WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

ISSUE FOR DD PROGRESS

10-20-23

SSOE, Inc.
1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
T. (248) 643-6222

DRAWING LIST - GENERAL

GENERAL	
GI-100	COVER SHEET
GI-300	OVERALL LEVEL 0 LIFE SAFETY PLAN

DRAWING LIST - STRUCTURAL

DRAWING LIST - ARCHITECTURAL

ARCHITECTURAL	
AE-000	ARCHITECTURAL SITE PLAN
AE-050	TYPICAL INTERIOR PARTITION DETAILS
AE-051	WALL / PARTITION TYPES
AE-100	OVERALL LEVEL 0 FLOOR PLAN
AE-101	ENLARGED MRI SUITE PLANS
AE-102	ENLARGED NMR AND MRI OFFICE PLANS
AE-361	DOOR & WINDOW DETAILS & SCHEDULES
AE-401	TOILET ROOM ELEVATIONS
INTERIORS	
AE-700	INTERIOR FINISH PLANS, SCHEDULES & DETAILS

DRAWING LIST - MECHANICAL

DRAWING LIST - ELECTRICAL

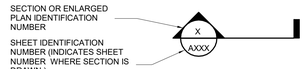
ELECTRICAL	
E0-000	ELECTRICAL LEGEND, SYMBOLS, & NOTES
E1-101	OVERALL LEVEL 0 FLOOR PLAN
E2-101	ENLARGED CLINICAL PLANS - LIGHTING
E2-102	ENLARGED NMR 0250 & MRI OFFICE A110 PLANS - LIGHTING
E3-101	ENLARGED CLINICAL PLANS - POWER & AUXILIARY
E3-102	ENLARGED NMR 0250 & MRI OFFICE A110 PLANS - POWER & AUXILIARY
E8-101	ELECTRICAL STANDARD CIRCUITING AND CONDUIT SIZING SCHEDULES

DRAWING LIST - PLUMBING

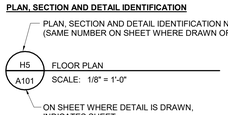
REFERENCE SYMBOLS

DETAIL IDENTIFICATION

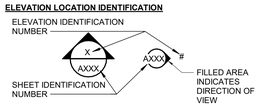
SECTION IDENTIFICATION



PLAN, SECTION AND DETAIL IDENTIFICATION

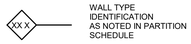


ELEVATION LOCATION IDENTIFICATION



MATERIAL OR WORK DIVISION INDICATION

WALL TYPE INDICATION



NORTH INDICATION

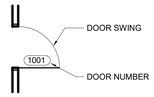
BULLETIN / ADDENDUM IDENTIFICATION

WORK POINT

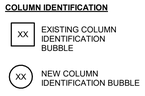
ROOM NAME AND NUMBER INDICATION

NOTE LEADER INDICATION

DOOR NUMBER INDICATION



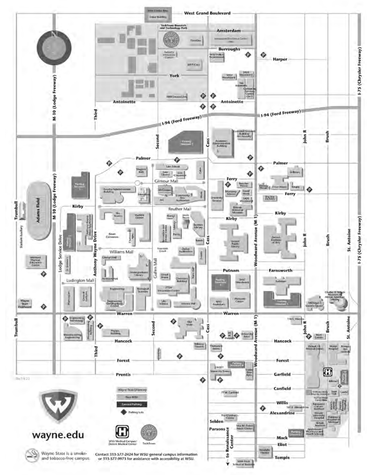
COLUMN IDENTIFICATION



REFER TO MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR ADDITIONAL SYMBOLS

VICINITY MAP

SITE MAP



PROFESSIONAL SEALS:

PROJECT PARTNERS:

KEYPLAN

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
1	10-20-23	DD PROGRESS

□ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

Wayne State University

WAYNE STATE UNIVERSITY
5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
T. (248) 643-6222

COVER SHEET

GI-100

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LIFE SAFETY PLAN LEGEND

WALL RATING GRAPHICS

NON RATED WALL

1P — 1 HOUR RATED FIRE PARTITION

1SB — 1 HOUR RATED SMOKE & FIRE BARRIER

Name
999 SF
999
101

NAME (AT OCCUPANT COUNT PLANS AND LIFE SAFETY PLANS, THIS IS THE OCCUPANT LOAD FACTOR TYPE)
SQUARE FOOTAGE
OCCUPANT LOAD COUNT (IF USED)
NUMBER (IF USED)

ROOM REFERENCE

Room name
101

ROOM NAME
ROOM NUMBER

AREA REFERENCE

EGRESS CAPACITY TAG

999

DESIGN # OF OCCUPANTS
MAXIMUM # OF OCCUPANTS ALLOWABLE PER EGRESS SYSTEM WIDTH

DOOR IDENTIFICATION

60

DOOR & FRAME RATING IN MINUTES

EXIT

DENOTES DOOR IS EXTERIOR EXIT

APPROACH TO DOOR
ADA/ANSI DOOR CLEARANCE
APPROACH TO DOOR

FIRE EXTINGUISHERS & CABINETS

F01

LIFE SAFETY PLAN NOTES

1. THIS PROJECT REQUIRES THAT THE FOLLOWING LIFE SAFETY MEASURES ARE TO BE IMPLEMENTED AND ENFORCED AT ALL CONSTRUCTION AREAS. CONTRACTORS AND THEIR SUBCONTRACTORS ARE TO BE AWARE OF AND FOLLOW THESE REQUIREMENTS.
2. ASSURE THAT EXITS PROVIDE FREE AND UNOBSTRUCTED EGRESS, AND THAT PERSONNEL RECEIVE TRAINING IF ALTERNATIVE EXITS ARE DESIGNATED. BUILDINGS OR AREAS UNDER CONSTRUCTION SHALL MAINTAIN ESCAPE FACILITIES FOR CONSTRUCTION WORKERS AT ALL TIMES. MEANS OF EGRESS IN CONSTRUCTION AREAS ARE TO BE INSPECTED DAILY.
3. MAINTAIN MEANS OF EGRESS ROUTES THROUGHOUT THE PERIODS WHEN THE BUILDING IS OCCUPIED. EGRESS ROUTES ARE TO BE CLEARLY MARKED WITH SIGNS, LIGHTING, AND PROPER FLOOR SURFACES.
4. ASSURE FREE AND UNOBSTRUCTED ACCESS FOR EMERGENCY PERSONNEL AND EMERGENCY RESPONSE FORCES.
5. ASSURE THAT FIRE ALARM DETECTION AND SUPPRESSION SYSTEMS ARE NOT IMPAIRED WITHIN OCCUPIED AREAS OF THE BUILDING. PROVIDE TEMPORARY, EQUIVALENT SYSTEMS WHEN ANY SYSTEM NEEDS TO BE INOPERATIVE DURING CONSTRUCTION. INSPECT AND TEST TEMPORARY SYSTEMS MONTHLY.
6. PROVIDE 1 HOUR RATED TEMPORARY CONSTRUCTION PARTITIONS (UL # U309) THAT ARE AIR AND SMOKE TIGHT. WHERE PART OF EXTERIOR PARTITIONS, PROVIDE MINIMUM R-11 INSULATION.
7. PROHIBIT SMOKING IN, OR ADJACENT TO, ALL CONSTRUCTION AREAS.
8. DEVELOP AND ENFORCE STORAGE, HOUSEKEEPING, AND DEBRIS REMOVAL PRACTICES THAT REDUCE THE FLAMMABLE AND COMBUSTIBLE FIRE LOAD OF THE BUILDING TO THE LOWEST LEVEL REQUIRED FOR DAILY OPERATION.
9. PROVIDE INCREASED HAZARD SURVEILLANCE OF BUILDINGS, GROUNDS AND EQUIPMENT, WITH SPECIAL ATTENTION TO THE EXCAVATIONS, CONSTRUCTION AREAS, CONSTRUCTION STORAGE AND FIELD OFFICES. PROVIDE APPROVED BARRIERS AT ALL HAZARDOUS AREAS.
10. CONDUCT ORGANIZATION-WIDE SAFETY EDUCATION PROGRAMS TO ASSURE AWARENESS OF ANY LIFE SAFETY CODE DEFICIENCIES, CONSTRUCTION HAZARDS, AND THESE REQUIREMENTS.
11. PROVIDE EXHAUST AIR FLOW SUFFICIENT TO MAINTAIN NEGATIVE AIR PRESSURE IN THE CONSTRUCTION ZONES, RELATIVE TO ALL OCCUPIED ADJACENT AREAS.

1 LEVEL 0 LIFE SAFETY PLAN
SCALE: 1/8" = 1'-0"

PROFESSIONAL SEALS:

PROJECT PARTNERS:

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SSOE MANAGER:	JEFF FALZON

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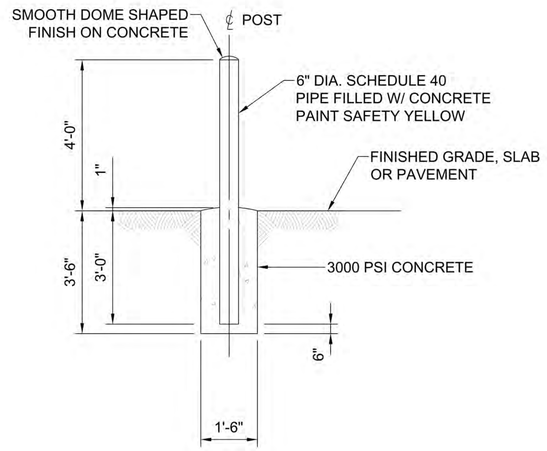
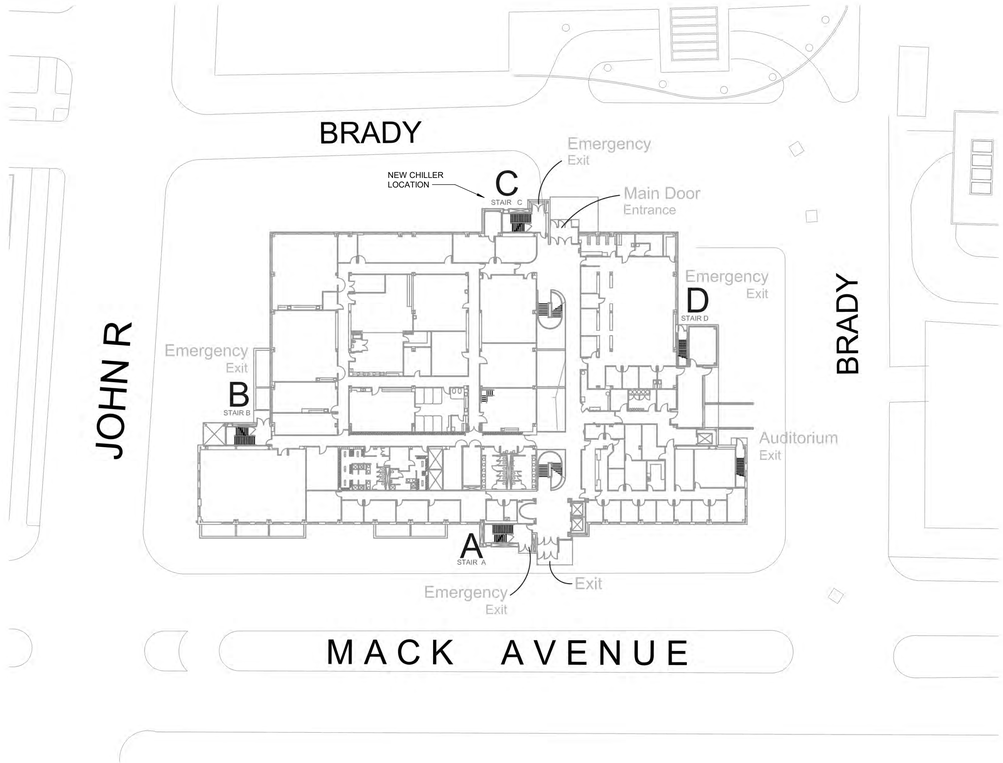
1001 Madison Avenue
Toledo, OH 43604
T. (419) 255-3830

OVERALL LEVEL 0 LIFE SAFETY PLAN

GI-300



1 BOLLARD DETAIL
SCALE: NOT TO SCALE



2 ARCHITECTURAL SITE PLAN
SCALE: 1 1/2" = 1'-0"

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

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1001 Madison Avenue
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ARCHITECTURAL SITE PLAN

AE-000

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GENERAL NOTES:
STUD CONSTRUCTION

1. BASIS OF DESIGN: *STEEL FRAMED PARTITIONS*
DESIGN IS BASED ON GUIDELINES INCLUDED IN PRODUCT TECHNICAL INFORMATION OF THE STEEL MANUFACTURE'S ASSOCIATION LATEST EDITION OF THE SSMA PUBLICATION AND THE FOLLOWING PERFORMANCE CRITERIA:

A. LIMITING HEIGHT CRITERIA:
DEFLECTION OF L/240 AT 7.5 LBS. PER SQ. FT CONSTANT AIR-PRESSURE LOADS

B. THICKNESS-STEEL COMPONENTS:

GAUGE	DESIGN THICKNESS
25	0.0188
22	0.0283
20	0.0346
18	0.0451

*LIGHT GUAGE METAL FRAMING MANUFACTURED TO "EQUIVALENT THICKNESS" PARAMETERS ARE ACCEPTABLE PROVIDED THEY DESIGN CIRTERIA NOTED ABOVE IS ACCOMDOATED .

2. BASIS OF DESIGN: *SHAFT WALL PARTITIONS*
DESIGN IS BASED ON UNITED STATES GYPSUM COMPANY PRODUCT LITERATURE SA 926 DATED 2000 AND THE FOLLOWING PERFORMANCE CRITERIA:
A. LIMITING HEIGHT CRITERIA:
DEFLECTION OF L/240 5 LBS. PER SQ. FT. INTERMITTENT AIR-PRESSURE LOADS

B. THICKNESS-STEEL COMPONENTS:

GAUGE	DESIGN THICKNESS
25	0.0188
22	0.0310
20	0.0356

*LIGHT GUAGE METAL FRAMING MANUFACTURED TO "EQUIVALENT THICKNESS" PARAMETERS ARE ACCEPTABLE PROVIDED THEY DESIGN CIRTERIA NOTED ABOVE IS ACCOMDOATED .

3. MINIMUM GAUGE:
IF LIMITING HEIGHT AS SCHEDULED IN PARTITION DETAILS EXCEEDS PROJECT CONDITIONS OR IF THE SELECTED STEEL STUD MANUFACTURE'S THICKNESS OF STEEL COMPONENTS VARIES FROM THE BASIS OF DESIGN AS SET FORTH ABOVE, PROVIDE MANUFACTURE'S STANDARD THICKNESS (GAUGE) THAT MEETS OR EXCEEDS LIMITING HEIGHT PERFORMANCE CRITERIA FOR STUD DEPTH AND SPACING INDICATED.

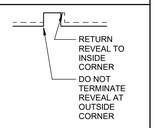
4. DOOR JAMBS
PROVIDE DOUBLE 20 GA. STUDS AT ALL DOOR OPENINGS, EXTEND FROM FLOOR TO STRUCTURE ABOVE. TYPICAL FOR ALL DOORS IN METAL STUD WALLS.

GENERAL NOTES:
GYPSUM WALLBOARD

1. DO NOT INSTALL GYPSUM WALLBOARD IN DIRECT CONTACT WITH THE FLOOR. ALL GWB SHALL BE SHIMMED 1/2" ABOVE FLOOR SLAB WITH NON-POROUS SHIM. PLASTIC NON-POROUS HORSESHOE SHIMS ARE RECOMMENDED. GYPSUM WALLBOARD SHIMS ARE NOT ACCEPTABLE. PROVIDE BACKER ROD & CONTINUOUS ACOUSTICAL OR FIRE RATED SEALANT TOOLED FOR HOURGLASS SHAPE PER MFR'S RECOMMENDATIONS.
2. WHERE GYPSUM WALL BOARD EXTENDS TO THE UNDERSIDE OF STRUCTURE, STOP GYPSUM WALL BOARD 1/2" BELOW LINE OF STRUCTURE AND SEAL AS REQUIRED.
3. TYPICAL AT ALL INTERIOR PARTITIONS, GYPSUM WALLBOARD TO BE 5/8" TYPE "X" UNLESS NOTED OTHERWISE AT PARTITION TYPE MODIFIER OR AS SCHEDULED IN SPECIFICATION.
4. TYPICAL AT ALL EXTERIOR PERIMETER WALLS, INSTALL 5/8" TYPE "X" MOLD AND MOISTURE RESISTANT GYPSUM WALLBOARD.
5. STAGGER JOINTS AT INSTALLATIONS OF MULTIPLE LAYERS OF GYPSUM WALLBOARD.
6. TO GREATEST EXTENT POSSIBLE, ALL HORIZONTAL JOINTS BETWEEN PANELS SHALL BE ABOVE CEILING.

GENERAL NOTES:
GYPSUM WALLBOARD REVEALS

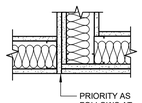
1. STANDARD, WHERE INDICATED IN THESE DOCUMENTS, PROVIDE REVEALS OF TYPE AND SIZE INDICATED AS SPECIFIED.
2. ELEVATIONS MAY NOT SHOW ALL FACES OF COLUMNS OR FACES OF EVERY WALL - G.C. SHALL ASSUME THAT ALL REVEALS WILL RETURN TO INSIDE CORNER UNLESS OTHERWISE NOTED.
3. AT ALL INTERSECTIONS OF VERTICAL AND HORIZONTAL REVEALS, PROVIDE FACTORY FABRICATED INTERSECTIONS AND CORNERS.



GENERAL NOTES:
FIRE RATED ASSEMBLIES

1. ALL FIRE-RATED ASSEMBLIES TO EXTEND FROM TOP OF SLAB TO UNDERSIDE OF STRUCTURE. SEAL TOP OF ASSEMBLY TO THE UNDERSIDE OF METAL DECK OR STEEL BEAM AS REQUIRED TO ACHIEVE FIRE PROTECTION RATING.
2. AT GWB/STUD FIRE RATED ASSEMBLIES, INSTALL FRAMING AND GYPSUM WALL BOARD TO OFFSET AROUND STRUCTURAL MEMBERS OR OTHER OBSTRUCTIONS TO MAINTAIN ACOUSTICAL OR FIRE RATINGS (IF ACOUSTICAL PARTITION IS ALSO FIRE-RATED). SEE DETAILS AT SHEET **AX.XX**.
3. SEAL BOTTOM OF WALL TO CONCRETE SLAB TO ACHIEVE FIRE PROTECTION RATING. SEE DETAILS AT SHEET **AX.XX**.
4. REFER TO SPECIFICATIONS FOR FIRE-RATED JOINT SYSTEMS FOR FIRE-RATED SEALANTS AND FIRESTOP CAULKING.
5. INSTALL FRAMING AND GWB TO OFFSET AROUND STRUCTURAL MEMBERS OR OTHER PENETRATIONS OF FIRE-RATED ASSEMBLIES TO MAINTAIN FIRE RESISTIVE RATINGS PER UL APPROVED DETAIL.

ASSEMBLY PRIORITY LEGEND



PROVIDE RATED ASSEMBLIES IN ACCORDANCE WITH UL LISTING, MFR. INSTRUCTIONS & APPROVED DETAILS INDICATING HOURS OF FIRE RESISTANCE. REFER TO LIFE SAFETY PLANS, PLANS & ENLARGED PLANS FOR PARTITION TYPES, LOCATIONS & EXTENT OF RATED WALLS.

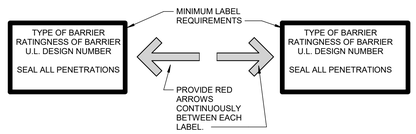
PRIORITY OF RATED ASSEMBLIES:

• TWO HOUR FIRE & SMOKE WALL	PRIORITY 1 - HIGHEST
• TWO HOUR FIRE WALL	PRIORITY 2
• TWO HOUR SHAFT WALL	PRIORITY 3
• ONE HOUR FIRE & SMOKE WALL	PRIORITY 4
• ONE HOUR FIRE WALL	PRIORITY 5
• ONE HOUR SHAFT WALL	PRIORITY 6
• NON-RATED	PRIORITY 7 - LOWEST

GENERAL NOTES - FIRE RATED STENCIL

1. APPLY PARTITION LABELS ABOVE THE CEILING ON ALL RATED AND SMOKE TIGHT ASSEMBLIES. LABEL AS PER ASSEMBLY RATING.
2. COLOR TO BE BRIGHT RED. MINIMUM TEXT SIZE AS REQUIRED BY LOCAL AUTHORITIES HAVING JURISDICTION.
3. APPLY LABEL AT BEGINNING AND END OF EACH LENGTH OF ASSEMBLY AND APPLY LABEL INTERMITTENTLY BETWEEN END/BEGINNING AT MINIMUM SPACING OF 12'-0" O.C.
4. ARROWS TO BE CONTINUOUS AROUND ASSEMBLY.
5. FIRE/SMOKE DAMPER ACCESS AND OTHER MECHANICAL ELEMENTS SHALL BE IDENTIFIED AS PER ***IBC 2018 SECTION 717.4***. ALL OTHER IDENTIFIERS SHALL BE IN COMPLIANCE WITH THE IBC AND ALL OTHER APPLICABLE CODES AND MUNICIPALITY REQUIREMENTS.
6. REPAIR/PATCH EXISTING FIRE RATED PARTITION LABELS AS NECESSARY
7. PAINT OVER EXISTING FIRE RATED PARTITION LABELS AND ARROWS SO AS TO COMPLETELY COVER ALL INDICATION OF A FIRE RATING FOR ASSEMBLIES THAT WILL NOT RETAIN A FIRE RATING IN THE PROPOSED NEW DESIGN.

FIRE RATED STENCIL DETAIL



GENERAL NOTES:
NON-RATED & ACOUSTICAL PARTITIONS/ASSEMBLIES

1. ALL INTERIOR PARTITIONS TO EXTEND TO DECK UNLESS NOTED OTHERWISE BY PARTITION TYPE HEAD CONDITION SCHEDULE. SEE PLAN FOR PARTITION IDENTIFICATION.
2. ALL ACOUSTIC PARTITIONS TO EXTEND FROM TOP OF SLAB TO UNDERSIDE OF STRUCTURE. SEAL TOP AND BOTTOM TYPICAL TO THE UNDERSIDE OF METAL DECK OR STEEL BEAM AS REQUIRED TO ACHIEVE ACOUSTIC OR FIRE PROTECTION RATING. SEE DETAILS AT SHEET AE.051. INSTALL FRAMING AND GYPSUM WALL BOARD TO OFFSET AROUND STRUCTURAL MEMBERS OR OTHER OBSTRUCTIONS TO MAINTAIN ACOUSTICAL OR FIRE RATINGS (IF ACOUSTICAL PARTITION IS ALSO FIRE-RATED).
3. ALL INTERIOR METAL STUD PARTITIONS TO HAVE SOUND BATTS INSULATION UNLESS NOTED OTHERWISE BY PARTITION MODIFIER. AT 3 5/8" STUD CAVITIES, PROVIDE 3 1/2" SOUND BATTS. AT 6" OR 8" STUD CAVITIES PROVIDE 5 1/2" SOUND BATTS.
4. ALL INTERIOR ROOF DRAINS AND OVERFLOW DRAINS TO BE WRAPPED CONTINUOUSLY WITH SOUND ATTENUATION INSULATION.
5. ALL PARTITIONS CONTAINING PLUMBING PIPING SHALL BE THERMALLY INSULATED WITH MINERAL WOOL.
6. THE FOLLOWING LIST OF ROOMS (IF USED) SHALL HAVE THEIR PERIMETER PARTITIONS INSULATED USING MINERAL WOOL: ELECTRICAL ROOMS, MECHANICAL ROOMS, AV EQUIPMENT ROOMS, DATA OR TELECOM ROOMS, SPRINKLER RISER ROOMS AND FIRE PUMP ROOMS.
7. WHERE NOTED, PROVIDE RESILIENT CHANNELS AT CORRIDOR SIDE OF WALL. SEE PARTITION TYPE DETAILS AND SPECIFICATIONS FOR INSTALLATION GUIDELINES.

GENERAL NOTES:
CONCRETE MASONRY UNIT ASSEMBLIES

1. ALL CMU PARTITIONS ARE TO BE INSTALLED TO UNDERSIDE OF DECK AND ANCHORED TO STRUCTURE UNLESS NOTED OTHERWISE BY PARTITION TYPE HEAD CONDITION AS SCHEDULED AT FLOOR PLAN PARTITION TYPE TAG. FOR WALLS NOT DIRECTLY ANCHORED TO STRUCTURE, WALL SHALL BE BRACED TO STRUCTURE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
2. ALL CMU PARTITIONS SHALL BE BRACED TO STRUCTURE IF NOT DIRECTLY ADJACENT TO OTHER CMU PARTITIONS, SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
3. ALL CMU PARTITIONS SHALL BE REINFORCED. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
4. SEE STRUCTURAL DRAWINGS FOR CORE GROUTING LOCATIONS.
5. SEE STRUCTURAL DRAWINGS FOR FOOTINGS/SLAB CONDITIONS UNDER CMU PARTITION ASSEMBLIES.
6. AT TOILET ROOM CHASES, BOTH WYTHES OF THE CHASE SHALL BE MADE OF CMU OF THE SAME WIDTH UNLESS NOTED OTHERWISE BY PARTITION TYPE TAG ON THE FLOOR PLAN.

GENERAL NOTES:
CAST IN PLACE CONCRETE

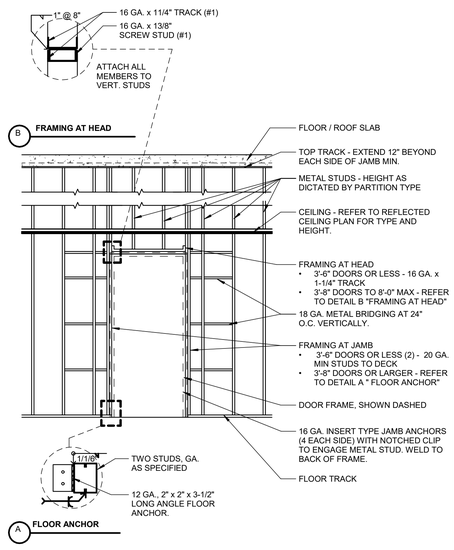
1. ALL CAST-IN-PLACE CONCRETE TO BE REINFORCED. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.

GENERAL NOTES:
WOOD STUD FRAMING & FURRING

1. TYPICAL, ALL WOOD STUD FRAMED PARTITIONS SHALL BE TO UNDERSIDE OF DESK UNO.
2. REFER TO DRAWINGS FOR ALL STRUCTURAL HEIGHTS, CEILING HEIGHTS AND HEIGHTS OF PARTIAL HEIGHT PARTITIONS.
3. WOOD STUDS SHALL BE INSTALLED AT 16" O.C. UNLESS OTHERWISE INDICATED BY "SPECIAL CONDITION"

GENERAL NOTES:
DOOR FRAMING

1. ALL DOOR JAMB STUDS ARE TO EXTEND TO DECK, REGARDLESS OF PARTITION TYPE STUD HEIGHTS AS NOTED BY PARTITION TYPE OR SPECIAL CONDITION.
2. REFER TO DETAIL BELOW FOR STUD GA. AT JAMB AND HEADER STUDS



- AS AN OPTION TO THE NESTED 16 GA. x 1-1/4" TRACK AND 16 GA. x 1-3/8" SCREW STUD 16 GA. x 1-1/4" TRACK SHOWN FOR "FRAMING AT HEAD" DETAIL A 16 GA. RECTANGULAR TUBE OF SAME SIZE AS THE NESTED STUD / TRACK MAY BE USED + 16 GA. x 1-1/4" TRACK.
- BRIDGING TO BE AT 24" O.C. VERTICALLY AT DOORS OVER 36" WIDE AND AT LEAD LINED DOORS; DOORS 36" WIDE AND NARROWER, CAN HAVE BRIDGING AT MID-POINT OF VERTICAL DOOR HEIGHT.

TYPICAL GYPSUM BOARD REQUIREMENTS BASED ON ENVIRONMENTAL SAFETY RISK LEVELS

CONTRACTOR TO COORDINATE GYPSUM BOARD REQUIRED PER SAFETY RISK LEVELS ON ENVIRONMENTAL SAFETY RISK ASSESSMENT PLAN.

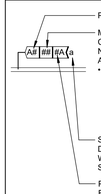
PROVIDE PER THE FOLLOWING SCHEDULE:

LEVEL 1 : STANDARD GYPSUM BOARD - TYPE 'X'
ASTM C 1396/C 1396M, 5/8"

LEVEL 2-3 : ABUSE RESISTANT GYPSUM BOARD
ASTM C 1396/C 1396M, 5/8" - TESTED ACCORDING TO ASTM C 1629M, LEVEL 1

LEVEL 4-5 : IMPACT RESISTANT GYPSUM BOARD
ASTM D 4977, ASTM D 5420, 5/8"

PARTITION TYPE TAG LEGEND - CALLED OUT ON FLOOR PLANS & ENLARGED PLANS



ABBREVIATIONS

I I	=	"CORE"
(#)	=	NUMBER OF LAYERS OF GWB
CIP	=	CAST-IN-PLACE CONCRETE
CMU	=	CONCRETE MASONRY UNIT
FC	=	STUD FURRING (TYPE AS SCHEDULED)
GSL	=	GYPSUM SHAFT LINER
GWB	=	GYPSUM WALLBOARD, TYPE AS SCHEDULED
HF	=	HAT-SHAPED METAL FURRING
MS	=	METAL STUD FRAMING
MF	=	METAL STUD FURRING
MSS	=	METAL SHAFTWALL STUD FRAMING
RC	=	RESILIENT CHANNEL
WS	=	WOOD STUD FRAMING
WF	=	WOOD FURRING
ZF	=	METAL Z-FURRING

PARTITION TYPE SCHEDULE

METAL STUD PARTITION TYPES

F1	GWB(1) + FC
F2	GWB(2) + FC
F3	GWB(3) + FC
M1	GWB (1) + MS + GWB(1)
M2	GWB (2) + MS + GWB(2)
M3	GWB (3) + MS + GWB(3)
M4	GWB (1) + MS + GWB(2)
M5	GWB (1) + MS + GWB(3)
M6	GWB (2) + MS + GWB(3)

SHAFTWALL PARTITION TYPES

S1	GSB(1) + MSS + GSL(1)
S2	GSB(2) + MSS + GSL(1)
S3	GSB(3) + MSS + GSL(1)
T1	GWB(1) + MSS + GSL(1) + GWB(1)
T2	GWB(2) + MSS + GSL(1) + GWB(2)
T4	GWB(1) + MSS + GSL(1) + GWB(2)
T7	GWB(2) + MSS + GSL(1) + GWB(1)

LIGHT GAUGE METAL STUD SCHEDULE

NOMINAL	ACTUAL
1	1 5/8"
2	2 1/2"
3	3 5/8"
4	4"
6	6"
8	8"

SHAFTWALL STUD SCHEDULE

NOMINAL	ACTUAL
2	2 1/2"
4	4"
6	6"

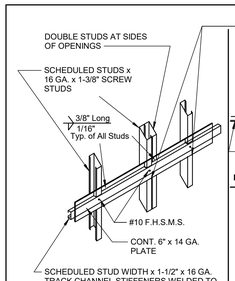
SPECIAL CONDITION SCHEDULE

A. STUD AND GWB TO 6" MIN ABOVE HIGHEST ADJACENT CEILING. SEE HEAD DETAIL **##** ON **A0.##**
B. STUD TO STRUCTURE AND GWB TO 6" MIN ABOVE HIGHEST ADJACENT CEILING. SEE HEAD DETAIL **##** ON **A0.##**
C. CMU TO ONE COURSE ABOVE HIGHEST ADJACENT CEILING.
D. PARTIAL HEIGHT WALL, CAP TOP OF WALL WITH SOLID SURFACE SILL. SEE ELEVATIONS FOR HEIGHT OF WALL. LIGHT GAUGE MFR.'S ENGINEER OF RECORD TO DESIGN WALL TO MEET PERFORMANCE CRITERIA AS DETAILED AT GENERAL NOTES ON A0.10. IF REQUIRED, PROVIDE STRUCTURAL STEEL TUBE POST TO PROVIDE ADDITIONAL SUPPORT FOR WALL.
E. LEAD LINED PARTITION, SEE SCHEDULE AND DETAILS AT **SHEET A5.50**.
F. INCREASE STUD SPACING TO 24" O.C. TO MEET ACOUSTICAL DESIGN RATING
G. PARTITION TO UNDERSIDE OF METAL PAN STAIR/LANDING.
H. FILL CAVITIES IN CMU WALL WITH SAND.
I. NOT TO BE USED
J. PROVIDE ABUSE RESISTANT GYPSUM WALLBOARD AT OUTERMOST LAYER OF "FINISH CONFIGURATION".
K. PROVIDE MOLD AND MOISTURE RESISTANT GYPSUM WALLBOARD AT ALL GWB LAYERS.

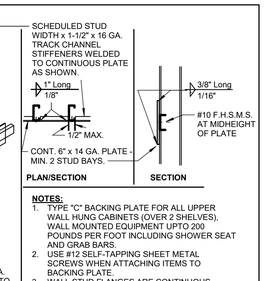
FURRING SCHEDULE

NOMINAL	TYPE	ACTUAL
A	HF	7/8"
B	HF	1 1/2"
C	RC	1/2"
D	ZF	1"
E	ZF	1 1/2"
F	ZF	2"
G	ZF	2 1/2"
H	MSF	3/4"
J	MSF	1"
K	MSF	1 1/2"
L	MSF	2"
M	1X2	3/4" x 1 1/2" WOOD
N	1X3	3/4 x 2 1/2"
P	1X4	3/4" x 3 1/2"
R	1X6	3/4" x 5 1/2"
S	1X8	3/4" x 7 1/4"
T	1X10	3/4" x 9 1/4"
U	1X12	3/4" x 11 1/4"
V		5/16" PLYWOOD SHEATHING
W		3/8" PLYWOOD SHEATHING
X		1/2" PLYWOOD SHEATHING

1. CAST-IN-PLACE CONCRETE "STRUCTURAL MEMBER SIZE IS DIMENSIONED AT PLANS, SEE STRUCTURAL DWGS FOR MORE INFORMATION.
2. RESILIENT CHANNEL IS 1/2" DEEP, SEE SPECIFICATIONS FOR LENGTH AND TYPE
3. FOR ALL METAL STUD FURRING, ONLY DEPTH IS NOTED. SEE SPECIFICATION FOR ALL OTHER SIZE AND GAUGE REQUIREMENTS. FURRING LEGS SHALL BE OF DIMENSION ADEQUATE TO MEET PERFORMANCE AND FASTENING REQUIREMENTS.

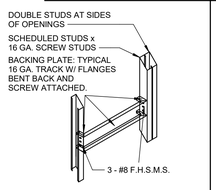


CONNECTION DETAIL



NOTES:
1. TYPE "C" BACKING PLATE FOR ALL UPPER WALL HUNG CABINETS (OVER 2 SHELVES), WALL MOUNTED EQUIPMENT UPTO 200 POUNDS PER FOOT INCLUDING SHOWER SEAT AND GRAB BARS.
2. USE #12 SELF-TAPPING SHEET METAL SCREWS WHEN ATTACHING ITEMS TO BACKING PLATE.
3. WALL STUD FLANGES ARE CONTINUOUS.

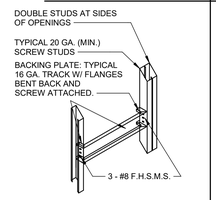
TYPE "C" BACKING PLATE



CONNECTION DETAIL

NOTES:
1. TYPE "B" BACKING PLATE FOR UPPER WALL HUNG CABINETS (UP TO 2 SHELVES), BASE CABINETS, FULL HEIGHT CABINETS, FILM VIEWING COUNTERS, WALL HUNG BENCHES, HANDRAILS, GUARDRAILS, AND WALL HUNG EQUIPMENT - MAXIMUM WEIGHT 100 POUNDS
2. VERIFY LENGTH, HEIGHT, LOCATION OF BACKING PLATE AND NUMBER REQUIRED WITH MANUFACTURER OF ITEMS IN NOTE 1.
3. USE #12 SELF-TAPPING SHEET METAL SCREWS WHEN ATTACHING ITEMS TO BACKING PLATE.
4. WALL STUD FLANGES ARE CONTINUOUS.

TYPE "B" BACKING PLATE



CONNECTION DETAIL

NOTES:
1. TYPE "A" BACKING PLATE FOR MISC. ITEMS; I.E. SURFACE MOUNTED MIRRORS, WASTE RECEPTACLES, TOWEL DISPENSERS, CHAIR RAILS, ETC. MAXIMUM WEIGHT 50 POUNDS
2. VERIFY LENGTH, HEIGHT, LOCATION OF BACKING PLATE AND NUMBER REQUIRED WITH ACCESSORY MANUFACTURER.
3. USE #12 SELF-TAPPING SHEET METAL SCREWS WHEN ATTACHING ITEMS TO BACKING PLATE.
4. WALL STUD FLANGES ARE CONTINUOUS.

TYPE "A" BACKING PLATE

SSOE®

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
1	10-20-23	DD PROGRESS

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CLIENT INFORMATION:

Wayne State University

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5454 CASS AVE
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WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

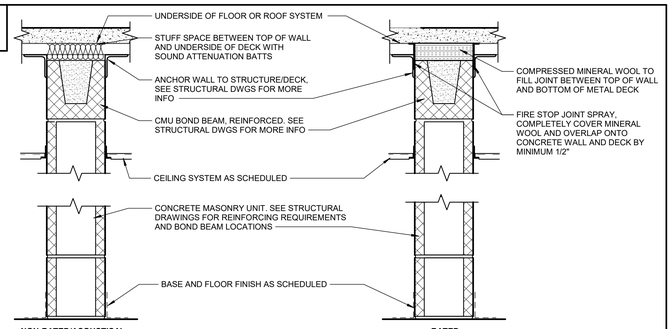
SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1001 Madison Avenue
Toledo, OH 43604
T. (419) 255-3830

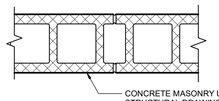
TYPICAL INTERIOR PARTITION DETAILS

AE-050

C



SECTION DETAIL



PLAN DETAIL

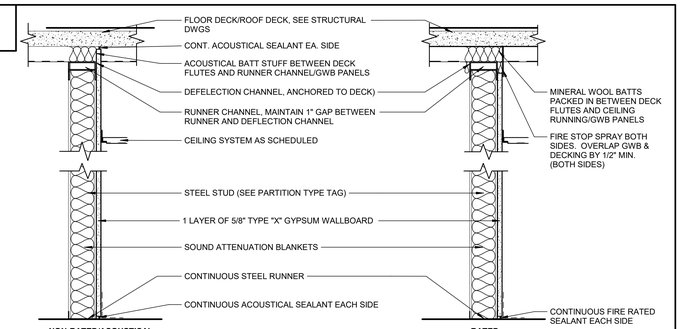
1. SPECIAL CONDITIONS AS TAGGED AT FLOOR PLAN ARE NOT SHOWN IN THE ABOVE DIAGRAM OR SCHEDULE BELOW, SEE SPECIAL CONDITIONS SCHEDULE FOR MORE INFO.

PARTITION NOTES

PARTITION TAG	FINISHED WIDTH	CMU SIZE	STC RATING	UL
C 4 NR	3 5/8"	3 5/8"	45	N/A
C 4 1P	3 5/8"	3 5/8"	45	N/A
C 4 1B	3 5/8"	3 5/8"	45	N/A
C 6 NR	5 5/8"	5 5/8"	45	N/A
C 6 1P	5 5/8"	5 5/8"	45	N/A
C 6 1B	5 5/8"	5 5/8"	45	N/A
C 6 2B	5 5/8"	5 5/8"	45	N/A
C 6 3B	5 5/8"	5 5/8"	45	N/A
C 8 NR	7 5/8"	7 5/8"	45	N/A
C 8 1P	7 5/8"	7 5/8"	45	N/A
C 8 1B	7 5/8"	7 5/8"	45	N/A
C 8 2B	7 5/8"	7 5/8"	45	N/A
C 8 3B	7 5/8"	7 5/8"	45	N/A
C 10 NR	9 5/8"	9 5/8"	45	N/A
C 10 1P	9 5/8"	9 5/8"	45	N/A
C 10 1B	9 5/8"	9 5/8"	45	N/A
C 10 2B	9 5/8"	9 5/8"	45	N/A
C 12 NR	11 5/8"	11 5/8"	45	N/A
C 12 1P	11 5/8"	11 5/8"	45	N/A
C 12 2B	11 5/8"	11 5/8"	45	N/A
C 12 3B	11 5/8"	11 5/8"	45	N/A

PARTITON SCHEDULE

G1



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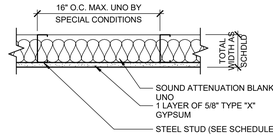


PLAN DETAIL

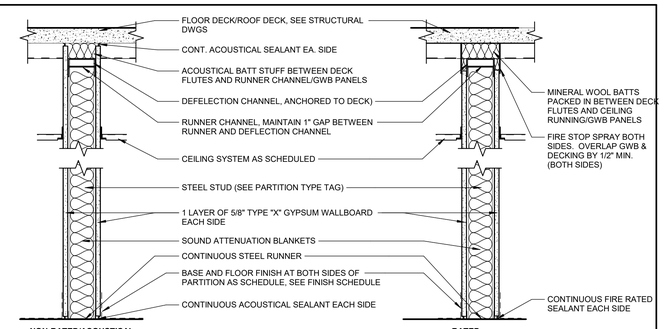
1. PA TO EDIT NOTES AS APPLICABLE TO PROJECT.
2. PARITION TYPE MAY BE USED FOR 1 HOUR RATING WHEN APPLIED IN CONTINUOUSLY ALL SIDES OF COLUMN.

PARTITON TYPE NOTES

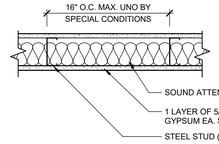
PARTITION TAG	FINISHED WIDTH	STUD SIZE	STC RATING	UL
G1 1 NR	2 7/8"	1 5/8"	45	N/A
G1 2 NR	3 3/4"	2 1/2"	45	N/A
G1 2 1P	3 3/4"	2 1/2"	45	U4119
G1 3 NR	4 7/8"	3 5/8"	45	N/A
G1 3 1P	4 7/8"	3 5/8"	45	U4119
G1 4 NR	5 1/4"	4"	45	N/A
G1 4 1P	5 1/4"	4"	45	U4119
G1 6 NR	7 1/4"	6"	45	N/A
G1 6 1P	7 1/4"	6"	45	U4119
G1 8 NR	9 1/4"	8"	45	N/A
G1 8 1P	9 1/4"	8"	45	U4119

PARTITION SCHEDULE

M1



SECTION DETAIL



PLAN DETAIL

1. ULI DESIGN NUMBER IS IN REFERENCE TO WALLS NOTED TO BE RATED AS INDICATED AT FLOOR PLANS AND LIFE SAFETY PLANS. REFER TO ULI DETAILS ON **G#.##** FOR MORE INFO
2. REFER TO **##** ON **A#.##** FOR MORE INFO ON RATED PARTITION HEAD OF PARTITION DETAIL.
3. REFER TO **##** ON **A#.##** FOR RATED RATED PARTITION HEAD CONDITION PARALELLE TO STRUCTURAL STEEL.
4. SPECIAL CONDITIONS AS TAGGED AT FLOOR PLAN ARE NOT SHOWN IN THE ABOVE DIAGRAM OR SCHEDULE BELOW, SEE SPECIAL CONDITIONS SCHEDULE FOR MORE INFO.

