THE MEDICAL CENTER OF AURORA
CARDIAC TOWER VACUUM PUMP REPLACEMENT

1501 S. POTOMAC ST.
AURORA, CO 80012

City of Aurora Building Division
Project: ***PUMP REPLACEMENT***
Address: ***1501 S. POTOMAC STREET***
Occupancy Group: ***IBC I-2***
Construction Type: ***IBC 1A SPR***
RSN: ***1531645***
Permit: ***2021-1955961 LT***

Code violations that are found during inspection are required to be corrected. Permit issuance does not grant approval of a code violation.

CHANGES TO EXISTING OR INSTALLATION OF NEW FIRE ALARM AND/OR FIRE SPRINKLER SYSTEMS REQUIRES SEPARATE PLAN AND PERMIT SUBMITTAL.

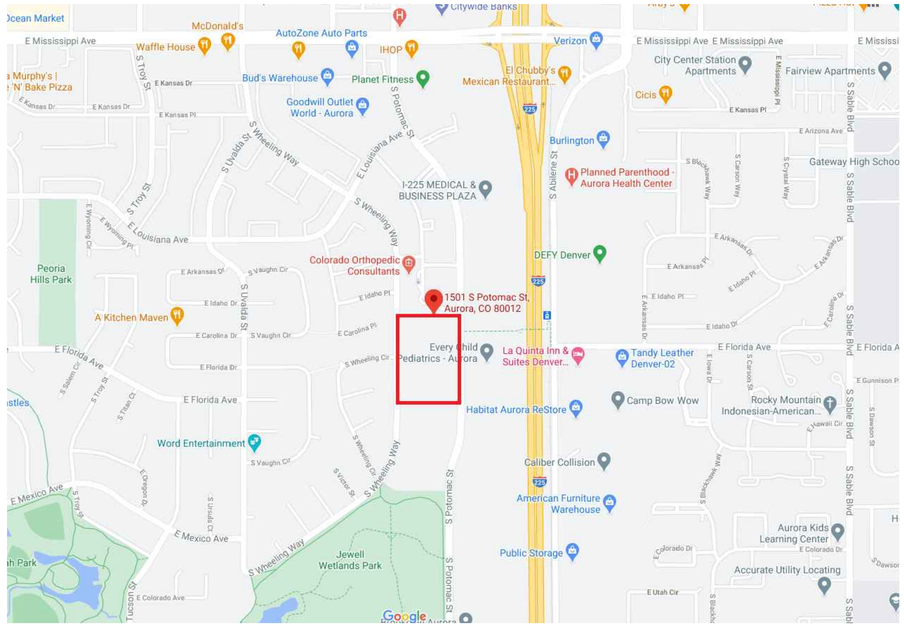
Colorado State licensed master plumber shall provide medical gas certified third party inspection and approval for medical gas piping.

ISSUED FOR 100% CONSTRUCTION DOCUMENTS
03.29.2021

INDEX OF DRAWINGS:

G0.00	COVER SHEET
E0.00	ELECTRICAL SYMBOL LIST AND SPECIFICATIONS
E1.01	ELECTRICAL PENTHOUSE PLAN
P0.00	MEDICAL GAS LEGEND, CODE INFO, NOTES AND DETAILS
P0.01	MEDICAL GAS SPECIFICATIONS
P1.01	MEDICAL GAS PENTHOUSE PLAN

PROJECT LOCATION:



PREPARED BY:
SALAS O'BRIEN
9250 EAST COSTILLA AVENUE, SUITE 220
GREENWOOD VILLAGE, CO 80112

THE MEDICAL CENTER OF AURORA
CARDIAC TOWER VACUUM PUMP REPLACEMENT
1501 S. POTOMAC ST.
AURORA, CO 80012

REVISION			
MARK	DATE	DESCRIPTION	
1	03.22.2021	95% CONSTRUCTION DOCUMENTS	
2	03.29.2021	100% CONSTRUCTION DOCUMENTS	

SALAS O'BRIEN
Chicago, IL 60605
815 South Wabash Avenue
Greenwood Village, CO 80112
9250 East Costilla Avenue

COLORADO LICENSED MICHAEL P THOMPSON 54150 PROFESSIONAL ENGINEER
04/08/2021

SHEET TITLE:
COVER SHEET

PROJECT NUMBER:
2021-00498-00

SHEET NUMBER:
G0.00

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CODE REFERENCES

CITY OF AURORA, CO LOCAL AMENDMENTS
2015 INTERNATIONAL BUILDING CODE
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL PLUMBING CODE
2008 ASHRAE STANDARDS 170
2012 NFPA 99 STANDARDS
2018 FGI GUIDELINES FOR HOSPITALS
2021 HCA ENGINEERING GUIDELINES

DRAWING LIST

P0.00	MEDICAL GAS LEGEND, CODE INFO, NOTES AND DETAILS	NO SCALE
P0.01	MEDICAL GAS SPECIFICATIONS	NO SCALE
P1.01	MEDICAL GAS PENTHOUSE PLAN	1/2"=1'-0"

MEDICAL GAS MATERIAL LIST

SERVICE DESCRIPTION	MATERIAL
MEDICAL GAS	TYPE 'K' HARD DRAWN SEAMLESS COPPER AND WROT FITTINGS CLEANED & CAPPED FOR OXYGEN SERVICE. JOINTS SHALL BE BRAZED IN ACCORDANCE TO CURRENT NFPA 99 STANDARDS.
VACUUM EXHAUST PIPING	TYPE L HARD DRAWN COPPER TUBE

NOTES:

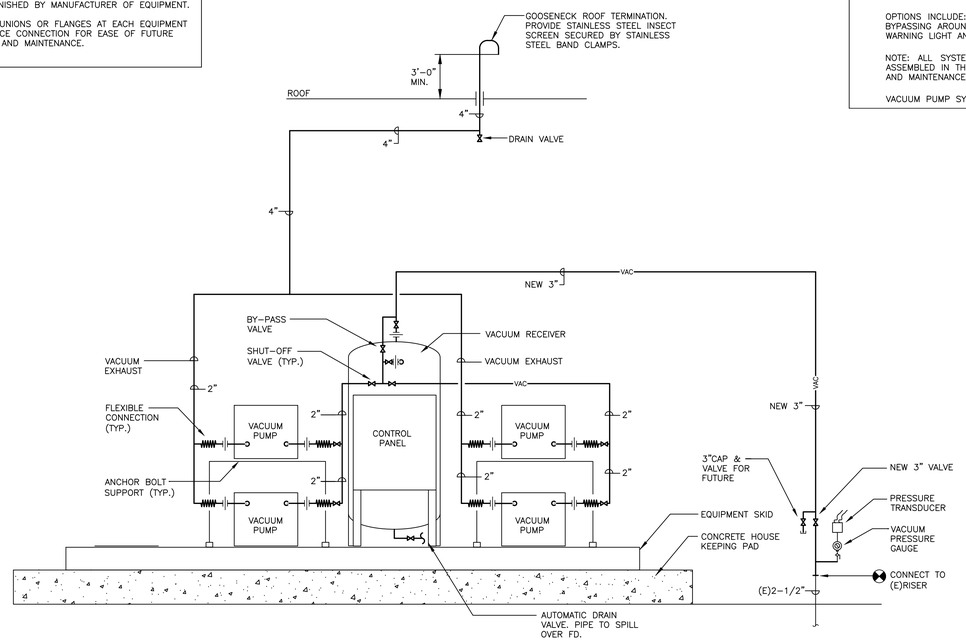
1. EQUIPMENT SHALL BE FACTORY ASSEMBLED AND COMPLETE WITH SPRING LOADED VIBRATION ISOLATORS FOR EACH PUMP ASSEMBLY AND ENTIRE SKID.
2. PACKAGE SHALL BE INSTALLED ON 4 INCH HIGH CONCRETE HOUSEKEEPING PAD, AND INCLUDE MASON INDUSTRIES TYPE SUPER WMH DUROMETER 70, WAFFLE ISOLATION PADS WITH MASON INDUSTRIES HLIB/HLIW BUSHINGS AND WASHERS, OR APPROVED EQUIVALENT. SPACING SHALL BE NO LESS THAN 12 INCH O.C., OR PER MANUFACTURER'S INSTRUCTIONS.
3. PIPE FLEXIBLE CONNECTORS SHALL BE PROVIDED AND FURNISHED BY MANUFACTURER OF EQUIPMENT.
4. PROVIDE UNIONS OR FLANGES AT EACH EQUIPMENT AND DEVICE CONNECTION FOR EASE OF FUTURE REMOVAL AND MAINTENANCE.

MEDICAL GAS SYMBOL LIST

SYMBOL	DESCRIPTION
O2	OXYGEN PIPING
MA	MEDICAL COMPRESSED AIR PIPING
VAC	MEDICAL VACUUM PIPING
N2	NITROGEN PIPING
WAGD	WASTE ANESTHETIC GAS DISPOSAL PIPING
CO2	CARBON DIOXIDE PIPING
N2O	NITROUS OXIDE PIPING
	NEW PIPE
	EXISTING PIPE
	ZONE VALVE BOX
	SHUT-OFF VALVE
	EXISTING FIXTURE/EQUIPMENT/PIPING TO BE REMOVED
	NEW CONNECTION

MEDICAL GAS ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
AIR	MEDICAL COMPRESSED AIR
VAC	MEDICAL VACUUM
(N)	NEW PIPING
(E)	EXISTING PIPING
VTR	VENT THRU ROOF
DN	DOWN
TYP.	TYPICAL



