Instructions to Bidders

1. **Bidding Requirements and Conditions:** Bids shall be prepared and submitted in accordance with the provisions listed in these *Instructions to Bidders*.
2. **Federal Tax ID and RI Contractor ID Number:** Each bidder shall state its RI Contractor Identification Number on the line provided on the bid form.
3. **Delivery of Proposals:** Each proposal shall be submitted in a sealed envelope addressed as follows:

   Tri-County Community Action Agency
   Attention: Dental Renovation Bid Committee
   1126 Hartford Avenue
   Suite 201
   Johnston, RI 02919

   All sealed bids must be received no later than Friday, September 29, 2023 at 3:00 p.m. Bids received after 3 p.m., or at a location other than the address listed above, will not be accepted. Bids may be hand delivered or delivered by Federal Express, U.S. Mail, or other means.

   Regardless of the delivery method, any bids that are received after the due date and time will not be considered.
4. Bids will be publicly opened and read at 1126 Hartford Avenue in Room 201, Second Floor, at **3:15 p.m. on Friday, September 29, 2023.**
5. **Award and Execution of Contract:** Bids shall be evaluated and awarded in accordance with the provisions listed in these Instructions to Bidders. **A contract is expected to be awarded no later than October 2, 2023. All renovations MUST BE COMPLETED NO LATER THAN FRIDAY, DECEMBER 15, 2023.**
6. **Performance and Payment Bond:** Performance and payment bonds are required for all contracts totaling $250,000 or more. Bond costs may be included in the total bid.
7. **Questions:** Questions pertaining to this bid may be will be recorded at the walk-through on Friday, September 22, 2023; and responses to questions will be provided to all BIDDER's no later than Monday, September 25, 2023
8. **Insurance:** The Contractor entering into any contract for services shall secure the insurance specified below and shall cause all its consultants/subcontractors to do likewise. Certificates of all required insurance shall be provided to Tri-County upon execution of any agreement. Exceptions to this policy must be approved by the President and CEO of Tri-County CAA.
   a. Workers' compensation. The policy shall provide the statutory limits required by Rhode Island law. In addition, it shall provide Employer's Liability coverage of not less than $1,000,000 each accident, $1,000,000 disease-policy limits. The required limit may be met by excess liability (umbrella) coverage.
   b. Commercial general liability. The policy shall provide occurrence from contractual, personal injury, bodily injury, and property damage liability coverage with limits of at least $1,000,000 per occurrence, $2,000,000 general aggregate, and $2,000,000 aggregate products and completed operations. The required limit may include excess liability (umbrella) coverage. The policy by endorsement shall name Tri-County Community Action Agency as additional insured. Blanket endorsements are acceptable if they define, list, or name "additional insureds" as including any person or organization

for whom the Bidder is performing operations under a written contract. If "occurrence form" insurance is not available, "claims made" insurance will be acceptable. The policy shall be maintained for three years after completion of this contract.

c. Automobile. The policy shall cover all owned, nonowned, and hired automobiles, trucks, and trailers. The coverage limits must conform to RI minimum coverage limits.

e. Tri-County's acceptance of a certificate of insurance does not mean that Tri-County assumes responsibility for its validity. Nor does it mean that Tri-County represents that the coverage and limits required are adequate to protect the Contractor.

9. **Permits**: All local, state, and federal work permits must be secured before work can begin. A copy of all work permits must be submitted to Tri-County CAA prior to the start of any work. It is the contractor's responsibility to insure that all necessary permits are secured and available upon the request by an appropriate local, state, or federal official with legal jurisdiction over this project. The cost of all permits, including any fees for missing permits, will be the sole responsibility of the bidder once the contract is awarded.

10. **Brand Name or Equal:** Whenever an article or material is defined by describing a proprietary product or by using the name of a manufacturer, the term "or equal" if not inserted shall be implied. The specified article or material shall be understood as indicating the type, function, minimum standard of design, efficiency, and quality desired and shall not be construed as to exclude other manufactured products of comparable quality, design, and efficiency. Bidders must list any substitutions proposed in the appropriate location on the Bid Forms. Substitutions may be allowed post contract if in the best interested of Tri-County CAA, but ONLY with prior written approval of the President and CEO. Bidders should not assume other articles or materials will be allowed or substituted by change order following the bid award.

11. **Disallowance of Noncomplying Bid or Offer, Contracts in Violation Void:** Any bidder or offeror who fails to comply with the provisions of these Instructions or who provides any false information in the submission of any bid or offer, is subject to having their bid or offer disallowed by Tri-County CAA. Any contract entered into that is later found to be in violation of these Instructions will be considered null and void.

PROPOSAL DOCUMENTS

PROJECT: Health Center Renovations:
(Please type or print)

Company Name _____

Address _____

City, State Zip code _____

Telephone Number _____

Contact Person _____

Email Address _____

RI Contractor # _____

Federal Tax ID # _____

Total Cost of bid including all materials, labor and other costs identified in this proposal **$** _____

The **Total Cost** above must include all labor, tools, materials, waste disposal, permits, bonds, equipment, and other costs that the Contractor or subcontractor(s) need to fully complete the proposed work to the specifications and details found in the attached Plan Drawings. The bid must include all local, state, and federal taxes that would affect the amount of the bid.

Please use the Notes section to list any information you feel Tri-County should know relative to your bid. Also use this space to list any substitutions of equipment or materials that you plan to use and the rationale for the substitution (lower price, longer warranty, etc.). If you need additional space please use the back of page.

NOTES:

Tri-County CAA reserves the right to reject any or all bids, waive technicalities, and make award(s) for reasons other than cost, as deemed to be in the best interest of the Agency or its programs.

The undersigned being familiar with all the details, conditions, and requirements hereby proposes to furnish all labor, tools, materials, waste disposal and equipment necessary to fully complete the work for the Tri-County Community Action Agency for the amount specified in this bid for the work as outlined in the plans labeled **Pediatric Dental Clinic** as drawn by *Castellone Architecture* on August 28, 2023.

_____ _____

Authorized Signature for Contractor Date

PROJECT

PEDIATRIC DENTAL CLINIC

Tri County Community Action Agency
1637 Mineral Spring Avenue, Suite 201
North Providence, Rhode Island

CONTACTS

OWNER:

TRI-COUNTY COMMUNITY ACTION AGENCY
1126 HARTFORD AVE, JOHNSTON, RI 02919
CONTACT: JOE DESANTIS
jdesantis@tricounty.org
401-351-2750

MECHANICAL ENGINEER:

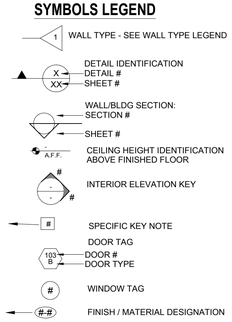
ENGINEERING DESIGN SERVICES
141 INDUSTRIAL DRIVE
PO BOX 986
NORTH SMITHFIELD, RI 02876
gmarkey@edesignservice.com
401-765-7659

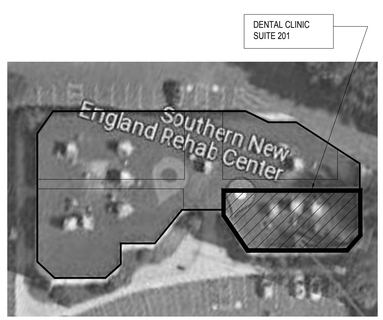
ARCHITECT:

CASTELLONE ARCHITECTURE
792 GREAT ROAD
LINCOLN, RI 02865
CONTACT: PAUL CASTELLONE, AIA
paulcastellone@cox.net
401-465-9861

DRAWING INDEX

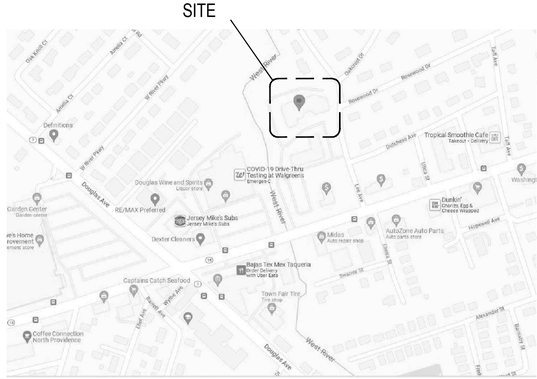
SYMBOLS LEGEND





KEY PLAN
NO SCALE
NORTH

SITE



LOCUS
NO SCALE
NORTH

castellone architecture
792 great road
lincoln, ri 02865
401-465-9861

ENGINEERING DESIGN SERVICES INCORPORATED
141 INDUSTRIAL DRIVE PO BOX 986 NORTH SMITHFIELD, RI 02876
TEL (401) 765-7659 FAX (401) 765-2984

DRAWN BY: PAC
DATE: AUG 28, 2023
REVISIONS:
9/1/23 ADDENDUM #1 - MECH

TRI-TOWN COMMUNITY ACTION AGENCY
1126 HARTFORD AVENUE
JOHNSTON, RI

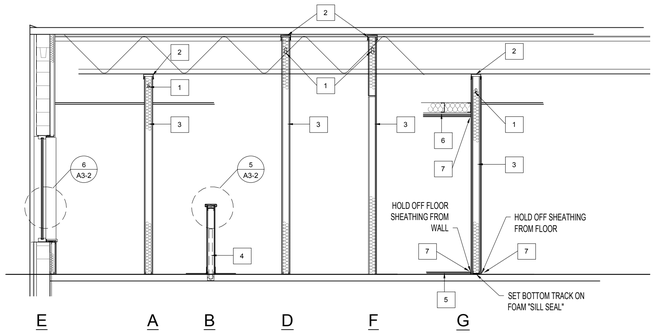
PEDIACTRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

COVER PAGE

ISSUED FOR BID

T-1

WALL TYPES



WALL TYPES
1/4" = 1'-0"

GENERAL WALLTYPE NOTES

1. PROVIDE CEMENT BOARD IN LIEU OF GYPSUM BOARD FOR NEW WALLS AT ALL LOCATIONS INDICATED TO RECEIVE CERAMIC TILE / BASE.
2. ALL JOINTS SHALL BE TAPED AND FINISHED IN ACCORDANCE WITH THE BOARD MANUFACTURER'S WRITTEN SPECIFICATIONS.
3. PRIME, PAINT, AND PREPARE WALL SUBSTRATES TO RECEIVE FINISH SPECIFIED.
4. PROVIDE MOISTURE RESISTANT GYPSUM BOARD AT ALL "WET" AREAS, INCLUDING TOILET ROOMS, JANITORS CLOSETS, AND IN OTHER AREAS SUBJECT TO WET CONDITIONS (ADJACENT TO KITCHEN SINKS, OR ANY OTHER PLUMBING FIXTURE.)
5. MAXIMUM VERTICAL UNSUPPORTED HEIGHT FOR AN L/240 ALLOWABLE DEFLECTION SHALL BE 12'-2" FOR A 3 5 / 8" METAL STUD WALL. TYPICAL STUD SPECIFICATION UNLESS OTHERWISE NOTED:
   - ASTM A1003 ST33H STEEL
   - STUD #: 362S125-18. 3-5/8" X 1-1/4" X 25 GA.
6. REVIEW ALL DRAWINGS FOR ALL ITEMS THAT WILL REQUIRE BACK BLOCKING IN WALLS, AND COORDINATE WORK SO THAT BLOCKING IS INSTALLED PRIOR TO INSTALLATION OF SUBSTRATES OVER PARTITIONS.
7. PROVIDE 3" MINIMUM SOUND ATTENUATION BLANKETS IN TOILET ROOM AND OFFICE WALLS AND WHERE OTHERWISE INDICATED IN DRAWINGS.
8. WHERE NON FIRE-RESISTANT RATED WALLS INTERSECT FIRE RATED WALLS, INSTALL CONTINUOUS FIRE-RATED SHEATHING OVER THE FIRE-RATED WALL PRIOR TO INSTALLING THE INTERSECTING NON-RATED WALL, SO AS NOT TO COMPROMISE THE FIRE-RATED ASSEMBLY.
9. FURNISH AND INSTALL ACCESS PANELS WHERE REQUIRED. USE FIRE-RATED PANELS IN RATED WALL ASSEMBLIES. SUBMIT PRODUCT DATA AND PANEL LOCATIONS TO ARCHITECT FOR APPROVAL PRIOR TO ORDERING.

WALL TYPE KEY NOTES

1. SPAZZER-5400 BRIDGING/SPACER BAR, INSTALL NOT MORE THAN 12" FROM TOP OF WALL. INSTALL PER MFR'S INSTRUCTIONS.
2. SLIP TRACK AT TOP OF STUD WALL. DO NOT FASTEN STUDS TO TRACK. HOLD STUDS $\frac{3}{4}$" FROM TRACK.
3. SOUND ATTENUATION BATT
4. 2 X 2 X 30" TS POST. CORE-DRILL EXISTING SLAB AND SET IN NON-SHRINK GROUT, INSTALLED AT ENDS OF LOW WALLS, AND EVERY 8'-0" O.C.
5. PUMP RM FLOOR: 1 LAYER 5/8" FIRE-RESISTANT TREATED PLYWOOD OVER 3/4" HOMASOSTE 440 SOUND BARRIER. ADHERE PANELS WITH ADHESIVE THAT MEETS APA-AFG-01. HOLD BACK SUB FLOOR FROM WALLS.
6. PUMP ROOM CEILING: 6" METAL JOISTS @ 24" O.C.. INSTALL 6" SOUND ATTENUATION BATT BETWEEN JOISTS. INSTALL RESILIENT METAL CHANNELS (RC-2 OR DWFC MOUNTED TO THE BOTTOM OF JOISTS WITH SOUND CLIPS). INSTALL PADDING TAPE OVER BOTTOM OF CHANNELS. INSTALL 3/4" HOMASOTE 440 BARRIER OVER CHANNELS. INSTALL 5/8" GWB OVER HOMASOTE.
7. $\frac{3}{4}$" SOUND ATTENUATION SEALANT AT PERIMETER EDGE OF GYPSUM SHEATHING

INTERIOR WALL TYPES

REFER TO GENERAL WALL TYPE NOTES FOR ADDITIONAL INFORMAITON

- A. 3 5 / 8" METAL STUDS AT 16" O.C. WITH 1 LAYER 5/8" GYPSUM BOARD EACH SIDE. FRICTION-FIT 3 1/2" MINERAL WOOL SOUND ATTENUATION BATT BETWEEN STUDS. EXTEND ASSEMBLY TO 6" ABOVE FINISHED CEILING. BRACE TOP OF WALL TO STRUCTURE.
- B. 48" LOW WALL - 5/8" GYPSUM BOARD OVER 3 5/8" METAL STUDS AT16" O.C.. INSTALL STAINED MAPLE CAP. PAINT FINISH OR WOOD VENEER PANELS AS OCCURS. SEE DETAIL
- C. 5/8" GYPSUM BOARD OVER BOTH SIDES OF METAL STUD INFILL AT EXISTING OPENINGS. ALIGN GYPSUM BOARD FLUSH WITH ADJACENT FINISH. FRICTION-FIT SOUND ATTENUATION BATT BETWEEN STUDS.
- D. CORRIDOR WALL (DEMISING WALL- SAME CONSTRUCTION AS TYPE "A". EXTEND WALL TO UNDERSIDE OF ROOF DECK. PROVIDE SLIP TRACK AT TOP OF WALL.
- E. EXTERIOR WALL (AT INFILL AREAS): 5/8" GYPSUM BOARD OVER 2" METAL STUDS @ 24" O.C. OVER 1" RIGID INSULATION. INSTALL KRAFT FACED FIBERGLASS BATT INSULATION BETWEEN STUDS. NEW GYPSUM SHEATHING SHALL BE FLUSH WITH EXISTING ADJACENT SHEATHING. EXTEND TO UNDERSIDE OF DECK ABOVE.
- F. (PUMP ROOM) 3 5/8" METAL STUDS AT 16" O.C. SET BOTTOM TRACK ON LAYER OF FOAM "SILL SEAL". WITH ONE BASE LAYER OF 3/4" HOMOSOTE 440 SOUND BARRIER EACH SIDE, AND ADHERE (NO SCREWS) ONE FINISH LAYER 5/8" GYPSUM BOARD EACH SIDE WITH ADHESIVE THAT MEETS APA AFG-01. EXTEND WALL TO UNDERSIDE OF JOISTS. SEAL ALL PENETRATIONS WITH EXPANDING CLASS A-RATED FOAM
- X. EXISTING WALL TO REMAIN. PATCH/REPAIR EXISTING SHEATHING TO RECEIVE NEW FINISHES SPECIFIED

GENERAL NOTES

GENERAL NOTES

1. CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING THEIR BID TO FAMILIARIZE THEMSELVES WITH CONDITIONS AT THE SITE.
2. DISCREPANCIES BETWEEN PORTION OF THE DOCUMENTS ARE NOT INTENDED. THE CONTRACTOR SHALL CLARIFY AND RESOLVE ANY SUCH DISCREPANCIES WITH THE ARCHITECT PRIOR TO COMMENCING THE WORK IN QUESTIONS.
3. DO NOT SCALE DRAWINGS TO DETERMINE LOCATIONS OF EQUIPMENT AND LAYOUT OF THE WORK.
4. UNLESS NOTED OTHERWISE, ALL ARCHITECTURAL DIMENSIONS ARE FROM FACE OF EXISTING WALL OR CONCRETE MASONRY UNITS TO FACE OF NEW WALL SHEATHING.
5. UNLESS OTHERWISE AGREED TO IN WRITING WITH THE OWNER, THE CONTRACTOR SHALL SECURE ALL PERMITS (BUILDING, MECHANICAL, ELECTRICAL, PLUMBING), AND CERTIFICATE OF OCCUPANCY, AND FEES FOR SAME.
6. UNLESS OTHERWISE AGREED TO WITH THE OWNER, THE CONTRACTOR SHALL PAY FOR AND ARRANGE ANY REQUIRED TEMPORARY SERVICES.
7. THE CONTRACTOR SHALL MAINTAIN CLEAN AND ORDERLY WORK AREAS AND SHALL NOTE ALLOW TRASH AND DEBRIS TO ACCUMULATE. UPON COMPLETION OF THE WORK, ALL SURFACES IN THE WORK AREAS, INCLUDING SURFACES WITH EXISTING FINISHES TO REMAIN, SHALL BE DUSTED, VACUUMED, WASHED, OR OTHERWISE CLEANED TO BE FREE OF CONTAMINANTS.
8. THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF APPROVED CONTRACT DOCUMENTS, INCLUDING ALL REVISIONS, ADDENDA, AND CHANGE ORDERS, ON THE PREMISES AT ALL TIMES. THESE DOCUMENTS SHALL NOT BE USED BY WORKMEN.
9. CONTRACTOR SHALL COMPLY WITH ALL PUBLISHED FEDERAL, STATE, AND LOCAL REQUIREMENTS FOR SAFETY AND ACCIDENT PREVENTION.
10. CONTRACTOR SHALL MAINTAIN AT LEAST TWO TYPE 2A-10 BC FIRE EXTINGUISHERS ON SITE AT ALL TIMES DURING CONSTRUCTION.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR 24-HOUR SECUREMENT OF THE WORK PREMISES WHILE THE JOB IS IN PROGRESS UNTIL TURNOVER OF THE PROJECT TO THE OWNER.
12. THE CONTRACTOR SHALL MAINTAIN MEANS OF EGRESS DURING CONSTRUCTION, AS REQUIRED BY NFPA 101 LIFE SAFETY CODE, CURRENT EDITION.
13. WORK BY OTHERS; THE OWNER RESERVES THE RIGHT TO PERFORM ADDITIONAL WORK THAT IS NOT PART OF THE CONTRACT WITH HIS OWN FORCES/VENDORS. THE CONTRACTOR SHALL COOPERATE WITH THE OWNER AND HIS CONTRACTORS/VENDORS, AND COORDINATE HIS WORK WITH THE OWNER SO THAT WORK BY OTHERS CAN BE INCORPORATED IN A TIMELY MANNER.
14. ALL MATERIALS/PRODUCTS/EQUIPMENT SHALL BE FURNISHED, STORED, AND INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS' PUBLISHED INSTRUCTIONS. WHEN NOT IN CONFLICT WITH MANUFACTURERS' INSTRUCTIONS, MATERIALS AND METHODS SHALL ALSO BE INSTALLED IN ACCORDANCE WITH THE CURRENT EDITION OF THE APPROPRIATE NATIONAL TRADE HANDBOOK (AWI QUALITY STANDARDS, USG GYPSUM CONSTRUCTION HANDBOOK, TCA HANDBOOK FOR CERAMIC TILE INSTALLATION, ETC.)
15. SUBSTITUTIONS: ANY SUBSTITUTIONS FOR SPECIFIED MATERIALS/PRODUCTS/EQUIPMENT MUST BE SUBMITTED IN WRITING WITH THE BID, ALONG WITH THE REASON FOR THE SUBSTITUTION, PROPOSED PRODUCT DATA, SAMPLES, ETC;, AND THE COST SAVINGS TO THE OWNER. EVALUATION FOR THE PROPOSED SUBSTITUTION MAY REQUIRE ADDITIONAL SERVICES IN THE FORM OF RESEARCH AND RE-DESIGN ON THE PART OF THE ARCHITECT AND THEIR CONSULTANTS. THE OWNER SHALL BE NOTIFIED OF THE NEED FOR ADDITIONAL SERVICES PRIOR TO REVIEW OF THE SUBSTITUTION BY THE ARCHITECT, AND THE OWNER SHALL AUTHORIZE ADDITIONAL SERVICES PRIOR TO THE ARCHITECT COMMENCING THEIR REVIEW. SUBSTITUTIONS SHALL NOT BE SUBMITTED DURING THE SUBMITTAL REVIEW PROCESS.
16. WARRANTY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR, AND SHALL REPLACE OR REMEDY ANY FAULTY, IMPROPER, OR INFERIOR MATERIALS, PRODUCTS, EQUIPMENT, OR WORKMANSHIP WHICH SHALL APPEAR WITHIN ONE (1) YEAR OF OWNER'S ACCEPTANCE OF THE WORK, OR AS OTHERWISE INDICATED IN SPECIFIED WARRANTIES FOR A SPECIFIC COMPONENT/EQUIPMENT/SYSTEM.
17. CONTRACTOR SHALL PROVIDE NESTED BACK-BLOCKING AS REQUIRED TO ACHIEVE FIRM ATTACHMENT OF ALL ARCHITECTURAL WOODWORK, AND ALL WALL AND/OR CEILING MOUNTED FINISHES, FIXTURES, EQUIPMENT, AND ACCESSORIES.
18. CONTRACTOR SHALL PROVIDE A BEAD OF SANITARY, MILDEW-RESISTANT SEALANT AT THE FOLLOWING LOCATIONS:

    METAL DOOR FRAME TO WALL TRANSITION JUNCTION OF MILLWORK AND ADJACENT SURFACES, INCLUDING TOP OF BACK SPLASHES TOILET ACCESSORIES AND FIXTURES AND WALLS WINDOW FRAMES AND TRIM WORK/WALL ELSEWHERE AS INDICATED ON THE DRAWINGS; AND AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.
19. PROVIDE PAINTABLE/STAINABLE SEALANT AT ALL AREAS SCHEDULED TO RECEIVE PAINT OR STAIN. REVIEW SEALANT COLOR AND LOCATIONS WITH ARCHITECT PRIOR TO FURNISHING AND INSTALLATION.
20. WHERE PIPES, CONDUIT, CABLE WIRES, DUCTS, OR SIMILAR BUILDING SERVICE EQUIPMENT PASS THROUGH FIRE/SMOKE-RATED ASSEMBLIES, THE SPACE BETWEEN THE PENETRATING ITEM AND THE RATED ASSEMBLY SHALL BE FILLED WITH A MATERIAL CAPABLE OF MAINTAINING THE SMOKE/FIRE-RESISTANCE OF THE ASSEMBLY.

PROJECT DATA

PROJECT DATA - PEDIATRIC DENTAL SUITE

PROJECT NARRATIVE:
PROJECT INCLUDES RENOVATIONS / ALTERATIONS TO EXISTING 3,457 SF MEDICAL SUITE LOCATED ON THE FIRST FLOOR, SLAB-ON GRADE. DEMOLITION OF EXISTING INTERIOR NONBEARING WALLS, FLOOR AND CEILING FINISHES, ELECTRICAL AND PLUMBING FIXTURES, AND MECHAINCAL SUPPLY DUCTWORK, REGISTERS AND DIFFUSERS. CONSTRUCTION OF NEW DENTAL SUITE TO INCLUDE NON-BEARING METAL STUD WALLS, NEW FINISHES, NEW HVAC DUCTWORK (EXISTING ROOFTOP UNITS TO REMAIN) PLUMBING AND ELECTRICAL FIXTURES, AND MILLWORK,

BUILDING /FIRE CODES:
- RI FIRE SAFETY CODE - NFPA 101 "LIFE SAFETY CODE", 2018 ED. W/ RI AMENDMENTS
- SBC-1 2022 "RHODE ISLAND STATE BUILDING CODE" (IBC, 2018 ED. W/ RI AMENDMENTS)

USE GROUP (SBC-1): EXISTING B PROPOSED: B

CONSTRUCTION TYPE (TABLE 601): 2B (NON-COMBUSTIBLE, UNPROTECTED)
STRUCTURAL FRAME: 0
NONBEARING WALLS, INTERIOR: 0

PROJECT AREA
DENTAL CLINIC AREA 3,457 SF

PROJECT OCCUPANT LOAD (SBC-1 TABLE 1004.1.1):

B Business Areas (DENTAL SUITE): 3,457 SF @ 150 gross

PROJECT OCCUPANT LOAD: 24

TOILET ROOMS:
SEPARATE SEX FACILITIES REQUIRED (SBC-3, 403.2): YES

PLUMBING FIXTURES REQUIRED (SBC-3, TABLE 403.1)

FIXTURES / FLOOR	REQUIRED:	PROVIDED:	
TOILETS M/F:	2		2
LAVATORIES:	2		2
JANITOR SINK:	1		1
WATER FOUNTAIN	2 (HI/LO)	2	

SPRINKLER SYSTEM: YES, EXISTING, TO BE ALTERED FOR PROJECT

FIRE ALARM SYSTEM: YES, EXISTING, TO BE ALTERED FOR PROJECT

NUMBER OF EXITS FROM PROJECT (SBC-1, 1006.2):
PERMITTED: 1 PROVIDED: 2(EXISTING)

COMMON PATH OF TRAVEL(SBC-1 TABLE1006.2.1)

ALLOWABLE: 75' PROJECT: 17'

SPACES PERMITTED WITH ONE EXIT OR EXIT ACCESS DOORWAY (TALE 1006.2.1):

OCCUPANCY B MAX OCC. LOAD: 49

TRAVEL DISTANCE TO EXIT (SBC-1 TABLE 1017.2.):

ALLOWABLE (SPRINKLERED): 250' PROJECT: 125'

FIRE SEPARATION REQUIREMENTS:

CORRIDORS (1018.1): 0 HR

DEAD END CORRIDORS (SBC-1 1020.4)

ALLOWABLE: 50' PROJECT: 3'-10"

MILLWORK NOTES

GENERAL MILLWORK NOTES

1. ALL MILLWORK SHALL BE FABRICATED IN ACCORDANCE WITH THE LATEST EDITION OF ARCHITECTURAL WOODWORK INSTITUTE'S "ARCHITECTURAL WOODWORK STANDARDS", CUSTOM GRADE.
2. VERIFY ALL DIMENSIONS WITH CATALOG CUTS OF ACTUAL EQUIPMENT AND HARDWARE TO BE USED. COORDINATE ROUGH-IN LOCATIONS WITH FIELD DIMENSIONS PRIOR TO FABRICATION. FIELD-CUT PLYWOOD COUNTERTOPS.
3. UNLESS NOTED OR DETAILED OTHERWISE, PROVIDE A 4" LAMINATED BACKSPLASH WHERE COUNTERTOPS MEET WALLS. FINISH TO MATCH COUNTERTOP.
4. UNLESS NOTED OR DETAILED OTHERWISE, INTERIOR CONCEALED SHELVING SHALL BE 3 / 4" MELAMINE WITH PVC EDGE BAND. EXPOSED SHELVING SHALL BE 3/4" PLYWOOD WITH PLASTIC LAMINATE FINISH AND PVC EDGE BAND.
5. SCRIBE AND CUT MILLWORK DURING INSTALLATION TO COMPENSATE FOR IRREGULAR WALL AND FLOOR SURFACES. INSTALLATION SHALL BE LEVEL AND TIGHT AT ALL FLOOR AND WALL SURFACES.
6. CAULK ALL SCRIBED JOINTS WITH CLEAR SILICONE SEALANT, OR COLORED SEALANT AS APPROVED BY ARCHITECT.
7. PROVIDE AND INSTALL NESTED FIRE-RATED, PRESSURE TREATED WOOD OR METAL BLOCKING IN WALL CONSTRUCTION TO ADEQUATELY SUPPORT THE MILLWORK FOR ITS INTENDED USE. PROVIDE NON-COMBUSTIBLE OR FIRE-RATED BLOCKING IN FIRE-RATED WALL ASSEMBLIES.
8. ALL HORIZONTAL PLASTIC-LAMINATE SURFACES SHALL HAVE MANUFACTURERS' APPROVED ABRASIVE-RESISTAN FINISH.
9. WHERE THE EDGES OF PLASTIC LAMINATE ARE EXPOSED, PLASTIC LAMINATES SHALL HAVE BLACK BACKING.
10. WOOD VENEER SHALL BE ROTARY CUT, BOOKMATCHED AND FREE FROM FOOTBALL PLUGS, KNOTS, OR ANY OTHER TYPES OF DEFECTS.
11. HARDWARE: UNLESS NOTED OR SPECIFIED OTHERWISE, MILLWORK HARDWARE SHALL CONSIST OF THE FOLLOWING:
    - HEAVY DUTY, FULL EXTENSION DRAWER SLIDES.
    - HEAVY DUTY, CONCEALED HINGES WITH 170 DEGREE OPENINGS.
    - 4" SATIN OR BRUSHED STAINLESS STEEL OR NICKEL PULLS
      HAFELE "BELLA ITALIANA" #100.89.102 OR EQUAL
    - BLACK PLASTIC GROMMETS AND COVERS FOR ELECTRICAL PLUG-IN CONNECTIONS RELATED TO MILLWORK ITEMS.

castellone architecture
792 great road
lincoln, ri 02865
401-465-9861

DRAWN BY: PAC
DATE: AUG 28, 2023
REVISIONS:
9/1/23 ADDENDUM #1 - MECH

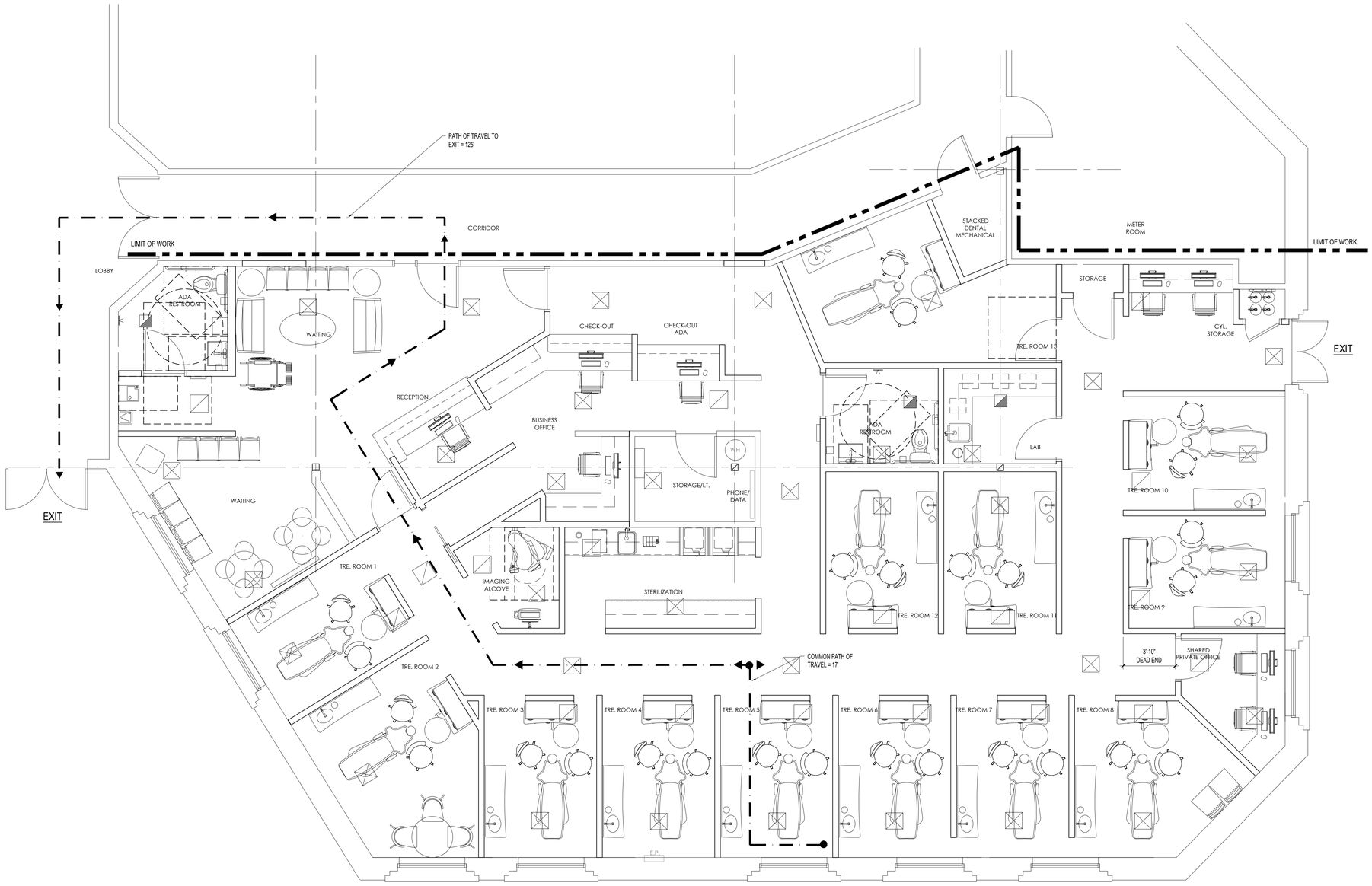
TRI-TOWN COMMUNITY ACTION AGENCY
1126 HARTFORD AVENUE
JOHNSTON, RI

PEDIATRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

CODE DATA,
GENERAL NOTES,
WALL TYPES

ISSUED FOR BID

T-2



NORTH

EGRESS PLAN

1/4" = 1'-0"

REFER TO MEP DRAWINGS FOR FIRE ALARM, FIRE PROTECTION AND LIFE SAFETY DEVICES.

PROJECT DATA - PEDIATRIC DENTAL SUITE

PROJECT NARRATIVE:
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BUILDING /FIRE CODES:
- RI FIRE SAFETY CODE - NFPA 101 "LIFE SAFETY CODE", 2018 ED. W/ RI AMENDMENTS
- SBC-1 2022 "RHODE ISLAND STATE BUILDING CODE" (IBC, 2018 ED. W/ RI AMENDMENTS)

USE GROUP (SBC-1): EXISTING B PROPOSED: B

CONSTRUCTION TYPE (TABLE 601): 2B (NON-COMBUSTIBLE, UNPROTECTED)
STRUCTURAL FRAME: 0
NONBEARING WALLS, INTERIOR: 0

PROJECT AREA
DENTAL CLINIC AREA 3,457 SF

PROJECT OCCUPANT LOAD (SBC-1 TABLE 1004.1.1):

B Business Areas (DENTAL SUITE): 3,457 SF @ 150 gross

PROJECT OCCUPANT LOAD: 24

TOILET ROOMS:
SEPARATE SEX FACILITIES REQUIRED (SBC-3, 403.2): YES

PLUMBING FIXTURES REQUIRED (SBC-3, TABLE 403.1)

FIXTURES / FLOOR	REQUIRED:	PROVIDED:
TOILETS M/F:	2	2
LAVATORIES:	2	2
JANITOR SINK:	1	1
WATER FOUNTAIN	2 (HI/LO)	2

SPRINKLER SYSTEM: YES, EXISTING, TO BE ALTERED FOR PROJECT

FIRE ALARM SYSTEM: YES, EXISTING, TO BE ALTERED FOR PROJECT

NUMBER OF EXITS FROM PROJECT (SBC-1, 1006.2):
PERMITTED: 1 PROVIDED: 2(EXISTING)

COMMON PATH OF TRAVEL(SBC-1 TABLE1006.2.1)

ALLOWABLE: 75' PROJECT: 17'

SPACES PERMITTED WITH ONE EXIT OR EXIT ACCESS DOORWAY (TALE 1006.2.1):

OCCUPANCY B MAX OCC. LOAD: 49

TRAVEL DISTANCE TO EXIT (SBC-1 TABLE 1017.2):

ALLOWABLE (SPRINKLERED): 250' PROJECT: 125'

FIRE SEPARATION REQUIREMENTS:

CORRIDORS (1018.1): 0 HR

DEAD END CORRIDORS (SBC-1 1020.4)

ALLOWABLE: 50' PROJECT: 3'-10"

LIFE SAFETY SYMBOLS LEGEND

REFER TO ELECTRICAL "LS" DRAWINGS FOR DEVICE SPECIFICATIONS

- EXIT SIGN / EMERGENCY LIGHT COMBINATION
- EXIT SIGN - SINGLE FACE
- EXIT SIGN - DOUBLE FACE
- EMERGENCY LIGHT - DBL HEAD
- EMERGENCY LIGHT - SINGLE HEAD
- FP EXISTING FIRE PULL
- FE EXISTING FIRE EXTINGUISHER
- HORN / STROBE
- STROBE
- S SMOKE DETECTOR

PATH OF TRAVEL TO EXIT

KEY PLAN
SECOND FLOOR
NORTH

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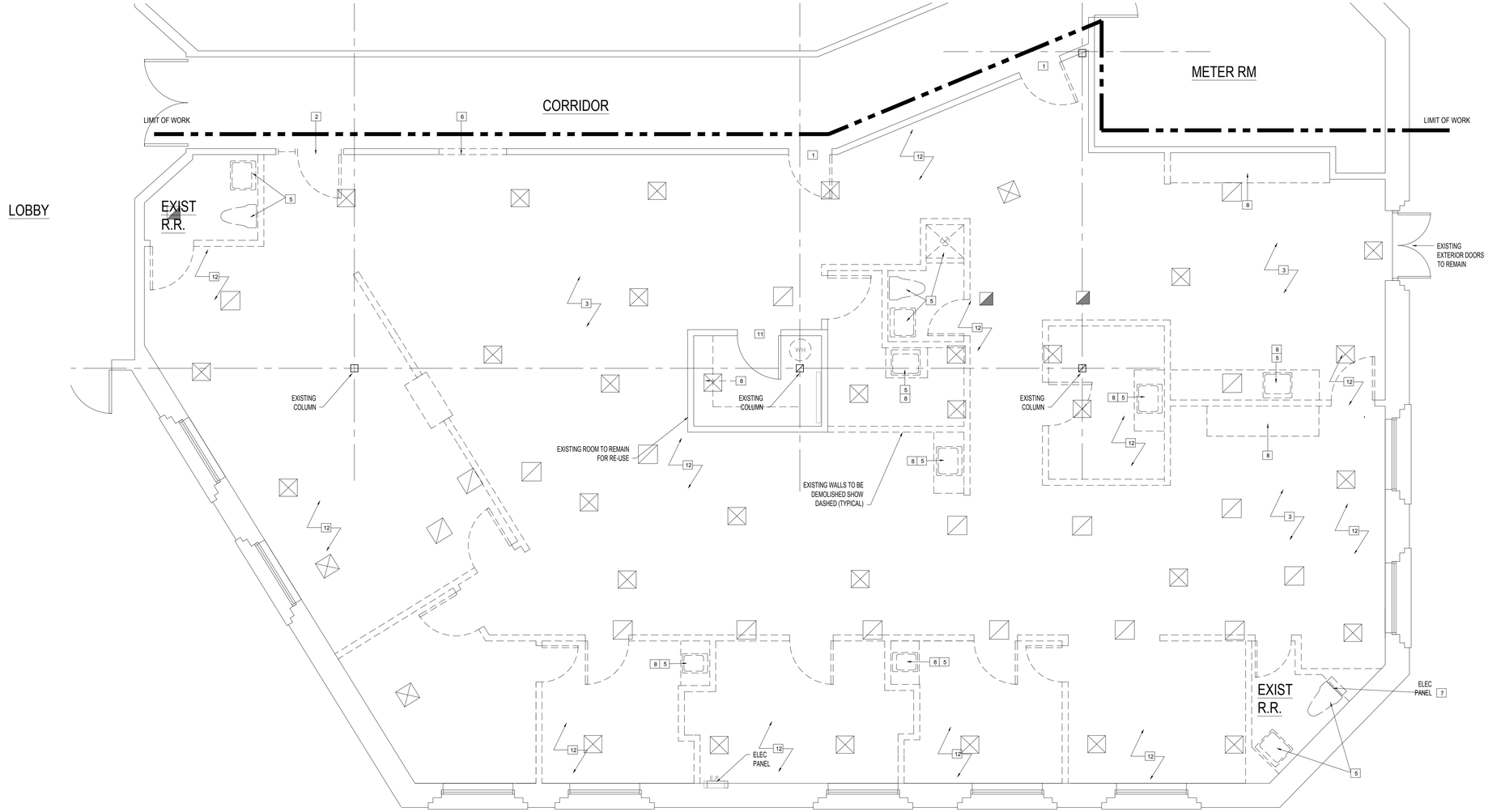
LIFE SAFETY PLAN / EGRESS

ISSUED FOR BID

T-3



NORTH

EXISTING / DEMOLITON PLAN

1/8" = 1'-0"

FIELD VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION, AND NOTIFY ARCHITECT OF ANY MAJOR DISCREPANCIES

GENERAL DEMOLITION NOTES

1. IN THE EVENT THAT SUSPECTED HAZARDOUS MATERIALS ARE DISCOVERED DURING THE COURSE OF DEMOLITION, CEASE WORK IMMEDIATELY AND NOTIFY THE BUILDING OWNER OF ANY SUCH DISCOVERIES.
2. IN ACCORDANCE WITH FEDERAL REGULATIONS PROMULGATED UNDER THE CLEAN AIR ACT, AND COMMONLY REFERRED TO AS ASBESTOS NESHAP, MORE SPECIFICALLY, 40 CFR PART 61, SUBPART M, SECTION 61.145, THE CONTRACTOR SHALL VERIFY THAT AN ASBESTOS SURVEY HAS BEEN CONDUCTED PRIOR TO THE COMMENCEMENT OF DEMOLITION OR RENOVATION WORK WHICH IS PART OF THIS CONTRACT.
3. IN ACCORDANCE WITH ABOVE REGULATION REQUIREMENTS, THE CONTRACTOR SHALL FILE WRITTEN NOTIFICATION WITH THE EPA PRIOR TO ANY DEMOLITION WORK BEING PERFORMED REGARDLESS OF THE AMOUNT OF ASBESTOS, INCLUDING ZERO.
4. ALL DEMOLITION WORK SHALL BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. SECURE REQUIRED PERMITS. ARRANGE WITH BUILDING OWNER AND/OR APPROPRIATE UTILITY COMPANIES FOR SERVICE SHUTOFFS BEFORE BEGINNING DEMOLITION OPERATIONS.
5. CONSULT WITH BUILDING OWNER AND FIRE OFFICIALS PRIOR TO MAKING ANY ALTERATIONS TO THE EXISTING FIRE ALARM SYSTEM.
6. COORDINATE ALL DEMOLITION OPERATIONS WITH OWNER FOR SHUTDOWN PERIODS AND SEQUENCE OF WORK. PROVIDE TEMPORARY DUST PARTITIONS, BARRICADES, SIGNAGE, AND PROTECTIVE ENCLOSURES REQUIRED TO PROPERLY SECURE, ISOLATE, WATERPROOF, AND PROTECT AREAS OF WORK FROM EXISTING AREAS TO REMAIN IN OPERATION AND TO ASSURE CONTINUING FACILITY OPERATIONS IN GENERAL. IDENTIFY AND PROTECT ANY AREAS WHERE DEMOLITION IS TO TAKE PLACE WHERE THE DEMOLITION CREATES A PHYSICAL SAFETY HAZARD. THE CONTRACTOR SHALL KEEP THE CORRIDORS AND EXITS CLEAR OF DEBRIS, STORED MATERIALS, ETC., AT ALL TIMES TO PROVIDE REQUIRED FIRE EGRESS FROM THE BUILDING.
7. MAKE EVERY EFFORT POSSIBLE TO MINIMIZE DISTURBANCES TO BUILDING OCCUPANTS. COORDINATE HOURS OF DISRUPTIVE DEMOLITION WITH BUILDING OWNER PRIOR TO COMMENCEMENT.
8. IT IS NOT THE INTENT TO SHOW EVERY PIECE OR ITEM TO BE REMOVED IN DEMOLITION WORK. MECHANICAL, ELECTRICAL AND OTHER WORK RELATED TO A WALL OR AREA SCHEDULED FOR DEMOLITION AND REMOVAL SHALL BE REMOVED WHETHER SPECIFICALLY ITEMIZED OR NOT. TERMINATE, CAP AND REMOVE ALL ABANDONED ELECTRICAL CONDUIT, WIRING BOXES, SWITCHES, ETC; PLUMBING, PIPING, AND PLUMBING FIXTURES, ETC; HVAC DUCTWORK, CONTROLS, PIPING, ETC; AS REQUIRED.
9. WHEN WALLS, COLUMNS, OR OTHER SUPPORTING AND/OR BRACING ELEMENTS ARE SCHEDULED FOR DEMOLITION, TEMPORARY STRUCTURAL SUPPORTS AND BRACING FOR THE ADJACENT CONSTRUCTION SHALL BE PROVIDED AND MAINTAINED UNTIL THE PERMANENT SUPPORTING STRUCTURES ARE IN PLACE AND ABLE TO SUPPORT IMPOSED LOADS. ANY STRUCTURAL BRACING DISCOVERED DURING DEMOLITION IS NOT TO BE REMOVED NOTIFY ARCHITECT OF ANY AND ALL SUCH DISCOVERIES IMMEDIATELY.
10. WHERE EXISTING WALL SUBSTRATES REMAIN AS BASE MATERIAL SURFACES FOR INSTALLATION OF NEW FINISHES, REMOVE PROJECTIONS, FILL VOIDS, SECURE OR REMOVE AND REPLACE ANY EXISTING LOOSE OR OTHERWISE UNSUITABLE SUBSTRATE MATERIALS AND ADD BLOCKING OR STRAPPING TO RECEIVE NEW MATERIALS AND FINISHES. STRIP EXISTING WALL FINISH MATERIAL TO EXPOSE SUBSTRATE WHERE NEEDED.
11. PATCH, REPAIR AND REFINISH ALL SURFACES TO MATCH AND ALIGN WITH EXISTING ADJACENT SURFACES SCHEDULED TO REMAIN, AND PREPARE TO RECEIVE NEW FINISHES SPECIFIED WORK SHALL INCLUDE ALL LABOR AND MATERIALS ON ALL SURFACES REQUIRED TO RENDER SUBSTRATES ACCEPTABLE TO RECEIVE NEW FINISHES SPECIFIED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS.
12. PROTECT FROM LOSS OR DAMAGE ALL ITEMS INTENDED FOR SALVAGE AND REUSE, OR SCHEDULED TO REMAIN.
13. REPLACE IN KIND ANY EXISTING CONSTRUCTION, OR ITEM INTENDED TO REMAIN, OR BE SALVAGED FOR REUSE, BUT DAMAGED OR LOST AS A RESULT OF THE WORK OF THIS CONTRACT.
14. REUSE OF SALVAGED MATERIALS NOT SPECIFICALLY SCHEDULED FOR REUSE, WILL BE AT THE SOLE DISCRETION OF THE OWNER. IN NO CASE SHALL SALVAGED MATERIAL BE INCORPORATED IN THE WORK THAT DOES NOT MEET MINIMUM REQUIREMENTS OF STATE AND LOCAL CODES AND REGULATIONS.
15. SCHEDULES OF ADDITIONAL ITEMS TO BE SALVAGED (IF ANY) ARE TO BE PROVIDED BY THE OWNER UPON REQUEST OF THE CONTRACTOR.
16. ITEMS TO BE SALVAGED BUT NOT SO SCHEDULED ON THE DEMOLITION PLAN SHALL BE CONFIRMED BY THE CONTRACTOR WITH THE OWNER. ALL ITEMS TO BE TURNED OVER TO THE OWNER, SHALL BE PROTECTED DURING DEMOLITION AND REMOVAL AND SHALL BE DELIVERED IN AN UNDAMAGED CONDITION.
17. REMOVE ALL DEMOLISHED MATERIALS NOT SCHEDULED FOR SALVAGE AND REUSE, OR THOSE TO BECOME PROPERTY OF THE OWNER, FROM THE SITE AND DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
18. TAKE CARE TO DISCONNECT ALL ELECTRICAL POWER TO ITEMS, AREAS, ELEMENTS INVOLVED IN THE DEMOLITION PRIOR TO DEMOLITION.
19. CONFINE TOOLS AND EQUIPMENT, STORAGE OF MATERIALS AND OPERATIONS TO LIMITS DESIGNATED BY THE BUILDING OWNER. THE PREMISES SHALL BE MAINTAINED IN SAFE, ORDERLY CONDITION AT ALL TIMES. REMOVE DEBRIS DAILY. COVER DUMPSTERS WITH FIRE RESISTANT COVERS SECURELY FASTENED TO PREVENT VANDALISM.
20. DEMOLITION PLANS SHALL BE USED IN CONJUNCTION WITH DRAWINGS FOR NEW CONSTRUCTION (EXTERIOR ELEVATIONS, DETAILS, ETC.) SO THAT EXACT LIMIT AND BOUNDARIES OF SPECIFIC DEMOLITION MAY BE DETERMINED.
21. ENSURE THAT ALL ELECTRICAL, MECHANICAL, FIRE PROTECTION, VOICE/DATA WIRING, AND PLUMBING SYSTEMS SERVING BASE BUILDING SYSTEMS WILL REMAIN OPERATIONAL DURING THE COURSE OF DEMOLITION. SURVEY THE SITE BEFORE STARTING WORK TO IDENTIFY LOCATIONS OF THESE SYSTEMS.

