Vantage Titan

DRAWING CONTENTS

TOSHIBA
Leading Innovation

REV	DATE	REVISED SHEET(S)	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08-05-13	A1, A2, S1, P1, M1, E1 & E2.	C.B.S.

TRISTAN ASSOCIATES

(MR SCAN ROOM – TITAN)

4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

DATE: 08–05–13

SCALE: NOT TO SCALE

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

C1

ALL INFORMATION ON THIS SHEET IS TO BE CONSIDERED PRELIMINARY AND TENTATIVE AND IS SUBJECT TO CHANGE OR REVISION WITHOUT PRIOR NOTICE. THIS INFORMATION IS FOR PLANNING PURPOSES ONLY.

MINIMUM SITE REQUIREMENTS CHECKLIST

PROJECT:		SITE INSPECTION DATE:
EQUIPMENT DELIVERY DATE:		INSPECTED BY:
IN ORDER TO ENSURE A TIMELY AND SUCCESSFUL INSTALLATION, IT IS NECESSARY TO COMPLETE THIS FORM PRIOR TO INSTALLATION. PLEASE ASSIST US BY HAVING THE CONTRACTOR OR YOUR REPRESENTATIVE COMPLETE THE FOLLOWING:		
	1.	ALL WALLS, FLOORS, AND CEILINGS FINISHED. WALLS PAINTED, FLOORS TILED, AND CEILING GRID WORK AND FIXTURES INSTALLED.
	2.	MONOLITHIC OR LAY–IN CEILING? PLEASE CIRCLE ONE. ALL MATERIALS IN SCAN ROOM MUST BE NON–FERROUS.
	3.	DOORS AND WINDOWS INSTALLED AND LOCKABLE. DOORS TO BE REMOVED PRIOR TO DELIVERY BY CUSTOMER OR CONTRACTOR AND REINSTALLED AFTER EQUIPMENT MOVE–IN. RESERVE SECURE ROOM FOR STORAGE DURING INSTALLATION.
	4.	AREA SET ASIDE FOR EQUIPMENT RIGGING AND MOVE–IN (INCLUDING MAGNET OPENING IN SCAN ROOM). ENVIRONMENTAL ISSUES ADDRESSED AND RESOLVED PRIOR TO EQUIPMENT DELIVERY. RECEPTACLE FOR TRASH AVAILABLE (LARGE ENOUGH FOR SHIPPING CRATES IF REQUIRED). EQUIPMENT (INGRESS) ROUTES ARE CLEAR AND OBSTACLE FREE.
	5.	ALL CONDUIT, TROUGHING (WITH COVERS), AND BOXES INSTALLED (CLEAN AND DUST FREE). GROMMETED OPENINGS, CHASE NIPPLES, RACEWAY DIVIDERS, ETC. COMPLETE.
	6.	CIRCUIT BREAKER INSTALLED AND INCOMING POWER (PER POWER QUALITY REQUIREMENTS) OPERATIONAL AND CONNECTED TO ROOM BREAKER(S).
	7.	LOCATION OF ALL ELECTRICAL BREAKERS IN POWER CHAIN NOTED.
	8.	ALL CONTRACTOR–INSTALLED STRUCTURAL SUPPORT DEVICES INSTALLED AND LEVELED ACCORDING TO TAMS SPECIFICATIONS ON SITE PLANS.
	9.	ALL CONTRACTOR–SUPPLIED CABLES PULLED AND TERMINATED, INCLUDING GROUND WIRE IN TROUGHING AS SPECIFIED IN THE TOSHIBA SITE PLANS.
	10.	DUST–FREE ENVIRONMENT IN ALL RELATED ROOMS.
	11.	HEATING AND AIR–CONDITIONING INSTALLED, OPERATIONAL AND STABILIZED PER TOSHIBA SITE PLANS. FILTERS TO BE CHANGED 24 HOURS BEFORE DELIVERY.
	12.	ALL MILLWORK COMPLETE AND INSTALLED. ENSURE THAT NON–FERROUS MATERIAL IS USED FOR ANY MILLWORK IN SCAN ROOM.
	13.	COMPUTER FLOORING INSTALLED, IF APPLICABLE.
	14.	ALL UNFINISHED AREAS SEALED OFF TO PREVENT DUST CONTAMINATION.
	15.	RECEPTACLE FOR TRASH AVAILABLE (LARGE ENOUGH FOR SHIPPING CRATES IF REQUIRED).
	16.	"PCDU/VRDU/UPS" INSTALLED AND CONNECTED TO "CB".
	17.	LINE FILTER PANEL INSTALLED IN SCAN ROOM.
	18.	RF ROOM COMPLETE AND TESTED. PROVIDED COPY OF SIGNED TEST RESULTS TO SITE PLANNING.
	19.	ALL REQUIRED WAVE GUIDES INSTALLED (INCLUDED MED–GASES, IF APPLICABLE).
	20.	PLUMBING FOR CHILLER AND CRYO COOLER INSTALLED, FLUSHED, AND TESTED.
	21.	SEISMIC REQUIREMENTS, AND REQUIRED SEISMIC ANCHORING DEVICES INSTALLED (IF APPLICABLE).
	22.	NETWORK CONNECTIONS INSTALLED AND OPERATIONAL.
	23.	QUENCH PIPE INSTALLED PER TOSHIBA SPECIFICATIONS (SEE SHEETS M1–M4). USE ONLY STAINLESS STEEL OR ALUMINUM MATERIAL FOR QUENCH PIPE AS SHOWN ON PLAN.
	24.	ALL APPLICABLE PERMITS OBTAINED.
	25.	MAGNETIC/RF SHIELDING DESIGNED, MODELED, AND BUILT.
	26.	ALL MATERIALS IN SCAN ROOM MUST BE NON–FERROUS.
	27.	CLEAN WORK AREA SET ASIDE OUTSIDE PROCEDURE ROOM DOOR AND CONTROL AREA.
	28.	EMERGENCY VENT INSTALLED AND OPERATIONAL.
	29.	CUSTOMER SUPPLIED WATER CHILLER SYSTEM INSTALLED AND OPERATIONAL.

NOTICE:
CUSTOMER MUST COMPLETE ALL ITEMS ON THIS CHECKLIST BEFORE SCHEDULED DELIVER DATE FOR THE EQUIPMENT. IF CUSTOMER FAILS TO DO SO, DELIVERY MAY BE DELAYED. FURTHERMORE, THE EQUIPMENT WARRANTY MAY BE VOIDED.

COMMENTS:

SIGNED TOSHIBA:	
CONTRACTOR:	
CUSTOMER:	

01–30–12

SPECIAL NOTES

SPECIAL SEISMIC CERTIFICATION

A. THE FOLLOWING COMPONENTS HAVE SPECIAL SEISMIC CERTIFICATION:
- A.A. OSP–0162–10
  PCDU/VRDU – GROUP 1 ENCLOSURES (AS APPLICABLE)
- A.B. OSP–0013–10
  UPS – 9390 160 KVA (AS APPLICABLE)
- A.C. OSP–0088–10
  BAT – BC55 (AS APPLICABLE)

B. WEIGHTS SHOWN ON THE OSP DOCUMENTS ARE GENERALLY A MAXIMUM AND THE WEIGHTS SHOWN ON THESE SITE PLANS REFLECT THE EQUIPMENT AS ORDERED.

09–18–12

GENERAL NOTES

CUSTOMER/CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING UNLESS OTHERWISE NOTED.

GENERAL

A. TOSHIBA RESERVES THE RIGHT TO CHANGE THESE DESIGNS AND SPECIFICATIONS WITHOUT NOTICE.

CUSTOMER/CONTRACTOR RESPONSIBILITIES

B. CUSTOMER/CONTRACTOR SHALL SUPPLY AND INSTALL MATERIALS AND OTHER FEATURES SPECIFIED IN THE TOSHIBA SITE PLANS. CUSTOMER/CONTRACTOR SHALL SUPPLY AND INSTALL ALL COUNTERTOPS, SINKS (REFER TO DETAIL 1, SHEET P1), CASE WORK AND CABINETS SPECIFIED IN THE TOSHIBA SITE PLANS.

C. ANY CABINETRY THAT MAY BE REQUIRED TO HOUSE VIDEO RECORDERS, MONITORS KEYBOARDS, OR OTHER ANCILLARY EQUIPMENT SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR.

D. THESE TOSHIBA SITE PLANS DO NOT INDICATE EQUIPMENT REQUIREMENTS FOR ITEMS NOT SOLD BY TOSHIBA SUCH AS, PHYSIOLOGICAL MONITORS, LASER CAMERAS, INJECTORS, ETC. SPECIFICATIONS FOR THOSE ITEMS MUST BE OBTAINED FROM THE VENDOR AND INCLUDED IN THE DESIGN TOTALS.

E. IF REQUIRED, THE CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN INTERCOM SPEAKER SYSTEM BETWEEN THE EQUIPMENT ROOM, CONTROL ROOM, AND PROCEDURE ROOM.

F. THE CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL COSTS REQUIRED FOR THE ENGINEERING AND/OR REMOVAL OF ANY HAZARDOUS MATERIALS SUCH AS ASBESTOS.

G. CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN OPERATING PHONE IN THE CONTROL ROOM AT THE TIME TOSHIBA EQUIPMENT INSTALLATION BEGINS.

H. CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE LIGHTING FOR SERVICING OF EQUIPMENT IN ALL AREAS OF THE INSTALLATION.

I. PRIOR TO EQUIPMENT DELIVERY AND INSTALLATION, THE SITE MUST BE 100% COMPLETE, CLEAN AND FREE OF DUST. CUSTOMER/CONTRACTOR AND TOSHIBA INSTALLATION PROJECT MANAGER MUST COMPLETE A SITE WALK THROUGH 1 WEEK PRIOR TO DELIVERY AND DETERMINE ACCEPTABILITY FOR DELIVERY.

J. CUSTOMER/CONTRACTOR/ARCHITECT SHALL BE RESPONSIBLE FOR PROVIDING THE ENTIRE NETWORKING AND COMMUNICATION SYSTEMS.

K. ALL MATERIAL IN SCAN ROOM MUST BE NON–FERROUS.

RF / MAGNETIC SHIELDING

L. CUSTOMER/CONTRACTOR RESPONSIBLE FOR OBTAINING A SHIELDING VENDOR, TO MODEL, DESIGN, AND BUILD REQUIRED MAGNETIC AND RF SHIELDING.

M. MAGNET FEET MUST BE INSULATED (ISOLATED) FROM RF ENCLOSURE.

N. GAUSS LINES IN THESE DRAWINGS ARE REPRESENTED WITHOUT MAGNETIC SHIELDING.

O. RF SHIELDING WEIGHT WILL VARY FROM SITE TO SITE. CUSTOMER'S STRUCTURAL ENGINEER MUST CONSULT WITH RF ENCLOSURE VENDOR FOR RF SHIELDING WEIGHTS.

P. THE EXISTING AND PROPOSED STRUCTURAL/ENVIRONMENTAL STEEL INFORMATION WITH RELATIONSHIP TO MAGNET MUST BE PROVIDED TO SITE PLANNING FOR REVIEW (FOR ALL WALLS, CEILING AND FLOOR). ALL STRUCTURAL/ENVIRONMENTAL STEEL SHOULD BE IDENTIFIED INCLUDING, BUT NOT LIMITED TO, REBAR, BEAMS, PIPES, DRAINS, AND ANY STEEL USE FOR MAGNETIC SHIELDING.

Q. THE MAGNET ENVIRONMENT IS SENSITIVE TO FERROUS MATERIAL, WHICH CAN AFFECT IMAGE QUALITY. THE MOST SENSITIVE AREA IS WITHIN AN 8' X 8' AREA BENEATH THE MAGNET TO A DEPTH OF 1'–4". CONTACT YOUR TOSHIBA INSTALLATION PROJECT MANAGER TO HAVE A STEEL SURVEY COMPLETED TO EVALUATE SITE SPECIFIC CONDITIONS.

R. MAGNETOMETER SURVEY MUST BE PERFORMED BY TOSHIBA BEFORE SUBMITTING FINAL DRAWINGS (120V POWER IS REQUIRED FOR TOSHIBA TO BEGIN SURVEY. A MINIMUM OF 50'F IS REQUIRED FOR SURVEY AREA).

S. THE SHIELDING WORK IS REQUIRED TO SUPPRESS EXTERNAL LEAKAGE OF THE ELECTROMAGNETIC RADIATION GENERATED BY THE SYSTEM.

T. THE SHIELD MUST ATTENUATE ELECTROMAGNETIC RADIATION IN THE FREQUENCY BAND OF 63.86 MHz ± 0.5 MHz BY AT LEAST 90 dB.

90 dB OR MORE FROM 64.36 MHz TO 70 MHz
90 dB OR MORE FROM 70 MHz TO 300 MHz
50 dB OR MORE FROM 300 MHz TO 350 MHz
40 dB OR MORE FROM 350 MHz TO 1 GHz

CODES AND PERMITS

U. THE CUSTOMER/CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES ARE COMPLIED WITH.

SITE CONDITIONS

V. DIMENSIONS TO WALLS AND OR OTHER ROOM FEATURES, EXCEPT FOR NOTED COLUMN AND BEAM CENTER LINES SHALL BE FROM FINISHED SURFACES.

PLUMBING

W. PLUMBING IS REQUIRED FOR CERTAIN COMPONENTS OF TOSHIBA EQUIPMENT.

TRANSPORT REQUIREMENTS

X. EQUIPMENT INGRESS ROUTE MUST BE CHECKED PRIOR TO EQUIPMENT DELIVERY TO ENSURE THE LARGEST AND HEAVIEST ITEMS OF EQUIPMENT CAN BE ACCOMMODATED, DIMENSIONS OF CORRIDORS SHOULD BE NO LESS THAN 8'–0".

Y. RECOMMENDED ENTRANCE TO SCAN ROOM SHOULD BE NO LESS THAN 7'–3"W X 8'–6"H FOR EQUIPMENT DELIVERY. SPECIAL ARRANGEMENTS MAY BE NECESSARY FOR MAGNET DELIVERY, INCLUDING A LARGER OPENING IN THE RF SHIELDING.

Z. CONTACT THE TOSHIBA INSTALLATION PROJECT MANAGER FOR DETAILS OF THE LARGEST AND HEAVIEST ITEMS OF EQUIPMENT FOR THIS INSTALLATION.

09–05–12

CEILING HEIGHT

RECOMMENDED CEILING HEIGHT: 8'–10 5/16"
MINIMUM CEILING HEIGHT: 7'–10 1/2"

IF A CEILING HEIGHT OF 8'–10 5/16" IS NOT AVAILABLE, THE SYSTEM CAN STILL BE INSTALLED AS LONG AS THE MINIMUM CEILING HEIGHT IS 7'–10 1/2" AND A SERVICE OPENING IS PROVIDED IN THE CEILING UP TO 8'–10 5/16".

09–05–12

VIBRATION SPECIFICATION

0.02 M/S² (PEAK TO PEAK) = 2.0 GAL OR LESS
VIBRATION TESTING (IF REQUIRED) IS RESPONSIBILITY OF CUSTOMER / CONTRACTOR.

01–10–11

HVAC REQUIREMENTS

CUSTOMER TO PROVIDE THE NECESSARY HVAC REQUIREMENTS FOR THE TOSHIBA EQUIPMENT TO OPERATE PROPERLY.

AMBIENT TEMPERATURE SHOULD BE IN ACCORDANCE WITH THE FOLLOWING FOR CORRECT EQUIPMENT OPERATION AND PATIENT/OPERATOR COMFORT.

ROOM NAME	HEAT OUTPUT (BTU/H) IN USE		HEAT OUTPUT (BTU/H) STANDBY (NIGHT TIME)		TEMP. (°F)	HUMIDITY (%RH)
MRI SCAN ROOM	TOTAL	4,095	TOTAL	1,707	60.8–75.2°	40–60% (NO CONDENSATION)
MAGNET		4,095		1,707		
CONTROL ROOM	TOTAL	2,391	TOTAL	2,391	60.8–86.0°	40–75% (NO CONDENSATION)
HOST CABINET		1,707		1,707		
MONITOR		342		342		
CONTROL BOX & CONTROL PAD		342		342		
EQUIPMENT ROOM *	TOTAL	31,053	TOTAL	23,205	68.0–75.2°	40–70% (NO CONDENSATION)
TRANSFORMER CAB.		3,071		3,071		
REFRIGERATOR		10,578		10,578		
GRADIENT POWER SUPPLY & ECO CAB.		16,379		8,872		
FILTER PANEL		683		342		
MAGNET FAN BOX		342		342		
POWER SYSTEMS	TOTAL		TOTAL			
PCDU		3,669		N/A		
VRDU (480V)		14,000		N/A		
VRDU (208V)		14,000		N/A		
TRANSFORMER (FOR VRDU 208V)		4,700		N/A		
UPS (480V)		32,800		N/A		
PDU OR PCDU		4,100		N/A		
UPS (208V)		35,500		N/A		
PDU OR PCDU		4,100		N/A		

* NOTE:
FINAL HEAT OUTPUT OF EQUIPMENT ROOM MUST INCLUDE SITE SPECIFIC POWER SYSTEM AND ANY OPTIONAL ITEMS. SEE SHEET A1 FOR ADDITIONAL HEAT OUTPUT OF OPTIONAL ITEMS.

NOTE:
A. A MINIMUM OF 10 AIR CHANGES PER HOUR IS SUGGESTED, CONSULT LOCAL CODE.
B. AIR SUPPLY DUCTS SHOULD NOT BE PLACED DIRECTLY OVER EXAMINATION TABLES FOR PATIENT COMFORT.
C. EQUIPMENT IN ENCLOSED SPACES SUCH AS EQUIPMENT ROOMS, TRANSFORMER CLOSETS AND COMPUTER ROOMS MUST BE PROVIDED WITH ADEQUATE VENTILATION. THE AIRFLOW THROUGH TOSHIBA EQUIPMENT CABINETS IS FROM BOTTOM TO TOP. WHERE POSSIBLE, AIR CONDITIONING SUPPLY OUTLETS SHOULD BE LOCATED AT FLOOR LEVEL WITH RETURN GRILLES IN THE CEILING.
D. DEDICATED AIR CONDITIONER REQUIRED FOR SCAN AND EQUIPMENT ROOM.
E. AIR CONDITIONING EQUIPMENT MUST HAVE THE ABILITY TO AUTOMATICALLY RESTART IN THE CASE OF A BLACKOUT.
F. THE EQUIPMENT ROOM MUST NOT HAVE SUPPLYING AIR FROM OUTSIDE DUE TO THE POSSIBLE RISE OF HUMIDITY.
G. IT IS NOT RECOMMENDED TO INSTALL THE AIR CONDITIONING UNIT OR FAN INSIDE THE CEILING OF THE MRI SCAN ROOM.
H. THE AIR CONDITIONING SENSOR FOR THE MRI SCAN ROOM SHOULD BE LOCATED IN A RETURN DUCT.

03–12–13

NOISE SPECIFICATION

NOISE IS GENERATED BY THE COOLING FANS IN EACH UNIT. THE NOISE LEVEL DIFFERS AMONG UNITS. THE REFERENCE NOISE LEVELS FOR UNITS THAT ARE PARTICULARLY LOUD ARE SHOWN BELOW.

REFRIGERATOR COMPRESSOR	:	75 dB (A)
TRANSFORMER CABINET	:	65 dB (A)
ECO CABINET	:	64 dB (A)
FAN BOX	:	67 dB (A)
FILTER PANEL	:	59 dB (A)

09–05–12

STRUCTURAL NOTES

CUSTOMER/CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING UNLESS OTHERWISE NOTED.

A. THESE SITE PLANS ARE INTENDED TO DEPICT ONLY A CONCEPT OF THE STRUCTURE REQUIRED FOR THE TOSHIBA EQUIPMENT. THE DESIGN OF ALL STRUCTURAL ELEMENTS MUST BE SPECIFIED BY A LICENSED STRUCTURAL ENGINEER IN ACCORDANCE WITH TOSHIBA SPECIFICATIONS AND ALL APPLICABLE CODES.

B. THE CUSTOMER/CONTRACTOR SHALL FIELD VERIFY ALL EXISTING AND PROPOSED DIMENSIONS AND SITE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION.

C. THE TOSHIBA INSTALLATION PROJECT MANAGER SHALL BE NOTIFIED IN WRITING OF ANY FIELD CONDITIONS ENCOUNTERED THAT ARE CONTRADICTORY TO THOSE SHOWN IN THE TOSHIBA SITE PLANS.

D. THE DEMOLITION, FABRICATION AND ERECTION OF SUPPORT STRUCTURES FOR TOSHIBA EQUIPMENT SHALL BE PERFORMED BY THE CUSTOMER/CONTRACTOR IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS SET FORTH BY THE STRUCTURAL ENGINEER OF RECORD.

E. VANTAGE TITAN MAGNET FEET MUST BE INSULATED/ISOLATED FROM SHIELDED ROOM.

F. INSULATION/ISOLATION FOR MAGNET FEET TO BE PROVIDED BY CUSTOMER/CONTRACTOR.

G. ALL STRUCTURAL MATERIAL IN SCAN ROOM MUST BE NON–FERROUS.

H. IT IS RF VENDOR'S RESPONSIBILITY TO ANCHOR THE MAGNET.

I. THE ENTIRE SCAN ROOM FLOOR TO BE LEVEL WITHIN 1/16".

FLOOR LOADING

J. THE FLOOR MUST SUPPORT 11,904.96 LBS. FOR THE MAGNET, INCLUDING THE COVERS AND THE GRADIENT COIL. THE COMPLETE FLOOR MUST WITHSTAND A MAXIMUM CONCENTRATED MAGNET LOAD OF 3,903.27 LBS. PER SQUARE FOOT (2,976.24 LBS PER MAGNET FOOT). THE FLOOR MUST BE ABLE TO WITHSTAND BOTH THE MAGNET AND THE WEIGHT OF THE MAGNETIC SHIELDING.

05–03–13

ELECTRICAL REQUIREMENTS FOR MRI SYSTEM WITH VRDU

SUPPLY CONFIGURATION: 3 PHASE DELTA
102 kVA SERVICE

SUPPLY VOLTAGE: 480V – 150 AMP

03–14–12

ELECTRICAL NOTES

CUSTOMER/CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING UNLESS OTHERWISE NOTED.

A. THESE SITE PLANS ARE INTENDED TO DEPICT ONLY A CONCEPT OF THE ELECTRICAL REQUIREMENTS FOR THE TOSHIBA EQUIPMENT. THE DESIGN OF ALL ELECTRICAL ELEMENTS MUST BE SPECIFIED BY A LICENSED ELECTRICAL ENGINEER IN ACCORDANCE WITH TOSHIBA SPECIFICATION AND ALL APPLICABLE CODES.

B. IN ACCORDANCE WITH NEC ARTICLE 517–72(B), THE EQUIPMENT CIRCUIT BREAKER(S) MUST BE LOCATED SO THAT THEY SHALL BE OPERABLE FROM A LOCATION READILY ACCESSIBLE FROM THE CONTROL AREA. IF THIS IS IMPOSSIBLE OR IMPRACTICAL, THE USE OF A SHUNT TRIP TYPE BREAKER WILL BE NECESSARY TO SATISFY THIS REQUIREMENT. THE EMERGENCY OFF BUTTON FOR THE SHUNT TRIP SHOULD BE LOCATED IN THE CONTROL AREA.

C. THE CUSTOMER/CONTRACTOR SHALL SUPPLY AND INSTALL ALL CIRCUIT BREAKERS, CONDUITS, JUNCTION BOXES, DUCTS, A/C POWER RECEPTACLES, THERMOSTATS, EMERGENCY OFF BUTTONS, AND 12 VOLT POWER, ETC. SPECIFIED HEREIN.

D. THE TOSHIBA SITE PLANS DO NOT SPECIFY ELECTRICAL REQUIREMENTS FOR EQUIPMENT NOT SOLD BY TOSHIBA. THESE REQUIREMENTS MUST BE OBTAINED BY THE VENDOR.

E. TOSHIBA WILL SUPPLY INTERCONNECTING CABLES FOR THE TOSHIBA EQUIPMENT. TOSHIBA WILL INSTALL IF LOCAL TRADE LABOR PERMITS.

F. TOSHIBA WILL PROVIDE CONNECTING AND FILTER PANELS TO RF PROVIDER FOR INSTALLATION. EXCEPT FOR THEIR USE IN POWER LINE CONNECTIONS TO EQUIPMENT CABINETS, FLEXIBLE CONDUIT SHALL NOT BE USED IN THIS INSTALLATION. ONLY FACTORY CONDUIT ELBOWS SHALL BE USED.

G. DUCT WORK SHALL BE PROVIDED WITH SWEEP ELBOWS.

H. ALL JUNCTION BOXES AND DUCTS THAT PENETRATE THE FLOOR SHALL BE WATERPROOF TYPE AND PROVIDED WITH GASKETED WATERPROOF COVERS. ALL FLOOR JUNCTION BOXES AND DUCT COVERS SHALL BE CAPABLE OF SUPPORTING A 200 LB. CONCENTRATED LOAD. ALL MATERIAL IN SCAN ROOM MUST BE NON–FERROUS.

I. ALL ACCESS HOLES ARE TO BE MADE IN THE EQUIPMENT ROOM RAISED FLOOR PER TOSHIBA SITE PLANS. ACCESS HOLES MUST BE GROMMETED WITH NON–CHAFING MATERIAL SUCH AS RUBBER/PLASTIC OR SLEEVED WITH A SHORT NIPPLE WITH NON–ABRASIVE BUSHINGS.

J. ALL CHASE OPENINGS SHALL HAVE PLASTIC/NYLON BUSHINGS.

K. ALL DUCT WORK SHALL HAVE A MINIMUM OF THREE COMPARTMENTS. TRANSITIONS SUCH AS HORIZONTAL TO VERTICAL WALL DUCT OR JUNCTION BOXES MUST BE REVIEWED ON AN INDIVIDUAL BASIS WITH THE INSTALLATION PROJECT MANAGER. LOCAL CODES. MAY REQUIRE THE USE OF CROSS–OVER TUNNELS OR OTHER SUCH DEVICES TO MAINTAIN CABLE SEPARATION.

L. ALL DUCT AND CONDUITS SHALL BE ELECTRICALLY BONDED AS A GROUNDING PATH IN ACCORDANCE WITH NEC ARTICLE 517–13(B).

M. CUSTOMER/CONTRACTOR SHALL SUPPLY AND INSTALL GREENLEE NYLON MEASURING PULL STRING OR EQUIVALENT IN ALL CONDUITS AND CLOSED DUCT WORK.

N. CONDUIT RUNS SHOWN ARE SCHEMATIC ONLY. ALL CONDUIT RUNS MUST TAKE THE SHORTEST MOST DIRECT ROUTE POSSIBLE.

O. CONDUIT RUNS MAY HAVE A MAXIMUM OF (3) 90° BENDS.

P. 110VAC GROUNDED OUTLETS SHALL BE PROVIDED ON WALLS NEAR THE TOSHIBA EQUIPMENT FOR USE DURING EQUIPMENT SERVICE.

Q. CUSTOMER/CONTRACTOR MUST SUPPLY AND INSTALL ALL INCOMING POWER CABLES FROM CIRCUIT BREAKER(S) TO TOSHIBA EQUIPMENT CONNECTION POINT. CABLE TYPE MUST BE MT. MULTI–STRAND COPPER – NO ALUMINUM IS PERMITTED. CABLE SIZE MUST BE IN ACCORDANCE WITH TOSHIBA POWER QUALITY REQUIREMENTS.

R. CUSTOMER/CONTRACTOR IS TO SUPPLY AND INSTALL ALL NECESSARY HARDWARE TO ENCLOSE INCOMING POWER CABLES IN FLEXIBLE WATER TIGHT CONDUIT FROM CIRCUIT BREAKER(S) TO TOSHIBA EQUIPMENT CABINET(S).

S. ANY CHANGES IN THE LOCATION OR TYPE OF CONDUIT, DUCT WORK, JUNCTION BOXES, ETC. MUST BE SUBMITTED IN WRITING TO THE TOSHIBA INSTALLATION PROJECT MANAGER FOR APPROVAL.

T. A SEPARATE CIRCUIT, FED FROM THE FACILITY RADIOLOGY PANEL OR A MAIN SERVICE PANEL IS REQUIRED. USE OF A SUB PANEL WITH LOADS SUCH AS ELEVATORS, HVAC, MOTORS, ETC. IS NOT PERMITTED.

