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Saint Luke's East Hospital

MRI Replacement
80 NE Saint Luke's Blvd.
Lee's Summit, MO 64086

PROJECT TEAM

ARCHITECT
ACI BOLAND, INC.

17107 Chesterfield Airport Road, Ste 110
Chesterfield, MO 63005

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MEP ENGINEER
W. L. Cassell & Associates, Inc. now IMEG

1600 Baltimore, Suite 300
Kansas City, MO 64108

PHONE 816.842.8437
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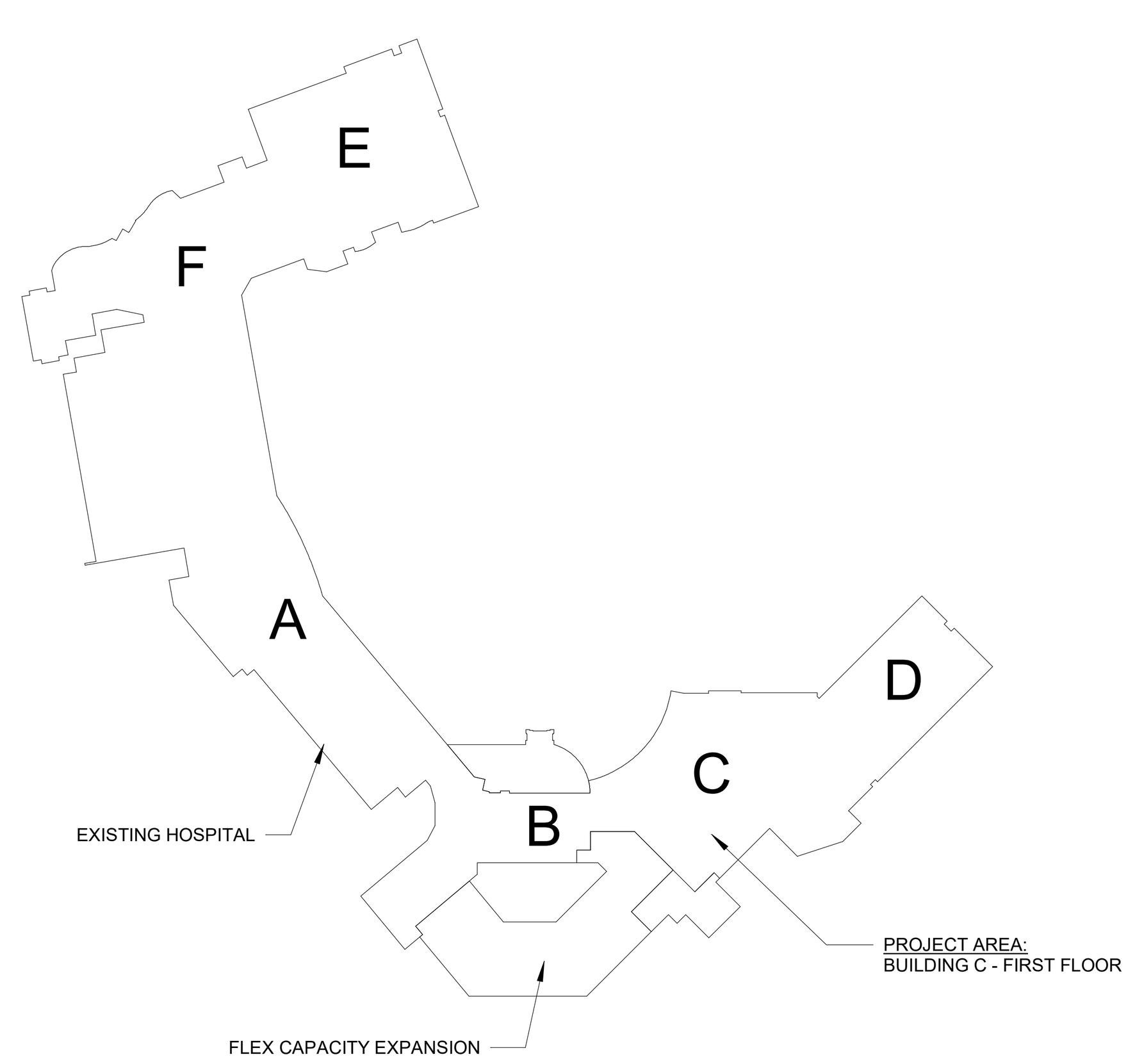
ABBREVIATIONS

AC.	ACOUSTIC/ACOUSTICAL
ADD.	ADDENDUM
ADD'N.	ADDITION
ABC	AGGREGATE BASE COURSE
AFF	ABOVE FINISH FLOOR
AGG.	AGGREGATE
A/C	AIR CONDITIONING
AL.	ALUMINUM
ALT.	ALTERNATE
A.B.	ANCHOR BOLT
&	AND
ARCH.	ARCHITECT
ASP.	ASPHALT
@	AT
ACT	ACOUSTIC CEILING TILE/PANEL
∠	ANGLE
BLKG.	BLOCKING
BSMT.	BASEMENT
BM.	BEAM
B.M.	BENCHMARK
BD.	BOARD
B.O.	BOTTOM OF
BLDG.	BUILDING
CAB'T.	CABINET
C.I.P.	CAST IN PLACE
C.B.	CATCH BASIN
CLG.	CEILING
CEM.	CEMENT/CEMENTITIOUS
CG.	CENTIGRAM
CM	CENTIMETER
CL.	CENTER LINE
CER.	CERAMIC
C.T.	CERAMIC TILE
CHAN.	CHANNEL
⊏	CHANNEL
CLR.	CLEAR
C.O.	CLEAN OUT
CLOS.	CLOSET
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCTION
C.J.	CONTROL JOINT
	CONSTRUCTION JOINT
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
COR'G.	CORRUGATED
CTR.	COUNTER
CTSK.	COUNTERSUNK
C.M.U.	CONCRETE MASONRY UNIT
D.P.	DAMP PROOFING
DB.	DECIBEL
DIAG.	DIAGONAL
DIAM.	DIAMETER
DIM.	DIMENSION
DISP.	DISPENSER
DWL.	DOWEL
DN.	DOWN
D.S.	DOWNSPOUT
DWG.	DRAWING
EA.	EACH
ELEC	ELECTRIC
E.W.C.	ELECTRIC WATER COOLER
EL.	ELEVATION
ELEV.	ELEVATOR
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXH.	EXHAUST
EXPAN.	EXPANSION
E.J.	EXPANSION JOINT
EXIST.	EXISTING
EXT.	EXTERIOR
FT.	FEET / FOOT
FIN.	FINISH
FIXT.	FIXTURE
FL.	FLASHING
FLR.	FLOOR
F.D.	FLOOR DRAIN
FLOR.	FLUORESCENT
FTG.	FOOTING
FND.	FOUNDATION
FR.	FRAME
F.H.C.	FIRE HOSE CAB.
FV.	FIELD VERIFY
GA.	GAUGE
GL.	GLASS / GLAZING
GD.	GRADE
G.	GRAM
GRL.	GRILLE
GRD.	GRID
GND.	GROUND
G.S.	GALVANIZED STEEL
GYP.	GYPSUM
GWB/G.B.	GYPSUM BOARD
H.R.	HAND RAIL
HDN.	HARDENER
HDW.	HARDWARE
HDWD.	HARDWOOD
HTR.	HEATER
HT.	HEIGHT
H.P.	HIGH POINT
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
H.B.	HOSE BIB
H.W.	HOT WATER
IN.	INCH / INCHES
I.D.	INSIDE DIAMETER
INSUL.	INSULATION
INT.	INTERIOR
INV.	INVERT
JAN.	JANITOR
JT.	JOINT
JST.	JOIST
K.P.	KICK PLATE
LAM.	LAMINATED
LB.	POUND
LDG.	LANDING
LTH.	LATH
LAV.	LAVATORY
LG.	LENGTH
LOC.	LOCATION
LT.	LIGHT
L.W.C.	LIGHT WEIGHT CONCRETE
LVR.	LOUVER
LOC.	LOCATION
M.O.	MASONRY OPENING
MAT'L..	MATERIAL
MFR.	MANUFACTURER
MB.	MARKER BOARD
MAX.	MAXIMUM
MECH.	MECHANICAL
MTL.	METAL
M.L.	METAL LATH
M.	METER
MIN.	MINIMUM
MLDG.	MOLDING
MULL.	MULLION
N.G.	NATURAL GRADE
NOM.	NOMINAL
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NO. / #	NUMBER
OBS.	OBSCURE
O.C.	ON CENTER
OPN'G.	OPENING
O.A.	OVERALL
O.D.	OUTSIDE DIAMETER
O.F.S.	OVERFLOW SCUPPER
O.F.D.	OVERFLOW DRAIN
O.H.D.	OVERHEAD DOOR
PTD.	PAINTED
PG.	PAGE
PLAM.	PLASTIC LAMINATE
PR.	PAIR
PNL.	PANEL
PTN.	PARTITION
d	PENNY
PL	PLATE
PLBG.	PLUMBING
PLYWD.	PLYWOOD
PT.	POINT
P.S.I.	POUNDS PER SQ. IN.
P.S.F.	POUNDS PER SQ. FT.
P.C.	PRECAST
P.L.	PROPERTY LINE
R.	RISER, RISERS
RAD.	RADIUS
R.D.	ROOF DRAIN
RB.	RESILIENT BASE
RE.	REFER TO
REG.	REGISTER
REQ'D.	REQUIRED
REV.	REVISION
RF'G.	ROOFING
RGH.	ROUGH
RM.	ROOM
RND.	ROUND
R.O.	ROUGH OPENING
SCHED.	SCHEDULE
S.C.	SEALED CONCRETE
SCR.	SCREW
SECT.	SECTION
SEL.	SELECT
SHG.	SHEATHING
SHT.	SHEET
SDG.	SIDING
SIM.	SIMILAR
SLDG.	SLIDING
SM.	SMOOTH
SPEC.	SPECIFICATION
SQ.	SQUARE
ST.	STAINED
STD.	STANDARD
S.S. / ST.STL.	STAINLESS STEEL
STRUC.	STRUCTURE
SUSP.	SUSPENDED
SW.BD.	SWITCHBOARD
SYS.	SYSTEM
T.	TREAD
T.C.	TOP OF CURB
T.G.	TEMPERED GLASS
T.O.	TOP OF
T.S.D.	TOP OF STEEL DECK
T.W.	TEACHERS WARDROBE
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
V.	VENT
VERT.	VERTICAL
V.G.	VERTICAL GRAIN
VEST.	VESTIBULE
V.C.T.	VINYL COMPOSITION TILE
VCP	VITREOUS CLAY PIPE
W.W.M.	WELDED WIRE MESH
W.C.	WATER CLOSET
W.H.	WATER HEATER
W.F.	WIDE FLANGE
W/	WITH
W/O	WITHOUT
WD.	WOOD
WDW.	WINDOW
W.W.	WINDOW WALL

LOCATION PLAN



GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH A.D.A. REQUIREMENTS AND ALL APPLICABLE LOCAL, STATE, AND FEDERAL BUILDING CODES AND REGULATIONS.
2. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY BUILDING PERMITS.
3. THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL FIELD VERIFY EXISTING CONDITIONS AND NOTIFY THE ARCHITECT OF ANY INCONSISTENCIES OR DISCREPANCIES WTH THE PROJECT DOCUMENTS. ACCESS TO THE SITE AND/OR SPACE UNDER CONSTRUCTION DURING BIDDING AND CONSTRUCTION SHALL BE COORDINATED WITH THE OWNER.
4. DO NOT SCALE DRAWINGS.
5. THE WORD "ALIGN" AS USED IN THESE DOCUMENTS SHALL SUPERSEDE ANY DIMENSIONAL INFORMATION GIVEN.
6. TYPICAL DIMENSIONS ARE TO FACE OF CONCRETE, DRYWALL, CURTAIN WALL, ETC., OR TO COLUMN CENTERLINE. DIMENSIONS AT WINDOWS ARE TYPICALLY TO FACE OF FRAME. REFER TO PLAN DETAILS FOR ADDITIONAL INFORMATION.
7. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR EXAMINING AND CONFIRMING ALL SUBSTRATE CONDITIONS WHERE NEW MATERIALS ARE APPLIED. THE SUBSTRATE SHALL BE SMOOTH AND FREE OF DEFECTS AND SHALL CONFORM TO THE REQUIREMENTS OF THE FINISHED MATERIAL MANUFACTURERS RECOMMENDATIONS.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN-UP.
9. THE GENERAL CONTRACTOR SHALL INSPECT AND CHECK THE ADEQUACY AND INSTALLATION OF THROUGH-WALL FLASHING PRIOR TO COVERING WITH FINISH MATERIALS. THIS SHALL INCLUDE, BUT IS NOT LIMITED TO INSPECTION AGAINST HOLES OR PENETRATIONS, APPROPRIATE LAPPING AND SEALING, AND OVERALL WORKMANSHIP IN CONFORMANCE WITH THE SPECIFICATIONS.

NOTE: REFER TO 3-19092 FLEX CAPACITY EXPANSION PROJECT MANUAL FOR SPECIFICATIONS.

SHEET INDEX

GENERAL
A0.1 COVER SHEET
A0.2 LIFE SAFETY PLAN

DEMOLITION
AD DEMOLITION PLAN

ARCHITECTURE
A2.1 FIRST FLOOR PLAN & RCP

PLUMBING
PM000 SYMBOLS, ABBREVIATIONS & GENERAL NOTES
DP1 PARTIAL FIRST FLOOR MED-GAS AND PLUMBING DEMOLITION PLANS
P2.1 PLUMBING PLANS

MECHANICAL
DM1 PARTIAL FIRST FLOOR MECHANICAL DEMOLITION PLANS
M2.1 MECHANICAL PLANS
M2.2 PARTIAL SECOND FLOOR AND ROOF MECHANICAL PLANS

ELECTRICAL
E000 SYMBOLS, ABBREVIATIONS AND GENERAL NOTES
EL2.1 LIGHTING PLANS
EP2.1 ELECTRICAL PLANS
EP2.2 ELECTRICAL ROOF PLANS
EC2.1 COMMUNICATIONS PLANS

NOTE: PHILIPS FINAL SITE PREPARATION SUPPORT DOCUMENTS INCLUDED FOR REFERENCE.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
08/04/2020

Joe Frogge
Digitally signed by Joe Frogge
DN: CN=Joe Frogge, OU=Development, OU=LS Users, DC=COLS, DC=LOC
Reason: release for construction
Date: 2020.08.04 16:08:04-05'00'

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SAMUEL K. BECKMAN
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04/17/2020

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Saint Luke's East Hospital
MRI Replacement
80 NE Saint Luke's Blvd
Lee's Summit, MO 64086

Date	Project Issue
Job Number	Project Number
Drawn By	Author
Checked By	Checker

Revision

Number	Date	Description

A0.1

COVER SHEET

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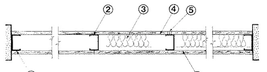

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ONLINE CERTIFICATIONS DIRECTORY

Design No. U465
BXUV.U465
Fire-resistance Ratings - ANSI/UL 263

Page Bottom

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263
BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

Design No. U465

August 25, 2016

Nonbearing Wall Rating — 1 HR.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Floor and Ceiling Runners —** (Not Shown) — Channel shaped runners, 3-5/8 in. deep (min), 1-1/4 in. legs, formed from min No. 25 MSG galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.

Item 6. Over the Resilient Channels install 3/4 inch thick SONOpan panel secured to the Resilient Channels with drywall screws and washers spaced at 16 in. OC on the perimeter of the panel and 8 in. OC in the field of the panel. Over the SONOpan panel install the same Gypsum Board as specified in Item 4 to Item 4I with the fastener length increased by minimum 3/4 inch. Not evaluated or intended as a substitute for the required layer(s) of UL Classified Gypsum Board.

MSL — RefleXor membrane, SONOpan panel

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Updated on 2016-08-25

NOTE: CUT ALL "ENCLOSURE" PIECES OF GYPSUM PANEL TO INSURE PROPER, TIGHT FIT.

1-HR FIVE SIDED BOX ENCLOSURE SECTION N.T.S.

1-HR FIVE SIDED BOX ENCLOSURE PLAN N.T.S.

System No. W-L-1514

December 08, 2015

F Rating — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr

1. **Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

   A. **Studs** — Wall framing consists of steel channel studs Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

   B. **Gypsum Board*** — One or two layers of nom 5/8 in. (16 mm) thick gypsum wallboard as specified in the individual Wall and Partition Design. Max diam of opening is 14 in. (356 mm).

2. **Through Penetrant** — One metallic pipe, conduit or tubing to be installed concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:

   A. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

   B. **Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) cast iron pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

   C. **Conduit** — Nom 4 in. (102 mm) diam (or smaller) steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic conduit A nom annular space of 0 (point contact) to 1 in. is required within the firestop system.

3. **Firestop System** — The firestop system shall consist of the following:

   A. **Packing Material** — (Optional, Not Shown) — In 2 hr wall assemblies, foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from each surface of the wall to accommodate the required thickness of fill material.

   B. **Fill, Void or Cavity Material* - Caulk** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus on both surfaces of the wall assembly. A min 1/2 in. (13 mm) diam bead of caulk shall be applied to the pipe/gypsum board interface at the point contact location on both sides of wall.

   SOUDAL ACCUMETRIC — Soudal Acryrub Firestop

A GYPSUM BOARD BOTH SIDES
NON-RATED - TYPICAL
1/2" = 1'-0"

G GYPSUM BOARD CEILING HEIGHT
1/2" = 1'-0"

U.L. DESIGNATIONS AT RATED WALLS AS INDICATED ON LIFE SAFETY PLAN	
🟥	1 HOUR FIRE SEPARATION U.L. U465 FOR 3 5/8" STUDS U.L. U442 AT TILED WALLS U.L. U451 FOR 2 1/2" STUDS

D4 PARTITION TYPES
1/2" = 1'-0"

PARTITION GENERAL NOTES

1. UNLESS NOTED OTHERWISE, ALL INTERIOR METAL STUDS ARE 3 5/8" THICK. REFER TO SUFFIX SCHEDULE BELOW FOR LOCATIONS OF METAL STUDS OTHER THAN 3-5/8" THICK. NOTE: STUD THICKNESS (GAUGE) MUST CONFORM TO MANUFACTURER'S RECOMMENDATIONS FOR SPAN (HEIGHT OF STUD)
2. WHERE THE PARTITION TYPE INDICATION IS SHOWN WITH A NUMERICAL SUFFIX, THE METAL STUD THICKNESS SHALL BE AS SCHEDULED BELOW:

SUFFIX	MTL. STUD THICKNESS
1	1-5/8" MTL. STUDS
2	2-1/2" MTL. STUDS
3	6" MTL. STUDS

3. UNLESS NOTED OTHERWISE, ALL INTERIOR DRYWALL PARTITIONS INDICATED ON THE FLOOR PLAN DRAWING ARE TYPE 'A' PARTITIONS. WHERE OCCURS, RATINGS ARE AS INDICATED ON THE LIFE SAFETY PLANS.
4. UNLESS NOTED OTHERWISE, ALL CMU PARTITIONS ARE 7-5/8", 8" NOMINAL. REFER TO SUFFIX SCHEDULE BELOW FOR LOCATIONS OF CMU PARTITIONS OTHER THAN 8" NOMINAL.
5. WHERE THE PARTITION TYPE INDICATION IS SHOWN WITH A NUMERICAL SUFFIX, THE CMU THICKNESS SHALL BE AS SCHEDULED BELOW:

SUFFIX	CMU THICKNESS
1	ACTUAL 3-5/8", 4" NOMINAL
2	ACTUAL 5-5/8", 6" NOMINAL
3	ACTUAL 11-5/8", 12" NOMINAL

6. UNLESS NOTED OTHERWISE, ALL INTERIOR MASONRY PARTITIONS INDICATED ON THE FLOOR PLAN DRAWING ARE TYPE 'B' PARTITIONS. WHERE OCCURS, RATINGS ARE AS INDICATED ON THE LIFE SAFETY PLANS.
7. ALL STUDS ARE CONTINUOUS FROM FLOOR STRUCTURE TO CEILING STRUCTURE UNLESS NOTED OTHERWISE.
8. METAL STUDS ARE SPACED @ 16" O.C. MAX., UNLESS NOTED OTHERWISE.
9. UNLESS NOTED OTHERWISE, ALL GYPSUM BOARD IS TO BE 5/8" THICK "FIRECODE".
10. THE LOCATION OF A CHANGE IN THE PARTITION TYPE IS INDICATED BY A WALL TAG.

11. THE CORRESPONDING RATED ASSEMBLIES ARE INDICATED BELOW THE PARTITION TYPES.
12. PARTITION TYPE DESIGNATIONS ARE INDICATED ON THE FLOOR PLAN DRAWINGS.
13. PARTITION TYPES DO NOT INCLUDE APPLIED FINISHES CALLED FOR IN THE ROOM FINISH SCHEDULE.
14. AT PARTITION TYPES WHERE MTL. STUDS ARE EXPOSED ON ONE OR BOTH SIDES, CUT STUD 1/4" SHORT AND SCREW BOTH SIDES TO MTL. RUNNER TRACK.

LIFE SAFETY LEGEND

▲	EXIT
FEC ●	NEW FIRE EXTINGUISHER CABINET
FEC ○	EXISTING FIRE EXTINGUISHER CABINET
▨	NOT IN SCOPE
- - - -	0 HR SMOKE PARTITION (SMOKE RESISTIVE)
• • • •	1 HR SMOKE BARRIER
—•—•—	1 HR FIRE BARRIER
—••—••—	2 HR FIRE BARRIER
— — —	2 HR FIRE SMOKE BARRIER
—•••—•••—	3 HR FIRE BARRIER

CODE SUMMARY

Project Construction Purpose: MRI equipment replacement and finish upgrades

Code Information
2018 International Building Code
2018 International Mechanical Code
2018 International Fuel Gas Code
2018 International Plumbing Code
2018 International Fire Code
2017 National Electric Code
2009 ICC/ANSI A117.1 Accessible Buildings and Facilities

State of Missouri Dept. of Health & Environment references the following codes:
2012 Life Safety Code (NFPA 101)
2018 FGI Guidelines for Design & Construction of Hospitals

Note: If code requirements overlap, the most stringent shall apply.

Owner Information
Saint Luke's East Hospital
80 NE Saint Luke's Boulevard
Lee's Summit, MO 64086

Designer Information
ACI Boland Architects
1710 Wyandotte St.
Kansas City, MO 64108
Phone: (816) 763-9600

Local Authority
Responding Fire Service: Lee's Summit Fire Department
Local Building Inspection: City of Lee's Summit - Codes Administration

Code Review:
The area of renovation will have no impact on occupant load or egress from the existing space.
Existing egress and occupant load will be routed through existing doors.
There are no alterations to the existing life safety plan.

Building Construction Type: Type 1-A - Section 602.2
Type 1 - 332 Sprinklered - Section 18.1.6.1)

Occupancy Group: I-2 - Section 308.3
(Healthcare - Section 6.1.5)

Occupant Load Factor: Institutional Outpatient = 100 gross Table 1004.5

Area of Renovation: Institutional Outpatient - 1,275 SF

Occupant Load:
Total Square Footage: 1,275 SF / 100 = 13 occupants total

Required Fire Resistance Ratings (in hours)
Per NFPA 101 A.8.2.1.2:

Exterior Bearing Walls	3 HR
Interior Bearing Walls	3 HR
Primary Structural Frame	3 HR
Floor Construction	2 HR
Roof Construction	1 1/2 HR
Interior non-bearing walls	0 HR

Active Fire Safety Features:
- Fire Alarm System - The fire alarm system is specified as an addressable type system. The device type and locations are per the applicable codes as well as ADA requirements.

- Smoke Control System - All ductwork penetrating smoke rated walls will have a smoke or combination fire/smoke damper as indicated on construction documents. These dampers will close upon detection of smoke by the area smoke detectors or duct smoke detectors in the air handling units.

- Fire Sprinkler System - Specified to be per NFPA 13. The sprinkler heads are specified to be quick response type.

- Emergency Lighting and Power - Emergency lighting, life safety and critical loads will receive power from a backup generator located outside the main electrical room.

- Illuminated Exit Signs

Passive Fire Safety Features:

- Smoke Compartments no greater than 22,500 SF

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
08/04/2020

A2 LIFE SAFETY PLAN
1/16" = 1'-0"

KEY PLAN
1" = 160'-0"

**THIS DRAWING IS INTENDED TO BE PRINTED IN COLOR. USE BLACK AND WHITE COPIES AT YOUR OWN RISK.*

STATE OF MISSOURI
SAMUEL K. BECKMAN
NUMBER A-2011012130
ARCHITECT
08/04/2020

Samuel K. Beckman - Architect
License - Missouri #A-2011012130

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Saint Luke's
East Hospital
MRI Replacement
80 NE Saint Luke's Blvd
Lee's Summit, MO 64086

Date	04/17/2020
Job Number	3-20037
Drawn By	Author
Checked By	Checker

Revision

Number	Date	Description
3	08.03.2020	CITY COMMENTS

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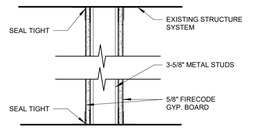
A0.2

LIFE SAFETY PLAN



WHERE DUST PARTITIONS ARE TO REMAIN THROUGH CONSTRUCTION, THEY SHALL BE CONSTRUCTED OF 3-5/8" METAL STUDS WITH CONTINUOUS TOP AND BOTTOM RUNNERS. PARTITIONS SHALL EXTEND TIGHT FROM FLOOR TO THE EXISTING CEILING OR STRUCTURE ABOVE, AND COPED AROUND DUCTS, PIPES, ETC., THAT PENETRATE THE PARTITION. THE ENTIRE PARTITION SHALL BE COVERED WITH 5/8" FIRE RATED GYP. BOARD SCREWED TO STUDS, ALL JOINTS BETWEEN SHEATHING, AT WALLS, AT FLOORS, CEILINGS, AROUND PIPES, ETC., TAPED AND SEALED TIGHT TO ENSURE DUST-PROOFING.

THE CONTRACTOR SHALL COVER AND SEAL IN A DUST-TIGHT MANNER ALL EXISTING OPENINGS, GRILLES, JOINTS AROUND DOORS AND FRAMES, ETC., WITH FIRE RETARDANT SHEET AND/OR TAPE AS APPROPRIATE WHERE SUCH OPENINGS, ETC., OCCUR IN EXISTING PARTITIONS SEPARATING EXISTING AREAS FROM CONSTRUCTION AREAS. THE CONTRACTOR SHALL MAINTAIN AND REPAIR ANY DUST BARRIERS AS DETERMINED BY, AND TO THE SATISFACTION OF, THE OWNER.

DP SMOKE TIGHT NON-COMBUSTIBLE CONSTRUCTION PARTITION
1 1/2" = 1'-0"

GENERAL DEMOLITION NOTES

1. THE OWNER SHALL VACATE THE EXISTING ROOMS AS INDICATED ON THE PLAN AND BE RESPONSIBLE FOR THE REMOVAL OF ANY EQUIPMENT WHICH IS TO REMAIN THE PROPERTY OF THE OWNER PRIOR TO ANY WORK DONE BY THE CONTRACTOR FOR THIS PORTION OF THE SEQUENCE.

2. INSTALL TEMPORARY DUST PROTECTION/ PARTITION AS INDICATED ON THE PLAN TO CONTAIN DEMOLITION/ CONSTRUCTION DUST AND DEBRIS WITHIN THE AREA OF CONSTRUCTION. REFER TO DUST PARTITION "DP" ON THIS SHEET.

3. IT IS THE INTENT OF THIS DEMOLITION TO REMOVE ALL EXISTING CONSTRUCTION WHICH CONFLICTS WITH THE INTENT OF THE NEW CONSTRUCTION. EVERY DEMOLITION DETAIL MAY NOT NECESSARILY BE COVERED ON THESE DRAWINGS. FIELD VERIFY THE EXTENT OF ALL DEMOLITION.

4. THE CONTRACTOR SHALL USE EXTREME CARE IN THE PROTECTION OF ALL ADJACENT AREAS FOR IT IS IMPERATIVE TO PROVIDE CONTINUOUS OPERATION OF ALL OCCUPIED AREAS DURING THE DEMOLITION, CONSTRUCTION AND RENOVATION WITHIN THIS AND ALL SEQUENCES OF CONSTRUCTION.

5. ALL PARTITIONS, DOORS, EQUIPMENT, ETC. INDICATED BY DASHED LINES ON THIS PLAN SHALL BE REMOVED.

6. ALL DEMOLITION DESCRIBED IN THESE DOCUMENTS SHALL BE COORDINATED WITH PHASING WORK REQUIRED TO COMPLETE THE WORK.

7. THE CONTRACTOR SHALL COORDINATE ALL DEMOLITION WORK W/ OCCUPIED SPACES BELOW AND SHALL NOTIFY OWNER TWO WEEKS PRIOR TO COMMENCING WORK. SUCH SPACES ARE TO REMAIN OCCUPIED DURING DEMOLITION AND ALL WORK SHALL BE PERFORMED IN SUCH A MANNER TO MINIMIZE DISRUPTION TO OCCUPIED SPACES. EXISTING FLOOR, WALL AND CEILING FINISHES TO REMAIN SHALL BE PROTECTED AND ANY DAMAGE DONE AS A RESULT OF DEMOLITION WORK SHALL BE REPAIRED.

8. IN AREAS SCHEDULED FOR DEMOLITION, THE CONTRACTOR SHALL REMOVE ALL ACCESSORIES. GRAB BARS, MIRRORS, SOAP AND PAPER TOWEL DISPENSERS, SHELVES, BULLETIN BOARDS, ETC., SHALL BE TURNED OVER TO THE OWNER, EXCEPT FOR RELOCATED ITEMS.

9. WHERE NEW FINISHES ARE CALLED FOR, REMOVE AND DISCARD EXISTING FLOORING, CEILINGS AND WALL COVERING THROUGH-OUT AREA DESIGNATED FOR NEW CONSTRUCTION AND PREP EXISTING FLOOR AND WALL SUBSTRATE TO RECEIVE THE INSTALLATION OF NEW FINISH AS SCHEDULED.

10. AT DISSIMILAR FLOOR ELEVATIONS, AFTER THE EXISTING CONSTRUCTION HAS BEEN REMOVED, FEATHER EPOXY GROUT TOPPINGS TO EACH FLOOR ELEVATION AND GRIND SMOOTH. AT DISSIMILAR FLOOR MATERIALS, AND/OR AT JUNCTIONS BETWEEN EXISTING FLOOR, PROVIDE THE APPROPRIATE TRANSITION STRIP AT THE EDGE.

11. AT VARIATIONS IN WALL SURFACES AFTER THE EXISTING CONSTRUCTION HAS BEEN REMOVED, FEATHER JOINT COMPOUND AND SAND SMOOTH.

12. WHERE CEILING IS TO REMAIN, REMOVE ALL DAMAGED CEILING PANELS/ TILES AND REPLACE WITH NEW TO MATCH EXISTING.

13. REMOVE AND RETURN TO THE OWNER ALL EXISTING PLUMBING FIXTURES. CAP ALL SUPPLY AND WASTE LINES AS REQUIRED. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION.

14. THE CONTRACTOR SHALL PATCH TO MATCH ADJACENT SURFACES OF EXISTING WALLS AND FLOORS IN ALL AREAS THAT REQUIRE THE REMOVAL OF GENERAL MECHANICAL, ELECTRICAL AND PLUMBING WORK AND OF EQUIPMENT AND FIXTURES.

15. THE CONTRACTOR SHALL PROVIDE FOR ALL NECESSARY TEMPORARY RELOCATION AND MAINTENANCE OF ALL EXISTING UTILITIES WHICH ARE CURRENTLY IN USE AND WHICH MUST BE TEMPORARILY RELOCATED DURING CONSTRUCTION OF NEW AREAS AND RENOVATION OF EXISTING AREAS THROUGH EACH SEQUENCE OF CONSTRUCTION.

16. REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR WORK REQUIRED IN THIS STEP OF THE SEQUENCE OF CONSTRUCTION.

17. WHERE REMOVAL OF EXISTING PARTITIONS, EQUIPMENT, ETC. DISTURBS EXISTING MECHANICAL, PLUMBING OR ELECTRICAL SERVICES, THE CONTRACTOR SHALL MAKE PERMANENT REVISIONS AS REQUIRED AND IF NECESSARY, PROVIDE TEMPORARY SERVICES TO AREAS NOT SCHEDULED FOR DEMOLITION AND RENOVATION.

18. WHERE EXISTING WALLS, CEILINGS, OR FLOORS ARE DAMAGED BY THE CONTRACTOR FOR ACCESS TO SERVICES AND NEW CONSTRUCTION WHICH MAY NOT BE SCHEDULED OR SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE TO PATCH TO MATCH MATERIAL AND FINISHES TO ORIGINAL CONDITIONS. IF EXISTING FINISHES CANNOT BE MATCHED, THE ENTIRE WALL, CEILING, OR FLOOR SHALL BE REFINISHED TO THE NEAREST CORNER OR POSITIVE BREAKING POINT.

19. WHEN DEMOLITION CAUSES OR EXPOSES DAMAGE TO FLOOR SLAB, WALL, OR CEILING SURFACES WHICH WILL REMAIN EXPOSED IN THE FINISHED WORK, SUCH CONDITIONS SHALL BE REPAIRED AND LEVELED AS REQUIRED TO RECEIVE NEW FINISHES.

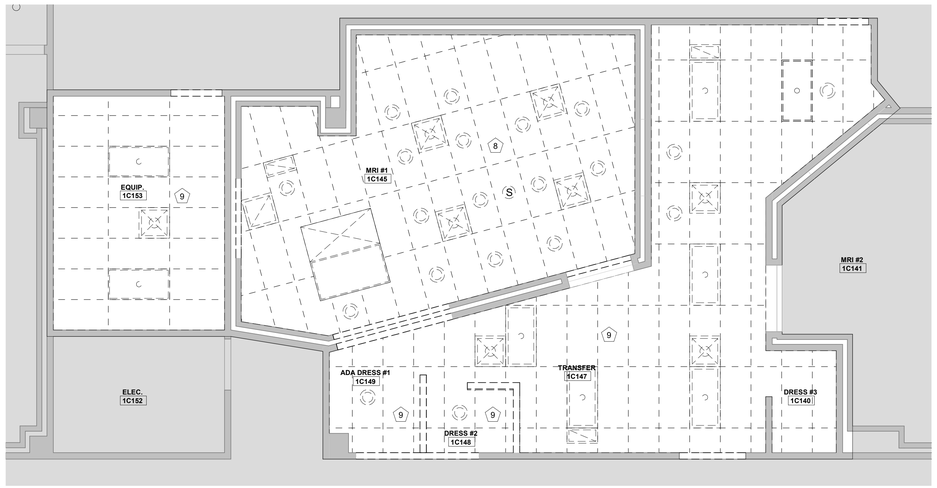
20. CLEAN AIR GRILLES AND LIGHT FIXTURES THROUGHOUT PROJECT AREA UPON COMPLETION OF WORK.

21. WHERE EXISTING PHONE, DATA, OR PHONE/DATA OUTLETS ARE REMOVED, THE CONTRACTOR SHALL USE EXTREME CARE IN PULLING WIRE THROUGH THE EXISTING CONDUITS, COIL AND WRAP ABOVE EXISTING CEILING FOR REUSE.

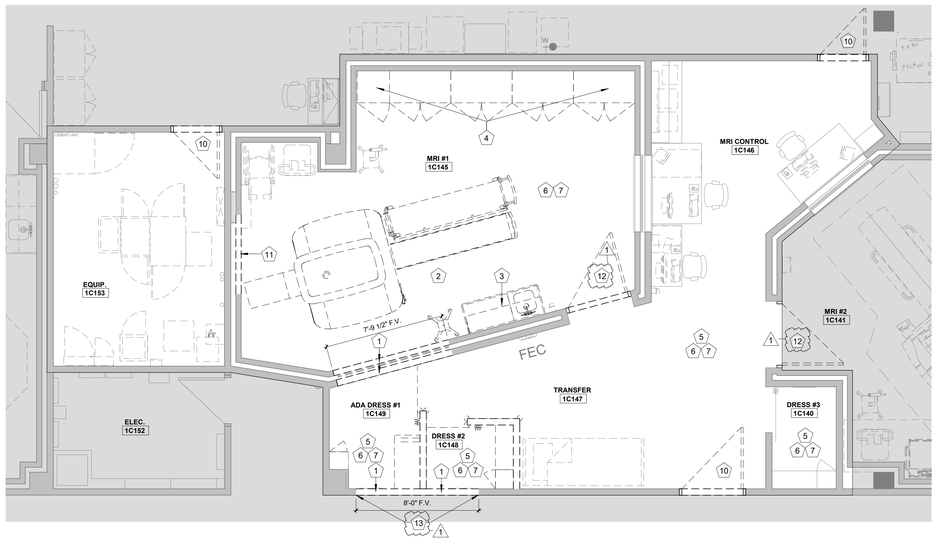
22. WHERE EXTERIOR WALLS, WINDOWS, AND/OR DOORS ARE BEING REMOVED, THE CONTRACTOR WILL BE RESPONSIBLE TO CONSTRUCT TEMPORARY PARTITIONS AS REQUIRED TO ENSURE THAT THE EXISTING BUILDINGS REMAIN WATERTIGHT AND WITHOUT DRAFTS DURING DEMOLITION WORK. THESE PARTITIONS SHALL REMAIN IN PLACE DURING THE NEW CONSTRUCTION WORK, OR AS REQUIRED TO MAINTAIN THIS SEPARATION.

23. THE CONTRACTOR SHALL FILL ALL OPENINGS IN EXTERIOR WALLS RESULTING FROM THE REMOVAL OF LOUVERS, EXHAUST FANS, ETC. THE OPENINGS SHALL BE FILLED FLUSH WITH AND OF THE SAME MATERIALS AS THE SURROUNDING WALLS.

24. PROVIDE SHORING AND BRACING AS REQUIRED DURING DEMOLITION AND NEW CONSTRUCTION.



C2 DEMO REFLECTED CEILING PLAN
1/4" = 1'-0"



A2 DEMO FLOOR PLAN
1/4" = 1'-0"

DEMOLITION LEGEND

- NOT IN SCOPE
- EXISTING TO REMAIN
- WALLS, DOORS, EQUIPMENT, FIXTURES, ETC. INDICATED BY DASHED LINES WITHIN THE AREA OF CONSTRUCTION SHALL BE REMOVED. REFER TO THIS SHEET FOR ARCHITECTURAL DEMOLITION NOTES.
- EXISTING DOOR, FRAME AND HARDWARE TO REMAIN
- REMOVE EXISTING DOOR, FRAME, HARDWARE AND WALL CONSTRUCTION COMPLETELY. REFER TO KEYNOTES FOR SPECIFIC DEMOLITION INFORMATION.
- DP — DUST PARTITIONS - THE CONTRACTOR SHALL MAKE EVERY EFFORT TO ENSURE THE EXISTING BUILDING TO BE COMPLETELY PROTECTED AGAINST INFILTRATION OF DUST AND MOISTURE DURING THE COURSE OF DEMOLITION/ CONSTRUCTION WITH DUST PARTITIONS ACROSS CORRIDORS AND OPENINGS THRU EXISTING WALLS. ALL CONSTRUCTION WORK CREATING ANY TYPE OF DUST THROUGHOUT THE BUILDING SHALL BE SHIELDED BY DUST PROTECTION. PROVIDE DOOR OPENING AS REQUIRED FOR EMERGENCY EGRESS.
- DB — (2) LAYERS 6 MIL PVC W/ STUDS @ 4'-0" O.C. DUST BARRIER. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO ENSURE THE EXISTING BUILDING TO BE COMPLETELY PROTECTED AGAINST THE INFILTRATION OF DUST & MOISTURE DURING THE COURSE OF DEMOLITION/ CONSTRUCTION. PROVIDE DOOR OPENING AS REQUIRED FOR EMERGENCY EGRESS.
- REMOVE EXISTING CAN LIGHT FIXTURE RE: ELECT
- REMOVE EXISTING 2X4 FLUORESCENT LIGHT FIXTURE RE: ELECT
- REMOVE EXISTING ACOUSTIC CEILING TILE GRID AND TILES
- REMOVE EXISTING MECHANICAL SUPPLY DIFFUSER RE: MEP
- REMOVE EXISTING MECHANICAL RETURN DIFFUSER RE: MEP

KEYNOTES - DEMO PLAN

NUMBER	COMMENTS
1	REMOVE EXISTING 'KNOCK-OUT' IN WALL (FOR MRI EQUIPMENT REMOVAL AND INSTALLATION) AND ASSOCIATED ELECTRICAL DEVICES/WIRING IN ITS ENTIRETY. PATCH & REPAIR ALL AFFECTED SURFACES AS REQUIRED TO RECEIVE NEW FINISHES.
2	REMOVE EXISTING MRI EQUIPMENT. PATCH & REPAIR ALL AFFECTED SURFACES AS REQUIRED TO RECEIVE NEW FINISHES.
3	REMOVE EXISTING CASEWORK, COUNTERTOP, BACKSPLASH, & SIDESPLASH(ES) IN ITS ENTIRETY. PATCH & REPAIR AFFECTED SURFACES AS REQUIRED TO RECEIVE NEW FINISHES.
4	REMOVE CASEWORK. PATCH & REPAIR ALL AFFECTED SURFACES AS REQUIRED FOR NEW CONSTRUCTION.
5	REMOVE ALL WALL & CEILING MOUNTED EQUIPMENT AS REQUIRED FOR INSTALLATION OF NEW FINISHES. PROTECT FOR REUSE.
6	REMOVE EXISTING FLOORING & WALL BASE IN ITS ENTIRETY. PATCH & REPAIR SUBFLOOR & WALLS AS REQUIRED TO RECEIVE NEW FINISHES.
7	REMOVE EXISTING WALL COVERING, CRASH RAIL, WALL PROTECTION, & WALL BASE IN ITS ENTIRETY. PATCH & REPAIR AFFECTED SURFACES AS REQUIRED TO RECEIVE NEW FINISHES.
8	REMOVE EXISTING CEILING GRID & CEILING TILE. REFER TO MEP DRAWINGS FOR EXTENT OF MECHANICAL AND ELECTRICAL DEMOLITION.
9	REMOVE EXISTING CEILING TILES. GRID TO REMAIN. REFER TO MEP DRAWINGS FOR EXTENT OF MECHANICAL AND ELECTRICAL DEMOLITION.
10	REMOVE DOOR, FRAME ETR, SALVAGE DOOR HARDWARE TO REINSTALL.
11	REMOVE PORTION OF WALL AS REQUIRED FOR NEW CONSTRUCTION.
12	REMOVE EXISTING RF DOOR AND FRAME. PREP OPENING FOR INSTALLATION OF NEW RF DOOR AND FRAME. ALT #1: EXISTING RF DOORS TO REMAIN.
13	REMOVE EXISTING HANDRAIL AND WALL PROTECTION. SALVAGE HANDRAIL TO REINSTALL.

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RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
08/04/2020

Saint Luke's East Hospital
MRI Replacement
80 NE Saint Luke's Blvd
Lee's Summit, MO 64086

Date	Project Issue
Job Number	Project Number
Drawn By	Author
Checked By	Checker

Revision

Number	Date	Description
1	05.11.20	ADD 01

AD

DEMOLITION PLAN

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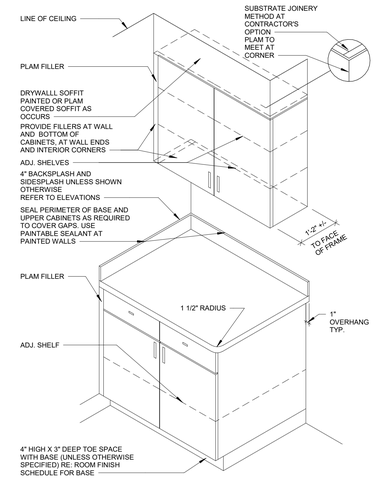
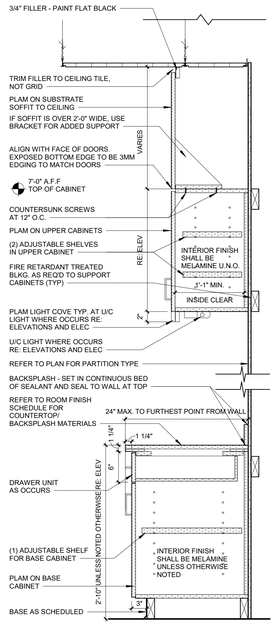


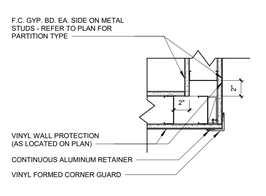
TYP. CABINET NOTES:

1. PROVIDE PLAM FILLER WHERE CABINETS BUTT UP TO WALLS.
2. ALL COUNTERTOPS HAVE A 4" BACKSPLASH (MATERIAL TO MATCH COUNTERTOP) AND OUTSIDE CORNERS HAVE 1 1/2" RADIUS EXCEPT WHERE NOTED OTHERWISE.
3. CASEWORK MFR. TO SUPPLY (2) - 2" [GROMMETS PER KNEESPACE. GROMMETS TO BE INSTALLED IN FIELD AS DIRECTED BY OWNER. COLOR TO BE SELECTED BY ARCHITECT.
4. PLASTIC LAMINATE COUNTERTOP EDGES SHALL BE 3 MM PLASTIC. COLOR AS SELECTED BY ARCHITECT)

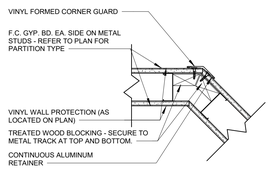
D6 CASEWORK ISOMETRIC
1 1/2" = 1'-0"



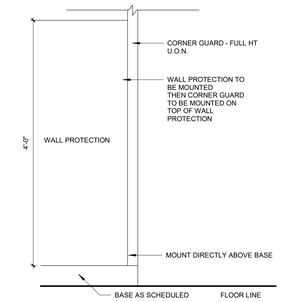
D5 CASEWORK SECTION
1" = 1'-0"



E4 TYP. SINGLE VINYL CORNER GUARD
1 1/2" = 1'-0"



D4 TYP. ANGLED VINYL CORNER GUARD
1 1/2" = 1'-0"



D3 TYPICAL ELEVATION OF WALL PROTECTION/ CORNER GUARD
1" = 1'-0"

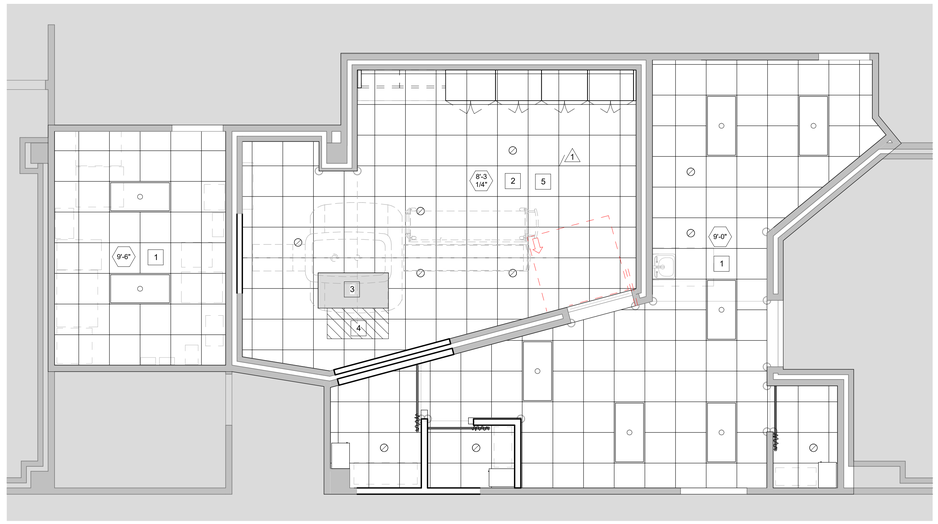
ROOM FINISH SCHEDULE

ROOM NUMBER	ROOM NAME	FLOOR FINISH	BASE FINISH	WALLS				CASEWORK			CEILING	NOTES
				NORTH	EAST	SOUTH	WEST	BASE CABINETS	UPPER CABINETS	COUNTER TOPS		
1C140	DRESS #3	LVT-2	RWB-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	PL-1	--	--	ACT-1	1,
1C145	MRI #1	SV-1, SV-2	IB-1	EP-1, WP-1	EP-1, WP-1	EP-1, WP-1	EP-1, WP-1	PL-1	PL-1	SS-1	ACT-4	1, 2
1C146	MRI CONTROL	LVT-2	RWB-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	--	--	--	ACT-1	1, 2
1C147	TRANSFER	LVT-2	RWB-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	--	--	--	ACT-1	1, 2
1C148	DRESS #2	LVT-2	RWB-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	PL-1	--	--	ACT-1	1
1C149	ADA DRESS #1	LVT-2	RWB-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	P-1, WP-1	PL-1	--	--	ACT-1	1
1C153	EQUIP.	ETR	ETR	P-1	P-1	P-1	P-1	--	--	--	ACT-1	2

NOTES:
1. WALL PROTECTION HEIGHT TO BE 4'-0" ABOVE BASE. WHERE WALL PROTECTION IS INDICATED WALL TO BE PAINTED PRIOR TO INSTALLATION.
2. PAINT ALL EXISTING DOOR FRAMES.

INTERIOR FINISH LEGEND

MARK	ITEM	MANUFACTURER	MODEL/ PATTERN	COLOR	SIZE	REMARKS
FLOOR						
LVT-2	LUXURY VINYL TILE	MANNINGTON	AMTICO STONE	CORINTHIAN MARBLE AROSTV13	18" X 18"	STRAIGHT EDGE ONLY, ASHLAR
SV-1	HOMOGENEOUS SHEET VINYL	ARMSTRONG	MEDINTONE, DIAMOND 10	#H5311 NATURAL WHITE	6'-0" ROLL	WELD ROD W0288
SV-2	HOMOGENEOUS SHEET VINYL	ARMSTRONG	MEDINTONE, DIAMOND 10	#H5421 HAZEL	6'-0" ROLL	
BASE						
IB-1	INTEGRAL BASE	ARMSTRONG	MEDINTONE, DIAMOND 10	#H5311 NATURAL WHITE	6" COVE	J-MOLD SCHLUTER STRIP AT TOP, TO BE USED WITH SV-1
RWB-1	RUBBER WALL BASE	ROPPE	PINNACLE PLUS, PROFILE #65	#110 BROWN	4-5/8"	
WALL						
EP-1	PAINT - EPOXY	SHERWIN WILLIAMS	SW7036	ACCESSIBLE BEIGE		FIELD PAINT, EPOXY FINISH
PT-1	PAINT	SHERWIN WILLIAMS	SW7036	ACCESSIBLE BEIGE		FIELD PAINT, EGGSHELL FINISH
PT-4	PAINT	SHERWIN WILLIAMS	SW7509	TIKI HUT		DOOR FRAME PAINT, SEMI GLOSS FINISH
WP-1	WALL PROTECTION	C/S ACROVYN	.040 ACROVYN 4000	#858 PUMICE	4' X 10' SHEETS	WALL PROTECTION AT 48" ABOVE BASE, INCLUDE ALL ACCESSORIES
CASEWORK						
EB-1	EDGE BANDING	DOELLKEN	8707E5	WALNUT HEIGHTS	-	3MM
IS-1	INTEGRAL SINK	CORIAN	BONE			
PL-1	HIGH PRESSURE LAMINATE	WILSONART	#7965K12	WALNUT HEIGHTS		CUSTOM 3MM PVC DOELLKEN WALNUT HEIGHTS 8707E5
SS-1	SOLID SURFACE	CORIAN	CLAM SHELL		1/2", 30" X 144" SHEET; 36" X 144" SHEET	EASED EDGE
CEILING						
ACT-1	ACOUSTIC CEILING TILE	USG	RADAR CLIMA PLUS #2210	WHITE	2' X 2'	SQUARE EDGE, DONN DX TEE 15/16" GRID SYSTEM
ACT-4	ACOUSTIC CEILING TILE	USG	MARS HEALTHCARE PANELS #86169	WHITE	2' X 2'	SQUARE EDGE, DONN AXCE 15/16" ALUMINUM GRID SYSTEM
MISC.						
CG-3	CORNER GUARD	C/S ACROVYN	SM-20AN-ACROVYN-4000	#858 PUMICE	3"	90 DEGREE, ABOVE BASE TO CEILING, INCLUDE ALL TRIM AND ACCESSORIES, TYPICAL
CG-4	CORNER GUARDS	C/S ACROVYN	SSM-25AN-ACROVYN 4000	#858 PUMICE	2"	END WALL ABOVE BASE TO CEILING, INCLUDE ALL TRIM AND ACCESSORIES, TYPICAL
ETR	EXISTING TO REMAIN					



C2 REFLECTED CEILING PLAN
1/4" = 1'-0"

CEILING LEGEND

- RECESSED CAN LIGHT FIXTURE RE: ELECT
- 2X4 RECESSED/SURFACE FLUORESCENT LIGHT FIXTURE RE: ELECT
- 2X2 RECESSED/SURFACE FLUORESCENT LIGHT FIXTURE RE: ELECT
- 2X2/2x4 LAY-IN ACOUSTICAL CEILING
- SUPPLY AIR GRILLE RE: MECH
- RETURN AIR OR EXHAUST GRILLE RE: MECH
- 9'-0" SOFFIT HEIGHT
- 9'-0" CEILING HEIGHT

GENERAL RCP NOTES

1. THIS PLAN SHALL BE USED TO COORDINATE THE CEILING LAYOUT WITH MECHANICAL AND ELECTRICAL WORK. VERIFY THE EXACT QUANTITY REQUIRED.
2. CONTRACTOR TO REFER TO THE ELECTRICAL PLANS FOR ACTUAL LIGHTING SIZES AND FIXTURE TYPES.
3. SEE SPECIFICATIONS FOR CEILING TYPES.
4. REFER TO ARCHITECTURAL FLOOR PLANS FOR MATERIAL LEGEND OF ALL TYPES.
5. ALL NEW CEILINGS TO BE INSTALLED AT EXISTING CEILING HEIGHT U.N.O.

KEYNOTES - RCP

Number	Comments
1	EXISTING CEILING GRID TO REMAIN. ADD CROSS TEES TO CREATE 2X2 GRID. REPLACE EXISTING TILE WITH 2X2 TILES. RELOCATE SPRINKLER HEADS & DEVICES AS REQUIRED.
2	REFER TO MEP AND PHILIPS SITE SPECIFIC DRAWINGS FOR EXACT LIGHT AND LED MODULE COUNT AND LOCATIONS
3	NO CEILING TILE OR GRID IN THIS AREA. 28" X 56" THIS SERVICE AREA MUST BE CLEAR OF OBSTRUCTIONS FROM TOP OF MAGNET TO 10'-0" AFF, RE: PHILIPS SITE SPECIFIC DRAWINGS
4	REMOVABLE CEILING AREA 23.75" X 46" FOR SERVICING EQUIPMENT. GRID WORK MUST BE EASILY REMOVED FOR ACCESS. RE: PHILIPS SITE SPECIFIC DRAWINGS.
5	NEW CEILING GRID AND TILES PER SCHEDULE

PLAN LEGEND

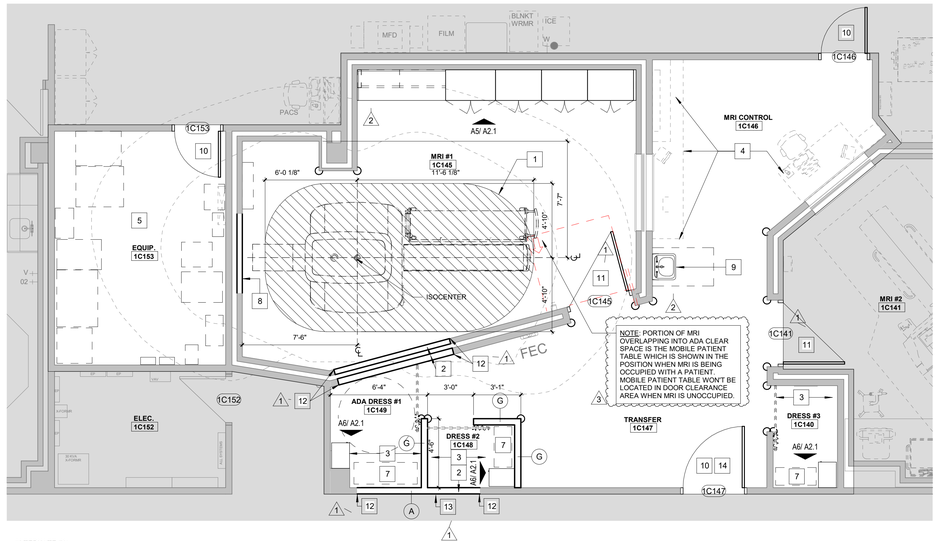
- NOT IN SCOPE
- EXISTING TO REMAIN
- EXISTING DOOR, FRAME AND HARDWARE TO REMAIN
- NEW WALL
- NEW CORNER GUARD

GENERAL PLAN NOTES

A. CONSTRATOR TO PROVIDE IN-WALL FRT WOOD BLOCKING AT ALL WALL-MOUNTED EQUIPMENT, FIXTURES, AND ACCESSORIES AS REQUIRED FOR INNSTALLATION. COORDINATE WITH OWNER.
B. TOP OF EXISTING RF SHIELDING IS 11'-0" A.F.F.
C. RE: PHILIPS SITE-SPECIFIC DRAWINGS FOR MRI EQUIPMENT INFORMATION.
D. ALL HARDWARE IN MRI ROOM SHALLBE NON-FERROUS.

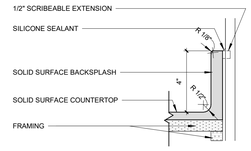
KEYNOTES - FLOOR PLAN

NUMBER	COMMENTS
1	CONTRASTING COLOR SHEET VINYL (SV-2); RE: PHILIPS SITE SPECIFIC DRAWINGS SHEET S4
2	INFILL OPENING WITH CONSTRUCTION MATERIALS, RF SHIELDING, FIRE-RATING (IF APPLICABLE) AND FINISHES EQUAL TO EXISTING ADJACENT CONSTRUCTION.
3	RE-INSTALL ALL APPLICABLE WALL MOUNTED AND CEILING MOUNTED EQUIPMENT
4	SYSTEMS FURNITURE, EXISTING TO REMAIN.
5	REFER TO MEP AND PHILIPS DRAWINGS FOR EQUIPMENT INFORMATION
7	ADA BENCH, PROVIDED BY FURNITURE VENDOR
8	MODIFY WALL CONSTRUCTION AS REQUIRED TO PROVIDE ADAPTIVE FRAME FOR INSTALLATION OF PATIENT IN-BORE SOLUTION MONITOR. RE: PHILIPS SITE SPECIFIC DRAWINGS SHEET SD7.
9	WALL-HUNG SINK, RE: MEP. PROVIDE WOOD BLOCKING AS REQUIRED.
10	PAINT DOOR FRAME PER SCHEDULE; NEW SOLID CORE WOOD DOOR; VT INDUSTRIES, HIGH PRESSURE DECORATIVE LAMINATE W/ 3MM PVC EDGES, LAMINATED TOP AND BOTTOM, COLOR: WILSONART WALNUT HEIGHTS, #7965K-12; RE-INSTALL SALVAGED HARDWARE
11	RF SHIELDED DOOR/FRAME/HARDWARE ETR
12	INSTALL NEW DRYWALL CONTROL JOINTS AT EACH SIDE AND INSIDE AND OUTSIDE OF WALL
13	INSTALL NEW WALL PROTECTION AT KNOCKOUT, REINSTALL SALVAGED HANDRAIL
14	DOOR 1C147 TO BE 20-MINUTE FIRE RATED

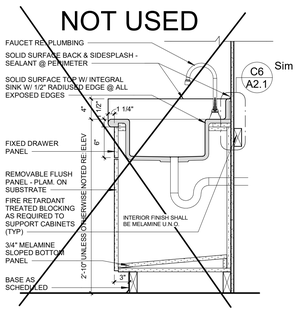


A2 FLOOR PLAN
1/4" = 1'-0"

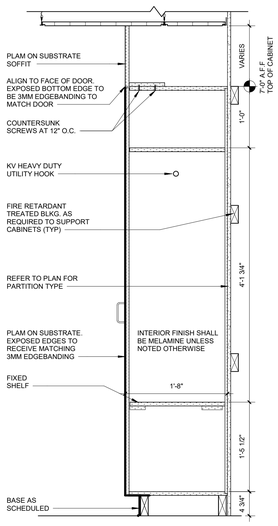
ALTERNATE #1:
PROVIDE A PRICE TO DEDUCT THE (2) RF DOORS 1C145 AND 1C141 ONLY. PROVIDE NEW DOORS 1C147, 1C146, AND 1C153.