VACUUM PUMP PIPING DIAGRAM
NOT TO SCALE

GENERAL NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY DURING BIDDING TO VERIFY THAT THE AREAS NECESSARY TO PERFORM THE WORK ARE SUFFICIENT FOR THE EQUIPMENT REQUIRED. IF THE AREAS ARE INSUFFICIENT THEY MUST MAKE THIS KNOWN AT THE TIME OF BIDDING.
2. THE PROJECT MUST BE EXECUTED IN MULTIPLE PHASES TO MAINTAIN EXISTING BUILDING OPERATIONS AND KEEP EXISTING BUILDING MEDICAL VACUUM SYSTEM FULLY OPERATIONAL AT ALL TIMES WITH MINIMAL SHUT-DOWN FOR CROSS-OVER. SYSTEM DOWN TIME TO BE KEPT TO AN ABSOLUTE MINIMUM. SHUT-DOWNS SHALL ONLY OCCUR ON OFF PEAK HOURS AT TIMES AND MANNER IN ACCORDANCE TO FACILITY APPROVAL. REQUESTS FOR SHUT-DOWNS SHALL BE MADE NO LESS THAN SEVEN (7) DAYS IN ADVANCE. SHUT-DOWNS SHALL NOT OCCUR WITHOUT WRITTEN FACILITY APPROVAL.
3. CONTRACTOR TO PROVIDE AN ESTIMATED PROJECT SCHEDULE WITH MILESTONES AND A PROPOSED PHASING SEQUENCE TO SUPPORT PROPOSED WORK WITHIN BID.
4. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY WORK REQUIRED TO COMPLETE THE ENTIRE PROJECT, INCLUDING OTHER TRADES SUCH AS ELECTRICAL AND ROOFER.
5. CONTRACTOR IS RESPONSIBLE TO CONFIRM IN BID THAT EQUIPMENT CAN BE APPROPRIATELY NAVIGATED AND/OR LIFTED TO MECHANICAL SPACE FOR NAVIGATION INTO INTENDED FINAL INSTALLATION SPACE.
6. THE CONTRACTOR MUST PROVIDE A PRICE FOR THE INFORMATION INCLUDED IN THIS SPECIFICATION AND WORK INDICATED ON THE PLANS. ANY DEVIATIONS TO EQUIPMENT OR MATERIAL MUST BE IDENTIFIED AS AN ADDITIVE OR DEDUCT AT THE TIME OF BIDDING.
7. THE CONTRACTOR SHALL COORDINATE AND WORK WITH OWNER TO SECURE ALL REQUIRED SPACES INCLUDING EQUIPMENT SPACE, CEILING SPACE, CHASE SPACE, WALL SPACE, ETC., TO PROPERLY ACCOMMODATE ALL WORK.
8. PROVIDE ALL DOCUMENTS REQUIRED TO SECURE PERMITS. THE DRAWINGS SHALL REFLECT THE REQUIREMENTS OF THE CITY AND OTHER AUTHORITIES HAVING JURISDICTION.
9. PROVIDE OWNER WITH OPERATION AND MAINTENANCE INSTRUCTIONS.
10. PROVIDE MANUFACTURER REPRESENTATIVE FOR ON-SITE OWNER TRAINING AND INSTRUCTION FOR PROPER OPERATION AND MAINTENANCE OF EQUIPMENT.
11. FURNISH TWO (2) SETS OF MANUALS IN BOUND FORM CONTAINING DATA COVERING CAPACITIES, MAINTENANCE AND OPERATION OF EACH MAJOR ITEM OF EQUIPMENT AND APPARATUS. OPERATING INSTRUCTIONS SHALL COVER ALL PHASES OF CONTROL AND SHALL ALSO INCLUDE THE FOLLOWING FOR PUMPS, AND COMPRESSORS AND SIMILAR EQUIPMENT AT OPERATING CONDITIONS:
    a. TYPE AND FREQUENCY OF MAINTENANCE ITEMS AND LUBRICATION REQUIRED.
    b. LIST OF SPARE PARTS RECOMMENDED FOR NORMAL SERVICE.
    c. WIRING DIAGRAMS AND CONTROL DIAGRAMS AS INSTALLED.
12. AT COMPLETION OF WORK, FURNISH A WRITTEN GUARANTEE STATING THAT THE EQUIPMENT, MATERIALS, AND WORK PERFORMED ARE IN FULL ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE GUARANTEE SHALL ALSO STATE THAT THIS WORK AND ALL CHANGE ORDERS ARE FULLY GUARANTEED FOR ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE, AND ANY EQUIPMENT MATERIALS, OR WORKMANSHIP WHICH MAY PROVE DEFECTIVE WITHIN THAT TIME WILL BE REPLACED AT NO COST TO THE OWNER.

MEDICAL GAS EQUIPMENT SCHEDULE

VP-1 VACUUM PUMP SYSTEM (QUADRAPLEX)

PUMP SCHEDULE:
BECKER MODEL VTLF 2.250/0-79 SK ROTARY VANE VACUUM PUMP AND MOTOR.
CAPACITY: 174 SCFM OPEN FLOW. MAXIMUM VACUUM: 26.6" HG.
DESCRIPTION: OIL-LESS ROTARY VANE VACUUM PUMP WITH CARBON VANES, BUILT-IN SUCTION FILTER WITH CLEAR COVER, INTEGRATED CHECK VALVE, VACUUM REGULATING VALVE, BLOW-OFF VALVE/SILENCER, 2½" BSP X 2" NPT REDUCER BUSHING, AND COUPLED TO A 12.1 HP, 480 VOLT, 3 PHASE, 60 HZ., TEFC MOTOR.

SYSTEM SCHEDULE:
COMPONENTS INCLUDE: (4) VTLF 2.250 SK PUMP/MOTOR COMBINATIONS, 240 GALLON VERTICAL RECEIVER WITH DRAIN, INLET CHECK VALVES, ISOLATION VALVES, FLEXIBLE CONNECTORS, INLET VACUUM GAUGES, INLET FILTERS, AND PUMP VIBRATION ISOLATORS. TOTAL SYSTEM CAPACITY: 696 CFM. 4TH PUMP IS REDUNDANT.

INTERIOR PANEL CONTROLS (UL LISTED) INCLUDE: (4) MOTOR STARTERS WITH LOCKABLE CIRCUIT DISCONNECTS AND ADJUSTABLE AMP SETTING, PLC (WITH EEPROM), CONTROLLER RUNNING LOGIC THAT CYCLES PUMPS BASED ON HOURS, CONTROL VOLTAGE TRANSFORMER, PRESSURE TRANSDUCER, AND DRY CONTACTS FOR REMOTE LOW VACUUM AND ALL PUMPS RUNNING ALARMS (NORMALLY OPEN AND/OR NORMALLY CLOSED).

EXTERIOR PANEL CONTROLS INCLUDE: (4) HOA SWITCHES, EMERGENCY STOP BUTTON, AUDIBLE AND VISUAL ALARMS (LOW VACUUM ALARM & ALL PUMPS RUNNING). HUMAN MACHINE INTERFACE INCLUDES (SCREEN 1) GRAPHICAL REPRESENTATION OF SYSTEM WITH COLOR CODES DESCRIBING PUMP STATUS: STOPPED-RUNNING- TRIPPED, BAR GRAPH SHOWING OPERATING VACUUM LEVEL AND SYSTEM SET POINTS, ALARM STATUS, MAINTENANCE ALERT SIGNAL. (SCREEN 2) DIGITAL RECORD OF INDIVIDUAL PUMP OPERATING HOURS, PUMP MAINTENANCE STATUS, AND TOUCH SCREEN ACCESS TO EACH PUMPS REQUIRED MAINTENANCE (THREE LEVELS A, B, C) SCREEN. (SCREEN 3) SYSTEM FAULT LOG. (SCREEN 4) SETUP. ALARM STATUS SHOWN ON ALL SCREENS. ETHERNET CONNECTION (10/100 BASE T) FOR TRANSMITTING INFORMATION.

OPTIONS INCLUDE: DISCHARGE MANIFOLD AND NFPA 99 RATING WHICH INCLUDES REMOTE ALARM CONTACTS, 3-VALVE BYPASSING AROUND THE RECEIVER, REDUNDANT CONTROL VOLTAGE TRANSFORMERS, SECONDARY TRANSFORMER IN USE WARNING LIGHT AND RECEIVER AUTOMATIC DRAIN VALVE.

NOTE: ALL SYSTEM COMPONENTS SHALL FIT THROUGH A 36" DOORWAY FOR EASY INSTALLATION AND SHALL BE ASSEMBLED IN THE FIELD. THE COMPLETE SYSTEM IS WARRANTED FOR 2 YEARS. PROVIDE WITH EQUIPMENT START UP AND MAINTENANCE TRAINING.

VACUUM PUMP SYSTEM MUST MEET THE 2021 HCA ENGINEERING GUIDELINES.

GENERAL DEMOLITION NOTES

1. BEFORE BID SUBMISSION, CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING EXISTING CONDITIONS WHICH MAY AFFECT THE SCOPE OF THIS PROJECT.
2. ALL WORK SHALL BE PERFORMED IN A CLEAN, WORKMANLIKE MANNER. CARE SHALL BE EXERCISED TO MINIMIZE INCONVENIENCE OR DISTURBANCE TO AREAS OF THE BUILDING WHICH ARE TO REMAIN IN OPERATION.
3. ALL DEMOLITION WORK SHALL BE COORDINATED WITH HOSPITAL TO LIMIT SHUTDOWNS AND VACUUM SYSTEM SHALL BE AVAILABLE AT ALL TIMES DURING DEMOLITION AND CONSTRUCTION ACTIVITIES. NEW VACUUM PUMP SYSTEM SHALL BE INSTALLED NEXT TO EXISTING VACUUM PUMP SYSTEM AND SHALL BE IN PLACE AND OPERATIONAL BEFORE COMPLETE REMOVAL OF THE EXISTING VACUUM PUMP SYSTEM.
4. ALL WORK SHALL BE DONE IN OFF-PEAK HOURS BETWEEN 8 PM AND 5 AM.
5. THE OWNER MUST BE GIVEN A MINIMUM OF ONE WEEK NOTICE PRIOR TO ANY PROPOSED SHUTDOWNS OF SERVICE.
6. COORDINATE WITH ALL RESPECTIVE TRADES FOR REMOVAL OF PLUMBING DEVICES AND EQUIPMENTS FOR THE PROPER DISCONNECTION AS REQUIRED.
7. PROTECT EXISTING BUILDING ELEMENTS FROM DAMAGE DURING DEMOLITION. PROVIDE ALL NECESSARY PROTECTIVE MEASURES. ANY DAMAGE THAT OCCURS IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR BACK TO ORIGINAL CONDITIONS.
8. PLUMBING EQUIPMENT, PIPING, ACCESSORIES, ETC. NOT SHOWN ON THESE DRAWINGS SHALL REMAIN AND FUNCTION AS INTENDED. PROTECT DURING DEMOLITION AND CONSTRUCTION.
9. REMOVE ALL EXISTING PIPING BACK TO ACTIVE SOURCE LEAVING NO DEAD END RUNS AND AS INDICATED. VALVE AND CAP EXISTING VACUUM RISER FOR CONNECTION TO NEW VACUUM PUMP SYSTEM.
10. REMOVAL OF PIPING SHALL INCLUDE ALL HANGERS & SUPPORTS, ANCHORS, ETC.
11. DISPOSE OF ALL MATERIALS IN ACCORDANCE TO CODE AND LOCAL REQUIREMENTS.

Colorado State licensed master plumber shall provide medical gas certified third party inspection and approval for medical gas piping.

RSN: *1531645*
Permit #: *2021-1955961 LT*

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *cmacy*
Date: *Apr 08, 2021*
2015 INTERNATIONAL CODES & 2020 NEC

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2	03.29.2021	100% CONSTRUCTION DOCUMENTS

SALAS O'BRIEN
Chicago, IL 60605
815 South Wabash Avenue
Greenwood Village, CO 80112
9250 East Costilla Avenue

COLORADO LICENSED MICHAEL P. THOMPSON 53150 PROFESSIONAL ENGINEER
04/08/2021

SHEET TITLE:
MEDICAL GAS LEGEND, CODE INFO, NOTES AND DETAILS

PROJECT NUMBER:
2021-00498-00

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P0.00

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MEDICAL GAS SPECIFICATIONS

PART 1 – BASIC REQUIREMENTS

1.01 DESCRIPTION

A. THE DRAWINGS AND SPECIFICATIONS SHALL BE UNDERSTOOD TO COVER SYSTEMS OF HEATING, VENTILATION AND AIR CONDITIONING, BUILDING AUTOMATION SYSTEMS AND TEMPERATURE CONTROL, MEDICAL GAS, AND INSULATION AND PIPE COVERING AS SHOWN ON THE DRAWINGS AND AS SPECIFIED. THE DRAWINGS AND SPECIFICATIONS ARE TO BE TAKEN TOGETHER. WORK SPECIFIED AND NOT SHOWN, OR WORK SHOWN AND NOT SPECIFIED, SHALL BE AS BINDING AS THOUGH REQUIRED BY BOTH, THE DRAWINGS AND SPECIFICATIONS.

B. MINOR ITEMS AND ACCESSORIES OR DEVICES NOT SHOWN BUT REASONABLY REFERRED AS NECESSARY TO THE COMPLETE AND PROPER OPERATION OF ANY SYSTEM SHALL BE PROVIDED FOR SUCH SYSTEMS, WHETHER OR NOT THEY ARE SPECIFICALLY CALLED FOR BY THE SPECIFICATIONS OR THE DRAWINGS.

