THAN 175 POUNDS WORKING PRESSURE AND OF A TYPE PERMITTING REPACKING WHILE UNDER PRESSURE.

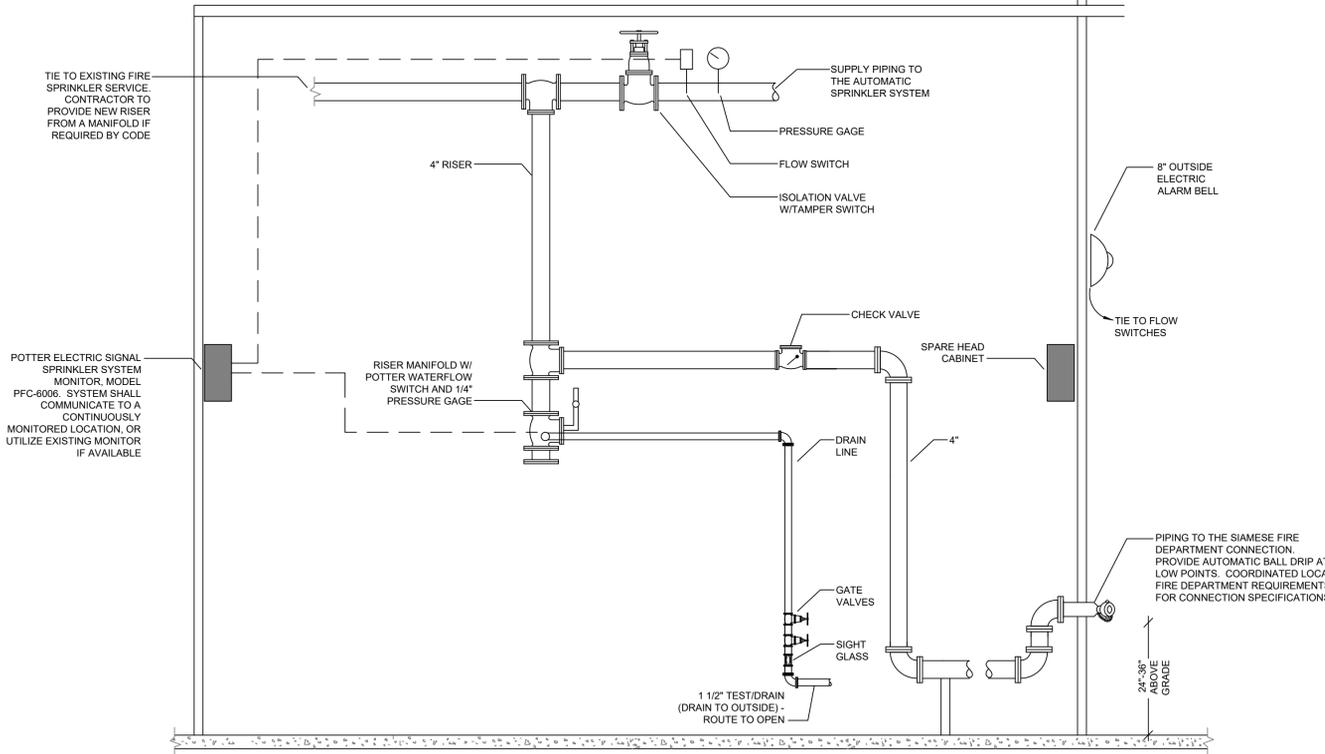
HANGERS AND SUPPORTS:
ALL PIPING SHALL BE NEATLY AND SUBSTANTIALLY SUPPORTED.