PA: SEE THE STEEL STUD MANUFACTURER'S ASSOCIATION PRODUCT TECHNICAL GUIDE FOR LIMITING HEIGHTS FOR DIFFERENT GAUGES AND STUD SIZES. ENSURE ALL WALLS LABELED ON PLANS DO NOT EXCEED LIMITATIONS

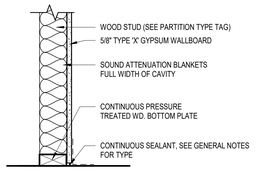
EDIT SCHEDULE TO INCLUDE WHAT IS RELEVANT. 1P INFO RELEVANT FOR ~~ANY 1 HOUR~~ RATING (1B, 1S) THIS WALL TYPE CANNOT BE RATED ABOVE 1 HOUR. FOR RATED WALLS (1W), PROVIDE WALL SECTION DETAIL

PARTITON TYPE NOTES

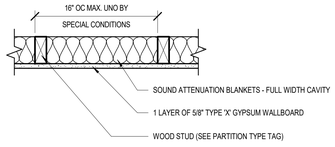
PARTITION TAG	FINISHED WIDTH	STUD SIZE	STC RATING	UL
M1 1 NR	2 7/8"	1 5/8"	?	N/A
M1 2 NR	3 3/4"	2 1/2"	?	N/A
M1 2 1P	3 3/4"	2 1/2"	?	U419
M1 3 NR	4 7/8"	3 5/8"	?	N/A
M1 3 1P	4 7/8"	3 5/8"	49	U419
M1 4 NR	5 1/4"	4"	?	N/A
M1 4 1P	5 1/4"	4"	?	U419
M1 6 NR	7 1/4"	6"	?	N/A
M1 6 1P	7 1/4"	6"	?	U419
M1 8 NR	9 1/4"	8"	?	N/A
M1 8 1P	9 1/4"	8"	?	U419

PARTITION SCHEDULE

Z1



SECTION DETAIL



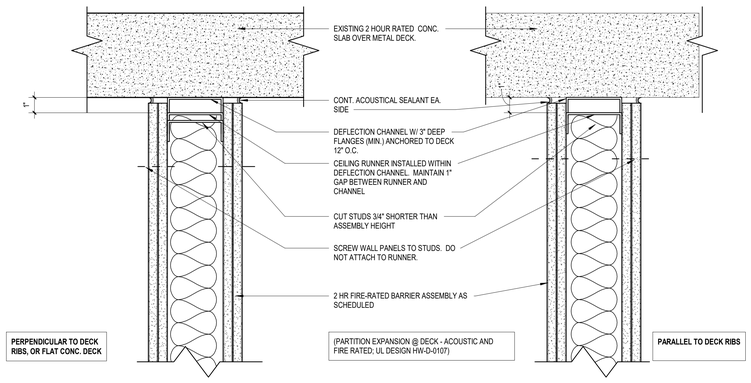
PLAN DETAIL

1. TYPICAL HEAD CONDITION 20/A0.04 AT NON-RATED WALL UNO.
2. USE ACOUSTIC SEALANT / CAULK AT NON-RATED PARTITIONS.
3. TYPICAL HEAD CONDITION AT RATED WALL 20/A0.04.
4. USE FIRE CAULK AT RATED PARTITIONS.

PARTITON TYPE NOTES

PARTITION TAG	FINISHED WIDTH	STUD SIZE	STC RATING	UL

PARTITION SCHEDULE



HEAD - M2 - TOP OF TYPICAL FIRE RATED WALL

SCALE: 3" = 1'-0"

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

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CLIENT INFORMATION:

Wayne State University

WAYNE STATE UNIVERSITY
5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1001 Madison Avenue
Toledo, OH 43604
T. (419) 255-3830

WALL / PARTITION TYPES

AE-051

A7 OVERALL LEVEL 0 FLOOR PLAN
SCALE: 1/8" = 1'-0"

N

PROFESSIONAL SEALS:

PROJECT PARTNERS:

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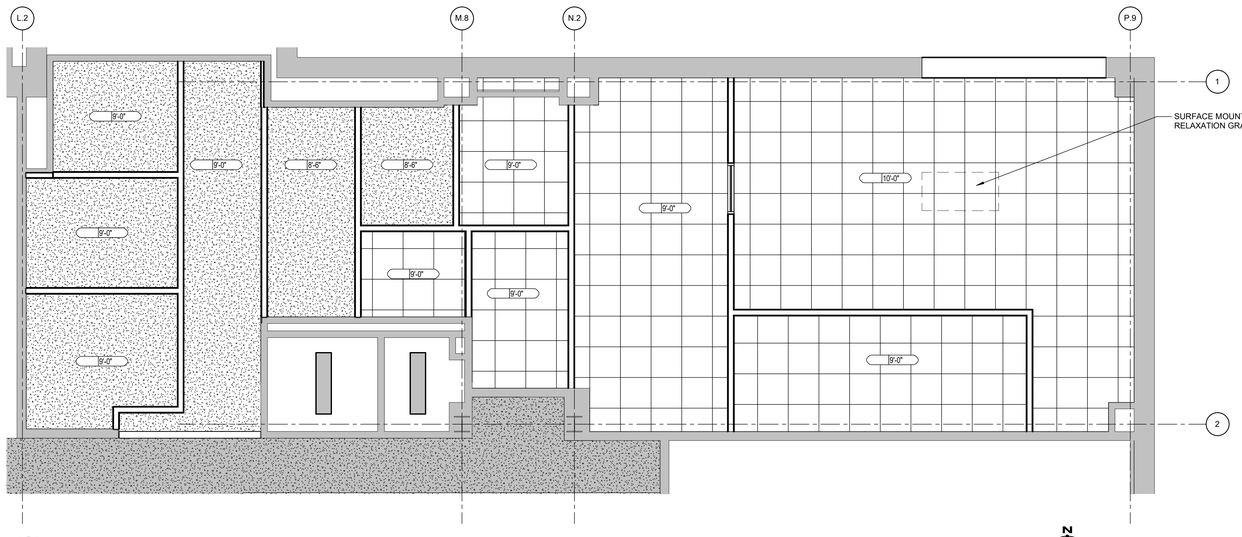
OVERALL LEVEL 0 FLOOR PLAN

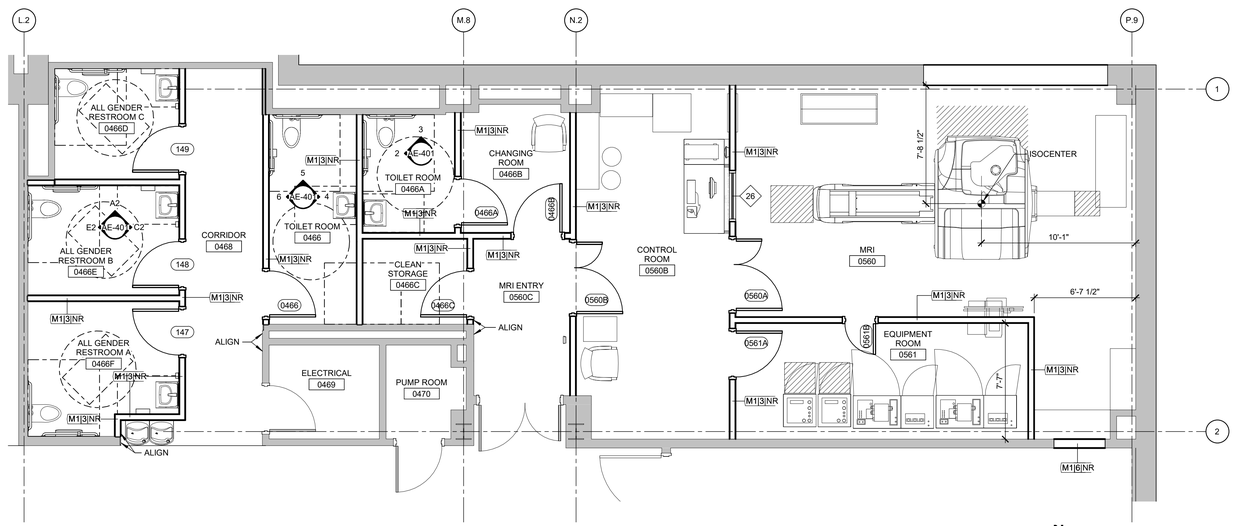
AE-100

Autodesk Docs://Wayne State University_WSU Applebaum MRI/0230372700_A23_SSOE.rvt :**FILE PATH**
10/23/2023 1:46:45 PM :**PRINT DATE**



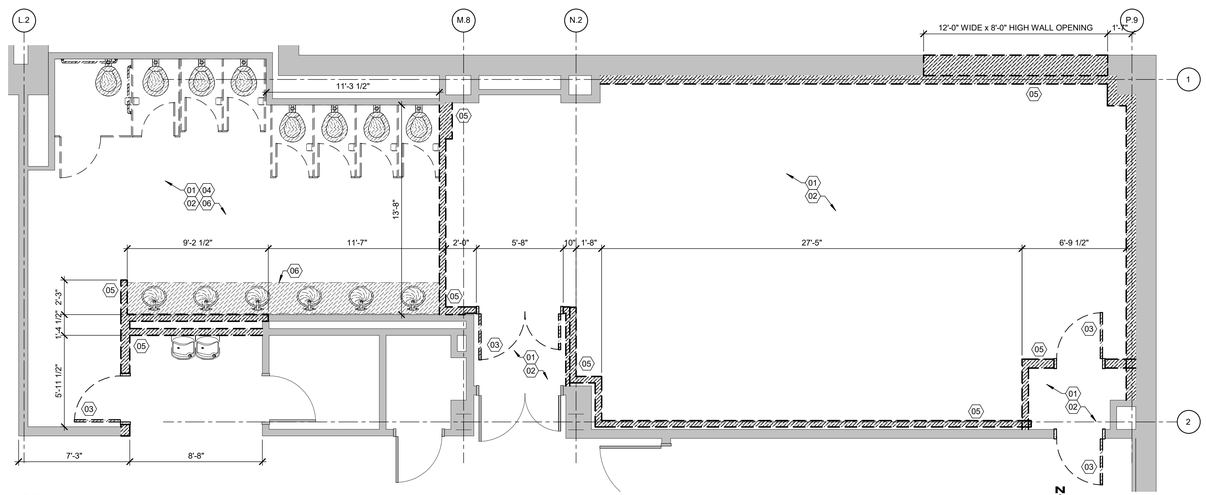
A7 ENLARGED MRI SUITE REFLECTED CEILING PLAN

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



A5 AE-100 ENLARGED MRI SUITE NEW WORK PLAN

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



A3 AE-100 ENLARGED NMR SUITE DEMOLITION PLAN

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

NEW WORK PLAN KEYNOTES

01 INSTALL NEW CEILING SYSTEM. COORDINATE WITH MECHANICAL AND ELECTRICAL. REFER TO REFLECTED CEILING PLAN AND ROOM FINISH SCHEDULE.

02 INSTALL NEW FLOOR FINISHES PER SHEET AE-700 AND MATERIAL FINISH AND ROOM FINISH SCHEDULES.

03 INSTALL NEW DOOR AND FRAME AS SHOWN PER PLANS. REFER TO DOOR SCHEDULE.

04 INFILL EXISTING SLAB DEPRESSION. COORDINATE WITH STRUCTURAL.

05 INFILL WALL OPENING PER STRUCTURAL DRAWINGS.

DEMOLITION PLAN KEYNOTES

01 REMOVE CEILING SYSTEM. COORDINATE MECHANICAL AND ELECTRICAL. REFER TO CEILING PLAN AND ROOM FINISH SCHEDULE.

02 REMOVE FLOORING SYSTEM. COORDINATE WITH MECHANICAL AND ELECTRICAL. REFER TO ROOM FINISH SCHEDULE.

03 EXISTING DOOR, FRAME, AND HARDWARE TO BE REMOVED. SALVAGE CARD READER FOR REINSTALLATION IN NEW WORK.

04 REMOVE EXISTING PLUMBING FIXTURES. CUT & CAP PLUMBING LINES. REFER TO PLUMBING DRAWINGS FOR EXTENT OF DEMOLITION.

05 REMOVE PORTION OF WALL INCLUDING ALL WALL-MOUNTED ACCESSORIES AND UTILITIES CONCEALED WITHIN THE WALL CAVITY.

06 REMOVE EXISTING TOILET ROOM ACCESSORIES AND TOILET PARTITIONS.

07 REMOVE EXISTING MILLWORK, INCLUDING ASSOCIATED PLUMBING FIXTURES WHERE APPLICABLE. CUT AND CAP PLUMBING LINES. REFER TO PLUMBING DRAWINGS FOR EXTENT OF DEMOLITION.

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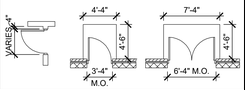
DRAWING CONVENTIONS LEGEND

- EXISTING CONSTRUCTION
- NEW EXTERIOR CONSTRUCTION
- NEW NON RATED CONCRETE CONSTRUCTION
- NEW NON RATED METAL STUDS CONSTRUCTION
- CENTERLINE
- BUILDING ELEMENTS ABOVE
- 23.4 COLUMN GRID REFERENCE
- 23.4 EXISTING COLUMN GRID REFERENCE
- ALIGN ALIGNMENT REFERENCE
- Masonry Opening OPENING REFERENCE

GENERAL FLOOR PLAN NOTES

1. THESE DRAWINGS SHOULD BE USED TO DETERMINE THE DESIGN INTENT. THE CONTRACTOR SHALL FIELD VERIFY ALL WORK AND SHALL NOTIFY THE ASSOCIATE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES IN THE DOCUMENTS BEFORE PROCEEDING. FAILURE TO DO SO WILL RESULT IN THE CONTRACTOR TAKING FULL RESPONSIBILITY AND LIABILITY FOR SAID DISCREPANCIES.
2. ALL WALLS EXTEND TO UNDERSIDE OF FLOOR/ROOF DECK ABOVE UNLESS NOTED OTHERWISE. (WALLS EXTEND TO BOTTOM OF TRUSS AT LIGHT GAUGE METAL TRUSSES).
3. ALLOW FOR 1/2" DEFLECTION WHERE WALL MEETS STRUCTURE ABOVE. PROVIDE COMPRESSIBLE FILLER BETWEEN TOP OF WALL AND STRUCTURE AT STANDARD WALL CONSTRUCTION AND FIRESAFING AT RATED WALL CONSTRUCTION.
4. FILL FLUTES OF DECK WITH ACOUSTICAL INSULATION AT STANDARD WALL CONSTRUCTION AND FIRE SAFING AT RATED WALL CONSTRUCTION.
5. BRACE INTERIOR PARTITIONS PER ANSI CRITERIA.
6. COORDINATE OPENINGS IN WALLS W/ OTHER TRADES AND SEAL.
7. SEAL ALL PENETRATIONS THROUGH WALL TYP.
8. FEC - FIRE EXTINGUISHER CABINET & EXTINGUISHER.
9. ALL DOORS AND EXTERIOR DOORS/STOOPS ARE DIMENSIONED AS SHOWN BELOW UNLESS NOTED OR DIMENSIONED OTHERWISE.
10. ALL EXTERIOR DIMENSIONS ARE TO FACE OF BRICK OR METAL PANEL UNLESS OTHERWISE NOTED.
11. ANY EXISTING FLOORS TO RECEIVE RESILIENT OR VINYL FLOORING SHALL BE GROUND OR LEVELED TO ACHIEVE FLATNESS THAT IS REQUIRED BY MANUFACTURER TO MAINTAIN WARRANTY.
12. ALL EXPOSED STRUCTURAL STEEL TO HAVE 2 HOUR SPRAY-ON FIRE PROOFING UNLESS NOTED OTHERWISE.
13. PROVIDE BULLNOSE CORNER BLOCKS AT ALL EXPOSED OUTSIDE CORNERS OF CMU WALLS AND PARTITIONS UNLESS NOTED OTHERWISE - TYPICAL.
14. PROVIDE DRYWALL CONTROL JOINTS AT LOCATIONS INDICATED ON DRAWINGS OR AT A MAXIMUM SPACING OF 30'-0" IN ANY DIRECTION AND AT ALL JAMB STUDS AT ALL OPENINGS. - TYPICAL. INSTALL IN ACCORDANCE WITH ASTM C-840. INSTALL CONTROL JOINTS ALIGNED WITH DOOR JAMBS AND/OR EDGE OF SOFFITS WHEREVER POSSIBLE. ALL GWB CONTROL JOINT LOCATIONS FOR WALLS AND SOFFITS SHALL BE MARKED UP ON SHOP DRAWINGS AND SUBMITTED TO THE ARCHITECT PRIOR TO INSTALLATION.
15. WHERE ADJACENT WALLS HAVE DISSIMILAR NUMBER OF LAYERS OF GWB, INSTALL FINAL LAYERS OF GWB FLUSH.
16. CONTRACTOR TO PROVIDE ALL BLOCKING IN WALLS FOR ALL BUILT-IN CABINETS, COUNTERTOP SUPPORTS, GRAB BARS, ETC
17. IN LOCATIONS WHERE DOORS ARE IN WALL ASSEMBLIES, HAVE FURRED OUT DRYWALL WRAP BACK TO DOOR FRAME.
18. PROVIDE ALL FIRE BLOCKING AS REQUIRED PER OBC.
19. ACCESS DOORS SHALL BE INSTALLED IN WALLS AT ALL EQUIPMENT, VALVE OR OTHER LOCATIONS REQUIRING ACCESS FOR MAINTENANCE WHICH ARE LOCATED BEHIND FINISHED SURFACES. SEE SPECIFICATIONS FOR SPECIFIC REQUIREMENTS AND DIRECTIONS.



EQUIPMENT ABBREVIATIONS

FEC - FIRE EXTINGUISHER CABINET & EXTINGUISHER
FF - SURFACE MTD FIRE EXTINGUISHER
PTD - PAPER TOWEL DISPENSER
UC - UTILITY CABINET
PORT - PORTFOLIO STORAGE CABINET
PB - PAPER STORAGE CABINET

REFLECTED CEILING PLAN LEGEND

SYMBOL	DESCRIPTION
	CEILING HEIGHT A.F.F.
	EXISTING CEILING TO REMAIN
	EXPOSED TO STRUCTURE ABOVE
	DOWNLIGHT - REFER TO ELECTRICAL DRAWINGS
	LIGHTING FIXTURE - REFER TO ELECTRICAL DRAWINGS
	EXIT LIGHT - REFER ELECTRICAL DRAWINGS
	EMERGENCY LIGHT - REFER TO ELECTRICAL DRAWINGS
(F)	FIRE ALARM SMOKE DETECTOR, CEILING MOUNTED - REFER TO TECHNOLOGY DRAWINGS
	2'x2' SUPPLY DIFFUSER - REFER TO MECHANICAL DRAWINGS
	RETURN GRILL - REFER TO MECHANICAL DRAWINGS
	ROUND DIFFUSER - REFER TO MECHANICAL DRAWINGS
OS	OCCUPANCY SENSOR - REFER TO ELECTRICAL DRAWINGS
J	JUNCTION BOX - REFER TO ELECTRICAL DRAWINGS
	VISUAL ALARM NOTIFICATION - REFER TO TECHNOLOGY DRAWINGS
	FIRE ALARM NOTIFICATION DEVICE - REFER TO TECHNOLOGY DRAWINGS
	ACCESS PANEL (COORDINATE LOCATION WITH MECHANICAL)
	2'x2' SUSPENDED ACOUSTICAL TILE CEILING SYSTEM
	2'x4' SUSPENDED ACOUSTICAL TILE CEILING SYSTEM
	5/8" GYPSUM BOARD CEILING ON 3 5/8" METAL STUDS
	HORIZONTAL SHAFT (2HR RATED) PER UL # U336
	EXPOSED ROOF JOISTS (PAINTED - TYP.)
C.J	CONTROL JOINT IN GYPSUM BOARD CEILING
	PATCH AND REPAIR PORTION OF CEILING
	CURTAIN TRACK
	PORTLAND CEMENT PLASTER (SHOWERS - TYP.)
	DIRECT - APPLIED EXTERIOR FINISH SYSTEM ON 5/8" CEMENT BOARD WITH AIR/ MOISTURE BARRIER ON 5/8 EXTERIOR SHEATHING ON METAL STUD FRAMING @ 16" O.C. (EXTERIOR - TYP.)
	PRE-VENTED METAL SOFFIT

PROFESSIONAL SEALS:

PROJECT PARTNERS:

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CLIENT INFORMATION:

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WAYNE STATE UNIVERSITY
5454 CASS AVE
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CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1001 Madison Avenue
Toledo, OH 43604
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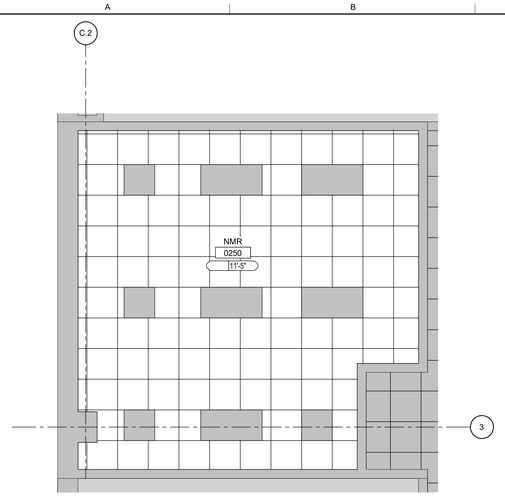
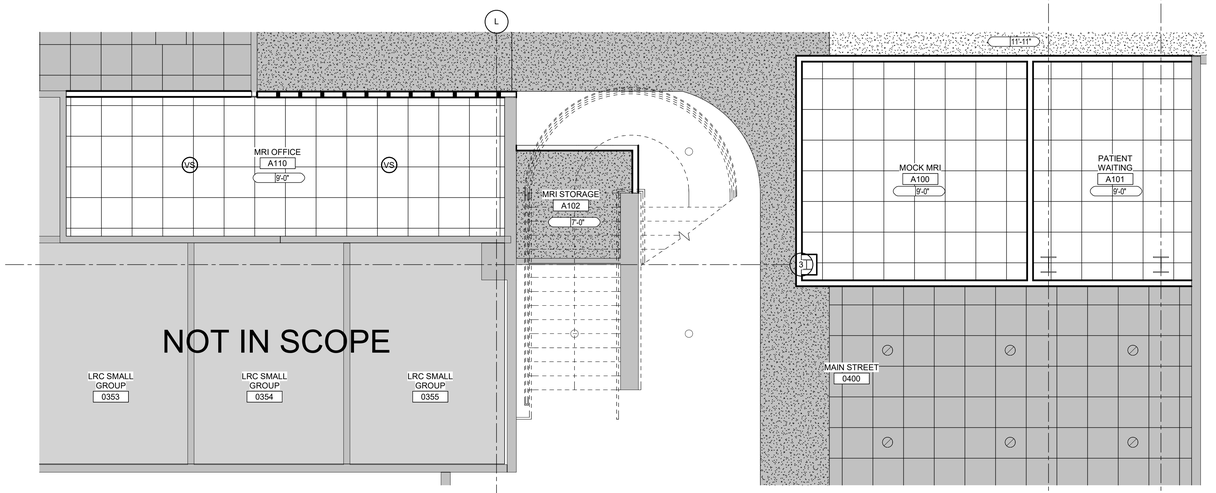
ENLARGED MRI SUITE PLANS

AE-101



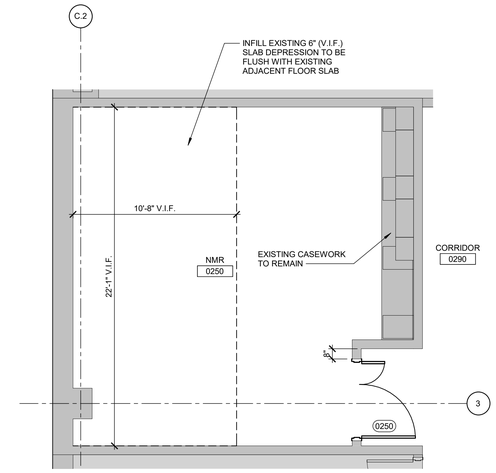
A3 ENLARGED NMR 0250 REFLECTED CEILING PLAN

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



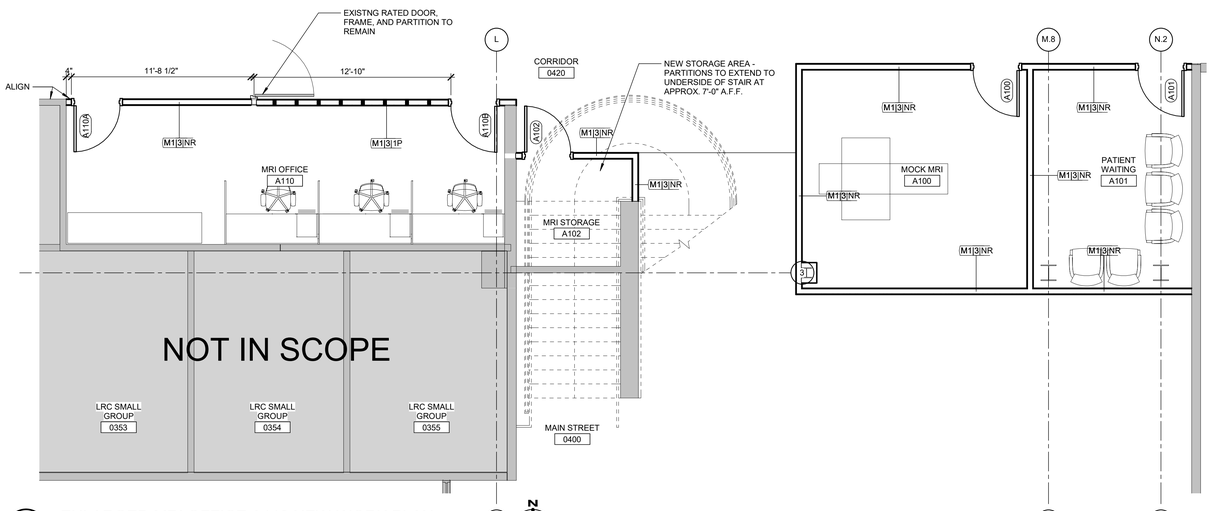
C3 ENLARGED MRI OFFICE A110 REFLECTED CEILING PLAN

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



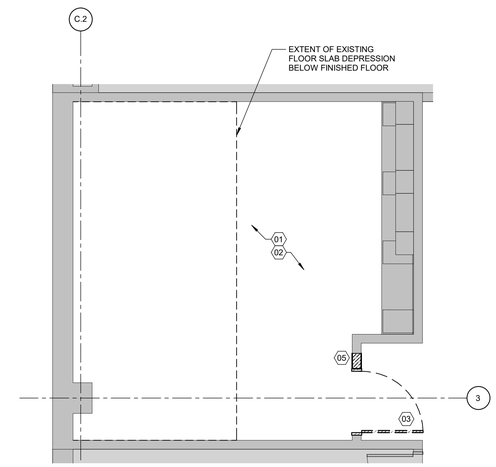
A5 AE-100 ENLARGED NMR 0250 NEW WORK PLAN

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



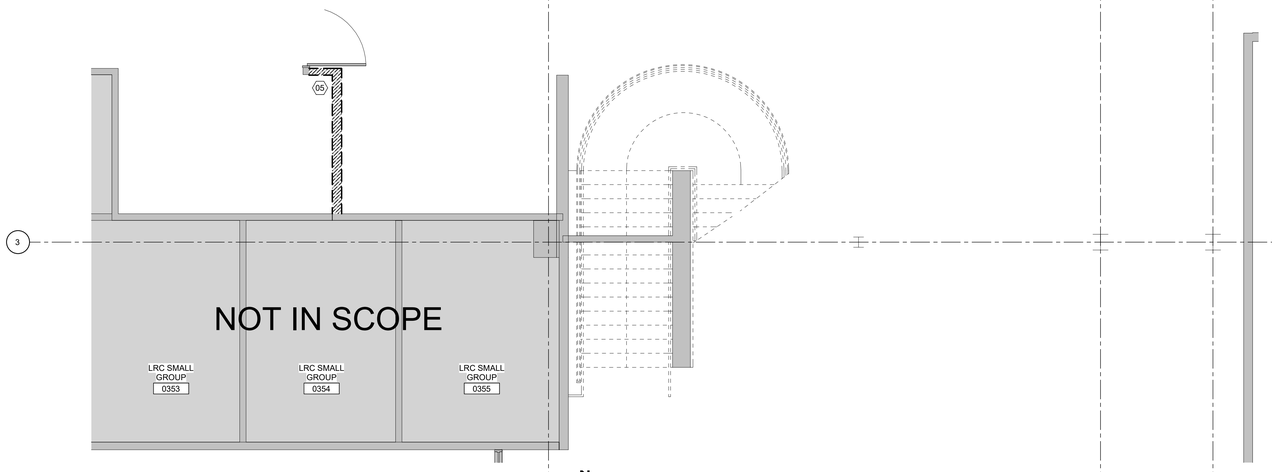
C5 AE-100 ENLARGED MRI OFFICE A110 NEW WORK PLAN

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



A7 AE-100 ENLARGED NMR 0250 DEMOLITION PLAN

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



C7 AE-100 ENLARGED MRI OFFICE A110 DEMOLITION PLAN

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

GENERAL FLOOR PLAN NOTES

1. THESE DRAWINGS SHOULD BE USED TO DETERMINE THE DESIGN INTENT. THE CONTRACTOR SHALL FIELD VERIFY ALL WORK AND SHALL NOTIFY THE ASSOCIATE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES IN THE DOCUMENTS BEFORE PROCEEDING. FAILURE TO DO SO WILL RESULT IN THE CONTRACTOR TAKING FULL RESPONSIBILITY AND LIABILITY FOR SAID DISCREPANCIES.
2. ALL WALLS EXTEND TO UNDERSIDE OF FLOOR/ROOF DECK ABOVE UNLESS NOTED OTHERWISE. (WALLS EXTEND TO BOTTOM OF TRUSS AT LIGHT GAUGE METAL TRUSSES).
3. ALLOW FOR 1/2" DEFLECTION WHERE WALL MEETS STRUCTURE ABOVE. PROVIDE COMPRESSIBLE FILLER BETWEEN TOP OF WALL AND STRUCTURE AT STANDARD WALL CONSTRUCTION AND FIRESAFING AT RATED WALL CONSTRUCTION.
4. FILL FLUTES OF DECK WITH ACOUSTICAL INSULATION AT STANDARD WALL CONSTRUCTION AND FIRE SAFING AT RATED WALL CONSTRUCTION.
5. BRACE INTERIOR PARTITIONS PER ANSI CRITERIA.
6. COORDINATE OPENINGS IN WALLS w/ OTHER TRADES AND SEAL.
7. SEAL ALL PENETRATIONS THROUGH WALL TYP.
8. FEC - FIRE EXTINGUISHER CABINET & EXTINGUISHER.
9. ALL DOORS AND EXTERIOR DOORS/STOOPS ARE DIMENSIONED AS SHOWN BELOW UNLESS NOTED OR DIMENSIONED OTHERWISE.
10. ALL EXTERIOR DIMENSIONS ARE TO FACE OF BRICK OR METAL PANEL UNLESS OTHERWISE NOTED.
11. ANY EXISTING FLOORS TO RECEIVE RESILIENT OR VINYL FLOORING SHALL BE GROUND OR LEVELED TO ACHIEVE FLATNESS THAT IS REQUIRED BY MANUFACTURER TO MAINTAIN WARRANTY.
12. ALL EXPOSED STRUCTURAL STEEL TO HAVE 2 HOUR SPRAY-ON FIRE PROOFING UNLESS NOTED OTHERWISE.
13. PROVIDE BULLNOSE CORNER BLOCKS AT ALL EXPOSED OUTSIDE CORNERS OF CMU WALLS AND PARTITIONS UNLESS NOTED OTHERWISE - TYPICAL.
14. PROVIDE DRYWALL CONTROL JOINTS AT LOCATIONS INDICATED ON DRAWINGS OR AT A MAXIMUM SPACING OF 30'-0" IN ANY DIRECTION AND AT ALL JAMB STUDS AT ALL OPENINGS. - TYPICAL. INSTALL IN ACCORDANCE WITH ASTM C-840. INSTALL CONTROL JOINTS ALIGNED WITH DOOR JAMBS AND/OR EDGE OF SOFFITS WHEREVER POSSIBLE. ALL GWB CONTROL JOINT LOCATIONS FOR WALLS AND SOFFITS SHALL BE MARKED UP ON SHOP DRAWINGS AND SUBMITTED TO THE ARCHITECT PRIOR TO INSTALLATION.
15. WHERE ADJACENT WALLS HAVE DISSIMILAR NUMBER OF LAYERS OF GWB, INSTALL FINAL LAYERS OF GWB FLUSH.
16. CONTRACTOR TO PROVIDE ALL BLOCKING IN WALLS FOR ALL BUILT-IN CABINETS, COUNTERTOP SUPPORTS, GRAB BARS, ETC
17. IN LOCATIONS WHERE DOORS ARE IN WALL ASSEMBLIES, HAVE FURRED OUT DRYWALL WRAP BACK TO DOOR FRAME.
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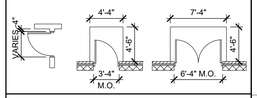

EQUIPMENT ABBREVIATIONS

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DEMOLITION PLAN KEYNOTES

01 REMOVE CEILING SYSTEM. COORDINATE MECHANICAL AND ELECTRICAL. REFER TO CEILING PLAN AND ROOM FINISH SCHEDULE.

02 REMOVE FLOORING SYSTEM. COORDINATE WITH MECHANICAL AND ELECTRICAL. REFER TO ROOM FINISH SCHEDULE.

03 EXISTING DOOR, FRAME, AND HARDWARE TO BE REMOVED. SALVAGE CARD READER FOR REINSTALLATION IN NEW WORK.

04 REMOVE EXISTING PLUMBING FIXTURES. CUT & CAP PLUMBING LINES. REFER TO PLUMBING DRAWINGS FOR EXTENT OF DEMOLITION.

05 REMOVE PORTION OF WALL INCLUDING ALL WALL-MOUNTED ACCESSORIES AND UTILITIES CONCEALED WITHIN THE WALL CAVITY.

06 REMOVE EXISTING TOILET ROOM ACCESSORIES AND TOILET PARTITIONS.

07 REMOVE EXISTING MILLWORK, INCLUDING ASSOCIATED PLUMBING FIXTURES WHERE APPLICABLE. CUT AND CAP PLUMBING LINES. REFER TO PLUMBING DRAWINGS FOR EXTENT OF DEMOLITION.

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SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

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1001 Madison Avenue
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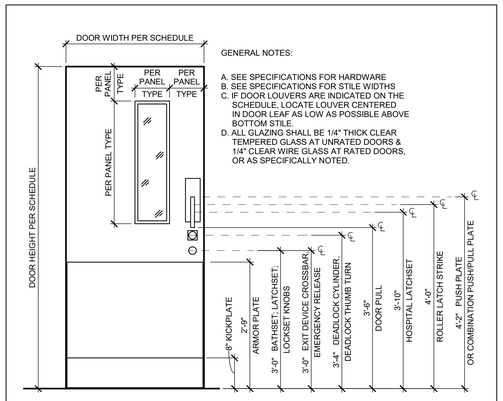
ENLARGED NMR AND MRI OFFICE PLANS

AE-102

DOOR SCHEDULE

DOOR NUMBER	TO ROOM INFO		DOOR & FRAME RATING (IN MINUTES)	NUM OF PANELS	DOOR PANEL(S)										DOOR FRAME			DETAILS		DOOR HARDWARE		COMMENTS	REV
					PANEL 1		PANEL 2																
	NUMBER	NAME			PANEL 1 - TYPE	P1 WIDTH	PANEL 2 - TYPE	P2 WIDTH	PANEL HEIGHT	PANEL MATERIAL #1	PANEL MATERIAL #2 (IF APPLICABLE)	FINISH 1	FINISH 2	FINISH 3	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HEAD	JAMB	SET	POWER / ACCESS		

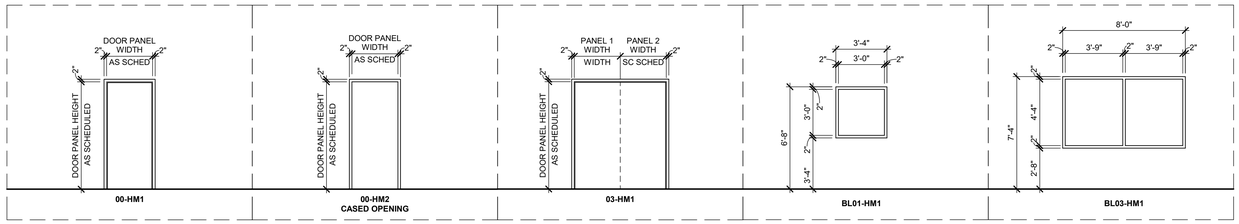


GENERAL NOTES:

A. SEE SPECIFICATIONS FOR HARDWARE
B. SEE SPECIFICATIONS FOR STILE WIDTHS
C. IF DOOR LOUVERS ARE INDICATED ON THE SCHEDULE, LOCATE LOUVER CENTERED IN DOOR LEAF AS LOW AS POSSIBLE ABOVE BOTTOM STILE.
D. ALL GLAZING SHALL BE 1/4" THICK CLEAR TEMPERED GLASS AT UNRATED DOORS & 1/4" CLEAR WIRE GLASS AT RATED DOORS, OR AS SPECIFICALLY NOTED.

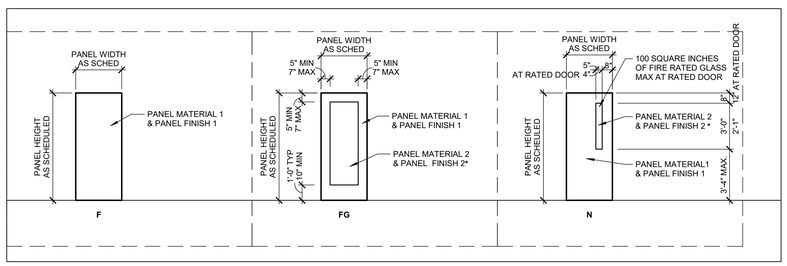
TYPICAL DOOR HARDWARE MOUNTING HEIGHTS

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



HOLLOW METAL FRAME TYPE ELEVATIONS

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



DOOR PANEL TYPE ELEVATIONS

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

DOOR SCHEDULE ABBREVIATIONS

ALUM	ALUMINUM
CR	CARD READER
CR-X	CARD READER A, B, C ETC
CW	CURTAINWALL
DMS	DOOR MONITORING SWITCH
EL	ELECTRIC LATCH RETRACTION
EXST	EXISTING
EXT STF	EXTERIOR STOREFRONT
FF	FACTORY FINISH
HGT	HEIGHT
HM	HOLLOW METAL
	• HM1 = STANDARD DOUBLE-RABBET FRAME
	• HM2 = CASED OPENING FRAME
	• HM3 = SINGLE RABBET FRAME
	• HM4 = DOUBLE EGRESS FRAME
	• HM5 - not used
	• HM6 = POCKET DOOR FRAME
	• HM7 = DOUBLE ACTING / NO RABBET FRAME
IN	INCH
INT STF	INTERIOR STOREFRONT
MAX	MAXIMUM
MHO	MAGNETIC HOLD OPEN DEVICE
MIN	MINIMUM
ML	MAGNETIC LOCK
THK	THICK/THICKNESS
P1	ACTIVE LEAF DOOR PANEL
P2	INACTIVE LEAF DOOR PANEL
PDO	POWER DOOR OPERATOR
PNT	PAINT
PR	PAIR
PT	POWER TRANSFER PREP
REV	REVISION (SEE SUBMITTAL/REVISION SCHEDULE AT RIGHT SHEET MARGIN)
RO	ROUGH OPENING
RX	REQUEST TO EXIT SWITCH
SCW	SOLID CORE WOOD
SIM	SIMILAR
STN	STAINED
WD	WOOD
	• WD1 = STANDARD DOUBLE-RABBET FRAME
	• WD2 = CASED OPENING FRAME
	• WD3 = SINGLE RABBET FRAME
	• WD4 = DOUBLE EGRESS FRAME
	• WD5 - not used
	• WD6 = POCKET DOOR FRAME
	• WD7 = DOUBLE ACTING / NO RABBET FRAME

GLAZING LEGEND

IG-1	1" INSULATED LOW-E
IG-1T	1" TEMPERED INSULATED LOW-E
IG-5	1" INSULATED LOW-E ACOUSTICAL
IG-5T	1" INSULATED LOW-E TEMPERED ACOUSTICAL
GL-1	1/4" CLEAR FLOAT GLASS
GL-1T	1/4" CLEAR TEMPERED FLOAT GLASS

DOORS & GLAZED OPENINGS NOTES

1. ALL DOOR FRAMES SHALL BE HOLLOW METAL WITH A 2" FACE DIMENSION, EXCEPT AS NOTED AT DOOR SCHEDULE.
2. SEE WINDOW AND DOOR DETAILS ON **AE-36#** FOR ADDITIONAL EXTERIOR HOLLOW METAL ELEVATIONS.
3. ALL DETAILS ARE ON **AE-36#** EXCEPT AS NOTED. REFER TO WALL SECTIONS AND EXTERIOR ELEVATIONS FOR NON-TYPICAL HEAD, JAMB AND SILL INFORMATION.
4. ALL FLOORING TRANSITIONS UNDER DOORS SHALL BE IN ACCORDANCE WITH TRANSITION DETAILS ON **AE-36#.**
5. SEE **AE-370** FOR CURTAINWALL ELEVATIONS.
6. SEE **AE-371** FOR STOREFRONT ELEVATIONS.
7. SEE **AE-372** FOR DOORS SET IN ALUMINUM CLAD WOOD WINDOW/DOOR FRAMES.
8. SEE **AE-36#** FOR DOORS SET IN ALUMINUM FRAME ELEVATIONS. BASIS OF DESIGN: WILSON PARTITIONS, APPROVED EQUAL: RACO
9. ALL PERIMETER JOINTS AT ALL EXTERIOR DOOR AND GLAZED OPENINGS SHALL BE 1/2" MINIMUM IN WIDTH AT JAMBS AND HEADS AND 1" MAXIMUM AT JAMBS AND HEADS. SEAL ALL JOINTS AS INDICATED AT DRAWINGS.
10. THE FLOOR ON BOTH SIDES OF A DOOR SHALL BE LEVEL AND SHALL HAVE THE SAME ELEVATION ON BOTH SIDES OF THE DOOR FOR A DISTANCE ON EACH SIDE AT LEAST EQUAL TO THE WIDTH OF THE WIDEST SINGLE DOOR PANEL **(NFPA 101 2012 EDITION 7.2.1.3.1 & 7.2.1.3.2).**
11. ALL DOORS WITH SELF-CLOSERS SHALL CONFORM TO ALL APPLICABLE CODES OR HAVE A MAXIMUM FORCE ALLOWABLE OF 5 LBF AND HAVE A MINIMUM SWEEP PERIOD OF 3 SECONDS FROM 70 DEGREES OPEN TO 3" LATCH FROM LATCH TO LEADING DOOR EDGE, WHICHEVER IS MORE STRICT SHALL APPLY. SELF CLOSING DEVICES SHALL MEET THE REQUIREMENTS OF THE **LATEST EDITION OF THE LIFE SAFETY CODE AND NFPA 80.**
12. SWING AND FORCE TO OPEN DOORS SHALL MEET THE REQUIREMENTS OF THE **LATEST EDITION LIFE SAFETY CODE, CHAPTER 7.2.1.4.5.**
13. DOORS/HARDWARE HANDLES, PULLS, LATCHES, LOCKS AND OTHER OPERATING DEVICES ON ACCESSIBLE DOORS SHALL HAVE A SHAPE THAT IS EASY TO GRASP WITH ONE HAND AND DOES NOT REQUIRE TIGHT GRASPING, TIGHT PINCHING OR TWISTING OF THE WRIST TO OPERATE. LEVER-OPERATED MECHANISMS, PUSH-TYPE MECHANISMS AND U-SHAPED HANDLES ARE ACCEPTABLE DESIGNS.
14. CURTAINWALLS AND STOREFRONTS MANUFACTURER ARE TO BE SOLE-SOURCED.
15. OPENING HEIGHTS AND WIDTHS NOTED ARE NOMINAL ROUGH OPENING WIDTHS. VERIFY IN FIELD ALL DIMENSIONS.
16. ALL DIMENSIONS AT CURTAINWALL AND STOREFRONT ELEVATIONS ARE TO TOP OF MULLION UNO.
17. PLUG ALL VERTICAL MULLIONS AT HEADERS.
18. CURTAINWALL/STOREFRONT MANUFACTURER TO PROVIDE HIGH-PERFORMANCE SUBSILL AND END DAMS.
19. G.C. TO PROVIDE TO GLAZING MANUFACTURER, PRODUCT DATA AND CUT SHEETS FOR ALL MATERIALS THAT COME INTO CONTACT WITH GLAZING.
20. AT ALL EXTERIOR HOLLOW METAL FRAMES, FILL FRAMES WITH THERMAL BATTS. R-19 MIN.
21. AT ALL HOLLOW METAL FRAMES AT MASONRY WALLS, GROUT FRAME SOLID.
22. AT ALL HOLLOW METAL FRAMES INSTALLED IN STUD WALLS THAT HAVE SOUND BATTS, FILL HOLLOW METAL FRAMES WITH SOUND BATTS.