09–05–12

RF ROOM GROUNDING

CUSTOMER/CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING UNLESS OTHERWISE NOTED.

A. WHEN INSTALLED BY THE RF/STEEL ROOM MANUFACTURER, THE RF ROOM MUST BE TOTALLY ISOLATED FROM GROUND. TO MAINTAIN THIS ISOLATION, NO CONDUCTIVE CONNECTIONS (i.e. ELECTRICAL CONDUITS, PLUMBING, HVAC DUCTS, OR ANY CONDUCTIVE BUILDING MATERIAL) CAN BE MADE TO THE OUTSIDE OF THE RF ROOM. TO KEEP THIS INTEGRITY, ALL ABOVE MENTIONED CONNECTIONS SHOULD BE MADE VIA DIELECTRIC CONNECTORS. A DIELECTRIC CONNECTOR IS A NON–FERROUS SLEEVE, NIPPLE, GASKET, ETC. THIS CONNECTOR MUST BE INSTALLED IN ALL HVAC DUCT, ELECTRICAL CONDUIT, AND ANY PIPE CONNECTION TO THE RF ROOM. THE LOCATION OF THE DIELECTRIC IS TO BE OUTSIDE OF THE RF ROOM, AS CLOSE TO THE WALL OR CEILING OF THE RF ROOM AS PRACTICAL.

B. WHILE THE RF ROOM IS UNDER CONSTRUCTION, A BATTERY OPERATED BELL SHOULD BE TEMPORARILY MOUNTED TO THE ROOM. THE RF ROOM IS TO BE USED AS A GROUND FOR THE BELL. IF ANY CONDUCTIVE MATERIAL CONTACTS THE RF ROOM, THE BELL WILL SOUND ALERTING THE FOREMAN AND/OR CONTRACTOR WHO GROUNDED THE ROOM.

C. DURING THE REMAINING CONSTRUCTION, A TEMPORARY #1 SAFETY GROUND SHOULD BE ATTACHED TO THE RF ROOM UNTIL THE "PCDU/VRDU/UPS" IS INSTALLED. AT THAT TIME, A PERMANENT #1 OR LARGER GROUND WIRE SHOULD BE INSTALLED BETWEEN THE MAGNET ROOM AND THE SECONDARY GROUND BUS OF THE POWER SOURCE. REFER TO DETAIL 4 SHEET E3 (FINAL DRAWINGS ONLY).

D. RF ROOM MUST BE ACCESSIBLE FROM ABOVE FOR ENGINEERS TO FIND AND CORRECT RF GROUNDS IN ROOM.

01–10–11

PLUMBING NOTE

A. IT IS THE CUSTOMER'S RESPONSIBILITY TO SUPPLY AND INSTALL THE CHILLED WATER SYSTEM PER TOSHIBA SPECIFICATIONS. REFER TO DETAIL 1, SHEET P2 FOR MORE INFORMATION REGARDING CHILLED WATER SYSTEM REQUIREMENTS.

01–10–11

TOSHIBA
Leading Innovation »»»

REV	DATE	DESCRIPTION	INT	M.C.	C.B.S.
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.			
1	08–05–13	NO CHANGES TO THIS SHEET.			

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FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION PURPOSES.

THESE TOSHIBA PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT AGREED UPON BETWEEN TOSHIBA AND THE CUSTOMER. THESE SITE PLANS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.

DATE: 08–05–13
SCALE: NOT TO SCALE
PLANNER: C.B.S.
SID: 30008837
PROJECT NO. **130013689MRF1**

GN

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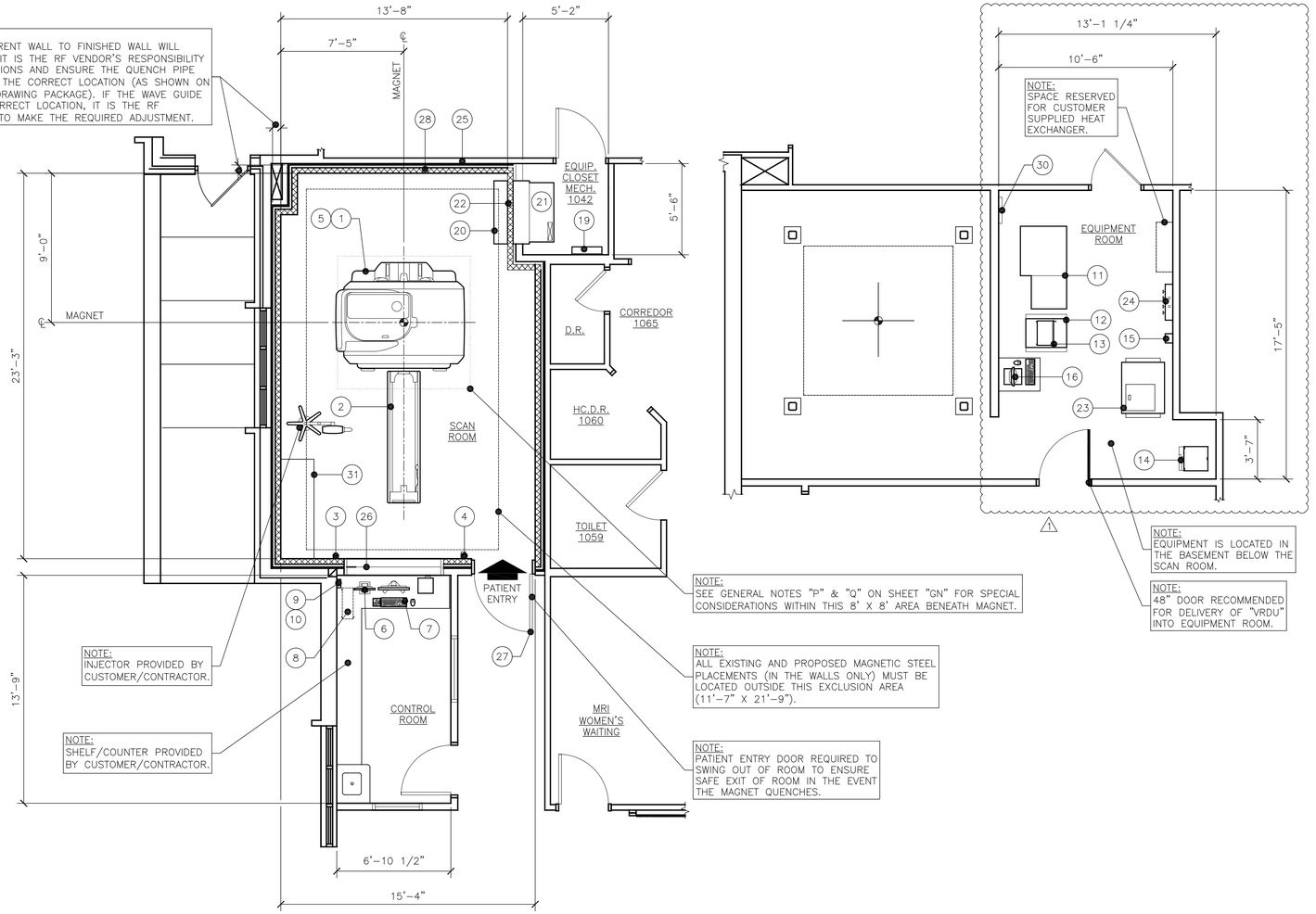
NOTE:
THE DIMENSIONS FROM PARENT WALL TO FINISHED WALL WILL VARY FROM SITE TO SITE. IT IS THE RF VENDOR'S RESPONSIBILITY TO PROVIDE THESE DIMENSIONS AND ENSURE THE QUENCH PIPE WAVE GUIDE IS PLACED IN THE CORRECT LOCATION (AS SHOWN ON SHEET M1 OF THE FINAL DRAWING PACKAGE). IF THE WAVE GUIDE IS NOT PLACED IN THE CORRECT LOCATION, IT IS THE RF VENDOR'S RESPONSIBILITY TO MAKE THE REQUIRED ADJUSTMENT.



NOTE:
INJECTOR PROVIDED BY CUSTOMER/CONTRACTOR.

NOTE:
SHELF/COUNTER PROVIDED BY CUSTOMER/CONTRACTOR.

NOTE:
SEE GENERAL NOTES "P" & "Q" ON SHEET "GN" FOR SPECIAL CONSIDERATIONS WITHIN THIS 8' X 8' AREA BENEATH MAGNET.

NOTE:
ALL EXISTING AND PROPOSED MAGNETIC STEEL PLACEMENTS (IN THE WALLS ONLY) MUST BE LOCATED OUTSIDE THIS EXCLUSION AREA (11'-7" X 21'-9").

NOTE:
PATIENT ENTRY DOOR REQUIRED TO SWING OUT OF ROOM TO ENSURE SAFE EXIT OF ROOM IN THE EVENT THE MAGNET QUENCHES.

NOTE:
EQUIPMENT IS LOCATED IN THE BASEMENT BELOW THE SCAN ROOM.

NOTE:
48" DOOR RECOMMENDED FOR DELIVERY OF "VRDU" INTO EQUIPMENT ROOM.

EQUIPMENT LAYOUT

0 1' 2' 4' 8' 16'

NOTE:
EXISTING/PROPOSED STRUCTURAL STEEL SHIELDING LOCATIONS WERE NOT SPECIFIED AT THE TIME THESE SITE PLANS WERE GENERATED. THE EXISTING AND PROPOSED STRUCTURAL/ENVIRONMENTAL STEEL INFORMATION WITH RELATIONSHIP TO MAGNET MUST BE PROVIDED TO SITE PLANNING FOR REVIEW (FOR ALL WALLS, CEILING AND FLOOR). ALL STRUCTURAL/ENVIRONMENTAL STEEL SHOULD BE IDENTIFIED INCLUDING, BUT NOT LIMITED TO, REBAR, BEAMS, PIPES, DRAINS, AND ANY STEEL USED FOR MAGNETIC SHIELDING. THE MAGNET ENVIRONMENT IS SENSITIVE TO FERROUS MATERIAL, WHICH CAN AFFECT IMAGE QUALITY. THE MOST SENSITIVE AREA IS WITHIN AN 8' X 8' AREA BENEATH THE MAGNET TO A DEPTH OF 1'-4". THESE SITE PLANS MUST BE CONSIDERED TENTATIVE UNTIL THIS INFORMATION IS PROVIDED. THE FINAL SITING OF THE MAGNET AND EQUIPMENT MAY BE AFFECTED BY ANY EXISTING/PROPOSED STRUCTURAL STEEL OR STEEL SHIELDING. THE CUSTOMER IS RESPONSIBLE FOR ANY ASSOCIATED CONSTRUCTION THAT MAY RESULT.

ALL MATERIAL IN SCAN ROOM MUST BE NON-FERROUS

SITE PLAN APPROVAL

IN ORDER TO USE THIS SET OF FINAL SITE PLANS, A CUSTOMER SIGNATURE IS REQUIRED BELOW. THE CUSTOMER'S SIGNATURE DEMONSTRATES ACCEPTANCE OF THE LAYOUT SHOWN AND ALL STATED SPECIFICATIONS.

CUSTOMER:	DATE:
SALES:	DATE:
I.P.M.:	DATE:

EQUIPMENT LEGEND

ITEM	ELEC. SYM.	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY TOSHIBA	BTU/HR	WEIGHT	REF.
1	MAG	1.5 TESLA MAGNET	4.095	11,905	1 A4
2	PCH	PATIENT COUCH	–	706	1 A4
3	OXMS	OXYGEN SENSOR	–	1	4 A5
4	SUVS	SUPERVISORY UNIT SWITCH	–	1	7 A5
5	CAM	PATIENT OBSERVATION SYSTEM CAMERA (ON MAGNET)	–	–	– –
6	POSM	PATIENT OBSERVATION SYSTEM MONITOR	120	10	2 A5
7	CON	WIDESCREEN LCD, CONTROL PAD, SPEAKER, AND CONTROL BOX	684	34	1 A5
8	HOST	HOST CABINET	1,707	47	1 A5
9	OXMM	OXYGEN MONITOR	–	1	4 A5
10	FSB	EMERGENCY VENTILATION FAN SWITCH BOX	100	3	– –
11	GECO	GRADIENT POWER SUPPLY AND ECO CABINET	16,379	2,161	2 A4
12	TFR	TRANSFORMER CABINET	3,071	574	3 A4
13	SUVU	SUPERVISORY UNIT (MOUNTED ON TRANSFORMER CABINET)	0	27	6 A5
14	RFG	REFRIGERATOR CABINET	10,578	221	3 A5
15	FLS	FLOW SWITCH	–	12	– –
16	INV	INNERVISION PC (ON CART SUPPLIED BY CUSTOMER / CONTRACTOR)	500	22	5 A5
17	SPK1	CONTROL ROOM SPEAKER (NOT SHOWN)	–	–	– –
18	SPK2	SCAN ROOM SPEAKER (NOT SHOWN)	–	–	– –
19	MFB	MAGNET FAN BOX	342	38	9 A5
20	FPC1	FILTER PANEL COVER (SCAN ROOM SIDE)	–	40	4 A4
21	FPC2	FILTER PANEL COVER (EQUIPMENT ROOM SIDE)	–	93	5 A4

ITEM	ELEC. SYM.	OPTIONAL ITEM DESCRIPTION SUPPLIED AND INSTALLED BY TOSHIBA	BTU/HR	WEIGHT	REF.

ITEM	ELEC. SYM.	ITEM DESCRIPTION – SUPPLIED BY TOSHIBA & INSTALLED BY CUSTOMER / CONTRACTOR	BTU/HR	WEIGHT	REF.
22	LFP	LINE FILTER PANEL	683	265	– –
23	VRDU	VOLTAGE REGULATION DISTRIBUTION UNIT	14,000	1,778	8 A5
24	MFOLD	MANIFOLD (FIELD VERIFY LOCATION)	–	80	6 A4

ITEM	ELEC. SYM.	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER / CONTRACTOR	BTU/HR	WEIGHT	REF.
25	WALL	PARENT WALL	–	–	– –
26	RFW	RF WINDOW–SITE SPECIFIC PER ROOM CONDITIONS	–	–	– –
27	RFD	RF SHIELDED DOOR–SITE SPECIFIC PER ROOM CONDITIONS	–	–	– –
28	RFS	RF SHIELDED ENCLOSURE–SITE SPECIFIC PER ROOM CONDITIONS (THICKNESS VARIES PER MANUFACTURER)	–	–	– –
29	HVAC	AIR CONDITIONING UNIT (NOT SHOWN)	–	–	– –
30	CB	EXISTING CIRCUIT BREAKER	–	–	– –
31	NFCC	NON–FERROUS COIL CABINET	–	–	– –

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
2	08-05-13	UPDATED EQUIPMENT ROOM LAYOUT.	C.B.S.

TRISTAN ASSOCIATES

(MR SCAN ROOM – TITAN)

4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION PURPOSES.

DATE: 08–05–13

SCALE: 1/4" = 1'–0"

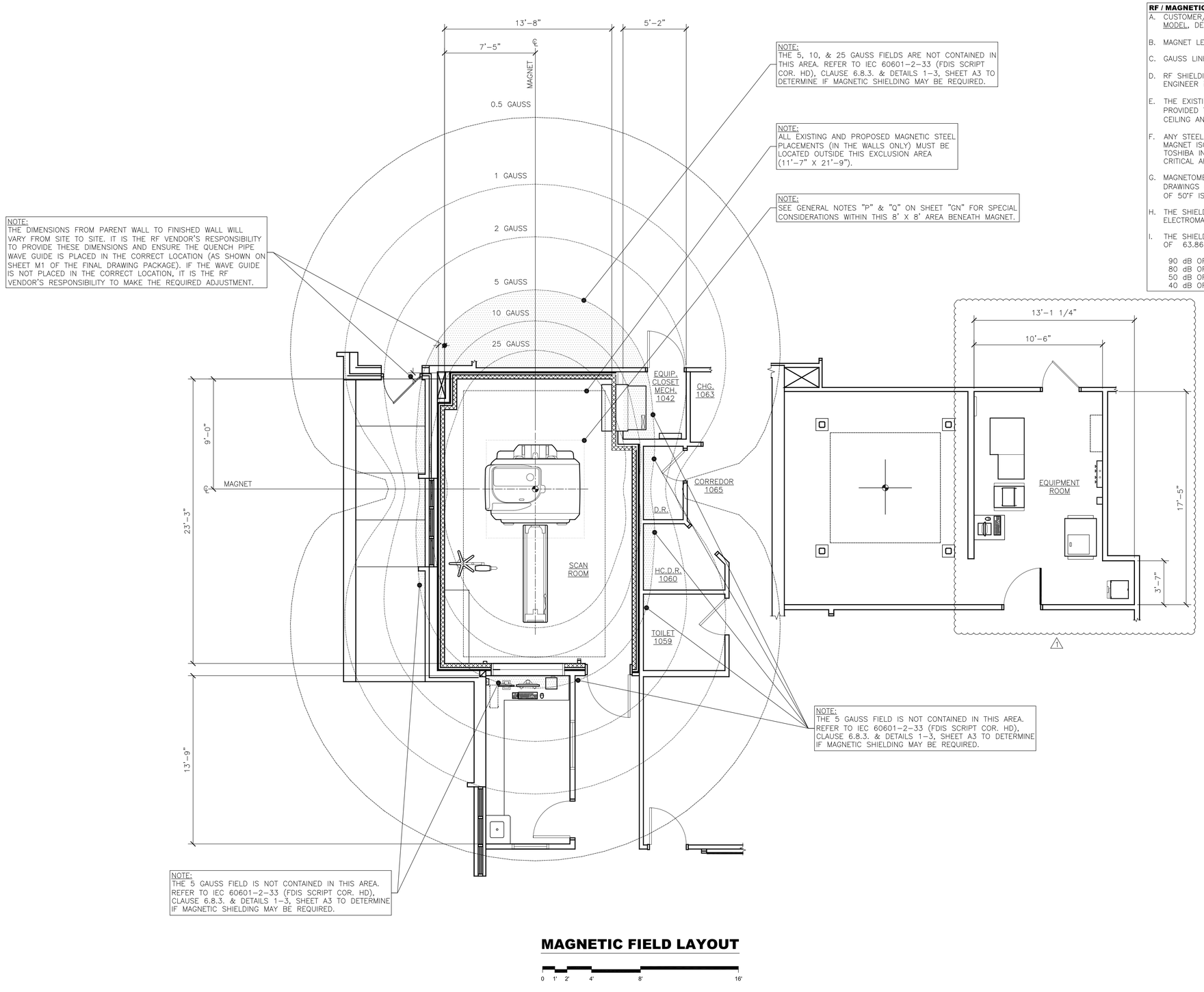
PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

A1

ALL INFORMATION ON THIS SHEET IS TO BE CONSIDERED PRELIMINARY AND TENTATIVE AND IS SUBJECT TO CHANGE OR REVISION WITHOUT PRIOR NOTICE. THIS INFORMATION IS FOR PLANNING PURPOSES ONLY.



NOTE:
THE DIMENSIONS FROM PARENT WALL TO FINISHED WALL WILL VARY FROM SITE TO SITE. IT IS THE RF VENDOR'S RESPONSIBILITY TO PROVIDE THESE DIMENSIONS AND ENSURE THE QUENCH PIPE WAVE GUIDE IS PLACED IN THE CORRECT LOCATION (AS SHOWN ON SHEET M1 OF THE FINAL DRAWING PACKAGE). IF THE WAVE GUIDE IS NOT PLACED IN THE CORRECT LOCATION, IT IS THE RF VENDOR'S RESPONSIBILITY TO MAKE THE REQUIRED ADJUSTMENT.

NOTE:
THE 5, 10, & 25 GAUSS FIELDS ARE NOT CONTAINED IN THIS AREA. REFER TO IEC 60601-2-33 (FDIS SCRIPT COR. HD), CLAUSE 6.8.3. & DETAILS 1-3, SHEET A3 TO DETERMINE IF MAGNETIC SHIELDING MAY BE REQUIRED.

NOTE:
ALL EXISTING AND PROPOSED MAGNETIC STEEL PLACEMENTS (IN THE WALLS ONLY) MUST BE LOCATED OUTSIDE THIS EXCLUSION AREA (11'-7" X 21'-9").

NOTE:
SEE GENERAL NOTES "P" & "Q" ON SHEET "GN" FOR SPECIAL CONSIDERATIONS WITHIN THIS 8' X 8' AREA BENEATH MAGNET.

RF / MAGNETIC SHIELDING

A. CUSTOMER/CONTRACTOR RESPONSIBLE FOR OBTAINING A SHIELDING VENDOR, TO MODEL, DESIGN, AND BUILD REQUIRED MAGNETIC AND RF SHIELDING.

B. MAGNET LEGS MUST BE INSULATED (ISOLATED) FROM RF ENCLOSURE.

C. GAUSS LINES IN THESE DRAWINGS ARE REPRESENTED WITHOUT MAGNETIC SHIELDING.

D. RF SHIELDING WEIGHT WILL VARY FROM SITE TO SITE. CUSTOMER'S STRUCTURAL ENGINEER MUST CONSULT WITH RF ENCLOSURE VENDOR FOR RF SHIELDING WEIGHTS.

E. THE EXISTING/FUTURE STEEL INFORMATION WITH RELATIONSHIP TO MAGNET MUST BE PROVIDED TO SITE PLANNING FOR REVIEW (ALL SIDES OF THE ROOM, INCLUDING CEILING AND FLOOR).

F. ANY STEEL BENEATH THE MAGNET MUST BE LOCATED A MINIMUM OF 4'-7" FROM MAGNET ISOCENTER. SOME STEEL REBAR COULD BE ACCEPTABLE, CONSULT WITH TOSHIBA INSTALLATION PROJECT MANAGER FOR APPROVAL OF ANY STEEL IN THIS CRITICAL AREA.

G. MAGNETOMETER SURVEY MUST BE PERFORMED BY TOSHIBA BEFORE SUBMITTING FINAL DRAWINGS (120V POWER IS REQUIRED FOR TOSHIBA TO BEGIN SURVEY. A MINIMUM OF 50°F IS REQUIRED FOR SURVEY AREA).

H. THE SHIELDING WORK IS REQUIRED TO SUPPRESS EXTERNAL LEAKAGE OF THE ELECTROMAGNETIC RADIATION GENERATED BY THE SYSTEM.

I. THE SHIELD MUST ATTENUATE ELECTROMAGNETIC RADIATION IN THE FREQUENCY BAND OF 63.86 MHz ± 0.5 MHz BY AT LEAST 90 dB.

90 dB OR MORE FROM 64.36 MHz TO 70 MHz
80 dB OR MORE FROM 70 MHz TO 300 MHz
50 dB OR MORE FROM 300 MHz TO 350 MHz
40 dB OR MORE FROM 350 MHz TO 1 GHz

NOTE:
IF A CEILING HEIGHT OF 8'-10 5/16" IS NOT AVAILABLE, THE SYSTEM CAN STILL BE INSTALLED AS LONG AS THE MINIMUM CEILING HEIGHT IS 7'-10 1/2" AND A SERVICE OPENING IS PROVIDED IN THE CEILING UP TO 8'-10 5/16".

MAGNET LEGS MUST BE INSULATED (ISOLATED) FROM RF ENCLOSURE.

NOTE:
THE 5 GAUSS FIELD IS NOT CONTAINED IN THIS AREA. REFER TO IEC 60601-2-33 (FDIS SCRIPT COR. HD), CLAUSE 6.8.3. & DETAILS 1-3, SHEET A3 TO DETERMINE IF MAGNETIC SHIELDING MAY BE REQUIRED.

NOTE:
THE 5 GAUSS FIELD IS NOT CONTAINED IN THIS AREA. REFER TO IEC 60601-2-33 (FDIS SCRIPT COR. HD), CLAUSE 6.8.3. & DETAILS 1-3, SHEET A3 TO DETERMINE IF MAGNETIC SHIELDING MAY BE REQUIRED.

MAGNETIC FIELD LAYOUT

0 1' 2' 4' 8' 16'

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
2	08-05-13	UPDATED EQUIPMENT ROOM LAYOUT.	C.B.S.

TRISTAN ASSOCIATES

(MR SCAN ROOM – TITAN)

4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

DATE: 08-05-13

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

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

A2

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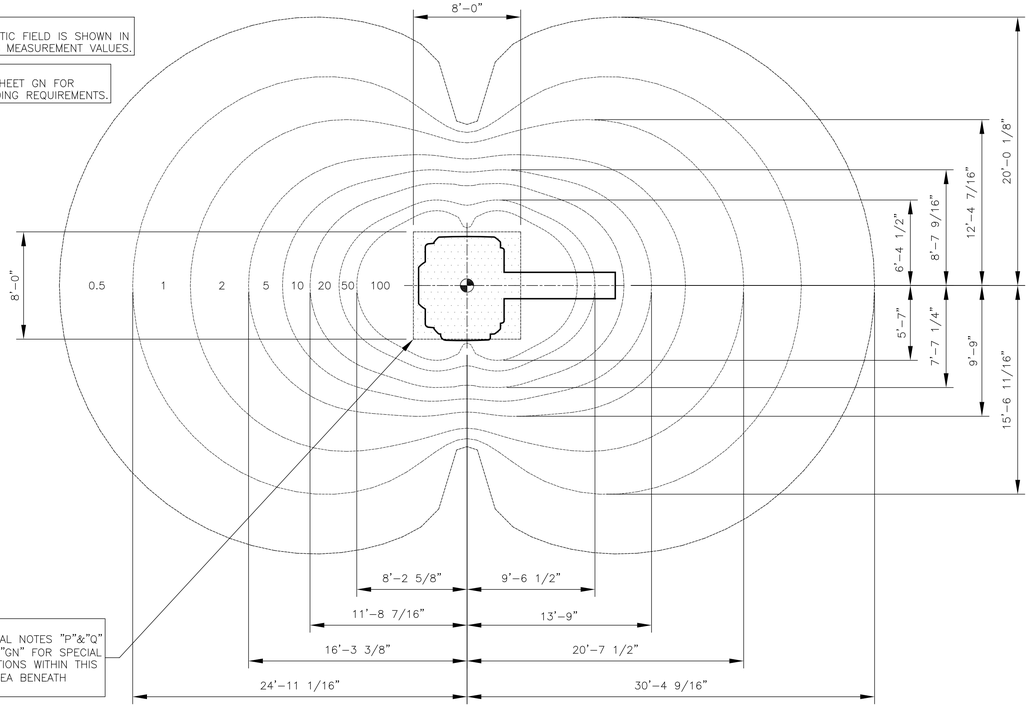
NOTE:
MAGNETIC FIELD IS SHOWN IN GAUSS MEASUREMENT VALUES.

NOTE:
SEE SHEET GN FOR SHIELDING REQUIREMENTS.



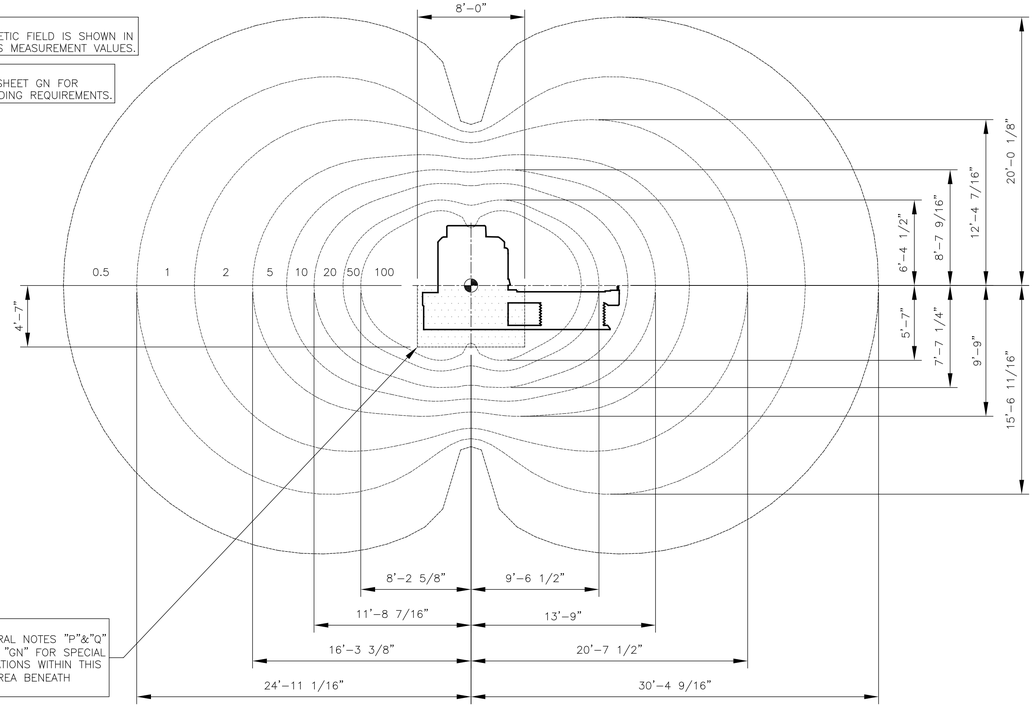
NOTE:
SEE GENERAL NOTES "P"&"Q" ON SHEET "GN" FOR SPECIAL CONSIDERATIONS WITHIN THIS 8' X 8' AREA BENEATH MAGNET.