DEMOLITION KEY NOTES

REFER TO GENERAL DEMOLITION NOTES FOR ADDITIONAL INFORMATION.

1. DEMOLISH EXISTING DOOR / FRAME. TYPICAL, UNLESS NOTED OTHERWISE.
2. CAREFULLY REMOVE, AND SALVAGE EXISTING DOOR AND FRAME/SIDELIGHT FOR RE-USE.
3. DEMOLISH EXISTING FLOOR FINISH. SCRAPE/SCARIFY CONCRETE SLAB. REMOVE EXISTING ADHESIVES/MORTAR FOR SMOOTH, CLEAN SURFACE AS REQUIRED TO RECEIVE NEW FLOORING PER NEW FLOOR MANUFACTURER'S PUBLISHED REQUIREMENTS.
4. DEMOLISH EXISTING STUD WALLS.
5. DEMOLISH EXISTING PLUMBING FIXTURES. REFER TO P- DRAWINGS
6. CUT FRAME NEW OPENING IN EXISTING CORRIDOR WALL OR NEW/RELOCATED DOOR
7. DEMOLISH EXISTING ELECTRICAL PANELS. REFER TO E- DRAWINGS
8. DEMOLISH EXISTING MILLWORK
9. DEMOLISH EXISTING ACOUSTIC TILE SYSTEM, GRID, LIGHT FIXTURES, SPEAKERS, DETECTORS, HVAC GRILLS,DIFFUSERS AND DUCTWORK ABOVE CILING ETC. REMOVE ALL WIRING BACK TO PANEL. SEE E-DRAWINGS REMOVE ALL DUCTWORK BACK TO MAIN HVAC FEED. REFER TO M- DRAWINGS
10. ADJUST EXISTING AUTOMATIC SPRINKLER HEADS TO MATCH NEW CEILING HEIGHT. ADD/REMOVE HEADS AS REQUIRED TO PROVIDE COVERAGE. REFER TO FP DRAWINGS/SPECIFICATIONS
11. EXISTING DOOR/FRAME TO REMAIN. RE-FINISH TO MATCH NEW DESIGN
12. SAW-CUT SLAB, TRENCH FOR NEW PLUMBING SANITARY AT NEW PLUMBING FIXTURE LOCATIONS - REFER TO P- DRAWINGS

KEY PLAN
NO SCALE
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DEMOLITION PLAN, DEMOLITION NOTES

ISSUED FOR BID

D1-1

EXISTING / DEMOLITION REFLECTED CEILING PLAN
1/4" = 1'-0"

NORTH

DEMOLITION KEY NOTES
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1. DEMOLISH EXISTING DOOR / FRAME. TYPICAL, UNLESS NOTED OTHERWISE.
2. CAREFULLY REMOVE, AND SALVAGE EXISTING DOOR AND FRAME/SIDELIGHT FOR RE-USE
3. DEMOLISH EXISTING FLOOR FINISH. SCRAPE/SCARIFY CONCRETE SLAB. REMOVE EXISTING ADHESIVES/MORTAR FOR SMOOTH, CLEAN SURFACE AS REQUIRED TO RECEIVE NEW FLOORING PER NEW FLOOR MANUFACTURER'S PUBLISHED REQUIREMENTS.
4. DEMOLISH EXISTING STUD WALLS.
5. DEMOLISH EXISTING PLUMBING FIXTURES. REFER TO P- DRAWINGS
6. CUT/FRAME NEW OPENING IN EXISTING CORRIDOR WALL OR NEW/RELOCATED DOOR
7. DEMOLISH EXISTING ELECTRICAL PANELS. REFER TO E- DRAWINGS
8. DEMOLISH EXISTING MILLWORK
9. DEMOLISH EXISTING ACOUSTIC TILE SYSTEM, GRID, LIGHT FIXTURES, SPEAKERS, DETECTORS, HVAC GRILLS,DIFFUSERS AND DUCTWORK ABOVE CILING ETC. REMOVE ALL WIRING BACK TO PANEL. SEE E-DRAWINGS REMOVE ALL DUCTWORK BACK TO MAIN HVAC FEED. REFER TO M- DRAWINGS
10. ADJUST EXISTING AUTOMATIC SPRINKLER HEADS TO MATCH NEW CEILING HEIGHT. ADD/REMOVE HEADS AS REQUIRED TO PROVIDE COVERAGE. REFER TO FP DRAWINGS/SPECIFICATIONS
11. EXISTING DOOR/FRAME TO REMAIN. RE-FINSH TO MATCH NEW DESIGN
12. SAW-CUT SLAB, TRENCH FOR NEW PLUMBING SANITARY AT NEW PLUMBING FIXTURE LOCATIONS - REFER TO P- DRAWINGS

KEY PLAN
SECOND FLOOR

NORTH

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EXISTING / DEMOLITION REFLECTED CEILING PLAN

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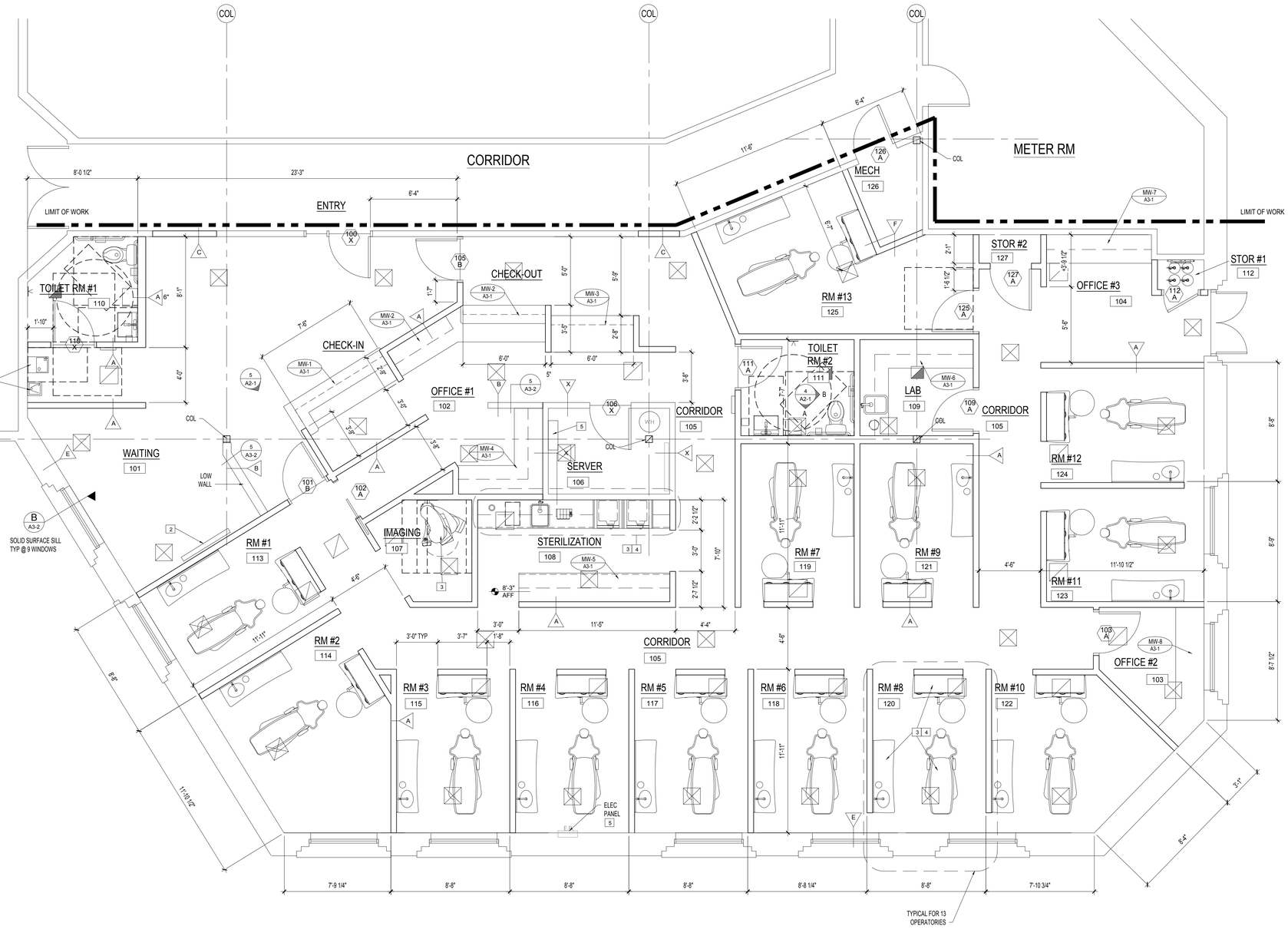
D-2



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

KEY PLAN
NO SCALE
NORTH

FLOOR PLAN KEY NOTES

1. HI/LO WATER FOUNTAIN - SEE P- DRAWINGS
2. WALL-HUNG TV MONITOR./BRACKET. FURNISHED BY OWNER, INSTALLED BY CONTRACTOR. PROVIDE NESTED BLOCKING AS REQUIRED.
3. DENTAL EQUIPMENT FURNISHED AND SET IN PLACE BY OWNER'S VENDOR. REFER TO FURNITURE/EQUIPMENT PLAN A1-3
4. DENTAL MILLWORK FURNISHED AND SET IN PLACE BY OWNER'S VENDOR. CONTRACTOR SHALL MAKE FINAL CONNECTIONS.
5. ELECTRICAL PANEL (NEW OR EXISTING TO REMAIN) - SEE E DRAWINGS

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FLOOR PLAN

ISSUED FOR BID

A1-1

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

KEY NOTES

1. NEW GYPSUM BOARD SOFFIT INSTALLED 7'-0" A.F.F UNLESS NOTED OTHERWISE.
2. REINSTALL SALVAGED CEILING TILES, LIGHT FIXTURES

CEILING FIXTURE LEGEND

- 2 X4 SUSPENDED ACOUSTIC TILE SYSTEM
- 2 X 2 SUSPENDED ACOUSTIC TILE SYSTEM
- GYPSUM BOARD SOFFIT / HEADER
- NEW PENDANT LIGHT FIXTURES
- NEW RECESSED DOWNLIGHT FIXTURE
- NEW RECESSED WALL WASHER FIXTURE
- NEW 2' X 2' LED LIGHT FIXTURES
- NEW 2' X 4' RECESSED LED LIGHT FIXTURE
- PENDENT MOUNTED TRACK LIGHT FIXTURES
- 1X4 RECESSED LED FIXTURE
- WALL MOUNTED SCONCE
- UNDER CABINET LED
- LIFE SAFETY DEVICES - SEE "E" AND "LS" DRAWINGS
- SUPPLY REG
- RETURN REG
- EXHAUST
- HVAC DEVICES - SEE "M" DRAWINGS

FIRE PROTECTION

- EXISTING
- NEW
- EXISTING RELOCATED

SPRINKLER HEAD - EXISTING SEMI-RECESSED HEADS TO REMAIN. MODIFY EXISTING HEAD LOCATIONS AND/OR INSTALL ADDITIONAL HEADS TO PROVIDE FULL COVERAGE. ADJUST EXISTING HEAD HEIGHT FOR NEW CEILING HEIGHT. CENTER HEADS WITHIN CEILING TILES. REFER TO FP DRAWINGS FOR ADDITIONAL INFORMAITON

KEY PLAN
SECOND FLOOR
NORTH

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REFLECTED CEILING PLAN

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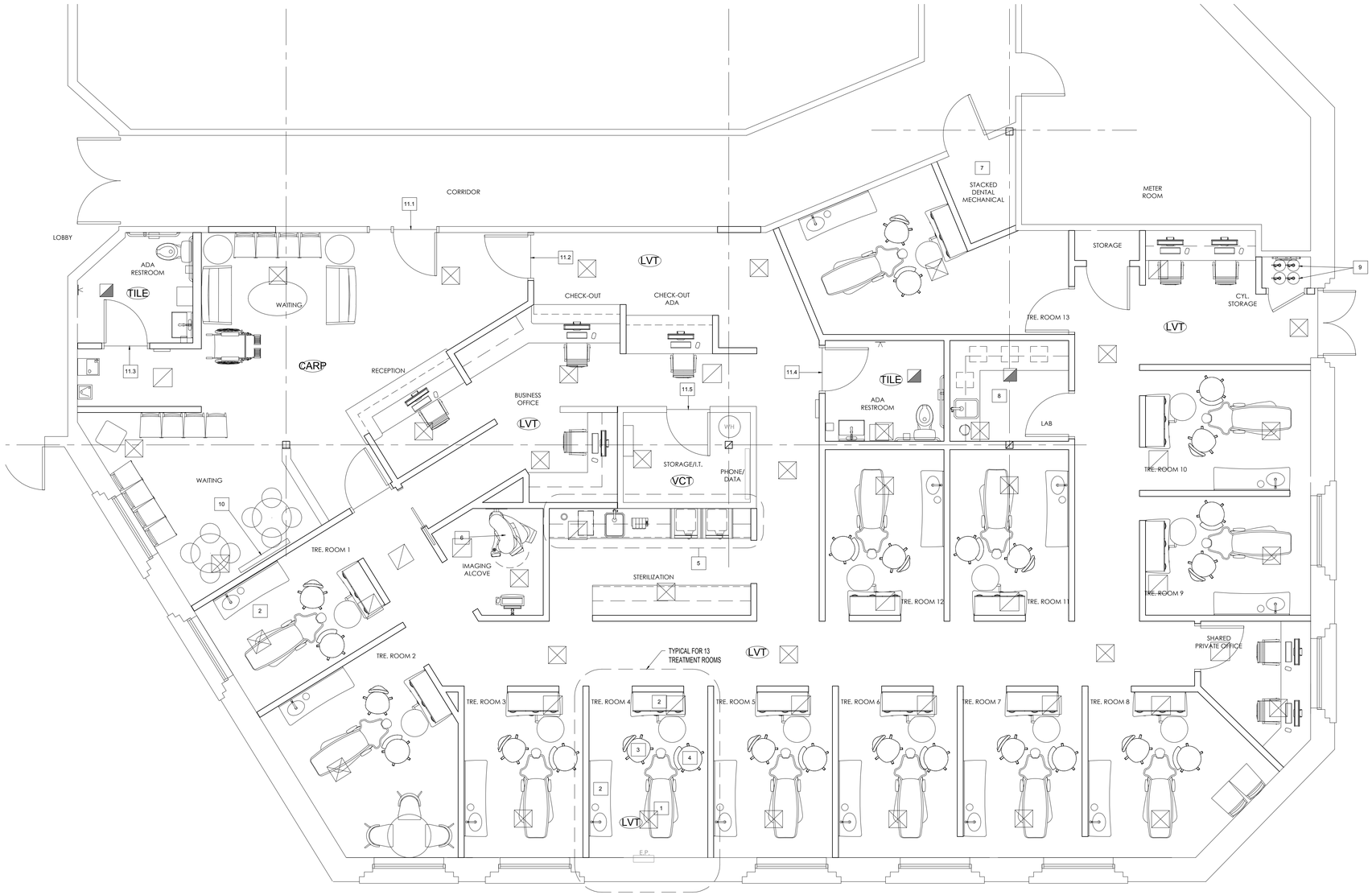
A1-2



FURNITURE, EQUIPMENT, & FINISH PLAN

1/4" = 1'-0"

NORTH

FURNITURE AND EQUIPMENT IS SHOWN FOR REFERENCE ONLY. UNLESS NOTED OTHERWISE, FURNITURE AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY OWNER OR OWNER'S VENDOR. PLUMBING ROUGHING, NESTED BLOCKING AND ELECTRICAL POWER AND FINAL P AND E CONNECTIONS SHALL BE PROVIDED BY CONTRACTOR

- KEYNOTES

FURNITURE AND EQUIPMENT IS SHOWN FOR REFERENCE ONLY. UNLESS NOTED OTHERWISE, FURNITURE AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY OWNER OR OWNER'S VENDOR. PLUMBING ROUGHING, NESTED BLOCKING AND ELECTRICAL POWER AND FINAL P AND E CONNECTIONS SHALL BE PROVIDED BY CONTRACTOR

1. DENTAL CHAIR - X-CAL SERIES
2. DENTAL REAR AND SIDE OPERATORY CABINETS
   - 2.1. REAR CONSOLE
   - 2.2. SIDE CABINET WITH SINK
   - 2.3. UPPER DISPENSER
3. DR STOOL
4. ASSIST STOOL
5. STERILIZATION CENTER - 14'-0" INCLUDES THE FOLLOWING:
   - 5.1. BASE AND UPPER CABINET MILLWORK
   - 5.2. FAUCET AND UNDERMOUNT SINK
   - 5.3. STERILIZER 115V
   - 5.4. AUTOCLAVE
   - 5.5. ULTRASONIC CLEANER
   - 5.6. INSTRUMENT WASHER
6. X-RAY
7. PUMP AND COMPRESSOR EQUIPMENT:
   - 7.1. CENTRAL VACUUM
   - 7.2. CONTROL PANEL
8. LAB EQUIPMENT
   - 8.1. LATHE 26A
   - 8.2. TRIMMER | HP
   - 8.3. VACUUM FORMING MACHINE
   - 8.4. VIBRATOR
9. GAS CYLINDERS AND MANIFOLD
10. WALL-MOUNTED TV MONITOR
11. FLOOR TRANSITION
    - 11.1. CARPET TILE - CARPET
    - 11.2. CARPET TILE - VINYL TILE
    - 11.3. CARPET TILE - CERAMIC TILE
    - 11.4. VINYL TILE - CERAMIC TILE
    - 11.5. VINYL TILE - VINYL TILE

LEGEND

- PHONE / DATA - REFER TO ELEC (SHOWN FOR REFERENCE ONLY)
- DUPLEX OUTLET - REFER TO ELEC (SHOWN FOR REFERENCE ONLY)

FLOOR FINISHES
REFER TO ROOM FINISH SCHEDULE AND FINISH / MATERIALS LEGEND

- LVT — VINYL TILE PLANKS
- VCT — VINYL COMP TILE / STATIC DISSIPATIVE TILE
- CARP — CARPET TILE
- TILE — CERAMIC OR PORCELAIN TILE

KEY PLAN
SECOND FLOOR

NORTH

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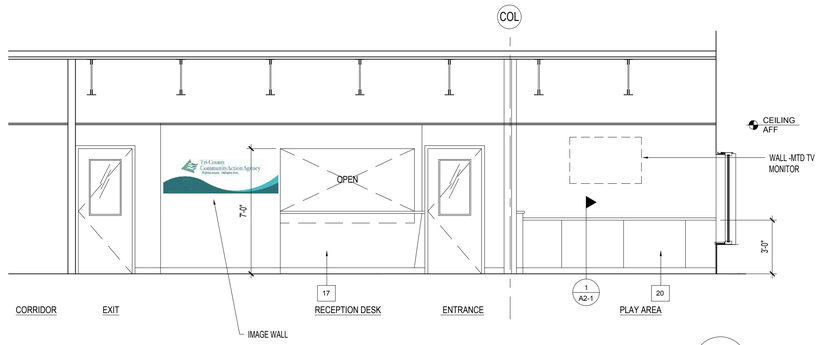
FURNITURE & EQUIPMENT PLAN

ISSUED FOR BID

A1-3

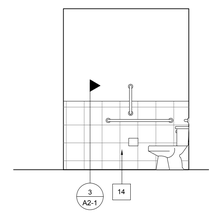


5 / - WAITING
1/4" = 1'-0"

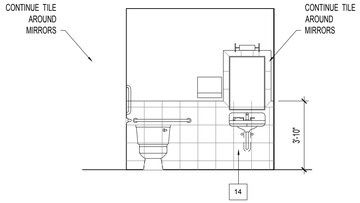
MILLWORK KEY NOTES

REFER TO DRAWING T-2 FOR GENERAL MILLWORK NOTES

1. UPPER CABINET
2. BASE CABINET
3. 5- TIER PLAM ADJUSTABLE SHELVING / EXTRA- DUTY BRACKETS AND STANDARDS - K&V 85 / 185 SERIES.
4. TRASH RECEPTACLE BY OWNER
5. FILLER PANEL
6. 4" BACK SPLASH
7. VINYL BASE
8. REFRIGERATOR BY OWNER
9. DRAWERS
10. EQUIPMENT BY OWNER - VERIFY UTILITY REQUIREMENTS. PROVIDE NESTING BLOCKING IN WALLS FOR WALL-MOUNTED EQUIPMENT.
11. OPEN ADJUSTABLE SHELVING
12. FILE CABINET DRAWERS/HARDWARE, INCLUDING CAM LOCKS
13. ADA COMPLIANT SINK APRON - SEE DETAIL ON A3-3
14. CERAMIC TILE
15. PLWD BRACKET WITH PLAM FINISH AND EDGE BAND.
16. UNDER CABINET LED LIGHTING
17. PLAM OR WOOD VENEER PANEL
18. SOLID SURFACE OR MANUFACTURED STONE COUNTERTOP - EASED EDGES.
19. 8" CYLINDRICAL TRASH CHUTE
20. FRP PANEL

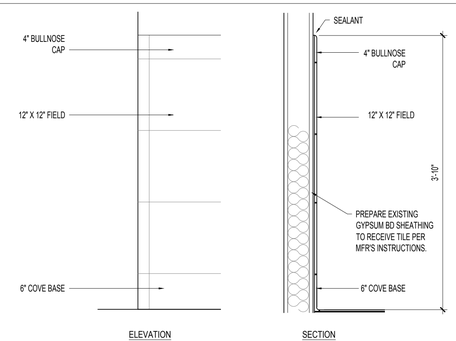


ELEVATION "B"

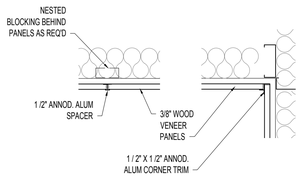


ELEVATION "A"

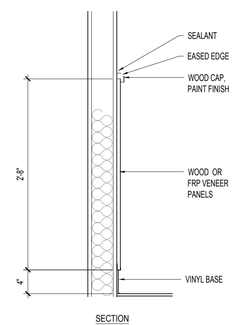
4 / - RESTROOM 111
1/4" = 1'-0" (RR 110 SIMILAR)



3 / - TILE WAINSCOT
1" = 1'-0"



2 / - PLAN - WOOD WAINSCOT
1" = 1'-0"



1 / - SECTION - WOOD WAINSCOT
1" = 1'-0"

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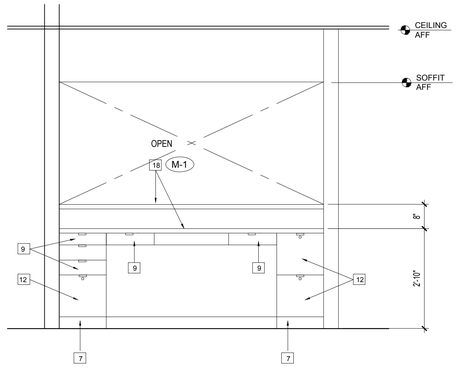
INTERIOR
ELEVATIONS

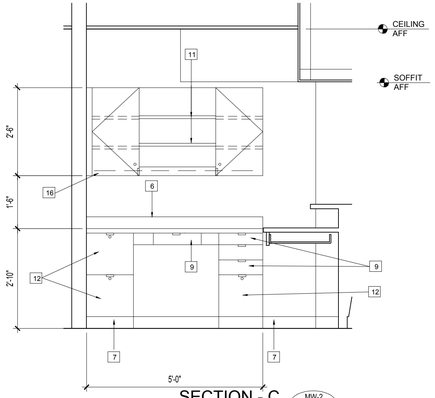
ISSUED FOR BID

A2-1



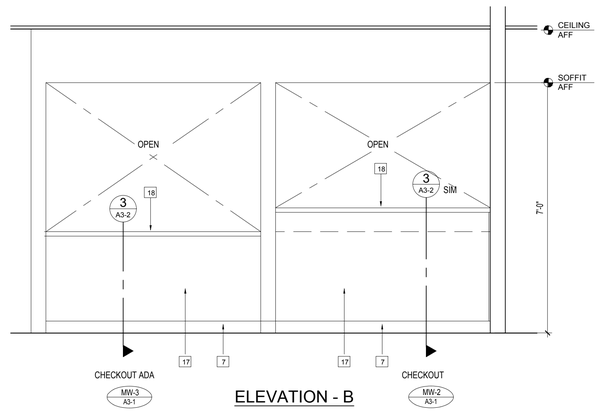
ELEVATION -D

MW-1 A3-1



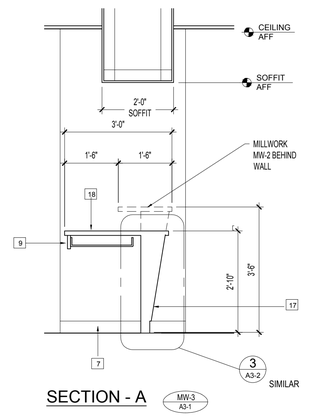
SECTION - C

MW-2 A3-1



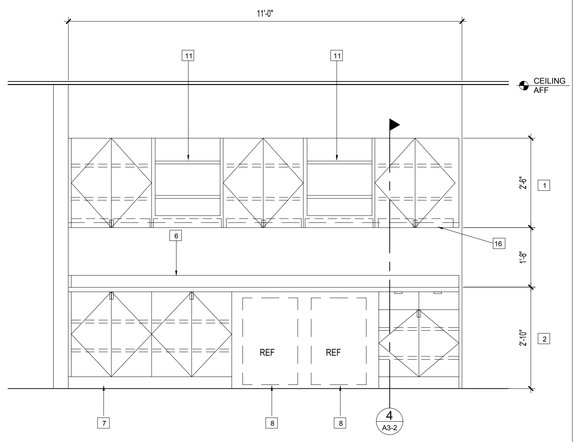
ELEVATION - B

MW-3 A3-1 MW-2 A3-1

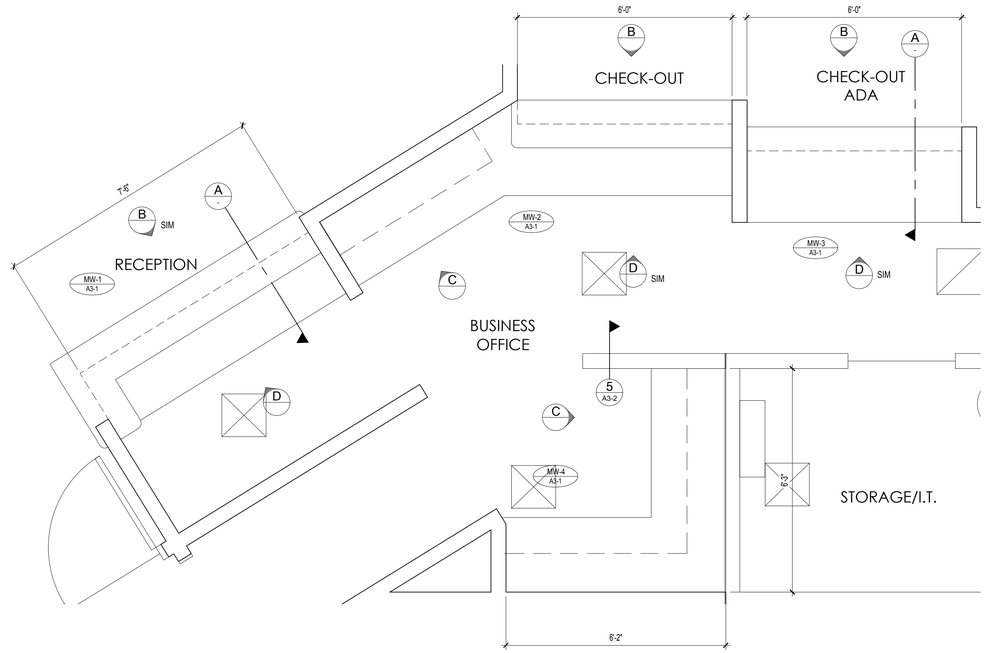


SECTION - A

MW-3 A3-1



ELEVATION - A

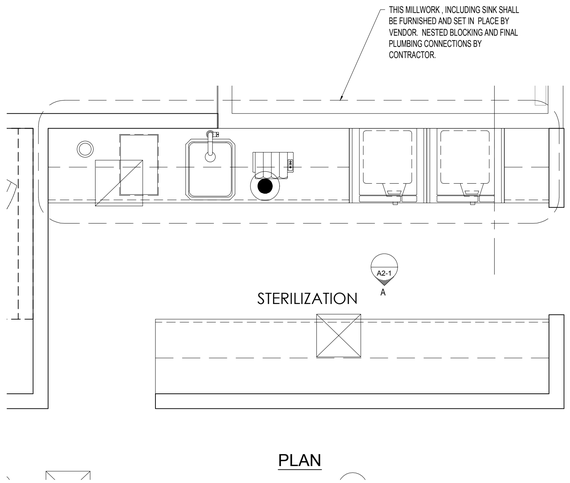


PLAN

MW-4 A3-1 MW-3 A3-1 MW-2 A3-1 MW-1 A3-1

RECEPTION - OFFICE #1

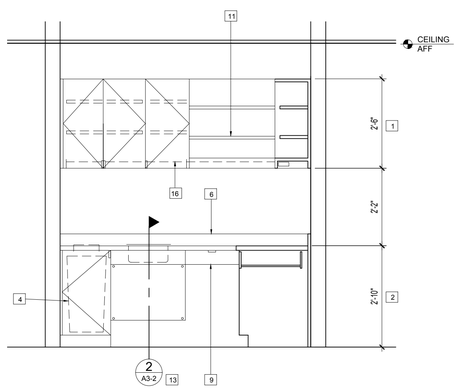
1/2" = 1'-0"



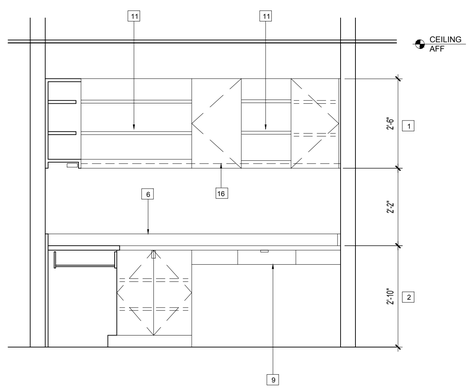
PLAN

MW-5 A3-1 STERILIZATION

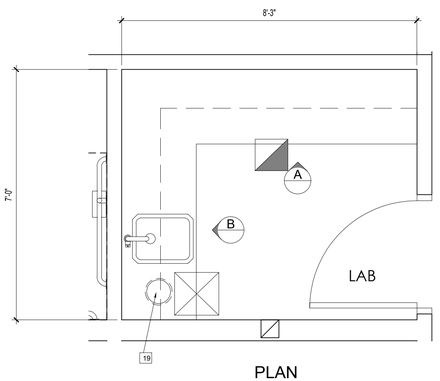
1/2" = 1'-0"



ELEVATION - B



ELEVATION - A



PLAN

MW-6 A3-1 LAB

1/2" = 1'-0"

MILLWORK KEY NOTES

REFER TO DRAWING T-2 FOR GENERAL MILLWORK NOTES

1. UPPER CABINET
2. BASE CABINET
3. 5- TIER PLAM ADJUSTABLE SHELVING / EXTRA- DUTY BRACKETS AND STANDARDS - K&V 85 / 185 SERIES.
4. TRASH RECEPTACLE BY OWNER
5. FILLER PANEL
6. 4" BACK SPLASH
7. VINYL BASE
8. REFRIGERATOR BY OWNER
9. DRAWERS
10. EQUIPMENT BY OWNER - VERIFY UTILITY REQUIREMENTS. PROVIDE NESTING BLOCKING IN WALLS FOR WALL-MOUNTED EQUIPMENT.
11. OPEN ADJUSTABLE SHELVING
12. FILE CABINET DRAWERS/HARDWARE, INCLUDING CAM LOCKS
13. ADA COMPLIANT SINK APRON - SEE DETAIL ON A3-3
14. CERAMIC TILE
15. PLWD BRACKET WITH PLAM FINISH AND EDGE BAND.
16. UNDER CABINET LED LIGHTING
17. PLAM OR WOOD VENEER PANEL.
18. SOLID SURFACE OR MANUFACTURED STONE COUNTERTOP - EASED EDGES.
19. 8" CYLINDRICAL TRASH CHUTE
20. FRP PANEL

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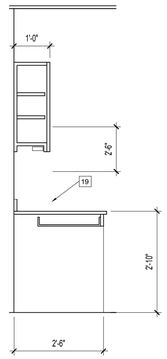
NORTH PROVIDENCE, RHODE ISLAND

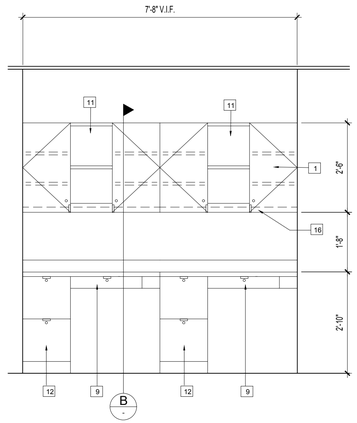
MILLWORK DETAILS

ISSUED FOR BID

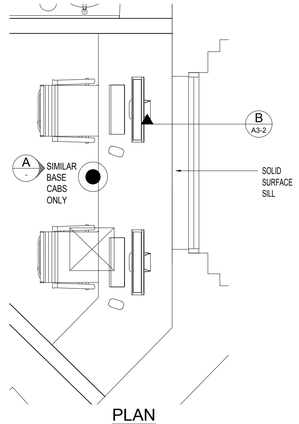
A3-1



SECTION - B
1/2" = 1'-0"



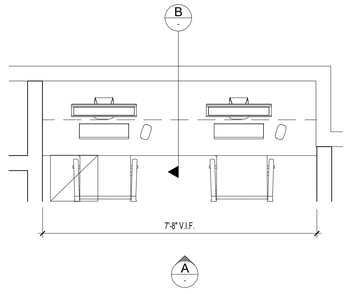
ELEVATION - A



PLAN

MW2
MED STAFF OFFICE #2
1/2" = 1'-0"

CAM LOCKS AT ALL DOORS AND DRAWERS, THIS ROOM TYPICAL



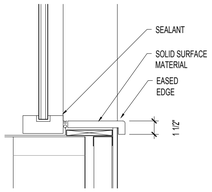
PLAN

MW3
MED STAFF OFFICE #3
1/2" = 1'-0"

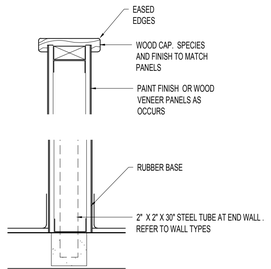
MILLWORK KEY NOTES

REFER TO DRAWING T-2 FOR GENERAL MILLWORK NOTES

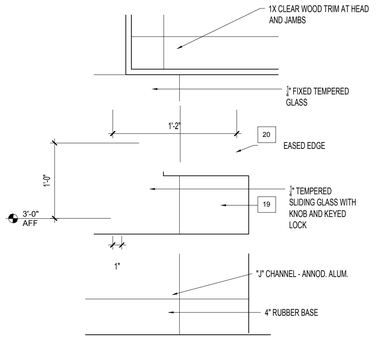
1. UPPER CABINET
2. BASE CABINET
3. 5- TIER PLAM ADJUSTABLE SHELVING / EXTRA- DUTY BRACKETS AND STANDARDS - K&V 85 / 185 SERIES.
4. TRASH RECEPTACLE BY OWNER
5. FILLER PANEL
6. 4" BACK SPLASH
7. VINYL BASE
8. REFRIGERATOR BY OWNER
9. DRAWERS
10. EQUIPMENT BY OWNER - VERIFY UTILITY REQUIREMENTS. PROVIDE NESTING BLOCKING IN WALLS FOR WALL-MOUNTED EQUIPMENT.
11. OPEN ADJUSTABLE SHELVING
12. FILE CABINET DRAWERS/HARDWARE, INCLUDING CAM LOCKS
13. ADA COMPLIANT SINK APRON - SEE DETAIL ON A3-3
14. CERAMIC TILE
15. PLWD BRACKET WITH PLAM FINISH AND EDGE BAND.
16. UNDER CABINET LED LIGHTING
17. PLAM OR WOOD VENEER PANEL.
18. SOLID SURFACE OR MANUFACTURED STONE COUNTERTOP - EASED EDGES.
19. 8" CYLINDRICAL TRASH CHUTE
20. FRP PANEL



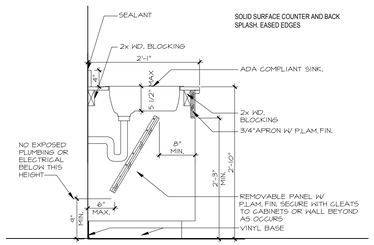
6 WINDOW SILL
1" = 1'-0"



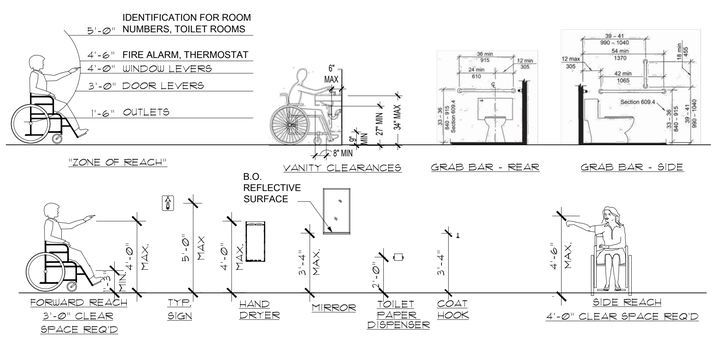
5 SECTION - LOW WALL CHECK-OUT
1-1/2" = 1'-0"



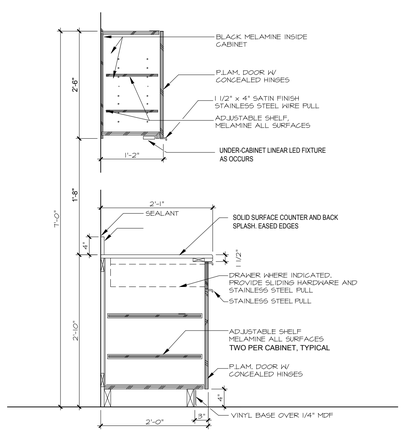
3 SECTION - CHECK IN PASS-THROUH
1-1/2" = 1'-0"



2 SECTION - ACCESSIBLE SINK
3/4" = 1'-0"



7 ACCESSORY & FIXTURE MOUNTING HEIGHTS



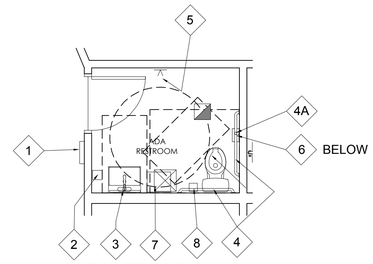
4 CABINETS
1/4" = 1'-0"

1. CABINET CONFIGURATIONS AND DIMENSIONS MAY VARY BY SPECIFIC MILLWORK.
2. REFER TO MILLWORK NOTES ON T2 FOR ADDITIONAL INFORMATION

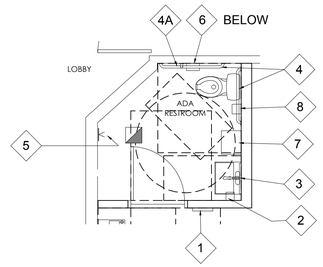
TOILET ROOM ACCESSORY SCHEDULE			
SYM.	ACCESSORY	MANUFACTURER	DESCRIPTION
1	HC SIGN		SIGN TO HAVE RAISED LETTER AND BRAIL WITH UNIVERSAL SYMBOLS FOR EACH TOILET ROOM. MOUNT ON JAMB SIDE OF DOOR OPENING . CENTER SIGN 5'-0" A.F. .
2	SOAP DISPENSER	BOBRICK	BY OWNER'S VENDOR
3	MIRROR	BOBRICK	BOBRICK B-165 24"X36". MOUNT BOTTOM OF REFLECTIVE SURFACE AT 40" A.F.
4	GRAB BARS	BOBRICK	BOBRICK B-6897.99. MINIMUM 54" SIDE x 48" REAR x 1-1/2" DIAM S.S. PEENED
4A	GRAB BAR- VERTICAL	BOBRICK	BOBRICK B-6806.99 X 18. 18" x 1-1/2" DIAM S.S., PEENED
5	COAT HOOK	BOBRICK	BOBRICK B-676717. MOUNT ON PULL SIDE OF DOOR, 48" A.F.
6	TOILET TISSUE DISPENSER	BOBRICK	BY OWNER'S VENDOR
7	PAPER TOWEL DISPENSER	BOBRICK	BY OWNER'S VENDOR
8	FEMININE NAPKIN DISP	BOBRICK	BOBRICK B-270 SS SURFACE-MTD

DISPENSER LOCATION
NO SCALE

1 TOILET ROOM ACCESSORIES
1/4" = 1'-0"



TOILET ROOM 111
1/4" = 1'-0"



TOILET ROOM 110
1/4" = 1'-0"

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SCHEDULES
LEGENDS
DETAILS

ISSUED FOR BID

A3-2

HARDWARE SCHEDULE

SET NO.	DOORS	HARDWARE
HW-1		• 1-1/2 PR. BB HINGES • 1 LOCKSET (PRIVACY FUNCTION) • 1 WALL / FLOOR STOP • 3 SILENCERS • CLOSER (PUSH SIDE)
HW-2		• 1-1/2 PR. BB HINGES • 1 LOCKSET (STOREROOM FUNCTION) • 1 WALL STOP • 3 SILENCERS • CLOSER • NEOPRENE WEATHERSTRIP (PUMP ROOM DOOR 126) • THRESHOLD (PUMP ROOM DOOR 126)
HW-3		• 1-1/2 PR. BB HINGES • 1 LOCKSET (OFFICE FUNCTION) • 1 WALL STOP • 3 SILENCERS • CLOSER
HW-4		• POCKET DOOR HARDWARE • LATCH • PULL

DOOR HARDWARE NOTES

1. Basis of Design:

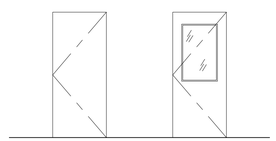
Product	Manufacturer
Hinges	Ives
Cylindrical Locksets	Falcon
Door Closers	LCN
Auxiliary Hardware	Ives

2. FINISH TO BE 626/US26D (SATIN CHROME).
3. DOOR HARDWARE TO BE U.L. FIRE-RATED WHEN USED IN A FIRE-RATED ASSEMBLY.
4. LOCKSETS TO BE "W" SERIES MEDIUM DUTY GRADE 2, "BOARDWALK" LEVER STYLE, SMALL DIAMETER ROSE
5. MASTER KEYED PER OWNER'S REQUIREMENTS.
6. SUBMIT KEYING SCHEDULE TO OWNER FOR REVIEW AND APPROVAL PRIOR TO ORDERING.
7. ALL DOOR HARDWARE TO BE ADA / ANSI A117.1 COMPLIANT.
8. SUBMIT PRODUCT DATA TO ARCHITECT FOR RECORD.

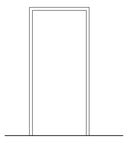
DOOR & FRAME SCHEDULE

NO.	DOOR						FRAME					HDWRE SET	DETAILS	REMARKS
	TYP	SIZE	MAT	LABEL	FINISH		TYP	MAT.	LABEL	FINISH				
					PUSH	PULL				PUSH	PULL			
100	X	3 X 7	WD		ST	ST	X	HM		P	P	HW-3		EXISTING DOOR AND FRAME TO BE RELOCATED, REFURBISHED. NEW LOCKSET HARDWARE
101	B	3 X 7	WD		ST	ST	B	HM		P	P	HW-3		
102	A	3 X 7	WD		ST	ST	B	HM		P	P	HW-4		POCKET DOOR
103	A	3 X 7	WD		ST	ST		HM		P	P	HW-3		
105	B	3 X 7	WD		ST	ST		HM		P	P	HW-3		
106	X	3 X 7	WD		ST	ST	X	HM		P	P			EXISTING DOOR AND FRAME TO BE RE-FURBISHED. NEW LOCKSET HARDWARE
109	A	3 X 7	WD		ST	ST	A	HM		P	P	HW-3		
110	A	3 X 7	WD		ST	ST	A	HM		P	P	HW-1		
111	A	3 X 7	WD		ST	ST	A	HM		P	P	HW-1		
112	A	3 X 7	WD		ST	ST	A	HM		P	P	HW-2		
125	A	3 X 7	WD		ST	ST	A	HM		P	P	HW-1		
126	A	3 X 7	WD		ST	ST	A	HM		P	P	HW-2		
127	A	3 X 7	WD		ST	ST	A	HM		P	P	HW-2		

DOOR / FRAME NOTES:
1. SUBMIT PRODUCT DATA / FINISH SAMPLES TO ARCHITECT FOR REVIEW AND APPROVAL
2. INTERIOR DOOR FRAMES TO BE KNOCK-DOWN HOLLOW METAL, FACTORY PRIMED WITH MITRED CORNERS.
3. FLUSH WOOD DOORS BASED ON LAMBTON STANDARD SERIES, PARTICALBOARD CORE DOOR "5PC-ME". PLAIN SLICED BIRCH VENEER, BOOK MATCHED, FACTORY_FINISHED PLS-104 "EMBASSY WALNUT".