1.02 CONTRACTOR

A. WHERE THE TERM "MECHANICAL CONTRACTOR" OR "CONTRACTOR' IS USED IT SHALL BE UNDERSTOOD TO BE A CONTRACTOR PROVIDING SINGLY OR IN COMBINATION PLUMBING SYSTEMS, FIRE PROTECTION SYSTEMS, HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS, TEMPERATURE CONTROL AND BUILDING AUTOMATION SYSTEMS, MEDICAL GAS SYSTEMS, TESTING AND BALANCING, OR INSULATION AND PIPE COVERING AS DESCRIBED IN DIVISION 22.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. PERFORM WORK STRICTLY AS REQUIRED BY RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES, AND LAWS OF LOCAL, STATE, AND FEDERAL GOVERNMENTS, AND ANY OTHER AUTHORITIES THAT HAVE LEGAL JURISDICTION OVER THE SITE.

B. PRIOR TO COMMENCEMENT OF WORK, NOTIFY STATE AND AUTHORITIES HAVING JURISDICTION AS REQUIRED AND SUBMIT ALL OF THE APPLICABLE NOTIFICATIONS FOR CONSTRUCTION, OPERATION AND/OR DEMOLITION.

C. THIS PROJECT AND ALL FIXTURES, EQUIPMENT AND MATERIALS SHALL CONFORM TO THE FOLLOWING AGENCIES:
1. TRI-COUNTY HEALTH DEPARTMENT
2. NFPA STANDARD 99 HEALTH CARE FACILITIES
3. NATIONAL ELECTRIC CODE (NEC)
4. CSA NON-FLAMMABLE MEDICAL GAS PIPING SYSTEMS
5. ASTM B819 STANDARD FOR SEAMLESS COPPER TUBE
6. AWS A5.8 AND NFPA BRAZING FILLER METAL

1.04 OWNER REQUIREMENTS

A. HCA MAINTAINS PURCHASING AGREEMENTS FOR SELECT EQUIPMENT AND MATERIALS WHICH ARE OUTLINED IN THE HCA INNOVATION MEMORANDUMS. ALL MATERIALS AND EQUIPMENT PURCHASED UNDER THIS CONTRACT SHALL COMPLY WITH THE INNOVATION MEMORANDUMS.
1. INNOVATION MEMORANDUM 07: ALL PIPING RELATED ITEMS ARE TO BE PURCHASED THROUGH FERGUSON ENTERPRISE (ALTON LASSITER – 615-316-1848, ALTON.LASSITER@FERGUSON.COM). ITEMS INCLUDE BUT ARE NOT LIMITED TO:
   a. COPPER PIPING
   b. CARBON STEEL PIPING
   c. POLYPROPYLENE PIPING
   d. CROSS-LINKED POLYETHYLENE (PEX) PIPING AND FITTINGS
   e. HIGH-DENSITY POLYETHYLENE (HDPE)
   f. SOIL PIPE AND FITTINGS
   g. PVC/ABS PIPE AND FITTINGS
   h. VALVES (ALL)
   i. STEEL PIPE FITTINGS AND FLANGES
   j. BRAZED AND SWEAT FITTINGS.

1.05 RULES AND REGULATIONS

A. ALL WORK SHALL BE INSTALLED IN CONFORMITY WITH ALL GOVERNMENTAL JURISDICTIONAL AUTHORITIES REGULATIONS, LAWS, RULES, OR ORDINANCES IN EFFECT AND GOVERNING SAME; SUCH RULES AND REGULATIONS AND LOCAL ORDINANCES TO BE CONSIDERED PART OF SPECIFICATIONS. THE CONTRACTOR SHALL BE HELD STRICTLY RESPONSIBLE FOR ANY VIOLATION OF SAME AND SHALL CHANGE HIS WORK TO CONFORM WITHOUT ADDITIONAL COST TO OWNER.

B. ALL WORK SHALL ALSO CONFORM TO THE PUBLISHED STANDARDS OF THE NATIONAL FIRE PROTECTION ASSOCIATION AND ELECTRICAL WORK AND EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF THE CURRENT ISSUE OF THE NATIONAL ELECTRICAL CODE.

C. ALL MATERIALS, IN GENERAL, SHALL BE UNDERWRITERS' LABORATORIES LISTED AND SHALL BEAR UL LABEL WHERE LABELING SERVICE IS AVAILABLE.

D. ALL CONTRACTORS ON JOB SHALL COOPERATE AND ASSIST EACH OTHER IN CONFORMING WITH ALL TRADE JURISDICTIONAL RULINGS. THEY SHALL PERFORM ALL WORK COVERED BY DRAWINGS AND SPECIFICATIONS WHICH PROPERLY COMES UNDER THE JURISDICTION OF THE PARTICULAR TRADE HE REPRESENTS. IN ADDITION, THEY SHALL INCLUDE, BY SUB-CONTRACT IF NECESSARY, SUCH WORK OF OTHER TRADES THAT IS EITHER INCIDENTAL TO HIS TRADE, OR IS SPECIFIED TO BE INCLUDED IN HIS CONTRACT OR SUB-CONTRACT.

E. WHERE JURISDICTIONAL RULES REQUIRE ASSISTANCE OF MECHANICS OF TRADES OTHER THAN THOSE ORDINARILY EMPLOYED BY A PARTICULAR MECHANICAL CONTRACTOR IN THE HANDLING, STORAGE OR SETTING OF SPECIAL EQUIPMENT, THE MECHANICAL CONTRACTOR SHALL EMPLOY SUCH TRADESMEN SO AS TO BE IN CONFORMANCE WITH LOCAL JURISDICTIONAL AGREEMENTS.

1.06 SCOPE

A. IT IS THE INTENT OF THE SPECIFICATIONS AND DRAWINGS TO ESTABLISH MINIMUM REQUIREMENTS FOR METHODS, PRODUCTS, AND EQUIPMENT, AND TO ENSURE SYSTEMS BE FINISHED, TESTED AND READY FOR OPERATION. INCIDENTAL DETAILS NOT USUALLY SHOWN OR SPECIFIED, BUT NECESSARY FOR PROPER INSTALLATION AND OPERATION, SHALL BE INCLUDED IN THE WORK THE SAME AS IF SPECIFIED. LOCATIONS OF ALL EQUIPMENT AND MATERIAL SHALL BE ADJUSTED AT NO EXTRA COST TO THE OWNER, TO ACCOMMODATE THE WORK INTERFERENCES ANTICIPATED AND/OR ENCOUNTERED. PRIOR TO INSTALLATION DETERMINE THE EXACT ROUTE AND LOCATION OF EACH RACEWAY, PIPE AND PIECE OF EQUIPMENT TO MINIMIZE CONFLICTS WITH OTHER TRADES.

1.07 CONTRACT DOCUMENTS

A. EXTENT OF DRAWINGS DOES NOT LIMIT RESPONSIBILITY OF DETERMINING FULL EXTENT OF WORK REQUIRED. REFER TO ARCHITECTURAL, HVAC, PLUMBING, FIRE PROTECTION, ELECTRICAL, STRUCTURAL, SITE UTILITY AND ALL OTHER DRAWINGS AND OTHER DOCUMENTS THAT INDICATE TYPES OF CONSTRUCTION IN WHICH WORK IS TO BE INSTALLED AND WORK OF OTHER TRADES WITH WHICH WORK OF THIS DIVISION MUST BE COORDINATED.

B. EXCEPT WHERE MODIFIED BY A SPECIFIC NOTATION TO THE CONTRARY, IT SHALL BE UNDERSTOOD THAT THE INDICATION AND/OR DESCRIPTION OF ANY ITEM, IN THE DRAWINGS OR SPECIFICATIONS OR BOTH, CARRIES WITH IT THE INSTRUCTION TO FURNISH AND INSTALL THE ITEM, REGARDLESS OF WHETHER OR NOT THIS INSTRUCTION IS EXPLICITLY STATED AS PART OF THE INDICATION OR DESCRIPTION.

C. WHEN REQUIREMENTS CITED IN THIS SPECIFICATION CONFLICT WITH EACH OTHER OR WITH OTHER CONTRACT DOCUMENTS, THE MOST STRINGENT SHALL GOVERN WORK.

D. ITEMS REFERRED TO IN SINGULAR NUMBER IN CONTRACT DOCUMENTS SHALL BE PROVIDED IN QUANTITIES NECESSARY TO COMPLETE WORK.

E. DRAWINGS ARE DIAGRAMMATIC. THEY ARE NOT INTENDED TO BE ABSOLUTELY PRECISE; THEY ARE NOT INTENDED TO SPECIFY OR TO SHOW EVERY OFFSET, FITTING, AND COMPONENT. THE PURPOSE OF THE DRAWINGS IS TO INDICATE A SYSTEMS CONCEPT, THE MAIN COMPONENTS OF THE SYSTEMS, AND THE APPROXIMATE GEOMETRICAL RELATIONSHIPS. BASED ON THE SYSTEMS CONCEPT, THE MAIN COMPONENTS, AND THE APPROXIMATE GEOMETRICAL RELATIONSHIPS, THE CONTRACTOR SHALL PROVIDE ALL OTHER COMPONENTS AND MATERIALS NECESSARY TO MAKE THE SYSTEMS FULLY COMPLETE AND OPERATIONAL.

F. THE LAYOUT OF THE PIPING, DUCTWORK, EQUIPMENT, ETC., AS SHOWN ON THE DRAWINGS SHALL BE CHECKED AND EXACT LOCATIONS SHALL BE DETERMINED BY THE DIMENSIONS OF EQUIPMENT APPROVED AND MECHANICAL CONTRACTOR SHALL OBTAIN THE ARCHITECT/ENGINEER'S APPROVAL FOR ANY REVISED LAYOUT BEFORE THE APPARATUS IS INSTALLED.

G. INSPECT ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, FIRE PROTECTION AND ELECTRICAL DRAWINGS FOR ALL DIMENSIONS, LOCATIONS, PARTITIONS AND WALLS, STRUCTURAL DETAILS AND LOCATIONS OF MECHANICAL PIPES AND DUCTS SO THAT INSTALLATION SHALL BE COORDINATED WITH THE WORK OF THE OTHER TRADES.

H. INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS BUT NOT SHOWN ON PLANS, AND VICE VERSA, SHALL APPLY OR BE PROVIDED AS IF EXPRESSLY REQUIRED ON BOTH.

I. DATA THAT MAY BE FURNISHED ELECTRONICALLY BY THE ARCHITECT (ON COMPUTER TAPE, DISKETTE, OR OTHERWISE) IS DIAGRAMMATIC. SUCH ELECTRONICALLY FURNISHED INFORMATION IS SUBJECT TO THE SAME LIMITATION OF PRECISION AS HERETOFORE DESCRIBED. IF FURNISHED, SUCH DATA IS FOR CONVENIENCE AND GENERALIZED REFERENCE, AND SHALL NOT SUBSTITUTE FOR ARCHITECT'S/ENGINEERS, SEALED OR STAMPED CONSTRUCTION DOCUMENTS.

1.08 RELATED REQUIREMENTS

A. THIS SPECIFICATION SHALL CONTROL ALL LABOR, SERVICES, MATERIALS, EQUIPMENT AND PERFORMANCE OF ALL WORK REQUIRED FOR THE INSTALLATION OF ALL PLUMBING, AS INDICATED WITHIN CONTRACT DOCUMENTS.

B. DEFINITIONS:

1. "PIPING" INCLUDES, IN ADDITION TO PIPE, ALL FITTINGS, VALVES, PIPE COVERING, HANGERS, AND OTHER SUPPORTS AND ACCESSORIES RELATED TO SUCH PIPING.

2. CONCEALED MEANS HIDDEN FROM SIGHT IN CHASES, FURRED SPACES, SHAFTS, HUNG CEILINGS, EMBEDDED IN CONSTRUCTION, IN CRAWL SPACES OR BURIED.

3. "EXPOSED" MEANS NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

4. "PROVIDE" MEANS TO FURNISH AND INSTALL COMPLETE.