1 FRINGE FIELD MEASUREMENTS (PLAN VIEW)

SCALE: 3/16" = 1'-0" 09-05-12

NOTE:
MAGNETIC FIELD IS SHOWN IN GAUSS MEASUREMENT VALUES.

NOTE:
SEE SHEET GN FOR SHIELDING REQUIREMENTS.



NOTE:
SEE GENERAL NOTES "P"&"Q" ON SHEET "GN" FOR SPECIAL CONSIDERATIONS WITHIN THIS 8' X 8' AREA BENEATH MAGNET.

2 FRINGE FIELD MEASUREMENTS (ELEVATION VIEW)

SCALE: 3/16" = 1'-0" 09-05-12

UNIT	EXAMPLE	GAUSS (NOTE A)	DISTANCE (FT.) (NOTE B)
ACCELERATING TUBE	LINEAR ACCELERATORS	0.5	30'-4 9/16"
I.I.	X-RAY SYSTEMS	0.5	30'-4 9/16"
NON-SHIELDED PHOTO-MULTIPLIER TUBE	CT, GAMMA CAMERA, PET SYSTEMS	0.5	30'-4 9/16"
REED RELAY	PACEMAKERS**	5	16'-3 3/8"
X-RAY TUBE	CT, X-RAY SYSTEMS	10	13'-9"
CRT	MONOCHROME MONITORS (SHIELDED)	5	16'-3 3/8"
	MONOCHROME MONITORS (UNSHIELDED)	2	20'-7 1/2"
	COLOR MONITORS (SHIELDED)	1	24'-11 1/16"
	COLOR MONITORS (UNSHIELDED)	0.5	30'-4 9/16"
	MULTIFORMAT CAMERAS	10	13'-9"
	ULTRASONIC DIAGNOSTIC SYSTEMS	2	20'-7 1/2"
	ELECTROCARDIOGRAPHS	2	20'-7 1/2"
	ELECTROENCEPHALOGRAPHS	2	20'-7 1/2"
OXYGEN MONITOR	INCLUDED IN THE MRI SYSTEM	20	11'-8 7/16"
SUPERVISORY UNIT	INCLUDED IN THE MRI SYSTEM	20	11'-8 7/16"
FILTER PANEL	INCLUDED IN THE MRI SYSTEM	100	8'-7"
GRADIENT POWER SUPPLY	INCLUDED IN THE MRI SYSTEM	5	16'-3 3/8"
TRANSFORMER CABINET (WITH VACUUM PUMP UNIT)	INCLUDED IN THE MRI SYSTEM	5	16'-3 3/8"
ECO CABINET	INCLUDED IN THE MRI SYSTEM	5	16'-3 3/8"
HOST CABINET	INCLUDED IN THE MRI SYSTEM	5	16'-3 3/8"
MAGNETIC RECORDING MEDIA	MAGNETIC TAPES, FLOPPY DISKS	10	13'-9"
MAGNETIC RECORDING MEDIA	BANK, CREDIT CARDS	20	11'-8 7/16"
OTHERS	WATCHES	30	10'-9 15/16"

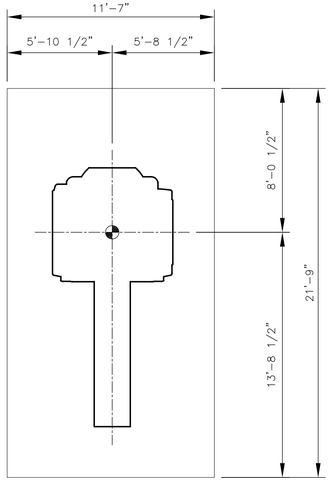
NOTE:
THE DEVICES LISTED ABOVE ARE AFFECTED BY MAGNETIC FIELDS AND MAY NOT OPERATE PROPERLY NEAR THE GANTRY.

A. MAXIMUM MAGNETIC FIELD INTENSITY AT WHICH THE UNIT OPERATES NORMALLY. THESE VALUES INCLUDE THE EARTH'S MAGNETIC FIELD (APPROXIMATELY 0.4 GAUSS). IF THE DIRECTION IN WHICH THE GANTRY IS INSTALLED IS CLOSE TO THAT OF THE EARTH'S MAGNETIC FIELD, THE MAXIMUM MAGNETIC INTENSITY (INCLUDING THE EARTH'S MAGNETIC FIELD) OF EACH UNIT MAY EXCEED THE LIMIT. IN THIS SITUATION, THE INSTALLED DIRECTION MUST BE CHANGED. OTHERWISE, DO NOT ALLOW ANY EQUIPMENT TO BE SET UP BEYOND ALLOWABLE LIMIT OR PERSONS TO ENTER THIS AREA.
B. MINIMUM DISTANCE FROM THE CENTER OF THE MAGNET FOR NORMAL OPERATION.
C. SPECIAL CAUTION IS REQUIRED FOR ELECTRON MICROSCOPES BECAUSE THEY CAN BE AFFECTED BY MAGNETIC FIELD VARIATIONS AS SMALL A FEW MILLIGAUSS.

3 EFFECTS OF THE MAGNETIC FIELD

SCALE: NOT TO SCALE 09-05-12

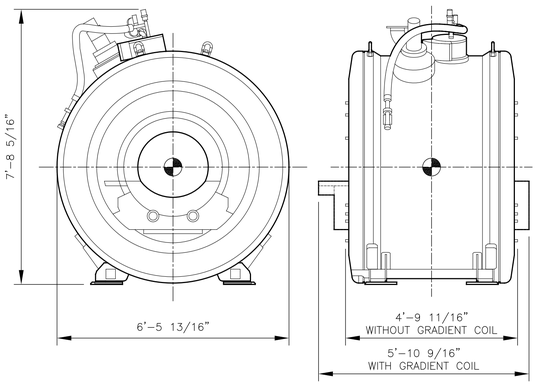
NOTE:
EXISTING/PROPOSED STRUCTURAL STEEL SHIELDING LOCATIONS WERE NOT SPECIFIED AT THE TIME THESE SITE PLANS WERE GENERATED. THE EXISTING AND PROPOSED STRUCTURAL/ENVIRONMENTAL STEEL INFORMATION WITH RELATIONSHIP TO MAGNET MUST BE PROVIDED TO SITE PLANNING FOR REVIEW (FOR ALL WALLS, CEILING AND FLOOR). ALL STRUCTURAL/ENVIRONMENTAL STEEL SHOULD BE IDENTIFIED INCLUDING, BUT NOT LIMITED TO, REBAR, BEAMS, PIPES, DRAINS, AND ANY STEEL USED FOR MAGNETIC SHIELDING. THE MAGNET ENVIRONMENT IS SENSITIVE TO FERROUS MATERIAL, WHICH CAN AFFECT IMAGE QUALITY. THE MOST SENSITIVE AREA IS WITHIN AN 8' X 8' AREA BENEATH THE MAGNET TO A DEPTH OF 1'-4". THESE SITE PLANS MUST BE CONSIDERED TENTATIVE UNTIL THIS INFORMATION IS PROVIDED. THE FINAL SITING OF THE MAGNET AND EQUIPMENT MAY BE AFFECTED BY ANY EXISTING/PROPOSED STRUCTURAL STEEL OR STEEL SHIELDING. THE CUSTOMER IS RESPONSIBLE FOR ANY ASSOCIATED CONSTRUCTION THAT MAY RESULT.



NOTE:
ALL EXISTING AND PROPOSED MAGNETIC STEEL PLACEMENTS (IN THE WALLS ONLY) MUST BE LOCATED OUTSIDE THIS EXCLUSION AREA (11'-7" X 21'-9").

4 STEEL EXCLUSION ZONE OF MAGNET

SCALE: 1/4" = 1'-0" 09-05-12

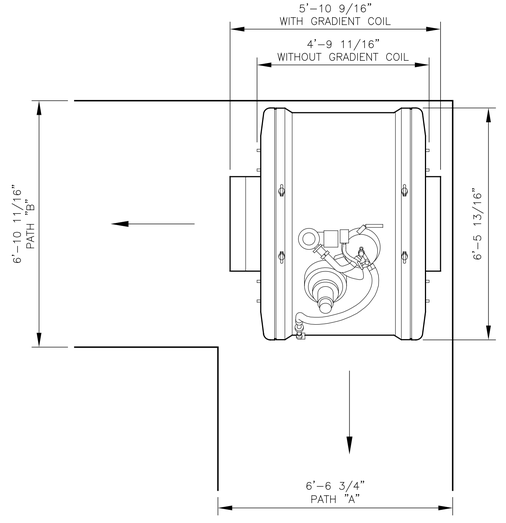


NOTE:
FOR DELIVERY: CONSULT RIGGING CONTRACTOR FOR HEIGHT REQUIREMENTS FOR MATERIALS USED TO TRANSPORT MAGNET TO FINAL LOCATION.

- CASTER HEIGHTS WILL VARY.
- CARRYING IN WEIGHT WITHOUT GRADIENT COIL, COVER IS 8,800 LBS (FILLED).

5 MAGNET ASSEMBLY FOR CARRYING IN

SCALE: 1/2" = 1'-0" 09-05-12



NOTE:
IF ORIENTATION IS NOT CHANGED AT THE CORNER, 6'-6 3/4" WIDTH IS SUFFICIENT FOR PATH "A" AND 6'-10 11/16" FOR PATH "B".

6 MINIMUM CORRIDOR WIDTH FOR MAGNET INGRESS

SCALE: 1/2" = 1'=0" 01-10-11

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08-05-13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM - TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

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DATE: 08-05-13
SCALE: AS NOTED
PLANNER: C.B.S.
SID: 30008837
PROJECT NO.
130013689MRF1

A3

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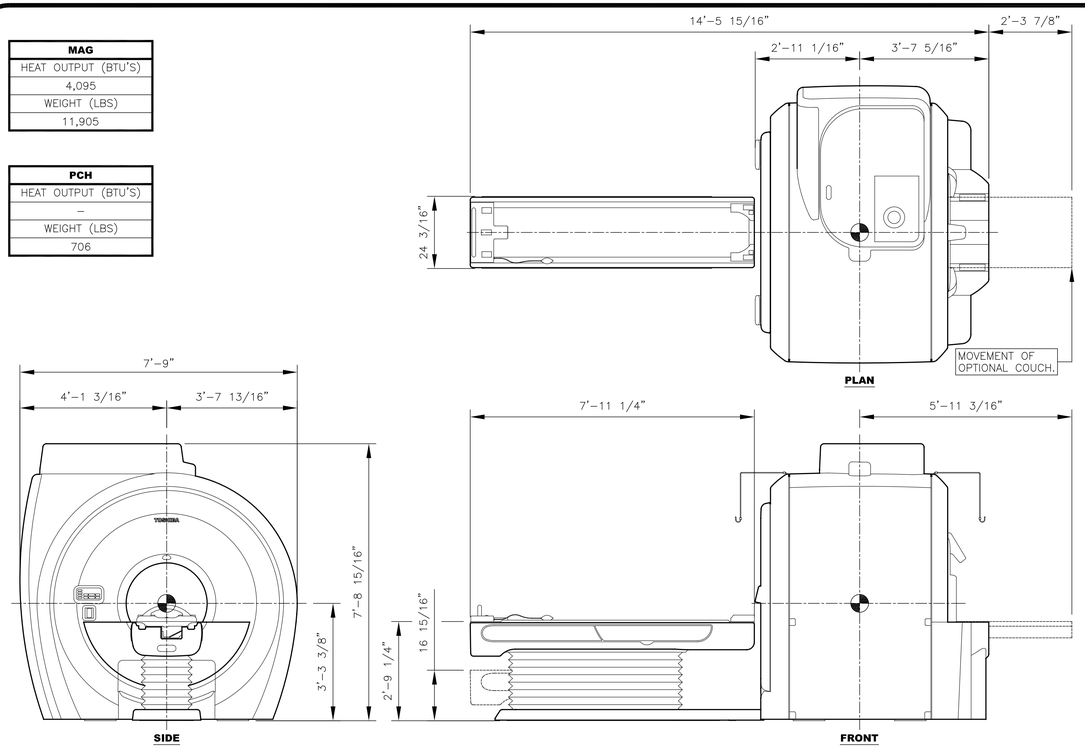
MAG
HEAT OUTPUT (BTU'S)
4,095
WEIGHT (LBS)
11,905

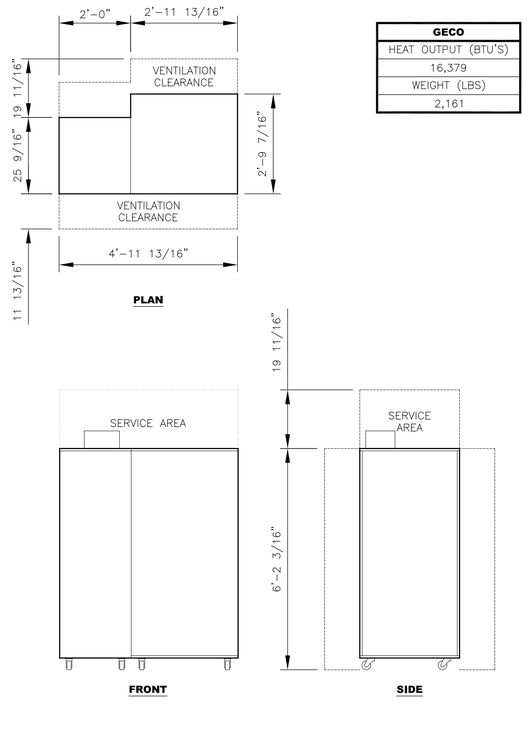
PCH
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
706



1 TITAN 1.5 TESLA MAGNET AND COUCH

SCALE: 1/2" = 1'–0" 03–12–13

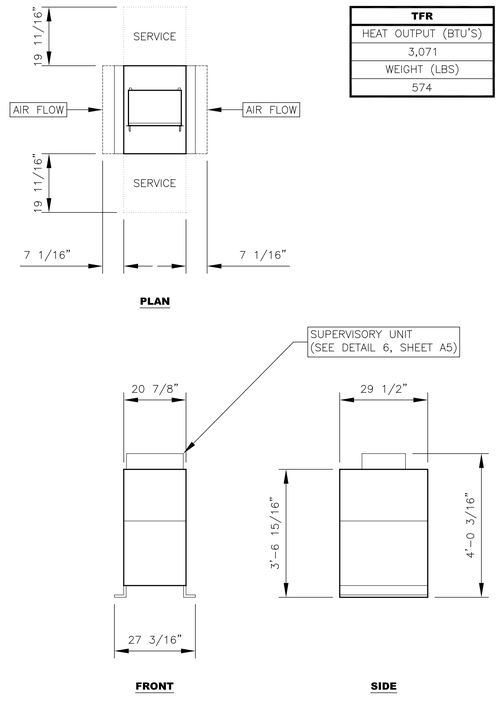
GECO
HEAT OUTPUT (BTU'S)
16,379
WEIGHT (LBS)
2,161



2 GRADIENT POWER SUPPLY AND ECO CABINET

SCALE: 1/2" = 1'–0" 03–12–13

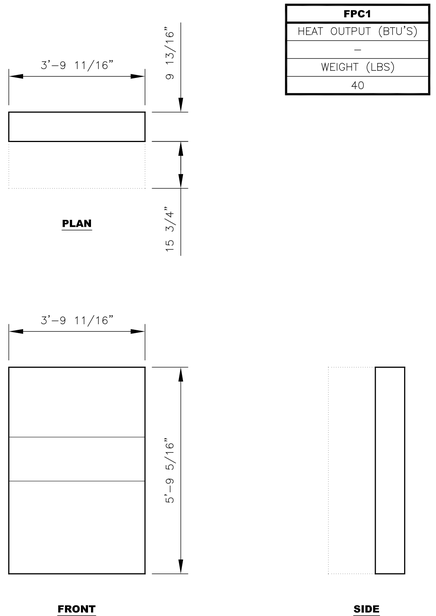
TFR
HEAT OUTPUT (BTU'S)
3,071
WEIGHT (LBS)
574



3 TRANSFORMER CABINET

SCALE: 1/2" = 1'–0" 03–12–13

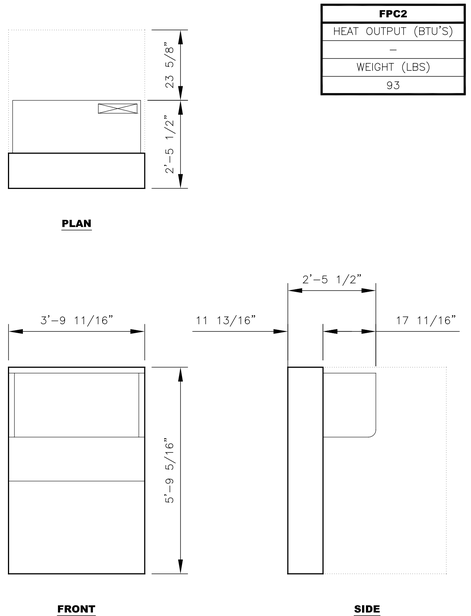
FPC1
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
40



4 FILTER PANEL COVER (SCAN ROOM SIDE)

SCALE: 1/2" = 1'–0" 03–12–13

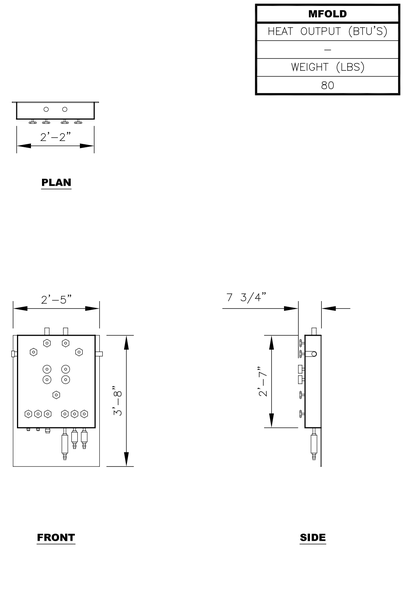
FPC2
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
93



5 FILTER PANEL COVER (EQUIPMENT ROOM SIDE)

SCALE: 1/2" = 1'–0" 03–12–13

MFOLD
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
80



6 MANIFOLD

SCALE: 1/2" = 1'–0" 03–12–13

REV	DATE	DESCRIPTION	INT
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
2	08–05–13	NO CHANGES TO THIS SHEET.	C.B.S.

TOSHIBA
Leading Innovation »»

TRISTAN ASSOCIATES

(MR SCAN ROOM – TITAN)

4518 UNION DEPOSIT RD.
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DATE: 08–05–13

SCALE: AS NOTED

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

A4

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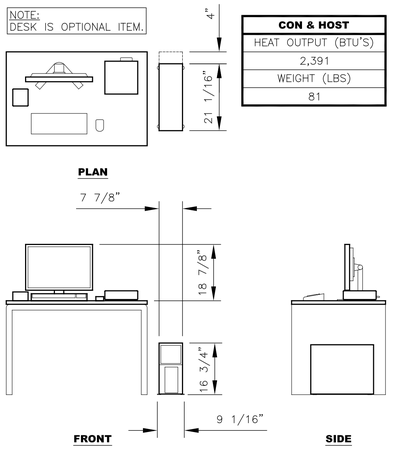
NOTE:
DESK IS OPTIONAL ITEM.

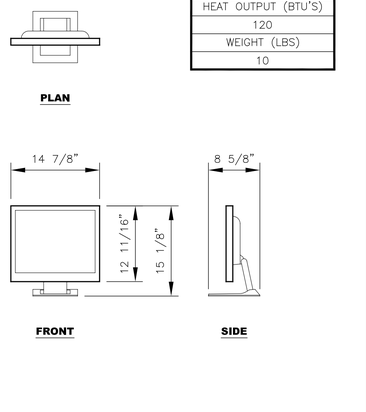
CON & HOST
HEAT OUTPUT (BTU'S)
2,391
WEIGHT (LBS)
81



1 CONTROL CONSOLE AND HOST CABINET

SCALE: 1/2" = 1'–0" 03–12–13

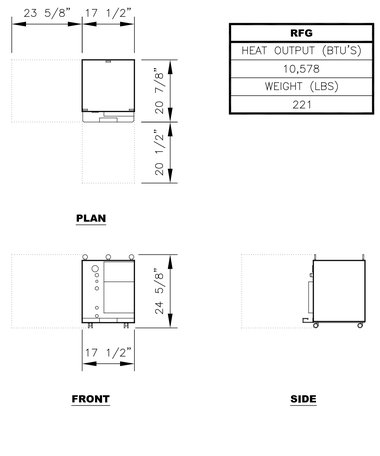
POSM
HEAT OUTPUT (BTU'S)
120
WEIGHT (LBS)
10



2 PATIENT OBSERVATION SYSTEM MONTIOR

SCALE: 1" = 1'–0" 03–12–13

RFG
HEAT OUTPUT (BTU'S)
10,578
WEIGHT (LBS)
221

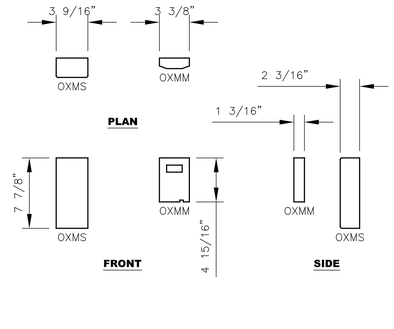


3 REFRIGERATOR CABINET

SCALE: 1/2" = 1'–0" 03–12–13

OXMS
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
1

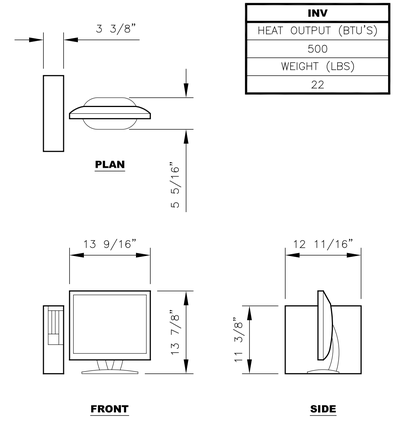
OXMM
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
1



4 OXYGEN SENSOR AND OXYGEN MONITOR

SCALE: 1 1/2" = 1'–0" 03–12–13

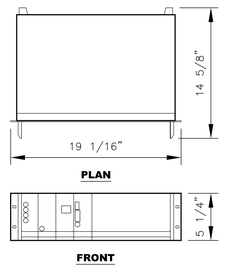
INV
HEAT OUTPUT (BTU'S)
500
WEIGHT (LBS)
22



5 INNERVISION WORKSTATION

SCALE: 1" = 1'–0" 03–12–13

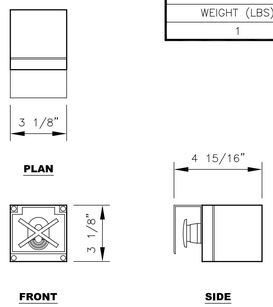
SUVU
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
27



6 SUPERVISORY UNIT

SCALE: 1 1/2" = 1'–0" 03–12–13

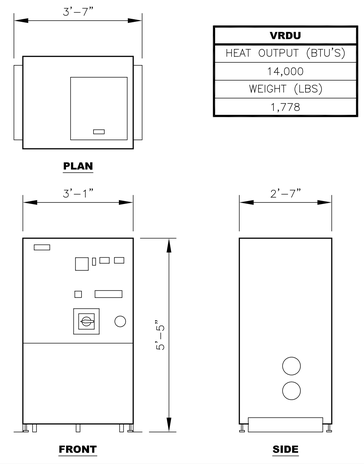
SUVS
HEAT OUTPUT (BTU'S)
–
WEIGHT (LBS)
1



7 SUPERVISORY UNIT SWITCH

SCALE: 3" = 1'–0" 03–12–13

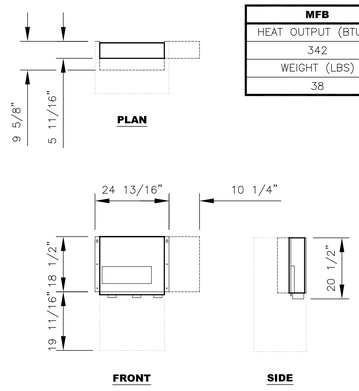
VRDU
HEAT OUTPUT (BTU'S)
14,000
WEIGHT (LBS)
1,778



8 VOLTAGE REGULATION DISTRIBUTION UNIT

SCALE: 1/2" = 1'–0" 03–12–13

MFB
HEAT OUTPUT (BTU'S)
342
WEIGHT (LBS)
38



9 MAGNET FAN BOX

SCALE: 1/2" = 1'–0" 03–12–13

TOSHIBA
Leading Innovation »»»

REV	DATE	DESCRIPTION	INT
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
2	08–05–13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

THESE TOSHIBA PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT AGREED UPON BETWEEN TOSHIBA AND THE CUSTOMER. THESE SITE PLANS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.

DATE: 08–05–13
SCALE: AS NOTED
PLANNER: C.B.S.
SID: 30008837
PROJECT NO.
130013689MRF1

A5

FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION PURPOSES.