DOOR TYPES
1/4" = 1'-0"



FRAME TYPES
1/4" = 1'-0"

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DOOR / HDWRE SCHEDULES, DETAILS

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A4-1

PAINTING NOTES

1. SUBMITTALS
   PRODUCT DATA: PROVIDE A COMPLETE LIST OF ALL PRODUCTS TO BE USED, WITH THE FOLLOWING INFORMATION FOR EACH:
   MANUFACTURER'S NAME, PRODUCT NAME AND/OR CATALOG NUMBER, AND GENERAL PRODUCT CATEGORY.
   MANUFACTURER'S INSTRUCTIONS: INDICATE SPECIAL SURFACE PREPARATION PROCEDURES.
   MAINTENANCE DATA: SUBMIT DATA ON CLEANING, TOUCH-UP, AND REPAIR OF PAINTED AND COATED SURFACES.
   SAMPLES: SUBMIT THREE PAPER SAMPLES, 5 INCHES BY 7 INCHES (127MM X 178MM) IN SIZE, ILLUSTRATING SELECTED COLORS FOR EACH COLOR AND SYSTEM SELECTED WITH SPECIFIED COATS CASCADED.
2. MANUFACTURER QUALIFICATIONS: A SINGLE MANUFACTURER WITH A MINIMUM OF TEN (10) YEARS EXPERIENCE WILL SUPPLY ALL PRIMARY PRODUCTS SPECIFIED IN THIS SECTION. ACCEPTABLE MANUFACTURERS: BENJAMIN MOORE & CO., SHERWIN WILLIAMS, PRATT & LAMBERT, OR APPROVED EQUAL.
3. MAINTAIN ENVIRONMENTAL CONDITIONS (TEMPERATURE, HUMIDITY, AND VENTILATION) WITHIN LIMITS RECOMMENDED BY MANUFACTURER FOR OPTIMUM RESULTS. DO NOT INSTALL PRODUCTS UNDER ENVIRONMENTAL CONDITIONS OUTSIDE MANUFACTURER'S ABSOLUTE LIMITS.
4. AT PROJECT CLOSEOUT, PROVIDE TO THE OWNER OR OWNER'S REPRESENTATIVE AN EXECUTED COPY OF THE MANUFACTURER'S STANDARD FORM OUTLINING THE TERMS AND CONDITIONS OF AND ANY EXCLUSIONS TO THEIR LIMITED WARRANTY AGAINST INSTALLATION AND/OR PRODUCT DEFECT.
5. AT PROJECT CLOSEOUT, PROVIDE THE COLOR MIXTURE NAME AND CODE TO THE OWNER OR OWNER'S REPRESENTATIVE FOR ACCURATE FUTURE COLOR MATCHING.
6. VOLATILE ORGANIC COMPOUND (VOC) CONTENT: ALL PAINTS AND COATINGS USED MUST MEET THE VOC LIMITS OF GREEN SEAL STANDARD GS-11:
   INTERIOR: 50 G/L VOC OR LESS FOR FLATS AND 150 G/L VOC FOR NON FLATS..
7. PROVIDE MATERIALS THAT ARE COMPATIBLE WITH ONE ANOTHER AND THE SUBSTRATES INDICATED UNDER CONDITIONS OF SERVICE AND APPLICATION, AS DEMONSTRATED BY MANUFACTURER BASED ON TESTING AND FIELD EXPERIENCE.
8. THE FOLLOWING TERMS ARE USED TO DESCRIBE SHEENS OR GLOSSES, AS MEASURED BY A GLOSS METER FROM A 60 DEGREE ANGLE FROM VERTICAL, AS A PERCENTAGE OF THE AMOUNT OF LIGHT THAT IS REFLECTED:
   FLAT - LESS THAN 5 UNITS.
   MATTE - 0 - 10 UNITS.
   EGGSHELL - 10 - 25 UNITS.
   SATIN / SOFT / MEDIUM-GLOSS - 20 - 35 UNITS.
   SEMI-GLOSS - 35 - 70 UNITS.
   GLOSS - 70 - 85 UNITS.
9. MIXING AND TINTING: EXCEPT WHERE SPECIFICALLY NOTED IN THIS SECTION, ALL PAINT SHALL BE READY-MIXED AND PRE-TINTED. AGITATE ALL PAINT PRIOR TO AND DURING APPLICATION TO ENSURE UNIFORM COLOR, GLOSS, AND CONSISTENCY. THINNER ADDITION SHALL NOT EXCEED MANUFACTURER'S PRINTED RECOMMENDATIONS. DO NOT USE KEROSENE OR OTHER ORGANIC SOLVENTS TO THIN WATER-BASED PAINTS. WHERE PAINT IS TO BE SPRAYED, THIN ACCORDING TO MANUFACTURER'S CURRENT GUIDELINES.
10. PAINT SYSTEMS:
    INTERIOR PRIMERS -
    WOOD: ONE (1) COAT - INTERIOR LATEX ACRYLIC PRIMER
    FERROUS METALS: ONE (1) COAT - ACRYLIC METAL PRIMER
    GYPSUM BOARD, PLASTER: ONE (1) COAT - ALL PURPOSE ACRYLIC PRIMER SEALER
    EXTERIOR FINISH COATS
    FLAT FINISH: TWO (2) COATS - ACRYLIC FLAT LATEX HOUSE PAINT
    SATIN / SOFT / MEDIUM-GLOSS FINISH: TWO (2) COATS - SOFT GLOSS LATEX HOUSE & TRIM PAINT
    SEMI-GLOSS FINISH: TWO (2) COATS - ACRYLIC LATEX SEMI - GLOSS
    HIGH GLOSS FINISH: TWO (2) COATS - LATEX HIGH GLOSS METAL & WOOD ENAMEL

    INTERIOR FINISH COATS
    FLAT FINISH: TWO (2) COATS - INTERIOR FLAT FINISH
    EGGSHELL FINISH: TWO (2) COATS -INTERIOR EGGSHELL FINISH
    SATIN/SEMI-GLOSS FINISH: TWO (2) COATS -INTERIOR SEMI-GLOSS FINISH
    HIGH GLOSS FINISH: TWO (2) COATS - INTERIOR ACRYLIC GLOSS ENAMEL

11. PREPARATION: CLEAN SURFACES THOROUGHLY PRIOR TO COATING APPLICATION. DO NOT START WORK UNTIL SURFACES TO BE FINISHED ARE IN PROPER CONDITION TO PRODUCE FINISHED SURFACES OF UNIFORM, SATISFACTORY APPEARANCE. STAINS AND MARKS: REMOVE COMPLETELY, IF POSSIBLE, USING MATERIALS AND METHODS RECOMMENDED BY COATING MANUFACTURER; COVER STAINS AND MARKS WHICH CANNOT BE COMPLETELY REMOVED WITH ISOLATING PRIMER OR SEALER RECOMMENDED BY COATING MANUFACTURER TO PREVENT BLEED-THROUGH.REMOVE MILDEW, ALGAE, AND FUNGUS USING MATERIALS AND METHODS RECOMMENDED BY COATING MANUFACTURER REMOVE DUST AND LOOSE PARTICULATE MATTER FROM SURFACES TO RECEIVE COATINGS IMMEDIATELY PRIOR TO COATING APPLICATION. PROTECT ADJACENT SURFACES NOT INDICATED TO RECEIVE COATINGS. PREPARE SURFACES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR SPECIFIED COATINGS AND INDICATED MATERIALS, USING ONLY METHODS AND MATERIALS RECOMMENDED BY COATING MANUFACTURER.
    GYPSUM BOARD: REPAIR CRACKS, HOLES AND OTHER SURFACE DEFECTS WITH JOINT COMPOUND TO PRODUCE SURFACE FLUSH WITH ADJACENT SURFACES.
    METALS - ALUMINUM, MILL-FINISH: CLEAN AND ETCH SURFACES WITH A PHOSPHORIC ACID-WATER SOLUTION OR WATER BASED INDUSTRIAL CLEANER. FLUSH WITH CLEAN WATER AND ALLOW TO DRY, BEFORE APPLYING PRIMER COAT.
    FERROUS, SHOP-PRIMED: REMOVE LOOSE PRIMER AND RUST, IF PRESENT, BY SCRAPING AND SANDING, FEATHERING EDGES OF CLEANED AREAS TO PRODUCE UNIFORM FLAT SURFACE; SOLVENT-CLEAN SURFACES AND SPOT-PRIME BARE METAL WITH SPECIFIED PRIMER, FEATHERING EDGES TO PRODUCE UNIFORM FLAT SURFACE.
    GALVANIZED STEEL, PASSIVATED: CLEAN WITH WATER-BASED INDUSTRIAL STRENGTH CLEANER. AFTER THE SURFACE HAS BEEN PREPARED, APPLY RECOMMENDED PRIMER TO A SMALL AREA. ALLOW PRIMER TO CURE FOR 7 DAYS, AND TEST ADHESION USING THE "CROSS-HATCH ADHESION TAPE TEST" METHOD IN ACCORDANCE WITH ASTM D 3359. IF THE ADHESION OF THE PRIMER IS POSITIVE, PROCEED WITH A RECOMMENDED COATING SYSTEM FOR GALVANIZED METAL.
    STAINLESS STEEL: CLEAN SURFACES WITH PRESSURIZED STEAM, PRESSURIZED WATER, OR WATER-BASED INDUSTRIAL CLEANER.
    POLYVINYL CHLORIDE (PVC) PIPE: REMOVE CONTAMINANTS AND MARKINGS WITH DENATURED ALCOHOL SCUFF SAND AND WIPE WITH SOLVENT FOR MAXIMUM ADHESION. TEST ADHESION BEFORE STARTING THE JOB.
12. WOOD:
    SEAL KNOTS, PITCH STREAKS, AND SAP AREAS WITH SEALER RECOMMENDED BY COATING MANUFACTURER; FILL NAIL RECESSES AND CRACKS WITH FILLER RECOMMENDED BY COATING MANUFACTURER; SAND SURFACES SMOOTH. APPLY PRIMER COAT TO BACK OF WOOD TRIM AND PANELING.

13. RE-PREPARE AND RE-COAT UNSATISFACTORY FINISHES; REFINISH ENTIRE AREA TO CORNERS OR OTHER NATURAL TERMINATIONS. REPAIR TO ARCHITECT'S ACCEPTANCE COATINGS DAMAGED BY SUBSEQUENT CONSTRUCTION ACTIVITIES. WHERE REPAIRS CANNOT BE MADE TO ARCHITECT'S ACCEPTANCE, RE-APPLY FINISH COATING TO NEAREST ADJACENT CHANGE OF SURFACE PLANE, IN BOTH HORIZONTAL AND VERTICAL DIRECTIONS.

FINISH NOTES

1. PROVIDE PRIMERS AND UNDERCOATS BY THE SAME MANUFACTURER OF THE FINISH COAT. USE ONLY THINNERS APPROVED BY THE PAINT MANUFACTURER. USE ONLY WITHIN RECOMMENDED LIMITS.
2. ALL FINISHES SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
3. PROVIDE VINYL COVE BASE AT VINYL TILE FLOORS. PROVIDE VINYL STRAIGHT BASE AT CARPETED FLOORS.
4. PROVIDE TRANSITION STRIPS AT JUNCTION/TRANSITION OF DISSIMILAR FLOORING MATERIALS. IF NOT NOTED OTHERWISE, PROVIDE VINYL STRIPS AT JUNCTIONS OF VINYL AND CARPET. PROVIDE METAL TRANSITION STRIPS AT JUNCTION OF TILE FLOORS AND CARPET. ACCEPTED MANUFACTURER: SCHLUTER OR APPROVED EQUAL.
5. PRIOR TO APPLICATION OF VINYL WALL COVERING, PREPARE NEW GYPSUM BOARD SUBSTRATE WITH LATEX PRIMER APPROVED BY WALL COVERING MANUFACTURER.
6. PROVIDE SEALANT AT LOCATIONS INDICATED IN "GENERAL NOTES", SHEET T-2
7. CERAMIC TILE SHALL BE THINSET WITH UNSANDED GROUT. PREPARE CONCRETE SUBSTRATE IN ACCORDANCE WITH TILE MORTAR/ADHESIVE MANUFACTURER'S PUBLISHED INSTRUCTIONS.
8. SUBMIT ONE (1) SAMPLE AND TWO (2) COPIES OF PRODUCT SPECIFICATION DATA ON ALL SPECIFIED FINISHES FOR ARCHITECT'S AND OWNER'S RECORD.
9. SUBSTITUTIONS SHALL NOT BE SUBMITTED DURING THE REVIEW PROCESS. SEE "GENERAL NOTES", SHEET T-2

ROOM FINISH SCHEDULE

RM NO.	ROOM NAME	FLOOR		WALLS				CEILING	CEILING HEIGHT	REMARKS
		FIELD	BASE	NORTH	WEST	SOUTH	EAST			
101	WAITING	C-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-1	8'-6"	
102	OFFICE #1	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-1, GYP	8'-6"	
103	OFFICE #2	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-1	8'-6"	
104	OFFICE #3	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-1	8'-6"	
105	CORRIDOR	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-1	8'-6"	
106	SERVER RM	VCT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-1	8'-6"	
107	IMAGING	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT -1	8'-6"	
108	STERILIZATION	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-2	8'-6"	
109	LAB	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-2	8'-6"	
110	TOILET RM #1	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT -2	8'-6"	
111	TOILET RM #2	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT -2	8'-6"	
112	STORAGE #1	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT -1	8'-6"	
113-125	TREATMENT ROOMS #1 - #13	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT -1	8'-6"	
126	MECH CLOSET	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	GYP	8'-6"	
127	STORAGE #2	LVT-1	B-1	PAINT	PAINT	PAINT	PAINT	ACT-1	8'-6"	

FINISH / MATERIALS LEGEND

FINISH NO.	DESCRIPTION	MANUFACTURER	MFR'S NUMBER	COLOR	FINISH	SIZE	REMARKS
INTERIOR FLOORING							
C-1	CARPET TILE	SHAW VANTAGE	5T086	ELEMENT EARTH 84750		24 X 24	WAITING AREA
LVT-1	LUXURY VINYL PLANK	TARKETT - CONTOUR COLLECTION	PCNU NUGRAIN	3710 GUNMETAL	EMBOSS: TICK (TK)	6" X 48"	
VCT-1	STATIC DISSIPATIVE VINYL SHEET OR TILE	JOHNSONITE / TARKETT IQ GRANITE SD	COLOR #0950	BLACK GREY		TILE: 24"X24" OR ROLL	IT WORK ROOM/SERVER ROOM. WELDED SEAMS AND COPPER UNDERLAYING STRIPS
B-1	4" RUBBER BASE	JOHNSONITE	63B	BURNT UMBER			COVE BASE AT VINYL FLOOR, STRAIGHT BASE AT CARPET
INTERIOR PAINT							
FRP-1	FIBERGLAS REINFORCED PANELS	MARLITE OR EQUAL	S-490N	LIGHT GREY	SMOOTH	4' X 8' X 3/32"	MATCHING PVC TRIM. APPLY PANELS TO 4' ABOVE FLOOR. PAINT ABOVE.
P-1	LATEX PAINT	SHERWIN WILLIAMS			EGGSHELL		WALLS
P-2	LATEX PAINT	SHERWIN WILLIAMS			SEIMI-GLOSS		DOOR FRAMES
P-2	LATEX PAINT	SHERWIN WILLIAMS			SEIMI-GLOSS		DOOR FRAMES
ST-1	STAIN				SATIN		MATCH DOOR FINISH
INTERIOR CEILING FINISHES							
ACT-1	2X2 ACOUSTICAL CEILING TILE	CERTAINTEED	PERFORMA SERENO FINE FISSURED SFF-454	WHITE	REVEAL BEVELED EDGE	24 x 24 x 3/4 BEVELED REVEAL EDGE	WITH MATCHING 15/16" TEE GRID SYSTEM
ACT-2	2X2 WASHABLE ACOUSTICAL CEILING TILE	CERTAINTEED	ECHOPHON FOCUS A 3450-4607	WHITE	LIGHTLY TEXTURED	24x24 OR 48 x 3/4 TRIM EDGE SEE PLAN FOR SIZE	WITH MATCHING 15/16" TEE GRID SYSTEM
INTERIOR MILLWORK FINISHES							
PL-1	PLASTIC LAMINATE	LAMINART					MILLWORK COUNTER TOPS
PL-2	PLASTIC LAMINATE	LAMINART					MILLWORK CABINETS
M-1	STONE SURFACE	SILESTONE				1 1/4" TH	RECEPTION, CHECKIN/OUT COUNTER TOPS
FINISH NO.	**DESCRIPTION**	**MANUFACTURER**	**MFR'S NUMBER**	**COLOR**	**FINISH**	**SIZE**	**REMARKS**

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DRAWN BY: PAC
DATE: AUG 28, 2023
REVISIONS:
9/1/23 ADDENDUM #1 - MECH

TRI-TOWN COMMUNITY ACTION AGENCY
1126 HARTFORD AVENUE
JOHNSTON, RI

PEDIATRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

ROOM FINISH SCHEDULE, FINISH LEGEND, DETAILS

ISSUED FOR BID

A4-2

PLUMBING SYMBOL LEGEND

GENERAL

SYMBOL	ABBR.	DESCRIPTION
	AP	ACCESS PANEL
TP	TP	AUTOMATIC TRAP PRIMER
	CE	CAP OR PLUG EXISTING
	CO	CLEANOUT
	FCO	FLOOR CLEANOUT (FLUSH FLOOR)
	DCO	CLEANOUT (DANDY)
	WCO	CLEANOUT (WALL)
	CTE	CONNECT TO EXISTING
	AD-A	DRAIN (AREA DRAIN & TYPE)
	FD-A	DRAIN (FLOOR DRAIN & TYPE)
	FS-A	DRAIN (FLOOR SINK & TYPE)
	RD-A	DRAIN (ROOF DRAIN & TYPE)
	TD-A	DRAIN (TRENCH DRAIN & TYPE)
DC	DC	DRESSER COUPLING
	DN	DOWN (PENETRATES LEVEL BELOW)
		DROP (DOES NOT PENETRATE LEVEL BELOW)
	HTI	HEAT TRACE AND INSULATE (FREEZE PROTECTION)
	TMC	HOT WATER TEMPERATURE MAINTENANCE CABLE
		INDICATES DIRECTION OF FLOW
		INDICATES DIRECTION OF SLOPE DOWN
1		KEY DESIGNATION
	KWHTI	KITCHEN WASTE HEAT TRACE AND INSULATE

SYMBOL	ABBR.	DESCRIPTION
		NATURAL GAS TEST COCK WITH PLUG
	OED	OPEN END DRAIN WITH TRAP
		PIPE ANCHOR
		PVC SCHEDULE 40 SOLID WALL EXPANSION JOINT
		RISE (DOES NOT PENETRATE LEVEL ABOVE)
	SA	SHOCK ABSORBER
		SLEEVE
		SOVENT AERATOR
		SOVENT DE-AERATOR
		UP (PENETRATES LEVEL ABOVE)
		WALL HYDRANT
– – E – –	E	WATER HEATER VENT EXHAUST
– – I – –	I	WATER HEATER COMBUSTION AIR INTAKE
	WTS	WATER TIGHT SLEEVE
	W & T	WASTE & TRAP

PIPING

SYMBOL	ABBR.	DESCRIPTION
	ETR	EXISTING WORK TO REMAIN (ABOVE GROUND) (PERTAINS TO ALL SYSTEMS)
	DEMO	EXISTING WORK TO BE REMOVED ABOVE GROUND (PERTAINS TO ALL SYSTEMS)
	ETR	EXISTING WORK TO REMAIN BELOW GROUND OR FLOOR (PERTAINS TO ALL SYSTEMS)
	DEMO	EXISTING WORK TO BE REMOVED BELOW GROUND OR FLOOR (PERTAINS TO ALL SYSTEMS)
		NEW WORK TO BELOW GROUND OR FLOOR (PERTAINS TO ALL SYSTEMS)
— BDTV —	BDTV	BLOWDOWN TANK VENT
— CA —	CA	COMPRESSED AIR PIPING
— CBW —	CBW	CARBONATED BEVERAGE WASTE
	CW	COLD WATER
— DYE —	DYE	DYE (FROM HAIR COLORING SINK)
— ESPPD —	ESPPD	ELEVATOR SUMP PUMP PRESSURE DISCHARGE
– – – GRL – – –	GRL	GARAGE RAIN LEADER
– – – GSV – – –	GSV	GARAGE SEPARATOR VENT
– – – GW – – –	GW	GARAGE WASTE
GSID	GSID	GREASE INTERCEPTOR SUCTION DISCHARGE
	HW	HOT WATER
	HWC	HOT WATER RECIRCULATION
— 140 —	140HW	HOT WATER (140°F)
— 140C —	140HW	HOT WATER RECIRCUALTION (140°F)
— 180 —	180HW	HOT WATER (180°F)
— 180C —	180HW	HOT WATER RECIRCUALTION (180°F)

SYMBOL	ABBR.	DESCRIPTION
— IW —	IW	INDIRECT WASTE
— IR —	IR	IRRIGATION WATER
— KW —	KW	KITCHEN WASTE
— G —	G	NATURAL GAS
— GTV —	GTV	NATURAL GAS/PROPANE TRAIN, APPLIANCE, OR REGULATOR VENT
— MA —	MA	MEDICAL AIR PIPING
— OX —	OX	MEDICAL OXYGEN PIPING
— VAC —	VAC	MEDICAL VACUUM PIPING
— NPCW —	NPCW	NON-POTABLE COLD WATER
— NPHW —	NPHW	NON-POTABLE HOT WATER W/ TEMP. MAINTENANCE CABLE
— NPHWC —	NPHWC	NON-POTABLE HOT WATER CIRCULATION
— LP —	LP	PROPANE GAS
— PD —	PD	PUMPED DISCHARGE
— BEER —	BEER	PVC CONDUIT (BEER)
— SODA —	SODA	PVC CONDUIT (SODA)
	RL	RAIN LEADER
— SRL —	SRL	SECONDARY RAIN LEADER
	S or W	SOIL OR WASTE
	SSVS	SUBSLAB VENTILATION SYSTEM (PROVIDED UNDER BASE BUILDING)
	TP	TRAP PRIMER WATER
– – – – – – –	V	VENT
— PPV —	PPV	WATER HEATER POSITIVE PRESSURE VENT

VALVES

SYMBOL	ABBR.	DESCRIPTION
	RPBFP	BACKFLOW PREVENTER
	BV	BALANCING VALVE
		BALANCING VALVE ASSEMBLY
	CV	CHECK VALVE
	DV-A	DRAIN VALVE TYPE WITH HOSE THREADS
	HB-A	HOSE BIBB TYPE WITH HOSE THREADS
		HOT WATER CIRCULATION FLOW SPLITTER
	PRV	PRESSURE REDUCING VALVE
		SHUTOFF VALVE
		SHUTOFF VALVE (EXISTING)
	SV	SOLENOID VALVE
	VIV	VALVE IN VERTICAL

MISCELLANEOUS

SYMBOL	DESCRIPTION	
	CONNECT TO EXISTING	
X	RISER DESIGNATION	NUMBER DENOTES WATER LETTER DENOTES SANITARY
4 / S 16 FU	CAPPED CONNECTION DESIGNATION	TOP DENOTES SIZE (IN.) BOTTOM DENOTES SERVICE TYPE SIDE DENOTES FUTURE FIXTURE UNITS
	EXISTING PLUMBING FIXTURE TO BE REMOVED (SAMPLE)	
1-1	EQUIPMENT DESIGNATION	

LEGEND NOTE:
NOT ALL SYMBOLS ARE NECESSARILY USED. ABSENCE OF A SYMBOL ON THE DRAWINGS DOES NOT NECESSARILY MEAN IT IS NOT REQUIRED. REFER TO DETAILS & SPECIFICATIONS FOR A COMPLETE UNDERSTANDING OF WORK REQUIRED.

ABBREVIATIONS

AD-A	DRAIN (AREA DRAIN & TYPE)
ADD'L	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
ALT	ALTITUDE OR ALTERNATE
AMP	AMPERE
AP	ACCESS PANEL
ARCH	ARCHITECT
AVG	AVERAGE
BDTV	BLOWDOWN TANK VENT
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BMS	BUILDING MANAGEMENT SYSTEM
BSMT	BASEMENT
BV	BALANCING VALVE
BW	BACKWATER VALVE
C&C	CUT & CAP
CBW	CARBONATED BEVERAGE WASTE
CE	CAP OR PLUG EXISTING
CI	CAST IRON PIPE & FITTINGS
CO	CLEANOUT
CP	CIRCULATOR PUMP
CTE	CONNECT TO EXISTING
CU	COPPER PIPE & FITTINGS
CV	CHECK VALVE
CVT	CONCENTRIC VENT TERMINATION
CW	COLD WATER
CWR	COLD WATER RISER
DC	DRESSER COUPLING
DCO	CLEANOUT (DANDY)
DEMO	DEMOLITION
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DV-A	DRAIN VALVE TYPE W/ HOSE THREADS
EA	EACH
EFF	EFFICIENCY
ELEC	ELECTRICAL
ELEV	ELEVATION
EMER	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
ENT	ENTER
ESSPD	ELEVATOR SUMP PUMP PRESSURE DISCHARGE
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
EWH-A	WATER HEATER (ELECTRIC & TYPE)
EWT	ENTERING WATER TEMPERATURE
EXIST.	EXISTING
F	FAHRENHEIT
FAI	FRESH AIR INTAKE
FCO	FLOOR CLEANOUT
FD-A	DRAIN (FLOOR DRAIN & TYPE)
FFE	FINISHED FLOOR ELEVATION
FGE	FINISHED GRADE ELEVATION
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FS	FLOW SWITCH
FS-A	DRAIN (FLOOR & SINK TYPE)
FT	FEET
FTR	FINNED TUBE RADIATION

G	GAS
GAL	GALLONS
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRL	GARAGE RAIN LEADER
GSID	GREASE INTERCEPTOR SUCTION DISCHARGE
GSV	GARAGE SEPARATOR VENT
GTV	NATURAL GAS/PROPANE TRAIN APPLIANCE, OR REGULATOR VENT
GW	GARAGE WASTE
GWH-A	WATER HEATER (GAS & TYPE)
GWB	GYPSUM WALL BOARD
HB	HOSE BIBB
HB-A	HOSE BIBB WITH HOSE THREADS
HGT	HEIGHT
HP	HORSEPOWER
HR	HOUR
HTG	HEATING
HTI	HEAT TRACE AND INSULATE (FREEZE PROTECTION)
HW	HOT WATER
HWC	HOT WATER RECIRCULATION
HWCR	HOT WATER RECIRCULATION RISER
HWR	HOT WATER RISER
HZ	HERTZ
ID	INSIDE DIAMETER
IN	INCHES
INV	INVERT ELEVATION
IR	IRRIGATION WATER
IW	INDIRECT WASTE
JS	JANITOR SINK
KE	KITCHEN EQUIPMENT
KEC	KITCHEN EQUIPMENT CONTRACTOR
KW	KITCHEN WASTE
KW & V	KITCHEN WASTE & VENT
KWHTI	KITCHEN WASTE HEAT TRACE AND INSULATE
L	LENGTH
LAV	LAVATORY
LB	POUND
LF	LINEAR FEET
LP	PROPANE GAS
LRA	LOCKED ROTOR AMPS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTH
MCA	MINIMUM CIRCUIT AMPS
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MSB	MOP SERVICE BASIN
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NIC	NOISE CRITERIA
NO	NORMALLY OPEN
No.	NUMBER
NOM	NOMINAL
NPCW	NON-POTABLE COLD WATER
NPHW	NON-POTABLE HOT WATER
NPHWC	NON-POTABLE HOT WATER RECIRCULATION
NTS	NOT TO SCALE
OED	OPEN-END DRAIN WITH CAP

PD	PUMPED DISCHARGE
PBG	PLUMBING
POS	PROVIDED BY OTHER SECTION
PPV	WATER HEATER POSITIVE PRESSURE VENT
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
PSID	PSI DIFFERENTIAL
PSIG	PSI GAUGE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RD-A	DRAIN (ROOF DRAIN & TYPE)
RPBFP	BACKFLOW PREVENTER
REQD	REQUIRED
RL	RAIN LEADER
RLA	RUNNING LOAD AMPS
RLS	RAIN LEADER STACK
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
S=0.01	SLOPE = 1/8" PER FOOT - 1%
S=0.02	SLOPE = 1/4" PER FOOT - 2%
S=0.04	SLOPE = 1/2" PER FOOT - 4%
S & V	SOIL & VENT
S or W	SOIL OR WASTE
SA	SHOCK ABSORBER
SH	SHOWER
SK	SINK
SPECS	SPECIFICATIONS
SF	SQUARE FEET
SQ	SQUARE
SRL	SECONDARY RAIN LEADER
SS	SOIL STACK
SSVS	SUBSLAB VENTILATION SYSTEM
STL	STEEL
SV	SOLENOID VALVE
T	TEMPERATURE
TD-A	DRAIN (TRENCH DRAIN & TYPE)
TEMP	TEMPERATURE
TMC	HOT WATER TEMPERATURE MAINTENANCE CABLE
TSTAT	THERMOSTAT
TOP	TOP OF PIPE
TOT	TOTAL
TP	AUTOMATIC TRAP PRIMER
TYP	TYPICAL
URN	URINAL
V	VENT
VB	VACUUM BREAKER
V	VOLTS (ELECTRICAL)
VEL	VELOCITY
VIV	VALVE IN VERTICAL
VS	VENT STACK
VTR	VENT THROUGH ROOF
W	WIDTH OR WATT
W & T	WASTE & TRAP
W & V	WASTE & VENT
W/	WITH
WC	WATER COLUMN
WCO	CLEANOUT (WALL)
WG	WATER GAUGE
W/O	WITHOUT
WP	WASTE PIPE
WPD	WATER PRESSURE DROP
WS	WASTE STACK
WTD	WATER TEMPERATURE DIFF.
WTS	WATER TIGHT SLEEVE

GENERAL CONSTRUCTION NOTES:

1. CONTRACTOR SHALL REFER TO THE PLUMBING SPECIFICATIONS.
2. GENERAL NOTES, SYMBOLS LIST AND DETAILS ARE APPLICABLE TO ALL PLUMBING DRAWINGS.
3. DRAWINGS ARE DIAGRAMMATIC: DETERMINE LOCATIONS OF SYSTEMS AND COMPONENTS IN FIELD.
4. ALL PLUMBING WORK SHALL BE IN ACCORDANCE WITH THE LOCAL STATE PLUMBING CODE, THE LOCAL STATE BUILDING CODE AND THE DRAWINGS. NO WORK SHALL BE INSTALLED IN VIOLATION OF ANY GOVERNING CODES. ANY WORK SHOWN ON THE DRAWINGS WHICH IS IN VIOLATION OF SUCH CODES SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND THE OWNER'S REPRESENTATIVE AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF THE WORK INVOLVED.
5. MANUFACTURERS' MODEL NUMBERS ARE SPECIFIED SOLELY TO ESTABLISH STANDARDS OF QUALITY FOR PERFORMANCE AND MATERIALS.
6. ALL PRODUCT INSTALLATIONS SHALL ADHERE TO MANUFACTURERS' RECOMMENDATIONS.
7. RUN PIPING CONCEALED, UNLESS SPECIFIED OTHERWISE, AND CLEAR OF CEILING INSERTS.
8. PROVIDE CLAMPS, OFFSETS, EXPANSION JOINTS, ANCHORS AND GUIDES AS NECESSARY TO PREVENT STRESS ON PIPING.
9. PROVIDE VENTS AT HIGH POINTS IN PRESSURE PIPING SYSTEMS AND DRAIN VALVES AT LOW POINTS.
10. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS IN ESTABLISHING PIPE RUNS AND SPACE CONDITIONS.
11. FOR SIZES AND REQUIREMENTS OF ALL HVAC EQUIPMENT SHOWN IN THESE DRAWINGS, REFER TO HVAC DRAWINGS AND SPECIFICATIONS.
12. PRIOR TO THE START OF CORING ANY STRUCTURAL MEMBER PLUMBING SUBCONTRACTOR SHALL COORDINATE LOCATION OF PENETRATION WITH STRUCTURAL ENGINEER AND GENERAL CONTRACTOR. PLUMBING SUBCONTRACTOR SHALL PREPARE AND SUBMIT TO STRUCTURAL ENGINEER AND ARCHITECT A SET OF PENETRATION DRAWINGS DURING COORDINATION DRAWING REVIEW PERIOD. PLUMBING SUBCONTRACTOR MAY DEVIATE FROM LOCATIONS OF PENETRATIONS AS SHOWN ON PLUMBING DRAWINGS BUT MUST COORDINATE ALTERNATIVE LOCATIONS WITH STRUCTURAL ENGINEER.
13. PRIOR TO START OF INSTALLATION OF BELOW SLAB PIPING, PLUMBING SUBCONTRACTOR SHALL COORDINATE LOCATIONS OF PIPING WITH STRUCTURAL FOOTINGS, GRADE BEAMS, ETC. WITH STRUCTURAL ENGINEER.
14. PRIOR TO INSTALLATION OF UNDER SLAB PIPING AT GROUND FLOOR, PLUMBING SUBCONTRACTOR SHALL COORDINATE ALL EXTERIOR INVERT ELEVATIONS WITH CIVIL ENGINEER.
15. PRIOR TO INSTALLATION OF ANY SURFACE MOUNTED OR RECESSED PLUMBING COMPONENTS (I.E. WALL HYDRANTS, PIPING PENETRATIONS, ETC.) ON EXTERIOR OF BUILDING, PLUMBING SUBCONTRACTOR SHALL COORDINATE THEIR EXACT LOCATION WITH ARCHITECT AND GENERAL CONTRACTOR.
16. PRIOR TO INSTALLATION OF ANY FLOOR DRAINS THIS ENTIRE PROJECT, PLUMBING SUBCONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF DRAINS WITH MECHANICAL SUBCONTRACTOR & ARCHITECT.
17. PLUMBING SUBCONTRACTOR SHALL COORDINATE ALL ROOF PENETRATIONS WITH ROOFING SUBCONTRACTOR. REFER TO ARCHITECTURAL DRAWINGS FOR FLASHING AT ALL ROOF PENETRATIONS.
18. THE PLUMBING SUBCONTRACTOR SHALL INSULATE ALL SANITARY, WASTE AND CONDENSATE PIPING AT THE CEILING OF THE TOP FLOOR.
19. PLUMBING SUBCONTRACTOR SHALL INSTALL TRAP PRIMER VALVES FOR ALL FLOOR DRAINS LOCATED WITHIN BUILDING. THE PLUMBING SUBCONTRACTOR SHALL COORDINATE EXACT LOCATION OF TRAP PRIMER VALVE AND WATER PIPING IN FIELD.
20. NOT ALL BRANCH PIPING AND OR OFFSETS FOR SOIL, WASTE, VENT AND DOMESTIC WATER PIPING IS SHOWN FOR CLARITY PURPOSES. IT SHALL BE THE RESPONSIBILITY OF THE PLUMBING SUBCONTRACTOR TO OWN THE PROVISION OF THIS PIPING DURING BIDDING AND CONSTRUCTION.
21. EACH INDIVIDUAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL NECESSARY FIRE STOPPING OF SLEEVES, PIPING, ELECTRICAL PIPING, DUCTWORK, ETC. PENETRATING ALL RATED PARTITIONS, FLOORS, AND CEILINGS FOR HIS/HER OWN WORK.
22. ALL WASTE/SANITARY AND STORM STACKS SHALL HAVE A CLEAN OUT AT THEIR BASE.
23. THE PLUMBING SUBCONTRACTOR SHALL HEAT TRACE AND INSULATE ALL PIPING SUBJECTED TO FREEZING TEMPERATURES.
24. PLUMBING SUBCONTRACTOR SHALL REFER TO PLUMBING FLOOR PLANS FOR ALL NATURAL GAS DISTRIBUTION PIPE SIZES.
25. PRIOR TO THE START OF WORK THE PLUMBING SUBCONTRACTOR SHALL COORDINATE ALL STACK LOCATIONS WITH ARCHITECT AND CONSTRUCTION MANAGER TO AVOID STRUCTURAL AND PARTITION CONFLICTS.
26. PRIOR TO THE START OF WORK THE PLUMBING SUBCONTRACTOR SHALL COORDINATE THE REQUIREMENTS FOR AND THE LOCATIONS OF ALL EQUIPMENT PERTAINING TO THE PROJECT.
27. ALL PLUMBING SYSTEMS TO BE INSTALLED IN PARTITIONS WHERE POSSIBLE. COORDINATE WITH GENERAL CONTRACTOR/CONSTRUCTION MANAGER PRIOR TO START OF WORK.
28. PLUMBING SUBCONTRACTOR SHALL OWN DRIP LEGS AND SHUT OFF VALVES AT THE BASE OF ALL NATURAL GAS RISERS AND AT ALL CONNECTIONS TO EQUIPMENT.
29. PLUMBING SUBCONTRACTOR SHALL OWN ALL FINAL CONNECTIONS OF GAS PIPING TO ALL GAS FIRED EQUIPMENT.
30. PLUMBING SUBCONTRACTOR SHALL OBTAIN ALL BUILDING STANDARDS & LEASE AGREEMENTS (IF APPLICABLE) PRIOR TO START OF BIDDING & SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES.

GENERAL RENOVATION NOTES:

1. THE PLUMBING CONTRACTOR SHALL REVIEW ALL OF THE ARCHITECTS AND OTHER TRADES DRAWINGS TO VERIFY ALL AREAS OF RENOVATION AND TO GET A COMPLETE UNDERSTANDING OF THE DEMOLITION WORK REQUIRED BY THIS PROJECT.
2. PRIOR TO SUBMITTING BID, VISIT SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK OF THIS SECTION. RENOVATION WORK WILL REQUIRE CAREFUL SITE EXAMINATION PRIOR TO BIDDING. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY AN EXPERIENCED OBSERVER.
3. COORDINATE ALL WORK WITH THE BUILDING OWNER 10 DAYS PRIOR TO DISRUPTION TO ANY PLUMBING SERVICES.
4. DISCONNECT AND REMOVE ALL PLUMBING FIXTURES, WATER & WASTE & VENT PIPING, VALVES AND FITTINGS, HANGERS, SUPPORTS, AND ALL OTHER PLUMBING COMPONENTS MADE OBSOLETE BY THIS PROJECT. ALL MATERIALS SHALL BECOME THE PROPERTY OF THE OWNER.
5. REFER TO ALL CONSTRUCTION DOCUMENTS TO GAIN A COMPLETE UNDERSTANDING OF THE DEMOLITION WORK REQUIRED.
6. ALL HVAC UNITS SCHEDULED TO BE REMOVED OR RE-LOCATED SHALL BE DONE SO BY THE HVAC CONTRACTOR. THE PLUMBING CONTRACTOR SHALL DISCONNECT GAS PIPING AND MAKE-SAFE FOR REMOVAL.
7. TEMPORARY WALL OPENINGS AND/OR MODIFICATIONS REQUIRED FOR REMOVAL/INSTALLATION OF EQUIPMENT SHALL BE PROVIDED AS NEEDED AND COORDINATED WITH THE GENERAL CONTRACTOR.
8. CUT, REMOVE AND LEGALLY DISPOSE OF SELECTED PLUMBING EQUIPMENT, COMPONENTS AND MATERIALS AS INDICATED, INCLUDING, BUT NOT LIMITED TO, REMOVAL OF PLUMBING ITEMS INDICATED TO BE REMOVED AND ITEMS MADE OBSOLETE BY THE WORK. THE OWNER RESERVES THE OPTION OF SALVAGE RIGHTS TO DEMOLISHED MATERIAL AND REMOVED EQUIPMENT. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER'S REPRESENTATIVE TO OBTAIN A LIST OF MATERIALS AND REMOVED EQUIPMENT TO BE TURNED OVER TO THE OWNER. ALL OTHER MATERIAL AND REMOVED EQUIPMENT NOT BEING SALVAGED BY THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR.
9. PROTECT THE STRUCTURE, FURNISHINGS, FINISHES, AND ADJACENT MATERIALS NOT INDICATED OR SCHEDULED TO BE REMOVED. PROTECT THE PLUMBING WORK AND THE WORK OF OTHERS IN A MANNER BEST SUITED TO THE PARTICULAR CASE. CORRECT ANY DAMAGE DONE TO ANY WORK AT NO ADDITIONAL COST.
10. PROVIDE AND MAINTAIN TEMPORARY PARTITIONS OR DUST BARRIERS ADEQUATE TO PREVENT THE SPREAD OF DUST AND DIRT TO ADJACENT AREAS.
11. MAINTAIN ACCESS TO EXISTING PLUMBING INSTALLATIONS WHICH REMAIN ACTIVE. MODIFY INSTALLATION OR PROVIDE ACCESS PANEL AS APPROPRIATE.
12. PROVIDE TEMPORARY WATER & WASTE CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION.
    a. EXISTING WATER & WASTE SERVICES: MAINTAIN EXISTING SYSTEMS IN SERVICE COMPLETE AND READY FOR SERVICE. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. OBTAIN PERMISSION FROM OWNER AND ARCHITECT/ENGINEER AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA AS REQUIRED.
13. THESE DRAWINGS HAVE BEEN COMPILED FROM THE BEST AVAILABLE INFORMATION AND ARE NOT INTENDED TO LIMIT THE SCOPE OF THE WORK. THE PLUMBING CONTRACTOR MAY ENCOUNTER HIDDEN OR COVERED CONDITIONS, NOT INDICATED IN THESE DOCUMENTS, REQUIRING THE PLUMBING CONTRACTOR TO PROVIDE ADDITIONAL WORK FOR THE COMPLETION OF HIS OR HER CONTRACT. IT WILL BE ASSUMED THAT THE CONTRACTOR HAS INSPECTED THE SITE PRIOR TO BIDDING AND VERIFIED THE INFORMATION SUPPLIED HEREIN.
14. PROTECT ALL EXISTING WALLS, FLOORS, CEILINGS, PLUMBING FIXTURES, ETC. WHICH ARE TO REMAIN & TO PREVENT DAMAGE DURING ALL CONSTRUCTION PHASES.

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DRAWN BY: TCC
DATE: AUGUST 25, 2023
REVISIONS:
9/1/2023 - Addendum #1

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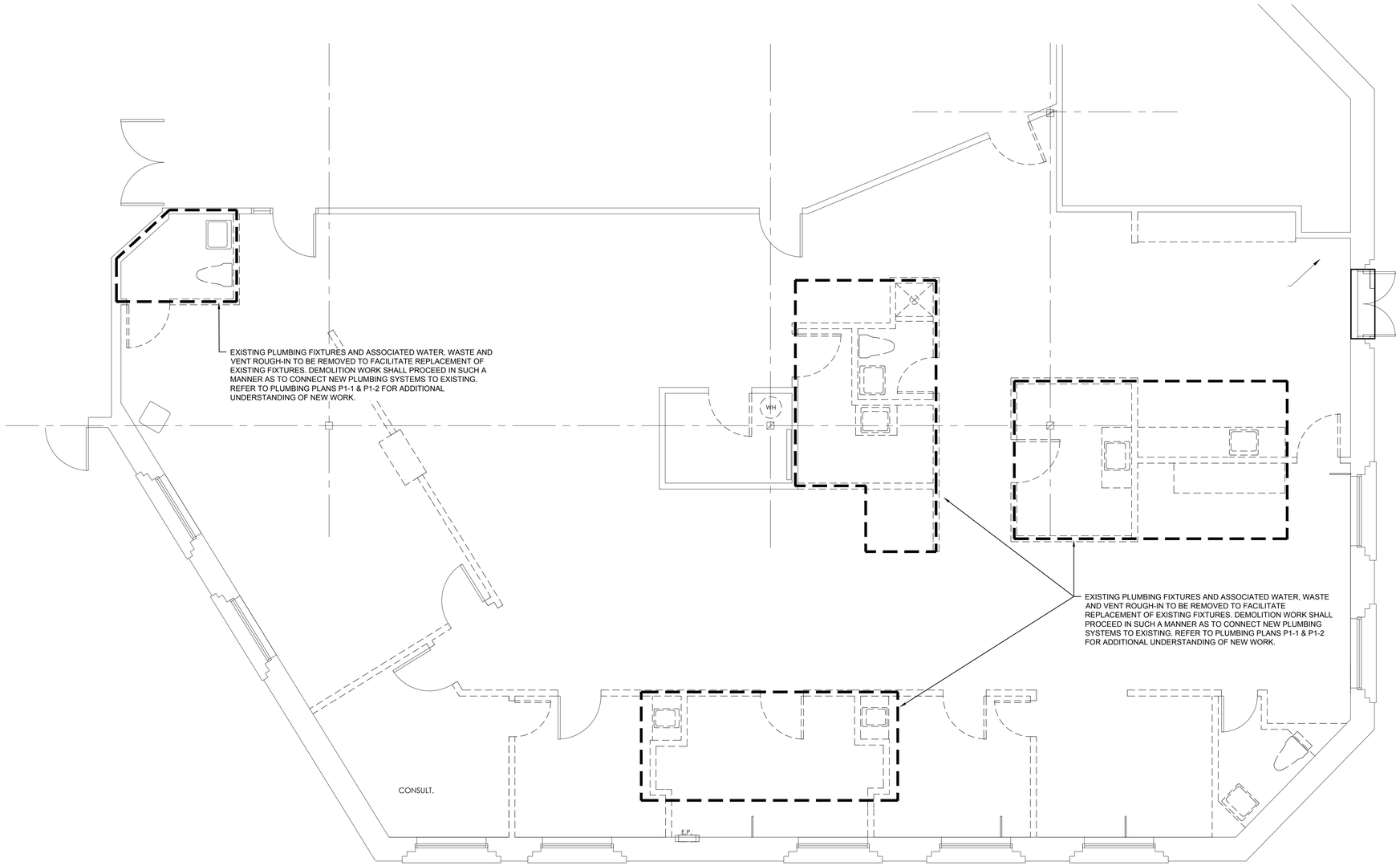
NORTH PROVIDENCE, RHODE ISLAND

PLUMBING LEGENDS & NOTES

ISSUED FOR BID

P0-1



1 PLUMBING - EXISTING / DEMOLITION PLAN
NORTH 1/4" = 1'-0"

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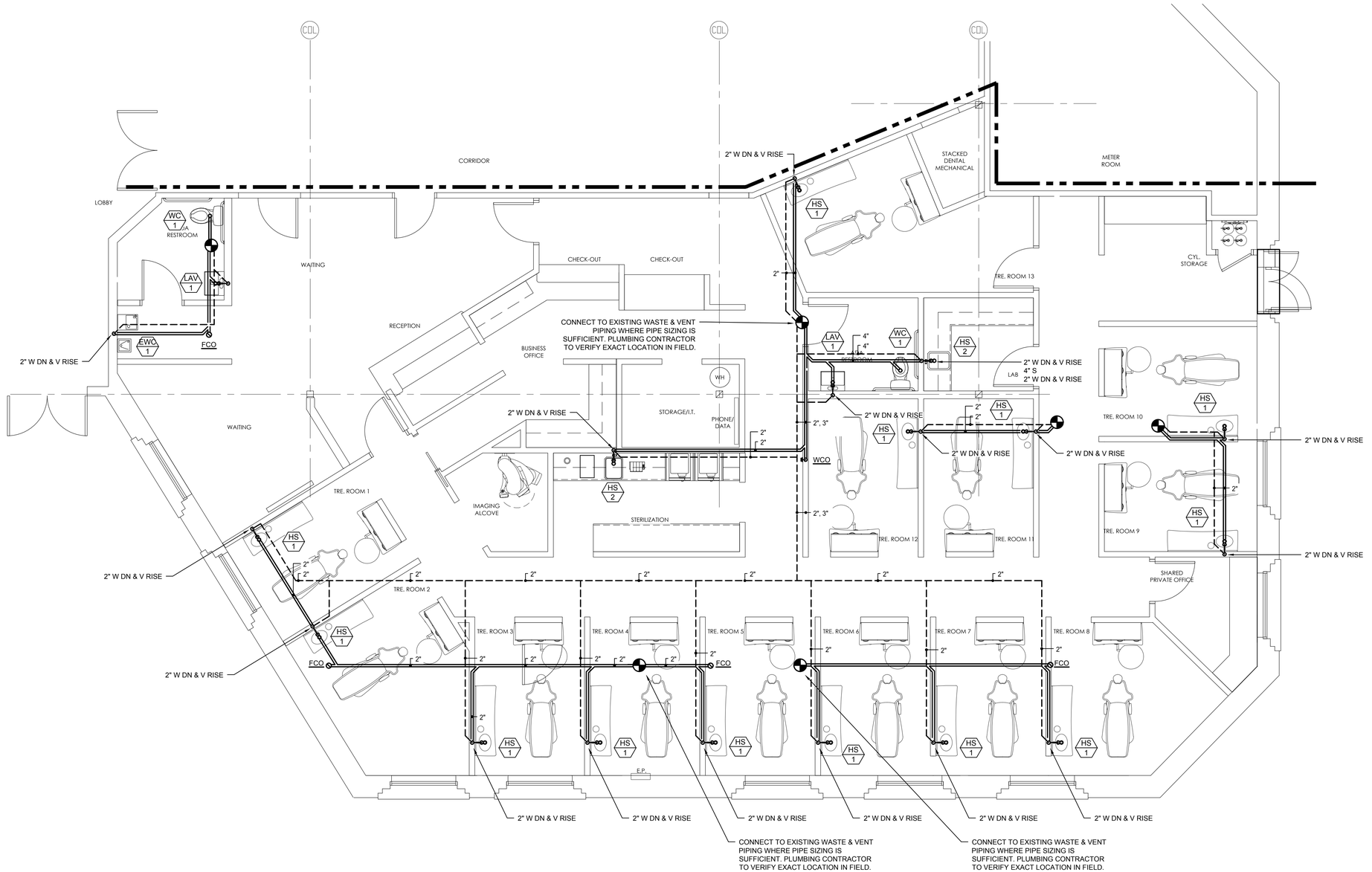
PLUMBING
DEMOLITION
PLAN