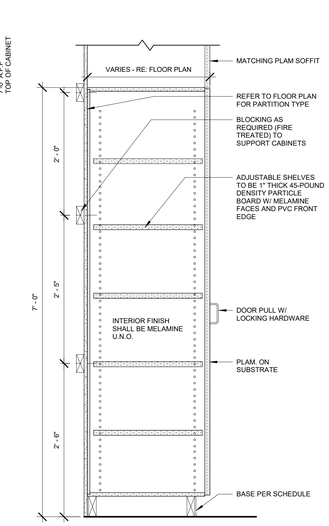
C6 DETAIL AT SOLID SURFACE BACKSPLASH
3" = 1'-0"



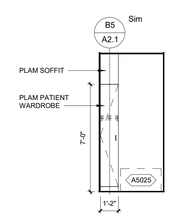
B6 SINK BASE CABINET SECTION
1" = 1'-0"



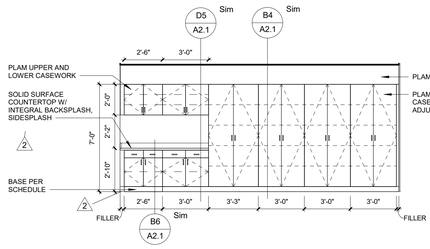
B5 SECTION AT PATIENT WARDROBE
1" = 1'-0"



B4 FULL HEIGHT CABINET SECTION
1" = 1'-0"



A6 DRESS - TYPICAL
1/4" = 1'-0"



A5 1C145 MRI - NORTH
1/4" = 1'-0"

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RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
08/04/2020

Saint Luke's East Hospital
MRI Replacement
80 NE Saint Luke's Blvd
Lee's Summit, MO 64086

Date	04/17/2020
Job Number	3-20037
Drawn By	APB
Checked By	ABD

Revision

Number	Date	Description
1	05.11.20	ADD 01
2	07.29.20	PR 01
3	08.03.20 20	CITY COMMENTS

A2.1

FIRST FLOOR PLAN & RCP

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ABBREVIATIONS

ABBREV.	DESCRIPTION
AAV	AUTOMATIC AIR VENT
ABAN	ABANDON
ABV	ABOVE
AC	AIR CONDITIONING UNIT
ACC	AIR COOLED CONDENSER
ACU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AF	AFTER FILTER
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AMB	AMBIENT
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AS	AIR SEPARATOR
ATM	ATMOSPHERE
ATMV	ATMOSPHERIC VENT
AWT	AVERAGE WATER TEMPERATURE
BB	BAR BARRIER
BDD	BACKDRAFT DAMPER
BFWP	BOILER FEED WATER PUMP
BFW	BOILER FEED WATER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BLWDN	BLOWDOWN
BS	BLOWDOWN SEPARATOR
BLR	BOILER
BLW	BELOW
BM	BEAM
BOT	BOTTOM
BOD	BOTTOM OF DUCT
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
C	CONVERTER
C/C	CENTER TO CENTER
CC	COOLING COIL
CF	CUBIC FEET
CFM	CUBIC FEET PER MINUTE
CFP	CHEMICAL FEED PUMP
CHD	CONCEALED HAND DAMPER W/ REMOTE OPERATOR
CH	CHILLER
CJ	CONSTRUCTION JOINT
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
CO	CLEANOUT
COL	COLUMN
CONC	CONCRETE
COND	CONDENSATE
CONDR	CONDENSOR
CONN	CONNECTION
CONT	CONTINUATION/CONTINUOUS
CONV	CONVECTOR
COP	COSEFFICIENT OF PERFORMANCE
CP	CONTROL PANEL
CPF	CHEMICAL POT FEEDER
CRP	CONDENSATE RETURN PUMP
CT	COOLING TOWER
CU FT	CUBIC FEET
CU IN	CUBIC INCHES
DB	DRY BULB
DEG	DEGREE FAHRENHEIT
DEMO	DEMOLITION
DET	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DLV	DOOR LOUVER
DMPR	DAMPER
DN	DOWN
DR	DRAIN
DWG	DRAWING
EX	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EDBT	ENTERING DRY BULB TEMPERATURE
EF	EXHAUST FAN
EFF	EFFICIENCY
EJ	EXPANSION JOINT
ELEC	ELECTRICAL
ELEV	ELEVATION
ENT	ENTERING
EQ	EQUAL
ET	EXPANSION TANK
EXH	EXHAUST
EXP	EXPANSION
EXT	EXTERIOR
EWBT	ENTERING WET BULB TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
FA	FACE AREA
FCV	FLOW CONTROL VALVE
FD	FIRE DAMPER
FF	FINAL FILTER
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FLA	FULL LOAD AMP
FMD	FLOW MEASURING DEVICE
FPM	FEET PER MINUTE
FSD	FIRE AND SMOKE DAMPER
FSS	FLOW SENSING SWITCH
FT	FEET

ABBREVIATIONS

ABBREV.	DESCRIPTION
FTR	FINNED TUBE RADIATION
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GRD	GROUND
GPM	GALLON PER MINUTE
GRL	GRILLE
GSNK	GOOSENECK
HC	HEATING COIL
HX	HEAT EXCHANGER
HORIZ	HORIZONTAL
HP	HORSEPOWER
HP	HIGH PRESSURE
HPT	HIGH POINT
HTG	HEATING
HZ	HERTZ
IN	INCHES
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LB	POUND
LD	LINEAR DIFFUSER
LDBT	LEAVING DRY BULB TEMPERATURE
LWBT	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
M	MOTORIZED DAMPER
MAT	MIXED AIR TEMPERATURE
MAX	MAXIMUM
MBTU	BRITISH THERMAL UNIT (1000)
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MEZZ	MEZZANINE
MIN	MINIMUM
MISC	MISCELLANEOUS
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPNG	OPENING
OPWT	OPERATING WEIGHT
P	PUMP
PA	PIPE ANCHOR
PCF	POUNDS PER CUBIC FOOT
PEN	PENETRATION
PERF	PERFORATOR
PL	PLATE
PRV	PRESSURE REDUCING VALVE
PSIA	POUNDS PER SQUARE INCH (ABSOLUTE)
PSIG	POUNDS PER SQUARE INCH (GAUGE)
RA	RETURN AIR
RD	RETURN DIFFUSER
RET	RETURN
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RPM	REVOLUTIONS PER MINUTE
S	STEAM TRAP
SA	SUPPLY AIR
SD	SUPPLY DIFFUSER
SF	SUPPLY FAN
SG	SUPPLY GRILLE
SP	STATIC PRESSURE
SQ FT	SQUARE FEET
SRV	SAFETY RELIEF VALVE
SS	STEAM SEPARATOR
SST	STAINLESS STEEL
ST	SOUND ATTENUATOR
STL	STEEL
STM	STEAM
STRUCT	STRUCTURAL
TEMP	TEMPERATURE
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TG	TRANSFER GRILLE
THK	THICK
TNL	TUNNEL
TYP	TYPICAL
UFD	UNDERFLOOR DUCT
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VIF	VERIFY IN FIELD
W/	WITH
WB	WET BULB
WC	WATER COLUMN
WF	WATER FILTER
WG	WATER GAUGE
WMS	WIRE MESH SCREEN
W/O	WITHOUT
WT	WEIGHT
WS	WATER SOFTENER

MECHANICAL SHEET METAL SYMBOLS

- EXISTING DUCTWORK TO REMAIN
- EXISTING DUCTWORK TO BE REMOVED
- NEW DUCTWORK
- HD — HAND DAMPER IN DUCT
- HD — HAND DAMPER IN CONCEALED DUCT W/ CONCEALED DAMPER ACTUATOR
- HUMIDIFIER IN DUCT
- B / AD — FIRE DAMPER WITH HINGED ACCESS DOOR (B) DENOTES 'B' STYLE DAMPER
- SD / AD — SMOKE DAMPER WITH HINGED ACCESS DOOR
- FSD / AD — COMBINATION FIRE/SMOKE DAMPER WITH HINGED ACCESS DOOR
- RECTANGULAR TO ROUND BRANCH CONNECTION FROM MAIN DUCT
- RECTANGULAR TO ROUND BRANCH CONNECTION FROM MAIN DUCT WITH HAND DAMPER IN ROUND SECTION
- RECTANGULAR TO ROUND TRANSITION
- RECTANGULAR TO ROUND TRANSITION WITH HAND DAMPER
- CEILING SUPPLY OUTLET (A) DENOTES DIFFUSER TYPE. (300) DENOTES CFM. SEE SCHEDULE FOR SIZE. ARROWS INDICATE DIRECTION OF THROW. NO ARROWS INDICATE 4-WAY THROW. — A 300
- CEILING SUPPLY OUTLET WITH FLEXIBLE DUCT CONNECTION. (A) DENOTES DIFFUSER TYPE. (300) DENOTES CFM. SEE SCHEDULE FOR FACE SIZE AND FLEXIBLE DUCT (NECK) SIZE. ARROWS INDICATE DIRECTION OF THROW. NO ARROWS INDICATE 4-WAY THROW. — A 300
- CEILING RETURN OR EXHAUST GRILLE (A) DENOTES GRILLE TYPE. (300) DENOTES CFM. SEE SCHEDULE FOR SIZE. — A 300
- WALL SUPPLY GRILLE (A) DENOTES GRILLE TYPE. (600) DENOTES CFM. SEE SCHEDULE FOR SIZE. — A 600
- WALL RETURN OR EXHAUST GRILLE (A) DENOTES GRILLE TYPE. (600) DENOTES CFM. SEE SCHEDULE FOR SIZE. — A 600
- VAV 1-3 — VARIABLE AIR VOLUME BOX
- VAV 1-3 — VARIABLE AIR VOLUME BOX WITH REHEAT COIL
- RECTANGULAR DUCT TRANSITION IN SINGLE LINE DUCTWORK
- RECTANGULAR TO ROUND TRANSITION IN SINGLE LINE DUCTWORK
- CEILING RETURN GRILLE WITH LINED BOOT ABOVE FINISH CEILING. FREE AREA OF BOOT = 2/3 OF GRILLE FACE. (A) DENOTES GRILLE TYPE. (300) DENOTES CFM. SEE DIFFUSER SCHEDULE FOR SIZE. — A 300
- LINED RETURN AIR BOOT WITH TURNING VANES ABOVE CEILING - SIZE OF BOOT IS INDICATED ON DRAWINGS
- DD 1-1 — DUAL DUCT MIXING BOX
- DD 1-1 — DUAL DUCT MIXING BOX - HIGH PERFORMANCE BLENDING

TEMPERATURE CONTROLS SYMBOLS

- PNEUMATIC PIPING
- ELECTRIC WIRING
- PARALLEL BLADE DAMPER
- OPPOSED BLADE DAMPER
- HUMIDIFIER
- AVERAGE SENSING ELEMENT
- AIR FLOW PROBE
- DAMPER ACTUATOR
- M — PILOT POSITIONER
- 1-1/2" AIR GAGE
- 3-1/2" DIAL THERMOMETER
- ROOM THERMOSTAT
- MOTOR STARTER
- M — MAIN AIR SUPPLY 20 PSIG
- D — DUAL PRESSURE AIR SUPPLY
- WU — WARM UP
- DP — DIFFERENTIAL PRESSURE SWITCH
- ES — END SWITCH
- HL — HIGH LIMIT SWITCH
- HS — HUMIDITY SENSOR
- HX — HEAT EXCHANGER
- SD — SMOKE DETECTOR
- SP — STATIC PRESSURE SENSOR
- TS — TEMPERATURE SENSOR
- VFD — VARIABLE FREQUENCY DRIVE
- VS — VELOCITY SENSOR
- LOCATED IN CONTROL CABINET
- LOCATED ON CONTROL CABINET DOOR
- AI — ANALOG INPUT
- AO — ANALOG OUTPUT
- AO-P — ANALOG OUTPUT PNEUMATIC
- C — COMMON
- DA — DIRECT ACTING
- DDC — DIRECT DIGITAL CONTROL
- DI — DIGITAL INPUT
- DO — DIGITAL OUTPUT
- EP — ELECTRIC TO PNEUMATIC SWITCH
- NC — NORMALLY CLOSED
- NO — NORMALLY OPEN
- PE — PNEUMATIC TO ELECTRIC SWITCH
- POF — PROOF OF FLOW
- RA — REVERSE ACTING
- R-C — RECEIVER-CONTROLLER
- S/S — START/STOP
- CR — CURRENT RELAY
- DI-P — DIGITAL INPUT PNEUMATIC
- PN — PNEUMATIC

MECHANICAL PIPING SYMBOLS

- EXISTING PIPING TO REMAIN
- EXISTING PIPING TO BE REMOVED
- NEW PIPING
- HWS — HOT WATER SUPPLY
- HWR — HOT WATER RETURN
- LPS — STEAM SUPPLY (LOW PRESSURE)
- LPR — STEAM RETURN (LOW PRESSURE)
- MPS — STEAM SUPPLY (MEDIUM PRESSURE)
- MPR — STEAM RETURN (MEDIUM PRESSURE)
- HPS — STEAM SUPPLY (HIGH PRESSURE)
- HPR — STEAM RETURN (HIGH PRESSURE)
- SV — STEAM RELIEF VENT
- CWS — CHILLED WATER SUPPLY
- CWR — CHILLED WATER RETURN
- CHS — CHILLED/HOT WATER SUPPLY
- CHR — CHILLED/HOT WATER RETURN
- SWS — SECONDARY WATER SUPPLY
- SWR — SECONDARY WATER RETURN
- TS — COOLING TOWER SUPPLY
- TR — COOLING TOWER RETURN
- RS — REFRIGERANT SUCTION PIPING
- RL — REFRIGERANT LIQUID PIPING
- HG — HOT GAS PIPING
- GS — GLYCOL SUPPLY PIPING
- GR — GLYCOL RETURN PIPING
- PD — PUMP DISCHARGE
- CD — CONDENSATE DRAIN PIPING
- CDS — CONDENSER WATER SUPPLY
- CDR — CONDENSER WATER RETURN
- SMS — SNOW MELTING SYSTEM SUPPLY
- SMR — SNOW MELTING SYSTEM RETURN
- T — THERMOSTAT
- H — HUMIDISTAT
- CONNECTION - NEW TO EXISTING
- FLOAT AND THERMOSTATIC TRAP
- SHUT-OFF VALVE
- BALANCING VALVE
- GLOBE VALVE
- CHECK VALVE (SWING OR CUSHION)
- CONTROL VALVE
- LUBRICATED PLUG COCK
- SOLENOID VALVE
- PRESSURE RELIEF VALVE
- PRESSURE REDUCING VALVE
- WYE STRAINER
- UNION
- PIPE ANCHOR
- FLOW ELEMENTS
- DIRECTION OF FLOW IN PIPES
- DIRECTION OF PITCH IN PIPES
- RISE AND DROP IN PIPING
- BRANCH PIPING CONNECTION (TOP OF PIPE)
- BRANCH PIPING CONNECTION (BOTTOM OF PIPE)
- WELDED ELBOW
- EXPANSION JOINT

MEDICAL GAS SYMBOLS

- NO — NITROUS OXIDE PIPING
- N — NITROGEN PIPING
- O — OXYGEN PIPING
- SA — SURGICAL AIR PIPING
- A — MEDICAL AIR PIPING
- V — VACUUM PIPING
- EVAC — MEDICAL GAS EVACUATION PIPING
- CVAC — LASER SMOKE EXHAUST PIPING
- NOV — NITROUS OXIDE VENT PIPING
- NV — NITROGEN VENT PIPING
- V V — VACUUM VENT PIPING
- SAI — SURGICAL AIR INTAKE PIPING
- CA — COMPRESSED AIR PIPING
- CO2 — CARBON DIOXIDE PIPING
- NO — NITROUS OXIDE OUTLET
- N — NITROGEN OUTLET
- O — OXYGEN OUTLET
- SA — SURGICAL AIR OUTLET
- A — MEDICAL AIR OUTLET
- V — VACUUM OUTLET
- EVAC — MEDICAL GAS EVACUATION OUTLET
- CHECK VALVE
- LOCKABLE SERVICE SHUT-OFF VALVE
- PS — PRESSURE SWITCH
- MEDICAL GAS ZONE VALVE
- NCP — NITROGEN CONTROL PANEL

PLUMBING SYMBOLS

- C — COLD WATER PIPING
- H — HOT WATER PIPING
- HC — HOT WATER CIRCULATING PIPING
- VENT PIPING
- WASTE PIPING
- SW — SAFE WASTE PIPING
- DS — DOWNSPOUT PIPING
- EDS — EMERGENCY DOWNSPOUT PIPING
- G — GAS PIPING
- FOS — FUEL OIL SUPPLY PIPING
- FOR — FUEL OIL RETURN PIPING
- A — ACID WASTE PIPING
- A — ACID VENT PIPING
- DI — DEIONIZED WATER PIPING
- SC — SOFT COLD WATER PIPING
- RO — REVERSE OSMOSIS WATER PIPING
- ETO — ETHYLENE OXIDE PIPING
- PD — PUMP DISCHARGE
- TW — TEMPERED WATER PIPING
- DW — DRINKING WATER PIPING
- CA — COMPRESSED AIR PIPING
- CA — COMPRESSED AIR OUTLET
- CO — CLEANOUT
- FCO — FLUSH CLEANOUT
- RD — ROOF DRAIN
- ERD — EMERGENCY ROOF DRAIN
- FD — FLOOR DRAIN
- FFD — FLOOR DRAIN WITH FUNNEL
- SFD — SAFE WASTE FLOOR DRAIN
- HB — HOSE BIBB
- WH — WALL HYDRANT
- VTR — VENT THRU ROOF
- SHUT-OFF VALVE
- BALANCING VALVE
- GLOBE VALVE
- CHECK VALVE (SWING OR CUSHION)
- CONTROL VALVE
- LUBRICATED PLUG COCK
- SOLENOID VALVE
- PRESSURE RELIEF VALVE
- PRESSURE REDUCING VALVE
- WYE STRAINER
- UNION
- PIPE ANCHOR
- FLOW ELEMENTS
- DIRECTION OF FLOW IN PIPES
- DIRECTION OF PITCH IN PIPES
- RISE AND DROP IN PIPING
- BRANCH PIPING CONNECTION (TOP OF PIPE)
- BRANCH PIPING CONNECTION (BOTTOM OF PIPE)
- WELDED ELBOW
- EXPANSION JOINT

FIRE PROTECTION SYMBOLS

- SP — STANDPIPE PIPING (WET TYPE)
- SPD — STANDPIPE PIPING (DRY TYPE)
- PSP — PRESSURIZED STANDPIPE PIPING
- S — SPRINKLER PIPING (WET TYPE)
- SD — SPRINKLER PIPING (DRY TYPE)
- F — FIRE SERVICE PIPING
- ID — INSPECTOR TEST DRAIN
- FPS — FIRE PUMP SUCTION PIPING
- FHC — FIRE HOSE CABINET
- PIV — POST INDICATOR VALVE
- EXISTING SPRINKLER HEAD
- NEW SPRINKLER HEAD
- FV — FIRE DEPARTMENT HOSE VALVE
- FS — SPRINKLER FLOW INDICATOR SWITCH
- TS — TAMPER SWITCH
- FIRE DEPARTMENT CONNECTION

PROJECT MECHANICAL GENERAL NOTES

(THESE NOTES APPLY TO ALL MECHANICAL SHEETS)

1. THE LOCATION OF ALL STRUCTURAL OPENINGS SHALL BE AS INDICATED ON THE MECHANICAL, STRUCTURAL AND ARCHITECTURAL DRAWINGS. COORDINATE EXACT SIZES OF OPENINGS REQUIRED.
2. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL FITTINGS, TRANSITIONS, DAMPERS, VALVES AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
3. CONTRACTOR SHALL FIELD VERIFY CLEARANCE ABOVE THE CEILING AND NOTIFY THE ENGINEER ABOUT POSSIBLE CONFLICTS.
4. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES RELATING TO WORK TO VERIFY SPACE IN WHICH WORK WILL BE INSTALLED. MAINTAIN HEADROOM AND SPACE CONDITIONS AT ALL TIMES.
5. IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE ALL WORK WITH ALL OTHER TRADES. THE SHOP DRAWINGS PREPARED BY THIS CONTRACTOR SHALL INDICATE SPACE ALLOWANCES FOR ALL WORK OF ALL OTHER TRADES AND SHALL BE SIGNED OFF BY ALL OTHER CONTRACTORS.
6. CONTRACTOR SHALL VERIFY ON-SITE ALL CONDITIONS AND MEASUREMENTS SHOWN ON CONTRACT DRAWINGS.
7. ALL SUPPORTS FOR MECHANICAL EQUIPMENT ARE BASED ON PRELIMINARY INFORMATION FROM ONE MANUFACTURER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING SIZES FROM CERTIFIED DRAWINGS OF EQUIPMENT BEING SUBMITTED AND SHALL MAKE ANY STRUCTURAL MODIFICATIONS REQUIRED WITHOUT ANY ADDITIONAL COST TO THE OWNER.
8. ALL NEW EQUIPMENT FURNISHED BY THE MECHANICAL CONTRACTOR SHALL BE MANUFACTURED INTO COMPONENTS THAT CAN BE MOVED INTO THE BUILDING THROUGH AVAILABLE BUILDING OPENINGS. IF ADDITIONAL BUILDING OPENINGS ARE REQUIRED, THE MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE GENERAL CONTRACTOR AND MAKE ALL PROVISIONS TO MOVE EQUIPMENT INTO FINAL LOCATION.
9. WHERE EQUIPMENT AND/OR PIPING AND/OR DUCTWORK IS NOTED TO BE DEMOLISHED, COORDINATE WITH GENERAL CONTRACTOR PRIOR TO REMOVAL OR ENSURE THAT REMOVAL OR EQUIPMENT FALLS WITHIN PRESENT CONSTRUCTION LIMITS AND SCOPE OF WORK.
10. WHERE REFRIGERANT PIPING OR SYSTEM ARE TO BE DEMOLISHED, RECLAIM ALL REFRIGERANT PER GUIDELINES AND STORE OR DISPOSE OF AS REQUIRED.
11. ALL STORED AND/OR PARTIALLY INSTALLED SHEET METAL, PIPING, AND EQUIPMENT SHALL BE PROTECTED FROM WEATHER. CONTRACTOR SHALL COVER OPEN ENDS AT END OF WORK DAY.
12. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE BUILDING CODE REQUIREMENTS AND PROVIDE ALL REQUIRED CONTROLLED INSPECTIONS FOR HIS WORK.
13. DUCTWORK SHALL BE INSULATED PER SPECIFICATIONS OR AS NOTED ON DRAWINGS. ALL DUCT JOINTS AND SEAMS SHALL BE SEALED PER SPECIFICATIONS.
14. DUCT AND PLENUM SIZES INDICATED ON THE DRAWINGS ARE SHEET METAL DIMENSIONS.
15. MANUAL DAMPERS SHALL BE PROVIDED IN ALL DUCT BRANCHES AND IN ALL BRANCHES TO INDIVIDUAL DIFFUSERS, GRILLES AND REGISTERS.
16. CONTRACTOR SHALL FURNISH AND INSTALL CONCEALED DAMPER ACTUATORS AND DAMPER WHERE DAMPERS ARE INSTALLED IN INACCESSIBLE CEILINGS.
17. EXACT LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS AND GRILLES DETAILED ON THE ARCHITECTURAL REFLECTIVE CEILING PLAN, AND ARCHITECTURAL ROOM ELEVATIONS.
18. ALL DUCTWORK SHALL BE CONSTRUCTED, ERECTED AND TESTED IN ACCORDANCE WITH THE MOST RESTRICTIVE OF LOCAL REGULATIONS, PROCEDURES DETAILED IN THE ASHRAE HANDBOOK OF FUNDAMENTALS, OR THE APPLICABLE STANDARDS ADOPTED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA).
19. PROVIDE METAL COVER PLATES FOR ALL PIPES LOCATED AT FLOOR LEVEL TO PREVENT PIPE DAMAGE. PLATES SHALL NOT BE ENCASED BY NORMAL MAINTENANCE TRAFFIC.
20. ALL BRANCH PIPING TO VAV BOXES, FCUS, OR OTHER COMPONENTS SHALL BE MINIMUM OF 3/4" UNLESS NOTED OTHERWISE.
21. PROVIDE MANUAL AIR VENTS, DRAINS AND RELIEF VALVES AS REQUIRED AT THE HIGH AND LOW POINTS IN THE SYSTEM.
22. PROVIDE VALVED AND CAPPED CONNECTIONS FOR DRAINAGE AT ALL LOW POINTS OF PIPING SYSTEM.
23. MINIMUM PITCH SHALL BE SUFFICIENT TO INSURE ADEQUATE VENTING OR DRAINAGE.
24. CONTRACTOR SHALL COORDINATE INSTALLATION OF HORIZONTAL PIPE RUNS IN THE CEILING PLENUMS WITH ALL TRADES.
25. PROVIDE REDUCER FITTINGS FOR CHANGE IN PIPE SIZE AND FOR FINAL CONNECTION AT EQUIPMENT AND AS REQUIRED TO PERMIT DRAINAGE AND VENTING.
26. ALL PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISERS OF RUNS.
27. THERMOSTAT AND/OR HUMIDISTAT LOCATIONS SHALL BE COORDINATED WITH LIGHT SWITCHES. FINAL LOCATIONS OF THERMOSTAT AND/OR HUMIDISTAT SHALL BE COORDINATED WITH ARCHITECT AND ENGINEER.
28. INSTALL BREAK GLASS SWITCHES FOR EMERGENCY SHUTDOWN FOR CHILLER ROOM, BOILER ROOM, AND ALL REQUIRED PRESSURE VESSELS.
29. MECHANICAL CONTRACTOR IS RESPONSIBLE TO FURNISH DISCONNECT SWITCHES AND MOTOR STARTERS FOR ALL HVAC EQUIPMENT. FOR INSTALLATION AND WIRING, MECHANICAL CONTRACTOR SHALL COORDINATE ELECTRICAL CONTRACTOR AND ELECTRICAL SPECIFICATIONS.
30. MECHANICAL CONTRACTOR IS RESPONSIBLE TO INSTALL DUCT MOUNTED SMOKE DETECTOR AS INDICATED ON DESIGN DRAWINGS. DUCT MOUNTED SMOKE DETECTORS ARE FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR PER ELECTRICAL SPECIFICATIONS.
31. PROVIDE ESCUTCHEONS AND SEALING OF ALL PENETRATIONS OF FIRE SEPARATIONS IN ACCORDANCE DETAIL DRAWINGS AND PER APPLICABLE CODES AS REFERENCE ON ARCHITECTURAL CODE SHEETS.
32. THIS IS A 24 HOUR OPERATING FACILITY, SO SOME WORK MAY HAVE TO BE DONE AFTER NORMAL WORKING HOURS OR ON WEEKENDS AT NO ADDITIONAL COST TO OWNER. SYSTEM SHUT DOWNS SHALL BE COORDINATED AND SCHEDULE WITH OWNER AT LEAST TWO WEEKS IN ADVANCE.

PROJECT PLUMBING GENERAL NOTES

(THESE NOTES APPLY TO ALL PLUMBING SHEETS)

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES RELATING TO WORK TO VERIFY SPACE IN WHICH WORK WILL BE INSTALLED. MAINTAIN HEADROOM AND SPACE CONDITIONS AT ALL TIMES.
2. COORDINATE PLUMBING SYSTEMS WITH WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. PROVIDE ALL FITTINGS, OFFSETS AND TRANSITIONS AS REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
3. MAINTENANCE LABEL SHALL BE AFFIXED TO ALL PLUMBING EQUIPMENT AND A MAINTENANCE MANUAL SHALL BE PROVIDED TO OWNER.
4. CONTRACTOR SHALL REFER TO ALL THE ARCHITECTURAL DRAWINGS FOR PLUMBING RELATED WORK.
5. PLUMBING CONTRACTOR IS RESPONSIBLE TO FURNISH DISCONNECT SWITCHES AND MOTOR STARTERS FOR ALL PLUMBING EQUIPMENT. FOR INSTALLATION AND WIRING, PLUMBING CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR AND ELECTRICAL SPECIFICATIONS.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS INCLUDING BUT NOT LIMITED TO ENTERING MANHOLES, USE OF WATER FROM LOW PRESSURE HYDRANTS, DEMOLITION AND NEW WORK, ETC. PRIOR TO COMMENCEMENT OF WORK.
7. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE CODES. PROVIDE ALL FITTINGS, TRANSITIONS, VALVES AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
8. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO ALL APPLICABLE LOCAL CODES AND REGULATIONS AS REFERENCED ON ARCHITECTURAL CODE PLANS.
9. WHERE EQUIPMENT AND/OR PIPING IS NOTED TO BE DEMOLISHED, COORDINATE WITH GENERAL CONTRACTOR PRIOR TO REMOVAL TO ENSURE THAT REMOVAL OF EQUIPMENT FALLS WITHIN PRESENT CONSTRUCTION LIMITS AND SCOPE OF WORK. DEMOLITION PLANS SHOW GENERAL INTENT OF DEMOLITION WORK, NOT ALL DEMO WORK MAY BE SHOWN. CONTRACTOR SHALL DISCONNECT AND REMOVE ALL ITEMS NOT REQUIRED TO REMAIN.

PROJECT FIRE PROTECTION GENERAL NOTES

(THESE NOTES APPLY TO ALL FIRE PROTECTION SHEETS)

1. COORDINATE FIRE PROTECTION SYSTEMS WITH WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. PROVIDE ALL FITTINGS, OFFSETS, AND TRANSITIONS AS REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
2. COMPLETE SPRINKLER INSTALLATION WITH ALL EQUIPMENT, SPRINKLER HEADS, PIPES, FITTINGS, DRAINS AND HANGERS.
3. UNLESS OTHERWISE NOTED, ALL CONTROL VALVES SHALL BE PROVIDED WITH TAMPER SWITCHES.
4. SPRINKLER PIPING SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE. HANGERS AND SUPPORTS SHALL BE UL LISTED APPROVED FOR USE IN SPRINKLER SYSTEMS. WHERE FIELD CONDITIONS DO NOT PERMIT SUPPORTING FROM THE BUILDING STRUCTURE, PROVIDE ADDITIONAL STEEL FRAMING AS REQUIRED. NO SPRINKLER PIPING SHALL BE HUNG FROM THE PIPING OF OTHER TRADES OR MECHANICAL SYSTEMS.
5. MINIMUM OF 18" CLEARANCE SHALL BE MAINTAINED BETWEEN TOP OF STORAGE AND SPRINKLER DEFLECTOR.
6. FIRE SPRINKLER CONTRACTOR SHALL OBTAIN APPROVAL FROM THE FIRE MARSHAL AND AUTHORITIES HAVING JURISDICTION FOR THE SPRINKLER SYSTEM PRIOR TO INSTALLATION.
7. FIRE SPRINKLER CONTRACTOR SHALL PREPARE AND SUBMIT PRIOR TO ANY FABRICATION AND INSTALLATION OF ALL NECESSARY DRAWINGS AND/OR DOCUMENTS FOR THE PROVISION AND INSTALLATION OF A FULLY AUTOMATIC FIRE SPRINKLER SYSTEM THROUGHOUT THE BUILDING, IN ACCORDANCE WITH AND SUBJECT TO THE INTERNATIONAL BUILDING AND FIRE CODES AND THE AUTHORITIES HAVING JURISDICTION.
8. ENTIRE INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING AND FIRE CODES, AND ALL LOCAL FIRE DEPARTMENT REQUIREMENTS.
9. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE CODES. PROVIDE ALL FITTINGS, TRANSITIONS, VALVES, AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.

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REGISTERED PROFESSIONAL ENGINEER
4-17-2020
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RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
08/04/2020

Saint Luke's East Hospital
MRI Replacement
80 NE Saint Luke's Blvd
Lee's Summit, MO 64086

Date	April 17, 2020
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PM000

SYMBOLS, ABBREVIATIONS, & GENERAL NOTES

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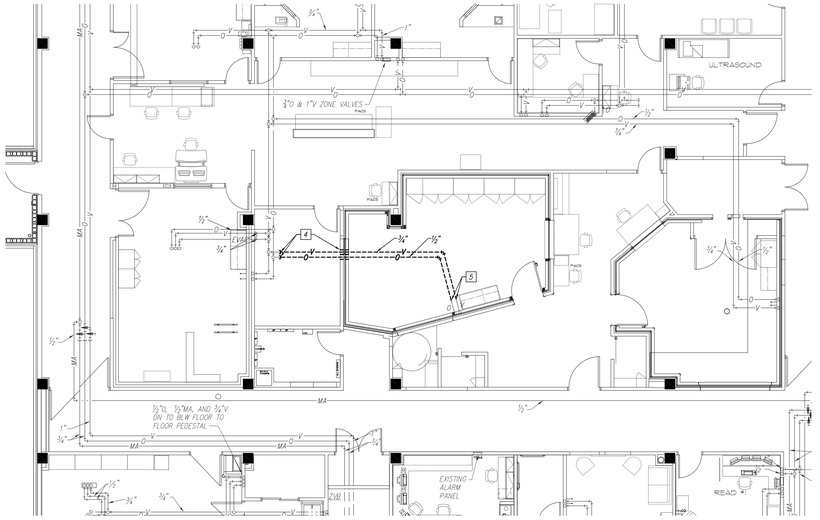
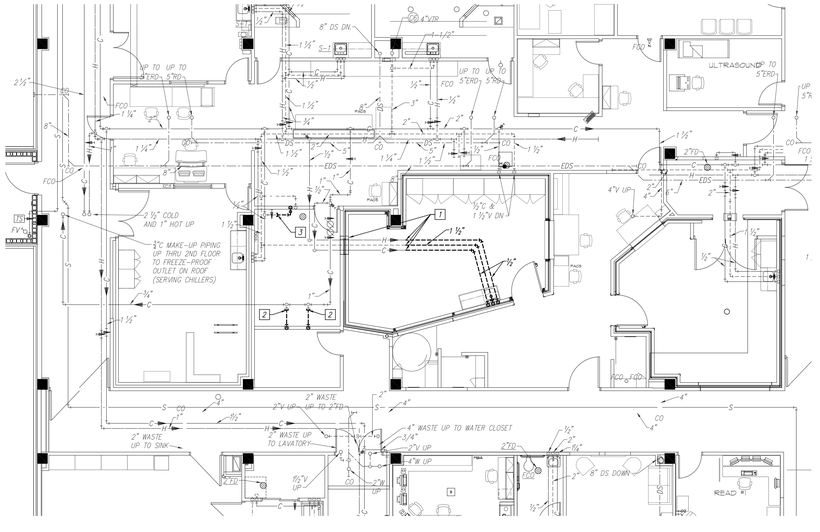


PARTIAL FIRST FLOOR MEDICAL GAS DEMOLITION PLAN

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

NORTH



PARTIAL FIRST FLOOR PLUMBING DEMOLIITION PLAN

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

NORTH

GENERAL NOTES:

1. REFER TO GENERAL NOTES ON SHEET PM000.
2. WORK SHOWN LIGHTLY IS EXISTING TO REMAIN. WORK SHOWN DASHED BOLD IS WORK TO BE REMOVED.
3. THIS IS A 24 HOUR OPERATING FACILITY. THEREFORE SOME WORK MAY NEED TO BE COMPLETED AFTER NORMAL WORKING HOURS OR DURING WEEKENDS AT NO EXTRA COST TO OWNER. ALL SHUTDOWNS SHALL BE COORDINATED AND SCHEDULED WITH OWNER.
4. FIELD VERIFY ALL EXISTING PIPE SIZES AND LOCATIONS PRIOR TO STARTING WORK.

KEYED NOTES:

1 IF EXIST'G WAVEGUIDE FOR PLUMBING PIPING DOES NOT INTERFERE WITH NEW MRI EQUIPMENT, THEN PROTECT AND RE-USE IT. CUT ½"C, ¾"H, AND 1 ¼"V PIPING INSIDE MRI EXAM ROOM RF SHIELDING AND REMOVE DOWNSTREAM PIPING AND SINK AS INDICATED, INCLUDING HANGERS, SUPPORTS, AND ACCESSORIES. IF EXIST'G WAVEGUIDE DOES INTERFERE WITH NEW MRI EQUIPMENT, THEN CUT THE PIPING OUTSIDE OF THE RF SHIELDING (ABOVE THE MRI EQUIPMENT ROOM) AND REMOVE ADDITIONAL PIPING AND THE WAVEGUIDE. ALSO REMOVE WASTE PIPING FROM THE SINK IN WALL, CAP IT BELOW SLAB, AND PATCH SLAB AS REQ'D.

2 CUT & CAP 1"C MAKE-UP WATER AND REMOVE DOWNSTREAM PIPING THAT SERVED THE OLD MRI EQUIPMENT HEAT EXCHANGER LOOP AND/OR CRYO COOLER LOOP, INCLUDING ASSOCIATED FILTERS, ACCESSORIES, AND ANY DRAIN PIPING BELOW RAISED FLOOR TO FLOOR DRAIN. PATCH RAISED FLOOR AS REQ'D.

3 CUT AND CAP ¾"C MAKE-UP WATER AND REMOVE DOWNSTREAM PIPING THAT SERVED THE OLD COMPUTER ROOM AIR CONDITIONING UNIT HUMIDIFIER.

4 CUT & CAP ¾"Ø AND ¾"V AND REMOVE PIPING SHOWN DARK & DASHED, INCLUDING ASSOCIATED HANGERS & SUPPORT AND THE ASSOCIATED WAVEGUIDE AT THE MRI EXAM ROOM RF SHIELDING, IF NOT REQ'D TO REMAIN.

5 CUT ¾"Ø AND ¾"V. PROTECT PIPING DOWN IN WALL TO EXIST'G WALL OUTLETS FOR NEW CONNECTIONS, RE: SHEET P2.1.

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PARTIAL FIRST FLOOR MED-GAS AND PLUMBING DEMOLITION PLANS

2020-034 DP1.dwg

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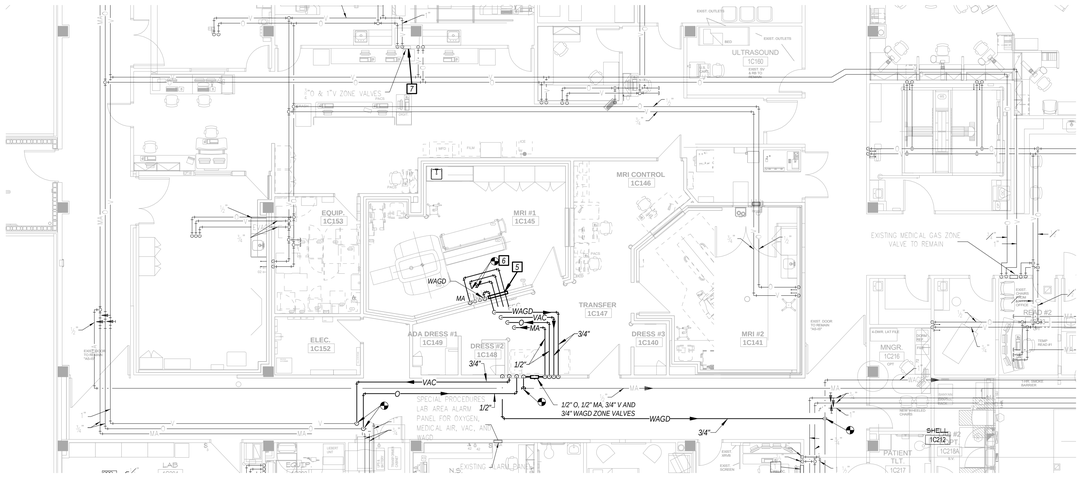
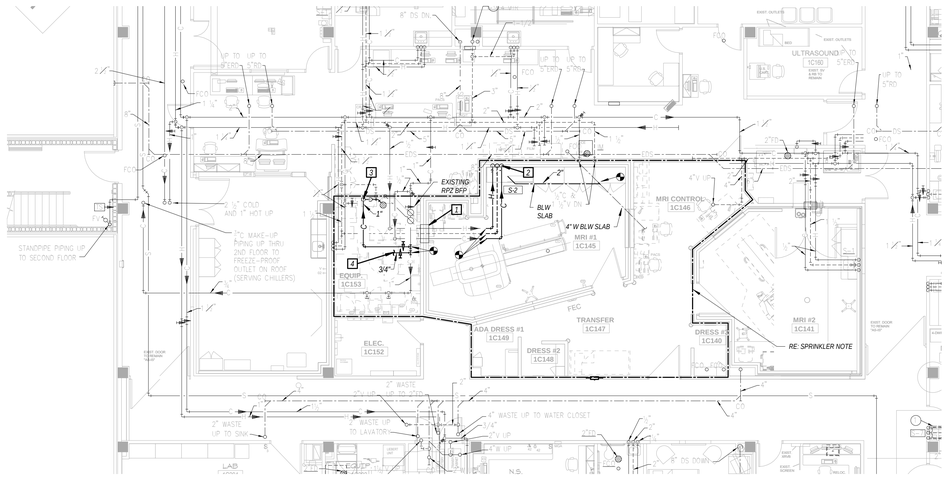
PLUMBING FIXTURE SCHEDULE

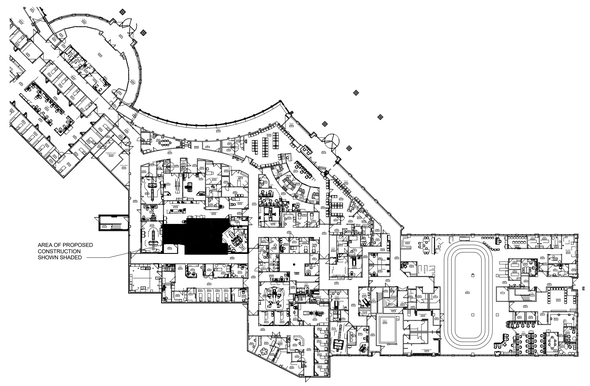
MARK	FIXTURE	DESCRIPTION	ACCESSORIES	MANFR AND MODEL NO.	WASTE	VENT	COLD	HOT
S-2	SINK NONFERROUS W/ SENSOR	SINK INTEGRAL WITH COUNTERTOP	ALL COMPONENTS SHALL BE NONFERROUS. CHICAGO FAUCET HYTRONIC GOOSENECK DECK MOUNTED SINGLE HOLE FAUCET 116.432.AB.1 BATTERY POWERED SENSOR OPERATED FAUCET. DUAL HOT AND COLD WATER SERVICE, ADJUSTABLE TEMPERATURE CONTROL MIXER. AMERICAN STANDARD NO. 2411.015 PERFORATED GRID STRAINER DRAIN WITH 1-1/4" TAILPIECE. DEARBORN NO. 510 1-1/2" 17 GAUGE "P" TRAP WITH ADAPTER FOR 1-1/4" TAILPIECE. CLEANOUT AND ESCUTCHEONS. DEARBORN NO. 2712 KCW GOT AND COLD WATER COMPRESSION INLET SUPPLIES WITH STOPS.	SINK INTEGRAL WITH COUNTERTOP.	2"	1 1/2"	1/2"	1/2"



C1 FIRST FLOOR MED GAS PLAN
1/8" = 1'-0"



A1 FIRST FLOOR PLUMBING PLAN
1/8" = 1'-0"



KeyPlan
SCALE:N.T.S.

GENERAL NOTES

1 *REFER TO GENERAL NOTES ON SHEET PM000.*

2 *ZONE VALVES SHALL FACE CORRIDORS.*

SPRINKLER NOTE

1 *SPRINKLER CONTRACTOR SHALL DISCONNECT, REMOVE AND RELOCATE ANY AND/OR ALL SPRINKLER PIPING AND SPRINKLER HEADS AS REQUIRED BY MECHANICAL, ELECTRICAL AND GENERAL CONTRACTORS. AFTER ALL LARGER DUCTWORK AND PIPING HAVE BEEN INSTALLED, SPRINKLER CONTRACTOR SHALL REINSTALL SPRINKLER PIPING AND HEADS REQUIRED TO SPRINKLER REMODELED SPACE. SPRINKLER CONTRACTOR SHALL ALSO INSTALL NEW SPRINKLER HEADS AND/OR PIPING AS REQUIRED BY REMODEL OF SPACE. ALL PIPING, FITTINGS AND HEADS INSIDE MRI EXAM ROOM RF SHIELDING SHALL BE NON-FERROUS. COORDINATE WITH MRI EQUIPMENT VENDOR AND RF SHIELDING VENDOR AND PROVIDE NEW WAYE GUIDE WHERE PIPING PENETRATES SHIELDING AS REQUIRED.*

KEYED NOTES 0

1 *RE-USE EXISTING PENETRATION PANEL/WAVE GUIDE, IF POSSIBLE. IF NOT POSSIBLE, COORDINATE WITH MRI EQUIPMENT VENDOR AND RF SHIELDING VENDOR AND PROVIDE A NEW PENETRATION PANEL/WAVE GUIDE FOR THE PLUMBING PIPE PENETRATIONS INTO THE MRI EXAM ROOM AS REQUIRED. CONNECT TO EXISTING ½" C, ½" H AND 1-1/2" V PIPING WHERE IT WAS CUT DURING DEMOLITION AND EXTEND TO NEW SINK AS INDICATED.*

2 *½" C, ½" H AND 1-1/2" V DOWN IN WALL TO NEW SINK. EXTEND 2" WASTE FROM SINK DOWN IN WALL AND THRU SLAB. SAW CUT SLAB AS REQUIRED TO INSTALL NEW 2" PIPING BELOW SLAB AND CONNECT TO EXISTING 4" WASTE BELOW SLAB. FIELD VERIFY EXACT LOCATION OF EXISTING PIPING PRIOR TO SAWCUTTING. PATCH SLAB AS SPECIFIED.*

3 *1" COLD MAKE-UP WATER DOWN TO CHILLER INTERFACE PANEL (C.I.P.). RE: MRI EQUIPMENT DRAWINGS. PROVIDE SHUT-OFF VALVE ON WALL ABOVE C.I.P. AND CONNECT PIPING TO "ALTERNATE WATER SOURCE (BYPASS MODE)" INLET CONNECTION ON C.I.P. ALSO CONNECT 1" BYPASS WATER DISCHARGE PIPING TO THE "ALTERNATE WATER SOURCE (BYPASS MODE)" OUTLET ON C.I.P. TURN THAT PIPING DOWN THRU RAISED FLOOR AND ROUTE BELOW RAISED FLOOR AND TERMINATE OVER EXISTING FLOOR DRAIN.*

4 *½" COLD MAKE-UP WATER TO HUMIDIFIER ON NEW COMPUTER ROOM AIR CONDITIONING UNIT. RE: SHEET M2.1 FOR LOCATION OF UNIT.*

5 *COORDINATE WITH MRI EQUIPMENT VENDOR AND RF SHIELDING VENDOR AND PROVIDE NEW PENETRATION PANEL/WAVE GUIDE FOR THE MED GAS PIPE PENETRATIONS INTO THE MRI EXAM ROOM.*

6 *CONNECT TO EXISTING ½" O AND ¾" V ABOVE CEILING. ALSO PROVIDE NEW ½" MA AND ¾" WAGD DOWN IN WALL TO NEW WALL OUTLET/INLET. COORDINATE EXACT LOCATIONS WITH ARCHITECT.*

7 *UPDATE LABEL ON EXISTING ZONE VALVE BOX TO REFLECT THAT IT NO LONGER SERVES MRI #1 EXAM ROOM.*

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P2.1

PLUMBING PLANS

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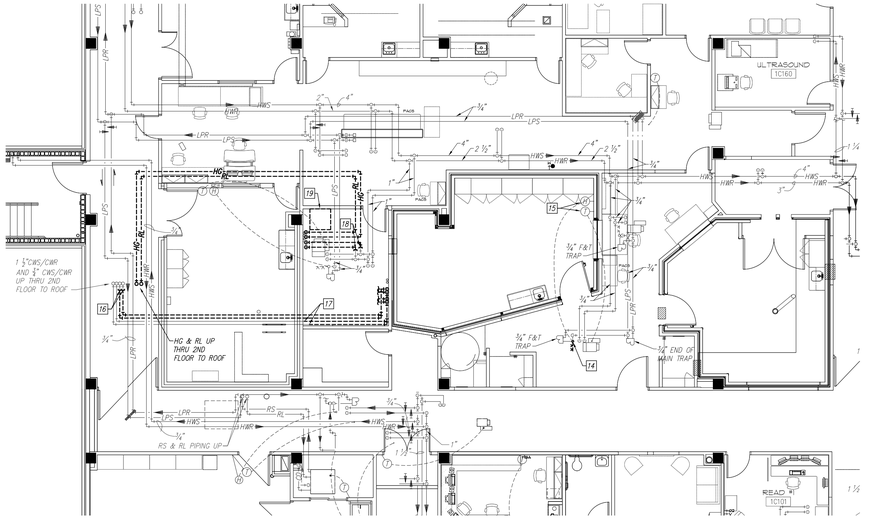
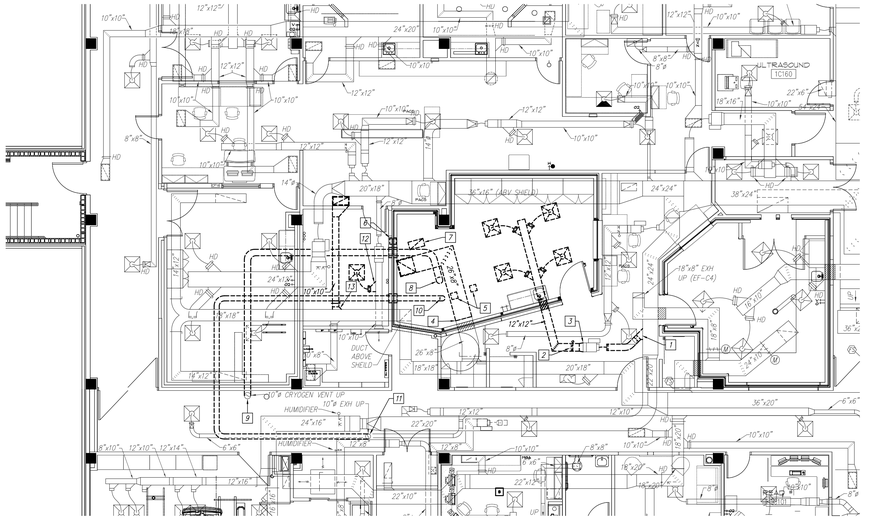


PARTIAL FIRST FLOOR MECHANICAL PIPING DEMOLITION PLAN

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

NORTH



PARTIAL FIRST FLOOR MECHANICAL DEMOLITION PLAN

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

NORTH

GENERAL NOTES:

1. REFER TO GENERAL NOTES ON SHEETS PM000.
2. PRIOR TO ERECTING CONSTRUCTION BARRIERS OR PERFORMING DEMOLITION, TAKE AIRFLOW READINGS AT THE FOLLOWING LOCATIONS AND SUBMIT THEM IN A WRITTEN REPORT TO THE ENGINEER:

   * FAN SOURCE READINGS AT THE AHU-C-1 SUPPLY FAN (LOCATED IN PENTHOUSE): DUCT TRAVERSE OF THE MEDIUM PRESSURE SUPPLY AIR DUCT (MULTIPLE TRAVERSES MAY BE REQUIRED), OUTSIDE AIR DUCT, AND RELIEF AIR DUCT. ALSO PROVIDE TOTAL UNIT STATIC PRESSURE, STATIC PRESSURE ACROSS EACH AHU SECTION/COMPONENT, FAN SPEED, MOTOR NAMEPLATE DATA, VFD FREQUENCY, MOTOR AMP READING, AND A DIAGRAM OF AHU & DUCTWORK SHOWING WHERE READINGS WERE TAKEN.

   * FAN SOURCE READINGS AT THE ASSOCIATED RETURN FAN; DUCT TRAVERSE FOR THE RETURN AIR MAIN DUCT (MULTIPLE TRAVERSES MAY BE REQUIRED). ALSO PROVIDE STATIC PRESSURE, FAN SPEED, MOTOR NAMEPLATE DATA, VFD FREQUENCY, AND MOTOR AMP READING.

   * DIFFUSER/GRILLE READINGS AT ALL EXISTING DIFFUSERS/GRILLES IN MRI EXAM ROOM AND SUPPORTING SPACES. INCLUDE A PLAN IN THE REPORT SHOWING LOCATION OF EACH INDIVIDUAL DIFFUSER/GRILLE AND THE AIRFLOW READING.
3. THIS PLAN SHOWS GENERAL INTENT OF DEMOLITION WORK. CONTRACTOR SHALL COORDINATE DEMOLITION WITH OWNER. THIS IS A 24 HOUR OPERATING FACILITY, SO SOME WORK MAY HAVE TO BE DONE AFTER NORMAL WORKING HOURS OR ON WEEKENDS AT NO EXTRA COST TO OWNER. SYSTEM SHUT DOWNS SHALL BE COORDINATED AS SCHEDULED WITH OWNER.
4. WORK SHOWN LIGHTLY IS EXISTING TO REMAIN. WORK SHOWN DASHED BOLD IS WORK TO BE REMOVED.
5. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO DEMOLITION.
6. NOT ALL DEMOLITION WORK MAY BE SHOWN. CONTRACTOR SHALL DISCONNECT AND REMOVE ALL ITEMS NOT REQUIRED TO REMAIN.
7. DUE TO CONTINUED OPERATION OF EXISTING FACILITY, DEMOLITION MAY HAVE TO BE COMPLETED IN PHASES. COORDINATE PHASING OF WORK WITH OWNER.

KEYED NOTES:

1. DISCONNECT AND REMOVE 10"ø SA BRANCH DUCT AND FLEXIBLE DUCT ON UPSTREAM SIDE OF CONSTANT VOLUME BOX. PROTECT BOX AND REMAINING DUCTWORK FOR NEW CONNECTIONS, RE: SHEET M2.1.
2. DISCONNECT DUCT HUMIDIFIER FROM SA DUCT AND PROTECT IT FOR RE-INSTALLATION AND NEW USE, RE: SHEET M2.1.
3. DISCONNECT 12"x12" SA FROM DOWNSTREAM SIDE OF CONSTANT VOLUME BOX AND REMOVE LOW PRESSURE DUCTWORK SERVING MRI EXAM ROOM. AS INDICATED, INCLUDING ASSOCIATED WAVE GUIDE, DAMPERS, FLEXIBLE DUCTS, DIFFUSERS, HANGERS & SUPPORTS. PROTECT BOX FOR NEW CONNECTIONS, RE: SHEET M2.1. COORDINATE WITH RF SHIELDING VENDOR TO PATCH THE RF SHIELDING AS REQ'D.
4. CUT 26"x8" RA DUCT AND REMOVE UPSTREAM DUCTWORK AS INDICATED, INCLUDING ASSOCIATED RETURN GRILLE, HANGERS & SUPPORTS.
5. REMOVE CEILING GRILLES/FILTERS ASSOCIATED WITH THE OLD "PATIENT VENTILATION SYSTEM".
6. REMOVE WAVEGUIDE ASSOCIATED WITH THE OLD "PATIENT VENTILATION SYSTEM" HOSES. COORDINATE WITH RF SHIELDING VENDOR TO PATCH THE RF SHIELDING AS REQ'D.
7. REMOVE PRESSURE RELIEF CEILING GRILLE AND ASSOCIATED DUCT UP THROUGH RF SHIELDING. COORDINATE WITH RF SHIELDING VENDOR TO PATCH THE RF SHIELDING AS REQ'D.
8. DISCONNECT 8"ø CRYOGEN VENT FROM MRI AND REMOVE VENT SHOWN DARK AND DASHED.
9. CUT & CAP 10"ø CRYGEN VENT JUST BELOW SECOND FLOOR SLAB. THE OWNER DESIRES TO KEEP THE RISER UP THRU SECOND FLOOR TO ROOF IN PLACE, FOR POSSIBLE RE-USE IN FUTURE.
10. DISCONNECT 8"ø EXH FROM MRI AND REMOVE DUCTWORK SHOWN DARK AND DASHED.
11. CUT & CAP 10"ø EXH JUST BELOW SECOND FLOOR SLAB. THE OWNER DESIRES TO KEEP THE RISER UP THRU SECOND FLOOR TO ROOF IN PLACE, FOR POSSIBLE RE-USE IN FUTURE.
12. DISCONNECT & REMOVE SA BRANCH DUCT & DIFFUSER SERVING MRI EXAM ROOM.
13. DISCONNECT AND REMOVE RA BRANCH DUCT AND GRILLE.
14. DISCONNECT LPS & LPR PIPING FROM DUCT HUMIDIFIER. PROTECT THE PIPING FOR RE-CONNECTION, RE: SHEET M2.1.
15. VERIFY THE EXISTING TEMPERATURE & HUMIDITY SENSORS MEET THE MRI EQUIPMENT VENDOR'S REQUIREMENTS (THEY MUST NOT HAVE INTELLIGENCE; NO MICRO-PROCESSOR CONTROL, NO OSCILLATORS, NO SOURCE OF CLOCK SIGNAL AT ALL). IF THEY MEET THE REQUIREMENTS, PROTECT THEM FOR RE-USE. IF THEY DO NOT MEET THE REQUIREMENTS, REMOVE THE SENSORS AND ASSOCIATED WIRING, AND INSTALL NEW DUCT-MOUNTED TEMPERATURE & HUMIDITY SENSORS IN THE RETURN DUCTWORK IMMEDIATELY OUTSIDE THE MRI EXAM ROOM RF SHIELDING, AND PROVIDE NEW CONTROL WIRING TO THE EXIST'G CONSTANT VOLUME BOX CONTROLLER AS REQ'D.
16. CUT & CAP 3/4" CWS/CWR PIPING JUST BELOW SECOND FLOOR SLAB AND REMOVE PIPING BACK TO THE OLD MRI CRYO COOLER CIRCUIT IN THE MRI EQUIPMENT ROOM, INCLUDING ASSOCIATED HANGERS & SUPPORTS. PATCH THE RAISED FLOOR OF THE EQUIPMENT ROOM AS REQ'D. THE OWNER DESIRES TO KEEP THE PIPE RISERS UP THRU SECOND FLOOR TO ROOF IN PLACE, FOR POSSIBLE RE-USE IN FUTURE.
17. CUT 1 1/2" CWS/CWR PIPING AND REMOVE PIPING BACK TO THE OLD MRI GRADIENT HEAT EXCHANGER CIRCUIT IN THE MRI EQUIPMENT ROOM, INCLUDING ASSOCIATED HANGERS & SUPPORTS. PATCH THE RAISED FLOOR OF THE EQUIPMENT ROOM AS REQ'D. PROTECT THE REMAINING PIPING ABOVE CEILING FOR NEW CONNECTIONS, RE: SHEET M2.1.
18. CUT & CAP AND REMOVE 1" HWS/HWR BRANCH PIPING TO THE OLD COMPUTER ROOM AIR CONDITIONING UNIT REHEAT COIL, INCLUDING ASSOCIATED VALVES, ACCESSORIES, HANGERS & SUPPORTS.
19. DISCONNECT & REMOVE THE OLD COMPUTER ROOM AIR CONDITIONING UNIT (VERTICAL DOWNFLOW UNIT ON RAISED FLOOR), INCLUDING ASSOCIATED ACCESSORIES, CONTROLS, REFRIGERANT PIPING UP THRU SECOND FLOOR SLAB, AND DRAIN PIPING BELOW RAISED FLOOR. PATCH THE RAISED FLOOR WITH NEW FLOOR TILES TO MATCH EXIST'G.