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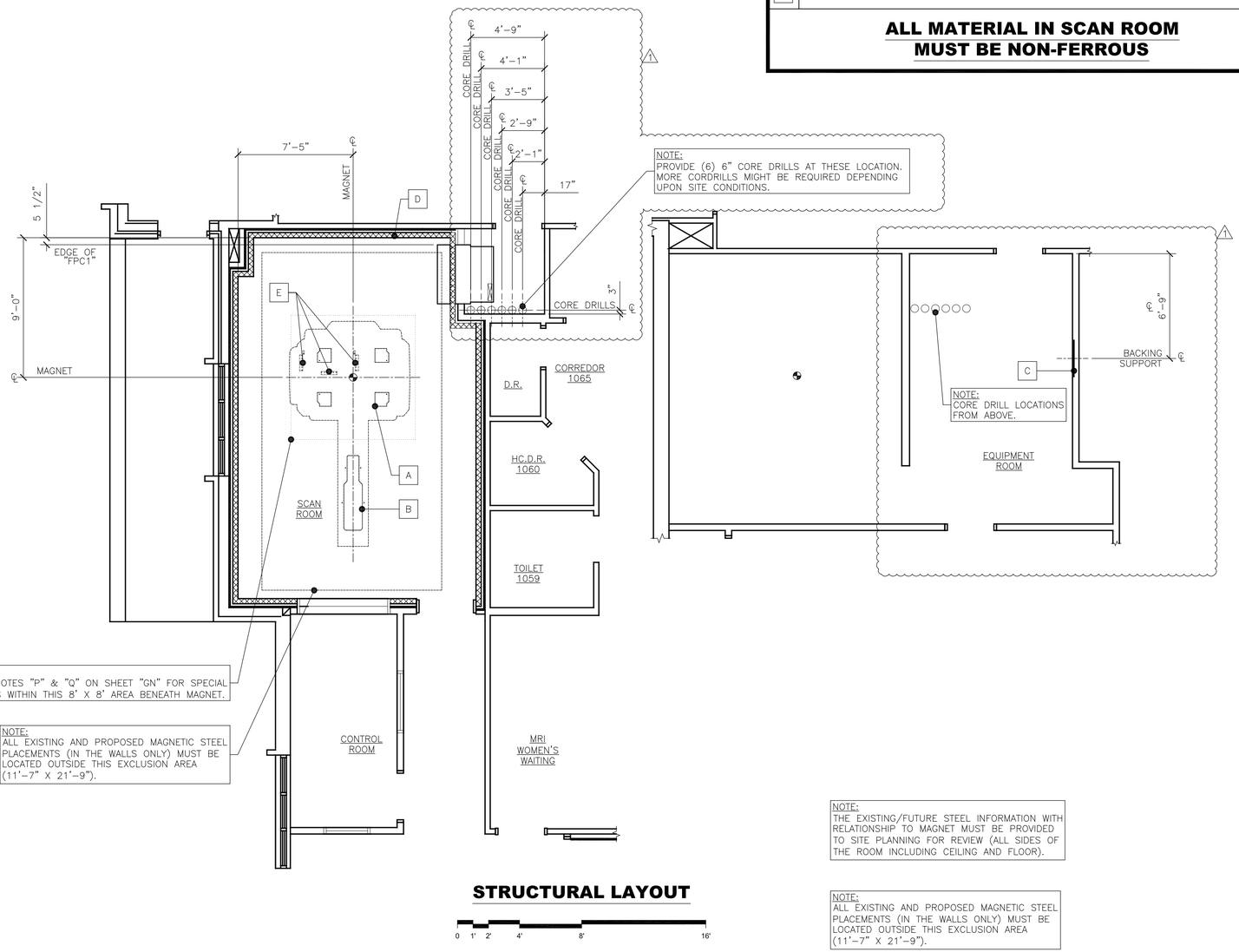
STRUCTURAL LEGEND

ITEM	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY TOSHIBA	REF.
A	SUPPORT BASE FOR MAGNET	1 / S1
B	MAGNET COUCH BASE	1 / S1
ITEM	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER / CONTRACTOR	REF.
C	BACKING SUPPORT FOR MANIFOLD	– / –
D	RF ENCLOSURE	– / –
ITEM	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER / CONTRACTOR	REF.
E	CEILING BELLOWS SUPPORT PANEL	2 / S1

ALL MATERIAL IN SCAN ROOM MUST BE NON-FERROUS

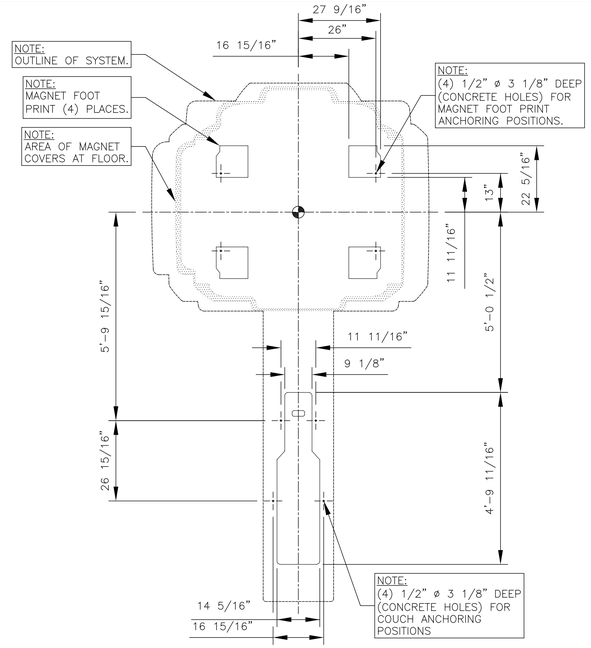


STRUCTURAL LAYOUT

0 1' 2' 4' 8' 16'

NOTE: THE EXISTING/FUTURE STEEL INFORMATION WITH RELATIONSHIP TO MAGNET MUST BE PROVIDED TO SITE PLANNING FOR REVIEW (ALL SIDES OF THE ROOM INCLUDING CEILING AND FLOOR).

NOTE: ALL EXISTING AND PROPOSED MAGNETIC STEEL PLACEMENTS (IN THE WALLS ONLY) MUST BE LOCATED OUTSIDE THIS EXCLUSION AREA (11'–7" X 21'–9").

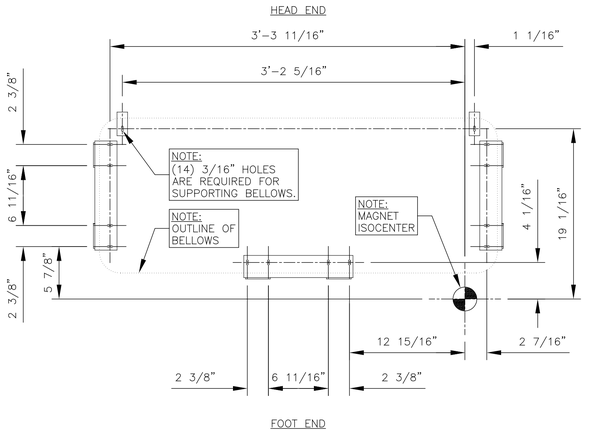


NOTE:

1. IN CASE OF FIRE, THE FINISH MATERIAL OF THE FLOOR MUST BE NONFLAMMABLE AND HIGHLY FIRE RESISTANT, IN ORDER TO PREVENT THE FIRE FROM SPREADING.
2. THE ENTIRE SCAN ROOM FLOOR TO BE LEVEL WITHIN 1/16".
3. THE FLOOR MUST SUPPORT 11,904.96 LBS. FOR THE MAGNET, INCLUDING THE COVERS AND THE GRADIENT COIL. THE COMPLETE FLOOR MUST WITHSTAND A MAXIMUM CONCENTRATED LOAD OF 3,796.04 LBS. PER SQUARE FOOT (2,976.24 LBS. PER MAGNET FOOT). THE FLOOR MUST BE ABLE TO WITHSTAND BOTH THE MAGNET AND THE WEIGHT OF THE MAGNETIC SHIELDING.
4. IT IS THE R/F VENDOR'S RESPONSIBILITY TO PROVIDE BOLTS AND ANCHOR THE MAGNET.
5. IT IS THE CUSTOMER/CONTRACTOR'S RESPONSIBILITY TO MEET SEISMIC REQUIREMENTS (IF NECESSARY).

1 MAGNET FOOTPRINT AND COUCH LAYOUT

SCALE: 1/2" = 1'–0" 05–03–13



NOTE:
THE BELLOWS FOR HIDING CABLES WILL BE SECURED TO THE CEILING. IT IS THEREFORE NECESSARY TO SUPPORT THE BELLOWS WITH APPROPRIATE STRUCTURAL SUPPORT.

THE STRUCTURAL SUPPORT IS TO BE SUPPLIED AND INSTALLED BY THE CUSTOMER/CONTRACTOR.

USE THE MAGNET ISOCENTER AS A REFERENCE POSITION FOR LOCATING THE STRUCTURAL SUPPORT FOR THE BELLOWS.

MAX BELLOWS EXTENSION FROM STRUCTURAL SUPPORT IS 21 1/2".

BELLOWS WEIGHT IS 6 LBS.

2 CEILING BELLOWS SUPPORT PANEL

SCALE: 1 1/2" = 1'–0" 09–18–12

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08–05–13	UPDATED EQUIPMENT RM LAYOUT. ADDED CORE DRILLS.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION PURPOSES.

DATE: 08–05–13

SCALE: 1/4" = 1'–0"

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

S1

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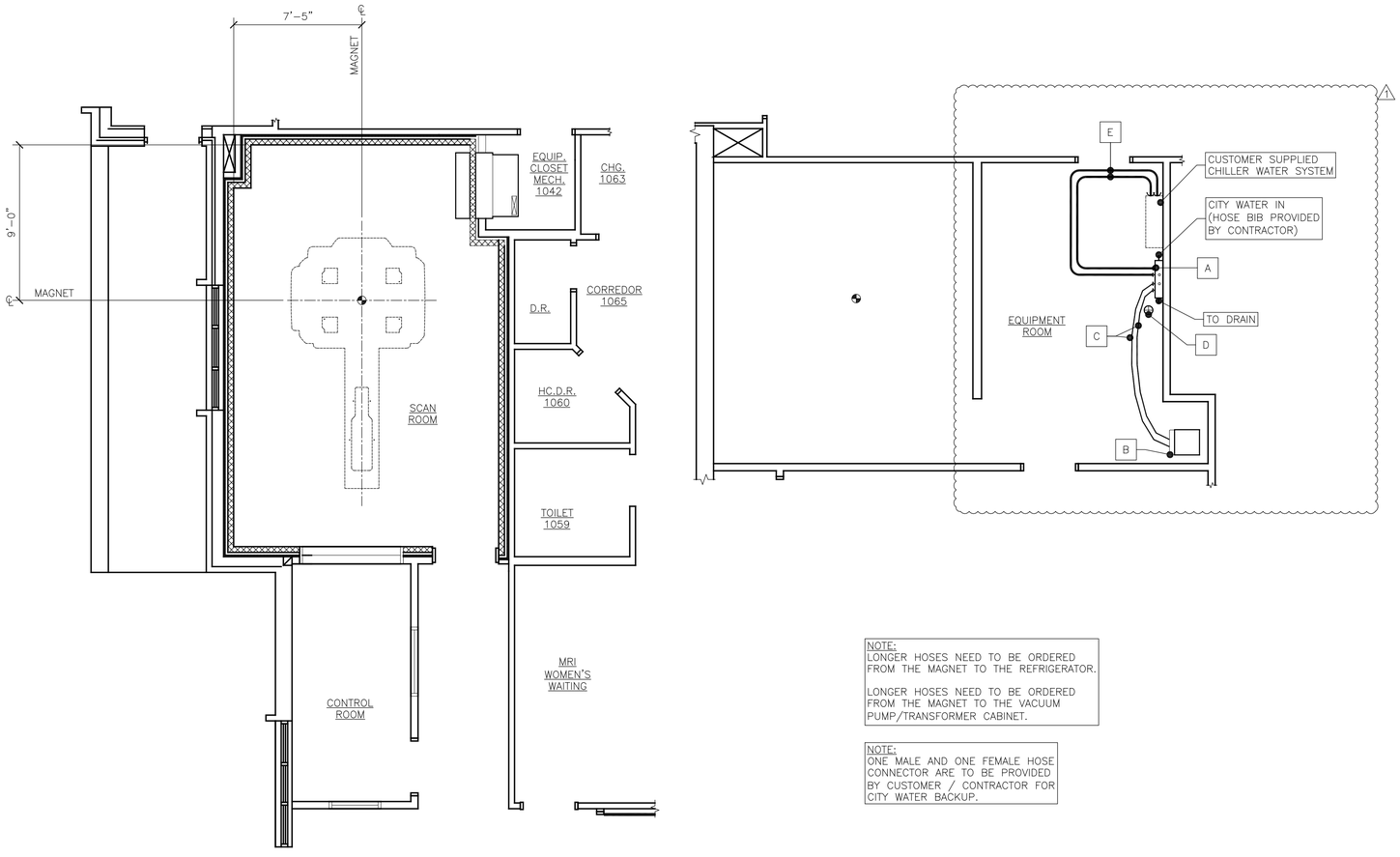


NOTE:
LONGER HOSES NEED TO BE ORDERED FROM THE MAGNET TO THE REFRIGERATOR.

LONGER HOSES NEED TO BE ORDERED FROM THE MAGNET TO THE VACUUM PUMP/TRANSFORMER CABINET.

NOTE:
ONE MALE AND ONE FEMALE HOSE CONNECTOR ARE TO BE PROVIDED BY CUSTOMER / CONTRACTOR FOR CITY WATER BACKUP.

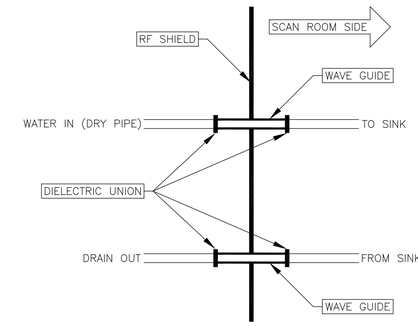
PLUMBING LAYOUT

0 1' 2' 4' 8' 16'

PLUMBING LEGEND

ITEM	ITEM DESCRIPTION SUPPLIED BY TOSHIBA AND INSTALLED BY CUSTOMER / CONTRACTOR	REF.
A	MANIFOLD	1 P2
B	REFRIGERATOR CABINET	1 P2
C	(2) 1/2" FLEXIBLE HOSE FROM MANIFOLD TO REFRIGERATION. FIELD VERIFY WITH TOSHIBA REPRESENTATIVE.	1 P2
ITEM	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER / CONTRACTOR	REF.
D	DRAIN FOR MANIFOLD & REFRIGERATOR. FIELD VERIFY EXACT LOCATION AT TIME OF INSTALLATION. DRAIN CAPACITY MUST MEET OR EXCEED DISCHARGE CAPACITY. DRAIN MUST BE EQUIPPED WITH AN APPROPRIATE BACK FLOW PREVENTER (BFP).	1 P2
E	SUPPLY AND VENT RETURN LINE FROM MANIFOLD TO CHILLER BY PLUMBING CONTRACTOR. PROVIDE 1" HIGH PRESSURE COPPER PIPE AFTER UNITS ARE SET IN PLACE.	1 P2

ALL MATERIAL IN SCAN ROOM MUST BE NON-FERROUS



NOTE:
A SINK IN THE SCAN ROOM IS NOT RECOMMENDED. IT WILL ONLY BE ACCEPTED IF A "DRY FILL" SYSTEM IS USED AND PLUMBING INTO AND OUT OF THE SCAN ROOM MUST BE VIA WAVE GUIDES WITH DIELECTRIC UNIONS ON BOTH SIDES. THIS WILL PROVIDE BOTH RF FREQUENCY AND ELECTRICAL ISOLATION. PLEASE REFER TO ABOVE DETAIL.

1 SCAN ROOM SINK

SCALE: NOT TO SCALE 01-10-11

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08-05-13	UPDATED EQUIPMENT ROOM LAYOUT.	C.B.S.

TRISTAN ASSOCIATES

(MR SCAN ROOM - TITAN)

4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

DATE: 08-05-13

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

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

P1

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IF CUSTOMER IS PURCHASING CHILLED WATER SYSTEM THROUGH TOSHIBA AS A PASS THROUGH TO DRAKE, PLEASE REFER TO THE DRAKE PASS THROUGH DOCUMENT FOR ADDITIONAL INFORMATION.

IF CUSTOMER IS SUPPLYING CHILLER WATER SYSTEM, PLEASE REFER TO SPECIFICATIONS BELOW:

REQUIREMENTS FOR COOLING WATER - TITAN

(1) SUPPLY FLOW RATE : 12.70 GAL. OR MORE/MIN (48 L) (24–HOUR CONTINUOUS SUPPLY)

GRADIENT POWER SUPPLY : 7.95 GAL. OR MORE/MIN (30 L)
GRADIENT COIL : 3.20 GAL. OR MORE/MIN (12 L)
REFRIGERATOR : 1.60 GAL. OR MORE/MIN (6 L)

(2) PRESSURE LOSS IN THE SYSTEM

GRADIENT POWER SUPPLY : 0.28 MPa (@ 7.95 GAL./MIN, WITHOUT HOSE (30 L/MIN)
GRADIENT COIL : 0.38 MPa (@ 3.20 GAL./MIN, WITH HOSE (12 L/MIN)
REFRIGERATOR : 0.10 MPa (@ 1.60 GAL./MIN, WITHOUT HOSE (6 L/MIN)

(3) MAXIMUM ALLOWABLE INPUT PRESSURE

GRADIENT POWER SUPPLY : 0.60 MPa
GRADIENT COIL : 0.50 MPa
REFRIGERATOR : 0.80 MPa

NOTE:
IF THE HEAD LOSS IN THE PIPING FROM THE HEAT EXCHANGER UNIT IS 65'–7" OR MORE, CONSULT THE TOSHIBA INSTALLATION PROJECT MANAGER AND TAKE MEASURES TO ENSURE THAT THE MAXIMUM ALLOWABLE INPUT PRESSURE FOR EACH UNIT IS NOT EXCEEDED.

(4) SUPPLY WATER TEMPERATURE : 64°F TO 71°F (18°C TO 22°C)

(5) REQUIRED COOLING CAPABILITY

GRADIENT POWER SUPPLY : 50,545/13,661 BTU/HR (14.8/4.0 kW)
(MAXIMUM DURING SCANNING/IN STANDBY STATUS)
GRADIENT COIL : 40,982 BTU/HR (12 kW) (MAXIMUM DURING SCANNING)
REFRIGERATOR : 14,003/16,734 BTU/HR (4.1/4.9 kW) (50/60 Hz)

SYSTEM TOTAL
IN STANDBY STATUS [AT NIGHT ETC.] : 27,663/30,395 BTU/HR (8.1/8.9 kW) (50/60 Hz)
DURING SCANNING : 105,529/108,261 BTU/HR (30.9/31.7) kW (50/60 Hz)
WHEN ONLY THE REFRIGERATOR IS POWERED : 14,002/16,734 BTU/HR (4.1/4.9 kW) (50/60 Hz)

IF THE COOLING WATER IS CIRCULATED USING THE CHILLER, ETC., THE COOLING PERFORMANCE MUST BE 1.2 TIMES THE STANDARD VALUES GIVEN ABOVE.

(6) WATER QUALITY

TAP WATER WHICH MEETS THE SPECIFICATIONS GIVEN IN THE TABLE BELOW

WATER QUALITY SPECIFICATIONS			
	ITEM	COOLING WATER	
		NON–CIRCULATING OR CIRCULATING COOLING WATER	COOLING TOWER
REFERENCE VALUE	pH 77°F (25°C)	6.5 TO 8.0	6.0 TO 8.0
	CONDUCTIVITY (77°F μS/CM)	800 MAX.	200 MAX.
	M ALKALI LEVEL (PPM)	100 MAX.	50 MAX.
	HARDNESS (PPM)	200 MAX.	50 MAX.
	CHLORIDE IONS (PPM)	200 MAX.	50 MAX.
	SULPHATE IONS (PPM)	200 MAX.	50 MAX.
	IRON (PPM)	1.0 MAX.	0.3 MAX.
	SULPHIDE IONS (PPM)	UNDETECTABLE	UNDETECTABLE
	AMMONIUM IONS (PPM)	1.0 MAX.	0.2 MAX.
	SILICA (PPM)	50 MAX.	30 MAX.

CAUTION:
THERE IS NO DEFINITE RATED VALUE FOR FREE CARBON DIOXIDE; HOWEVER, THE VALUE SHOULD BE AS LOW AS POSSIBLE, SINCE SUCH FREE CARBON DIOXIDE IS A CORROSION AGENT.

(7) OTHER

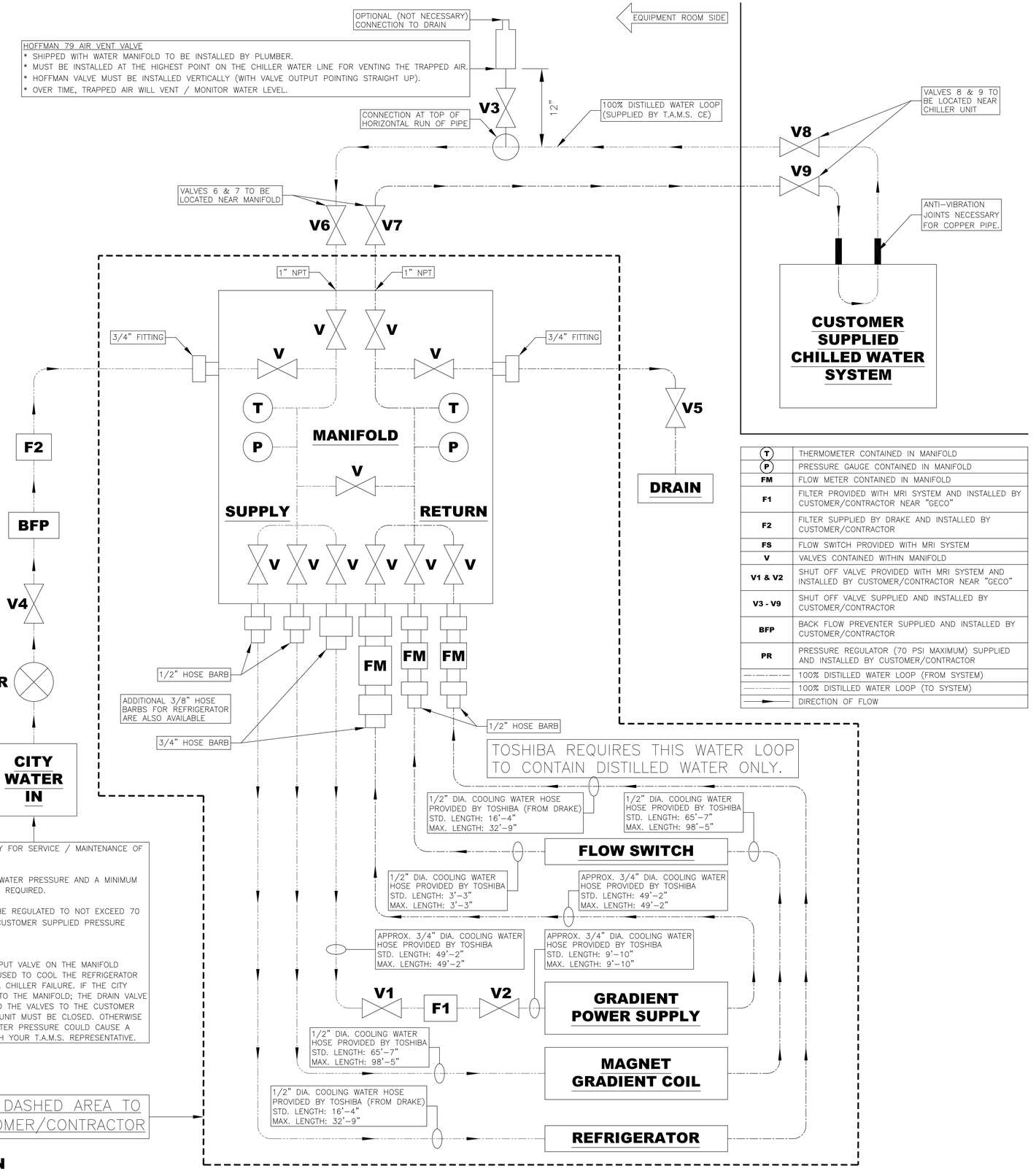
IF THE COOLING WATER SUPPLY IS INTERRUPTED, THE SYSTEM CANNOT BE USED. THE COOLING WATER MUST BE CHECKED AND REPLACED ONCE EVERY 6 MONTHS. IN COLD CLIMATES, CARE MUST BE TAKEN TO PREVENT THE COOLING WATER FROM FREEZING (USE OF ANTIFREEZE IS NOT ALLOWED).

NOTE:
VANTAGE/TITAN SYSTEMS CAN ONLY USE DISTILLED WATER (NO GLYCOL ALLOWED) IN THE SYSTEM COMPONENTS.

IF THE CUSTOMER'S CHILLER CONTAINS GLYCOL, THEN WE SUGGEST THE USE OF A HEAT EXCHANGER. THE FUNCTION OF THE HEAT EXCHANGER IS TO SEPARATE THE GLYCOL FROM THE WATER IN THE VANTAGE/TITAN SYSTEM COMPONENTS.

IF A HEAT EXCHANGER IS USED, COLDER WATER MAY BE REQUIRED. REQUIRED TEMPERATURE WILL VARY DEPENDING ON THE HEAT EXCHANGER SELECTED.

CARE SHOULD BE TAKING NOT TO EXCEED MAXIMUM ALLOWABLE INPUT PRESSURE AS STATED ABOVE.



T	THERMOMETER CONTAINED IN MANIFOLD
P	PRESSURE GAUGE CONTAINED IN MANIFOLD
FM	FLOW METER CONTAINED IN MANIFOLD
F1	FILTER PROVIDED WITH MRI SYSTEM AND INSTALLED BY CUSTOMER/CONTRACTOR NEAR "GECO"
F2	FILTER SUPPLIED BY DRAKE AND INSTALLED BY CUSTOMER/CONTRACTOR
FS	FLOW SWITCH PROVIDED WITH MRI SYSTEM
V	VALVES CONTAINED WITHIN MANIFOLD
V1 & V2	SHUT OFF VALVE PROVIDED WITH MRI SYSTEM AND INSTALLED BY CUSTOMER/CONTRACTOR NEAR "GECO"
V3 - V9	SHUT OFF VALVE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR
BFP	BACK FLOW PREVENTER SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR
PR	PRESSURE REGULATOR (70 PSI MAXIMUM) SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR
———	100% DISTILLED WATER LOOP (FROM SYSTEM)
———	100% DISTILLED WATER LOOP (TO SYSTEM)
——→	DIRECTION OF FLOW

CITY WATER IS ONLY FOR SERVICE / MAINTENANCE OF WATER COOLING.

A MAX OF 70 PSI WATER PRESSURE AND A MINIMUM OF 13.8 GPM FLOW REQUIRED.

CITY WATER MUST BE REGULATED TO NOT EXCEED 70 PSI (MAX.) USING CUSTOMER SUPPLIED PRESSURE REGULATOR.

WARNING:
THE CITY WATER INPUT VALVE ON THE MANIFOLD SHOULD ONLY BE USED TO COOL THE REFRIGERATOR IN THE EVENT OF A CHILLER FAILURE. IF THE CITY WATER IS APPLIED TO THE MANIFOLD; THE DRAIN VALVE MUST BE OPEN AND THE VALVES TO THE CUSTOMER SUPPLIED CHILLER UNIT MUST BE CLOSED. OTHERWISE A BUILD UP OF WATER PRESSURE COULD CAUSE A LEAK. CONSULT WITH YOUR T.A.M.S. REPRESENTATIVE.

ALL ITEMS OUTSIDE OF DASHED AREA TO BE PROVIDED BY CUSTOMER/CONTRACTOR

WATER COOLING FACILITIES CONFIGURATION

09–05–12

TOSHIBA
Leading Innovation »»»

REV	DATE	DESCRIPTION	INT
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
2	08–05–13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

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DATE: 08–05–13
SCALE: NOT TO SCALE
PLANNER: C.B.S.
SID: 30008837
PROJECT NO.
130013689MRF1

P2

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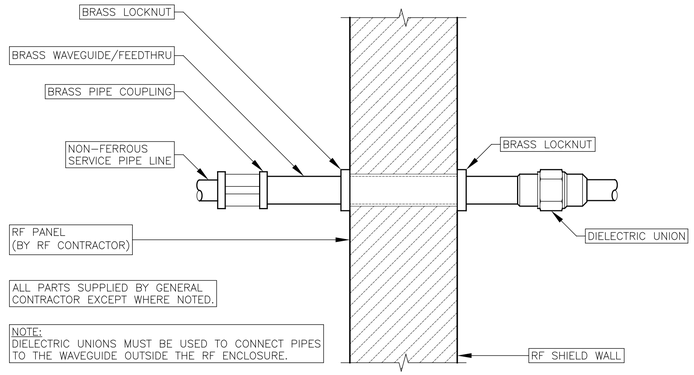
TOSHIBA RECOMMENDS THAT A PRE–ACTION PROTECTION SYSTEM (DRY PIPE SPRINKLER SYSTEM) BE INSTALLED BY THE CUSTOMER/CONTRACTOR. TOSHIBA RECOMMENDS THE PRE–ACTION PROTECTION SYSTEM TO MINIMIZE GROUNDING ISSUES THAT CAN ARISE UTILIZING WET TYPE SPRINKLER SYSTEMS. A WET TYPE SPRINKLER SYSTEM CAN BE UTILIZED PROVIDED THE CUSTOMER ASSUMES RESPONSIBILITY OF ALL GROUNDING AND IMAGE ARTIFACT ISSUES THAT MAY RESULT FROM THE USE OF WET SYSTEM. IF A WET–TYPE SPRINKLER SYSTEM IS USED, THE LOCATION OF THE PIPE PENETRATION, MATERIAL AND CONSTRUCTION IS STRICTLY LIMITED AS SHOWN BELOW.



STANDING WATER WITHIN THE SPRINKLER PIPES IN THE RF ENCLOSURE HAS BEEN KNOWN TO ACT AS A GROUND AND A CAUSE OF IMAGE ARTIFACTS. THESE ISSUES CAN DEVELOP OVER TIME.

WAVE GUIDES ARE REQUIRED FOR SPRINKLER LINES. THE REQUIRED LENGTH OF THE WAVE GUIDE DEPENDS ON THE DIAMETER OF THE SPRINKLER LINE.