1.09 GENERAL REQUIREMENTS

A. CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO VERIFY CONDITIONS AND WORK REQUIRED.

B. PRODUCTS AND EXECUTION SHALL BE PROVIDED FOR A COMPLETE AND FULLY OPERATIONAL PLUMBING SYSTEM THROUGHOUT THE EXTENT OF THE PROJECT.

C. PROVIDE SHOP DRAWINGS AND PRODUCT SUBMITTALS FOR ARCHITECT/ENGINEER REVIEW AND APPROVAL PRIOR TO ANY WORK.

D. ALL PRODUCTS AND EQUIPMENT SHALL BE UL LISTED AND APPROVED BY THE LOCAL AUTHORITY.

E. ALL NEW EQUIPMENT SHALL COMPLY WITH RECOGNIZED ASME AND ANSI STANDARDS.

F. EACH MAJOR COMPONENT OR PIECE OF EQUIPMENT TO HAVE THE MANUFACTURER'S NAME, ADDRESS, MODEL NUMBER AND RATING ON A PLATE SECURELY AFFIXED IN A CONSPICUOUS PLACE.

G. CODE RATINGS, LABELS OR OTHER DATA WHICH ARE DIE-STAMPED OR OTHERWISE AFFIXED TO THE SURFACE OF THE EQUIPMENT SHALL BE IN VISIBLE LOCATION.

H. CONTRACTOR SHALL COORDINATE PROPOSED WORK WITH EXISTING FIELD CONDITIONS INCLUDING ARCHITECTURAL BUILDING ELEMENTS, STRUCTURAL CONDITIONS, AND EXISTING MECHANICAL AND ELECTRICAL CONDITIONS.

I. CONTRACTOR SHALL ADHERE TO ALL CURRENT FACILITY STANDARDS AND REQUIREMENTS. SHUT-DOWN OF EXISTING BUILDING SYSTEMS FOR NEW CONNECTIONS SHALL BE AUTHORIZED, SCHEDULED AND PERFORMED IN ACCORDANCE TO BUILDING MANAGEMENT REQUIREMENTS. BUILDING SHALL BE NOTIFIED NO LESS THAN 72 HOURS PRIOR TO ANY SHUT-DOWNS. ACCESS TO AREAS OUTSIDE WORKS SPACES, SUCH AS ADJOINING SPACES AND SPACES IMMEDIATELY BELOW, SHALL BE PERFORMED IN ACCORDANCE TO BUILDING MANAGEMENT REQUIREMENTS.

J. UNLESS SPECIFICALLY INDICATED, NO EXISTING EQUIPMENT, SUPPORT OR RELATED DEVICES SHALL BE REUSED.

1.10 WORK INCLUDED

A. INCLUDE ALL COSTS RELATED TO PROVIDE ALL PERMITS, LICENSES, INSPECTIONS, APPROVALS AND OTHER ARRANGEMENTS FOR WORK.

B. PROVIDE DEMOLITION OF EXISTING MEDICAL GAS INCLUDING REMOVAL OF ALL DEBRIS. REMOVE ALL PIPING BACK TO ACTIVE SOURCE AND CAP LEAVING NO DEAD ENDS.

C. PRIOR TO DEMOLITION OF EQUIPMENT OR DEVICES, COORDINATE WITH OWNER AND/OR BUILDING MANAGEMENT ANY EXISTING EQUIPMENT OR DEVICES THAT SHALL BE RETAINED. CAREFULLY REMOVE SUCH ITEMS AND TURN OVER TO OWNER OR BUILDING MANAGEMENT.

D. PROVIDE REMOVAL OF ALL CONSTRUCTION DEBRIS IN ACCORDANCE WITH APPLICABLE STANDARDS AND FACILITY REQUIREMENTS.

E. MAKE NEW CONNECTIONS TO EXISTING RISERS AND BRANCH PIPING AS INDICATED ON PLANS AND DETAILS, AND AS NECESSARY TO COMPLETE THE WORK. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL SERVICES RELATED TO CLEANING AND INSPECTIONS.

F. INSTALL PIPING WITH ADEQUATE PROVISIONS TO CONTROL EXPANSION AND CONTRACTION.

G. PROVIDE AND SET SLEEVES FOR ALL PIPING SYSTEMS PASSING THROUGH WALLS, FLOORS, PARTITIONS, ETC. SLEEVES SHALL BE SIZED AT LEAST TWO PIPE DIAMETERS LARGER THAN PIPING, OR OUTSIDE DIAMETER OF INSULATED PIPING.

H. PROVIDE ALL CUTTING AND PATCHING OF BUILDING ELEMENTS AS REQUIRED FOR INSTALLATION OF WORK HERE IN SPECIFIED. ALL WORK SHALL BE COORDINATED AND APPROVED BY BUILDING AND ARCHITECTURAL FIELD REPRESENTATIVE PRIOR TO ANY WORK BEING PERFORMED.

I. PROVIDE FIRE-STOP AT ALL FLOOR AND WALL PENETRATIONS AS REQUIRED BY PROJECT PARAMETERS AND LOCAL CODE AUTHORITY.

J. COORDINATE PROPOSED WORK WITH ADDITIONAL TRADES AND OTHERS INVOLVED PRIOR TO ANY INSTALLATION WORK.

K. PROVIDE PIPING IDENTIFICATION MARKERS FOR ALL PIPING SYSTEMS WITH ANSI/ASME STANDARD COLORS AND LABELS. MARKERS SHALL BE INSTALLED 25 FEET ON CENTER.

L. PROVIDE VALVE TAGS OF BRASS OR STAINLESS STEEL HAVING A MINIMUM OF 1-1/2 INCH DIAMETER. PROVIDE COMPLETED VALVE CHART INDICATING VALVE SERVICE AND LOCATION.

M. PROVIDE AS-BUILT DRAWINGS IN AUTOCAD 2015 FORMAT AT COMPLETION OF PROJECT.

N. PROVIDE TWO COPIES OF OWNER'S OPERATION AND MAINTENANCE MANUALS WITH ALL PLUMBING EQUIPMENT AND DEVICES, MANUFACTURER'S MAINTENANCE INSTRUCTIONS AND MANUALS.

O. COORDINATE GENERAL GLEANUP WITH BUILDING MANAGEMENT.

1.11 FIELD TESTING

A. TESTING SHALL BE IN STRICT COMPLIANCE TO THE APPLICABLE CODES AND NFPA STANDARDS.

B. NO WORK SHALL BE ENCLOSED, CONCEALED, COVERED UP OR USED UNTIL THE SYSTEMS HAVE BEEN INSPECTED AND APPROVED BY THE CODE OFFICIALS AND ARCHITECTURAL FIELD REPRESENTATIVE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ALL NECESSARY ARRANGEMENTS FOR INSPECTIONS.

C. MEDICAL GAS PIPING SHALL BE TESTED AND CERTIFIED IN ACCORDANCE TO CURRENT NFPA #99 STANDARDS.

PART 2 – BASIC MATERIALS

2.01 PIPES AND FITTINGS

A. MEDICAL GAS: HARD DRAWN SEAMLESS TYPE "K" MEDICAL GAS TUBE; ASTM B819 AND MARKED ACCORDINGLY FOR SERVICE TYPE PER NFPA 99 STANDARDS. FITTINGS SHALL CLEANED AND LISTED FOR OXYGEN SERVICE. JOINTS SHALL BE BRAZED IN ACCORDANCE TO NFPA 99 AND MSS SP-73 BRAZING STANDARDS.

B. EXHAUST PIPING: HARD DRAWN SEAMLESS COPPER TUBING, TYPE "L" CONFORMING TO ASTM STANDARD B-88. ALL JOINTS FOR PIPING 2-1/2" AND LARGER SHALL BE BRAZED IN ACCORDANCE WITH THE COPPER DEVELOPMENT ASSOCIATION COPPER TUBE HANDBOOK.

2.02 VALVES

A. PROVIDE VALVES FOR ALL PIPING SYSTEMS FOR PROPER CONTROL AND ISOLATION OF EQUIPMENT AND DEVICES. PROVIDE VALVES FOR PROPER OPERATION OF EQUIPMENT.

B. MEDICAL GAS VALVES SHALL BE 3-PIECE DESIGN CLEANED AND LISTED FOR OXYGEN SERVICE.

C. ALL VALVES SHALL MEET THE 2021 HCA STANDARDS.

2.03 CONCRETE BASES

A. ANCHOR EQUIPMENT TO CONCRETE BASE ACCORDING TO EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND ACCORDING TO SEISMIC CODES AT PROJECT.

B. CONSTRUCT CONCRETE BASES OF DIMENSIONS INDICATED, BUT NOT LESS THAN 4 INCHES (100 MM) LARGER IN BOTH DIRECTIONS THAN SUPPORTED UNIT.

C. INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONCRETE FLOOR. UNLESS OTHERWISE INDICATED, INSTALL DOWEL RODS ON 18-INCH (450-MM) CENTERS AROUND THE FULL PERIMETER OF THE BASE.

D. INSTALL EPOXY-COATED ANCHOR BOLTS FOR SUPPORTED EQUIPMENT THAT EXTEND THROUGH CONCRETE BASE, AND ANCHOR INTO STRUCTURAL CONCRETE FLOOR.

E. PLACE AND SECURE ANCHORAGE DEVICES. USE SUPPORTED EQUIPMENT MANUFACTURER'S SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.

F. INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SUPPORTED EQUIPMENT.

G. INSTALL ANCHOR BOLTS ACCORDING TO ANCHOR-BOLT MANUFACTURER'S WRITTEN INSTRUCTIONS.

H. USE 3000-PSI (20.7-MPA) 28-DAY COMPRESSIVE-STRENGTH CONCRETE AND REINFORCEMENT.

2.04 SUPPORTS AND HANGERS

A. PROVIDE ALL NECESSARY HANGERS, SUPPORTS, BUILDING ATTACHMENTS, SUPPLEMENTAL STEEL, ANCHORS, INSERTS, ETC., AS REQUIRED TO INSTALL THE PLUMBING WORK. HANGERS AND SUPPORTS SHALL BE CAPABLE OF SUPPORTING PIPE LOADS AND FULL CONTENTS WITH ALL RELATED DEVICES, PUMPS, ETC.

B. PIPE SHALL BE SUPPORTED IN ACCORDANCE TO CODE, MANUFACTURER REQUIREMENTS, MSS STANDARDS AND CONTRACT DOCUMENTS.

C. HANGERS, SUPPORTS AND RELATED ITEMS SHALL HAVE FACTORY COATED FINISHES THAT WILL NOT PROMOTE GALVANIC OR CORROSION ACTION. RODS, NUTS AND MISCELLANEOUS FASTENERS SHALL BE GALVANIZED.

D. ADDITIONAL HANGERS MUST BE PROVIDED AT ALL VALVE ASSEMBLIES, AUTOMATIC VALVES, BY-PASSES, OR ELSEWHERE, WHERE REQUIRED TO PROPERLY SUPPORT ANY ADDITIONAL PIPE LOADINGS.

E. ANCHORS, FASTENERS AND INSERTS SHALL BE UL LISTED HOT DIP GALVANIZED OF THE SIZES REQUIRED BY HANGER ROD SIZE, SUPPORTS AND THE IMPOSED LOADING.

F. MAXIMUM SPACING FOR HANGERS SHALL BE IN ACCORDANCE TO CODE. MSS STANDARDS AND PIPE MANUFACTURER INSTRUCTIONS. HANGERS SUPPORTING CAST IRON PIPE OF THE HUB AND SPIGOT TYPE IN 60 INCHES LENGTHS SHALL BE 60 INCHES O.C. HANGERS SHALL BE LOCATED AT THE PIPE CONNECTIONS AND AT EACH FITTING.