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PARTIAL FIRST FLOOR MECHANICAL DEMOLITION PLANS

2020-034 DM1.dwg

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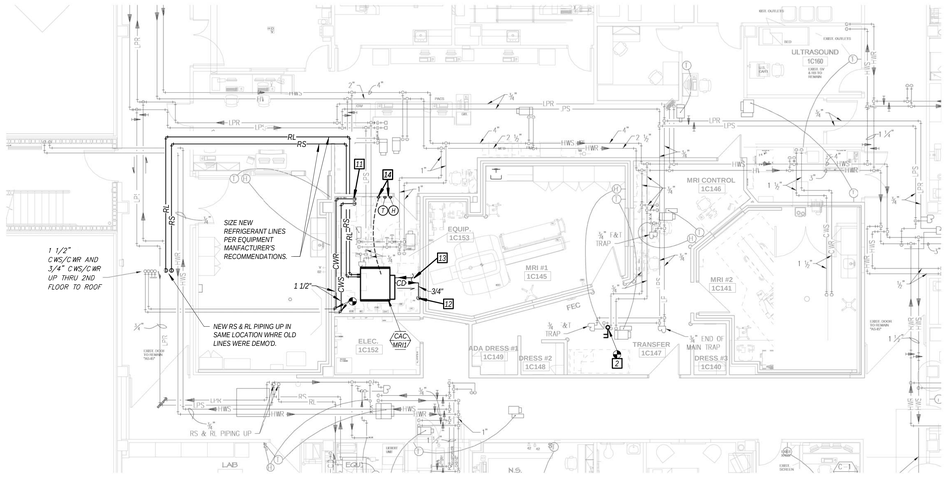
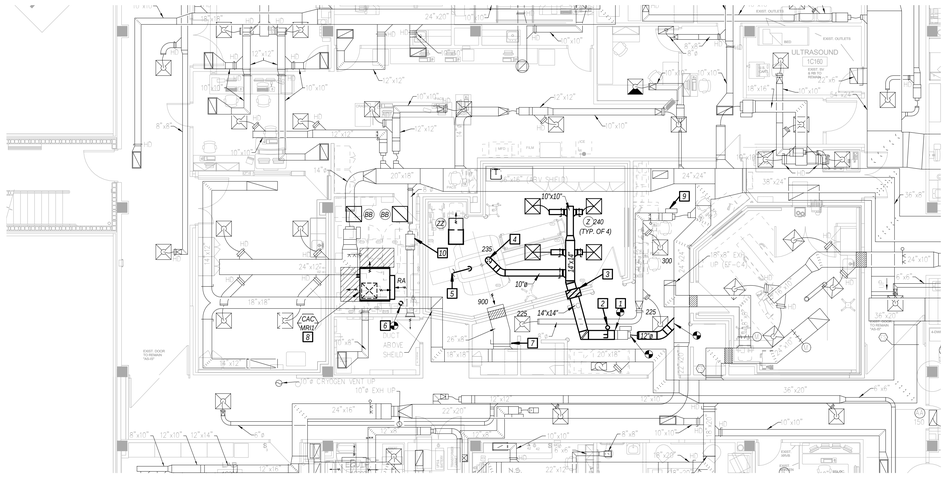


C1 FIRST FLOOR MECHANICAL PIPING PLAN
1/8" = 1'-0"



A1 FIRST FLOOR MECHANICAL PLAN
1/8" = 1'-0"

GENERAL NOTES

1 *REFER TO GENERAL NOTES ON SHEET PM000.*

2 *ALL WORK (DUCTWORK, DAMPERS, FLEXIBLE DUCTS, DIFFUSERS, GRILLES, BOOTS, HANGERS, SUPPORTS, ETC.) WITHIN MRI EXAM ROOM RF SHIELDING SHALL BE CONSTRUCTED OF ALUMINUM OR OTHER APPROVED NON-FERROUS MATERIALS.*

KEYED NOTES 0

1 *CONNECT NEW DUCTWORK TO EXISTING CONSTANT VOLUME BOX. ADJUST BOX TO NEW DESIGN AIRFLOW RATE OF 1200 CFM.*

2 *RE-INSTALL THE DUCT HUMIDIFIER THAT WAS DISCONNECTED DURING DEMOLITION IN THE NEW SUPPLY AIR DUCT. RECONNECT THE ASSOCIATED LPS AND LPR PIPING AS REQUIRED.*

3 *COORDINATE WITH MRI EQUIPMENT VENDOR AND RF SHIELDING VENDOR AND PROVIDE A NEW WAVE GUIDE WHERE NEW SUPPLY AIR DUCT PENETRATES RF SHIELDING.*

4 *TURN 10" DIA. SA DOWN INSIDE SHROUD OVER MAGNET AND TERMINATE 8'-1" A.F.F., RE: MRI EQUIPMENT DRAWINGS. COORDINATE EXACT LOCATION WITH MRI EQUIPMENT VENDOR. BALANCE TO AIRFLOW RATE (CFM) INDICATED.*

5 *MRI EQUIPMENT VENDOR WILL PROVIDE AND INSTALL A FLEX HOSE TO CARRY HEATED AIR FROM INSIDE THE MAGNET SHROUD TO THE "SYSTEM AIR COOLING UNIT (SACU) (PROVIDED BY MRI EQUIPMENT VENDOR). THIS HOSE WILL CARRY 235 CFM OF AIR OUT OF THE MRI EXAM ROOM. COORDINATE WITH MRI EQUIPMENT VENDOR AND RF SHIELDING VENDOR AND PROVIDE A WAVE GUIDE FOR THE HOSE AS REQUIRED.*

6 *PROVIDE A 6" DIA., 45 DEGREE BRANCH CONNECTION ON THE BOTTOM OF THE EXISTING 18"x18" RETURN AIR DUCT. PROVIDE A 6" DIA. TO 5" DIA. REDUCER TO ACCEPT THE 5 ½" DIA. HOSE THAT IS BEING PROVIDED BY THE MRI EQUIPMENT VENDOR ON THE DOWNSTREAM SIDE OF THEIR "SYSTEM AIR COOLING UNIT" (SACU). COORDINATE EXACT LOCATION OF CONNECTION WITH MRI EQUIPMENT VENDOR. THE CONNECTION POINT MUST BE WITHIN 6' OF THE OUTLET OF THE SACU. CONNECT THE HOSE TO THE RIGID DUCTWORK AS REQUIRED.*

7 *BALANCE THE EXISTING RETUN AIR WAND DAMPER SERVING THE MRI EXAM ROOM TO PROVIDE A SLIGHT POSITIVE PRESSURE IN THE EXAM ROOM (APPROXIMATE AIRFLOW RATE OF 900 CFM).*

8 *INSTALL COMPUTER ROOM AIR CONDITIONING SYSTEM INDOOR UNIT CAC-MRI1 ABOVE CEILING OF MRI EQUIPMENT ROOM. CAREFULLY COORDINATE EXACT LOCATION AND ORIENTATION WITH EXISTING WORK, WITH OTHER TRADES AND WITH OWNER (FACILITIES MANAGER) TO PROVIDE A MINIMUM OF 30" OF SPACE IN FRONT OF UNIT AND ON RIGHT SIDE OF UNIT, CLEAR OF OBSTRUCTIONS (AS RECOMMENDED BY MANUFACTURER FOR COMPONENT ACCESS AND REMOVAL). ENSURE THAT CEILING TILES IN THIS AREA ARE EASILY REMOVEABLE. PROVIDE RIGID DUCT CONNECTION BETWEEN BOTTOM OUTLET OF UNIT AND 3-WAY SUPPLY GRILLE FURNISHED WITH UNIT. PROVIDE AND INSTALL CONTROL WIRING BETWEEN INDOOR AND OUTDOOR UNITS AS REQUIRED.*

9 *BALANCE EXISTING BOX TO DESIGN AIRFLOW RATE OF 750 CFM, AND EACH DIFFUSER ON THIS ZONE TO AIRFLOW RATE (CFM) INDICATED.*

10 *BALANCE EXISTING BOX TO NEW DESIGN AIRFLOW RATE OF 300 CFM.*

11 *1-1/2" CWS/CWR DOWN TO CHILLER INTERFACE PANEL (C.I.P.), RE: MRI EQUIPMENT DRAWINGS. PROVIDE SHUT-OFF VALVES ON WALL, ABOVE C.I.P. AND CONNECT PIPING TO "INLET WATER FROM CHILLER" AND "OUTLET WATER TO CHILLER" CONNECTIONS ON C.I.P. INSTALL MANUAL AIR VENT VALVES AT ANY HIGH POINTS IN PIPING. THE PIPING ON THE MRI EQUIPMENT SIDE OF THE C.I.P. WILL BE PROVIDED AND INSTALLED BY THE MRI EQUIPMENT VENDOR.*

12 *ROUTE ¾" CD PIPING FROM COMPUTER ROOM A/C UNIT CAC-MRI1 DOWN THRU CEILING AND DOWN ON WALL IN A LOCATION THAT WILL NOT INTERFERE WITH THE NEW MRI EQUIPMENT, THEN DOWN THRUBELOW RAISED FLOOR AND TURN DOWN OVER EXISTING FLOOR DRAIN BELOW RAISED FLOOR (RE: PLUMBING FOR LOCATION). PROVIDE TEE WITH CLEANOUT PLUG AT EACH CHANGE OF DIRECTION.*

13 *½" COLD MAKE-UP WATER FROM BACKFLOW PREVENTER, RE: SHEET P2.1 FOR CONTINUATION. EXTEND AND CONNECT TO HUMIDIFIER IN COMPUTER ROOM A/C UNIT CAC-MRI1.*

14 *TEMPERATURE AND HUMIDITY SENSORS AND TOUCHSCREEN DISPLAY CONTROL INTERFACE FOR COMPUTER ROOM A/C UNIT CAC-MRI1. COORDINATE EXACT LOCATIONS WITH MRI EQUIPMENT VENDOR (TO AVOID INTERFERING WITH THEIR EQUIPMENT) AND WITH ENGINEER. AVOID PLACING NEAR ANY EQUIPMENT THAT REJECTS HEAT.*

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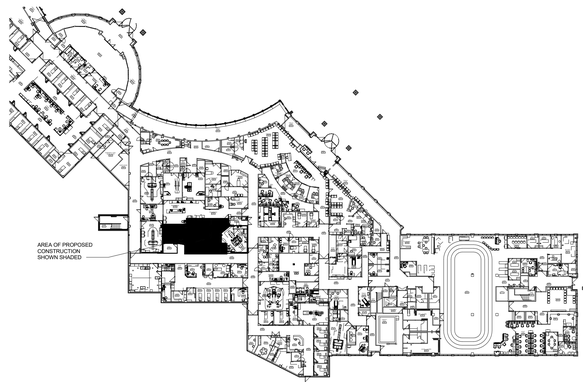
08/04/2020



KeyPlan
SCALE:N.T.S.

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BRUCE ELDON HART
NUMBER E-22817
PROFESSIONAL ENGINEER

4-17-2020

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Saint Luke's East Hospital
MRI Replacement
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Lee's Summit, MO 64086

Date	April 17, 2020
Job Number	3-20037
Drawn By	MJL
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Revision

Number	Date	Description

M2.1

MECHANICAL PLANS

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COMPUTER ROOM AIR CONDITIONING UNIT & CONDENSING UNIT SCHEDULE

PLAN MARK	LOCATION/ AREA SERVED	TYPE	MANUF.	MODEL NUMBER	PRE-FILTERS		COOLING COIL				SUPPLY FAN				REHEAT		HUMIDIFIER			ELECTRICAL (INDOOR UNIT)			CONDENSING UNIT							OPER. WT. LBS	NOTES
					EFFICIENCY	QUANTITY & SIZE	TYPE	ENT. AIR DB/RH	TOTAL BTUH	SENSIBLE BTUH	TYPE	AIRFLOW CFM	E.S.P. IN. W.G.	MOTOR HP	TYPE	CAPACITY BTUH	TYPE	CAPACITY LBS/HR	KW	VOLTS/PHASE/HZ	FLA	DISC. SW.	PLAN MARK	TYPE	LOW AMBIENT	HIGH AMBIENT	VOLTS/PHASE/HZ	FLA	DISC. SW.		
CAC-MR1	MRI #1 EQUIP. RM.	ABOVE-CEILING	LIEBERT	MT060E (INDOOR) PFD067AH (OUTDOOR)	MERV 13	2 - 20"x20"	EVAPORATOR	75°F/50%	60,300	50,700	VARIABLE SPEED EC PLUG	2650	0.2	3	———	———	STEAM-GEN CANNISTER	8	2.8	460/3/60	7.7	FACTORY MTD. & WIRED	CU-MR1	OUTDOOR AIR-COOLED W/ DIGITAL SCROLL	-30°F	105°F	460/3/60	12.6	BY ELEC	498 (INDOOR) 488 (OUTDOOR)	1

NOTES

1. FURNISH INDOOR UNIT WITH FACTORY-MOUNTED CONTROLS, INCLUDING COMMUNICATIONS CARD TO ALLOW REMOTE ACCESS TO THE CONTROLS VIA THE WWW OR THROUGH A BACNET COMMUNICATIONS LINK. CONTROLS SHALL INCLUDE A FACTORY-MOUNTED FILTER CLOG SWITCH AND COMMON ALARM CONTACT. FURNISH RETURN AIR SMOKE DETECTOR, FACTORY WIRED TO SHUT DOWN THE UNIT AND SEND LOCAL VISUAL & AUDIBLE ALARMS, WITH OPTIONAL CONNECTIONS FOR EXTERNAL MONITORING. ALSO FURNISH TEMPERATURE & HUMIDITY SENSORS AND A TOUCH SCREEN DISPLAY CONTROL INTERFACE FOR REMOTE FIELD MOUNTING ON THE WALL. FURNISH AND CHARGE SYSTEM WITH REFRIGERANT R-410A AS REQUIRED. FURNISH OPTIONAL FILTER BOX AND HIGH-EFFICIENCY FILTERS AS SCHEDULED. FURNISH OPTIONAL 3-WAY DISCHARGE GRILLE FOR INSTALLATION DIRECTLY BELOW THE INDOOR UNIT.

DIFFUSER & GRILLE SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	SERVICE	STYLE	FACE SIZE (INCHES)	NECK SIZE (INCHES)	BORDER TYPE	FINISH	REMARKS
Z	TITUS	OMNI-AA	SUPPLY	SQUARE PLAQUE	24x24	8"ø	LAY-IN	BAKED WHITE	ENTIRELY ALUMINUM FOR MRI APPLICATIONS
BB	TITUS	23RL	RETURN	HORIZONTAL FACE 45° DEFLECTION	24x24	22x22	LAY-IN	BAKED WHITE	
ZZ	TITUS	3FL	RETURN	HORIZONTAL FACE 45° DEFLECTION	24x24	22x22	LAY-IN	BAKED WHITE	ENTIRELY ALUMINUM FOR MRI APPLICATIONS

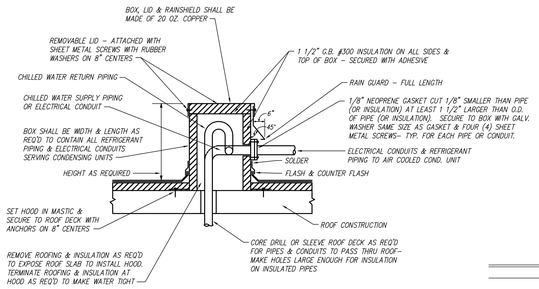
NOTE: NOT ALL DIFFUSER & GRILLE TYPES MAY BE USED IN THIS PACKAGE. REFER TO DRAWINGS FOR TYPES REQUIRED. REFER TO SHEET METAL PLANS FOR INDIVIDUAL DIFFUSER AIRFLOWS.

SHEET METAL PLAN MARK

4 / 100 — PLAN MARK / TOTAL CFM

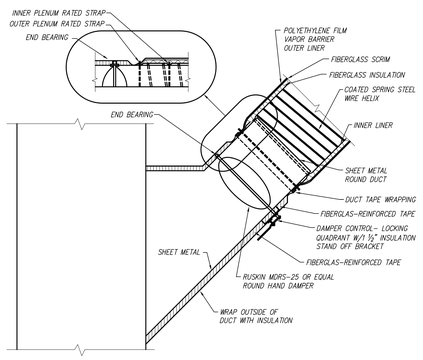
GENERAL NOTES:

1. REFER TO GENERAL NOTES ON SHEET PM000.



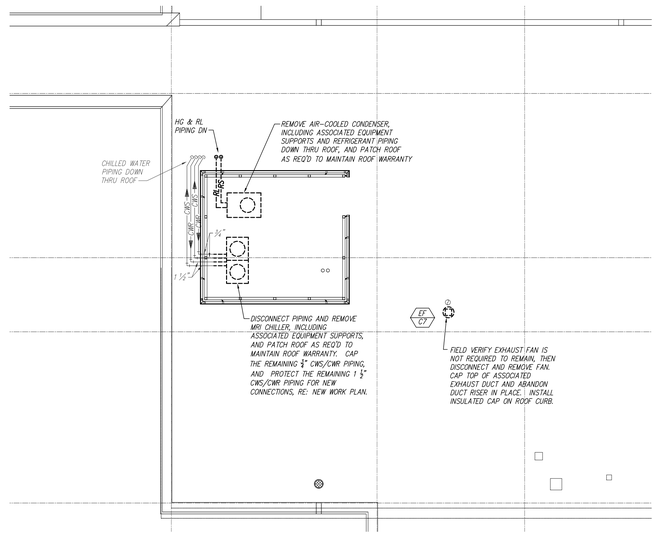
DETAIL OF RAIN SHIELD FOR REFRIGERANT PIPING THROUGH ROOF

NOT TO SCALE



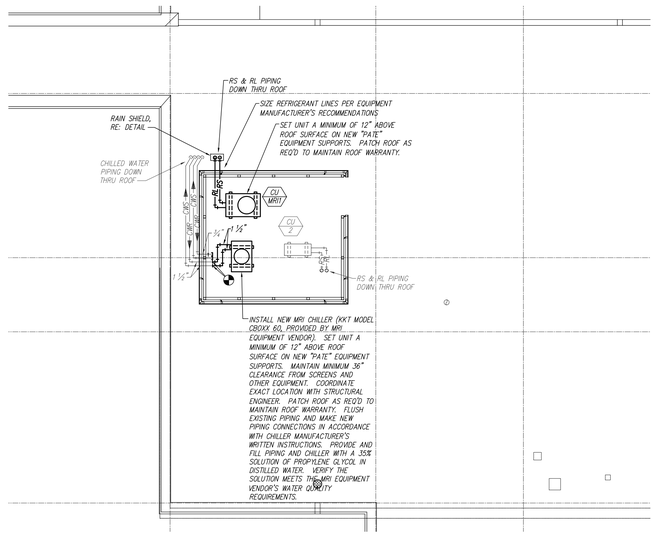
FLEXIBLE DUCT CONNECTION DETAIL

NOT TO SCALE



PARTIAL ROOF MECHANICAL & PIPING DEMO PLAN

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



PARTIAL ROOF MECHANICAL PIPING PLAN

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

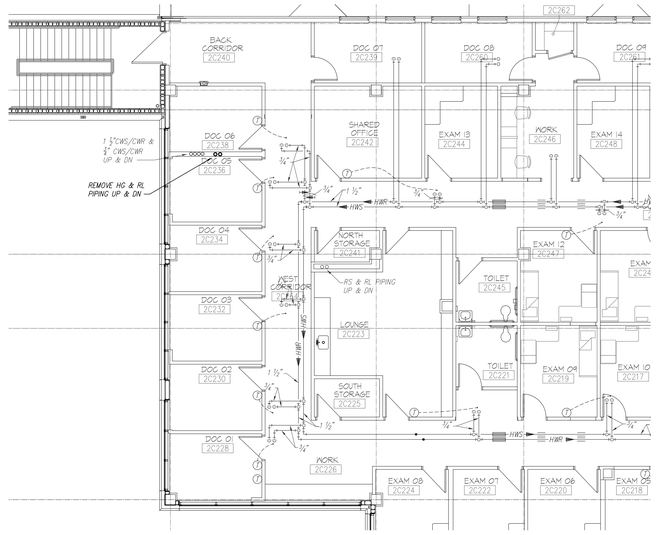
GENERAL CONTROLS NOTES:

1. DIAGRAMS INDICATE GENERAL LOCATIONS OF SENSORS, VALVES, DAMPERS, AND OTHER CONTROL DEVICES FOR INTENT OF SEQUENCE. CONTRACTOR SHALL COORDINATE EXACT LOCATIONS BASED ON FIELD CONDITIONS.
2. CONTROL PIPING, CONTROL WIRING, SWITCHES, RELAYS, ACCESSORIES, ETC. REQUIRED FOR CONTROL SEQUENCE ARE NOT SHOWN.
3. ALL POWER WIRING (120 VOLT OR HIGHER) FOR EQUIPMENT MOTORS, WIRING SPECIFICALLY SHOWN ON THESE DRAWINGS, WIRING SHOWN ON ELECTRICAL PLANS AND FIRE ALARM WIRING TO BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR. ALL REMAINING CONTROL WIRING REQUIRED FOR CONTROL SEQUENCE, TO BE FURNISHED AND INSTALLED BY CONTROL CONTRACTOR.

SEQUENCE OF OPERATION

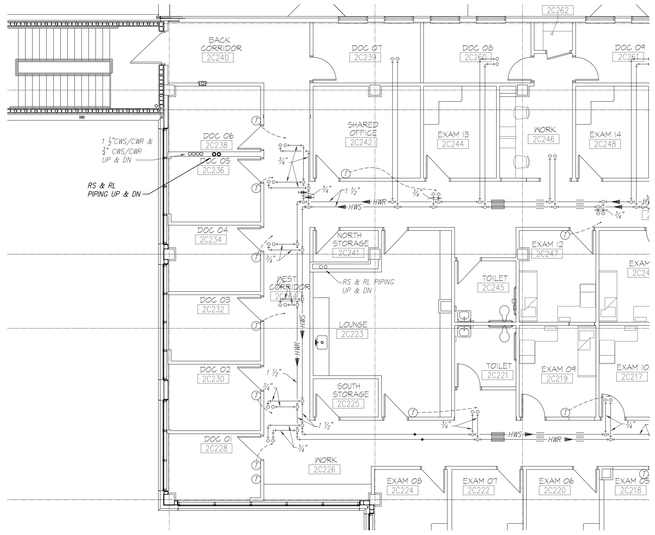
CRAC UNIT INCLUDES FACTORY-MOUNTED CONTROLS WITH BACNET COMMUNICATIONS CAPABILITY. PROVIDE A BACNET CONNECTION TO THE BUILDING MANAGEMENT SYSTEM (BMS), AND COORDINATE WITH THE OWNER THE POINTS TO MAP TO THE BMS, AND PROVIDE GRAPHICS ON BMS AS REQUIRED.

COMPUTER ROOM AIR CONDITIONING UNIT CONTROL DIAGRAM



PARTIAL SECOND FLOOR MECHANICAL PIPING DEMO PLAN

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



PARTIAL SECOND FLOOR MECHANICAL PIPING PLAN

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

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LEE'S SUMMIT, MISSOURI
08/04/2020

STATE OF MISSOURI
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PARTIAL SECOND FLOOR AND ROOF MECHANICAL PLANS

2020-034 M2.2.dwg

ELECTRICAL SYMBOLS LIST
(ALL MAY NOT APPLY)

POWER SYMBOLS

- HOMERUN TO SOURCE AS NOTED
- CONDUIT IN WALL OR CEILING CONSTRUCTION WITH ONE PHASE WIRE, ONE NEUTRAL WIRE AND ONE GROUND WIRE. CONDUIT IN FLOOR OR BELOW GRADE CONSTRUCTION WITH ONE PHASE WIRE, ONE NEUTRAL WIRE AND ONE GROUND WIRE
- CONDUIT WITH WIRING (TWO PHASE WIRES, NEUTRAL AND GROUND WIRE)
- CONDUIT WITH #10 WIRE THROUGHOUT ENTIRE CIRCUIT
- PARTIAL CIRCUIT, HOMERUN TO SOURCE AS NOTED
- LOW VOLTAGE WIRING
- EXISTING CONDUIT WITH NEW WIRE
- PANELBOARD (DOUBLE LINE INDICATES FRONT OF PANELBOARD)
- DISCONNECTING SWITCH
- COMB. MOTOR STARTER AND DISC. SWITCH
- NF DENOTES NON-FUSED
- VFD — VARIABLE FREQUENCY DRIVE
- VFD — VARIABLE FREQUENCY DRIVE WITH DISCONNECTING MEANS
- TCP — TEMPERATURE CONTROL PANEL
- MOTOR CONNECTION
- MECHANICAL VAV BOX
- MECHANICAL MIXING BOX
- TRANSFORMER
- SINGLE RECEPTACLE
- DUPLEX CONVENIENCE RECEPTACLE
- FOURPLEX CONVENIENCE RECEPTACLE
- 6-20R — HEAVY DUTY OUTLET - WITH NEMA CONFIGURATION
- CONVENIENCE RECEPTACLE - TOP HALF SWITCHED
- GROUND FAULT CIRCUIT INTERRUPTER
- IG — ISOLATED GROUND RECEPTACLE
- CONVENIENCE RECEPTACLE - MOUNTED HORIZONTALLY
- 48 — NUMBER INDICATES MOUNTING HEIGHT OF DEVICE (CENTER LINE ABOVE FLOOR) IF OTHER THAN SPECIFIED HEIGHT
- EWC — ELECTRIC WATER COOLER
- JEWC — JUNCTION BOX FOR ELECTRIC WATER COOLER
- FLOOR OUTLET - DUPLEX RECEPTACLE
- FLOOR OUTLET - FOURPLEX RECEPTACLE
- CEILING DROP
- FPT — FLOOR POKE THROUGH - DUPLEX RECEPTACLE
- J — JUNCTION BOX
- J — WALL MOUNTED JUNCTION BOX
- JEC — JUNCTION BOX MOUNTED OVER CEILING
- J — FLOOR JUNCTION BOX
- T — ELECTRIC THERMOSTAT - WALL MOUNTED
- P — PUSHBUTTON - WALL MOUNTED
- PL — PUSHBUTTON WITH PILOT LIGHT
- BELL OR BUZZER
- P — SINGLE CIRCUIT PLUGMOLD
- P2 — TWO CIRCUIT PLUGMOLD
- SR — SURFACE RACEWAY
- BUSHING AT END OF CONDUIT
- CM — INDICATES DEVICE THAT SHALL BE MOUNTED ABOVE OR OTHER THAN SPECIFIED HEIGHT REFER TO ARCHITECTURAL DETAILS AND ELEVATIONS AND COORDINATE EXACT LOCATION OF DEVICE. WHERE DEVICES ARE NOT SHOWN IN ARCHITECTURAL DETAILS, CONTRACTOR SHALL CONFIRM EXACT MOUNTING LOCATION WITH ARCHITECT.
- EM — INDICATES LIGHT OR DEVICE CONNECTED TO EMERGENCY POWER OR FURNISHED WITH A BATTERY PACK CONNECTED TO A NON-SWITCHED HOT WIRE
- EX — EXISTING DEVICE, LIGHT, OR CONDUIT & WIRE TO REMAIN
- N — NEW DEVICE IN EXISTING OUTLET BOX
- NL — INDICATES NIGHT LIGHT FIXTURE CONNECTED TO A NON-SWITCHED HOT WIRE
- R — EXISTING DEVICE, LIGHT, OR CONDUIT & WIRE TO BE REMOVED
- RB — EXISTING DEVICE OR LIGHT TO BE REMOVED WITH BLANK COVER ON OUTLET BOX
- RL — EXISTING DEVICE OR LIGHT RELOCATED
- RN — EXISTING DEVICE OR LIGHT TO BE REMOVED AND OUTLET BOX REUSED FOR NEW DEVICE OR LIGHT
- RT — RAINTIGHT DEVICE - NEMA 3R
- TP — TAMPER-PROOF DEVICE
- WP — WEATHER-PROOF DEVICE
- VUH — VERTICAL UNIT HEATER. REFER TO DETAIL FOR ALL WIRING REQUIRED. REFER TO FLOOR PLANS FOR LOCATIONS.
- LK — DEVICE WITH LOCKABLE COVERPLATE
- USB — RECEPTACLE FURNISHED WITH (1) TYPE-A AND (1) TYPE-C USB OUTLET.

LIGHTING SYMBOLS

- CEILING MOUNTED LIGHT FIXTURE
- CEILING MOUNTED WALL WASH LIGHT FIXTURE
- WALL MOUNTED LIGHT FIXTURE
- WALL MOUNTED LIGHT FIXTURE
- CEILING MOUNTED FLUORESCENT LIGHT FIXTURE
- WALL MOUNTED FLUORESCENT LIGHT FIXTURE
- TRACK LIGHT FIXTURE. X - INDICATES TYPE OF AIMABLE LIGHT FIXTURE. Y - INDICATES TYPE OF TRACK
- POLE MOUNTED LIGHT FIXTURE
- CEILING MOUNTED EXIT LIGHT
- WALL MOUNTED EXIT LIGHT
- CEILING MOUNTED EXIT LIGHT WIDIRECTIONAL ARROW
- WALL MOUNTED EXIT LIGHT WIDIRECTIONAL ARROW
- SHADING DENOTES FACE DIRECTION OF EXIT LIGHT
- BATTERY OPERATED EMERGENCY LIGHT - WALL MOUNTED
- BATTERY OPERATED EMERGENCY LIGHT - CEILING MOUNTED
- SINGLE POLE SWITCH
- S_2 — DOUBLE POLE SWITCH
- S_3 — THREE WAY SWITCH
- S_4 — FOUR WAY SWITCH
- S_K — KEYED SWITCH
- S_M — MOMENTARY SWITCH
- S_P — SWITCH WITH PILOT LIGHT
- S_T — THERMAL MOTOR PROTECTION SWITCH
- S_{LV} — LOW VOLTAGE SWITCH
- D_X — DIMMER - NUMBER (X 100) EQUALS WATTAGE
- D_F — FLUORESCENT DIMMER
- D_{LV} — LOW-VOLTAGE DIMMER
- D_{3W} — 3-WAY DIMMER
- X: S_Y — MULTIPLE SWITCHES. X - INDICATES HOW MANY. ? - INDICATES WHAT TYPE OF SWITCH
- X: D_Y — MULTIPLE DIMMERS. X - INDICATES HOW MANY. ? - INDICATES WHAT TYPE OF DIMMER
- S_{WS} — WATTSTOPPER DIGITAL TIME SWITCH: TS-400
- CS_{XX} — WATTSTOPPER DIGITAL LIGHTING MANAGEMENT CONTROL STATION KEYPAD WITH PROGRAMMABLE FUNCTION BUTTONS. REFER TO DETAILS FOR ADDITIONAL REQUIREMENTS. XX INDICATES TYPE: S1: ONE BUTTON KEYPAD; S2: TWO BUTTON KEYPAD; S3: THREE BUTTON KEYPAD; S4: FOUR BUTTON KEYPAD; S8: EIGHT BUTTON KEYPAD; D1: DIMMING WALL SWITCH
- S_{MS} — WATTSTOPPER DUAL TECHNOLOGY LINE VOLTAGE WALL OCCUPANCY SENSOR: DSW-301
- WATTSTOPPER DUAL TECHNOLOGY CEILING OCCUPANCY SENSOR WITH POWER PACK: DT-300 AND BZ-150
- S_{MS-D} — WATTSTOPPER DUAL TECHNOLOGY 0-10 VOLT DIMMING WALL SWITCH OCCUPANCY SENSOR: DW-311
- PC — WATTSTOPPER DLM SYSTEM PHOTO CELL: LMLS-500
- MS — WATTSTOPPER DLM SYSTEM DUAL TECHNOLOGY CEILING MOTION SENSOR: LMDC-100
- MS$_{EM}$ — WATTSTOPPER EMERGENCY LIGHTING CONTROL UNIT. UPON LOSS OF NORMAL POWER, EMERGENCY LIGHTING SHALL BE BROUGHT TO FULL BRIGHTNESS REGARDLESS OF SWITCH POSITION. PROVIDE ALL LOW VOLTAGE CABLINGS AS REQUIRED: ELCU-200
- MS$_{BMS}$ — WATTSTOPPER DIGITAL LIGHTING MANAGEMENT INPUT/OUTPUT INTERFACE FOR BMS CONTROL OF LIGHTING. PROVIDE ALL LOW VOLTAGE CABLING AS REQUIRED: LMIN-104
- RC$_X$ — WATTSTOPPER DIGITAL LIGHTING MANAGEMENT ROOM CONTROLLER. REFER TO DETAILS FOR SYSTEM INTERCONNECTION REQUIREMENTS. X INDICATES TYPE. A: ONE RELAY SWITCHING CONTROLLER: LMRC-101; B: TWO RELAY SWITCHING CONTROLLER: LMRC-102; C: ONE RELAY SWITCHING OR 0-10V DIMMING CONTROLLER: LMRC-211; D: TWO RELAY SWITCHING OR 0-10V DIMMING CONTROLLER: LMRC-212; E: THREE RELAY SWITCHING OR 0-10V DIMMING CONTROLLER: LMRC-213

HOSPITAL SYMBOLS

- N — NURSE CALL PATIENT STATION - SINGLE
- N — NURSE CALL PATIENT STATION - DOUBLE
- N$_M$ — NURSE CALL MASTER
- N$_D$ — NURSE CALL DOME LIGHT
- N$_Z$ — NURSE CALL ZONE LIGHT
- N$_{DS}$ — NURSE CALL DUTY STATION
- N$_S$ — NURSE CALL STAFF STATION
- N$_E$ — NURSE CALL EMERGENCY STATION
- N$_{EC}$ — NURSE CALL EMERGENCY PULL CORD STATION
- N$_{CB}$ — NURSE CALL CODE BLUE STATION
- N$_L$ — NURSE CALL STAFF LOCATOR
- N$_A$ — NURSE ASSISTANCE CALL STATION
- M — PATIENT MONITORING OUTLET
- G — EQUIPOTENTIAL GROUNDING MODULE
- TA — TIME AND ATTENDANCE STATION
- XVB — X-RAY VIEW BOX

COMMUNICATION SYMBOLS

- TELEPHONE OUTLET WITH 3/4" CONDUIT INTO ACCESSIBLE CEILING SPACE
- DATA OUTLET WITH 3/4" CONDUIT INTO ACCESSIBLE CEILING SPACE
- TELEPHONE/DATA OUTLET WITH 3/4" CONDUIT INTO ACCESSIBLE CEILING SPACE
- 48 — WALL MOUNTED TELEPHONE OUTLET - NUMBER INDICATES HEIGHT ABOVE FINISHED FLOOR
- FLOOR OUTLET - TELEPHONE
- FLOOR OUTLET - DATA
- FLOOR OUTLET - TELEPHONE/DATA
- FPT — FLOOR POKE THROUGH - TELEPHONE
- FPD — FLOOR POKE THROUGH - DATA
- FPTD — FLOOR POKE THROUGH - TELEPHONE/DATA
- S — CEILING SPEAKER
- S — WALL MOUNTED SPEAKER
- S — HORN TYPE SPEAKER
- V — VOLUME CONTROL
- TV — TELEVISION OUTLET WITH 3/4" CONDUIT INTO ACCESSIBLE CEILING SPACE
- INTERCOM STAFF STATION
- IC — INTERCOM MASTER STATION
- CLOCK OUTLET
- DOUBLE DIAL CLOCK - CEILING MOUNTED
- DOUBLE DIAL CLOCK - WALL MOUNTED
- J — MICROPHONE OUTLET WITH 3/4" CONDUIT INTO ACCESSIBLE CEILING SPACE

SECURITY SYMBOLS

- TV — FIXED CCTV CAMERA
- TV — CCTV CAMERA WITH MOTORIZED DOME
- TV — CCTV CAMERA WITH PAN/TILT/ZOOM
- MD — SECURITY MOTION DETECTOR
- PR — PROXIMITY READER (CARD READER)
- IA — INTRUSION ALARM
- ES — ELECTRIC DOOR STRIKE

FIRE ALARM SYMBOLS

- M — MANUAL PULL STATION
- WALL MOUNTED FIRE ALARM SPEAKER
- M — COMBINATION PULLSTATION/HORN
- S — SMOKE DETECTOR
- S — SMOKE DETECTOR - DUCT MOUNTED
- S — SMOKE DETECTOR - ELEVATOR LOBBY
- S — SMOKE DETECTOR WITH AUXILIARY CONTACTS FOR USE IN PATIENT ROOMS AND TREATMENT ROOMS, INCLUDING NURSE CALL RELAY LOCATED AT NURSE CALL LIGHT
- H — HEAT DETECTOR
- DH — DOOR HOLDER - WALL MOUNTED
- DH — DOOR HOLDER - FLOOR MOUNTED
- DC — DOOR CLOSER
- FR — FAN SHUT-DOWN RELAY
- FS — SPRINKLER FLOW SWITCH
- TS — SPRINKLER VALVE TAMPER SWITCH
- VA — VISUAL/AUDIBLE ALARM - NUMBER INDICATES CANDELA OUTPUT, LACK OF NUMBER INDICATES 15/75 CANDELA OUTPUT
- VA — VISUAL ALARM - NUMBER INDICATES CANDELA OUTPUT, LACK OF NUMBER INDICATES 15/75 CANDELA OUTPUT
- R — AREA OF RESCUE STATION
- R — AREA OF RESCUE - MASTER STATION
- PIV — POST INDICATOR VALVE
- FACP — FIRE ALARM CONTROL PANEL (DOUBLE LINE INDICATES FRONT OF PANEL)
- FAA — FIRE ALARM ANNUNCIATOR (DOUBLE LINE INDICATES FRONT OF PANEL)
- AI — ADDRESSABLE INTERFACE MODULE
- AI — ADDRESSABLE INTERFACE MODULE WITH RELAY

TEMPERATURE CONTROLS SYMBOLS

- IR — INTER RELAY
- ES — ELECTRIC TO PNEUMATIC SWITCH
- PE — PNEUMATIC TO ELECTRIC SWITCH
- DP — DIFFERENTIAL PRESSURE SWITCH
- T1 — THERMOSTAT - SEE TEMP. CONT. DRAWING
- T2 — THERMOSTAT - SEE TEMP. CONT. DRAWING

ELECTRICAL ABBREVIATIONS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A	AMPERES(AMPS)	LTG	LIGHTING
AFF	ABOVE FINISHED FLOOR		
AFG	ABOVE FINISHED GRADE	MCB	MAIN CIRCUIT BREAKER
AG	ABOVE GRADE	MECH	MECHANICAL
AIC	AMPS INTERRUPTING CURRENT	MERC (MV)	MERCURY VAPOR
APPROX.	APPROXIMATE	MH	METAL HALIDE
ARCH	ARCHITECTURAL	MISC	MISCELLANEOUS
ATS	AUTOMATIC TRANSFER SWITCH	MLO	MAIN LUGS ONLY
		MTD	MOUNTED
BLDG	BUILDING	MTG	MOUNTING
		MV	MEDIUM VOLTAGE
C	CONDUIT		
CB	CIRCUIT BREAKER	N	NEUTRAL
CKT	CIRCUIT	NC	NORMALLY C'LOSED
CL	CENTER LINE	NEC	NATIONAL ELECTRICAL CODE
CLG	CEILING	NEMA	NAT'L ELEC MFR ASSOCIATION
CM	COORDINATE MOUNTING	NF	NON-FUSED
CO	CONDUIT ONLY	NIC	NOT IN CONTRACT
CT	CURRENT TRANSFORMER	NL	NIGHT LIGHT (NON-SWITCHED LIGHT)
CU	COPPER	NO	NORMALLY OPEN
		NO.	NUMBER
DISC	DISCONNECT	NTS	NOT TO SCALE
DP	DISTRIBUTION PANEL		
DPDT	DOUBLE POLE DOUBLE THROW	PB	PULL BOX
DPST	DOUBLE POLE SINGLE THROW	PF	POWER FACTOR
DWG	DRAWING	PH	PHASE
		PNL	PANEL, PANELBOARD
EM	INDIC. LIGHT OR DEVICE IS ON EMERG. POWER	PRI	PRIMARY
EMT	ELECTRICAL METALLIC TUBING	PVC	POLYVINYL CHLORIDE CONDUIT
EQUIP	EQUIPMENT	PWR	POWER
ETR	EXISTING TO REMAIN		
		RGS	RIGID GALVANIZED STEEL CONDUIT
F	FUSED		
FC	FOOTCANDLE	SEC	SECONDARY
FDR	FEEDER	SPEC	SPECIFICATION
FLA	FULL LOAD AMPS	SPST	SINGLE POLE SINGLE THROW
FLR	FLOOR	STD	STANDARD
FLUOR	FLUORESCENT	SPKR	SPEAKER
FT	FOOT, FEET	SWT	SWITCH
		SWBD	SWITCH BOARD
G.GFI.GFCI	GROUND FAULT CIRCUIT INTERRUPTER	SWGR, SG	SWITCH GEAR
GEC	GROUNDING ELECTRODE CONDUCTOR		
GND	GROUND	TELE	TELEPHONE
		TEMP	TEMPERATURE
HID	HIGH INTENSITY DISCHARGE	T'STAT	THERMOSTAT
HMC	HAZARDOUS MATERIAL CONTRACTOR	TV	TELEVISION
HPS	HIGH PRESSURE SODIUM	TYP	TYPICAL
HZ	HERTZ		
		UG	UNDERGROUND
IG	ISOLATED GROUND	UL	UNDERWRITERS LABORATORY
IN	INCHES	UON	UNLESS OTHERWISE NOTED
INC	INCANDESCENT	UPS	UNINTERRUPTABLE POWER SUPPLY
ISC (AIC)	SHORT CIRCUIT CURRENT		
		V	VOLTS
J, JB	JUNCTION BOX	VA	VOLTAMPERES
		VFD	VARIABLE FREQUENCY DRIVE
KA	KILOAMPS		
KV	KILOVOLTS	W	WATTS (OR WIRE)
KVA	KILOVOLT AMPS	WI	WITH
KW	KILOWATTS	WO	WITHOUT
KWH	KILOWATT HOURS	WP	WEATHERPROOF
		WT	WATERTIGHT
		XFMR	TRANSFORMER

GENERAL NOTES

(THESE NOTES APPY TO ALL ELECTRICAL SHEETS)

1. A MAXIMUM OF SIX(6) CURRENT - CARRYING WIRES SHALL BE INSTALLED IN ANY ONE(1) CONDUIT. ALL BRANCH CIRCUITS EXCEPT MOTOR CIRCUITS SHALL BE INSTALLED WITH A DEDICATED NEUTRAL WIRE.
2. COORDINATE ALL WORK WITH OTHER TRADES. OFFSET PANELS, LIGHTS, RECEPTACLES AND CONDUIT AS REQUIRED. APPROVAL MUST BE OBTAINED FROM ARCHITECT PRIOR TO OFFSETTING ANY DEVICE OR EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS WITH OWNER. NO SHUT DOWNS SHALL BE PERFORMED WITHOUT RECEIVING PRIOR APPROVAL FROM OWNER.
4. COORDINATE WITH ALL OTHER TRADES AND DISCONNECT OR REMOVE ELECTRICAL WIRING, EQUIPMENT, ETC. TO MAKE SITE SAFE FOR DEMOLITION BY OTHER CONTRACTORS. REFER TO CIVIL PLANS FOR SITE DEMOLITION THAT MAY NOT BE SHOWN ON ELECTRICAL SHEETS.
5. CONTRACTOR SHALL COORDINATE ALL PRIMARY VOLTAGE UTILITY WORK WITH OWNER AND ELECTRICAL UTILITY.
6. NO CONDUIT OR DEVICES IN FINISHED AREAS SHALL BE SURFACE MOUNTED. CONTRACTOR SHALL RECESS OR CONCEAL CONDUITS AND DEVICES AS REQUIRED. WHERE WALL TRENCHING IS REQUIRED, SAME SHALL BE APPROVED BY ARCHITECT.
7. CONTRACTOR SHALL GAIN APPROVAL FROM ARCHITECT PRIOR TO INSTALLING ANY SURFACE MOUNTED DEVICES.
8. WHERE FLOOR TRENCHING IS REQUIRED, THE CONTRACTOR SHALL TRENCH TO NEAREST WALL AS REQUIRED. FLOOR SHALL BE PATCHED TO MATCH ADJACENT SURFACES. COORDINATE WITH ARCHITECT FOR ANY TRENCHING REQUIRED.
9. ALL LOW-VOLTAGE CABLING SHALL BE PLENUM RATED. THIS IS NOT LIMITED TO, BUT SHOULD INCLUDE, ALL FIRE ALARM CABLING.
10. CONTRACTOR SHALL RE-LABEL AND UPDATE SCHEDULES IN ALL EXISTING-TO-REMAIN PANELBOARDS AT THE COMPLETION OF THE PROJECT. PROVIDE NEW TYPED DIRECTORIES FOR EXISTING PANELBOARDS TO REFLECT ALL WORK DONE AS PART OF THIS PROJECT.
11. ALL EXISTING CONDUIT AND WIRING BEING CONNECTED TO NEW WORK THAT IS NOT IN COMPLIANCE WITH THE NEC SHALL BE CORRECTED AS REQUIRED.
12. AFTER COMPLETION OF NEW WORK, REMOVE ALL TEMPORARY EQUIPMENT, CONDUIT, AND WIRING NOT REQUIRED TO REMAIN.
13. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING ANY WORK.
14. ALL EXISTING ITEMS REMOVED DURING DEMOLITION SHALL BE TURNED OVER TO OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING THE ITEMS TO A STORAGE LOCATION AS DETERMINED BY THE OWNER. ANY ITEMS THAT ARE NOT TO BE KEPT BY THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR. COORDINATE AS REQUIRED.
15. ELECTRICAL SERVICE SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
16. ALL CONDUITS SHALL BE HELD AS HIGH AND AS TIGHT AS POSSIBLE TO THE STRUCTURE SUPPORTING THE FLOOR ABOVE AREA WHERE INSTALLATION OCCURS. COORDINATE WITH OTHER TRADES AS REQUIRED.
17. COORDINATE THE ROUTING OF ALL CONDUITS WITH OTHER TRADES. MAKE OFFSETS AS REQUIRED. FURNISH AND INSTALL JUNCTION AND PULL BOXES AS REQUIRED. ROUTING SHOWN ON PLANS IS DIAGRAMATIC.
18. CONTRACTOR SHALL REROUTE, RELOCATE, OR REMOVE ANY CONDUIT, FIXTURES, OR OTHER EXISTING ELECTRICAL DEVICES AS REQUIRED FOR NEW WORK. MAINTAIN AND RESTORE POWER TO ALL EXISTING DEVICES BEING SERVED IN UNDISTURBED AREAS, AND DEVICES THAT ARE SHOWN AS EXISTING TO REMAIN.
19. ALL CIRCUITS FROM EXISTING-TO-REMAIN PANELBOARDS THAT HAVE THEIR ENTIRE LOAD REMOVED AND ARE NOT REQUIRED TO BE RE-USED TO SERVE NEW LOADS, AS SHOWN ON NEW WORK DRAWINGS, SHALL HAVE THEIR CONDUIT AND WIRE REMOVED BACK TO THEIR PANELBOARD AND THEIR ASSOCIATED BREAKER SHALL BE LABELED AS A SPARE. CONDUIT THAT IS LOCATED IN THE FLOOR SLAB OR ABOVE INACCESSIBLE CEILING SHALL BE ABANDONED IN PLACE; HOWEVER, ALL CONDUCTORS SHALL BE REMOVED.
20. DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL DEVICES, LIGHT FIXTURES, ELECTRICAL EQUIPMENT SHOWN DARK AND DASHED ON THE DEMOLITION PLANS. DEVICES SHOWN LIGHT ARE EXISTING TO REMAIN.
21. THE CONTRACTOR SHALL VERIFY THE OPERATION OF ALL DEVICES THAT ARE EXISTING TO REMAIN. ALL NON-OPERATIONAL DEVICES SHALL BE CORRECTED OR REPLACED AS REQUIRED. REPLACE ALL DAMAGED AND MISSING COVERPLATES IN AREAS OF NEW WORK AS REQUIRED.
22. COORDINATE REMOVAL OF ALL COMMUNICATION WIRING WITH OWNER. ALL ABANDONED COMMUNICATION CABLING SHALL BE REMOVED AS REQUIRED. COORDINATE REMOVAL WITH OWNER.
23. ALL CONDUIT, WIRING, DEVICES AND EQUIPMENT TO BE REMOVED MAY NOT BE SHOWN. HOWEVER, ALL ITEMS NOT REQUIRED TO REMAIN SHALL BE REMOVED.
24. THE CONTRACTOR SHALL MATCH THE RATINGS AND CHARACTERISTICS OF ALL NEW CIRCUIT BREAKERS BEING FURNISHED TO THOSE OF THE EXISTING BREAKERS IN EXISTING PANELBOARDS.
25. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN AND ELEVATIONS FOR EXACT LOCATION OF LIGHT FIXTURES.
26. ALL RECEPTACLES INSTALLED IN BATHROOMS OR WITHIN SIX FEET OF ANY SINK SHALL BE GFI PROTECTED.
27. ALL LOW-VOLTAGE ELECTRICAL CONNECTIONS ON THE SITE, EXTERIOR OF BUILDING, OR IN TUNNELS SHALL BE MADE USING WATERPROOF CONNECTORS.

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LEE'S SUMMIT, MISSOURI
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STATE OF MISSOURI — BRUCE ELDON HART — NUMBER E-22817 — PROFESSIONAL ENGINEER
4-17-2020
Bruce E. Hart - Engineer
License - Missouri #E-22817

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Saint Luke's East Hospital
MRI Replacement
80 NE Saint Luke's Blvd
Lee's Summit, MO 64086

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Revision

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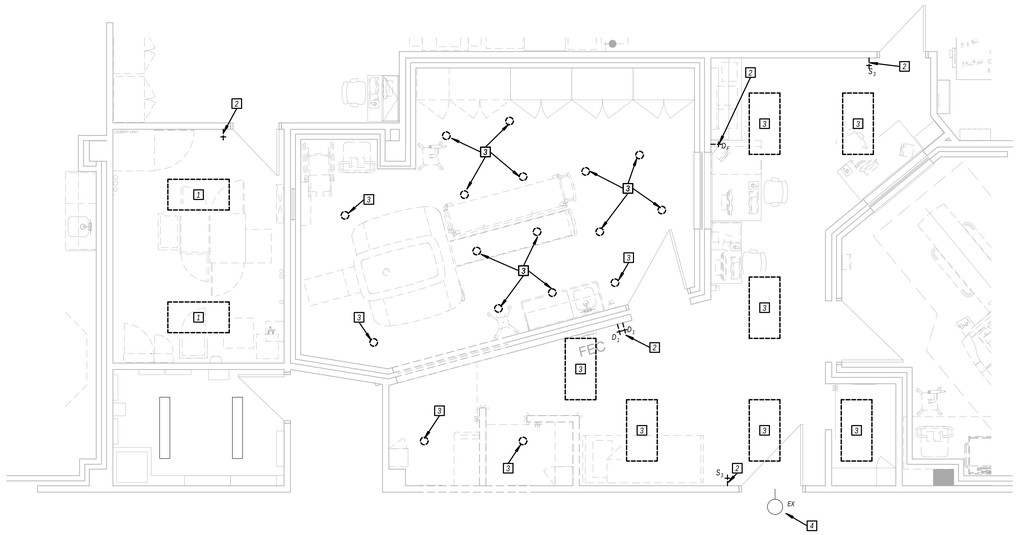
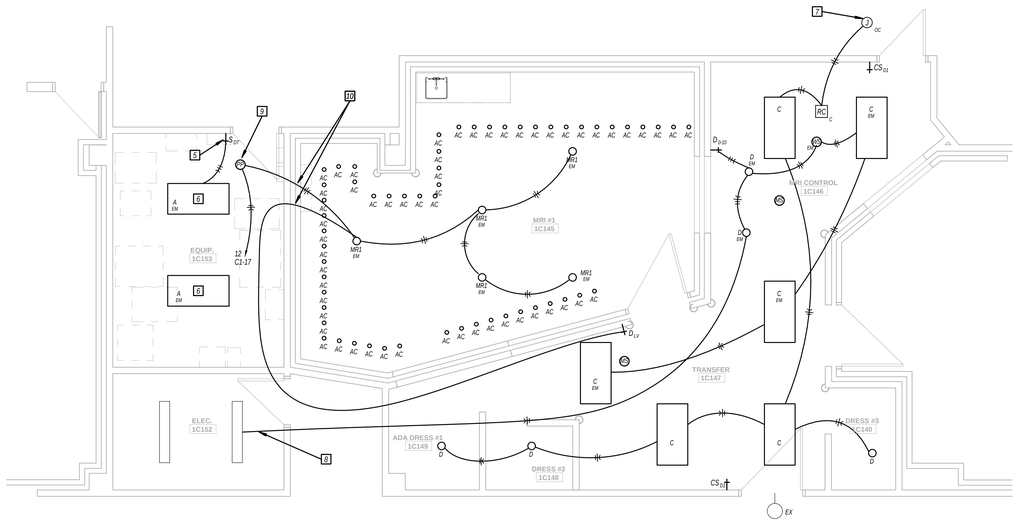
E000

SYMBOLS, ABBREVIATIONS AND GENERAL NOTES



C1 FIRST FLOOR LIGHTING DEMOLITION PLAN
1/4" = 1'-0"



A1 FIRST FLOOR LIGHTING PLAN
1/4" = 1'-0"

SCHEDULE OF LIGHT FIXUTRES

TYPE	MANUFACTURER/MODEL	DESCRIPTION	MOUNTING	DRIVER/BALLAST	LAMP	VOLTAGE	WATTAGE
A	WILLIAMS 50 SERIES	2'x4' GRID TROFFER WITH 0.125" PRISMATIC ACRYLIC LENS. FIXTURE STEEL DOOR WITH MITERED CORNERS. CAM ACTION LATCHES. ALL FIXTURE STEEL POST PAINTED WHITE ENAMEL.	GRID	INTEGRAL LED DRIVER	3500K, 5900 LUMEN, 80CRI	120-277V	48 W
AC	DIALIGHT H16-RGB	RGB LED MODULE AND CABLING FURNISHED AND INSTALLED BY PHILIPS	RECESSED		LED MODULE	120-277V	0 W
C	WILLIAMS PT SERIES	2'x4' DIRECT/INDIRECT TROFFER FIXTURE FOR LED SOUCE. LINEAR SMOOTH CURVED PRISMATIC LENS WITH SURFACE RELIF DIFFUSER 1-1/2" DEEP TELESCOPING HOUSING. ALL FIXTURE STEEL POST PAINTED BAKED WHITE ENAMEL.	GRID	INTEGRAL LED DRIVER	3500K, 4900 LUMEN, 80CRI	120-277V	37 W
D	WILLIAMS 6DR	6" APERATURE LED SOURCE. WIDE DISTRIBUTION. FURNISH WITH SATIN GLOW ACCENT CONE AND FLUSH LENS. FURNISH WITH ALL REQUIRED MOUNTING HARDWARE.	RECESSED	1%, 0-10V DIMMING DRIVER	3500K, 3000 LUMEN, 80 CRI	120-277V	0 W
ISL	APPLETON VS1 SERIES	ENCLOSED AND GASKETED STANCHION FOR ONE(1) A21 INCANDESCENT LAMP. CLEAR GLASS GLOBE WITH WIRE GUARD.	RECESSED		100W, A21 INCANDESCENT	120V	100 W
MR1	KENALL MEDMASTER MRIDL6 SERIES	6" SEALED MRI DOWNLIGHT WITH FLUSH LENS. ALL NON-FERROUS CONSTRUCTION AND RF-FREE FILTERS. DIE-CAST ALUMINUM TRIM IN FLAT WHITE. MEDIUM LIGHT DISTRIBUTION. CLEAR SEMI-SPECULAR REFLECTOR. FURNISH WITH ONE REMOTE POWER SUPPLY WITH EMI FILTER AND ONE DIMMING FILTER.	RECESSED	0-10V DIMMING DRIVER	3500K, 2372 LUMEN, 80 CRI	24V	31 W

ELECTRICAL LIGHTING GENERAL NOTES

1 *REFER TO SHEET E000 FOR GENERAL NOTES. NOT ALL GENERAL NOTES MAY APPLY TO THIS SHEET.*

2 *WORK SHOWN LIGHTLY IS EXISTING TO REMAIN. ARE WORK SHOWN DARK AND DASHED ON DEMOLITION PLAN IS TO BE DISCONNECTED AND REMOVED. NEW WORK IS SHOWN DARK ON NEW WORK PLAN.*

3 *THIS IS A 24 HOUR FACILITY, THEREFORE SOME WORK MAY BE REQUIRED TO BE PREFORMED AFTER HOURS AT NO ADDITIONAL EXPENSE TO OWNER. ALL SHUT DOWNS SHALL BE COORDINATED WITH OWNER.*

4 *ALL SHUT DOWNS SHALL BE COORDINATED WITH OTHER TRADES AND APPROVED BY OWNER.*

5 *OWNER SHALL HAVE RIGHT OF REFUSAL ON ALL LIGHT FIXTURES AND DEVICES BEING REMOVED.*

6 *WHERE EXISTING DEVICES, EQUIPMENT AND LIGHTING CIRCUITS TO REMAIN ARE SHARING CIRCUITS OF DEVICES WHICH ARE TO REMAIN, EXISITNG CONDUIT AND WIRING SHALL BE ADAPTED/EXTENDED MODIFIED AS REQUIRED TO MAINTAIN DEVICES, LIGHTING AND EQUIPMENT. ALL EXISTING CIRCUITS REQUIRE FIELD VERIFICATION AND SHALL BE TRACES FROM SOURCE PANEL TO DEVICES, LIGHT FIXTURES AND EQUIPMENT REQUIRED TO REMAIN. UTILIZE INFORMATION TO PROVIDE ACCURATE UPDATED TYPE-WRITTEN PANEL SCHEDULE.*

KEYED NOTES

0

1 *DISCONNECT AND REMOVE EXISTING LIGHT FIXTURE. EXISTING CIRCUITING TO REMAIN FOR CONNECTION TO NEW LIGHT FIXTURE.*
2 *DISCONNECT AND REMOVE EXISTING LIGHT SWITCH. EXISTING BACKBOX AND CONDUIT TO REMAIN FOR INSTALLATION OF NEW SWITCH.*
3 *DISCONNECT AND REMOVE EXISTING LIGHT FIXTURE AND ALL ASSOCIATED CONDUIT AND WIRING.*
4 *EXISTING IN-USE WARNING LIGHT TO REMAIN. DISCONNECT CIRCUITING FROM EXISTING EQUIPMENT WHICH IS BEING REMOVED.*
5
6 *CONNECT NEW LIGHT FIXTURE TO EXISTING LIGHT CIRCUIT.*
7 *EXTEND AND CONNECT TO AREA NON-SWITCHED HOT LEG OF AREA NORMAL LIGHTING CIRCUIT C1-10-HN, #6.*
8 *EXTEND AND CONNECT TO EXISTING EMERGENCY LOGHTING CIRCUIT.*
9 *LIGHTING POWER SUPPLY FURNISHED WITH TYPE MRI FIXTURES.*
10 *LIGHTING AND DIMMING CIRCUIT SHALL ENTER ROOM THROUGH EMI FILTER.*

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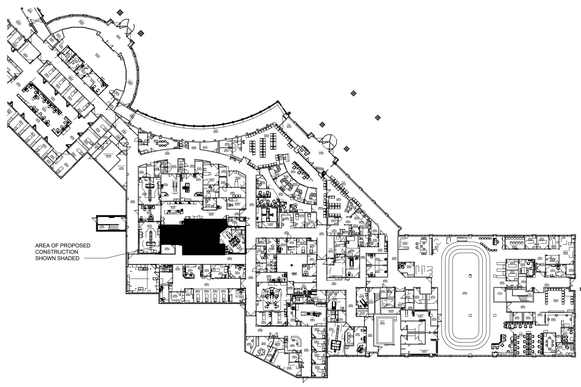

KeyPlan
SCALE:N.T.S.