SSOE®

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SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

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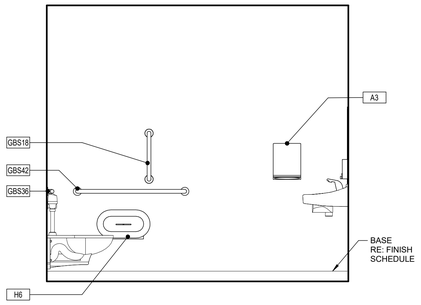
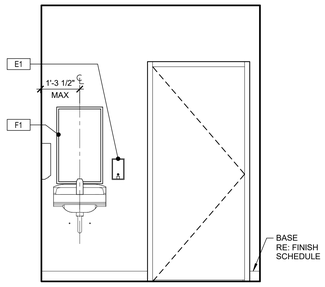
DOOR & WINDOW DETAILS & SCHEDULES

AE-361



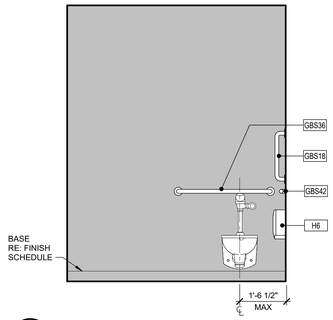
A2 / AE-101 TYPICAL ALL GENDER RESTROOMS - NORTH ELEVATION

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



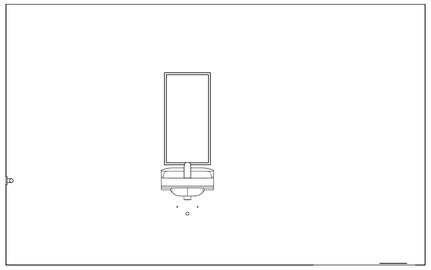
A1 / C2 / AE-100 TYPICAL ALL GENDER RESTROOMS

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



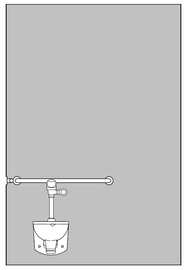
E2 / AE-100 TYPICAL ALL GENDER RESTROOMS

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



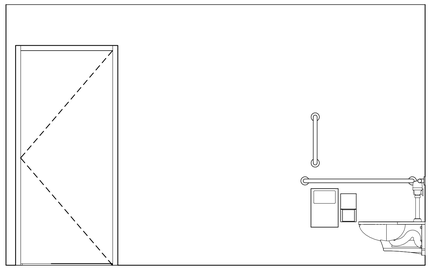
4 / AE-100 TOILET ROOM 0466 - EAST ELEVATION

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



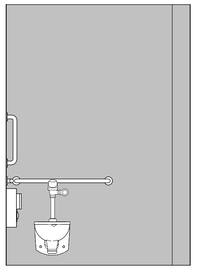
5 / AE-100 TOILET ROOM 0466 - NORTH ELEVATION

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



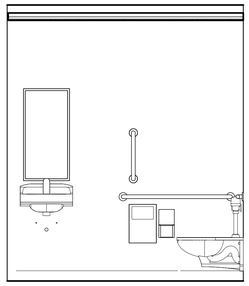
6 / AE-100 TOILET ROOM 0466 - WEST ELEVATION

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



3 / AE-100 TOILET ROOM 0466A - NORTH ELEVATION

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



2 / AE-100 WOMEN'S RESTROOM WEST ELEVATION 0469

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

TOILET ACCESSORIES SCHEDULE

ITEM #	DESCRIPTION	MFR.	MODEL #	PROVIDED BY	REV

TOILET ROOM NOTES

1. REFER TO DRAWING X.X FOR TYPICAL TOILET ELEVATIONS, MOUNTING HEIGHTS, ETC.
2. PROVIDE WOOD BLOCKING IN GYPSUM BOARD PARTITIONS AT WALL MOUNTED EQUIPMENT - TYPICAL.
3. SLOPE SINK TO HAVE 4'-0" FIBERGLASS REINFORCED PANEL (FRP) EACH WAY, 6'-0" HIGH WITH MOP HOLDER AND SHELF ABOVE.

ssoe®

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
1	10-20-23	DD PROGRESS

■ APPROVED FOR CONSTRUCTION
□ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

Wayne State University

WAYNE STATE UNIVERSITY

5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

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TOILET ROOM ELEVATIONS

AE-401

Autodesk Docs://Wayne State University_WSU Applebaum MRI/023037270 0_A23_SSOE.rvt :**FILE PATH**
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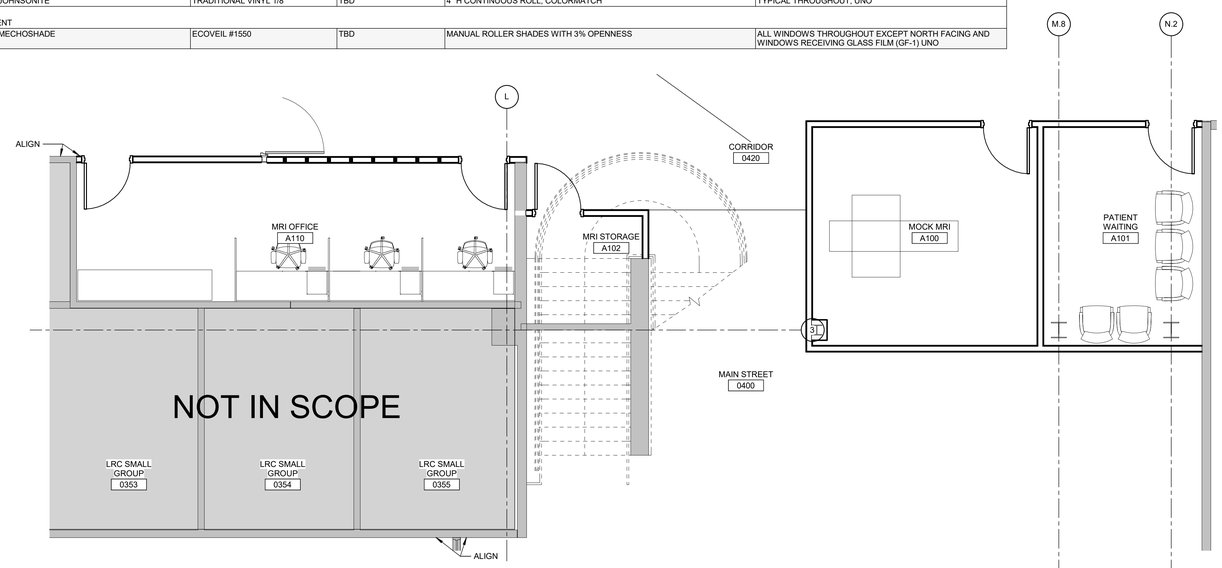
MATERIAL FINISH SCHEDULE

CODE	BASIS OF DESIGN MANUFACTURER	STYLE NAME #	COLOR NAME #	DESCRIPTION	LOCATION
ACOUSTICAL CEILING TILE					
ACT-1	ARMSTRONG CEILING SOLUTIONS	OPTIMA	WHITE (WH)	2'x2', SQUARE TEGULAR IN 15/16" PRELUDE GRID WITH STABILIZER CLIPS	OFFICE BREAKROOM, CONFERENCE ROOMS, HUDDLE ROOMS, PRIVATE OFFICES, OPEN OFFICE, CORRIDORS, SUPPORT AREAS
CARPET TILE					
CPT-1	INTERFACE	TBD	TBD	FIELD	
CPT-2	INTERFACE	TBD	TBD	ACCENT	
CERAMIC FLOOR TILE					
FT-1	MILESTONE - FLORIM USA	CONCRETE LOOK FLOOR TILE	TBD	LARGE FORMAT FIELD TILE	OFFICE BREAKROOM, TOILET ROOM FLOORS
CERAMIC FLOOR TILE BASE					
FTB-1	MILESTONE - FLORIM USA	CONCRETE LOOK BULLNOSE TILE BASE	TBD	BULLNOSE TRIM TO COORDINATE WITH FT-1	OFFICE BREAKROOM
CERAMIC WALL TILE					
WT-1	AMERICAN OLEAN	COLOR STORY	TBD		TBD
WT-2	AMERICAN OLEAN	COLOR STORY	TBD		TBD
LUXURY VINYL TILE					
LVT-1	INTERFACE	TBD	TBD	FIELD	
LVT-2	INTERFACE	TBD	TBD	ACCENT	
PAINT AND COATINGS					
PT-1	SHERWIN WILLIAMS	TBD	TBD	FIELD; EGGSHELL FINISH	TYPICAL WALLS, U.N.O.
PT-3	SHERWIN WILLIAMS	TBD	TBD	ACCENT; EGGSHELL FINISH	TBD
PT-4	SHERWIN WILLIAMS	SW 7757	HIGH REFLECTIVE WHITE	FLAT	TYPICAL PAINTED GWB CEILINGS IN NON WET LOCATIONS
PLASTIC LAMINATE					
PL-1	WILSONART	TBD	TBD	STANDARD HPL	MILLWORK VERTICAL SURFACES
PL-2	WILSONART	TBD	TBD	STANDARD HPL	MILLWORK COUNTERTOPS
QUARTZ COUNTERTOPS					
QZ-1	WILSONART	QUARTZ COUNTERTOP	TBD		QUARTZ COUNTERTOPS
RESILIENT BASE / ACCESSORIES / STAIR ACCESSORIES					
RB-1	JOHNSONITE	TRADITIONAL VINYL 1/8"	TBD	4" H CONTINUOUS ROLL, COLORMATCH	TYPICAL THROUGHOUT, UNO
WINDOW TREATMENT					
WS-1	MECHOSHADE	ECOVEIL #1550	TBD	MANUAL ROLLER SHADES WITH 3% OPENNESS	ALL WINDOWS THROUGHOUT EXCEPT NORTH FACING AND WINDOWS RECEIVING GLASS FILM (GF-1) UNO

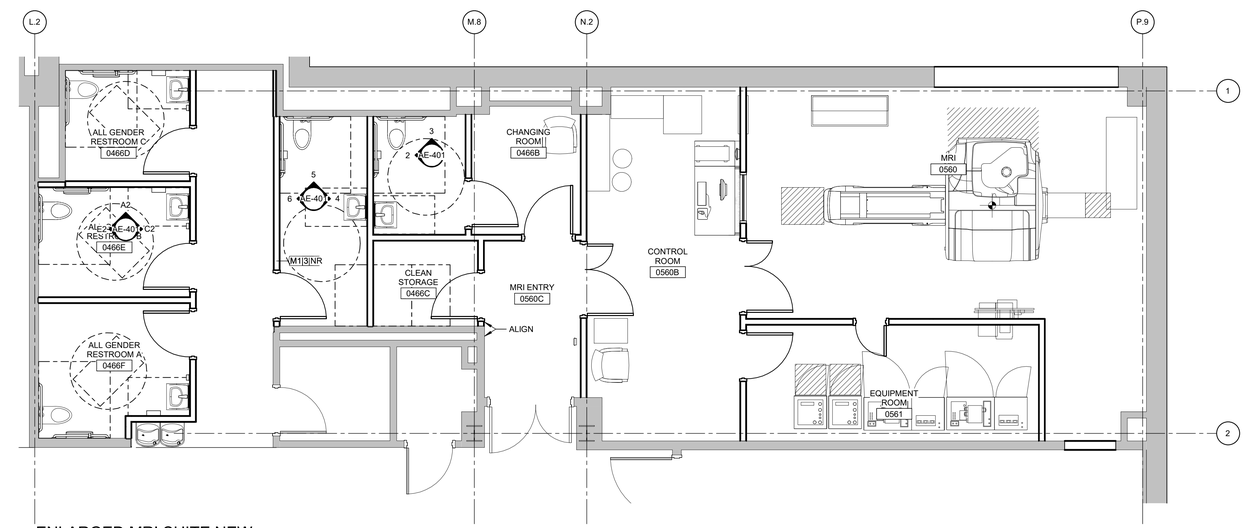
ROOM FINISH SCHEDULE

NO	ROOM NAME	FLOOR FINISH	BASE FINISH	WALL FINISH NORTH	WALL FINISH EAST	WALL FINISH SOUTH	WALL FINISH WEST	CASEWORK VERTICAL	CASEWORK HORIZONTAL	CEILING HEIGHT	CEILING MATL	CEILING FINISH	REMARKS
LEVEL 0													
0210	ELECTRICAL	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0215	SMALL SEMINAR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0221	SMALL SEMINAR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0231	18-SEAT SEMINAR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0235	18-SEAT SEMINAR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0240	MUSEUM ARCHIVE	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0245	ELECTRICAL	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0250	NMR	SDT	SDT	PT	PT	PT	PT	ETR	ETR		ACT	-	
0260	DISTANCE LEARNING CLASSROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0290	CORRIDOR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0300	LRC STACKS/ STUDY	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0300.2	MEDIA CENTER STORAGE	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0300.3	OFFICE	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0300.4	LRC QUIET STUDY	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0301	LRC CIRCULATION	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0321	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0322	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0323	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0324	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0325	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0326	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0330	LRC READING/ STUDY AREA	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0331	SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0332	SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0333	SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0334	SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0340	CLASSROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0340.1	COMP. SERVER	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0351	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0352	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0353	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	ETR	
0354	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0355	LRC SMALL GROUP	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0360	CLASSROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0363	AD STAFF OFFICE	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0364	CLASSROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0368	PS OFFICE	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0390.1	CORRIDOR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0400	MAIN STREET	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0420	CORRIDOR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	ETR	
0460	SEMINAR ROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0464	STAIR C	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0466	TOILET ROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0466A	TOILET ROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0466B	CHANGING ROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0466C	CLEAN STORAGE	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0466D	ALL GENDER RESTROOM C	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0466E	ALL GENDER RESTROOM B	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0466F	ALL GENDER RESTROOM A	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0468	CORRIDOR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0469	ELECTRICAL	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0470	PUMP ROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0490	CORRIDOR	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0520	66-SEAT CLASSROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0540	132-SEAT CLASSROOM	ETR	ETR	ETR	ETR	ETR	ETR	-	-		ETR	-	
0560	MRI	SDT	RB	PT	PT	PT	PT	-	-		EX. ACT	-	
0560B	CONTROL ROOM	SDT	RB	PT	PT	PT	PT	PL	PL		EX. ACT	-	
0560C	MRI ENTRY	LVT	RB	PT	PT	PT	PT	-	-		EX. ACT	-	
0561	EQUIPMENT ROOM	SDT	RB	PT	PT	PT	PT	PL	PL		EX. ACT	-	
A100	MOCK MRI	LVT	RB	PT	PT	PT	PT	-	-		ACT	-	
A101	PATIENT WAITING	LVT	RB	PT	PT	PT	PT	-	-		ACT	-	
A102	MRI STORAGE	ETR	RB	PT	PT	PT	PT	-	-		EX. GYP	PT	
A110	MRI OFFICE	LVT	RB	PT	PT	PT	PT	-	-		EX. ACT	-	



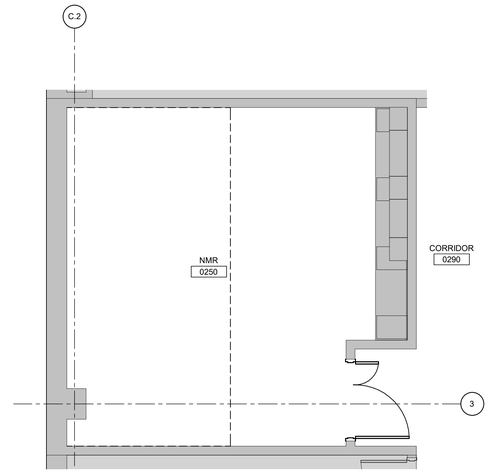
3 AE-100 ENLARGED MRI OFFICE A110 NEW WORK FINISH PLAN

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



2 AE-100 ENLARGED MRI SUITE NEW WORK FINISH PLAN

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



1 AE-100 ENLARGED NMR 0250 NEW WORK FINISH PLAN

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

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

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1	10-20-23	DD PROGRESS

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CLIENT PROJECT #:	PROJECT NUMBER
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PROJECT INFORMATION:

WSU APPLEBAUM MRI

259 MACK AVE
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SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

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1001 Madison Avenue
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INTERIOR FINISH PLANS, SCHEDULES & DETAILS

AE-700

GENERAL LEGEND
(NOT ALL SYMBOLS USED)

SYMBOL	DESCRIPTION
———————	EXISTING SUPPLY DUCT OR PIPE
— — — — —	EXISTING RETURN DUCT OR VENT
////////	EXISTING SUPPLY DUCT OR PIPE TO BE DEMOLISHED
-//-//-//-	EXISTING RETURN DUCT OR VENT TO BE DEMOLISHED
━━━━━━	NEW DUCT OR PIPE
	POINT OF NEW CONNECTION
Ⓣ	THERMOSTAT - WALL MOUNTED
→	AIR FLOW, SUPPLY, OUTSIDE AIR
	AIR FLOW, EXHAUST, RETURN
—U→	UNDERCUT DOOR
	FINNED TUBE
— COND —	CONDENSATE RETURN PIPING
— CW —	DOMESTIC COLD WATER PIPING
— CWR —	CONDENSER WATER RETURN PIPING
— CWS —	CONDENSER WATER SUPPLY PIPING
— DT —	DRAIN TILE PIPING
— F —	FIRE PROTECTION PIPING
— HWHR —	HOT WATER HEATING RETURN PIPING
— HWHS —	HOT WATER HEATING SUPPLY PIPING
— HP COND —	HIGH PRESSURE CONDENSATE PIPING
— HPCW —	HIGH PRESSURE COLD WATER PIPING
— HPHW —	HIGH PRESSURE HOT WATER PIPING
— MA —	MEDICAL AIR PIPING
— MV —	MEDICAL VACUUM PIPING
— N2O —	NITROUS OXIDE PIPING
— N —	NITROGEN PIPING
— O2 —	OXYGEN PIPING
— PC —	PUMPED CONDENSATE PIPING
— SAN —	SANITARY SEWER PIPING
— SAN(U) —	UNDERGROUND SANITARY SEWER PIPING
— ST —	STORM SEWER PIPING
— STM —	STEAM PIPING
— V —	VENT PIPING
	PIPE CAP (SCREWED)
	PIPE CAP (WELDED)
	BLIND FLANGE
	90° ELBOW DOWN
○—	90° ELBOW UP
	PIPE FLANGES
	ECCENTRIC REDUCER OR INCREASER
	CONCENTRIC REDUCER OR INCREASER
CO	CLEANOUT
FCO	CLEANOUT (FLOOR)
WCO	CLEANOUT (WALL)
	FLOW ARROW
	UNION
	STRAINER (WYE TYPE)
	STRAINER (WYE TYPE) W/BLOW OFF
	ANGLE VALVE
	GATE VALVE
	O.S. & Y. GATE VALVE
	GLOBE VALVE
	CHECK VALVE
	BUTTERFLY VALVE
	BALL VALVE
⊠	MANUAL BALANCING VALVE
	CALIBRATED BALANCING VALVE
S	SOLENOID VALVE 2-WAY
S	SOLENOID VALVE 3-WAY
	AUTO.CONTROL VALVE 2-WAY PNEUMATIC OPERATOR
	AUTO.CONTROL VALVE 3-WAY PNEUMATIC OPERATOR
	MOTORIZED BUTTERFLY VALVE
T	STEAM TRAP
	FLEXIBLE HOSE
	FLEXIBLE CONNECTOR
OR	FLOOR DRAIN (FLOOR SINK)
	BACKFLOW PREVENTER/
	UNIT HEATER
	DRAIN VALVE w/HOSE END
	THERMOWELL
T	THERMOSTATIC AIR VENT
	DRAIN VALVE
	ACCESS DOOR
	FINNED TUBE

DUCTWORK LEGEND
(NOT ALL SYMBOLS USED)

ROUND DUCT

DOUBLE LINE		SINGLE LINE
12"Ø	DUCT SIZE (DIAMETER)	12"Ø
	FLEXIBLE DUCT (CONNECTION)	
	DUCT INDICATION FOR STACKING	
	DUCT TURNING TOWARD VIEWER	
	DUCT TURNING AWAY FROM VIEWER	
	ROUND ELBOW	
	MITERED ELBOW	
20°MAX.	TRANSITION	
	RECTANGULAR TO ROUND TRANSITION	

SQUARE DUCT

DOUBLE LINE		SINGLE LINE
12x6	DUCT SIZE (INSIDE DIMENSIONS/INCHES) FIRST FIGURE IS SIDE SHOWN	12x6
⊠	SUPPLY DUCT, GRILLE (REGISTER) OR DIFFUSER	
	RETURN DUCT, GRILLE OR REGISTER	
	EXHAUST DUCT, GRILLE OR REGISTER	
	SUPPLY DIFFUSER, GRILLE OR REGISTER ▼ INDICATES BLANKED-OFF SECTION	
	DUCT TURNING UP	
	DUCT TURNING DOWN	

DUCT ELBOWS

DOUBLE LINE		SINGLE LINE
	ELBOW WITH TURNING VANES	
	RADIUS ELBOW W/VANES	
20°MAX. 30°MAX.	TRANSITION IN DIRECTION OF AIR FLOW	

DAMPERS

DOUBLE LINE		SINGLE LINE
	VOLUME DAMPER	
AIR FLOW 45° L W	BOOT TYPE CONNECTION L=1/4W, 6"MIN.	
	CEILING DIFFUSER	

ABBREVIATIONS
(NOT ALL ABBREVIATIONS USED)

ABBREVIATION	DESCRIPTION
AAV	AUTOMAITC AIR VENT
ACH	AIR CHANGES PER HOUR
AD	ACCESS DOOR OR AREA DRAIN
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AIV	ALARM INTERFACE VALVE
ARCH	ARCHITECTURAL
ARR	ARRANGEMENT
BF	BLIND FLANGE
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BMS	BULIDING MANAGEMENT SYSTEM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOT	BOTTOM
BTUH	BRITISH THERMAL UNIT PER HOUR
CD	CEILING DIFFUSER
CENTRIF.	CENTRIFUGAL
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
CO	CLEANOUT
COND	CONDENSATE
CONN.	CONNECTION
CONT.	CONTINUATION
CONTR.	CONTRACTOR
CP	CONDENSATE PUMP
CSS	CLINICAL SERVICE SINK
CUH	CABINET UNIT HEATER
CW	COLD WATER
DD	DECK DRAIN
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DET	DETAIL
DI	DE-IONIZED WATER
DIA	DIAMETER
DMPR	DAMPER
DN	DOWN
DWG	DRAWING
E	EXISTING
EA	EXHAUST AIR OR EACH
EG	EXHAUST GRILLE
EF	EXHAUST FAN
EFF	EFFICIENCY
ELECT	ELECTRICAL
ELEV	ELEVATION
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
EW	EYE WASH
EXH	EXHAUST
EXIST.	EXISTING
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FLEX.	FLEXIBLE
FLR	FLOOR
FM	FLOW METER
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FU	FIXTURE UNITS
GA	GAUGE
GAL	GALLON
GPM	GALLONS PER MINUTE
HB	HOSE BIBB
HO	HUB OUTLET
HORIZ	HORIZONTAL
HP	HORSEPOWER OR HIGH PRESSURE
HW	HOT WATER
HWR	HOT WATER RETURN
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCHES
INSUL.	INSULATION
IW	INDIRECT WASTE
KW	KILOWATT
KWH	KILOWATT HOUR
LAV	LAVATORY
LB	POUND
MA	MEDICAL AIR
MAX	MAXIMUM
MBH	1000 BTU/HR
MIN	MINIMUM
MV	MEDICAL VACUUM
N	NITROGEN OR NEW
N/A	NOT APPLICABLE
NG	NATURAL GAS
NK	NECK
N2O	NITROUS OXIDE
NTS	NOT TO SCALE
OA	OUTSIDE AIR
O2 OR OXY	OXYGEN
P	PUMP
PH	PHASE
PRV	PRESSURE REDUCING VALVE
PSI(G)	POUNDS PER SQUARE INCH (GAUGE)
RA	RETURN AIR
RG	RETURN GRILLE
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAN	SANITARY
SD	SUPPLY DIFFUSER
SK	SINK
SG	SUPPLY GRILLE
SH	SHOWER
SP	STATIC PRESSURE OR SUMP PUMP
SPEC	SPECIFICATIONS
SQ	SQUARE
SS	SERVICE SINK OR STAINLESS STEEL
TMV	THERMOSTAIC MIXIING VALVE
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TYP	TYPICAL
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
V	VENT
VAC	VACUUM
VEL	VELOCITY
VERT	VERTICAL
W	WASTE OR WATT
WC	WATER CLOSET OR WATER COLUMN
WCO	WALL CLEANOUT
WTR	WATER

GENERAL NOTES

1. THE CONTRACTOR SHALL EXAMINE THE SITE AND BE FAMILIAR WITH THE CONDITIONS UNDER WHICH THIS CONTRACT MUST BE EXECUTED. NO ADJUSTMENT TO THIS CONTRACT PRICE WILL BE PERMITTED BECAUSE OF LACK OF KNOWLEDGE OF THE EXISTING FIELD CONDITIONS.
2. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL SYSTEMS WITH OTHER TRADES AND OWNER TO AVOID INTERFERENCES.
3. THE CONTRACTOR SHALL VERIFY ALL SPACE CONDITIONS AND DIMENSIONS PRIOR TO THE FABRICATION AND THE INSTALLATION OF THE PIPING SYSTEM AND DUCTWORK.
4. ALL WORK SHALL BE DONE IN A MANNER CONDUCIVE TO A PROFESSIONAL ENVIRONMENT. ALL AREAS MUST BE KEPT AS NEAT AS POSSIBLE, AND AREAS SHALL BE CLEANED BEFORE LEAVING SAID AREAS ON A DAILY BASIS.
5. PROVIDE COMPLETE OPERATING SYSTEMS WITH MATERIALS OF CONSTRUCTION AND METHODS OF FABRICATION, ASSEMBLY, ERECTION, TESTING, AND INTERIM OPERATIONS IN COMPLIANCE WITH THE REQUIREMENTS SPECIFIED HEREIN AND THE REQUIREMENTS OF APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION.
6. LOCATE CONTROLS, RELAYS, INSTRUMENTS, VALVE BOXES, SWITCHES, ALARM PANELS, AND ACCESSORIES SO THEY ARE READILY ACCESSIBLE FOR ADJUSTMENT, SERVICE, AND REPLACEMENT OR AS INDICATED.
7. COORDINATE SUPPORT HANGERS, PIPE AND ROUTING AND EQUIPMENT INSTALLATION WITH EXISTING CONDITIONS TO AVOID INTERFERENCES.
8. INSTALL TEMPERATURE SENSORS 4'-0" ABOVE FINISHED FLOOR.
9. DEMOLITION WORK SHALL BE COMPLETED TO THE EXTENT INDICATED OR SPECIFIED.
10. THE OWNER'S NORMAL OPERATION IN SURROUNDING AREAS WILL BE CONTINUED DURING DEMOLITION. THE DEMOLITION SHALL NOT INTERFERE WITH THESE OPERATIONS IN ANY WAY WITHOUT THE OWNER'S EXPRESSED CONSENT. CONTRACTOR SHALL COORDINATE AND SCHEDULE EXTENT OF DEMOLITION WORK WITH OWNER IN FIELD.
11. COMPLY WITH OWNER'S STANDARDS AND ALL APPLICABLE LOCAL CODES, STANDARDS, AND REGULATIONS.
12. CONFIRM THAT EXISTING SYSTEMS ARE INACTIVE AND PURGED BEFORE TAPPING INTO THEM, UNLESS OTHERWISE DIRECTED.
13. SOME STANDARD SYMBOLS, ABBREVIATIONS, AND DETAILS MAY NOT BE APPLICABLE TO THE SPECIFIC CONTRACT ISSUE.
14. CONTRACTOR SHALL REVIEW THE DOCUMENTS OF ALL INTERFACING TRADES, CONTRACTS, AND DRAWINGS PRIOR TO BIDDING AND COMMENCEMENT OF WORK TO ENSURE SUCCESS OF FINISHED WORK.
15. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER OF ANY PROBLEMS THAT MIGHT OCCUR DURING DEMOLITION WORK.
16. THE DEMOLITION WORK REQUIRED MAY NOT BE LIMITED TO WHAT IS SHOWN ON PLAN. CONTRACTOR TO REMOVE ALL RELATED ITEMS AS REQUIRED TO FACILITATE THE WORK.
17. UPON COMPLETION OF THE MECHANICAL TRADES WORK, ALL SYSTEMS SHALL BE TESTED, BALANCED AND ADJUSTED. THE CONTRACTOR SHALL MAKE ANY CHANGES IN THE SHEAVES, BELT OR MOTOR SIZE REQUIREMENT FOR CORRECT BALANCE AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER. THEREAFTER, THE CONTRACTOR SHALL SUBMIT A BALANCE REPORT OF THE HVAC SYSTEM. ALL SYSTEMS SHALL BE LEFT IN WORKING ORDER. BALANCING MUST BE DONE BEFORE FINISHED CEILING IS INSTALLED. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL DEBRIS LEFT BY THE MECHANICAL TRADES.
18. FOR THE EXACT LOCATION OF ALL THE CEILING MOUNTED AIR DEVICES REFER TO THE ARCHITECTURAL DRAWINGS.
19. ALL EQUIPMENT AND MATERIAL BROUGHT TO THE SITE IS THE PROPERTY OF THE CONTRACTOR UNTIL THE OWNER HAS OFFICIALLY ACCEPTED THE FINAL INSPECTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE PROTECTION FOR EQUIPMENT AND MATERIAL UNTIL COMPLETION OF THE PROJECT.
20. ALL SHEETMETAL DUCTWORK AND FITTINGS SHALL BE SECURELY INSTALLED AND STEEL ANGLE REINFORCED AND PROPERLY SUPPORTED IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL CONNECTIONS AND JOINTS IN THE EXITING AND NEW DUCTWORK SHALL BE SEALED AND CAULKED AIR TIGHT IN AN APPROVED MANNER FOR THE VARIOUS PRESSURE APPLICATIONS.
21. WHEN A DESIGN BASE IS INDICATED AND OTHER THAN THE DESIGN BASE EQUIPMENT IS APPROVED, DESIGN ALL NECESSARY MODIFICATIONS AT NO ADDITIONAL COST TO THE OWNER AND SUBMIT A SHOP DRAWING OF THE PROPOSED INSTALLATION.
22. VERIFY ALL EXISTING WORK, PROVIDE ALL NECESSARY MATERIAL, LABOR, AND EQUIPMENT REQUIRED TO MODIFY EXISTING WORK AS NECESSARY. IN ADDITION, MAINTAIN INTEGRITY OF THE EXISTING SYSTEM.
23. CONTRACTOR SHALL GUARANTEE INSTALLATION AGAINST DEFECTS IN MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF 12 MONTHS FROM THE DATE OF FINAL ACCEPTANCE. IF, DURING GUARANTEE PERIOD, ANY DEFECTS APPEAR, CONTRACTOR SHALL REMEDY THEM INCLUDING ANY NECESSARY MATERIALS AND LABOR WITHOUT COST TO THE OWNER.
24. REPAIR AND PAY FOR ALL DAMAGE DONE TO THE EXISTING AND NEW WORK.
25. PROTECT ALL MECHANICAL EQUIPMENT, PLUMBING FIXTURES AND TRIM FROM MORTAR, PAINT, ETC., DURING CONSTRUCTION. ALL PRODUCTS USED IN MECHANICAL SYSTEMS SHALL BE ASBESTOS-FREE.
26. COORDINATE EXACT LOCATION OF CONSTRUCTION TO PRECLUDE ANY INTERFERENCE BETWEEN NEW AND EXISTING PIPING, WIRING, LIGHTING FIXTURES, CABLE TRAYS, DUCTWORK, BUILDING EQUIPMENT, PNEUMATIC TUBING, WORK BY OTHER CONTRACTORS, AND OTHER CONSTRUCTION.
27. COORDINATE EXACT LOCATION OF EQUIPMENT REQUIRING SERVICE TO PRECLUDE ANY INTERFERENCE WITH EQUIPMENT ACCESS DOORS OR PANELS OR WITH SERVICE TO EQUIPMENT. INSTALLATION SHALL BE MADE SO THAT EQUIPMENT SERVICE CAN BE ACCOMPLISHED WITHOUT HAVING TO REMOVE EQUIPMENT.
28. CONTRACTOR SHALL CONFIRM ALL AVAILABLE UTILITY SERVICES, STORAGE AREAS AND TRANSPORTATION MEANS.
29. ALL EQUIPMENT SHALL BE NEW UNLESS NOTED OTHERWISE AND SHALL CONFORM IN ALL RESPECTS TO THE LATEST STANDARDS OF ANSI, ASME, ASTM, FM, MIOSHA AND PDI.
30. DO NOT PROVIDE FLEXIBLE DUCTWORK TO AIR DEVICES LOCATED ABOVE GYP BOARD CEILING. DUCTWORK ABOVE GYP BOARD CEILING SHALL BE SHEET METAL.
31. PIPING LAYOUT IS SCHEMATIC ONLY, FINAL LAYOUT AND PIPING SIZES SHALL BE COORDINATED WITH EQUIPMENT SUPPLIER. PREPARE COORDINATION DRAWINGS.
32. MAXIMUM LENGTH OF FLEXIBLE DUCTWORK INSTALLATION SHALL BE 5 FEET.
33. INSTALL LOCKING QUADRANT BALANCING DAMPER ON EACH DIFFUSER AND GRILLE RUNOUT.

MECHANICAL SPECIFICATIONS

1. DESCRIPTION OF WORK
   - A. Contractor shall provide all materials, equipment, and labor to provide a complete and operating installation.
   - B. Work includes labor and materials necessary for demolition and installation of new equipment, piping, ductwork, and other mechanical items as described herein and shown on drawings. Omission of direct reference herein to any essential item shall not excuse contractor from complying with design intent. Drawings are diagrammatic unless dimensioned. The drawings diagrammatically show suggested examples for possible routing of mechanical systems. The drawings are based on available information and do not show the only possible arrangement, nor do they relieve the contractors of the responsibility of field verification and preparation of coordination drawings.
   - C. Provide miscellaneous steel and hardware as required to support, handle, and secure equipment furnished as part of this work.
   - D. Perform cutting and core drilling as required for work described.
   - E. Provide sleeves for pipes passing through slabs, walls, or floors (3" high at floor penetrations).
   - F. The Owner's representative is to be notified of all testing and flushing & cleaning and equipment start-ups. Copies of start-up reports are to be provided to Owner's representative.
   - G. The installing contractor shall provide a walkthrough and training for the Owner's building engineers at or near completion of the project.
   - H. Operation and maintenance manuals are to be provided for all components and/or systems requiring a manual.
   - I. Submit for approval shop drawings for all mechanical systems or equipment but not limited to the items listed below:

     Duct Accessories — Grilles, Registers & Diffusers
     Controls — Insulation

2. CODES, PERMITS, AND INSPECTIONS
   - A. Work shall be installed in accordance with local, state, and federal regulations and ordinances.
   - B. Secure and pay for all permits and inspections.
3. STANDARDS
   - A. All equipment shall be new unless noted otherwise and shall conform in all respects to the latest approved standards of ANSI, ASME, ASTM, FM, IRI, MIOSHA and PDI.
4. PROJECT/SITE CONDITIONS
   - A. Contractor shall visit job site and examine premises at and adjacent to proposed work, and shall fully inform himself of the condition of premises with respect to obstructions, actual levels, excavation, fill and other requirements necessary for carrying out this work.
   - B. Contractor shall confirm all available utility services, storage areas, and transportation means.
5. REMODELING
   - A. Contractor shall comply with all requirements for confined space entry to the satisfaction of the Owner's safety department. Contractor shall present a plan for safe entry and construction methods and shall furnish all required testing and safety equipment.
   - B. Locate existing piping and make connections where required or where shown on the drawings. Do not cut into existing services without verifying with the Owner that the pipe involved is the desired service. In any areas where mechanical work is involved, restore the area to its original condition upon completion of work.
   - C. Perform work that interrupts any service or system, including cutting existing lines for new connections, at times (usually at night, after Owner's normal operating hours, or during slowest periods of activity) to cause no interference to the normal operation of the building.
   - D. Inform the Owner in advance of any shut-off that will occur and give estimate of duration. Obtain Owner's permission for system shut-down 24 hours in advance. Only after the Owner's facilities management staff is fully informed, and has approved the schedule of shut-offs, can the work then proceed accordingly.
   - E. All diffusers, coils, valves, thermostats, fixtures, piping and other valuable equipment to remain property of the Owner, except where noted otherwise, shall be stored on the site where directed.
   - F. Protect all mechanical equipment, plumbing fixtures and trim, from mortar, paint, etc. during construction. All products used in mechanical systems shall be asbestos-free.
6. CLEANING AND PAINTING
   - A. Clear away all debris, surplus materials resulting from mechanical work or operations, leaving the job and equipment in a clean, first-class condition. Where new work occurs in existing areas, clean and restore to original condition.
   - B. Clean specialties such as traps, strainers, etc. and all mechanical equipment surfaces.
7. SELECTIVE DEMOLITION
   - A. Remove ductwork, controls and existing equipment as indicated.
   - B. Remove ductwork (including hangers, insulation, dampers, etc.), diffusers, grilles and registers, as indicated. Cap duct openings as required to maintain airtight condition and as required to close off abandoned branch or main ducts to remain connected to active systems, airtight.
   - C. All equipment, plumbing fixtures, trim, grilles/registers/diffusers, and controls not reused shall remain the property of the Owner, unless otherwise directed, and shall be delivered by this contractor to a storage area at the project site as directed by the Owner's project representative.
   - D. Unclaimed demolished materials shall be legally disposed of, off-site, by the contractor as part of this scope of work and at no additional cost to the Owner.
8. CONNECTIONS TO EXISTING SYSTEMS
   - A. Make all connections to existing systems piping and equipment during designated periods upon approval of the Owner and at no increase in the contract sum.
   - B. Verify all existing work. Provide all necessary material, labor and equipment required to modify existing work as necessary. In addition, maintain integrity of the existing systems.
9. GUARANTEE
   - A. Contractor shall guarantee installation against defects in materials, equipment, and workmanship for a period of 12 months from the date of final acceptance. If, during guarantee period, any defects appear, Contractor shall remedy them, including any necessary materials and labor, without cost to the Owner.
10. DAMAGE TO OTHER WORK
    - A. Repair, and pay for, all damage done to the existing and new work.
11. COORDINATION OF THE WORK
    - A. Coordinate work with other trades to avoid interferences and to present a neat appearance. Interferences which result due to a lack of coordination are the contractor's responsibility to correct.
    - B. Verify locations of existing piping for connections to same and building structural beams, to avoid possible interference.
    - C. Coordinate exact location of construction to preclude any interference between new and existing piping, wiring, lighting fixtures, cable trays, ductwork, building equipment, work by other contractors, and other construction.
    - D. Coordinate exact location of equipment requiring service to preclude any interference with equipment access doors or panels, or with service to equipment. Installation shall be made so that equipment service can be accomplished without having to remove equipment.
    - I. <u>Refrigerant piping</u> shall be Type ACR drawn or annealed temper copper tubing (ASTM B280), wrought-copper fittings and unions (ASME B16.22) with brazed joints.
    - J. Unless otherwise indicated, steam piping shall be pitched uniformly down in the direction of steam flow at ¼" per 10 feet, and return piping shall be pitched downward in the direction of the condensate flow at ½" per 10 feet.
12. VALVES
    - A. All valves shall be manufactured in the United States of America and bear markings to ascertain the same.
    - B. All valves shall be selected and suitable for use with ethylene glycol, even if project does not currently incorporate the use of ethylene glycol.
    - C. Provide stem extension of proper length on insulated pipes. Approved manufacturers: Apollo 77-240-01, Nibco S-585-70-66 or Watts B-6081-SS.
    - D. Approved Manufacturers shall be Apollo 300, Centerline CLC, Nibco W-910-W, Milwaukee, or Watts.
    - E. Hydronic - Ball valves, 2" and smaller, MSS SP-110, Class 150, 600 PSI CWP, ASTM B 584 cast bronze body and bonnet, 2-piece construction, stainless steel ball, full port; blowout proof, bronze or brass stem; PTFE (15% glass filled) seats and seals, threaded or soldered end connections. Approved manufacturers: Apollo 77-240-01, Nibco S-585-70-66 or Watts B-6081-SS.
    - F. Hydronic - Flow Balancing Valves shall be self-draining. Approved manufacturers: Armstrong CSV-T, FDI or Wheatley.
13. ESCUTCHEON PLATES
    - A. Finished Areas: Chrome-plated.
14. MECHANICAL IDENTIFICATION AND PAINTING
    - A. All pipes and ducts shall be identified with factory fabricated, pre-curled labels securely attached to the pipe or duct at 20'-0" O.C., approximately (At least at each mechanical equipment room penetration, on each side of a wall penetration, each story traversed by the piping system, exit and centerpoint). Film markers are not acceptable. Secure pre-curled or recoiled labels to pipes with 1" wide color tape, matching piping color, and wrapped completely around pipe.
    - B. All pipes shall be color-coded intermittently at 20'-0" intervals to identify the characteristic properties of the contents.
    - C. Color code lines by painting a 1" wide band around pipe or by using 1" wide color-coded tape wrapped completely around pipe.
    - D. Where more than 1 band is used, a 1" space shall be allowed between bands.
    - E. Color coding shall be provided for all mechanical systems in accordance with the Owner's existing system.
    - F. Content of Legend
      1. Identify contents of piping systems 20'-0" O.C. above ceilings by both fluid contained and unique temperature and/or pressure (if necessary to distinguish between other systems with same fluid at different conditions); i.e., Potable Hot Water - 110°F vs. Potable hot Water - 140°F, low pressure steam - 5 psig vs. low pressure steam - 2 psig.
      2. Clearly identify direction of flow in pipe with flow arrows 1" wide x 6" long with arrow head, 2" wide at base in shafts, above ceiling, pipe spaces, etc.
    - G. Location of Markers
      1. Pipe labels shall be installed at all access panels or doors, adjacent to valves and branch connections, both sides of floors, ceilings and walls, all major changes in direction, on straight lengths of pipe every 20 feet, and at points of entry termination.
      2. Similarly for duct labels flow arrows on ducts, 20'-0" O.C.
      3. Arrows and markers shall be mounted to provide unobstructed visibility from floor level.
      4. Piping identification materials shall be larger, legible labels, 3-1/2" high as manufactured by Brady or Seton on piping 10" and larger, 2-1/2" high on piping smaller than 10", and ¾" lettering on piping ¾" and smaller.
      5. Locations for pipe markers above ceilings in finished areas shall be adjacent to each valve, and on all horizontal pipe runs-marked every 20'-0", and on each side of a wall penetration.
15. MECHANICAL INSULATION
    - A. General
      1. Contractor shall provide thermal insulation on all supply ductwork, outside air intake ductwork and return air ductwork. Insulation shall not be installed until systems have been tested and inspected.
      2. All insulation on piping and ductwork that has been damaged or has been damaged during construction shall be repaired to 'like-new' condition.
      3. Approved manufacturers for fiberglass insulation: Certainteed, Owens-Corning Fiberglass Corp., Manville Products Corp., and Knauf Fiber Glass.
      4. All insulation, including facings, cements, and adhesives when tested per ASTM E84 by UL shall have a flame spread rating of less than 25, and a smoke developed rating of less than 50.
      5. For adhesives, mastics, coatings and sealants, approved manufacturers are: Foster Products Div., HB Fuller Co., I-C Adhesives Co., Chicago Mastic Co., Childers Products Co., and St. Clair Rubber Co.
    - B. Ductwork Insulation

      Concealed ductwork shall be covered with 1-1/2 inch glass fiber, flexible blanket insulation with a density of 1.5 lb/cu.ft. Blanket shall have a vapor retardant jacket of aluminum foil reinforced with fiberglass yarn and laminated to a fire resistant kraft paper, secured with UL listed pressure sensitive tape.
16. METAL DUCTWORK
    - A. <u>Ductwork Construction</u>

      All ductwork shall be constructed and supported in accordance with the requirements of the latest SMACNA HVAC Metal Ductwork Standards. All joints and seams of all ductwork shall be sealed. All ductwork shall be constructed air-tight and after the installation, ductwork shall be tested. Ductwork shall be kept free of dirt and foreign materials and therefore, after and during assembly of ducts, clean all dirt, grease, rubbish, etc. from both the interior and exterior of ductwork.
    - B. <u>Pressure Class</u>

      Ductwork pressure classification shall be no less than +2" for all supply ductwork, and no greater than -2" for all exhaust and return ductwork.
    - C. <u>Sealing Ductwork</u>

      All existing and new ductwork shall be effectively sealed per seal class A. All sealant shall be UL rated and shall comply with NFPA 90A. Sealing shall be defined as caulking all joints with duct sealer. Not only circumferential joints shall be sealed, but all along each and every Pittsburgh seam shall be sealed, or provide prefabricated duct connectors (Ductmate or Nexus). Duct joint sealers shall be tested in accordance with ASTM E-84-80 and not exceed 25 flame spread and 50 smoke developed ratings.
    - D. <u>Insulated Flexible Duct</u>

      Low pressure and high pressure insulated flexible duct shall be Flexmaster USA Inc., type 8M7, mechanically locked without adhesives into a formed aluminum helix on the duct's outside surface, and shall be factory wrapped in a thick blanket of fiberglass insulation with a C-factor of 0.23 or less. The insulation shall be encased in a fire retardant polyethylene protective vapor barrier with a perm rating of not over 0.1 grains/sq.ft./hr/in. The flexible duct shall be UL listed 181 Class I air duct and comply with NFPA 90A and 90B and have a flame spread of not over 25 and a smoke developed of not over 50. The flexible duct shall have a minimum pressure rating of 12" W.C. through a temperature range of -20 deg. F to +250 deg. F. Maximum length of flexible duct shall be (5) five feet to each connection.
    - E. <u>Access Panels</u>

      Access panels shall be double wall construction with 1" of rigid insulation on insulated ducts and single wall panels on uninsulated ducts. Access panels shall be installed wherever ducts contain devices requiring maintenance or calibration, such as coils, air flow stations, humidifiers, fire dampers, smoke dampers, etc. Access doors for ductwork shall be rated for pressure of 12" W.G. both frame and door shall be made from 16 gage galvanized steel. Approved Manufacturers: Cesco Models GHS and CAD, Airsan, Ruskin, and Advanced air.
    - F. <u>Clear Access</u>

      Clear access from the occupied space shall be maintained to devices within ducts (dampers, sensors, TAB boxes, etc.), without requiring personnel to step on ductwork, remove equipment, remove piping, or remove equipment or piping supports.
17. DUCTWORK ACCESSORIES
    - A. <u>Turning Vanes</u>

      All mitered duct elbows greater than 45°F, shall have SMACNA 24 gauge turning vanes. Provide turning vanes constructed of 1-1/2" wide curved blades set at ¾" O.C., supported with bars perpendicular to blades set at 2" O.C. and set into side strips suitable for mounting in ductwork. Approved manufacturers: Aero Dyne Co.
    - B. <u>Volume Dampers</u>

      All supply, return and exhaust branch ducts shall have manual opposed steel blade volume dampers. A ceiling access panel or door is required to each inaccessible damper. Approved manufacturers: Nailor, Ruskin, and Young Regulator.
18. CUTTING AND PATCHING
    - A. Cut walls and floor slabs for new work. Patch and paint to match new work.
19. TESTING AND BALANCING
    - A. Testing and Balancing (T&B) Contractor shall meet with Mechanical Contractor during early phase of construction to review project for preliminary and pre-demolition testing and flow measurement requirements prior to any work on mechanical systems, and to point out location of taps and dampers that T&B Contractor may require to conduct his tests.
    - B. T&B Contractor shall be a current member in good standing of AABC, NEBB, and SMACNA. The services of an independent T&B agency that specializes in and whose business is limited to the testing and balancing of air conditioning shall be required.
    - C. Field testing and balancing shall be performed under the direct supervision of journeyman technician.
    - D. All removed ceiling tiles for testing and balancing have to be re-installed at the end of each day, unless Owner's Representative agrees otherwise.
    - E. Prior to starting any new work, the balancing contractor shall take readings and record the following data for each existing air handling system to be modified:
      1. CFM for each diffuser, grille and register (supply, return, and/or exhaust).
      2. Identify and list size, type, and manufacturer of all diffusers, grilles, registers, coils, filters, fans, sheave sizes, and motors.
      3. Assemble the complete records in hard-backed loose-leaf binders properly identified. Furnish three (3) copies of each system and deliver to the Owner's Representative.
    - F. T&B Contractor shall be responsible for providing all testing and balancing equipment required to conduct these tests.
    - G. Balance and measure all existing and new air and hydronic terminal devices and equipment to the flow rates indicated on the drawings.
    - H. For each system tested, the contractor shall provide a certificate testifying that the system was satisfactorily tested as specified and passed. The certification should also provide the following information:
      1. Identification of system tested referencing specific equipment (model and serial number) connected to the system.
      2. Date and time of test.
      3. Ambient temperature and humidity at time of test.
      4. Test pressure and duration of test (for duct leak testing).
      5. Design and actual flow rates and temperatures for all flows (supply air, return air, exhaust air, relief air, outside air, HWHS&R, CHWS&R).
      6. Individual equipment section pressure drops.
      7. Measurements and checks used to ensure accuracy of data obtained and that tolerances were met.
      8. Media used for testing, calibration and certification dates
      9. Performance data sheets shall be furnished for equipment, including curves and operating information.
      10. List of necessary repairs made before system passed the test.
      11. Method or formulas and references used for correcting measure readings.
      12. Air flow pitot tube duct traverses. (main and branch ductwork).
      13. Any information that may be useful in an analysis of test results.
      14. The submitted final report shall include a one line diagram of each measured system with locations of all measurements shown and given a unique name/ID that is also shown in the report data.
      15. Location of volume dampers.
      16. Heating and cooling coil inlet and outlet temperatures.
    - I. Adjustment Tolerance Schedule with permissible tolerances is as follows:

Supply, return and exhaust fan	+5% to 10%
Diffusers and supply grilles	0% to +10%
Return and exhaust grilles	0% to -10%

    - J. T&B Contractor shall assemble the complete record in hard-backed, loose-leaf binder(s), properly identified. Supply three (3) copies of each system and deliver to the Owner's Representative.
    - K. Approved T&B Contractors: Enviro-Aire Inc., Absolut Balancing Co., Inc., Airflow Testing Inc., International Test & Balance.
20. CLEAN UP
    - A. Contractor shall keep site clean and free of debris at all times. Remove unused piping and materials from premises. Owner shall be given the option of retaining any removed items.
21. RECORD DRAWINGS
    - A. At the close of the project and prior to receipt of final payment, submit to the Owner one set of documents clearly indicating all deviations from the original documents.