G. REGARDLESS OF ANY OF THE ABOVE LISTED HANGER SPACING, PROVIDE A HANGER NOT MORE THAN 12 INCHES FROM EACH CHANGE IN DIRECTION OF PIPING.

2.05 PRESSURE SWITCHES

A. VACUUM SWITCH SHALL HAVE AN ADJUSTABLE RANGE OF 0.8" TO 29" HG OF VACUUM. ELECTRICAL CHARACTERISTICS SHALL BE: DUAL CONTROL WITH TWO SINGLE POLE, DOUBLE-THROW SNAP ACTION SWITCHES RATED AT 10 AMPS, 125 VOLTS AC. ALL PRESSURE SWITCHES MAY BE WIRED TO ACCOMMODATE EITHER A NORMALLY OPEN OR NORMALLY CLOSED ALARM CIRCUIT.

B. PROVIDE PRESSURE OR VACUUM GAUGE ASSEMBLY AFTER THE PRESSURE SWITCHES. A GAS SPECIFIC DISS NUT AND NIPPLE SHALL BE ATTACHED TO THE BOTTOM OF THE GAUGE, THEN TO A DEMAND CHECK, HAVING A 3/8 INCH MALE NPT CONNECTION DIRECTLY ONTO THE PIPELINE.

PART 3 – BASIC EXECUTION

3.01 MEDICAL GAS INSTALLATION

A. MEDICAL GAS SYSTEM DEMOLITION AND INSTALLATION SHALL COMPLY WITH CURRENT EDITION OF NFPA 99.

B. SYSTEM TEST AND CERTIFICATIONS SHALL BE IN STRICT COMPLIANCE WITH NFPA STANDARDS. TEST AND CERTIFICATION SHALL CONSIST OF ALL PIPELINES WITHIN AFFECTED AREA OF SCOPE AND PIPELINE IMMEDIATELY UPSTREAM OF AREA AS PRESCRIBED IN NFPA 99. FINAL CROSS CONNECTION, CERTIFICATION AND PURITY TESTS SHALL BE CONDUCTED BY A THIRD PARTY AS DIRECTED BY THE HOSPITAL.

C. PROVIDE ALL REQUIRED CUTTING AND PATCHING FOR THE NEW MEDICAL GAS SYSTEMS.

D. PROVIDE A NOTORIZED DOCUMENT INDICATING ALL TEST RESULTS FOR SUBMISSION TO ALL NECESSARY CODE AUTHORITIES AND FOR FACILITY RECORDS.

E. THE EQUIPMENT MANUFACTURER'S REPRESENTATIVE SHALL TRAIN THE USER'S PERSONNEL IN THE PROPER USE OF THE PIPING SYSTEMS AND THE SECONDARY EQUIPMENT WHICH IS ASSOCIATED WITH THOSE SYSTEMS.

3.02 EQUIPMENT INSTALLATION

A. ALL EQUIPMENT, DEVICES AND ACCESSORIES SHALL BE INSTALLED IN ACCORDANCE TO MANUFACTURER'S INSTRUCTIONS. PROVIDE ALL REQUIRED START-UP SERVICES.

B. PROVIDE EQUIPMENT WITH NECESSARY SUPPORTS AND HOUSEKEEPING PADS. EQUIPMENT SUPPORTED BY BUILDING STRUCTURE OR ELEMENTS SHALL BE DESIGNED TO HANDLE TWICE THE FULL OPERATING WEIGHTS, AND BE APPROVED BY ARCHITECT AND STRUCTURAL ENGINEER.

C. ALL EQUIPMENT ITEMS AND SYSTEMS SHALL BE DESIGNED AND INSTALLED TO OPERATE QUIETLY AND FREE OF VIBRATION. STARTING AND STOPPING OF EQUIPMENT DURING NORMAL OPERATION SHALL NOT GENERATE ANY NOTICEABLE VIBRATION. FURNISH AND INSTALL VIBRATION ELIMINATORS AND ISOLATION EQUIPMENT FOR EQUIPMENT, PUMPS, MOTORS, AND ETC., AS SPECIFIED.

D. ANY ROTATING SHAFTS, COUPLINGS, BELT_DRIVES, OR OTHER MOVING OR HAZARDOUS PORTION OF EQUIPMENT AND MACHINERY SHALL BE PROVIDED WITH DETACHABLE MOUNTED GUARDS.

E. ALL EQUIPMENT SHALL BE INSTALLED WITH SUFFICIENT UNIONS TO ALLOW REPLACEMENT, TESTING AND SERVICING WITHOUT HAVING TO DISASSEMBLE LARGE PORTIONS OF PIPING.

F. PROVIDE VALVED DRAINS FOR EACH ITEM OF EQUIPMENT, FROM ALL LOW POINTS OF VARIOUS SYSTEM COMPONENTS AND PROVIDE AIR COCKS AT ALL HIGH POINTS TO VENT TRAPPED GASES.

G. ARRANGE FOR ELECTRICAL CONNECTIONS, RACEWAY, WIRING, ETC TO ALL ALARM LOCATIONS AND ELECTRICAL DEVICES.

H. INSTALL WITH MANUFACTURER'S REQUIRED MAINTENANCE AND ACCESS CLEARANCES.

I. REFER TO EQUIPMENT SCHEDULE ON DRAWINGS FOR EQUIPMENT MODEL NUMBERS.

PART 4 – EQUIPMENT AND DEVICES

4.01 GENERAL

A. INSTALL ALL ITEMS IN ACCORDANCE TO MANUFACTURER'S INSTRUCTIONS. PROVIDE ALL REQUIRED FACTORY AUTHORIZED START-UP SERVICES WHERE REQUIRED.

B. ITEMS SHALL BE SET, LEVELED, FASTENED AND CONNECTED COMPLETE WITH ALL REQUIRED SUPPORTS, ETC. ALL

C. ALL ITEMS SHALL BE PROVIDED WITH PROPER SUPPORT AND VIBRATION ISOLATION.

D. AFTER WORK HAS BEEN COMPLETED, ALL ITEMS SHALL BE THOROUGHLY CLEANED.

E. PROVIDE ALL MEDICAL GAS EQUIPMENT AND DEVICES AS SPECIFIED. EQUIPMENT DEVICES, VALVES AND RELATED COMPONENTS SHALL BE FROM BECKER AND IN ACCORDANCE TO CURRENT NFPA #99 STANDARDS AND 2021 HCA STANDARDS.

RSN: *1531645*
Permit #: *2021-1955961 LT*

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *cmacy*
Date: *Apr 08, 2021*
2015 INTERNATIONAL CODES & 2020 NEC

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THE MEDICAL CENTER OF AURORA
CARDIAC TOWER VACUUM PUMP REPLACEMENT
1501 S. POTOMAC ST.
AURORA, CO 80012

REVISION

MARK	DATE	DESCRIPTION
1	03.22.2021	95% CONSTRUCTION DOCUMENTS
2	03.29.2021	100% CONSTRUCTION DOCUMENTS

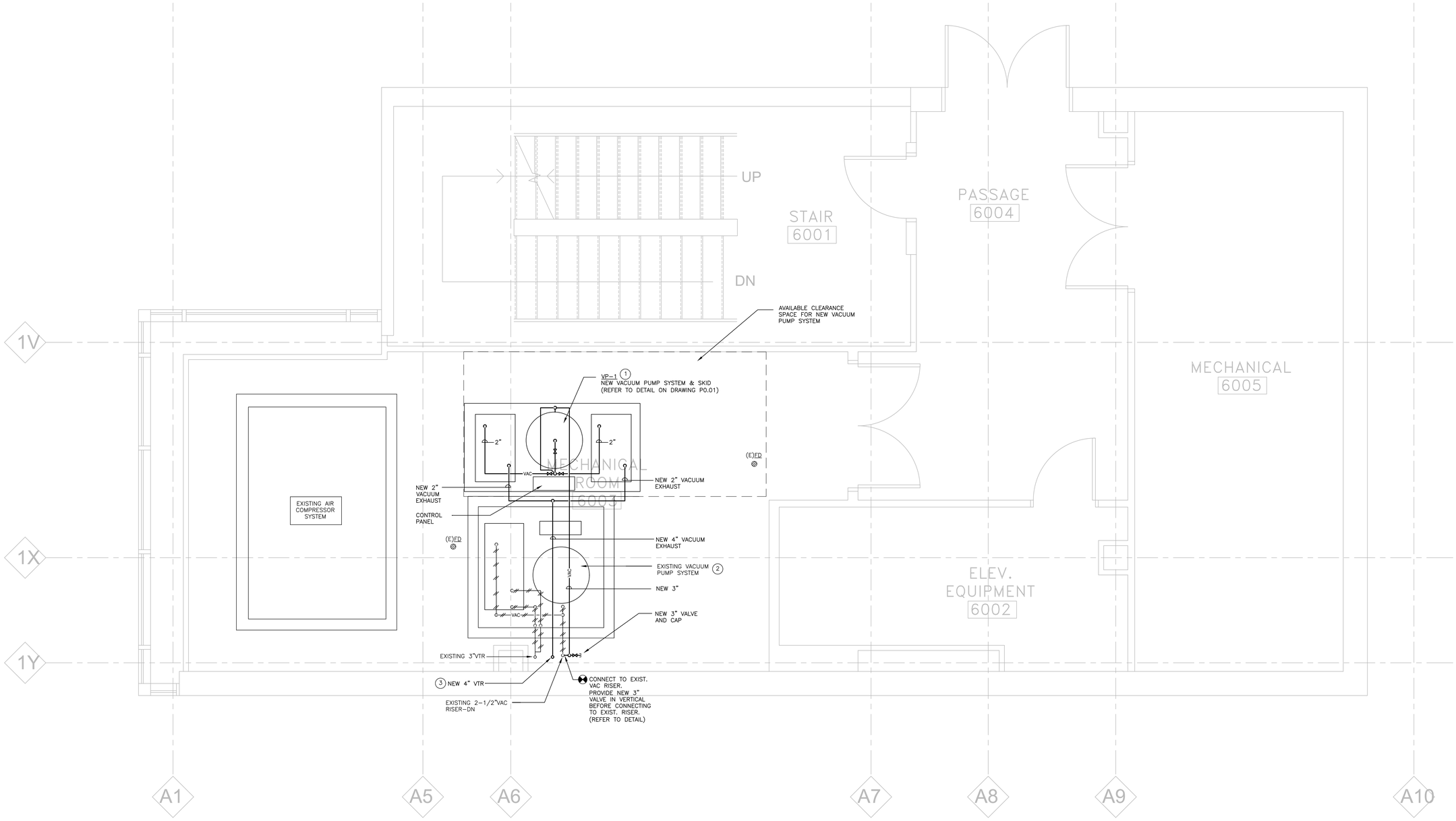
SALAS O'BRIEN
815 South Wabash Avenue Chicago, IL 60605
9250 East Costilla Avenue Greenwood Village, CO 80112

STATE OF COLORADO LICENSED ARCHITECT, ENGINEER & THEODORE J. TOMASZEWSKI 53150 PROFESSIONAL ENGINEER
04/08/2021

SHEET TITLE:
MEDICAL GAS SPECIFICATIONS

PROJECT NUMBER:
2021-00498-00

SHEET NUMBER:
P0.01



1 MEDICAL GAS PENTHOUSE PLAN

1/2"=1'-0"

0 1 2 4

GENERAL DRAWING NOTES:

1. MAINTAIN A MINIMUM CLEARANCE SPACE OF 3 FEET IN FRONT OF THE EXISTING MEDICAL AIR COMPRESSOR SYSTEM.
2. ROUTE DISCHARGE FROM VACUUM RECEIVER INDIRECT TO EXISTING FLOOR DRAIN NEAR EXISTING VACUUM PUMP SYSTEM. LIMIT AMOUNT OF PIPING RUNNING ACROSS THE FLOOR.
3. COORDINATE WITH FACILITY IN FIELD FINAL VACUUM PUMP PACKAGE LOCATION AND ORIENTATION PRIOR TO ANY WORK. SYSTEM TO BE INSTALLED IN SUCH AS MANNER FOR EXISTING VACUUM SYSTEM TO REMAIN FULLY OPERATIONAL UNTIL SWITCHOVER.
4. PACKAGE SHALL BE INSTALLED ON 4 INCH HIGH CONCRETE HOUSEKEEPING PAD, AND INCLUDE MASON INDUSTRIES TYPE SUPER WMH DUROMETER 70, WAFFLE ISOLATION PADS WITH MASON INDUSTRIES HLIB/HLIW BUSHINGS AND WASHERS, OR APPROVED EQUIVALENT. SPACING SHALL BE NO LESS THAN 12 INCH O.C., OR PER MANUFACTURER'S INSTRUCTIONS.
5. NEW WORK AND INSTALLATIONS SHALL BE ROUTED AROUND EXISTING SYSTEMS TO MAINTAIN EXISTING SYSTEM FULLY OPERATIONAL.
6. MASTER ALARM WIRING AND RELATED WORK TO BE SWITCHED OVER TO NEW VACUUM SYSTEM AT THE SAME TIME VACUUM PUMP SWITCHOVER OCCURS.
7. SWITCHOVER OF EXISTING VACUUM PUMP TO NEW SYSTEM SHALL BE DONE AT A TIME AND MANNER AS APPROVED BY THE FACILITY. WORK SHALL BE PERFORMED ON PREMIUM TIME.
8. ALL SYSTEM COMPONENTS FOR THE NEW VACUUM PUMP SYSTEM SHALL FIT THROUGH A 36" DOORWAY FOR EASY INSTALLATION AND SHALL BE ASSEMBLED IN THE FIELD.

DRAWING KEY NOTES:

1. NEW VACUUM PUMP SYSTEM SHALL BE INSTALLED IN THE APPROXIMATE 18' X AVAILABLE SPACE IN THE MECHANICAL ROOM AND ADJACENT TO THE EXISTING PUMP SYSTEM. COORDINATE ALL ELECTRICAL REQUIREMENTS WITH THE ELECT CONTRACTOR. LOCATE CONTROL PANEL WITH A MINIMUM OF 3 FEET OF CLEAR FRONT OF IT.
2. DEMO EXISTING VACUUM PUMPS, VACUUM RECEIVER, CONTROL PANEL AND ALL ASSOCIATED PIPING, FITTINGS AND ACCESSORIES. DEMOLITION SHALL OCCUR AI VACUUM PUMP SYSTEM HAS BEEN INSTALLED AND IS FULLY OPERATIONAL. E CONCRETE PAD SHALL BE REMOVED TO ALLOW FOR CLEARANCE SPACE AROUN VACUUM PUMP SYSTEM.
3. NEW 4" EXHAUST VENT THRU THE ROOF. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING THRU THE ROOF. COORDINATI THE ROOFING CONTRACTOR.

ALTERNATE NOTE:

PROVIDE ALTERNATE PRICE FOR THE FOLLOWING: MASON INDUSTRIES TYPE J STEEL BEAM BASE WITH MASON INDUSTRIES TYPE B SLF 1" DEFLECTION SPRI APPROVED EQUIVALENT IN LIEU OF WAFFLE ISOLATION PADS. OVERALL FRAME CROSS REINFORCING STEEL TO BE COORDINATED WITH MASON INDUSTRIES.

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SALASO'BRIEN
Chicago, IL 60605
815 South Wabash Avenue
Greenwood Village, CO 80112
9250 East Costilla Avenue

COLORADO LICENSED 53150 PROFESSIONAL ENGINEER
04/08/2021

SHEET TITLE:
MEDICAL GAS PENTHOUSE PLAN

PROJECT NUMBER:
2021-00498-00

SHEET NUMBER:
P1.01

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SYMBOLS

PB	PULL BOX
J	JUNCTION BOX– EXPOSED OR IN CEILING
HJ	JUNCTION BOX – WALL MOUNTED
	FLEXIBLE CONDUIT
PDO 13	EQUIPMENT IDENTIFICATION TAG
	DUPLEX RECEPTACLE
HJ	JUNCTION BOX WITH FLEXIBLE CONDUIT AND FINAL EQUIPMENT CONNECTION
	SURFACE MOUNTED DISTRIBUTION PANELBOARD
	SURFACE MOUNTED BRANCH CIRCUIT PANELBOARD
	RECESSED MOUNTED BRANCH CIRCUIT PANELBOARD
1–HDP–1	SWITCHBOARDS, DISTRIBUTION PANELBOARDS, MOTOR CONTROL CENTERS, PANELBOARDS, CABINETS, AND RELATED EQUIPMENT
	INDICATES LEVEL ON WHICH PANEL IS LOCATED – G, B, 1, 2, ETC. INDICATES TYPE, CODED AS FOLLOWS: INDICATES PANEL NUMBER 1 HDP 1 "C" CRITICAL OR COMPUTER; "D" DISTRIBUTION; "E" EMERGENCY; "H" 480/277V, OR 480V; "ISP" ISOLATION; "K" KITCHEN; "L" LIGHTING; "L" 208/120V, OR 208V; "MCC" MOTOR CONTROL CENTER; "P" POWER; "Q" EQUIPMENT; "R" RECEPTACLE; "S" STANDBY; "SWBD" SWITCHBOARD; "XR" X–RAY
AS ☐h	NON–FUSED DISCONNECT SWITCH, "AS" INDICATES AMPERE RATING OF SWITCH
AS/AF ☐h	FUSED DISCONNECT SWITCH, "AS" INDICATES AMPERE RATING OF SWITCH AND "AF" INDICATES AMPERE RATING OF FUSE
☒	MAGNETIC MOTOR STARTER – NEMA SIZE AS INDICATED
AS ☒h	COMBINATION MOTOR STARTER AND NON–FUSED DISCONNECT, "AS" INDICATES AMPERE RATING OF SWITCH
AS/AF ☒h	COMBINATION MOTOR STARTER AND FUSED DISCONNECT, "AS" INDICATES AMPERE RATING OF SWITCH AND "AF" INDICATES AMPERE RATING OF FUSE
T	TRANSFORMER
BGB	BUILDING GROUND BOX
	PANELBOARD
	SWITCHBOARD OR MOTOR CONTROL CENTER AS INDICATED
	TRANSFORMER WITH FLEXIBLE CONDUIT AND PAD
F1 1a	FLUORESCENT LIGHTING FIXTURE – PENDANT MOUNTED AS REQUIRED
F1 E1	FLUORESCENT LIGHTING FIXTURE CONNECTED TO EMERGENCY CIRCUIT
X3	"XX" INDICATES INSCRIPTION, ARROWS, AND SINGLE OR DOUBLE FACED. SHADED QUADRANTS INDICATES DIRECTION OF LIGHTED FACES
$	SINGLE POLE SWITCH UNLESS NOTED OTHERWISE: "TH" DENOTES THERMAL OVERLOAD
AV	AUDIBLE GENERAL ALARM WITH VISUAL STROBE
	TELEPHONE OUTLET
DD	DUCT DETECTOR

MOUNTING HEIGHTS

1. MOUNTING HEIGHTS SHALL WATCH TENANT STANDARD, UNLESS NOTED OTHERWISE.
2. DIMENSIONS LISTED BELOW ARE TO CENTER, UNLESS NOTED OTHERWISE:

LIGHTING SWITCHES	–	48"AFF
RECEPTACLES AND OUTLETS	–	15"AFF
SPEAKER/VISUAL DEVICES	–	80"AFF
DISCONNECT SWITCHES	–	60"AFF TO CENTER LINE
PANELBOARDS	–	72"AFF TO HIGHEST OCP
	–	18"AFF TO LOWEST OCP

ABBREVIATIONS

NOTE: ABBREVIATIONS ARE ALPHABETICALLY LISTED BY DESCRIPTION.

ABBREV.	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
AC	ALTERNATING CURRENT
A	AMPERE
AMP	AMPERE
AIC	AMPERES INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
BGB	BUILDING GROUND BOX
C.B.	CIRCUIT BREAKER
CCT	CIRCUIT
C.U.	COEFFICIENT OF UTILIZATION
COMED	COMMONWEALTH EDISON
C	CONDUIT
CU	COPPER
CT	CURRENT TRANSFORMER
DC	DIRECT CURRENT
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
ELEC	ELECTRIC
EM	EMERGENCY
EMT	ELECTRIC METALLIC TUBING (THIN WALL CONDUIT)
EQ	EQUIPMENT
EX	EXISTING
EP	EXPLOSION PROOF
FA	FIRE ALARM
FLUOR	FLUORESCENT
F	FUSE
F.S.	FUSED SWITCH
GRD	GROUND
GFI	GROUND FAULT INTERRUPTER
HWG	GALVANIZED HEAVYWALL STEEL CONDUIT
HV	HIGH VOLTAGE
HP	HORSE POWER
INC	INCANDESCENT
IC	INTERRUPTING CAPACITY
IMC	INTERMEDIATE GRADE CONDUIT
JB	JUNCTION BOX
KW	KILOWATT
KWH	KILOWATT–HOUR
KVA	KILOVOLT–AMPERE
KO	KNOCKOUT
LTG	LIGHTING
LV	LOW VOLTAGE
MH	MANHOLE
MFR	MANUFACTURER
MCC	MOTOR CONTROL CENTER
MTD	MOUNTED
NEC	NATIONAL ELECTRICAL CODE
NC	NORMALLY CLOSED
NO	NORMALLY OPENED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PNL	PANEL
PH	PHASE
PT	POTENTIAL TRANSFORMER
PRI	PRIMARY
PA	PUBLIC ADDRESS
PB	PULL BOX
RECP	RECEPTACLE
RC	REMOTE CONTROL
SEC	SECONDARY
SC	SHORT CIRCUIT
SP	SINGLE POLE
SPST	SINGLE POLE SINGLE THROW
SPDT	SINGLE POLE DOUBLE THROW
SPKR	SPEAKER
SPEC	SPECIFICATION
SS	STAINLESS STEEL
S	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
SYS	SYSTEM
TC	TERMINAL CABINET
TEL	TELEPHONE
TTC	TELEPHONE TERMINAL CABINET
TV	TELEVISION
TERM.	TERMINAL
TX	TRANSFORMER
UNO	UNLESS NOTED OTHERWISE
VP	VAPORPROOF
VT	VAPORTIGHT
V	VOLT
VA	VOLT–AMPERE
WT	WATERTIGHT
W	WATT
WP	WEATHERPROOF
XR	EXISTING TO BE REMOVED
XRL	EXISTING TO BE RELOCATED

SPECIFICATIONS

DIVISION 16000 – ELECTRICAL

1. GENERAL

A. Requirements

1. Products and execution shall be provided for a complete and fully operational electrical system throughout the extent of the project, in conformance with applicable codes, laws, ordinances and agency standards of governing bodies having jurisdiction, and in strict accordance with the contract documents, and building standards.
2. Products, including equipment, devices, fixtures, and materials shall be new unless noted otherwise, UL listed, and bear appropriate label.
3. Execution, including preparation, installation, starting, and testing shall be performed by skilled trades personnel, in compliance with the associated manufacturers recommendations, and coordinated with the other construction trades.