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NUMBER E-22817
PROFESSIONAL ENGINEER
4-17-2020
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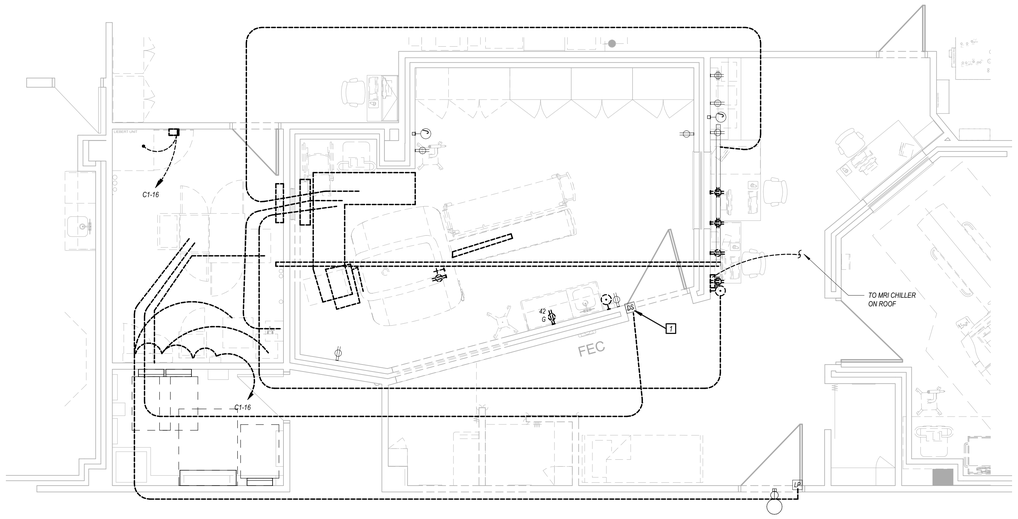
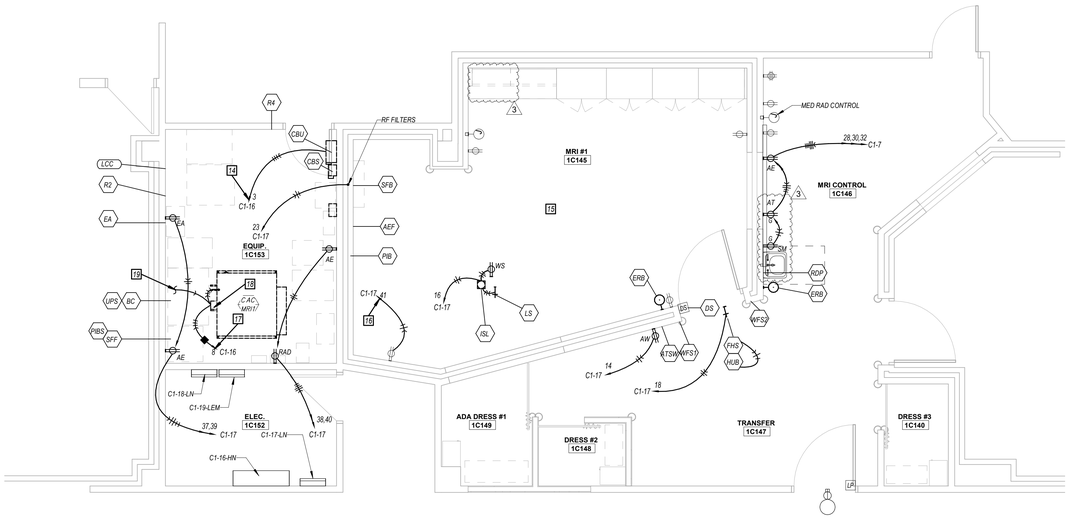
EL2.1

LIGHTING PLANS



1 FIRST FLOOR POWER DEMOLITION PLAN
1/4" = 1'-0"



2 FIRST FLOOR POWER PLAN
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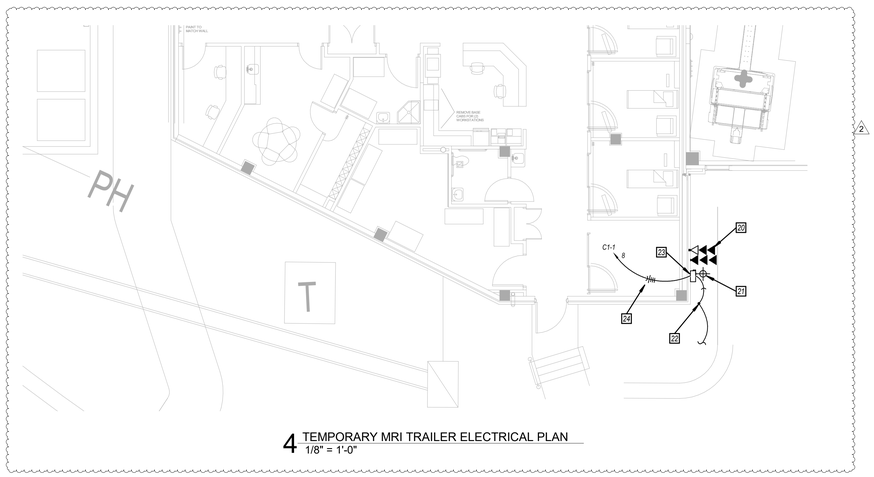


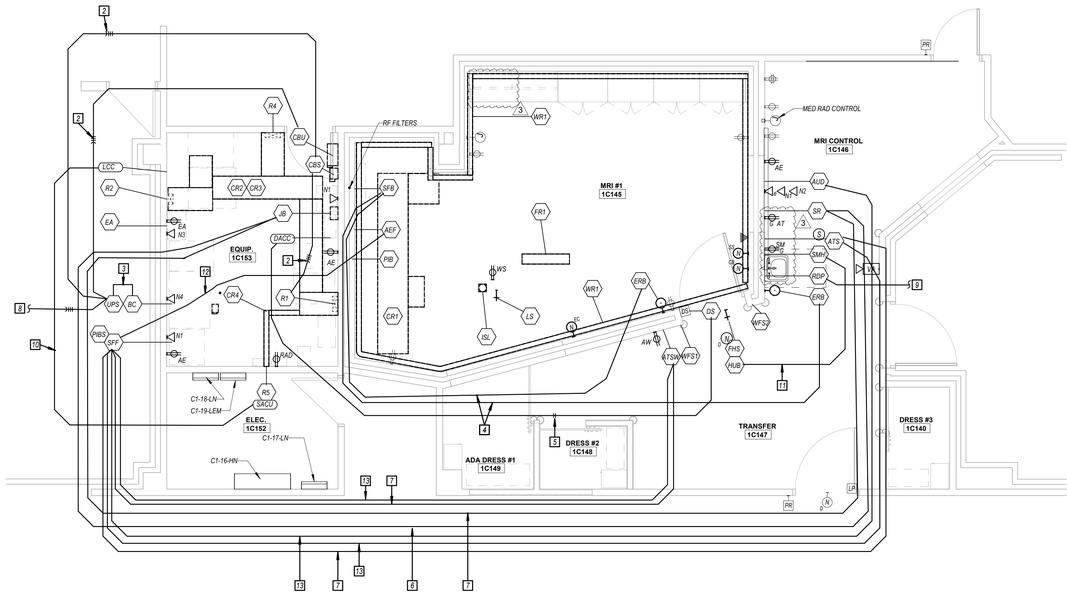
4 TEMPORARY MRI TRAILER ELECTRICAL PLAN
1/8" = 1'-0"

ELECTRICAL POWER GENERAL NOTES

1. *REFER TO SHEET E000 FOR GENERAL NOTES. NOT ALL GENERAL NOTES MAY APPLY TO THIS SHEET.*
2. *WORK SHOWN LIGHTLY IS EXISTING TO REMAIN. ALL WORK SHOWN DARK AND DASHED ON DEMOLITION PLAN IS TO BE DISCONNECTED AND REMOVED. NEW WORK IS SHOWN DARK ON NEW WORK PLAN.*
3. *THIS IS A 24 HOUR FACILITY. THEREFORE SOME WORK MAY BE REQUIRED TO BE PREFORMED AFTER HOURS AT NO ADDITIONAL EXPENSE TO OWNER. ALL SHUT DOWNS SHALL BE COORDINATED WITH OWNER.*
4. *ALL SHUT DOWNS SHALL BE COORDINATED WITH OTHER TRADES AND APPROVED BY OWNER.*
5. *OWNER SHALL HAVE RIGHT OF REFUSAL ON ALL LIGHT FIXTURES AND DEVICES BEING REMOVED.*
6. *WHERE EXISTING DEVICES, EQUIPMENT AND LIGHTING CIRCUITS TO REMAIN ARE SHARING CIRCUITS OF DEVICES WHICH ARE TO REMAIN, EXISTING CONDUIT AND WIRING SHALL BE ADAPTED/EXTENDED/MODIFIED AS REQUIRED TO MAINTAIN DEVICES, LIGHTING AND EQUIPMENT. ALL EXISTING CIRCUITS REQUIRE FIELD VERIFICATION AND SHALL BE TRACES FROM SOURCE PANEL TO DEVICES, LIGHT FIXTURES AND EQUIPMENT REQUIRED TO REMAIN. UTILIZE INFORMATION TO PROVIDE ACCURATE UPDATED TYPE-WRITTEN PANEL SCHEDULE.*
3. *CIRCUITS TO RECEPTACLES AND FIXED ELECTRICAL EQUIPMENT IN PATIENT CARE SPACES SHALL BE INSTALLED IN METAL CONDUIT AND GROUNDED TO MEET THE REQUIREMENTS OF 2017 NEC, ARTICLE 517.13.*

KEYED NOTES 0

1. *EXISTING DOOR SWITCH TO REMAIN. DISCONNECT FROM EXISTING EQUIPMENT. REFER TO NEW WORK PLAN FOR RECONNECTION.*
2. *3-#10W, 1-#10 GND IN 2"C.*
3. *(2)-2"C.*
4. *FURNISH AND INSTALL (1)- 3/4"C FOR PHILIPS' INSTALLED CABLE.*
5. *FURNISH AND INSTALL (1)-1"C WITH SIGNAL CABLE AS REQUIRED BY PHILIPS.*
6. *FURNISH AND INSTALL (1)- 3"C FOR PHILIPS' INSTALLED CABLE.*
7. *FURNISH AND INSTALL (1)- 2"C FOR PHILIPS' INSTALLED CABLE.*
8. *UP TO CHILLER ON ROOF. REFER TO SHEET EP2.2 FOR CONTINUATION.*
9. *FURNISH 1"C AND EXTEND UP TO CHILLER ON ROOF FOR PHILPS' CABLES TO BE INSTALLED BY ELECTRICAL CONTRACTOR,COORDINATE EXACT LOCATION OF RDP WITH PHILIPS, TO ALLOW FOR INSTALLATION OF SINK.* 3
10. *FURNISH AND INSTALL (1)- 1-1/2"C FOR PHILIPS' INSTALLED CABLE.*
11. *FURNISH AND INSTALL (2) 1-1/4"C WITH PULLSTRING, COORDINATE EXACT LOCATION OF SMH WITH PHILIPS, TO ALLOW FOR INSTALLATION OF SINK.* 3
12. *FURNISH AND INSTALL (1)- 2-1/2"C FOR PHILIPS' INSTALLED CABLE.*
13. *FURNISH AND INSTALL (1)- 1"C FOR PHILIPS' INSTALLED CABLE.*
14. *DISCONNECT AND REMOVE EXISTING SWITCH IN PANEL AND REPLACE WITH NEW 150A, 3P SWITCH WITH 125A FUSING TO SERVE NEW LOAD. SWITCH SHALL BE CAPABLE OF BEING LOCKED IN OFF POSITION.*
15. *ALL CIRCUITS WITHIN MRI ROOM SHALL PASS THROUGH RF FILTERS.*
16. *REFEED EXISTING ROOM RECEPTACLES.*
17. *EXTEND AND CONNECT TO EXISTING SWITCH. FURNISH AND INSTALL NEW 15A FUSING FOR SWITCH.*
18. *FURNISH AND INSTALL 30A NON-FUSED DISCONNECT SWITCH.*
19. *UP TO CONDENSING UNIT ON ROOF. REFER TO PARTIAL ROOF ELECTRICAL PLAN ON SHEET EP2.2 FOR CONTINUATION.*
20. *FURNISH TEMPORARY INSTALLATION OF TWO (2) TELEPHONE HUBBEL PH-6595, TWO (2) MODEM HUBBEL PH-6595, AND ONE (1) DATA CAT5, LEVITON 41108-RWS WEATHERPROOF DROPS.* 2
21. *FURNISH TEMPORARY INSTALLATION OF RUSSELL STOLL DF2504FRAB RECEPTACLE FOR MOBILE MRI CONNECTION. REFER TO VENDOR DRAWINGS FOR ADDITIONAL INSTALLATION INFORMATION.*
22. *8' LONG, 3/4" DIAMETER GALVANIZED STEEL GROUNDING ELECTRODE ROD INSTALLED WITHIN GRADE THAT IS EXPOSED TO WEATHER AND LOCATED WITHIN 5' OF SERVICE DISCONNECT SWITCH. EXTEND #1/0 BARE COPPER GRAOUND FROM NEW DRIVEN GROUND ROD TO DISCONNECT SWITCH GROUND STUD AND #6 BARE COPPER GROUND FROM GROUND ROD TO TRAILER GROUND LUG. REFER TO MOBILE MRI VENDOR DRAWINGS FOR ADDITIONAL INFORMATION.*
23. *FURNISH TEMPORARY INSTALLATION OF 200A, 3P, WEATHERPROOF DISCONNECT SWITCH FUSED AT 150A.*
24. *4-#1/0W, 1-#1/0 GROUND IN 2"C.*



3 FIRST FLOOR ELECTRICAL PLAN
1/4" = 1'-0"

NOTES

1. *REFER TO PHILIPS SITE SPECIFIC DRAWINGS FOR ALL INTERCONNECTING CABLING, CONDUIT AND WIRING, DESCRIPTION OF ITEMS TO BE FURNISHED BY ELECTRICAL CONTRACTOR AND DESCRIPTION OF THE SYMBOLS WHICH APPLY TO THIS PROJECT.*
2. *ALL DEVICES AND CABLING WITHIN THE MRI ROOM MUST BE NON-FERROUS FOR USE IN MRI ENVIRONMENT.*
3. *ALL CONDUIT AND DEVICES MUST BE INSTALLED IN STRICT COMPLIANCE WITH REQUIREMENTS AS SPECIFIED ON PHILIPS DRAWINGS. ALL DEVICE MOUNTING HEIGHTS TO BE COORDINATED WITH PHILIPS SITE SPECIFIC DRAWINGS.*
4. *ALL CONDUIT RUNS MUST TAKE THE MOST DIRECT ROUTE AND MUST BE FURNISHED WITH PULL STRINGS.*
5. *NOT ALL WORK REQUIRED BY THE ELECTRICAL CONTRACTOR IS SHOWN ON THESE DRAWINGS. ELECTRICAL CONTRACTOR SHALL FURNISH AND/OR INSTALL ALL DEVICES, PATHWAYS AND CABLING AS SPECIFIED ON THE PHILIPS DRAWINGS.*

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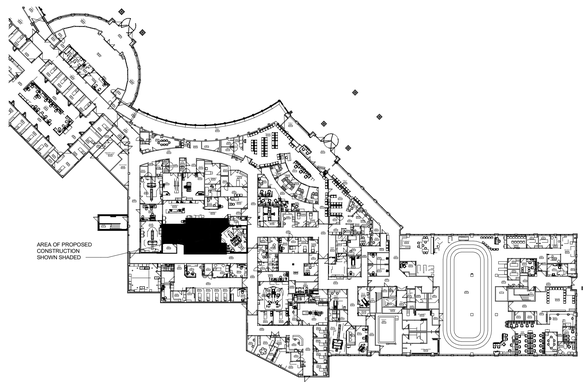

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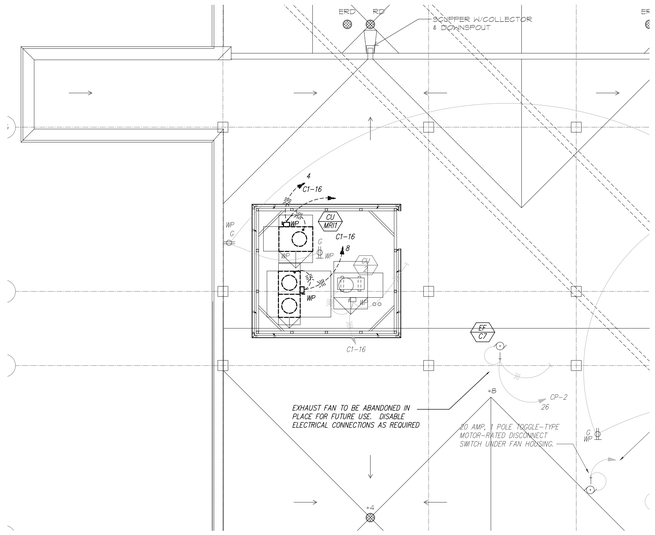
3	8.03.20	CITY COMMENTS

EP2.1

ELECTRICAL PLANS

GENERAL NOTES:

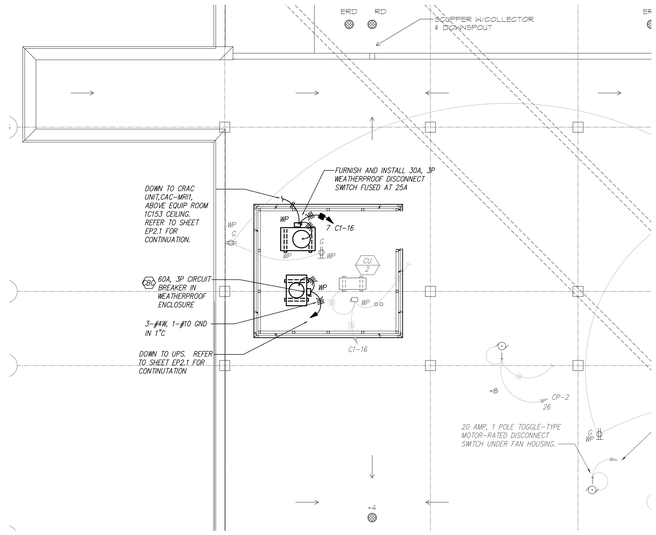
1. REFER TO GENERAL NOTES ON SHEET E000.
2. WORK SHOWN LIGHTLY IS EXISTING TO REMAIN. DISCONNECT AND REMOVE ALL DEVICES AND ASSOCIATED CONDUIT AND WIRING SHOWN DARK AND DASHED ON DEMOLITION PLAN. ALL NEW WORK IS SHOWN DARK AND BOLD ON NEW WORK PLAN.
3. THIS IS A 24 HOUR FACILITY SO SOME WORK MAY NEED TO BE PREFORMED AFTER HOURS AT NO EXTRA COST TO OWNER.
4. ALL SHUTDOWN SHALL BE APPROVED BY OWNER AND BE COORDINATED WITH OTHER TRADES.



PARTIAL ROOF ELECTRICAL DEMOLITION PLAN

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

NORTH



PARTIAL ROOF ELECTRICAL PLAN

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

NORTH

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI

08/04/2020

STATE OF MISSOURI
BRUCE ELDON HART
NUMBER E-22817
PROFESSIONAL ENGINEER

4/17/2020

Bruce E. Hart - Engineer
License - Missouri # E-22817

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Licensee's Certificate of Authority Number: Missouri: #000958

MEP CONSULTANT

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1600 Baltimore, Suite 300
Kansas City, MO 64108
Phone Number: 816.842.8437
Licensee's Certificate of Authority Number: #00127265

Saint Luke's East Hospital
MRI Replacement
80 NE Saint Luke's Blvd
Lee's Summit, MO 64086

Date	April 17, 2020
Job Number	3-20037
Drawn By	LLD
Checked By	BEH

Revision

Number	Date	Description

EP2.2

ELECTRICAL ROOF PLANS

2020-034 EP2.2.dwg

ELECTRICAL COMMUNICATIONS GENERAL NOTES

1 *REFER TO SHEET E000 FOR GENERAL NOTES. NOT ALL GENERAL NOTES MAY APPLY TO THIS SHEET.*

2 *WORK SHOWN LIGHTLY IS EXISTING TO REMAIN. ARE WORK SHOWN DARK AND DASHED ON DEMOLITION PLAN IS TO BE DISCONNECTED AND REMOVED. NEW WORK IS SHOWN DARK ON NEW WORK PLAN.*

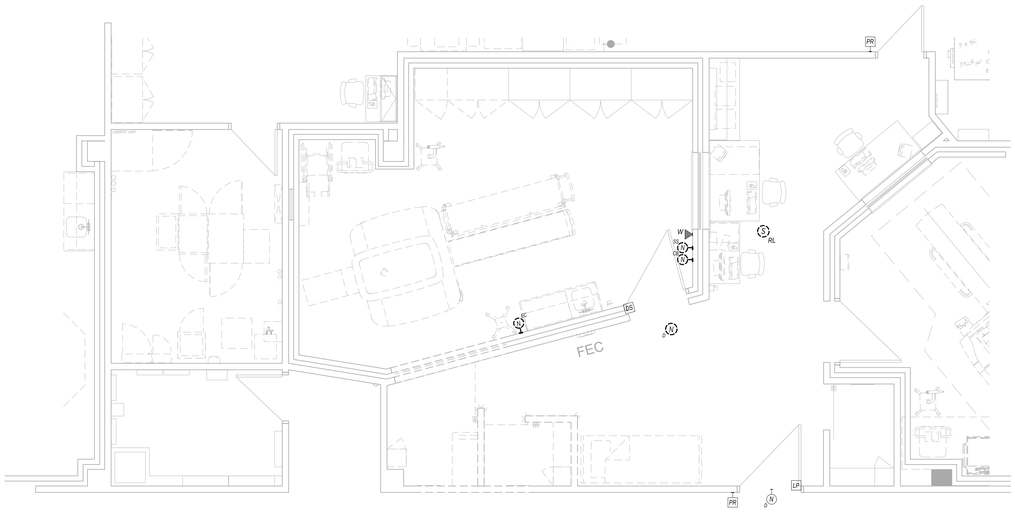
3 *THIS IS A 24 HOUR FACILITY, THEREFORE SOME WORK MAY BE REQUIRED TO BE PREFORMED AFTER HOURS AT NO ADDITIONAL EXPENSE TO OWNER. ALL SHUT DOWNS SHALL BE COORDINATED WITH OWNER.*

4 *OWNER SHALL HAVE RIGHT OF REFUSAL ON ALL DEVICES BEING REMOVED.*

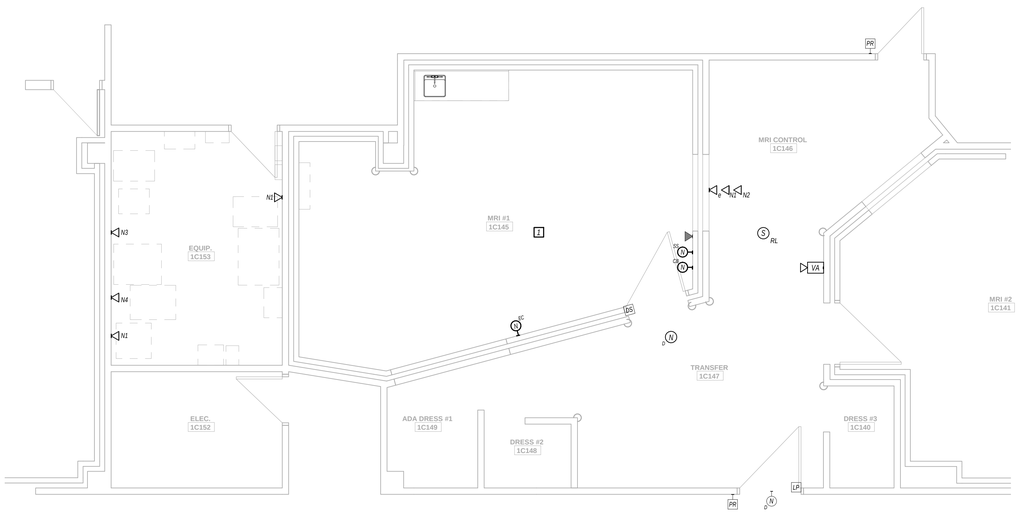
5 *EXTEND ALL IT CABLING TO EXISTING IT ROOM C185 UNLESS NOTED OTHERWISE.*

KEYED NOTES 0

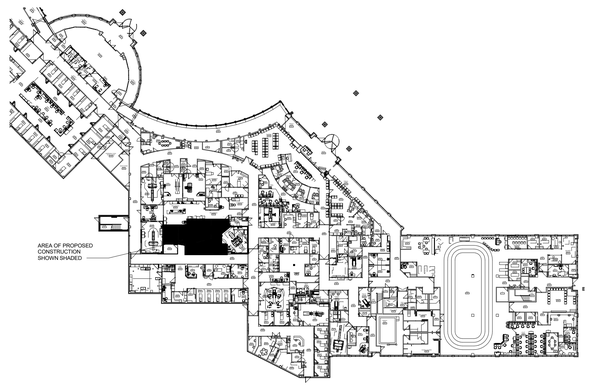
1 *REFER TO FIRST FLOOR ELECTRICAL PLAN ON SHEET EP2.0 FOR ADDITIONAL COMMUNICATIONS DEVICES AND INFORMATION.*



C1 FIRST FLOOR COMMUNICATIONS DEMOLITION PLAN
1/4" = 1'-0"



A1 FIRST FLOOR COMMUNICATIONS PLAN
1/4" = 1'-0"



KeyPlan
SCALE:N.T.S.

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LEE'S SUMMIT, MISSOURI
08/04/2020

STATE OF MISSOURI
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Date	April 17, 2020
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Revision

Number	Date	Description

EC2.1

COMMUNICATIONS PLANS

PHILIPS

www.healthcare.philips.com

Final Site Preparation Support Document

The equipment components shown in this drawing package are based on the current proposed purchase and are subject to change if modifications are made to the configuration.

Revision History

Note for Architects and/or Contractors: If revisions are listed, these drawings must be thoroughly reviewed so that all changes can be incorporated into your project

Rev.	Date	Revision Descriptions	By
-	11/26/2019	Created preliminary site preparation support document.	MA
A	2/12/2019	Created final site preparation support document. Added Tier 1 Ambient Experience with the Patient In-Bore Option per the new order. A1/A2/S1/E1 - Updated layout to account for existing equipment. Removed counter from exam room. Rotated magnet to be square to back wall.	MA
01	3/5/2020	A2/SD9-SD12 - Added existing shielding calculations for 5 Gauss containment along plan south walls of exam room.	MA
B	3/5/2020	A2/S1/E1 - Rearranged equipment room to fit UPS and BC.	MA

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PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
Project Manager: Craig Denny
Contact Number: (402) 490-0275
Email: craig.denny@philips.com
Drawn By: Markie Apple

Project Details
Drawing Number
N-MID190452 B
Date Drawn: 3/5/2020
Quote: 1-21JYZD0 Rev. 7
Order: 6600461060.010000 - 6600461060.020000

C1

General Specifications

1. Responsibility
The customer shall be solely responsible, at their expense for preparation of site, including any required structural alterations. The site preparation shall be in accordance with plans and specifications provided by Philips. Compliance with all safety electrical and building codes relevant to the equipment and its installation is the sole responsibility of customer. The customer shall advise Philips of conditions at or near the site which could adversely affect the carrying out of the installation work and shall ensure that such conditions are corrected and that the site is fully prepared and available to Philips before the installation work is due to begin. The customer shall provide all necessary plumbing, carpentry work, or conduit wiring required to attach and install products ready for use.

2. Permits
Customer shall obtain all permits and licenses required by federal, state/provincial or local authorities in connection with the construction, installation and operation of the products and related rules, regulations, shall bear any expense in obtaining same or in complying with any ordinances and statutes.

3. Asbestos and Other Toxic Substances
Philips assumes no hazardous waste (i.e., PCB's in existing transformers) exists at the site. If any hazardous material is found, it shall be the sole responsibility of the customer to properly remove and dispose of this material at its expense. Any delays caused in the project for this special handling shall result in Philips time period for completion being extended by like period of time. Philips assumes that no asbestos material is involved in this project in any ceilings, walls or floors. If any asbestos material is found anywhere on the site, it shall be the customer's sole responsibility to properly remove and/or make safe this condition, at the customer's sole expense.

4. Labor
In the event local labor conditions make it impossible or undesirable to use Philips' regular employees for such installation and connection, such work shall be performed by laborers supplied by the customer, or by an independent contractor chosen by the customer at the customer's expense, and in such case, Philips agrees to furnish adequate engineering supervision for proper completion of the installation.

5. Schedule
The general contractor should provide Philips with a schedule of work to assist in the coordination of delivery of Philips supplied products which are to be installed by the contractor and delivery of the primary equipment.

6. Extended Installation or Turnkey Work by Philips
Any room preparation requirements for Philips equipment indicated on these drawings is the responsibility of the customer. If an extended installation or turnkey contract exists between Philips and the customer for room preparation work required by the equipment represented on these drawings, some of the responsibilities of the customer as depicted in these drawings may be assumed by Philips. In the event of a conflict between the work described in the turnkey contract workscope and these drawings, the turnkey contract workscope shall govern.

(14.0)

Ambient Experience Requirements

Supply Configuration: Single Phase, 3 wire power, neutral and ground

Nominal Line Voltage: 110 - 240 VAC, 60 Hz.

Circuit Breaker: 15 Amps, 110V
Dedicated neutral circuit required

(14.0)

Minimum Site Preparation Requirements

A smooth efficient installation is vital to Philips and their customers. Understanding what the minimum site preparation requirements are will help achieve this goal. The following list clearly defines the requirements which must be fulfilled before the installation can begin.

1. Walls to be painted or covered, baseboards installed, floors to be tiled and/or covered, ceiling shall have grid tiles and lighting fixtures installed and operational.

2. Doors and windows, especially radio frequency shielding, installed and finished with locksets operational.

3. All electrical convenience, conduit, raceway, knockouts, cable openings, chase nipples, and junction boxes installed and operational.

4. Incoming mains power operational and connected to room MR mains breaker.

5. 115V convenience outlets operational.

6. All support structure correctly installed. All channels, pipes, beams and/or other supporting devices should be level, parallel, and free of lateral or longitudinal movements.

7. All contractor supplied cables pulled and terminated.

8. A dust-free environment in and around the procedure room.

9. All HVAC (heating, ventilating and air conditioning) installed and operational as per specifications.

10. Architectural features such as computer floor, wood floor, casework, bulkheads, installed and finished.

11. All plumbing installed and finished.

12. Clear door openings and pathway leading up to and into the exam room are recommended to be 48" (1220mm) W x 84" (2135mm) H. Minimum 40" (1000mm) W x 81" (2050mm) H, contingent on an 8' - 0" (2440mm) corridor width.

13. The magnet is the only system part that in most cases cannot be transferred through the door of the RF enclosure. A special opening to allow its installation in the enclosure must therefore be made available. The recommended transfer opening dimensions are 7' - 10 $\frac{1}{2}$" (2400mm) H x 8' - 3" (2500mm) W.
Refer to Sheet AD2 for transport dimension details.

14. Internet access is required to be available in the control area prior to system delivery for Web FSE access. Refer to Sheet EL of the final drawing package for details.

15. Remote Service Diagnostics - Medical imaging equipment to be installed by Philips Medical is equipped with a service diagnostic feature which allows for remote and on site service diagnostics. To establish this feature, a RJ45 type ethernet 10/100/1000 Mbit network connector must be installed as shown on plan. Access to customer's network via their remote access server is needed for Remote Service Network (RSN) connectivity. All cost with this feature are the responsibility of the customer.

Note
Once Philips has moved equipment into the suite and started the installation, the contractor shall schedule his work around the Philips installation team on site.

All contractor work should be completed within 3 days of delivery to prepare for magnet ramping.

(19.0)

MRI Chiller Requirements

Chilled water is required for Magnet cooling. For chillers purchased from Philips, KKT chillers shall provide chiller commissioning and in-warranty chiller service. Philips can provide contractors who will perform turnkey installation of mechanical, electrical, and plumbing requirements for the chiller installation at an additional cost. Consult with Philips Sales to arrange for turnkey services.

Refer to Sheet MP2 of final drawing package for complete chiller requirements.

(16.0)

Electrical Requirements

Supply Configuration: 3 phase, 3 wire power, unity ground, and bonded ground

Nominal Line Voltage: 480 VAC, 60 Hz

Branch Power Requirement: 80 kVA (for MRI system)
100 kVA (for system UPS)
Circuit Breaker: 3 pole, 100 Amps (480 VAC) (for MRI system)
3 pole, 200 Amps (480 VAC) (for UPS system)

Note:
For voltages other than 480 VAC: **PDU-MRPT2 must be ordered**
Circuit Breaker size for PDU-MRPT2: 3 pole, 225 Amps (208 VAC)

Note: It is absolutely required to have the MDU connected to hospital power the first day of magnet delivery.
Refer to sheet ED1 of final drawing package for complete electrical requirements.

(18.0)

KKT Chiller Requirements

Supply Configuration Voltage: 460 VAC / 3 phase / 60Hz +/- 10%

Circuit Breaker: 60 Amps (for standard cBoxX60 chiller)
80 Amps (for high ambient cBoxX70 chiller used at sites with outdoor ambient air temperatures above 113F. Consult your local Philips Project Manager for confirmation.)

(17.0)

HVAC Requirements for General Equipment Locations

Heating, ventilation, air conditioning requirements concern all rooms (equipment room, magnet room, and control room) and must be maintained 24 hours a day, 7 days a week.

Examination Room
Temperature: 65° to 72° Fahrenheit (18° to 22° Celsius)
Maximum Temperature Rate of Change: 9° Fahrenheit (5° Celsius) per 10 minutes
Humidity: 40% to 70%, non-condensing
Air Conditioning Capacity: **7507 BTU/hr (2.2 kW)**
- Energy dissipated in the examination room will be removed from the room by an additional air exhaust system
- Gradient coil heat dissipation (3400 to 51200 BTU/hr [1 to 15 kW]) will be removed via liquid cooling of the gradient coil.
- Exam room temperature and humidity specifications are critical for the MR and must be met at all times. No exceptions are allowed.

Equipment Room
Temperature: 59° to 75° Fahrenheit (15° to 24° Celsius)
- The temperature of the conditioned air that enters the room must not be less than 42° Fahrenheit (6° Celsius) below the mean room temperature.

Maximum Temperature Rate of Change: 9° Fahrenheit (5° Celsius) per 10 minutes
Humidity: 30% to 70%, non-condensing
Air Conditioning Capacity:
- At Standby: 27297 BTU/hr (8 kW)
- Peak Dissipation Scanning: **28321 BTU/hr (8.3 kW)**

Note: Normal standby capacity is 6824 BTU/hr (2 kW). In case of emergency, hospital supplied air cooling must be able to deliver 8 kW cooling if the back up **air** cooled cryo cooler is activated.
Note: Full Load UPS heat dissipation may increase peak dissipation by 17750 BTU/hr (5.2 kW).

Control Room
Temperature: 50° to 95° Fahrenheit (10° to 35° Celsius)
Maximum Temperature Rate of Change: 9° Fahrenheit (5° Celsius) per 10 minutes
Humidity: 30% to 70%, non-condensing
Air Conditioning Capacity: **1024 BTU/hr (0.3 kW)**

Ambient Experience (Patient In-bore Solution)
Temperature: 32° to 104° Fahrenheit (0° to 40° Celsius)
Humidity: 10% to 80%, non-condensing
- Patient In-bore Monitor is mounted outside of RF cage. PIB monitor may need special heating/coolling to maintain required temperature.

Refer to Sheet MP1 of final drawing package for completed HVAC requirements.
* Heat load indicated above and on Sheet MP1 will be less than the sum of the peak dissipation shown on Sheet AL due to the fact that not all cabinets will run peak heat loads at the same time. Sheet AL shows the peak dissipation for each cabinet measured individually.

(19.0)

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
Project Manager: Craig Denny
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Drawn By: Markie Apple

Project Details
Drawing Number
N-MID190452 B
Date Drawn: 3/5/2020
Quote: 1-21JYZD0 Rev. 7
Order: 6600461060.010000 - 6600461060.020000

AN

Equipment Legend

A Furnished and installed by Philips
B Furnished by customer/contractor and installed by customer/contractor
C Installed by customer/contractor
D Furnished by Philips and installed by contractor
E Existing
F Future
G Optional
H Furnished by RF Enclosure Supplier and Installed by RF Enclosure Supplier
J Furnished by Philips and Installed by Rigging Company
K Furnished by Philips and Installed by LAP
L Provided by Philips and Installed by RF Enclosure Supplier

	Equipment Designation	Description	Max. Gauss	Weight (lbs)	Heat Load (btu/hr) *	Detail Sheet
A	WFS1	Wall-Mounted Ferroguard Sensor A	---	10	---	AD7
A	WFS2	Wall-Mounted Ferroguard Sensor B	---	10	---	AD7
D	HUB	Ferroguard Assure Hub	---	13	---	AD7
A	SM	System Manager (Touchscreen)	---	7	---	AD7
A	ODAS	Door Sensor (not shown)	---	0.5	---	
A	SFF	AE Small Form Factor Cabinet	50	123	921	AD8
A	LED	LED Module (not shown)	150	24	600	AD8
A	ATSW	AE Touch Screen Elo 1515L (Wall mounted)	-	10.6	102	AD8
A	USB	USB Extender (located under counter)	-	2	51	-
A	ATS	AE Touch Screen Elo 1515L	-	10.6	102	AD8
A	PIB	Patient In-Bore Solution Monitor	100	217	853	AD8
A	DVD	USB DVD Player	-	-	-	AD8

Equipment Legend

A Furnished and installed by Philips
B Furnished by customer/contractor and installed by customer/contractor
C Installed by customer/contractor
D Furnished by Philips and installed by contractor
E Existing
F Future
G Optional
H Furnished by RF Enclosure Supplier and Installed by RF Enclosure Supplier
J Furnished by Philips and Installed by Rigging Company
K Furnished by Philips and Installed by LAP
L Provided by Philips and Installed by RF Enclosure Supplier

	Equipment Designation	Description	Max. Gauss	Weight (lbs)	Heat Load (btu/hr) *	Detail Sheet
A	OT	Operator's Table	-	220	0	AD3
D	ERB	Emergency Run-Down Button (Qty. = 2)	-	3	0	AD3
J	MAG	Magnet Assembly	-	8157	6800	AD3
A	PS	Patient Support (MT)	-	573	1025	AD3
A	GAC	Gradient Amplifier 787 Double Cabinet	150	2015	27900	AD4
A	DACC	Data Acquisition and Control Cabinet	50	875	3400	AD4
D	LCC	Liquid Cooling Cabinet	150	719	4095	AD4
D	ACCC	Air Cooled Cryo-cooler	150	243	19108	AD4
D	MDU	Mains Distribution Unit	150	605	1700	AD4
A	SFB	System Filter Box with Covers	70	175	3400	AD4
B	CBS	Circuit Breaker (For System)	50	t.b.d.	t.b.d.	
B	CBC	Circuit Breaker (For Chiller)	50	t.b.d.	t.b.d.	
D	CH	KKT cBoxX 60 Chiller	10	1477	139898	AD5
D	RDP	KKT Chiller Remote Controller	10	t.b.d.	0	AD5
D	CIP	KKT Chiller Interface Panel	-	132	0	AD5
A	SACU	System Air Cooling Unit	50	55	340	AD5
A	EA	e-Alert	-	1	0	
A	SR	Storage Rail	---	---	-	AD5
A	FT	HA FlexTrak	---	113	---	AD5
A	SP	Service Platform	-	t.b.d.	0	AD6
F	BCP	Backup Power Connection Panel	150	605	t.b.d.	AD6
D	TC	60Hz Transformer Cabinet	-	64	171	AD6
E	CAF	Computer Access Flooring		-	-	
A	RAD	Resoundant Active Driver	50	53	-	AD6
D	UPS	100 kVA Socomec UPS Cabinet	5	1043	17750	AD6
D	BC	Socomec UPS Battery Cabinet	5	3854	-	AD6
B	CBU	Circuit Breaker (for UPS)	50	t.b.d.	t.b.d.	
D	SBU	Signaling Box for UPS (not shown)		-	-	

*** Heat load indicated is peak dissipation for each cabinet measured individually. Peak room heat dissipation as indicated on Sheet AN and MP5 will be different than the sum of each individual cabinet in a given room due to the fact that not all cabinets will run peak heat loads at the same time.**

PHILIPS

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Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
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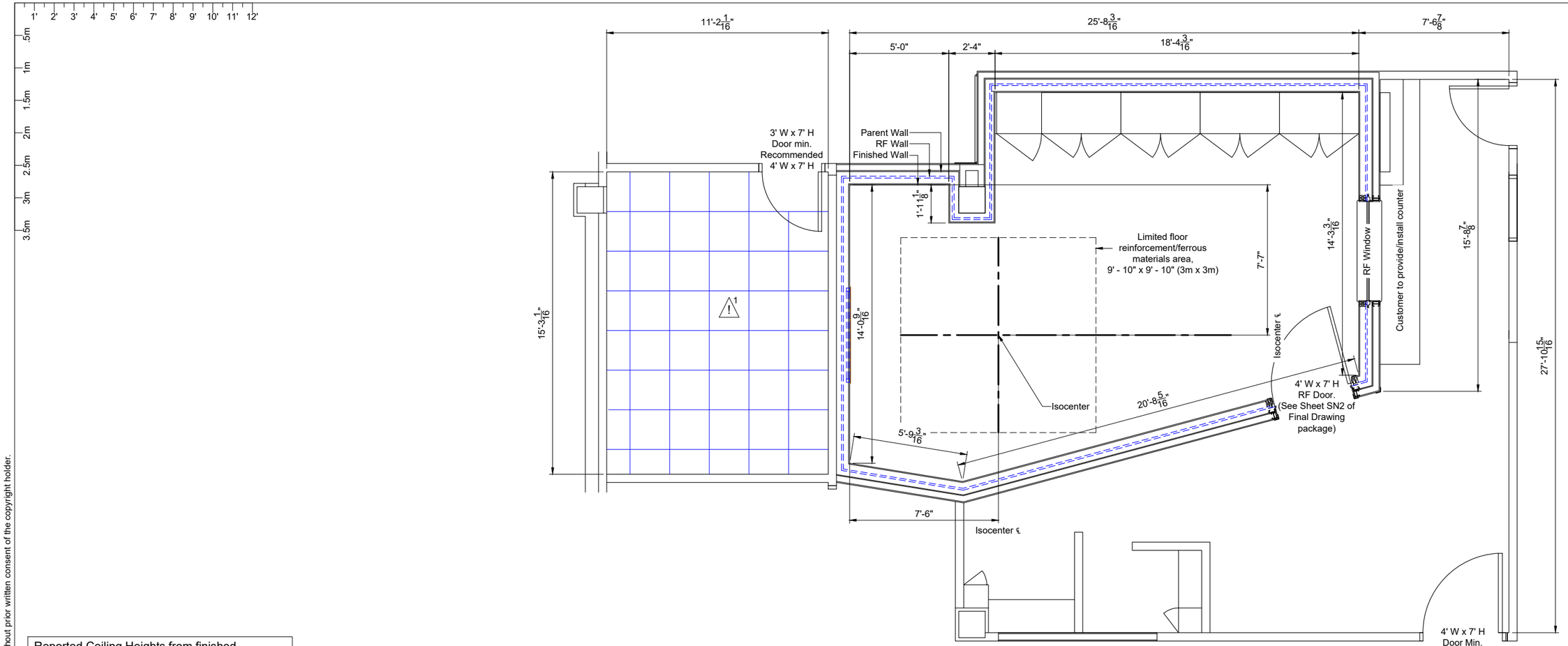
Order: 6600461060.010000 - 6600461060.020000

AL



Reported Ceiling Heights from finished floor to bottom of :
Deck above : Unknown
RF Ceiling : Unknown
Exam Room Suspended Ceiling: Unknown
Equipment Room Ceiling: Unknown

Legend

- Walls
- Soffit
- Existing (to be removed)
- Beams or other building construction elements

Planning Issues and Considerations

1 Ceiling height from the existing computer access floor to the finished ceiling must be minimally 9' - 2" for proper installation and clearance for the ladder trays, otherwise, computer access flooring will need to be removed.

* Field to verify all room dimensions.

Site Layout

3/16" = 1'-0"

Ceiling Height Guide

Equipment Room:	10' - 6" (3200mm)	Recommended
	9' - 2" (2795mm)	***Minimum****
Exam Room Suspended Ceiling:	8' - 3 1/4" (2520mm)	***Required***
Exam Room RF Ceiling:	9' - 9" (2970mm)	Recommended
Control Room:	9' - 10" (3000mm)	Recommended
	7' - 3" (2200mm)	***Minimum***

* Ceiling Heights outside the minimum dimensions may be possible. These Ceiling Heights must be reviewed and approved.

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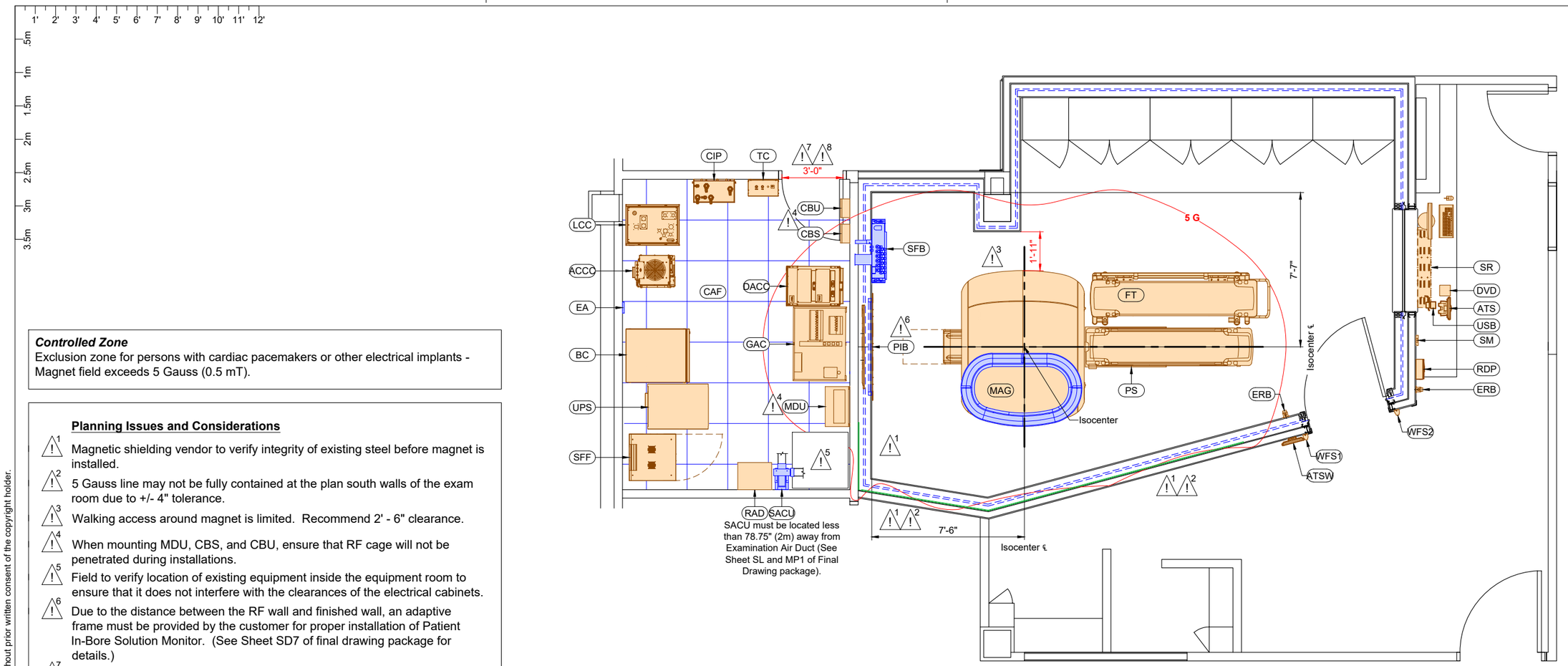
A1



Controlled Zone
Exclusion zone for persons with cardiac pacemakers or other electrical implants - Magnet field exceeds 5 Gauss (0.5 mT).

Planning Issues and Considerations

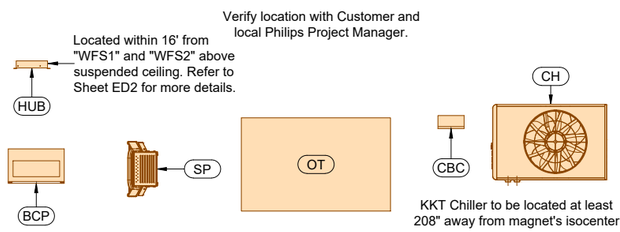
1. Magnetic shielding vendor to verify integrity of existing steel before magnet is installed.
2. 5 Gauss line may not be fully contained at the plan south walls of the exam room due to +/- 4" tolerance.
3. Walking access around magnet is limited. Recommend 2' - 6" clearance.
4. When mounting MDU, CBS, and CBU, ensure that RF cage will not be penetrated during installations.
5. Field to verify location of existing equipment inside the equipment room to ensure that it does not interfere with the clearances of the electrical cabinets.
6. Due to the distance between the RF wall and finished wall, an adaptive frame must be provided by the customer for proper installation of Patient In-Bore Solution Monitor. (See Sheet SD7 of final drawing package for details.)
7. In order to fit all of the equipment in the equipment room, the door must be reduced in size to 3' - 0".
8. Potential collision of noted door with CBS and CBU. Recommend a customer-provided door-stop.

* It is absolutely required to have the MDU connected to hospital power the first day of magnet delivery.

* All floor support below the magnet including floor reinforcement and beams must be verified to meet the requirements shown on the SN1 page of the final drawing package.

* If metal is needed inside the Examination room for air ducts, suspended ceiling, wall construction, cabinets, etc; they must be non-ferromagnetic. This is to avoid potential image quality issues and missile effects due to attraction forces of the magnetic field.

* Field to verify all existing Philips and/or third party equipment will not affect the functionality of the system and its components.



Equipment Layout

3/16" = 1'-0"

Ceiling Height Guide

Equipment Room:	10' - 6" (3200mm)	Recommended
	9' - 2" (2795mm)	***Minimum****
Exam Room Suspended Ceiling:	8' - 3 1/4" (2520mm)	***Required***
Exam Room RF Ceiling:	9' - 9" (2970mm)	Recommended
Control Room:	9' - 10" (3000mm)	Recommended
	7' - 3" (2200mm)	***Minimum***

* Ceiling Heights outside the minimum dimensions may be possible. These Ceiling Heights must be reviewed and approved.

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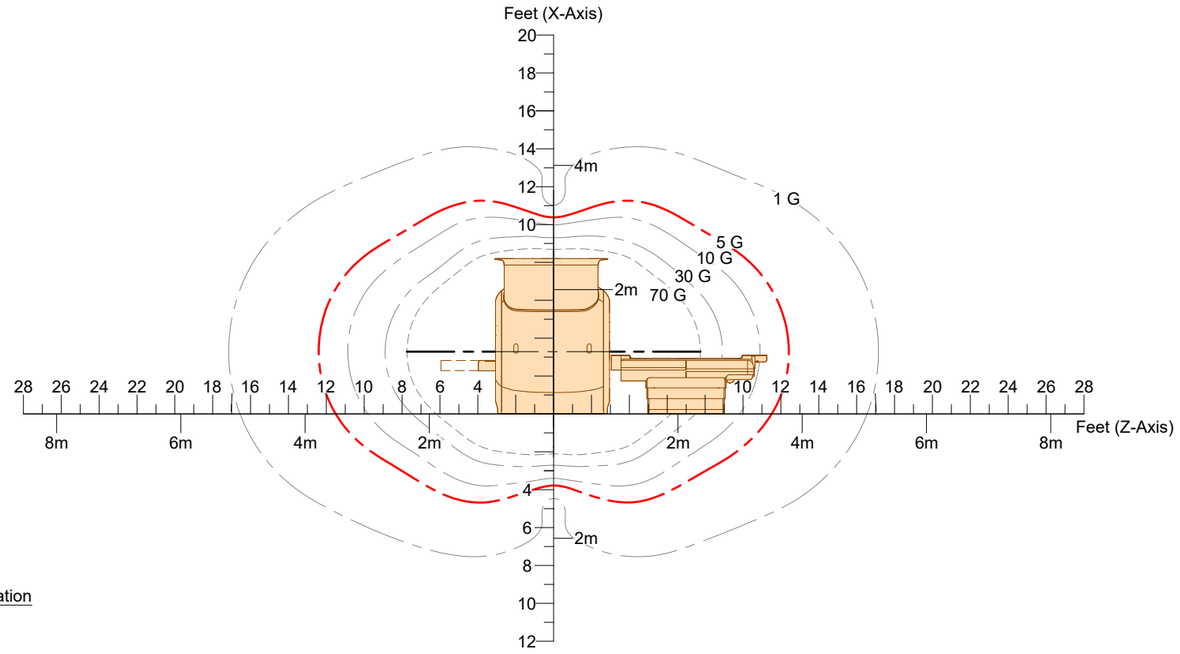
A2

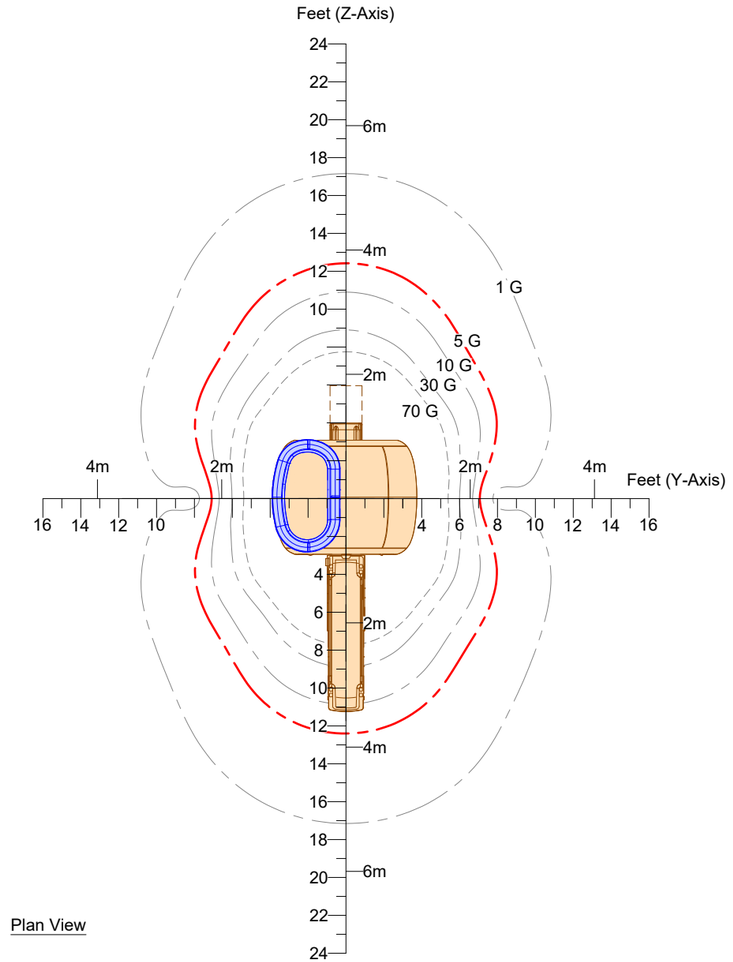
Detail - Magnetic Field Plot, without Magnet Shielding

(Static fringe field shown / Not to scale)



Side Elevation

(14.0)



Plan View

(18.0)

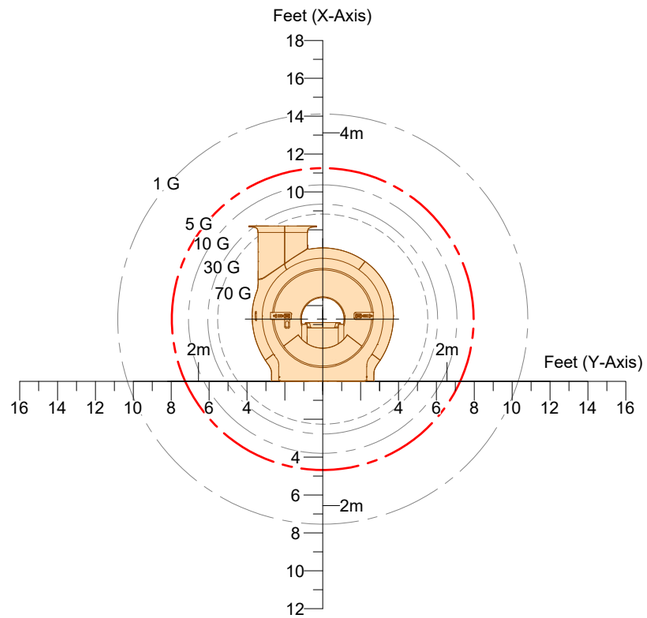
Typical Maximum Fringe Field

Equipment	
≤ 1.0 G (0.1 mT)	Nuclear Camera, PET Scanners, Linear Accelerators, Electron Microscopes, Gamma Camera, **Image Intensifiers**, Blood Chemistry Analyzers, Cyclotrons, X-ray CT Scanner with photo multipliers and **CRT Monitors**
2.0 G (0.2 mT)	CT Scanners manufactured after 2003
2.5 G (0.25 mT)	CT Scanners manufactured prior to 2003, Power and Main Distribution Transformers, and Ultrasound Machines
5.0 G (0.5 mT)	Neurostimulators, Biostimulation Devices, Power Conditioners, Flat Detectors, Video Monitor (monochrome), and **Pacemakers**
10.0 G (1.0 mT)	Computers, Tape Storage, Disc Drivers, HVAC Equipment, X-Ray Tubes, Emergency Generators, Food Prep Areas, Chillers, Telephone Switching, Credit Cards, Analog Watches and Clocks, Fuel Storage Tanks, ECG Equipment with LCD Display, and Motors/Pumps > 5 HP
15.0 G (1.5 mT)	Film Processors and Cardiac Recorders
25.0 G (2.5 mT)	Flat Panel (LCD) Monitors, Ultrasound with LCD
50.0 G (5.0 mT)	Laser Imagers, Telephones, X-Ray Electronics, Metal Detectors
100.0 G (10.0 mT)	Oxygen Monitor Sensor

Note:
The fringe field limits above are provided for preliminary planning purposes and represent the approximate exposure to magnet field acceptable for the type of instrument. It is the responsibility of the customer to have the vendor of the equipment in question set acceptable magnet field limits for proper operation of their equipment.

Valid for equipment located outside the RF Enclosure. In the examination room only MRI compatible equipment can be used. For specifications consult the supplier of the equipment.

(16.0)



Front Elevation

(14.0)

Notes:

1. The fringe field diagrams indicated have been empirically confirmed under unobstructed, greenfield conditions. Actual environmental parameters at this site may influence the true extent of the fringe field and affect the accuracy of the field shown.
2. Isocenter in the X-Axis is 39.53" (1004mm) above finished floor.
3. Magnet shielding requirements are to be determined on a site by site basis. If additional shielding is required, consult with Philips Project Manager. The customer accepts full responsibility for all cost associated with additional magnet shielding.
4. Due to variability in the orientation of the site with respect to the earth's magnetic field and construction of the site, the tolerances in Table 1 should be taken into account.

Table 1- Fringe Field Tolerances	
Fringe Field	**Tolerance**
1 Gauss	± 2' - 8" (± 800mm)
5 Gauss	± 8" (± 200mm)
10 Gauss	± 4" (± 100mm)

(19.0)

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
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AD1

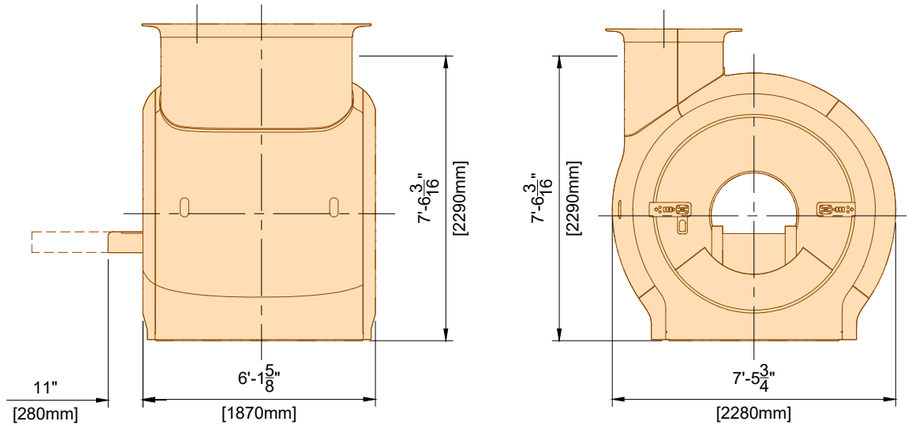
7.12.2019

Detail - Magnet Rigging - Pre-assembled Magnet

Magnet assembly dimensions including transport frame and wheels	Length	Width	Height
Pre-assembled magnet assembly including covers	6' - 1 $\frac{1}{2}$" (1870mm)	7' - 6" (2280mm)	
If transport width is > 7' - 6" (2280mm)			7' - 6 $\frac{1}{4}$" (2290mm)
If transport width < 7' - 6" (2280mm) *			7' - 7 $\frac{1}{4}$" (2320mm)

* If transport width is < 7' - 6" (2280mm), the magnet needs to be transported sideways. Now the height increases due to a different location of the wheels under the magnet.

Note: Part of the patient support that is sticking out at the rear of the assembly has to be removed on site. This is a 15 minute job.



(14.0)

Detail - Magnet Rigging - With Covers Locally Removed

Magnet assembly dimensions including transport frame and wheels	Length	Width	Height
Pre-assembled magnet assembly with covers removed	6' - 0" (1820mm)	6' - 3 $\frac{1}{2}$" (1920mm)	
If transport width is > 6' - 4 $\frac{3}{8}$" (1940mm)			7' - 6 $\frac{1}{4}$" (2290mm)
If transport width < 6' - 4 $\frac{3}{8}$" (1940mm) *			7' - 7 $\frac{1}{4}$" (2320mm)

* If transport width is < 6' - 4 $\frac{3}{8}$" (1940mm), the magnet needs to be transported sideways. Now the height increases due to a different location of the wheels under the magnet.

(18.0)

General Delivery and Rigging Notes

1. Additional height for protective floor covering, and/or other site-specific restrictions must be added to the transport height.
2. All magnets are delivered pre-assembled.
3. The transport beams, wheels and hydraulic lifting tool will be delivered by the Transport and Installation team. An additional order is not needed.
4. It is the rigger's responsibility to provide a spreader bar if a crane will be used.
   a. Rigging is customer/contractor's responsibility unless specific arrangements have been made with Philips Sales/Service.
   b. Assembled magnet weight is 8157 lbs (3700kg).
   c. Transport via wall: A height of 7' - 10 $\frac{1}{2}$" (2400mm) and a width of 7' - 6 $\frac{9}{16}$" (2300mm) is recommended.
      Transport via roof: A length of 8' - 3" (2500mm) and width of 8' - 3" (2500mm) is recommended.
      Openings with smaller dimensions are possible, but are site situation depended. The tables above provide the minimum dimensions of the magnet assembly.
   d. The absolute minimum transport height is (2920mm)

Additional lifting detail to be provided upon request.

(18.0)

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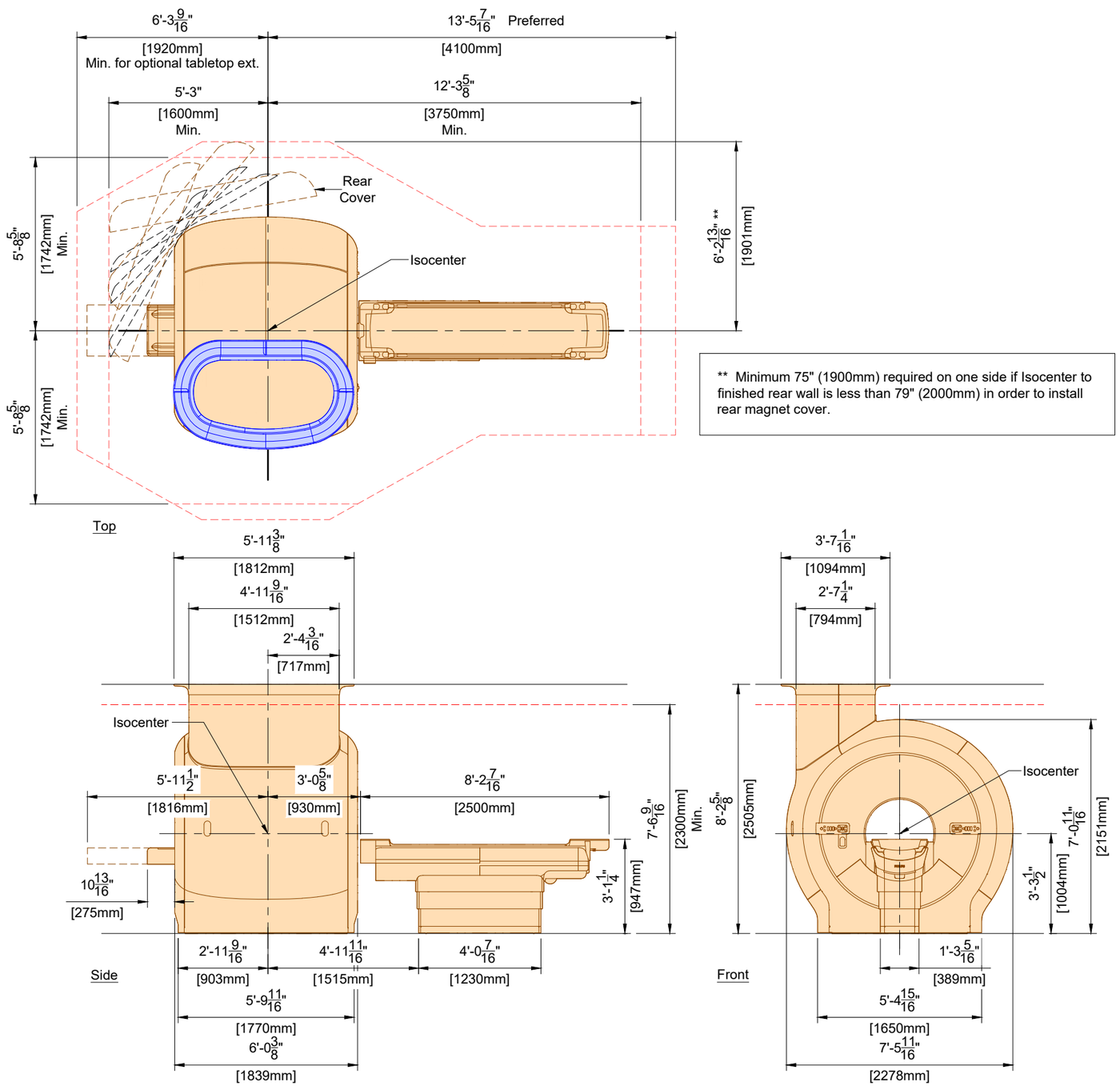
AD2



** Minimum 75" (1900mm) required on one side if Isocenter to finished rear wall is less than 79" (2000mm) in order to install rear magnet cover.