ISSUED FOR BID

PD1-1



PLUMBING - WASTE & VENT FLOOR PLAN

NORTH

1/4" = 1'-0"

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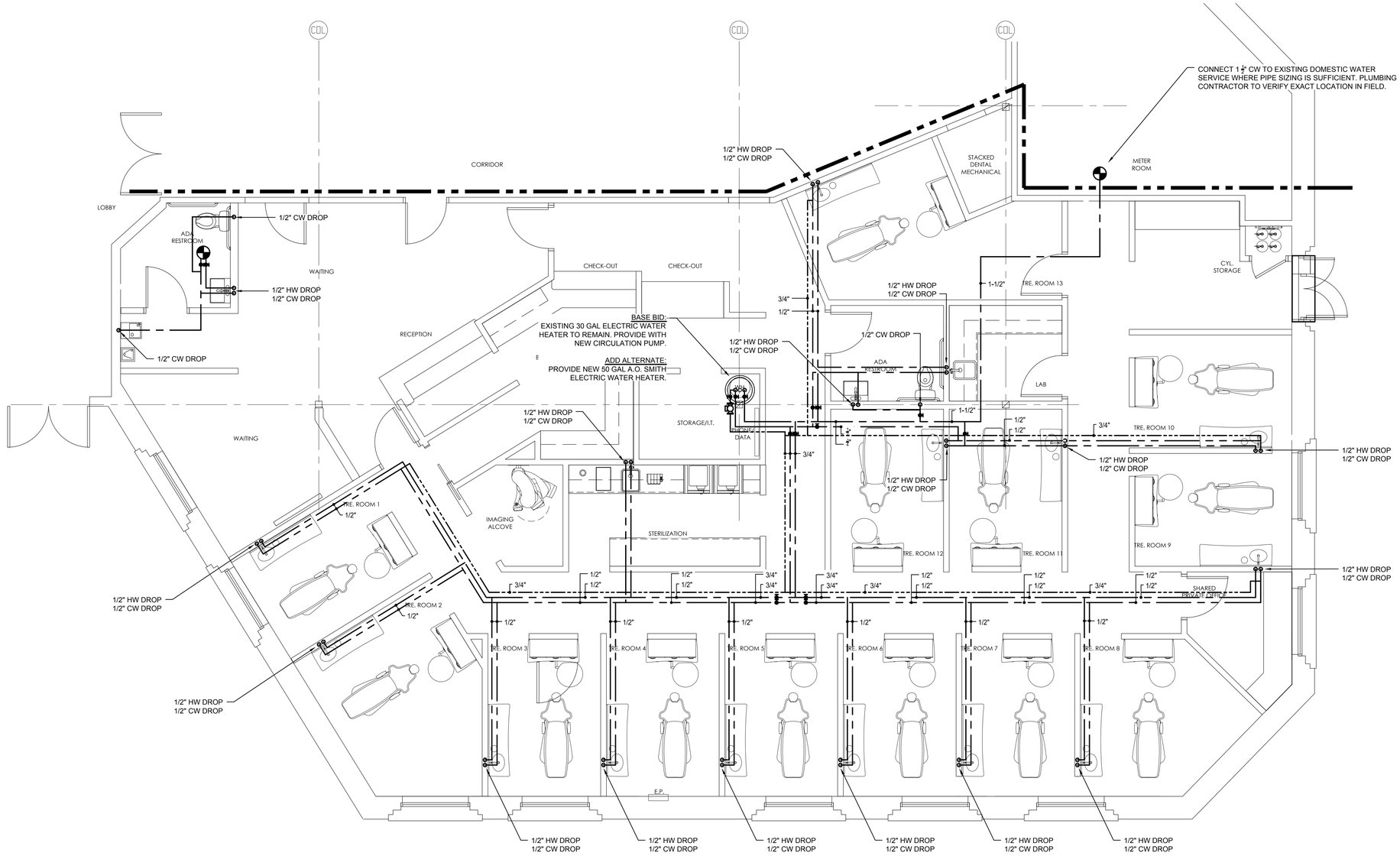
PLUMBING
WASTE & VENT
FLOOR PLAN

ISSUED FOR BID

P1-1



PLUMBING - WASTER PIPING FLOOR PLAN
1/4" = 1'-0"
NORTH

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PLUMBING
WATER PIPING
FLOOR PLAN

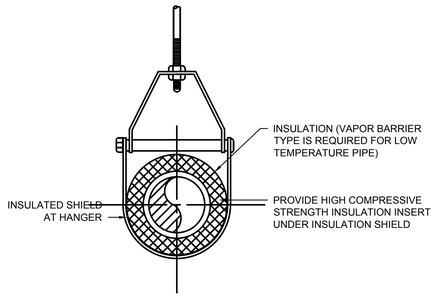
ISSUED FOR BID

P1-2

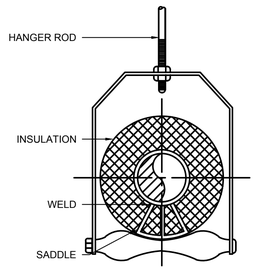
PLUMBING FIXTURE SCHEDULE

SYMBOL	FIXTURE INFORMATION				FITTING INFORMATION			CONNECTIONS				TRAP	CARRIER	MAXIMUM WATER CONSUMPTION	REMARKS AND SPECIFICATIONS
	DESCRIPTION	MANUFACTURER	MODEL	COLOR	TYPE	MAKE/MODEL	SUPPLY	WASTE	VENT	HW	CW				
LAV-1	LAVATORY (ADA)	AMERICAN STANDARD	LUCERNE 0355.012	WHITE	FAUCET-MOUNT	CHICAGO FAUCET W4D-DB6AE1-317ABCP	4" CENTERS, 2 HANDLE, POP-UP STRAINER	1-1/2"	1-1/2"	1/2"	1/2"	1-1/4"x1-1/2" CAST BRASS P-TRAP w/C.O. PLUG	ZURN OR EQUAL	0.5 GPM	G.C. SHALL COORDINATE FINAL SELECTIONS WITH OWNER PRIOR TO BIDDING/CONSTRUCTION. PROVIDE WITH 0.5 GPM AERATOR.
WC-1	WATER CLOSET (ADA)	AMERICAN STANDARD	CADET PRO "RIGHT-HEIGHT" #215AA104.020 #215AA105.020	WHITE	FLOOR-MOUNTED	AMERICAN STANDARD CHROME TRIP LEVER	SUPPLY WITH STOP & LOOSE KEY	4"	2"	-	1/2"	INTEGRAL	-	1.28 GPF	G.C. SHALL COORDINATE FINAL SELECTIONS WITH OWNER PRIOR TO BIDDING/CONSTRUCTION. LEVER TO BE LOCATED ON WIDE SIDE OF TANK COMPARTMENT.
HS-1	LAVATORY (ADA)	AMERICAN STANDARD	OVALYN 9482.000	WHITE	FAUCET-MOUNT	CHICAGO FAUCET W4D-DB6AE1-317ABCP	4" CENTERS, 2 HANDLE, POP-UP STRAINER	1-1/2"	1-1/2"	1/2"	1/2"	1-1/4"x1-1/2" CAST BRASS P-TRAP w/C.O. PLUG	ZURN OR EQUAL	1.5 GPM	G.C. SHALL COORDINATE FINAL SELECTIONS WITH OWNER PRIOR TO BIDDING/CONSTRUCTION. PROVIDE WITH 1.5 GPM AERATOR.
HS-2	SINK	ELKAY	LUSTERTONE LRAD-2219-65-4-Q	STAINLESS STEEL	SURFACE MOUNTED	CHICAGO FAUCET 200-A317CPR-CF	8" CENTERS W/ SWING SPOUT	1-1/2"	1-1/2"	1/2"	1/2"	1-1/4"x1-1/2" CAST BRASS P-TRAP w/C.O. PLUG	-	2.0 GPM	G.C. SHALL COORDINATE FINAL SELECTIONS WITH OWNER PRIOR TO BIDDING/CONSTRUCTION. PROVIDE WITH 2.0 GPM AERATOR.
EWC-1	ELECTRIC WATER COOLER	HALSEY TAYLOR	HAC8BLPV-NF	PLATINUM VINYL	-	-	-	1-1/2"	1-1/2"	-	1/2"	-	-	-	HI-LOW ADA COMPLIANT, 120V. PROVIDE WITH BOTTLER FILLER.

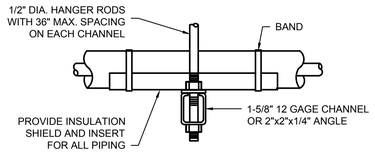
NOTES:
1. APPLY SILICONE SEALANT WHERE FIXTURES MEET FLOORS AND WALLS.



ADJUSTABLE CLEVIS HANGER



ADJUSTABLE ROLLER HANGER



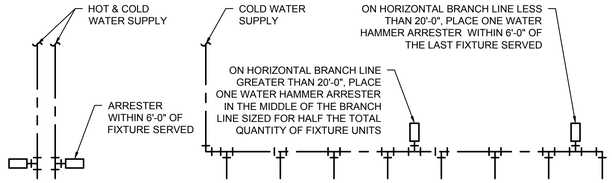
TRAPEZE HANGER FOR UP TO 1000 LB. UNIFORM LOAD

MAXIMUM SUPPORT SPACING (FEET)

NOMINAL SIZE	THRU 3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
PIPE	7 FT	7 FT	7 FT	9 FT	10 FT	11 FT	12 FT	14 FT	16 FT	17 FT	19 FT	22 FT	23 FT	25 FT	27 FT	28 FT	30 FT	32 FT
TUBING	5 FT	6 FT	7 FT	8 FT	8 FT	9 FT	10 FT	12 FT	13 FT	14 FT	16 FT	-	-	-	-	-	-	-

NOTES:
1. FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.

PIPE HANGER DETAIL
NTS



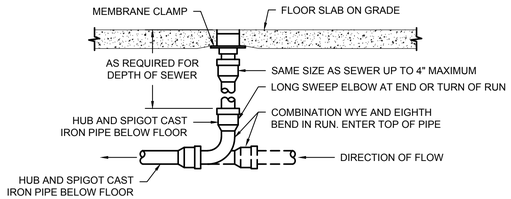
SINGLE FIXTURE — MULTIPLE FIXTURES

PDI SIZE	FIXTURE UNIT LOAD
AA	1-3
A	4-11
B	12-32
C	33-60
D	61-113
E	114-154

FIXTURE UNIT TABULATION		
FIXTURE TYPE	COLD	HOT
FLUSH VALVE WATER CLOSET	10	-
URINAL	5	-
LAVATORY	1.5	1.5
SINK	2	2
MOP BASIN	3	3
DRINKING FOUNTAIN	0.5	-

NOTES:
P.C. TO PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS, OR APPROVED EQUIVALENT WITH PISTON AND O-RING CONSTRUCTION, HAVING PDI #WH-201, ASSE #1010 OR ANSI #A1126.1M CERTIFICATION. SIZE AND INSTALL PER PDI #WH-201 STANDARD OR MANUFACTURER'S RECOMMENDATION. THE TABLES ABOVE ARE BASED ON THE SIOUX CHIEF PRODUCT LINE. IF PRESSURE IS IN EXCESS OF 65 PSI, THEN UP-SIZE THE ARRESTERS BY ONE SIZE (I.E. AN 'A' ARRESTER WOULD BECOME A 'B' ARRESTER).

WATER HAMMER ARRESTER DETAIL
NTS



NOTES:
1. PROVIDE ROUND SECURE NICKEL BRONZE ADJUSTABLE TOP WITH "CO" CAST INTO COVER. PROVIDE CLEANOUT TOP WITH VARIATIONS SUITABLE FOR FLOOR COVERING (CARPET MARKER, RECESSED FOR TILE, SCORIATED FOR UNFINISHED FLOORS). PROVIDE BRONZE PLUG IN CAST IRON BODY.
2. LOCATE AT BUILDIGN EXIT, AT ENDS OF RUNS, AT TURNS OF PIPE GREATER THAN 45 DEGREES, AT 50' INTERVALS ON STRAIGHT RUNS, AND WHERE SHOWN ON PLANS. PROVIDE BACKFILL PER ARCHITECTURAL SPECIFICATIONS. LOCATE CLEANOUTS WHERE THERE IS 18" CLEAR AROUND. CONSULT LOCAL CODES FOR OTHER FCO REQUIREMENTS.

FLOOR CLEANOUT DETAIL
NTS

CLEANOUT, FLOOR DRAIN, AND FLOOR SINK SCHEDULE

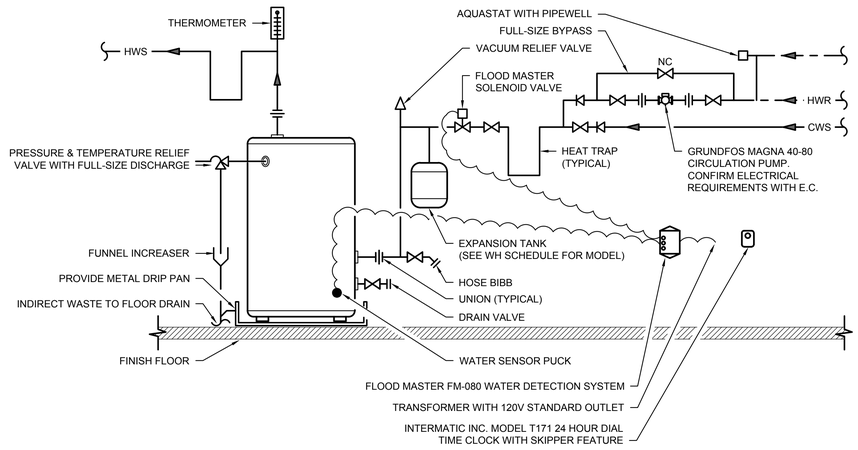
SYMBOL	TYPE	MANUFACTURER	MODEL	OUTLET	MATERIAL	REMARKS
FCO	FLOOR CLEANOUT	J.R. SMITH	4026C	CAULK	NICKEL BRONZE TOP BRONZE PLUG	FINISHED AREAS (PROVIDE CARPET MARKER IN CARPETED ARAS).

NOTES:
1. ALL FLOOR DRAINS THAT DO NOT RECEIVE INDIRECT WASTE DISCHARGE SHALL BE TRAP SEAL PROTECTED WITH TRAP PRIMER VALVES, BELOW SLAB PIPING AND DISTRIBUTION UNITS OR INSTALL "SURE-SEAL" OR "PRO-SET" NEOPRENE DUCKBILL FLAPPER DEVICE TO PREVENT TRAP SEAL EVAPORATION.

WATER HEATER SCHEDULE (BASED ON STATE WATER HEATERS)

SYMBOL	LOCATION	MODEL	RECOVERY TEMP. RISE	FUEL	NO. OF ELEMENTS	SIMULTANEOUS	KW	ELECTRICAL DATA		WEIGHT (LBS.)	NOTES
								AMPS	VOLTAGE		
WH-1	JANITORS CLOSET	PCE-10	100° F	ELEC	1	NO	2.5	12	208/1/60	54	1,2

NOTES:
1. PROVIDE WITH DISCONNECT. COORDINATE WITH E.C.
2. PROVIDE WITH AMTROL # ST-5 EXPANSION TANK (ET-1) RATED FOR 150 PSIG.



NOTES:
1. INSTALL WATER HEATER DIRECTLY ABOVE MOP RECEPTOR.
2. SEE FLOOR PLANS FOR ALL PIPE SIZING.

ELECTRIC WATER HEATER DETAIL
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PLUMBING SCHEDULES & DETAILS

ISSUED FOR BID

P2-1

SECTION 22000 - PLUMBING

PART I -- GENERAL

1.1 DESCRIPTION OF WORK

A. The work under this section shall consist of furnishing all labor, materials, equipment, supervision, transportation, construction, facilities, devices and incidentals necessary to provide complete plumbing systems as hereinafter described and as indicated on the drawings, including, but not limited to the following:

1. Sanitary, waste and vent piping system
2. Domestic water piping system
3. Natural gas system (Refer to mechanical plans for scope of work)
4. Plumbing fixtures and trim
5. Sleeves, escutcheons, hangers and supports
6. Fire safing of pipe penetrations
7. Floor drains
8. Hose bibs
9. Insulation
10. Valves
11. Water Hammer arrestors
12. Backflow preventers and file DEP submission
13. Fittings, unions and couplings
14. Cleaning, flushing, testing and disinfection
15. All supplementary steel for piping and equipment support
16. Guarantees
17. Drilling for installation of inserts
18. Vibration isolation and flexible connections
19. Installation of toilet accessories
20. Coordination drawings
21. Access panels
22. Selective demolition

1.2 CODES, ORDINANCES AND PERMITS

A. All material and work provided shall be in accordance with the following codes and standards:

1. State Plumbing and Fuel Gas Code
2. State Department of Public Safety
3. Standards of the Underwriters' Laboratories (UL)
4. RI State and local Building Codes
5. Occupational Safety and Health Act
6. Local Codes and Board of Health requirements
7. Requirements of the RI Department of Environmental Protection
8. Requirements of the City of North Providence, RI

B. Where the contract documents indicate more stringent requirements than the above codes and ordinances, the contract documents shall take precedence.

C. File all documents, pay all fees and secure all permits, inspections and approvals necessary for the work of this section.

1.3 CONTRACT DRAWINGS & SPECIFICATIONS

A. The Contract Drawings are generally diagrammatic and convey the Scope of Work and General Arrangement of apparatus and equipment. The locations of all items shown on the drawings or called for in the specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect and Engineer before being installed. The Subcontractor shall follow drawings in laying out work and shall check drawings of the other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, the Subcontractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or before proper execution of the work.

B. Specifications: The specifications are intended only to complement the drawings; however, work detailed and/or noted only on the drawings or work described only in the specifications shall all be considered as part of the scope of work.

1.4 SHOP DRAWINGS

A. Within thirty (30) days after the date of notice to proceed, and before purchasing any materials or equipment, submit for approval a complete list, in six (6) copies, of all materials to be incorporated in the work.

B. After the list has been processed, submit six (6) complete sets of shop drawings of all equipment. These shop-drawing submittals shall be submitted within thirty (30) days after the processing date of the original submittal.

C. All submittals shall be complete and shall be in three-ring loose-leaf binders. No consideration will be given to partial submittals, except with prior approval.

D. The approval of the equipment does not relieve the Subcontractor of responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist.

E. Refer to General Requirements for the substitutions of equipment and submittal of shop drawings. If apparatus or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, piping, supports, or construction, same shall be provided. Plumbing Subcontractor to assume cost and entire responsibility thereof.

1.5 RECORD DRAWINGS

A. The General Contractor will provide two sets of black or blue line and white drawings to the Plumbing Contractor to maintain and submit record drawings. One set of which shall be maintained at the site, and which shall, at all times, be accurate, clear and complete. Showing the actual location of all equipment and piping. The record drawings shall be available to the Architect/Engineer and/or General Contractor field representative at all times.

B. Any addenda, sketches, and supplementary drawings issued during the course of construction shall be transferred to the "as-built" drawings in AutoCAD format.

C. At the completion of the contract, submit an accurate, checked set of "as-built" drawings along with a disc with plans in AutoCAD format.

D. All valves installed shall be indicated on these drawings, and shall be numbered with numbers corresponding to those on the valve charts.

1.6 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Operating Instructions: Provide operating instructions to the Owner's designated representative with respect to the operation functions and maintenance procedures for all equipment and systems installed..

B. Maintenance Manuals: At the completion of the project, turn over to the General Contractor four (4) complete manuals in 3-ring binders, indexed, containing the following:

1. Complete shop drawings of all material and equipment in Part 2 of this section.
2. Operation descriptions of all systems.
3. Names, addresses and telephone numbers of all suppliers of system components.
4. Preventative maintenance instructions for all systems.
5. Spare parts list of all system components.
6. Copies of all valve charts.

1.7 GUARANTEE

A. This Contractor shall obtain in the General Contractor's and Owner's name, the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents. The guarantee shall be for a period of one (1) year minimum from the date of acceptance or final payment.

1.8 STORAGE OF MATERIALS

A. Store materials prior to their installation where designated by the General Contractor. This Contractor shall be responsible for all materials stored and protect all installed equipment from injury or defacement.

1.9 SITE VISITATION

A. Prior to bid, This Contractor shall be required to visit the site and to have examined the existing conditions, which may affect the work under this contract. Failure to do so shall be this Subcontractor's responsibility and no claims for extra compensation or extension of time shall be allowed because of it.

1.10 COOPERATION WITH OTHER TRADES

A. Give full cooperation to other trades and furnish in writing to the Architect any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Coordination drawings shall be initiated under Section 15500 of the Specifications. It is their responsibility for preparation of project coordination drawings showing the installation of all equipment, piping, ducts and accessories to be provided under Section 15500 of the Specifications. These drawings shall be prepared at not less than ¼ in. = 1 ft. scale, and shall show building room layouts, structural elements, ductwork and lighting layouts of function. Drawings shall indicate horizontal and vertical dimensions, to avoid interference with structural framing, ceilings, partitions, and other services. A reproducible copy of each drawing prepared shall then be submitted to each Contractor working under Sections 15300, 15400 and 16000, who shall be responsible to coordinate his equipment and systems and shall show these on the drawings submitted. After this Contractor has fulfilled his obligation, he shall return the drawings to the HVAC Contractor. After each drawing has been coordinated between trades, each trade shall sign each drawing, indicating acceptance of the installation. The HVAC Contractor shall then print the coordination original and these prints submitted through the General Contractor to the architect for review and comment, similar to shop drawings. Comments made on these drawings shall result in a correction and re-submittal of the drawings.

C. Furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

1.11 DEMOLITION

A. Prior to submitting bid, visit site and identify existing conditions and difficulties that will affect work of this section. Demolition work will require careful site examination prior to bidding. No compensation will be granted for additional work caused by unfamiliarity with site conditions that are visible or readily construed by experienced observers.

B. Prior to commencing demolition, contractor shall identify with owner any equipment to be returned to the owner after demolition. All other debris shall be disposed of by this contractor in accordance with all applicable regulations. Any shutdowns required for demolition shall be coordinated with building owner to avoid impact to operations.

C. During demolition, any equipment found to be abandoned shall be demolished. Existing unused connections to existing piping shall be capped accordingly.

D. Under demolition, the following is, in brief, the extent of the work to be performed by the Plumbing Contractor under this contract.

1. The plumbing contractor shall be responsible for the disconnection and removal of the existing equipment, fixtures, piping, valves, etc. in designated areas. Cut & cap piping back to mains. Patch all roof and wall penetrations to match existing.
2. This contractor shall protect work against injury or damage; and carefully store material and equipment to be relocated. Open ends of work shall be closed with temporary covers or plugs during storage and construction to prevent entry of obstructing material.
3. Refer to plumbing relocation drawings for new locations of equipment called out "To be Re-installed".

1.12 INSPECTION AND TESTS

A. If inspection of materials installed shows defects, such defective work, materials, and/or equipment shall be replaced at no cost to the General Contractor or Owner, and the inspection and tests repeated.

B. Make all reasonable tests as required, and prove the integrity of all work and leave the entire installation in correct adjustment and ready to operate.

1.13 CONFLICT BETWEEN PLANS AND SPECIFICATIONS

A. In case of conflict between the contract drawings and specifications, the Engineer shall determine which takes precedence.

PART 2 - PRODUCTS

2.1 ACCESS PANELS

A. Furnish access panels for access to all concealed parts of the plumbing system that require accessibility such as valves, shock absorbers and cleanouts. Access panels to be installed by others under the appropriate section of the specifications.

B. All access panels shall be located in a workmanlike manner, positioned so that the component can be easily reached and the size shall be sufficient for this purpose (minimum size 12-in. square). Location of access panels will be submitted for approval prior to installation.

C. Access panels shall be prime painted with cam lock, as manufactured by Inland Steel Products Co. Milcor, Miami Carey or Walsh-Hannon-Gladwin, Inc., Waylector or an approved equal. Provide fire rated access panels where required by applicable code. They should be as follows:

D. Access panel shop drawings shall be submitted to the Architect for approval.

2.2 PIPING/FITTINGS/JOINTS

A. Pipe and fittings shall be of US manufacture, and shall conform to the latest ASA, ASTM and/or FS Standards.

B. Domestic Water Piping: Pipe - Type L copper tubing, conforming to Federal Specification WW-T-799 hard temper, or ASTM B88 drawn copper. Fittings -Wrought copper and bronze solder joints. Joints - Soldered joints shall be lead free solder.

C. Waste and Vent: PVC Schedule 40 solid wall pipe and PVC drainage fittings joined by solvent welding.

D. Natural Gas Piping 2-1/2 in. and Larger: Schedule 40, black steel pipe (ASTM A120) with Schedule 40, black steel fittings. Pipe joints shall be welded or flanged.

E. Natural Gas Piping and Gas Train Vents 2 in. and Smaller: Schedule 40, black steel pipe (ASTM B16.3) with 125-psi malleable iron, screwed fittings.

2.3 HANGERS

A. All piping shall be supported from the building structure by means of approved standard weight UL/FM hangers and supports. Piping shall be supported to maintain required grading and pitching of lines to prevent vibration and to secure piping in place and shall be so arranged as to provide for expansion and contraction. Piping shall not be hung from the hangers of other trades.

B. The spacing of hangers for horizontal piping shall be in accordance with State Plumbing Code. In no case shall horizontal piping be supported at intervals greater than 10 ft. Vertical lines shall be adequately supported at their bases by a suitable hanger placed in the horizontal line near the riser and at every story height vertically.

C. Hangers shall be manufactured by Grinnell, Carpenter and Patterson, Fee and Mason, or equal. All hangers and support figure numbers referred to are Carpenter and Patterson.

D. On insulated piping, each hanger shall be oversized so that the hanger will allow the insulation to pass through undisturbed and uncut. Install a 14 gauge metal pipe shield between pipe insulation and at all pipe hangers or saddles. Hangers shall be around insulation so insulation will be between pipe and hanger or saddle.

E. Seismic Restraints: It is the intent of this seismic specification to keep all mechanical building system components in place during a seismic event.

2.4 INSULATION

A. Pipe and equipment installed under this Contract shall be covered as follows:

B. All cold water piping: 1/2 in. glass fiber, 3-1/2 pound density, snap-on fiberglass insulation with vapor barrier jacket and self-sealing lap.

C. All Hot Water Piping: 1 in. glass fiber, 3-1/2 pound density, snap-on fiberglass insulation with jacketed vapor barrier and self-sealing lap.

D. All existing horizontal storm water drain piping: 1/2 in. glass fiber, 3-1/2 pound density, snap-on fiberglass insulation with vapor barrier jacket and self-sealing lap.

E. All valves and fittings shall have fiberglass insulation and covered with Manville's Zeston or Proto, PVC fitting covers with a 25/50 flame and smoke rating. The covers shall be Manville's Zeston or an approved equal. The covers shall be secured in place with a 1-inch wide white vinyl tape on all seams joints and throat. No tacks or staples will be allowed on this project.

F. All Condensate Piping: Horizontal runs of condensate drainage piping, including the horizontal to vertical elbow of fitting and drain body and connection shall be insulated with 1/2" fiberglass insulation with vapor barrier.

G. All piping on factory assembled equipment shall be insulated same as for field installed piping.

H. All pipe insulation shall be covered with a fire retardant vapor jacket in accordance with NFPA. Jacket shall be constructed of outer layers of white kraft paper and one mil aluminum foil with a glass fiber reinforcing between, laminated together with fire retardant adhesive. This jacket shall have a water vapor permeability of .02 perms.

I. Joints: The end joints of insulation shall be tightly butted and covered with factory furnished end joint sealing tapes. The jacket overlap shall be sealed with an approved sealer which shall not mar the jacket finish. End joints on cold water piping shall be sealed with vapor barrier mastic.

J. All sealer, solvents, tapes, adhesives and mastics used in conjunction with the installation of all insulation specified under this section of the specifications, shall pass the maximum possible fire safe qualities available and be of a type approved under NFPA or NFBU 91A and 90B Standards. The flame-spread rating shall not exceed 25. Smoke development rating shall not exceed 50.

K. No covering will be applied until the piping has passed all tests as required by the Engineer and approving authority.

L. All covering shall be Gustin Bacon, Johns-Manville, Owens Corning Fiberglass Co., or equal by recognized manufacturer, and shall be installed by reputable Sub-subcontractors regularly engaged in this work and employing particularly skilled therein.

2.5 VALVES

A. Furnish and install valves, required by code, where indicated on the drawings or specifications, so located that they may be operated, repaired or replaced with minimum effort and repacked under pressure. Provide access panels where valves are concealed behind non-removable ceilings or walls. Provide shut off valves for each battery of fixtures.

B. Ball valves 2 in. and smaller shall be two piece, all bronze with full port chrome plated ball, teflon seats, solder or threaded ends, extended stems and 600 psi cold working pressure. Ball valves 2-1/2 in. and larger shall be carbon steel with full port ball, teflon seats, flanged and designed for 600 lbs. non-shock cold water.

C. Stop and waste ball valves 3/4 in. and smaller shall be two piece, all bronze, with full port chrome plated ball, drain cap, teflon seats, solder or threaded ends, extended stems and 400-psi cold working pressure.

D. Gas cocks 2-1/2 in. and larger shall be all iron, lubricated plug, flanged ends, and 125-psi working pressure. Gas cocks 2 in. and smaller shall be bronze, lubricated plug, screwed ends and 125-psi working pressure.

2.6 HOSE BIBS AND WALL HYDRANTS

A. Hose bibs shall be Chicago No. 293, 1/2-in. brass "Y" pattern with lock shield, composition disk, loose tee handler and 3/4 in. hose end. Provide watts #8-A chrome plated backflow preventer on outlet. Mount the hose bib with the outlet 16-in. above finish floor.

A. Traps installed on threaded pipe shall be recessed drainage pattern.

2.8 PLUMBING FIXTURES

A. Plumbing fixtures shall be of the best quality as fabricated by a manufacturer of established reputation. Refer to architectural plans (Interior Design) for plumbing fixture specifications.

B. All fixtures shall have the manufacturer's guarantee label or trademark indicating first quality.

C. Provide in all areas where floor drains are located a 1/2" chrome plated hose bib with vacuum breaker and loose key.

D. All materials specified to be chromium plated shall be thoroughly cleaned and polished before plating and plate shall be heavily, thoroughly and evenly plated, guaranteed not to strip or peel.

E. Where escutcheons are not furnished with plumbing fixtures, this Contractor shall supply them. Fixtures shall meet the requirements for the conservation of hot and cold water as noted in the State Plumbing Code.

F. Each fixture shall be separately trapped, using the type and size of trap required by the Plumbing Code or as specifically denoted otherwise. Unless otherwise specified, faucets and all exposed fittings and pipe shall be chrome plated. All replacement materials shall be verified in the field to assure a trouble free installation.

G. Dimensions locating plumbing fixtures shall be as shown on the architectural drawings.

2.9 SHOCK ABSORBERS

A. Furnish and install where required to prevent water hammer (all cold water drops to waterclosets and urinals), Zurn Z-1700 Shoktrol arrestors stainless steel, gas filled, bellows type shock absorber. Installation of absorbers shall be as per manufacturer's recommendations. Access panels are required at shock absorbers.

2.10 DRAIN VALVES

A. It shall be possible to drain the water from all the cold and hot and hot water piping. This subcontractor shall furnish and install 1/2-in. bronze gate valves with 3/4-in. hose outlets to drain each section and branch.

2.11 FIRE SAFING

A. Where piping passes through fire rated walls, floors and ceilings, provide a fire safing system so as to maintain the integrity of the rated assemblies to the satisfaction of the Architect and the Building Inspector. The fire safing system shall be as manufactured by 3M, Dow, Bio-Fire Shield, or Nelson. Provide manufacturer's details or custom details when there are not manufacturer's details for each condition with a UL listing referenced. Where piping is insulated, pipe insulation shall run continuously through the rated opening. Details shall show the required depth and annular space width requirements and limitations and any packing requirements.

B. Refer to architectural drawings for rated walls and partitions. Where there are no architectural drawings or they do not indicate rated walls and partitions, the following guidelines shall be used. All floors, corridor walls, party walls, mechanical room walls, duct and pipe chase walls, stairwells, trash room and chute walls shall be considered minimum two hour fire rated walls.

C. Products for fire safing of PVC piping shall be Proset System "C" or approved equal.

2.12 SYSTEMS IDENTIFICATION

A. All systems identification materials shall meet ANSI standard A13.1 - 1975, and be as manufactured by Seton Name Plate Corporation or approved equal.

B. Valve tags shall be circular 19 gauge brass, 1-1/2 in. diameter, with black filled text Seton No. 250-BL with No 530 brass hooks, No. 16 brass jack chain, or No.6 nickel-plated bead chain. Letter abbreviations shall be 4 in. high above 1/2-in. high numbers.

C. Pipe markers shall be setmark type "SNA" pre-molded acrylic plastic, snap on markers, either 8 in. or 12 in. long with overlap, for up to 6 in. diameter ER and type "STP" strap for 6 in. and larger. The background, field and legend colors and letter sizes shall be per ANSI standards.

2.13 ESCUTCHEONS

Install escutcheons around exposed pipe passing through finished floor, wall or ceiling. Escutcheons shall be one piece heavy cast brass, chromium plated, with set screw adjustable and shall be of sufficient outside diameter to cover sleeve opening and shall fit snugly around pipe.

2.14 FLOOR DRAINS

All floor drains shall be the product of one manufacturer such as Jay R. Smith, Josam, Zurn, or approved equal.

A. FD-A: Cast iron body and flashing collar with protector cap and 5-inch nickel bronze adjustable square strainer, similar to Jay R. Smith 2010C.

B. Provide round funnel similar to Jay R. Smith Figure No. 3580 where applicable.

C. Provide trap primer connection similar to Jay R. Smith P050 where applicable.

D. FD-B: Cast iron body and flashing collar with adjustable top bar grate and sediment bucket, similar to Jay R. Smith 2360C-S

E. Provide round funnel similar to Jay R. Smith Figure No. 3580 where applicable.

F. Provide trap primer connection similar to Jay R. Smith P050 where applicable.

G. FS-A: Cast iron flanged body with flashing clamp, acid-resistant coated interior, nickel bronze rim and secured grate, with aluminum sediment bucket, similar to Jay R. Smith 3151C-C.

H. FS-B: Same as FS-A except with Jay R. Smith 12 nickel bronze rim and half grate.

I. FS-C: Same as FS-A except with Jay R. Smith 13 nickel bronze rim and 3/4 grate.

J. FS-D: Cast iron flanged body with flashing clamp, acid-resistant coated interior, nickel bronze rim and half secured grate, aluminum sediment bucket and trap primer connection similar to Jay R. Smith 3151C-12-LXH-P050 .

2.15 PLUMBING FIXTURES

See Plumbing Fixture Schedule.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. Prior to the work of this section, this Contractor must ascertain that preceding work has been accomplished in a manner to permit compliance with the level of quality required by this Section.

B. The entire work provided in this specification shall be constructed and finished in every respect in a workmanlike and substantial manner. It is not intended that the drawings shall show every pipe, fitting, and appliance. Furnish all parts as may be necessary to complete the system in accordance with the best trade practices and to be the satisfaction of the Architect, Engineer and General Contractor.

C. This Contractor shall keep other contractors fully informed as the shape, size and position of all openings required for his apparatus and shall give full information to the General Contractor or other contractors sufficiently in advance of the work so that all openings may be built in advance. Furnish and install all sleeves, supports, etc., specified or required.

D. In the case of failure on the part of this Subcontractor to give proper and timely information as noted above, he shall do his own cutting and patching, or have same done by the General Contractor at this subcontractor's expense, but in any case, without extra expense to the Owner and General Contractor.

E. This Contractor shall obtain detailed information from the manufacturer of apparatus as to the proper method of installing and connecting same. He shall also obtain all information from the General Contractor and the other contractors which may be necessary to facilitate his work and the completion of the whole project.

3.2 CORE DRILLING

A. All holes through concrete or masonry for the passage of plumbing piping not provided by sleeves or openings at the time of casting, shall be cut by the Plumbing Contractor using an approved core boring machine with diamond edge bit and vacuum sludge removal device. The size of holes shall provide for fire stopping around a pipe. The location of all core drilled holes shall be coordinated with the structural reinforcing and be reviewed by the Architect prior to commencing work.

B. Prior to coring, the Plumbing Contractor shall submit a minimum 1/8 in. scale plan, dimensioning the location of proposed cored opening locations and indicating the core diameter. Prior to developing the coring plan, the Plumbing Contractor shall examine the site carefully in an attempt to determine whether there are structural, mechanical or electrical obstacles in the proposed coring locations. Once the plans are reviewed by the Architect and Owner's representative, the Plumbing Contractor may proceed with caution.

3.3 TESTING PIPING SYSTEMS

A. Test all work in the presence of the Architect/Engineer and/or Owner, Owner's representative and Plumbing Inspector as called for in local codes.

B. After soil, waste and vent piping is in place and before being furred in, plug lower ends and fill. The system shall be left tight under these conditions and water level shall be maintained intact for a period of at least four hours.

C. Test domestic water piping and service by applying a hydrostatic pressure of 125 psi using a pump for this purpose. Make sure that all lines are properly plugged or capped, and that air has been vented before applying pressure, which shall remain constant without pumping for one hour at least.

D. Gas system piping shall be tested at a pressure of 5 psig and pressure shall be held for two hours minimum.

E. This Contractor shall furnish all equipment, labor and materials, required for these tests.

F. Any leaks in joints or evidence of defective pipe or fittings disclosed by tests shall be immediately corrected by replacing defective parts with new joints or corrected materials. No makeshift repairs effected by caulking threaded pipe with lead wool, application of wicking or patented compounds being permitted. Perform smoke tests as required by local code or by the Architect/Engineer.

3.4 PROTECTION AND CLEANING

A. Each subcontractor shall be responsible for his work and equipment until finally inspected, tested and accepted. Carefully store materials and equipment, which are not immediately installed after delivery on site. Close open ends or work with temporary covers or plug during construction to prevent entry of obstructing materials.

B. Each subcontractor shall protect work and materials of other trades from damage that might be caused by his work or workman and make good damage thus caused.

C. The premises shall be kept reasonably clean at all times, and rubbish shall be removed as directed by the General Contractor.

D. Upon completion of this work, the Contractor shall clean all fixtures and equipment and replace damaged parts. Upon failure of this Contractor to fulfill his obligation, this work will be taken care of at his expense.

3.5 WORK COORDINATION AND JOB COORDINATION

A. Plumbing equipment shall not be installed in congested and possible problem areas without first coordinating the installation of same with the other trades and the General Contractor.

B. Particular attention shall be directed to the coordination of system with all equipment of other trades installed in and above the ceiling areas. Conflicts in heights and clearance above hung ceilings shall be brought to the attention of the General Contractor for a decision before equipment is installed.

C. Furnish to the General Contractor and other trades all information relative to the position of the plumbing installation that will affect them so that they may plan their work and installation accordingly.

3.6 SUPPLEMENTARY STEEL, CHANNEL AND SUPPORTS

A. Furnish and install all supplementary steel, channels and supports required for the proper installation, mounting and support of all equipment.

B. Supplementary steel and channels shall be firmly connected to building construction in a manner approved by the Architect/Engineer.

C. The type and size of the supporting channels and supplementary steel shall be determined by the Plumbing Subcontractor and shall be sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.

D. All supplementary steel and channels shall be installed in a neat and workmanlike manner parallel to the walls, floor and ceiling construction. all turns to be made with 90 degree fittings, as required to suit the construction and installation conditions.

3.7 SLEEVES AND INSERTS

A. Sleeves shall be furnished, set and properly secured in place and at all points where piping passes through masonry or concrete. All sleeves shall be of sufficient diameter to provide 1/4-in. clearance around the pipe.

B. Sleeves through concrete slabs, and interior concrete and masonry walls or partitions shall be steel pipe. Fire stop annular openings between sleeves and pipes at floor slab passages and make watertight. Galvanized sleeves and copper piping shall not be placed in concrete.

C. Install UL listed and FM approved inserts or other anchoring devices in concrete and masonry construction as required to support piping. Inserts shall be of the adjustable type as manufactured by Carpenter and Patterson, Grinnell, or Fee and Mason.

3.8 SYSTEM IDENTIFICATION

A. All valves on pipes of every description shall have circular brass valve tags of at least 1-1/2 in. in diameter, attached with brass hooks to each valve stem. Stamp number of the valve and the service, such as "HW", "CW", "GAS", etc., for hot water, cold water, gas, etc., respectively. The numbers of each service shall be consecutive and shall correspond with the numbers indicated for valves and controls on the record drawings and on three printed valve lists. These printed lists shall state number and locations of each valve and control and the section, fixture or equipment which it controls.

B. The printed valve lists shall be prepared in a form to meet the approval of the Architect and Engineer and one copy shall be framed under glass and mounted in approved locations.

C. All plumbing lines and equipment shall be identified by pipe markings, which shall be provided by this Contractor. Markers shall be applied every 20 ft. Markings shall indicate pipe content and direction of flow. The markers shall be as manufactured by Seton Name Plate Corp. or equal.

3.9 INSERTS AND OPENINGS

A. Inserts: Install inserts or other anchoring devices in concrete and masonry construction as required to support piping. Inserts shall be of the adjustable type as manufactured by Carpenter and Patterson, Grinnell of Fee and Mason.

B. Escutcheons: All exposed pipe, uncovered, passing through walls, floors or ceilings shall be fitted with one piece chrome plated brass escutcheons with set screw holding in position. Floor escutcheons to be deep enough to fit over sleeves, fastened to pipe and extending down to floor.

3.10 PLANS AND SPECIFICATIONS

A. The drawing showing layout of the plumbing systems indicate the approximate location of outlets, apparatus and equipment are schematic. The final determination as to the routing shall be governed by structural conditions and other obstructions.

B. The right to make any reasonable change in the location of outlets, apparatus and equipment up to the time of the roughing-in is reserved by the Architect and Engineer without involving any expense to the Owner or the General Contractor.

C. The specifications supplement the drawings and provide specifics pertaining to the methods of material to be used in the execution of the work.

3.11 SANITARY WASTE, STORM WATER AND VENT SYSTEMS

A. Furnish and install piping to take wastes from all soil and waste stacks, fixtures, drains and equipment as indicated and/or described in these plans and specifications.

B. Unless specifically noted otherwise on the plans, all horizontal piping 4 in. and larger shall be pitched at the rate of 1/8 in. per foot in the direction of the flow. Horizontal sanitary piping 3 in. and smaller shall be pitched at the rate of 1/4 in. per foot in the direction of the flow.

C. When connecting new piping to existing, the existing waste lines shall be tested and thoroughly cleaned to insure proper operation of all new and existing systems.

D. Vent System: Furnish and install piping to vent all stacks, fixtures, traps and appliances as indicated on the drawings and/or required to meet the Plumbing Code. All vent piping shall be concealed where possible with the horizontal pipe pitching back toward fixtures to allow connection to drain. Whether indicated on plan, riser diagram or not, offset vents below the roof to avoid air intakes, equipment, penthouse mansard etc., bring vents through the roof a minimum of 25 ft. away from air intakes, windows, and operable sash and 10 ft. away from other obstructions.

3.12 HOT AND COLD WATER SYSTEMS

A. Furnish and install complete cold, hot and hot water return systems to service all fixtures and equipment indicated on the drawings or specified as requiring cold or hot water. Cold water piping shall start at the connection to the water main indicated on plan and extend to all fixtures and equipment, including piping, fittings and valves requiring connections. Hot water piping shall extend from the hot water heater to all fixtures and equipment, including piping, fittings and valves. In general, piping shall pitch upward in the direction of flow with each branch and riser separately valved and with 1/2 in. hose end drains on the outlet side of the valve and at all low points in the systems. Install valves for each battery of fixtures and other valves as necessary to isolate all parts of these systems. All valves shall be accessible.

B. Hot water piping shall be circulated as shown on plans to ensure uniform temperatures throughout the system. All branches larger than 50 ft. shall be provided with hot water return lines.

3.13 GAS SYSTEM

A. Furnish and install pipe, fittings, valves and connections to all gas-fired equipment and all accessories and incidentals as indicated or specified to maintain a complete gas system. Install solenoid valves supplied by others as required. Installations shall be made in accordance with the State Gas Code requirements. All horizontal gas piping shall be pitched not less than 1/4 in. in 15 ft. to prevent traps. Pitch piping to risers. Install an 8 in. long sediment leg at the base of all risers.

B. All changes in direction shall be made with plugged tees for cleaning out piping. All horizontal branch outlet pipes shall be taken from the top or side of horizontal mains and not from the bottom. Coordinate the installation of the gas system with the utility company and General Contractor.

C. Provide gas train vents to the atmosphere for all gas-fired equipment as required by Code.

3.14 CHLORINATION

A. All water lines and water service shall be thoroughly flushed and chlorinated before being put into service. The domestic cold and hot water systems shall be chlorinated and flushed in accordance with the requirements of the State Plumbing Code and Local Inspector.

B. Submit a certificate of compliance when chlorination has been completed stating when performed, by whom and who witnessed the procedure.