B. Applicable Laws and Agency Standards

1.	American National Standards Institute	ANSI
2.	American Society for Testing and Materials	ASTM
3.	Americans with Disabilities Act	ADA
4.	Association of Edison Illuminating Companies	AEIC
5.	Certified Ballast Manufacturers	CBM
6.	Electrical Testing Laboratories	ETL
7.	Electronic/Telecommunications Industries Association	EIA/TIA
8.	Energy Policy Act of 1992	EPACT
9.	Federal Aviation Administration	FAA
10.	Illuminating Engineering Society of North America	IESNA
11.	Institute of Electrical and Electronics Engineers	IEEE
12.	Insulated Cable Engineers Association	ICEA
13.	National Electrical Manufacturers Association	NEMA
14.	National Fire Protection Association	NFPA
15.	Underwriters' Laboratories	UL

C. Approvals

1. Emergency and Exit Lighting Documents shall be prepared and submitted to the Local Fire Department for their approval of system layout, circuiting, and fixture type. Approved drawings shall be submitted for review prior to construction.
2. Fire Alarm and Life Safety Documents shall be prepared and submitted to the Local Fire Department for their approval of system expansion, layout, circuiting, equipment and device type. The base building fire alarm and life safety system manufacturer/installer shall be retained to produce or update the building fire alarm and life safety documents, and to make final connections and alterations to the existing system. Approved drawings shall be submitted for review prior to construction.

D. Submittals

1. Product Data shall be prepared and submitted for review prior to construction for the following products: cabinets, access panels, supports, wire, fuses, circuit breakers, receptacles, toggle switches, disconnect switches, motor starters, contactors, lighting fixtures, ballasts, lamps, controls, fire alarm devices and life safety devices.
2. Shop Drawings shall be prepared and submitted for review prior to construction for the following products: distribution panelboards, branch panelboards, transformers.
3. Manufacturers Instructions shall be prepared and submitted prior to construction including installation manuals with application conditions and limitations for electrical apparatus use, storage, handling, protection, examination, preparation, installation, and starting.
4. Project Record Documents shall be prepared using AutoCAD or equivalent CAD package. Project Record Documents shall be submitted on reproducible media prior to project completion for electrical systems. Record actual location of equipment, devices, fixtures, etc. Record actual routing of overhead feeders. Record actual routing of feeders below slab and branch circuits within or below slab.
5. Maintenance Data shall be prepared and submitted prior to project completion for electrical apparatus including operation manuals and maintenance manuals.

E. Coordination

1. Electrical Engineer: Notify the Engineer of any conflicting design information or any design intentions which are not readily interpreted from the contract documents prior to any product selection or execution of work. Notify the Engineer of any products which are damaged, unsuitable, incompatible, or non–compliant with applicable codes or ordinances of any governing bodies having lawful jurisdiction.
2. Construction Trades: Coordinate work with other construction trades.
3. Building Management: Meet on site with the building engineer to become familiar with building standards. Normal building working hours shall be recognized. After–hours work or temporary services shall be with prior written approval from building management. Enclose construction area from other areas to prevent transmission of dust, dirt and noise into other existing tenant areas. Product and waste transfer shall be coordinated with building management for scheduling of the elevators, deliveries, and waste removal.

F.

4. Existing Building Systems: Review building standards with the building engineer. Perform a site visit to verify the existing site conditions. Costs associated with unforseen conditions as result of not performing a site visit shall not be an entitlement for an increase to the contract. Construction shall be performed without interruption to the building power, communications, security, fire alarm and life safety systems, or interference to common areas, corridors, exits or existing tenants. Where any construction would interfere with the daily operations of the building or other tenants, after–hours work or temporary services shall be provided at no increase to the contract.
5. All work shall comply with HCA Engineering Standards.

G. Warrantee and Guarantee

1. Provide warrantee and manufacturers certificate for each product, minimum of one year or longer as specified, from the date of occupancy. Repair and/or replace any equipment, devices, fixtures, materials, etc. with defect as required at no increase to the contract.
2. Provide guarantee of installation for a period of one year from the date of occupancy. Repair and/or reinstall any work with defect as required at no increase to the contract. Provide guarantee of rework for a period of one year from the completion of repair or reinstallation.
3. Damage caused to finishes, surfaces, ceiling tiles, equipment, etc. shall be repaired and/or replaced to match the pre–existing condition at no increase to the contract.

H. Pay fees and other charges incidental to the electrical work and obtain and pay for required liability and casualty insurance, permits, licenses, inspections, taxes, etc.

I. Construction shall be done during regular working hours and days, unless otherwise specified. Work required to be performed during overtime hours or days shall be as indicated.

J. Allow for 8 man–hours of training to the Owners staff for the operation of the electrical systems.

K. Substitutions are not acceptable.

2. PRODUCTS

A. Cabinets, enclosures and access panels shall be code gage steel with baked enamel finish and flangeless hinges and fasteners. Equipment bases shall be 3 inch high concrete, steel braced and reinforced with 1/4 inch chamfer, and shall extend a minimum of 2 inches around base of equipment. Vibration isolation shall be spring elements in suspended rods and isolation pads below equipment, electrical connections shall be flexible conduit.

B. Conduits shall be hot–dipped galvanized or electro–galvanized steel, minimum size shall be 3/4 inch, except power branch circuits may be 1/2 inch (unless noted otherwise) and flexible connections to recessed lighting fixtures which may be 3/8 inch. Flexible steel conduit shall be galvanized steel, with UL listed liquid tight jacket as required, for final connections to motors, recessed lighting fixtures, and life safety devices. Supports, including channels, angles, rods, and fasteners shall be hot–dipped galvanized steel. Manufacturer shall be Allied, LTV/Republic, Steelduct, or Wheatland.

C. Conduit fittings shall be steel, die cast fittings of pot metal are not acceptable. Electrical metallic tubing (EMT) fittings shall be set–screw type with insulated throats. Intermediate metal conduit (IMC) and heavy wall conduit (HWG) fittings shall be of threaded joints; set screw and compression fittings are not acceptable Manufacturer shall be Appleton, Crouse Hinds/Midwest, OZ/GGedney, Raco, Steel City, or T&B.

D. Outlet boxes for all toggle switches, receptacles, communications devices, fire alarm devices, and life safety devices shall include plaster rings, device plates, and cover plates where required. Provide boxes suitable for plenum, wet, or hazardous locations as required. Device cover plates shall be stainless steel painted to match finish. Multi–gang outlet boxes shall include suitable one–piece device cover plate. Outlets located on opposite sides of a partition shall be staggered by 12 inches, minimum. Manufacturer shall be Appleton, Raco, or Steel City.

E. Local disconnect switches for electrically operated equipment shall be heavy duty within enclosure suitable for the location. Fusible disconnect switches 800 Amps and larger shall be bolted pressure, load–break type. Fusible and non–fusible disconnect switches 600 Amps and smaller shall be quick–make, quick–break type. Manufacturer shall be Cutler–Hammer, Siemens/ITE, or Square D.

3. EXECUTION

A. Penetrations and channels in floors and walls shall be via cutting and coring as required for the size of product, only in accordance with the Architect and Engineer recommendations, and as scheduled with the building management. Patch and fill sleeves, inserts, penetrations, and channels with appropriate code approved fire safing or filling to match or restore the original fire rating of the construction.

B. Install 3 inch concrete pad below floor mounted equipment including distribution panelboards, transformers, etc.

C. Make final connections to vibrating equipment, fixtures, and devices with flexible metal conduit or liquid tight flexible metal conduit as required. Extend ground wire through flexible connections.

D. Install conduit, fittings, supports, etc. in accordance with codes, standards, and manufacturers recommendations. The voltages identified in the following schedules are line–to–line or line–to–neutral. Interior concealed locations are those locations which are above ceilings, within walls, within floor slabs, and within dedicated electrical rooms. Conduit installation shall be as follows unless noted otherwise:

Location	0V thru 50V	Above 50V thru 250V	Above 250V thru 600V	Above 600V
Interior Concealed	EMT	EMT	< 2"EMT > 2 1/1"IMC	HWG
Interior Exposed	EMT	< 2"EMT > 2 1/2"IMC	IMC	HWG
Exterior and Hazardous Locations	IMC	IMC	HWG	HWG

E. Installations within air handling spaces, including plenum ceilings and built up air handling systems shall be approved for plenum installation and shall be in strict accordance with all applicable codes.

F. Installations within hazardous locations shall be listed for the Classification and Division of hazard. Install wiring and conduit complete with seals and explosion proof fittings in strict accordance with all applicable codes.

G. Install pull boxes, junction boxes, and outlet boxes in accordance with codes, standards, and manufacturers recommendations. Boxes shall include accessible covers, shall be fabricated of heavy gage galvanized steel, and shall be sized in accordance with code to adequately facilitate pulling and connecting the quantity and size of wires, cables, and feeders contained. Conduit terminations shall be made with bushings and locknuts. Supports for conduits and boxes shall be suspended directly to the building structural components and in no case shall they be attached to suspended ceiling grid, ductwork, or piping components.

H. Install feeders and branch circuit wiring in accordance with codes, standards, and manufacturers recommendations. Install normal power, emergency power, fire alarm, and life safety systems within continuous metal raceways. Install concealed security and communications wiring within continuous metal raceways. Separate each system into independent raceways. Provide cable supports as required. Terminate cables per code and manufacturers recommendations. Provide (2) hole lugs for cables 250 kcmil and larger. Power wiring insulation shall be as follows unless noted otherwise:

Location	300 kcmil and smaller	350 kcmil and larger	Environmental Conditions
Interior Locations	THHN/THWN	XHHW	dry
Exterior Locations	THHN/THWN THHN/THWN	XHHW XHHW–2	damp wet

I. Install electrical distribution equipment and devices, including distribution panelboards, branch panelboards, motor starters, local disconnect switches, overcurrent protection, transformers, main contactors, receptacles, etc. in accordance with codes, standards, and manufacturers recommendations.

J. Install lighting and associated controls, including fixtures, ballasts, lamps, toggle switches, lighting contactors, etc in accordance with codes, standards, and manufacturers recommendations.

K. Install single and multiple device cover plates as required. Extend existing devices to finished surface as required.

L. Install inscription plates and identification markings for products and wiring including the same inscriptions where indicated on the contract documents. Install plastic laminate nameplates on enclosures for each device within metering equipment, distribution panelboards, branch panelboards, motor starters, disconnect switches, transformers, and contactors. Nameplates shall be white with black core, 1–1/4 inches by 3 inches minimum, with 3/16 inch lettering, secured to equipment with two machine screws. Prepare and install type–written panel directory within each branch panel. Device plates shall be engraved for toggle switches and other devices whose function is not readily apparent. Markers shall be self–sticking for each wire and cable at terminations and at each accessible point in equipment and raceway.

M. Clean electrical apparatus prior to completion of construction. Keep work areas clean at all times.

N. Alterations and Demolition of existing systems shall be as follows:

1. Provide all alterations and demolition of the existing electrical installation as required, including any incidental materials to execute all removal, rerouting, relocation, and any other modifications for proper accommodation of all new construction as indicated on the contract documents. All alterations and demolition shall be as indicated on the contract documents or as required, including any modifications not specifically identified on any contract documents but required to complete all new construction.
2. Provide all modifications to existing equipment as required or as indicated on the contract documents in strict accordance with the existing product manufacturers recommendations.
3. Existing raceway, wire and cable extending through the construction area but serving areas outside the contract shall be rerouted and reconnected as required. All modifications shall be without any interruption to the building power, communications, security, fire alarm and life safety systems, or interference to other areas or tenants. Where any modifications would interfere with the daily operations of the building or other tenants, after–hours work or temporary services shall be provided with prior written approval from the building.
4. Existing conduit, wire, cable, supports, hangers, and other electrical installation which is removed, shall be completely removed, back to the first device or that equipment which is unaffected by the modifications. Conduit which is buried in concrete or otherwise inaccessible may be abandoned and capped at each end. All wire and cable shall be removed from any abandoned conduit.
5. Existing electrical materials and equipment, including lighting fixtures, switches, receptacles, speakers, conduit, outlet boxes, fittings, wire, cable, and other equipment and devices which are removed shall remain the property of the Owner and shall be stored or discarded as directed.
6. Reuse existing electrical products as indicated on the contract documents only as is found practical. Examine the condition of all such products, determine suitability for re–use, and periodically notify the Architect/Engineer of findings for final acceptance of re–use. Wire and cable for new construction or extension of an existing installation shall be new, in no case shall existing wire and cable be reused.