* For gradient coil, 3400 - 51200 btu/hr removed via water cooling system.

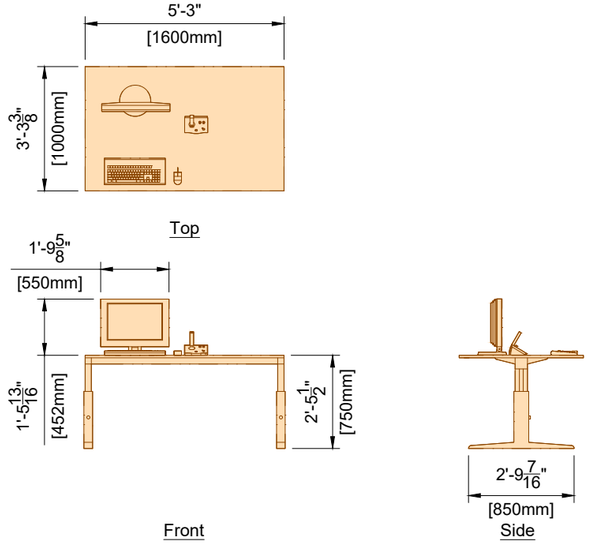
Maximum Patient Weight: 551 lbs (250 kg).

(18.0)

	Magnet Assembly	
MAG	Weight	Heat Dissipation
	8157 lbs	6800 btu/hr *

(19.0)

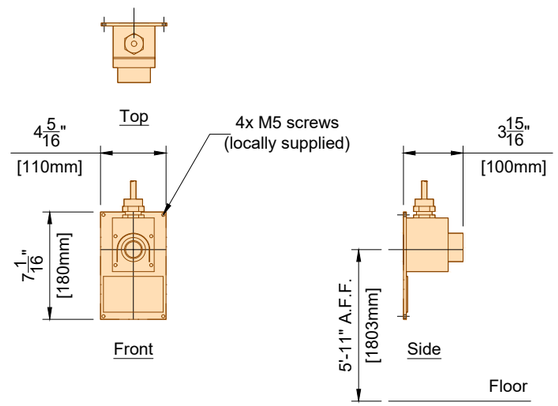
	Patient Support (MT)	
PS	Weight	Heat Dissipation
	573 lbs	1025 btu/hr



* Maximum distance between Monitor/Keyboard and Storage Rail is 1' - 8" (510mm) if Operator Console table is not ordered

(19.0)

	Operator's Table	
OT	Weight	Heat Dissipation
	220 lbs	0 btu/hr



(19.0)

	Emergency Run-Down Button	
ERB	Weight	Heat Dissipation
	3 lbs	0 btu/hr

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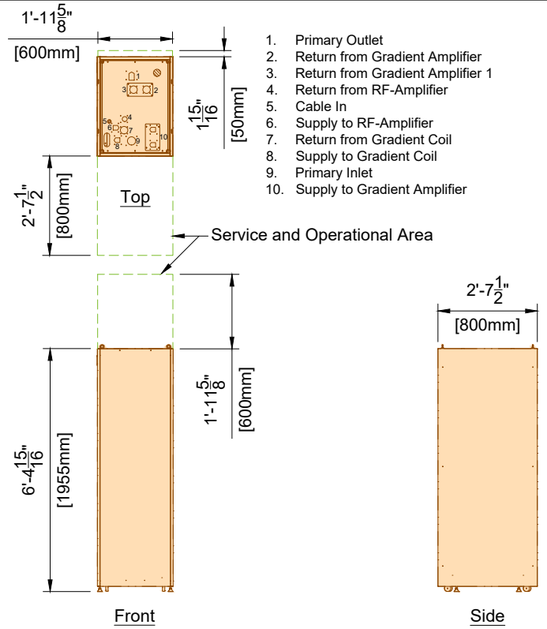
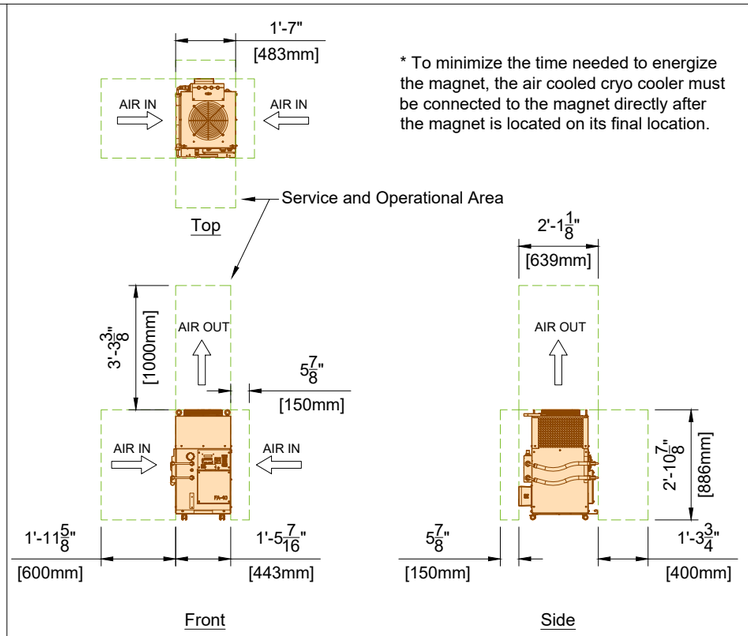
AD3

7.12.2019



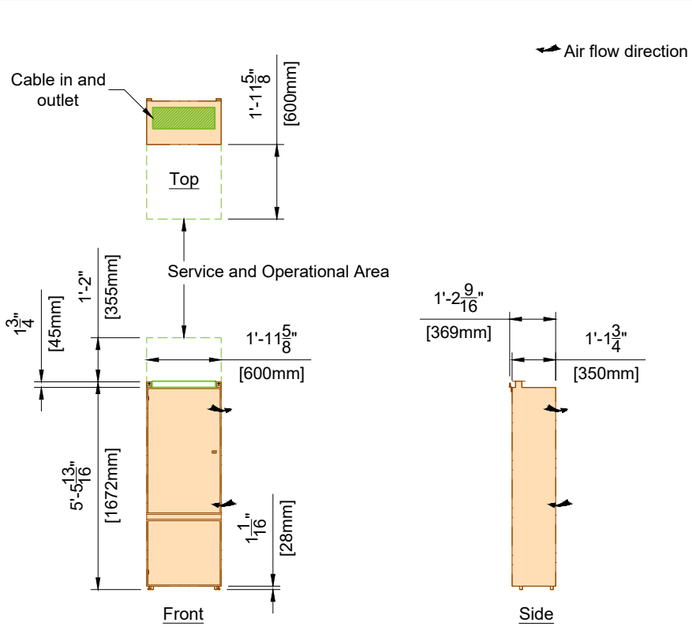
(19.0)

LCC	Liquid Cooling Cabinet	
	Weight	Heat Dissipation
	719 lbs	4095 BTU/hr



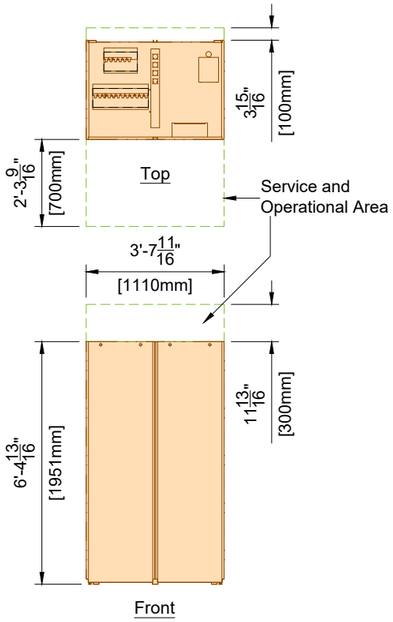
(19.0)

ACCC	Air Cooled Cryo Cooler	
	Weight	Heat Dissipation
	243 lbs	19108 BTU/hr



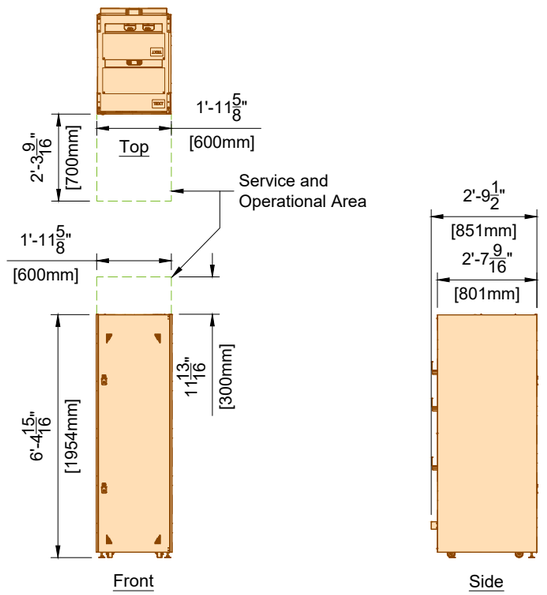
(19.0)

MDU	Mains Distribution Unit - 480V, 60Hz	
	Weight	Heat Dissipation
	605 lbs	1700 BTU/hr



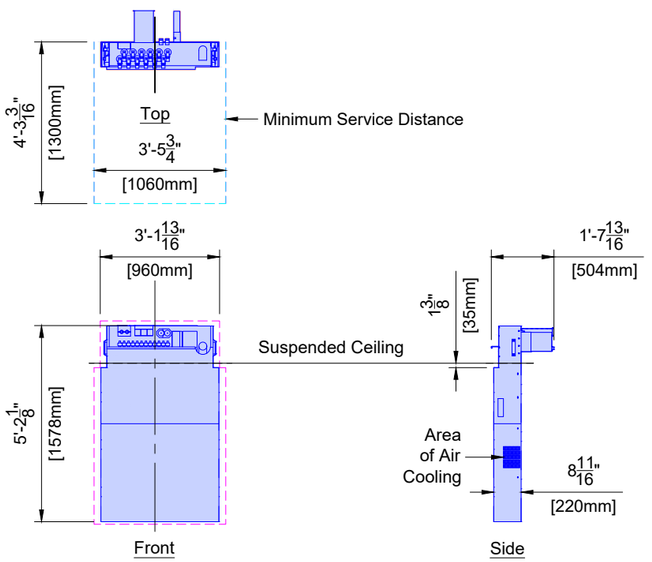
(19.0)

GAC	Gradient Amplifier 787 Double Cabinet	
	Weight	Heat Dissipation
	2015 lbs	27900 BTU/hr



(19.0)

DACC	Data Acquisition and Control Cabinet	
	Weight	Heat Dissipation
	875 lbs	3400 BTU/hr



(19.0)

SFB	System Filter Box	
	Weight	Heat Dissipation
	175 lbs	3400 BTU/hr

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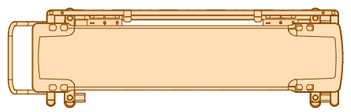
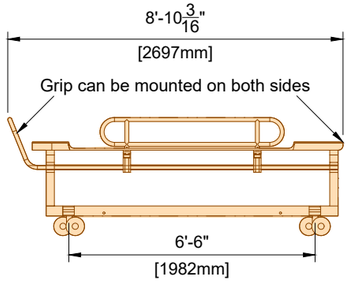
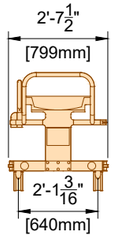
AD4



Top



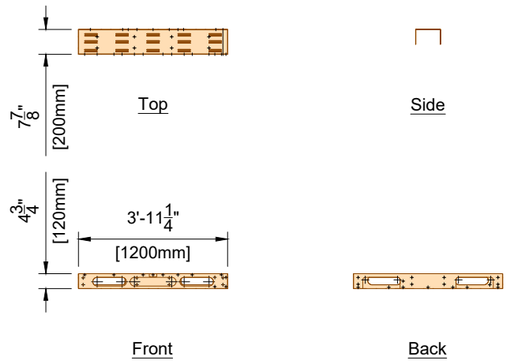
Front



Side

(19.0)

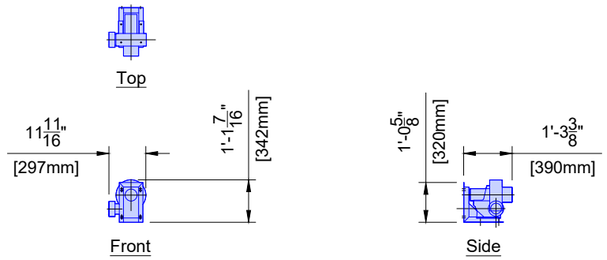
	HA FlexTrak	
FT	Weight	Heat Dissipation
	113 lbs	- BTU/hr



* For Mounting methods, see SD4 Page.

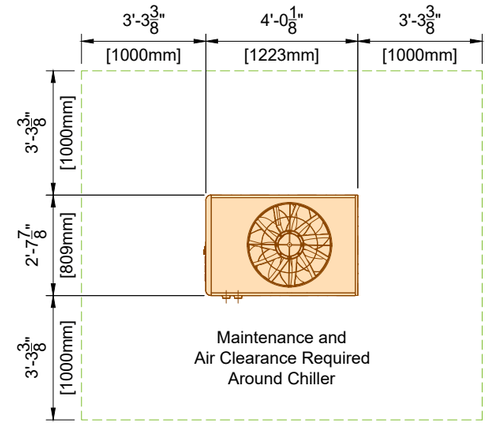
(19.0)

	Storage Rail	
SR	Weight	Heat Dissipation
	- lbs	- BTU/hr

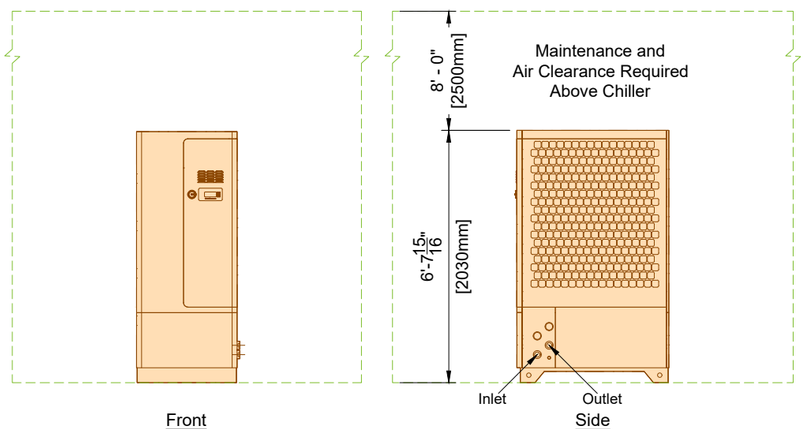


(19.0)

	System Air Cooling Unit	
SACU	Weight	Heat Dissipation
	55 lbs	340 BTU/hr



Top

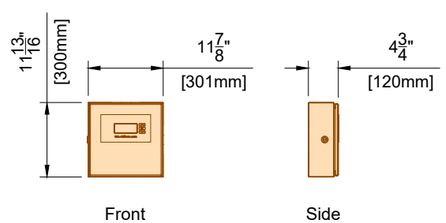


8' - 0" (2500mm) air clearance is required above the chiller. Refer to Sheet MP2 for additional notes and specifications regarding the chiller.

(19.0)

	KKT cBoxX 60	
CH	Weight	Heat Dissipation
	1,477 lbs	139898 BTU/hr

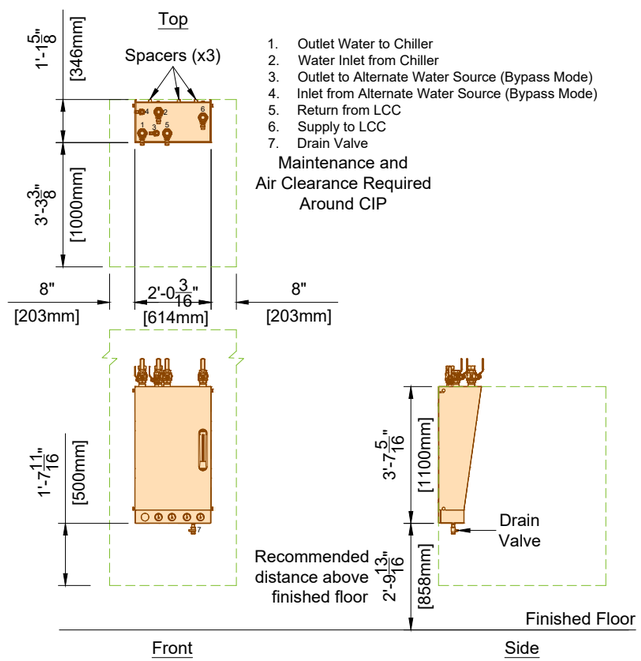
Top



Front Side

(19.0)

	KKT Remote Display Panel	
RDP	Weight	Heat Dissipation
	TBD	- BTU/hr



(19.0)

	KKT Chiller Interface Panel	
CIP	Weight	Heat Dissipation
	132 lbs	- BTU/hr

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AD5

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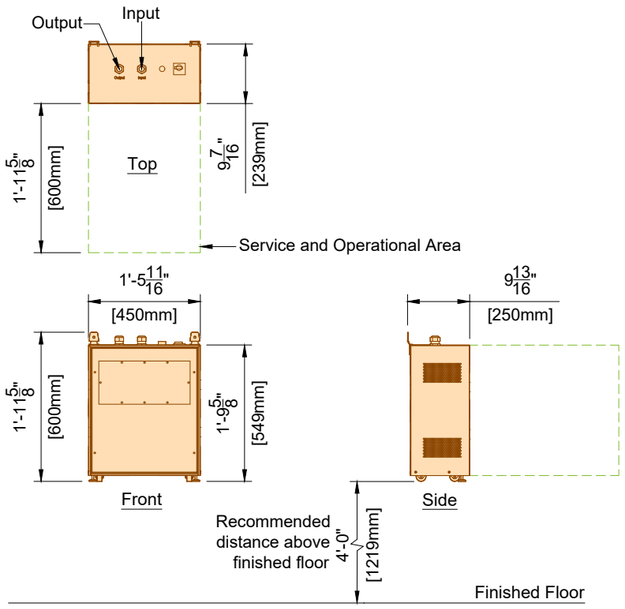
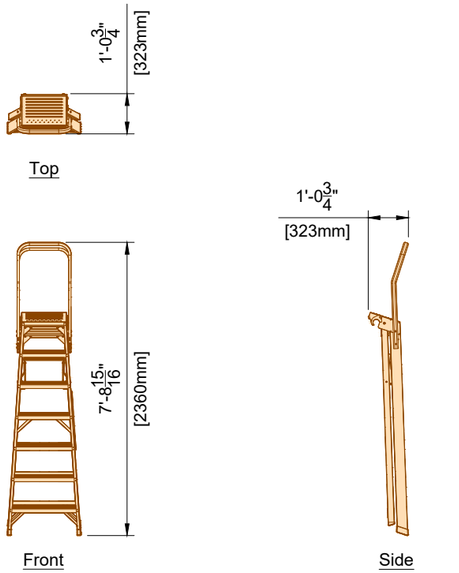


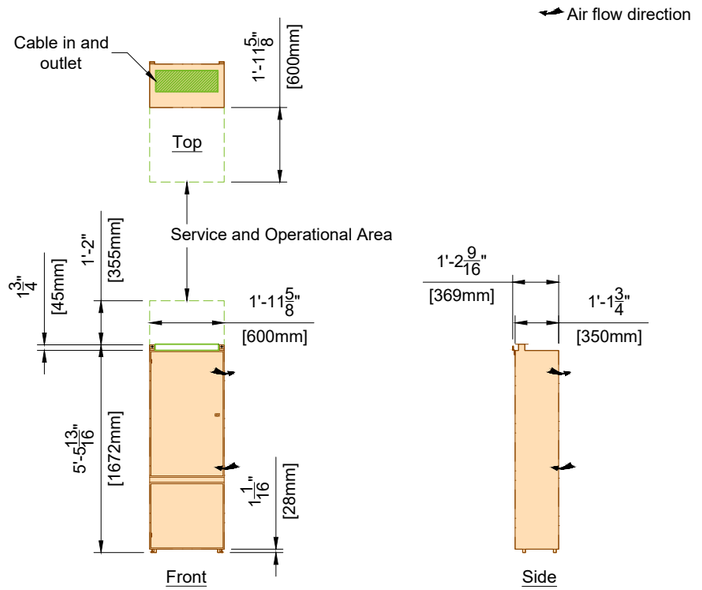
(19.0)

TC	Transformer Cabinet - 60Hz	
	Weight	Heat Dissipation
	64 lbs	171 BTU/hr



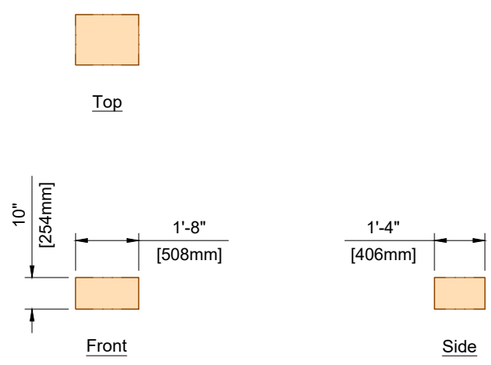
(19.0)

SP	Service Platform	
	Weight	Heat Dissipation
	t.b.d.	0 BTU/hr



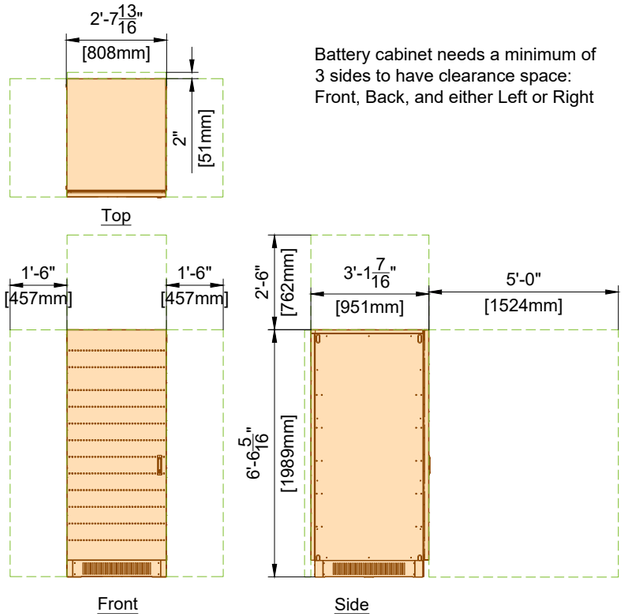
(19.0)

BCP	Backup Power Connection Panel	
	Weight	Heat Dissipation
	605 lbs	t.b.d.



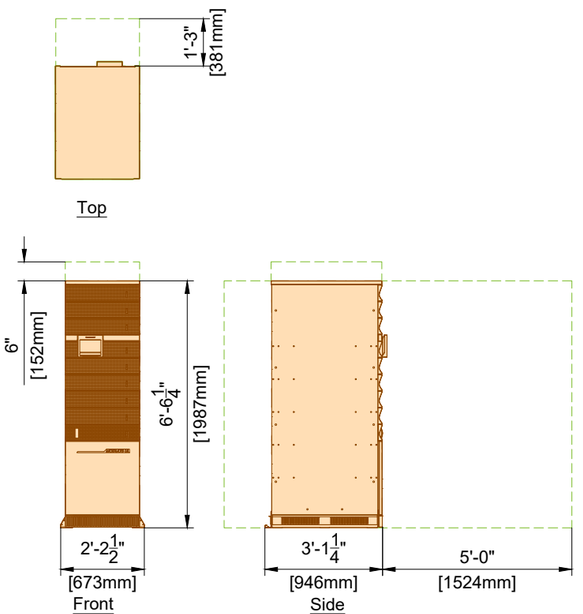
(19.0)

RAD	Resoundant Active Driver	
	Weight	Heat Dissipation
	53 lbs	- BTU/hr



(19.0)

BC	UPS Socomec Battery Cabinet	
	Weight	Heat Dissipation
	3854 lbs.	-



(19.0)

UPS	100kVA Socomec UPS Cabinet	
	Weight	Heat Dissipation
	1043 lbs.	17750 BTU/hr

PHILIPS

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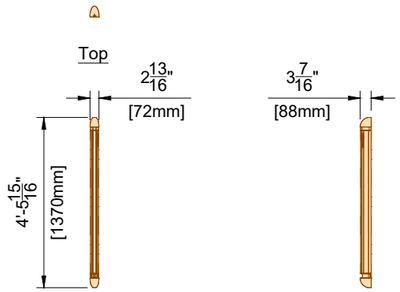
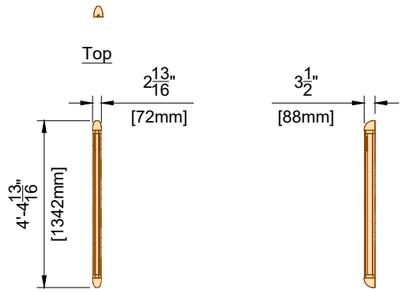
AD6



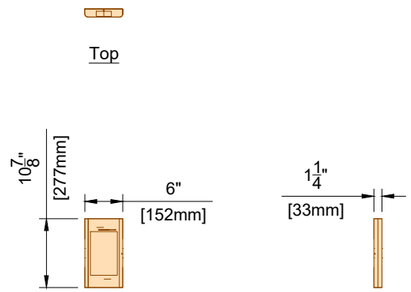
(19.1)

	Wall-Mounted Ferroguard Sensor A	
WFS1	Weight	Heat Dissipation
	10 lbs	0 BTU/hr



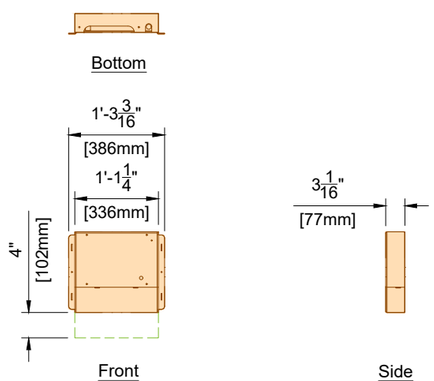
(19.1)

	Wall-Mounted Ferroguard Sensor B	
WFS2	Weight	Heat Dissipation
	10 lbs	0 BTU/hr



(19.0)

	System Manager (Touchscreen)	
SM	Weight	Heat Dissipation
	7 lbs	0 BTU/hr



(19.0)

	Ferroguard Assure Hub	
HUB	Weight	Heat Dissipation
	13 lbs	0 BTU/hr

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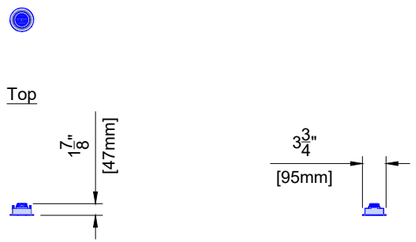
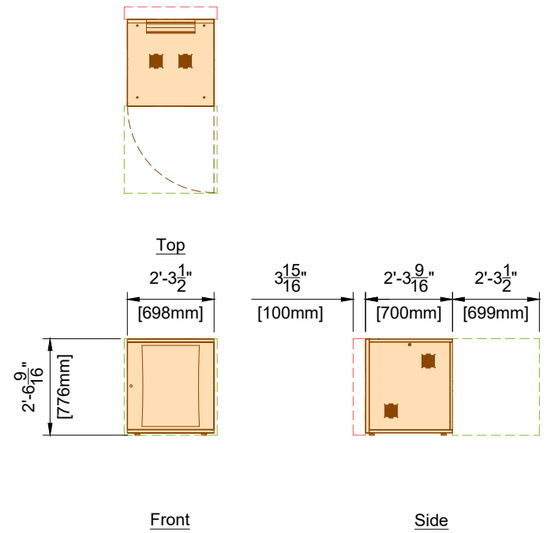
AD7



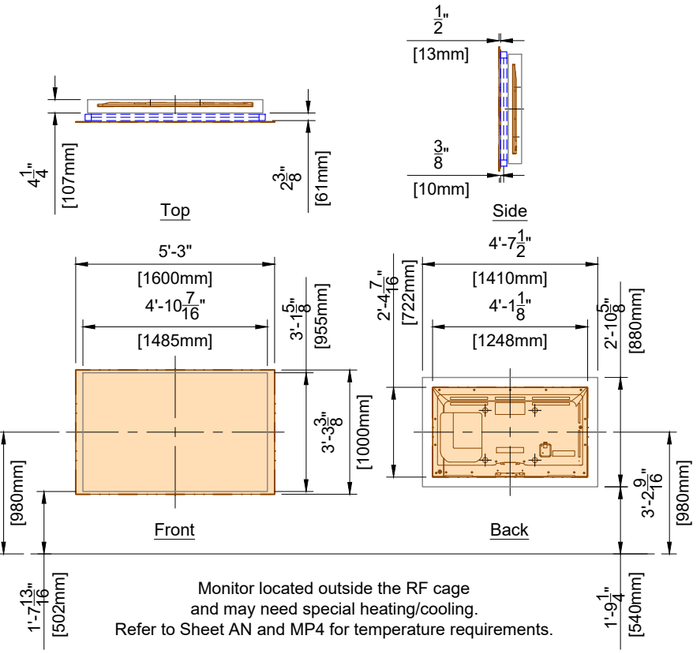
(15.0)

	LED Module	
LED	Weight	Heat Dissipation
	0.4 lbs	10 BTU/hr



(15.0)

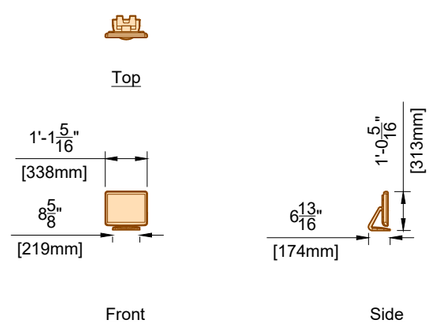
	AE Small Form Factor Cabinet	
SFF	Weight	Heat Dissipation
	123 lbs	921 BTU/hr



Monitor located outside the RF cage
and may need special heating/cooling.
Refer to Sheet AN and MP4 for temperature requirements.

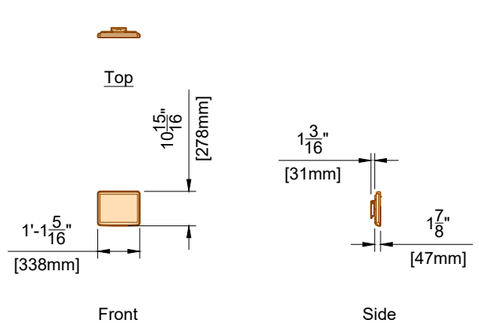
(15.0)

	Patient In-Bore Monitor	
PIB	Weight	Heat Dissipation
	217 lbs	853 BTU/hr



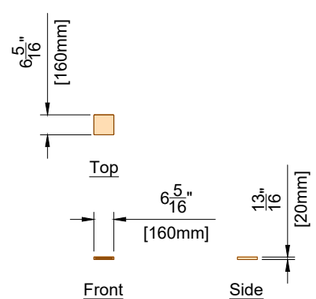
(15.0)

	AE Touch Screen	
ATS	Weight	Heat Dissipation
	10.6 lbs	102 BTU/hr



(15.0)

	AE Touch Screen (Wall Mounted)	
ATSW	Weight	Heat Dissipation
	10.6 lbs	102 BTU/hr



(17.0)

	DVD Writer	
DVD	Weight	Heat Dissipation
	-	-

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

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AD8

Magnet Field Homogeneity Explained

Image quality is dependant on the homogeneity and stability of the magnetic field (B0). The homogeneity of B0 can be distorted by static ferromagnetic objects such as floor reinforcement (rebar, structural beams, etc.). The stability of the magnetic field (B0) can be disrupted by moving ferromagnetic objects (cars, trains, elevators, etc.). These can cause variations of B0 which will produce image artifacts such as ghosting.

Electromagnetic fields such as current in power lines, motors, generators, and transformers can also cause B0 variation. The magnitude of the variation will decrease as the source gets farther away from the magnet. As such, there are minimum required distances to the magnet for every type of disturbance, depending upon its properties (weight, current, etc.). Disturbances measured in the Z-axis (direction of the patient table) are most critical for image quality.

Solutions for sites violating requirements will depend on the source of disturbance and construction of the site. To help identify potential disturbances, sources can be classified into seven categories:

1. Static ferromagnetic objects (beams, stirrups, rebar, etc.)
2. Moving ferromagnetic objects (cars, trucks, etc.)
3. Moving magnetized objects
4. Electrically Powered Rail Systems (trains, trams, subways)
5. Electromagnetic fields (power lines, transformers, motors)
6. Static magnetic fields (other magnets)
7. Coherent and non-coherent vibrations

1. Static Ferromagnetic Objects - (see Figure 1)

a. Floor Reinforcement (i.e. rebar, stirrups, etc.):
For the square area of 9' - 10" x 9' - 10" (3 m x 3 m) symmetrically around magnet isocenter, ferromagnetic reinforcement must be:
- **NOT allowed** between the finished floor level and 1-15/16" (50mm) below the finished floor level.
- **NO greater** than 25 kg/m^2 average concentration between 1-15/16" (50mm) and 9-13/16" (250mm) below the floor slab, Ferromagnetic reinforcement in this area must be evenly distributed. Reinforcement below 9-13/16" (250mm) can be ignored.

b. Ferromagnetic beams perpendicular to the Z-axis of the magnet must be located at least 9-13/16" (250mm) below the finished floor level.

c. All other ferromagnetic beams must be located at least 1' - 11-5/8" (600mm) below the finished floor level.

d. Substantial ferro-magnetic objects or structures outside of the RF enclosure must be located at a minimum of 8' - 3" (2.5m) from magnet isocenter.

e. Inside the Examination Room, all metal must be non-ferromagnetic. This is to avoid potential image quality issues and missile effects due to attraction forces of the magnet field.

2. Moving Ferromagnetic and Magnetized Objects - (see Figure 2)

a. Minimum Distances: Ferromagnetic objects such as trucks, cars, and trolleys can be magnetized by the Earth's magnetic field and by the magnet's fringe field. Figure 2 shows the minimum distances moving ferromagnetic objects must be from isocenter.

b. Minimum Distances: Some ferromagnetic objects are magnetized because of high currents repeatedly entering the fringe field of the magnet (e.g. elevators). The safety distance for these objects can be calculated by multiplying their weight by 10 and using the chart in Figure 2.

3. Electrically Powered Rail Systems - (see Table 1)

a. Minimum Distances: Electric trains, tramways, and subways are typically powered by electrical traction. For railways with overhead power lines, the current through the power lines (and the returning current through the rails) will induce high magnetic field variations that will extend over a large region. These fields will have a small variation in the direction perpendicular to the power lines. Therefore, B0 variation depends on the distance from the power line to the isocenter, the current, and the angle between the power line and the magnet's Z-axis (0° is parallel to Z-axis). Table 1 shows the minimum distance allowed for electrically powered rail systems versus current and its angle to the magnet Z-axis.

4. Electromagnetic Fields - (see Table 2)

a. Minimum Distances: Currents in power lines, large transformers or electric motors near an MR system can affect the stability of the magnetic field since they also produce electromagnetic fields. Table 2 shows the minimum distances allowed.

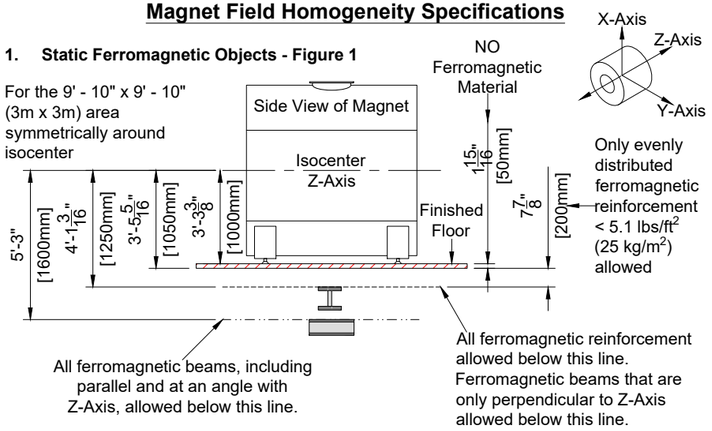
5. Static Magnetic Fields - (see Table 3)

a. Minimum Distances: If an MR system is installed next to another MR system, ensure that the strength of the magnet field from the other system does not exceed the specified values at isocenter of the future system. If the field is between certain values, then the magnet must be re-shimmed when the other system's field goes on or off. Table 3 shows the maximum gauss field allowed.

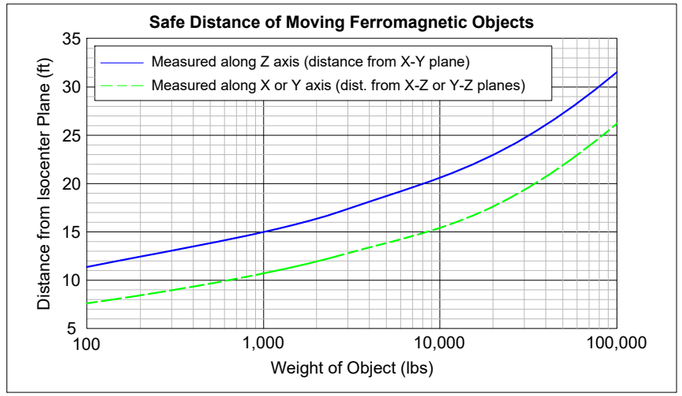
Possible Counter Measures:
If minimum distances are not met, image quality problems are likely to occur. B0 variations can be measured at various angles to find the most optimum angle to site the future Z-axis of the MR system if the distances or the angle to the isocenter are not exactly known. If minimum distances are not met, contact local Philips service to test and evaluate the site.

Magnet Field Homogeneity Specifications

1. Static Ferromagnetic Objects - Figure 1



2. Moving Ferromagnetic Objects - Figure 2



3. Moving Magnetized Objects
For magnetized objects (because of high currents or repeatedly entering the fringe field of the magnet, e.g. elevators), multiply the weight by 10 to obtain a safety distance from Figure 2.

4. Electrically Powered Rail Systems - Table 1

Distance (ft) for Electrically Powered Subway and Trains *	Angle (degrees), 0° is parallel to Z-Axis						
	0°	15°	30°	45°	60°	75°	90°
Current = 750 Amps	46' (14m)	62' (19m)	69' (21m)	75' (23m)	79' (24m)	82' (25m)	82' (25m)
Current = 2000 Amps	59' (18m)	105' (32m)	115' (35m)	125' (38m)	131' (40m)	135' (41m)	135' (41m)

* Note that for short distances, the weight of the trains must also be considered.

5. Electromagnetic Fields - Table 2

Object with Electromagnetic Field	Safety Distanced from Magnet Isocenter (in)
Power Line	8.8 √ Amperage (A)
Transformer	15.5 √ Power (kVA)
Motor/Generator	36 √ Power (kVA)

6. Static Magnet Fields - Table 3

Allowed Field Strength of Another MR System at Magnet Isocenter	
Field Strength of Other System *	**Result**
< 0.5 Gauss (0.05 mT)	Always Possible
> 0.5 Gauss (0.05 mT) AND < 3 Gauss (0.3 mT)	Re-shimming Required
> 3 Gauss (0.3 mT)	Not Allowed

* Note that these values are for Philips magnets only.

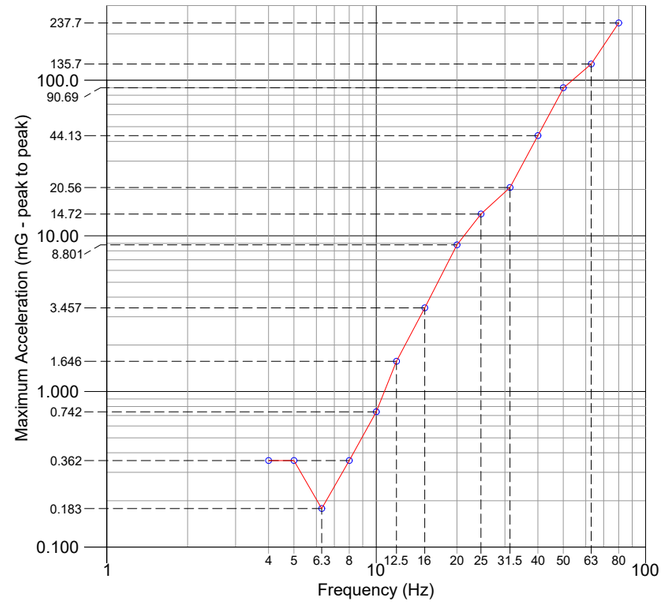
Magnetic Field Homogeneity - Vibration Specifications

7. Coherent and Non-Coherent Vibrations

a. Mandatory Floor Vibration Testing: Floor vibrations can affect the stability of the magnetic field which leads to poor image quality. In order to evaluate the acceptance of a site, environmental testing is mandatory. Measurements are to be completed by local Philips service and evaluations are completed by Philips Site Planning department. Contact local Philips service to arrange an environmental test and evaluation.

b. Specifications:
- Coherent Vibration: Coherent vibrations have a signal with a constant amplitude and frequency. Typical sources are electrical powered motors, air handling systems, etc. These vibrations provide a constant disturbance during the entire measurement period (scan). Coherent signals result in distinct artifacts which are the main source of image quality problems. However, disturbing sources can typically be handled once the source is found. Solutions involve re-balancing, isolating on springs, or re-installing the source on vibration pads.
- Non-Coherent Vibration: Non-coherent vibrations can be categorized into pulse, transient, or noise-like vibrations. Pulse and transient vibrations are single events, and will decrease in a short time. Noise-like vibrations have no specific frequency and are broadband. Typical noise-like vibrations are caused by vehicular traffic, people walking, or the resonance of the building structure. These sources are difficult to eliminate. Furthermore, the building structure can have a negative response on the vibration induced. The only possible solution is to change the construction of the building (i.e. isolate MR floor slab). In this case, the customer must consult with a third party vibration and structural engineer.
- Settings for Fast Fourier Transformer Analyzer shown in table below:

Maximum Allowed Acceleration in Terts Band



Acceleration [m/s2] rms vs Frequency Scale (Hz)					
Acceleration	Frequency	Acceleration	Frequency	Acceleration	Frequency
0.001256	4.0	0.005709	12.5	0.153029	40.0
0.001256	5.0	0.011990	16.0	0.314500	50.0
0.000637	6.3	0.030520	20.0	0.470690	63.0
0.001256	8.0	0.051033	25.0	0.824273	80.0
0.002573	10.0	0.071302	31.5		

c. Third Party Consultation: Third party vibrations pads are not allowed under the feet of the magnet. All other third party solutions to external vibration disturbances (i.e. pneumatic isolated floors, etc.) must be designed to encompass the whole exam room floor and must meet all of the MR system's specifications (vibration specification, shimming requirements, proximity of ferromagnetic material, etc.). In addition, long term affects (such as creeping), must be considered since the magnet's relationship with the patient table is extremely critical. Philips does not review or approve any third party designed solutions.

(18.0)

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

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SN1

MRI Support Notes

1. Door(s)
For convenient and safe transport of patients on trolleys, and for installation and maintenance actions, a minimum clearance of 48" W x 84" H (1220mm W x 2130mm H) is recommended. Smaller doors may hinder facility staff in getting access to the patient and in transferring the patient to a place where life saving actions can be performed in an emergency situation. For safety reasons the door(s) should comply with the following:

a. To be opened or closed within 3 sec., and with a force < 22.5 lbs (100 N).
b. Manual operator action required to close the door (not automatic).
c. Threshold no more than 0.8" (20mm), or 2.4" (60mm) if provided with ramps no
d. Steeper than 10%.
e. Simple to operate.
f. A power-assisted door must, in the event of a failure, be opened within 10 seconds with a force no greater than 56.2 lbs (250 N).
g. The design of the door posts should be such that they are not damaged by typical contact with patient gurneys.

2. Magnet Transfer Opening
The magnet is the only system part that in most cases cannot be transferred through the door of the RF enclosure. A special opening to allow its installation in the enclosure must therefore be made available. **Refer to Sheet AD2** for required dimensions. The underside of the magnet transfer opening should be flush with the floor. If building constraints make this impossible, the RF enclosure supplier must deliver ramp(s) with slopes no steeper than 5% and a maximum height of 4.75" (120mm). The location of the transfer opening will naturally be site dependent. It should, however, comply with the following conditions:

a. Preferably be accessible through existing hospital corridor(s), provided these meet other other necessary requirements (i.e. floor loading, corridor width and height).
b. It should be accessible from outside through a wall or the roof.

If re-opening of magnet transfer opening is needed, it must be possible for Philips service to re-open the magnet transfer opening without invalidating the RF enclosure guarantee. Should specialist servicing be required, this should be done only by the RF shielding manufacturer's own personnel and any special tools used should be supplied by the RF shielding manufacturer.

3. RF Viewing Window
The recommended window size is 48" W x 40" H (1200mm W x 1000mm H) with the window base no more than 39" (1000mm) above finished floor level. The minimum window size is 36" W x 24" H (900mm x 600mm H). The transparency of window material (i.e. the mesh) must be better than:

a. 30% for an angle between 40 and 140°.
b. 50% for an angle between 70 and 110°.

The windowpane must be made of tempered safety glass. The window material must have an attenuation factor less than 2 in the light color range of 2600 to 4200 K. Moreover, it must cause no color change in the transmitted light to allow the operator to get an accurate impression of the patient's complexion. The window shielding material (mesh) must be sandwiched between two panes of glass. All parts of the window (e.g. the mesh) that contribute to the attenuation must be made of non ferro-magnetic material. For optional sound damping the two window panes should have a different thickness (e.g. 0.24" and 0.31" [6 and 8mm]).

4. Floor - Covering Material
To avoid electrostatic discharge problems, the floor must have a resistively of less than 1 x 10^9 Ω / square or it must comply with NEN EN IEC 61340-4. Verify local codes before installing any flooring that is not rated as static dissipative.

5. Foundation of Magnet and Patient Support
Shocks and vibrations up to 0.1 g, in all directions, have to be anticipated. The friction between magnet and floor will normally be great enough to keep the magnet in place (friction factor > 0.1) so no fixing measures are required unless in a seismic area. The patient support is subject to forces induced by operators and patients. To prevent tilting, the patient support must be fastened to the floor.

6. Suspension Provisions
The provisions for system wiring and suspended ceiling are not part of the RF enclosure delivery by Philips. However, fixing points for the suspension of these items must be available in the enclosure ceiling. Requirements are determined by the local situation. In addition, suspension points for the lighting, air-conditioning equipment, etc. maybe required. Finally, the suspension provisions must not affect RF enclosure integrity. The responsibility for ensuring this integrity lies with the manufacturer of the RF enclosure.

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General Equipment Support Notes

1. General
The customer shall be solely responsible, at their expense, for preparation of the site, including any required structural alterations. The site preparation shall be in accordance with this plan and specifications, the architectural/construction drawings, and in compliance with all safety and building codes. The customer shall be solely responsible for obtaining all construction permits from jurisdictional authority.

2. Equipment Anchorage
Philips provides, with this plan and specifications, information relative to equipment size, weight, shape, anchoring hole locations and forces which may be exerted on anchoring fasteners. The customer shall be solely responsible, through the engineer of record for the building, to provide on the architectural/construction drawings, information regarding the approved method of equipment anchoring to floors, walls and/or ceiling of the building. Any anchorage test required by local authority shall be the customer's responsibility. Stud type anchor bolts should not be specified as they hinder equipment removal for service.

3. Floor Loading and Surface
Philips provides, with this plan and specifications, information relative to size, weight and shape of floor mounted equipment. The customer shall be solely responsible, through the engineer of record for the building, to provide on the architectural/construction drawings confirmation of the structural adequacy of the floor upon which the equipment will be placed. Any load test required by local authority, shall be the customer's responsibility. The floor surface upon which Philips equipment and floor plates are to be placed/anchored shall be super flat and level to within +0" / - $\frac{1}{8}$" (2.5mm).

4. Ceiling Support Apparatus (If Applicable)
Philips provides, with this plan and specifications, information relative to size, weight and shape of ceiling supported equipment. The customer shall be solely responsible, through the engineer of record for the building, to provide on the architectural/construction drawings, information regarding the approved method of structural support apparatus, fasteners and anchorage to which Philips will attach equipment. Any anchorage and/or load test required by local authority shall be the customer's responsibility.

The structural support apparatus surface to which Philips equipment is to be attached, shall have horizontal equipment attachment surfaces parallel, square and level to within plus or minus $\frac{1}{16}$" (2mm) for the area the system covers.

Contractor to clearly mark Philips equipment longitudinal centerline on bottom of each structural support.

Any drilling and/or tapping of holes required to attach Philips equipment to the structural support apparatus shall be the responsibility of the customer.

Fasteners/anchors (i.e., bolts, spring nuts, lock and flat washers) and strip closures shall be provided by the customer.

5. Suspended Ceiling
Special requirements for the suspended ceiling within the RF enclosure:

a. It must be constructed from non-ferrous material. Tiles composed of high recycle metal composition (ie. USG490) are not allowed as they often contain ferrous ferromagnetic metal.
b. It is recommended to have sound damping
c. No hanging objects such as spot lamps are to hang lower than 8' - 3 $\frac{1}{4}$" (2520mm) in order to give clearance for the removal of the magnet covers for servicing.
d. The access panel or opening in the ceiling to enable a cold head change shall comply with specifications given on SD1.
e. Ceiling grid hangers must be made of non-ferromagnetic material and must be insulated.
f. Any loose hardware or tools should not be installed or left above suspended ceiling. If the hardware vibrates it could cause image quality issues and if it is ferrous it could eventually end up inside the magnet gantry.

- To avoid spikes, (non ferromagnetic) metal e.g. aluminum strips, aluminum light fixtures, air handling grids etc. must be connected to the RF-enclosure grounding point. Beware of metal-on-metal connections where two metal parts rub against one another. This could cause image artifacts.
- In case of aluminum strips used for the suspended ceiling grid; each individual strip must be connected. In case aluminum tiles, each individual tile must be connected to the RF-enclosure grounding point.
- It is allowed to connect all individual parts to each other and finally to the RF-enclosure grounding point.
- For good electrical connection of the grounding wire a tooth washer is required.
- Before connection is made, coating / insulating finishing must be removed.
- The volume above the suspended ceiling above the magnet and service area must be free of obstacles for service activities. No third party equipment / installations are allowed here.
- The impedance between any conductive part and the central PE bus-bar/terminal must not exceed 100 mW.

6. Lighting
Lighting fixtures shall be placed in such a position that they are not obscured by any equipment or its movement, nor shall they interfere with Philips ceiling service clearances. Such lighting fixture locations shall be the sole responsibility of the customer. Recommend plastic conduit when it does not interfere/violate with local codes.

7. Ceiling Obstructions
There shall be no obstructions that project below the finished ceiling in the area covered by ceiling suspended equipment travel (if applicable).

8. Floor Obstructions
There shall be no obstructions on the floor (sliding door tracks, etc.) in front of the Philips technical cabinets. Floor must be clear to allow cabinets to be pulled away from the wall for service.

9. Seismic Anchorage (For Seismic Zones Only)
All seismic anchorage hardware, including brackets, backing plates, bolts, etc., shall be supplied and installed by the customer/contractor unless otherwise specified within the support legend on these drawings.

Installation of electronic cabinets to meet seismic anchorage requirements must be accomplished using expansion type (HILTI HDI, or eq.) anchor/bolt systems to facilitate the removal of a cabinet for maintenance. Do not use threaded rod/adhesive anchor systems for the cabinets. Consult with Philips regarding any anchor system issues.

10. Sprinkler System
All sprinkler pipes and sprinkler heads inside the RF-enclosure to be made of non-ferrous material. Supplier of sprinkler system must declare that the system works in high magnetic environments. The sprinkler pipe must enter the RF-enclosure via one feedthrough and sprinkler heads must be located outside of the magnet's body. Philips strongly suggests installation of dry sprinkler system to avoid possible attenuation of the RF enclosure due to contaminated water standing inside the pipes.

(18.0)

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

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Date Drawn: 3/5/2020
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Order: 6600461060.010000 - 6600461060.020000

SN2

MRI Safety

1. Safety with Magnetic Fields
It is the responsibility of the customer to satisfy the following safety requirements:

a. Controlled Zone:
- During the siting of a Philips MR system, a controlled access area around the MR system must be defined where the field strength will exceed 5 Gauss (0.5 mT). Warning signs "CAUTION" - Magnetic field permanently switched on" should be used to indicate this area. The area must be clearly visible, e.g. by markings on the floor, barriers or other means to control access to this area by unauthorized persons.
- Persons having pacemakers, neuro-stimulators, insulin pumps or similar devices, or implants of ferromagnetic material (i.e. surgical clips, artificial cardiac valves, prostheses or metal splinters) must stay outside the controlled access zone.
- The security procedures at the entrances of the examination room should prevent prohibited objects from being brought into the examination room. Metal detection equipment can be used.
- No medical gas containers may be brought into the exam room area unless it has been determined that the container is made of non-ferrous material. Special non-ferrous containers are available from liquid gas suppliers and must be appropriately labeled.
- Ferromagnetic objects, such as scissors, tools, gas bottles, vacuum cleaners and stretchers, must be kept outside the examination room. Such objects will be pulled to the magnet, and may cause injury to patients and staff, or may damage the equipment.
- Magnetic shielding requirements to minimize the controlled zone, or contain it within the exam room are to be determined on a site by site basis. If additional shielding is required, consult with Philips service. The customer accepts full responsibility for all costs associated with additional magnetic shielding.

b. Emergency Magnet Run-down:
- The MR system is provided with two magnet emergency run-down remote push buttons to terminate the magnetic field. This should only be used in case of an emergency.
- If in a medical emergency, non MRI-safe instruments must be used, the patient must be removed from the examination room first.
- In case of a deliberate quench (magnet run-down) by the operator to implement life supporting and other safety procedures, the magnet field strength at the isocenter is reduced to a value below 200 G (20 mT) within 30 seconds.

2. Safety Zones
MRI safety guidelines recommend that facilities be zoned to ensure patient safety. It is the sole responsibility of the customer to regulate and/or restrict staff and patient flow within the MR environment as necessary. MR safety zones are described as follows:

Zone I - Entrance to facility, reception and waiting areas. No restrictions to patient access.
Zone II - Patient holding area and/or dressing rooms. Patient access may be restricted, or staff supervision may be required.
Zone III - MR control area and equipment room. Accessible only by authorized or properly trained MR personnel. It is recommended that a card-key locking device be used to gain access to these areas.
Zone IV - Scanner room. This area should be accessible solely from Zone III, and access to the scanner room should be observed and control by authorized MR personnel. It is recommended that a warning light be illuminated at all times, with a 24-hour backup power system in the event of a power outage.

(18.0)

Safety Marking Plate

An Examination / RF-door provide access to high static magnetic fields and RF-fields.

To guard against accidents and injuries to patients and others as well as damage to the MR scanner, warning signs are required to exclude:
- People who may have pace makers, implants, neuro-stimulators, etc.
- Ferromagnetic objects to avoid missile effects.
- Sensitive electronic devices.

The safety marking plate should be placed to be viewed if the door is closed, but especially also if the door is opened. Due to that, it is better to locate the sign near the door frame and not on the door.

An alternative is to locate adhesive signs on the floor in front of the door.

Presence of a safety marking plate will be checked as a part of the installation procedure and hand over. Is is not allowed to bring the magnet on field if safety marking plates are not installed.

Please check with local code and consult local end-users and safety-officers about the layout of Safety Marking Plate and if possible multiple languages are needed.

Please contact local Philips Project Manager for sample.

(14.0)

RF Enclosure Requirements

1. RF Shielding Effectiveness
The room has to be built and tested to the following specifications that apply to all parts of the shielded enclosure, including seams, doors, windows, vents and mechanical penetrations:

Values Measured Analogue to MIL-STD-285		
H Field	0 MHz - 10 MHz	Irrelevant
	10 MHz - 15 MHz	90 dB
	15 MHz - 130 MHz	100 dB
E Field and Plane Wave	5 MHz - 130 MHz	100 dB

These requirements are valid for Philips parts not installed and are subject to the following:
a. The RF shielding is completely installed.
b. Foundation provisions for the magnet and patient support are installed.
c. Protective earth wiring (inside and outside the RF Enclosure) is installed.
d. All components/equipment to be located inside the enclosure are installed and operational (including all external facilities and their interfaces to systems inside the enclosure, excluding Philips parts).
e. All RF enclosure feedthrough frames covered with blind plates (provided by RF vendor).

2. RF Enclosure Materials

a. Copper RF Enclosures:
Philips recommends copper RF enclosures due to its shielding effectiveness, long term stability, flexible design capabilities, availability, and cost.

b. Ferrous Material RF Enclosures:
RF enclosures made of ferrous material may be acceptable, but are subject to restrictions:
- The floor of the RF Enclosure must be made of non-ferrous material (i.e. copper) within a 9' - 10" x 9' - 10" (3m x 3m) box from magnet isocenter.
- The total combined thickness of the ferrous material must achieve the specified shielding effectiveness with the magnetic field on.
- All walls must be at least 63" (1600mm) from magnet isocenter. The walls do not need to be symmetrically located around isocenter.
- The RF enclosure must not vibrate. This can introduce B0 variations, especially at the RF enclosure ceiling.

c. Aluminum RF Enclosures:
Aluminum RF enclosures are acceptable, but require special attention. Over time, a layer of aluminum oxide will form. This causes electrical contact between RF enclosure parts to degrade, especially around doors, feedthroughs, and windows. As such, extra measures (such as special coating) must be taken. Also, the RF enclosure quality between moving contact points (doors) will rapidly degrade. To reduce degradation, a thin sheet of brass can be used between such surfaces. If the connection is made by an appropriate screw connection, the electrical resistance between the brass and the aluminum must be less than 10 Ohms. The use of gaskets for the door, in addition to the issues mentioned above must not degrade the RF enclosure such that it no longer meets the shielding requirements. Therefore, Philips strongly recommends the use of "finger stocks".

3. Environmental Conditions
The shielding must operate effectively and not suffer damage under the following conditions:

Temperature Range		50° to 104° F (10° to 40° C)	
Humidity		20% to 90% non-condensing	
Air Pressure		7.25 to 16.0 PSI (50 to 110 kPa)	
Frequency		Drip	
Mechanical Vibration		**Mechanical Shocks**	
Water/Damp/Liquid	0 - 150 Hz	G-Value	0 - 0.1 g
G-Value	0 - 0.1 g	Pulse Duration	6 - 10 ms

These conditions also apply for the system wiring, ducts, gas exhausts and other interface provisions. During and shortly after installation, the shielding may be subject to extreme conditions due to construction activities. Power loss or temperature control failure can also cause extreme environmental conditions. Local earthquake regulations must be followed. Special measures may be required to fasten the magnet and patient support to the building.