END OF SECTION

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REVISIONS:
9/1/2023 - Addendum #1

TRI-TOWN COMMUNITY ACTION AGENCY
1126 HARTFORD AVENUE
JOHNSTON, RI

PEDIATRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

PLUMBING SPECIFICATIONS

ISSUED FOR BID

P3-1

ABBREVIATIONS

GENERAL ABBREVIATIONS:

AAV	AUTOMATIC AIR VENT	L	LENGTH
ADD'L	ADDITIONAL	LAT	LEAVING AIR TEMPERATURE
AFF	ABOVE FINISHED FLOOR	LB	POUND
AMS	AIR FLOW MEASURING STATION	LF	LINEAR FEET
ALT	ALTITUDE OR ALTERNATE	LD	LINEAR DIFFUSER
AMP	AMPERE	LRA	LOCKED ROTOR AMPS
AP	ACCESS PANEL	LVD	LOUVERED DOOR
APD	AIR PRESSURE DROP	LVG	LEAVING
ARCH	ARCHITECT	LWT	LEAVING WATER TEMPERATURE
ATC	AUTOMATIC TEMP. CONTROL		
ATM	ATMOSPHERE	MAX	MAXIMUM
AVG	AVERAGE	MBH	THOUSAND BTH
		MCA	MINIMUM CIRCUIT AMPS
BDD	BACKDRAFT DAMPER	MD	MOTOR OPERATED DAMPER
BG	BLAST GATE DAMPER	MECH	MECHANICAL
BHP	BRAKE HORSEPOWER	MEZZ	MEZZANINE
BI	BACKWARDS INCLINED	MFR	MANUFACTURER
BLDG	BUILDING	MIN	MINIMUM
BMS	BUILDING MANAGEMENT SYSTEM	MUA	MAKE-UP AIR
BOD	BOTTOM OF DUCT		
BOP	BOTTOM OF PIPE	N/A	NOT APPLICABLE
BSMT	BASEMENT	NC	NORMALLY CLOSED
BTU	BRITISH THERMAL UNIT	NC	NOISE CRITERIA
BTH	BTU PER HOUR	NIC	NOT IN CONTRACT
		NO	NORMALLY OPEN
CA	COMPRESSED AIR	No.	NUMBER
CDW	CONDENSER WATER	NOM	NOMINAL
CENT	CENTRIFUGAL	NTS	NOT TO SCALE
CF	CUBIC FEET		
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
CL	CENTERLINE	OD	OUTSIDE DIAMETER
C.L.	COLUMN LINE	ODP	OPEN DRIP PROOF
CND	CONDENSATE	OED	OPEN END DUCT
CLG	CEILING OR COOLING	OV	OUTLET VELOCITY
C.O.	CLEAN-OUT		
CO	CARBON MONOXIDE	PD	PRESSURE DROP
CO2	CARBON DIOXIDE	PH	PHASE
COL	COLUMN	PHC	PREHEAT COIL
CONN	CONNECTION	PBG	PLUMBING
CONTR	CONTRACTOR	POS	PROVIDED BY OTHER SECTION
CV	CONSTANT VOLUME	PSI	POUNDS PER SQUARE INCH
		PSIA	PSI ABSOLUTE
DB	DRY BULB TEMPERATURE	PSID	PSI DIFFERENTIAL
		PSIG	PSI GAUGE
DEG	DEGREE DIRECT	PVC	POLYVINYL CHLORIDE
DDC	DIGITAL CONTROL	PRV	PRESSURE REDUCING VALVE
DIA	DIAMETER		
DIFF	DIFFUSER	QTY	QUANTITY
DIM	DIMENSION		
DN	DOWN	R	RADIUS
DP	DIFFERENTIAL PRESSURE	RA	RETURN AIR
DWDI	DOUBLE WIDTH DOUBLE INLET	REG	REGISTER
DX	DIRECT EXPANSION	RET	RETURN
		REQD	REQUIRED
EA	EACH OR EXHAUST AIR	RH	RELATIVE HUMIDITY
EAT	ENTERING AIR TEMPERATURE	RLA	RUNNING LOAD AMPS
ECH	ELECTRIC CABINET HEATER	RLL	REFRIGERANT LIQUID LINE
EFF	EFFICIENCY	RM	ROOM
ELEC	ELECTRICAL	RPM	REVOLUTIONS PER MINUTE
ELEV	ELEVATION	RSL	REFRIGERANT SUCTION LINE
EMER	EMERGENCY		
EMS	ENERGY MANAGEMENT SYSTEM	SA	SUPPLY AIR
ENT	ENTER	SCH	SCHEDULE
ESP	EXTERNAL STATIC PRESSURE	SD	SMOKE DETECTOR
EWT	ENTERING WATER TEMPERATURE	SEN	SENSIBLE
EXH	EXHAUST	SHC	SENSIBLE HEAT CAPACITY
EXIST.	EXISTING	SP	STATIC PRESSURE
		SPECS	SPECIFICATIONS
F	FAHRENHEIT OR FAN	SQ	SQUARE
FA	FREE AREA	SF	SQUARE FEET
FD	FIRE DAMPER (ACCESS DOOR)	SS	STAINLESS STEEL
FLA	FULL LOAD AMPS	STL	STEEL
FLEX	FLEXIBLE	SUP	SUPPLY
FPM	FEET PER MINUTE	SWSI	SINGLE WITH SINGLE INLET
FPS	FEET PER SECOND		
FRP	FIBERGLASS REINFORCED PLASTIC	T	TEMPERATURE
FS	FLOW SWITCH	TEL	TELEPHONE
FT	FEET	TEFC	TOT. ENCLOSED FAN COOLED
FTR	FINNED TUBE RADIATION	TEMP	TEMPERATURE
		TSTAT	THERMOSTAT
G	GAS	TOD	TOP OF DUCT
GAL	GALLONS	TON	12,000 BTH
GALV	GALVANIZED	TOP	TOP OF PIPE
GC	GENERAL CONTRACTOR	TOT	TOTAL
GPH	GALLONS PER HOUR	TSP	TOTAL STATIC PRESSURE
GPM	GALLONS PER MINUTE	TYP	TYPICAL
GWB	GYPSUM WALL BOARD		
		V	VENT
HB	HOSE BIBB	VB	VACUUM BREAKER
HC	HEATING COIL	VD	VOLUME DAMPER
HEX	HEAT EXCHANGER	V	VOLTS (ELECTRICAL)
HGT	HEIGHT	VEL	VELOCITY
HP	HORSEPOWER		
HR	HOUR	W	WIDTH OR WATT
HTG	HEATING	W/	WITH
HW	HOT WATER	WB	WET BULB TEMPERATURE
HZ	HERTZ	WC	WATER COLUMN
		WG	WATER GAUGE
ID	INSIDE DIAMETER	WMS	WIRE MESH SCREEN
IN	INCHES	W/O	WITHOUT
		WPD	WATER PRESSURE DROP
KW	KILOWATT	WTD	WATER TEMPERATURE DIFF.

CONTROLS ABBREVIATIONS:

ACD	AUTOMATIC CONTROL DAMPER	LSPS	LOW STATIC PRESSURE SWITCH
ACV	AUTOMATIC CONTROL VALVE	LS	LEVEL SENSOR
AMS	AIR FLOW MEASURING STATION		
ALM	ALARM	MD	MOTORIZED DAMPER
ATC	AUTOMATIC TEMPERATURE CONTROL		
ATS	AIR TEMPERATURE SENSOR	NC	NORMALLY CLOSED (POWER LOSS)
		NO	NORMALLY OPEN (POWER LOSS)
BD	BACKDRAFT DAMPER		
BV	BYPASS VALVE	OAH	OUTSIDE AIR HUMIDITY SENSOR
		OAT	OUTSIDE AIR TEMP. SENSOR
CO2	CARBON DIOXIDE SENSOR		
CO	CARBON MONOXIDE SENSOR	RH	RELATIVE HUMIDITY
CT	CURRENT TRANSFORMER		
CV	CONTROL VALVE	S	SWITCH
		SP	STATIC PRESSURE SENSOR
DDC	DIRECT DIGITAL CONTROL	SD	SMOKE DETECTOR
DPS	DIFFERENTIAL PRESSURE SWITCH	SPD	SPEED CONTROL
DPT	DIFFERENTIAL PRESSURE SENSOR	S/S	START/STOP
DPV	DIFF. PRESSURE BYPASS VALVE		
DSD	DUCT MOUNTED SMOKE DETECTOR	T	THERMOSTAT
DWDI	DOUBLE WIDTH DOUBLE INLET	TS	TEMPERATURE SENSOR
ES	END SWITCH	WTS	WATER TEMPERATURE SENSOR
FM	FLOW METER/TRANSMITTER		
FZ	FREEZESTAT		
H	HUMIDISTAT		
HEPA	HIGH EFF. PARTICULATE AIR FILTER		
HGB	HOT GAS BYPASS		
HHL	HIGH HUMIDITY LIMIT SENSOR		
HOA	HANDS-OFF AUTOMATIC SWITCH		
HS	HUMIDITY SENSOR		
HZ	HERTZ		

EQUIPMENT ABBREVIATIONS:

AC	AIR CONDITIONING UNIT	GMS	GLYCOL MAKE-UP SYSTEM
ACU	AC CONDENSING UNIT	GUH	GAS FIRED UNIT HEATER
AHU	AIR HANDLING UNIT		
AS	AIR SEPARATOR	H	HUMIDIFIER
		HP	HEAT PUMP
B	BOILER	HPU	HP CONDENSING UNIT
BB	BASE BOARD	HV	HEATING & VENTILATING UNIT
BC	BRANCH CONTROLLER	HWC	HOT WATER COIL
BP	BOILER PUMP		
BT	BUFFER TANK	LV	LOUVER
CAC	CRITICAL COOLING AC UNIT	KEF	KITCHEN EXHAUST FAN
CC	COOLING COIL		
CCU	CC CONDENSING UNIT	MAU	MAKE-UP AIR UNIT
CEF	CEILING EXHAUST FAN	MCC	MOTOR CONTROL CENTER
CH	CHILLER		
CP	CIRCULATOR PUMP	P	PUMP
CT	COOLING TOWER	PTAC	PACKAGED TERMINAL AC UNIT
CUH	CABINET UNIT HEATER		
CWC	CHILLED WATER COIL	R	RETURN GRILLE
		REF	ROOF EXHAUST FAN
DC	DRY COOLER	RHP	RADIANT HEATING PANEL
DEF	DISHWASHER EXHAUST FAN	RTU	ROOF TOP UNIT
DSF	DESTRATIFICATION FAN		
		S	SUPPLY DIFFUSER
E	EXHAUST GRILLE	SA	SOUND ATTENUATOR
EBB	ELECTRIC BASE BOARD	SAC	SPLIT AC UNIT
ECH	ELECTRIC CABINET HEATER	SHP	SPLIT HEAT PUMP
ECH	ELECTRIC CEILING HEATER	SF	SUPPLY FAN
EF	EXHAUST FAN		
ERV	ENERGY RECOVERY VENTILATOR	T	TRANSFER GRILLE
ET	EXPANSION TANK		
EUH	ELECTRIC UNIT HEATER	UH	UNIT HEATER
		UV	UNIT VENTILATOR
F	FURNACE		
FC	FAN COIL UNIT	VAV	VARIABLE AIR VOLUME BOX
FPB	FAN POWERED VAV	VFD	VARIABLE FREQUENCY DRIVE
FT	FINTUBE		
		WSHP	WATER SOURCE HEAT PUMP

MECHANICAL SYMBOL LEGEND

AIR DEVICES

- 4-WAY SUPPLY DIFFUSER
- 3-WAY SUPPLY DIFFUSER
- 2-WAY SUPPLY DIFFUSER
- 2-WAY CORNER SUPPLY DIFFUSER
- 1-WAY SUPPLY DIFFUSER
- RETURN REGISTER
- EXHAUST REGISTER
- SIDE WALL SUPPLY DIFFUSER
- SIDE WALL RETURN OR EXHAUST GRILLE

DUCTWORK

- STANDARD SIZE REDUCTION
- ASYMMETRICAL TRANSITION
- SQUARE-TO-ROUND TRANSITION
- STANDARD BRANCH TAKE-OFF
- ROUND BRANCH TAKE-OFF
- STANDARD TEE
- STANDARD TEE WITH TURNING VANES
- SLOPED DUCT RISE
- FIRE DAMPER ACCESS DOOR
- GREASE DUCT ACCESS DOOR
- DUCT RISE
- DUCT DROP
- STANDARD SQUARE ELBOW
- SQUARE ELBOW WITH TURNING VANES
- STANDARD RADIUS ELBOW (R=D)
- FIRE WRAPPED DUCTWORK
- ACOUSTICALLY LINED DUCTWORK
- OPEN ENDED DUCT OUTLET
- OPEN ENDED DUCT INTAKE
- OPEN ENDED DUCT OUTLET W/ SCREEN
- OPEN ENDED DUCT INTAKE W/ SCREEN

CONTROLS

- THERMOSTAT
- TEMPERATURE SENSOR
- DUCT MOUNTED SMOKE DETECTOR

AIR DAMPERS

- MANUALLY ADJUSTABLE VOLUME DAMPER
- FIRE DAMPER
- MOTORIZED DAMPER

TAGS

- DIFFUSER TAG
- EQUIPMENT TAG
- REVISION
- CONNECT NEW TO EXISTING

LEGEND NOTE:
NOT ALL SYMBOLS ARE NECESSARILY USED. ABSENCE OF A SYMBOL ON THE DRAWINGS DOES NOT NECESSARILY MEAN IT IS NOT REQUIRED. REFER TO DETAILS & SPECIFICATIONS FOR A COMPLETE UNDERSTANDING OF WORK REQUIRED.

GENERAL CONSTRUCTION NOTES:

1. ALL WORK IS TO BE PERFORMED IN STRICT COMPLIANCE WITH LOCAL CODES AND ALL OTHER REGULATIONS GOVERNING WORK OF THIS NATURE.
2. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS, AND LABOR TO SATISFY A COMPLETE WORKING SYSTEM WHETHER SPECIFIED OR IMPLIED.
3. THIS CONTRACTOR, PRIOR TO SUBMITTING HIS BID, SHALL VISIT THE PROJECT SITE TO FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS. REQUESTS FOR COMPENSATION FOR EXTRA WORK, WHICH WOULD HAVE BEEN EVIDENT BY COMPLIANCE WITH THE PREVIOUS STATEMENT, WILL NOT BE CONSIDERED. THE CONTRACTOR SHALL CONDUCT A THOROUGH FIELD INVESTIGATION TO VERIFY WORK SHOWN ON THE DRAWINGS. THE DRAWINGS REFLECT THE BEST AVAILABLE INFORMATION FROM EXISTING PLANS AND SITE INVESTIGATIONS.
4. THE MECHANICAL PLANS ARE INTENDED TO BE DIAGRAMMATIC AND ARE BASED ON ONE MANUFACTURER'S EQUIPMENT. THEY ARE NOT INTENDED TO SHOW THE EXACT ROUTING OF SYSTEMS OR LOCATION OF COMPONENTS. THE EXACT LOCATIONS, DIMENSIONS AND ALL OTHER DETAILS OF EQUIPMENT ARE THE RESPONSIBILITY OF THIS CONTRACTOR. THIS CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS OF THE EQUIPMENT PROPOSED TO ENSURE THAT THE EQUIPMENT WILL FIT IN THE AVAILABLE SPACE. PROVIDE ALL DUCT AND PIPE TRANSITIONS REQUIRED FOR CONNECTION TO EQUIPMENT.
5. THIS CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO PROCEEDING WITH ANY WORK. WHERE DISCREPANCIES OCCUR BETWEEN THESE DOCUMENTS AND EXISTING CONDITIONS, THE DISCREPANCY SHALL BE REPORTED TO THE OWNER AND/OR ENGINEER FOR EXPEDITING AND RESOLVE.
6. ALL WORK SHALL BE PERFORMED IN A CLEAN AND WORKMANLIKE MANNER. CARE SHALL BE EXERCISED TO MINIMIZE ANY INCONVENIENCE OR DISTURBANCE TO OTHER AREAS OF THE BUILDING WHICH ARE TO REMAIN IN OPERATION. ISOLATE WORK AREAS BY MEANS OF TEMPORARY PARTITIONS AND/OR TARPS TO KEEP DUST AND DEBRIS WITHIN THE CONSTRUCTION AREA.
7. CLEAN THE JOB SITE DAILY AND REMOVE FROM THE PREMISES ANY DIRT AND DEBRIS CAUSED BY THE PERFORMANCE OF THE WORK INCLUDED IN THIS CONTRACT.
8. ALL OPENINGS IN WALLS SHALL BE KEPT PROPERLY SEALED AT ALL TIMES, EXCEPT WHEN BEING WORKED ON TO PRECLUDE THE POSSIBILITY OF FLOODING DUE TO STORM OR OTHER CAUSES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFEKEEPING OF HIS OWN PROPERTY ON THE JOB SITE. OWNER ASSUMES NO RESPONSIBILITY FOR PROTECTION OF PROPERTIES AGAINST FIRE, THEFT, AND ENVIRONMENTAL CONDITIONS.
10. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER TRADES PRIOR TO FABRICATION, PURCHASE AND/OR INSTALLATION OF ALL WORK. ALL OFFSETS IN PIPING AND DUCTS TO AVOID OBSTRUCTIONS SHALL BE PROVIDED AT NO COST TO THE OWNER.
11. CONTRACTOR SHALL REFER TO THE COMPLETE SET OF CONTRACT DOCUMENTS INCLUDING SPECIFICATIONS AND OTHER TRADES FOR A FULL UNDERSTANDING OF ALL WORK REQUIRED.
12. WHERE USED THE TERM "PROVIDE" SHALL MEAN "FURNISH AND INSTALL".
13. PROVIDE ALL REQUIRED RIGGING TO ACCOMMODATE THE REMOVAL & INSTALLATION OF ALL EQUIPMENT.
14. PROVIDE ACCESS PANELS FOR ALL CONCEALED DAMPERS, VALVES, AND EQUIPMENT.
15. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER OR ARCHITECT.
16. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF REGISTERS, DIFFUSERS, AND GRILLES.
17. CONTRACTOR SHALL SPRAY PAINT INSIDE OF DUCT BLACK, BEHIND ALL GRILLES AND REGISTERS.
18. ALL DUCTWORK AND PIPING SHALL BE INSTALLED AS INDICATED ON THE DRAWINGS IN A NEAT AND WORKMANLIKE MANNER AND BE SUPPORTED AS REQUIRED BY CODES. DUCTWORK AND PIPING SHALL BE SET UP AND DOWN AND OFFSET AS REQUIRED TO SUIT FIELD CONDITIONS. DIELECTRIC COUPLINGS SHALL BE USED WHERE DISSIMILAR METALS ARE JOINED.
19. IF A SECTION OF DUCT OR PIPE IS NOT LABELED FOR SIZE, THEN THE LARGER SIZE INDICATED ON THE DRAWINGS SHALL PREVAIL. SIZE OF DUCT RUN-OUTS TO DIFFUSERS SHALL EQUAL DIFFUSER NECK SIZE UNLESS OTHERWISE NOTED.
20. PROVIDE ALL NECESSARY TEMPORARY OR PERMANENT CAPS OR PLUGS FOR PIPING. DO NOT LEAVE PIPING OPEN ENDED.
21. PROVIDE CONDENSATE PUMPS THROUGHOUT CONDENSATE DRAINAGE SYSTEM AS REQUIRED TO PROPERLY REMOVE CONDENSATE. PROVIDE A PER PUMP LINE-ITEM ALLOWANCE.
22. REFRIGERANT PIPE SIZING SHALL BE PER MANUFACTURER'S RECOMMENDATIONS. LENGTH OF PIPE, ELEVATION CHANGE AND EQUIPMENT ORIENTATION SHALL BE TAKEN INTO ACCOUNT.
23. SUCCESSFULLY PRESSURE TEST ALL REROUTED PIPING SYSTEMS. TEST SHALL BE PERFORMED AT TWICE SYSTEM OPERATING PRESSURES. REPAIR AND RETEST AS REQUIRED UNTIL SYSTEMS PROVE TIGHT.
24. ALL ROOF MOUNTED EQUIPMENT SHALL BE INSTALLED A MINIMUM OF 10' FROM THE ROOF EDGE. EQUIPMENT INSTALLED CLOSER THAN 10' SHALL REQUIRE THE INSTALLATION OF GUARD RAILS.
25. ALL CONCEALED ELECTRICAL CONNECTIONS SHALL BE HARD WIRED. PLUGS SHALL NOT BE USED AS A DISCONNECTING MEANS IN CONCEALED LOCATIONS.
26. CONTRACTOR SHALL PROVIDE ALL TEMPERATURE CONTROLS INCLUDING WIRING, TUBING, AND THERMOSTATS (WITH LOCKING COVERS) AND ALL MISCELLANEOUS APPURTENANCES TO MEET THE INTENT OF THESE DOCUMENTS.
27. DUCT SMOKE DETECTORS SHALL BE FURNISHED BY ELECTRICAL CONTRACTOR, INSTALLED IN THE DUCTWORK BY MECHANICAL CONTRACTOR AND WIRED BY THE ELECTRICAL CONTRACTOR.
28. ALL FRESH AIR INTAKES & DIRECT VENTS SHALL TERMINATE AT LEAST 10' HORIZONTALLY FROM ANY GAS METERS.
29. ALL THERMOSTATS, CONTROL SWITCHES, ETC. SHALL BE INSTALLED 48" AFF.

GENERAL RENOVATION NOTES:

1. ALL SHUT DOWNS OF EXISTING SYSTEMS SHALL BE SCHEDULED AND APPROVED BY THE OWNER PRIOR TO COMMENCING WITH WORK.
2. NO DUCTWORK, PIPING, EQUIPMENT, ETC. SHALL BE REMOVED, DISCONNECTED, OR SHUT DOWN WITHOUT PRIOR REVIEW WITH THE OWNER AND/OR ENGINEER TO CONFIRM THAT AREAS TO REMAIN IN OPERATION WILL NOT BE AFFECTED. IF ANY AREAS NOT WITHIN THE SCOPE OF WORK ARE AFFECTED BY ANY SHUTDOWN, REMOVAL, OR DISCONNECTION, 1 WEEK NOTICE MUST BE GIVEN TO THE OWNER INDICATING WHICH AREAS WILL BE AFFECTED, WHEN THE PROPOSED SHUTDOWN WILL OCCUR, AND FOR HOW LONG A PERIOD.
3. USE OF THE OWNER'S ELEVATORS AND BUILDING CORRIDORS FOR HANDLING OF THE OWNER'S AND REMOVED EQUIPMENT AND MATERIALS SHALL BE AT THE DIRECTION OF THE OWNER AND SHALL BE COORDINATED WITH HIS OPERATIONS.
4. ALL ITEMS REMOVED SHALL BECOME PROPERTY OF THE OWNER AND SHALL BE DISPOSED OF AS PER OWNER'S INSTRUCTIONS, UNLESS INDICATED OTHERWISE. ALL ITEMS WHICH ARE NOT TO BE STORED ON SITE BY OWNERS SHALL BE REMOVED FROM THE BUILDING IMMEDIATELY.
5. DISCONNECT AND REMOVE ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, FLUES, REGISTERS, SUPPORTS, HANGERS, AND ALL OTHER MECHANICAL COMPONENTS MADE OBSOLETE BY THIS PROJECT.
6. PRIOR TO RENOVATION, CONTRACTOR TO RECORD ALL SUPPLY & RETURN MAIN AIRFLOWS & SUBMIT A COPY TO THE ENGINEER. ALL READINGS SHALL BE PERFORMED BY A CERTIFIED NEBB CONTRACTOR. COMPARE NEW EQUIPMENT VALUES & ALERT DISCREPANCIES FOR ENGINEER FEEDBACK. AT THE END OF THE PROJECT EXISTING SYSTEMS SHALL BE BALANCED TO PRE-CONSTRUCTION VALUES OR ADJUSTED VALUES BASED ON PRE-CONSTRUCTION TESTING ENGINEERING FEEDBACK.
7. ALL NEW, RELOCATED, OR EXISTING EQUIPMENT AFFECTED BY THIS SCOPE OF WORK SHALL BE REBALANCED BEFORE BEING PLACED IN SERVICE.
8. PROVIDE ALL REQUIRED CUTTING AND PATCHING AS REQUIRED TO COMPLETE THE INSTALLATION OF NEW MECHANICAL SYSTEM. PATCH ALL SURFACES TO MATCH AND MAINTAIN ALL FIRE RATINGS.
9. EXISTING ROOF CUTTING, FLASHING, SEALING, ETC. TO BE ACCOMPLISHED BY A ROOFING CONTRACTOR APPROVED BY THE EXISTING ROOF MANUFACTURER AND INSTALLED IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS SO AS NOT TO VOID ROOF WARRANTY.
10. EXISTING MATERIALS THAT ARE REMOVED SHALL NOT BE REUSED IN NEW SYSTEMS, EXCEPT WHERE INDICATED AS SUCH ON THE DRAWINGS. ALL MATERIALS AND EQUIPMENT LISTED AS NEW MUST BE NEW.
11. THE FIRE PROOFING OF THE EXISTING STRUCTURE IS NOT TO BE REMOVED FOR THE INSTALLATION OF HANGERS, SUPPORTS AND DUCTWORK ETC. IF FIRE PROOFING IS DAMAGED, IT SHALL BE REPAIRED AT THE EXPENSE OF THE TRADE.

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REVISIONS:
9/1/2023 - Addendum #1

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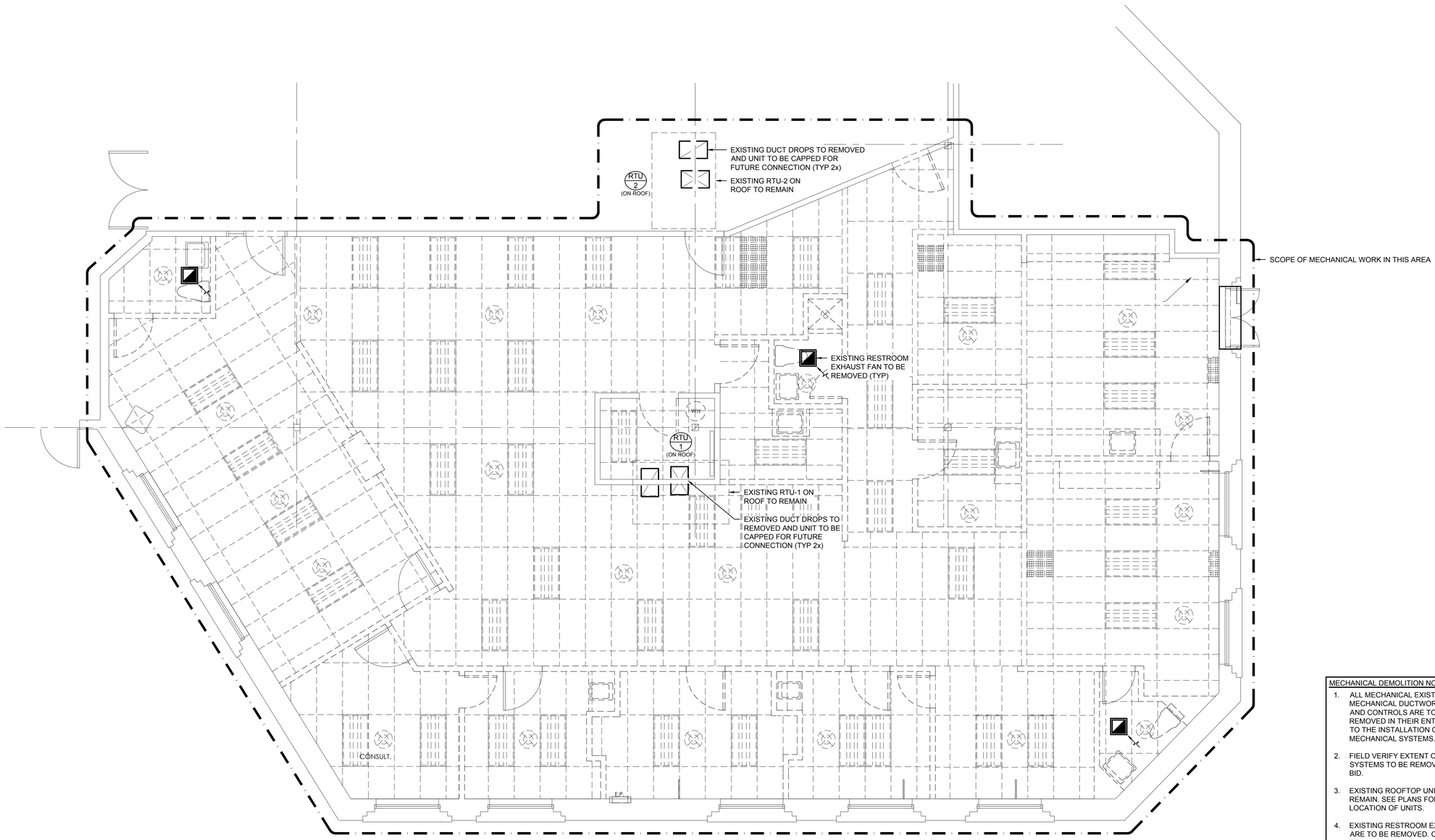
PEDIATRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

MECHANICAL LEGENDS & NOTES

ISSUED FOR BID
ADDENDUM #1

M0-1



MECHANICAL DEMOLITION NOTES:

1. ALL MECHANICAL EXISTING MECHANICAL DUCTWORK, PIPING, AND CONTROLS ARE TO BE REMOVED IN THEIR ENTIRETY PRIOR TO THE INSTALLATION OF NEW MECHANICAL SYSTEMS.
2. FIELD VERIFY EXTENT OF EXISTING SYSTEMS TO BE REMOVED PRIOR TO BID.
3. EXISTING ROOFTOP UNITS ARE TO BE REMAIN. SEE PLANS FOR GENERAL LOCATION OF UNITS.
4. EXISTING RESTROOM EXHAUST FANS ARE TO BE REMOVED. CAP DUCT CONNECTION IN SPACE FOR FUTURE.

1 MECHANICAL - EXISTING / DEMOLITION PLAN
NORTH 1/4" = 1'-0"

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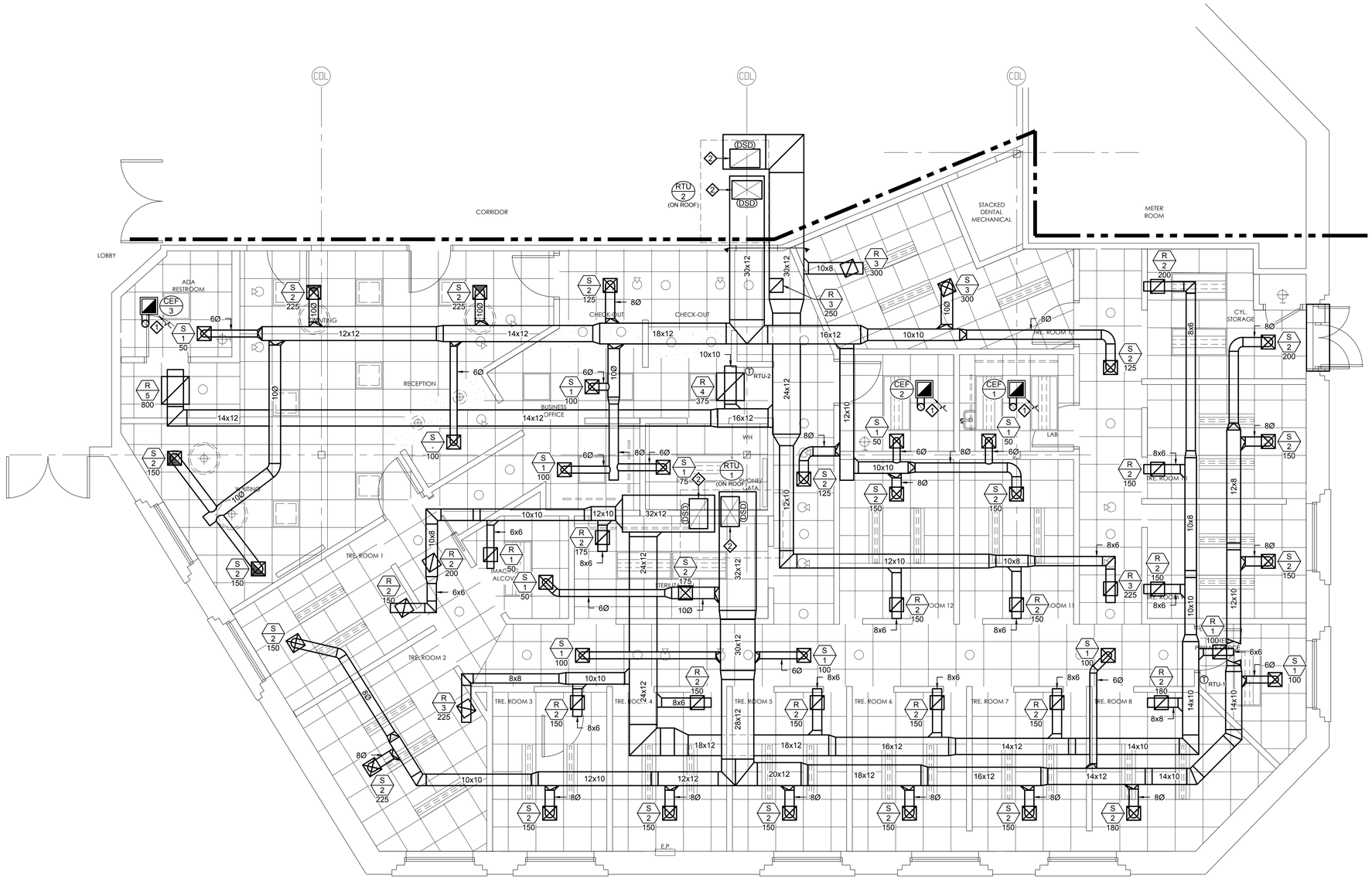
MECHANICAL EXISTING/ DEMOLITION PLAN

ISSUED FOR BID
ADDENDUM #1

MD1-1



MECHANICAL - FLOOR PLAN
NORTH 1/4" = 1'-0"

GENERAL NOTE:

1. FINAL LOCATION OF ALL THERMOSTATS TO BE APPROVED BY ARCH/OWNER.

MINIMUM CLEARANCE NOTES:

1. ALL EXHAUST TERMINATIONS MUST MAINTAIN A MINIMUM OF 10'-0" HORIZONTAL DISTANCE FROM ALL FA INTAKES AND OPENINGS.

KEYED MECHANICAL NOTES:

1. 6Ø CTE EXHAUST FAN TERMINATIONS TO EXTERIOR. FIELD-VERIFY EXACT LOCATION OF CONNECTION.
2. 26x16 UP TO CTE RTU ON ROOF.

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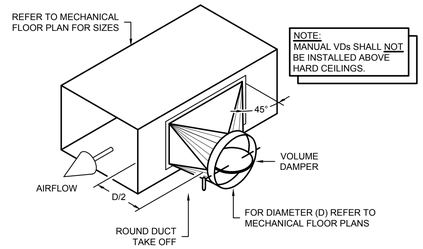
MECHANICAL FLOOR PLAN

ISSUED FOR BID
ADDENDUM #1

M1-1



ROUND DUCT TAKE OFF DETAIL
NTS

EXHAUST FAN SCHEDULE (BASED ON GREENHECK)

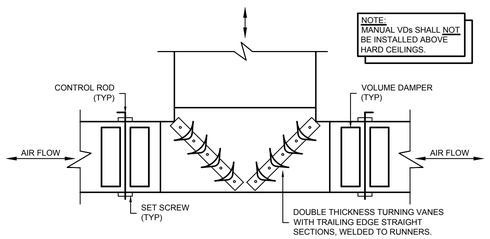
SYMBOL	MAKE	MODEL	TYPE	DRIVE	CFM	ESP (IN)	FAN RPM	MOTOR DATA				UNIT WEIGHT (LBS.)	NOTES
								HP	RPM	FLA	VOLTAGE		
CEF-1,2,3	GREENHECK	SP-80-VG	CEILING	DIRECT	70	0.5	2	0.01	935	0.1	115/1/60	12	1,2,3,4

NOTES:
1. PROVIDE DISCONNECT. COORDINATE WITH E.C.
2. PROVIDE WITH BACKDRAFT DAMPER.
3. PROVIDE WITH ISOLATION KIT.
4. FAN POWER TO BE INTERCONNECTED TO LIGHT SWITCH. COORDINATE WITH E.C.

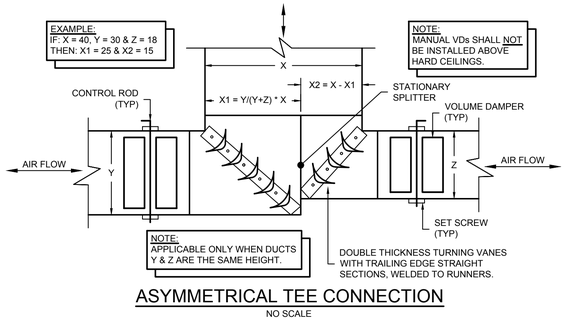
EXISTING ROOFTOP UNIT SCHEDULE (BASED ON YORK)

SYMBOL	MODEL	NOMINAL CAPACITY	TOTAL CFM	O.A. CFM	HEATING DATA			ELECTRICAL DATA			NOTES
					FUEL	INPUT MBH	OUTPUT MBH	MCA	MOP	VOLTAGE	
RTU-1	DM090N15N2AAA4	7.5-TONS	2480	600	NG	180.0	140.0	43.8	50	208/3/60	1,2,3
RTU-2	DM090N15N2AAA4	7.5-TONS	2250	450	NG	180.0	140.0	43.8	50	208/3/60	1,2,3

NOTES:
1. PROVIDE DISCONNECT. COORDINATE WITH E.C.
2. EXISTING ROOFTOP UNITS TO BE INSTALLED. SCHEDULE FOR REFERENCE ONLY.
3. PROVIDE WITH SPACE-MOUNTED THERMOSTAT.



TYPICAL TEE CONNECTION
NO SCALE



ASYMMETRICAL TEE CONNECTION
NO SCALE

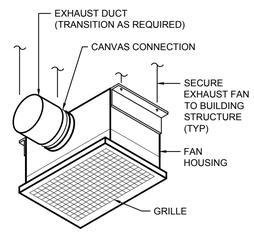
AIR DEVICE SCHEDULE

SYMBOL	MANUFACTURER	MODEL	TYPE	THROW	CFM	NECK SIZE	NOTES
S-1	PRICE	SCD	SQUARE CONE	4-WAY	50-100	6Ø	1,2,3,4
S-2	PRICE	SCD	SQUARE CONE	SEE PLANS	125-225	8Ø	1,2,3,4
S-3	PRICE	SCD	SQUARE CONE	4-WAY	300	10Ø	1,2,3,4
R-1	PRICE	535	LOUVERED GRILLE	-	50-100	6x6	1,2,3,4
R-2	PRICE	535	LOUVERED GRILLE	-	150-200	8x8	1,2,3,4
R-3	PRICE	535	LOUVERED GRILLE	-	225-300	10x8	1,2,3,4
R-4	PRICE	535	LOUVERED GRILLE	-	375	16x10	1,2,3,5
R-5	PRICE	535	LOUVERED GRILLE	-	800	18x14	1,2,3,5

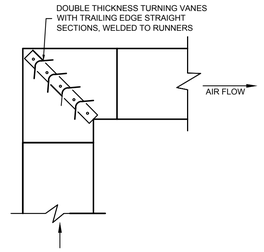
NOTES:
1. CONTRACTOR SHALL PROVIDE ALL NECESSARY DUCT TRANSITIONS AND MOUNTING HARDWARE AS REQUIRED. CONTRACTOR TO CONFIRM MOUNTING TYPE.
2. ARCHITECT TO VERIFY COLOR AND FINISH.
3. PROVIDE LAY-IN PANEL (FOR ACT APPLICATIONS).
4. BASED ON 12x12 FACE SIZE.
5. BASED ON 24x24 FACE SIZE.

* - S-SUPPLY, R-RETURN, E-EXHAUST, T-TRANSFER
** - SIZE
*** - CFM

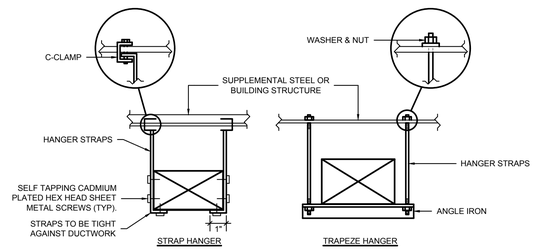
DIFFUSER CONNECTION DETAIL
NTS



CEILING EXHAUST FAN DETAIL
NO SCALE



TYPICAL SQUARE ELBOW
NTS



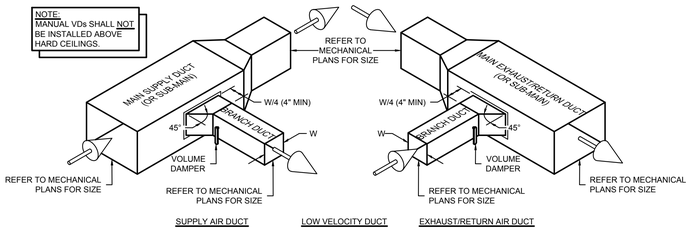
NOTE:
NO POP RIVETS ALLOWED, USE SELF-TAPPING SHEETMETAL SCREWS ONLY.

HANGER SIZES*

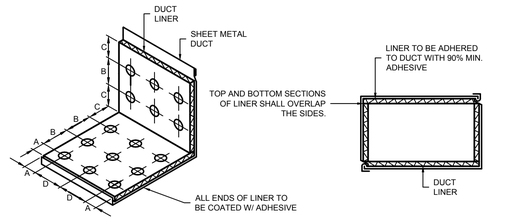
MAX. SIDE	HANGER	HORIZONTAL SUPPORT ANGLE	MAXIMUM SPACING
30"	1"x18" GAUGE STRAP	NONE REQUIRED	10'-0"
36"	1/4" ROD	1-1/2"x1-1/2"x1/8"	8'-0"
48"	1/4" ROD	2"x2"x1/8"	8'-0"
60"	5/16" ROD	2"x2"x1/8"	8'-0"
84"	3/8" ROD	2"x2"x1/8"	8'-0"

* FOR RECTANGULAR DUCTS

DUCT HANGER DETAIL
NTS



BRANCH DUCT CONNECTIONS
NTS



NOTES:
1. METAL FASTENERS SHALL BE OMARK INSUL-PINS DURO DYNE FASTENERS OR GRIP NAILS
2. GRIP NAILS SHALL BE INSTALLED BY "GRIPNAIL AIR HAMMER" OR BY AUTOMATIC FASTENER EQUIPMENT
3. ENDS OF LINER SHALL BE BUTTED FIRMLY TOGETHER
4. SEE "DUCT LINER NOSING DETAIL"

VELOCITY	DIMENSIONS			
	A	B	C	D
0-2500 FPM	3"	12"	4"	18"
2501-6000 FPM	3"	6"	4"	16"

DUCT LINER DETAIL
NTS

castellone architecture
792 great road
lincoln, ri 02865
401-465-9861

dms ENGINEERING DESIGN SERVICES INCORPORATED
141 Dyer Street, Providence, RI 02903
tel (401) 765-1500 fax (401) 765-2954

DRAWN BY: YYY
DATE: AUGUST 25, 2023
REVISIONS:
9/1/2023 - Addendum #1

TRI-TOWN COMMUNITY ACTION AGENCY
1126 HARTFORD AVENUE
JOHNSTON, RI

PEDIATRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

MECHANICAL SCHEDULES & DETAILS

ISSUED FOR BID
ADDENDUM #1

M2-1

SECTION 230000 - MECHANICAL

PART 1: GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

1.2 SUMMARY OF WORK

A. Provide complete functional Heating, Ventilating and Air Conditioning system as shown on Mechanical Construction Documents.

1.3 REFERENCE STANDARDS

A. NFPA Standards

B. ANSI Standards

C. ASME Standards

D. ASTM Standards

E. AWWA Standards

F. ASHRAE Standards

G. SMACNA Standards

H. OSHA Standards

I. NEBB Standards

J. Local Codes and Ordinances

K. Owner's Insurance Company Requirements

L. Where the contract documents indicate more stringent requirements than the above codes and ordinances, the contract documents shall take precedence.

M. File all documents, pay all fees and secure all permits, inspections and approvals necessary for the work of this section.

1.4 CONTRACT DRAWINGS & SPECIFICATIONS

A. The Contract Drawings are generally diagrammatic and convey the Scope of Work and General Arrangement of apparatus and equipment. The locations of all items shown on the drawings or called for in the specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect and Engineer before being installed. The Subcontractor shall follow drawings in laying out work and shall check drawings of the other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, the Subcontractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or before proper execution of the work.

B. Specifications: The specifications are intended only to complement the drawings; however, work detailed and/or noted only on the drawings or work described only in the specifications shall all be considered as part of the scope of work.

1.5 CONFLICT BETWEEN PLANS AND SPECIFICATIONS

A. In case of conflict between the contract drawings and specifications, the Engineer shall determine which takes precedence.

1.6 SHOP DRAWINGS AND PRODUCT DATA

A. SUBMITTALS: Submit shop drawings, manufacturers data and certificates for equipment, materials and finish, and pertinent details for each system where specified in each individual section, and have them approved before procurement, fabrication, or delivery of the items to the job site. Partial submittals will not be acceptable and will be returned without review. Submittals shall include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry, and technical society publication references, and other information necessary to establish contract compliance of each item the Contractor propose to furnish.

B. Submit in accordance with Division 1.

C. It is the intent of these specifications that all equipment, materials and workmanship used on this project be in complete conformance with all local, state and national codes, ordinances and standards.

D. Substitutions shall be equivalent to specified equipment in all aspects of quality and performance and shall conform to the intent stated above. It is the contractor's responsibility to submit only those items that meet these requirements. Should any non-conforming items be installed, they shall be replaced by the contractor at no additional cost to the owner.

E. The approval of the equipment does not relieve the Subcontractor of responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist.

F. Refer to General Requirements for the substitutions of equipment and submittal of shop drawings. If apparatus or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, piping, supports, or construction, it shall be provided. Contractor to assume cost and entire responsibility thereof.

1.7 INSPECTION AND TESTS

A. During the progress of the work it shall be subject to the inspection of the Owner and to such other inspectors, as may have jurisdiction.

B. At completion of the work, Contractor shall submit to the Owner's representative in writing a statement stating; (1) that the work is complete; (2) that the entire installation is in accordance with the specification; (3) that preliminary tests have been made; and (4) that the work is ready for final inspection and test.

C. A final inspection of the installation to determine compliance with the drawing and specifications will be made by the Owner's representative. Work will be checked for quality of materials, quality of workmanship, proper installation and finished appearance. This Contractor shall provide the services of the project foreman for inspection purposes. The foreman shall remove and reinstall access panels, ceiling tiles, etc., as required to facilitate any inspections required by the Owner's representative.

D. The Contractor shall arrange and conduct operating tests on all equipment in the presence of the Owner's representative. The component parts of systems and the various systems shall be demonstrated to operate in accordance with the requirements and intent of this specification. Any non-complying or defective materials or workmanship disclosed as a result of the inspection and the Contractor shall correct tests promptly, and the tests repeated as often as necessary until approved and accepted by the Owner's representative.

1.8 ELECTRICAL EQUIPMENT

A. Electrical components of mechanical equipment and systems, such as motors, factory mounted motor starters, disconnects, and control equipment shall be provided under the related Section of Division 23.

B. Temperature control equipment, including thermostats, zone valves, relays, aquastats, etc. shall be provided under related sections of Division 23. Temperature control wiring not specifically shown on electrical drawings shall be provided under related Section of Division 23.

C. Upon completion of temperature control system wiring, the responsibility of the control system will fall under Division 23.

D. All electrical equipment installed in concealed spaces shall be provided with a hard-wired electrical connection. Plug-type disconnects shall not be allowed in concealed spaces. Equipment provided with plug-in cords shall not have their cords modified.

1.9 OPENINGS IN EXTERIOR WALLS OR ROOF

A. Openings in exterior walls or roof shall be kept properly plugged and caulked at all times, except when being worked on to preclude the possibility of flooding due to storm or other causes. After completion of work, openings shall be permanently sealed and caulked in a manner approved by the Architect.

1.10 GUARANTEE

A. Except as otherwise specified, all work, materials and equipment shall be guaranteed against defects resulting from the use of inferior materials, equipment, or workmanship for one year from the date of final completion of the contract, or from full acceptance by the Owner, whichever is earlier.

B. If, within any guarantee period, repairs or changes to guaranteed work are required as a result of the use of defective materials or equipment, inferior workmanship or work that is not in accordance with the terms of the contract, and upon receipt of notice from the Owner, the following shall be done without expense to the Owner.

C. Place in satisfactory condition in every particular all of such guaranteed work and correct all defects therein.

D. Repair all damage to the building or site/equipment or contents thereof which is the result of the use of defective materials or equipment or inferior workmanship, or of work not in accordance with the terms of the contract.

E. Make good any work or materials, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

F. In fulfilling the requirements of the contract or of any guarantee embraced in or required thereby, any work guaranteed under another contract is disturbed, restore such disturbed work to original condition and guarantee such restored work to the same extent as it was guaranteed under such other contract.

G. If upon failure to proceed promptly after notice to comply with the terms of the guarantee, the Owner may have the defects corrected and Contractor and his surety shall be liable for all expenses incurred.

H. This Contractor shall obtain in the General Contractor's and Owner's name, the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities, which the Contractor may have by law or other provisions of the Contract Documents. The guarantee shall be for a period of one (1) year minimum from the date of acceptance or final payment.

1.11 CLEANING OF SYSTEM

A. Thoroughly clean piping, ducts, fixtures and equipment of all foreign substances inside and out before placing in operation. All air handling equipment shall be provided with "construction filters" for use during construction. Once construction is substantially complete and prior to final testing adjusting and balancing, furnish and install new filters for each piece of equipment.

B. If any foreign matter should stop any part of a system after being placed in operation, clean and reconnect system.

C. Remove all covers of interior floor drains and cleanouts, clean of all dirt, concrete traces, etc., then lightly grease and reinstall.

1.12 TEMPORARY OPENINGS

A. Coordinate construction and provide temporary openings in the building as required for the admission of equipment furnished under this Division.

1.13 DEFINITIONS

A. "Piping" includes, in addition to pipe, all fittings, valves, hangers, and other accessories relating to such piping.

B. "Concealed" means hidden from sight in trenches, chases, furred spaces, shafts, hung ceilings, embedded in construction or in crawl spaces.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Provide" means furnish and install complete and ready to operate.

1.14 EQUIPMENT DEVIATIONS

A. Where proposals to use an item of equipment other than that specified which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign, and all new drawings and detailing required therefore, shall be prepared by the Architect at the Contractor's expense.

B. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the drawings, furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

1.15 EQUIPMENT PADS

A. All grade and floor mounted equipment shall be provided with a reinforced concrete pad. Refer to architectural plans for pad locations, thickness, sizes, and construction requirements.

B. If grade and/or floor mounted equipment is shown but no pad indicated on the architectural plans the contractor shall be responsible for clarifying the necessity, size, and location of any pads during the bidding process. No additional compensation will be given for pads which are required by this section but not indicated on the plans if no formal request for clarification was issued during the bidding process.

1.16 EQUIPMENT VISIBILITY

A. Where equipment is located on the roof or outside the building at grade in a place that is visible to the owner or general public, the following shall take place prior to roofing, placement of roof curbs or concrete equipment pads, routing of piping/electrical/controls/etc.:

1. The contractor shall construct a full-size temporary mock-up of the equipment in the proposed location.
2. The contractor shall review mock-up with architect and owner to obtain approval of equipment location. After approval, contractor shall remove and dispose of mockup materials.
3. Any modification to equipment location to satisfy architect/owner requirements shall be noted on a shop drawing and submitted to the architect/engineer for comment and approval prior to final placement of equipment.