EXCEPT FOR THE BLAZE MASTER PVC PIPE FIRE SPRINKLER SYSTEM, WHICH CANNOT BE USED AS PART OF A WET PIPE SYSTEM, ALL SPRINKLER LINES ARE CONDUCTIVE. THEY ARE ALSO MECHANICALLY ATTACHED TO THE BUILDING, WHICH MAKES THEM GROUNDED. THUS IF A SPRINKLER LINE IS ATTACHED TO THE RF ENCLOSURE, THE RF ENCLOSURE ALSO BECOMES GROUNDED TO THE BUILDING.

WET SPRINKLER SYSTEM CAN BE SPECIFIED FOR USE IN THE RF ENCLOSURE. STANDARD STEEL PIPES CAN BE USED OUTSIDE THE RF ENCLOSURE, BUT COPPER, BRASS, OR 304 STAINLESS STEEL PIPES SHOULD BE USED WITHIN THE RF ENCLOSURE. THE WAVE GUIDE FOR THE SPRINKLER PIPE MUST BE LOCATED WITHIN 3' FROM THE EDGE OF THE FILTER PANEL.

IF A BRASS OR OTHER APPROPRIATE FEED–THROUGH WAVE GUIDE IS INSTALLED ABOVE THE FILTER PANEL AREA, THE SPRINKLER PIPE OUTSIDE THE RF ENCLOSURE MUST BE CONNECTED TO THE WAVE GUIDE VIA A DIELECTRIC UNION TO ISOLATE THE GROUNDED SPRINKLER PIPE FROM THE RF ENCLOSURE.

THE SPRINKLER LINE INSIDE THE RF ENCLOSURE MUST BE CONNECTED DIRECTLY TO THE WAVE GUIDE, WHICH IS GROUNDED TO THE RF ENCLOSURE. ALL SPRINKLER HEADS WITHIN THE RF ENCLOSURE MUST ORIGINATE FROM THIS PRIMARY LINE.

INSTALLATION OF A DEDICATED SHUT–OFF VALVE FOR THE SPRINKLER SYSTEM FOR THE RF ENCLOSURE IS STRONGLY RECOMMENDED.

THE LOCATION OF THE PENETRATION MUST BE WITHIN 30" ABOVE THE GROUND BUS BAR, WHICH IS THE CENTRAL REFERENCE GROUND.

DIELECTRIC UNIONS MUST BE USED TO CONNECT PIPES TO THE WAVE GUIDE OUTSIDE THE RF ENCLOSURE. ALL WET PIPE SYSTEMS MUST ENTER THE RF ENCLOSURE DIRECTLY ABOVE THE FILTER PANEL.

ONLY BRASS AND COPPER COMPONENTS CAN BE USED IN THE SCAN ROOM. ALL SPRINKLER DROPS THAT PENETRATE THE SCAN ROOM MUST BE ELECTRICALLY BONDED TO THE SCAN ROOM CEILING, AND MUST BE ELECTRICALLY DETACHED FROM THE MAIN SPRINKLER PIPE BY A NONCONDUCTIVE SLEEVE.

IF A SMOKE DETECTOR SYSTEM IS REQUIRED, DO NOT USE A CALL/RECEIVE SYSTEM.

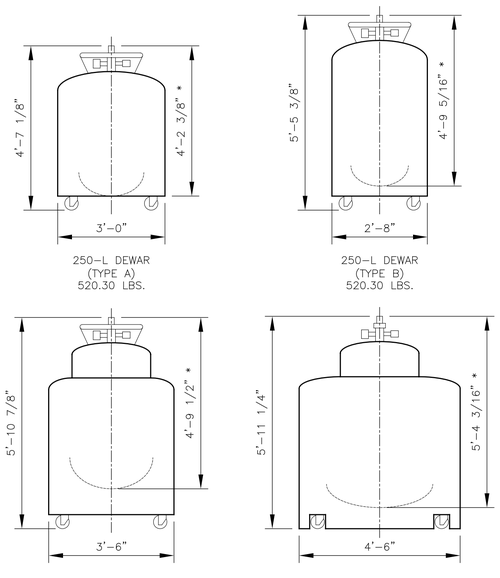
BY SIGNING BELOW THE CUSTOMER/CONTRACTOR ACKNOWLEDGES AND ACCEPTS RESPONSIBILITY OF ANY POTENTIAL ISSUES THAT CAN BE DEVELOP DUE TO CONSTRUCTION, INSTALLATION OR USE OF A WET–TYPE FIRE SPRINKLER SYSTEM. IN THE EVENT THAT ANY ISSUES OR PROBLEMS DEVELOPING DUE TO THE WET–TYPE SPRINKLER SYSTEM, THE CUSTOMER/CONTRACTOR AGREES TO REPAIR, MODIFY, OR REPLACE WET–TYPE FIRE SPRINKLER SYSTEM. TOSHIBA RECOMMENDS A PRE–ACTION PROTECTION SYSTEM (DRY–TYPE SPRINKLER SYSTEM) AND THEREFORE, SHALL NOT ASSUME ANY COSTS OR DOWNTIME PENALTIES ASSOCIATED WITH THE REPAIR, MODIFICATION, OR REPLACEMENT OF WET–TYPE FIRE SPRINKLER SYSTEM.

THE TOSHIBA PROJECT INSTALLATION MANAGER IS TO FAX DETAIL WITH CUSTOMER SIGNATURE INCLUDED WITH SITE NAME AND TAMS PROJECT NUMBER TO TAMS SITE PLANNING DEPARTMENT, ATTENTION SITE PLANNING ADMINISTRATOR.
FAX # (714) 544–5893
PROJECT # _____
SITE NAME: _____
CUSTOMER/CONTRACTOR SIGNATURE _____ DATE: _____

1 TYPICAL SPRINKLER PENETRATION

SCALE: NOT TO SCALE 01–10–11

SIZES MARKED WITH (*) INDICATED DEPTH. MASS INCLUDES THE LHe IN THE DEWAR. LHe DEWAR MANUFACTURER: CRYOFAB.

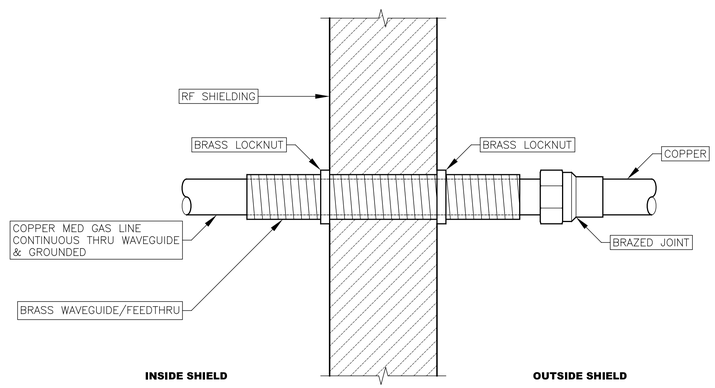


1. THE SIZE OF A LHe DEWAR DIFFERS ACCORDING TO SUPPLIER. BE SURE TO CHECK THE SHAPE OF THE DEWAR IN ADVANCE.
2. BE SURE TO USE A NON–MAGNETIC DEWAR (STAINLESS STEEL, ALUMINUM).
3. 11'–9 3/4" CLEARANCE IS REQUIRED TO INSERT THE TRANSFER TUBE INTO THE HELIUM CONTAINER.
4. ENSURE THE DEWARS HAVE A CLEAR DELIVERY PATH TO MAGNET (CONSIDER DOORS, HALLWAYS, ELEVATORS, ETC.).
5. SET ASIDE AREA FOR HELIUM DEWAR STORAGE DURING INSTALLATION.

2 DEWAR - LHe REPLENISHMENT

SCALE: 1/2" = 1'–0" 01–10–11

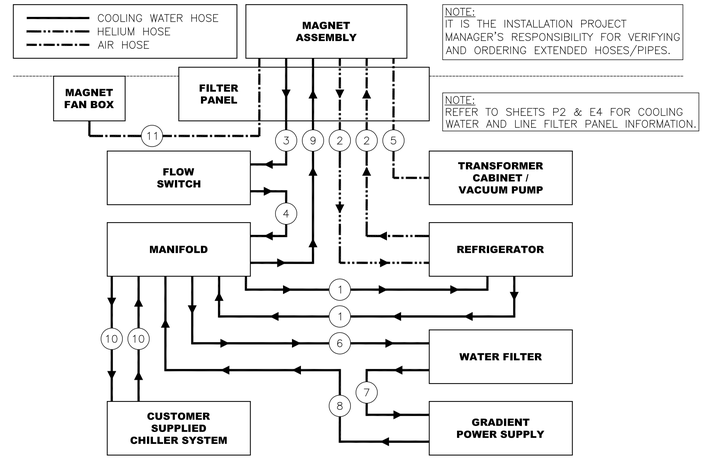
EXAMPLE OF MEDICAL GAS THROUGH DUCT (PER CODE)



NOTE:
1. THE THROUGH DUCT OF THE MEDICAL GAS PIPE MUST BE WITHIN APPROXIMATELY 2'–0" OF THE LINE FILTER PANEL.
2. THE FINAL MEDICAL GAS CONNECTION TO THE WAVEGUIDE CANNOT BE MADE UNTIL GROUND ISOLATION MONITORING IS COMPLETE.
3. THE MEDICAL GAS MUST BE GROUNDED TO THE WAVEGUIDE & RF SHIELDING.
4. MOUNT AS CLOSE AS POSSIBLE TO LINE FILTER PANEL.

4 TYPICAL MEDICAL GASES DETAIL (OPTIONAL)

SCALE: NOT TO SCALE 01–10–11



ROUTE NO.	TYPE	INTERCONNECTION (1)	INTERCONNECTION (2)	STANDARD LENGTH	MAXIMUM LENGTH
1	COOLING WATER HOSES (IN–HOUSE)	MANIFOLD	REFRIGERATOR	16'–4"	32'–9"
2	HELIUM HOSES	REFRIGERATOR	MAGNET ASSEMBLY	42'–7"	85'–3"
3	COOLING WATER HOSE	FLOW SWITCH	GRADIENT COIL	98'–5"	98'–5"
4	COOLING WATER HOSE	MANIFOLD	FLOW SWITCH	3'–3"	3'–3"
5	VACUUM HOSE	TRANSFORMER CABINET	MAGNET ASSEMBLY	32'–9"	98'–5"
6	COOLING WATER HOSE	MANIFOLD	WATER FILTER	49'–2"	49'–2"
7	COOLING WATER HOSE	WATER FILTER	GRADIENT POWER SUPPLY	9'–10"	9'–10"
8	COOLING WATER HOSE	GRADIENT POWER SUPPLY	MANIFOLD	49'–2"	49'–2"
9	COOLING WATER HOSE	GRADIENT COIL	MANIFOLD	65'–7"	98'–5"
10	COOLING WATER HOSES	MANIFOLD	CUSTOMER CHILLER SYS.	*	*
11	AIR HOSE	GANTRY	MAGNET FAN BOX	49'–2"	49'–2"

* PROVIDED BY CUSTOMER/CONTRACTOR. EXACT LENGTH TO BE DETERMINED.

3 LIQUID AND GAS HOSE CONNECTIONS

SCALE: NOT TO SCALE 05–03–13

TOSHIBA
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REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08–05–13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

THESE TOSHIBA PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT AGREED UPON BETWEEN TOSHIBA AND THE CUSTOMER. THESE SITE PLANS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.

DATE: 08–05–13
SCALE: AS NOTED
PLANNER: C.B.S.
SID: 30008837
PROJECT NO.
130013689MRF1

P3

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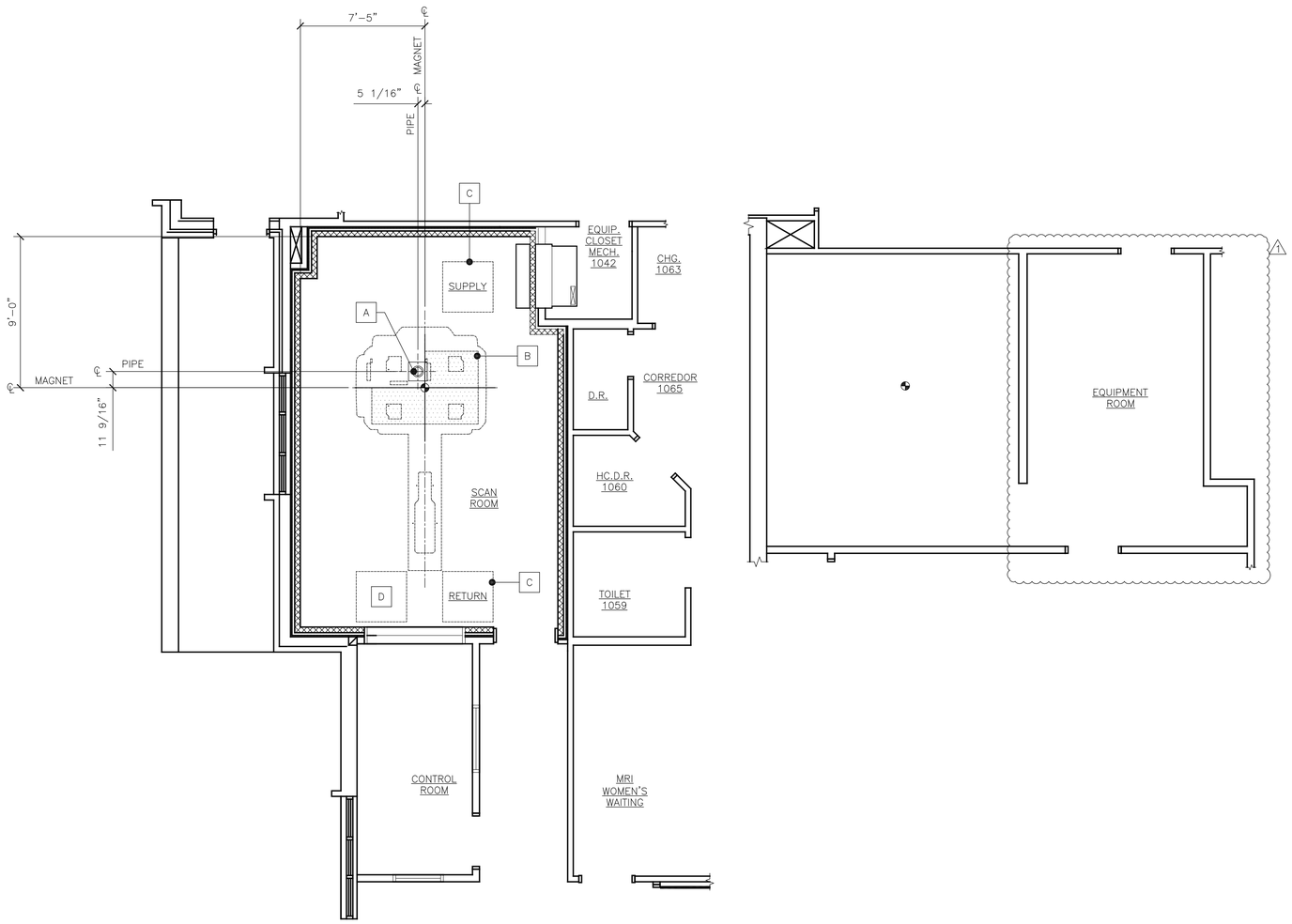

MECHANICAL LAYOUT

0 1' 2' 4' 8' 16'

MECHANICAL LEGEND

ITEM	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER / CONTRACTOR	REF.
A	EMERGENCY GHe DISCHARGE PIPE & RF SHIELDING OPENING	ALL M2-4
B	AREA FOR EMERGENCY VENTILATION DUCT WORK (1,060 CUBIC FEET PER MINUTE)	- -
C	RECOMMENDED SUPPLY / RETURN LOCATION OF AIR CONDITIONING	- -
D	RECOMMENDED PASS-THRU WAVE GUIDE FOR PRESSURE EQUALIZATION	- -

ALL MATERIAL IN SCAN ROOM MUST BE NON-FERROUS

ENTIRE EMERGENCY GHe DISCHARGE PIPE MUST BE MADE FROM STAINLESS STEEL OR ALUMINUM

NOTE:
THIS DIMENSION FROM PARENT WALL TO FINISHED WALL WILL VARY FROM SITE TO SITE. IT IS THE RF VENDOR'S RESPONSIBILITY TO PROVIDE THIS DIMENSION AND ENSURE THE QUENCH PIPE WAVE GUIDE IS PLACED IN THE CORRECT LOCATION (AS SHOWN ON SHEET M1 OF THE FINAL DRAWING PACKAGE). IF THE WAVE GUIDE IS NOT PLACED IN THE CORRECT LOCATION, IT IS THE RF VENDOR'S RESPONSIBILITY TO MAKE THE REQUIRED ADJUSTMENT.

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08-05-13	UPDATED EQUIPMENT ROOM LAYOUT.	C.B.S.

TRISTAN ASSOCIATES

(MR SCAN ROOM - TITAN)

4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

DATE: 08-05-13

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

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

M1

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GENERAL

07–18–12

THIS DOCUMENT COVERS THE DESIGN OF QUENCH LINES USED IN CONJUNCTION WITH TOSHIBA MAGNET TECHNOLOGY 1.5T AND 3T MAGNETS. FOR CALCULATING THE PRESSURE DROPS, **QUENCH LINE CALCULATION** TOOLS ARE AVAILABLE AND MUST ALWAYS BE USED.

IN THE EVENT OF A QUENCH, THE THERMAL ENERGY DISSIPATED CAUSES AN EXTREMELY RAPID BOIL OFF OF THE LIQUID HELIUM. THE SYSTEM MUST BE CAPABLE OF VENTING THE LARGE VOLUME OF GAS GENERATED AT THE APPROXIMATE EXPANSION RATIO OF 1:700 FROM LIQUID AT 4.2 K TO ROOM TEMPERATURE GAS. THE EXHAUST SYSTEM IS CRITICAL FOR THE SAFE OPERATION OF THE MAGNET, AND THE GUIDELINES SET OUT IN THIS SECTION MUST BE FOLLOWED. SINCE HELIUM VENTED IN A QUENCH IS AN ASPHYXIANT AND AN EXTREMELY COLD GAS, THE QUENCH LINE MUST ALWAYS END AT A POINT WHERE ACCESS BY PEOPLE IS NOT POSSIBLE.

IT IS THE RESPONSIBILITY OF THE OPERATOR OF THE MRI SYSTEM IS TO ENSURE THAT THE QUENCH LINE IS MAINTAINED IN AN OPERABLE STATE.

BELLOWS ARE TO BE PROVIDED BY CUSTOMER/CONTRACTOR.

SAFETY NOTES

01–10–11

WARNING: RISK OF ASPHYXIATION
FAILURE TO OBSERVE THE FOLLOWING MAY RESULT IN DIZZINESS AND LOSS OF CONSCIOUSNESS.
-> DO NOT VENT HELIUM GAS DIRECTLY INTO THE MAGNET ROOM.
-> DO NOT VENT EXHAUST GAS FROM THE QUENCH LINE INTO AN ENCLOSED SPACE.

NOTE: THE OPERATOR OF THE MRI SYSTEM MUST PREPARE AN "EMERGENCY PLAN".

NOTE: ONLY THE EXAMPLES OF THE TUBE IN THIS GUIDE MAY BE USED.

NOTE: PLANNING AND INSTALLATION OF QUENCH LINES MUST BE CONDUCTED BY QUALIFIED PERSONNEL, AS APPOINTED BY THE PROJECT MANAGER.

NOTE: COMPONENTS USED FOR OTHER TUBING, E.G., IN AIR CONDITIONING OR ROOM VENTING, ARE GENERALLY NOT SUITABLE FOR QUENCH LINE CONSTRUCTION.

NOTE: THE QUENCH LINE MUST BE IDENTIFIED WITH A MARKER TAPE ALONG THE COMPLETE LENGTH OF THE QUENCH LINE. THE CONTENT COULD BE, E.G.: "DO NOT CUT, QUENCH LINE EXHAUST LINE".

NOTE: NEW CUSTOMER SITES MUST HAVE THE QUENCH LINE INSTALLED AND AVAILABLE FOR IMMEDIATE USE BEFORE THE MAGNET SYSTEM ARRIVES TO ALLOW SUITABLE VENTING FOR THE MAGNET DURING INSTALLATION.

QUENCH LINE DESIGN RULES

07–13–12

THE FOLLOWING SPECIFIC DESIGN RULES APPLY TO THE COMPONENTS MAKING UP THE QUENCH LINE:

- THE MAXIMUM INTERNAL PRESSURE ALLOWED ON THE LINE IN THE **DESIGN CALCULATIONS** IS **100 MBAR**. HOWEVER, THE QUENCH LINE AND ALL ITS ELEMENTS MUST BE DESIGNED TO WITHSTAND A PRESSURE OF **450 MBAR**. THE LINE MUST BE CONSTRUCTED IN ACCORDANCE WITH SOUND ENGINEERING PRACTICE AS DESCRIBED BELOW.
- THE QUENCH LINE WILL COMPRISE STRAIGHT, HYDRAULICALLY SMOOTH LINE SECTIONS, BENDS UP TO 90° **(FIG. 10-12)** AND A DIFFUSER IF REQUIRED **(FIG. 13)**.
- THE END OF THE LINE MUST BE TERMINATED IN A WAY TO PREVENT INGRESS OF RAIN, SNOW, AND FOREIGN OBJECTS **(FIG. 4-8)**.
- IF A QUENCH LINE IS VERY SHORT AND STRAIGHT, A FLEXIBLE LINE MAY BE USED FOR THE WHOLE OF THE QUENCH LINE. NOTE, HOWEVER, THAT DUE TO THE HIGH PRESSURE DROP, THE MAXIMUM PERMISSIBLE LENGTH OF FLEXIBLE LINES IS VERY SHORT AS COMPARED TO STRAIGHT LINES.
- THE QUENCH LINE MUST BE MADE FROM A **NON-MAGNETIC STAINLESS STEEL OR ALUMINUM**. ONLY STAINLESS STEEL GRADES AISI 304, 309, 316, and 321 [EN 1.4301, 1.4828, 1.4401, AND 1.4878] OR ALUMINUM MAY BE USED.

NOTE: THE QUENCH LINE COMPONENTS OTHER THAN THOSE SUPPLIED WITH THE MRI SYSTEM (I.E. MAGNET ELBOW, HORIZONTAL ADAPTER, AND FLEXIBLE TUBE) MUST ONLY BE MADE OF STAINLESS STEEL OR ALUMINUM.

- THE WALL THICKNESS OF THE TUBE MUST BE A **MINIMUM OF 0.7mm (22 S.W.G)**.
- ONLY ROUND SECTION TUBING MAY BE USED. **SQUARE SECTION IS NOT ALLOWED**.
- DUE CONSIDERATION MUST BE GIVEN TO THE THERMAL CONTRACTION (UP TO 3mm/METER FOR STAINLESS STEEL OR ALUMINUM). STAINLESS STEEL OR ALUMINUM BELLOWS MUST BE USED TO ALLOW FOR ADEQUATE CONTRACTION. **BELLOWS ARE TO BE FITTED AT A MINIMUM OF EVERY 10 METERS**. THE MOVEMENT OF THE BELLOWS MUST BE LIMITED SO THAT THE LINE DOES NOT EXPAND EXCESSIVELY UNDER INTERNAL PRESSURE.
- BELLOWS ARE DESCRIBED AS "STRAIGHT FLEXIBLE" IN THE **QUENCH LINE CALCULATION** TOOL.

NOTE: FLEXIBLE LINES AND BELLOWS MAY ONLY BE MADE OF STAINLESS STEEL OR ALUMINUM.

- THE LENGTH OF THE BELLOWS IN TOTAL MAY NOT EXCEED 2% OF THE ALLOWED MAXIMUM LINE LENGTH, IN ORDER THAT THE LINE PRESSURE DROP DOES NOT INCREASE EXCESSIVELY.
- THE WEIGHT OF THE LINE MUST BE SUPPORTED AGAINST THE BUILDING. IN ORDER THAT THE LINE SUSPENSION IS NOT OVERSTRESSED DUE TO THE THERMAL CONTRACTION, THE SUSPENSION NEEDS TO BE FLEXIBLE ENOUGH TO ACCOMMODATE THE MOVEMENTS. ALSO, THE WALL EXIT IN GENERAL SHOULD NOT BE FIXED HARD TO THE WALL.
- THE FLEXIBLE TUBE SUPPLIED WITH THE MRI SYSTEM MUST BE FITTED AT THE QUENCH VALVE END. ITS MAIN FUNCTION IS TO REDUCE NOISE TRANSMISSION. ITS SECONDARY FUNCTIONS ARE TO EASE THE FITTING OF THE QUENCH LINE AND TO **ENSURE THAT THE QUENCH VALVE DOES NOT CARRY ANY LOAD FROM THE WEIGHT OF THE QUENCH LINE**.
- THE CLEAR BORE IN THE CUSTOMER/CONTRACTOR SUPPLIED BELLOWS FOR 1.5 TESLA SYSTEMS WILL VARY DEPENDING ON THE LENGTH OF QUENCH LINE.

QUENCH LINE DESIGN RULES CONTINUED

NOTE: THE FLEXIBLE TUBE MUST BE INSTALLED NOMINALLY STRAIGHT, I.E., TO ALLOW FOR MINOR MISALIGNMENT.

IT SHOULD TYPICALLY NOT EXCEED ±5mm, AND NEVER EXCEED THE DESIGN LIMIT OF ±20mm.

- IT MUST NOT BE BENT IN A WAY TO REPLACE AN ELBOW. THE LENGTH OF THE FLEXIBLE TUBE IS INCLUDED IN THE **QUENCH LINE CALCULATION** TOOL.
- JOINTS MAY ONLY BE MADE BY WELDING (BY COMPETENT WELDERS), OR BY BOLTED FLANGES. ROTARY FLANGES ARE PERMITTED TO EASE THE INSTALLATION PROCESS. V–CLAMPED FLANGES MAY NOT BE USED. GASKETS USED TO SEAL SECTION JOINTS HAVE TO BE MADE OF EITHER UHMW–PE [CESTILENE HD1000, HOSTALEN GC579, OR HOSTALEN GUR812], PTFE [BS EN 13000–1:1998, BS EN 13000–2:1998], OR FIBRE [ASTM F36, BS 7531, DIN 3754P]. **NO OTHER MATERIALS ARE PERMITTED**.

NOTE: WELDS MUST BE ONLY BE MADE BY COMPETENT WELDERS.

- THE END OF THE QUENCH LINE MUST BE PROTECTED FROM WEATHER CONDITIONS SUCH AS RAIN OR SNOW. IT MUST BE FITTED WITH A WIRE MESH. THE MESH SIZE MUST BE 3/8" (10 +2/–1mm) WITH 18 GAUGE (1.0 ±0.3mm) ROUND WIRES, TO PREVENT INGRESS OF FOREIGN BODIES [E.G. BIRDS AND RODENTS].

NOTE: THE AREA OF THE MESH MUST BE AT LEAST 2.5 TIMES THE CROSS-SECTION AREA OF THE QUENCH TUBE (FIG. 4-8).

- WHERE THE QUENCH LINE EXITS VERTICALLY THROUGH A FLAT ROOF, THE OUTLET MUST BE ABOVE A LEVEL WHERE WATER COULD ENTER IT IN THE EVENT OF THE ROOF DRAINS BECOMING BLOCKED. WHERE THE QUENCH LINE EXISTS VERTICALLY, A RAIN SHIELD MUST BE FITTED **(FIG. 4)**.
- A DEFLECTOR PLATE MUST BE WELDED TO THE LINE WHERE IT EXITS THE ROOF TO PREVENT HELIUM FROM RE–ENTERING THE BUILDING. THE DEFLECTOR PLATE MUST BE AT LEAST THE SAME DIAMETER AS THE RAIN GUARD. IT MUST BE LOCATED AT LEAST TWO LINE DIAMETERS ABOVE THE ROOF, AND TWO DIAMETERS BELOW THE BOTTOM OF THE RAIN GUARD **(FIG. 4)**.
- IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET MUST BE TURNED DOWN BY NOT LESS THAN THE LINE DIAMETER TO PREVENT RAIN INGRESS **(FIG. 5-8)**. THE EXIT MUST BE SITUATED WHERE IT CANNOT BE BLOCKED BY DRIFTING SNOW.

CAUTION: ONLY USE THE QUENCH LINE OUTLET CONFIGURATIONS DESCRIBED IN THIS CHAPTER. IF THE QUENCH LINE IS NOT CONFIGURED CORRECTLY, SAFETY IS COMPROMISED.