PROFESSIONAL SEALS:

PROJECT PARTNERS:

KEYPLAN

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
	10-20-23	DD PROGRESS

■ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

KEY PLAN
NO SCALE

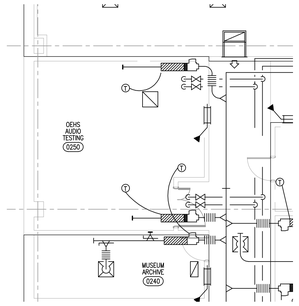
259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
T. (248) 643-6222

HVAC NOTES, LEGEND, SPECS. & ABBREVIATIONS

MH-001

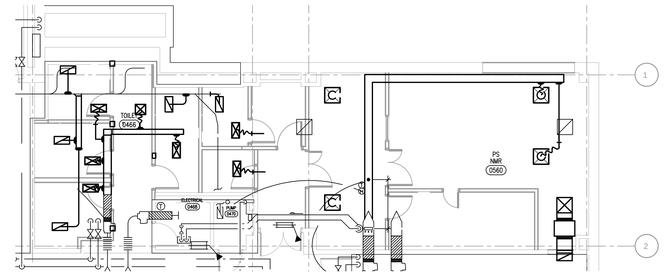


E7 MH-101 PARTIAL LEVEL 0 HVAC NEW WORK PLAN

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

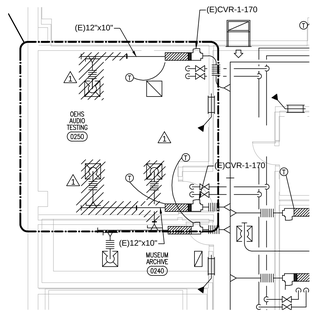
HVAC NEW WORK KEYNOTES

1. TREF-2, EXTEND 8"Ø DUCT TO EXISTING TOILET ROOM EXHAUST SYSTEM.
2. EXISTING 4"x4" EXHAUST GRILLE TO REMAIN.



E7 MH-101 PARTIAL LEVEL 0 HVAC NEW WORK PLAN

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

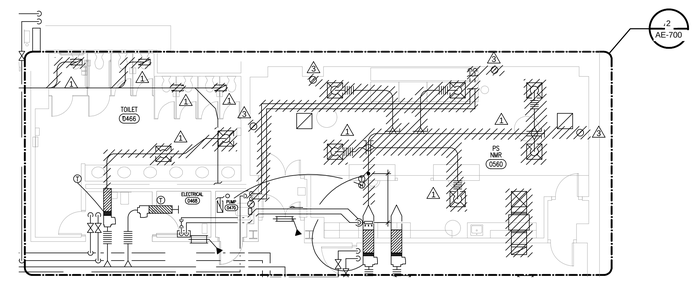


A5 MH-101 PARTIAL LEVEL 0 HVAC DEMOLITION PLAN

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

HVAC DEMOLITION KEYNOTES

1. REMOVE ALL DIFFUSERS, GRILLES, CEILING EXHAUST FANS AND ASSOCIATED DUCTWORK IN THE PROJECT WORK AREA AS SHOWN. REMOVE DUCTS AS SHOWN AND CAP AIRTIGHT.
2. REMOVE EXISTING THERMOSTATS FOR FUTURE INSTALLATION LOCATION.
3. REMOVE EXISTING OXYGEN SENSORS FOR FUTURE INSTALLATION LOCATION.



A5 MH-101 PARTIAL LEVEL 0 HVAC DEMOLITION PLAN

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

PROFESSIONAL SEALS:

PROJECT PARTNERS:

KEYPLAN

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
	10-20-23	DD PROGRESS

■ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

WAYNE STATE UNIVERSITY

5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

KEY PLAN
NO SCALE
AREA OF WORK

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
T. (248) 643-6222

PARTIAL LEVEL 0 HVAC DEMOLITION AND NEW WORK FLOOR PLANS

MH-101

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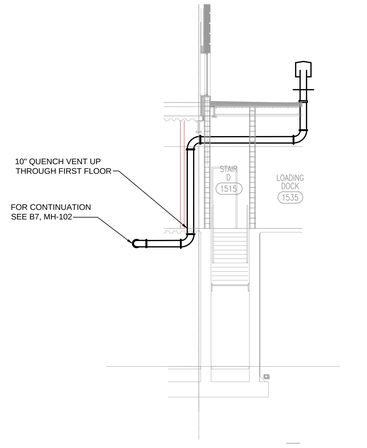
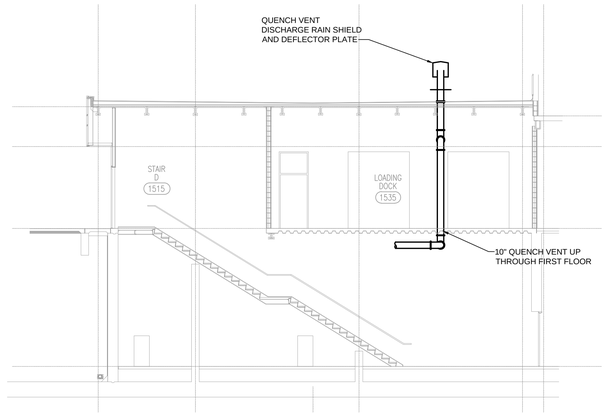


D3 MH-102 SECTION
SCALE: 1/8" = 1'-0"



E3 MH-102 SECTION
SCALE: 1/8" = 1'-0"

Quench Line Calculator Report

WSU Applebaum MRI OAR meeting

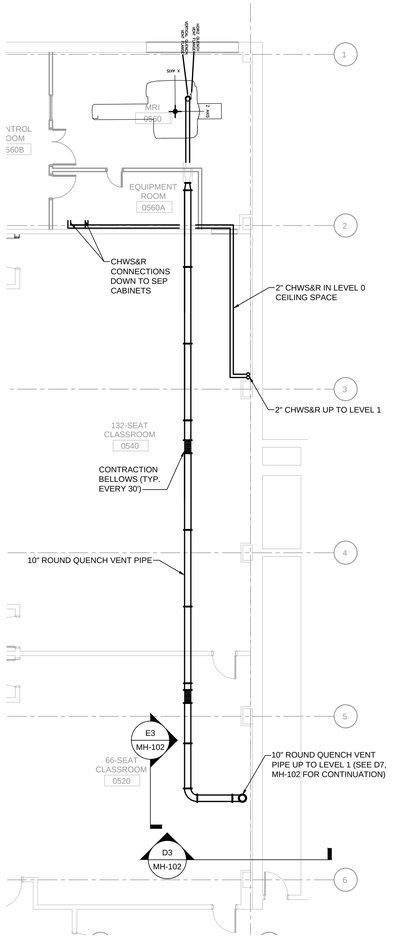
Magnet Type:	3T	Total pressure drop:	75.00
Mass flow rate:	2	Total length:	34.50
Max pressure:	100	Inlet flange Force:	118.6
		Outlet thrust:	174.2
		Gas temperature:	21
		Max velocity:	37.1

PASS

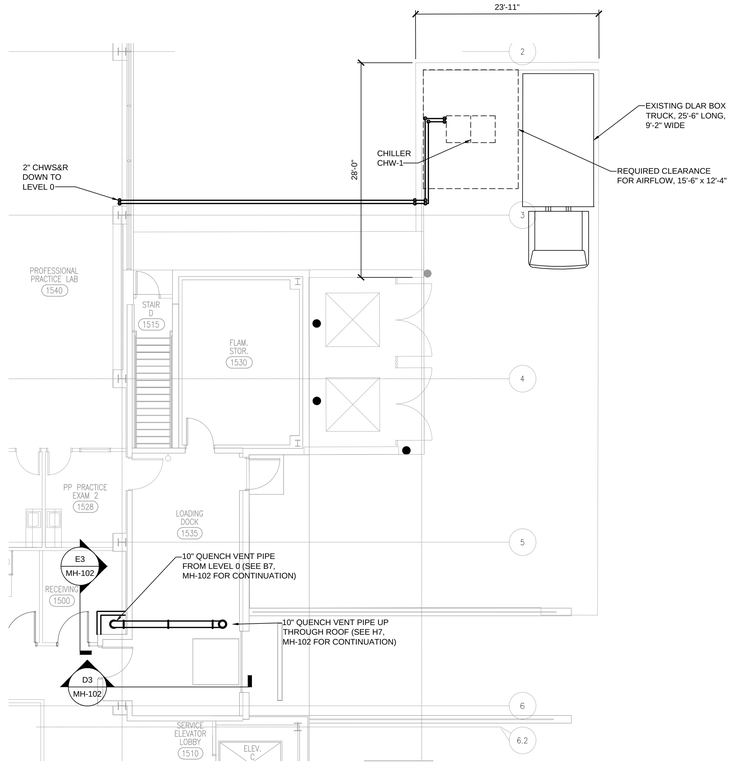
Type	Diameter (in)	Diameter (mm)	Length (m)	Length (ft)	Pressure Drop (mBar)	Total Pressure (mBar)
Vibration denoucler	6	152	0.37	1.21	4.84	4.84
Straight smooth	6	152	1.00	3.28	6.51	11.35
90° smooth	10	254	0.60	1.98	1.88	13.23
Straight smooth	10	254	19.16	62.12	29.10	53.82
90° smooth	10	254	0.60	1.98	4.27	58.09
Straight smooth	10	254	1.52	4.99	2.23	60.94
90° smooth	10	254	0.60	1.98	4.58	64.92
Straight smooth	10	254	3.55	10.59	5.34	90.26
90° smooth	10	254	0.60	1.98	4.95	95.21
Straight smooth	10	254	3.66	13.01	6.04	81.45
90° smooth	10	254	0.60	1.96	5.26	86.72
Straight smooth	10	254	2.13	6.98	3.81	70.53
90° smooth	10	254	0.60	1.96	5.46	75.99

QUENCH VENT NOTES

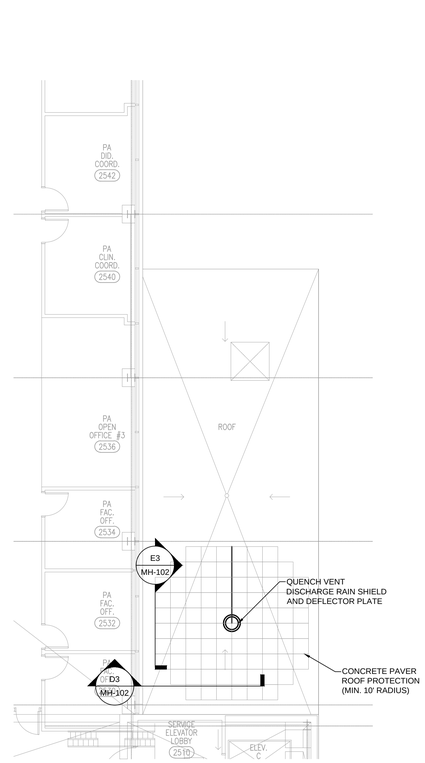
1. QUENCH VENT TO BE WELDED OR FLANGED WITH FIBER GASKETS AND STAINLESS STEEL (>22 GA) GRADES 304, 309, 316 OR 321 OR ALUMINUM 6063 OR 6082 (MIN. 14 GA).
2. QUENCH VENT EXIT SHALL BE VERTICAL THROUGH THE ROOF WITH RAIN SHIELD AND DEFLECTOR PLATE. PROTECTION OF THE OUTLET SHALL BE ⅜" WIRE MESH OF ½" WIRES. PROTECT EXISTING ROOF WITH CONCRETE PAVERS FOR A DISTANCE OF 10'.
3. ALL ELBOWS SHALL BE SMOOTH WALLED WITH A BEND RADIUS TO DIAMETER OF A MINIMUM OF 1.5.
4. ENTIRE VENT LENGTH SHALL BE INSULATED WITH A MINIMUM OF 1" OF MINERAL FIBER INSULATION OR 1" OF ARMAFLEX.



B7 MH-102 PARTIAL LEVEL 0 QUENCH VENT AND CHILLER PIPING NEW WORK PLAN
SCALE: 1/8" = 1'-0"



D7 MH-102 PARTIAL LEVEL 1 QUENCH VENT AND CHILLER PIPING NEW WORK PLAN
SCALE: 1/8" = 1'-0"



H7 MH-102 PARTIAL QUENCH VENT AND CHILLER PIPING ROOF NEW WORK PLAN
SCALE: 1/8" = 1'-0"

SSOE®

PROFESSIONAL SEALS:

PROJECT PARTNERS:

KEYPLAN

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
	10-20-23	DD PROGRESS

■ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

WAYNE STATE UNIVERSITY

5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
T. (248) 643-6222

QUENCH VENT PLANS AND DETAILS

MH-102

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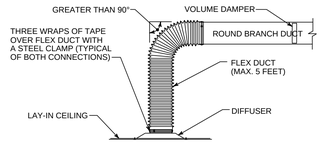
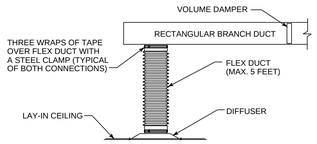
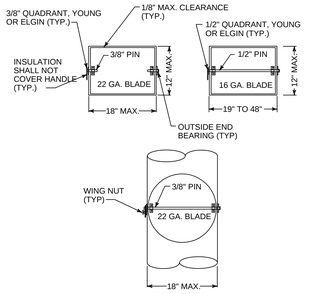
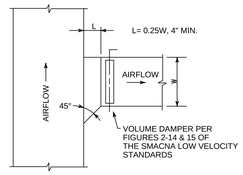




A2 / M600 FLEX DUCT DROP DETAIL
SCALE: NONE



C2 / M600 VOLUME DAMPER DETAIL
SCALE: NONE



D2 / M600 BRANCH DUCT DETAIL (SUPPLY)
SCALE: NONE

FANS

MARK	SERVICE/ LOCATION	TYPE	CFM	SP (IN WC)	RPM	DRIVE	AMPS	WATTS	VOLTAGE/ PHASE	MANUFACTURER & MODEL	REMARKS
TREF-1	TOILET ROOMS	CENTR	100	0.7	640	DIRECT	1.3	100	120/1	BROAN L150	ROUTE DISCHARGE TO EXISTING TOILET ROOM EXHAUST DUCT. OPERATE WITH LIGHT SWITCH.
TREF-2	LAB	CENTR	175	0.7	1207	DIRECT	0.7	-	120/1	BROAN L300E	ROUTE DISCHARGE TO EXISTING TOILET ROOM EXHAUST SYSTEM.

SPLIT SYSTEM AIR CONDITIONER SCHEDULE

MARK	LOCATION	TYPE	CFM	COOLING DATA		ELECTRICAL DATA			WEIGHT	MANUFACTURER & MODEL	REMARKS
				TOTAL MBH	SENSIBLE MBH	FLA	VOLT	PHASE			
AC-1	COMM ROOM	INDOOR	632-775	24	18.5	0.36	208/230	1	46	MITSUBISHI PKA-A24KA7	WALL MOUNTED, R-410A, WITH CONDENSATE PUMP. POWERED BY OUTDOOR UNIT.
CU-1	SOUTH BUILDING CORNER	OUTDOOR	1940	-	-	17 MCA	208/230	1	190	MITSUBISHI PUZ-HA24NHA1	MOUNT UNIT ON EQUIPMENT PAD

PROFESSIONAL SEALS:

PROJECT PARTNERS:

KEYPLAN

SUBMITTAL/REVISION SCHEDULE:

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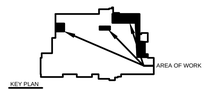

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
T. (248) 643-6222

HVAC EQUIPMENT SCHEDULES AND DETAILS

MH-600

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GENERAL LEGEND
(NOT ALL SYMBOLS USED)

SYMBOL	DESCRIPTION
	EXISTING SUPPLY DUCT OR PIPE
	EXISTING RETURN DUCT OR VENT
	EXISTING SUPPLY DUCT OR PIPE TO BE DEMOLISHED
	EXISTING RETURN DUCT OR VENT TO BE DEMOLISHED
	NEW DUCT OR PIPE
	POINT OF NEW CONNECTION
T	THERMOSTAT - WALL MOUNTED
	AIR FLOW, SUPPLY, OUTSIDE AIR
	AIR FLOW, EXHAUST, RETURN
U	UNDERCUT DOOR
	FINNED TUBE
COND	CONDENSATE RETURN PIPING
CW	DOMESTIC COLD WATER PIPING
CWR	CONDENSER WATER RETURN PIPING
CWS	CONDENSER WATER SUPPLY PIPING
DT	DRAIN TILE PIPING
F	FIRE PROTECTION PIPING
HWHR	HOT WATER HEATING RETURN PIPING
HWHS	HOT WATER HEATING SUPPLY PIPING
HP COND	HIGH PRESSURE CONDENSATE PIPING
HPCW	HIGH PRESSURE COLD WATER PIPING
HPHW	HIGH PRESSURE HOT WATER PIPING
MA	MEDICAL AIR PIPING
MV	MEDICAL VACUUM PIPING
N2O	NITROUS OXIDE PIPING
N	NITROGEN PIPING
O2	OXYGEN PIPING
PC	PUMPED CONDENSATE PIPING
SAN	SANITARY SEWER PIPING
SAN(U)	UNDERGROUND SANITARY SEWER PIPING
ST	STORM SEWER PIPING
STM	STEAM PIPING
V	VENT PIPING
	PIPE CAP (SCREWED)
	PIPE CAP (WELDED)
	BLIND FLANGE
	90° ELBOW DOWN
	90° ELBOW UP
	PIPE FLANGES
	ECCENTRIC REDUCER OR INCREASER
	CONCENTRIC REDUCER OR INCREASER
CO	CLEANOUT
FCO	CLEANOUT (FLOOR)
WCO	CLEANOUT (WALL)
	FLOW ARROW
	UNION
	STRAINER (WYE TYPE)
	STRAINER (WYE TYPE) W/BLOW OFF
	ANGLE VALVE
	GATE VALVE
	O.S. & Y. GATE VALVE
	GLOBE VALVE
	CHECK VALVE
	BUTTERFLY VALVE
	BALL VALVE
	MANUAL BALANCING VALVE
	CALIBRATED BALANCING VALVE
S	SOLENOID VALVE 2-WAY
S	SOLENOID VALVE 3-WAY
	AUTO.CONTROL VALVE 2-WAY PNEUMATIC OPERATOR
	AUTO.CONTROL VALVE 3-WAY PNEUMATIC OPERATOR
	MOTORIZED BUTTERFLY VALVE
T	STEAM TRAP
	FLEXIBLE HOSE
	FLEXIBLE CONNECTOR
OR	FLOOR DRAIN (FLOOR SINK)
	BACKFLOW PREVENTER/
	UNIT HEATER
	DRAIN VALVE w/HOSE END
	THERMOWELL
T	THERMOSTATIC AIR VENT
	DRAIN VALVE
	ACCESS DOOR
	FINNED TUBE

DUCTWORK LEGEND
(NOT ALL SYMBOLS USED)

ROUND DUCT

DOUBLE LINE		SINGLE LINE
12"Ø	DUCT SIZE (DIAMETER)	12"Ø
	FLEXIBLE DUCT (CONNECTION)	
	DUCT INDICATION FOR STACKING	
	DUCT TURNING TOWARD VIEWER	
	DUCT TURNING AWAY FROM VIEWER	
	ROUND ELBOW	
	MITERED ELBOW	
20°MAX.	TRANSITION	
	RECTANGULAR TO ROUND TRANSITION	

SQUARE DUCT

DOUBLE LINE		SINGLE LINE
12x6	DUCT SIZE (INSIDE DIMENSIONS/INCHES) FIRST FIGURE IS SIDE SHOWN	12x6
	SUPPLY DUCT, GRILLE (REGISTER) OR DIFFUSER	
	RETURN DUCT, GRILLE OR REGISTER	
	EXHAUST DUCT, GRILLE OR REGISTER	
	SUPPLY DIFFUSER, GRILLE OR REGISTER ▼ INDICATES BLANKED-OFF SECTION	
	DUCT TURNING UP	
	DUCT TURNING DOWN	

DUCT ELBOWS

DOUBLE LINE		SINGLE LINE
	ELBOW WITH TURNING VANES	
	RADIUS ELBOW W/VANES	
20°MAX. 30°MAX.	TRANSITION IN DIRECTION OF AIR FLOW	

DAMPERS

DOUBLE LINE		SINGLE LINE
	VOLUME DAMPER	
AIR FLOW 45° L W	BOOT TYPE CONNECTION L=1/4W, 6"MIN.	
	CEILING DIFFUSER	

ABBREVIATIONS
(NOT ALL ABBREVIATIONS USED)

ABBREVIATION	DESCRIPTION
AAV	AUTOMAITC AIR VENT
ACH	AIR CHANGES PER HOUR
AD	ACCESS DOOR OR AREA DRAIN
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AIV	ALARM INTERFACE VALVE
ARCH	ARCHITECTURAL
ARR	ARRANGEMENT
BF	BLIND FLANGE
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BMS	BULIDING MANAGEMENT SYSTEM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOT	BOTTOM
BTUH	BRITISH THERMAL UNIT PER HOUR
CD	CEILING DIFFUSER
CENTRIF.	CENTRIFUGAL
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
CO	CLEANOUT
COND	CONDENSATE
CONN.	CONNECTION
CONT.	CONTINUATION
CONTR.	CONTRACTOR
CP	CONDENSATE PUMP
CSS	CLINICAL SERVICE SINK
CUH	CABINET UNIT HEATER
CW	COLD WATER
DD	DECK DRAIN
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DET	DETAIL
DI	DE-IONIZED WATER
DIA	DIAMETER
DMPR	DAMPER
DN	DOWN
DWG	DRAWING
E	EXISTING
EA	EXHAUST AIR OR EACH
EG	EXHAUST GRILLE
EF	EXHAUST FAN
EFF	EFFICIENCY
ELECT	ELECTRICAL
ELEV	ELEVATION
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
EW	EYE WASH
EXH	EXHAUST
EXIST.	EXISTING
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FLEX.	FLEXIBLE
FLR	FLOOR
FM	FLOW METER
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FU	FIXTURE UNITS

ABBREVIATION	DESCRIPTION
GA	GAUGE
GAL	GALLON
GPM	GALLONS PER MINUTE
HB	HOSE BIBB
HO	HUB OUTLET
HORIZ	HORIZONTAL
HP	HORSEPOWER OR HIGH PRESSURE
HW	HOT WATER
HWR	HOT WATER RETURN
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCHES
INSUL.	INSULATION
IW	INDIRECT WASTE
KW	KILOWATT
KWH	KILOWATT HOUR
LAV	LAVATORY
LB	POUND
MA	MEDICAL AIR
MAX	MAXIMUM
MBH	1000 BTU/HR
MIN	MINIMUM
MV	MEDICAL VACUUM
N	NITROGEN OR NEW
N/A	NOT APPLICABLE
NG	NATURAL GAS
NK	NECK
N2O	NITROUS OXIDE
NTS	NOT TO SCALE
OA	OUTSIDE AIR
O2 OR OXY	OXYGEN
P	PUMP
PH	PHASE
PRV	PRESSURE REDUCING VALVE
PSI(G)	POUNDS PER SQUARE INCH (GAUGE)
RA	RETURN AIR
RG	RETURN GRILLE
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAN	SANITARY
SD	SUPPLY DIFFUSER
SK	SINK
SG	SUPPLY GRILLE
SH	SHOWER
SP	STATIC PRESSURE OR SUMP PUMP
SPEC	SPECIFICATIONS
SQ	SQUARE
SS	SERVICE SINK OR STAINLESS STEEL
TMV	THERMOSTAIC MIXIING VALVE
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TYP	TYPICAL
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
V	VENT
VAC	VACUUM
VEL	VELOCITY
VERT	VERTICAL
W	WASTE OR WATT
WC	WATER CLOSET OR WATER COLUMN
WCO	WALL CLEANOUT
WTR	WATER

GENERAL NOTES

1. THE CONTRACTOR SHALL EXAMINE THE SITE AND BE FAMILIAR WITH THE CONDITIONS UNDER WHICH THIS CONTRACT MUST BE EXECUTED. NO ADJUSTMENT TO THIS CONTRACT PRICE WILL BE PERMITTED BECAUSE OF LACK OF KNOWLEDGE OF THE EXISTING FIELD CONDITIONS.
2. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL SYSTEMS WITH OTHER TRADES AND OWNER TO AVOID INTERFERENCES.
3. THE CONTRACTOR SHALL VERIFY ALL SPACE CONDITIONS AND DIMENSIONS PRIOR TO THE FABRICATION AND THE INSTALLATION OF THE PIPING SYSTEM AND DUCTWORK.
4. ALL WORK SHALL BE DONE IN A MANNER CONDUCIVE TO A PROFESSIONAL ENVIRONMENT. ALL AREAS MUST BE KEPT AS NEAT AS POSSIBLE, AND AREAS SHALL BE CLEANED BEFORE LEAVING SAID AREAS ON A DAILY BASIS.
5. PROVIDE COMPLETE OPERATING SYSTEMS WITH MATERIALS OF CONSTRUCTION AND METHODS OF FABRICATION, ASSEMBLY, ERECTION, TESTING, AND INTERIM OPERATIONS IN COMPLIANCE WITH THE REQUIREMENTS SPECIFIED HEREIN AND THE REQUIREMENTS OF APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION.
6. LOCATE CONTROLS, RELAYS, INSTRUMENTS, VALVE BOXES, SWITCHES, ALARM PANELS, AND ACCESSORIES SO THEY ARE READILY ACCESSIBLE FOR ADJUSTMENT, SERVICE, AND REPLACEMENT OR AS INDICATED.
7. COORDINATE SUPPORT HANGERS, PIPE AND ROUTING AND EQUIPMENT INSTALLATION WITH EXISTING CONDITIONS TO AVOID INTERFERENCES.
8. INSTALL TEMPERATURE SENSORS 4'-0" ABOVE FINISHED FLOOR.
9. DEMOLITION WORK SHALL BE COMPLETED TO THE EXTENT INDICATED OR SPECIFIED.
10. THE OWNER'S NORMAL OPERATION IN SURROUNDING AREAS WILL BE CONTINUED DURING DEMOLITION. THE DEMOLITION SHALL NOT INTERFERE WITH THESE OPERATIONS IN ANY WAY WITHOUT THE OWNER'S EXPRESSED CONSENT. CONTRACTOR SHALL COORDINATE AND SCHEDULE EXTENT OF DEMOLITION WORK WITH OWNER IN FIELD.
11. COMPLY WITH OWNER'S STANDARDS AND ALL APPLICABLE LOCAL CODES, STANDARDS, AND REGULATIONS.
12. CONFIRM THAT EXISTING SYSTEMS ARE INACTIVE AND PURGED BEFORE TAPPING INTO THEM, UNLESS OTHERWISE DIRECTED.
13. SOME STANDARD SYMBOLS, ABBREVIATIONS, AND DETAILS MAY NOT BE APPLICABLE TO THE SPECIFIC CONTRACT ISSUE.
14. CONTRACTOR SHALL REVIEW THE DOCUMENTS OF ALL INTERFACING TRADES, CONTRACTS, AND DRAWINGS PRIOR TO BIDDING AND COMMENCEMENT OF WORK TO ENSURE SUCCESS OF FINISHED WORK.
15. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER OF ANY PROBLEMS THAT MIGHT OCCUR DURING DEMOLITION WORK.
16. THE DEMOLITION WORK REQUIRED MAY NOT BE LIMITED TO WHAT IS SHOWN ON PLAN. CONTRACTOR TO REMOVE ALL RELATED ITEMS AS REQUIRED TO FACILITATE THE WORK.
17. UPON COMPLETION OF THE MECHANICAL TRADES WORK, ALL SYSTEMS SHALL BE TESTED, BALANCED AND ADJUSTED. THE CONTRACTOR SHALL MAKE ANY CHANGES IN THE SHEAVES, BELT OR MOTOR SIZE REQUIREMENT FOR CORRECT BALANCE AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER. THEREAFTER, THE CONTRACTOR SHALL SUBMIT A BALANCE REPORT OF THE HVAC SYSTEM. ALL SYSTEMS SHALL BE LEFT IN WORKING ORDER. BALANCING MUST BE DONE BEFORE FINISHED CEILING IS INSTALLED. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL DEBRIS LEFT BY THE MECHANICAL TRADES.
18. FOR THE EXACT LOCATION OF ALL THE CEILING MOUNTED AIR DEVICES REFER TO THE ARCHITECTURAL DRAWINGS.
19. ALL EQUIPMENT AND MATERIAL BROUGHT TO THE SITE IS THE PROPERTY OF THE CONTRACTOR UNTIL THE OWNER HAS OFFICIALLY ACCEPTED THE FINAL INSPECTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE PROTECTION FOR EQUIPMENT AND MATERIAL UNTIL COMPLETION OF THE PROJECT.
20. ALL SHEETMETAL DUCTWORK AND FITTINGS SHALL BE SECURELY INSTALLED AND STEEL ANGLE REINFORCED AND PROPERLY SUPPORTED IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL CONNECTIONS AND JOINTS IN THE EXITING AND NEW DUCTWORK SHALL BE SEALED AND CAULKED AIR TIGHT IN AN APPROVED MANNER FOR THE VARIOUS PRESSURE APPLICATIONS.
21. WHEN A DESIGN BASE IS INDICATED AND OTHER THAN THE DESIGN BASE EQUIPMENT IS APPROVED, DESIGN ALL NECESSARY MODIFICATIONS AT NO ADDITIONAL COST TO THE OWNER AND SUBMIT A SHOP DRAWING OF THE PROPOSED INSTALLATION.
22. VERIFY ALL EXISTING WORK, PROVIDE ALL NECESSARY MATERIAL, LABOR, AND EQUIPMENT REQUIRED TO MODIFY EXISTING WORK AS NECESSARY. IN ADDITION, MAINTAIN INTEGRITY OF THE EXISTING SYSTEM.
23. CONTRACTOR SHALL GUARANTEE INSTALLATION AGAINST DEFECTS IN MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF 12 MONTHS FROM THE DATE OF FINAL ACCEPTANCE. IF, DURING GUARANTEE PERIOD, ANY DEFECTS APPEAR, CONTRACTOR SHALL REMEDY THEM INCLUDING ANY NECESSARY MATERIALS AND LABOR WITHOUT COST TO THE OWNER.
24. REPAIR AND PAY FOR ALL DAMAGE DONE TO THE EXISTING AND NEW WORK.
25. PROTECT ALL MECHANICAL EQUIPMENT, PLUMBING FIXTURES AND TRIM FROM MORTAR, PAINT, ETC., DURING CONSTRUCTION. ALL PRODUCTS USED IN MECHANICAL SYSTEMS SHALL BE ASBESTOS-FREE.
26. COORDINATE EXACT LOCATION OF CONSTRUCTION TO PRECLUDE ANY INTERFERENCE BETWEEN NEW AND EXISTING PIPING, WIRING, LIGHTING FIXTURES, CABLE TRAYS, DUCTWORK, BUILDING EQUIPMENT, PNEUMATIC TUBING, WORK BY OTHER CONTRACTORS, AND OTHER CONSTRUCTION.
27. COORDINATE EXACT LOCATION OF EQUIPMENT REQUIRING SERVICE TO PRECLUDE ANY INTERFERENCE WITH EQUIPMENT ACCESS DOORS OR PANELS OR WITH SERVICE TO EQUIPMENT. INSTALLATION SHALL BE MADE SO THAT EQUIPMENT SERVICE CAN BE ACCOMPLISHED WITHOUT HAVING TO REMOVE EQUIPMENT.
28. CONTRACTOR SHALL CONFIRM ALL AVAILABLE UTILITY SERVICES, STORAGE AREAS AND TRANSPORTATION MEANS.
29. ALL EQUIPMENT SHALL BE NEW UNLESS NOTED OTHERWISE AND SHALL CONFORM IN ALL RESPECTS TO THE LATEST STANDARDS OF ANSI, ASME, ASTM, FM, MIOSHA AND PDI.
30. DO NOT PROVIDE FLEXIBLE DUCTWORK TO AIR DEVICES LOCATED ABOVE GYP BOARD CEILING. DUCTWORK ABOVE GYP BOARD CEILING SHALL BE SHEET METAL.
31. PIPING LAYOUT IS SCHEMATIC ONLY, FINAL LAYOUT AND PIPING SIZES SHALL BE COORDINATED WITH EQUIPMENT SUPPLIER. PREPARE COORDINATION DRAWINGS.
32. MAXIMUM LENGTH OF FLEXIBLE DUCTWORK INSTALLATION SHALL BE 5 FEET.
33. INSTALL LOCKING QUADRANT BALANCING DAMPER ON EACH DIFFUSER AND GRILLE RUNOUT.

PLUMBING SPECIFICATIONS

1. DESCRIPTION OF WORK
   - A. Contractor shall provide all materials, equipment, and labor to provide a complete and operating installation.
   - B. Work includes labor and materials necessary for demolition and installation of new equipment, piping, and other mechanical items as described herein and shown on drawings. Omission of direct reference herein to any essential item shall not excuse contractor from complying with design intent. Drawings are diagrammatic unless dimensioned. The drawings diagrammatically show suggested examples for possible routing of mechanical systems. The drawings are based on available information and do not show the only possible arrangement, nor do they relieve the contractors of the responsibility of field verification and preparation of coordination drawings.
   - C. Provide miscellaneous steel and hardware as required to support, handle, and secure equipment furnished as part of this work.
   - D. Perform cutting and core drilling as required for work described.
   - E. Provide sleeves for pipes passing through slabs, walls, or floors (3" high at floor penetrations).
   - F. The Owner's representative is to be notified of all testing and flushing & cleaning and equipment start-ups. Copies of start-up reports are to be provided to Owner's representative.
   - G. The installing contractor shall provide a walkthrough and training for the Owner's building engineers at or near completion of the project.
   - H. Operation and maintenance manuals are to be provided for all components and/or systems requiring a manual.
   - I. Submit for approval shop drawings for all mechanical systems or equipment but not limited to the items listed below:

Plumbing Fixtures	Plumbing Accessories
Piping Materials	Insulation

2. CODES, PERMITS, AND INSPECTIONS
   - A. Work shall be installed in accordance with local, state, and federal regulations and ordinances.
   - B. Secure and pay for all permits and inspections.
3. STANDARDS
   - A. All equipment shall be new unless noted otherwise and shall conform in all respects to the latest approved standards of ANSI, ASME, ASTM, FM, IRI, MIOSHA and PDI.
4. PROJECT/SITE CONDITIONS
   - A. Contractor shall visit job site and examine premises at and adjacent to proposed work, and shall fully inform himself of the condition of premises with respect to obstructions, actual levels, excavation, fill and other requirements necessary for carrying out this work.
   - B. Contractor shall confirm all available utility services, storage areas, and transportation means.
5. REMODELING
   - A. Contractor shall comply with all requirements for confined space entry to the satisfaction of the Owner's safety department. Contractor shall present a plan for safe entry and construction methods and shall furnish all required testing and safety equipment.
   - B. Locate existing piping and make connections where required or where shown on the drawings. Do not cut into existing services without verifying with the Owner that the pipe involved is the desired service. In any areas where mechanical work is involved, restore the area to its original condition upon completion of work.
   - C. Perform work that interrupts any service or system, including cutting existing lines for new connections, at times (usually at night, after Owner's normal operating hours, or during slowest periods of activity) to cause no interference to the normal operation of the building.
   - D. Inform the Owner in advance of any shut-off that will occur and give estimate of duration. Obtain Owner's permission for system shut-down 24 hours in advance. Only after the Owner's facilities management staff is fully informed, and has approved the schedule of shut-offs, can the work then proceed accordingly.
   - E. All diffusers, coils, valves, thermostats, fixtures, piping and other valuable equipment to remain property of the Owner, except where noted otherwise, shall be stored on the site where directed.
   - F. Protect all mechanical equipment, plumbing fixtures and trim, from mortar, paint, etc. during construction. All products used in mechanical systems shall be asbestos-free.
6. CLEANING AND PAINTING
   - A. Clear away all debris, surplus materials resulting from mechanical work or operations, leaving the job and equipment in a clean, first-class condition. Where new work occurs in existing areas, clean and restore to original condition.
   - B. Thoroughly clean floor drains, cleanouts, and plumbing fixtures. Remove all plaster, stickers, rust, discoloration and foreign matter.
   - C. Clean specialties such as traps, strainers, etc. and all mechanical equipment surfaces.
7. SELECTIVE DEMOLITION
   - A. Remove piping and existing equipment as indicated.
   - B. In general, piping shall be removed back to the main branch piping shutoff valves in the ceiling space, or to below floor, and capped or plugged. Patch openings to match existing adjacent materials and finish. Where piping is within walls that remain, remove pipes to within wall, cap or plug, and patch wall to match existing adjacent wall materials and finish.
   - C. All equipment, plumbing fixtures and trim not reused shall remain the property of the Owner, unless otherwise directed, and shall be delivered by this contractor to a storage area at the project site as directed by the Owner's project representative.
   - D. Unclaimed demolished materials shall be legally disposed of, off-site, by the contractor as part of this scope of work and at no additional cost to the Owner.
8. CONNECTIONS TO EXISTING SYSTEMS
   - A. Make all connections to existing systems piping and equipment during designated periods upon approval of the Owner and at no increase in the contract sum.
   - B. Verify all existing work. Provide all necessary material, labor and equipment required to modify existing work as necessary. In addition, maintain integrity of the existing systems.
9. GUARANTEE
   - A. Contractor shall guarantee installation against defects in materials, equipment, and workmanship for a period of 12 months from the date of final acceptance. If, during guarantee period, any defects appear, Contractor shall remedy them, including any necessary materials and labor, without cost to the Owner.
10. DAMAGE TO OTHER WORK
    - A. Repair, and pay for, all damage done to the existing and new work.
11. COORDINATION OF THE WORK
    - A. Coordinate work with other trades to avoid interferences and to present a neat appearance. Interferences which result due to a lack of coordination are the contractor's responsibility to correct.
    - B. Verify locations of existing piping for connections to same and building structural beams, to avoid possible interference.
    - C. Coordinate exact location of construction to preclude any interference between new and existing piping, wiring, lighting fixtures, cable trays, ductwork, building equipment, work by other contractors, and other construction.
    - D. Coordinate exact location of equipment requiring service to preclude any interference with equipment access doors or panels, or with service to equipment. Installation shall be made so that equipment service can be accomplished without having to remove equipment.
12. SANITARY DRAIN AND PLUMBING VENT
    - A. No-Hub cast iron soil pipe and cast iron fittings per ASTM A888. Construct couplings of 24 gauge Type 304 stainless steel in conformance with FM 1680, and incorporating a neoprene gasket in accordance with ASTM C564. Provide two tightening bands on pipe up to 4 inch. Install system in accordance with manufacturer's recommendations.
    - B. Supports shall be 5'-0" on center, maximum.
13. PIPE AND FITTINGS
    - A. All piping and fittings to be manufactured in the United States of America and bear markings to ascertain the same.
    - B. Domestic Hot and Cold Water piping shall be Type L hard drawn copper tubing (ASTM B88) with solder type fittings, Type L wrought copper (ASTM B16.22). Unions shall be solder type, brass (ASTM B62). Solder shall be lead-free 95-5.
14. VALVES
    - A. All valves shall be manufactured in the United States of America and bear markings to ascertain the same.
    - B. All valves shall be selected and suitable for use with ethylene glycol, even if project does not currently incorporate the use of ethylene glycol.
    - C. Domestic Hot and Cold Water - Isolation and Throttling Valves, 2" and smaller, unless otherwise shown or specified, shall be Class 150 PSI S.W.P., two-piece, 80 percent of port, bronze body, PTFE (15% glass filled) seat and seal, stainless steel ball and stem, oval handle with locking feature, suitable for threaded or soldered ends.
    - D. Provide stem extension of proper length on insulated pipes. Approved manufacturers: Apollo 77-240-01, Nibco S-585-70-66 or Watts B-6081-SS.
    - E. Domestic Hot and Cold Water - Check valves, 2" and smaller, shall be Class 200 PSI S.W.P., 400 PSI W.O.G., bronze body, resilient disk, stainless steel spring and seat, regrinding, suitable for threaded or soldered ends.
    - F. Approved Manufacturers shall be Apollo 300, Centerline CLC, Nibco W-910-W, Milwaukee, or Watts.
15. ESCUTCHEON PLATES
    - A. Finished Areas: Chrome-plated.
16. FIRESAFING
    - A. At all cored, irregular, angular, and any other openings for pipe penetrations of fire rated walls, ceilings and floors, provide a permanent fire stop system that consists of a water based fire-stop compound as the fill, void or cavity material along with appropriate damming material as per manufacturer's instruction. Provide a system that is UL classified for all pipe sizes.
17. PIPE HANGERS AND SUPPORTS
    - A. Furnish and install miscellaneous iron supports and appurtenances as required to securely and properly hang or support piping systems. Hangers and supports shall be designed and manufactured in conformance with MSS-SP-58 and the selection and application shall be in conformance with MSS-SP-69.
    - B. Approved manufacturers: Anvil (Grinnell), B-line Systems, Inc., Carpenter and Paterson, and Michigan Hanger.
    - C. Dissimilar metal-to-metal contact between pipe and hanger shall be avoided.
    - D. "C" type beam clamp hangers are unacceptable.
    - E. Insulated piping smaller than 3" shall be hung with clevis hangers larger than O.D. of insulation, and with steel shields to avoid crushing insulation. Insulated piping 4" and larger shall be installed on steel saddles and iron rollers.
    - F. On insulated piping, locate hangers or supports outside the insulation and provide insulated supports as manufactured by Pipe Shields, Inc., Value Engineering Products, Inc., or B-line Systems, Inc.
18. MECHANICAL IDENTIFICATION AND PAINTING
    - A. All pipes and ducts shall be identified with factory fabricated, pre-curled labels securely attached to the pipe or duct at 20'-0" O.C., approximately (At least at each mechanical equipment room penetration, on each side of a wall penetration, each story traversed by the piping system, exit and centerpoint). Film markers are not acceptable. Secure pre-curled or recoiled labels to pipes with 1" wide color tape, matching piping color, and wrapped completely around pipe.
    - B. All pipes shall be color-coded intermittently at 20'-0" intervals to identify the characteristic properties of the contents.
    - C. Color code lines by painting a 1" wide band around pipe or by using 1" wide color-coded tape wrapped completely around pipe.
    - D. Where more than 1 band is used, a 1" space shall be allowed between bands.
    - E. Color coding shall be provided for all mechanical systems in accordance with the Owner's existing system.
    - F. Content of Legend
      1. Identify contents of piping systems 20'-0" O.C. above ceilings by both fluid contained and unique temperature and/or pressure (if necessary to distinguish between other systems with same fluid at different conditions); i.e., Domestic Hot Water - 110°F vs. Domestic hot Water - 140°F, low pressure steam - 5 psig vs. low pressure steam - 2 psig.
      2. Clearly identify direction of flow in pipe with flow arrows 1" wide x 6" long with arrow head, 2" wide at base in shafts, above ceiling, pipe spaces, etc.
    - G. Location of Markers
      1. Pipe labels shall be installed at all access panels or doors, adjacent to valves and branch connections, both sides of floors, ceilings and walls, all major changes in direction, on straight lengths of pipe every 20 feet, and at points of entry termination.
      2. Similarly for duct labels flow arrows on ducts, 20'-0" O.C.
      3. Arrows and markers shall be mounted to provide unobstructed visibility from floor level.
      4. Piping identification materials shall be larger, legible labels, 3-1/2" high as manufactured by Brady or Seton on piping 10" and larger, 2-1/2" high on piping smaller than 10", and ¾" lettering on piping ¾" and smaller.
      5. Locations for pipe markers above ceilings in finished areas shall be adjacent to each valve, and on all horizontal pipe runs-marked every 20'-0", and on each side of a wall penetration.
    - H. Valve Identification
      1. Mechanical contractor shall tag all valves with brass tags having incised painted black numbers and attached securely to valve by brass chain. Include valve tag charts bound in operating manuals and submit one set of charts, under glass, in metal frame(s) for Owner's representative to turn over to the Maintenance Department.
      2. All main and branch line valves are to be tagged in accordance with the Owner's existing system.
19. PRESSURE TESTING AND CLEANING OF THE PIPING SYSTEMS
    - A. The following pressure test shall be performed on new or revised piping systems.
    - B. Chemically clean piping system of all welding slag. Operate the system for one week, then drain and flush out. Replace all start-up strainers with permanent strainers and leave the system in proper working order.
    - C. Perform the following prior to start of the Test and Balance (T&B).
      1. In scheduling completion of all work required by the Contract Documents, include allowance for time required to complete Testing and Balancing (verify required time needed with T&B contractor).
      2. Cooperate with test and balance contractor and make all necessary preparation for testing and balancing.
      3. Complete the following:
         - a. Check the temperature control sequence and calibration of all controls.
         - b. Make preliminary settings on all control devices and have all systems operational. The above two items should be jointly done with cooperation of the temperature control contractor.
         - c. Clean and flush all piping systems.
         - d. Leak test, pressure test and make tight all piping systems.
         - e. Fill all piping systems with clean water.
         - f. Remove all air from the water piping systems (make sure that control valves are circulating water through coils, etc. during air removal).
         - g. Tag and identify all equipment.
         - h. Patch insulation and housing using materials identical to those removed.
         - i. Seal insulation to re-establish integrity of the vapor barrier.
         - j. Operate system(s) successfully for twenty-four (24) hours, minimum.
         - k. Provide the required access to flow meter ports.
         - l. Provide a complete set of updated as-built drawings.
         - m. Attend a coordination meeting with the T&B Contractor.
    - D. Attend a coordination meeting with the T&B contractor following balancing of the system(s).
    - E. Provide craftsmen of the proper trade to work with T&B Contractor to make adjustments and installation changes as required.
    - F. Change out pump impellers when and if required by the T&B Contractor, at no added cost to the Owner.
    - G. Dedicate the resources to accommodate all changes identified by the T&B Contractor required by the contract documents in a timely manner.
    - H. Contact Owner's representative if balancing problems are discovered. Do not just identify problems in the report. Seek least expensive remedy to problems prior to leaving job site.
20. MECHANICAL INSULATION
    - A. General
      1. Contractor shall provide thermal insulation on all domestic hot water, domestic cold water piping, first ten feet of plumbing vents through roof, horizontal sanitary and storm piping above occupied spaces. Insulation shall not be installed until systems have been tested and inspected.
      2. All insulation on piping and ductwork that has been damaged or has been damaged during construction shall be repaired to 'like-new' condition.
      3. Approved manufacturers for fiberglass insulation: Certainteed, Owens-Corning Fiberglass Corp., Manville Products Corp., and Knauf Fiber Glass.
      4. All insulation, including facings, cements, and adhesives when tested per ASTM E84 by UL shall have a flame spread rating of less than 25, and a smoke developed rating of less than 50.
      5. For adhesives, mastics, coatings and sealants, approved manufacturers are: Foster Products Div., HB Fuller Co., I-C Adhesives Co., Chicago Mastic Co., Childers Products Co., and St. Clair Rubber Co.
    - B. Piping Insulation
      1. Fiberglass piping insulation shall be pre-formed, rigid, molded insulation with vapor retardant jacket consisting of white kraft paper reinforced with glass fiber yarn and bonded to aluminum foil, with self-sealing longitudinal laps and butt strips. Provide insulation with a thermal conductivity "k" of 0.23 Btu/hr/sq.ft./degree F/in at 75 degree F mean temperature.
      2. Pipe insulation glass fiber minimum thickness:

Pipe Service	Pipe Size	Thickness	Vapor Barrier	Jacket
Dom. CW, HW, HWR	½" to 4"	1"	No/ (yes for CW)	None
Horiz San / Storm	All sizes	1"	No	None
HW Heating S&R	½" to 1-1/2"	1-1/2"	No	None
HW Heating S&R	2" to 8"	2"	No	None
Refrigerant	All sizes	1"	Yes	None
Chilled Water	<3"	1"	Yes	Aluminum

21. PLUMBING EQUIPMENT AND SPECIALTIES
    - A. Water hammer arrestor
      Non-ferrous elasticals subje5 chamber contained in heavy steel casing with approved recoil dampeners. Locate the arrestor where required to eliminate water hammer in the domestic water system. Size the arrestor in accordance with Plumbing and Drainage Institute Standard PDI-WH 201 and submit selection criteria with shop drawings. Install arrestor per manufacturer's instructions. Approved manufacturers: Amtrol, Josam, Watts, Zurn, Jay R. Smith, and Wade.
    - B. Cleanout
      Cast iron body with straight threads and gasket seal or taper threads for plug, flashing flange and clamping ring, and a brass closure plug (ASME A112.36.2M). Cleanouts for installation in floors not having membrane waterproofing may be furnished without clamping ring (Jay R. Smith Series 4000 as required for varied installation conditions at finished and non-finished walls or floors). Floor Cleanouts: Jay R. Smith model 4020 with polished bronze cleanout covers in finished areas and nickel bronze cleanout covers in non-finished areas. Provide round stainless steel access cover at wall cleanout in finished areas. Approved manufacturers: Josam (58740-3), Jay R. Smith (4434-NB), Zurn (ZANB-1462). l
    - C. Floor Sink
      Cast-iron body, with acid resistant coated interior, nickel bronze rim, aluminum anti- splash interior bottom dome strainer, and grate with center opening (ASME A112.21.1M). 12"x12" top, no-hub outlet, seepage flange, and options as required to accommodate construction of floor assembly with no leakage. Zurn Z1901-4 or equal by Josam, Jay R. Smith, or Wade.
    - D. Floor Drain
      Cast-iron body, with seepage flange and clamping device, and options as required to accommodate construction of floor assembly with no leakage (ASME A112.21.1M). Jay R. Smith Model 2005-A or equal by Zurn, Josam or Wade.
22. CUTTING AND PATCHING
    - A. Cut walls and floor slabs for new work. Patch and paint to match new work.
23. CLEAN UP
    - A. Contractor shall keep site clean and free of debris at all times. Remove unused piping and materials from premises. Owner shall be given the option of retaining any removed items.
24. RECORD DRAWINGS
    - A. At the close of the project and prior to receipt of final payment, submit to the Owner one set of documents clearly indicating all deviations from the original documents.

SSOE®

PROFESSIONAL SEALS:

PROJECT PARTNERS:

KEYPLAN

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
	10-20-23	DD PROGRESS

■ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

WAYNE STATE UNIVERSITY
5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #: PROJECT NUMBER
JHA PROJECT #: PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM MRI

KEY PLAN
NO SCALE

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #: 023-03727-00
SSOE MANAGER: JEFF FALZON

SSOE
1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
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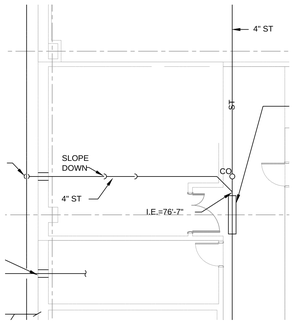
PLUMBING NOTES, LEGEND, SPECS. & ABBREVIATIONS

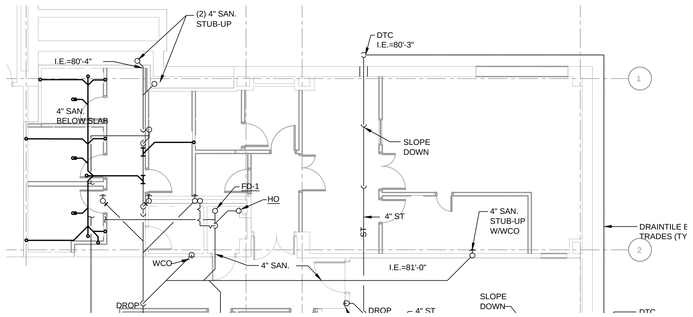
PL-001



D7
PL-100

PARTIAL UNDERGROUND
PLUMBING NEW WORK PLAN

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



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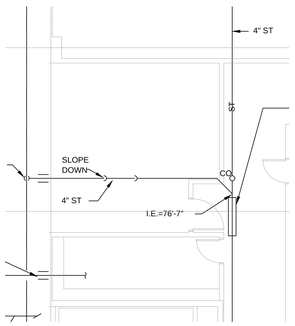
PARTIAL UNDERGROUND PLUMBING NEW WORK PLAN

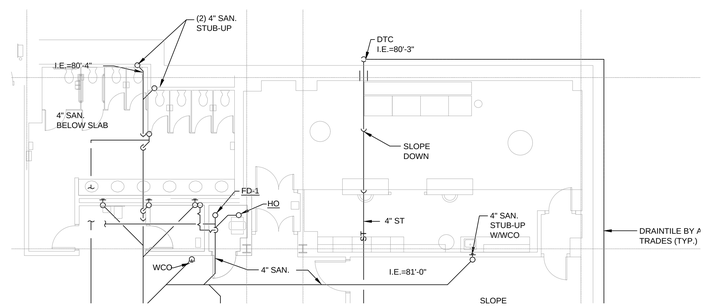
SCALE: 1/8" = 1'-0"



D7
PL-100

PARTIAL UNDERGROUND
PLUMBING DEMOLITION PLAN

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



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PARTIAL UNDERGROUND PLUMBING DEMOLITION PLAN

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

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KEYPLAN

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PROJECT INFORMATION:

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259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1050 Wilshire Drive, Suite 260
Troy, MI 48084-1526
T. (248) 643-6222

PARTIAL UNDERGROUND PLUMBING DEMO. & NEW WORK FLOOR PLANS

PL-100

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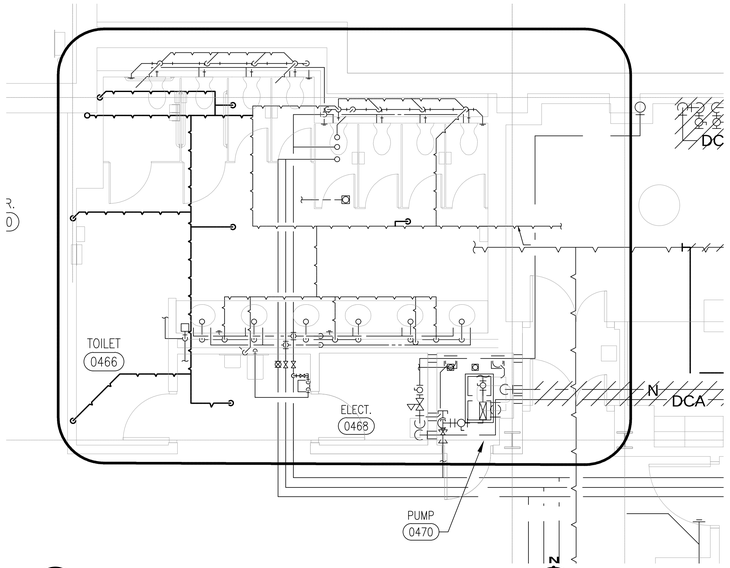
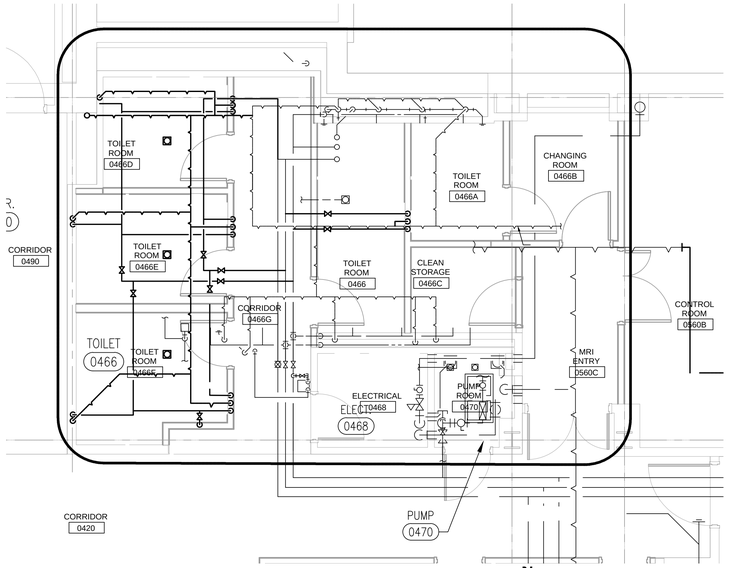


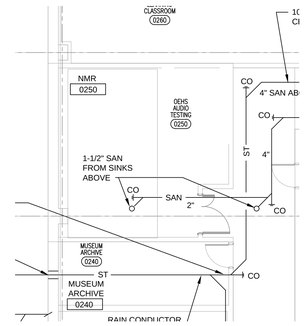
B3 PL-101 PARTIAL LEVEL 0 PLUMBING DEMOLITION PLAN

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



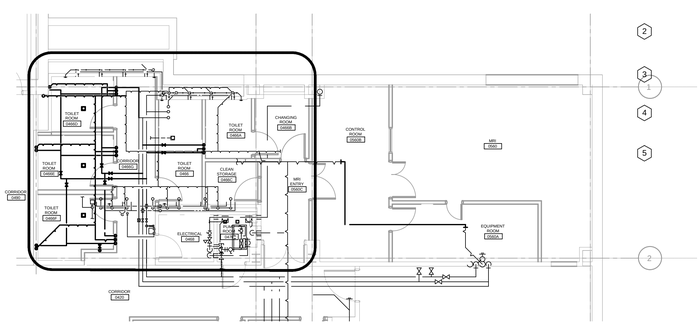
E3 PL-101 PARTIAL LEVEL 0 PLUMBING NEW WORK PLAN

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



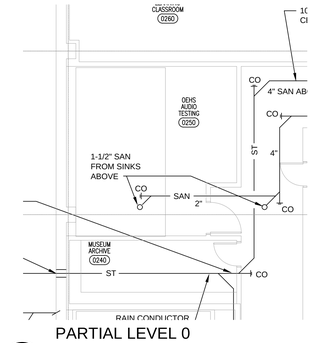
B5 PL-101 PARTIAL LEVEL 0 PLUMBING NEW WORK PLAN

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



F5 PL-101 PARTIAL LEVEL 0 PLUMBING NEW WORK PLAN

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



B7 PL-101 PARTIAL LEVEL 0 PLUMBING DEMOLITION PLAN

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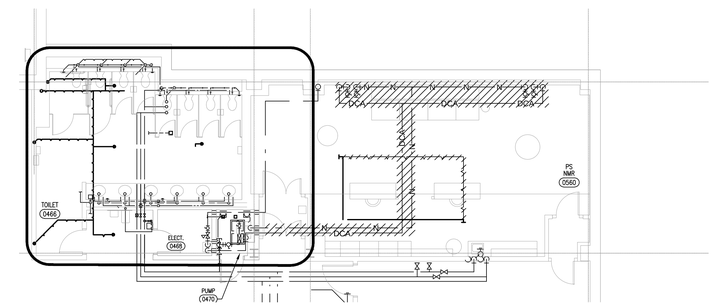

F7 PL-101 PARTIAL LEVEL 0 PLUMBING DEMOLITION PLAN

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

PROFESSIONAL SEALS:

PROJECT PARTNERS:

KEYPLAN

SUBMITTAL/REVISION SCHEDULE:

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PARTIAL LEVEL 0 PLUMBING DEMO. & NEW WORK FLOOR PLANS

PL-101

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LIGHTING SYMBOL LEGEND

(NOT ALL SYMBOLS USED)

XXX	LIGHT FIXTURE TYPE, REFER TO LIGHT FIXTURE SCHEDULE
◎ ◉ ◎〉	SURFACE OR PENDANT LIGHT FIXTURE, CHEVRON INDICATED WALL WASH AIMING, SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
○ ◐ ○〉	RECESSED LIGHT FIXTURE, CHEVRON INDICATED WALL WASH AIMING, HALF-SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
▭ ◩	SURFACE OR PENDANT LIGHT FIXTURE, HALF-SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
▭ ◩	RECESSED LIGHT FIXTURE, HALF-SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
▤ ◩	RECESSED ARCHITECTURAL LIGHT FIXTURE, HALF-SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
⊢○⊣ ⊢◐⊣	SURFACE OR CHAIN HUNG STRIP LIGHT FIXTURE, HALF-SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
○ ◐	WALL MOUNTED LIGHT FIXTURE, HALF-SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
▭ ◩	WALL MOUNTED LIGHT FIXTURE, HALF-SHADING INDICATES EMERGENCY EGRESS LIGHT FIXTURE
	TRACK MOUNTED LIGHT FIXTURE
⊗ ⊗ ⊗	EXIT SIGN, PROVIDE ARROWS/CHEVRONS AS INDICATED ON PLANS, SHADED AREA INDICATES FACE, FOOT ON SYMBOL INDICATES WALL MOUNTED, LIGHT HEADS INDICATE COMBINATION EXIT/BATTERY POWERED EMERGENCY LIGHTING UNIT
	BATTERY POWERED EMERGENCY LIGHTING UNIT, LIGHT HEADS ON SIDES OF UNIT INDICATES CEILING MOUNTED
$ $_{Xa}$	SINGLE POLE SWITCH - 20A, 125/277V UON, -'a' INDICATES WHICH FIXTURES/DEVICES ARE CONTROLLED VIA SWITCH -'X' DENOTES TYPE: BLANK - SINGLE POLE 2 - DOUBLE POLE 3 - THREE WAY 4 - FOUR WAY D - DIMMER K - KEY OPERATED I - ILLUMINATED (ILLUMINATED IN 'OFF' POSITION) P - WITH PILOT LIGHT (LIGHT ON IN 'ON' POSITION) T - TIME SWITCH L - LOW VOLTAGE C - MOMENTARY CONTACT O - WALL BOX OCCUPANCY SENSOR - PASSIVE INFRARED V - WALL BOX VACANCY SENSOR - PASSIVE INFRARED
OS Xa VS Xa OS Xa VS Xa	OCCUPANCY/VACANCY SENSOR, FOOT ON SYMBOL INDICATES WALL MOUNTED, -'a' INDICATES WHICH FIXTURES ARE CONTROLLED VIA SENSOR -'X' DENOTES TYPE: A - 180° DUAL TECHNOLOGY OCCUPANCY SENSOR B - 360° DUAL TECHNOLOGY OCCUPANCY SENSOR C - 180° PASSIVE INFRARED OCCUPANCY SENSOR D - 360° ULTRASONIC OCCUPANCY SENSOR
DS a DS a	DAYLIGHT SENSOR, FOOT ON SYMBOL INDICATES WALL MOUNTED, -'a' INDICATES WHICH FIXTURES ARE CONTROLLED VIA SENSOR
C	LIGHTING CONTACTOR, SIZE AS INDICATED ON DRAWINGS/DETAIL
ELTD , GTD	EMERGENCY LOAD/GENERATOR TRANSFER DEVICE
TC	TIME CLOCK

ONE-LINE DIAGRAM SYMBOL LEGEND

(NOT ALL SYMBOLS USED)

○	TERMINAL	△	DELTA
●	TERMINATOR		WYE - SOLIDLY GROUNDED
○◁	STRESS CONE CABLE TERMINATION	⏚	GROUND
→≻—	STAB	G	ENGINE GENERATOR
	STATIONARY CIRCUIT BREAKER	ST	SHUNT TRIP
	DRAWOUT CIRCUIT BREAKER	A	AMMETER
	STATIONARY SWITCH	M	UTILITY METER
	FUSE	V	VOLT METER
	MOTOR STARTER WITH OVERLOAD	EMU	ELECTRONIC MONITORING UNIT
	THERMAL OVERLOAD RELAY	PM	POWER MONITORING UNIT
⊣⊢	NORMALLY OPEN CONTACTS	K	KEYED INTERLOCK
	NORMALLY CLOSED CONTACTS	SPD	SURGE PROTECTION DEVICE
⏚	GROUND	MH	MANHOLE
	LIGHTNING ARRESTOR	HH	HANDHOLE
	CURRENT TRANSFORMER		TRANSFORMER
	POTENTIAL TRANSFORMER	XX-XX	PANELBOARD, 'XX-XX' INDICATES PANELBOARD DESIGNATION
	TRANSFER SWITCH		

NOTE:
1. REFER TO POWER SYMBOLS SCHEDULE FOR MORE SYMBOL DESCRIPTIONS THAT MAY BE SHOWN ON THE ONE LINE DIAGRAM.

GROUNDING AND LIGHTNING PROTECTION LEGEND

(NOT ALL SYMBOLS USED)

▪	CADWELD CONNECTION BETWEEN GROUND CABLE AND BUILDING COLUMN
✚	CADWELD CABLE TO CABLE 'X' CONNECTION
┳	CADWELD CABLE TO CABLE 'T' CONNECTION
TW	COPPERWELD TYPE GROUND ELECTRODE WITH CADWELD CONNECTION. 'TW' INDICATES TEST WELL.
— — — —	BARE COPPER GROUND CABLE. INSTALL MINIMUM 30" BELOW FINISHED FLOOR OR GRADE
▲	LUG CONNECTION BETWEEN BUS BAR AND CABLE OR BONDING CONNECTION TO EQUIPMENT
●	CADWELD CONNECTION BETWEEN REBAR OR ROD AND CABLE
┬─┬	WALL MOUNTED GROUND BAR
------------	COPPER LIGHTNING PROTECTION CONDUCTOR
✕	AIR TERMINAL
■	THRU ROOF PENETRATION
■	THRU ROOF PENETRATION WITH CONNECTION TO BUILDING STEEL
◉	BOND OR DOWN LEAD TO GROUND ROD BOND TO GROUND RING BELOW GRADE AT EACH DOWN LEAD
	DOWN LEAD TO COPPER CLAD GROUND ROD

POWER SYMBOL LEGEND

(NOT ALL SYMBOLS USED)

	SIMPLEX RECEPTACLE - NEMA 5-20R, HORIZONTAL LINE INDICATES MOUNTED AFC UON, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
	DUPLEX RECEPTACLE - NEMA 5-20R, HORIZONTAL LINE INDICATES MOUNTED AFC UON, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
	DUPLEX RECEPTACLE - NEMA 5-20R, GROUND FAULT INTERRUPTING, HORIZONTAL LINE INDICATES MOUNTED AFC UON, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
	DUPLEX RECEPTACLE - NEMA 5-20R, TAMPER RESISTANT, HORIZONTAL LINE INDICATES MOUNTED AFC UON, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
	SPLIT-WIRED DUPLEX RECEPTACLE - NEMA 5-20R, HORIZONTAL LINE INDICATES MOUNTED AFC UON, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
	COMBINATION DUPLEX RECEPTACLE (NEMA 5-20R)/USB (TYPE A, 2.0), TWO CHARGING USB PORTS, HORIZONTAL LINE INDICATES MOUNTED AFC UON, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
	QUADPLEX RECEPTACLE - NEMA 5-20R, HORIZONTAL LINE INDICATES MOUNTED AFC UON, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER (ALL OTHER NEMA 5-20R QUAD RECEPTACLE SYMBOLS FOLLOW SAME STACKED DUPLEX PATTERN)
X	SPECIAL RECEPTACLE -'X' DENOTES TYPE: A - (NEMA L5-30R) 125V, 30A, SINGLE PHASE, TWIST-LOCK RECEPTACLE 2 POLE, 3 WIRE B - (NEMA L6-20R) 250V, 20A, SINGLE PHASE, TWIST-LOCK RECEPTACLE 2 POLE, 3 WIRE C - (NEMA L6-30R) 250V, 30A, SINGLE PHASE, TWIST-LOCK RECEPTACLE, 2 POLE, 3 WIRE D - (NEMA L15-20R) 250V, 20A, THREE PHASE, TWIST-LOCK RECEPTACLE 3 POLE, 4 WIRE E - (NEMA L15-30R) 250V, 30A, THREE PHASE, TWIST-LOCK RECEPTACLE, 3 POLE, 4 WIRE F - (NEMA L21-30R) 208Y/120V, 30A, THREE PHASE, TWIST-LOCK RECEPTACLE 4 POLE, 5 WIRE G - (NEMA 14-30R) 125/ 250V SINGLE PHASE RECEPTACLE 3 POLE, 4 WIRE H - (NEMA 14-50R) 125/ 250V SINGLE PHASE RECEPTACLE 3 POLE, 4 WIRE
	CEILING MOUNTED SIMPLEX RECEPTACLE - NEMA 5-20R, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
	CEILING MOUNTED DUPLEX RECEPTACLE - NEMA 5-20R, SHADING INDICATES CIRCUITED TO GENERATOR/UPS POWER
X	CEILING MOUNTED SPECIAL RECEPTACLE -'X' DENOTES TYPE: REFER TO WALL MOUNTED SPECIAL RECEPTACLE TYPES ABOVE
	MULTI-OUTLET SURFACE RACEWAY
	SINGLE POINT ELECTRICAL CONNECTION OR AS INDICATED IN CIRCUITING/EQUIPMENT SCHEDULE
J J J	JUNCTION BOX, LEG INDICATES WALL/EQUIPMENT MOUNTING IS REQUIRED, SQUARE INDICATES FLOOR MOUNTED
S M	MANUAL MOTOR STARTER/DISCONNECT SWITCH WITH THERMAL OVERLOAD PROTECTION
	ENCLOSED DISCONNECT SWITCH, SHADING INDICATES SWITCH IS FUSIBLE
	ENCLOSED CIRCUIT BREAKER
⊠	COMBINATION MAGNETIC MOTOR CONTROLLER/STARTER, SHADING INDICATES STARTER IS FUSIBLE
⊠	MAGNETIC MOTOR CONTROLLER
VFD	VARIABLE FREQUENCY DRIVE (FURNISHED BY OTHERS)
⊡	PUSHBUTTON STATION
	MOTOR
	AUTOMATIC OR MANUAL TRANSFER SWITCH.
	UTILITY METER
T	TRANSFORMER, DASHED LINE INDICATES NEC WORKING SPACE.
	DISTRIBUTION PANELBOARD. SOLID FILL INDICATES 480V LINE TO LINE, NO FILL INDICATES 208V OR 240V LINE TO LINE. DASHED LINE INDICATES NEC WORKING SPACE.
	SURFACE MOUNTED PANELBOARD. SOLID FILL INDICATES 480V LINE TO LINE, NO FILL INDICATES 208V OR 240V LINE TO LINE. INSTALL DOOR HINGE ON THE SIDE SHOWN ON SYMBOL. DASHED LINE INDICATES NEC WORKING SPACE. HALF-TONE LINE INDICATES WALL.
	FLUSH/RECESSED MOUNTED PANELBOARD. SOLID FILL INDICATES 480V LINE TO LINE, NO FILL INDICATES 208V OR 240V LINE TO LINE. INSTALL DOOR HINGE ON THE SIDE SHOWN ON SYMBOL. DASHED LINE INDICATES NEC WORKING SPACE. HALF-TONE LINE INDICATES WALL.
	MULTI-SECTION SWITCHBOARD OR MOTOR CONTROL CENTER. DASHED LINE INDICATES NEC WORKING SPACE.
CP	CONTROL PANEL/CONTROL POWER PANEL (FURNISHED BY OTHERS)
PS	POWER SUPPLY
GA	GENERATOR ANNUNCIATOR
BMS	BUILDING MANAGEMENT SYSTEM PANEL (FURNISHED BY OTHERS)
FACP	FIRE ALARM CONTROL PANEL (FURNISHED BY OTHERS)
FAA	FIRE ALARM ANNUNCIATOR (FURNISHED BY OTHERS)
FNAC	FIRE ALARM NOTIFICATION APPLIANCE CIRCUIT PANEL (FURNISHED BY OTHERS) EDIT ITEMS IN () TO SUIT PROJECT
———○	CONDUIT TURNING UP
———●	CONDUIT TURNING DOWN
RP1-1,3,5	INDICATES CIRCUITS TO PANEL, 'RP1' INDICATES PANEL DESIGNATION AND '1,3,5' INDICATED POLE POSITION(S)
X#Y, X#YG ,Z"C	'X' INDICATES QUANTITY AND 'Y' INDICATES SIZE OF CONDUCTORS, Z INDICATES CONDUIT SIZE
RP1	PANEL TAG, i.e. CIRCUITS WITHIN AREA WHERE TAG IS LOCATED ON PLAN ARE CIRCUITED TO PANEL 'RP1' UON
WSHP-2 MECH	MECHANICAL EQUIPMENT CONNECTION TAG. DESIGNATION ON TOP INDICATES EQUIPMENT IDENTIFIER AND DESIGNATION ON BOTTOM INDICATES ASSOCIATED EQUIPMENT CONNECTION SCHEDULE AS FOLLOWS: MECH = MECHANICAL, KTCH = KITCHEN, PUMP = PUMP, HEAT = HEATER, FAN = FAN. REFER TO ELECTRICAL SCHEDULES SHEETS FOR ADDITIONAL INFORMATION.

FIRE ALARM SYMBOL SCHEDULE

(NOT ALL SYMBOLS USED)

SYMBOL	DESCRIPTION
FACP	FIRE ALARM CONTROL PANEL, MH=6'-0" AFF TO TOP OF PANEL UNO
FAP	FIRE ALARM PANEL, MH=6'-0" AFF TO TOP OF PANEL UNO
FAPS	FIRE ALARM POWER SUPPLY, MH=6'-0" AFF TO TOP OF PANEL UNO
FAA	FIRE ALARM ANNUNCIATOR, MH=5'-0" AFF TO TOP OF PANEL UNO
⊠◁	FIRE ALARM SPEAKER WITH STROBE, MH=6'-8" AFF UNO
⊠	FIRE ALARM SPEAKER WITH STROBE, CEILING MOUNTED

DATA SYMBOL SCHEDULE

(NOT ALL SYMBOLS USED)

SYMBOL	DESCRIPTION
◀ W	TELEPHONE OUTLET, FLUSH MOUNTED, MH=5'-0" AFF UNO
◀ #	TELEPHONE OUTLET, FLUSH MOUNTED, # = QUANTITY OF CABLES, MH=1'-4" AFF UNO
◀ #	TELEPHONE AND DATA OUTLET, FLUSH MOUNTED, # = QUANTITY OF CABLES, MH=1'-4" AFF UNO
◁ #	DATA OUTLET, FLUSH MOUNTED, # = QUANTITY OF CABLES, MH=1'-4" AFF UNO

ELECTRICAL GENERAL NOTES

1. PRIOR TO BID, THE CONTRACTOR SHALL VISIT SITE TO SURVEY EXISTING CONDITIONS AFFECTING WORK. INCLUDE NECESSARY MATERIALS AND LABOR TO ACCOMPLISH THE ELECTRICAL WORK, INCLUDING RELOCATION OF EXISTING EQUIPMENT TO ALLOW FOR NEW CONSTRUCTION. ANY CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER AND RESOLVED PRIOR TO BID. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES.
2. THESE DRAWINGS ARE A PART OF A COMPLETE SET OF ARCHITECTURAL/ENGINEERING DRAWINGS. DRAWINGS SHOWING ELECTRICAL WORK ARE DIAGRAMATIC. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR GUIDANCE AND COORDINATION WITH DIMENSIONS, CEILINGS, DOOR SWINGS, ELEVATIONS, CASEWORK, FINISHES, STRUCTURAL CONCRETE, FRAMING, DUCTWORK, AND PIPING.
3. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH THE NEC AND LOCAL ORDINANCES INCLUDING ALL REQUIREMENTS OF APPLICABLE CODES. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS.
4. ALL SYMBOLS SHOWN ON THESE LEGENDS MAY NOT BE USED.
5. PROVIDE EXPANSION JOINT FITTINGS ON ALL CONDUITS THAT CROSS EXPANSION JOINTS OR CONDUITS THAT PENETRATE WALLS WITH SEISMIC BRACING. SEE ARCHITECTURAL DRAWINGS.
6. ALL FLUSH MOUNTED PANELS SHALL HAVE (4) 1" EMPTY CONDUITS STUBBED OUT ABOVE ACCESSIBLE CEILING FOR FUTURE CIRCUITS.
7. VERIFY LOCATION OF ALL FLOOR OUTLETS WITH ARCHITECT PRIOR TO ROUGH-IN.
8. ALL WALL OUTLETS NOT PROVIDED WITH A DEVICE BY THIS CONTRACTOR SHALL BE PROVIDED WITH BLANK WALL PLATES.
9. MULTI-WIRE BRANCH CIRCUITS ARE PROHIBITED UNLESS SPECIFICALLY NOTED OTHERWISE.
10. FINAL EQUIPMENT CONNECTIONS - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR AND MATERIALS REQUIRED TO MAKE FINAL CONNECTIONS TO ALL EQUIPMENT FURNISHED BY THIS CONTRACTOR AND/OR EQUIPMENT FURNISHED BY OTHERS. VERIFY ALL REQUIREMENTS, CONDUCTOR SIZE, OVERCURRENT PROTECTION, PHASE, VOLTAGE, ETC., INDICATED ON DRAWINGS WILL SATISFY EQUIPMENT SUPPLIER REQUIREMENTS PRIOR TO ROUGH-IN. PROVIDE FUSED DISCONNECT IF REQUIRED BY MANUFACTURER.
11. REFER TO "TYPICAL MOUNTING AND ALIGNMENT CRITERIA" DETAIL FOR OUTLET DEVICE MOUNTING HEIGHT AND LOCATIONS.
12. TYPE "ENT" ELECTRICAL NON-METALLIC TUBING SHALL NOT USED.
13. PROVIDE ACCESS PANELS IN GYPBOARD CEILINGS WHERE ACCESS TO JUNCTION BOXES IS REQUIRED.
14. PROVIDE A MINIMUM OF (1) 3/4"C. WITH PULLSTRING AND NYLON END BUSHING STUBBED TO ABOVE ACCESSIBLE CEILING FOR ALL WALL MOUNTED AUXILIARY DEVICE, JUNCTION BOXES INCLUDING, BUT NOT LIMITED TO CARD READERS, PUSH PLATES, ETC, UON.
15. ALL 120V RECEPTACLE OUTLETS WITHIN 6FT OF A WATER SOURCE SHALL BE GFCI PROTECTED.
16. VERIFY ALL DOOR SWINGS W/ ARCHITECT PRIOR TO ROUGH-IN OF WALL MOUNTED LIGHTING CONTROLS, ACCESS CONTROLS, DOOR OPERATORS, ETC.
17. PROVIDE ADDITIONAL STEEL SUPPORTS FOR MOTOR CONTROLLERS, FIXTURES, RACEWAYS, CABINETS, BOXES, AND THE LIKE WHRE THE BUILDING, EQUIPMENT, OR STRUCTURE IS NOT SUITABLE FOR MOUNTING DIRECTLY THEREON.
18. "PROVIDE" USED IN SPECIFICATIONS AND DRAWINGS SHALL MEAN "TO FURNISH, INSTALL, CONNECT, AND PLACE IN SERVICE COMPLETELY IN SPECIFIED OR APPROVED MANNER THE ITEM DESCRIBED."
19. ELECTRICAL WORK EMBEDDED IN CONCRETE OR OTHERWISE PERMANENTLY CONCEALED SHALL NOT BE COVERED UNTIL INSPECTED BY THE OWNER'S REPRESENATIVE.
20. ALL PENETRATIONS THROUGH FIRE RESISTANT WALLS AND OTHER SUCH RATED ASSEMBLIES SHALL BE FIRESTOPPED TO MAINTAIN ITS RATING.
21. DIVISION 22 AND 23 EQUIPMENT CIRCUITING, DISCONNECT, AND OVERCURRENT PROTECTION CHARACTERISTICS ARE BASED ON THE BASIS OF DESIGN EQUIPMENT SPECIFICATION. CONTRACTOR SHALL BEAR ALL COSTS OF ELECTRICAL CHANGES RESULTING FROM PROVIDING EQUIPMENT FROM AN ALTERNATE MANUFACTURER.

ELECTRICAL DEMOLITION LEGEND

TAG	SYMBOLOGY	DESCRIPTION
(EX)	■	EXISTING DEVICE TO REMAIN.
(ED)	▨	EXISTING DEVICE TO BE DEMOLISHED.
(ER)	▨	EXISTING DEVICE TO BE RELOCATED.
(EL)	☐	EXISTING DEVICE SHOWN IN NEW LOCATION TO BE REINSTALLED.
(EN)	☐	EXISTING DEVICE TO BE REPLACED WITH NEW DEVICE IN SAME LOCATION.

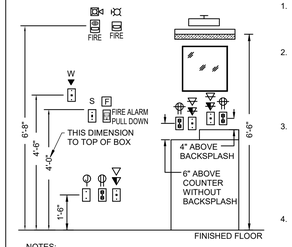
ELECTRICAL DEMOLITION NOTES

1. THE CONTRACTOR SHALL REMOVE THE EXISTING ELECTRICAL WORK NECESSARY TO PROVIDE THE INTENDED ARRANGEMENT OF WALLS AND CELINGS, AND SHALL RECONNECT ALL CIRCUITS INTERRUPTED BY THIS DEMOLITION WHERE THOSE CIRCUITS ARE UTILIZED BEYOND THE DEMOLITION, WHETHER SUCH CIRCUITS ARE INDICATED OR NOT.
2. WHERE AN ELECTRICAL DEVICE THAT IS TO BE REMOVED IS AN “END OF LINE” OR A SINGLE DEVICE, THE CONDUCTORS SHALL BE DISCONNECTED AT THE NEXT UPSTREAM DEVICE TO REMAIN OR AT ITS RELATED PANELBOARD. ALL NON-FUNCTIONAL CONDUCTORS INCLUDING POWER AND TELECOMMUNICATION CABLES SHALL BE REMOVED.
3. DEMOLITION: ACCURACY OF ORIGINAL PLANS HAS NOT BEEN VERIFIED. THE CONTRACTORS SHALL MAINTAIN CIRCUIT CONTINUITY OF ALL EXISTING FIXTURES AND DEVICES THAT ARE TO REMAIN.
4. EXISTING CIRCUITS, IF INDICATED, ARE DIAGRAMMATIC ONLY. VERIFY EXACT CONDUIT LOCATION AND ROUTING OF EXISTING CONDUIT RUNS AND NUMBER OF CONDUCTORS. AND PROVIDE ADDITIONAL CONDUITS / CONDUCTORS AS NECESSARY TO ACCOMPLISH THE DESIGN INTENT.
5. CIRCUIT BREAKERS ADDED TO THE EXISTING PANELBOARDS SHALL MATCH THE EXISTING BREAKER TYPE, MANUFACTURER, AND AIC RATING. PROVIDE NEW TYPE WRITTEN, UPDATED DIRECTORIES IN THE EXISTING PANELBOARDS TO REFLECT CHANGES MADE BY THIS RENOVATION.
6. ALL ADDITIONS TO SYSTEMS SHALL MATCH THE MANUFACTURER’S EXISTING SYSTEMS PRESENTLY INSTALLED IN THE FACILITY UNLESS OTHERWISE NOTED.
7. EXISTING SYSTEMS SHALL REMAIN UNLESS NOTED FOR REMOVAL OR RELOCATION. ALL SYSTEMS SHALL BE CHECKED TO ENSURE THEY ARE IN PROPER WORKING ORDER BEFORE ANY DEMOLITION IS STARTED. SYSTEMS NOT FOUND TO BE IN SATISFACTORY WORKING CONDITION SHALL BE REPORTED TO THE OWNER IN WRITING PRIOR TO THE START OF ANY DEMOLITION WORK. ALL SYSTEMS SHALL BE CHECKED TO ENSURE THAT THEY ARE WORKING PROPERLY AFTER THE DEMOLITION WORK IS FINISHED AND AFTER THE NEW ELECTRICAL INSTALLATION IS COMPLETE.
8. DEMOLITION, WHERE INDICATED ON PLAN, IS BASED ON EXISTING DRAWINGS AND LIMITED FIELD INVESTIGATION OF EXISTING CONDITIONS. SELECT DEMOLITION MAY BE REQUIRED FOR NEW CONSTRUCTION AND MAY NOT BE DELINEATED ON THIS DRAWING. CAREFULLY COORDINATE DEMOLITION WITH NEW CONSTRUCTION PLANS OF ALL DISCIPLINES TO VERIFY ACTUAL EXTENT OF DEMOLITION. VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND FULLY UNDERSTAND THE EXTENT OF DEMOLITION WORK.
9. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
10. QUANTITY AND LOCATION OF EXISTING DEVICES SHOWN ON PLANS ARE APPROXIMATE. FIELD VERIFY DEVICES AND LOCATIONS.
11. ITEMS SHOWN HEAVY LINE WEIGHT DASHED LINES, HATCHED AND/OR NOTED SHALL BE DEMOLISHED AND ALL ASSOCIATED DEVICES, CONDUIT, AND WIRING SHALL BE REMOVED BACK TO THE NEAREST ACTIVE JUNCTION BOX OR SOURCE UNLESS NOTED OTHERWISE. SEE DEMOLITION LEGEND FOR ADDITIONAL INFORMATION.
12. ALL EXISTING EQUIPMENT MAY NOT BE INDICATED. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO BIDDING. EXISTING ITEMS NOT SHOWN HATCHED SHALL REMAIN IN OPERATION. REVISE THE EXISTING CIRCUITRY TO MAINTAIN OPERATION OF ITEMS TO REMAIN.
13. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES, AND EQUIPMENT THAT ARE OUTSIDE AREA OF RENOVATION. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
14. RECYCLE OR DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL ASSOCIATED COSTS IN BID. ALL MATERIALS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING LEED REQUIREMENTS, TCLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
15. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS “SPARE” AND PLACE IN THE "OFF" POSITION.
16. VERIFY ALL UNDERGROUND AND IN SLAB UTILITY LOCATIONS PRIOR TO SAW-CUTTING OR PENETRATING ANY FLOOR SLAB.
17. OFFER OWNERS REPRESENTATIVE FIRST RIGHT OF REFUSAL OF ALL EQUIPMENT REMOVED FROM SPACE.
18. PROVIDE CODE-COMPLIANT SUPPORT TO EXISTING-TO-REMAIN UNSUPPORTED CONDUITS AND BOXES WHERE CEILINGS ARE TO BE REMOVED. RE-ROUTE BRANCH CIRCUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.