4. Reliability / General Policy
a. Specifications listed are MANDATORY REQUIREMENTS for the proper functionality of the MR system.
b. Philips accepts no responsibility for correct operation of the RF enclosure. The performance of the MR system is only guaranteed if mandatory requirements are met.
c. The RF enclosure effectiveness must be tested by the RF vendor, and the results accepted by Philips. If requested by the customer, a Philips representative can be present to witness the testing. The shielding effectiveness must be tested according to the following codes and standards applicable to the extent indicated:
   - MIL-STD-285: Method of attenuation measurements for electromagnetic shielding enclosures for electronic test purposes.
   - MIL-STD-220A: Standard of safety of electromagnetic interference filters.
   - UL 1283: Standard for safety of electromagnetic interference filters.
d. The shielding must be designed for 100% operation throughout the year.
e. There must be a a gap between the RF Shield and finished wall in the exam room to ensure proper shielding grounding and isolation.
   - The gap prevents contractors from accidentally puncturing the shield with screws or nails.
   - The gap will ensure the shield stays electrically isolated except for approved connections

(14.0)

PHILIPS

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SN3

Acoustical Noise and Vibration Forces

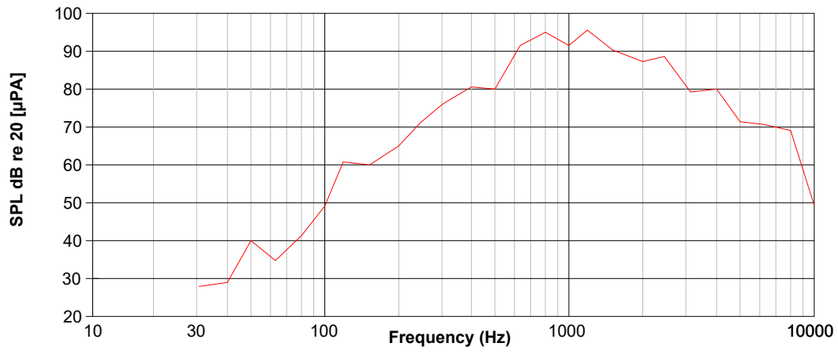
Acoustical noise produced is related to clinical use and the gradient system applied. During scanning acoustical noise originates from the gradient coil. Acoustical noise can vary.

To avoid possible acoustical nuisance the worst case situations must be considered for site design.
The use of sound absorbent materials in the examination room is required.

Below a figure that shows peak hold SPL of each of > 30 clinical scans made.

Note: There is no individual/single scan that produces this SPL for the frequencies displayed.

Dynamic Forces Applied to floor in $\frac{1}{3}$ Octave Bands, envelop of all sequences



To avoid possible acoustical nuisance the worst case situations must be considered for site design. The use of sound absorbent materials in the examination room is required. It is recommended to make the wall between the examination and control room of two panels. Sound absorbent materials can be mounted between these panels. Some RF Enclosure suppliers already use double-panel walls, one panel for RF shielding and one panel for room finishing. Contact an architect to determine which of the following acoustical noise means can be provided, if needed. Depending on the building construction additional acoustical noise suppression to the same floor level or to other floor levels can be achieved via the following means:

- Additional brick wall between the RF enclosure and technical/operator room or other room. Thickness: $4\frac{3}{8}$" to $4\frac{3}{4}$" (110mm to 120mm). Specific weight: 1.8, 250 kg/m2 R'w > 52 dB
- A double wooden wall (0.08" x 0.50" [2mm x 12.5mm] thick) with 3.15" (80mm) thick mineral fiber material in between, type W-w according DIN 18165 Teil 1.
- The RF door and RF window can be assembled to a construction with sufficient attenuation for acoustical noise:
- RF door : R'w > 32 dB
- RF window : R'w > 40 dB (panes of different thickness)
- The ceiling inside the RF-Enclosure can be finished with a 4" (100 mm) thick mineral fiber material, type W-w according DIN 18165 Teil 1.
- Avoid openings from examination room to other rooms (except needed openings to technical room).

Additional acoustical contact noise suppression can be achieved via the following means:

- Free standing RF enclosure.
- No other coupling to the building than the floor of the RF-Enclosure.
- All other interfaces off the RF enclosure to the building (wall and ceiling) must be de-coupled for to avoid noise (flexible connection of air conditioning pipes etc.).

Typical Acoustical Noise Levels*

39.37" (1m) from equipment room cabinet	75 dBA
39.37" (1m) from Operator's Console	40 dBA

Acoustical Noise Suppression

Sound Absorption Coefficient of Materials to be Used	
Suspended Ceiling - Control and Equipment Room	> 0.6
Main Frequency to be Attenuated	600 to 1000 Hz

* Maximum levels can increase by 4 dBA during various sequences and do not include noise produced by third party equipment.
* The SACU is normally installed inside the equipment room. Anticipate 72 dBA acoustical noise generated by the SACU. Never install SACU in the Operators or Reporting Room.

(18.0)

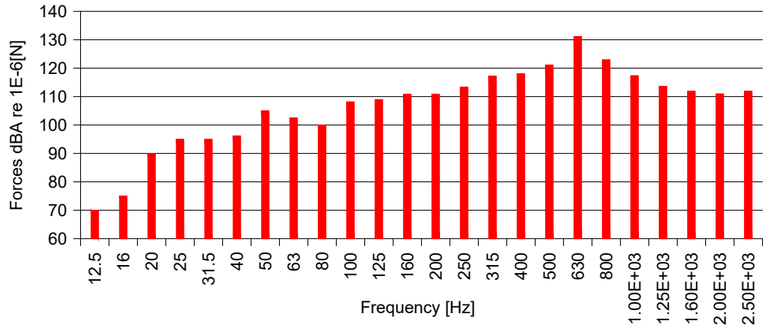
Contact Noise

Due to mechanical vibration of the scanner during clinical use the building floor can start to vibrate and transport the acoustic energy through the floor to surrounding areas. This energy in the hospital structure will generate acoustic noise in the adjoining spaces. Depending on the building structure the energy can travel across large areas.

If needed an acoustic consultant can investigate if the contact noise could be a problem.

Below a figure that shows peak hold of each of > 30 clinical scans made. This is no representation of one individual clinical protocol, but an envelope of cumulative forces.

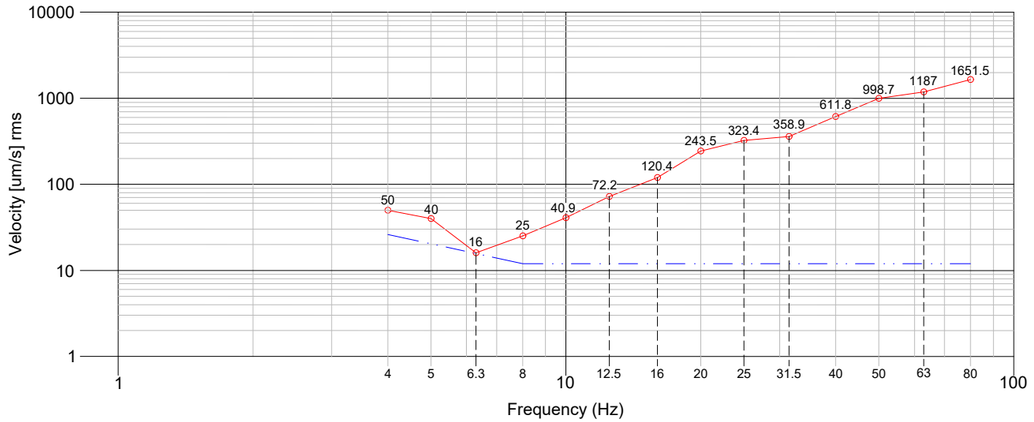
Forces acting on floor



Third party delivered vibration pads are no longer allowed. Philips Healthcare newly designed vibration pads are now delivered and shall be used. Typical contact noise reduction is 20 dB compared to Achieva systems. Use of third party pads could interfere with the vibration specification of the magnet and the shimming of the magnet due to sinking. Weak pads can also affect the correct alignment of the magnet and patient table.

(14.0)

Typical floor design in relation to MR Vibration Requirements



Vibration of the site has the ability to affect the stability of the magnetic field and because of this image quality.

A typical example of a good floor design is a so called VC-C type. Above you find a figure of the floor design in relation to the vibration requirements of the MR system

(18.0)

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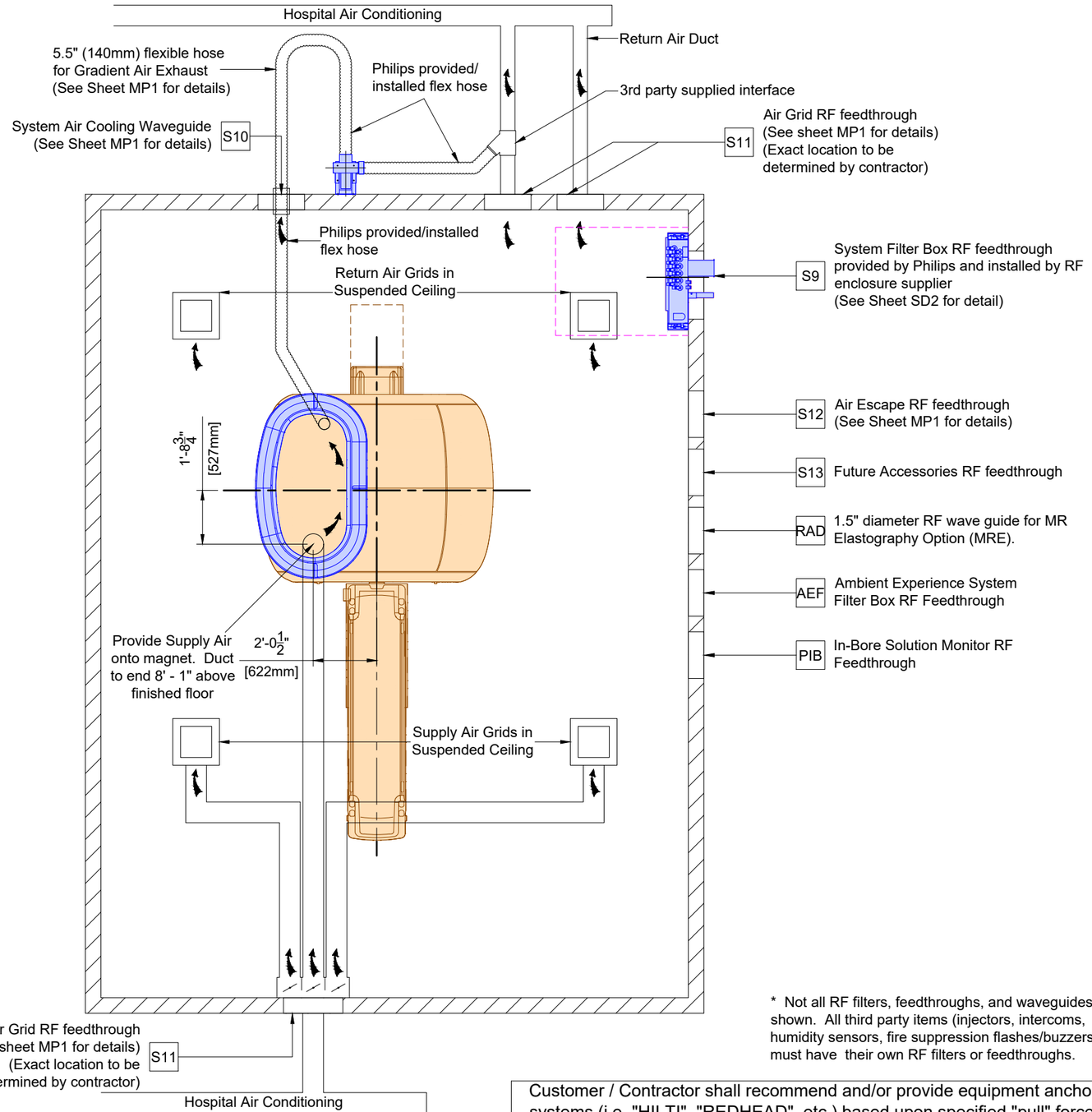
SN4

Waveguide/Feedthrough Summary

For reference only. Exact locations to be determined by customer/contractor/RF Vendor



* Not all RF filters, feedthroughs, and waveguides are shown. All third party items (injectors, intercoms, humidity sensors, fire suppression flashes/buzzers, etc.) must have their own RF filters or feedthroughs.

Customer / Contractor shall recommend and/or provide equipment anchoring systems (i.e. "HILTI", "REDHEAD", etc.) based upon specified "pull" forces and wall/ceiling composition.

Floor & Wall Support Legend

A Furnished and installed/anchored by Philips (exceptions may exist, see Note 2)
B Furnished and installed by customer/contractor and installed/anchored by customer/contractor
C Furnished by Philips and installed by RF Enclosure Supplier
D Furnished by Philips and installed/anchored by contractor
E Existing
F Future
G Optional
H Furnished by RF Enclosure Supplier and installed by RF Enclosure Supplier

	Item Number	Description	Detail Sheet
H	S1	Aluminum magnet support pads (4x) by RF enclosure supplier.	SD1
H	S2	Aluminum patient support pads (2x) by RF enclosure supplier.	SD1
B	S3	Limited floor reinforcement/ferrous materials area, 9' - 10" x 9' - 10" (3m x 3m).	S1 / SN1
B / H	S4	No false ceiling (tile or grid) in this area, 28" x 56" (700mm x 1400mm). This service area must be clear of obstructions from top of magnet to 10' - 0" above finished floor except for the Supply Air exhaust duct. (See Waveguide/Feedthrough Summary for the location of duct).	SD1
B / H	S5	Removable ceiling area 23.75" x 46" (600mm x 1170mm) for servicing equipment. Grid work must be easily removed for access.	SD1
B	S6	Wall anchorage for Mains Distribution Unit. Not to penetrate RF shield.	
B	S7	Wall anchorage for Emergency Run-Down Button mounted 71" (1805mm) A.F.F. Not to penetrate RF shield.	AD3
B / H	S8	Opening in suspended ceiling for ceiling speakers - exact location to be determined. (Not shown on plan)	SD1
H	S9	System Filter Box RF feedthrough (frame to mount System Filter Box must be flush with finished wall).	SD2
H	S10	System Air Cooling Waveguide, 6.25" (160mm) dia., do NOT use honeycomb-type wave guide. Must be located < 78.75" (2m) from exam room air out duct - exact location to be determined by customer.	SD3 / MP1
H	S11	Air Grid RF feedthrough for conditioned air entering/exiting exam room - exact location to be determined. (Not shown on plan)	MP1
H	S12	Air Escape RF feedthrough (optional - for pressure balancing between magnet room and adjacent room) - exact location and size to be determined. (Not shown on plan)	MP1
H	S13	12" (300mm) x 12" (300mm) RF panel with 3" (75mm) diameter waveguide for future accessories - exact location to be determined. (Not shown on plan)	
B	CIP	Wall anchorage for KKT Chiller Interface Panel.	SD4
B	RDP	Wall anchorage for KKT Chiller Remote Display Panel.	SD4
B	SR	Storage Rail Mounting (Mounting option to be determined. Reference SD4 page.)	SD4
F	BCP	Wall anchorage for Backup Power Connection Panel. Not to penetrate RF shield.	
B	TC	Wall anchorage for 60Hz Transformer Cabinet mounted 4' - 0" (1.2m) from finished floor to the bottom of the cabinet. Not to penetrate RF shield.	
H	RAD	1.5" diameter RF wave guide for MR Elastography Option (MRE). (Recommended minimum height of waveguide is 2' - 3 9/16" (700mm) A.F.F.)	-
A	WFS	Ferroguard Anchorage	
A	SM	Ferroguard System Manager Anchorage	SD4
H	AEF	Ambient Experience System Filter Box RF Feedthrough located above suspended ceiling. Mounting plate provided by Philips and installed by RF enclosure supplier.	SD5
A	DB	Distribution Box mounted to RF wall above suspended ceiling with two non-magnetic screws or double-sided adhesive tape.	SD5
B	ATSW	Anchorage for Touch Screen Monitor.	SD6
B / H	PIB	In-Bore Solution Monitor RF Feedthrough (See Sheet SD9 for detail for the opening sizes in the RF and finished wall). InBore interface frame will be installed by RF enclosure supplier.	SD7 / SD8

PHILIPS

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Drawn By: Markie Apple

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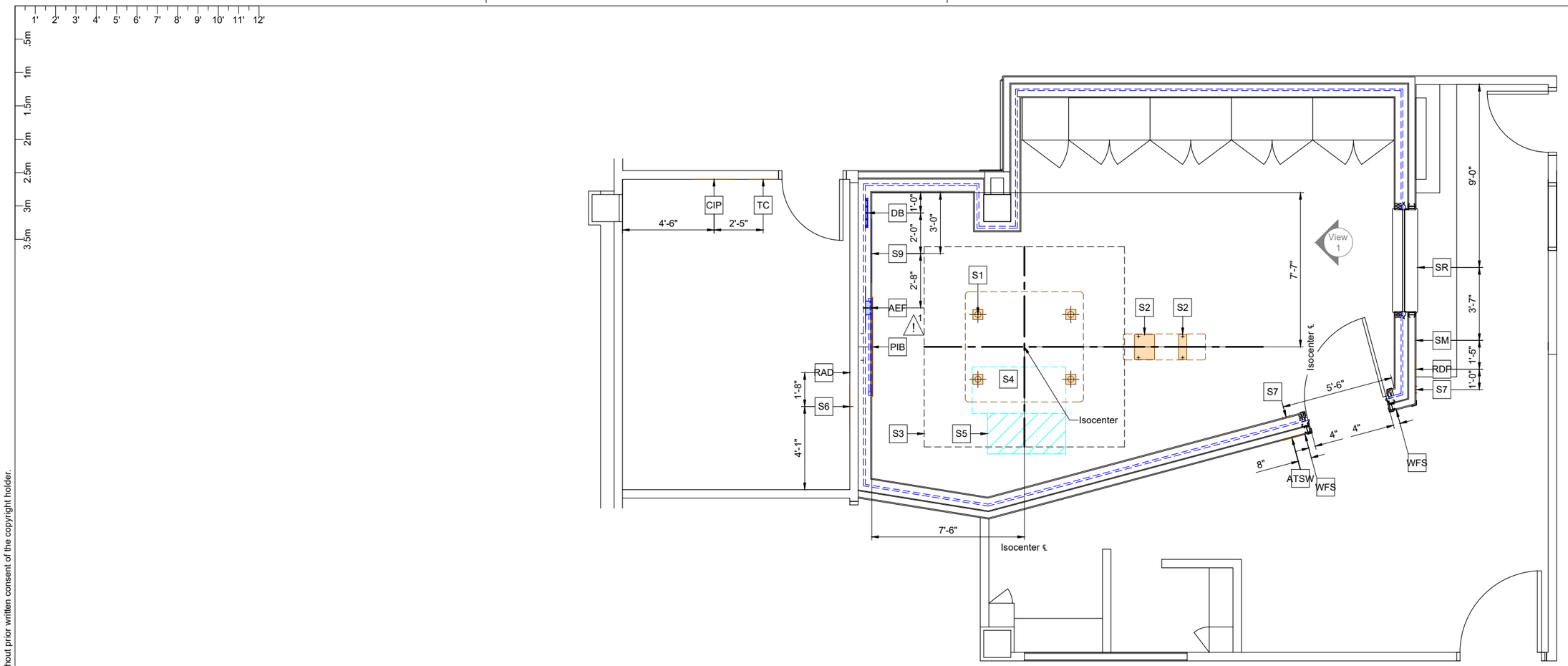

All wall anchorages are dimensioned to centerlines.

Planning Issues and Considerations

⚠1 AEF to be mounted above the PIB monitor, above the suspended ceiling.

* All floor support below the magnet including floor reinforcement and beams must be verified to meet the requirements shown on the SN1 page of the final drawing package. The "S3" box shows the critical area below the magnet.

Verify location with Customer and local Philips Project Manager.

Support Layout

3/16" = 1'-0"

Ceiling Height Guide

Equipment Room:	10' - 6" (3200mm)	Recommended
	9' - 2" (2795mm)	***Minimum****
Exam Room Suspended Ceiling:	8' - 3 $\frac{1}{4}$" (2520mm)	***Required***
Exam Room RF Ceiling:	9' - 9" (2970mm)	Recommended
Control Room:	9' - 10" (3000mm)	Recommended
	7' - 3" (2200mm)	***Minimum***

* Ceiling Heights outside the minimum dimensions may be possible. These Ceiling Heights must be reviewed and approved.

PHILIPS

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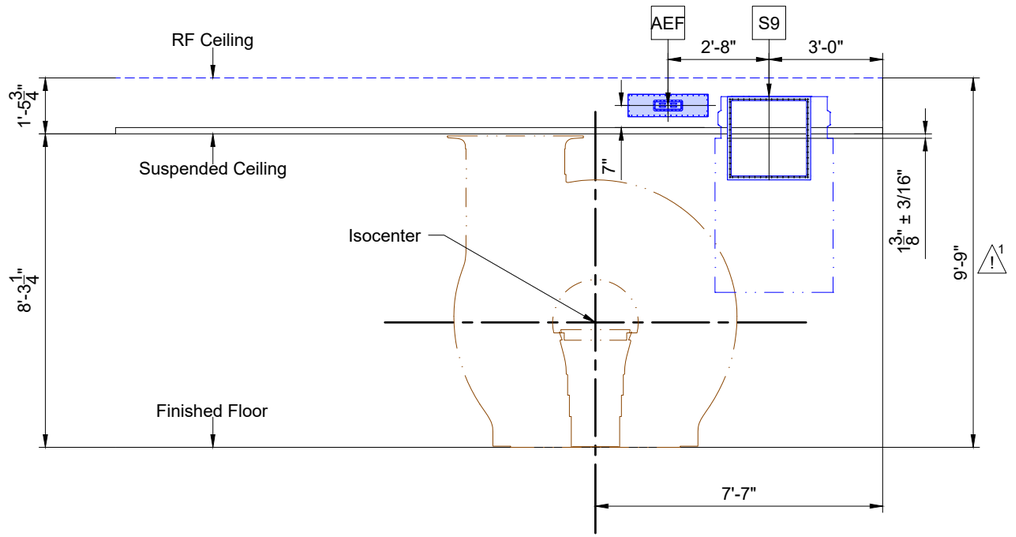
S1

Detail - System Filter Box and AEF RF Feedthroughs (View 1)



Note:
Wall and location shown are preferred/recommended. If there are existing obstructions, alternate routing plans, more suitable options, please consult with your Philips Project Manager to investigate a more suitable location and have these details revised.

S9 AEF

General Notes:
RF and Suspended ceiling heights are shown using the best data available at the time. If actual or planned heights differ, please consult with your Philips Project Manager to have these details revised.

Planning Issues and Considerations

1 Recommended Ceiling Heights shown. Plans must be revised to reflect the site specific ceiling heights.

Gradient Exhaust Waveguide for System Air Cooling Unit (SACU) location to be determined based on final location of SACU. SACU must be located less than 78.75" (2m) away from Examination Air Out Duct (See Sheet MP1).

S10

PHILIPS

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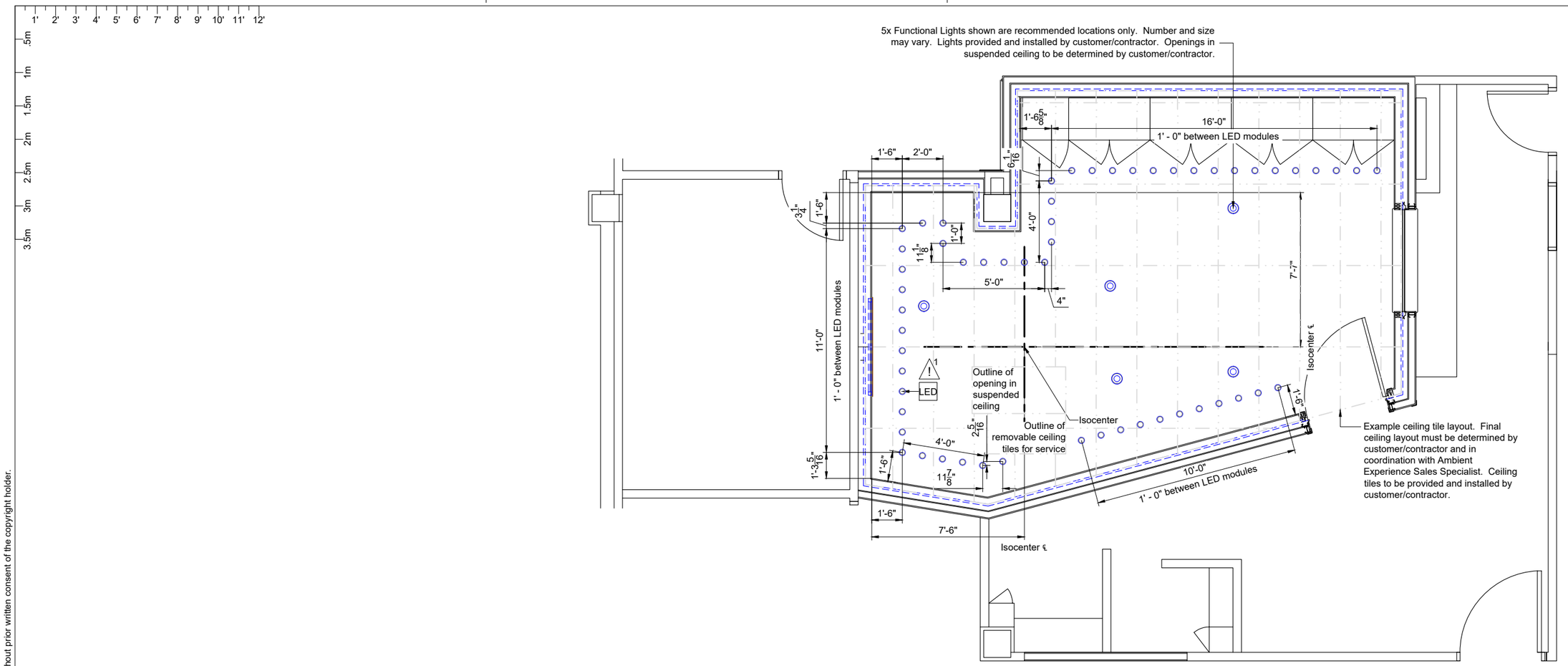
S2



Planning Issues and Considerations

1 All LED lights are equally spaced with 12" between them, unless otherwise noted.

Ceiling Support Legend

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B Furnished by customer/contractor and installed by customer/contractor
C Furnished by Philips and installed by RF Enclosure Supplier
D Furnished by Philips and installed by contractor
E Existing
F Future
G Optional
H Furnished by RF Enclosure Supplier and installed by RF Enclosure Supplier

	Item Number	Description	Detail Sheet
A	LED	56 x LED modules (Dialight H16-RGB) and cabling.	AD8 ED3
B	LED	56 x Openings in suspended ceiling, 3.07" (78 mm) diameter	AD8 ED3

CUSTOMER / CONTRACTOR SHALL RECOMMEND AND /OR PROVIDE EQUIPMENT ANCHORING SYSTEMS (I.E. "HILTI", "REDHEAD", ETC.) BASED UPON SPECIFIED "PULL" FORCES AND WALL / CEILING COMPOSITIONS.

Ceiling Layout

3/16" = 1'-0"

Ceiling Height Guide

Equipment Room:	10' - 6" (3200mm)	Recommended
	9' - 2" (2795mm)	***Minimum****
Exam Room Suspended Ceiling:	8' - 3 1/4" (2520mm)	***Required***
Exam Room RF Ceiling:	9' - 9" (2970mm)	Recommended
Control Room:	9' - 10" (3000mm)	Recommended
	7' - 3" (2200mm)	***Minimum***

* Ceiling Heights outside the minimum dimensions may be possible. These Ceiling Heights must be reviewed and approved.

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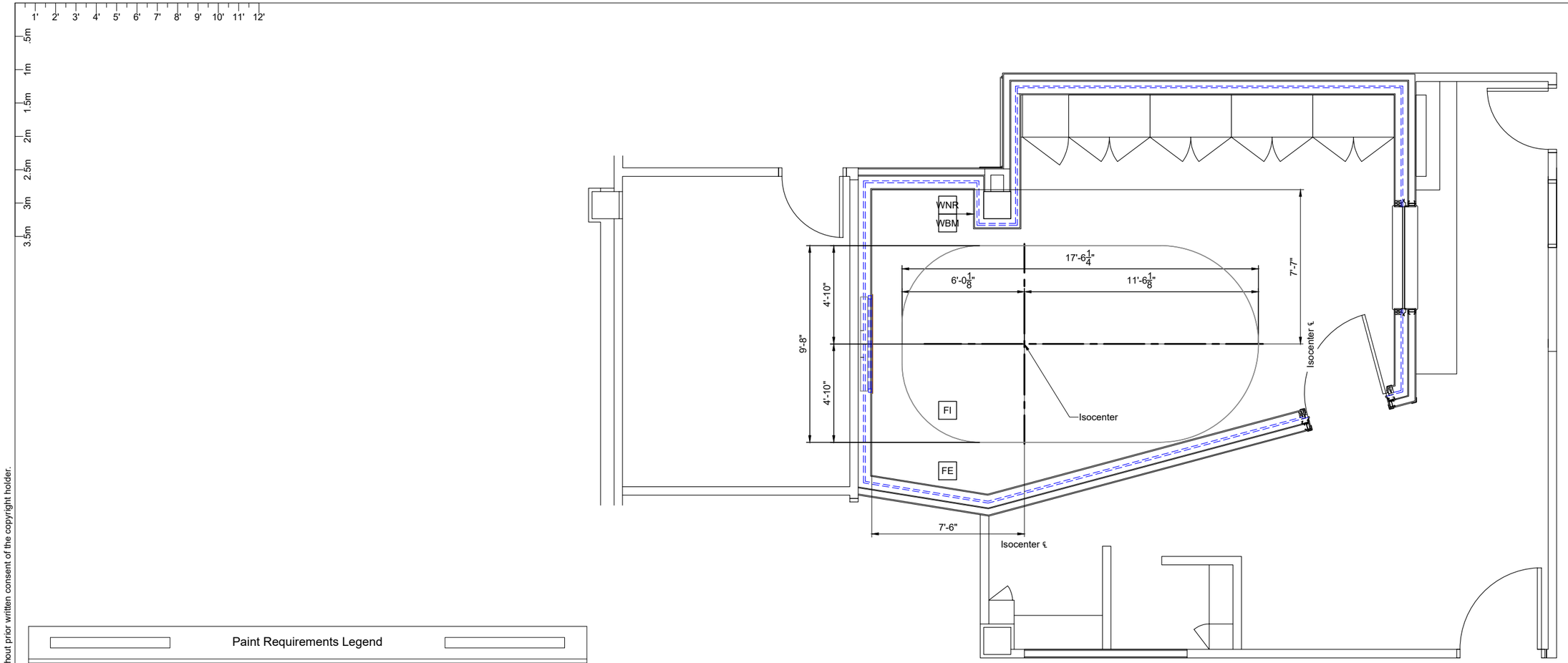
S3



Paint Requirements Legend

A Furnished and installed/anchored by Philips (exceptions may exist, see Note 2)
B Furnished by customer/contractor and installed by customer/contractor
C Furnished by Philips and installed by RF Enclosure Supplier
D Furnished by Philips and installed by contractor
E Existing
F Future
G Optional
H Furnished by RF Enclosure Supplier and installed by RF Enclosure Supplier

Item Number — Detail Sheet

		Description
B	FI	Exam room floor island. Floor must meet specifications stated on SN1 under "Finished Floor Covering". Recommend "Forbo Colorex EC" out of the classic color range (Forbo Colorex Quartz EC).
B	FE	Remaining exam room floor. Floor must meet specifications stated on SN1 under "Finished Floor Covering". Recommend "Forbo Colorex EC" out of the classic color range (Forbo Colorex Montblanc EC).
B	WNR	Finished wall in examination room to be made out of non-reflecting material. Recommend to plaster wall and paint white (Sherwin Williams SW 7005 Pure White matte recommended). If walls are currently made from "wood", paint them along with the strips between them using non-reflecting white paint (Sherwin Williams SW 7005 matte recommended). Walls must have a level 5 finish.
B	WBM	Wall base molding. Color to match Sherwin Williams SW 7005 Pure White (matte)

CUSTOMER / CONTRACTOR SHALL RECOMMEND AND /OR PROVIDE EQUIPMENT ANCHORING SYSTEMS (I.E. "HILTI", "REDHEAD", ETC.) BASED UPON SPECIFIED "PULL" FORCES AND WALL / CEILING COMPOSITIONS.

Paint Requirements

3/16" = 1'-0"

Ceiling Height Guide

Equipment Room:	10' - 6" (3200mm)	Recommended
	9' - 2" (2795mm)	***Minimum****
Exam Room Suspended Ceiling:	8' - 3 1/4" (2520mm)	***Required***
Exam Room RF Ceiling:	9' - 9" (2970mm)	Recommended
Control Room:	9' - 10" (3000mm)	Recommended
	7' - 3" (2200mm)	***Minimum***

* Ceiling Heights outside the minimum dimensions may be possible. These Ceiling Heights must be reviewed and approved.

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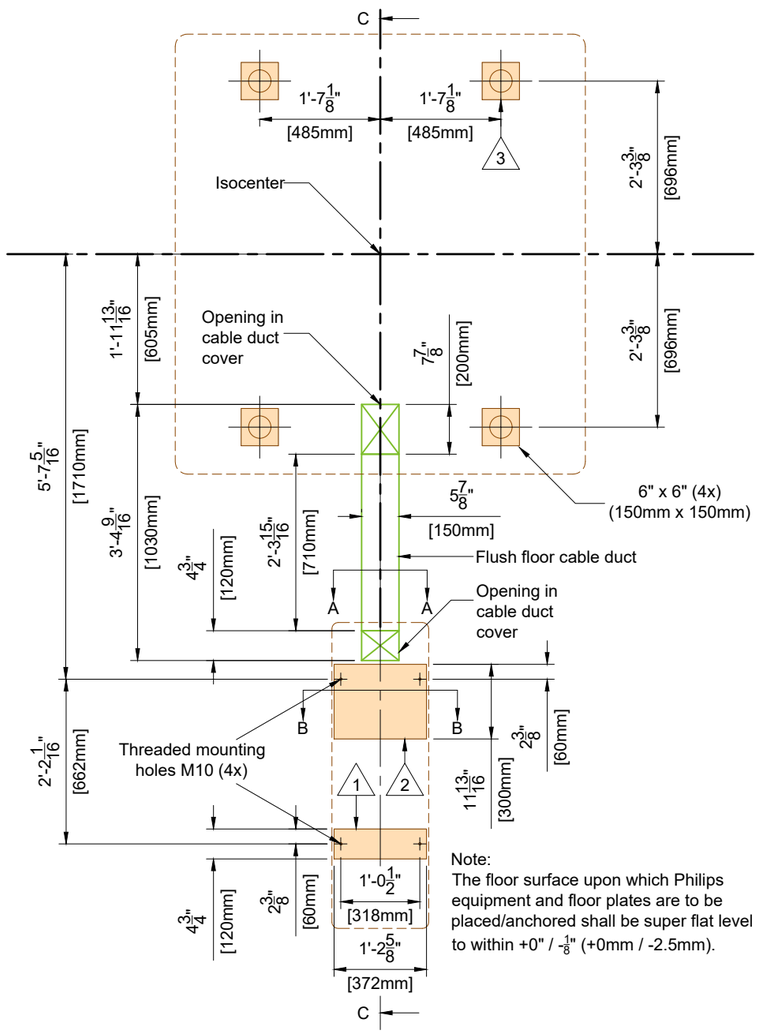
S4

Detail - Magnet and Patient Support

(Not to scale)



Note:
The floor surface upon which Philips equipment and floor plates are to be placed/anchored shall be super flat level to within +0" / -1/8" (+0mm / -2.5mm).

Floor Pads - Minimum Thickness

Pad 3	0.4" (10mm) for stainless steel for 0.6" (15mm) for aluminum
Pad 1 & 2	0.6" (15mm) for stainless steel or aluminum

Floor Pads - Floorload Forces

	Pad 1 & 2	Pad 3
Horizontal	900 lbs (4 kN)	340 lbs (1.5 kN)
Upwards	2250 lbs (10 kN) per bolt or 3600 lbs (16 kN) per pad	N/A
Downwards	560 lbs (2.5 kN) per pad	2810 lbs (12.5 kN) per foot 10115 lbs (45 kN) in total for 4 feet

Threaded mounting holes must have at least 0.6" (15mm) thread. Bolts must be electrically isolated and anchored through the RF floor to a medium that can support above mentioned forces.

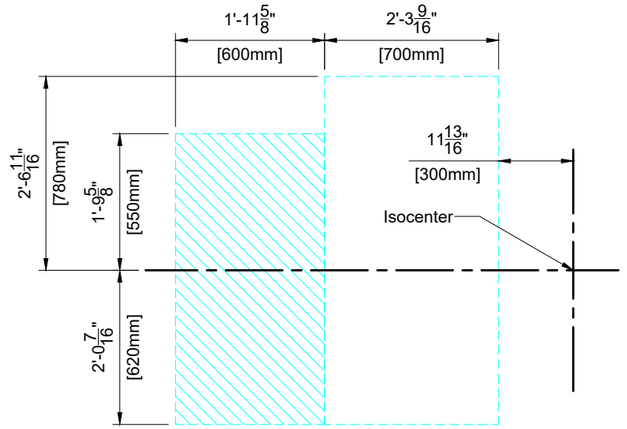
Customer / Contractor shall recommend and/or provide equipment anchoring systems (i.e. "HILTI", "REDHEAD", etc.) based upon specified "pull" forces and wall/ceiling composition.

S1 S2 FR1

(14.0)

Detail - Suspended Ceiling Magnet Service Area

(Not to scale)



Removable suspended ceiling in this area.
Grid work must be easily removed for access.

Clear opening in suspended ceiling.
No tiles or grid work in this area.

S4 S5

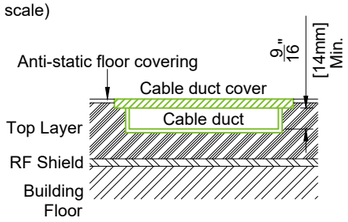
(14.0)

Detail - Cross Section A-A

(Not to scale)

Cable Duct Cover Requriements

1. 1 cover with length of 27.94" (710mm)
2. Pressure force: 2000N
3. Max. bending-through: 0.02" (0.4mm)
4. Removable
5. Smooth and well rounded edges
6. Non-magnetic material
7. Flush with finished floor

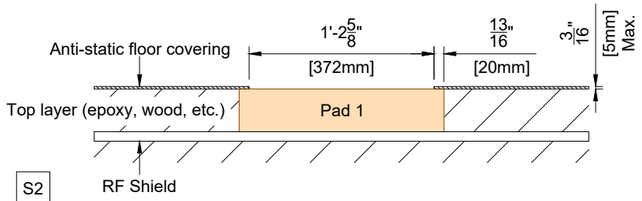


FR1

(14.0)

Detail - Cross Section B-B

(Not to scale)



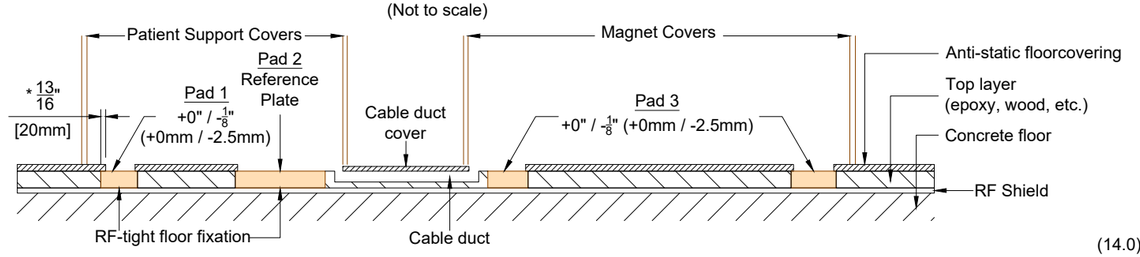
S2

(14.0)

* The magnet and patient table mounting plates must be covered with 0.80" (20mm) overlapping final floor covering. The magnet feet must not be placed on the floor covering but directly on the floor plates.

Detail - Cross Section C-C

(Not to scale)

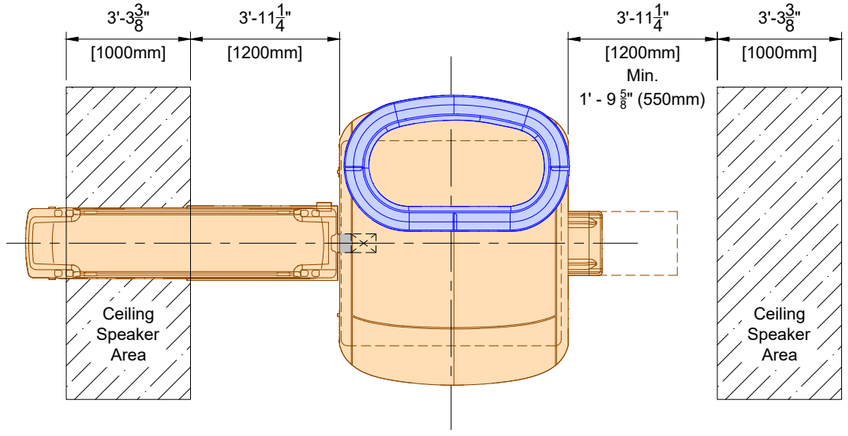


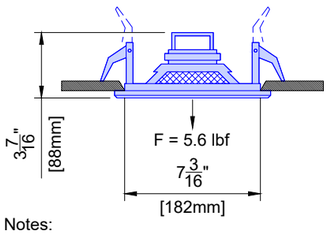
S1 S2

(14.0)

Detail - Ceiling Speakers in Exam Room

(Not to scale)





Notes:
1. Two communication speakers are supplied by Philips. Customer/contractor to flush mount one speaker on each side in the suspended ceiling.
2. Speaker wires provided by Philips.
3. Speakers must be located outside 100 Gauss field.
4. If gypsum or glass wool tiles are used, reinforced backing plates are recommended.
5. If tiles are removed for service, it is recommended to add a mechanical connection (fibre) between the speaker and the RF ceiling to avoid the speaker from moving due to attraction forces.

S8 CS

(18.0)

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
Project Manager: Craig Denny
Contact Number: (402) 490-0275
Email: craig.denny@philips.com
Drawn By: Markie Apple

Project Details
Drawing Number
N-MID190452 B
Date Drawn: 3/5/2020
Quote: 1-21JYZD0 Rev. 7
Order: 6600461060.010000 - 6600461060.020000

SD1

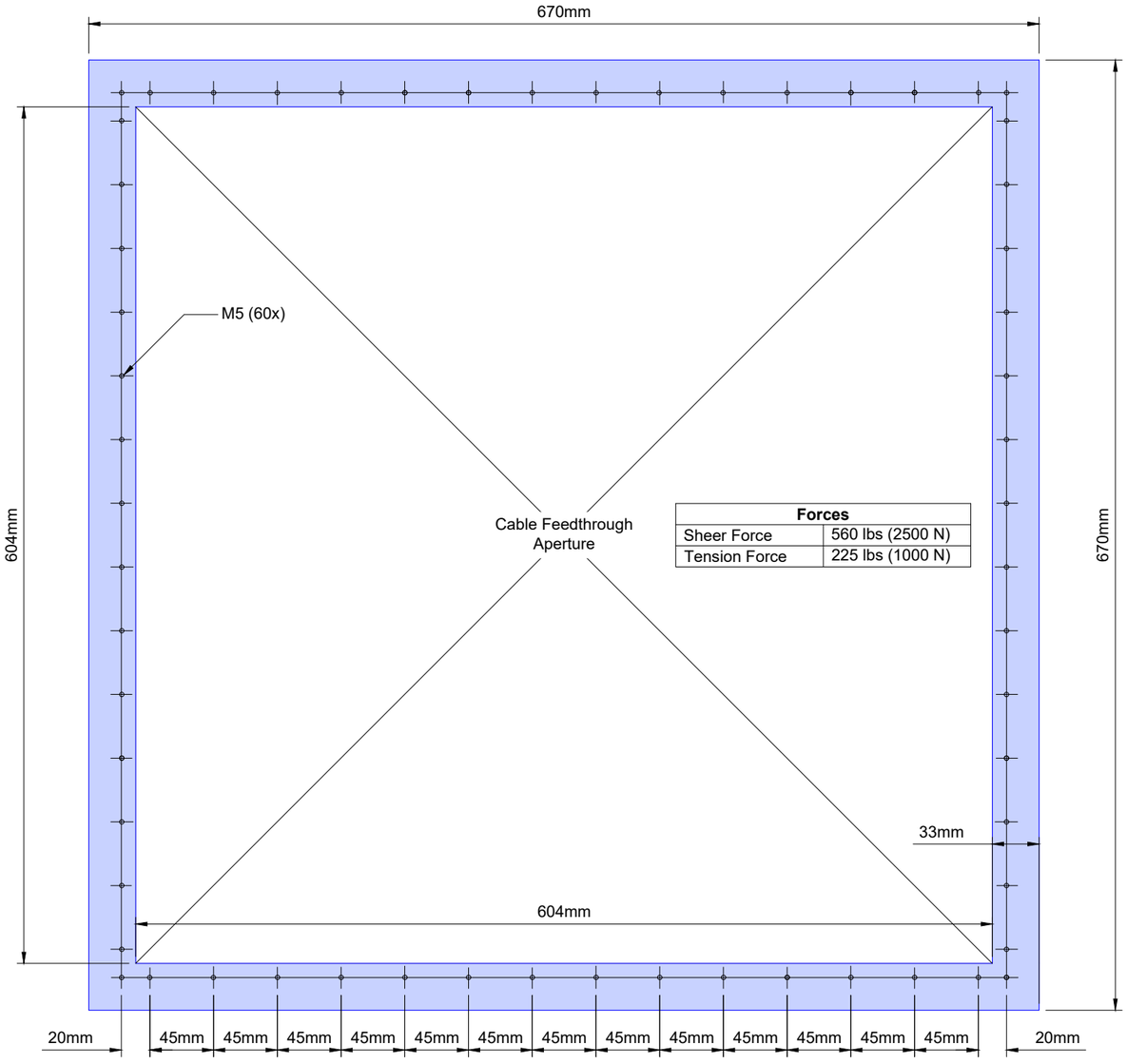
Detail - System Filter Box - RF Feedthrough

(Not to scale)

Notes:

1. 60 M5 threaded holes included 60 stainless steel screws (10mm L) and washers (M5) to be provided by RF Enclosure supplier.
2. Mounting holes to be unblocked to ensure screws can fully penetrate frame. Leave a minimum 5mm clearance around mounting holes.
3. Cable feedthrough reinforcement/height adaptation dimensions to be determined by RF Enclosure supplier.
4. Mounting Frame to be flush with finished wall.
5. Mounting Frame to be flush with finished wall.
   a. *Aluminum shield + intermediate layer + copper or brass RF-frame by the RF-enclosure supplier.
   b. *Galvanized shield + intermediate layer + copper or brass RF-frame by the RF-enclosure supplier
   c. Copper shield + copper or brass RF-frame by the RF-enclosure supplier.

* For an aluminum or galvanized steel RF shielding material you need an intermediate metal to avoid galvanic corrosion between the brass/copper RF frame and the RF enclosure material. This it the responsibility of the RF enclosure supplier.



Forces	
Sheer Force	560 lbs (2500 N)
Tension Force	225 lbs (1000 N)

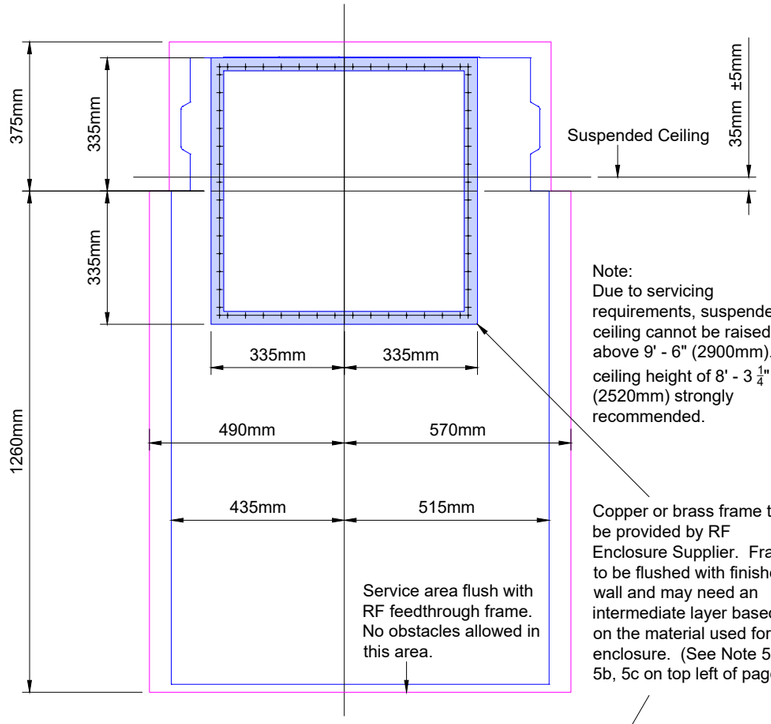
Dimensions shown are to be used on all sides of panel.

S9

(18.0)

Detail - System Filter Box - Service Clearance

(Not to scale)



Note:
Due to servicing requirements, suspended ceiling cannot be raised above 9' - 6" (2900mm). A ceiling height of 8' - 3 $\frac{1}{4}$" (2520mm) strongly recommended.

Copper or brass frame to be provided by RF Enclosure Supplier. Frame to be flushed with finished wall and may need an intermediate layer based on the material used for RF enclosure. (See Note 5a, 5b, 5c on top left of page)

View from Exam Room side of penetration.

S9

(18.0)

Detail - System Filter Box - Cross Section

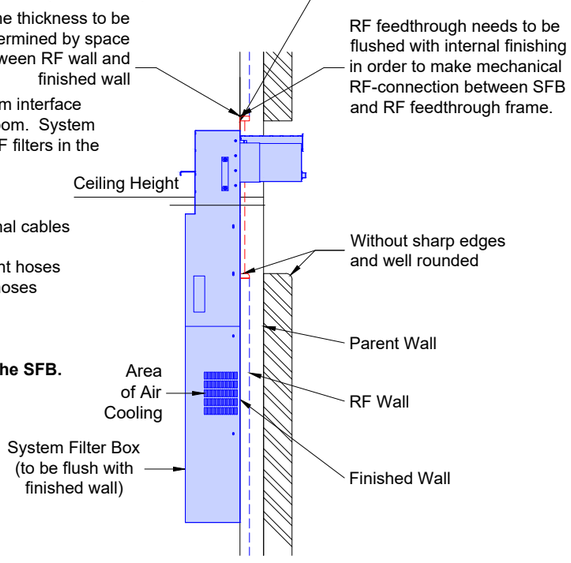
(Not to scale)

The System Filter Box (SFB) is the MR system interface between equipment room and examination room. System cables are mounted and connected via the RF filters in the SFB.

The SFB consists of the following parts:

1. Feed through for System power and signal cables
2. Feed through for helium gas lines
3. Feed through for gradient coil and coolant hoses
4. Feed through for the patient ventilation hoses
5. Feed through for HOS filters
6. System Filter Box covers

*** No Third-Party cables allowed through the SFB.**



S9

(18.0)

PHILIPS

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Ingenia Ambition 1.5T X
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Lee's Summit, MO
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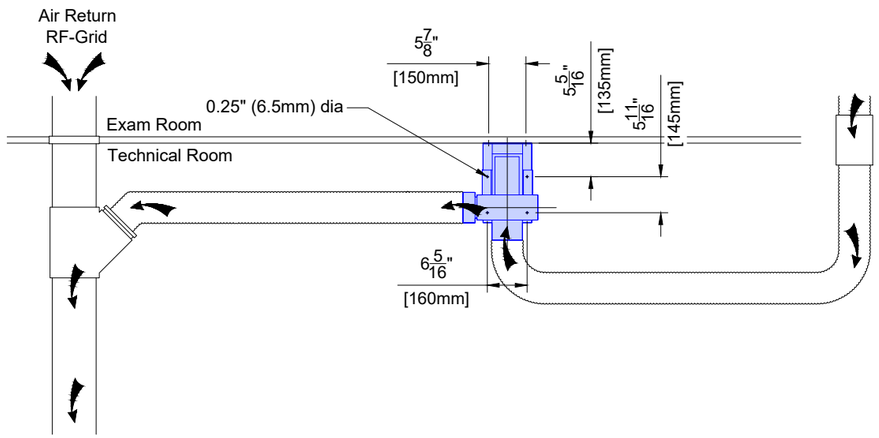
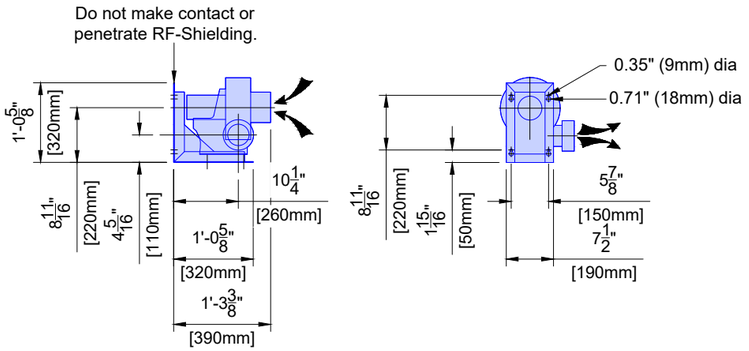
SD2

Detail - System Air Cooling Unit Mounting

(Not to scale)





(18.0)

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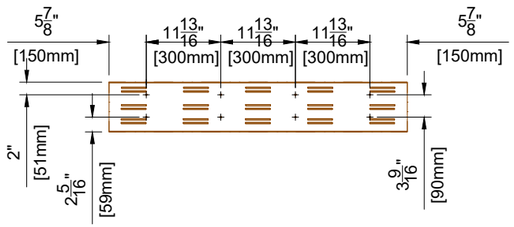
SD3

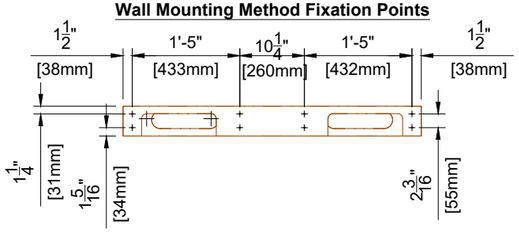
7.12.2019

Detail - Storage Rail Mounting

Counter/Table Mounting Method Fixation Points



Wall Mounting Method Fixation Points



Mounting Methods

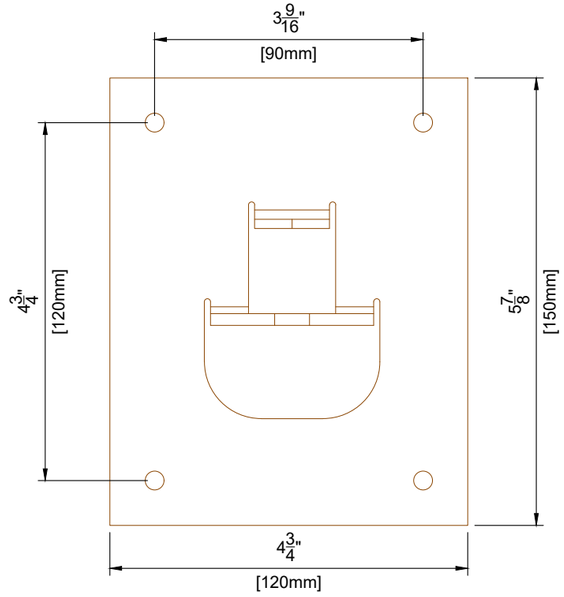
1. Mounted to wall using 8 fixation points*.
2. Mounted to underside of counter/table using 8 fixation points*.
3. Suspended from counter/table using clamps
   a. Clamps (provided by Philips) can only be used when counter/table thickness is 1 1/8" (28mm) or less.

* Fixation points have a 1/4" (6mm) diameter

SR

(16.0)

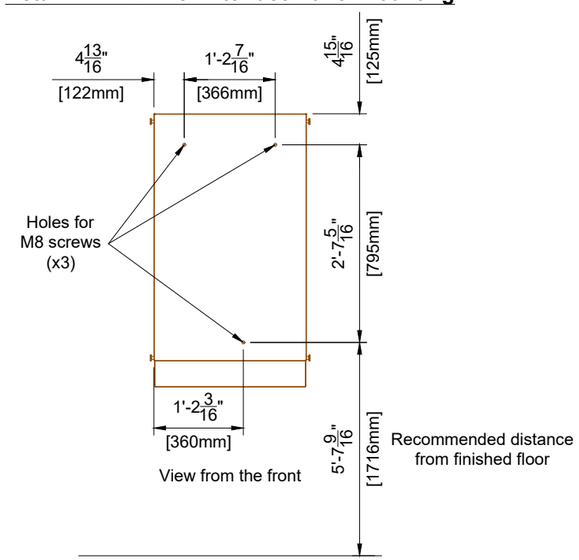
Detail - System Manager Wall-Mounting Bracket



SM

(19.0)

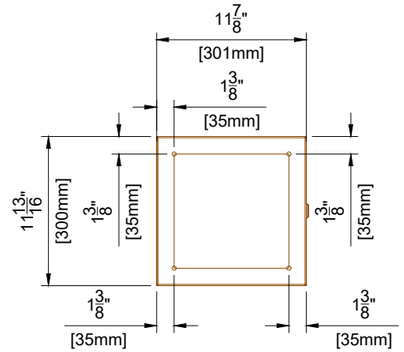
Detail - KKT Chiller Interface Panel Mounting



CIP

(16.0)

Detail - KKT Chiller Remote Display Panel Mounting



Notes:
1. Use of proper screw type designed for your specific mounting surface (wood, concrete, etc.) is required.
2. Recommended screw size M8.