1.17 COOPERATION WITH OTHER TRADES

A. Give full cooperation to other trades and furnish in writing to the Architect any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Coordination drawings shall be initiated by this contractor. It this contractor's responsibility for preparation of project coordination drawings showing the installation of all equipment, piping, ducts and accessories to be provided under Section 230000 of the Specifications.

1. Drawings shall be prepared at not less than 1/4 in. = 1 ft. scale, and shall show building room layouts, structural elements, ductwork and lighting layouts of function. Drawings shall indicate horizontal and vertical dimensions, to avoid interference with structural framing, ceilings, partitions, and other services.
2. A reproducible copy of each drawing prepared shall then be submitted to each Contractor working under Sections 210000, 220000, and 260000, who shall be responsible to coordinate his equipment and systems and shall show these on the drawings submitted.
3. After each Contractor has fulfilled his obligation, he shall return the drawings to the HVAC Contractor. After each drawing has been coordinated between trades, and appropriate revisions made, each trade shall sign each drawing, indicating acceptance of the installation.
4. The HVAC Contractor shall then print the coordination original and these prints submitted through the General Contractor to the architect for review and comment, similar to shop drawings. Comments made on these drawings shall result in a correction and re-submittal of the drawings.

C. Furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

1.18 PROJECT RECORD DOCUMENTS:

A. Each Contractor shall record clearly, neatly, accurately, and promptly as work progresses the following data:

1. Changes made resulting from change orders or instructions issued by the Architect.
2. Changes in routing made to avoid conflict with other trades or structural conditions.
3. Final location of equipment and panels if different than contract documents.

B. Upon completion of the project submit to the Architect a set of electronic media noting "as built" conditions indicating all variations and deviations of his work from contract documents.

1.19 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Operating Instructions: Provide operating instructions to the Owner's designated representative with respect to the operation functions and maintenance procedures for all equipment and systems installed. The cost of providing a manufacturer's representative at the site for instructional purposes shall be included in the Contract Price.

B. Maintenance Manuals: At the completion of the project, turn over to the General Contractor four (4) complete manuals in 3-ring binders, indexed, containing the following:

1. Complete shop drawings of all material and equipment of this section.
2. Operation descriptions of all systems.
3. Names, addresses and telephone numbers of all suppliers of system components.
4. Preventative maintenance instructions for all systems.
5. Spare parts list of all system components.
6. Copies of all valve charts.

1.20 PROTECTION

A. Protect all work and material from damage by work and workmen, and accept liability for all damage thus caused.

B. Be responsible for work and equipment until finally inspected, tested, and accepted. Protect work against theft, injury or damage; and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

C. All openings in stored & installed ductwork shall be covered & sealed when not in use to prevent contamination from dust & debris.

1.21 SCAFFOLDING, RIGGING AND HOISTING

A. Provide scaffolding, rigging, hoisting and services necessary for delivery, erection and installation of material, equipment and apparatus furnished under this division. Remove same from premises upon completion of work.

B. Coordinate propose routing with architect prior to rigging and protect all existing building components against damage.

1.22 MATERIALS AND WORKMANSHIP

A. All materials and apparatus required for the work, except as specifically specified otherwise, shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the Architect shall be furnished.

B. Furnish the services of an experienced foreman who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, welder, helpers, and labor required to unload, transfer, erect, connect, adjust, start, operate, and test each system.

C. All equipment and materials shall be installed in strict accordance with the manufacturer's recommended installation instructions as well as UL Listing instructions and all Local, State and National codes.

1.23 QUIET OPERATION AND VIBRATION

A. Work shall operate under all conditions of load without any objectionable sound or vibration. In case of moving machinery, sound, or vibration noticeable outside of room in which it is installed, or annoyingly noticeable inside its own room, will be considered objectionable. Sound or vibration conditions considered objectionable shall be corrected in an approved manner at no expense to the Owner. Vibration control shall be means of approved vibration eliminators in a manner as recommended by the manufacturer of the eliminators.

1.24 ACCESSIBILITY

A. Assure and be responsible for the adequacy of shafts and chases, the adequate clearance in double partitions and hung ceilings for the proper installation of the work. Cooperate with all other trades whose work is in the same space. Such spaces and clearances shall, however, be kept to the minimum size required.

B. Locate all equipment, which must be serviced, operated, adjusted or maintained fully accessible positions. Equipment shall include, but not be limited to, valves, traps, cleanouts, motors, controllers, filters, dampers, starters, coils, fire dampers, smoke dampers and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility, and the engineer shall approve any change.

C. Provide access panels for installation in concrete block walls or gypsum wallboard ceilings and partitions in locations, which require access for service to the items located behind the permanent gypsum wallboard or concrete block finish.

D. Access panels shall be installed where required to gain access to valves, dampers, controls, etc. Panels shall be flush, insulated, contain continuous steel hinge and screwdriver operated latch. Panels shall be rated equal to the assembly that they are being installed in panels shall be UL listed.

E. Access panels located in fire rated partitions shall be fire panels. The frame and panel assembly of these fire panels shall be manufactured under the Factory Inspection Service of the Underwriters' Laboratories, Inc., and shall bear a label reading: "Frame and Fire Panel Assembly, Rating 2 hours. (B) Temperature Rise 30 Minutes, 250° F. Maximum." Rated panels shall be equipped with automatic closing mechanism and be self-latching.

F. Panels shall be provided with screwdriver operated flush cam locks.

G. Panel size shall be 12 inches x 12 inches except furnish a larger size if required to service a particular item. The exact location and size of each access panel shall be reviewed with, and approved by, the Engineer.

H. The exact location and size of each access panel shall be noted on a shop drawing and reviewed with, and approved by, the Architect and Engineer in writing prior to installation.

1.25 CUTTING AND PATCHING

A. Provide all cutting and patching necessary to install the work specified in this division. Patching shall match adjacent surfaces.

B. At floor slabs & wall openings to be cored drilled or cut, contractor shall find and mark on both faces all reinforcing, rebar, conduits, utilities, etc.. by means of x-ray, pach-ometer or prof-ometer. Submit sketch showing locations of all findings and proposed cuts or cores for review.

C. No structural members shall be cut without the approval of the Structural Engineer, and all such cutting shall be accomplished in a manner directed by the Structural Engineer.

1.26 GROUNDING

A. All components of mechanical piping systems shall be properly grounded to building ground. Where ground path is interrupted by non-conductive materials, appropriate bonding or grounding to building ground shall be provided.

1.27 WATERPROOFING

A. Where any work pierces waterproofing including waterproof concrete, the method of installation shall be as approved by the Architect before work is started. Furnish all necessary sleeves required.

1.28 DEMOLITION

A. Prior to submitting bid, visit site and identify existing conditions and difficulties that will affect work of this section. Demolition work will require careful site examination prior to bidding. No compensation will be granted for additional work caused by unfamiliarity with site conditions that are visible or readily construed by experienced observers.

B. Prior to commencing demolition, contractor shall identify with owner any equipment to be returned to the owner after demolition. All other debris shall be disposed of by this contractor in accordance with all applicable regulations. Any shutdowns required for demolition shall be coordinated with building owner to avoid impact to operations.

C. During demolition, any equipment, ductwork, piping, etc. found to be abandoned shall be demolished. Existing unused connections to existing ducts or piping shall be cut back to the mains and capped accordingly.

D. Under demolition, the following is, in brief, the extent of the work to be performed by the mechanical contractor under this contract.

1. The mechanical contractor shall be responsible for the disconnection and removal of the existing mechanical equipment, ductwork, piping, valves, etc.,in designated areas. Cut & cap piping and ductwork back to mains. Patch all roof and wall penetrations to match existing.
2. This contractor shall protect work against injury or damage; and carefully store material and equipment to be relocated. Open ends of work shall be closed with temporary covers or plugs during storage and construction to prevent entry of obstructing material.
3. All existing HVAC components, including but not limited to ductwork, piping, equipment, controls & accessories, shall be removed from the area of renovation.
4. Coordinate all demolition with other trades to ensure all relevant portions of the system including associated electrical and plumbing components are removed.
5. Refer to drawing plans and notes for additional information.

1.29 DESIGN BUILD PROVISIONS

A. The Work will be performed based on a Design/Build approach in which the Mechanical Subcontractor provides the engineering needed to satisfy performance criteria and other requirements listed herein. The criteria and requirements are meant to establish the general intent and do not always give specific sizes and types. This proposal must therefore include both system design and engineering services.

B. Shop Drawings shall clearly describe the limits of the Work and identify related work by other trades. Work that the Mechanical Subcontractor requires to be done by other trades should also be noted. Formal coordination drawings will not be produced. Instead each major subcontractor will circulate their drawings to the other trades for review and comments. This will conclude with a coordination meeting in which all conflicts will be identified and resolved.

C. The responsibility to insure that all Work items fit in the space available lies with the Mechanical Subcontractor. The Shop Drawings must in turn include dimensioned details drawn to scale.

D. The Mechanical Subcontractor shall revise the Shop Drawings to include all required changes. Final revised drawings shall be issued prior to starting work.

1.30 TEMPORARY HEAT

A. The building must remain in full operation during the construction period. This contractor shall provide temporary space conditioning, hot water heating, and/or domestic water production for the duration of time which the existing systems are inoperable or have owner approval for any downtime.

B. This contractor shall provide a minimum of 48 hours' notice of any shutdowns and coordinate maximum allowable system downtimes with the Owner and/or Director of Operations prior to the start of work.

C. This contractor shall be responsible for providing temporary heating equipment at any point during construction as required to maintain laborer comfort and avoid damage to the building or any of its associated components, systems, or equipment.

D. Contractor shall provide all temporary or permanent equipment, materials, and labor to ensure these stipulations are met.

E. Temporary heating requirements shall be coordinated with the electrical and plumbing contractor as required. This contractor shall carry all costs associated with utilizing other contractors to provide materials or labor for temporary services indicated above.

PART 2: PRODUCTS

2.1 IDENTIFICATION, MARKING AND TAGGING

A. Systems and equipment to be identified and marked and valves tagged include, but are not limited to the Heating, Air Conditioning & Ventilating systems.

B. Submit samples of marking and tagging devices and wording, lettering and numbering scheme for each system.

C. Equipment Identification:

1. Manufacturer's nameplates or trademark shall be permanently affixed to all equipment and materials furnished under this division. Manufacturer's nameplates shall include all pertinent data relative to the piece of equipment including model number, serial number, and operating characteristics as applicable.
2. Separate Equipment Identification Markers shall identify each item of equipment with a permanently attached marker indicating designation and/or number corresponding to design documents.
3. Markers shall be of rigid black Bakelite or phenolic construction with white engraved or incised letters.
4. Lettering on equipment markers shall be of adequate size to be legible from floor levels. In all cases marker lettering shall no be less than 1 inch high.

D. Piping System Identification:

1. Piping Systems shall be identified as indicated herein or as required by applicable codes and/or officials having jurisdiction.
2. Pipe Markers shall be color coded according to " Designations to Colors" - ASME A13.1-2007.
3. All piping and equipment shall be identified by pipe markings, which shall be provided by this Contractor. Markers shall be applied every 20 ft. Markings shall indicate pipe content, system, operating pressure & temperature, and direction of flow. The markers shall be as manufactured by Seton Name Plate Corp. or equal
4. Pipe Markers shall be of the pressure sensitive type as manufactured by the Seton Nameplate Corp. (F10-Code)
5. Valve Identification: Provide laminated plastic nameplates on all valves installed under Division 23, except stop valves in supplies to fixtures. Tags shall be constructed of 0.125 inches thick melamine plastic conforming to Fed. Spec. L-P-387. Surface shall be matte finish. Accurately align lettering and engrave into white core. Nameplates shall be to 2 inches round or hexagonal. Lettering shall be minimum of 0.375 inch high normal block lettering. Key the nameplates to a chart and schedule for each system. Frame one chart and schedule for each system under glass and place where directed in mechanical room. Furnish four copies of each chart and schedule. Each inscription shall identify its function. Attach nameplates with "S" hooks and chain to each valve. Valve nameplates shall be numbered and "keyed".

2.2 SLEEVES, INSERTS AND ESCUTCHEONS

A. Provide sleeves for all work passing through floor, wall, and ceiling construction. Locate and provide sleeves and inserts before the floor, wall or ceiling is constructed. If this contractor does not comply with the above, he shall bear all costs incurred for cutting and patching required for the installation of sleeves and inserts. Holes required for sleeves in existing walls and floors, or to conform to the above shall be saw cut or core drilled. This Contractor shall provide all drilling required for the installation of hangers.

B. Pipe sleeves through outside walls shall be Schedule 80 black steel pipe with 150 lb. black steel slip-on welded flanges welded at the center of the outside. Extend sleeves 1/2 inch beyond each side of the wall. Pack the space between sleeve and pipe with oakum to within 2 inches of each face of the wall. Pack the remaining space and make watertight with an approved waterproof compound.

C. Pipe sleeves through concrete floors or interior masonry walls shall be Schedule 40 black steel pipe, set flush with finished wall or ceiling surfaces, but extending 2 inches above finished floors. Plastic, PVC, or light metal sleeves shall not be installed.

D. Provide individual or strip type inserts pressed steel construction with accommodation for removable nuts and threaded rods up to 3/4-inch diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods to 1/2 inch diameter to be passed through the insert body. Strip inserts shall have attached rods with hooded ends to allow fastening to reinforcing rods.

E. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe and the insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations.

F. Provide 22 gauge galvanized steel duct sleeves through interior walls, floors and ceilings set flush with finished surfaces.

G. Pack the space between sleeves and structure, and sleeves and pipes or ducts passing through fire rated interior walls, floors, and ceilings with an approved fire and smoke proof packing material. Fire-stopping material shall maintain its dimensions and integrity while preventing the passage of flame, smoke, and gases under conditions of installation and user when exposed to the ASTM E119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Fire-stopping material shall be non-combustible as defined by ASTM E136; and in addition, for insulation materials, melt point shall be a minimum of 1700 degrees F. for 1-hour protection and 1850 degrees F. for 2-hour protection.

H. Fasten sleeves securely in floors, walls, etc. so that they will not become displaced when concrete is poured or when construction is built around them. Take precautions to prevent concrete, plaster, or other materials being forced into the space between pipe and sleeve during construction.

I. In all areas where ducts are exposed and pass through floors, the hole shall be surrounded by a 4-inch high by 3-inch wide concrete curb, or otherwise protected as determined by the Engineer.

J. Escutcheon plates shall be provided for all exposed un-insulated pipes passing through walls, floors, and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe. Where plates are provided for pipes passing through sleeves, which extend above the floor surface, provide deep recessed plates to conceal pipe sleeves.

2.3 SUPPORTS & ATTACHMENTS

A. Provide all necessary supports and bases required for all equipment, piping and for all other equipment furnished under this contract. Submit shop drawings to the Architect for approval before purchase, fabrication or construction of same.

B. All equipment, unless shown otherwise, shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and any attachments that are not strong enough shall be replaced as directed.

C. Vibration Isolation: All mechanical equipment, piping and ductwork shall be mounted on vibration isolators/inertia bases to prevent the transmission of vibration and mechanically transmitted sound to the building structure.

1. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflections.
2. All isolators and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.

2.4 SEISMIC RESTRAINTS

A. It is the intent of this seismic specification that this contractor shall provide all necessary seismic restraints required to keep all mechanical building system components in place during a seismic event as required by the Building Code.

B. All mechanical systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.

C. This contractor shall engage a professional structural engineer registered in the jurisdiction of this project to review the entire installation to determine all seismic restraint requirements and methods. Contractor shall submit a report outlining the structural engineer's review as well as seismic restraint shop drawings and supporting calculations prepared by the professional structural engineer for review by the Architect.

1. Any questions relative to Component Importance factors shall be issued to the Architect/Engineer for resolution prior to seismic analysis.

D. Seismic restraints shall be designed in accordance with seismic force levels as detailed in the applicable building code.

2.5 ELECTRIC MOTORS/STARTERS

A. Electric motors and starters shall conform to requirements of the AIEE, NEMA, UL, and NEC and shall be suitable for load duty, voltage, phase, frequency, service and location required. Provide inverter duty rated motors for use with variable frequency drives. Provide shaft grounding rings for all VFD controlled motors.

B. All motors shall be rated at 85% power factor at full rated load. Motors less than 85% power factor shall be corrected to 90% power factor at the factory. All motors shall be rated high efficiency.

C. Starters shall be Cerus International or equal.

1. Enclosed Non-Combination Starter

a) Motor Starter shall be enclosed in a Type 1 or Type 4 UL rated enclosure.

b) Motor Starter shall be rated for NEMA class B motors for AC-3 switching and AC-4 switching.

c) Controls and annunciation shall include Hand- OFF- Auto keypad. LED indication shall include Hand, Off, Auto, Run and Overload. Overload reset shall be available.

d) Control inputs shall include: Auto Wet input, Auto Dry input, Permissive Auto input, Damper Status Input and Override Input. Automatic control inputs shall be capable of accepting a transistorized input without the need for interposing relays. Wet control inputs shall accept AC or DC inputs from 10 to 138VAC or DC.

e) Damper control shall be built into the starter to provide 24VAC or 120VAC damper control and monitoring.

f) Override input shall disable the starter from operating in either Hand or Auto mode.

g) Protective Functions

(i) Electronic Overload shall provide phase failure and phase loss protection, stall, and class 1 - 30 selectable overload protection. Phase failure protection shall initiate when phase loss is greater than 70% for 3 seconds or phase unbalance is greater than 50% for more than 5 seconds.

(ii) Cycling fault protection shall be integral to the starter. Cycling fault shall be enabled whenever the starter is cycled more than 1000 times in a one hour period. This feature shall be selectable to be disabled. Cycling fault shall cause overload LED to blink rapidly.

2. Enclosed Combination Starter

a) Enclosed combination starter shall include all of the above descriptions in addition to either a motor circuit protector with lock-out mechanism, a UL 508 breaker, or a fused disconnect with lock-out mechanism.

b) The Motor Circuit protector shall be a UL listed 508 manual motor starter with magnetic trip elements only. The breaker and shall carry a UL 508F rating (up to 100A frame size) which provides for coordinated short circuit rating for use with the motor contactor and provides an interrupting rating for the breaker and contactor combination.

c) Fused disconnect shall be UL 98 suitable for service entrance protection.

d) UL 508 breaker shall include thermal and magnetic trip mechanisms.

2.6 USE OF INSTALLATION

A. The Owners shall have the privilege of using any part of the installation when sufficiently complete, but such use thereof, or partial or final payment shall not be considered as an acceptance of such work in lieu of a written certificate from the Engineer.

2.7 DUCTWORK

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, supports and sealing for operating pressures indicated.

B. Duct gauge shall be as required by SMACNA Duct Construction Standards taking into account duct size, supports, pressure rating, and any other relevant parameters. All ductwork, regardless of SMACNA Standards, shall be no thinner than 26 gauge.

C. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A90.

1. Sealant: As recommended by manufacturer specifically for sealing joints and seams in ductwork.
2. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
3. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

D. Round Ductwork: Provide a complete double wall, spiral wound, round ductwork system as designed on the drawings with all necessary fittings, hangers, supports, turning vanes, and all other appurtenances for the installation of an operable system. All ductwork and fittings shall be galvanized sheet metal in accordance with ASTM-A527 specifications. Ductwork shall be of round spiral lockseam construction.

E. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

F. Flexible Connections

1. Flexible connections shall be provided where a fan connects to a duct or casings to prevent transmission of vibration to ductwork.
2. Flexible connections shall fit tightly around ducts and fans and be securely bolted or clamped in place. Taping shall not be allowed.
3. Flexible duct connections shall be 6" long and made of straight, waterproof, flame retardant fabric having a flame spread rating of not over 25 and a smoke development rating of not over 50

G. Volume Dampers:

1. Provide Young Regulator manual adjustable rectangular opposed blade dampers for duct heights less than 12" with factory-installed locking hand quadrants extended 2" for all dampers installed in externally insulated duct:
   a) On each supply, return and general duct take-off.
   b) At each take-off to register, grille or diffuser (not all are shown on drawing).
2. Dampers are manufactured approximately 5/16" smaller in width and 1/8" smaller in height than size of duct in which they are installed; e.g., nominal damper size is 24" x 10"; actual size is approximately 23-11/16" x 9-7/8".
3. Damper frame shall be constructed of #6063 extruded aluminum reinforced channel with minimum thickness of .050". Opposed damper blades shall be #6063 extruded aluminum with minimum thickness of .050" and shall include reinforcing ribs. Each blade shall be supported in the damper frame by individual Teflon axle bearings, and shall be driven by stainless steel connecting slide linkage controlled by 3/8" square steel control shaft.
4. Note: All required volume dampers may not be indicated on drawings but dampers shall be provided as necessary for systems balancing.
5. Dampers 12" and larger in height shall be opposed multi-blade equal to Greenheck, Nailor or Vent Products.
6. Where dampers are inaccessible, use Young Rectangular locking type ceiling regulators and miter gear or worm gear for all horizontal dampers. Bearing coupling for bottom duct control may be used for shaft on vertical blade dampers. The 3/8" rod between ceiling regulator and damper shall be provided by Contractor.
7. Where dampers are to be located above hard ceilings Young Regulator Bowden Cable Control Dampers shall be utilized. Controllers (actuators) shall be of the concealed ceiling type. Controller type, finish & locations to be approved by architect prior to purchase & installation. The cable between the damper and controller shall be provided by the contractor.
8. Damper blades shall be two gauges heavier than adjoining ductwork, and shall be riveted to supporting rods. Hem over edges parallel to rods.
9. Brackets shall be galvanized metal, secured to ductwork with sheetmetal screw with locking quadrant arms (see seal class section for additional requirements). Provide 2" handle extension for all dampers on externally insulated ductwork.
10. Note: All required volume dampers may not be indicated on Drawings but dampers shall be provided as necessary for system balancing.

H. Fire Dampers:

1. Provide fire dampers throughout air distribution system as required by applicable codes, standards and authorities. Provide access door for each fire damper of sufficient size to repair internal link. Fire dampers indicated on drawings may not fully represent the exact number required for this project. It is the Contractor's responsibility, at no additional cost to the Owner, to provide all required dampers.
2. Dampers shall be approved fusible-link self-closing spring loaded type, Buckley Model 150B or equal.
3. Dampers shall be dynamic type when serving a system that is not shut down during fire alarm activation.
4. Frame shall be fitted with angle iron stop and stainless steel spring latch, and shall be securely fastened to building construction.
5. Seal spaces between damper frames and walls and between damper frames and floor with approved fire-retardant material.
6. Use of dampers shall NOT reduce net free area of duct below that shown on drawings. Fire dampers shall be Type B with blades of dampers out of air stream.
7. Samples of fire dampers shall be submitted to and approved by local authorities having jurisdiction.
8. Dampers shall bear 1-1/2 hour UL-rating fire damper label and shall be constructed and installed as required by UL-555.
9. Fire dampers shall be Buckley, Ruskin, Nailor Industries or Prefco for use in the proper duct pressure classification.
10. Dampers shall be installed per SMACNA with breakaway connections and nose pieces on duct liner (see SMACNA HVAC Duct Construction Standards).

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11. All dampers in ductwork served by equipment not subject to fan shut down upon fire alarm activation shall be dynamic type.

2.8 DUCT INSULATION

A. Compliance: Insulation thickness, conductivity and installation shall comply with local Mechanical and Energy Codes. Where local code conflicts with specifications, the more stringent shall apply.

B. Definitions:

1. Conditioned Space: An area, room or space that is enclosed within the building thermal envelope and is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors, or ceilings or where they contain uninsulated ducts, piping or other sources of heating or cooling.
2. Unconditioned Space: An enclosed space within a building that is not a conditioned space or a semiheated space. Crawlspaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.

C. Supply and Return Air Duct Insulation:

1. Insulation: ASTM C553; flexible, foil faced, noncombustible blanket.
   a) Exposed Conditioned
      (i) Supply Air: No Insulation Required
      (ii)Return Air: No Insulation Required
      (iii) Outside Air: No Insulation Required
   b) Concealed Conditioned
      (i) Supply Air: R-Value of 6.0 installed.
      (ii)Return Air: No Insulation Required
      (iii) Outside Air: R-Value of 6.0 installed.
   c) Unconditioned
      (i) Supply Air: R-Value of 6.0 installed.
      (ii)Return Air: R-Value of 6.0 installed.
      (iii) Outside Air: No Insulation Required
2. Vapor Barrier Jacket:
   a) Kraft paper with glass fiber yarn and bonded to aluminized film.
      (i) Moisture vapor transmission: ASTM E96; 0.02 perms.
      (ii)Secure with pressure sensitive tape.
3. Vapor Barrier Tape:
   a) Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

D. Exhaust Ductwork Insulation:

1. Insulation: ASTM C553; flexible, foil faced, noncombustible blanket.
2. Direct Exhaust: No Insulation Required.
3. Upstream of an ERV:
   a) Refer to Supply and Return Duct Insulation.

E. All duct insulation & wrap shall be installed per the manufacturer's application instructions. Provide mechanical fasteners to the bottom of ducts as required by the manufacturer.

2.9 INTERIOR DUCT LINER

A. Polymer Foam insulation (EPFI) equal to IMCOA "IMCOSHEET" Engineered Polymer Foam Insulation, 1 inch thick, R = 4.0, closed cell. Insulation shall be installed as required by the insulation manufacturer. Insulation shall be in compliance with NFPA 90 and 90B. Flame spread shall be less than 25 and smoke density less than 50 per ASTM E-84, NFPA 255, UL 723 Class I and UL 181.

B. Duct lining shall be applied in the following locations:

1. 20' upstream and downstream from all air handling units exceeding 10 tons.
2. 10' upstream and downstream from all air handling unit of 10 tons or less.
3. 5' downstream from all other fan powered units including, but not limited to, fan powered VAV boxes.

C. Areas provided with interior duct lining shall also be provided with exterior duct insulation as indicated by these specifications.

2.10 FIRESTOPPING

A. Provide Firestopping systems for penetrations in fire-resistance-rated assemblies, including both membrane and through penetrations. This contractor shall thoroughly review architectural plans for assembly type and location and shall prepare bid accordingly.

B. Materials and systems shall be designed to meet the requirements of the intended application and shall be installed per manufacturer's guidelines.

C. Submittals: Provide for review Manufacturer's product literature and tested assembly for each type of fire protection material including product characteristics, typical uses, installation procedures, performance and limitation criteria.

PART 3: EXECUTION

3.1 OPERATING INSTRUCTIONS

A. Instruction to the Owner's Personnel - After completion of all work and all tests and at such times as designated by the Architect, provide the necessary skilled personnel to operate the entire installation until receipt of owners acceptance.

B. During the operating period, instruct the Owner's representative in the complete operation, adjustment, and maintenance of the entire installation.

C. Give at least forty-eight (48) hours advance notice to the Owner to coordinate scheduling of this instructional period.

D. Furnish to the Architect five (5) complete bound sets of typewritten or blueprinted instruction manuals for operating and maintaining all systems and equipment included in the contract. All instruction manuals shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.

E. The above-mentioned instructions shall include the maintenance schedule for the principal items of equipment furnished under this contract.

3.2 MANUFACTURER'S RECOMMENDATIONS:

A. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Architect prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

3.3 TESTING, ADJUSTING, STARTING UP AND COMMISSIONING

A. Testing: All work must be proved satisfactory. The tests herein specified shall be applied in the presence of, and to the satisfaction of, the Architect before the work is covered, concealed or made inaccessible to testing, repair, correction or replacement. Accommodate the testing operation to the progress of the project as a whole. Correct all defects appearing under test and repeat the tests until all parts of the work have been successfully tested. Apply the specific tests herein described. Present all work for acceptance in clean condition, properly adjusted and in good working order; for instance, all machinery must be quiet, well balanced, and must be in place and reading accurately. All systems, equipment, controls, and devices in this work shall be tested in operation and must prove for their purposes in the judgment of the Architect or his authorized representative. All internal surfaces of all lines and equipment shall be blown or flushed clean. Where pressure tests are specified, the apparatus shall be clean before the tests are applied. Contractor shall provide adequate protection of piping and duct systems to prevent vandalism and/or accidental damage, blockage, etc., that will hinder or prevent proper operation of the finished systems.

1. Provide instruments, pumps, gauges, supplies, equipment, materials, and labor for testing and starting up. Dispose of test water and wastes after test, in a manner approved by all applicable codes.
2. Perform tests which may be required by authorities or agencies in addition to those herein specified.
3. Piping for steam, hot water, chilled water, supply and return, drain, escape and relief valve discharge shall be tested with water and made tight under pressure of 150 pounds per square inch gauge maintained for one hour without pumping or as long as required to inspect all joints. Repair all leaks and retest. Piping shall be made tight without caulking. Apply pressure tests to piping only before connection of equipment. In no case shall piping, equipment or accessories be subjected to a pressure exceeding it's rating. Low-pressure elements shall be isolated or removed before tests are conducted.
4. Test valve bonnets for tightness. Test operate all valves at least once from closed-to-open-to-closed positions while valve is under pressure. Test all automatic valves for proper operation at the settings indicated. Test pressure relief valves at least three (3) times.
5. Test piping specialties for proper operation. Test air vent points to ensure that air has been vented.
6. Furnish certified shop test records for all pressure vessels. After installation, test at full operating pressures and temperatures maintained for one hour. Set and test all pressure control, relief and safety devices.
7. Repair or replace all defective work and repeat tests until the particular system and component parts thereof receive the approval of the Architect.
8. The duration of tests shall be as determined by authorities having jurisdiction, but in no case less than the time prescribed in each section of the specifications.
9. Test equipment and systems, which normally operate during seasons of the year during the appropriate season. Perform tests on individual equipment, systems and their controls. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, function, and performance; the latter shall be operated simultaneously with the equipment of system being tested.

B. Adjusting, Balancing and Starting Up

1. Flush clean all systems prior to starting up the system. Any damages to the building or system components caused by failure to clean the systems properly shall be corrected to the satisfaction of the Architect or his authorized representative at no additional cost to the Owner.
2. In duct and piping systems, eliminate all noise and vibration and take all measures to secure proper circulation.
3. Run motor-driven equipment continuously for at least two hours in the presence of the Architect. Correct all defects of noise, vibration, alignment and balance. Replace all motors, which overheat or are noisy.
4. Balance systems completely for temperature, volume, and pressure per NEBB performance standards. Balancing subcontractor shall provide proof of certification by NEBB.
5. Air and water volumetric flow rates shall be within ten (10) percent of those specified. Air and water quantities and pressures shall be tested, balanced and recorded at all terminal devices. Volumetric flows and pressures shall be recorded on suitable forms and submitted for approval.
6. Provide any and all labor and equipment necessary to properly balance the installation including but not limited to dampers, valves, flow stations, test ports, sheaves, belts, etc.
7. All sequences of the system shall be checked and all temperature controls operated and commissioned as required to insure that all systems operate per Engineers intent.

C. Commissioning

1. This Contractor shall provide the deliverables to the engineer/owner.
2. Copies of all records shall be provided to the Engineer by this Contractor including, but not limited to:
   a) Equipment manuals including the name of at least one service agency;
   b) Testing and Balancing reports;
   c) Functional performance testing of the equipment, controls, economizers, and lighting control systems.
3. All commissioning shall be performed as indicated here and elsewhere in the specifications and shall comply with provisions of the applicable Energy Conservation Code.
4. Start-up shall be provided by factory representatives and a full start-up report shall be provided for review and approval for the following equipment:
   a) Packaged Rooftop Units

3.4 SEQUENCE OF OPERATIONS

A. Sequence of Operations: This is a performance-based specification intended to convey the control intent of the various systems. The contractor shall provide detailed shop drawings including P&ID diagrams, equipment lists and finalized sequences for review by the Engineer prior to installation. Any questions concerning specific details shall be referred to the engineer for clarification.

B. System: It is the intent of this specification that programmable electronic controls be provided to control occupied/unoccupied modes of all HVAC systems within the facility. Systems shall be provided with all additional required controls including, but not limited to, space mounted monitoring and user interface devices, to provide the specified sequence.

C. Equipment and Wiring: This contractor shall provide all control equipment, and wiring (regardless of voltage) to accomplish the sequence of operations as detailed below. This contractor shall carry funds sufficient to hire the Electrical Contractor to provide line-voltage power, including any required wiring, breakers, and/or disconnects, to all control's components needing such power. Such components shall include, but may not be limited to:

1. Control Transformers
2. Central Equipment Controllers
3. Line-voltage Thermostats or other sensors

D. Control and Monitoring: Sensors shall be provided throughout the HVAC systems (hydronic and air) as required to control and monitor their operation. Provide sensors with remote mounted stats where indicated on the drawings. Where multiple space mounted sensors are required for a given unit they shall be located in the same general area.

E. Smoke Detection System and Control: Duct mounted smoke detectors (DSD) shall be installed as indicated on the plans and in the supply and return ductwork of all systems with a design capacity greater than 2000 CFM including the total airflow of common return air systems.

1. DSDs shall be installed at each story prior to the connection to a common return and prior to any recirculation or fresh air inlet connection in return air systems having a capacity greater than 15,000 CFM and serving more than one story.
2. DSDs shall be installed in accordance with NFPA 72 and shall monitor the entire airflow conveyed by the system.
3. Upon activation the smoke detectors shall shut down all operational capabilities of the air distribution system. Air distribution systems that are part of a smoke control system shall switch to the smoke control mode upon activation of a detector.
4. DSDs shall be connected to a fire alarm system when present. The actuation of a DSD shall activate a visible and audible supervisory signal at a constantly attended location. IN facilities that are required to be monitored by a supervising station, DSDs shall report only as a supervisory signal, not as a fire alarm.

F. Safety Controls: This contractor shall provide all safety controls required to protect the building and all controlled equipment from damage as well as those controls necessary to signal abnormal operation or malfunction of equipment. These shall include but not be limited to high limits, low limits, freezestats, flow switches, interlocks and relays.

G. Energy Efficiency: All controls and sequences shall be configured to provide maximum energy efficiency while maintaining occupant comfort.

H. Functional Performance Testing: The contractor shall perform complete and thorough Control Functional Performance Test (FPT) and Commissioning of the control systems. Upon completion of the FPT, a report shall be submitted to the engineer for review and comment. The FPT shall include testing of:

1. Safeties in every mode, i.e., in manual run mode as well as auto mode.
2. Signals to and from the fire alarm, security and entry systems.
3. Sequences of operation step by step in every mode and possible situation.
4. The operation of all control loops under actual operating conditions.
5. The interlocked operation of all equipment (i.e., the operation of starters in manual and off modes as well as auto mode, damper end switch interlock, etc.)
6. Where the BAS performs computations, the actual computation of any formulas and simulation of actual conditions to check the BAS computations.
7. Review of BAS programs for errors and omissions.
8. Hard copy graphs of trend logs of most, if not all, operational parameters.
9. Commissioning should test every conceivable life safety scenario and every conceivable operational scenario that the system will encounter and document this testing with printed graphs of trend logs.

I. Existing Packaged Rooftop HVAC Unit
   a) Existing sequence to be maintained.

J. Exhaust Fans:

1. Bathroom Ceiling Exhaust Fans
   a) Integral lights (where applicable) shall be energized/de-energized by a separate wall mounted switch.

END OF SECTION

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WIRING DEVICE LEGEND

	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE	18" A.F.F.
	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	42" A.F.F. OR 6" ABOVE COUNTER
	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE WITH GROUND FAULT PROTECTION.	18" A.F.F.
	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE WITH GROUND FAULT PROTECTION.	42" A.F.F. OR 6" ABOVE COUNTER
	SPECIAL NEMA CONFIGUATION OUTLET; VERIFY NEMA TYPE WITH EQUIPMENT TO BE SERVED.	--
	SINGLE CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	18" A.F.F.
	DEDICATED DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	18" A.F.F.
	SWITCHED DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE. TOP OUTLET SWITCHED, BOTTOM OUTLET UN-SWITCHED. REFER TO PLANS FOR SWITCH LOCATION(S).	18" A.F.F.
	QUADRUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	18" A.F.F.
J	JUNCTION BOX; SIZE AS REQUIRED PER CODE.	-
R	RELAY; REFER TO PLANS FOR RATINGS.	-
C	CONTACTOR; REFER TO PLANS FOR RATINGS.	-
TC	TIMECLOCK; REFER TO DETAILS ON PLANS.	-
	MOTOR; REFER TO PLANS FOR DETAILS.	-
60/50	FUSED DISCONNECT SWITCH. 60/50 INDICATES FRAME SIZE/FUSE SIZE IN THAT ORDER. STARTERS FOR HVAC EQUIPMENT BY MECHANICAL CONTRACTOR.	-
	SURFACE MOUNTED PANELBOARD; 208Y/120V, 3-PHASE, 4-WIRE. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.	MOUNT 6'-6" AFF TO TOP BREAKER.
	RECESSED MOUNTED PANELBAORD; 208Y/120V, 3-PHASE, 4-WIRE. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.	MOUNT 6'-6" AFF TO TOP BREAKER.
	GROUNDING CONDUCTOR / MEANS & METHOD; IN ACCORDANCE WITH THE *"NATIONAL ELECTRIC CODE"*, (NEC). REFER TO PLANS FOR SIZING.	-

NOTES:

1. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE G.C. FOR WALLS BEING FURRED-OUT WITH SHEETROCK DRYWALL SO OUTLET BOXES & DEVICES CAN BE INSTALLED FLUSH WITHIN THE WALLS. (TYPICAL)
2. ALL RECEPTACLES SHALL BE PROVIDED WITH AN ADHERED, TYPED LABEL INDICATING PANEL NAME AND CIRCUIT NUMBER. HANDWRITTEN LABELS WILL NOT BE ACCEPTED.
3. ALL RECEPTACLES WITH A DEDICATED CIRCUIT SHALL BE LABELED WITH PANEL NAME AND CIRCUIT NUMBER AS INDICATED, AS WELL AS LABELED "DEDICATED".
4. ALL COLORS OF RECEPTACLES AND ASSOCIATED FACEPLATES TO BE CONFIRMED WITH OWNER'S REPRESENTATIVE AND LOCAL (AHJ) PRIOR TO ANY SUBMITTALS, PURCHASE AND/OR INSTALLATION OF EQUIPMENT. THIS REQUIREMENT AS INDICATED, SHALL BE CORRECTED AS REQUIRED.
5. ALL TYPES AND LOCATIONS OF RECEPTACLES TO BE CONFIRMED WITH OWNER'S REPRESENTATIVE AND LOCAL (AHJ) PRIOR TO ANY SUBMITTALS, PURCHASE AND/OR INSTALLATION OF EQUIPMENT. FAILURE OF THIS REQUIREMENT AS INDICATED IN THESE NOTES SHALL BE CORRECTED AS REQUIRED.
6. ANY CONFLICT WITH RECEPTACLE LOCATIONS, TYPES OF RECEPTACLES OR COLORS OF RECEPTACLES WITH OWNER'S REPRESENTATIVE OR WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR, AND GENERAL CONTRACTOR TO PROVIDE ALL ADDITIONAL WORK AND EXPENSES TO REPAIR AND CORRECT. NO ADDITIONAL REIMBURSEMENTS OR TIME OF COMPLETION FOR WORK WILL BE ALLOWED.
7. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH LOCAL (AHJ) FOR ALL INSTALLATIONS AND REQUIREMENTS.

LIGHTING CONTROL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
SM	MANUAL MOTOR RATED TOGGLE SWITCH WITH THERMAL OVERLOADS.	48" A.F.F.
Sa	SINGLE POLE SWITCH; "a" INDICATES LIGHT FIXTURES CONTROLLED.	48" A.F.F.
S3a	THREE-WAY SWITCH; "a" INDICATES LIGHT FIXTURES CONTROLLED.	48" A.F.F.
SDa	SINGLE POLE DIMMER SWITCH; "a" INDICATES LIGHTING FIXTURES CONTROLLED.	48" A.F.F.
SD3a	THREE-WAY DIMMER SWITCH; "a" INDICATES LIGHTING FIXTURES CONTROLLED.	48" A.F.F.
TC	TIME CLOCK EQUAL nLIGHT SWITCH CONTROLS #nDTC. PROGRAM SUCH THAT KEY SWITCH OVERRIDES TIME CLOCK FUNCTION. INSTALL PER MANUFACTURERS INSTRUCTIONS.	
WS	WALL SWITCH VACANCY SENSOR (MANUAL "ON" AND AUTOMATIC "OFF") SENSOR SWITCH #WSX-PDT ("2P" REQUIRED WHEN CONTROLLING 2 SWITCH LEGS, "2P-FAN" WHEN CONTROLLING EXHAUST FAN SEPARATE FROM LIGHTING). INSTALL PER MANUFACTURERS INSTRUCTIONS.	48" A.F.F.
MS	DUAL TECHNOLOGY VACANCY SENSOR EQUAL TO nLIGHT CONTROLS nCM SERIES. PROVIDE nLIGHT POWER PACK "nPP16-X" FOR EACH SWITCH LEG CONTROLLED BY OCCUPANCY SENSOR. WIRE TO POWER PACK PER MANUFACTURERS INSTRUCTIONS FOR MANUAL "ON" WITH WALL LOW VOLTAGE SWITCH AND AUTOMATIC "OFF" WITH SENSOR. SET DELAY TIMES FOR 15 MINUTES. SET SENSOR SO THAT ONLY ONE TECHNOLOGY IS NEEDED TO KEEP LIGHTS ON.	CEILING
PP	POWER PACK FOR VACANCY SENSORS EQUAL TO ACUITY nLIGHT CONTROLS #nPP16-X. WIRE PER MANUFACTURERS INSTRUCTIONS FOR MANUAL "ON" WITH WALL LOW VOLTAGE SWITCH AND AUTOMATIC "OFF" WITH SENSOR.	48" A.F.F.

NOTES:

- E.C. SHALL FURNISH AND INSTALL ALL DEVICES AND ACCESSORIES FOR A COMPLETE LIGHTING CONTROL INSTALLATION.
- COORDINATE EXACT REQUIREMENTS FOR INSTALLATION WITH LIGHTING CONTROL REPRESENTATIVE.
- PROVIDE ALL LOW VOLTAGE CABLING REQUIRED FOR CONTROLS.

TYPICAL ELECTRICAL NOTES

1. FURNISH LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR THE PROPER AND COMPLETE INSTALLATION OF ALL ELECTRIC WORK SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED.
2. ALL ITEMS NOT SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE ELECTRICAL INSTALLATION, SHALL BE FURNISHED AND INSTALLED AS PART OF THIS PROJECT.
3. ALL ELECTRICAL INSTALLATIONS AND GROUNDING SHALL BE IN STRICT ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE LOCAL, STATE AND NATIONAL CODES.
4. OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND INSPECTIONS.
5. MATERIALS AND WORKMANSHIP SHALL BE THE BEST OF THEIR RESPECTIVE KIND AND IN FULL ACCORDANCE WITH THE MOST MODERN ELECTRICAL CONSTRUCTION STANDARDS. ALL MATERIAL SHALL BE NEW, UNLESS OTHERWISE NOTED AND FREE OF ANY DEFECTS.
6. THE ELECTRICAL CONTRACTOR SHALL CLEAN AT THE END OF EACH DAY ALL AREAS WORKED IN. EMPTY BOXES, RUBBISH, AND OTHER CONSTRUCTION MATERIALS OF NO USE SHALL BE REMOVED FROM THE BUILDING.
7. ALL WORK SEQUENCES SHALL BE COORDINATED WITH THE G.C. AND SHALL BE COORDINATION WITH OTHER BUILDING TRADES AND G.C. BUILDING SCHEDULES.
8. ALL BRANCH CIRCUITS RATED AT 120 VOLTS, 20 AMPERES EXCEEDING 75 FEET SHALL BE MINIMUM #10 AWG.
9. THE ELECTRICAL CONTRACTOR (E.C.) SHALL COORDINATE WITH THE LOCAL UTILITY POWER COMPANY AND PROVIDE ALL MATERIAL & LABOR REQUIRED TO COMPLY WITH THE UTILITY POWER COMPANY'S REQUIREMENTS AND STANDARDS, PRIOR TO ORDERING ANY ELECTRICAL EQUIPMENT, SUCH AS, SWITCHGEAR, PANELS, TRANSFORMERS, DISCONNECT SWITCHES, ETC... E.C. SHALL CONFIRM METERING SEQUENCE (HOT OR COLD) AND MAKE THE APPROPRIATE PROVISIONS FOR THE APPROVED METERING SEQUENCE ARRANGEMENT. A.I.C. RATINGS, GROUNDING, BONDING, RACEWAYS, ETC... SHALL BE IN ACCORDANCE WITH THE UTILITY COMPANY'S STANDARDS.
10. THE ELECTRICAL CONTRACTOR (E.C.) SHALL COORDINATE WITH THE LOCAL TELEPHONE COMPANY AND PROVIDE ALL MATERIAL & LABOR REQUIRED TO COMPLY WITH THE TELEPHONE COMPANY'S REQUIREMENTS AND STANDARDS, PRIOR TO ODERING ANY ELECTRICAL EQUIPMENT, SUCH AS, TERMINAL BOARDS, GROUNDING, RACEWAYS, ETC...
11. ALL RECEPTACLE WITH "WP" DESIGNATION SHALL BE PROVIDED WITH A WEATHER-PROOF WHILE IN-USE ENCLOSURE. (TYPICAL)
12. ELECTRICAL CONTRACTOR TO ALLOW TIME FOR DIRECTIONAL ADJUSTMENT OF ALL LIGHT FIXTURES AS DIRECTED BY OWNER.
13. ALL RECEPTACLES SHALL BE LABELED INDICATING THEIR RESPECTIVE PANEL & CIRCUIT NUMBER.
14. AT EXISTING FLOOR SLABS AND WALLS TO BE CORE-DRILLED OR CUT, THE CONTRACTOR SHALL FIND AND MARK ALL EXISTING REINFORCING, PIPING, CONDUIT & FEEDERS, ETC IN BOTH FACES LOCATED BY MEANS OF X-RAY, PACH-OMETER, OR PROFOMETER. SUBMIT DRAWING SHOWING LOCATIONS OF EXISTING REBAR, PIPING AND/OR CONDUIT AND PROPOSED CORES AND/OR CUTS FOR REVIEW.
15. ALL PENETRATIONS FOR POWER RECEPTACLES, JUNCTION BOXES, TELEPHONE/DATA OUTLETS, SWITCHES, BACKBOXES, ETC.. LOCATED IN EXTERIOR WALLS SHALL BE PROVIDED WITH APPROPRIATE CAULKING AND GASKETS TO SEAL OFF AND PREVENT AIR LEAKAGE. FOLLOW CAULKING AND GASKET MANUFACTURERS INSTALLATION GUIDELINES TO ENSURE CORRECT AND EFFECTIVE INSTALLATION.

TYPICAL FIRE STOPPING NOTES

A. GENERAL: FIRE STOPPING SHALL BE PROVIDED BY THIS CONTRACTOR FOR ALL FLOOR, CEILING AND FIRE RATED WALL PENETRATIONS FOR CONDUIT, SLEEVES AND/OR CABLING AS REQUIRED BY JOB CONDITIONS.

B. THE CONTRACTOR SHALL PROVIDE A FIRE STOP SYSTEM IN ACCORDANCE WITH THE FOLLOWING:

1. THE SYSTEM SHALL CONSIST OF A WATERBASED SEALANT AND SUITABLE DAMMING MATERIALS (WHERE REQUIRED) AND BE INSTALLED PER MANUFACTURER'S REQUIREMENTS.
2. THE SEALANT SUPPLIED SHALL BE A TWO STAGED INTUMESCENT AND CAPABLE OF EXPANDING UP TO 8 TIMES ITS ORIGINAL VOLUME.
3. THE SEALANT SUPPLIED SHALL CONTAIN NO ASBESTOS, NO FIBERGLASS, AND NO SOLVENTS NOT CORROSIVE MINERAL SALTS OF ANY KIND.
4. THE SEALANT SHALL FORM A SURFACE CAPABLE OF BEING SANDED AND PAINTED TO MATCH SURROUNDING SURFACES AND SHALL BE IMPERVIOUS TO WATER WHEN DRY.
5. THE FIRE STOP SYSTEM SHALL BE TESTED TO THE TIME/TEMPERATURE REQUIREMENTS OF ASTM E119 AND SHALL BE UL1479 (ASTM E814) AND CLASSIFIED FOR UP TO 3 HOURS.
6. THE FIRE STOP SEALANT SHALL BE SPECSEAL SEALANT AS MANUFACTURED BY SPECIFIED TECHNOLOGIES, INC. OR APPROVED EQUAL.
7. SPECIAL CARE SHALL BE TAKEN WITH ELECTRICAL SYSTEMS NOT TO COMPROMISE ANY OF THE BUILDING FIRE PARTITIONS, FLOORS, WALLS OR MEMBRANES. PROVIDE ALL FIRESTOPPING REQUIRED TO COMPLY WITH THE BUILDING CODE, THE ELECTRICAL CODE AND THE UL LISTING OF EACH ASSEMBLY. COORDINATE LOCATIONS AND TYPES OF MEMBRANES WITH ARCHITECT.