ELECTRICAL ABBREVIATIONS

ABBREVIATION	DESCRIPTION
(ED)	EXISTING TO BE DEMOLISHED
(EL)	EXISTING DEVICE SHOWN IN NEW LOCATION TO BE REINSTALLED
(EN)	EXISTING TO BE REPLACED WITH NEW.
(ER)	EXISTING TO BE RELOCATED
(EX)	EXISTING TO REMAIN
A, AMP	AMPERES
AF	AMP FRAME - CIRCUIT BREAKER; AMP FUSE - FUSED SWITCH
AFC, AC	ABOVE FINISHED CABINET/COUNTER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AFI	ARC FAULT INTERRUPTER
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
ALSI	ARC FLASH ENERGY REDUCTION, LONG TIME, SHORT TIME, INSTANTANEOUS
ALSIG	ARC FLASH ENERGY REDUCTION, LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND FAULT
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
BKR, CB	CIRCUIT BREAKER
C	CONDUIT
CM	COFFEE MAKER
CPT	CONTROL POWER TRANSFORMER
CR	CRITICAL / CRITICAL BRANCH EMERGENCY
CT	CURRENT TRANSFORMER
CU	COPPER
DISC	DISCONNECT
DIV	DIVISION
DW	DISHWASHER
EC	ELECTRICAL CONTRACTOR
ECB	ENCLOSED CIRCUIT BREAKER
EG	EQUIPMENT GROUND
EM	EMERGENCY
EO	ELECTRICALLY OPERATED
EPO	EMERGENCY POWER OFF
EQ	EQUIPMEN BRANCH EMERGENCY
EWC	ELECTRIC WATER COOLER
FLA	FULL LOAD AMPS
FWE	FURNISHED WITH EQUIPMENT
G, GND	GROUND
GD	GARBAGE DISPOSAL
GDS	GENERATOR DOCKING STATION
GFI, GFCI	GROUND FAULT INTERRUPTER
GFPE	GROUND FAULT PROTECTION OF EQUIPMENT
H	HORIZONTAL, HORIZONTALLY MOUNTED
HOA	HAND-OFF-AUTO
HP	HORSEPOWER
IAW	IN ACCORDANCE WITH
IG	ISOLATED GROUND
IM	ICE MACHINE
KV	KILOVOLT
KVA	KILOVOLT-AMPERES
KWH	KILOWATT-HOURS
LS	LIFE SAFETY BRANCH EMERGENCY
LSI	LONG TIME, SHORT TIME, INSTANTANEOUS
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND FAULT
LTS	LIGHTS
MCA	MAXIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MECHANICAL CONTROL PANEL
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MRS	MOTOR RATED SWITCH
MW	MEGAWATT
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT - FIXTURE CONTROLLED AT BRANCH CIRCUIT BREAKER ONLY
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
P	POLE
PH	PHASE
PNL	PANEL
PT	POTENTIAL TRANSFORMER
RECEPT, RCPT	RECEPTACLE
REF	REFRIGERATOR
SPD	SURGE PROTECTION DEVICE
SWBD	SWITCHBOARD
TR	TAMPER-RESISTANT
TYP	TYPICAL
UNO,UON	UNLESS NOTED OTHERWISE
UPS	UNINTERUPTABLE POWER SUPPLY
V	VOLTS
VA	VOLT-AMPERES
VB	VIEWBOX
W	WATTS, WIRE
WP	WEATHERPROOF WHILE IN USE COVER
XFMR	TRANSFORMER
XP, EP	EXPLOSION PROOF

STANDARD MOUNTING HEIGHTS



NOTES:

1. MOUNTING HEIGHTS SHOWN ARE FROM FINISHED FLOOR TO CENTERLINE OF DEVICE/OUTLET/FIXTURE, UNLESS OTHERWISE NOTED.
2. MOUNTING HEIGHTS, WHERE INDICATED, ON FLOOR PLANS, SHALL TAKE PRECEDENCE OVER THESE MOUNTING HEIGHTS. LOCATIONS OF OUTLETS SHOWN ON ARCHITECTURAL ELEVATIONS SHALL TAKE PRECEDENCE OVER THESE MOUNTING HEIGHTS. FIELD LOCATE OUTLETS WITH ARCHITECT DURING ROUGH-IN.
3. INSTALL OUTLETS THAT ARE IN CLOSE PROXIMITY ON THE SAME CENTERLINE. OUTLETS THAT ARE WITHIN 2'-0" HORIZONTALLY AND WITHIN 1'-0" VERTICALLY SHALL BE INSTALLED ON THE SAME HORIZONTAL CENTERLINE LOCATED HALF WAY BETWEEN THE HEIGHTS SHOWN. OUTLETS THAT ARE MORE THAN 1'-0" APART VERTICALLY SHALL BE INSTALLED ON THE SAME VERTICAL CENTERLINE.
4. MAXIMUM MOUNTING HEIGHT FOR SWITCHES ABOVE A COUNTER TOP 20" DEEP OR LESS IS 48" AFF TO TOP OF BOX. SWITCHES MOUNTED ABOVE COUNTER TOPS DEEPER THAN 20" SHALL BE INSTALLED AT NO MORE THAN 44" ABOVE FINISHED FLOOR TO TOP OF BOX. NOTIFY ARCHITECT WHERE COUNTERTOP PROHIBITS SWITCH INSTALLTION.

ELECTRICAL INDEX OF DRAWINGS

SHEET NUMBER	SHEET NAME
E0-000	ELECTRICAL LEGEND, SYMBOLS, & NOTES
E0-001	ELECTRICAL SPECIFICATIONS
E0-002	ELECTRICAL SPECIFICATIONS
E1-101	OVERALL LEVEL 0 FLOOR PLAN
E2-101	ENLARGED CLINICAL PLANS - LIGHTING
E2-102	ENLARGED NMR 0250 & MRI OFFICE A110 PLANS - LIGHTING
E3-101	ENLARGED CLINICAL PLANS - POWER & AUXILIARY
E3-102	ENLARGED NMR 0250 & MRI OFFICE A110 PLANS - POWER & AUXILIARY
E8-101	ELECTRICAL STANDARD CIRCUITING AND CONDUIT SIZING SCHEDULES
TOTAL COUNT: 9	

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
1	10-20-23	DD PROGRESS

☐ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

Wayne State University

WAYNE STATE
UNIVERSITY
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DETROIT, MICHIGAN
48202

CLIENT PROJECT #: PROJECT NUMBER
JHA PROJECT #: PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM
MRI

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48201

SSOE PROJECT #: 023-03727-00
SSOE MANAGER: JEFF FALZON

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Toledo, OH 43604
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ELECTRICAL LEGEND,
SYMBOLS, & NOTES

E0-000

ELECTRICAL GENERAL REQUIREMENT:

A. SCOPE OF WORK: ALL MATERIAL SHALL BE NEW UNLESS OTHERWISE INDICATED. FURNISH ALL LABOR, EQUIPMENT, TECHNICAL SUPERVISION, AND INCIDENTAL SERVICES REQUIRED TO COMPLETE, TEST AND LEAVE READY FOR OPERATION THE ELECTRICAL SYSTEMS AS SPECIFIED AND AS INDICATED ON DRAWINGS.

B. ORDINANCES AND CODES: PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL ORDINANCES AND REGULATIONS, THE RULES AND REGULATIONS OF NFPA, NECA, AND UL UNLESS OTHERWISE INDICATED.

C. UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR ELECTRICAL WORK SHALL BE SECURED AND PAID FOR BY THE CONTRACTOR. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES, RULES AND REGULATIONS.

D. THE DRAWINGS SHOW THE LOCATION AND GENERAL ARRANGEMENT OF EQUIPMENT, ELECTRICAL SYSTEMS AND RELATED ITEMS. THEY SHALL BE FOLLOWED AS CLOSELY AS ELEMENTS OF NEW CONSTRUCTION WILL PERMIT.

E. EXAMINE THE DRAWINGS OF OTHER TRADES AND VERIFY THE CONDITIONS GOVERNING THE WORK ON THE JOB SITE. ARRANGE WORK ACCORDINGLY, PROVIDING LABOR AND MATERIALS AS MAY BE REQUIRED TO MEET SUCH CONDITIONS.

F. COORDINATE ARRANGEMENT, MOUNTING AND SUPPORT OF ELECTRICAL EQUIPMENT WITH OTHER TRADES.

G. VISIT THE SITE, EXAMINE AND VERIFY THE CONDITIONS UNDER WHICH THE WORK MUST BE CONDUCTED BEFORE SUBMITTING PROPOSAL THE SUBMISSION OF A PROPOSAL IMPLIES THAT THE CONTRACTOR HAS VISITED THE SITE AND UNDERSTANDS THE CONDITIONS UNDER WHICH THE WORK MUST BE CONDUCTED. NO ADDITIONAL CHARGES WILL BE ALLOWED BECAUSE OF FAILURE TO MAKE THIS EXAMINATION OR TO INCLUDE ALL MATERIALS AND LABOR TO COMPLETE THE WORK.

H. BIDS SHALL BE BASED UPON MANUFACTURED EQUIPMENT SPECIFIED. VOLUNTARY ALTERNATES MAY BE SUBMITTED FOR CONSIDERATION, WITH LISTED ADDITION OR DEDUCTION TO THE BID.

I. WARRANTY: CONTRACTOR SHALL WARRANTY THAT THE ELECTRICAL INSTALLATION IS FREE FROM DEFECTS AND AGREES TO REPLACE OR REPAIR, TO THE OWNER'S SATISFACTION, ANY PART OF THIS ELECTRICAL INSTALLATION WHICH BECOMES DEFECTIVE WITHIN A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION FOLLOWING FINAL ACCEPTANCE, PROVIDED THAT SUCH FAILURE IS DUE TO DEFECTS IN THE EQUIPMENT, MATERIAL WORKMANSHIP OR FAILURE TO FOLLOW THE CONTRACT DOCUMENTS.

J. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY TEMPORARY SERVICES INCLUDING EQUIPMENT AND INSTALLATION REQUIRED TO MAINTAIN OPERATION AS A RESULT OF ANY EQUIPMENT FAILURE OR DEFECT DURING WARRANTY PERIOD.

K. FILE WITH THE OWNER ANY AND ALL WARRANTIES FROM THE EQUIPMENT MANUFACTURERS INCLUDING THE OPERATING CONDITIONS AND PERFORMANCE CAPACITIES THEY ARE BASED ON.

L. IN GENERAL DEMOLITION WORK IS INDICATED ON THE DRAWINGS. HOWEVER, THE CONTRACTOR SHALL VISIT THE JOB SITE TO DETERMINE THE FULL EXTENT AND CHARACTER OF THIS WORK.

M. UNLESS SPECIFICALLY NOTED TO THE CONTRARY, REMOVED MATERIALS SHALL NOT BE REUSED IN THE WORK. SALVAGED MATERIALS THAT ARE TO BE REUSED SHALL BE STORED SAFE AGAINST DAMAGE AND TURNED OVER TO THE APPROPRIATE TRADE FOR REUSE. SALVAGED MATERIALS OF VALUE THAT ARE NOT TO BE REUSED SHALL REMAIN THE PROPERTY OF THE OWNER UNLESS SUCH OWNERSHIP IS WAIVED. ITEMS ON WHICH THE OWNER WAIVES OWNERSHIP SHALL BECOME THE PROPERTY OF THE CONTRACTOR, WHO SHALL REMOVE AND LEGALLY DISPOSE OF SAME, AWAY FROM THE PREMISES.

N. CONSULT WITH THE OWNER'S REPRESENTATIVE AS TO THE METHODS OF CARRYING ON THE WORK SO AS NOT TO INTERFERE WITH THE OWNER'S OPERATION ANY MORE THAN ABSOLUTELY NECESSARY. ACCORDINGLY, ALL SERVICE LINES SHALL BE KEPT IN OPERATION AS LONG AS POSSIBLE AND THE SERVICES SHALL ONLY BE INTERRUPTED AT SUCH TIME AS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE.

O. ALL CUTTING, PATCHING AND REPAIR WORK SHALL BE PERFORMED BY THE CONTRACTOR THROUGH APPROVED, QUALIFIED SUBCONTRACTORS. CONTRACTOR SHALL INCLUDE FULL COST OF SAME IN BID.

P. PROVIDE ALL EXCAVATION, TRENCHING, TUNNELING, DEWATERING AND BACKFILLING REQUIRED FOR THE ELECTRICAL WORK. COORDINATE THE WORK WITH OTHER EXCAVATING AND BACKFILLING IN THE SAME AREA.

Q. INSPECT THE INSTALLATION OF ALL EQUIPMENT PER THE MANUFACTURER'S RECOMMENDATION AND APPLICABLE CODES.

R. PROVIDE UL APPROVED FIRE-STOPPING SYSTEM FOR ALL PENETRATIONS PASSING THROUGH FIRE RATED ASSEMBLES.

S. COMPLY WITH NECA 1.

T. PROVIDE COMPLETE OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS COVERING ALL ELECTRICAL EQUIPMENT HEREIN SPECIFIED, TOGETHER WITH PARTS LISTS.

U. CONTRACTOR SHALL SUBMIT TO THE ARCHITECT/ENGINEER, RECORD DRAWINGS ON ELECTRONIC MEDIA OR BLACK LINE REPRODUCTIONS WHICH HAVE BEEN NEATLY MARKED TO REPRESENT AS-BUILT CONDITIONS FOR ALL NEW ELECTRICAL WORK.

V. SUBMIT FOR APPROVAL SHOP DRAWINGS FOR ALL ELECTRICAL SYSTEMS OR EQUIPMENT LIMITED TO THE ITEMS LISTED BELOW:
   1. PANEL BOARDS
   2. TRANSFORMERS
   3. DISCONNECT SWITCHES
   4. WIRING DEVICES
   5. LIGHTING FIXTURES
   6. LIGHTING CONTROL SYSTEMS AND DEVICES

W. PROVIDE AND INSTALL ARC-FLASH HAZARD LABELS ON ELECTRICAL EQUIPMENT AND ENCLOSURES DEFINED BY NFPA 70E. LABELS SHALL COMPLY WITH THE REQUIREMENTS OF NFPA 70E AND CONTAIN AS A MINIMUM:
   1. VOLTAGE (PHASE-PHASE)
   2. FLASH PROTECTION BOUNDARY (INCHES)
   3. INCIDENT ENERGY LEVEL AT THE WORKING DISTANCE (CA/CM2)
   4. PERSONNEL PROTECTIVE EQUIPMENT (PPE) CLASS AND DESCRIPTION
   5. RESTRICTED APPROACH BOUNDARY (INCHES)
   6. LIMITED SHOCK APPROACH BOUNDARY (INCHES)
   7. PROHIBITED SHOCK APPROACH BOUNDARY (INCHES)

LIGHTING CONTROL DEVICES

A. COORDINATE OCCUPANCY/VACANCY SENSOR LOCATIONS, COVERAGE AND REQUIRED QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS. COVERAGE AREAS INDICATED ON THE DRAWINGS ARE FOR MINOR MOTION (6 TO 8 INCHES OF HAND MOVEMENT). PROVIDE ADDITIONAL OCCUPANCY SENSORS AND CONTROL UNITS AS REQUIRED TO ACHIEVE COMPLETE MINOR MOTION COVERAGE OF THE SPACE INDICATED.

B. OCCUPANCY/VACANCY SENSOR ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SENSORS TO SUIT ACTUAL OCCUPIED CONDITIONS PROVIDE UP TO TWO VISITS TO SITE OUTSIDE NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.

C. OCCUPANCY/VACANCY SENSOR:
   1. WALL SWITCH DUAL TECHNOLGY SENSOR 120/177V: WATTSTOPPER DSW-100 OR EQUAL
   2. WALL SWITCH DUAL RELAY, DUAL TECHNOLOGY SENSOR 120/277V: WATTSTOPPER DSW-200 OR EQUAL
   3. MULTI-WAY DUAL REALY, DUAL TECHNOLOGY SENSOR: WATTSTOPPER DSW-203 OR EQUAL
   4. 360° CEILING MOUNTED DUAL TECHNOLOGY SENSOR 24VDC/VAC: WATTSTOPPER DT-300 OR EQUAL
   5. 360° CEILING MOUNTED PASSIVE INFRARED SENSOR. WATTSTOPPER CI-200 OR EQUAL

D. OCCUPANCY/VACANCY SENSOR CONTROL UNITS:
   1. DESCRIPTION: TRANSFORMER AND RELAY COMBINED IN SINGLE UNIT TO PROVIDE 24DC POWER TO SENSORS AND PROVIDE 20A CONTACT(S) FOR CONTROL OF LIGHTING LOADS AT 120 OR 277V. CONTROL UNIT INPUT POWER SHALL BE FROM UNSWITCHED LEG OF LIGHTING CIRCUIT IT IS CONTROLLING.
      a. CONTROL UNITS SHALL BE PROVIDED AS REQUIRED TO POWER CEILING MOUNTED OCCUPANCY SENSORS, CONTROL LIGHTING LOADS AND PROVIDE A MINIMUM OF ONE AUXILIARY CONTACT.
      b. OCCUPANCY SENSOR CONTROL UNITS SHALL MOUNT EXTERNAL TO 4-INCH SQ JUNCTION BOX IN THE CEILING SPACE. ALL WIRING BETWEEN CONTROL UNIT AND OCCUPANCY SENSOR SHALL BE PLENUM RATED.
      c. LOCATE CONTROL UNIT IN ACCESSIBLE LOCATION IN GYP-BOARD CEILINGS, ADJACENT TO RETURN AIR GRILLES, OR PROVIDE ACCESS PANEL
      d. ADDITIONAL AUXILIARY RELAY MODULES SHALL BE PROVIDED AS REQUIRED TO PROVIDE CONTROL OF ALL LIGHTING CIRCUITS AND ADDITIONAL AUXILIARY CONTACTS AS REQUIRED.
      e. IT IS ACCEPTABLE TO PROVIDE CONTROLS AND AUXILIARY CONTACTS AS REQUIRED INTEGRAL TO NEW CEILING SENSOR, PROVIDED ALL REQUIRED CONTACTS ARE PROVIDED.
      f. MAXIMUM OF 3 SENSORS PER POWER PACK. VERIFY EXACT QUANTITIES REQUIRED WITH MANUFACTURER.

RACEWAYS AND BOXES

A. SURFACE METAL RACEWAYS: GALVANIZED STEEL WITH SNAP-ON COVERS. FINISH WITH MANUFACTURER'S STANDARD PRIME COATING. WIREMOLD OR EQUAL SIZE/TYPE AS SHOWN ON DRAWINGS.

B. MINIMUM RACEWAY SIZE 3/4-INCH TRADE SIZE

C. INSTALL CONDUIT IN ACCORDANCE WITH NECA "NATIONAL ELECTRICAL INSTALLATION STANDARDS".

D. ROUTE CONDUITS IN FINISHED AREAS WITH EXPOSED CEILINGS AT UNDERSIDE OF STRUCTURAL DECK OR AS HIGH AS POSSIBLE. WHERE STEEL METAL DECK ON STEEL JOIST CONSTRUCTION, ROUTE CONDUITS ABOVE JOISTS. DO NOT SECURE CONDUIT TO BOTTOM OF JOISTS.

E. **[**RACEWAY APPLICATIONS REFER TO RACEWAY APPLICATIONS SCHEDULE ON SHEET E0.2.**]**

F. FITTINGS FOR EMT: STEEL COMPRESSION TYPE.

IDENTIFICATION

A. COMPLY WITH ANSI A13.1, ANSI C2, NFPA 70, AND 29 CFR 1910.145.

B. COORDINATE IDENTIFICATION NAMES, ABBREVIATIONS, COLORS, AND OTHER FEATURES WITH REQUIREMENTS IN THE CONTRACT DOCUMENTS, SHOP DRAWINGS, MANUFACTURER'S WIRING DIAGRAMS, AND THE OPERATION AND MAINTENANCE MANUAL AND WITH THOSE REQUIRED BY CODES, STANDARDS, AND 29 CFR 1910.145. USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.

C. COORDINATE INSTALLATION OF IDENTIFYING DEVICES WITH COMPLETION OF COVERING AND PAINTING OF SURFACES WHERE DEVICES ARE TO BE APPLIED, WITH LOCATION OF ACCESS PANELS AND DOORS.

D. INSTALL IDENTIFYING DEVICES BEFORE INSTALLING ACOUSTICAL CEILINGS AND SIMILAR CONCEALMENT.

E. INSTALL ENGRAVED, LAMINATED ACRYLIC OR MELAMINE LABELS THAT ARE PUNCHED OR DRILLED FOR SCREW MOUNTING WITH SELF TAPPING STAINLESS STEEL SCREW. LABELS SHALL HAVE BLACK LETTERS ON A WHITE BACKGROUND AND WHITE LETTERS ON RED BACKGROUND FOR EMERGENCY. MINIMUM LETTER HEIGHT SHALL BE 3/8 INCH (10 MM). LABELS SHALL BE INSTALLED ON ALL ELECTRICAL EQUIPMENT AFFECTED BY PROJECT.
   1. PANELBOARD AND TRANSFORMER NAMEPLATES IDENTIFY SOURCE FED FROM, VOLTAGE, SIZE, NAME.
   2. ENCLOSED CONTROLLERS, CIRCUIT BREAKERS, DISCONNECT SWITCHES IDENTIFY SOURCE AND LOAD SERVED.

F. WIRING DEVICES: USE ADHESIVE LABEL WITH BLACK, RED FOR EMERGENCY, FILM LETTERING ON FACE OF WALL PLATE AND DURABLE WIRE MARKERS OR TAGS INSIDE OUTLET BOXES. LABELS SHALL BE CLEAR POLYESTER WITH BLACK LETTER, RED LETTER FOR EMERGENCY, FONT SIZE OF 7. IDENTIFY PANELBOARD AND CIRCUIT NUMBER FROM WHICH SERVED.

G. USE THE COLORS USED BELOW FOR UNGROUNDED SERVICE, FEEDER, AND BRANCH-CIRCUIT CONDUCTORS.
   1. COLOR SHALL BE FACTORY APPLIED OR, FOR SIZES LARGER THAN NO. 10 AWG IF AUTHORITIES HAVING JURISDICTION PERMIT, FIELD APPLIED.
   2. COLORS FOR 208/120-V CIRCUITS
      a. PHASE A BLACK
      b. PHASE B: RED
      c. PHASE C: BLUE
      d. NEUTRAL: WHITE
   3. COLORS FOR 480/277-V CIRCUITS:
      a. PHASE A: BROWN
      b. PHASE B: ORANGE
      c. PHASE C: YELLOW
      d. NEUTRAL: GRAY
   4. FIELD-APPLIED, COLOR-CODING CONDUCTOR TAPE APPLY IN HALF-LAPPED TURNS FOR A MINIMUM DISTANCE OF 6 INCHES FROM TERMINAL POINTS AND IN BOXES WHERE SPLICES OR TAPS ARE MADE. APPLY LAST TWO TURNS OF TAPE WITH NO TENSION TO PREVENT POSSIBLE UNWINDING. LOCATE BANDS TO AVOID OBSCURING FACTORY CABLE MARKINGS.

H. WARNING LABELS FOR INDOOR CABINETS, BOXES, AND ENCLOSURES FOR POWER AND LIGHTING: COMPLY WITH 29 CFR 1910.145 AND APPLY SELF-ADHESIVE WARNING LABELS. IDENTIFY SYSTEM VOLTAGE WITH BLACK LETTERS ON AN ORANGE BACKGROUND. APPLY TO EXTERIOR OF DOOR, COVER, OR OTHER ACCESS.
   1. EQUIPMENT REQUIRING WORKSPACE CLEARANCE ACCORDING TO NFPA 70: UNLESS OTHERWISE INDICATED, APPLY TO DOOR OR COVER OF EQUIPMENT BUT NOT ON FLUSH PANELBOARDS AND SIMILAR EQUIPMENT IN FINISHED SPACES.

I. ACCESSIBLE RACEWAYS AND CABLES OF AUXILIARY SYSTEMS IDENTIFY THE FOLLOWING SYSTEMS WITH COLOR-CODED, SELF-ADHESIVE VINYL TAPE APPLIED IN BANDS OR PAINTED RACEWAY
   1. FIRE ALARM SYSTEM: RED.
   2. SECURITY SYSTEM: BLUE AND YELLOW.
   3. TELECOMMUNICATION SYSTEM: GREEN AND YELLOW.
   4. CONTROL WIRING: GREEN AND RED.

WIRING DEVICES

A. HOSPITAL GRADE STRAIGHT BLADE RECEPTACLES: COMPLY WITH NEMA WD1, NEMA WD6, DSCC W-C-596G AND UL498. CONFIGURATION 5-20R DUPLEX RECEPTACLE. HUBBELL HBL8300X OR EQUAL BY PASS & SEYMOUR OR COOPER.

B. HOSPITAL GRADE GFI RECEPTACLES: STRAIGHT BLADE FEED-THROUGH TYPE, GENERAL DUTY GRADE, WITH INTEGRAL NEMA WD 6, CONFIGURATION 5-20R DUPLEX RECEPTACLE; COMPLYING WITH UL 498 AND UL 943. DESIGN UNITS FOR INSTALLATION IN A 2-3/4-INCH- (70-MM-) DEEP OUTLET BOX WITHOUT AN ADAPTER. HUBBELL GFR8300HXL OR EQUAL BY PASS & SEYMOUR OR COOPER.

C. HOSPITAL GRADE TAMPER-RESISTANT RECEPTACLES: STRAIGHT BLADE WITH SAFETY MECHANISM TO ENERGIZE CONTACTS ONLY WHEN BOTH OPENINGS ARE SIMULTANEOUSLY ENGAGED. COMPLY WITH NEMA WD1, NEMA WD6, UL498, AND UL544. PROVIDE IN ALL AREAS WHERE CHILDREN MAY BE PRESENT (I.E. WAITING AREAS, LOBBIES, EXAM ROOMS, ETC.). CONFIGURATION 5-20R DUPLEX RECEPTACLE. HUBBELL HBL8300SG OR EQUAL BY PASS & SEYMOUR OR COOPER.

D. HOSPITAL GRADE MRI RECEPTACLES: STRAIGHT BLADE NON-FERROUS CONTACTS. COMPLY WITH NEMA WD1, NEMA WD6, UL498, AND UL544. PROVIDE IN MRI PROCEDURE ROOM. CONFIGURATION 5-20R DUPLEX RECEPTACLE. HUBBELL HBL8300XMRI OR EQUAL BY PASS & SEYMOUR OR COOPER.

E. HOSPITAL GRADE USB CHARGER TYPE A RECEPTACLES: COMPLY WITH NEMA WD1, NEMA WD6, UL498, AND UL544. CONFIGURATION 5-20R DUPLEX RECEPTACLE. AND TWO TYPE A 2.0 PORTS. HUBBELL USB8300A5X OR EQUAL BY PASS & SEYMOUR OR COOPER.

F. WALL SWITCHES: SINGLE AND DOUBLE-POLE SWITCHES COMPLY WITH DSCC W-C-896F AND UL 20. HUBBELL WIRING DEVICE, KELLEMS 1220 SERIES OR EQUAL BY PASS & SEYMOUR, COOPER OR LEVITON.

G. LED LAMP DIMMER SWITCHES: LEGRAND OR EQUAL, COMPATIBLE WITH LED DIMMING DRIVER SPECIFIED.

H. DIMMERS:
   1. CONTROL: CONTINUOUSLY ADJUSTABLE SLIDER WITH PRE-SET; SINGLE-POLE OR THREE-WAY SWITCHING TO SUIT CONNECTIONS.
   2. INSTALL WALL DIMMERS TO ACHIEVE FULL RATING SPECIFIED AND INDICATED AFTER DERATNG FOR GANGING ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS
   3. INSTALL UNSHARED NEUTRAL CONDUCTORS ON LINE AND LOAD SIDE OF DIMMERS ACCORDING TO MANUFACTURERS' WRITTEN INSTRUCTIONS.

I. WALL PLATES:
   1. PROVIDE STAINLESS STEEL WALL PLATES IN FINISHED AREAS.
   2. PROVIDE GALVANIZED STEEL WALL PLATES IN UNFINISHED AREAS.
   3. PROVIDE WEATHERPROOF WHILE-IN-USE COVERPLATES FOR WET LOCATIONS.

J. WIRING DEVICE/WALL PLATE COLOR AS SELECTED BY ARCHITECT UNLESS OTHERWISE INDICATED OR REQUIRED BY NFPA 70.

K. CONNECT WIRING DEVICE GROUNDING TERMINAL TO OUTLET BOX WITH BONDING JUMPER. USE OF QUICK GROUND STRAP OR SCREW IS NOT ACCEPTABLE.

L. CORD AND PLUG SETS: MATCH VOLTAGE, AND CURRENT RATINGS AND NUMBER OF CONDUCTORS TO REQUIREMENTS OF EQUIPMENT BEING CONNECTED.
   1. CORD: RUBBER-INSULATED, STRANDED-COPPER CONDUCTORS, WITH TYPE SOW-A JACKET; WITH GREEN-INSULATED GROUNDING CONDUCTOR AND EQUIPMENT-RATING AMPACITY PLUS A MINIMUM OF 30 PERCENT.
   2. PLUG: NYLON BODY AND INTEGRAL CABLE-CLAMPING JAWS. MATCH CORD AND RECEPTACLE TYPE FOR CONNECTION.
   3. PROVIDE STRAIN RELIEF FOR CORD DROP INSTALLATIONS.

GROUNDING AND BONDING

A. EQUIPMENT GROUNDING: COMPLY WITH NFPA 70, ARTICLE 250, FOR TYPES, SIZES, AND QUANTITIES OF EQUIPMENT GROUNDING CONDUCTORS, UNLESS SPECIFIC TYPES, LARGER SIZES, OR MORE CONDUCTORS THAN REQUIRED BY NFPA 70 ARE INDICATED.

B. PROVIDE EQUIPMENT GROUNDING CONDUCTORS IN EACH RACEWAY.

C. PROVIDE PANELBOARD BONDING FOR PATIENT CARE AREAS PER NEC 517 WHERE REQUIRED.

CONDUCTORS AND CABLES

A. CONDUCTOR MATERIAL: COPPER COMPLYING WITH NEMA WC: 70; STRANDED CONDUCTOR.

B. CONDUCTOR INSULATION TYPES: TYPE THHN-THWN, SO, COMPLYING WITH NEMA WC 70.

C. CONCEAL CABLES IN FINISHED WALLS, CEILINGS, AND FLOORS, UNLESS OTHERWISE INDICATED.

D. USE CONDUCTOR NOT SMALLER THAN 12 AWG FOR POWER AND LIGHTING CIRCUITS. UNLESS INDICATED OTHERWISE, ALL 20A BRANCH CIRCUITS SHALL BE 2#12, 1#12G, 3/4"C.

E. USE CONDUCTOR NOT SMALLER THAN #14 AWG FOR CONTROL CIRCUITS PROVIDED BY ELECTRICAL CONTRACTOR.

F. SUPPORT COMMUNICATION CABLES ABOVE ACCESSIBLE CEILING, USING SPRING METAL CLIPS OR PLASTIC CABLE TIES TO SUPPORT CABLES FROM STRUCTURE DO NOT REST CABLE ON CEILING PANELS.

G. USE "STA-KON" CONNECTORS TO TERMINATE STRANDED CONDUCTORS #10 AWG AND SMALLER TO SCREW TERMINALS.

H. CONDUCTOR AND INSULATION APPLICATIONS:
   1. FEEDERS: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY
   2. BRANCH CIRCUITS, INCLUDING IN CRAWLSPACES: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY OR ARMORED CABLE TYPE AC (HFC) PROVIDE A DEDICATED NEUTRAL FOR EACH CIRCUIT.
   3. CORD DROPS AND PORTABLE APPLIANCE CONNECTIONS: TYPE SO, HARD SERVICE CORD
   4. CLASS I CONTROL CIRCUITS TYPE THHN -THWN IN RACEWAY
   5. CLASS II CONTROL CIRCUITS: POWER LIMITED CABLE

I. REFER TO RACEWAY APPLICATION SCHEDULE ON SHEET EX.X FOR ADDITIONAL REQUIREMENTS.

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY SQUARE D, EATON, GENERAL ELECTRIC, OR SIEMENS.

B. FUSIBLE AND NON-FUSIBLE WATCHES: NEMA KS 1, QUICK MAKE QUICK-BREAK LOAD INTERRUPTER ENCLOSED KNIFE SWITCH TYPE HD, WITH CLIPS OR BOLT PADS TO ACCOMMODATE SPECIFIED FUSES (IF REQUIRED), EXTERNALLY OPERABLE LOCKABLE HANDLE WITH CAPABILITY TO ACCEPT TWO PADLOCKS, AND INTERLOCKED WITH COVER IN CLOSED POSITION. SQUARE D OR EQUAL

C. TOGGLE DISCONNECT SWITCH: HEAVY DUTY, 30A, 600 VOLT, DOUBLE OR THREE POLE AS REQUIRED, SINGLE THROW, MOTOR RATED SWITCH WITHOUT OVERLOAD PROTECTION. PROVIDE NEMA 1 ENCLOSURE AND PADLOCK ATTACHMENT.

D. MOLDED-CASE CIRCUIT BREAKER: NEMA AB 1, WITH INTERRUPTING CAPACITY TO MEET AVAILABLE FAULT CURRENTS. THERMAL-MAGNETIC CIRCUIT BREAKER WITH 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 250A AND LARGER.

E. MOLDED-CASE SWITCHES: MOLDED-CASE CIRCUIT BREAKER WITH FIXED, HIGH-SET INSTANTANEOUS TRIP ONLY, AND SHORT-CIRCUIT WITHSTAND RATING EQUAL TO EQUIVALENT BREAKER FRAME SIZE INTERRUPTING RATING.

F. COMPLY WITH APPLICABLE PORTIONS OF NECA 1, NEMA PB 1.1, AND NEMA PB 2.1 FOR INSTALLATION OF ENCLOSED SWITCHES AND CIRCUIT BREAKERS.

G. SET FIELD-ADJUSTABLE SWITCHES AND CIRCUIT-BREAKER TRIP AND TIME DELAY SETTINGS.

ENCLOSED CONTROLLERS

A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY SQUARE D, EATON, ABB, OR SIEMENS.

B. ENCLOSURES: FLUSH- OR SURFACE-MOUNTING CABINETS AS INDICATED. NEMA 250, TYPE 1, UNLESS OTHERWISE INDICATED TO COMPLY WITH ENVIRONMENTAL CONDITIONS AT INSTALLED LOCATION.

C. SELECT HORSEPOWER RATING OF CONTROLLERS TO SUIT MOTOR CONTROLLED.

D. FOR CONTROL EQUIPMENT AT WALLS, BOLT UNITS TO WALL OR MOUNT ON LIGHTWEIGHT STRUCTURAL-STEEL CHANNELS BOLTED TO WALL FOR CONTROLLERS NOT AT WALLS, PROVIDE FREESTANDING RACKS.

E. MANUAL CONTROLLER: NEMA ICS 2, GENERAL PURPOSE, CLASS A, WITH 'QUICK-MAKE QUICK-BREAK" TOGGLE OR PUSHBUTTON ACTION, MARKED TO SHOW WHETHER UNIT IS "OFF," "ON," OR 'TRIPPED,' AND OVERLOAD RELAY.

F. ACCESSORIES:
   1. DEVICES SHALL BE FACTORY INSTALLED IN CONTROLLER ENCLOSURE, UNLESS OTHERWISE INDICATED.
   2. PUSH-BUTTON STATIONS, PILOT LIGHTS: NEMA ICS 2, HEAVY-DUTY TYPE.
   3. INDICATING LIGHTS RUN (RED), OFF OR READY (GREEN).
   4. AUXILIARY CONTACTS: PROVIDE TWO NORMALLY OPEN (N.0.) AND TWO NORMALLY CLOSED (N.C.) CONTACTS.
   5. SELECTOR SWITCH: NEMA ISC 2, MOUNTED IN FRONT COVER TO READ 'HAND/OFF/AUTO," PROVIDE AUXILIARY CONTACT FOR AUTO POSITION MONITORING.
   6. CONTROL RELAYS: AUXILIARY AND ADJUSTABLE TIME-DELAY RELAYS.

FUSES

A. OBTAIN FUSES FROM A SINGLE MANUFACTURER.

B. COORDINATE FUSE RATINGS WITH UTILIZATION EQUIPMENT NAMEPLATE LIMITATIONS OF MAXIMUM FUSE SIZE.

C. EXAMINE UTILIZATION EQUIPMENT NAMEPLATES AND INSTALLATION INSTRUCTIONS. INSTALL FUSES OF SIZES AND WITH CHARACTERISTICS APPROPRIATE FOR EACH PIECE OF EQUIPMENT.

D. INSTALL LABELS INDICATING FUSE REPLACEMENT INFORMATION ON INSIDE DOOR OF EACH FUSED SWITCH.

E. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY COOPER BUSMAN, INC. OR EQUAL

F. CARTRIDGE FUSES: NEMA FU 1, NONRENEWABLE CARTRIDGE FUSE; CLASS AND CURRENT RATING INDICATED; VOLTAGE RATING CONSISTENT WITH CIRCUIT VOLTAGE
   1. SERVICE ENTRANCE: CLASS L TIME DELAY.
   2. FEEDERS: CLASS RK5 TIME DELAY.
   3. MOTOR BRANCH CIRCUITS: CLASS RK1, TIME DELAY.
   4. OTHER BRANCH CIRCUITS: CLASS RK1, TIME DELAY.

G. COMPLY WITH:
   1. NEMA FU 1 - LOW VOLTAGE CARTRIDGE FUSES.
   2. NFPA 70 - NATIONAL ELECTRICAL CODE.
   3. UL 198C - HIGH-INTERRUPTING-CAPACITY FUSES, CURRENT-LIMITING TYPES.
   4. UL 198E - CLASS R FUSES.
   5. UL 512 - FUSEHOLDERS.

LIGHTING

A. PROVIDE LIGHTING FIXTURES AS INDICATED ON DRAWINGS.

B. INSTALL DRIVERS/BALLASTS, AND SPECIFIED ACCESSORIES AT FACTORY. FOR FIXTURES CONTAINING LAMPS, INSTALL ON PROJECT SITE AFTER FIXTURE INSTALLATION.

C. FIXTURES SET LEVEL, PLUMB, AND SQUARE WITH CEILINGS AND WALLS. INSTALL LAMPS IN EACH FIXTURE WHERE REQUIRED.

D. SUPPORT LUMINARIES INDEPENDENT OF CEILING FRAMING. SUPPORT RECESSED GRID LUMINARIES FROM TWO OPPOSITE CORNERS DIRECTLY TO STRUCTURE. WIRE OR ROD SHALL HAVE BREAKING STRENGTH OF THE WEIGHT OF FIXTURE AT A SAFETY FACTOR OF 3.

E. INSTALL RECESSED LUMINARIES TO PERMIT REMOVAL FROM BELOW.

F. INSTALL RECESSED LUMINARIES USING ACCESSORIES AND FIRE STOPPING MATERIALS TO MEET REGULATORY REQUIREMENTS FOR FIRE RATING.

G. INSTALL SURFACE MOUNTED LUMINARIES AND EXIT SIGNS PLUMB AND ADJUST TO ALIGN WITH BUILDING LINES AND WITH EACH OTHER. SECURE TO PROHIBIT MOVEMENT.

H. TIGHTEN ELECTRICAL CONNECTORS AND TERMINALS ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE-TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A AND UL 4868.

I. MAKE WIRING CONNECTIONS TO BRANCH CIRCUIT USING BUILDING WIRE WITH INSULATION SUITABLE FOR TEMPERATURE CONDITIONS WITHIN LUMINAIRE

J. BOND PRODUCTS AND METAL ACCESSORIES TO BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTOR.

K. CONNECT LUMINARIES TO BRANCH CIRCUIT OUTLET BOXES PROVIDED UNDER RACEWAYS AND BOXES SECTION USING 1/2" FLEXIBLE CONDUIT OF NO MORE THAN 6'-0" IN LENGTH.

L. CLEAN ELECTRICAL PARTS TO REMOVE CONDUCTIVE AND DELETERIOUS MATERIALS.

M. REMOVE DIRT AND DEBRIS FROM ENCLOSURES AND LENSES.

N. CLEAN PHOTOMETRIC CONTROL SURFACES AS RECOMMENDED BY MANUFACTURER.

O. CLEAN FINISHES AND TOUCH UP DAMAGE.

P. EACH LED LUMINAIRE TYPE SHALL BE BINNED WITHIN A THREE-STEP MACADAM ELLIPSE TO ENSURE COLOR CONSISTENCY AMONG LUMINAIRES AND CONTAIN INTERNAL DRIVER UNLESS NOTED OTHERWISE.

Q. EMERGENCY LOAD TRANSFER DEVICE LOCALIZED LOAD TRANSFER SWITCH TO SENSE NORMAL PRESENCE OF NORMAL POWER FOR SWITCHED CIRCUITS AND SWITCH LUMINAIRE OVER TO EMERGENCY SOURCE UPON LOSS OF NORMAL SOURCE. DEVICE SHALL BE INSTALLED INTEGRAL TO LUMINAIRE OR MOUNTED REMOTELY AS APPLICATION REQUIRED. U.L 924 LISTED, INTEGRAL TEST SWITCH AND INDICATING LAMPS TO INDICATE STATUS: BODINE BLCD SERIES OR EQUAL BY LVS OR CHLORIDE.

R. EXIT SIGNS: COMPLY WITH UL 924; FOR SIGN COLORS AND LETTERING SIZE, COMPLY WITH AUTHORITIES HAVING JURISDICTION.
   1. PROVIDE EXIT SIGNS WIN LIGHT-EMITTING DIODES, 70,000 HOURS MINIMUM OF RATED LAMP LIFE
   2. SELF-POWERED EXIT SIGNS (BATTERY TYPE): INTEGRAL AUTOMATIC CHARGER IN A SELF-CONTAINED POWER PACK.
   3. BATTERY: SEALED, MAINTENANCE-FREE NICKEL-CADMIUM TYPE WITH SPECIAL WARRANTY.
   4. CHARGER: FULLY AUTOMATIC, SOLID-STATE TYPE WITH SEALED TRANSFER RELAY.
   5. OPERATION: RELAY AUTOMATICALLY ENERGIZES LAMP FROM BATTERY WHEN CIRCUIT VOLTAGE DROPS TO 80 PERCENT OF NOMINAL VOLTAGE OR BELOW. WHEN NORMAL VOLTAGE IS RESTORED, RELAY DISCONNECTS LAMPS FROM BATTERY, AND BATTERY IS AUTOMATICALLY RECHARGED AND FLOATED ON CHARGER.

S. EMERGENCY LIGHTING UNITS SELF-CONTAINED UNITS COMPLYING WITH UL 924.
   1. BATTERY: SEALED, MAINTENANCE-FREE LEAD-ACID TYPE WITH MINIMUM 10-YEAR NOMINAL LIFE AND SPECIAL WARRANTY.
   2. CHARGER: FULLY AUTOMATIC, SOLID-STATE TYPE WITH SEALED TRANSFER RELAY.
   3. OPERATION: RELAY AUTOMATICALLY TURNS LAMP ON WHEN POWER SUPPLY CIRCUIT VOLTAGE DROPS TO 80 PERCENT OF NOMINAL VOLTAGE OR BELOW. LAMP AUTOMATICALLY DISCONNECTS FROM BATTERY WHEN VOLTAGE APPROACHES DEEP-DISCHARGE LEVEL WHEN NORMAL VOLTAGE IS RESTORED.
   4. WIRE GUARD: WHERE INDICATED, HEAVY-CHROME-PLATED WIRE GUARD PROTECTS LAMP HEADS OR FIXTURES.
   5. INTEGRAL TIME-DELAY RELAY: HOLDS UNIT ON FOR FIXED INTERVAL WHEN POWER IS RESTORED AFTER AN OUTAGE TIME DELAY PERMITS HIGH-INTENSITY-DISCHARGE LAMPS TO RE-STRIKE AND DEVELOP ADEQUATE OUTPUT.