ELECTRICAL CODE REFERENCE

CITY OF AURORA, COLORADO MUNICIPAL CODE
2018 INTERNATIONAL BUILDING CODE
2018 INTERNATIONAL FIRE CODE
2020 NATIONAL ELECTRICAL CODE

ELECTRICAL DRAWING LIST

E0.00	ELECTRICAL SYMBOL LIST, GENERAL NOTES, AND SPECIFICATIONS	NO SCALE
E1.01	ELECTRICAL PENTHOUSE PLAN	1/2"=1'–0"

RSN: *1531645*
Permit #: *2021–1955961 LT*

THE ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTION CORRECTIONS AND APPROVALS.

THE MEDICAL CENTER OF AURORA
CARDIAC TOWER VACUUM PUMP REPLACEMENT
1501 S. POTOMAC ST.
AURORA, CO 80012

REVISION MARK	DATE	DESCRIPTION
1	03.22.2021	99% CONSTRUCTION DOCUMENTS
2	03.29.2021	100% CONSTRUCTION DOCUMENTS

SALASOBRIEN
Chicago, IL 60605
815 South Wabash Avenue
Greenwood Village, CO 80112
9250 East Costilla Avenue

COLORADO LICENSED RACHEL P THOMPSON 54150 PROFESSIONAL ENGINEER
04/08/2021

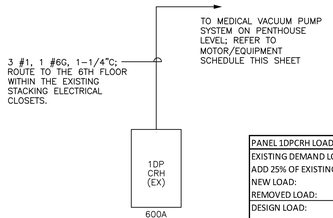
SHEET TITLE:
ELECTRICAL SYMBOL LIST AND SPECIFICATIONS

PROJECT NUMBER:
2021-00498-00

SHEET NUMBER:
E0.00

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E:\2020–0339–00\120_PLUM\DRAWINGS\Vol1.5 MEDICAL GAS FIFTH FLOOR PARTIAL PLAN.DWG Last edited by TATYANA.LOSKAKOVICH on 01–15–2021 @ 3:15



PANEL 1DPCRH LOAD SUMMARY	
EXISTING DEMAND LOAD (30-DAY LOAD STUDY):	95 KVA
ADD 25% OF EXISTING DEMAND LOAD	24 KVA
NEW LOAD:	56 KVA
REMOVED LOAD:	-23 KVA
DESIGN LOAD:	152 KVA
	183 AMPS
PANEL RATING:	600 AMPS

2 ELECTRICAL RISER DIAGRAM

N.T.S.

NOTES:

1. EXISTING CRITICAL BRANCH DISTRIBUTION PANEL 1DPCRH IS LOCATED IN ELECTRICAL ROOM 1133. PROVIDE NEW 100A/3P CIRCUIT BREAKER IN EXISTING PANEL FOR FEED TO NEW MEDICAL VACUUM PUMP SYSTEM ON THE 6TH FLOOR. COORDINATE EXACT ROUTING OF EQUIPMENT FEEDER ON SITE.

MOTOR/EQUIPMENT SCHEDULE

TAG	DESCRIPTION	LOCATION	ELECTRICAL RATING					FEEDER/SOURCE				DISCONNECT		STARTER		NOTES
			KW	FLA	HP	VOLT	PH	PANEL	CCT	OCPD	WIRING	INTEGRAL	BY EC	SIZE	TYPE	
VP-1	QUADRAPLEX VACUUM PUMP SYSTEM	PENTHOUSE			(4) 12.1	480	3	1DPCRH	-	100A/3P	3P-3W+G	X	-	-	-	1,2,3

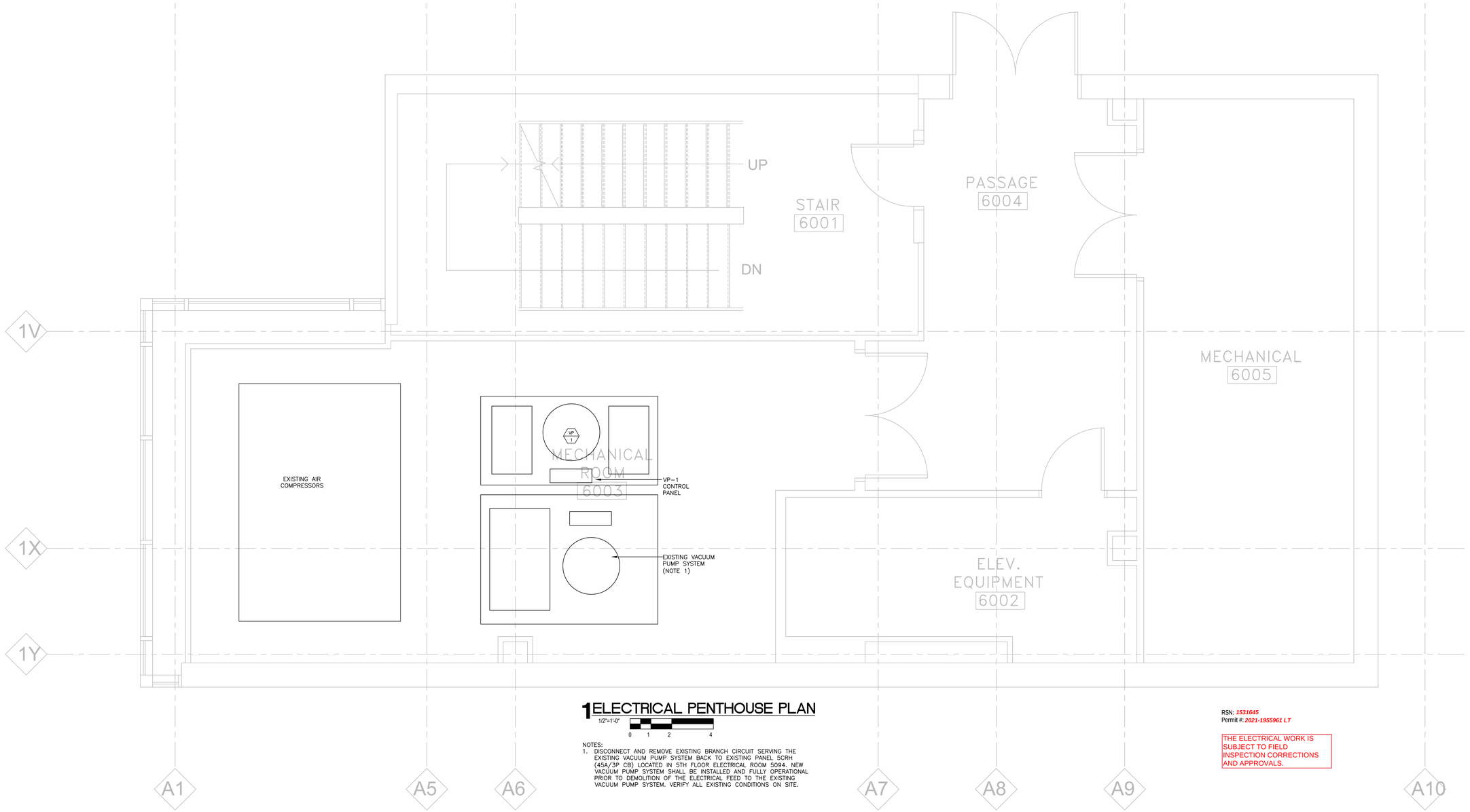
NOTES:
1. TERMINATE CIRCUIT IN SYSTEM CONTROL PANEL MOUNTED ON THE UNIT.
2. REFER TO RISER DIAGRAM FOR MORE INFORMATION.
3. PROVIDE WIRING FROM NEW SYSTEM CONTROL PANEL TO MASTER ALARM PANEL LOCATION. COORDINATE EXACT REQUIREMENTS WITH PLUMBING CONTRACTOR.

PANEL: (EX) 1DPCRH — OC DEVICE TYPE: BREAKER — ENCLOSURE: NEMA 1 — MAINS(A): 600 — CONTINUOUS(A): 600
LOCATION: ELEC 1133 — DEVICE FAMILY: BOLT ON — MOUNTING: SURFACE — WIRING: 3-PHASE 4-WIRE — BUS SC RATING (A): 65,000
FED FROM: ATS 1DPCRH (CRITICAL BRANCH) — VOLTAGE: 480/277

CUBICLE NO.	DESCRIPTION	CONNECTED KVA	DEMAND KVA	DESIGN KVA	DESIGN AVE AMPS	OC DEVICE TYPE	OC DEVICE SIZE	P	NOTES
1	(EX) 1CRH	-	-	-	-	CB	100	3	
2	(EX) 2CRH	-	-	-	-	CB	100	3	
3	(EX) 3CRH	-	-	-	-	CB	100	3	
4	(EX) 4CRH	-	-	-	-	CB	100	3	
5	(EX) 5CRH	-	-	-	-	CB	100	3	
6	(EX) T2DPCRL	-	-	-	-	CB	225	1	
7	(EX) T4DPCRL	-	-	-	-	CB	225	1	
8	(N) VP-1	56	56	56	67.4	CB	100	3	NOTE 1,2,3

	KVA	AMPS
TOTAL CONNECTED	56	67.4
TOTAL DEMAND	56	67.4
TOTAL DESIGN	56	67.4

NOTES:
1. LOADS SHOWN REPRESENT NEW LOADS ONLY. REFER TO RISER DIAGRAM FOR PANEL LOAD SUMMARY.
2. PROVIDE NEW CIRCUIT BREAKER FOR VP-1. MATCH EXISTING PANEL MANUFACTURER AND AIC RATING.
3. CONFIRM MAXIMUM OCP DEVICE REQUIREMENTS WITH SYSTEM SUBMITTAL PRIOR TO ORDERING NEW 100A/3P CIRCUIT BREAKER.



1 ELECTRICAL PENTHOUSE PLAN

1/2"=1'-0"

0 1 2 4

NOTES:
1. DISCONNECT AND REMOVE EXISTING BRANCH CIRCUIT SERVING THE EXISTING VACUUM PUMP SYSTEM BACK TO EXISTING PANEL 5CRH (45A/3P CB) LOCATED IN 5TH FLOOR ELECTRICAL ROOM 5094. NEW VACUUM PUMP SYSTEM SHALL BE INSTALLED AND FULLY OPERATIONAL PRIOR TO DEMOLITION OF THE ELECTRICAL FEED TO THE EXISTING VACUUM PUMP SYSTEM. VERIFY ALL EXISTING CONDITIONS ON SITE.

RSN: *1531645*
Permit #: *2021-1955961 LT*

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THE MEDICAL CENTER OF AURORA
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REVISION

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SALAS O'BRIEN
815 South Wabash Avenue Chicago, IL 60605
9250 East Costilla Avenue Greenwood Village, CO 80112

COLORADO LICENSED
MICHAEL P. THOMAS
55150
PROFESSIONAL ENGINEER
04/08/2021

SHEET TITLE:
ELECTRICAL PENTHOUSE PLAN

PROJECT NUMBER:
2021-00498-00

SHEET NUMBER:
E1.01