SEISMIC RESTRAINT NOTE

A. GENERAL- IT IS THE INTENT OF THIS SEISMIC SPECIFICATION TO KEEP ALL ELECTRIAL BUILDING SYSTEM COMPONENTS IN PLACE DURING A SEISMIC EVENT. ALL ELECTRICAL SYSTEMS MUST BE INSTALLED IN STRICT ACCORDANCE WITH SEISMIC CODES, COMPONENT MANUFACTURER'S AND BUILDING CONSTRUCTION STANDARDS. WHENEVER A CONFLICT OCCURS BETWEEN THE MANUFACTURER'S OR CONSTRUCTION STANDARDS, THE MOST STRINGENT SHALL APPLY.

B. THIS CONTRACTOR SHALL ENGAGE A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE JURISDICTION OF THIS PROJECT TO REVIEW THE ENTIRE INSTALLATION TO DETERMINE ALL SEISMIC RESTRAINT REQUIREMENTS AND METHODS. CONTRACTOR SHALL SUBMIT A REPORT OUTLINING THE STRUCTURAL ENGINEER'S REVIEW AS WELL AS SEISMIC RESTRAINT SHOP DRAWINGS AND SUPPORTING CALCULATIONS PREPARED BY THE PROFESSIONAL STRUCTURAL ENGINEER FOR REVIEW BY THE ARCHITECT.

C. SEISMIC RESTRAINTS SHALL BE DESIGNED IN ACCORDANCE WITH SEISMIC FORCE LEVELS AS DETAILED IN THE APPLICABLE BUILDING CODE.

1. ALL EQUIPMENT, CONDUIT AND PULL BOXES SHALL BE ADEQUATELY RESTRAINED TO RESIST SEISMIC FORCES. RESTRAINT DEVICES SHALL BE DESIGNED AND SELECTED TO MEET SEISMIC REQUIREMENTS AS DEFINED IN THE LATEST ISSUE OF THE BOCA NATIONAL BUILDING CODE IN ACCORDANCE WITH THE APPLICABLE SEISMIC ZONE.
2. ANCHOR BOLT CALCULATORS, SIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER, SHALL BE SUBMITTED SHOWING ADEQUACY OF THE BOLT SIZING AND TYPE. STAMPED CALCULATIONS SHALL ALSO BE FURNISHED FOR ANCHORS ON RESTRAINT DEVICES, CABLES, ISOLATORS AND RIGIDLY MOUNTED EQUIPMENT.

ABBREVIATIONS

A	AMPERES
ADA	AMERICANS WITH DISABILITIES ACT
AMPS	AMPERES
AFF	ABOVE FINISHED FLOOR
A/C	AIR CONDITIONING
AWG	AMERICAN WIRE GAGE
C	CONDUIT
C/B	CIRCUIT BREAKER
CF	COMPACT FLUORESCENT
CLG	CEILING
℄	CENTERLINE
DN	DOWN
DWG	DRAWING
E.C.	ELECTRICAL CONTRACTOR
EQ	EQUAL
ETR	EXISTING TO REMAIN
ER	EXISTING TO BE REMOVED
ERL	EXISTING TO BE RE-LOCATED
F.A.	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FLR	FLOOR
G.C.	GENERAL CONTRACTOR
GFCI	GROUND FAULT CIRCUIT INTERUPTER.
G	GROUND
GND	GROUND
HVAC	HEATING, VENTILATING, & & AIR CONDITIONING
JB	JUNCTION BOX
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LTG	LIGHTING
MAX	MAXIMUM
M.C.	MECHANICAL CONTRACTOR
MECH	MECHANICAL
MIN	MINIMUM
MTD	MOUNTED
NAC	F.A. NOTIFICATION APPLIANCE CIRCUIT EXPANDER PANEL
NEC	NATIONAL ELECTRICAL CODE
NTS	NOT TO SCALE
P	POLE
P.C.	PLUMBING CONTRACTOR
PNL	PANEL
RE	RE-LOCATED DEVICE OR EQUIPMENT SHOWN IN NEW LOCATION
TYP	TYPICAL
UL	UNDERWRITERS LABATORY
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
W	WATTS
WP	WEATHER-PROOF

RECEPTACLE BRANCH CIRCUIT WIRING SCHEDULE

CONDUCTOR AWG.	MAXIMUM CONDUCTOR LENGTH AT 120V	GROUND CONDUCTOR AWG.
#12	100'-0"	#12
#10	165'-0"	#10
#8	255'-0"	#10
#6	405'-0"	#10

RECEPTACLE BRANCH CIRCUIT WIRING SCHEDULE NOTES:

1. BASED ON 20A CIRCUIT LOADED TO 9A USING SINGLE PHASE, 2 WIRE CIRCUITS.
2. THE ABOVE SCHEDULE REPRESENTS MINIMUM CONDUCTOR SIZE BASED FROM PANEL TO CENTER OF LEAD TO OVERCOME VOLTAGE DROP.
3. MAKE PROVISIONS FOR JUNCTION BOX ADJACENT TO OUTLET TO TRANSITION TO #12 WIRE FOR FINAL TERMINATIONS TO DEVICE AS REQUIRED.

LUMINAIRE BRANCH CIRCUIT WIRING SCHEDULE

CONDUCTOR AWG.	MAXIMUM CONDUCTOR LENGTH AT 120V	GROUND CONDUCTOR AWG.
#12	175'-0"	#12
#10	285'-0"	#10
#8	445'-0"	#10
#6	-	#10

RECEPTACLE BRANCH CIRCUIT WIRING SCHEDULE NOTES:

1. BASED ON 20A CIRCUIT LOADED TO 9A USING SINGLE PHASE, 2 WIRE CIRCUITS.
2. THE ABOVE SCHEDULE REPRESENTS MINIMUM CONDUCTOR SIZE BASED FROM PANEL TO CENTER OF LEAD TO OVERCOME VOLTAGE DROP.
3. MAKE PROVISIONS FOR JUNCTION BOX ADJACENT TO OUTLET TO TRANSITION TO #12 WIRE FOR FINAL TERMINATIONS TO DEVICE AS REQUIRED.

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ELECTRICAL LEGENDS & NOTES

ISSUED FOR BID

E0-0

TYPICAL DEMOLITION NOTES

1. THE ELECTRICAL CONTRACTOR SHALL REVIEW ALL OF THE ARCHITECTS AND OTHER TRADES DRAWINGS TO VERIFY ALL AREAS OF RENOVATION AND TO GET A COMPLETE UNDERSTANDING OF THE DEMOLITION WORK REQUIRED BY THIS PROJECT.
2. PRIOR TO SUBMITTING BID, VISIT SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK OF THIS SECTION. RENOVATION WORK WILL REQUIRE CAREFUL SITE EXAMINATION PRIOR TO BIDDING. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY AN EXPERIENCED OBSERVER.
3. COORDINATE ALL WORK WITH THE BUILDING OWNER 10 DAYS PRIOR TO DISRUPTION TO ANY POWER.
4. DISCONNECT AND REMOVE ALL FIXTURES, WIRING DEVICES, CONDUIT AND FITTINGS, WIRING & CABLE, FIRE ALARM DEVICES/COMPONENTS , HANGERS, SUPPORTS, WIREWAYS, AND ALL OTHER ELECTRICAL COMPONENTS MADE OBSOLETE BY THIS PROJECT.
5. REFER TO ALL CONSTRUCTION DOCUMENTS TO GAIN A COMPLETE UNDERSTANDING OF THE DEMOLITION WORK REQUIRED.
6. ALL HVAC UNITS SCHEDULED TO BE REMOVED OR RE-LOCATED SHALL BE DONE SO BY THE HVAC CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL DISCONNECT AND MAKE-SAFE FOR REMOVAL.
7. TEMPORARY WALL OPENINGS AND/OR MODIFICATIONS REQUIRED FOR REMOVAL/INSTALLATION OF EQUIPMENT SHALL BE PROVIDED AS NEEDED AND COORDINATED WITH THE GENERAL CONTRACTOR.
8. CUT, REMOVE AND LEGALLY DISPOSE OF SELECTED ELECTRICAL EQUIPMENT, COMPONENTS AND MATERIALS AS INDICATED, INCLUDING, BUT NOT LIMITED TO, REMOVAL OF ELECTRICAL ITEMS INDICATED TO BE REMOVED AND ITEMS MADE OBSOLETE BY THE WORK. THE OWNER RESERVES THE OPTION OF SALVAGE RIGHTS TO DEMOLISHED MATERIAL AND REMOVED EQUIPMENT. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER'S REPRESENTATIVE TO OBTAIN A LIST OF MATERIALS AND REMOVED EQUIPMENT TO BE TURNED OVER TO THE OWNER. ALL OTHER MATERIAL AND REMOVED EQUIPMENT NOT BEING SALVAGED BY THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR.
9. PROTECT THE STRUCTURE, FURNISHINGS, FINISHES, AND ADJACENT MATERIALS NOT INDICATED OR SCHEDULED TO BE REMOVED. PROTECT THE ELECTRICAL WORK AND THE WORK OF OTHERS IN A MANNER BEST SUITED TO THE PARTICULAR CASE. CORRECT ANY DAMAGE DONE TO ANY WORK AT NO ADDITIONAL COST.
10. PROVIDE AND MAINTAIN TEMPORARY PARTITIONS OR DUST BARRIERS ADEQUATE TO PREVENT THE SPREAD OF DUST AND DIRT TO ADJACENT AREAS.
11. MAINTAIN ACCESS TO EXISTING ELECTRICAL INSTALLATIONS WHICH REMAIN ACTIVE. MODIFY INSTALLATION OR PROVIDE ACCESS PANEL AS APPROPRIATE.
12. PROVIDE TEMPORARY WIRING AND CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION. WHEN WORK MUST BE PERFORMED ON ENERGIZED EQUIPMENT OR CIRCUITS, USE PERSONNEL EXPERIENCED IN SUCH OPERATIONS.
    a. EXISTING ELECTRICAL SERVICE: MAINTAIN EXISTING SYSTEM IN SERVICE COMPLETE AND READY FOR SERVICE. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. OBTAIN PERMISSION FROM OWNER AND ARCHITECT/ENGINEER AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA AS REQUIRED.
    b. EXISTING FIRE ALARM SYSTEM: MAINTAIN EXISTING SYSTEM IN SERVICE UNTIL THE MODIFIED/EXPANDED SYSTEM IS TESTED AND ACCEPTED BY THE FIRE DEPARTMENT. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. NOTIFY OWNER, ARCHITECT/ENGINEER AND LOCAL FIRE DEPARTMENT AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA AS REQUIRED OR PROVIDE A "FIRE-WATCH" SYSTEM COORDINATED WITH THE LOCAL FIRE DEPARTMENT.
    c. EXISTING TELEPHONE & DATA SYSTEMS: MAINTAIN EXISTING SYSTEM IN SERVICE COMPLETE AND READY FOR SERVICE. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. NOTIFY OWNER, ARCHITECT/ENGINEER AND TELEPHONE UTILITY COMPANY AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA.
13. THESE DRAWINGS HAVE BEEN COMPILED FROM THE BEST AVAILABLE INFORMATION AND ARE NOT INTENDED TO LIMIT THE SCOPE OF THE WORK. THE ELECTRICAL CONTRACTOR MAY ENCOUNTER HIDDEN OR COVERED CONDITIONS, NOT INDICATED IN THESE DOCUMENTS, REQUIRING THE ELECTRICAL CONTRACTOR TO PROVIDE ADDITIONAL WORK FOR THE COMPLETION OF HIS OR HER CONTRACT. IT WILL BE ASSUMED THAT THE CONTRACTOR HAS INSPECTED THE SITE PRIOR TO BIDDING AND VERIFIED THE INFORMATION SUPPLIED HEREIN.
14. PROTECT ALL EXISTING WALLS, FLOORS, CEILINGS, LIGHT FIXTURES, ETC. WHICH ARE TO REMAIN & TO PREVENT DAMAGE DURING ALL CONSTRUCTION PHASES

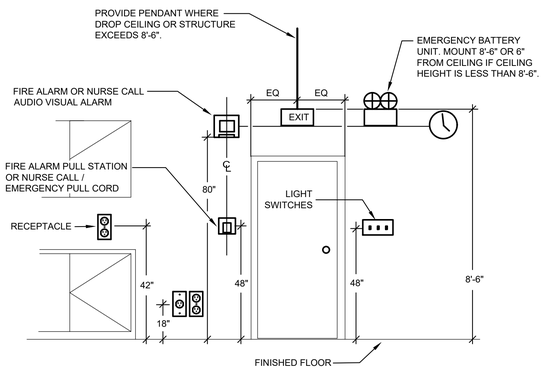
TELEPHONE & DATA RACEWAY NOTES

1. NO SECTION OF CONDUIT SHALL BE LONGER THAN 100-FEET BETWEEN PULL POINTS.
2. NO SECTION OF CONDUIT SHALL CONTAIN MORE THAN TWO 90-DEGREE BENDS, OR EQUIVALENT, BETWEEN PULL POINTS (e.g., OUTLET BOXES, TELECOMMUNICATIONS CLOSETS, OR PULL BOXES). IF THERE IS A REVERSE (U-SHAPED) BEND IN THE SECTION, A PULL BOX SHALL BE INSTALLED.
3. THE INSIDE RADIUS OF A BEND IN CONDUIT SHALL BE AT LEAST 6 TIMES THE INTERNAL DIAMETER. BENDS IN THE CONDUIT SHALL NOT CONTAIN ANY KINKS OR OTHER DISCONTINUITIES THAT MAY HAVE A DETRIMENTAL EFFECT ON THE CABLE SHEATH DURING CABLE PULLING OPERATIONS.
4. ANY SINGLE CONDUIT RUN EXTENDING FROM A TELECOMMUNICATIONS CLOSET SHALL NOT SERVE MORE THAN THREE OUTLET BOXES.
5. CONDUITS PROTRUDING / PENETRATING THROUGH THE FLOOR IN THE TELECOMMUNICATIONS CLOSETS SHALL BE TERMINATED 3-INCHES ABOVE THE FLOOR ADJACENT WALLS. PROTRUSIONS / PENETRATIONS SHALL BE LOCATED TO AVOID CREATING A TRIPPING HAZARD WITHIN THE CLOSETS. FIRESTOP ALL PROTRUSIONS / PENETRATIONS.
6. A MINIMUM 3/4-INCH CONDUIT SHALL BE PROVIDED FROM THE TELECOMMUNICATIONS CLOSET TO SERVE EACH WALL-MOUNTED PUBLIC TELEPHONE. IN DISCUSSION WITH THE TELEPHONE PROVIDER, AND WHERE IT IS DESIRABLE TO CONCEAL THE OUTLET BOX DIRECTLY BEHIND THE TELEPHONE, THE CENTER OF THE OUTLET BOX SHALL BE LOCATED 48-INCHES ABOVE THE FINISHED FLOOR. FOR RECESSED APPLICATIONS, THE CONDUIT AND BOX SHALL BE INSTALLED TO SUIT THE SPECIFIC TYPE OF MOUNTING. REFER TO APPLICABLE CODES, ADA GUIDELINES, UNIFORM FEDERAL ACCESSIBILITY STANDARDS, MANUFACTURES SPECIFICATIONS AND ANSI STANDARDS FOR ADDITIONAL REQUIREMENTS.
7. WHERE A TELECOMMUNICATIONS CONDUIT IS TO BE INSTALLED TO A DEVICE EXPOSED TO THE WEATHER, CARE SHALL BE TAKEN TO PREVENT THE INGRESS OF MOISTURE. CARE SHALL ALSO BE TAKEN TO ENSURE THAT MOISTURE WILL NOT COLLECT IN LOW POINTS, FREEZE AND DAMAGE THE CABLE. NONMETALLIC CONDUIT SHALL BE UV RESISTANT AND MARKED ACCORDINGLY.
8. CONDUITS SHALL BE REAMED TO ELIMINATE SHARP EDGES. METALLIC CONDUIT SHALL BE TERMINATED WITH AN INSULATED BUSHING.
9. REFER TO ANSI/TIA/EIA-606 FOR ADMINISTRATION OF THE CONDUIT SYSTEM IDENTIFICATION.
10. ALL CONDUITS SHALL BE PROVIDED WITH PULL STRINGS.
11. OUTLET BOXES SHALL BE NO SMALLER THAN 2-INCHES WIDE, 3-INCHES HIGH AND 2.5-INCHES DEEP. THIS WILL ACCOMODATE ONE OR TWO 3/4-INCH CONDUITS. WHERE A LARGER CONDUIT IS REQUIRED, THE BOX SHALL BE INCREASED ACCORDINGLY. A MAXIMUM 1-1/4-INCH CONDUIT WILL REQUIRE A 4-11/16-INCH x 4-11/16-INCH x 2-1/2-INCH BOX.
12. CONDUIT TYPES SHALL BE ELECTRICAL METALLIC TUBING (EMT) OR RIGID METAL CONDUIT. LOCATIONS SUBJECT TO MOISTURE SHALL BE RIGID PVC. FLEXIBLE CONDUIT SHALL NOT BE USED FOR TELE/DATA RACEWAYS.
13. CONDUIT REQUIREMENTS FOR SUPPORT, END PROTECTION AND CONTINUITY SHALL COMPLY WITH APPROPRIATE ELECTRICAL CODES.
14. CONDUIT AND BOXES FOR TELE/DATA WIRING SHALL BE DEDICATED TO THOSE SYSTEMS. POWER WIRING SHALL BE KEPT OUT OF CONDUIT AND BOXES DEDICATED TO TELE/DATA WIRING.
15. CONDUIT SIZE FOR MAXIMUM NUMBER OF CABLES (SEE TABLE BELOW):

Conduit Trade Size	Maximum number of cables based upon allowable fill									
	Cable Outside Diameter in Inches									
	0.13	0.18	0.22	0.24	0.29	0.31	0.37	0.53	0.62	0.70
1/2"	1	1	0	0	0	0	0	0	0	0
3/4"	6	5	4	3	2	2	1	0	0	0
1"	8	8	7	6	3	3	2	1	0	0
1-1/4"	16	14	12	10	6	4	3	1	1	1
1-1/2"	20	18	16	15	7	6	4	2	1	1
2"	30	26	22	20	14	12	7	4	3	2
2-1/2"	45	40	36	30	17	14	12	6	3	3
3"	70	60	50	40	20	20	17	7	6	6
3-1/2"	-	-	-	-	-	-	22	12	7	6
4"	-	-	-	-	-	-	30	14	12	7

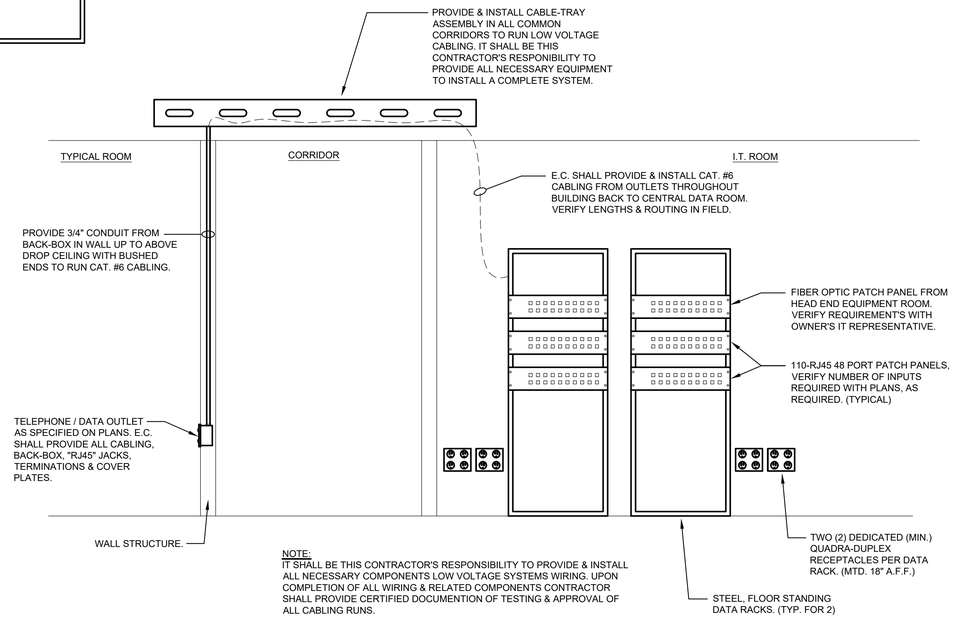
COMMUNICATIONS SYMBOL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
▽	TEL./DATA OUTLET; PROVIDE BACK BOX, DUAL RJ45 JACKS, COVER PLATES AND CABLING (CAT. #6, 2-RUNS) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	18" A.F.F.
▼	DATA OUTLET; PROVIDE BACK BOX, RJ45 JACK, COVER PLATES AND CABLING (CAT. #6) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	18" A.F.F.
▽	TELEPHONE OUTLET; PROVIDE BACK BOX, RJ45 JACK, COVER PLATES AND CABLING (CAT. #6) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	18" A.F.F.
WIFI CLG. MTD.	WIFI OUTLET; PROVIDE BACK BOX, RJ45 JACK, COVER PLATES AND CABLING (CAT. #6) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX ABOVE DROP CEILING TO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	FLUSH IN CEILING
SP	PA / INTERCOM SYSTEM SPEAKER; PROVIDE BACK BOX, RJ45 JACK, COVER PLATES AND CABLING (CAT. #6) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	FLUSH IN WALL, VERFIY HGT. WITH ARCH.
54" INT ▼	INTERCOM SYSTEM OUTLET; PROVIDE BACK BOX, RJ45 JACK, COVER PLATES AND CABLING (CAT. #6) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	FLUSH IN MTD. 54" A.F.F.
TV	TELEVISION OUTLET; PROVIDE BACK BOX,COAX JACK, COVER PLATES AND CABLING (COAX CABLE) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO CABLE TELEVISION SERVICE EQUIPMENT. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	FLUSH IN WALL, VERFIY HGT. WITH ARCH.
	PENDANT HUNG CABLE TRAY SYSTEM AS MANUFACTURED BY "CABLOFIL" (OR) APPROVED EQUAL. CONTRACTOR SHALL PROVIDE ALL REQUIRED COMPONENTS TO INSTALL A COMPLETE WIRE MANAGEMENT SYSTEM. CABLE TRAY SYSTEM TO BE A MINIMUM OF 12" WIDE BY 2" TALL, CONSTRUCTED OF STEEL / MESH TYPE.	VERIFY
	PLENUM RATED, CAT #6 WIRING. MFG. TELEDATA EXPRESS, CATALOG #101360 (OR) APPROVED EQUAL.	



NOTE:
THIS DETAIL INDICATES CENTERLINE FOR FIRE ALARM/PULL STATION SWITCHES AND RECEPTACLES. HOWEVER THIS SAME CENTERLINE PRINCIPLE SHALL BE FOR ALL GROUP MTD. ELECTRICAL DEVICES. IF FIRE ALARM IS ON SAME SIDE OF DOOR AS SWITCHES, PULL STATION SHALL BE HORIZONTALLY SEPARATED BY A MINIMUM OF 18". THIS ELEVATION IS A GENERAL ARRANGEMENT OF OF DEVICES. ARCHITECT PLANS TAKE PRECEDENCE FOR EXACT LOCATIONS.

MOUNTING HEIGHT DETAIL
NOT TO SCALE



NOTE:
IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO PROVIDE & INSTALL ALL NECESSARY COMPONENTS LOW VOLTAGE SYSTEMS WIRING. UPON COMPLETION OF ALL WIRING & RELATED COMPONENTS CONTRACTOR SHALL PROVIDE CERTIFIED DOCUMENTION OF TESTING & APPROVAL OF ALL CABLING RUNS.

TYPICAL WIRING DIAGRAM FOR COMMUNICATIONS DISTRIBUTION
NOT TO SCALE

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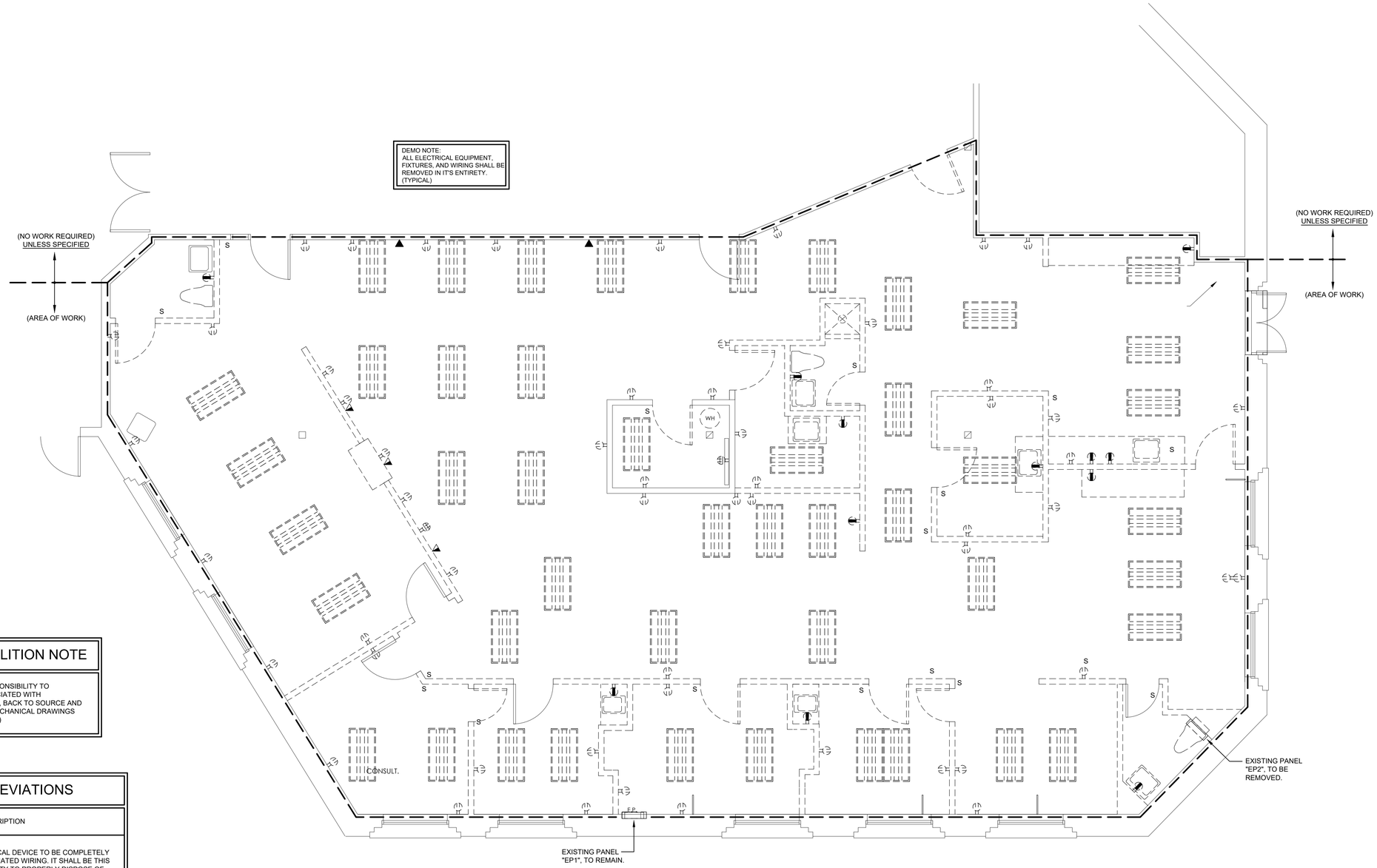
ELECTRICAL LEGENDS, NOTES & DETAILS

ISSUED FOR BID

E0-1



ELECTRICAL - DEMOLITION FLOOR PLAN
NORTH
1/4" = 1'-0"

MECHANICAL DEMOLITION NOTE

IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO PROPERLY REMOVE ALL WIRING ASSOCIATED WITH DEMOLISHED MECHANICAL EQUIPMENT, BACK TO SOURCE AND DISPOSE OF EQUIPMENT. REFER TO MECHANICAL DRAWINGS FOR EXACT SCOPE OF WORK. (TYPICAL)

DEMOLITION ABBREVIATIONS

SUBSCRIPT	DESCRIPTION
ER	INDICATES EXISTING ELECTRICAL DEVICE TO BE COMPLETELY REMOVED AS WELL AS ASSOCIATED WIRING. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO PROPERLY DISPOSE OF EQUIPMENT.
ERN	INDICATES EXISTING ELECTRICAL DEVICE TO REMAIN IN PLACE. E.C. SHALL ENSURE DEVICE IS PROTECTED AND FULLY OPERATIONAL UPON COMPLETION OF PROJECT. ANY DEVICE SCHEDULED TO REMAIN, NOT IN PROPERLY WORKING ORDER SHALL BE REPLACED IN KIND.
ERL	INDICATES EXISTING ELECTRICAL DEVICE TO BE REMOVED & RELOCATED, EXISTING WIRNG / CIRCUITRY TO BE EXTENDED. ANY NEW WIRING & INSTALLATIONS REQUIRED TO RELOCATE EQUIPMENT SHALL MATCH EXISTING ELECTRICAL CHARACTERISTICS.
RE	INDICATES EXISTING ELECTRICAL DEVICE IN NEW LOCATION. ANY DEVICE SCHEDULED TO BE RELOCATED, NOT IN PROPERLY WORKING ORDER SHALL BE REPLACED IN KIND.

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DRAWN BY: YYY
DATE: AUGUST 25, 2023
REVISIONS:
9/1/2023 - Addendum #1

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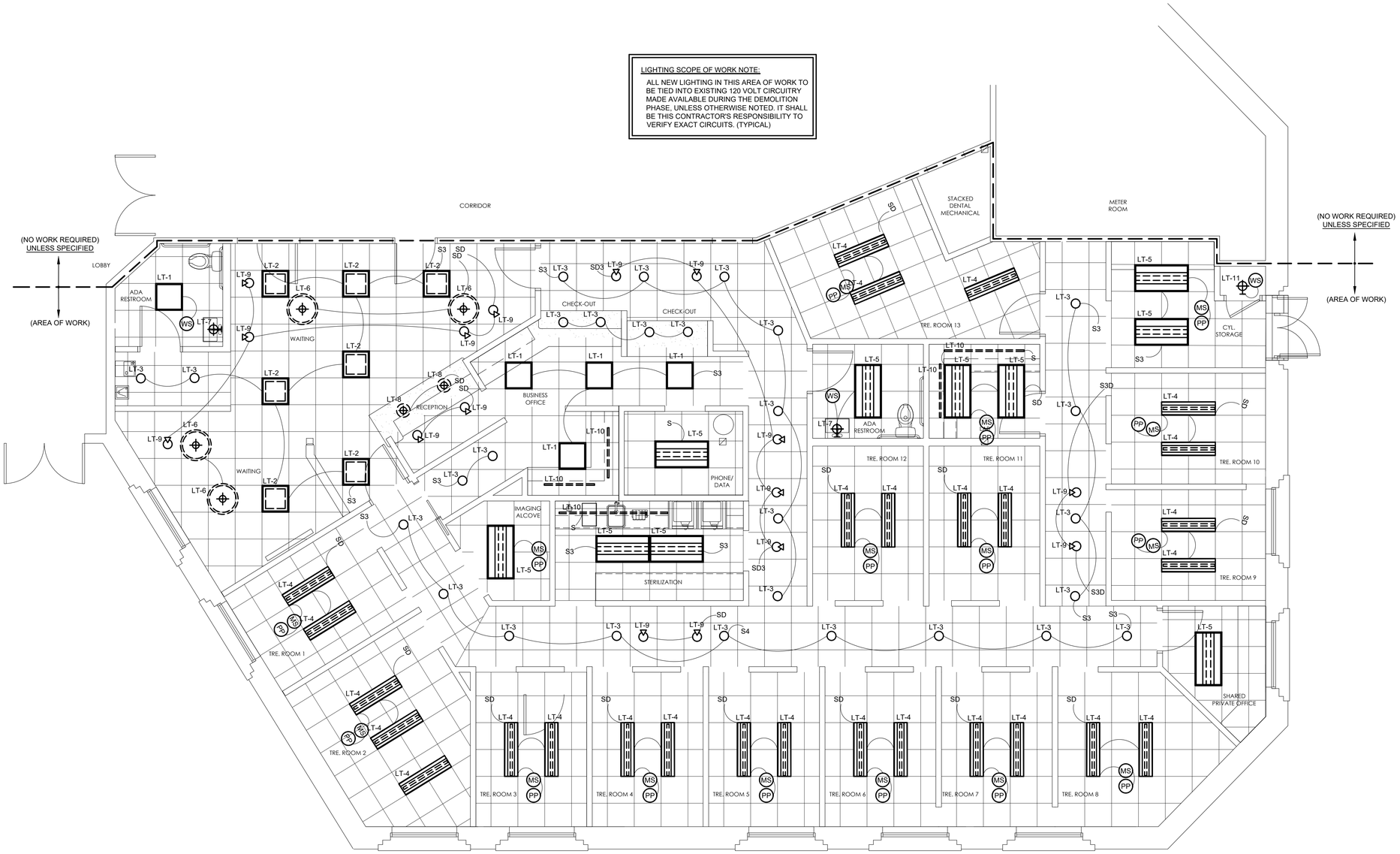
ELECTRICAL DEMOLITION FLOOR PLAN

ISSUED FOR BID

ED1-0

LIGHTING SCOPE OF WORK NOTE:

ALL NEW LIGHTING IN THIS AREA OF WORK TO BE TIED INTO EXISTING 120 VOLT CIRCUITRY MADE AVAILABLE DURING THE DEMOLITION PHASE, UNLESS OTHERWISE NOTED. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO VERIFY EXACT CIRCUITS. (TYPICAL)



ELECTRICAL - LIGHTING FLOOR PLAN
1/4" = 1'-0"
NORTH

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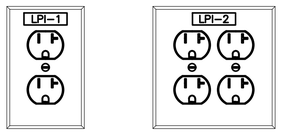
ELECTRICAL LIGHTING FLOOR PLAN

ISSUED FOR BID

E1-0

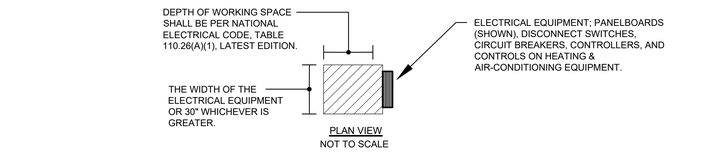


SYMBOL ON PLANS =

NOTES:
1. LABEL ALL RECEPTACLES WITH PANEL DESIGNATION AND CIRCUIT NUMBER
2. LABEL SHALL BE BLACK LETTERING ON CLEAR TAPE EQUAL TO P-TOUCH EXTRA STRENGTH ADHESIVE TZ LAMINATED TAPE

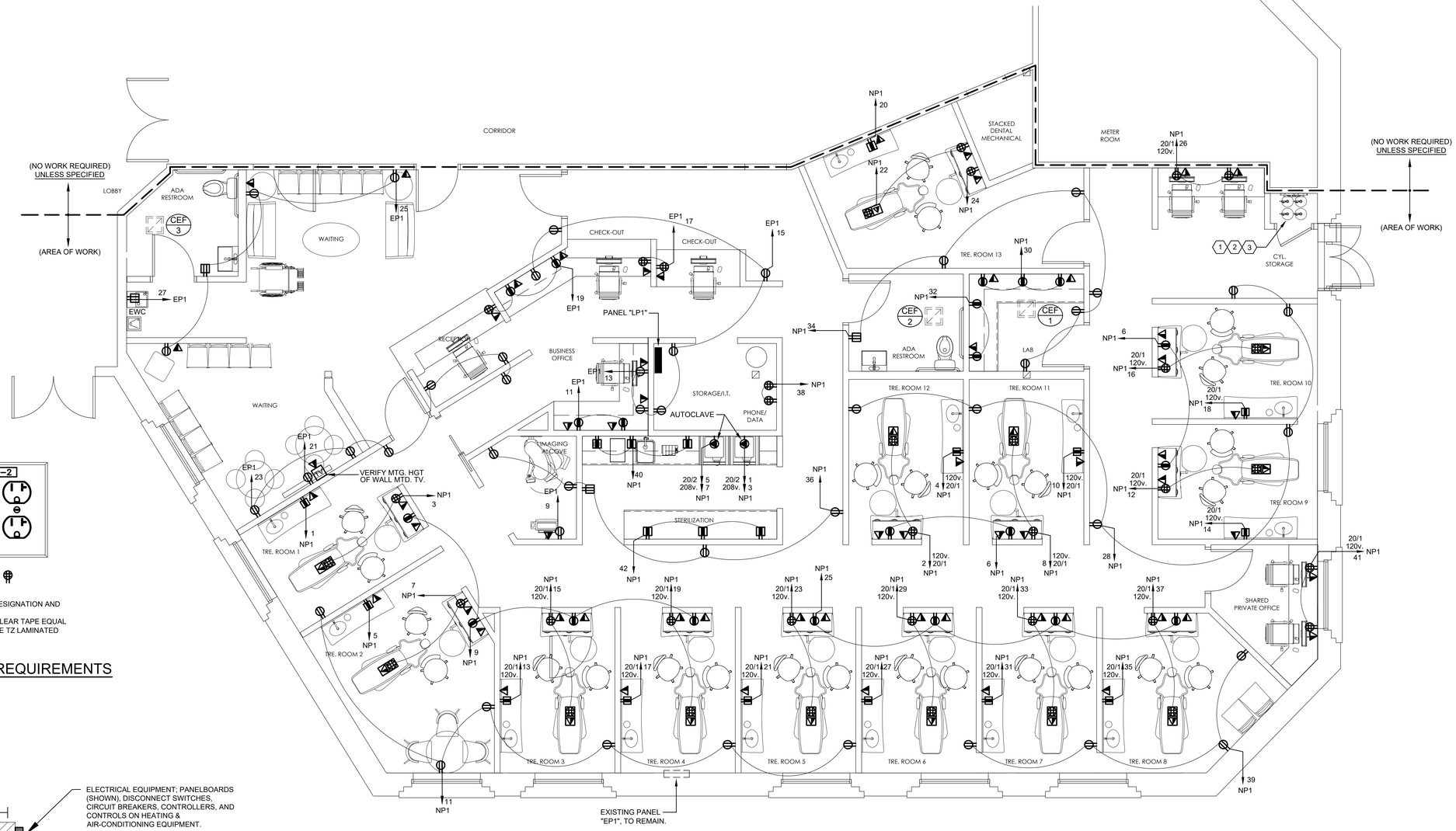
RECEPTACLE LABELING REQUIREMENTS

NOT TO SCALE



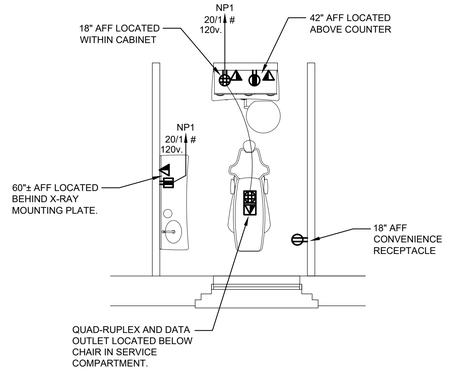
SPACES ABOUT ELECTRICAL EQUIPMENT DETAIL

NOT TO SCALE



ELECTRICAL - POWER & SIGNAL FLOOR PLAN

NORTH 1/4" = 1'-0"



ELECTRICAL - TYPICAL TREATMENT ROOM PART PLAN

NORTH 1/4" = 1'-0"

SHEET NOTES:

1. E.C. SHALL PROVIDE DEDICATED 20-AMP 1-POLE CIRCUIT FOR WATER FILTER. PROVIDE CIRCUIT FROM PANEL "EP1" CIRCUIT NUMBER #2. COORDINATE WIRING IN FIELD.
2. E.C. SHALL PROVIDE TWO (2) DEDICATED 20-AMP 2-POLE CIRCUITS FOR COMPRESSORS. PROVIDE CIRCUITS FROM PANEL "EP1" CIRCUIT NUMBERS #4,#6 AND #8,#10. COORDINATE WIRING IN FIELD.
3. E.C. SHALL PROVIDE A DEDICATED 20-AMP 2-POLE CIRCUIT FOR VACUUM PUMP. PROVIDE CIRCUIT FROM PANEL "EP1" CIRCUIT NUMBERS #12,#14. COORDINATE WIRING IN FIELD.

XXX ##
MECHANICAL EQUIPMENT CONNECTION TAG:
REFER TO "MECHANICAL EQUIPMENT ELECTRICAL CONNECTION SCHEDULE" ON DRAWING "E___A" FOR ALL CIRCUITING INFORMATION, INCLUDING BUT NOT LIMITED TO BRANCH CIRCUITING WIRING AND CONDUIT SIZE, VOLTAGE, PHASE, MOTOR CONTROL, DISC. SWITCH & CIRCUIT BREAKER.

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ELECTRICAL POWER & SIGNAL FLOOR PLAN

ISSUED FOR BID

E1-1

(PANEL / SWITCHBOARD / SERVICE) FEEDER SIZING

AMPERES	POLES	TYPE (XHHW) COPPER CONDUCTORS
30A	3	4#10 + 1#8 GND. IN 3/4" CONDUIT
60A	2	3#4 + 1#8 GND. IN 1" CONDUIT
60A	3	4#4 + 1#8 GND. IN 1-1/4" CONDUIT
100A	2	3#1 + 1#6 GND. IN 1-1/4" CONDUIT
100A	3	4#1 + 1#6 GND. IN 1-1/2" CONDUIT
125A, 150A	2	3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT
125A, 150A	3	4#1/0 + 1#6 GND. IN 2" CONDUIT
200A	2	3#3/0 + 1#4 GND. IN 2" CONDUIT
200A	3	4#3/0 + 1#4 GND. IN 2" CONDUIT
225A	3	4#4/0 + 1#2 GND. IN 2-1/2" CONDUIT
300A	3	4#350kcmil + 1#2 GND. IN 3" CONDUIT
400A	3	4#600kcmil + 1#1/0 GND. IN 3-1/2" CONDUIT
600A	3	2 SETS OF: (4#350kcmil + 1#2 GND.) IN TWO (2) 3" CONDUITS
800A	3	2 SETS OF: (4#600kcmil + 1#1/0 GND.) IN TWO (2) 3-1/2" CONDUITS
1000A	3	3 SETS OF: (4#400kcmil + 1#1/0 GND.) IN THREE (3) 3" CONDUITS
1200A	3	3 SETS OF: (4#600kcmil + 1#1/0 GND.) IN THREE (3) 3-1/2" CONDUITS
1600A	3	4 SETS OF: (4#600kcmil + 1#1/0 GND.) IN FOUR (4) 3-1/2" CONDUITS
2000A	3	5 SETS OF: (4#600kcmil + 1#1/0 GND.) IN FIVE (5) 3-1/2" CONDUITS
2500A	3	6 SETS OF: (4#600kcmil + 1#1/0 GND.) IN SIX (6) 3-1/2" CONDUITS
3000A	3	7 SETS OF: (4#700kcmil + 1#1/0 GND.) IN SEVEN (7) 4" CONDUITS

(EQUIPMENT) SIZING CIRCUIT

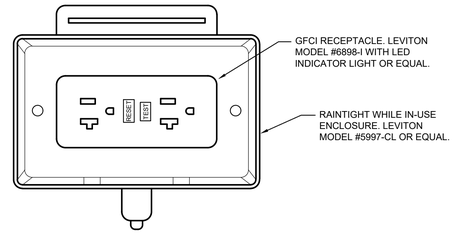
AMP / POLE PANEL / SERVICE	POLES	TYPE (XHHW) COPPER CONDUCTORS
15A, 20A	1 (or) 2	2#12 + 1#12 GND. IN 3/4" CONDUIT
15A, 20A	3	3#12 + 1#12 GND. IN 3/4" CONDUIT
25A, 30A	1 (or) 2	2#10 + 1#10 GND. IN 3/4" CONDUIT
25A, 30A	3	3#10 + 1#10 GND. IN 3/4" CONDUIT
35A, 40A	1 (or) 2	2#8 + 1#10 GND. IN 3/4" CONDUIT
35A, 40A	3	3#8 + 1#10 GND. IN 3/4" CONDUIT
45A, 50A, 55A	1 (or) 2	2#6 + 1#10 GND. IN 3/4" CONDUIT
45A, 50A, 55A	3	3#6 + 1#10 GND. IN 3/4" CONDUIT
60A	2	2#4 + 1#10 GND. IN 1" CONDUIT
60A	3	3#4 + 1#10 GND. IN 1" CONDUIT
70A	3	3#4 + 1#8 GND. IN 1" CONDUIT
80A	3	3#3 + 1#8 GND. IN 1-1/4" CONDUIT
90A	3	3#2 + 1#8 GND. IN 1-1/4" CONDUIT
100A, 110A	3	3#1 + 1#6 GND. IN 1-1/4" CONDUIT
125A, 150A	3	3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT
175A	3	3#2/0 + 1#6 GND. IN 2" CONDUIT
200A	3	3#3/0 + 1#4 GND. IN 2" CONDUIT

MECHANICAL EQUIPMENT ELECTRICAL CONNECTION SCHEDULE

ITEM No. (xxx / ##)	DESCRPITION	LOCATION	EQUIPMENT CHARACTERISTICS					CIRCUIT	BRKR.	FEEDER / WIRING	DISCONNECT SWITCH				MANUAL MOTOR CONTROLLER	REMARKS
			VOLTS	PH	FREQ.	(KW) / HP	FLA				SIZE	FUSE	POLES	NEMA		
RTU-1	(EXISTING) ROOF TOP UNIT	(SEE PLANS)	208	3	60	-	-	EP1	70A/3P	(EXISTING MECHANICAL UNIT & ASSOCIATED WIRING / DISCONNECT MEANS TO REMAIN. "NO WORK REQUIRED")						
RTU-2	(EXISTING) ROOF TOP UNIT	(SEE PLANS)	208	3	60	-	-	EP1	70A/3P	(EXISTING MECHANICAL UNIT & ASSOCIATED WIRING / DISCONNECT MEANS TO REMAIN. "NO WORK REQUIRED")						
CEF-1	CEILING EXHAUST FAN	(SEE PLANS)	120	1	60	-	-	ROOMS LTG. CIRCUIT	20A/1P	2#12 + 1#12 GND. IN 3/4" CONDUIT	-	-	-	-	-	TIE FAN INTO ROOMS LIGHTING CIRCUIT AND LIGHTING CONTROL SWITCH.
CEF-2	CEILING EXHAUST FAN	(SEE PLANS)	120	1	60	-	-	ROOMS LTG. CIRCUIT	20A/1P	2#12 + 1#12 GND. IN 3/4" CONDUIT	-	-	-	-	-	TIE FAN INTO ROOMS LIGHTING CIRCUIT AND LIGHTING CONTROL SWITCH.
CEF-3	CEILING EXHAUST FAN	(SEE PLANS)	120	1	60	-	-	ROOMS LTG. CIRCUIT	20A/1P	2#12 + 1#12 GND. IN 3/4" CONDUIT	-	-	-	-	-	TIE FAN INTO ROOMS LIGHTING CIRCUIT AND LIGHTING CONTROL SWITCH.

NOTES:

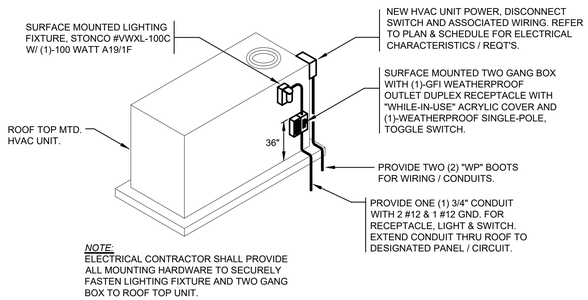
1. COORDINATE WITH HVAC CONTRACTOR & DRAWINGS FOR EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT PRIOR TO INSTALLING ELECTRICAL COMPONENTS.
2. COORDINATE WITH PLUMBING CONTRACTOR & DRAWINGS FOR EXACT LOCATIONS OF ALL PLUMBING EQUIPMENT PRIOR TO INSTALLING ELECTRICAL COMPONENTS.
3. ALL DISCONNECTING MEANS SHALL BE SUPPLIED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
4. ALL STARTERS, VFD'S ETC. SHALL BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL WIRE ALL HVAC EQUIPMENT.
5. ALL HVAC CONTROL WIRING SHALL BE PROVIDED BY OTHERS.