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
1	10-20-23	DD PROGRESS

☐ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

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ELECTRICAL SPECIFICATIONS

E0-001

OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY

- A. SCOPE: STUDY SHALL ENCOMPASS ALL NEW AND EXISTING EQUIPMENT DOWN TO THE PANELBOARD LEVEL. CONTRACTOR SHALL COLLECT EXISTING INFORMATION IN FIELD AS NEEDED TO COMPLETE THE STUDY. NO NEW EQUIPMENT SHALL BE ORDERED UNTIL THE STUDY IS REVIEWED BY THE ENGINEER OF RECORD.
- B. STUDIES SHALL USE COMPUTER PROGRAMS THAT ARE DISTRIBUTED NATIONALLY AND ARE IN WIDE USE. SOFTWARE ALGORITHMS SHALL COMPLY WITH REQUIREMENTS OF STANDARDS AND GUIDES SPECIFIED IN THIS SECTION. MANUAL CALCULATIONS ARE UNACCEPTABLE.
- C. SHORT-CIRCUIT STUDY SOFTWARE DEVELOPER QUALIFICATIONS: AN ENTITY THAT OWNS AND MARKETS COMPUTER SOFTWARE USED FOR STUDIES, HAVING PERFORMED SUCCESSFUL STUDIES OF SIMILAR MAGNITUDE ON ELECTRICAL DISTRIBUTION SYSTEMS USING SIMILAR DEVICES.
  - 1. THE COMPUTER PROGRAM SHALL BE DEVELOPED UNDER THE CHARGE OF A LICENSED PROFESSIONAL ENGINEER WHO HOLDS IEEE COMPUTER SOCIETY'S CERTIFIED SOFTWARE DEVELOPMENT PROFESSIONAL CERTIFICATION.
- D. SHORT-CIRCUIT STUDY SPECIALIST QUALIFICATIONS: PROFESSIONAL ENGINEER IN CHARGE OPROJECT IS LOCATED. ALL ELEMENTS OF THE STUDY SHALL BE PERFORMED UNDER THE DIRECT SUPERVISION AND CONTROL OF THIS PROFESSIONAL ENGINEER.
- E. FIELD ADJUSTING AGENCY QUALIFICATIONS: AN INDEPENDENT AGENCY, WITH THE EXPERIENCE AND CAPABILITY TO ADJUST OVERCURRENT DEVICES AND TO CONDUCT THE TESTING INDICATED, THAT IS A MEMBER COMPANY OF THE INTERNATIONAL ELECTRICAL TESTING ASSOCIATION OR IS A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) AS DEFINED BY OSHA IN 29 CFR 1910.7, AND THAT IS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

- COMPUTER SOFTWARE
  - A. COMPLY WITH IEEE 399 AND IEEE 551.
  - B. ANALYTICAL FEATURES OF FAULT-CURRENT-STUDY COMPUTER SOFTWARE PROGRAM SHALL HAVE THE CAPABILITY TO CALCULATE "MANDATORY," "VERY DESIRABLE," AND "DESIRABLE" FEATURES AS LISTED IN IEEE 399.
  - C. COMPUTER SOFTWARE PROGRAM SHALL BE CAPABLE OF PLOTTING AND DIAGRAMMING TIME-CURRENT-CHARACTERISTIC CURVES AS PART OF ITS OUTPUT.

- SHORT-CIRCUIT STUDY REPORT CONTENTS
  - A. STUDY DESCRIPTIONS, PURPOSE, BASIS, AND SCOPE. INCLUDE CASE DESCRIPTIONS, DEFINITION OF TERMS, AND GUIDE FOR INTERPRETATION OF THE COMPUTER PRINTOUT.
  - B. ONE-LINE DIAGRAM, SHOWING THE FOLLOWING:
    - 1. PROTECTIVE DEVICE DESIGNATIONS AND AMPERE RATINGS.
    - 2. CABLE SIZE AND LENGTHS.
    - 3. TRANSFORMER KILOVOLT AMPERE (KVA) AND VOLTAGE RATINGS.
    - 4. MOTOR AND GENERATOR DESIGNATIONS AND KVA RATINGS.
    - 5. SWITCHGEAR, SWITCHBOARD, MOTOR-CONTROL CENTER, AND PANELBOARD DESIGNATIONS.
    - 6. COMMENTS AND RECOMMENDATIONS FOR SYSTEM IMPROVEMENTS, WHERE NEEDED.
  - C. PROTECTIVE DEVICE EVALUATION:
    - 1. EVALUATE EQUIPMENT AND PROTECTIVE DEVICES AND COMPARE TO SHORT-CIRCUIT RATINGS.
    - 2. TABULATIONS OF CIRCUIT BREAKER, FUSE, AND OTHER PROTECTIVE DEVICE RATINGS VERSUS CALCULATED SHORT-CIRCUIT DUTIES.
    - 3. FOR 600-V OVERCURRENT PROTECTIVE DEVICES, ENSURE THAT INTERRUPTING RATINGS ARE EQUAL TO OR HIGHER THAN CALCULATED 1/2-CYCLE SYMMETRICAL FAULT CURRENT.
    - 4. FOR DEVICES AND EQUIPMENT RATED FOR ASYMMETRICAL FAULT CURRENT, APPLY MULTIPLICATION FACTORS LISTED IN THE STANDARDS TO 1/2-CYCLE SYMMETRICAL FAULT CURRENT.
    - 5. VERIFY ADEQUACY OF PHASE CONDUCTORS AT MAXIMUM THREE-PHASE BOLTED FAULT CURRENTS; VERIFY ADEQUACY OF EQUIPMENT GROUNDING CONDUCTORS AND GROUNDING ELECTRODE CONDUCTORS AT MAXIMUM GROUND-FAULT CURRENTS. ENSURE THAT SHORT-CIRCUIT WITHSTAND RATINGS ARE EQUAL TO OR HIGHER THAN CALCULATED 1/2-CYCLE SYMMETRICAL FAULT CURRENT.
  - D. SHORT-CIRCUIT STUDY INPUT DATA: AS DESCRIBED IN "POWER SYSTEM DATA" ARTICLE IN THE EVALUATIONS.
  - F. SHORT-CIRCUIT STUDY OUTPUT:
    - 1. LOW-VOLTAGE FAULT REPORT: THREE-PHASE AND UNBALANCED FAULT CALCULATIONS, SHOWING THE FOLLOWING FOR EACH OVERCURRENT DEVICE LOCATION:
      - a. VOLTAGE.
      - b. CALCULATED FAULT-CURRENT MAGNITUDE AND ANGLE.
      - c. FAULT-POINT X/R RATIO.
      - d. EQUIVALENT IMPEDANCE.
    - 2. MOMENTARY DUTY REPORT: THREE-PHASE AND UNBALANCED FAULT CALCULATIONS, SHOWING THE FOLLOWING FOR EACH OVERCURRENT DEVICE LOCATION:
      - a. VOLTAGE.
      - b. CALCULATED SYMMETRICAL FAULT-CURRENT MAGNITUDE AND ANGLE.
      - c. FAULT-POINT X/R RATIO.
      - d. CALCULATED ASYMMETRICAL FAULT CURRENTS:
        - 1. BASED ON FAULT-POINT X/R RATIO,
        - 2. BASED ON CALCULATED SYMMETRICAL VALUE MULTIPLIED BY 1.6.
        - 3. BASED ON CALCULATED SYMMETRICAL VALUE MULTIPLIED BY 2.7.
    - 3. INTERRUPTING DUTY REPORT: THREE-PHASE AND UNBALANCED FAULT CALCULATIONS, SHOWING THE FOLLOWING FOR EACH OVERCURRENT DEVICE LOCATION:
      - a. VOLTAGE.
      - b. CALCULATED SYMMETRICAL FAULT-CURRENT MAGNITUDE AND ANGLE.
      - c. FAULT-POINT X/R RATIO.
      - d. NO AC DECREMENT (NACD) RATIO.
      - e. EQUIVALENT IMPEDANCE.
      - f. MULTIPLYING FACTORS FOR 2-, 3-, 5-, AND 8-CYCLE CIRCUIT BREAKERS RATED ON A SYMMETRICAL BASIS.
      - g. MULTIPLYING FACTORS FOR 2-, 3-, 5-, AND 8-CYCLE CIRCUIT BREAKERS RATED ON A TOTAL BASIS.
  - G. OBTAIN ALL DATA NECESSARY FOR THE CONDUCT OF THE STUDY.
    - 1. VERIFY COMPLETENESS OF DATA SUPPLIED ON THE ONE-LINE DIAGRAM. CALL ANY DISCREPANCIES TO THE ATTENTION OF ARCHITECT.
    - 2. FOR EQUIPMENT PROVIDED THAT IS WORK OF THIS PROJECT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT.
  - H. GATHER AND TABULATE THE FOLLOWING INPUT DATA TO SUPPORT THE SHORT-CIRCUIT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 551 AS TO THE AMOUNT OF DETAIL THAT IS REQUIRED TO BE ACQUIRED IN THE FIELD. FIELD DATA GATHERING SHALL BE UNDER THE DIRECT SUPERVISION AND CONTROL OF THE ENGINEER IN CHARGE OF PERFORMING THE STUDY, AND SHALL BE BY THE ENGINEER OR ITS REPRESENTATIVE WHO HOLDS NETA ETT LEVEL III CERTIFICATION OR NICET ELECTRICAL POWER TESTING LEVEL III CERTIFICATION.
    - 1. PRODUCT DATA FOR PROJECT'S OVERCURRENT PROTECTIVE DEVICES INVOLVED IN OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDIES. USE EQUIPMENT DESIGNATION TAGS THAT ARE CONSISTENT WITH ELECTRICAL DISTRIBUTION SYSTEM DIAGRAMS, OVERCURRENT PROTECTIVE DEVICE SUBMITTALS, INPUT AND OUTPUT DATA, AND RECOMMENDED DEVICE SETTINGS.
    - 2. OBTAIN ELECTRICAL POWER UTILITY IMPEDANCE AT THE SERVICE.
    - 3. POWER SOURCES AND TIES.
    - 4. FOR TRANSFORMERS, INCLUDE KVA, PRIMARY AND SECONDARY VOLTAGES, CONNECTION TYPE, IMPEDANCE, X/R RATIO, TAPS MEASURED IN PERCENT, AND PHASE SHIFT.
    - 5. FOR REACTORS, PROVIDE MANUFACTURER AND MODEL DESIGNATION, VOLTAGE RATING, AND IMPEDANCE.
    - 6. FOR CIRCUIT BREAKERS AND FUSES, PROVIDE MANUFACTURER AND MODEL DESIGNATION. LIST TYPE OF BREAKER, TYPE OF TRIP, SCCR, CURRENT RATING, AND BREAKER SETTINGS.
    - 7. GENERATOR SHORT-CIRCUIT CURRENT CONTRIBUTION DATA, INCLUDING SHORT-CIRCUIT REACTANCE, RATED KVA, RATED VOLTAGE, AND X/R RATIO.
    - 8. BUSWAY MANUFACTURER AND MODEL DESIGNATION, CURRENT RATING, IMPEDANCE, LENGTHS, AND CONDUCTOR MATERIAL.
    - 9. MOTOR HORSEPOWER AND NEMA MG 1 CODE LETTER DESIGNATION.
    - 10. CABLE SIZES, LENGTHS, NUMBER, CONDUCTOR MATERIAL AND CONDUIT MATERIAL (MAGNETIC OR NONMAGNETIC).
- SHORT-CIRCUIT STUDY
  - A. PERFORM STUDY FOLLOWING THE GENERAL STUDY PROCEDURES CONTAINED IN IEEE 399.
  - B. CALCULATE SHORT-CIRCUIT CURRENTS ACCORDING TO IEEE 551.
  - C. BASE STUDY ON THE DEVICE CHARACTERISTICS SUPPLIED BY DEVICE MANUFACTURER.
  - D. THE EXTENT OF THE ELECTRICAL POWER SYSTEM TO BE STUDIED IS INDICATED ON DRAWINGS.
  - E. BEGIN SHORT-CIRCUIT CURRENT ANALYSIS AT THE SERVICE, EXTENDING DOWN TO THE SYSTEM OVERCURRENT PROTECTIVE DEVICES AS FOLLOWS:
    - 1. TO NORMAL SYSTEM LOW-VOLTAGE LOAD BUSES WHERE FAULT CURRENT IS 10 KA OR LESS.
  - F. STUDY ELECTRICAL DISTRIBUTION SYSTEM FROM NORMAL AND ALTERNATE POWER SOURCES THROUGHOUT ELECTRICAL DISTRIBUTION SYSTEM FOR PROJECT. STUDY ALL CASES OF SYSTEM- SWITCHING CONFIGURATIONS AND ALTERNATE OPERATIONS THAT COULD RESULT IN MAXIMUM FAULT CONDITIONS.
  - G. THE CALCULATIONS SHALL INCLUDE THE AC FAULT-CURRENT DECAY FROM INDUCTION MOTORS, SYNCHRONOUS MOTORS, AND ASYNCHRONOUS GENERATORS AND SHALL APPLY TO LOW- AND MEDIUM-VOLTAGE, THREE-PHASE AC SYSTEMS. THE CALCULATIONS SHALL ALSO ACCOUNT FOR THE FAULT-CURRENT DC DECREMENT, TO ADDRESS THE ASYMMETRICAL REQUIREMENTS OF THE INTERRUPTING EQUIPMENT.
    - 1. FOR GROUNDED SYSTEMS, PROVIDE A BOLTED LINE-TO-GROUND FAULT-CURRENT STUDY FOR AREAS AS DEFINED FOR THE THREE-PHASE BOLTED FAULT SHORT-CIRCUIT STUDY.
  - H. CALCULATE SHORT-CIRCUIT MOMENTARY AND INTERRUPTING DUTIES FOR A THREE-PHASE BOLTED FAULT AT EACH OF THE FOLLOWING:
    - 1. ELECTRIC UTILITY'S SUPPLY TERMINATION POINT.
    - 2. INCOMING SWITCHGEAR.
    - 3. LOW-VOLTAGE SWITCHGEAR.
    - 4. CONTROL PANELS.
    - 5. STANDBY GENERATORS AND AUTOMATIC TRANSFER SWITCHES.
    - 6. BRANCH CIRCUIT PANELBOARDS.
- ADJUSTING
  - A. MAKE MINOR MODIFICATIONS TO EQUIPMENT AS REQUIRED TO ACCOMPLISH COMPLIANCE WITH SHORT-CIRCUIT STUDY.

FIRE ALARM

- A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE SYSTEM BY COMPONENTS TO MATCH EXISTING.

- B. PERFORMANCE REQUIREMENTS:
  - 1. DESIGN AND INSTALLATION OF NEW DEVICES ONTO AN EXISTING FIRE ALARM SYSTEM. THE COMPLETE FUNCTIONAL SYSTEM SHALL MEET THE REQUIREMENTS OF THIS SPECIFICATION, APPLICABLE CODES, AND AUTHORITIES HAVING JURISDICTION (AHJ) REQUIREMENTS.
  - 2. COMPLY WITH NFPA 72.
  - 3. PROVIDE DEVICE LOCATIONS AND RATINGS AS REQUIRED TO MEET THE REQUIREMENTS OF THE AHJ AND ALL APPLICABLE CODES.
  - 4. FIRE ALARM SYSTEM VENDOR SHALL PROVIDE SOUND PRESSURE LEVEL CALCULATIONS DEMONSTRATING COMPLIANCE WITH NFPA 72 AND ESTABLISH QUANTITIES AND TAP SETTINGS OF AUDIBLE DEVICES.
  - 5. NO ADDITIONAL CHARGE FOR FIRE ALARM DEVICES WILL BE ALLOWED UNLESS SPACE DEFINITION, USE OR CONSTRUCTION IS SUBSTANTIALLY REVISED.

- C. MANUAL FIRE ALARM BOXES: UL 38 LISTED; FINISHED IN RED WITH MOLDED, RAISED-LETTER OPERATING INSTRUCTIONS IN CONTRASTING COLOR. STATION SHALL SHOW VISIBLE INDICATION OF OPERATION. MOUNTED ON RECESSED OUTLET BOX IF INDICATED AS SURFACE MOUNTED, PROVIDE MANUFACTURER'S SURFACE BACK BOX.
  - 1. DOUBLE-ACTON MECHANISM REQUIRING TWO ACTIONS TO INITIATE AN ALARM, PULL-LEVER TYPE WITH INTEGRAL ADDRESSABLE MODULE, ARRANGED TO COMMUNICATE MANUAL-STATION STATUS (NORMAL, ALARM, OR TROUBLE) TO THE FACP.
  - 2. STATION RESET: KEY- OR WRENCH-OPERATED SWITCH.

- D. DUCT SMOKE DETECTORS: PHOTOELECTRIC TYPE; UL 268A USED, OPERATING AT 24-V DC, NOMINAL INTEGRAL ADDRESSABLE MODULE: ARRANGED TO COMMUNICATE DETECTOR STATUS (NORMAL, ALARM, OR TROUBLE) TO THE FACP; PLUG-IN ARRANGEMENT: DETECTOR AND ASSOCIATED ELECTRONIC COMPONENTS SHALL BE MOUNTED IN A PLUG-IN MODULE THAT CONNECTS TO A FIXED BASE. THE FIXED BASE SHALL BE DESIGNED FOR MOUNTING DIRECTLY TO THE AIR DUCT. PROVIDE TERMINALS IN THE FIXED BASE FOR CONNECTION TO BUILDING WIRING.
  - 1. SELF-RESTORING: DETECTORS SHALL NOT REQUIRE RESETTING OR READJUSTMENT AFTER ACTUATION TO RESTORE THEM TO NORMAL OPERATION.
  - 2. EACH SENSOR SHALL HAVE MULTIPLE LEVELS OF DETECTION SENSITIVITY.
  - 3. SAMPLING TUBES: DESIGN AND DIMENSIONS AS RECOMMENDED BY MANUFACTURER FOR THE SPECIFIC DUCT SIZE, AIR VELOCITY, AND INSTALLATION CONDITIONS WHERE APPLIED. INSTALL SAMPLING TUBES SO THEY EXTEND THE FULL WIDTH OF THE DUCT.
  - 4. RELAY FAN SHUTDOWN: PROVIDE TWO (2) SETS OF CONTACTS RATED TO INTERRUPT FAN MOTOR-CONTROL CIRCUIT.
  - 5. COMPLY WITH NFPA 72 AND NFPA 90A

- E. SINGLE-STATION DUCT DETECTORS:
  - 1. UL 268A USED, OPERATING AT 120-V AC.
  - 2. SENSOR: LED OR INFRARED LIGHT SOURCE WITH MATCHING SILICON-CELL RECEIVER
    - a. DETECTOR SENSITIVITY: BETWEEN 2.5 AND 3.5 PERCENT/FOOT (0.008 AND 0.011 PERCENT/1MM) SMOKE OBSCURATION WHEN TESTED ACCORDING TO UL 268A
  - 3. PLUG-IN ARRANGEMENT: DEFECTOR AND ASSOCIATED ELECTRONIC COMPONENTS SHALL BE MOUNTED IN A PLUG-IN MODULE THAT CONNECTS TO A FIXED BASE. THE FIXED BASE SHALL BE DESIGNED FOR MOUNTING DIRECTLY TO THE AIR DUCT. PROVIDE TERMINALS IN THE FIXED BASE FOR CONNECTION TO BUILDING WIRING.
    - a. WEATHERPROOF DUCT HOUSING ENCLOSURE UL LISTED FOR USE WITH THE SUPPLIED DETECTOR. THE ENCLOSURE SHALL COMPLY WITH NEMA 250 REQUIREMENTS FOR TYPE 4X.
  - 4. SELF-RESTORING: DETECTORS SHALL NOT REQUIRE RESETTING OR READJUSTMENT AFTER ACTUATION TO RESTORE THEM TO NORMAL OPERATION.
  - 5. INTEGRAL VISUAL-INDICATING LIGHT: LED TYPE. INDICATING DETECTOR HAS OPERATED AND POWER-ON STATUS. PROVIDE REMOTE STATUS AND ALARM INDICATOR AND TEST STATION WHERE INDICATED AND/OR REQUIRED.
  - 6. TUBES DESIGN AND DIMENSIONS AS RECOMMENDED BY MANUFACTURER FOR THE SPECIFIC DUCT SIZE, AIR VELOCITY, AND INSTALLATION CONDITIONS WHERE APPLIED.
  - 7. RELAY FAN SHUTDOWN: PROVIDE TWO (2) SETS OF CONTACTS RATED TO INTERRUPT FAN MOTOR-CONTROL CIRCUIT.

- F. SYSTEM SMOKE DETECTORS
  - 1. PHOTOELECTRIC: UL 268 LISTED, OPERATING AT 24-V DC, NOMINAL WITH INTEGRAL ADDRESSABLE MODULE: ARRANGED TO COMMUNICATE DETECTOR STATUS (NORMAL, ALARM, OR TROUBLE) TO THE FACP.

- G. SINGLE-STATION SMOKE DETECTORS: (CHANGE REQUIREMENTS IF THEY NEED TO TALK TO THE FACP)
  - 1. UL 217 LISTED, SUITABLE FOR NFPA 101, SECTION 9.6.2.9 OCCUPANCIES, OPERATING AT 120-V AC
  - 2. AUXILIARY RELAYS: ONE FORM C RATED AT 0.5 A
  - 3. AUDIBLE NOTIFICATION APPLIANCE PIEZOELECTRIC SOUNDER RATED AT 90 DBA AT 10 FEET (3 M) ACCORDING TO UL 464.
  - 4. VISIBLE NOTIFICATION APPLIANCE 177 CANDELA STROBE
  - 5. TEST SWITCH: PUSH-TO-TEST, SIMULATES SMOKE AT RATED OBSCURATION.
  - 6. TANDEM CONNECTION: ALLOW TANDEM CONNECTION OF NUMBER OF INDICATED DETECTORS; ALARM ON ONE DETECTOR SHALL ACTUATE NOTIFICATION ON ALL CONNECTED DETECTORS.
  - 7. PLUG-IN ARRANGEMENT: DEFECTOR AND ASSOCIATED ELECTRONIC COMPONENTS SHALL BE MOUNTED IN A PLUG-IN MODULE THAT CONNECTS TO A FIXED BASE. PROVIDE TERMINALS IN THE FIXED BASE FOR CONNECTION TO BUILDING WIRING.
  - 8. SELF-RESTORING: DETECTORS SHALL NOT REQUIRE RESETTING OR READJUSTMENT AFTER ACTUATION TO RESTORE THEM TO NORMAL OPERATION.
  - 9. INTEGRAL VISUAL-INDICATING LIGHT: LED TYPE INDICATING [DETECTOR HAS OPERATED] [AND POWER-ON] STATUS.
  - 10. WHERE MORE THAN ONE SMOKE ALARM IS INSTALLED WITHIN A DWELLING OR SUITE, THEY SHALL BE CONNECTED SO THAT THE OPERATION OF ANY SMOKE ALARM CAUSES THE ALARM IN ALL SMOKE ALARMS TO SOUND.

- H. HEAT DETECTORS: UL 521 LISTED. FIXED-TEMPERATURE TYPE ACTUATED BY TEMPERATURE THAT EXCEEDS A FIXED TEMPERATURE OF 190 DEG F (88 DEG C).

- I. NOTIFICATION APPLIANCES: EQUIPPED FOR MOUNTING AS INDICATED AND WITH SCREW TERMINALS FOR SYSTEM CONNECTIONS
  - 1. COMBINATION DEVICES FACTORY-INTEGRATED AUDIBLE AND VISIBLE DEVICES IN A SINGLE-MOUNTING ASSEMBLY.
  - 2. BELLS: ELECTRIC-VIBRATING, 24-V DC, UNDER-DOME TYPE; WITH PROVISION FOR HOUSING THE OPERATING MECHANISM BEHIND THE BELL. BELLS SHALL PRODUCE A SOUND-PRESSURE LEVEL OF 94 DBA, MEASURED 10 FEET (3 M) FROM THE BELL 10-INCH (254-MM) SIZE, UNLESS OTHERWISE INDICATED. BELLS ARE WEATHERPROOF WHERE INDICATED.
  - 3. CHIMES, LOW-LEVEL OUTPUT: VIBRATING TYPE, 75-DBA MINIMUM RATED OUTPUT.
  - 4. CHIMES, HIGH-LEVEL OUTPUT: VIBRATING TYPE, 81-DBA MINIMUM RATED OUTPUT. HORNS: ELECTRIC-VIBRATING-POLARIZED TYPE, 24-V DC; WITH PROVISION FOR HOUSING THE OPERATING MECHANISM BEHIND A GRILLE.
  - 5. HORNS SHALL PRODUCE A SOUND-PRESSURE LEVEL OF 90 DBA, MEASURED 10 FEET (3 M) FROM THE HORN.
  - 6. VISIBLE ALARM DEVICES XENON STROBE LIGHTS USED UNDER UL 1971, WITH CLEAR OR NOMINAL WHITE POLYCARBONATE LENS MOUNTED ON AN ALUMINUM FACEPLATE. THE WORD "FIRE" IS ENGRAVED IN MINIMUM 1-INCH- (25-MM-) HIGH LETTERS ON THE LENS.
    - a. RATED LIGHT OUTPUT: 15, 30, 60, 75, 110, 135, 185 CANDELA AS REQUIRED TO MEET NFPA 72 REQUIREMENTS.
      a.a. STROBE LEADS: FACTORY CONNECTED TO SCREW TERMINALS.
  - 7. VOICE/TONE SPEAKERS:
    - a. UL 1480 LISTED.
    - b. HIGH-RANGE UNITS: RATED 2 TO 15 W.
    - c. LOW-RANGE UNITS: RATED 1 TO 2 W.
    - d. MOUNTING: FLUSH, SEMIRECESSED, OR SURFACE MOUNTED; BIDIRECTIONAL AS INDICATED.
    - e. MATCHING TRANSFORMERS TAP RANGE MATCHED TO THE ACOUSTICAL ENVIRONMENT OF THE SPEAKER LOCATION.
  - 8. AUDIBLE ALARM-INDICATING DEVICES INSTALL AT 96” AFF OR 6 INCHES (150 MM) BELOW THE CEILING, WHICHEVER IS LESS. INSTALL BELLS AND HORNS ON FLUSH-MOUNTED BACK BOXES WITH THE DEVICE-OPERATING MECHANISM CONCEALED BEHIND A GRILLE.
  - 9. VISIBLE ALARM-INDICATING DEVICES: INSTALL AT 96" AFF OR 6 INCHES (150 MM) BELOW THE CEILING, WHICHEVER IS LESS.
- J. MAGNETIC DOOR HOLDERS: UNITS ARE EQUIPPED FOR WALL OR FLOOR MOUNTING AS INDICATED AND ARE COMPLETE WITH MATCHING DOOR PLATE.
  - 1. ELECTROMAGNET: REQUIRES NO MORE THAN 3 W TO DEVELOP 25-LBF (111-N) HOLDING FORCE.
  - 2. WALL-MOUNTED UNITS: FLUSH MOUNTED, UNLESS OTHERWISE INDICATED.
  - 3. RATING: 24-V AC OR DC OR 120V AC AS REQUIRED.
  - 4. MATERIAL AND FINISH: MATCH DOOR HARDWARE.

- K. DIGITAL ALARM COMMUNICATOR TRANSMITTER: LISTED AND LABELED ACCORDING TO UL 632.
  - 1. FUNCTIONAL PERFORMANCE: UNIT RECEIVES AN ALARM, SUPERVISORY, OR TROUBLE SIGNAL FROM THE FACP, AND AUTOMATICALLY CAPTURES ONE OR TWO TELEPHONE LINES AND DIALS A PRESET NUMBER FOR A REMOTE CENTRAL STATION. WHEN CONTACT IS MADE WITH THE CENTRAL STATION(S), THE SIGNAL IS TRANSMITTED. THE UNIT SUPERVISES UP TO TWO TELEPHONE LINES. WHERE SUPERVISING 2 LINES, IF SERVICE ON OTHER LINE IS INTERRUPTED FOR LONGER THAN 45 SECONDS, THE UNIT INITIATES A LOCAL TROUBLE SIGNAL AND TRANSMITS A SIGNAL INDICATING LOSS OF TELEPHONE LINE TO THE REMOTE ALARM RECEIVING STATION OVER THE REMAINING LINE. WHEN TELEPHONE SERVICE IS RESTORED, UNIT AUTOMATICALLY REPORTS THAT EVENT TO THE CENTRAL STATION. IF SERVICE IS LOST ON BOTH TELEPHONE ONES, THE LOCAL TROUBLE SIGNAL IS INITIATED.
  - 2. SECONDARY POWER: INTEGRAL RECHARGEABLE BATTERY AND AUTOMATIC CHARGER. BATTERY CAPACITY IS ADEQUATE TO COMPLY WITH NFPA 72 REQUIREMENTS.
  - 3. SELF-TEST: CONDUCTED AUTOMATICALLY EVERY 24 HOURS WITH REPORT TRANSMITTED TO CENTRAL STATION.

- L. REMOTE STATUS AND ALARM INDICATORS:
  - 1. INSTALL NEAR EACH SMOKE DETECTOR AND EACH SPRINKLER WATER-FLOW SWITCH AND VALVE-TAMPER SWITCH THAT IS NOT READILY VISIBLE FROM NORMAL VIEWING POSITION.
  - 2. LOCATE INDICATING LIGHTS IN PUBLIC SPACE NEAR THE DEVICE THEY MONITOR.

- M. ADDRESSABLE INTERFACE DEVICE MICROELECTRONIC MONITOR MODULE LISTED FOR USE IN PROVIDING A SYSTEM ADDRESS FOR LISTED ALARM-INITIATING DEVICES FOR WIRED APPLICATIONS WITH NORMALLY OPEN CONTACTS.

- N. ADDRESSABLE CONTROL MODULE PROVIDE FOR INTEGRATION OF AUXILIARY CONTROL FUNCTIONS INTO THE ANALOG SIGNALING CIRCUIT. INTELLIGENT ANALOG SIGNALING CIRCUIT CONTROL WITH COMMUNICATION INTERACTION WITH THE ANALOG SIGNALING CIRCUIT HAVING THE CAPABILITY OF INITIATING A CONTROL FUNCTION TO AN AUXILIARY DEVICE BASED ON A SPECIFIED EVENT AND NO/NC CONTACT PAIRS RATED AT 2 AMPS 120 VAC OR 24 VDC.

- O. WIRE AND CABLE WIRE AND CABLE FOR FIRE ALARM SYSTEMS SHALL BE UL LISTED AND LABELED AS COMPLYING WITH NFPA 70, ARTICLE 760.
  - 1. SIGNALING LINE CIRCUITS: TWISTED, SHIELDED PAIR, SIZE AS RECOMMENDED BY SYSTEM MANUFACTURER.
  - 2. NON-POWER-LIMITED CIRCUITS: SOLID-COPPER CONDUCTORS WITH 600-V RATED, 75 DEG C, COLOR-CODED INSULATION. LOW-VOLTAGE CIRCUITS: NO. 16 AWG, MINIMUM. LINE-VOLTAGE CIRCUITS: NO. 12 AWG MINIMUM.
  - 3. INSTALL WIRING ACCORDING TO NECA 1 AND TIA/EIA 568-A
  - 4. FIRE ALARM CIRCUITS AND EQUIPMENT CONTROL WIRING ASSOCIATED WITH THE FIRE ALARM SYSTEM SHALL BE INSTALLED IN A DEDICATED RACEWAY SYSTEM IN AREAS OF EXPOSED CONSTRUCTION.
  - 5. [PLENUM RATED CABLE IS ALLOWED ABOVE CONCEALED, ACCESSIBLE CEILINGS.] (Not allowed in Phx)

- P. SUBMIT FIRE ALARM DRAWINGS AND DOCUMENTATION TO THE AUTHORITIES HAVING JURISDICTION AND THE ARCHITECT/ENGINEER.

- Q. INSTALLER QUALIFICATIONS: PERSONNEL CERTIFIED BY NICET AS FIRE ALARM LEVEL II

- R. INTERRUPTION OF EXISTING FIRE ALARM SERVICE: DO NOT INTERRUPT FIRE ALARM SERVICE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY GUARD SERVICE ACCORDING TO REQUIREMENTS INDICATED. NOTIFY ARCHITECT, OWNER OR CONSTRUCTION MANAGER NO FEWER THAN SEVEN DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF FIRE ALARM SERVICE DO NOT PROCEED WITH INTERRUPTION OF FIRE ALARM SERVICE WITHOUT OWNER'S WRITTEN PERMISSION.

- R. EXISTING FIRE ALARM EQUIPMENT: MAINTAIN FULLY OPERATIONAL UNTIL NEW EQUIPMENT HAS BEEN TESTED AND ACCEPTED. AS NEW EQUIPMENT IS INSTALLED, LABEL IT "NOT IN SERVICE" UNTIL IT IS ACCEPTED. REMOVE LABELS FROM NEW EQUIPMENT WHEN PUT INTO SERVICE AND LABEL EXISTING FIRE ALARM EQUIPMENT "NOT IN SERVICE" UNTIL REMOVED FROM THE BUILDING.

- S. EQUIPMENT REMOVAL AFTER ACCEPTANCE OF THE NEW FIRE ALARM SYSTEM, REMOVE EXISTING DISCONNECTED FIRE ALARM EQUIPMENT.

- T. FIRE ALARM SYSTEM AND COMPONENTS SHALL OPERATE AS AN EXTENSION OF AN EXISTING SYSTEM. ALL NEW DEVICES SHALL BE SUITABLE AND LISTED WITH EXISTING FIRE ALARM CONTROL PANEL.

- U. CONNECTING TO EXISTING EQUIPMENT: VERIFY THAT EXISTING FIRE ALARM SYSTEM IS OPERATIONAL BEFORE MAKING CHANGES OR CONNECTIONS.

- V. PERFORM BATTERY CALCULATIONS AND PROVIDE NECESSARY EQUIPMENT WHERE EXISTING BATTERIES WILL NOT SUPPORT ADDITION OF NEW DEVICES INDICATED ON DRAWINGS.

- W. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT EST, AND ADJUST FIELD-ASSEMBLED COMPONENTS AND EQUIPMENT INSTALLATION, INCLUDING CONNECTIONS, AND TO ASSIST IN FIELD TESTING. REPORT RESULTS IN WRITING.

- X. TEST AND INSPECTION RECORDS: PREPARE ACCORDING TO NFPA 72, INCLUDING DEMONSTRATION OF SEQUENCES OF OPERATION BY USING THE MATRIX-STYLE FORM IN APPENDIX A IN NFPA 7.

- Y. CERTIFY FIRE ALARM SYSTEM UPON COMPLETION OF INSTALLATION AND TESTING.

TELECOMMUNICATIONS

- A. ALL INSTALLATIONS, EQUIPMENT AND MATERIALS SHALL BE PROVIDED IN COMPLIANCE WITH THE CURRENT LAWS AND REGULATIONS OF STATE COUNTY AND CITY FIRE MARSHALLS, BUILDING INDUSTRY CONSULTING SERVICES INTERNATIONAL (BIOS), NEC, THE INTERNATIONAL BUILDING CODE (IBC), COMMUNICM1ONS STANDARDS PUBLISHED BY TIA/EIA, AND ALL OTHER APPLICABLE CODES.

- B. THE CONTRACTOR SHALL INSURE THAT THE MANUFACTURER PULL TENSIONS AND MINIMUM BENDING RADIUS OF THE CABLES BEING INSTALLED ARE NOT EXCEEDED AT ANY TIME DURING INSTALLATION.

- C. [3/4” CONDUIT SHALL BE RUN TO THE CLOSEST CABLE TRAY IN THE DIRECTION OF THE IDF ROOM, FOR DEVICES WITH MORE THAN 3 CABLES, UTILIZE (1) 1" CONDUIT.]

- D. ALL BENDS WILL BE LONG, SWEEPING BENDS WITH A RADIUS NOT LESS THAN:
  - 1. SIX TIMES THE INTERNAL DIAMETER OF CONDUITS 2 INCHES OR SMALLER.
  - 2. TEN TIES THE INTERNAL DIAMETER OF CONDUITS LARGER THAN 2 INCHES.

- E. ENSURE THAT THE HORIZONTAL CABLE BEND RADIUS IS NO LESS THAN FOUR (4) TIMES THE CABLE DIAMETER.

- F. THE AMOUNT OF UNTWISTING MUST NOT EXCEED 13mm (0.5 INCHES) FOR ALL CAT5E CABLES.

- G. ENSURE THAT THERE IS A MINIMUM OF 10' OF SLACK AT THE IDF.

- H. ENSURE THAT THERE IS A MINIMUM OF 12' OF SLACK AT THE WORK AREA OUTLET.

- I. IDENTIFY CABLES AT EACH END WITH PERMANENT ALPHANUMERIC LABELS PER OWNER STANDARDS.

- J. [WHERE CABLE TRAY IS NOT ACCESSIBLE, SUPPORT NEW CABLING SYSTEM USING J-HOOKS.]

- K. TELECOMMUNICATIONS JACKS SHALL MEET OWNER'S STANDARDS.

- L. COLOR CODING SHALL MEET OWNER'S STANDARDS.

- M. TELECOMMUNICATION CLOSETS TO HAVE 4'X8' PLYWOOD BACKBOARD ON ALL WALLS OR AS SHOWN ON DRAWINGS. BACKBOARD SHALL BE FIRE RETARDANT, AND PAINTED WITH WHITE FIRE RETARDANT PAINT. DO NOT PAINT OVER FIRE RATING STAMP.

- N. ALL ELECTRONICS HARDWARE WILL BE DESIGNED AND PROVIDED BY THE OWNER.

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

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1	10-20-23	DD PROGRESS

☐ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

Wayne State University

5454 CASS AVE
DETROIT, MICHIGAN
48202

CLIENT PROJECT #:	PROJECT NUMBER
JHA PROJECT #:	PROJECT NUMBER

PROJECT INFORMATION:

WSU APPLEBAUM
MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

1001 Madison Avenue
Toledo, OH 43604
T. (419) 255-3830

ELECTRICAL
SPECIFICATIONS

E0-002

PLAN NOTES

GENERAL NOTES - LIGHTING

A. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL LIGHTING FIXTURES UNLESS NOTED OTHERWISE.

B. REFER TO THE LUMINAIRE SCHEDULE LOCATED ON THE ELECTRICAL GENERAL INFORMATION DRAWING.

C. ELECTRICAL DEVICES INDICATED ON THIS PLAN SHALL BE NEW UNLESS NOTED OTHERWISE.

D. LIGHT SWITCHES SHALL BE GROUPED UNDER ONE COMMON FACEPLATE WHERE MORE THAN ONE LIGHT SWITCH IS INDICATED TO BE INSTALLED AT THE SAME LOCATION.

E. EXISTING LIGHTING INDICATED TO REMAIN SHALL BE RELAMPED AND CLEANED. REPAIR EXISTING FIXTURES THAT ARE MALFUNCTIONING WHERE FEASIBLE. OTHERWISE REPLACE WITH NEW. REVISE CIRCUITING AS INDICATED.

F. LIGHTING BRANCH CIRCUIT WIRING ASSOCIATED WITH NEW LIGHTING SHALL BE 2#12, 1#12GND IN 3/4"C UNLESS NOTED OTHERWISE.

G. EXISTING EQUIPMENT/DEVICES NOT SPECIFICALLY INDICATED TO BE DEMOLISHED SHALL REMAIN OPERATIONAL. REVISE EXISTING CIRCUITING TO MAINTAIN OPERATION TO SUCH EQUIPMENT/DEVICES AS REQUIRED.

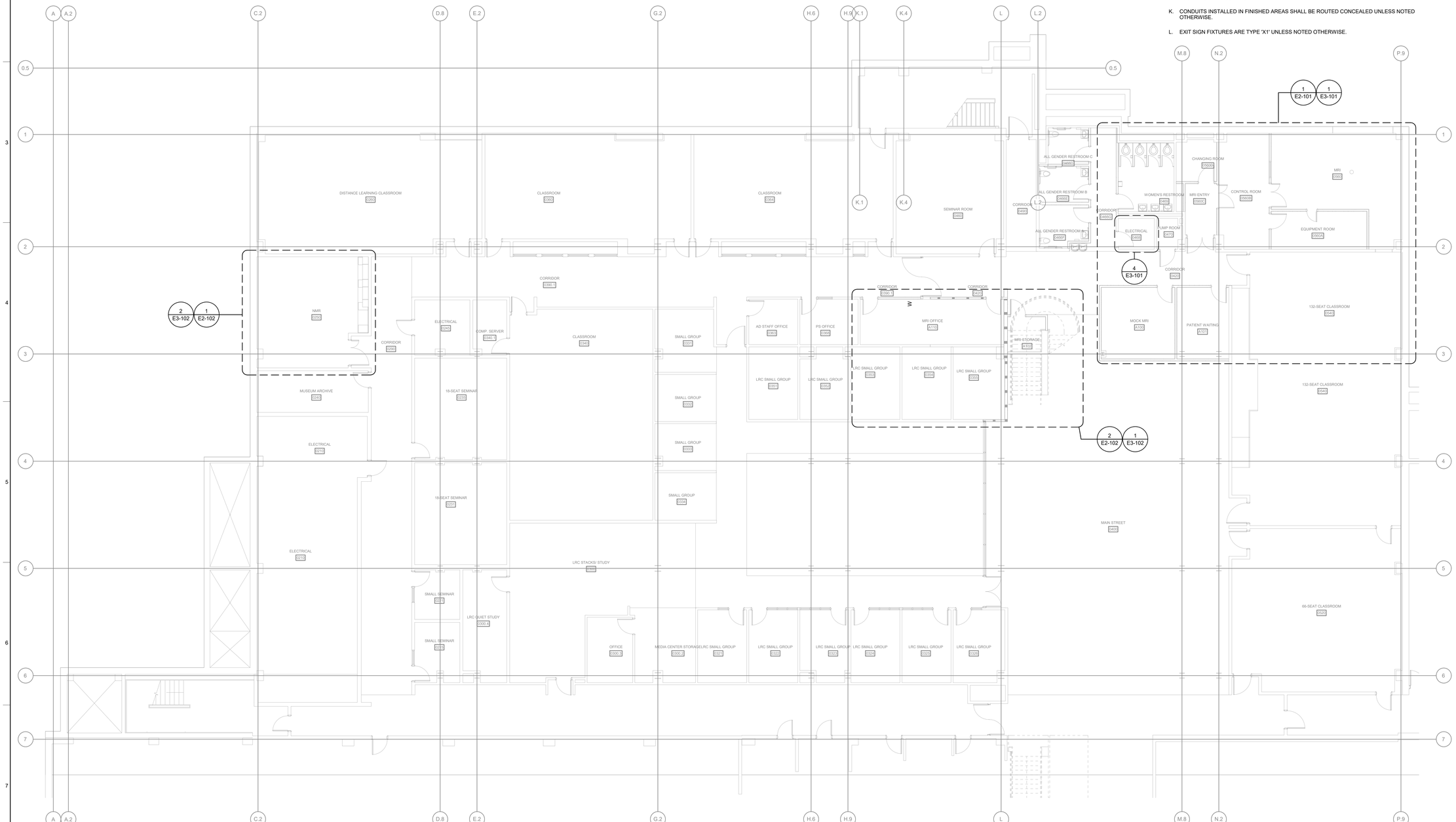
H. REUSE OF THE LEFT-IN-PLACE EXISTING BRANCH CIRCUIT CONDUIT AND WIRING ASSOCIATED WITH THE LIGHTING FIXTURES REMOVED DURING DEMOLITION TO REFEED NEW LIGHTING FIXTURES IS ACCEPATBLE. REWORK THE EXISTING CIRCUIT TO PROVIDE LIGHTING CONTROL AS INDICATED ON THIS DRAWING, UNLESS NOTED OTHERWISE.

I. EXISTING LIGHTING INDICATED AS TO REMAIN AND LOCATED IN AREAS WHERE THE CEILING IS BEING MODIFIED SHALL BE TEMPORARILY SUPPORTED AND REINSTALLED UPON COMPLETION OF CEILING REVISIONS. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ARCHITECTURAL TRADE.