- TO AVOID THE RISK OF INJURY FROM COLD BURNS AND ASPHYXIATION, ACCESS TO THE QUENCH LINE MUST BE RESTRICTED BY 3m EACH SIDE AND BELOW, AND 6m VERTICALLY ABOVE THE OUTLET; WARNING SIGNS MUST BE PUT UP **(FIG. 2, 3, & 9)**. THIS MEANS IN PARTICULAR, THAT THE OUTLET SHOULD BE NO LESS THAN 5m ABOVE SIDEWALKS. THE OUTLET MUST NOT BE SITUATED WHERE, IN CASE OF A QUENCH, HELIUM GAS MIGHT BE DRAWN INTO AN AIR INLET, OR WHERE GAS MIGHT ENTER OPEN WINDOWS. THE COLD GAS MUST NOT BE ALLOWED TO BLOW DIRECTLY ONTO A WINDOW.

NOTE: WHERE WINDOWS ARE WITHIN THE RESTRICTED ACCESS AREA, THEY MUST BE SEALED AND PERMANENTLY CLOSED. MEANS OF OPENING THE WINDOWS MUST BE REMOVED.

- ALL BENDS MUST BE SMOOTH WALLED AND HAVE A CENTERLINE RADIUS TO INTERNAL LINE DIAMETER RATIO IN THE RANGE OF 1.5 TO 5.0. WHERE A ONE–PIECE BEND IS NOT READILY AVAILABLE, A FABRICATED BEND USING STRAIGHT SECTIONS IS PERMISSIBLE **(FIG. 11)**.
- EXPANSION FROM A SMALL TO LARGE LINE DIAMETER MUST BE ACCOMPLISHED USING A DIFFUSER. DIFFUSERS MUST CONFORM TO THE GEOMETRIC PARAMETERS SHOWN IN **(FIG.13)**.

CAUTION: NEVER REDUCE THE DIAMETER OF A TUBE IN THE DOWNSTREAM DIRECTION. THIS WILL CAUSE SHOCKWAVE REFLECTIONS AND LOCAL PRESSURE PEAKS WHICH MAY DAMAGE THE MAGNET.

- THE QUENCH LINE MUST BE THERMALLY INSULATED ALONG ITS FULL LENGTH. THIS IS TO AVOID CONDENSATION OF LIQUID AIR IN CASE OF A QUENCH, AS WELL AS WATER CONDENSATION ON THE INSIDE IN HUMID WEATHER CONDITIONS. A DOUBLE–WALLED STRUCTURE IS ALLOWED. MINERAL FIBER INSULATION (BRANDS SUCH AS ROCKWOOL DUCTWRAP OR OTHER) MUST NOT BE LESS THAN 25mm THICK. THE INSULATION MUST CONFORM TO LOCAL REGULATIONS FOR FIBROUS INSULATION MATERIALS.
- WITHIN THE RF ROOM, THE LINE MUST BE INSULATED WITH ONE LATER OF MINERAL FIBER INSULATION 25mm THICK WITH VAPOR BARRIER, COVERED WITH ONE LAYER OF 25mm THICK CLASS O ARMAFLEX [ARMACELL]. VAPOR BARRIERS MUST NOT MAKE ELECTRICAL CONTACT BETWEEN THE MAGNET LINE WORK AND THE WAVE GUIDE. IN ORDER TO AVOID RF DISTURBANCE TO THE IMAGING SYSTEM. THE OUTSIDE MAY BE COVERED WITH AN AESTHETIC FINISH.
- OUTDOOR LINES MUST BE COVERED IF ACCESS CANNOT BE EXCLUDED AT THE LINE OR BELOW (DRIPPING LIQUID AIR IN CASE OF A QUENCH). OUTSIDE INSULATION MUST BE WEATHERPROOF [E.G., ARMAFINISH FR PAINT, OR ARMA–CHECK INSULATION].

NOTE: THE QUENCH LINE INSULATION MUST EXTEND UP TO THE QUENCH VALVE ON THE MAGNET.

NOTE: THERE MUST BE CLEARANCE BETWEEN THE FINISHED INSULATION AND THE MAGNET COVERS.

- THE FULLY INSULATED QUENCH LINE MUST BE MARKED ALONG ITS LENGTH WITH A WARNING TAPE STATING ITS FUNCTION, **(FIG. 2)**.

WARNING
VENT PIPE FOR EXTREMELY COLD HELIUM GAS
ONLY AUTHORIZED PERSONNEL TO WORK ON VENT PIPE

FIGURE 2: WARNING LABEL - QUENCH LINE

QUENCH LINE DESIGN RULES CONTINUED

- A WARNING LABEL, **(FIG. 3)** MUST BE ADHERED NEXT TO THE EXTERNAL OUTLET.

WARNING
KEEP AWAY. EXTREMELY COLD GAS MAY BE EXHAUSTED WITH NO WARNING.
DO NOT WORK ON THE VENTING IF THE MAGNET IS AT FIELD.

FIGURE 3: WARNING LABEL - QUENCH LINE OUTLET

- TO AVOID ELECTRICAL NOISES BEING PICKED UP BY LOOPS BETWEEN THE MAGNET, QUENCH LINE, THE RF ROOM AND THE BUILDING, IT IS NECESSARY TO HAVE GALVANIC SEPARATION AT THE MAGNET END AND AT THE BUILDING END OF THE QUENCH LINE.
- THE GALVANIC SEPARATION AT THE MAGNET IS BETWEEN THE FLEXIBLE TUBE AND MAGNET ELBOW OR HORIZONTAL ADAPTER (WHICH EVER IS FITTED). THIS GALVANIC JOINT IS ACHIEVED BY USING THE GASKET, STAINLESS STEEL OR ALUMINUM BOLTS, INSULATING BUSHES NUTS AND WASHERS SUPPLIED WITH THE MAGNET SYSTEM **(FIG. 16)**.
- A SECOND GALVANIC SEPARATION IS REQUIRED AT THE BUILDING END.
- THE QUENCH LINE DESIGN MUST COMPLY WITH THE REQUIREMENTS SPECIFIED IN THIS DOCUMENT. IT IS THE RESPONSIBILITY OF THE PROJECT MANAGER TO ACCEPT THE DESIGN AND INSTALLATION OF THE QUENCH LINE BEFORE THE MAGNET IS CONNECTED!
- A PRINT OFF OF THE COMPLETED "**CALCULATOR**" SHEET AND A COMPLETED "**QUENCH LINE ACCEPTANCE PROTOCOL**" FROM THE **QUENCH LINE CALCULATION** TOOL MUST BE PROVIDED WITH ACCEPTANCE DOCUMENTATION.

NOTE: THE DESIGN AND CONSTRUCTION OF THE QUENCH LINE MUST BE DOCUMENTED IN DRAWINGS AND CALCULATIONS, AND KEPT WITH THE "SYSTEM OWNER MANUAL".

QUENCH LINE OUTLET CONFIGURATIONS

01–10–11

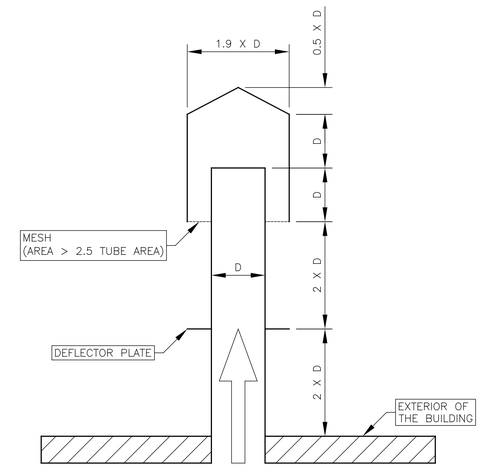

FIGURE 4 - QUENCH LINE OUTLET TO ATMOSPHERE - VERTICAL

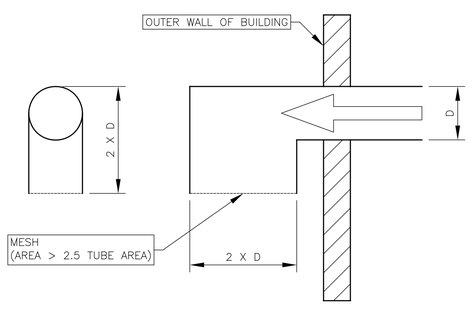

FIGURE 5 - QUENCH LINE OUTLET TO ATMOSPHERE - HORIZONTAL OPTION 1

QUENCH LINE OUTLET CONFIGURATIONS CONT.

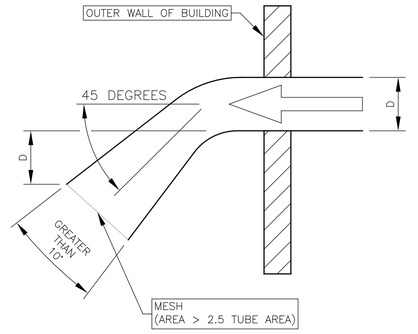

FIGURE 6 - QUENCH LINE OUTLET TO ATMOSPHERE - HORIZONTAL OPTION 2

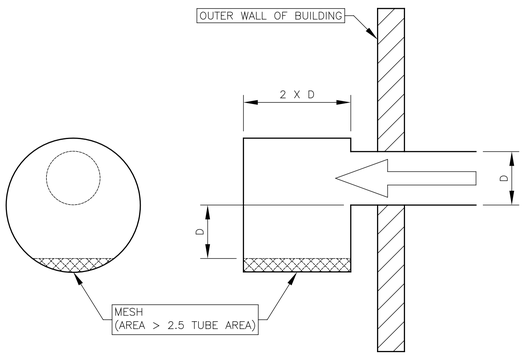

FIGURE 7 - QUENCH LINE OUTLET TO ATMOSPHERE - HORIZONTAL OPTION 3

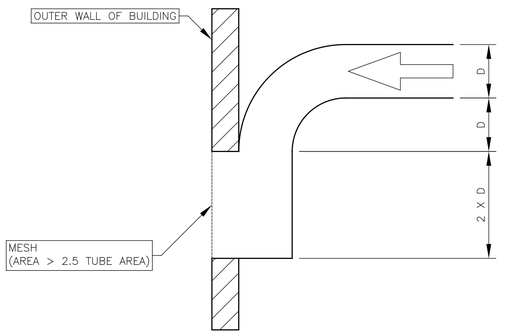

FIGURE 8 - QUENCH LINE OUTLET TO ATMOSPHERE - HORIZONTAL OPTION 4

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REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08–05–13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

DATE:	08–05–13
SCALE:	AS NOTED
PLANNER:	C.B.S.
SID:	30008837

PROJECT NO.
130013689MRF1

M2

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QUENCH LINE OUTLET CONFIGURATIONS CONT.

01–10–11

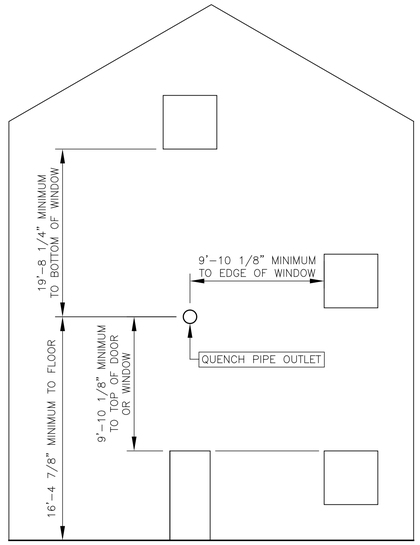
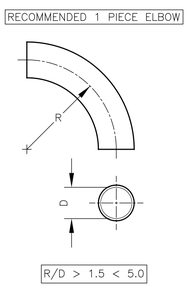


FIGURE 9 - EXAMPLE OF QUENCH LINE OUTLET POSITION REQUIREMENTS TO THE OUTSIDE (NOT TO SCALE)

QUENCH LINE ELBOWS

01–10–11



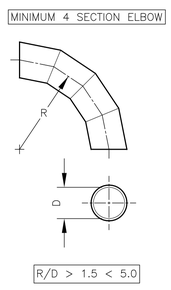
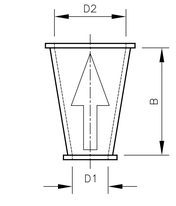


FIGURE 10 - QUENCH LINE SMOOTH ELBOW

FIGURE 11 - QUENCH LINE SEGMENTED ELBOW

DIFFUSER

07–13–12



THE RECOMMENDED DIFFUSER DESIGN FOR MINIMUM PRESSURE LOSS IS THE RATIO OF:

B > 2.5 X (D2 – D1)

D1 = SMALL INSIDE DIAMETER OF TUBE (FLEXIBLE TUBE SIDE)
D2 = LARGE INSIDE DIAMETER OF TUBE (QUENCH TUBE SIDE)
B = LENGTH OF DIFFUSER

FIGURE 13 - DIFFUSER

QUENCH LINE WATER DRAINS (AS REQUIRED)

08–05–11

- **SECTIONS WHERE WATER MIGHT COLLECT ARE TO BE AVOIDED, BUT IF THEY CANNOT BE AVOIDED, AN AUTOMATIC WATER DRAIN MUST BE FITTED AT THE BOTTOM OF THE SECTION. SEE (FIG. 14 & 15) FOR DIMENSIONS AND THE METHOD OF FITTING TO THE QUENCH PIPE.**
- IF THE MAGNET SHOULD QUENCH, THERE WILL BE A VERY SMALL RELEASE OF HELIUM GAS FROM THE DRAINS, WHICH CAN BE TOLERATED EVEN IN SMALL ROOMS [10 L IN 10 MIN]. IF THE EXIT IS RAIN PROTECTED AND THE LINE IS PROPERLY INSULATED, THERE WILL BE NEXT TO NO WATER COMING FROM THE DRAINS. IT IS THEREFORE NOT REQUIRED TO CONNECT THE DRAINS TO A WASTEWATER INSTALLATION. WATER UNDER THE DRAINS WOULD INDICATE A MALFUNCTION.
- THE DRAINS ARE TO BE INSPECTED AND CLEANED FROM DEBRIS ANNUALLY TO ENSURE THAT THEY ARE OPERATING CORRECTLY. ACCESS MUST BE TAKEN INTO CONSIDERATION WHEN DESIGNING THE QUENCH LINE. THIS OPERATION MAY BE DONE WITH THE MAGNETIC AT FIELD, AND AN M8 SCREW SHOULD BE INSERTED INTO THE OPEN ATTACHMENT HOLD TO ENSURE MINIMAL ESCAPE OF GAS IN THE UNLIKELY EVEN THAT THE MAGNET SHOULD QUENCH DURING INSPECTION.

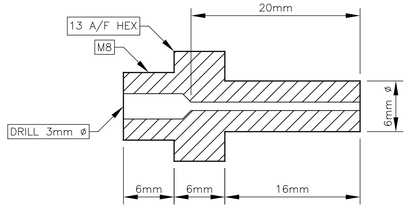
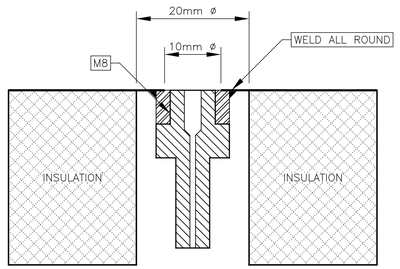


FIGURE 14 - DRAWING OF AUTOMATIC WATER DRAIN (SCALE: 3:1)



- CUT THROUGH PIPE 10mm ø
- WELD M8 NUT TO SURFACE OF PIPE
- SCREW IN WATER DRAIN
- WHEN INSULATING PIPE, LEAVE 20mm ø CLEARANCE FOR DRAIN

FIGURE 15a - WATER DRAIN INSTALLATION (SCALE: 2:1)

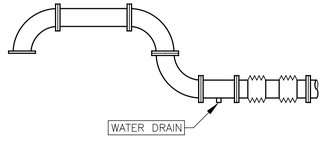
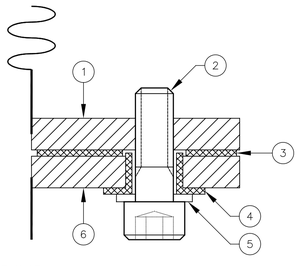


FIGURE 15b - WATER DRAIN INSTALLATION (NOT TO SCALE)

FLEXIBLE TUBE GALVANIC SEPARATION

07–13–12



1. FLEXIBLE TUBE FLANGE
2. M8 HEX HEAD SCREWS (12 OFF)
3. FIBER GASKET
4. PTFE INSULATOR (12 OFF)
5. NORDLOCK WASHER (12 OFF)
6. TURRET FLANGE

FIGURE 16 - GALVANIC JOINT AT FLEXIBLE TUBE (NOT TO SCALE)

RF WAVEGUIDE

01–10–11

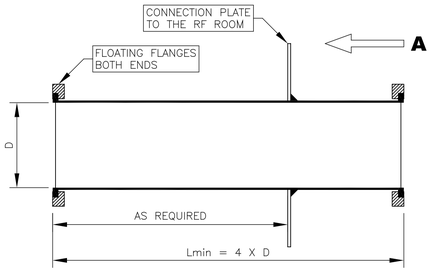
THE RF ROOM FEED–THROUGH NEEDS TO CONFORM TO CERTAIN GEOMETRY CONSTRAINTS IN ORDER TO GUARANTEE THE RF INTEGRITY OF THE RF ROOM (FIG. 17).

AS A FUNCTION OF THE INNER PIPE DIAMETER (D) THE FOLLOWING APPLIES TO THE MINIMUM LINE LENGTH Lmin FOR FREQUENCIES UP TO 128 MHz AND 110 dB ATTENUATION:

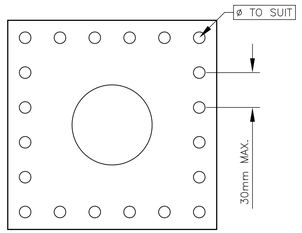
Lmin = 4.0 X D

WHEREBY: D ≤ 300mm

- THE BOLT SPACING IN THE CONNECTOR PLATE TO RF ROOM MUST BE A MAXIMUM OF 30mm APART TO ENSURE RF SHIELDING.
- DEPENDING ON RF ROOM DESIGNS, RF SEALS MAY BE REQUIRED BETWEEN THE MOUNTING FLANGE AND THE RF ROOM.



NOTE:
INSULATING CONNECTIONS ARE TO BE MADE AT BOTH ENDS OF THE WAVEGUIDE.

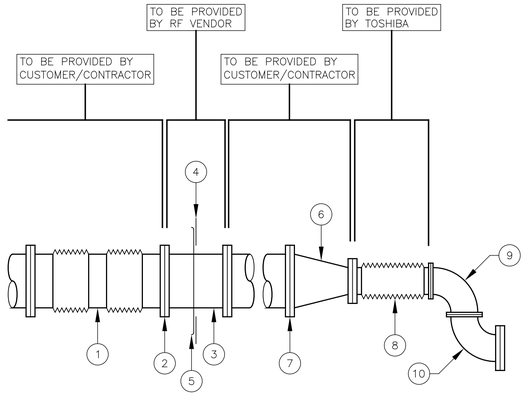


VIEW ON ARROW "A"

FIGURE 17 - RF WAVEGUIDE

QUENCH LINE CONFIGURATIONS

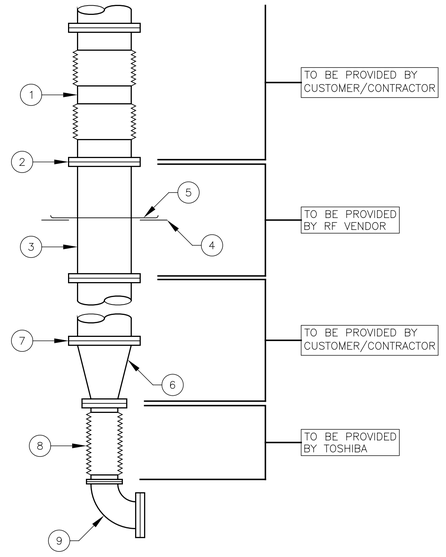
07–13–12



1. BELLOWS (SUPPLIED BY CUSTOMER/CONTRACTOR, SEE **FIG. 20**)
2. GALVANIC SEPARATION (2 PLACES)
3. RF FEED THROUGH
4. RF ROOM
5. CONNECTION PLATE TO RF ROOM
6. DIFFUSER (OPTIONAL)
7. FLANGE (E.G. WELDED, SCREW CONNECTION)
8. FLEXIBLE TUBE (SUPPLIED WITH MAGNET, SEE **FIG. 22**)
9. 90° ELBOW (SUPPLIED BY CUSTOMER/CONTRACTOR)
10. 90° ELBOW (SUPPLIED WITH MAGNET)

FIGURE 18 - EXAMPLE OF HORIZONTAL BELLOWS AND CABIN FEED-THROUGH

QUENCH LINE CONFIGURATIONS CONTINUED



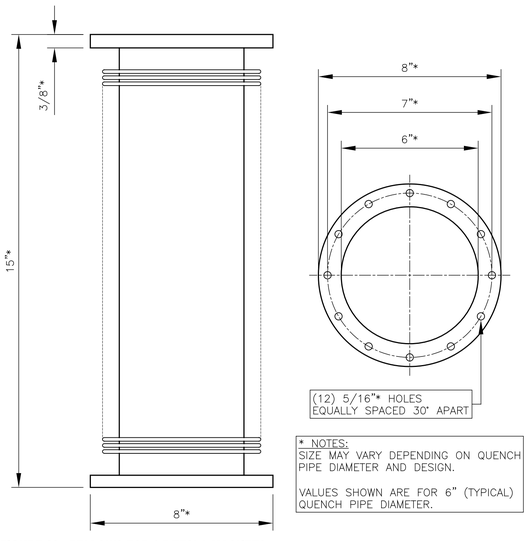
1. BELLOWS (SUPPLIED BY CUSTOMER/CONTRACTOR, SEE **FIG. 20**)
2. GALVANIC SEPARATION (2 PLACES)
3. RF FEED THROUGH
4. RF ROOM
5. CONNECTION PLATE TO RF ROOM
6. DIFFUSER (OPTIONAL)
7. FLANGE (E.G. WELDED, SCREW CONNECTION)
8. FLEXIBLE TUBE (SUPPLIED WITH MAGNET, SEE **FIG. 22**)
9. 90° ELBOW (SUPPLIED WITH MAGNET)

FIGURE 19 - EXAMPLE OF VERTICAL BELLOWS AND CABIN FEED-THROUGH

BELLOWS

(SUPPLIED/INSTALLED BY CUSTOMER/CONTRACTOR)

07–13–12



* NOTES:
SIZE MAY VARY DEPENDING ON QUENCH PIPE DIAMETER AND DESIGN.

VALUES SHOWN ARE FOR 6" (TYPICAL) QUENCH PIPE DIAMETER.

FIGURE 20 - BELLOWS FOR 1.5 TESLA MAGNETS

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REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08–05–13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

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SID: 30008837
PROJECT NO.
130013689MRF1

M3

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FLEXIBLE TUBE

07–13–12

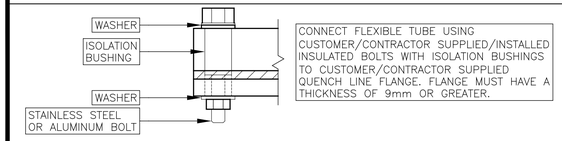


FIGURE 21 - GALVANIC JOINT AT QUENCH PIPE END (NOT TO SCALE)

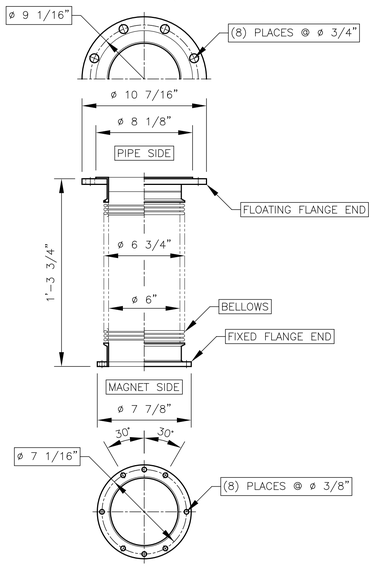


FIGURE 22 - FLEXIBLE TUBE FOR 1.5 TESLA MAGNETS

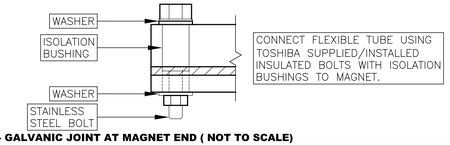
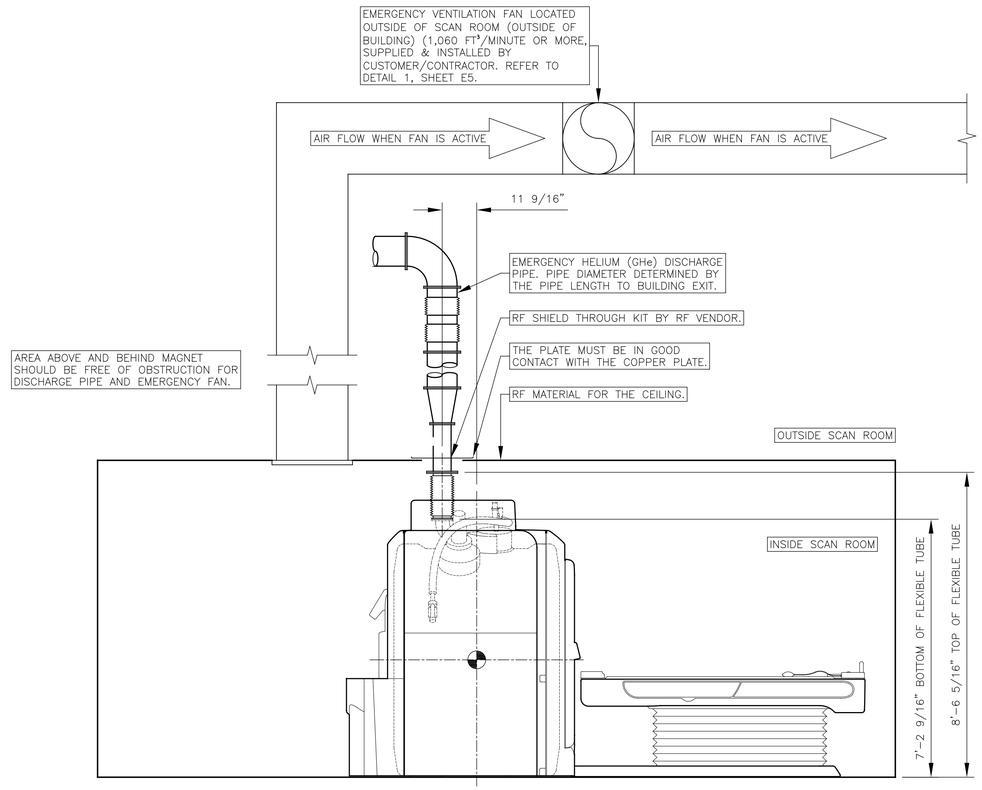


FIGURE 23 - GALVANIC JOINT AT MAGNET END (NOT TO SCALE)

QUENCH LINE AND EMERGENCY VENTILATION FAN

09–05–12



QUENCH LINE CONDENSATION

07–08–11

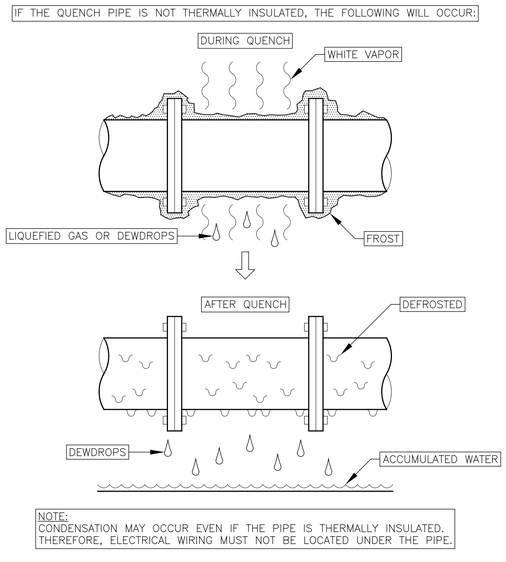
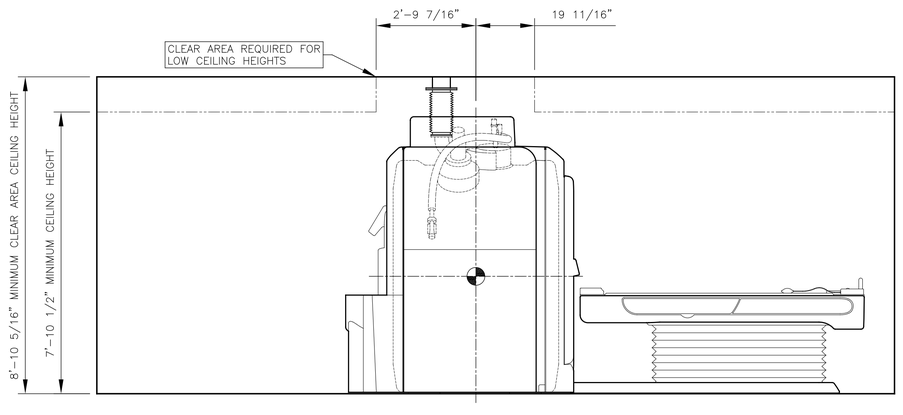