FIRE PROTECTION SYSTEM GENERAL NOTES

- FIRE SPRINKLERS SHALL BE INSTALLED IN STRICT CONFORMANCE WITH APPLICABLE NFPA GUIDELINES: SPRINKLERS - NFPA 13.
- PIPING SHOWN IS FOR REFERENCE, ACTUAL ROUTING MAY VARY.
- SPRINKLER CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS FOR PIPING DESIGN.
- SYSTEM SHALL BE HYDRAULICALLY SIZED AND SUBMITTED BY THE CONTRACTOR. HYDRAULIC DESIGN AND CALCULATIONS SHALL BEAR THE SEAL OF A REGISTERED PROFESSIONAL ENGINEER. SYSTEM SHALL BE SIZED FOR ORDINARY HAZARD EXCEPT AS NOTED ON THE DRAWINGS. SUBMIT ALL SHOP DRAWINGS TO THE LOCAL AUTHORITY HAVING JURISDICTION. SEE SPECIFICATIONS FOR EQUIPMENT AND DETAILS.
- SPRINKLER CONTRACTOR SHALL COORDINATE HEAD LOCATIONS AND PIPE ROUTING WITH ALL OTHER TRADES.
- CONTRACTOR SHALL INSTALL THE FIRE PROTECTION SYSTEM SO THAT THE SPRINKLER SPACING IS LESS THAN 12 FEET AND THE COVERAGE AREA DOES NOT EXCEED 144 SQ. FT.
- CONTRACTOR SHALL INSTALL ALL PIPING SO AS TO BE PITCHED TOWARDS EITHER A RISER/AUXILIARY DRAIN TO ALLOW PORTIONS OF THE SYSTEM TO BE PROPERLY DRAINED.
- ALL VALVE TAMPER SWITCHES TO BE WIRED TO THE CENTRAL ALARM SYSTEM, IF APPLICABLE, SUCH THAT THE OPERATION OF A VALVE FROM A FULLY OPEN POSITION CAUSES A "TROUBLE" TYPE ALARM. ALL WATER FLOW SWITCHES TO BE WIRED TO THE BUILDING CENTRAL ALARM SYSTEM SUCH THAT ANY WATER FLOW CAUSES THE CENTRAL FIRE ALARM TO OPERATE.
- CONTRACTORS SHALL ROUTE THE SPRINKLER TRUNKS AND BRANCHES BETWEEN PURLINS WHERE POSSIBLE WITH HEADS TO DROP TO THE BOTTOM OF BEAM.

SPRINKLER SYSTEM DESIGN CRITERIA

- APPLICABLE CODES: NFPA 13, INTERNATIONAL FIRE CODE, ARKANSAS FIRE CODE
- HAZARD CLASSIFICATION: ORDINARY HAZARD GROUP 2
- DENSITY, GPM/SQ. FT.: 0.2
- FIRE FLOW REQUIREMENTS: REFER TO LOCAL UTILITY TEST RECORDS
- ADDITIONAL REQUIREMENTS:
 - THE FIRE PROTECTION SYSTEM SHALL MEET ALL SEISMIC REQUIREMENTS TO MEET THE LOCAL BUILDING CODE



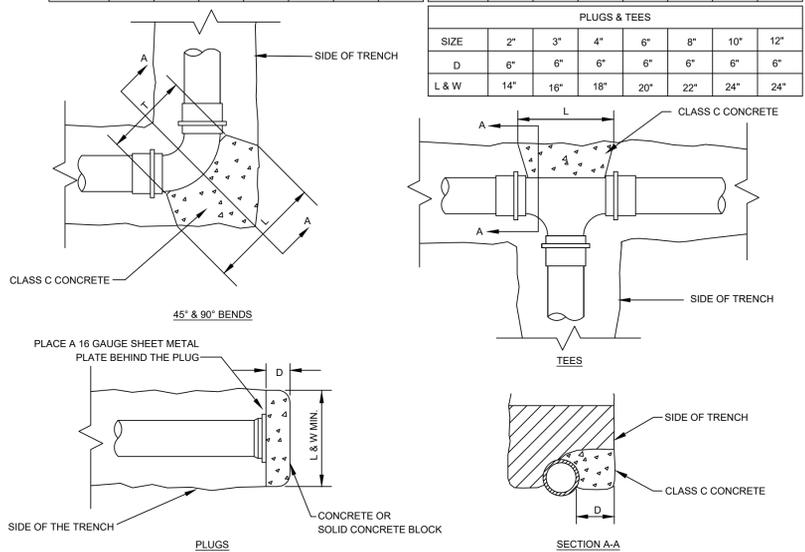
FIRE PROTECTION SYSTEM RISER DETAIL

NOT TO SCALE

(45°) EIGHT BENDS							
SIZE	2"	3"	4"	6"	8"	10"	12"
D	6"	6"	6"	6"	6"	6"	6"
L	12"	14"	16"	18"	20"	22"	24"
T	10"	12"	14"	16"	16"	18"	18"