J. NIGHT LIGHT AND EXIT SIGNS SHALL BE UNCONTROLLED AND CONNECTED AHEAD OF THE LOCAL LIGHTING CONTROLS.

K. CONDUITS INSTALLED IN FINISHED AREAS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.

L. EXIT SIGN FIXTURES ARE TYPE 'X1' UNLESS NOTED OTHERWISE.



1 E1-101 OVERALL LEVEL 0 FLOOR PLAN

SCALE: NOT TO SCALE

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PROFESSIONAL SEALS:

PROJECT PARTNERS:

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WSU APPLEBAUM MRI

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48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE
1001 Madison Avenue
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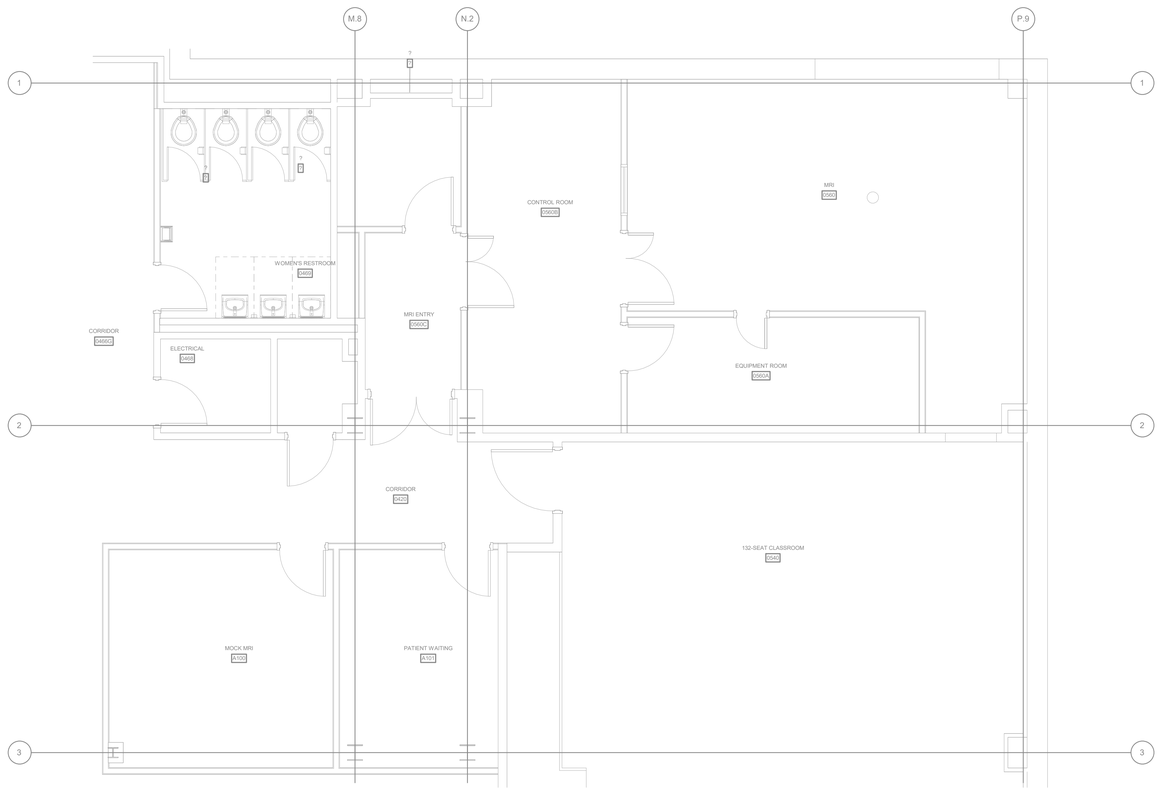
T. (419) 255-3830

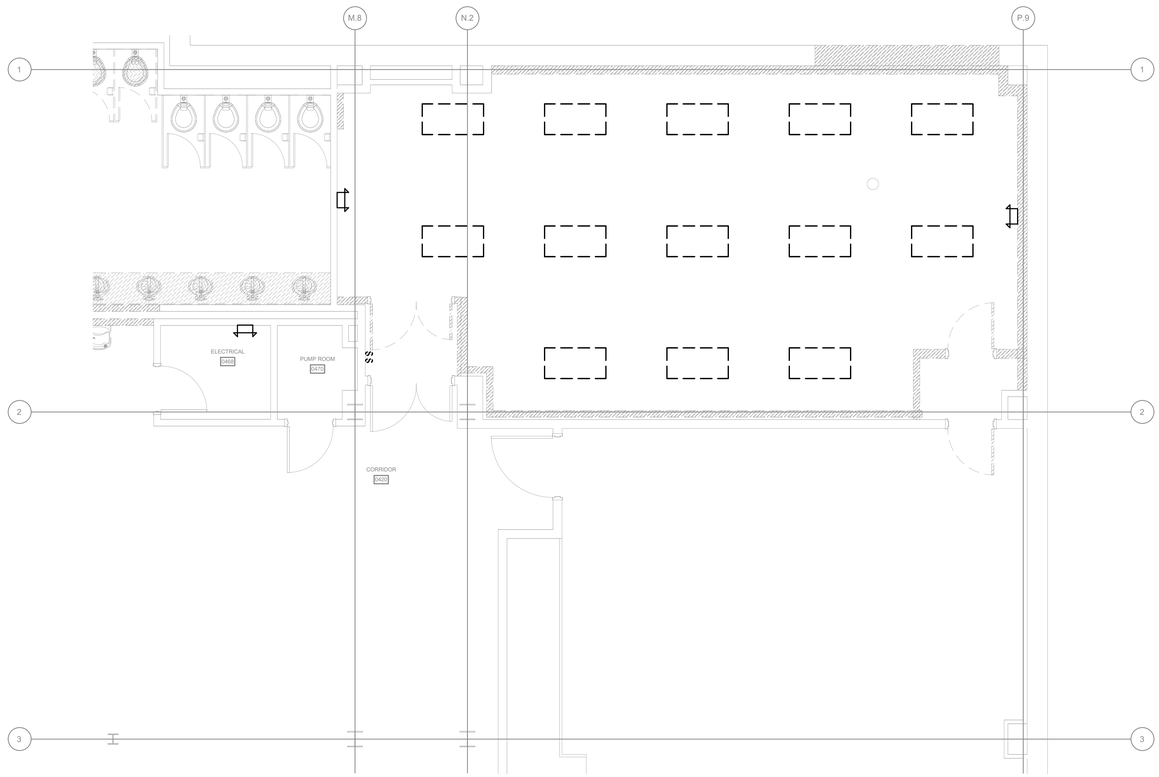
OVERALL LEVEL 0 FLOOR PLAN

E1-101



1 E1-101 ENLARGED CLINICAL LIGHTING - NEW WORK PLAN

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



2 ENLARGED CLINICAL LIGHTING - DEMOLITION PLAN

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

GENERAL NOTES - LIGHTING

A. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL LIGHTING FIXTURES UNLESS NOTED OTHERWISE.

B. REFER TO THE LUMINAIRE SCHEDULE LOCATED ON THE ELECTRICAL GENERAL INFORMATION DRAWING.

C. ELECTRICAL DEVICES INDICATED ON THIS PLAN SHALL BE NEW UNLESS NOTED OTHERWISE.

D. LIGHT SWITCHES SHALL BE GROUPED UNDER ONE COMMON FACEPLATE WHERE MORE THAN ONE LIGHT SWITCH IS INDICATED TO BE INSTALLED AT THE SAME LOCATION.

E. EXISTING LIGHTING INDICATED TO REMAIN SHALL BE RELAMPED AND CLEANED. REPAIR EXISTING FIXTURES THAT ARE MALFUNCTIONING WHERE FEASIBLE. OTHERWISE REPLACE WITH NEW. REVISE CIRCUITING AS INDICATED.

F. LIGHTING BRANCH CIRCUIT WIRING ASSOCIATED WITH NEW LIGHTING SHALL BE 2#12, 1#12GND IN 3/4"C UNLESS NOTED OTHERWISE.

G. EXISTING EQUIPMENT/DEVICES NOT SPECIFICALLY INDICATED TO BE DEMOLISHED SHALL REMAIN OPERATIONAL. REVISE EXISTING CIRCUITING TO MAINTAIN OPERATION TO SUCH EQUIPMENT/DEVICES AS REQUIRED.

H. REUSE OF THE LEFT-IN-PLACE EXISTING BRANCH CIRCUIT CONDUIT AND WIRING ASSOCIATED WITH THE LIGHTING FIXTURES REMOVED DURING DEMOLITION TO REFEED NEW LIGHTING FIXTURES IS ACCEPATBLE. REWORK THE EXISTING CIRCUIT TO PROVIDE LIGHTING CONTROL AS INDICATED ON THIS DRAWING, UNLESS NOTED OTHERWISE.

I. EXISTING LIGHTING INDICATED AS TO REMAIN AND LOCATED IN AREAS WHERE THE CEILING IS BEING MODIFIED SHALL BE TEMPORARILY SUPPORTED AND REINSTALLED UPON COMPLETION OF CEILING REVISIONS. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ARCHITECTURAL TRADE.

J. NIGHT LIGHT AND EXIT SIGNS SHALL BE UNCONTROLLED AND CONNECTED AHEAD OF THE LOCAL LIGHTING CONTROLS.

K. CONDUITS INSTALLED IN FINISHED AREAS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.

L. EXIT SIGN FIXTURES ARE TYPE 'X1' UNLESS NOTED OTHERWISE.

PLAN NOTES

ssoe®

PROFESSIONAL SEALS:

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SSOE MANAGER:	JEFF FALZON

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ENLARGED CLINICAL PLANS - LIGHTING

E2-101

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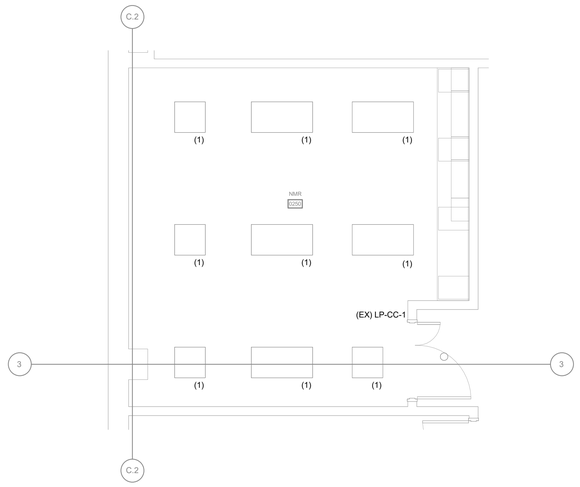
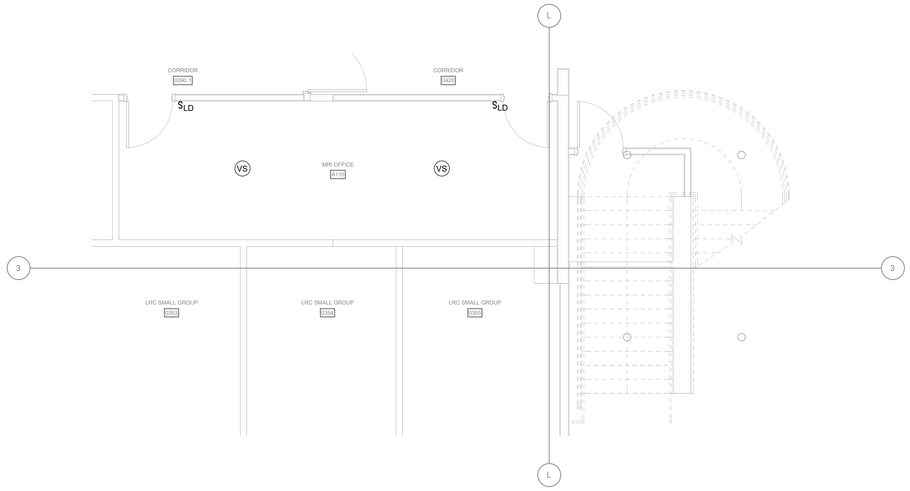


1 E1-101 ENLARGED NMR 0250 LIGHTING - NEW WORK PLAN

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



2 E1-101 ENLARGED MRI OFFICE A110 LIGHTING - NEW WORK PLAN

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

GENERAL NOTES - LIGHTING

A. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL LIGHTING FIXTURES UNLESS NOTED OTHERWISE.

B. REFER TO THE LUMINAIRE SCHEDULE LOCATED ON THE ELECTRICAL GENERAL INFORMATION DRAWING.

C. ELECTRICAL DEVICES INDICATED ON THIS PLAN SHALL BE NEW UNLESS NOTED OTHERWISE.

D. LIGHT SWITCHES SHALL BE GROUPED UNDER ONE COMMON FACEPLATE WHERE MORE THAN ONE LIGHT SWITCH IS INDICATED TO BE INSTALLED AT THE SAME LOCATION.

E. EXISTING LIGHTING INDICATED TO REMAIN SHALL BE RELAMPED AND CLEANED. REPAIR EXISTING FIXTURES THAT ARE MALFUNCTIONING WHERE FEASIBLE. OTHERWISE REPLACE WITH NEW. REVISE CIRCUITING AS INDICATED.

F. LIGHTING BRANCH CIRCUIT WIRING ASSOCIATED WITH NEW LIGHTING SHALL BE 2#12, 1#12GND IN 3/4"C UNLESS NOTED OTHERWISE.

G. EXISTING EQUIPMENT/DEVICES NOT SPECIFICALLY INDICATED TO BE DEMOLISHED SHALL REMAIN OPERATIONAL. REVISE EXISTING CIRCUITING TO MAINTAIN OPERATION TO SUCH EQUIPMENT/DEVICES AS REQUIRED.

H. REUSE OF THE LEFT-IN-PLACE EXISTING BRANCH CIRCUIT CONDUIT AND WIRING ASSOCIATED WITH THE LIGHTING FIXTURES REMOVED DURING DEMOLITION TO REFEED NEW LIGHTING FIXTURES IS ACCEPATBLE. REWORK THE EXISTING CIRCUIT TO PROVIDE LIGHTING CONTROL AS INDICATED ON THIS DRAWING, UNLESS NOTED OTHERWISE.

I. EXISTING LIGHTING INDICATED AS TO REMAIN AND LOCATED IN AREAS WHERE THE CEILING IS BEING MODIFIED SHALL BE TEMPORARILY SUPPORTED AND REINSTALLED UPON COMPLETION OF CEILING REVISIONS. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ARCHITECTURAL TRADE.

J. NIGHT LIGHT AND EXIT SIGNS SHALL BE UNCONTROLLED AND CONNECTED AHEAD OF THE LOCAL LIGHTING CONTROLS.

K. CONDUITS INSTALLED IN FINISHED AREAS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.

L. EXIT SIGN FIXTURES ARE TYPE 'X1' UNLESS NOTED OTHERWISE.

PLAN NOTES

3 E1-101 ENLARGED NMR 0250 LIGHTING - DEMOLITION PLAN

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

4 E1-101 ENLARGED MRI OFFICE A110 LIGHTING - DEMOLITION PLAN

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

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

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Wayne State University

WAYNE STATE UNIVERSITY

5454 CASS AVE
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48202

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PROJECT INFORMATION:

WSU APPLEBAUM MRI

259 MACK AVE
DETROIT, MICHIGAN
48201

SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

SSOE

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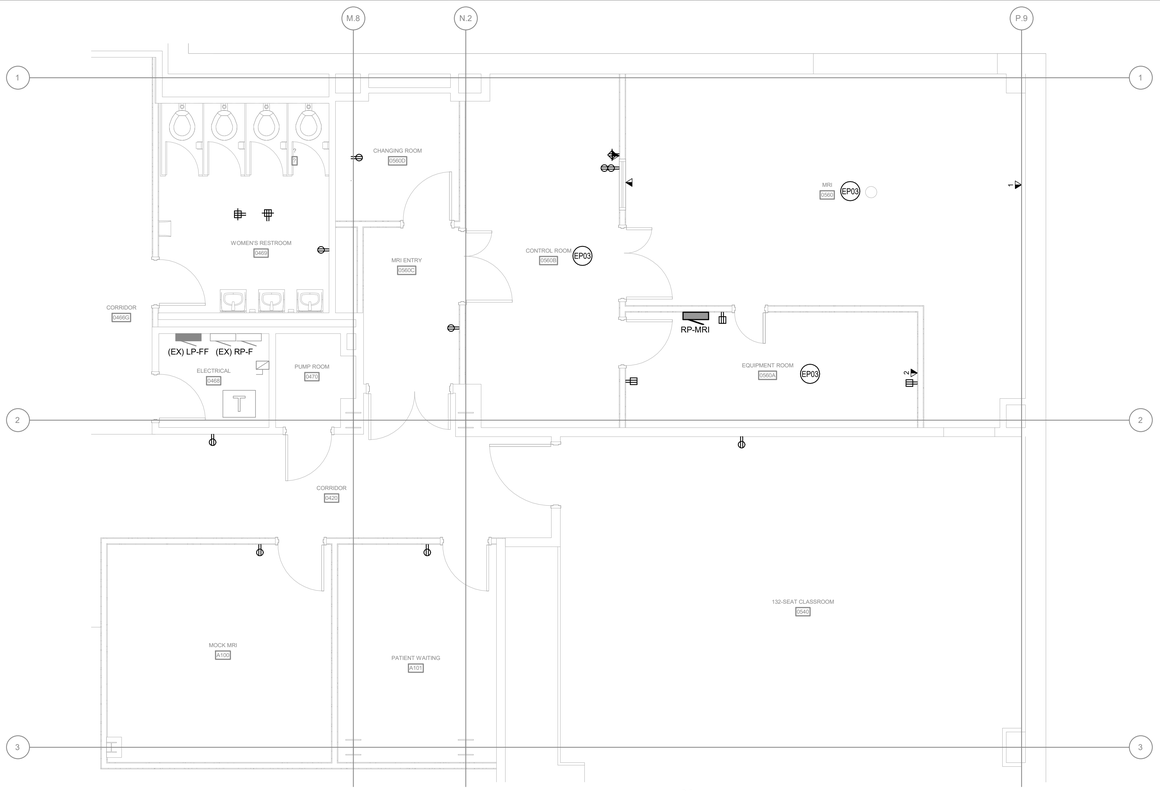
Toledo, OH 43604
T. (419) 255-3830

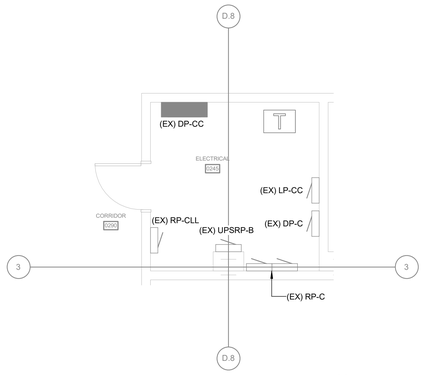
ENLARGED NMR 0250 & MRI OFFICE A110 PLANS - LIGHTING

E2-102



1 E1-101 ENLARGED CLINICAL POWER AND AUXILIARY - NEW WORK PLAN

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



4 E1-101 ELECTRICAL 0245

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

GENERAL NOTES - POWER

A. REFER TO ARCHITECTURAL FLOOR PLAN AND ELEVATIONS FOR EXACT LOCATION OF DEVICES WHERE INDICATED.

B. RECEPTACLE OUTLETS SHALL BE RATED 20A U.O.N..

C. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE U.O.N..

D. PROVIDE GFCI PROTECTION WHERE REQUIRED BY THE NEC WHETHER INDICATED OR NOT.

E. BRANCH CIRCUIT JUNCTION BOXES SHALL BE LABELED WITH THE CIRCUITS ENCLOSED.

F. SINGLE PHASE 20A BRANCH CIRCUIT W/RING SHALL BE 2#12, 1#12GND IN 3/4"C UNLESS NOTED OTHERWISE.

G. EXISTING EQUIPMENT/DEVICES NOT SPECIFICALLY INDICATED TO BE DEMOLISHED SHALL REMAIN OPERATIONAL. REVISE EXISTING CIRCUITING TO MAINTAIN OPERATION TO SUCH EQUIPMENT/DEVICES AS REQUIRED.

H. CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.

I. ELECTRICAL EQUIPMENT MOUNTED ON THE FLOOR SHALL BE MOUNTED ON A 4" CONCRETE HOUSEKEEPING PAD.

J. PROVIDE ARC FAULT CIRCUIT INTERRUPTER TYPE CIRCUIT BREAKERS IN DWELLING AND DORMITORY UNITS AND FOR ALL BRANCH CIRCUITS INDICATED IN SECTION 210.12 OF THE NEC.

K. PROVIDE HOSPITAL GRADE RECEPTACLE OUTLETS.

L. PROVIDE A METAL RACEWAY SYSTEM, METALLIC CABLE ARMOR, OR SHEATH ASSEMBLY THAT QUALIFIES AS AN EQUIPMENT GROUND CONDUCTOR IN ACCORDANCE WITH SECTION 250.118 OF THE NEC IN PATIENT CARE AREAS AS REQUIRED BY SECTION 517.13 OF THE NEC. AN INSULATED EQUIPMENT GROUND CONDUCTOR SHALL BE PROVIDED IN ADDITION AS INDICATED IN SECTION 517.13 OF THE NEC.

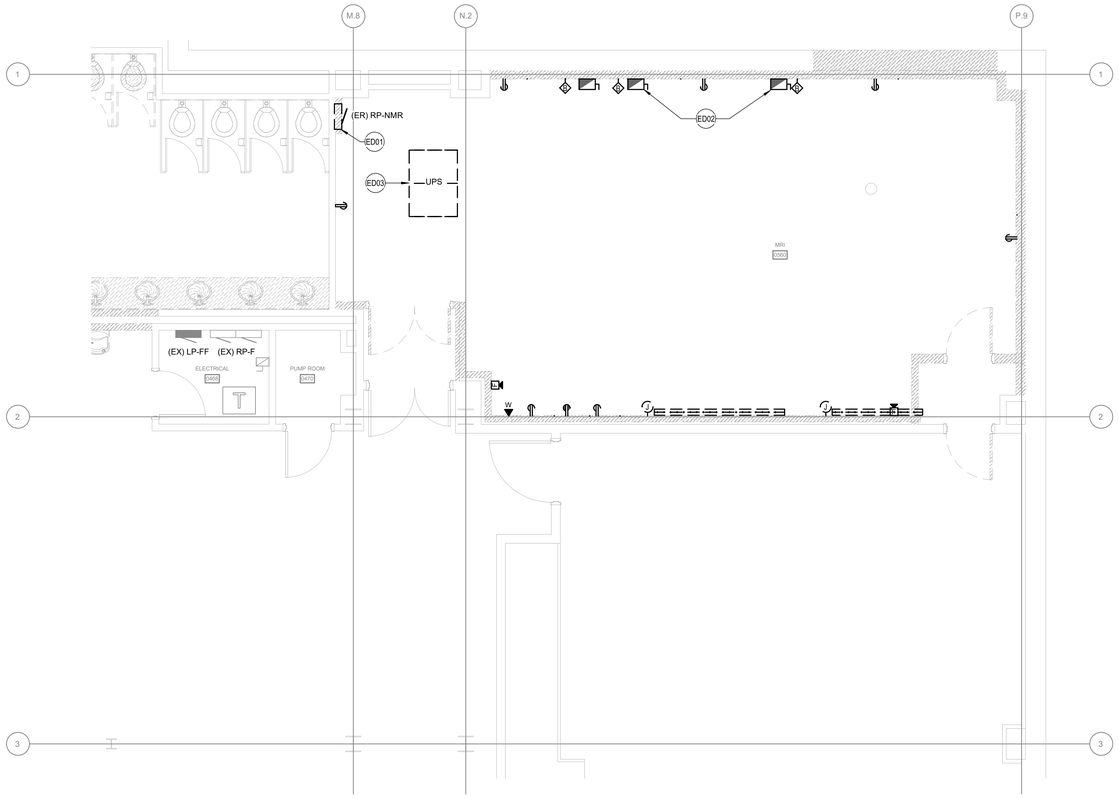
PLAN NOTES

ED01 RELOCATE EXISTING PANEL 'RP-NMR' TO NEW NRM ROOM. INTERCEPT AND EXTEND EXISTING PANELBOARD FEEDER FROM 45KVA 240D/120V TRANSFORMER ON MAIN STREET LEVEL ELECTRICAL ROOM 0468.

ED02 RELOCATE EXISTING 30A NON-FUSED DISCONNECT SWITCH AND ASSOCIATED L6-20 RECEPTACLE FOR RELOCATED NMR.

ED03 DEMOLISH UPS FEEDER BACK TO SOURCE. DEMOLISH ALL ASSOCIATED FEEDERS, CONDUIT, DEVICES, AND SUPPORTS ASSOCIATED WITH UPS. RETURN ALL BREAKERS ASSOCIATED WITH DEMOLISHED UPS TO SPARE AND UPDATE PANEL SCHEDULES ACCORDINGLY.

EP03 REFER TO MRI VENDOR'S DRAWINGS FOR ALL FINAL LOCATIONS, MOUNTING HEIGHTS, DEVICES, WIRING, CONNECTIONS, SUPPORTS, PULL BOXES, ELECTRICAL EQUIPMENT, DUCTS, CABLE PULLS AND RACEWAY ROUTING AND SIZES.



2 ENLARGED CLINICAL POWER AND AUXILIARY - DEMOLITION PLAN

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

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

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Wayne State University

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WSU APPLEBAUM MRI

259 MACK AVE
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SSOE PROJECT #:	023-03727-00
SSOE MANAGER:	JEFF FALZON

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ENLARGED CLINICAL PLANS - POWER & AUXILIARY

E3-101

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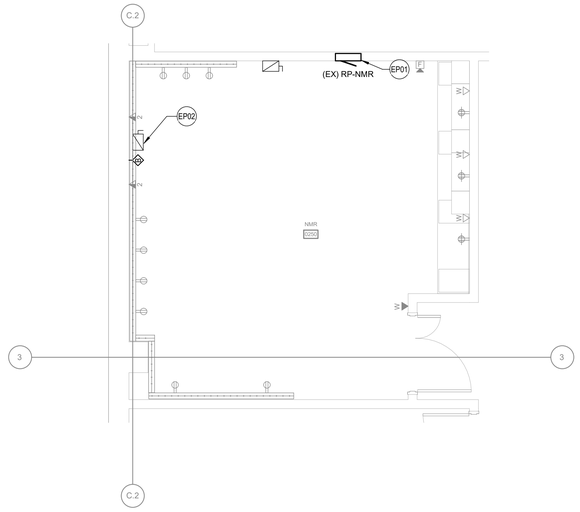
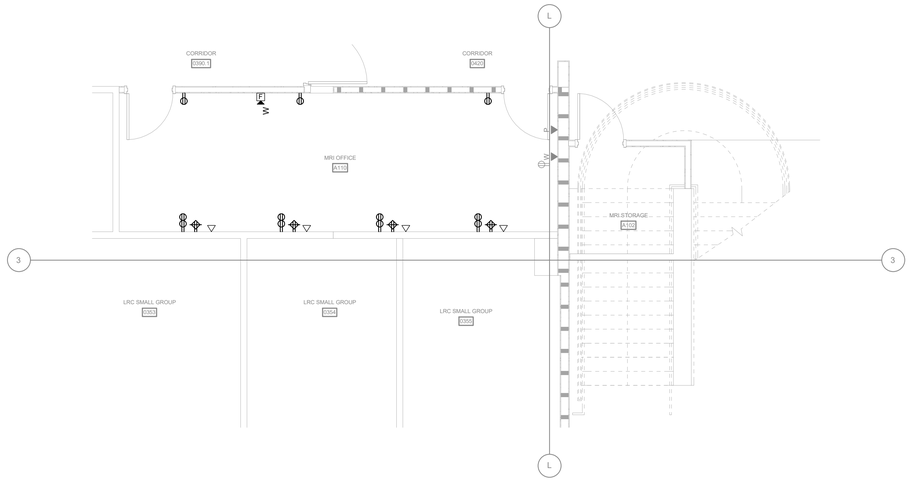


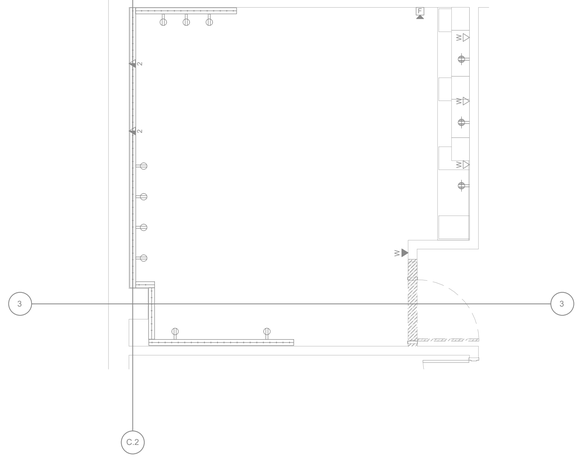
2 E1-101 ENLARGED NMR 0250 POWER AND AUXILIARY - NEW WORK PLAN

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



1 E1-101 ENLARGED MRI OFFICE A110 POWER AND AUXILIARY - NEW WORK PLAN

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



6 ENLARGED NMR 0250 POWER AND AUXILIARY - DEMOLITION PLAN

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

GENERAL NOTES - POWER

A. REFER TO ARCHITECTURAL FLOOR PLAN AND ELEVATIONS FOR EXACT LOCATION OF DEVICES WHERE INDICATED.

B. RECEPTACLE OUTLETS SHALL BE RATED 20A U.O.N..

C. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE U.O.N..

D. PROVIDE GFCI PROTECTION WHERE REQUIRED BY THE NEC WHETHER INDICATED OR NOT.

E. BRANCH CIRCUIT JUNCTION BOXES SHALL BE LABELED WITH THE CIRCUITS ENCLOSED.

F. SINGLE PHASE 20A BRANCH CIRCUIT W/RING SHALL BE 2#12, 1#12GND IN 3/4"C UNLESS NOTED OTHERWISE.

G. EXISTING EQUIPMENT/DEVICES NOT SPECIFICALLY INDICATED TO BE DEMOLISHED SHALL REMAIN OPERATIONAL. REVISE EXISTING CIRCUITING TO MAINTAIN OPERATION TO SUCH EQUIPMENT/DEVICES AS REQUIRED.

H. CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.

I. ELECTRICAL EQUIPMENT MOUNTED ON THE FLOOR SHALL BE MOUNTED ON A 4" CONCRETE HOUSEKEEPING PAD.

J. PROVIDE ARC FAULT CIRCUIT INTERRUPTER TYPE CIRCUIT BREAKERS IN DWELLING AND DORMITORY UNITS AND FOR ALL BRANCH CIRCUITS INDICATED IN SECTION 210.12 OF THE NEC.

K. PROVIDE HOSPITAL GRADE RECEPTACLE OUTLETS.

L. PROVIDE A METAL RACEWAY SYSTEM, METALLIC CABLE ARMOR, OR SHEATH ASSEMBLY THAT QUALIFIES AS AN EQUIPMENT GROUND CONDUCTOR IN ACCORDANCE WITH SECTION 250.118 OF THE NEC IN PATIENT CARE AREAS AS REQUIRED BY SECTION 517.13 OF THE NEC. AN INSULATED EQUIPMENT GROUND CONDUCTOR SHALL BE PROVIDED IN ADDITION AS INDICATED IN SECTION 517.13 OF THE NEC.

PLAN NOTES

EP01 RELOCATED PANEL 'RP-NMR'. PROVIDE ALL NEW FEEDERS TO EXISTING BRANCH CIRCUITS AND RECONNECT TO MATCH EXISTING CONFIGURATION.

EP02 RELOCATED EXISTING 30A NON-FUSED DISCONNECT SWITCH AND ASSOCIATED L6-20 RECEPTACLE FOR RELOCATED NMR. PROVIDE ALL NEW WIRING, CONDUIT, AND SUPPORTS TO RECONNECT TO RELOCATED EXISTING PANEL 'RP-NMR' LOCATED IN THIS ROOM. RE-USE EXISTING 20A 2 POLE BREAKERS. TYPICAL OF TWO.

PROFESSIONAL SEALS:

PROJECT PARTNERS:

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ENLARGED NMR 0250 & MRI OFFICE A110 PLANS - POWER & AUXILIARY

E3-102

COPPER CIRCUIT LENGTH TABLE. 480V 3PH
(NOTES 7,8, 9)

OVERCURRENT DEVICE RATING	MAX. CIRCUIT LOAD (AMPS)	MINIMUM AMPERAGE RATING OF WIRE REQUIRED FOR LENGTH INDICATED																							ONE WAY MAXIMUM CIRCUIT LENGTH
		20A	30A	40A	50A	70A	80A	90A	100A	150A	175A	200A	225A	250A	300A	350A	400A	450A	500A	600A	700A	800A	1000A	1200A	1600A	2000A	
20A	16	250'	415'	645'	1025'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
30A	24	-	275'	425'	680'	1060'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
40A	32	-	-	320'	510'	800'	1000'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
50A	40	-	-	-	410'	640'	780'	960'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
70A	56	-	-	-	-	455'	560'	690'	840'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
80A	64	-	-	-	-	-	490'	600'	735'	950'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
90A	72	-	-	-	-	-	-	535'	655'	850'	990'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
100A	80	-	-	-	-	-	-	-	590'	755'	880'	1070'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
150A	120	-	-	-	-	-	-	-	-	505'	588'	710'	840'	-	-	-	-	-	-	-	-	-	-	-	-	-	
175A	140	-	-	-	-	-	-	-	-	-	500'	600'	710'	780'	-	-	-	-	-	-	-	-	-	-	-	-	
200A	160	-	-	-	-	-	-	-	-	-	-	525'	620'	685'	830'	-	-	-	-	-	-	-	-	-	-	-	
225A	180	-	-	-	-	-	-	-	-	-	-	-	550'	605'	750'	885'	-	-	-	-	-	-	-	-	-	-	
250A	200	-	-	-	-	-	-	-	-	-	-	-	-	530'	650'	770'	820'	-	-	-	-	-	-	-	-	-	
300A	240	-	-	-	-	-	-	-	-	-	-	-	-	-	540'	635'	685'	820'	-	-	-	-	-	-	-	-	
350A	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	545'	585'	705'	765'	-	-	-	-	-	-	-	
400A	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	510'	615'	670'	815'	-	-	-	-	-	-	
450A	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	550'	600'	725'	850'	-	-	-	-	-	
500A	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	535'	650'	765'	820'	-	-	-	-	
600A	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	545'	640'	680'	820'	-	-	-	
700A	560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	550'	580'	750'	875'	-	-	
800A	640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	510'	650'	760'	1020'	-	
1000A	800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	525'	610'	815'	1010'	
1200A	960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	510'	680'	850'	
1600A	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	510'	680'	
2000A	1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	510'	

COPPER FEEDER & BRANCH CIRCUIT SIZING SCHEDULE
(NOTES 1,2,10,11,12)

OVERCURRENT DEVICE RATING	SETS PER PHASE	AWG OR KCMIL		CONDUIT SIZE	
		PHASE & NEUTRAL	EG	3 WIRE (3W) (3PH)	4 WIRE (4W) (3PH & 1N)
20A	1	12	12	3/4"	3/4"
30A	1	10	10	3/4"	3/4"
40A	1	8	10	3/4"	3/4"
50A	1	6	10	3/4"	1"
60A	1	4	10	1"	1-1/4"
70A	1	4	8	1"	1-1/4"
100A	1	2	8	1-1/4"	1-1/4"
110A	1	2	6	1-1/4"	1-1/4"
125A	1	1	6	1-1/4"	1-1/2"
150A	1	1/0	6	1-1/2"	1-1/2"
175A	1	2/0	6	1-1/2"	2"
200A	1	3/0	6	2"	2"
225A	1	4/0	4	2"	3"
250A	1	250	4	2"	3"
300A	1	350	4	3"	3"
400A	1	500	2	3"	3"
450A	2	4/0	2	2"	3"
500A	2	250	2	2"	3"
600A	2	350	1	3"	3"
800A	2	500	1/0	3"	3"
1000A	3	500	2/0	3"	3"
1200A	3	600	3/0	3"	4"
1600A	4	600	4/0	3"	4"
2000A	5	600	250	3"	4"

SHEET NOTES

1. AMPACITIES BASED ON THHN/THWN, 90° , 600V., INSULATED, COPPER WIRE APPLIED AT 60° TERMINATIONS FOR CIRCUITS RATED 110A AND DOWN AND APPLIED AT 75° TERMINTATIONS FOR CIRCUITS RATED ABOVE 110A PER NEC 110.14(C)(1).
2. BASED ON WIRE OUTSIDE DIAMETERS AND NON-RIGID METALLIC CONDUIT INSIDE DIAMETERS AS PROVIDED IN THE NEC. REFER TO NEC FOR CONDUIT TYPES MORE RESTRICTIVE THAN NON-RIGID METALLIC. CONDUCTOR AND CONDUIT SIZES INDICATED ARE MINIMUM REQUIREMENTS. FOLLOW NEC REQUIRMENTS FOR DERATING AND PROVIDE LARGER CONDUCTORS AND CONDUIT WHERE APPLICABLE.
3. BASED ON MOTOR FULL LOAD AMPERES AS PROVIDED BY THE NEC.
4. BASED ON MOTOR RUNNING OVERLOAD PROTECTION PROVIDED BY THERMAL OVERLOAD RELAYS.
5. MOTOR STARTING TYPE BASED ON 3 PHASE, FULL VOLTAGE NON-REVERSING EXCEPT FOR MOTORS SIZED 75HP OR GREATER WHICH ARE BASED ON 3 PHASE, PART WINDING REDUCED VOLTAGE STARTING.
6. TRANSFORMER CIRCUITS BASED ON 480V-208Y/120V, 3 PHASE, 4 WIRE, DRY TYPE. REFER TO CIRCUIT SIZING SCHEDULES ON THIS SHEET FOR PRIMARY/SECONDARY PHASE/NEUTRAL/SUPPLY SIDE BONDING JUMPER CONDUCTOR REQUIREMENTS ASSOCIATED WITH CIRCUIT SIZES NOTED IN THIS TABLE UON.
7. CIRCUIT MAXIMUM DISTANCE IS BASED ON NEC CHAPTER 9, TABLE 8 CONDUCTOR PROPERTIES FOR COATED COPPER AT 75 DEGREES CELSIUS. REFER TO NEXT LARGER OVERCURRENT DEVICE RATING IN THIS TABLE FOR OVERCURRENT DEVICES WITH RATINGS NOT INDICATED.
8. MAXIMUM CIRCUIT LOAD FOR DISTANCE IS BASED ON NEC 220-10.
9. REFER TO CIRCUIT SIZING SCHEDULE ON THIS SHEET FOR UPSIZING CONDUIT AND WIRING. E.G. SHALL BE INCREASED IN SIZE PROPORTIONATELY PER THE NEC. ONLY CONDUCTORS AND CONDUIT SHALL BE INCREASED IN SIZE. OVERCURRENT PROTECTION DEVICE SHALL REMAIN AS SPECIFIED.
10. CONDUCTORS SHALL BE STRANDED. COPPER CONDUCTORS ARE REQUIRED.
11. WHERE OVERCURRENT DEVICE REQUIRED IS NOT LISTED IN TABLE, USE CONDUIT AND WIRE REQUIREMENTS LISTED FOR NEXT LARGER LISTED OVERCURRENT DEVICE.
12. TABLE IS NOT APPLICABLE FOR SERVICE ENTRANCE FEEDERS. REFER TO ELECTRICAL PLANS AND DIAGRAMS FOR SERVICE ENTRANCE FEEDER REQUIREMENTS.
13. REFER TO CIRCUIT SIZING SCHEDULE ON THIS SHEET FOR CONDUIT AND WIRING REQUIREMENTS ASSOCIATED WITH CIRCUIT SIZES NOTED IN THIS TABLE.
14. NON-FUSED LOCAL DISCONNECT SWITCH SIZE SHALL HAVE AN AMPERE RATING NO LESS THAN THE CIRCUIT SIZE INDICATED IN THIS TABLE. WHERE THE CIRCUIT SIZE IS NOT INDICATED, THE AMPERE RATING SHALL BE NO LESS THAN THE RATING OF THE PHASE CONDUCTORS PER THE NEC.

CIRCUIT LENGTH TABLE. 120V 1PH
(NOTES 7,8,9)

OVERCURRENT DEVICE RATING	MAX. CIRCUIT LOAD (AMPS)	CIRCUIT SIZE					ONE WAY CIRCUIT LENGTH
		20A	30A	40A	50A	70A	
20A	4	215'	360'	555'	880'	-	
	8	105'	180'	275'	440'	700'	
	12	70'	120'	185'	295'	465'	
	16	50'	90'	140'	220'	350'	
30A	24	-	60'	90'	145'	230'	
40A	32	-	-	70'	110'	175'	
50A	40	-	-	-	85'	140'	
60A	48	-	-	-	-	115'	

CIRCUIT LENGTH TABLE. 208V 1PH
(NOTES 7,8,9)

OVERCURRENT DEVICE RATING	MAX. CIRCUIT LOAD (AMPS)	CIRCUIT SIZE					ONE WAY CIRCUIT LENGTH
		20A	30A	40A	50A	70A	
20A	4	375'	625'	965'	-	-	
	8	185'	310'	480'	765'	-	
	12	125'	205'	320'	510'	810'	
	16	90'	155'	240'	380'	605'	
30A	24	-	100'	160'	255'	405'	
40A	32	-	-	120'	190'	300'	
50A	40	-	-	-	150'	240'	
60A	48	-	-	-	-	200'	

CIRCUIT LENGTH TABLE. 208V 3PH
(NOTES 7,8,9)

OVERCURRENT DEVICE RATING	MAX. CIRCUIT LOAD (AMPS)	CIRCUIT SIZE					ONE WAY CIRCUIT LENGTH
		20A	30A	40A	50A	70A	
20A	4	435'	720'	1115'	-	-	
	8	215'	360'	555'	880'	-	
	12	145'	240'	370'	590'	935'	
	16	105'	180'	275'	440'	700'	
30A	24	-	120'	185'	295'	465'	
40A	32	-	-	135'	220'	350'	
50A	40	-	-	-	175'	275'	
60A	48	-	-	-	-	230'	

CIRCUIT LENGTH TABLE. 277V 1PH
(NOTES 7,8,9)

OVERCURRENT DEVICE RATING	MAX. CIRCUIT LOAD (AMPS)	CIRCUIT SIZE					ONE WAY CIRCUIT LENGTH
		20A	30A	40A	50A	70A	
20A	4	500'	830'	1290'	-	-	
	8	250'	415'	645'	1010'	-	
	12	165'	275'	430'	675'	1065'	
	16	125'	205'	320'	510'	805'	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	

TRANSFORMER CIRCUIT SIZING SCHEDULE - GENERAL PURPOSE TYPE (NOTE 6)

KVA	PRIMARY CIRCUIT (480V)			SECONDARY CIRCUIT (208Y/120V)			
	FLA	SWITCH/FUSE OR CIRCUIT BREAKER SIZE	PRIMARY FEEDER	FLA	SWITCH/FUSE OR CIRCUIT BREAKER SIZE	GROUNDING ELECTRODE CONDUCTOR/ SUPPLY SIDE BONDING JUMPER	SECONDARY FEEDER [PROVIDE SUPPLY SIDE BONDING JUMPER FOR SECONDARY FEEDER PER LOW VOLTAGE DISTRIBUTION TRANSFORMER WIRING DETAIL IN LIEU OF EQUIPMENT GROUND]
9	10.8	30/20A	20A, 3W	25.0	30/30A	#8	30A, 4W
15	18.1	30/30A	30A, 3W	41.7	60/60A	#8	70A, 4W
30	36.1	60/60A	60A, 3W	83.3	100/100A	#6	125A, 4W
45	54.2	100/90A	100A, 3W	125.0	200/150A	#6	150A, 4W
75	90.3	200/150A	150A, 3W	208.3	400/250A	#2	250A, 4W
112.5	135.4	400/225A	225A, 3W	312.5	400/400A	#1/0	4#600, 4°C.
150	180.5	400/300A	300A, 3W	416.7	600/500A	#1/0	500A, 4W
225	270.8	400/400A	400A, 3W	625.0	800/800A	#3/0	2 SETS 4#600, 4°C
300	361.0	600/600A	600A, 3W	833.3	1200/1000A	#3/0	1000A, 4W

MOTOR CIRCUIT SCHEDULE. 208V 3PH
(NOTES 3,4,5,13,14)

MOTOR HP	SWITCH/FUSE	CIRCUIT BREAKER	NEMA STARTER SIZE/TYPE	CIRCUIT SIZE
1/2	30/4A	15A	00	20A
3/4	30/6.25A	15A	00	20A
1	30/8A	15A	00	20A
1 1/2	30/15A	20A	00	20A
2	30/15A	20A	0	20A
3	30/20A	30A	0	3#12, 1#10G, 3/4"C
5	30/30A	45A	1	30A
7 1/2	60/45A	60A	1	40A
10	60/60A	80A	2	3#8, 1#8G, 1"C
15	100/90A	125A	3	3#4, 1#6G, 1-1/4"C
20	100/100A	150A	3	110A
25	200/150A	200A	3	110A
30	200/150A	225A	4	3#1, 1#4G, 1-1/2"C
40	200/200A	300A	4	3#1/0, 1#4G, 2"C
50	400/250A	400A	5	3#3/0, 1#2G, 2"C
60	400/300A	450A	5	3#4/0, 1#2G, 2"C
75	400/400A	600A	5	3#350, 1#1G, 3"C
100	600/500A	700A	6	3#500, 1#1/0G, 3"C
125	600/600A	900A	6	2 SETS 3#2/0,1#1/0G, 3"C
150	800/700A	1000A	6	2 SETS 3#250,1#2/0G, 3"C
200	-	1600A	6	2 SETS 3#500,1#4/0G, 3"C

MOTOR CIRCUIT SCHEDULE. 480V 3PH
(NOTES 3,4,5,13,14)

MOTOR HP	SWITCH/FUSE	CIRCUIT BREAKER	NEMA STARTER SIZE/TYPE	CIRCUIT SIZE
1/2	30/2A	15A	00	20A
3/4	30/3.2A	15A	00	20A
1	30/4A	15A	00	20A
1 1/2	30/5.6A	15A	00	20A
2	30/6.25A	15A	00	20A
3	30/8A	15A	0	20A
5	30/15A	20A	0	20A
7 1/2	30/20A	30A	1	3#12, 1#10G, 3/4"C
10	30/25A	35A	1	3#12, 1#10G, 3/4"C
15	60/40A	60A	2	30A
20	60/50A	70A	2	3#8, 1#8G, 1"C
25	60/60A	90A	2	3#6, 1#8G, 1"C
30	100/70A	100A	3	3#6, 1#8G, 1"C
40	100/90A	150A	3	3#4, 1#6G, 1-1/4"C
50	200/125A	175A	3	110A
60	200/150A	200A	4	125A
75	200/175A	250A	4	3#1, 1#4G, 1 1/2"C
100	400/225A	350A	4	3#2/0, 1#2G, 2"C
125	400/300A	400A	5	3#3/0, 1#2G, 2"C
150	400/350A	450A	5	3#4/0, 1#2G, 3"C
200	600/450A	600A	5	3#350, 1#1G, 3"C

SSOE

PROFESSIONAL SEALS:

PROJECT PARTNERS:

SUBMITTAL/REVISION SCHEDULE:

NO.	DATE	DESCRIPTION
1	10-20-23	DD PROGRESS

□ APPROVED FOR CONSTRUCTION
■ NOT APPROVED FOR CONSTRUCTION

CLIENT INFORMATION:

Wayne State University

WAYNE STATE UNIVERSITY

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CLIENT PROJECT #:	PROJECT NUMBER
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PROJECT INFORMATION:

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ELECTRICAL STANDARD CIRCUITING AND CONDUIT SIZING SCHEDULES

E8-101