RDP

(16.0)

PHILIPS

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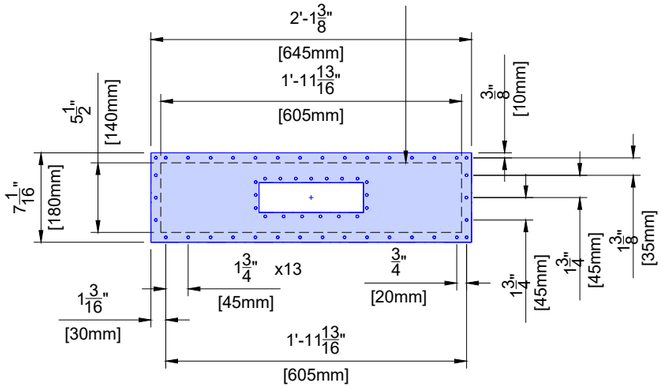
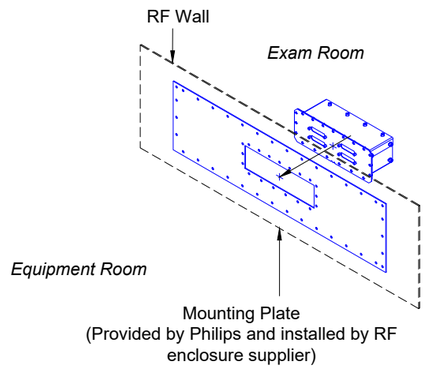
SD4

Detail - Ambient Experience System Filter Box Mounting Plate

(Not to scale)

Cut out in RF enclosure to be provided by RF enclosure supplier



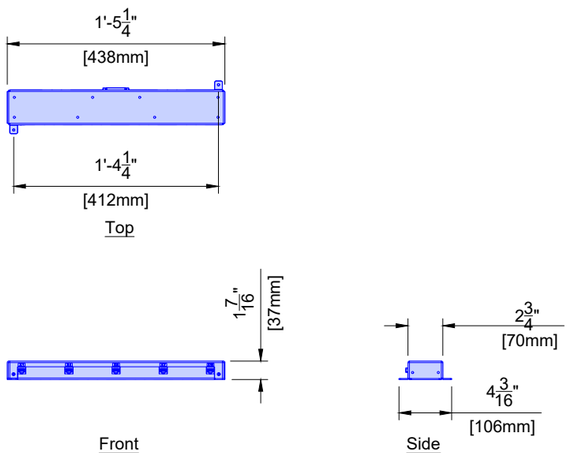


AEF

(15.0)

Detail - Distribution Box

(Not to scale)



DB

(15.0)

PHILIPS

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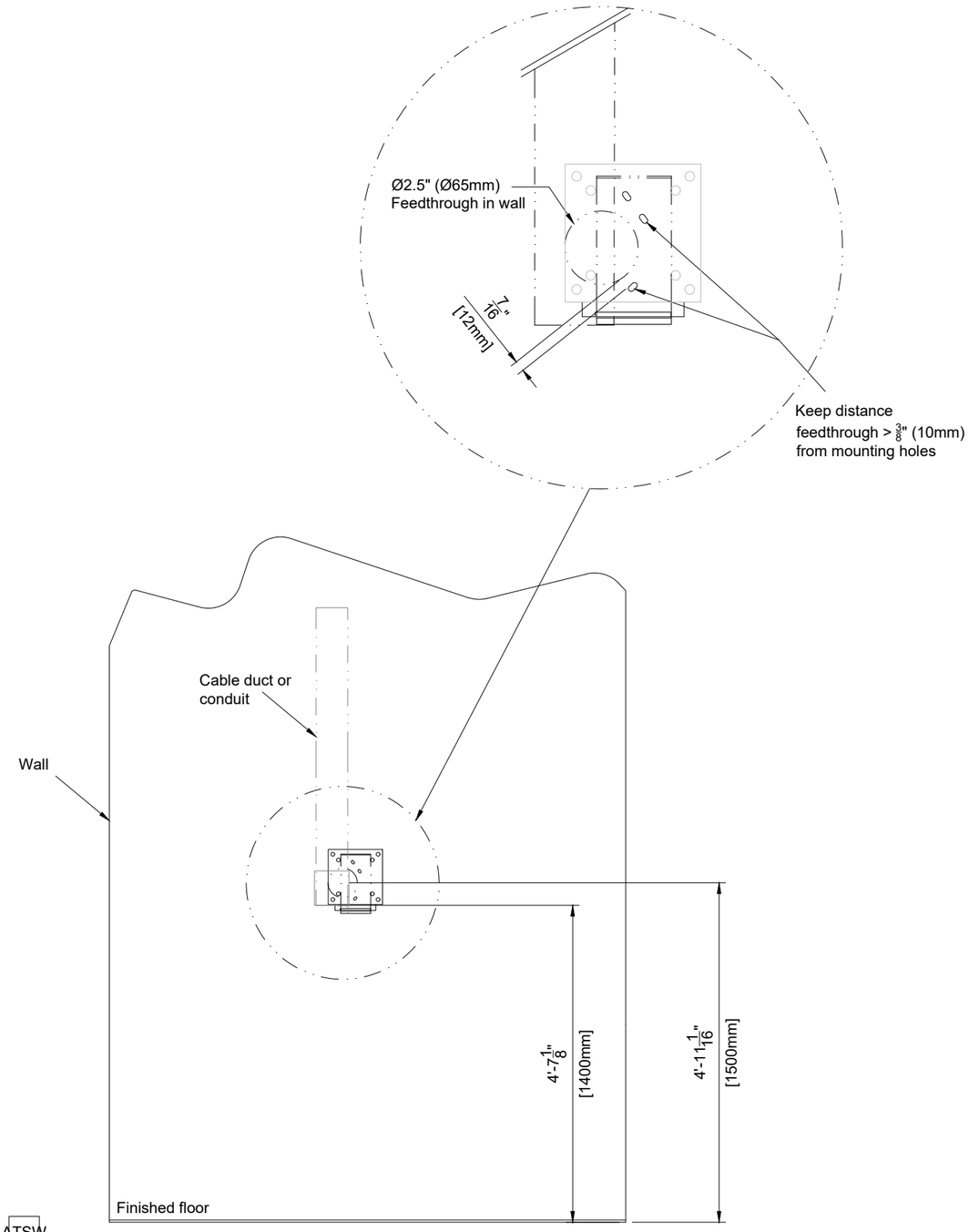
SD5

7.12.2019

Detail - Wall Mounting for Touch Screen Monitor Elo 1515L

(Not to scale - Not site specific)

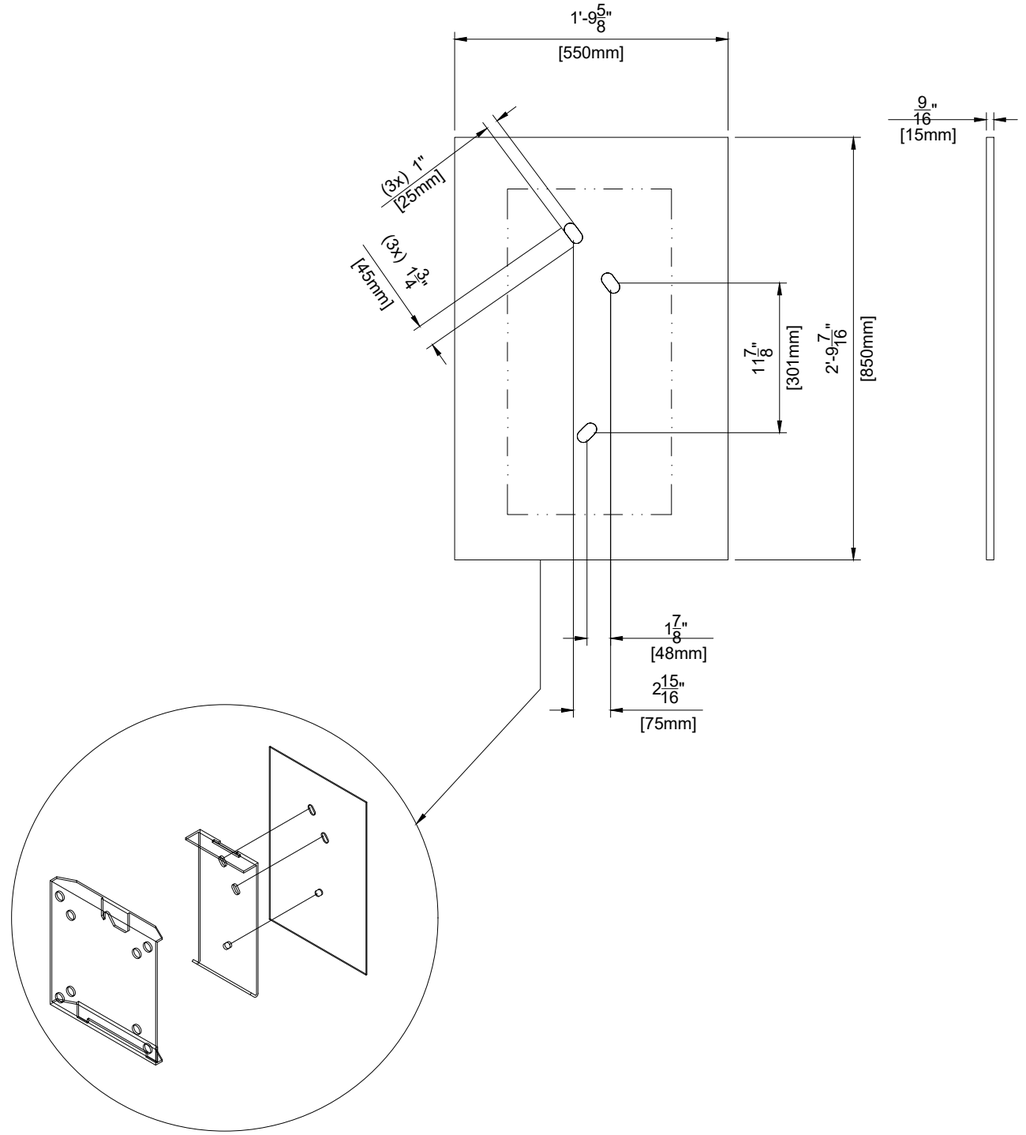


ATSW

(14.0)

Detail - Wall Mounting Template for Touch Screen Monitor Elo 1515L

(Not to scale)



ATSW

(14.0)

PHILIPS

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660046l060.020000

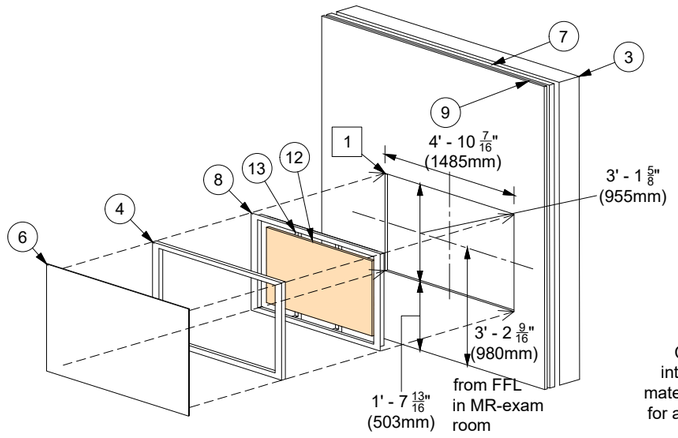
SD6

7.12.2019

Detail - Patient In-Bore Solution Wall Mounting Frame

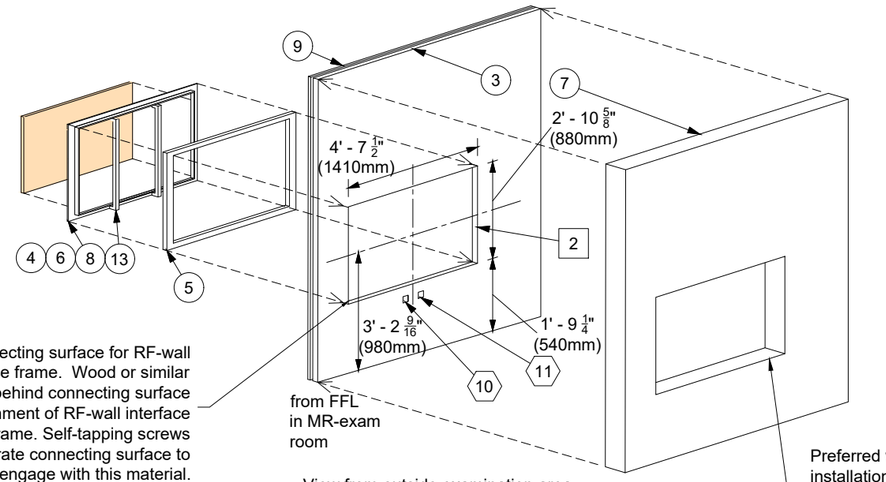
(Not to scale)

Exam Room Wall Window Opening



View from inside examination area

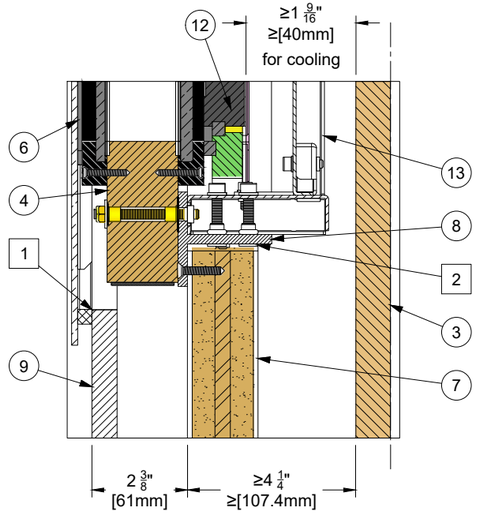
RF Wall Window Opening

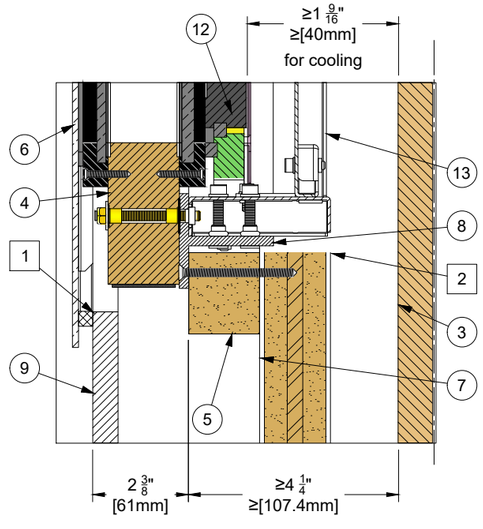


Connecting surface for RF-wall interface frame. Wood or similar material behind connecting surface for attachment of RF-wall interface frame. Self-tapping screws penetrate connecting surface to engage with this material.

View from outside examination area (Rear side of RF-cage)

Preferred way of installation and servicing of the Inbore flatscreen: Make a hole in the structural wall behind the RF-wall with the same dimensions as the hole in the RF-wall-opening.





Requirements for wall with Inbore solution (without optional RF adaptive frame)

Item list:

Resp	No	Description	Qty
B	1	Wall opening in finished wall	1
B	2	Wall opening in RF-wall	1
E	3	Structural wall behind RF-wall	1
A/C	4	RF-window	1
B	5	RF-wall adaptive frame (optional - not included)	1
A	6	Inbore decorative bezel	1
E	7	RF-wall	1
C	8	Aluminium T-frame for mounting RF window	1
E	9	Finished wall inside examination room	1
B	10	AE Power outlet 120 VAC (Philips dedicated)	2
B	11	AE Network connection 100Mbps, RJ45	1
A	12	Display 55"	1
A	13	Mounting plate for 55" display	1

Responsibilities:

A Delivered and installed by Philips
B Delivered and installed by customer
C Delivered by Philips and installed by customer
D Delivered by customer and installed by Philips
E Existing

Works symbology
- Construction works
- Electrical works
- Mechanical works
- Equipment works

(15.0)

PIB

PHILIPS

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Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

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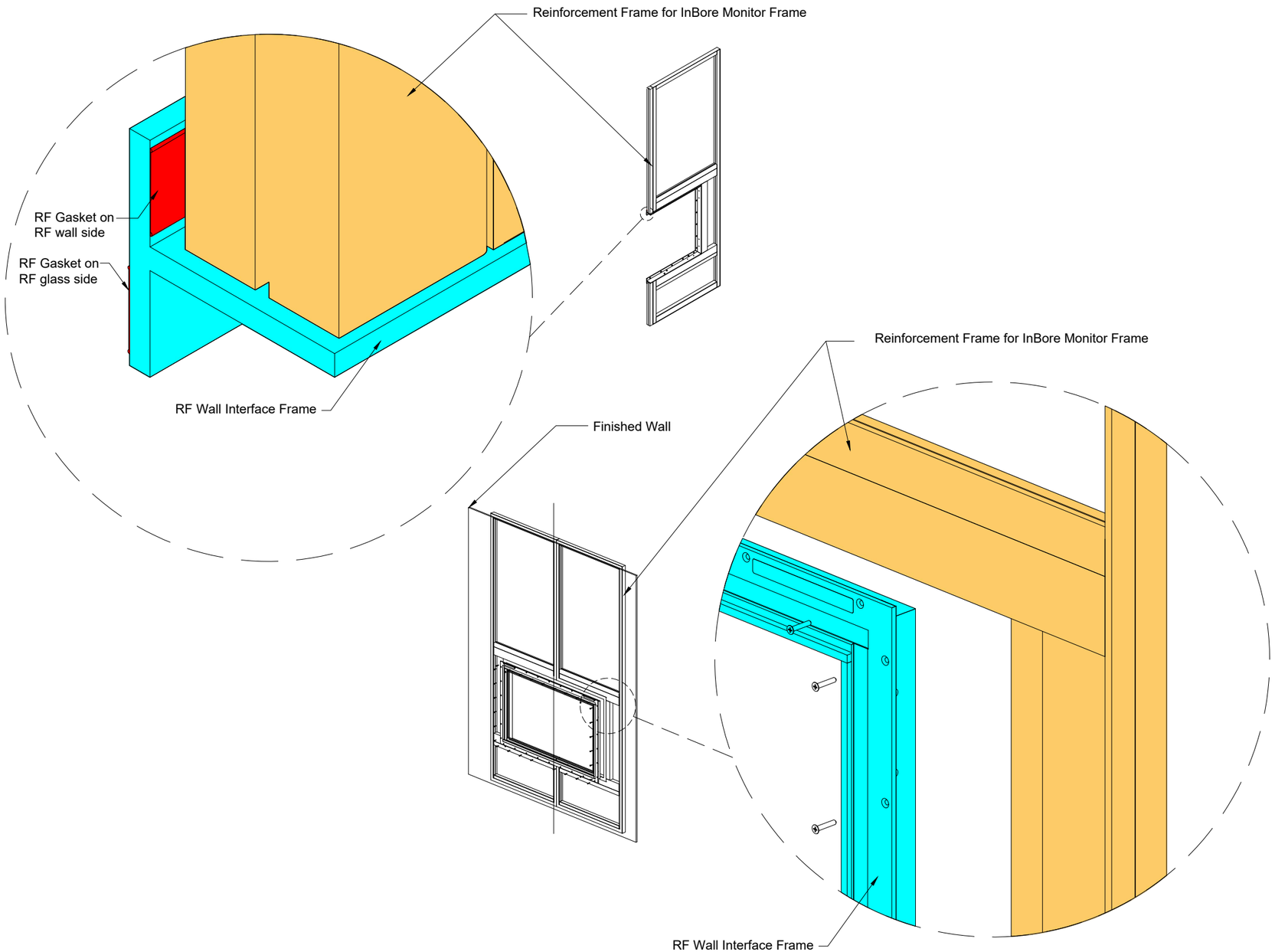
SD7

7.12.2019

Detail - Patient In-Bore Solution Wall Interface Frame

(Not to scale)



PIB

(15.0)

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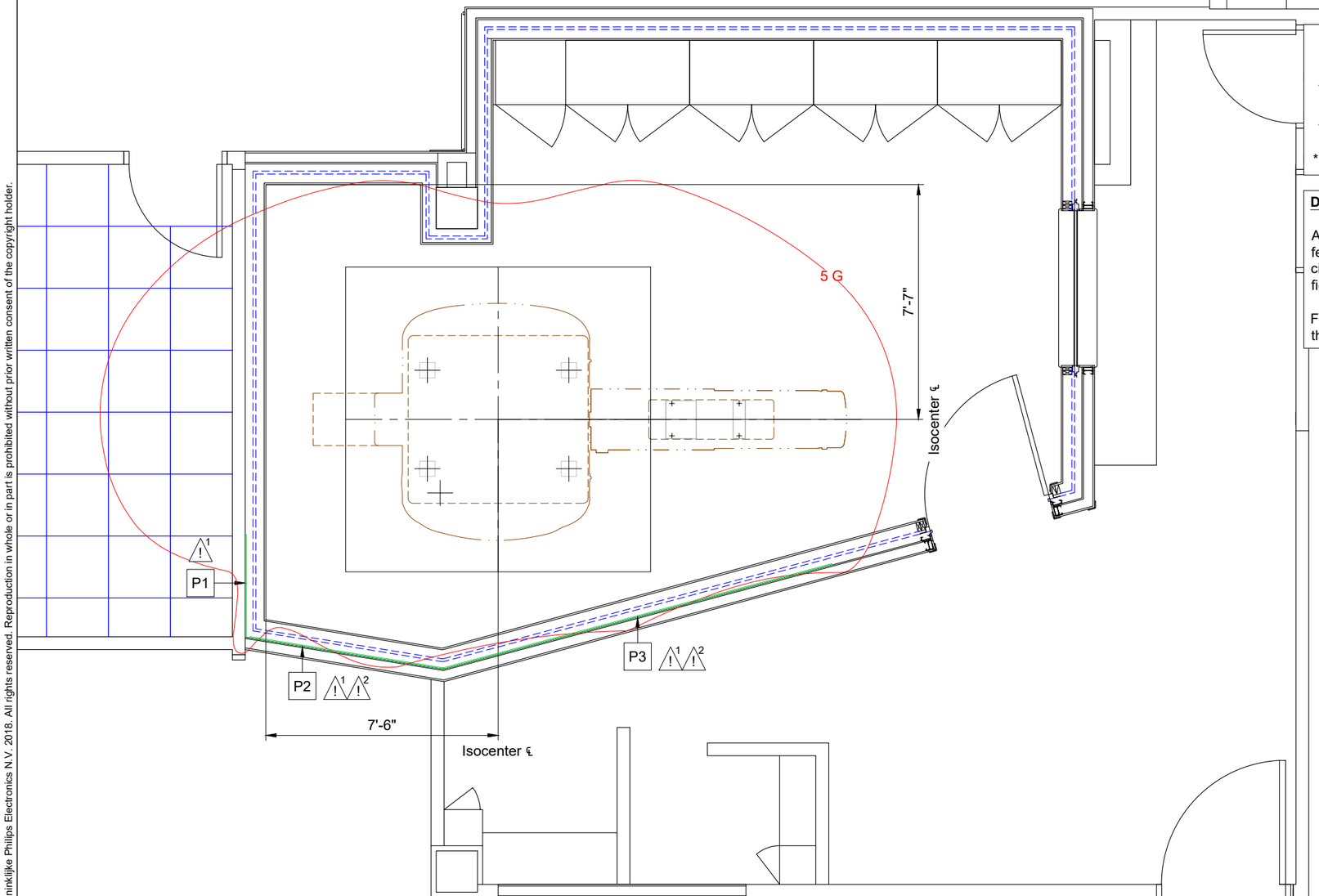
SD8

Shielding Design

0 1' 2' 4' 8'

0 .5m 1m 2m

Plan View



Floor & Wall Support Legend

A Furnished and installed/anchored by Philips (exceptions may exist, see Note 2)
B Furnished and installed by customer/contractor and installed/anchored by customer/contractor
C Installed/anchored by customer/contractor
D Furnished by Philips and installed/anchored by contractor
E Existing
F Future
G Optional
H Furnished by RF Enclosure Supplier and installed by RF Enclosure Supplier

	Item Number	Description	Attraction Force (N)	Detail Sheet
E	P1	Rear Shielding Plate	<1	SD11
E	P2	Left Wall Front Shielding Plate	<2	SD12
E	P3	Left Wall Back Shielding Plate	<24	SD12

Planning Issues and Considerations

1! Magnetic shielding vendor to verify integrity of existing steel before magnet is installed.

2! 5 Gauss line may not be fully contained at the plan south walls of the exam room due to +/- 4" tolerance.

* 5 Gauss Tolerance: +/- 4"

Disclaimer

Although the fringe field data has been calculated with high accuracy, due to local ferromagnetic objects, Earth's magnetic filed and unavoidable, local, and unpredictable circumstances, the actual measured fringe field may differ from the computed fringe field.

For this reason, Philips Healthcare cannot be held responsible for the performance of the actual fringe field when the shielding has been installed.

MATERIAL (all plates): M22 or M36 Silicon Steel, 90 A/m or less, Non grain oriented electrical low carbon (<0.006%) silicon iron

The design is only valid if the magnetic shielding supplier provides a certification providing a sample of the material used has been tested and meets the requirements after installation.

Notes

- Measurements taken within 3 $\frac{7}{8}$" (10mm) of a plate may give higher readings due to the shield being magnetized.
- Shielding is optimized. Thickness specified is minimum needed with the magnetic quality mentioned. A maximum 10% thicker plate can be used if due to commercial availability.
- Shielding calculations sees each shielding plate as a single, solid mass. In reality plates are made of smaller multi-layered sheets. Maximum $\frac{3}{32}$" (2mm) gaps are allowed between adjacent plates.
- For single and dual layered shielding: To cover a seam, a patch can be used. Minimum width of the patch must be 20 times the width of the seam and with the same thickness as calculated in the shielding calculation.
- Triple or more layered /thickness shielding: the seams must be overlapped with minimum 66% thickness as given in the passive shielding design. This can be achieved with a 3 layered thick shield.
- No seams are allowed in corners. A corner piece patch can be used. The angled piece must have the same thickness as given in the passive shielding design.
- Make sure fringe field measurements are performed after the MR is energized to investigate if the location of the fringe field due to the installation of the passive shielding is acceptable.

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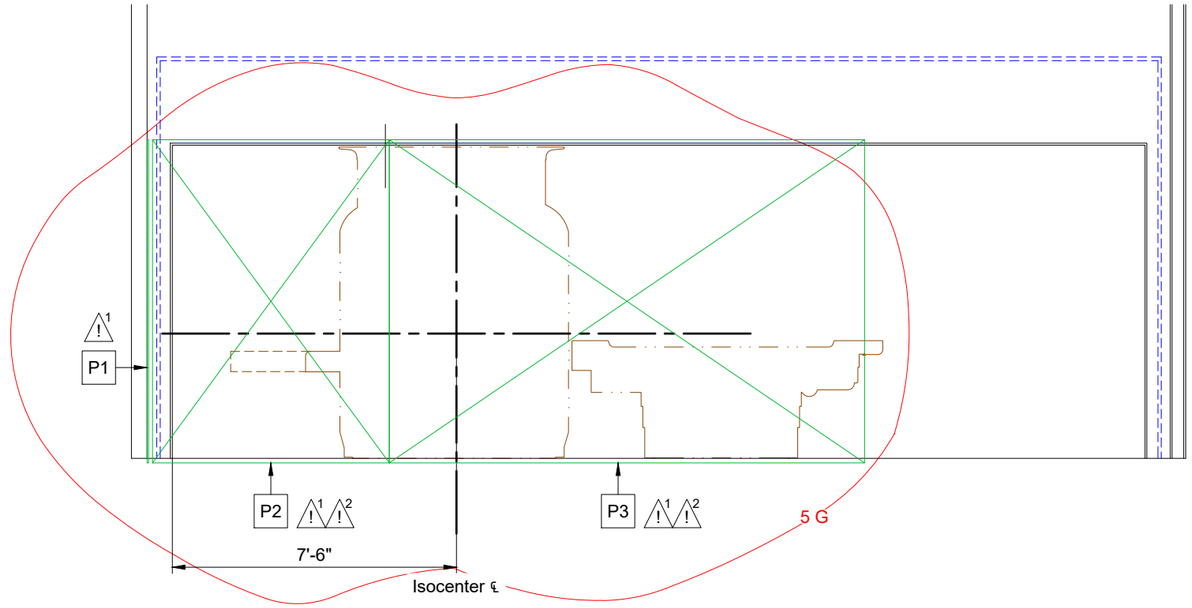
SD9

Shielding Design

0 1' 2' 4' 8'

0 .5m 1m 2m

Left View



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Item Number — Detail Sheet

	Item Number	Description	Attraction Force (N)	Detail Sheet
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E	P2	Left Wall Front Shielding Plate	<2	SD12
E	P3	Left Wall Back Shielding Plate	<24	SD12

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* 5 Gauss Tolerance: +/- 4"

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- Shielding calculations sees each shielding plate as a single, solid mass. In reality plates are made of smaller multi-layered sheets. Maximum 3/32" (2mm) gaps are allowed between adjacent plates.
- For single and dual layered shielding: To cover a seam, a patch can be used. Minimum width of the patch must be 20 times the width of the seam and with the same thickness as calculated in the shielding calculation.
- Triple or more layered /thickness shielding: the seams must be overlapped with minimum 66% thickness as given in the passive shielding design. This can be achieved with a 3 layered thick shield.
- No seams are allowed in corners. A corner piece patch can be used. The angled piece must have the same thickness as given in the passive shielding design.
- Make sure fringe field measurements are performed after the MR is energized to investigate if the location of the fringe field due to the installation of the passive shielding is acceptable.

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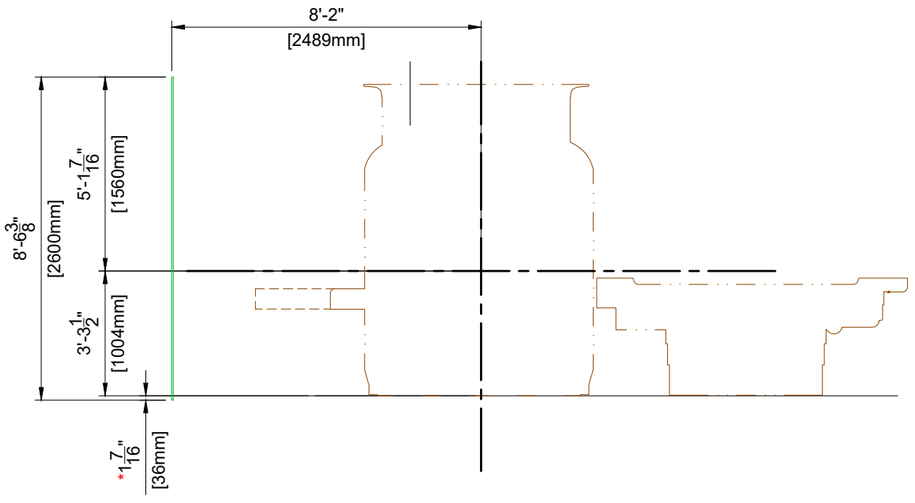
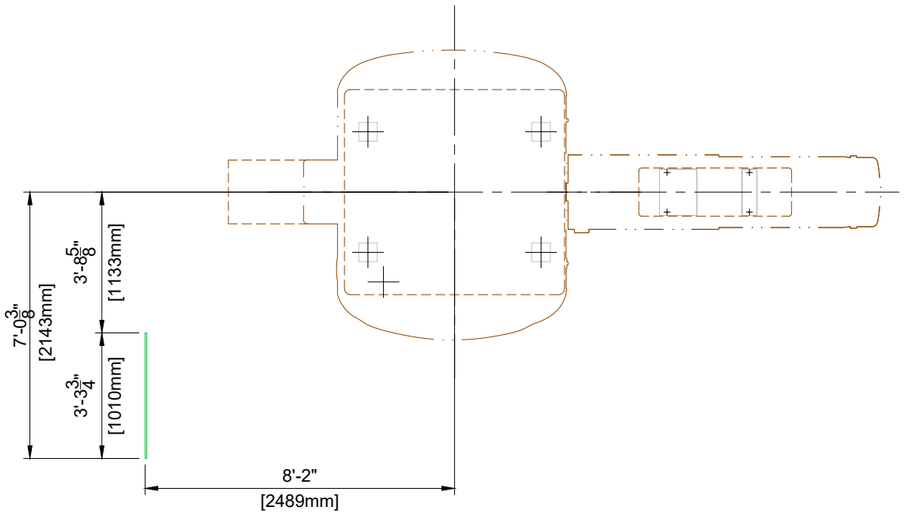
SD10

Rear Plate Detail (Exterior Left View)



Rear Plate Detail (Plan View)



P1

Plate Specifications:

18mm thick steel plate
Plate to be positioned in between parent and RF wall

* Dimension can vary depending on the thickness of the RF enclosure and the finished floor. Plate must be outside RF enclosure.

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
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Drawn By: Markie Apple

Project Details
Drawing Number
N-MID190452 B
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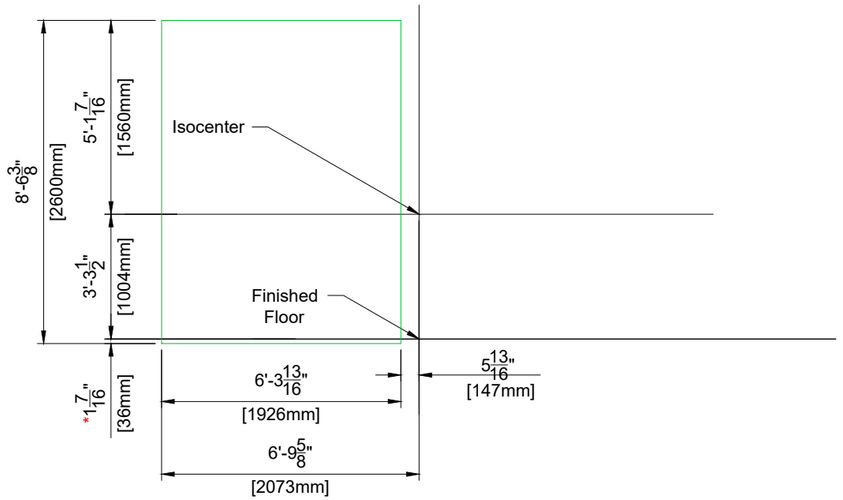
Quote: 1-21JYZD0 Rev. 7
Order: 6600461060.010000 - 6600461060.020000

SD11

Left Front Plate Detail (Exterior Left View)



Left Front Plate Detail (Plan View)

P2

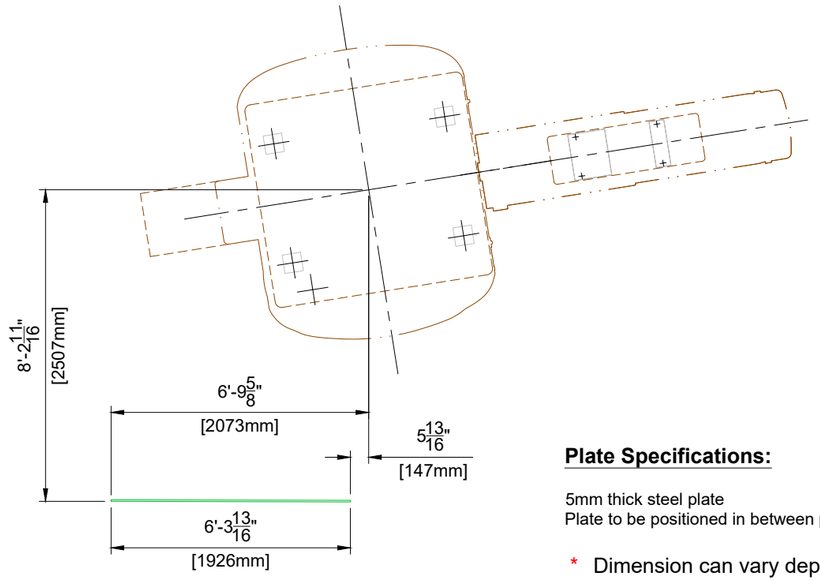
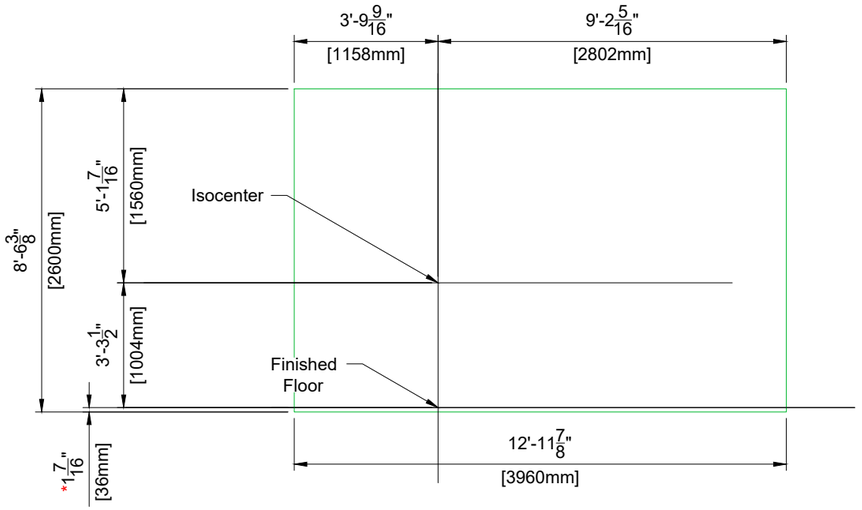


Plate Specifications:

5mm thick steel plate
Plate to be positioned in between parent and RF wall

* Dimension can vary depending on the thickness of the RF enclosure and the finished floor. Plate must be outside RF enclosure.

Left Back Plate Detail (Exterior Left View)



Left Back Plate Detail (Plan View)

P3

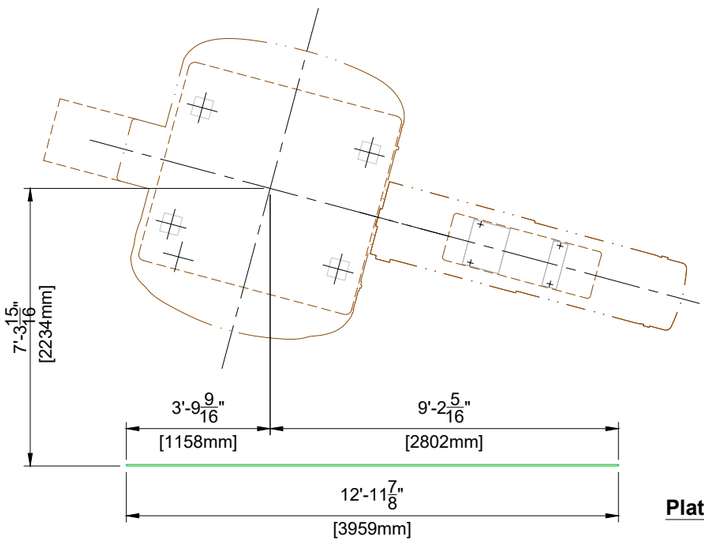


Plate Specifications:

5mm thick steel plate
Plate to be positioned in between parent and RF wall

* Dimension can vary depending on the thickness of the RF enclosure and the finished floor. Plate must be outside RF enclosure.

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SD12

General Electrical Information

1. General
The customer shall be solely responsible, at thier expense, for preparation of the site, including any required electrical alterations. The site preparation shall be in accordance with this plan and specifications, the architectural/construction drawings and in compliance with all safety and electrical codes, the customer shall be solely responsible for obtaining all electrical permits from jurisdictional authority.

2. Materials and Labor
The customer shall be solely responsible, at its expense, to provide and install all electrical ducts, boxes, conduit, cables, wires, fittings, bushings, etc., as separately specified herein.

3. Electrical Ducts and Boxes Outside the RF Enclosure
Electrical ducts and boxes shall be accessible and have removable covers. Floor ducts and boxes shall have watertight covers. Ducts shall be divided into as many as three separate channels by metal dividers, separately specified herein, to separate wiring and/or cables into groups as follows: Group a: power wiring and/or cables. Group b: signal and/or data and protective ground wiring and/or cables. The use of 90° ells is not acceptable. On ceiling duct and wall duct use 45° bends at all corners. All intersecting points in duct to have cross over tunnels supplied and installed by contractor to maintain separation of cables.

4. Conduit Outside RF Enclosure
Conduit point-to-point runs shall be as direct as possible. Empty conduit runs used for cables may require pull boxes located along the run. Consult with Philips. A pull wire or cord shall be installed in each conduit run. All conduits which enter duct prior to their termination point must maintain separation from other cables via use of dividers, cross over tunnels, or flex conduit supplied and installed by contractor from entrance into duct to exit from duct. Maximum conduit lengths shown on these plans are calculated from electrical box entrance to electrical box entrance. Any conduit installed below grade must be water tight.

5. Conduits Inside RF Enclosure
Conduits point-to-point runs shall be as direct as possible. Conduits to be made of non-ferromagnetic material and to be installed securely. If aluminum flex conduit is used, it needs to be secured so that it is not touching any other metal in the room. Common items that loose flex might rub against are ceiling grids and hangers, HVAC ducts, Ladder Tray, and cryogen gas lines. Metal-on-metal situations can cause artifacts that make patient images un-diagnostic.

6. Conductors / Earth Conductor
All conductors, separately specified, shall be 75° C stranded copper, rung out and marked. Do not use metal conduit or raceway as a ground conductor. The earth conductor for the MRI system must be dedicated and totally separate from the conduit, raceway, or structural ground. This is required to maintain the MR system "Quiet Ground" as permitted by NFPA 99. The earth conductor to be the same size as incoming phase conductor wires.

7. Disconnecting Means
A disconnecting means shall be provided as separately specified.

8. Grounding
Grounding must conform with current requirements for electrically susceptible patient areas. See Article 517, National Electrical code.

9. Lighting and Wall Sockets Inside the RF Enclosure
Incandescent AC lamps with reinforced filaments or quartz (halogen) lamps are acceptable. The use of linear fluorescent lamps, compact fluorescent lamps (CFL), energy saving lamps, electronic light dimmers and low voltage track lighting are strictly prohibited to avoid RF interference.

- LED light fixtures are acceptable inside the RF enclosure, only if, they are non-ferrous low voltage DC LED light fixtures with their electronics (driver, power supply, power source, convertor) outside the RF enclosure. It is the LED supplier's responsibility to ensure their LED solution will not cause any interference for the magnet. If for whatever reason the LEDs negatively influence the magnet, the LED lighting supplier must be responsible for removing or correcting the issue.

The magnetic field may shorten the lifetime of the light bulb. For patient comfort, avoid direct light above the patient support and the rear of the magnet. A spotlight with a separate switch to assist the doctor during intervention procedures is recommended. Two lighting levels (separate control) are required around the magnet:

a. 200 lux for patient examination
b. 500 lux for servicing

Wall outlets should be located inside the RF enclosure for use of MRI compatible third party equipment. A duplex outlet (20 Amp) and a light with switch for servicing purposes must be provided above the suspended ceiling in the RF enclosure in the vicinity of the magnet turret. The location of the light switch must be reachable by the engineer when he/she opens the removable part of the suspended ceiling.

(18.0)

RF Enclosure Electrical Notes

1. Mains Safety Switches - Mains safety switches may be installed inside the RF enclosure. Installation must follow all local regulations. There are no RF filters in the System Filter Box provided for this purpose.

2. Door Open / Closed Switch - Each door into the exam room must be provided with a switch that signals the open/closed status of the door to the system. The switch(es) must be mounted (mechanically or electrically) outside the RF enclosure and have a contact that closes when the door is closed. Switches must be wired in series with screened cable, and the wire must be rated at a minimum of 30 V DC, 100 mAmps. Use Grainger item 4B811, Telemecanique model XCKJ10541 or equivalent.

3. Protective Earth - The RF enclosure requires one central protective earth (PE) bus-bar/terminal. This PE point must be connected to the Hospital Earth Ground supplied near the Hospital Mains by a conductor at least #1 AWG. Refer to sheet ED1 for details. The central PE bus-bar/terminal must be located as close as possible to the earth point inside the System Filter Box (< 39.4" [< 1000mm]) and there cannot be any seams in the shielding between the two points. The MR system parts connect to the earth point inside the System Filter Box while all other items, (facilities heating and water supply, receptacles, etc.) must be connected to the central PE bus-bar/terminal. The following requirements apply:

a. The impedance between any conductive part and the central PE bus-bar/terminal cannot exceed 100 mOhms.
b. All PE conductors used must be at least #8AWG. An earth leakage switch is not required.
c. For optimum shielding performance, "loops" inside the RF enclosure must be minimized.
d. A galvanic isolation layer between the RF enclosure and the building is recommended. Local regulations or the the RF vendor may require the enclosure be isolated from the building.
e. Isolated in this context means DC impedance greater than 3 kOhms.

4. Auxiliary Electrical Filters - Any electrical interconnection, that are not part of the MR system entering the RF enclosure requires an electrical filter. These filters may give rise to earth leakage currents in the RF enclosure, which could present a safety hazard. For complete safety, the total of all the earth leakage currents generated by all auxiliary electrical filters must not exceed 5 mAmps. If necessary, use an isolation transformer with the filters to minimize the effects of current leakage. Electrical filters are to be placed near the System Filter Box and they should be easily accessible. Beware of metal-on-metal connections that can occur near electrical filters which can cause imaging issues for the system. All 3rd party items (injectors, intercoms, humidity sensors, fire suppression flashers/buzzers, Invivo Esys, etc.) must have their own RF filters or feedthroughs. The filters and feedthrough of the PHILIPS System Filter Box cannot be used for these 3rd party items. RF Enclosure provider to verify that they have installed enough RF Filters for all the 3rd party items

(14.0)

General Electrical Notes

1. The contractor will supply and install all breakers, shunt trips and incoming power to the breakers. The exact location of the breakers and shunt trips will be determined by the architect/contractor.
2. The contractor shall supply and install all pull boxes, raceways, conduit runs, stainless steel covers, etc. Conduit/raceways must be free from burrs and sharp edges over its entire length. A Greenlee pull string/measuring tape (part no. 435, or equivalent) shall be provided with conduit runs.
3. All pre-terminated, cut to length cables, will be supplied and installed by Philips service. All cables to the breakers, will be supplied and installed by the contractor, subject to local arrangements.
4. Electrical raceway shall be installed with removable covers. The raceway should be accessible for the entire length. In case of non-accessible floors, walls and ceilings, an adequate number of access hatches should be supplied to enable installation of cabling. Approved conduits may be substituted. All raceways must be designed in a manner that will not allow cables to fall out of the raceway when the covers are removed. In most cases, this will require above-ceiling raceway to be installed with the covers removable from the top. Any raceway system(s) illustrated in these drawings are based on length of furnished cables, and any changes in routing could exceed maximum allowable length. Conduit or raceway above ceiling must be kept as near to finished ceiling as possible.
5. Conduit sizes shall be verified by the architect, electrical engineer or contractor, in accordance with local or national electrical codes, whichever govern. Conduit sizes shown on these plans are minimum sizes. This is based on fill factor and cable connector size. Substituting smaller conduits is not permitted.
6. Convenience outlets are not illustrated. Their number and location are to be specified by the customer/architect.
7. All sections of raceway and conduit shall be grounded with an independent #6 AWG green wire that is to be attached using solderless lugs. All ceiling mounted structural support members and ceiling plates shall also be grounded. All grounding connections, terminals, etc. shall be installed in a manner to provide accessibility for inspection, maintenance, repair, etc.

(14.0)

Electrical Power Distribution Requirement Notes

Electrical power distribution at the facility shall comply with:

- Utilization voltages per ANSI C84.1 - 1982 range A.
- ANSI / NFPA 70 - National Electrical Code
  - Article 250 - Grounding
  - Article 517 - Healthcare facilities
- ANSI / NFPA 99 - Healthccare facilities
- NEMA standard XR9 - Power supply guideline for x-ray machines

Phase conductors to be sized for instantaneous voltage drop per NEC 517 - 73 and Philips recommendations.

On sites without a PDU (typical case for 480V branch supply), the ground conductor for the power feeder shall be the same size as the phase conductor wires. The separate ground wire connections from building steel to the ground busbar shall be sized per NEC at a minimum of #1 AWG.

On sites with a Universal PDU-MRPT2 (typical case for branch power other than 480V), the ground conductor for the power feeder shall be the same size as the phase conductor wires.

(14.0)

Power Quality Guidelines

1. Power supplied to medical imaging equipment must be separate from power feeds to air conditioning, elevators, outdoor lighting, and other frequently switched or motorized loads. Such loads can cause waveform distortion and voltage fluctuations that can affect MR image quality.
2. Equipment that utilizes the facility power system to transmit control signals (especially clock systems) may interfere with medical imaging equipment, thus requiring special filtering.
3. Static UPS systems, Series filters, Power conditioners, and Voltage regulators provide a high impedance, nonlinear voltage source, which may affect image quality. Do not install such devices at the mains supply to medical imaging equipment without consulting Philips installation or service personnel.
4. Line impedance is the combined resistance and inductance of the electrical system and includes the impedance of the power source, the facility distribution system, and all phase conductors between the source and the imaging equipment. Philips publishes recommended conductor sizes based on equipment power requirements, acceptable voltage drops, and assumptions about the facility source impedance. The minimum conductor size is based on the total line impedance and NEC requirements. Unless impedance calculations are performed by an electrical engineer, the recommended values must be used.

(14.0)

Hospital Mains Switch

According to IEC, the hospital mains switch:

- shall switch all 3 phases simultaneously.
- shall be capable of being locked in the OFF position.
- shall comply with creepage distance and air clearance as specified in IEC 61058 -1 for Mains Transient Voltage of 4 kV.
- shall have an actuator that comply with IEC 60447.

(14.0)

PHILIPS

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Project Details
Drawing Number
N-MID190452 B
Date Drawn: 3/5/2020
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Order: 6600461060.010000 - 6600461060.020000

EN

Electrical Legend

A Furnished and installed by Philips
B Furnished by customer/contractor and installed by customer/contractor
C Installed by customer/contractor
D Furnished by Philips and installed by contractor
E Existing
F Future
G Optional

Item Number | Description | Detail Sheet

Duplexes

B	WS	Wall Socket (duplex, single phase) above finished ceiling. See Sheet EN for details.	EN
B	S	120V/20A dedicated duplex outlet for service in the equipment room and control room. Additional outlets may be desired by customer or required by code. (Not shown on plan)	
B	EA	120V/20A dedicated duplex outlet for "EA".	
B	RAD	120V/20A dedicated duplex outlet for RAD (Resoundant Active Driver). To be located within 20' (6100mm) of RAD.	
B	SM	120V/20A dedicated duplex outlet for Ferroguard System Manager (touchscreen). To be located within 3' (914mm) of equipment ("SM").	
B	A_W	120V/20A dedicated duplex outlet for ATSW. Outlet to be located inside ATSW wall box.	
B	A_T	120V/20A dedicated quad outlet for ATS, USB Extenders, and DVD.	
B	AE	120V/20A dedicated duplex outlet for Patient In-Bore Solution Monitor (To be located outside the RF cage), Ambient Experience Cabinet, and external audio source.	

Network Connectors

B	N1	RJ45 type ethernet 10/100/1000 Mbit network connector. Access to customer's network via their remote access server is needed for Remote Service Network (RSN) connectivity.	N1
B	N2	RJ45 type ethernet 10/100/1000 Mbit network connector with access to customer's network. Locate within 10' of network. Network fiber optic and ethernet cabling, connectors, wall boxes, patch panels, etc. are the responsibility of the purchaser. Philips assumes no responsibility for procurement, installation, or maintenance of these components.	N1
B	N3	RJ45 type ethernet 10/100/1000 Mbit network connector with access to customer's network. Locate within 9' - 10" of "EA". Network fiber optic and ethernet cabling, connectors, wall boxes, patch panels, etc. are the responsibility of the purchaser. Philips assumes no responsibility for procurement, installation, or maintenance of these components.	N1
B	e	RJ45 type ethernet 10/100/1000 Mbit network connector with internet access for Philips Field Service Engineer connectivity to on-line system documentation.	
B	N4	RJ45 type ethernet 10/100/1000 Mbit network connector. Access to customer's network via their remote access server may be needed for service.	

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Item Number | Description | Detail Sheet

Floor

B	FR1	Flush mounted floor duct. Refer to Sheet SD1 for details.	SD1

Ceiling

B	CR1	4" (100mm) H x 24" (600mm) W non-ferro magnetic cable ladder tray mounted above suspended ceiling from "SFB" to behind magnet. "CR1" must be between 13' (4m) and 30' (9m) in length and divided into 3 compartments: 8" (200mm) W, 10" (250mm) W, and 6" (150mm) W. Cable tray must be non-ferro magnetic material, such as aluminum or glass-reinforced plastic (GRP). GRP material is recommended and wooden trays are not allowed. Must be a minimum of 2" (50mm) above the top of suspended ceiling.	
B	CR2	Upper Tray - 4" (100mm) H x 18" (460mm) W cable ladder tray mounted 4" (100mm) above "CR3", from "SFB" to above equipment cabinets. "CR2" must be at least 10' (3m) in length and divided into 2 compartments. Maximum cable weight will be 34 lbs/linear foot.	ED2
B	CR3	Lower Tray - 4" (100mm) H x 18" (460mm) W cable ladder tray mounted 7' - 6" (2285mm) a.f.f. to bottom of tray, from "SFB" to above equipment cabinets. "CR3" must be at least 10' (3m) in length.	ED2
B	CR4	2" (50mm) H x 4" (100mm) W cable ladder tray mounted from "CR3" to "R2".	
B	JB	10" (250mm) W x 10" (250mm) H x 6" (150mm) D wall box with removable screw-type coverplate. Surface mounted above "CR2".	
D	CS	Flush mounted ceiling speakers. (Not shown on plan)	SD1
B	ISL	Incandescent Service Light (AC, 500 lux) above finished ceiling.	EN
B	LS	Electrical switch for service light (ISL) above finished ceiling.	
B	CZ	Patient comfort zone. No direct lighting in this area.	
B	HUB	Hardwire 115V/3A hospital power to "HUB". AC Power connection must be via PVC Insulated 3-core cable with PVC sheath. Must not be placed within 40" (1000mm) of "WFS1" and "WFS2". Ideal location is within 16' - 0" (5000mm) of "WFS1" and "WFS2". (Not shown)	ED2

See E1 - E2 sheets for conduit and raceway requirements.

PHILIPS

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EL1

Electrical Legend

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F Future
G Optional

	Item Number	Description	Detail Sheet
		Wall	
D	UPS	100 kVA Socomec UPS Cabinet	ED1
D	BC	Socomec UPS Battery Cabinet	ED1
B	CBU	480 V, 3 phase, 200 Amp circuit breaker for UPS system	ED1
B	FHS	Hub Power Isolation Switch. Recommended location above finished ceiling, next to "HUB". Hardwire 115V/5A hospital power. (Not shown)	ED2
B	WFS1 WFS2	1 1/4" (32mm) diameter hole at 5' - 7" (1700mm) above finished floor and 2" from door frame for Wall-Mounted Ferroguard Sensor. No J-boxes needed. Pull strings from left and right pole cable holes installed through to "HUB" via conduit. See Sheet ED2 for cable hole locations.	ED2
B	FDS	10.8" (273mm) H x 7" (1770mm) W x 1.9" (49mm) D door sensor. 1 1/4" (32mm) diameter hole at hinge side of door. To be located on door header. No J-boxes needed. Pull string installed through to "HUB" via conduit. See Sheet ED2 for cable hole locations. (Not shown)	ED2
B	SMH	1 1/4" (32mm) diameter hole drilled under control desk. 12" (300mm) to 24" (600mm) a.f.f. Desk grommet present below touch screen mounting position. Pull string installed through to "HUB" via conduit. See Sheet ED2 for cable hole locations.	ED2
B	SFF	12" (300mm) W x 12" (300mm) H x 4" (100mm) D wall box with removable screw-type cover plate, flush mounted. Location as shown or near AE Small Form Factor Cabinet.	
D	AEF	Ambient Experience System Filter Box	
B	WR1	4" (100mm) H x 2" (50mm) D non-ferro magnetic wall raceway mounted above suspended ceiling and along perimeter of exam room for LED chains connecting to distribution box, "DB". J Hooks can be used instead of raceway, if local code allows.	ED3
B	AUD	4" (100mm) W x 4" (100 mm) H x 4" (100 mm) D wall box with removable screw-type coverplate. "AUD" flush mounted 12" A.F.F. to bottom of box. Locate "AUD" as shown or near location of Storage Rail.	
B	ATSW	8" (200mm) W x 8" (200mm) H x 4" (100mm) D wall box flush mounted to wall located 57" (1450mm) A.F.F. with grommet opening in face plate 2.5" (60mm) off center 1" (25mm) from center. Duplex main outlet located inside the wall box.	
B	ATS	4" (100mm) W x 4" (100mm) H x 4" (100mm) D wall box with removable screw-type cover plate, surface mounted 12" (300mm) A.F.F. to bottom of box. Location shown is recommended and may be changed - verify relocation with local Philips Service.	
B	PIBS	Electrical switch to power off Patient In-Bore Solution Monitor. Location shown is recommended and may be changed - verify relocation with local Philips Service.	
B	PIB	Patient In-Bore Solution Monitor. 4" (100mm) W x 4" (100mm) D wall box located behind the monitor and outside the RF cage.	

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	Item Number	Description	Detail Sheet
		Wall	
B	CBS	480V, 3 phase, 100 Amp circuit breaker. See Sheet ED1 for details.	ED1
B	CBC	460V, 3 phase, 60 Amp circuit breaker for KKT cBoxX 60 Chiller or 80 Amp circuit breaker for KKT cBoxX 70 Chiller. Run power from breaker to chiller, refer to Sheet ED1. Exact location to be determined. (Not shown on plan)	ED1
B	R1	12" (300mm) W x 4" (100mm) H cable ladder tray mounted from "CR3" to "MDU".	ED2
B	R2	8" (200mm) W x 2" (50mm) H cable ladder tray mounted from "CR3" to "ACCC".	ED2
F	R3	12" (300mm) W x 4" (100mm) H cable ladder tray mounted from "CR3" to "BCP".	ED2
B	R4	12" (300mm) W x 4" (100mm) H cable ladder tray mounted from "CR3" to "TC".	ED2
B	R5	2" (50mm) W x 2" (50mm) D cable ladder tray mounted from "CR3" to "RAD".	
B	SR	10" (250mm) W x 10" (250mm) H x 6" (150mm) D wall box with removable screw-type coverplate. Surface mounted near Storage Rail "SR".	
B	ERB	2" (50mm) W x 4" (100mm) H x 2" (50mm) D wall box with removable screw-type coverplate. Flush mounted 70" (1800mm) above finished floor to bottom of box.	
B	DS	RF Door Open Switch - 120 V, 5 Amp switch limited to open when door is open. Mounted in upper corner on strike side of entry door. Use Grainger item 4B811, Telemecanique model XCKJ10541 or equivalent.	
D	SFB	Wall mounted System Filter Box.	
D	RDP	KKT Chiller Remote Display Panel with flush mounted Gang box placed in a landscape orientation. Exact height to be determined by local Philips Service.	
B	EA	e-Alert box. Final location of "EA", to be determined and installed by Philips.	

See E1 - E2 sheets for conduit and raceway requirements.

PHILIPS

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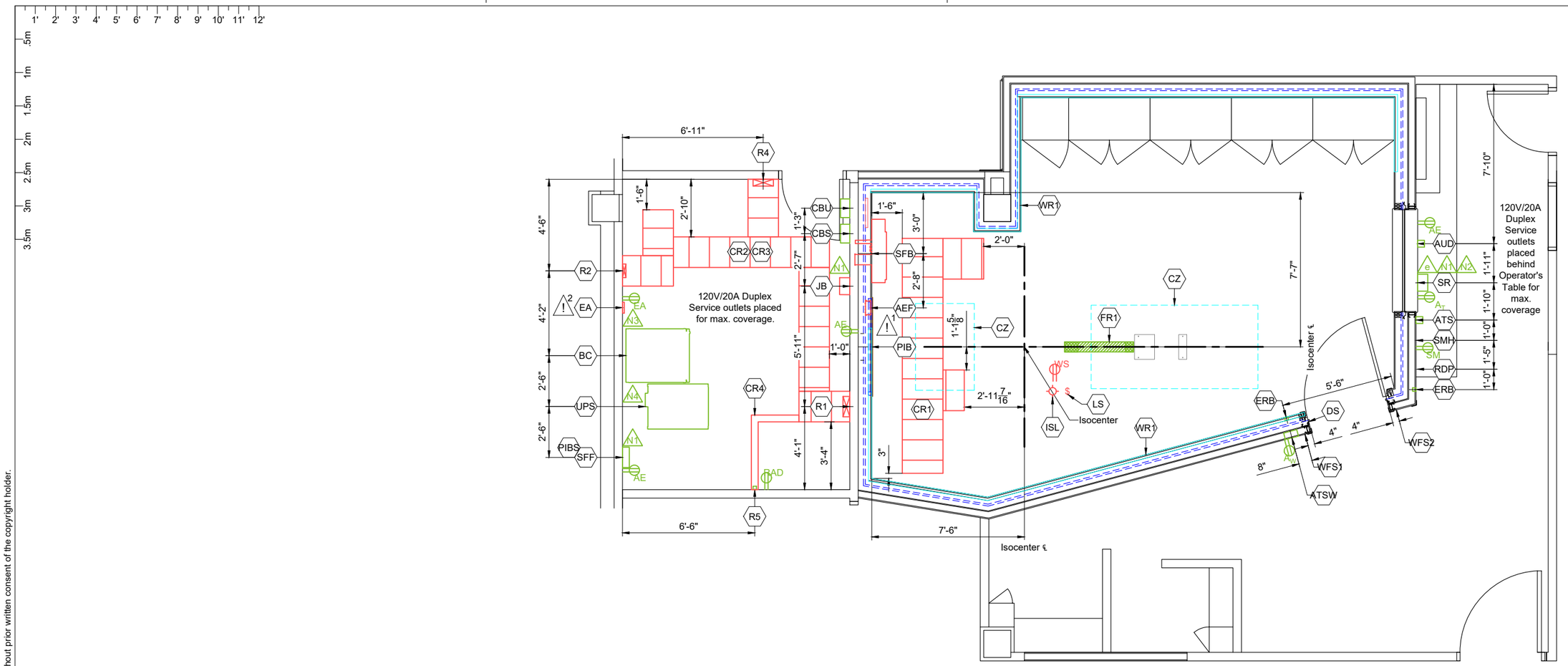
EL2



Planning Issues and Considerations

1. AEF to be mounted above the suspended ceiling, above the PIB monitor.
2. Final location of e-Alert "EA", to be determined and installed by Philips.

All risers and circuit breakers are dimensioned to centerlines.

Verify location with Customer and local Philips Project Manager.

Electrical Layout

3/16" = 1'-0"

Ceiling Height Guide

Equipment Room:	10' - 6" (3200mm)	Recommended
	9' - 2" (2795mm)	***Minimum****
Exam Room Suspended Ceiling:	8' - 3 1/4" (2520mm)	***Required***
Exam Room RF Ceiling:	9' - 9" (2970mm)	Recommended
Control Room:	9' - 10" (3000mm)	Recommended
	7' - 3" (2200mm)	***Minimum***

* Ceiling Heights outside the minimum dimensions may be possible. These Ceiling Heights must be reviewed and approved.

PHILIPS

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E1

Conduit Required

General Notes

1. All conduit runs must take most direct route point to point.
2. All conduit runs must have a pull string.

A	Conduit supplied/installed by contractor - Philips cables installed by Philips
B	Conduit supplied/installed by contractor - Philips cables installed by contractor
C	Conduits and cables supplied and installed by contractor
D	Conduit existing - cables supplied and installed by Philips
E	Conduit existing - cables supplied by Philips and installed by contractor
F	Conduit existing - cables supplied and installed by contractor
G	Optional equipment, verify with local Philips Service

* **P** Power (AC), **D** Power (DC), **G** Ground, **S** Signal, **H** High Tension, **C** Cooling Hose, **A** Air Supply Hose

	Conduit Run No.	Conduit From	Conduit To	Conduit Quantity	Cable Type (*)	Minimum Conduit Size	Maximum Conduit Length	Special Requirements
C	1	Hosp. Power	RF Filters	Per N.E.C.	P	Per N.E.C.	Per N.E.C.	See ED1 sheet for more information.
C	2	Hosp. Power	CBU	Per N.E.C.	P	Per N.E.C.	Per N.E.C.	See ED1 sheet for more information.
C	3	CBU	UPS	1	P	Per N.E.C.	Per N.E.C.	See ED1 sheet for more information.
C	4	UPS	BC	2	P	Per N.E.C.	Per N.E.C.	See ED1 sheet for more information.
C	5	UPS	CBS	1	P	Per N.E.C.	Per N.E.C.	See ED1 sheet for more information.
C	6	CBS	MDU	1	P	Per N.E.C.	25'	See ED1 sheet for more information.
A	7	ERB	"SFB"	1	P	$\frac{3}{4}$"	80'	ERB in control room.
A	8	ERB	"SFB"	1	P	$\frac{3}{4}$"	49'	ERB in exam room.
C	9	"DACC"	DS	1	S	1"	75'	
A	10	SR	JB	1	S	3"	65'	Conduits to be routed outside RF enclosure.
A	11	SR	JB	1	P	2"	65'	Conduits to be routed outside RF enclosure.
C	12	UPS	CBC	Per N.E.C.	P	Per N.E.C.	Per N.E.C.	See ED1 sheet for more information.
C	13	CBC	Chiller	1	P	Per N.E.C.	Per N.E.C.	See ED1 sheet for more information.
B	14	Chiller	RDP	1	S	1"	164'	Conduit for transfer cable only and not for power supply.
A	15	"SACU"	"LCC"	1	P	1 $\frac{1}{2}$"	45'	Cable to routed from "SACU" to "JB" to "CR3" to "LCC". Conduit not needed if "SACU" is close enough for cable to be directly routed onto "CR3". Refer to Sheet MP1 for more details.
C	16	Hosp Power	FHS	1	(P)	Per N.E.C.	Per N.E.C.	
C	17	FHS	HUB	1	(P)	Per N.E.C.	Per N.E.C.	
C	18	HUB	SMH	1	(P)	1 $\frac{1}{4}$"	65'	
A	19	SFF	AEF	1	S	2 1/2"	32.8'	
A	20	SFF	AUD	1	S	1"	98'	For audio output cable from SFF to MR system audio switch in Control Room.
A	21	ATSW	SFF	1	S	2"	65'	For DVI Connection between wall mounted Touch Screen and SFF.
A	22	ATSW	SFF	1	S	1"	98'	For USB Extender of wall mounted Touch Screen.
A	23	ATS	SFF	1	S	2"	65'	For DVI Connection between Touch Screen and SFF.
A	24	ATS	SFF	1	S	1"	98'	For USB Extender of Touch Screen.
A	25	SFF	PIB	1	S	2"	72'	For DVI Connection between SFF and In-Bore Solution Monitor.
A	26	SFF	PIB	1	S	1"	328'	For Network Connection between SFF and In-Bore Solution Monitor.