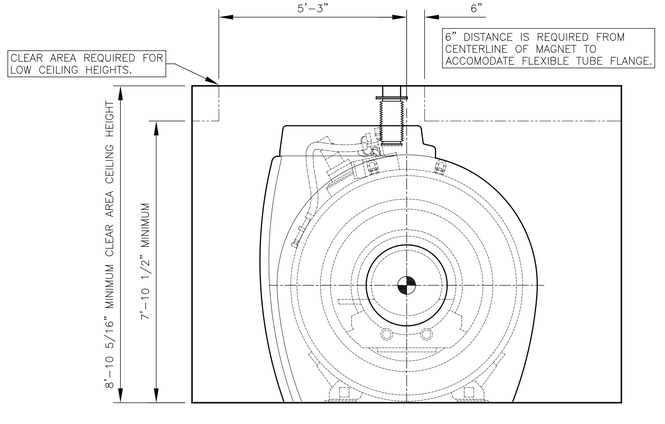
FIGURE 24 - QUENCH LINE CONDENSATION (NOT TO SCALE)

INSTALLATION SPACE FOR THE GANTRY

09–05–12



SIDE



FRONT

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(MR SCAN ROOM – TITAN)
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HARRISBURG, PA 17111

DATE: 08–05–13
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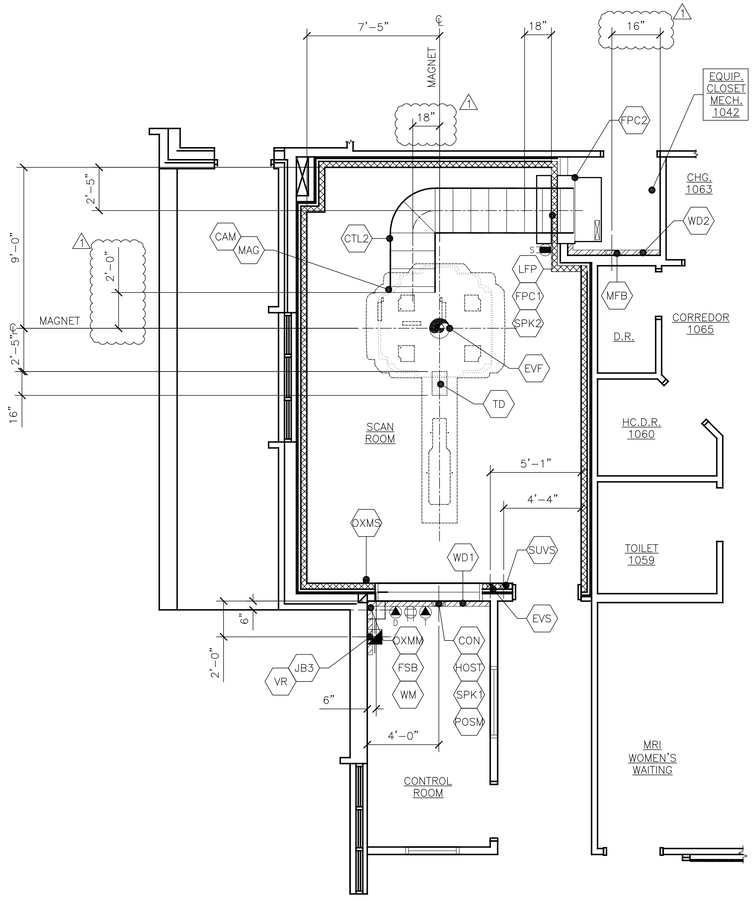
MAIN CB1 CB2 EPO BS RL DOOR

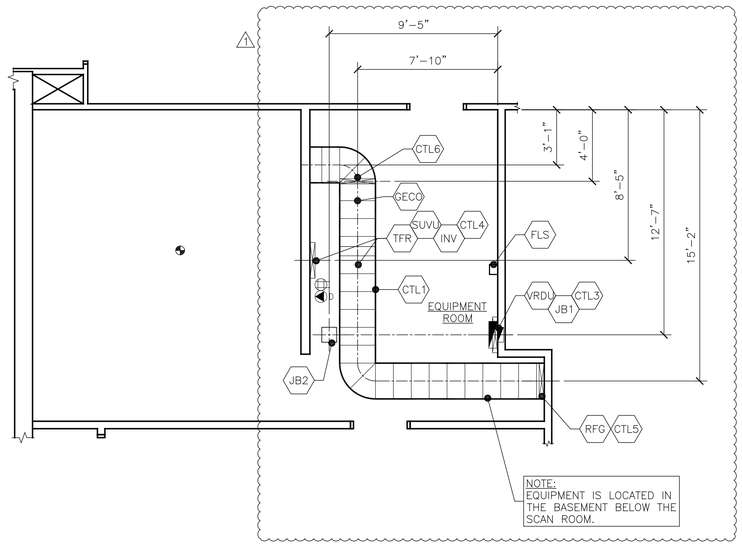
NOTE:
TO BE LOCATED BY CUSTOMER / CONTRACTOR.

ADDITIONAL "EPO" SWITCHES TO BE LOCATED IN ADJACENT ROOMS WITH TOSHIBA EQUIPMENT IF MAIN "EPO" IS NOT ACCESSIBLE (VERIFY WITH LOCAL CODE). ALL "EPO" SWITCHES TO BE PROVIDED BY CUSTOMER / CONTRACTOR.



ELECTRICAL LAYOUT

0 1' 2' 4' 8' 16'



NOTE:
J-BOX SIZES MAY BE INCREASED AS NEEDED WITH EXCEPTION TO THE "VRDU" J-BOX.

NOTE:
GROMMETED OPENINGS ARE SHOWN FOR REFERENCE ONLY. VERIFY SIZE AND LOCATION WITH TOSHIBA REPRESENTATIVE.

NOTE:
CUSTOMER HAS THE OPTION TO FURR OUT WALL TO ACCOMMODATE FLUSH MOUNTED WALL DUCT IF DESIRED.

ELECTRICAL DUCT LEGEND

ITEM	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER / CONTRACTOR	REF.
WD1	10" W X 3 1/2" D, FLUSH/SURFACE MOUNTED WALL DUCT W/(3) EQUALLY PARTITIONED COMPARTMENTS THROUGHOUT & REMOVABLE ACCESS COVERS. MOUNTED 12" A.F.F. TO BOTTOM OF DUCT.	5 E3
WD2	10" W X 3 1/2" D, FLUSH/SURFACE MOUNTED WALL DUCT W/(3) EQUALLY PARTITIONED COMPARTMENTS THROUGHOUT & REMOVABLE ACCESS COVERS. MOUNTED 12" A.F.F. TO BOTTOM OF DUCT.	5 E3
CTL1	24" W X 4" H, CABLE TRAY LADDER. LOCATION TO BE DETERMINED. WORKING LOAD OF CABLE TRAY LADDER IS 100 LBS/LINEAR FOOT.	2 E3
CTL2	30" W X 6" H, NON-FERROUS CABLE TRAY LADDER. MOUNTED ABOVE FINISHED CEILING. WORKING LOAD OF CABLE TRAY LADDER IS 100 LBS/LINEAR FOOT.	5 E4
CTL3	24" W X 4" H, CABLE TRAY LADDER. LOCATION TO BE DETERMINED. WORKING LOAD OF CABLE TRAY LADDER IS 100 LBS/LINEAR FOOT. CONNECTING "VRDU" TO "CTL1".	2 E3
CTL4	24" W X 4" H, CABLE TRAY LADDER. LOCATION TO BE DETERMINED. WORKING LOAD OF CABLE TRAY LADDER IS 100 LBS/LINEAR FOOT. FROM FINISHED FLOOR TO "CTL1".	2 E3
CTL5	24" W X 4" H, CABLE TRAY LADDER. LOCATION TO BE DETERMINED. WORKING LOAD OF CABLE TRAY LADDER IS 100 LBS/LINEAR FOOT. FROM FINISHED FLOOR TO "CTL1".	2 E3
CTL6	24" W X 4" H, CABLE TRAY LADDER. LOCATION TO BE DETERMINED. WORKING LOAD OF CABLE TRAY LADDER IS 100 LBS/LINEAR FOOT. CONNECTING "FPC2" TO "CTL1" VIA CORE DRILLS.	2 E3
WM	G-3000 (2 3/4" X 1 17/32") WIREMOLD, SURFACE MOUNTED ON WALL CONNECTING WALL DUCT "WD1" TO "OXMM" AND "OXMM" TO "FSB".	1 E3
VR	10" W X 3 1/2" D, FLUSH/SURFACE MOUNTED RISER DUCT W/(3) EQUALLY PARTITIONED COMPARTMENTS THROUGHOUT & REMOVABLE ACCESS COVERS. FROM "JB3" TO "WD2".	2 E3
TD	10" W X 16" L X 3" D, ALUMINUM DUCT, FLUSH MOUNTED IN FINISHED FLOOR. REMOVABLE ACCESS COVERS ARE REQUIRED.	

ELECTRICAL LEGEND

ITEM	ITEM DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER / CONTRACTOR	REF.
MAIN	MAIN SERVICE ENTRANCE PANEL	1 E5
CB1	THREE PHASE CIRCUIT BREAKER PER TOSHIBA POWER SPECIFICATIONS (SEE DETAIL) CIRCUIT BREAKER LOCATION PER CODE REQUIREMENTS BY ELECTRICAL CONTRACTOR.	2 E5
CB2	CUSTOMER/CONTRACTOR PROVIDED CIRCUIT BREAKER FOR ROOM LIGHTS, CIRCUIT BREAKER LOCATION TO BE DETERMINED BY ELECTRICAL CONTRACTOR.	1 E5
VRDU	18" W X 18" H X 6" D J-BOX, SURFACE MOUNTED 45 1/2" A.F.F. TO BOTTOM OF BOX. OPEN TO "CTL3".	3 E3
EPO	4" STD. J-BOX FOR REMOTE OFF SWITCH. LOCATED BY CUSTOMER/CONTRACTOR. DPDT, NORMALLY OPEN MUSHROOM HEAD PUSH BUTTON.	1 E5
BS	BUILDING STEEL.	1 E5
MAG	CABLES WILL DRAPE FROM THE CABLE TRAY LADDER "CTL2" TO THE TOP OF THE MAGNET.	2 E3
CON, HOST, SPK1, POSM	SHARED GROMMETED OPENING IN "WD1".	5 E4
OXMM	WIRE CONNECTION THROUGH RF SHIELD IN CONTROL ROOM @ +5'-0" A.F.F. TO CENTER.	1 E3
OXMS	WIRE CONNECTION THROUGH RF SHIELD IN SCAN ROOM, (COPPER OR ALUMINUM) @ JUST BELOW FINISHED CEILING. A WAVE GUIDE IS REQUIRED, TO BE SUPPLIED BY RF VENDOR.	1 E3
SUVS	4" W X 4" D X 4" H J-BOX, FLUSH MOUNTED IN WALL (PLASTIC OR ALUMINUM). +6'-0" A.F.F. TO CENTER OF BOX. ADJACENT TO SCAN ROOM DOOR.	
SUVU	MOUNTED ON TOP OF "TFR".	
EVS	4" W X 4" H X 4" D J-BOX FOR EMERGENCY VENTILATION EXHAUST FAN SWITCH @ 4'-0" A.F.F. TO BOTTOM OF BOX.	
EVF	SCAN ROOM EMERGENCY VENTILATION EXHAUST FAN (FIELD VERIFY LOCATION).	
FSB	12" W X 12" L X 6" H VENTED J-BOX (PER CODE) FOR FAN SWITCH BOX & CUSTOMER'S CONTACTOR (MOUNTED ABOVE FINISHED CEILING, VERIFY EXACT LOCATION).	
CAM	PATIENT MONITOR CAMERA ON THE MAGNET.	
LFP	LINE FILTER PANEL.	
FPC1	FILTER PANEL COVER SUPPLIED AND INSTALLED BY TOSHIBA (SCAN ROOM SIDE).	1-5 E4
FPC2	FILTER PANEL COVER SUPPLIED AND INSTALLED BY TOSHIBA (EQUIPMENT ROOM SIDE).	1-5 E4
MFB	GROMMETED OPENING W/NON-CHAFING MATERIAL IN "WD2".	5 E3
FLS	FLOW SWITCH SUPPLIED AND INSTALLED BY TOSHIBA.	
TFR	CABLES WILL DRAPE FROM CABLE TRAY LADDER "CTL4" TO THE BACK OF THE CABINET.	
RFG	CABLES WILL DRAPE FROM CABLE TRAY LADDER "CTL5" TO THE BACK OF THE CABINET.	
GECO	CABLES WILL DRAPE FROM THE CABLE TRAY LADDER "CTL1" TO THE TOP OF CABINET.	
INV	CABLES WILL DRAPE FROM CABLE TRAY LADDER "CTL4".	
JB1	10" W X 10" H X 4" D, J-BOX FLUSH W/FINISHED WALL, MOUNTED 45 1/2" A.F.C. TO BOTTOM OF BOX. OPEN TO "VRDU".	
JB2	10" W X 10" L X 4" H, J-BOX FLUSH MOUNTED IN FINISHED CEILING.	
JB3	10" W X 10" L X 4" H, J-BOX MOUNTED UNDER FLOOR. OPEN TO "VR".	
RL	ROOM LIGHTING (BY CUSTOMER/CONTRACTOR).	
SPK2	SCAN ROOM SPEAKER.	
DOOR	DOOR SWITCH. EXACT LOCATION T.B.D.	
	QUAD 110V ELECTRICAL OUTLETS FOR SYSTEM EQUIPMENT AND/OR SERVICE EQUIPMENT. OUTLETS TO BE LOCATED IN EACH ROOM WHERE SYSTEM EQUIPMENT IS LOCATED.	
D	RJ45 CONNECTOR, CAT5 CABLE TO BE USED FOR DATA CONNECTION FOR NETWORKING.	
T	DEDICATED PHONE LINE SUPPLIED/INSTALLED BY CUSTOMER/CONTRACTOR.	
S	CUSTOMER/CONTRACTOR PROVIDED SERVICE ELECTRICAL OUTLETS THAT CONNECTS TO "FPC1".	1 E5

SCAN ROOM EMERGENCY LIGHTS

IF RECHARGEABLE BATTERY LIGHTS ARE TO BE USED IN THE SCAN ROOM, THE CHARGING UNIT MUST BE LOCATED OUTSIDE OF THE RF ROOM. THE CHARGING LEADS MUST BE ROUTED INTO THE RF ROOM VIA APPROPRIATE POWER FILTERS TO THE LIGHT AND THE BATTERY.

ALL MATERIAL IN SCAN ROOM MUST BE NON-FERROUS

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
2	08-05-13	UPDATED THE ELECTRICAL LAYOUT IN THE EQUIP. ROOM.	C.B.S.

TRISTAN ASSOCIATES
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4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

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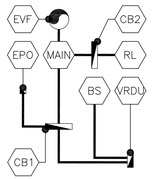
DATE: 08-05-13
SCALE: 1/4" = 1'-0"
PLANNER: C.B.S.
SID: 30008837
PROJECT NO. 130013689MRF1

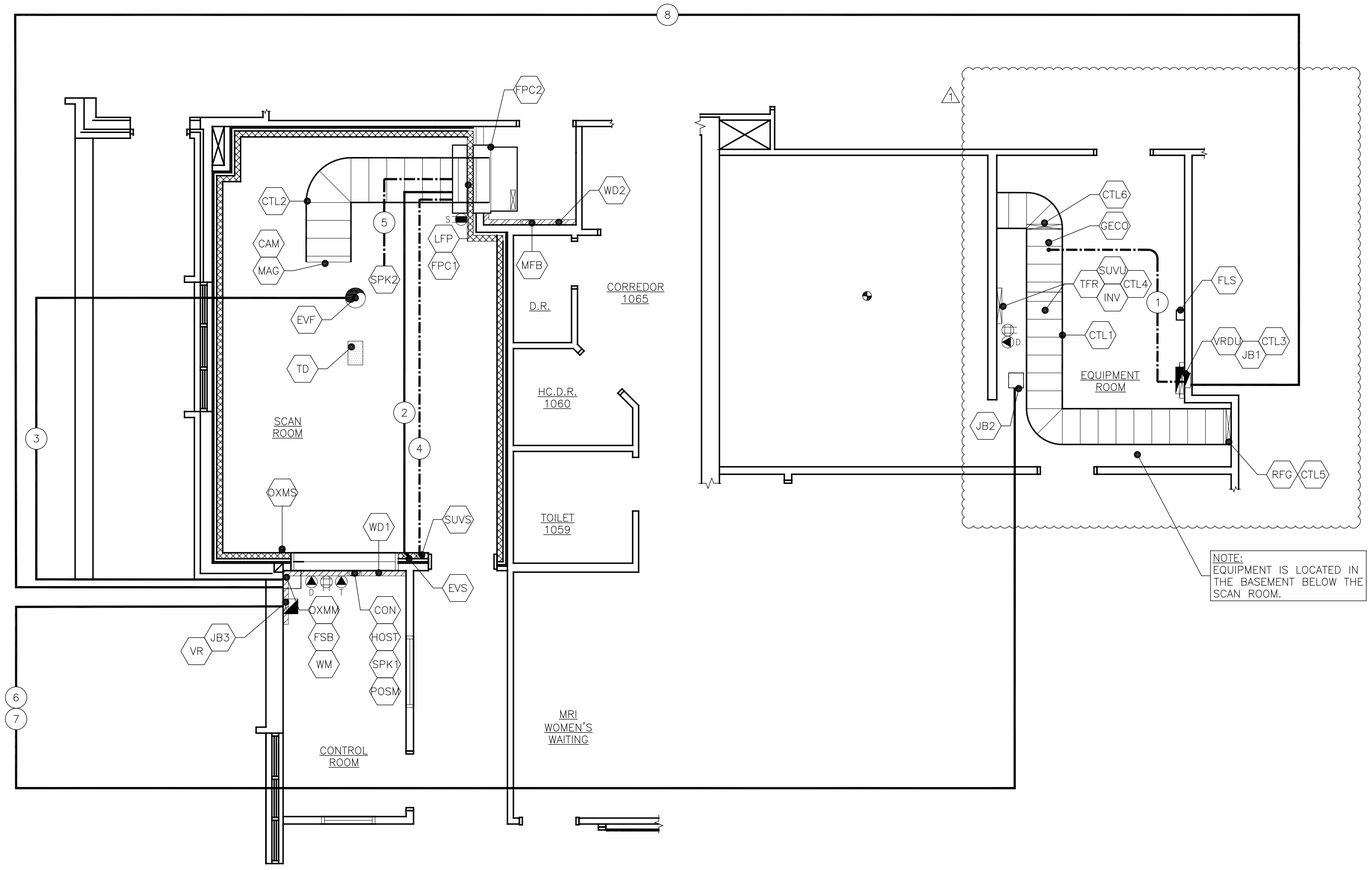
E1



NOTES:
FOR ABOVE CONNECTIONS, SEE DETAIL 1, SHEET E3.

ADDITIONAL "EPO" SWITCHES TO BE LOCATED IN ADJACENT ROOMS WITH TOSHIBA EQUIPMENT IF MAIN "EPO" IS NOT ACCESSIBLE (VERIFY WITH LOCAL CODE). ALL "EPO" SWITCHES TO BE PROVIDED BY CUSTOMER/CONTRACTOR.

ALL CABLES AND CONDUITS REQUIRED ARE TO BE PROVIDED BY CUSTOMER/CONTRACTOR.



ELECTRICAL SCHEMATIC

(PROVIDED FOR REFERENCE PURPOSES ONLY)

0 1' 2' 4' 8' 16'

CABLE KEY	
	IN/UNDER FLOOR
	OVER CEILING
	CONTRACTOR DETERMINED

CONDUIT SCHEDULE

CONTRACTOR CONDUIT REFERENCE						CABLE REFERENCE			
RUN NO.	CONDUIT (POINT TO POINT)		CONDUIT (ROUTING)	CONDUIT (DIAMETER)	CONDUIT (MAX. LENGTH)	CABLE (POINT TO POINT)		CABLE LENGTH (USABLE)	CABLES (SUPPLIED BY)
1	JB1	GECO	OVER CEILING	2 1/2"	TBD*	VRDU	GECO	SEE RUN "N" DETAIL (1/E6)	TOSHIBA
2	LFP	EVS	CONTRACTOR DETERMINED	1"	CONTRACTOR DETERMINED	LFP	EVS	PER CONTRACTOR	CONTRACTOR (IN RF SHIELD)
3	FSB	EVF	CONTRACTOR DETERMINED	1"	26'-9"	FSB	EVF	SEE RUN "A" DETAIL (1/E6)	CONTRACTOR (THRU RELAY BOX)
4	LFP	SUVS	OVER CEILING	1"	34'-0"	LFP	SUVS	SEE RUN "CC" DETAIL (1/E6)	TOSHIBA (SIGNAL) (IN RF SHIELD)
5	LFP	SPK2	OVER CEILING	1/2"	50'-5"	LFP	SPK2	SEE RUN "DD" DETAIL (1/E6)	TOSHIBA (SIGNAL) (IN RF SHIELD)
6	JB2	JB3	CONTRACTOR DETERMINED	3"	TBD*	TFR	CON	SEE RUN "H" DETAIL (1/E6)	TOSHIBA
						GECO	HOST	SEE RUN "L" DETAIL (1/E6)	TOSHIBA
						GECO	CON	SEE RUN "E" DETAIL (1/E6)	TOSHIBA
						GECO	HOST	SEE RUN "L" DETAIL (1/E6)	TOSHIBA
7	JB2	JB3	CONTRACTOR DETERMINED	3"	TBD*	GECO	DOOR	SEE RUN "AA" DETAIL (1/E6)	TOSHIBA
						LFP	CON	SEE RUN "D" DETAIL (1/E6)	TOSHIBA
8	JB1	FSB	CONTRACTOR DETERMINED	PER CODE	TBD*	VRDU	FSB	SEE RUN "C" DETAIL (1/E6)	TOSHIBA (POWER)

NOTE:
A. CONDUITS SUPPLIED/INSTALLED BY CUSTOMER/CONTRACTOR.
B. ALL CONDUIT RUNS MUST TAKE THE SHORTEST MOST DIRECT ROUTE POSSIBLE.
C. CONDUITS MAY HAVE A MAXIMUM OF (3) 90° BENDS.
D. CONDUIT IS NOT TO BE RUN IN SUCH A MANNER THAT WILL ALLOW CABLE POINT TO POINT LENGTHS TO BE EXCEEDED AS SHOWN IN CONDUIT LEGEND.
E. ALL GROUND WIRES NEED TO BE INSULATED/ISOLATED.
F. CONTRACTOR TO PROVIDE PULL STRINGS IN EACH CONDUIT.

*** FINAL LENGTH OF CONDUIT TO BE DETERMINED IN FIELD BY I.P.M.**

ALL MATERIAL IN SCAN ROOM MUST BE NON-FERROUS

TOSHIBA
Leading Innovation

REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08-05-13	UPDATED THE ELECTRICAL LAYOUT IN THE EQUIP. ROOM.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

DATE: 08-05-13
SCALE: 1/4" = 1'-0"
PLANNER: C.B.S.
SID: 30008837
PROJECT NO.
130013689MRF1

E2

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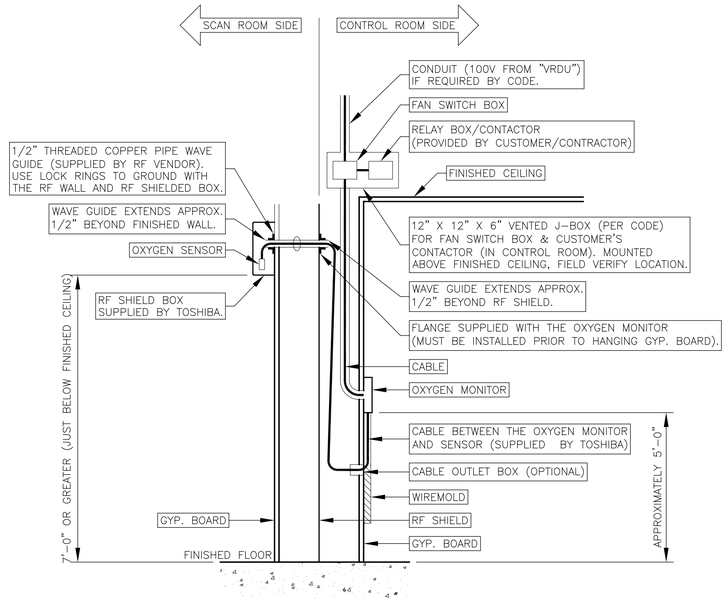
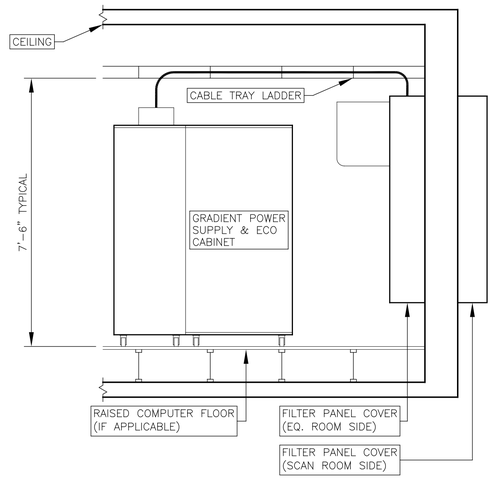


NOTE:
PASS THE COPPER TUBE WAVE GUIDE PREPARED BY THE RF VENDOR BETWEEN THE FLANGES SUPPLIED WITH THE OXYGEN MONITOR. CONNECT THE COPPER TUBE (WAVE GUIDE), AND RF SHIELD BOX USING THREADED WAVE GUIDE AND LOCK RINGS. THIS IS REQUIRED FOR PROPER GROUNDING.