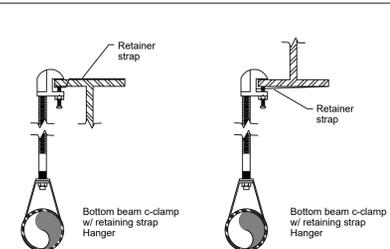
(90°) QUARTER BENDS							
SIZE	2"	3"	4"	6"	8"	10"	12"
D	6"	6"	6"	6"	6"	6"	6"
L	15"	18"	21"	24"	27"	30"	34"
T	10"	12"	14"	16"	18"	20"	22"

PLUGS & TEES						
SIZE	2"	3"	4"	6"	8"	10"
D	6"	6"	6"	6"	6"	6"
L & W	14"	16"	18"	20"	22"	24"



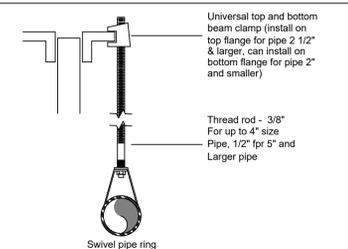
THRUST BLOCK DETAILS

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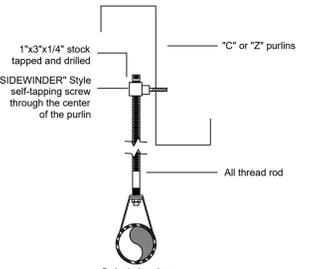
TYPICAL HANGER OFF I-BEAM

NOT TO SCALE



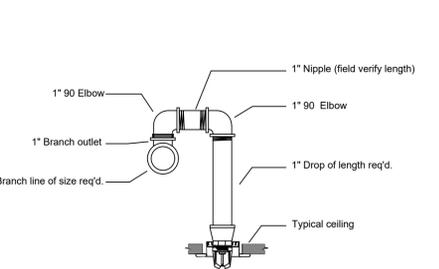
TYPICAL HANGER AT WEB JOISTS

NOT TO SCALE



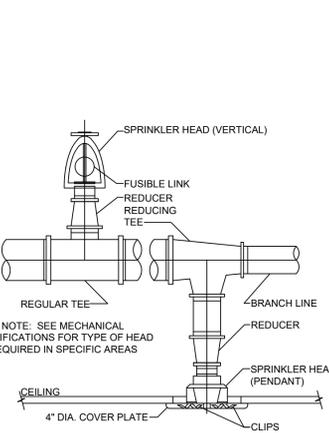
TYPICAL HANGER AT PURLINS

NOT TO SCALE



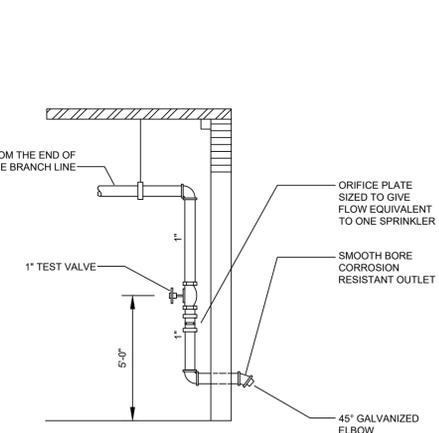
PENDENT HEAD ON RETURN BEND

NOT TO SCALE



VERTICAL AND RECESSED PENDANT TYPE SPRINKLER

NOT TO SCALE



INSPECTOR'S TEST DETAIL

NOT TO SCALE

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11/28/2016

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