PHILIPS

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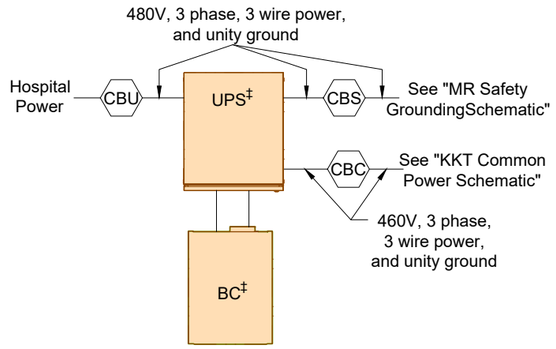
E2

Power Quality Requirements (Incoming power to UPS)

Supply Configuration	3 Phase + Ground
Nominal Input Voltage	480 VAC
Circuit Breaker (3ϕ, 60 Hz, 3 pole)	125 Amps (CBU)
Power Factor	>0.99
Feeder Wire Size (Min)	1/0 AWG
Feeder Wire Size (Max)	2/0 AWG



For UPS purchased from PHILIPS, refer to Installation and Operation manual from the manufacturer for all detailed specification and installation requirements. Wiring and circuit sizes at supply and load side of UPS to meet UPS requirements and verified by contractor to meet building conditions and local codes.

Maximum Cable Length per Wire Size (Between UPS and CBS)

(Based on 20° C copper ambient temperature)

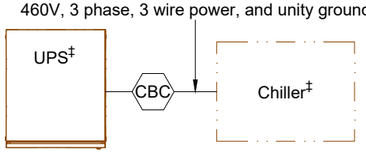
< 95'	#1 AWG
< 119'	#1/0 AWG
< 150'	#2/0 AWG
< 190'	#3/0 AWG
< 242'	#4/0 AWG
< 283'	250 MCM
< 340'	300 MCM

The ground conductor for the power feeder shall be the same size as the phase conductor wires. Ground conductor must be dedicated and totally separate from conduit, raceway, or structural ground.

(17.0)

Diagram - Common KKT Chiller Power Schematic

(Not to scale)



Provided and installed by customer/contractor.

Circuit Breaker for Chiller
KKT cBoxX60 Chiller: 460V, 60 Hz, 3ϕ + ground, 60 Amps.
KKT cBoxX70 Chiller: 460V, 60 Hz, 3ϕ + ground, 80 Amps. cBoxX70 Chiller used at sites with outdoor ambient air temperatures above 113F. Consult your local Philips Project Manager for confirmation).

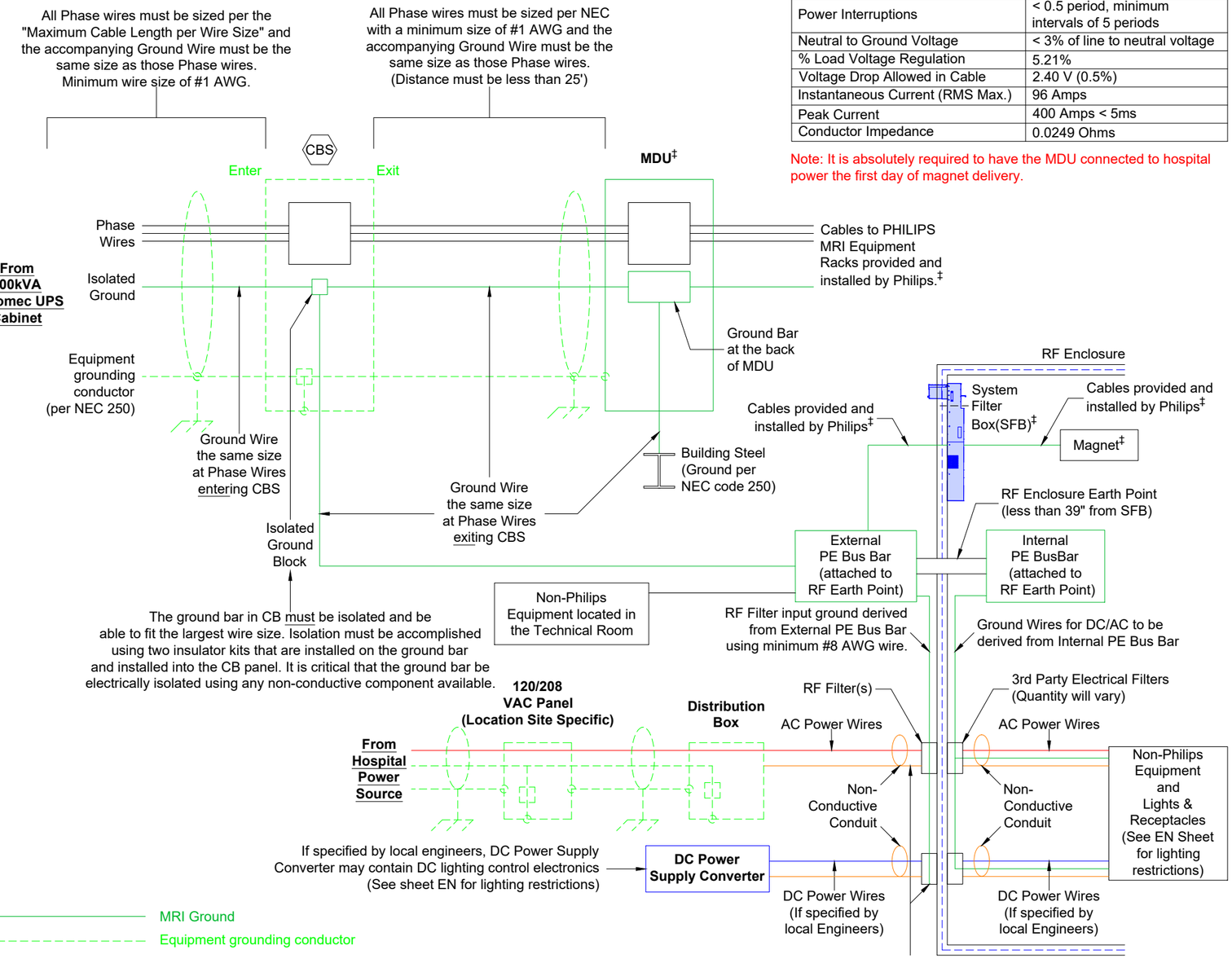
CBC

(17.0)

Diagram - MR Safety Grounding Schematic

(Not to scale)

Notes:
1. All items shown are to be provided and installed by contractor unless otherwise specified.
2. Philips provided equipment designated with ‡.
3. All ground conductors for power feeders must be the same size as the phase conductor wires.
4. All non-power feeder ground wires must be sized per NEC without going below the minimum size shown.
5. Universal PDU - MRPT2 (not shown) must be ordered if incoming voltage other than 480 VAC is utilized.
6. All wires and conduits must be insulated per NEC.
7. For additional notes, see Sheet EN (section "RF Enclosure Electrical Notes").



(17.0)

Power Quality Requirements into MDU

Branch/Max. Power Required	80 kVA
Supply Configuration	3 Phase + Ground
Nominal Input Voltage	480 VAC
Circuit Breaker (3ϕ, 60 Hz, 3 pole)	100 Amps
Mains Impedance	< 0.150 Ohms
Distortion Power Factor	> 0.9
Cos phi	> 0.98
Total Harmonic Distortion (THD)	< 45%
K-factor	< 10
Crest Factor	< 3
Power Interruptions	< 0.5 period, minimum intervals of 5 periods
Neutral to Ground Voltage	< 3% of line to neutral voltage
% Load Voltage Regulation	5.21%
Voltage Drop Allowed in Cable	2.40 V (0.5%)
Instantaneous Current (RMS Max.)	96 Amps
Peak Current	400 Amps < 5ms
Conductor Impedance	0.0249 Ohms

Note: It is absolutely required to have the MDU connected to hospital power the first day of magnet delivery.

PHILIPS

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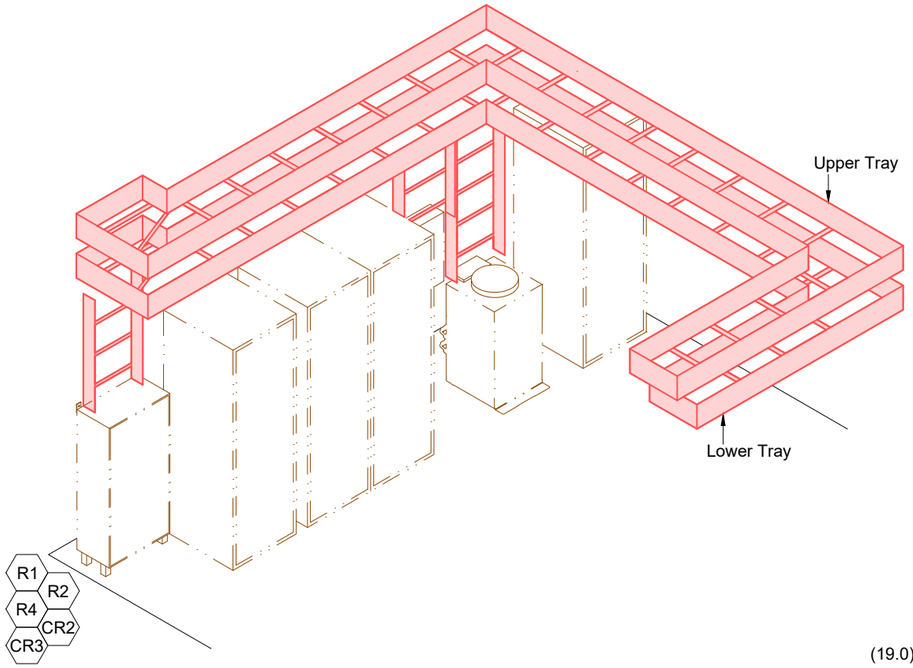
ED1

7.12.2019

Detail - Equipment Room Isometric

(Not to scale - Not site specific)

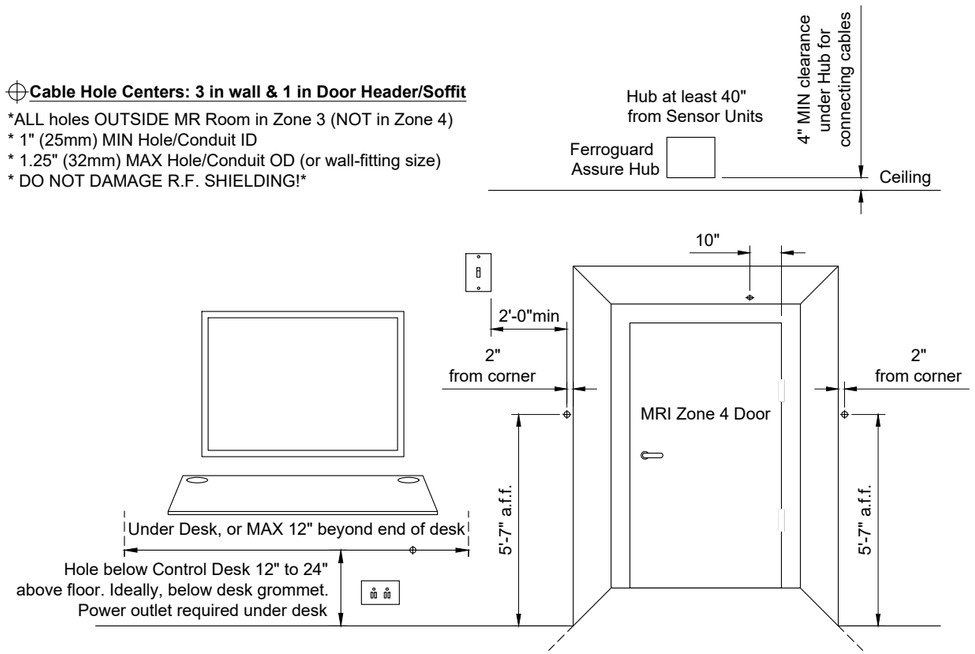


(19.0)

Detail - Cable Holes for Wall-Mounted Ferroguard (Left Handle)

Cable Hole Centers: 3 in wall & 1 in Door Header/Soffit

*ALL holes OUTSIDE MR Room in Zone 3 (NOT in Zone 4)
* 1" (25mm) MIN Hole/Conduit ID
* 1.25" (32mm) MAX Hole/Conduit OD (or wall-fitting size)
* DO NOT DAMAGE R.F. SHIELDING!*



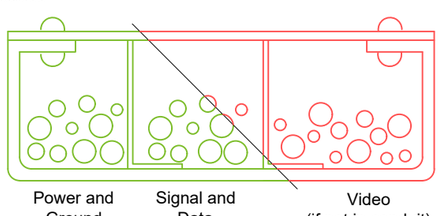
(19.0)

Detail - Cable Trough Divisions Outside of RF Enclosure (Or as directed by local code)

(Not to scale)

Ducts must be separated by metal barriers into three sections.

1. Power cables and ground cables can be run together.
2. Signal cables and data cables can be run together but must be separated from power cables.
3. Video cables must be run separately from all other cables.
4. It is important that all cables are placed in the appropriate through and at no given point do any cables from division cross with cables from another. Trough separation must be continuous from the beginning to the end of the run.
5. Trough or ducts: Steel with steel dividers grounded per local code.
6. Contractor to provide cable restraints in all troughs.
7. Low cable duct is for signal cables.
8. High cable duct is for:
   - Gradient cables (not allowed to route patient ventilation hose in gradient cable section)
   - RF send cable
   - Helium Gas Lines
   - Hoses for gradient coil cooling liquid
   - Power cables

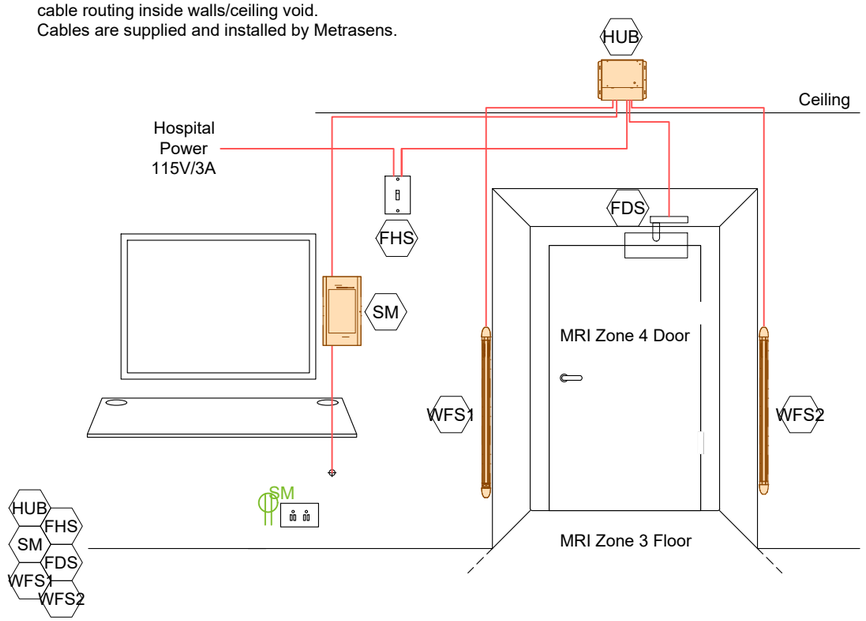


CR2 CR3

(14.0)

Detail - Wall-Mounted Ferroguard Electrical Diagram (Left Handle)

Notes: See Cable Hole Diagram to determine cable routing inside walls/ceiling void.
Cables are supplied and installed by Metrasens.



(19.0)

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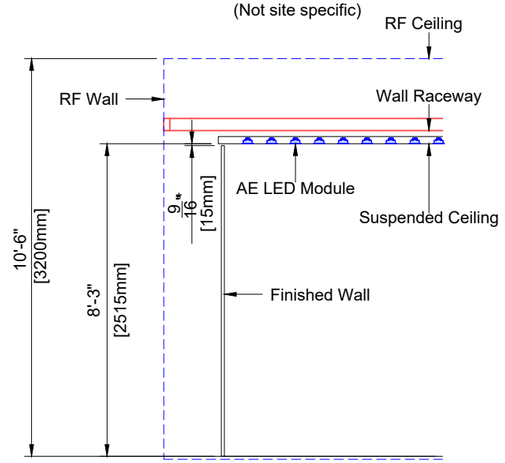
ED2

7.12.2019

Detail - Exam Room

(Not to scale)
(Not site specific)



* 0.59" (15 mm) gap needed between top of finished wall and bottom of ceiling tile. Ceiling tile must go over and past the finished wall.

(15.0)

USB Extender for Touch Screen Monitor

The USB Extender is required for each Touch Screen Monitor located >18' away from Ambient Experience SFF Cabinet.

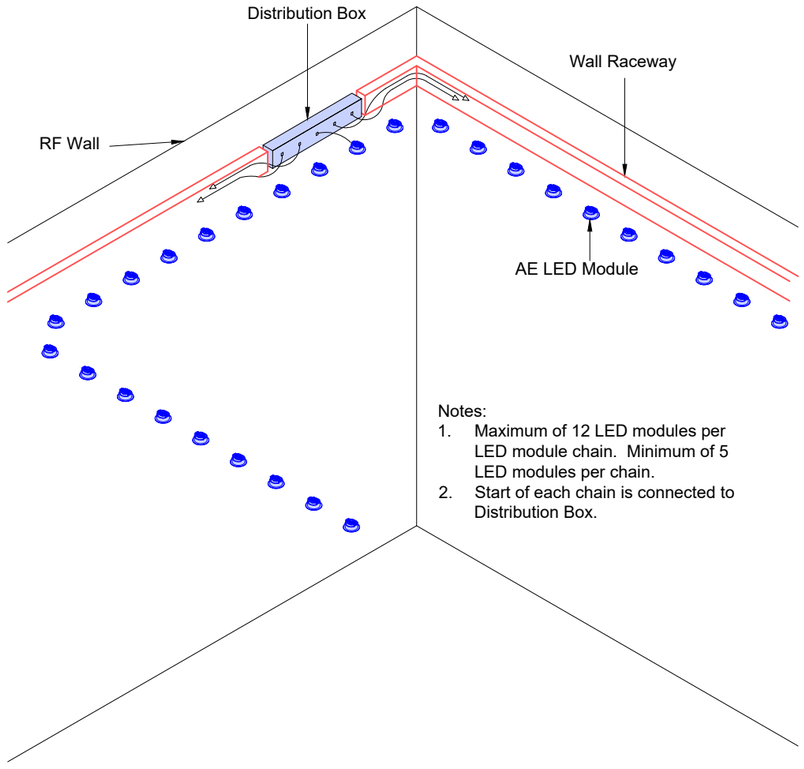
It is composed of two units:

a. LEX - Local Unit:
   - Located within 5m of the AE Server.
   - Receives power from the AE server via USB connection.
b. REX - Remote Unit:
   - Located within 5m of the Touch Screen Monitor.
   - Receives power from the supplied 5 VCD power supply unit.
   - Installed inside ATSW junction box for the wall mounted Touch Screen Monitor, or on/under desk/counter for the Touch Screen Monitor in the control room.
c. LEX and REX connected via a UTP (Cat 5e or better) cable.

(15.0)

Detail - Isometric Diagram of Distribution Box and AE LED Modules

(Not to scale / Not site specific)



Notes:
1. Maximum of 12 LED modules per LED module chain. Minimum of 5 LED modules per chain.
2. Start of each chain is connected to Distribution Box.

(15.0)

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ED3

Air Conditioning Requirements

1. Equipment Room Specifications

Ambient Requirements *	
Temperature	59° - 75° F (15° - 24° C)
Maximum Temperature Change	9° F (5° C) per 10 min.
Relative Humidity	30% to 70%, no condensation
Total Heat Dissipation to Air	
Dissipation Standby	27297 BTU/hr (8 kW) ***
Peak Dissipation Scanning	**28321 BTU/hr (8.3 kW)**

* Requirements given are specified at the cabinet air intake.
** The temperature of the conditioned air that enters the room must not be less than 42° Fahrenheit (6° Celsius) below the mean room temperature.
***Note: Normal standby capacity is 6824 BTU/hr (2 kW). In case of emergency, hospital supplied air cooling must be able to deliver 8 kW cooling if the back up **air** cooled cryo cooler is activated.

Note: Full Load UPS heat dissipation may increase peak dissipation by 17750 BTU/hr (5.2 kW).

a. The MR system heat dissipation is dependant on the type and duration of the acquisition. Therefore, actual heat dissipation will vary greatly. Equipment room air conditioning provided at average heat dissipation will result in dangerously high temperatures during peak loads, causing permanent damage and voiding system warranty. As such, air conditioning must be designed to handle peak loads.
b. Heat dissipation of an optional chiller, if installed in the equipment room, is not included.
c. A slight air overpressure is recommended to avoid dust build-up.
d. The HVAC system must be designed around equipment cabinet air flow/circulation. Modifying the room layout is allowed only after consulting the HVAC provider to avoid "hot spots".
e. Pollution: The equipment room is equipped with highly technical medical electronics. To avoid any potential failures due to pollution, dust containment should be considered (despite individual system parts having air filters). Ceilings walls and floors must be sealed to prevent dust particles from releasing into the air. Special attention shall also be considered when there is a cement floor slab under raised computer floors. Before the delivery of any equipment and after any construction, the site must be cleaned before turning on the MR system. The air conditioning system must be equipped with 90% less than 10 micron particles and 80% less than 5 micron particles filters.

2. Control Room Specifications

a. Comfort depends on local practice and preferences. For this reason, it is the responsibility of the customer to define the appropriate conditions of the control room for human comfort.

Ambient Requirements		
Temperature	MRI Equipment	50° - 95° F (10° - 35° C)
Maximum Temperature Change		9° F (5° C) per 10 min.
Relative Humidity		30% to 70%, no condensation
Total Heat Dissipation to Air		
Peak Dissipation Scanning		1024 btu/hr (0.3 kW)

3. Exam Room Specifications

Scan procedures involves the emission of RF energy. This can raise patient temperature. The amount of energy absorption (Specific Absorption Rate) is directly related to the ambient conditions. Therefore, the ambient requirements for the exam room are mandatory for safety.

Ambient Requirements	
Temperature ***	65° - 72° F (18° - 22° C) Preferred for patient comfort: 70° F (21° C)
Maximum Temperature Change	9° F (5° C) per 10 min.
Relative Humidity ***	40% to 70%, no condensation
Total Heat Dissipation to Air	
Dissipation **	7507 BTU/hr (2.2 kW)

** Philips LCC to remove gradient coil heat dissipation (3400 - 51200 BTU/hr [1 - 15 kW]) by liquid cooling.
*** Exam room temperature and humidity specifications are critical for the MR and must be met at all times. No exceptions are allowed.

a. The air under the suspended ceiling must be routed via an air grill (opening) in the suspended ceiling to the void above the suspended ceiling but remain inside of the RF enclosure.
b. A slight overpressure is required to avoid dust penetration
c. The air exchange rate in the examination room (for equipment under the suspended ceiling) must minimally be 5 times per hour at a minimum air flow of 235 CFM (400 m^3/h). The air inflow under the suspended ceiling must disperse evenly to ensure comfort and avoid "hot spots". Additional 235 CFM (400 m^3/h) must be supplied above the suspended ceiling in the top covers near the magnet shroud.
d. The conditioned air must enter the examination room through RF feedthrough wave guides.
e. If a dedicated HVAC system is used in the exam room, it is recommended that a system be designed to provide malfunction warnings, since excessive over/under temperatures or high/low relative humidity may damage the MR system.
f. The air flow through the magnet assembly must always be maintained while the system is in use.
g. Installation of Temperature and Humidity sensors in the RF-enclosure can be a problem due to the RF-filters required for each electrical cable entering and leaving the RF-enclosure and possible electrical interference. Best solution is to locate the sensors directly outside the RF Enclosure in the HVAC air return.
h. Smoke / fire detection system to be installed according to local code, fire and smoke detection common for medical devices and equipment with corresponding power rating. The use of these detectors inside the RF-enclosure is limited due to possible RF-interferences. A possible alternative is to install the detection device inside the air out / return duct located outside the RF-enclosure. Another alternative is to install an Aspirating Smoke Detector.
i. Smoke detection, temperature sensing, thermostats, humidity sensors, fire suppression duct control units, fire flashers/buzzers/annunciators and O2 Sensors, etc. inside exam room, MUST have a MR compatibility certification document. They must have NO INTELLENGENCE: No micro-processor control, no oscillators, no stepper motors, and no source of clock signal at all. If they do, and there is no MR compatibility certificate, it means that the device is disqualified for use inside the RF room.
j. System Air Cooling Unit
- Heat from the magnet gradient coil will be removed via the SACU (System Air Cooling Unit). The SACU and ventilation hose are delivered by Philips.
- The necessary 6.25" (160mm) System Air Cooling waveguide is to be provided by the RF enclosure supplier.
- 235 CFM (400 m3/ /h) of the inlet air will be directed through the magnet shroud. This will be pulled through the magnet by the SACU via the Gradient Exhaust RF Feedthrough and a Philips provided 5.5" hose (140mm).
- The exhaust air from the SACU must be directed back into the return air by a customer/contractor provided interface.

(19.0)

Additional Exam Room Air Feedthrough Requirements

1. Air Escape RF Feedthrough

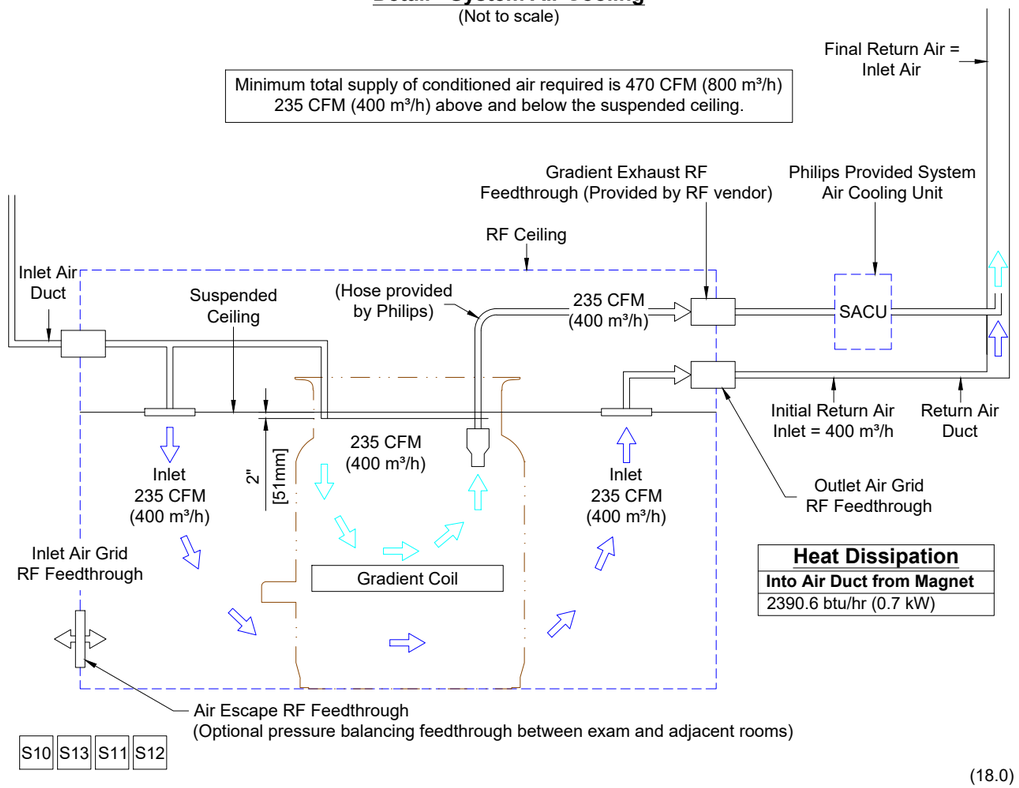
To ease the opening and closing of exam room entry doors, and prevent ceiling tiles from shifting when doors are opened or closed, an optional pressure balancing feedthrough can be installed between the exam room and adjacent room. Placing this feedthrough at the control room wall may lead to an increase in noise and affect comfort level.

S12

(18.0)

Detail - System Air Cooling

(Not to scale)



Heat Dissipation
Into Air Duct from Magnet
2390.6 btu/hr (0.7 kW)

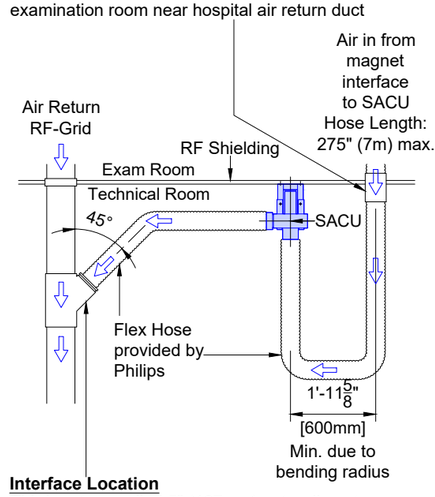
S10 S13 S11 S12

(18.0)

Detail - System Air Cooling Unit - Air Flow

(Not to scale)

RF Feedthrough
Philips supplied hose through
Wave guide inner diameter min. 6.3" (160mm)
Typical location above suspended ceiling of examination room near hospital air return duct



Interface Location
Third party supplied 5" (127mm) outer diameter interface.
Hose Length: 78.7" (2m) max. distance from SACU
Airflow: 235 CFM (400 m^3/h)
Heat Load: 2390 btu/hr (0.7 kW) during scanning

(16.1)

PHILIPS

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MP1

KKT cBoxX60/70 Chiller - Specifications/Notes

1. KKT cBoxX60/70 AC Chiller Siting Requirements

a. Customer/contractor required to flush out (with water) all piping prior to connecting to chiller. There must be no debris in the piping when final connections are made.

b. Mechanical contractors must supply and fill all chilled water systems, prior to "commissioning", with ethylene/propolene glycol and water solution. cBoxX chillers require a water/glycol mixture of 35% glycol to water for regions with ambient temperatures greater than -13°F (-25°C). Regions with colder temperatures require a low ambient chiller model and higher glycol concentrations (up to 50%). Use Distilled, Demineralized, or Reverse Osmosis water. Customer/contractor responsible for providing and installing glycol.

c. Chiller must have a minimum of 8' (2.5m) overhead clearance in order to allow proper discharge of warm air from the chiller. Siting must be such that the condenser constantly receives fresh outside air. In addition, chiller must be located such that there is no possibility of condenser fans ingesting lint (from hospital industrial dryers), leaves, sand, dirt or any other materials that can quickly obstruct the condenser fans.

d. The chiller cannot be located in any fully enclosed area (e.g. pits, unused stairwells, closets).

e. Chiller cannot be located next to other heat generating devices or systems (i.e. condenser exhaust, veneration ducts, heating exhaust, etc.). Chiller must be positioned such that it avoids other systems hot air discharge.

f. Any actions and/or add-ons for noise abatement beyond what is provided with the chiller (if any) is solely and exclusively the responsibility of the customer/contractor and must not violate any service clearances or chiller warranty.

g. Maximum allowed elevation above sea level is 6562' (2000m).

h. Ambient temperature range must be between (-13° F to 122° F [(-25° C) to 55° C]).

i. Liquid feed temperature range is 46.4° F to 86° F (8° C to 30° C).

j. Use only the following materials for the pipes: Copper (recommended); Stainless steel; PE or PVC (ensure that the appropriate steps are taken to protect the pipe along its length.) Never use galvanized piping.

k. The maximum one-way linear piping distance between chiller and CIP is 328' (100m). (See table)

l. The maximum allowed long radius elbows in total piping run is 20 pieces.

m. Long radius elbows must be used.

n. Maximum height difference between chiller and LCC is 82' (25m).

o. Chiller must be located a minimum 208" from magnet isocenter to avoid Electromagnetic Field interference from the motor. Refer to Sheet SN1 for details.

2. KKT cBoxX60/70 Chiller Commissioning Notes

a. KKT chillers shall commission the chiller. A completed "Pre-Startup Checklist" shall be forwarded to your Philips Project Manager prior to commissioning. Items incomplete at the time of the commissioning will generate delays and additional commissioning costs to be incurred by the installer. Philips Project Manager to schedule Startup with KKT.

b. Mandatory Commissioning Conditions:

- The Startup must be scheduled no less than 10 business days in advance of the requested startup date. The "Pre-Startup Checklist" must be completed and returned prior to scheduling.
- The Startup visit will be conducted within standard business hours. Weekends and after hours Startup service may be available at an additional charge.
- 4 hours is allotted for the completion of this service. If the Startup is delayed due to the site not being adequately prepared, additional charges may apply. Automatic air bleeders must be installed as detailed in the KKT installation manual.
- The Mechanical Contractor responsible for Electrical and Piping installation must be on site during the Startup visit.
- The site's plumbing lines must be flushed before connecting to the chiller. Additionally, all lines must be leak checked with pressurized air (no water) prior to the arrival of KKT technician. All wiring must be installed and connection made prior to KKT technician's arrival. Additionally, safety disconnects must be installed and tested.
- A water sources must be available within close proximity (i.e. garden hose attached to a building water supply) for maintenance purposes.
- The KKT technician will verify the chiller installation was completed per manufacturer's guidelines, and will complete the Startup Checklist while onsite.

c. Commission Summary - The commissioning technician will:

- Verify: inlet voltage, proper pump, compressor, and condenser fan rotation, clearances, control voltage (adjust primary multi-tap as required), water levels in tank.
- Start unit and check: refrigerant operation, pumps and water hose connections for leaks, operation of remote controller (per customer's requirements), amperage of compressor/pump/condenser fans, correct minor installation problems, review proper operation with maintenance personnel, provide report to Philips.

* Installation, rigging, and support (i.e. concrete pad or roof curbing) of Chiller to be provided by customer/contractor. Installation and support of Chiller to follow local codes.

(19.2)

Mechanical / Plumbing Layout

All piping to be minimum 1-1/2" (40mm) copper (recommended), stainless steel, PE or schedule 80 PVC with long radius bends, provided and installed by customer/contractor. All Full port ball valves and branching tees to be provided and installed by customer/contractor.

Customer/contractor to insulate all piping to prevent condensation and to minimize heat gain from ambient air.

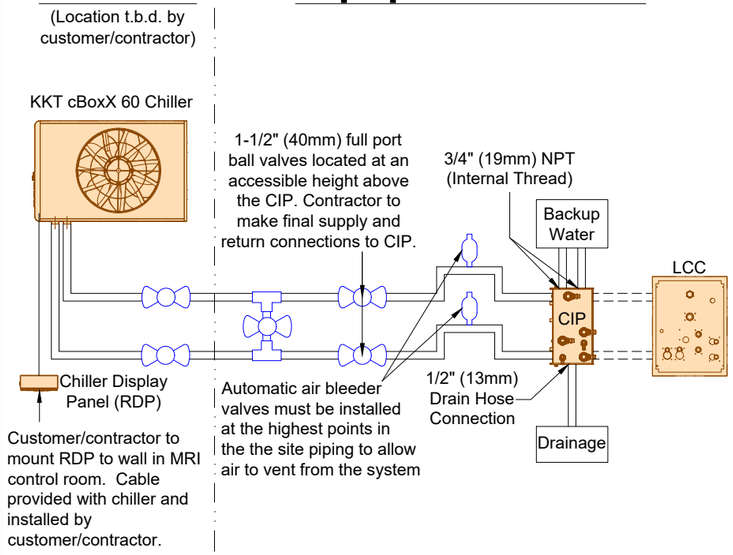
Maximum long radius 90° elbows: 10 long radius elbows one way (or 20 round trip). Maximum elevation above sea level is 6562' (2000m).

Relation of Pipe Diameter to Distance between Chiller and CIP		
Chiller to CIP Elevation	**Connections at Chiller**	**Max Allowed One Way Piping**
cBoxX 60 Below/Equal to CIP	1-1/2" RP	<=328' (100m) @ 1-1/2" Pipe
cBoxX 60 Above CIP	1-1/2" RP	<=164' (50m) @ 1-1/2" Pipe
		<=328' (100m) @ 2" Pipe
cBoxX 70 Below/Equal to CIP	2" RP	<=328' (100m) @ 1-1/2" Pipe
cBoxX 70 Above CIP	2" RP	<=164' (50m) @ 1-1/2" Pipe
		<=328' (100m) @ 2" Pipe

For distances exceeding 328' (100m) of straight pipe one way, e-mail actual pipe length, the difference in height, and the required pipe elbows to support@kkt-chillerusa.com.

For CIP purchased from PHILIPS, refer to Installation and Operation manual from the manufacturer for all detailed specification and installation requirements.

All flow, temperature, and pressure gauges shown on the diagram below are required and must be installed prior to chiller delivery.



Plumbing provided and installed by customer/contractor.

Plumbing provided and installed by Philips.

*** Because the "LCC" is delivered with the magnet, customer/contractor must provide a closed loop system so the Chiller can be tested prior to magnet delivery.**

**** If a chilled water system is used, it is the customer/contractor responsibility to meet all codes concerning the dumping of glycol. The amount of glycol (by volume) drained during a switch-over is the total volume of piping between the CIP and LCC multiplied by the concentration.**

(19.1)

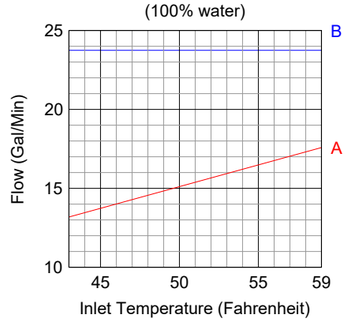
Mechanical / Plumbing Notes

1. Liquid cooling is required 24 hours / 7 days a week. It is the customer/contractor's responsibility to ensure the water source meets the Primary Coolant, Flow, and Pressure Drop Requirements below. Failure of the cold water distribution system will result in a shutdown of the MR system. If Water cooled cryo cooler fails, the Air cooled cryo cooler would need to take over cooling of the magnet but clinical use is not possible.

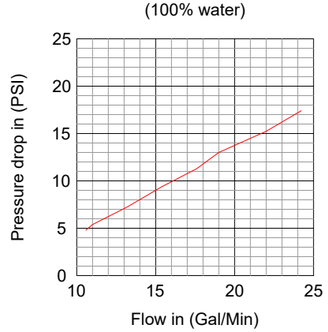
2. Primary Coolant Requirements to the Liquid Cooling Cabinet (LCC):

Inlet Water Quality	Potable Distilled Water
Inlet Water Acidity	6.0 - 8.0 pH
$CaCO_3$	< 250 ppm
Hardness	< 14 (degrees German hardness)
Chlorine	< 200 ppm
Maximum Suspended Matter	< 10 mg/L, <100 micron particle size
Inlet Water Temperature	43° - 61° F (6° - 16° C), 54° F (12° C) preferred
Maximum Flow	23.8 GPM
Maximum Inlet Pressure	87 PSI (6 Bar)
Inlet Water Temperature Stability	± 3.6° F (± 2° C) per 10 minutes
Ethylene/Propolene Glycol Concentration	MRI Chiller: Minimum 35% - Maximum 50%. Hospital Chilled Water: Minimum 0% - Maximum 50%.
Heat Dissipation to Liquid	17,061 - 153,550 btu/hr (5 - 45 kW)

3. Flow Requirements to the Liquid Cooling Cabinet (LCC):
- Flow in gallons per minute versus inlet temperature in Fahrenheit of the chilled water needs to fall into the area on or between curves A and B for each of the graphs in order to maintain enough cooling capacity.
- Maximum flow not to be exceeded to avoid temperature instability in the secondary circuit.
- If needed due to local requirements, it is allowed to use a mixture of maximum 50% of Glycol. Make sure that the supplier of the chilled water calculates the correct flow needed.



4. Pressure drop through Liquid Cooling Cabinet (LCC):
- If needed due to local requirements, it is allowed to use a mixture of maximum 50% of Glycol. Make sure that the supplier of the chilled water calculates the correct flow needed.



5. It is recommended to provide a water back-up system in case the cold water supply to the LCC is down (due to servicing or failure) to reduce the amount of liquid helium evaporating. **(Clinical use/scanning is not possible on tap/domestic water because it does not meet cooling requirements.)** Maximum allowed time of tap/domestic water cooling is 2 weeks.

6. A minimum 66 gallon (250 liter) water buffer in the chilled water system is recommended to be installed to smooth out the dynamic behavior of the MR heat load. A dedicated MR chiller can accommodate this requirement. Contact Philips for more information. (19.0)

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
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Drawn By: Markie Apple

Project Details
Drawing Number
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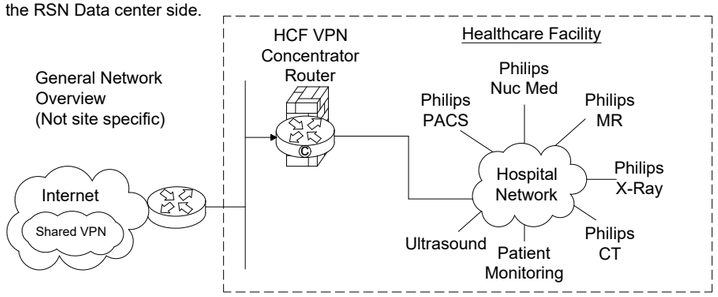
MP2

Philips Healthcare Remote Services Network (RSN)

Secure broadband connection required for Philips remote technical support, diagnostics, and applications assistance

Broadband Site-to-Site Connectivity (Preferred)
This connectivity method is designed for customers who prefer a connection from the RSN Data Center to the Health Care Facility (HCF) utilizing their existing VPN equipment.

Connectivity Details:
- A Site-to-Site connection from the RSN data center's Cisco router will be established to the HCF's VPN concentrator.
- The VPN Tunnel will be an IPSEC, 3DES encrypted Tunnel using IKE as standard, but alternative standards are also available, such as AES, MD5, SHA, Security Association lifetime and Encryption Mode.
- Every system that we will be servicing remotely will have a static NAT IP that we configure on the RSN Data center side.

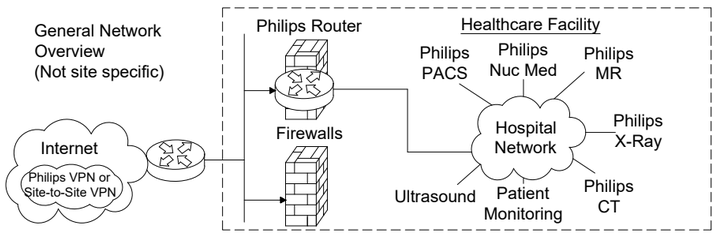


Action Required by Hospital:
- Review and approve connection details.
- Complete appropriate Site Checklist.
- Configure and allow Site-to-Site access prior to setting up connectivity depending on the access criteria that the HCF decides to implement (ex: Source IP filtering, destination IP filtering, NAT assignment, etc.).
- Route traffic from within the hospital network with destination addresses 192.68.48.0/22 to the designed IP provided by Philips.

Broadband Router Installed at Health Care Facility
This connectivity method is designed for customers who have a dedicated high speed connection for Philips equipment.

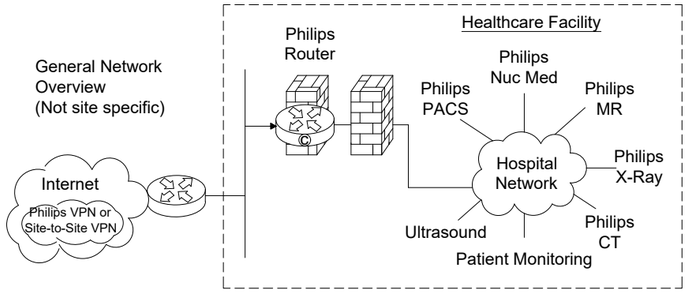
Connectivity Details:
- An RSN Cisco 1711 or 1712 router will be preconfigured and installed at the HCF by Philips in conjunction with the HCF IT representative.
- The VPN Tunnel will be an IPSEC, 3DES encrypted Tunnel using IKE and will be established from the RSN-DC and terminated at the RSN Router on-site.
- One to One NAT is used to limit access to Philips equipment only.
- Router Config and IP auditing is enabled for Customer IT to view via website 24/7.
- Dedicated DSL connections are also supported.

Option 1: Parallel to HCF Firewall Connectivity Method
This connectivity method is designed for customers who prefer a Philips RSN Router installed on site utilizing all the security features provided and managed by Philips.



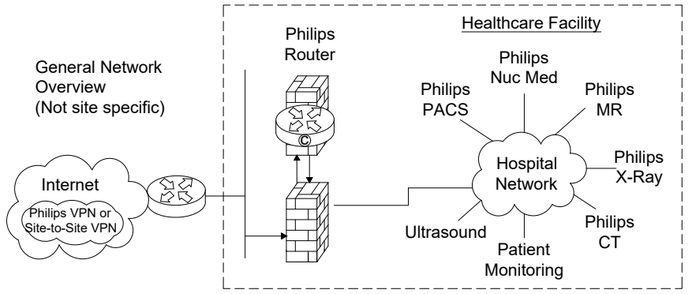
Action Required by Hospital:
- Assign a fixed public IP Address from the ISP to be configured on the Philips router. This is the DOTTED link on the picture connected to the firewall.
- Assign a Back end IP for the Philips router on the Hospital Network.
- Complete appropriate Site Checklist.
- Route traffic from within the hospital network with destination addresses 192.68.48.0/22 to internal Philips router Ethernet interface. This is the DASHED line connected to the firewall.

Option 2: Back End Connected to the HCF Firewall Connectivity Method
This connectivity method is designed for customers who prefer a Philips RSN Router installed on site by setting up an IP-Based policy allowing access thru existing HCF Firewall to Philips equipment.



Action Required by Hospital:
- Assign a fixed public IP Address from the ISP to be configured on the Philips router. This is the DOTTED link on the picture connected to the firewall.
- Assign a Back end IP for the Philips router on the Hospital Network.
- Complete appropriate Site Checklist.
- Route traffic from within the hospital network with destination addresses 192.68.48.0/22 to internal Philips router Ethernet interface. This is the DASHED line connected to the firewall.
- Configure and allow on the firewall on the DASHED line interface access between the IP address allocated by the hospital to the Philips internal Ethernet router interface and the target modality IP address.

Option 3: Router Installed Inside the HCF's DMZ
This connectivity method is designed for customers who prefer the RSN Router installed inside an existing, or new DMZ, allowing access to Philips equipment.



Action Required by Hospital:
- Assign a fixed public IP Address from the ISP to be configured on the Philips router. This is the DOTTED link on the picture connected to the firewall.
- Assign a Back end IP for the Philips router on the Hospital Network.
- Complete appropriate Site Checklist.
- Route traffic from within the hospital network with destination addresses 192.68.48.0/22 to internal Philips router Ethernet interface. This is the DASHED line connected to the firewall.
- Configure and allow on the firewall on the DASHED line interface IPSec protocol communication by opening protocol 500, 50, 51, 47 and port 23 + TACACS. Traffic should be between external IP Address located on the Philips router and the RSN Data center IP address 192.68.48/24 and IP address AOSN TACAS.
- Configure and allow on the firewall on the DASHED line interface access between the IP address allocated by the hospital to the Philips internal Ethernet router interface and the target modality IP address.

(14.0)

System Network Information

IMPORTANT NOTE:
It is the customer's responsibility to coordinate with the local Philips Engineer to provide ALL required network information and install ALL required network and cabling & drops according to Philips specifications PRIOR to the scheduled installation start date. Failure to do so may delay system installation and jeopardize the customer hand over date.

MRI Scanner		
	Default	**Hospital Preference**
AE Title:	MR1	
Port Number:	104 >= R2.6.3 3010 < R2.6.3	
IP Address:		
Subnet Mask:		
Default Gateway:		

Extended Work Station (EWS)		
	Default	**Hospital Preference**
AE Title:	EWS1	
Port Number:	3010	
IP Address:		

Hospital Network				
	RIS	**PACS (STORE)**	**PACS (Q/R)**	**DICOM PRINTER**
AE Title:				
Port Number:				
IP Address:				

RSN Ports	
Application	**Port**
Field Service Framework for MR	4440 and 80 (TCP)
McAfee ePolicy Orchestrator	80 (TCP)
Remote Desktop Sharing (Lots/To)	5900 (TCP)
Secure FTP (Passive)	22 (TCP)
Telnet SSH2	22 (TCP)
Philips Service Agent (Outbound)	443 (TCP)

(14.0)

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
Project Manager: Craig Denny
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Drawn By: Markie Apple

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N1

7.12.2019

Chiller Installation Checklist

It is the responsibility of the customer/contractor to ensure that this unit is properly installed before Philips begins installation and commissioning of your chiller. Philips can provide at additional charge, contractors who can install this system and/or glycol in premixed concentrations if you so desire. Please contact your Project Manager for assistance.

By signing the following checklist, you agree that all of the below steps have been properly completed before the commissioning begins. Additional charges may apply if any of the below are not completed properly. The unit must be powered (in operation) and meet all of the below a minimum of 8 hours before KKT arrives on site to commission the chiller system.

- ☐ Chiller has been offloaded, uncrated, and rigged into position. This is the contractor's responsibility and usually requires a forklift (terrain dependent).
- ☐ Chiller has not been damaged during shipment (i.e. damaged crating, bent panels, fluid leaks, etc.). If damage is observed, please notify the Philips Project Manager.
- ☐ Chiller install location meets all air and service clearance requirements (refer to AD Sheet).
- ☐ Chiller has been mounted, anchored, and supported per specifications in chiller manual.
- ☐ Chiller is not located near any other heat sources (i.e. condenser exhaust, ventilation ducts, heating exhaust, etc.).
- ☐ Incoming power to the chiller (phase, voltage, and current rating) has been recorded and confirmed with the installation guide and chiller specification tag to meet all requirements. Safety disconnects must be installed and tested.
- ☐ All field wiring connections verified and match prints. All wiring terminations are tight. All wiring must be installed and connections made prior to KKT technician's arrival.
- ☐ Power supplied to crankcase heaters for minimum of 8 hours prior to arrival of Service Tech for start-up. Note: Power must be supplied to the unit and main chiller disconnect must remain in the ON position.
- ☐ Piping to be Copper (recommended), stainless steel, PE or Schedule 80 PVC (with long radius bends), insulated to prevent condensation and heat gain from ambient air.
- ☐ Piping (plumbing) has been tested, free of leaks and free of air. All lines must be leak checked with pressurized air (not water) prior to the arrival of KKT technician.
- ☐ The site's plumbing lines must be flushed before connecting to the chiller. The recommended glycol/water must be at the filling point. Extra water and glycol should be on hand during startup to ensure the reservoir level maintained after the chiller is operational.
- ☐ Piping is terminated to the medical equipment and is not leaking. Field piping sized and installed according to specs.
- ☐ Automatic air-bleeder valves must be installed at the highest point of the site piping to allow for air to escape from the system.
- ☐ The chiller has been filled (after flushing any particulate matter) Glycol must be maintained at a minimum level of 35% Glycol to water. Tap water is NEVER recommended as minerals and contaminants may pose potential problems. Use Distilled, Demineralized, or Reverse Osmosis water. If the water is not distilled, it must meet the requirements on the MP2 sheet. Water can freeze inside the chiller and algae can form in the system if it is not followed.
- ☐ A water sources must be available within close proximity (i.e. garden hose attached to a building water supply) for maintenance purposes.
- ☐ Chiller Interface Panel (CIP) has been installed and plumbing connections completed.
- ☐ All permits completed and installation approved by proper governing authorities.

Chiller Installation Checklist One Week Prior to Delivery

- ☐ All criteria on Chiller Pre-Startup Checklist for commision completed and commissioning service scheduled.
- ☐ If a water bypass system is incorporated into the design, all associated plumbing completely installed.

Customer/Contractor Signature	Date	Print Name	Date
Title		Accepted By (Philips)	Date

Site Readiness Checklist

Instructions:
- This form is to be used by Project Manager and Customer/Contractor.
- Information is used to develop and determine site ready date.
- Items listed are go/no go items for delivery unless noted as delay only items.
- Items listed with ** are critical to magnet and site readiness and may cause significant cost and delay to site readiness if not addressed properly.
- Items identified as delay items must be completed after hours or on weekends. These items cannot be accomplished while installation is in progress and must be completed within 2 days of installation start or they may stop installation.

General Requirements

- ☐ Customer site preparation verified in general against the Philips Final Site Planning drawings.
- ☐ Site is safe to work: i.e. no open mains, no slippery floors, no sharp edges and no hazardous goods on site.
- ☐ Existing equipment is dismantled and moved from the site.
- ☐ Handover between Project Manager and Installation crew done: update on site layout, names, telephone numbers, additional hardware and other open items. Escalation procedures communicated.
- ☐ Permits and inspections completed by applicable governing authorities. Method statement available and safety instructions attended (if required).
- ☐ ****Climate equipment is installed and operational: humidity, temperature and dust conditions are according the Site Planning drawings.All pre-cabling identified on Philips drawings has been installed.**
- ☐ All network cabling, drops installed according to Philips specifications. (Including hardcopy cameras). Network connection point available as well as contact details for facility IT.
- ☐ Common electrical power (e.g. house wiring, lighting, etc.) completed and functional.
- ☐ Cable conduit and ducts installed and clean. Duct covers in place but not finally closed. Cable opening are clear, without sharp edges.
- ☐ Cable ducts and feedthroughs available according to site drawings and incl. pull strings if applicable. Point to point cable lengths verified and enough space to store overlength.
- ☐ Construction resource scheduled to finish transport opening (e.g. sheet rock, studding, sanding, painting, etc.) Not later than 2 days after SID.
- ☐ Floors are finished and covered with protective covering (scratch protection).
- ☐ Walls finished including painting. Cabinets and casework installed.
- ☐ Backing support as required for wall mounted equipment.
- ☐ Ceiling lights installed. Ceilings installation completed.
- ☐ Rooms have been cleaned.
- ☐ Rooms are lockable and keys/alarm codes are provided. Access is arranged including permission for after-hours as well as storage for tools. Sufficient storage space Min. 18 sqm = min. 195 sqft.
- ☐ Coordination with all the third party vendors is done for the UPS, additional equipment, finishing the transport opening and waste removal.
- ☐ Optional Local requirements.
- ☐ RSN Surveys completed and submitted. RSN Connectivity to be established prior to the end of the installation.
- ☐ No other construction works needed other than required to complete the site after magnet bring in and rigging. No dust generating activities allowed anymore.

Rigging

- ☐ Access route for Magnet and system parts route are prepared as committed, checked for size, max floor load and all obstacles removed. Check executed on weather conditions; Project Manager to decide on optional plan.
- ☐ Rigging Tools, Installations tools as required, general tools and ladders present.

Control Room

- ☐ Electrical / Mechanical / Network / Millwork completed.

Equipment Room

****Mains and PE available and according to norms mentioned in Site Planning drawing. Resources are scheduled to connect facility mains to gMDU.** It is absolutely required to have the MDU connected to hospital power the first day of magnet delivery.

- ☐ Chiller operational, water plumbing and required valves installed, tested, free of air and leaks, flushed and ready for use. Facility water connections are prepared for LCC connections. Not later than 2 days after SID.
- ☐ **Magnet connected to the cryo cooler within 8 days after the magnet has left the factory.**

Exam Room

- ☐ Ceiling ladder trays, service light and switch, installed and operational.
- ☐ Service clearance area above magnet in place and unobstructed.
- ☐ Ceiling grid, functional lighting, sprinklers, etc. installed (ceiling tile may be excluded around the magnet and System Filter Box (SFB). Sprinklers, lighting, HVAC ducts and all other 3rd party items above suspended ceiling positioned correctly.
- ☐ Sheet rock hung, taped, sanded, and primed (except for transport opening).
- ☐ Finished floor that avoids electrostatic discharge problems installed.
- ☐ All metal e.g. aluminum strips, aluminum light fixtures, air handling grids, supports etc. must be connected to the central RF-enclosure grounding point using a tooth washer. The impedance between any conductive part and the central PE bus-bat/terminal must not exceed 100 mΩ.
- ☐ All loose ferromagnetic materials have been removed from the examination room (required prior to system ramping - approximately Day 3 of installation).

Items Specific for the MRI Systems

- ☐ ****Ferromagnetic reinforcement and structural beams specifications on Site Planning drawings must be met.**
- ☐ Environmental Survey completed (Required for 3.0T and applicable for 1.5T if known disturbances are near the magnet).
- ☐ Magnetic shielding installed if applicable.
- ☐ Gradient air cooling available and operational according to specifications. (Only applicable for Achieva, Multiva and Ingenia CX)
- ☐ RF enclosure grounding connected to the facility earth point. Responsibility of the local electrical contractor.
- ☐ RF enclosure supplier planned to close up the RF cage. Including cable ducts, ceiling, floor finishing, wave guides, walls, PE, lights and electricity. Ceiling may be left open around the magnet, SFB and cable duct. Not later than 2 days after SID. Door opens smoothly.
- ☐ RF Enclosure hand over, certification tests (attenuation measurements, floor levelness and magnet footprint) and sign off by the Project Manager planned; PRD document to be used for RF enclosure hand over.

Site Requirements/Readiness - Signature
Approved for Delivery

Customer/Contractor	Date	Project Manager (Philips)	Date

PHILIPS

Project
Ingenia Ambition 1.5T X
St. Luke's Hospital East
Lee's Summit, MO
Room: MRI

Philips Contacts
Project Manager: Craig Denny
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Drawn By: Markie Apple

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CHK1

Ambient Checklist

(InBore Solution + Tier 1 Lighting)

Installation Item	Philips Supply	Philips Install	Shielding Vendor Supply	Shielding Vendor Install	Contractor Supply	Contractor Install	Notes
Basic							
RF Cage, door, window			X	X			
AE RF cage filter and mounting plate	X			X			
AE equipment cabinet	X	X					
AFF power cable termination					X	X	
Floor covering					X	X	
Floor island					X	X	
Exam room walls (including projection wall)					X	X	
Rounded corners					X	X	
All conduits/boxes/trays specified for AE cables					X	X	
External audio input cable	X	X					
AE audio output cable to MR system	X	X					
Wireless access point (optional)	X	X					
Mains electrical outlet for SFF					X	X	
Power outlet for external audio source					X	X	
Grounding straps (Philips supplied AL ceiling)	X			X			
Power outlets for AE power adapters					X	X	
Grounding straps (Shield vendor supplied AL ceiling)			X	X			
Cabinets							
Coil cabinet(s) (optional)	X					X	
Lighting							
Perimeter LED ceiling holes (non-aluminum)						X	
Perimeter LED modules (non-aluminum ceiling)	X	X					
Raceway or J Hooks above ceiling for LED light cables					X	X	Per local code
AE distribution box, lighting	X	X					
Cabling from AE cage filter to LED distribution box	X	X					
Cabling from distribution boxes to LED modules	X	X					
Cabling between LED modules	X	X					
Support for cabling between LEDs, if required					X	X	Per local code
Terminator on LED module string	X	X					

Installation Item	Philips Supply	Philips Install	Shielding Vendor Supply	Shielding Vendor Install	Contractor Supply	Contractor Install	Notes
InBore Monitor	X	X					
Opening in finished examination room wall centered on iso-center on rear wall						X	
Opening in RF wall for the RF wall interface frame centered on iso-center on rear wall				X			
Electrically conductive material around opening in RF wall			X	X			
RF Wall interface frame	X			X			
RF Window	X	X		X			
Glass Bezel	X	X					
Local mains power supplied behind the RF Wall					X	X	
Conduit runs from SFF to behind InBore monitor and junction box location					X	X	
Power cable for InBore Monitor	X	X					
Network cable for InBore Monitor	X	X					
Distance between structural outside wall and RF wall > 50mm					X		
Power switch for InBore Monitor in technical room					X	X	
Patient head coil mirror	X						
Heating/cooling behind InBore monitor					X	X	
Touchscreen							
Touch Screens (wall and desk)	X	X					
Cables from SFF to touchscreens	X	X					
Power outlet for desk touchscreen					X	X	
Power for wall touchscreen and USB Extender					X	X	Located in junction box
Touchscreen power adapter (desk or wall)	X	X					
Touchscreen wall mount	X	X					
Junction box for both touchscreens					X	X	

PHILIPS

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Room: MRI

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Drawn By: Markie Apple

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CHK2