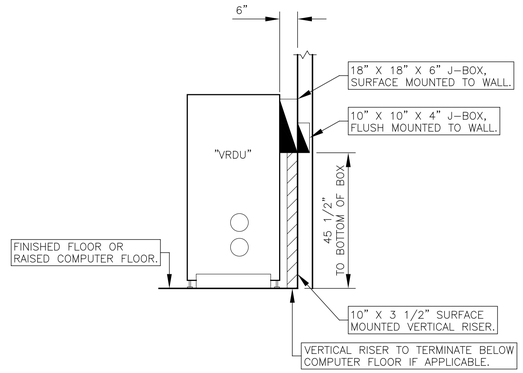
1 CONNECTION OF "OXMM" & "OXMS"

SCALE: NOT TO SCALE — 01-10-11



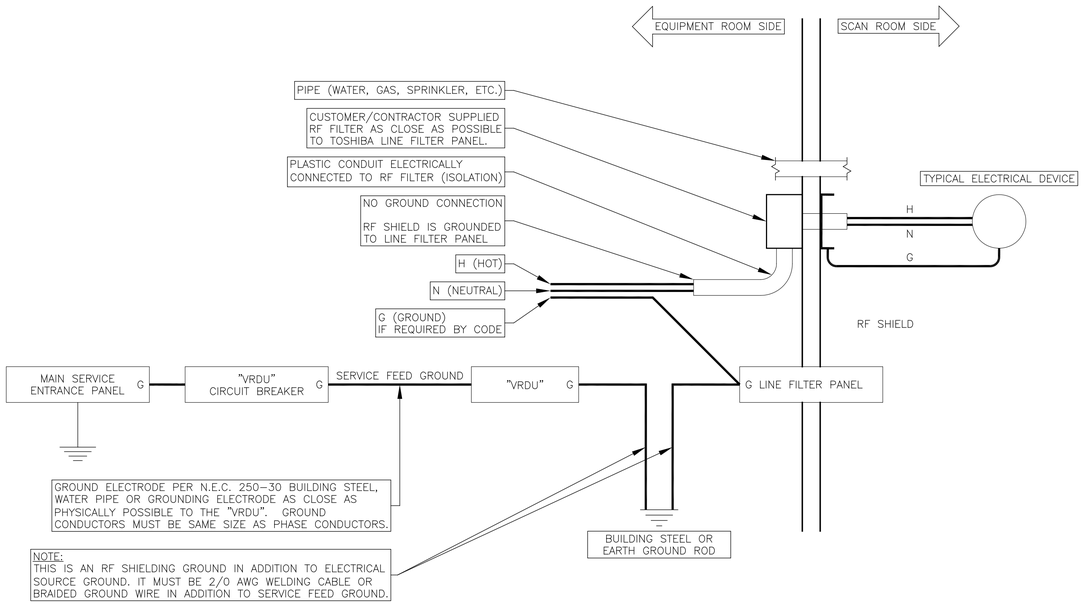
2 TYPICAL CABLE LADDER ELEVATION

1/2" = 1'-0" — 09-05-12



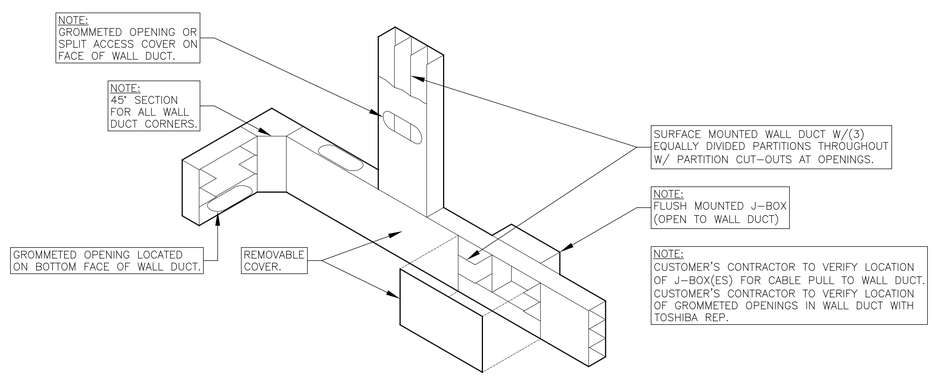
3 "VRDU" ELECTRICAL ELEVATION

SCALE: 1/2" = 1'-0" — 01-10-11



4 TYPICAL SCAN ROOM GROUNDING

SCALE: NOT TO SCALE — 01-10-11



5 TYPICAL WALL DUCT DETAIL WITH WALL DUCT / J-BOX / VERTICAL RISER

SCALE: NOT TO SCALE — 01-10-11

TOSHIBA
Leading Innovation »»

REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08-05-13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

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DATE: 08-05-13
SCALE: AS NOTED
PLANNER: C.B.S.
SID: 30008837
PROJECT NO.
130013689MRF1

E3

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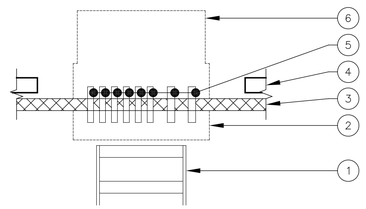
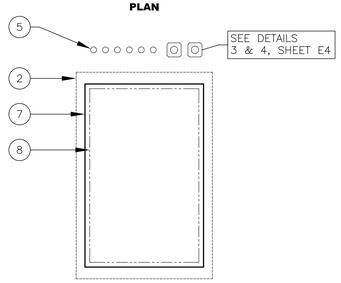
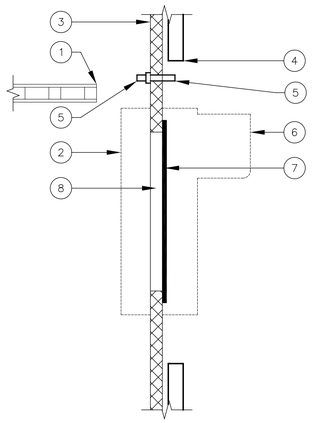


PLAN

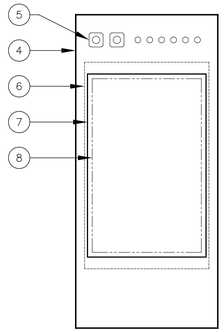
DETAIL NOTES:	
1	CABLE LADDER TRAY (SCAN ROOM SIDE).
2	FILTER PANEL COVER ON SCAN ROOM SIDE.
3	RF SHIELD (THICKNESS VARIES PER MANUFACTURER).
4	PARENT WALL.
5	WAVE GUIDES (SEE DETAIL 3 / SHEET E4).
6	FILTER PANEL COVER ON EQUIPMENT ROOM SIDE.
7	INSTALLATION SURFACE OF THE FILTER PANEL (SEE DETAIL 2 / SHEET E4)
8	OPENING FOR LINE FILTER PANEL (3'–0 5/8" WIDE X 4'–10 1/4" HIGH).



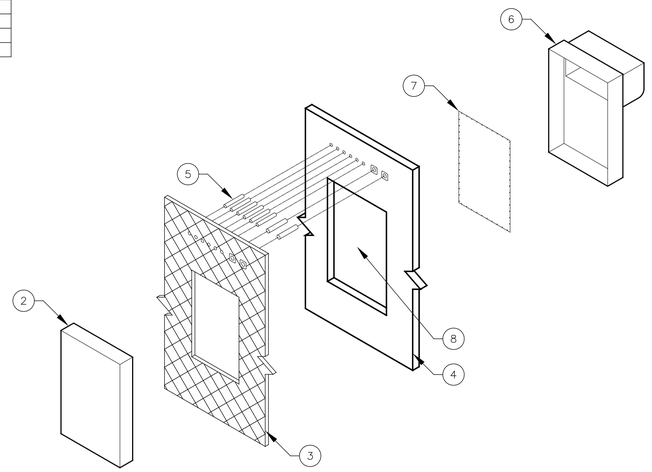
ELEVATION
(SCAN ROOM SIDE)



SIDE



ELEVATION
(EQUIPMENT ROOM SIDE)



ASSEMBLY ISOMETRIC
(FOR REFERENCE ONLY)

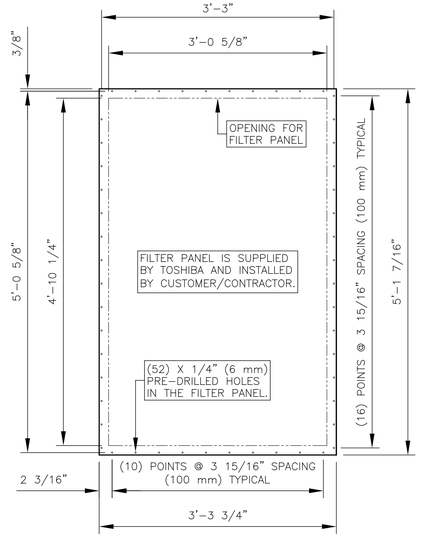
1 TYPICAL INSTALLATION AREA OF THE FILTER PANEL

SCALE: 1/2" = 1'–0"

09–05–12

CUSTOMER / CONTRACTOR SUPPLIED RF FILTERS TO BE LOCATED AS CLOSE AS POSSIBLE TO TOSHIBA FILTER PANEL.

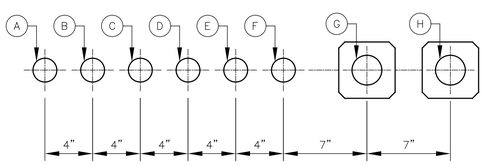
RF VENDOR TO SUPPLY RF GASKET FOR FILTER PANEL.



2 INSTALLATION SURFACE OF THE FILTER PANEL

SCALE: 1" = 1'–0"

09–13–11



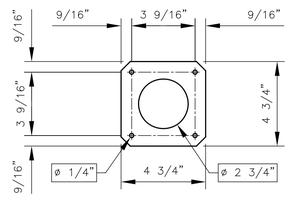
WAVE GUIDE HOLES
(SCAN ROOM SIDE)

DETAIL NOTES:					
ITEM	DESCRIPTION	SIZE (DIAMETER)	MIN. LENGTH	PROVIDED BY	INSTALLED BY
A	HELIUM (SUPPLY)	2"	12"	RF VENDOR	RF VENDOR
B	HELIUM (RETURN)	2"	12"	RF VENDOR	RF VENDOR
C	WATER HOSES (SUPPLY & RETURN)	2"	12"	RF VENDOR	RF VENDOR
D	FIBER OPTIC	2"	12"	RF VENDOR	RF VENDOR
E	VACUUM	2"	12"	RF VENDOR	RF VENDOR
F	SERVICE	2"	12"	RF VENDOR	RF VENDOR
G	AIR HOSE (TO MAGNET FAN BOX)	2 1/2"	15"	TOSHIBA	RF VENDOR
H	AIR HOSE (TO MAGNET FAN BOX)	2 1/2"	15"	TOSHIBA	RF VENDOR

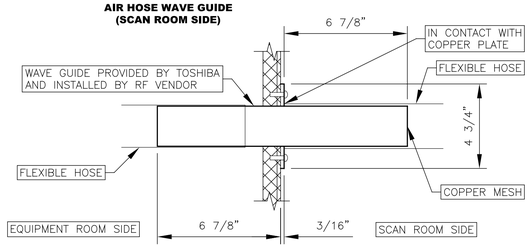
3 TYPICAL FILTER PANEL WAVE GUIDES

SCALE: 2" = 1'–0"

09–05–12



AIR HOSE WAVE GUIDE
(SCAN ROOM SIDE)



SIDE VIEW

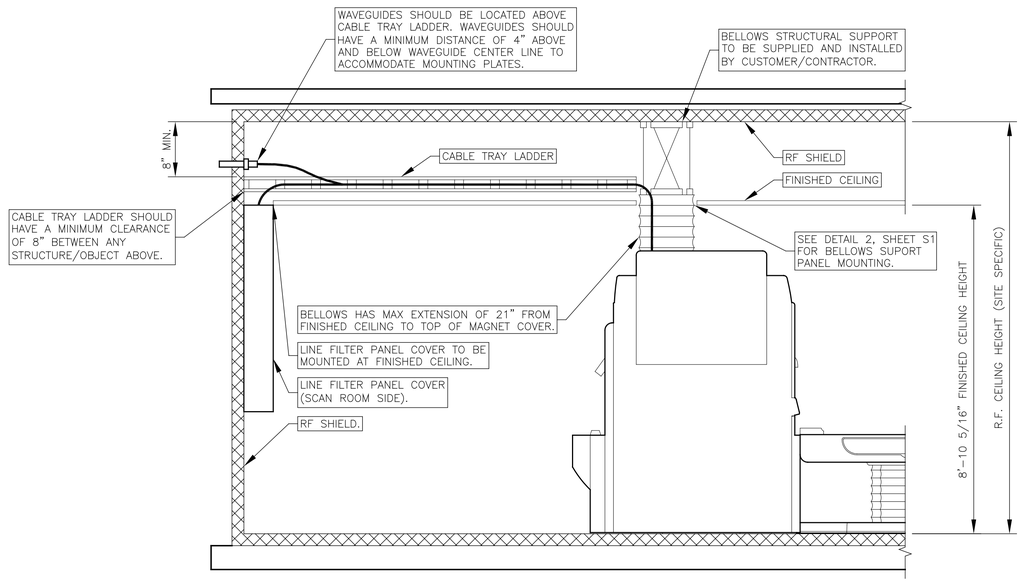
DETAIL NOTES:

A. INSTALL THE DEDICATED WAVE GUIDE (SHIPPED BEFOREHAND IN THE PRE–INSTALLATION KIT) IN THE RF SHIELD TO COOL THE WB COIL OF THE TITAN SYSTEM USING THE FAN IN THE EQUIPMENT ROOM.
B. WAVE GUIDE RECOMMENDED SIZE IS 2 1/2" IN DIAMETER (WAVE GUIDE SIZE RANGE IS BETWEEN 2 3/8" – 2 3/4" IN DIAMETER)
C. THE LENGTH OF HOSE FROM THE REAR OF THE GANTRY TO THE FANBOX SHOULD BE LESS THAN 49'–2".
D. THE COPPER PLATE (SHOWN ABOVE) OF THE WAVE GUIDE MUST BE IN CONTACT WITH THE SHIELD.
E. IF THERE ARE (6) TAPPED HOLES, 4 SCREWS ARE USED TO INSTALL THE WAVE GUIDE, IF NOT, (4) WOOD SCREW (NOT PROVIDED BY TOSHIBA) ARE NEEDED.
F. SCREWS OF ANY MATERIAL CAN BE USED TO SECURE THE COPPER PLATE IN THE COMPUTER ROOM.
G. SCREWS OF A NON–MAGNETIC MATERIAL MUST BE USED TO SECURE THE COPPER PLATE IN THE SCAN ROOM.
H. INSTALL COPPER MESH (PROVIDED BY TOSHIBA) ON SCAN ROOM SIDE OF AIR HOSE WAVE GUIDE.

4 AIR HOSE WAVE GUIDE

SCALE: 3" = 1'–0"

08–10–11



5 CEILING CABLING KIT DETAIL

SCALE: 1/2" = 1'–0"

03–12–13

TOSHIBA
Leading Innovation »»

REV	DATE	DESCRIPTION	INT
2	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
1	08–05–13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES

(MR SCAN ROOM – TITAN)

4518 UNION DEPOSIT RD.
HARRISBURG, PA 17111

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DATE: 08–05–13

SCALE: AS NOTED

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

E4

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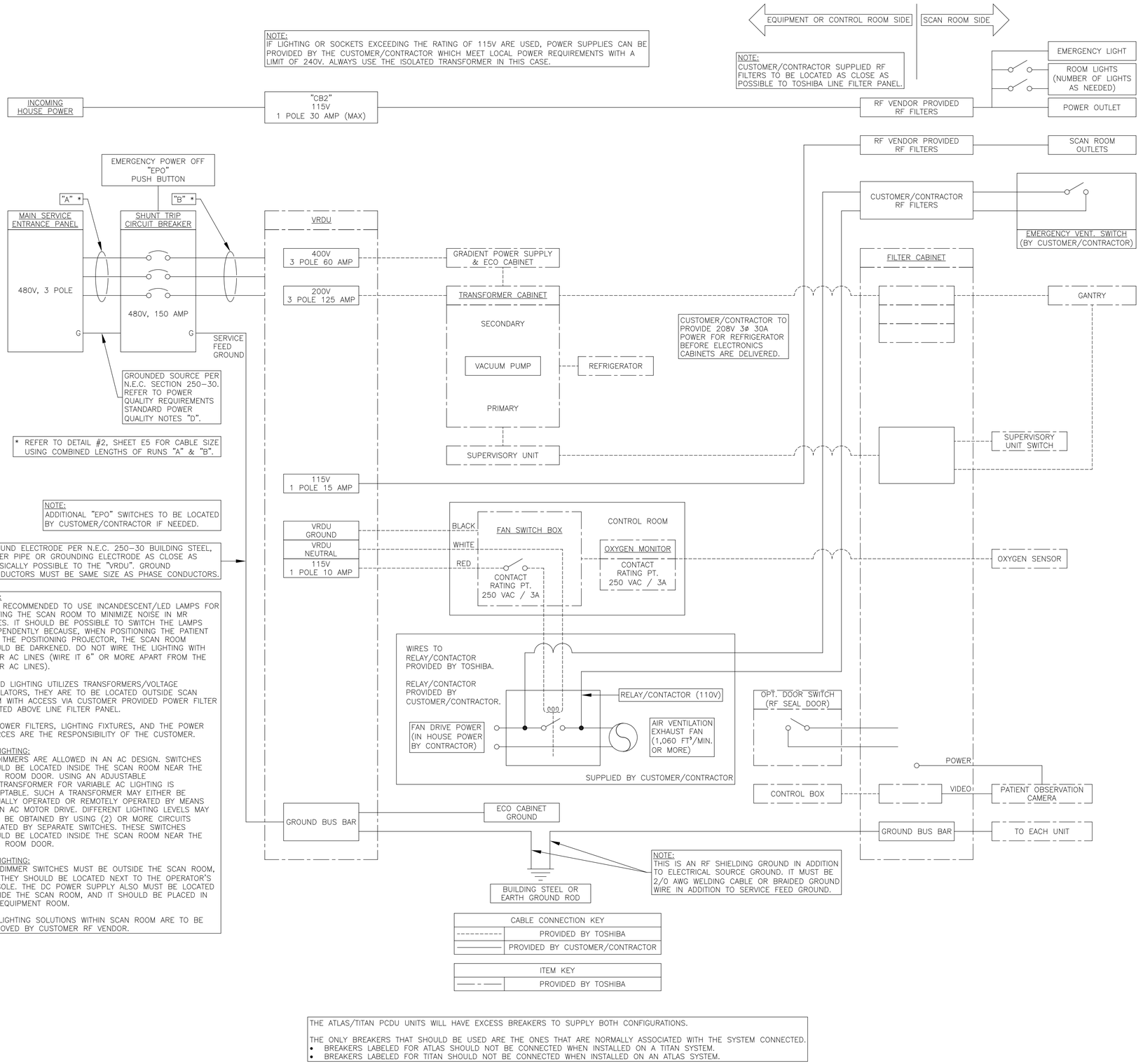


1 POWER SYSTEM DIAGRAM

SCALE: NOT TO SCALE

09-18-12

POWER QUALITY REQUIREMENTS TITAN SCANNER WITH VRDU

SUPPLY CONFIGURATION:	3 PHASE DELTA
KVA RATING:	102.00
VOLTAGE (SEE NOTE B):	480V, 60Hz (PREFFERED)
CALCULATED CURRENT (AMP):	122.69
CIRCUIT BREAKER (AMP) (SEE NOTE F):	150
% IMPEDANCE:	5.00
LINE RESIST. SPEC.:	0.000
MAXIMUM CURRENT (AMPS):	122.69
VOLTAGE DROP (VOLTS):	24.00
LINE RESIST. (OHMS):	0.196
LINE DROP (PERCENT):	1.50
LINE DROP (VOLTS):	7.20
CONDUCTOR (OHMS):	0.059
TEMPERATURE:	68°F (20°C)

CONDUCTOR SIZES (SEE NOTE E)	OHMS PER 1000 FT.	TEMP DERATED	NEC 75 °C	LENGTH (FT.)
1/0 AWG	0.1270	0.1044	150	281
2/0 AWG	0.1010	0.0831	175	353
3/0 AWG	0.0797	0.0655	200	448
4/0 AWG	0.0626	0.0515	230	570
250 MCM	0.0535	0.0440	255	667
300 MCM	0.0446	0.0367	285	800
350 MCM	0.0382	0.0314	310	934
400 MCM	0.0331	0.0272	335	1,078
500 MCM	0.0265	0.0218	380	1,346

VRDU MAX INPUT LUG SIZE 500 MCM
STEP UP TRANSFORMER MAX INPUT LUG SIZE 500 MCM
STEP UP TRANSFORMER MAX OUTPUT LUG SIZE 350 MCM
STEP UP BREAKER IS SET TO 150A

STANDARD POWER QUALITY NOTES

A. A GROUNDED NEUTRAL POWER SOURCE IS REQUIRED TO ASSURE RELIABLE EQUIPMENT OPERATION. THE NEUTRAL CONDUCTOR MAY NOT BE USED FOR A PARTICULAR SYSTEM.

B. IN CASES WHERE MULTIPLE VOLTAGES ARE PERMITTED, THE PREFERRED SYSTEM VOLTAGE IS SPECIFIED.

C. DUE TO THE HIGH INSTANTANEOUS POWER OF MEDICAL IMAGING SYSTEMS, USE THE HIGHEST AVAILABLE VOLTAGE SOURCE. ENSURE THAT LOWER VOLTAGE SOURCES ARE DERIVED DIRECTLY FROM THE SERVICE ENTRANCE OF THE FACILITY.

D. GROUND CONDUCTORS ARE REQUIRED TO BE THE SAME SIZE AS THE PHASE CONDUCTORS UNLESS A LARGER SIZE IS REQUIRED BY CODE.

E. ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS MUST BE COPPER – ALUMINUM IS NOT PERMITTED.

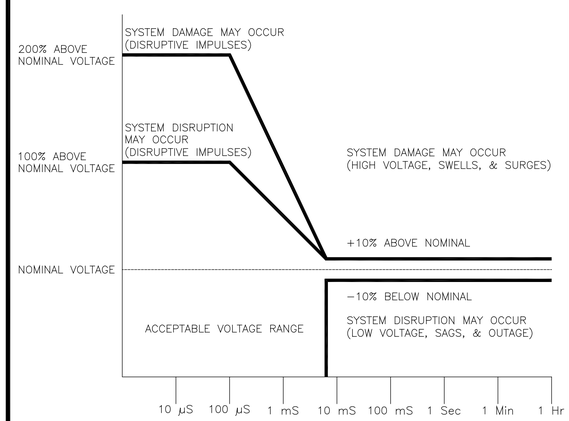
F. IF THE EQUIPMENT CIRCUIT BREAKER IS NOT LOCATED IN THE CONTROL AREA, A SHUNT TRIP BREAKER MUST BE USED IN ORDER TO COMPLY WITH N.E.C. 517-72(B). A PUSH-BUTTON TO OPERATE THE SHUNT TRIP MUST BE LOCATED IN THE CONTROL AREA.

G. A SEPARATE CIRCUIT, FED FROM THE FACILITY RADIOLOGY PANEL OR A MAIN SERVICE PANEL IS REQUIRED. USE OF A SUB PANEL WITH LOADS SUCH AS ELEVATORS, HVAC, MOTORS, ETC., IS NOT PERMITTED.

H. DEVICES SUCH AS UNINTERRUPTIBLE POWER SUPPLIES, POWER CONDITIONERS, VOLTAGE REGULATORS, AND FILTERS MAY BE INCOMPATIBLE WITH THIS IMAGING EQUIPMENT. CONSULT YOUR TOSHIBA SERVICE REPRESENTATIVE PRIOR TO PURCHASING OR INSTALLING THESE DEVICES.

I. THE MAINS POWER GROUND CONDUCTOR IS TO BE RUN WITH THE POWER PHASE CONDUCTORS. THE GROUNDS TO BUILDING STEEL OR EARTH GROUND ARE NOT TO BE RUN WITH THE PHASE CONDUCTORS.

J. POWER AND GROUND CABLES SHOULD BE FLEXIBLE WELDING TYPE CABLES, NOT THHN TYPE AS LONG AS IT MEETS LOCAL CODE.



2 POWER REQUIREMENTS WITH VRDU

SCALE: NOT TO SCALE

09-05-12

TOSHIBA Leading Innovation

REV	DATE	DESCRIPTION	INT	M.C.	C.B.S.
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.			
2	08-05-13	NO CHANGES TO THIS SHEET.			

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
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DATE: 08-05-13
SCALE: NOT TO SCALE
PLANNER: C.B.S.
SID: 30008837
PROJECT NO. 130013689MRF1

E5

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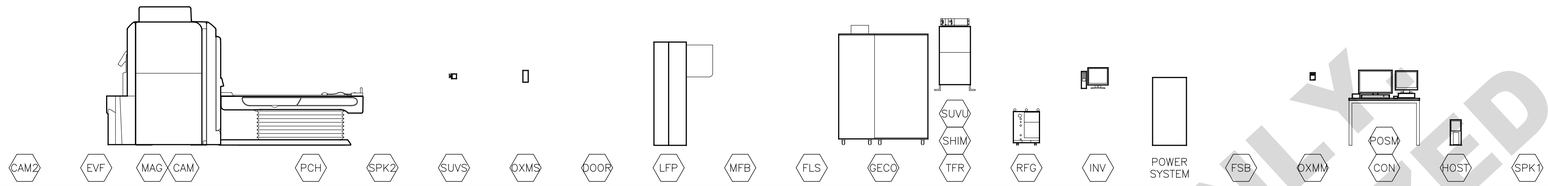

RUN LTR.	CONNECTION (POINT TO POINT)		REMARKS	
A	EVF	FSB	**CM49-02358-2 (49'-2")**	**N/A**
B	FSB	OXMM	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
C	POWER SYSTEM	FSB	**CM49-02357-2 (65'-7")**	**CM49-02357-3 (98'-5")**
D	LFP	CON	**CM49-06641-3 (90'-2")**	**N/A**
E	GECO	CON	**CM49-06637-3 (88'-7")**	**N/A**
F	CON	HOST	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
G	CON	SPK1	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
H	TFR	CON	**CM49-05625-2 (95'-9") CM49-06640-3 (88'-7")**	**N/A**
I	LFP	POWER SYSTEM	**CM49-02353-4 (51'-6")**	**CM49-02353-6 (77'-9")**
J	LFP	SUVU	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
K	SUVU	TFR	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
L	GECO	HOST	**BSM43-1660-03 (88'-7") BSM43-1659-03 (88'-7") BSM43-1658-03 (88'-7") CM49-06639-3 (88'-7")**	**N/A**
M	GECO	SUVU	**BSM49-0477-04 (72'-10") CM49-06636-3 (50'-10")**	**BSM49-0477-05 (89'-2")**
N	GECO	POWER SYSTEM	**CM49-06635-2 (34'-5")**	**CM49-06635-3 (50'-10")**
O	GECO	INV	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
P	TFR	POWER SYSTEM	**PM49-06634-2 (32'-9")**	**PM49-06634-3 (49'-2")**
Q	GECO	RFG	**CM49-06490-4 (43'-3")**	**CM49-06490-6 (56'-5")**
R	FLS	GECO	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
S	LFP	GECO	MAX. CABLE LENGTH IS LIMITED BY NON-EXTENDABLE CABLE (30'-9") **BSM49-0759-10 (32'-9") / CM49-06491-2 (41'-6") BSM49-0759-11 (32'-9") / CM49-06492-2 (41'-6") BSM49-0759-12 (32'-9") / CM49-06493-2 (41'-6") CM49-06494-2 (41'-6")**	
T	GECO	TFR	MAX. CABLE LENGTH IS LIMITED BY NON-EXTENDABLE CABLE (32'-9") **CM49-06633-2 (34'-5") / BSM49-0740-2 (42'-7")**	
U	GECO	SHIM	**CM49-06436-3 (34'-5")**	**CM49-06436-4 (41'-0")**
V	TFR	SHIM	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
W	LFP	SHIM	**PM49-02304-4 (48'-2") PM49-02306-4 (48'-2")**	**PM49-02304-6 (74'-5") PM49-02306-6 (74'-5")**
X	LFP	TFR	**CM49-06545-2 (43'-3") CM49-06503-3 (41'-0")**	**CM49-06545-3 (59'-8") CM49-06503-5 (60'-8")**
Y	LFP	RFG	**BSM41-0618-01 (44'-11")**	**BSM41-0618-02 (61'-4")**
Z	TFR	RFG	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
AA	DOOR	GECO	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
BB	CAM	LFP	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
CC	SUVS	LFP	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
DD	SPK2	LFP	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
EE	MAG	LFP	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
FF	PCH	LFP	**CM49-06626-3 (49'-2") CM49-06629-3 (42'-7") / CM49-06628-3 (42'-7")**	
GG	OXMS	OXMM	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
HH	MFB	GECO	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
II	LFP	MFB	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
JJ	CAM2	LFP	EXTENDED CABLES ARE NOT AVAILABLE	EXTENDED CABLES ARE NOT AVAILABLE
KK	CAM2	POSM2	**CM49-06197-2 (93'-2")**	**N/A**

1 CABLE LENGTH DIAGRAM (FOR INTERNAL USE ONLY)

SCALE: NOT TO SCALE

05-03-13

TOSHIBA
Leading Innovation »»

REV	DATE	DESCRIPTION	INT
1	06/12/13	ORIGINAL FINAL DRAWINGS COMPLETED.	M.C.
2	08-05-13	NO CHANGES TO THIS SHEET.	C.B.S.

TRISTAN ASSOCIATES
(MR SCAN ROOM – TITAN)
4518 UNION DEPOSIT RD.
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THESE TOSHIBA PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT AGREED UPON BETWEEN TOSHIBA AND THE CUSTOMER. THESE SITE PLANS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.

DATE: 08-05-13

SCALE: NOT TO SCALE

PLANNER: C.B.S.

SID: 30008837

PROJECT NO.
130013689MRF1

E6

FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION PURPOSES.

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