HORIZONTAL MOUNT

WEATHER-PROOF RECEPTACLE DETAIL

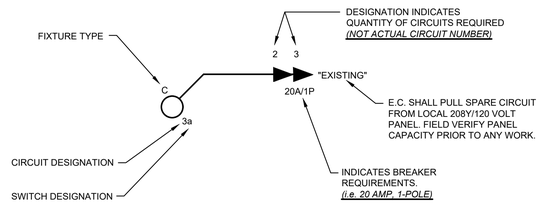
NOT TO SCALE



NOTE:
ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MOUNTING HARDWARE TO SECURELY FASTEN LIGHTING FIXTURE AND TWO GANG BOX TO ROOF TOP UNIT.

TYPICAL MOUNTING INSTALLATION - ROOF TOP UNITS

NOT TO SCALE



NOTES:

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN CONTRACT. INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS BUT NOT ON PLANS, AND VICE VERSA, SHALL APPLY OR SHALL BE PROVIDED AS THOUGH EXPRESSLY REQUIRED ON BOTH. IT IS NOT INTENDED THAT EVERY JUNCTION BOX, OFFSET, FITTING OR COMPONENT BE SPECIFIED OR SHOWN ON DRAWINGS; HOWEVER, CONTRACT DOCUMENTS REQUIRE PROVISION OF ALL COMPONENTS AND MATERIALS NECESSARY FOR COMPLETE AND OPERATIONAL ELECTRICAL INSTALLATION, WHETHER OR NOT INDICATED OR SPECIFIED.

2. BRANCH CIRCUIT WIRING MAY NOT BE GRAPHICALLY SHOWN ON DRAWINGS AND MAY BE SHOWN BY CIRCUIT NUMBERS BESIDE FIXTURES, DEVICES AND EQUIPMENT. PROVIDE COMPLETE WIRING SYSTEM WHETHER OR NOT SHOWN GRAPHICALLY. WIRING IS SHOWN BY CONDUIT RUNS ON DRAWINGS WHERE SPECIFIC ROUTING IS REQUIRED OR FOR OTHER SPECIAL REASONS. ONLY ROOMS WITH MULTIPLE SWITCHING HAVE "SWITCH CONTROL LETTERS" ASSIGNED. PROVIDE THHN CONDUCTORS IN AREAS WITH HIGH AMBIENT TEMPERATURES SUCH AS BOILER ROOMS, INCINERATOR ROOMS, MECHANICAL EQUIPMENT ROOMS ETC., FOR SIZES LARGER THAN NO. 10 AWG.

TYPICAL CIRCUITING DETAIL

NOT TO SCALE

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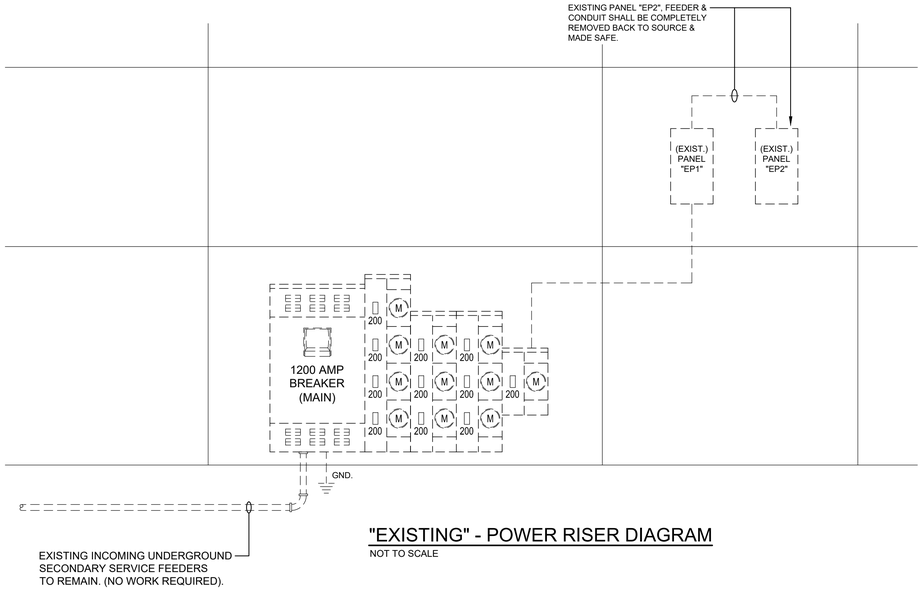
ELECTRICAL SCHEDULES & DETAILS

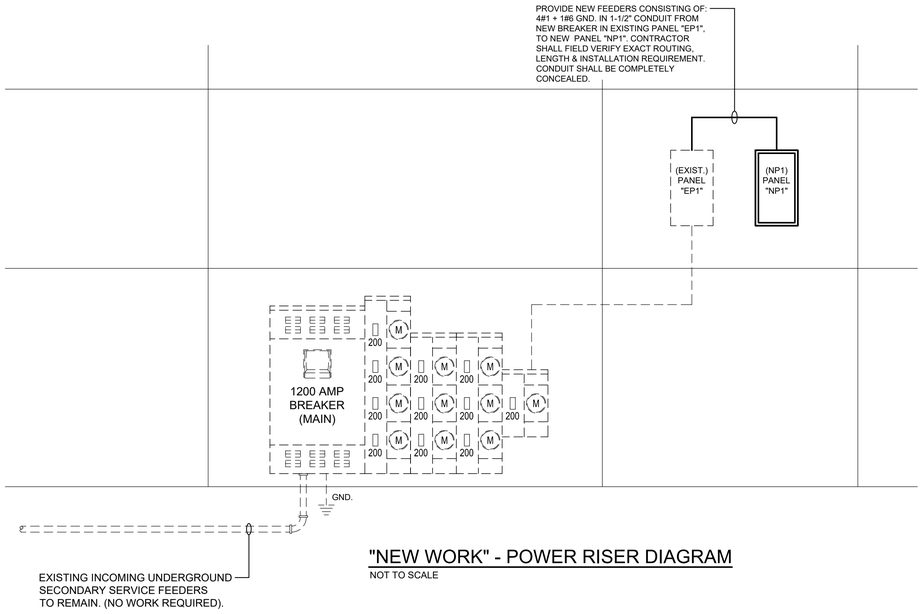
ISSUED FOR BID

E2-0



"EXISTING" - POWER RISER DIAGRAM

NOT TO SCALE



"NEW WORK" - POWER RISER DIAGRAM

NOT TO SCALE

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG No.	MOUNTING	LAMPING			VOLTAGE	DESCRIPTION / REMARKS
				TYPE	WATTAGE	QTY.		
LT1	WARELIGHT	WL-BLFP-2X2-CWT-MV-DM010	RECESSED	LED	30	-	120	2' X 2' RECESSED FLAT PANEL TROFFER.
LT2	WARELIGHT	GFLED-2X2-CWT-010D-MV	RECESSED	LED	35	-	120	2' X 2' RECESSED FRAME LIGHT.
LT3	WARELIGHT	RSL3-MCT5	RECESSED	LED	6	-	120	3" RECESSED DOWNLIGHT
LT4	WARELIGHT	TRCBLED1x4/35/3500K-G2 TRCBLED1x4/35/4000K-G2	RECESSED	LED	35	-	120	1' X 4' RECESSED DIRECT / INDIRECT TROFFER.
LT5	WARELIGHT	TRCBLED2X4-CHWT-MV-DM010-G3	RECESSED	LED	38	-	120	2' X 4' RECESSED DIRECT / INDIRECT TROFFER.
LT6	OXYGEN LIGHTING	CIRCULO	PENDANT	LED	72.6	-	120	DECORATIVE PENDANT.
LT7	USA PHILIPS	FT000/18/36	WALL	LED		-	120	VANITY LIGHTING.
LT8	PHILIPS FORECAST	FC000/98/36	PENDANT	LED	60	-	120	DECORATIVE PENDANT.
LT9	WARELIGHT	RSL3-MCT5-WALL WASH	RECESSED	LED	6	-	120	3" RECESSED WALL WASH DOWNLIGHT
LT10	T.B.D.	---	SURFACE	LED		-	120	LED UNDER CABINET LIGHT.
LT11	T.B.D.	---	WALL	LED		-	120	2'-0" STRIP LIGHT, MTD. ABOVE DOOR FRAME

CBA = COLOR TO BE SELECTED BY ARCHITECT (THE ELECTRICAL CONTRACTOR SHALL VERIFY COLOR & FINISH WITH ARCHITECT PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
CC = CUSTOM COLOR TO BE SELECTED BY ARCHITECT (THE ELECTRICAL CONTRACTOR SHALL VERIFY CUSTOM COLOR & FINISH WITH ARCHITECT PRIOR TO SUBMITTAL OF SHOP DRAWINGS.

NOTES:

1. ALL FIXTURES SHALL COMPLY WITH NATIONAL GRID REBATE PROGRAM.
2. ALL PENDANT MOUNTED LIGHTING FIXTURES SHALL BE COORDINATED CEILING HEIGHTS AND ARCHITECT FOR PROPER HEIGHT OF THE BOTTOM OF THE FIXTURES.
3. ALL LIGHTING FIXTURES SHALL BE PROVIDED WITH MATCHING KELVIN TEMPERATURE OF (3500K.)
4. ALL LIGHT FIXTURES SHALL BE PROVIDED WITH LED LAMPS INSTALLED READY FOR OPERATION. ALL LED LAMPS SHALL HAVE THE SAME COLOR TEMPERATURE FROM A SINGLE LAMP MANUFACTURER.
5. ELECTRICAL CONTRACTOR TO ALLOW TIME FOR DIRECTIONAL ADJUSTMENT OF ALL LIGHT FIXTURES AS DIRECTED BY ARCHITECT, ENGINEER AND/OR OWNER REPRESENTATIVE.
6. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE LIGHTING FIXTURE MANUFACTURER AND LIGHTING CONTROLS MANUFACTURER TO PROVIDE COMPATIBLE COMPONENTS BETWEEN LIGHTING FIXTURE AND ASSOCIATED CONTROLS. (TYPICAL)
7. ALL LIGHTING FIXTURES SHALL MEET OR EXCEED CURRENT ENERGY STAR RATINGS & STANDARDS.

PANEL BOARD SCHEDULE

DESIGNATION	BUS AMPS	MAIN	LOCATION	VOLTAGE	PH	BREAKERS USED 1-POLE	BREAKERS USED 2-POLE	BREAKERS USED 3-POLE	SPACES AVAILABLE	TOTAL POLES	MOUNTING	REMARKS
EP1	225A	MLO	(SEE PLANS)	208Y/120	3	(VERIFY BREAKERS WITH FLOOR PLANS) (1) 100A - "NP1"			-	42	RECESSED	EXISTING PANEL, TO REMAIN. SHOWN FOR REFERENCE. (NO WORK REQUIRED)
EP2	100A	100A	(SEE PLANS)	208Y/120	3	-	-	-	-	12	SURFACE	EXISTING PANEL, TO BE REMOVED.
NP1	225A	MLO	(SEE PLANS)	208Y/120	3	(VERIFY BREAKERS WITH FLOOR PLANS)			-	42	SURFACE	(NEW) PANEL. MATCH EXISTING SWITCHGEAR A.I.C. RATING MINIMUM.

NOTES:

1. ALL PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED NAMEPLATE ON THE DOOR INDICATING THE PANELBOARD DESIGNATION, VOLTAGE, RATING OF MCB OR MAIN LUGS AND SOURCE OF SUPPLY. ENGRAVED PLATE SHALL BE AS CALLED FOR IN THE SPECIFICATIONS.
2. ALL PANELBOARDS SHALL BE PROVIDED WITH A TYPED (HAND WRITTEN IS NOT ALLOWED) CIRCUIT DIRECTORY INDICATING THE LOAD FED BY EACH CIRCUIT BREAKER AND ITS LOCATION IN THE BUILDING.
3. ALL PANELBOARDS SHALL BE PROVIDED WITH FULL SIZE EQUIPMENT GROUND AND NEUTRAL BUSSES ON EACH SIDE OF THE ENCLOSURE SO AS TO PROVIDE A SEPARATE EQUIPMENT GROUND AND NEUTRAL TERMINAL FOR EACH BRANCH CIRCUIT.
4. SPACES SHALL BE PROVIDED WITH ALL REQUIRED BUSSING, SUPPORTS, CONNECTORS, ETC.. NECESSARY FOR FUTURE INSTALLATION OF CIRCUIT BREAKERS.
5. FLUSH MOUNTED PANELBOARDS SHALL BE PROVIDED WITH FIVE (5) EMPTY 1" EMT CONDUITS INSTALLED UP TO ABOVE ACCESSIBLE CEILING FOR FUTURE USE.
6. ALL PANELBOARDS SHALL HAVE HINGED "DOOR-IN-DOOR" TYPE COVERS.
7. REFER TO THE SPECIFICATIONS FOR ALL OTHER PANELBOARD REQUIREMENTS.

NOTES:

1. ALL CONDUCTORS INDICATED ARE BASED ON COPPER.
2. ALL FEEDER SIZES SHOWN, HAVE HAD "VOLTAGE DROP" CALCULATIONS INCORPORATED. (TYPICAL)
3. ALL NEW ELECTRICAL SWITCHGEAR HAS BEEN BASED ON "SIEMENS".

MANUFACTURER CONTACT:
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1-860-208-8295
EMAIL: briankelley@siemens.com

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ELECTRICAL SCHEDULES & POWER RISER DIAGRAMS

ISSUED FOR BID

E2-1

SECTION 160000 (26 00 00) ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

B. This Contractor shall also include allowances for startup and for making the systems fully operational, and for scope and design contingencies. Future changes in price for items not shown on these drawings will not be allowed if the system itself is shown on these Drawings.

C. Give notices, file plans, obtain permits and licenses, pay fees and back charges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents.

D. The drawings show the layout of the electrical systems and indicate the approximate locations of outlets, apparatus, and equipment. The runs of feeders and branches as shown on the drawings are schematic only. The exact routing of branch circuits and feeders shall be determined by the structural conditions and possible obstructions. This shall not be construed to mean that the design of the systems may be changed but refers only to exact runs between given points. The Engineer reserves the right to revise the drawings from time to time to indicate changes in the work.

E. The Contractor shall consult and review all contract and reference drawings which may affect the location of any outlets, apparatus and equipment to avoid any possible interference and permit full location of outlets, apparatus and equipment up to the time of rough-in is reserved by the Engineer and such change shall be made without additional expense to the Owner.

F. It shall be the responsibility of this Contractor to see that all electrical equipment such as junction and pull boxes, panelboards switches, controls and such other apparatus as may require maintenance and operation from time to time is made accessible. Although the equipment may be shown on the drawings in certain locations, the construction may disclose the fact that such locations do make its position accessible. In such cases this Contractor shall call the attention of the Engineer to the condition before advancing the construction to a state where a change will reflect additional expense to the Owner.

1.2 SUMMARY

A. This Section specifies the basic requirements for electrical installations and includes requirements common to more than one section of Division 26. It expands and supplements the requirements specified in sections of Division 1.

B. These documents have been prepared with the intention that they call for finished, tested work, in full operating condition and complete with necessary accessories.

C. The contract drawings are generally diagrammatic and convey the scope of work and general arrangement of apparatus and equipment. The locations of all items shown on the drawings or called for in the specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect/Engineer before being installed. The Contractor shall follow the drawings in laying out work and shall check drawings of the other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

D. These contract documents are complementary. What is called for by one shall be as binding as if called for by all. Materials or work described in words, which have well-known technical, or trade meaning shall be held to refer to such recognized standards. Incidental devices and accessories needed for complete, operational systems shall be provided even though they may not be indicated or identified in the documents.

E. If apparatus have been omitted, notify the Architects/Engineers of such belief. It is understood that bidder has included all required items and work in his bid, and will not if bid is successful, claim extra compensation for furnishing a complete and satisfactory system. If a particular item is called for or specified more than once in these contract documents, the higher grade shall be considered specified.

F. Should it appear that the character of the work is not sufficiently explained in these specifications or on the drawings, apply to the A/E for further information. Conform to the A/E's decision and directions as shall become part of these contract documents. The A/E reserves the right to be sole interpreter of the drawings and specifications, and all decisions shall be conclusive, final and binding on the parties.

G. Materials called for in these documents shall be new, unused equipment and of the latest recognized standards.

H. The work to be done under Division 16 is shown on the electrical drawings.

1.3 OUTLINE SCOPE OF WORK

A. The work under this contract, without limiting the generality thereof, includes all materials, labor, equipment, services, and transportation, unless otherwise specified, necessary to complete all systems of electrical wiring and equipment required by the drawings and/or as specified herein. It is the intent of this section and accompanying electrical drawings that these systems be furnished complete in every respect. The Electrical Contractor shall furnish all wiring, equipment and labor needed for a complete operating installation.

B. The Electrical Contractor shall fully indemnify the Owner against any damages, removals and alteration work. This is in addition to the requirements of the General Conditions of the Specifications.

C. The Electrical Contractor shall review architectural, interior design and all other trades plans, elevations and details prior to any work and identify any conflicts between furnishings, furniture, art-work, molding, casework, televisions, signage, awnings, canopies, diffusers, fixtures, etc.. and electrical, fire alarm, audio/visual and communications devices shown on the electrical plans and details. The Electrical Contractor shall prepare 8.5" x 11" sketches showing the conflicts and submit to the Architect for resolution prior to any work. Failure of the electrical contractor to coordinate, identify and obtain a field-directive on any conflict herein noted, that results in installed electrical work to be relocated to the Owner/Architects liking shall be the sole-responsibility of the Electrical Contractor. The Electrical Contractor shall assume and cover all costs associated with conflicts not coordinated, identified and submitted to the Architect, inclusive of material, labor, overtime pay, etc.. and shall not affect the project schedule.

1.4 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

B. Refer to equipment specifications in Divisions 2 through 25 for rough-in requirements.

1.5 SURVEYS AND MEASUREMENTS

A. Base measurements, both horizontal and vertical, on established bench marks. Work shall agree with these established lines and levels. Verify measurements at site and check the corrections of same as related to the work.

B. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the A/E.

1.6 EXAMINATION OF SITE

A. Prior to submitting bid, visit the site where the work is to be performed and the materials are to be delivered. Failure in this respect shall not excuse the Contractor from his obligation to supply and install the work in accordance with the plans and specifications and under all conditions, as they exist.

B. By submitting a bid, this Contractor warrants that all specification sections and drawings showing equipment for plumbing, heating, ventilation, air conditioning, electrical, and architectural, have been examined and is familiar with the conditions and extent of work affecting this contract.

1.7 EQUIPMENT AND MATERIALS

A. All equipment and materials for permanent installation shall be the products of recognized manufacturer's and shall be new, unless noted for re-use, without damaged, functional or aesthetic components.

B. New equipment and materials shall:

1. Be Underwriters Laboratories, Inc. (UL) labeled and/or listed where specifically called for, or where normally subject to such UL labeling and/or listing services
2. Be without blemish or defect.
3. Be in accordance with the latest applicable NEMA standards.
4. Be products, which will meet with the acceptance of the agency inspecting the electrical work. Where such acceptance is contingent upon having the products examined, tested and certified by UL or other recognized testing laboratory, the product shall be so examined, tested and certified.

C. For all equipment, which is to be installed but not purchased as part of the electrical work, the electrical work shall include:

1. The coordination of their delivery.
2. Their unloading from delivery trucks driven in to any point on the property line at grade level.
3. Their safe handling and field storage up to the time of permanent placement in the project.
4. The correction of any damage, defacement or corrosion to which they may have been subjected.
5. Their field make-up and internal wiring as may be necessary for their proper operation.
6. Their mounting in place, including the purchase and installation of all dunnage, supporting members and fastenings necessary to adapt them to architectural and structural conditions.

D. Equipment, which is to be installed but not purchased as part of the electrical work, shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the electric work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The electric work includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

1.8 ELECTRICAL INSTALLATIONS

A. All materials and labor called for, specified in Division 16 of the specifications, and or shown on the electrical drawings furnished under this contract shall be provided under Division 16 unless called for otherwise in the Division 16 documents. The word "provide" as used in the Division 16 documents, shall mean to furnish, install, connect up, complete with all accessories ready for operation and warranted.

B. Coordinate electrical equipment and materials installation with other building components. Fully coordinate work with that of other trades. Furnish information in writing that is needed for the coordination of clearances, etc., with the work of others, and such information shall be given in a timely fashion so as not to impede the progress of two or more trades. Confer and resolve the conflict immediately. If so directed by the A/E, prepare composite drawings to resolve any space or clearance conflict.

C. Verify all dimensions by field measurements.

D. Arrange for chases, slots, and openings in other building components to allow for electrical installations.

E. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.

F. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

G. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.

H. Where mounting heights are not detailed or dimensioned, the exact location shall be determined by the A/E, install electrical services and overhead equipment to provide the code and/or utility requirements.

I. Install electrical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

J. Coordinate the installation of electrical materials and equipment above ceilings with suspension systems, mechanical equipment and systems, and structural components.

K. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

L. Attention is directed to areas and items indicated on the drawings by the notations "HOLD", "N.I.C.", "BY OTHERS" and words of similar intent. The work indicated in these areas is shown for information and continuity only. Work or items furnished and installed in these areas solely for the convenience of this Contractor or others, without prior written approval of the Owner, shall be removed at the option of the Owner and at the Contractor's expense.

M. Provide all required staging and scaffolding for all the work under this section.

1.9 ALTERATION WORK

A. Maintain continuity of service in areas where occupancy is to be maintained during alterations. If it becomes necessary to disconnect or interrupt service, obtain written consent of the Owner, and only disconnect service at the convenience of, and with the consent of the Owner. A copy of the written request for a shutdown shall be forwarded to the A/E.

1.10 CUTTING AND PATCHING

A. Cutting and patching of electrical equipment, components, and materials specified under Division 16 (conduit, sleeves, equipment, etc.) shall be performed by Electrical Contractor.

B. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 Section: "Cutting and Patching" for definitions, requirements, and procedures.

C. Cutting and patching of existing structures (thru walls, floors, ceilings, etc.) to accommodate equipment, components, and materials of all Contractors, including Mechanical and Electrical Contractors, shall be performed by General Contractor and/or his designated Subcontractor.

D. Cutting and patching of new structures (thru walls, floors, ceilings, etc.) to accommodate installation of ill-timed work or removal and replacement of defective work or work not conforming to requirements of Contract Documents, shall be performed by General Contractor and/or his designated Subcontractor and costs shall be back charged to appropriate trade Contractor.

E. Do not endanger or damage installed work through procedures and processes of cutting and patching.

F. Arrange for repairs required to restore other work, because of damage caused as a result of electrical installations.

G. Arrange to have ducts, raceways, conduit, panelboards, boxes, and such other pertinent parts, set in place ahead of construction work so that they will be built-in with structures and eliminate need for cutting and patching. Failure to conform to this paragraph will require that this Contractor perform any cutting and patching required for his work at his expense. Cutting shall be neatly finished to match adjoining work in a manner acceptable to the A/E. Cutting and patching shall not affect the fire rating of walls or structural parts. Cutting and patching required to correct work, due to error or negligence of the Contractor, or to defects in his material or workmanship, shall be corrected at no additional cost to the Owner. Patching shall meet or exceed quality of adjacent surfaces. Cutting must be accomplished as not to weaken adjacent structural members and must be approved by the Structural Engineer before proceeding.

H. Perform cutting, fitting, and patching of electrical equipment and material required to:

1. Uncover work to provide for installation of ill-timed work.
2. Remove and replace defective work.
3. Remove and replace work not conforming to requirements of the contract documents.
4. Remove samples of installed work as specified for testing.
5. Install equipment and materials in existing structures.
6. Upon written instructions from the A/E, uncover and restore work to provide for A/E observation of concealed work.

I. Cut, remove and legally dispose of selected electrical equipment, components and materials as indicated, including, but not limited to, removal of electrical items indicated to be removed and items made obsolete by the work.

J. Protect the structure, furnishing, finishes, and adjacent materials not indicated or scheduled to be removed. Protect the electrical work and the work of others in a manner best suited to the particular case. Correct any damage done to any work at no additional cost.

K. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

L. Locate, identify, and protect electrical services passing through areas that are to under-go remodeling or demolition. Electrical services serving other areas required to be maintained, and transit services must be interrupted, provide temporary services for the affected areas and notify the Owner prior to changeover.

1.11 SUBMITTALS

A. Within fifteen (15) business days after the date of notice to proceed and before purchasing any materials or equipment, submit for approval a complete list, in six (6) copies, of all materials to be incorporated in the work.

B. Shop drawings/manufacturer's cuts are required for:

1. Wire & Cable.
2. Lighting Fixtures.
3. Panelboards.
4. Disconnect Switches.
5. Fire Alarm System.
6. Wiring Devices and Plates.
7. Fire Stopping Materials.
8. Seismic Restraint Components.

C. After the list has been processed, submit complete shop drawings of all equipment. These shop drawings submittals shall be submitted within thirty days after the processing date of the original submittal.

D. All submittals shall be complete and submitted electronically to all applicable parties. No consideration will be given to partial submittals except with prior approval. No consideration will be given to faxed submittals.

E. Explanation of Shop Drawing Stamp:

1. Approved: indicates that we have not found any reason why this item should not be acceptable within the intent of the documents.
2. Approved with Comments: indicates that we have found questionable components which, if corrected or otherwise explained, make the product acceptable.
3. Resubmit for Final Review: indicates that this item should be resubmitted for approval before further processing.
4. Does Not Conform: indicates that the item will not meet the intent of the Contract.

F. No shop drawing stamp or note shall constitute an order to fabricate or ship. Such notification can only be performed by the Project Manager for construction, the Contractor scheduling his own work, or the Owner.

G. Submittal of shop drawings, product data, will be reviewed only when submitted by the Contractor. Data submitted from Sub-contractors and material suppliers directly to the A/E will not be processed.

H. If shop drawing is not in compliance after two submissions, a third submission for the same manufacturer will not be considered for review.

I. Check shop drawings and other submittals to assure compliance with contract documents before submittal to A/E.

J. Review of shop drawings is final and no further changes shall be considered without written application. Shop drawing review does not apply to quantities, dimensions, nor relieve this Contractor of his responsibility for furnishing materials or performing his work in full compliance with these contract drawings and specifications. Review of these shop drawings shall not be considered a guarantee of the measurements of this building or the conditions encountered.

K. General requirements for the substitution of equipment and submittal of shop drawings as follows. If apparatus, systems or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, wiring, supports, or construction, it shall be provided by this Contractor at no additional cost to the Owner. This Contractor shall assume all cost and entire responsibility thereof. The approval of substituted equipment does not relieve the contractor of his/her responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist. It is the contractor's responsibility to submit only those items that meet the specified apparatus, systems and material. Should any non-conformance code items be installed, they shall be replaced by this Contractor at no additional cost to the Owner. The construction means and methods used in the project shall be reviewed and approved through the local building department or a deputy inspector to insure compliance with the current codes, project specifications and general building practices.

L. Coordination drawings shall be submitted and shall show all HVAC, Electrical, Plumbing and Fire Protection systems superimposed in order to identify conflicts and ensure inter-coordination of all trades. Coordination drawings shall be initiated under this Section of the Specifications. It is this Contractors responsibility for preparation of project coordination drawings showing the installation of all electrical equipment, switchgear, motor control centers, panelboards, transformers, transfer switches, disconnect switches, enclosed circuit breakers, conduits, outlets, switches and accessories to be provided under this Section of the Specifications. These drawings shall be prepared at not less than 3/8 in. = 1 ft. scale, and shall show building room layouts, structural elements, ductwork and lighting layouts of function. A reproducible copy of each drawing prepared shall then be submitted to the Mechanical, Plumbing and Sprinkler Contractors, who shall be responsible to coordinate his equipment and systems and shall show these on the drawings submitted. After this Contractor has fulfilled his obligation, he shall notify all other Contractors. After each drawing has been coordinated between trades, each trade shall sign each drawing, indicating acceptance of the installation. This Contractor shall then print the coordination original and these prints submitted through the General Contractor to the architect for review and comment, similar to shop drawings. Comments made on these drawings shall result in a correction and re-submittal of the drawings. A Subcontractor who fails to promptly review and incorporate his work on the drawings shall assume full responsibility of any installation conflicts affecting his work and of any schedule ramifications. Review of coordination drawings shall not diminish responsibility under this Contract for final coordination of installation and maintenance clearances of all systems and equipment with Architectural, Structural, Mechanical, and Electrical Contractors.

1.12 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. If materials of equipment are substituted for specified items that alter the systems shown or its physical characteristics, or which have different operating characteristics, clearly note the alterations or differences and call it to the attention of the A/E. Under no circumstances shall substitutions be made unless identical material or equipment has been successfully operated for at least three consecutive years.

C. All substitution made by the Contractor shall require the Contractor to fully coordinate the substitution with other trades. The Contractor must make any modifications required by the substitution at no additional cost to the Owner. In addition the Contractor must notify the A/E of any changes required and obtain approval for the changes. The review of the shop drawings by the A/E shall not relieve the Contractor from his responsibility as set forth in this specification.

1.13 NAMEPLATE DATA

A. Provide permanent operational data nameplate on each item of power operated equipment, conduits with pull string, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in a readily accessible location.

1.14 DELIVERY STORAGE AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage. All devices shall be stored in a locked room. Assume responsibility for the devices until the date of final inspection.

C. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

1.15 RECORD DOCUMENTS

A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.

B. At completion of work prepare a complete set of Record As-Built Drawings in AutoCAD, Computer Aided Drafting (CAD) software, showing all systems as actually installed, including all fire alarm and electrical circuitry. The Record As-Built Drawings computer files shall be made available to the Architect, Engineer and Owner prior to final payment.

C. The Architect will not certify the accuracy of the Record Drawings. This is the sole responsibility of the Electrical Contractor.

D. This trade shall submit the record set for approval by the Fire and Building Departments in a form acceptable to the departments, when required by the jurisdiction.

E. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

1.16 WARRANTIES

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. All work and equipment furnished under this Section shall be guaranteed free from defects in workmanship or materials for a period of one (1) year, unless specifically noted otherwise for a particular system, from the date of final acceptance of the systems as set forth in this Contract. The Subcontractor shall replace any defective work developing during this period, unless such defects are clearly the result of misuse of equipment by persons not under the control of the Subcontractor, without cost to the Owner. Where such defective work results in damage to work of other Sections, all such work shall be restored to its original condition by mechanics skilled in the affected trade, at the expense of the Subcontractor. The Subcontractor shall submit a separate written guarantee stipulating the aforesaid conditions.

C. Prior to or at the time of Substantial Completion for the work and during administrative close-out of the project, submit one (1) copy of all specified warranties and guarantees to the Architect for review, approval and subsequent transmittal to the Owner.

D. Warranties and guarantees, including those specified in excess of the general one (1) year guarantee, shall be complete for all specific materials, systems, sub-systems, equipment, appliances and products specified and required by the Contract Document.

E. Warranties and guarantees shall clearly define what is to be guaranteed; the extent, terms, conditions, time and effective dates.

F. Copies of the same warranties and guarantees shall be included in the "Operating and Maintenance Manual" as specified herein.

1.17 CLEANING

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. Upon completion of work, the Contractor shall clean, polish and leave bright, fixtures and lamps, and shall remove dust, dirt, debris and loose plaster from panelboards, controls, and switchboards. Unused openings in pull boxes, junction boxes, equipment and raceways shall be capped or closed by an approved means. Replace all inoperative lamps.

1.18 DEFINITION OF TERMS

A. "This Contractor" or "E.C." specifically means, the Electrical Contractor working under this section of the specifications.

B. "Concealed" means hidden, in chases, furred spaces, walls, above ceilings or enclosed in construction.

C. "Exposed" means visible in sight or not installed "concealed" as defined above.

D. "Approved Equal" means any equipment or material which is approved by the Engineer and equal in quality, durability, appearance, strength, design and performance to the equipment or material originally specified.

E. "Conduit" shall mean all conduit including fittings, joints, hangers and supports.

F. "Furnish" shall mean to purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of the electrical work.

G. "Install" shall mean to perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the electrical work.

H. "Provide" shall mean to furnish and install.

1.19 QUALITY ASSURANCE

A. Obtain services of manufacturer's representatives of electrical equipment, during erection and construction of their respective equipment to insure proper installation of same.

B. A letter is required from each system manufacturer's representative certifying to the A/E that requirements have been checked and are properly installed and operating.

1.20 PERFORMANCE TESTS - ELECTRICAL

A. Test and adjust the electrical systems and equipment during the progress of the work.

B. Upon completion of work and after preliminary tests to assure that all systems are complete and in proper working order, arrange with the A/E to conduct performance tests of the electrical systems. These tests may be witnessed by the A/E prior to acceptance of systems and shall be arranged for the purpose of demonstrating compliance with contract documents. During this period, visually inspect all electrical equipment. Lighting fixtures shall be tested with specified lamps in place for not less than six (6) hours. Check voltages to assure that all transformer taps are properly set.

C. General operating tests shall be performed under as near design conditions as possible, for a period of not less than one (1) hour for each system, and shall demonstrate that all equipment is functioning in accordance with specifications. Furnish all instruments, ladders, test equipment and personnel required for tests. Any equipment or systems found by test to be deficient or unsatisfactory shall be replaced and tests repeated as often as necessary to assure compliance with contract documents.

D. Test all feeders, sub-feeders and all branch wiring for amperage, voltage, phase balance, phase sequence of A,B,C and insulation resistance, then submit the results of this test to the A/E neatly typed in triplicate for review. This test may be conducted at any time up to, through and including, the guarantee period if requested by the A/E, at no additional cost to the Owner.

E. Phase balance the complete electrical system, phase balance all panels as near as loads will permit under normal working conditions.

F. Test all ground conductors for current flow, as near design operating conditions as possible. If any measured current exceeds one (1) ampere, determine and correct the cause. Also, if measured resistance is greater than 5 ohms indoor or 10 ohms outdoor, determine and correct the cause.

G. During the progress or completion of the work it shall be subject to the inspection of the Owner and to such other inspectors, as may have jurisdiction, including those of the Electric Company, Fire Department and the Telephone Company.

H. The Contractor shall be responsible for correct voltages, tap settings, trip settings and correct phasing on all equipment. Secondary voltages shall be measured at the line side of the main breakers with the breakers in an open position, at panelboards, and at such other location on the distribution systems and branch circuits as directed by the Engineer.

I. At completion of the work, Contractor shall submit to the Owner's representative in writing a statement stating: (1) that the work is complete; (2) that the entire installation is in accordance with the drawings and specifications; (3) that preliminary tests have been made; and (4) that the work is ready for final inspection and test.

J. A final inspection of the installation to determine compliance with the drawings and specifications will be made by the Owner's representative. Work will be checked for quality of materials, quality of workmanship, proper installation and finished appearance. The electrical contractor shall provide the services of the project electrical foreman for inspection purposes. The foreman shall remove and reinstall wiring devices, junction box covers, panelboard trims, switchboard covers, terminal box covers, ceiling tiles, lighting fixtures, etc. as required to facilitate any inspections required by the Owner's representative.

K. The Contractor shall arrange and conduct operating tests on all equipment in the presence of the Owner's representative. The components parts of systems and the various systems shall be demonstrated to operate in accordance with the requirements and intent of this specification. Any non-complying or defective materials or workmanship disclosed as a result of the inspection and tests shall be corrected promptly by the Contractor, and the tests repeated as often as necessary until approved and accepted by the Owner's representative.

L. The Contractor shall visit the site to acquaint himself with existing conditions. No extra compensation will be paid for failure to comply with this paragraph.

M. The Electrical Contractor shall provide supervision, labor, materials, tools, test equipment, and all other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the electrical systems and circuitry throughout this section.

N. The electrical contractor shall pay for all tests including expences incident to retests occasioned by defects and failures of equipment to meet specifications at no additional cost to the owner.

O. Any defects or deficiencies discovered in any of the electrical work shall be corrected at no cost to the owner.

P. All testing shall be compatible with the manufacturer's installation instructions.

1.21 SEISMIC RESTRAINT

A. It is the intent of this seismic specification to keep all electrical building system components in place during a seismic event.

B. All electrical systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a Conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.

C. This contractor shall engage a professional structural engineer registered in the jurisdiction of this project to review the entire installation to determine all seismic restraint requirements and methods. Contractor shall submit a report outlining the structural engineer's review as well as seismic restraint shop drawings and supporting calculations prepared by the professional structural engineer for review by the Architect.

D. Seismic restraints shall be designed in accordance with seismic force levels as detailed in the applicable building code.

1.22 TEMPORARY LIGHT AND POWER

A. Under this Section of the specifications, this Contractor shall provide temporary electric service, sized suitable for construction for each trade. This contractor shall provide all material and labor for temporary electrical service per the local power company's requirements and standards with all necessary panelboards, disconnect switches, transformers, conduit, wiring, etc. as required. This contractor shall pay all associated costs, up front.

B. Where temporary electrical service cannot be obtained from the local power company, this contractor shall provide a temporary, on-site, electric generator with all necessary panelboards, disconnect switches, transformers, conduit, wiring, etc. as required. The fuel used for the generator shall be provided and paid for by this Contractor.

C. This contractor shall provide a distribution system with circuits for receptacles and lighting as required for construction. This contractor shall maintain the temporary electrical system during construction and remove the system when construction is complete.

D. Under this section of the specifications, this Contractor shall provide and maintain temporary lighting based on using not less than one 100-watt lamp for each 100 square feet of building floor area and one duplex GFCI receptacle for each 200 square feet of building floor area. Where higher lighting intensities are required by Federal or State laws or otherwise specified, the above specified wattage shall be increased to provide the increase intensities.

E. This contactor shall provide temporary power and telephone services from the local telephone company for site trailers, fax machines, computers, etc., per the general contractor's direction.

F. The service shall incorporate ground fault protection and comply with NEC Article 527 and OSHA requirements.

1.23 PERMITS

A. Obtain all required electrical permits and pay all fees for same.

B. Provide to Engineer, in duplicate, a certificate of final inspection from the authority having jurisdiction for the electrical and systems.

1.24 OPERATING, INSTRUCTION, AND MAINTAINANCE MANUALS

A. Refer to Section 01700 - CONTRACT CLOSEOUT for submittal procedures pertaining to operating and maintenance manuals.

B. Each copy of the approved operating and maintenance manual shall contain copies of approved shop drawings, equipment literature, cuts, bulletins, details, equipment and engineering data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed.

1.25 BIDDERS REPRESENTATION

A. By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the drawings, specifications and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended; further that,
2. The Bidder and workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of construction represented by the construction contract documents bid upon; further that,
3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the Owner, or the Owner's employees or agents including architects, engineers or consultants, in assembling the bid figure; and further that,
4. The bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

1.26 UTILITY COMPANY & AGENCY COORDINATION

A. This section includes, but is not limited to coordination with the following utilities, agencies and authorities having jurisdiction:

1. Local Fire Marshal: This contractor shall verify with the local fire alarm official, the type of master-box or municipal connection required for this project. This contractor shall provide all material & labor to comply with the local municipality. Notify Engineer of discrepancies between the plans and the municipality's standards. No extra compensation will be given for corrections required for failure to coordinate with the municipality, but corrections shall be made.
2. Electrical Inspector: Review plans and specifications with the local electrical and/or wiring inspector(s). Obtain and pay for all permits.
3. Building Inspector: Review plans and specifications with the local building inspector, if not done so by the General Contractor.
4. OSHA Representative: Review plans and specifications with the local OSHA representative, if not done so by the General Contractor.
5. Dig Safe: This contractor shall notify and coordinate with Dig Safe prior to any excavation; digging; trenching; grading; tunneling; augering; boring; drilling; pile driving; plowing-in or pulling-in pipe, cable, wire, conduit, or other sub-structure; backfilling; demolition; and blasting related to this Contractor.

B. The Electrical Contractor shall pay for all permits, inspections, labor, material and fees associated with the various Utility Companies coordination requirements mentioned in this section and for this Contractor's work under this project.

C. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structural and other trades and to meet Architectural requirements.

D. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Architect. Where the electrical work shall interfere with the work of other trades, assist in working out the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owners, make reasonable modifications to the work as required by normal structural interferences. Pay the General Contractor for additional openings, or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.

E. If any electrical work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the trades involved without extra cost to the Owners.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Architect and Engineer for review and approval.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Minimum Size: ¾-inch, unless otherwise specified.

B. Underground Installations:

1. More than Five Feet from Foundation Wall: Use thick wall nonmetallic conduit concrete encased.
2. Within Five Feet from Foundation Wall: Use rigid steel conduit concrete encased.
3. In or Under Slab on Grade: Use plastic coated conduit.
4. Minimum Size: 1-inch.

C. Outdoor Locations, Above Grade: Use rigid steel conduit.

D. In Slab Above Grade:

1. Use rigid steel conduit.
2. Maximum Size Conduit in Slab: ¾ inch (19 mm); ½ inch (13 mm) for conduits crossing each other.

E. Wet and Damp Locations: Use rigid aluminum conduit.

F. Dry Locations:

1. Concealed and in Cable-Tray: Use metal clad (MC) cable (see Division 1)
2. Exposed: (Unfinished or utility spaces) Use electrical metallic tubing.

G. Metal conduit: Rigid Steel Conduit shall comply with ANSI C80.1 and be heavy wall zinc coated steel. Rigid Aluminum Conduit shall comply with ANSI C80.5. Intermediate Metal Conduit (IMC) shall be rigid steel. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1 and material to match conduit. Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.

H. Flexible metal conduit shall be interlocked aluminum contruction. Fittings shall comply with ANSI/NEMA FB 1. Acceptable manufacturers are AFC Cable Systems, Electri-Flex Company and Eastern Flexible Conduit Technologies. All flexible conduits shall include a grounding conductor.

I. Electrical metallic tubing (EMT) shall comply with ANSI C80.3; galvanized zinc coated steel tubing. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1; steel, compression or set screw type. Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.

J. Nonmetal conduit shall comply with NEMA TC 2; Schedule 40 PVC, or as indicated on plans. Fittings and Conduit Bodies shall comply with NEMA TC 3. Acceptable manufacturers are Carlon or approved equal.

K. Flexible nonmetallic conduit (Sealtite) shall be UL and CSA listed for purpose specified and shown. Acceptable manufacturers are Carlon or approved equal.

L. Install conduit in accordance with NECA "Standard of Installation." Install nonmetallic conduit in accordance with manufacturer's instructions.

M. Arrange supports to prevent misalignment during wiring installation. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits. Fasten conduit supports to building structure and surfaces under provisions of Division 1. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports. Do not attach conduit to ceiling support wires.

N. Arrange conduit to maintain headroom and present neat appearance. Route exposed conduit parallel and perpendicular to walls. Route conduit installed above accessible ceilings parallel and perpendicular to walls. Route conduit in and under slab from point-to-point. Do not cross conduits in slab.

O. Maintain adequate clearance between conduit and piping. Maintain 12-inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

P. Cut conduit square using saw or pipe cutter; de-burr cut ends. Bring conduit to shoulder of fittings; fasten securely. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch (50 mm) size.

R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints. All expansion and deflection fittings shall have a ground strap. Provide suitable pull string in each empty conduit except sleeves and nipples. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

S. Ground and bond conduit under provisions of NEC 250.

2.2 BUILDING WIRE & CABLE

A. Building Wire and Cable shall be copper with 600V insulation rated at 75°C minimum, Type XHHW insulation for feeders and branch circuits larger than #3 AWG; Type THHN/THWN insulation for feeders and branch circuits #4 AWG and smaller.

B. Conductors shall be of soft drawn 98% minimum conductivity properly refined copper, solid construction where No. 10 AWG and smaller, stranded construction where No. 8 AWG and larger.

C. Exterior of wires shall bear repetitive markings along their entire length indicating conductor size, insulation type and voltage rating.

D. Exterior of wires shall be color coded, so as to indicate a clear differentiation between each phase and between each phase and neutral. In all cases, grounded neutral wires and cables shall be identified by the colors "white" or "gray". In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are made. Colored tape shall be applied for a distance of 6 inches along the wires and cables, or along their entire extensions beyond raceway ends, whichever is less.

E. Final connections to motors shall be made with 18" of neoprene sheathed flexible conduit.

F. Minimum branch circuit conductor size shall be No. 12 AWG installed in conduit. Motor control circuit wiring shall be minimum No. 14 AWG installed in conduit.

G. Fire alarm and security system wiring shall be No. 16 twisted non-shielded pairs for alarm and trouble circuits and a minimum of #14 AWG for device power, control and alarm annunciation circuits. Fire alarm system riser circuits shall be 2-hour rated, CI type (circuit integrity) cable per NFPA 72 and NEC 760.

H. Other wires and cables required for the various systems described elsewhere in this section of the Specifications shall be as specified herein, as shown on the Contract Drawings, or as recommended by the manufacturer of the specific equipment for which they are used, all installed in conduit.

I. Metal clad sheathed cable NFPA 70, type MC may be used for branch circuitry where shown and where run concealed and not subject to physical damage. All branch circuits shall be run in conduit from the panelboard to the first outlet. All type MC cable used shall contain a full size insulated ground conductor. All conductors shall be copper. All type MC cable insulation used shall have voltage rating of 600 volts, shall have a temperature rating of 75° C, and shall be thermoplastic material. Armor material shall be steel and armor design shall be interlocked metal tape. Fire alarm rated MC cable may be used for fire alarm work where concealed and approved by the Authority Having Jurisdiction.

J. Wiring materials except MI cable shall be manufactured by Triangle, Essex, General Cable, AFC, Southwire or equal.

K. Concealed Dry Interior Locations: Use only building wire Type THHN/THWN or XHHW insulation in raceway, or metal clad cable where concealed and code acceptable.

L. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

M. Above Accessible Ceilings: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway or metal clad cable where code acceptable.

N. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

O. Exterior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

P. Underground Installations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

Q. Wiring methods, in general, are as follows:

1. Galvanized rigid steel conduit shall be used for telephone system sleeves for main cable runs between floors, closets, etc. and for sweeps, bends, etc. in ductbanks and as specifically noted on the plans. EMT shall be used generally for exposed circuiting in unfinished spaces. Metal clad cable (type MC) may be used for branch circuiting and fire alarm rated MC cable for fire alarm circuiting where run concealed and where code acceptable.
2. To prevent transmittal of vibration to conduit, connections to any vibration producing equipment (i.e. transformers, motors, etc.) shall be terminated by 18 inches of flexible metal conduit. Where flexible connections are exposed to grease and oil, liquid-tight flexible metal conduit shall be used.
3. In general, no splices or joints shall be permitted in either feeders or branches except at outlets or accessible junction boxes. Splices in wire #8 AWG and smaller shall be pigtail type, made mechanically tight. All conduit systems shall be complete.
4. Raceway, boxes, etc., run on walls in wet areas which are subject to being washed down, shall be mounted on the walls with 1/4" stand-offs. All boxes shall be cast type.

R. Route wire and cable as required to meet the Project Conditions. Install cable in accordance with the NECA "Standard of Installation." Use solid conductor for feeders and branch circuits 10 AWG and smaller. Use stranded conductors for control circuits. Use conductor not smaller than 12 AWG for power and lighting circuits. Use conductor not smaller than 16 AWG for control circuits. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m). Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (160 m). Pull all conductors into raceway at same time. Use suitable wire pulling lubricant for building wire 4 AWG and larger. Protect exposed cable from damage.

S. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system, cables that are not part of the ceiling system cannot be supported from ceiling supports. Do not rest cable on ceiling panels. Use suitable cable fittings and connectors. Neatly train and lace wiring inside boxes, equipment, and panelboards.

T. Clean conductor surfaces before installing lugs and connectors. Make splices, taps, and terminations to carry full ampacities of conductors with no perceptible temperature rise. Use suitable reducing connectors or mechanical connector adapters for connecting aluminum conductors to copper conductors. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape un-insulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

2.3 BOXES

A. Outlet Boxes:

1. Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations shall be of cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps are not allowed in new construction.
2. Each box shall have sufficient volume to accommodate number of conductors in accordance with requirements of NFPA 70. Boxes shall not be less than 1-1/2" deep unless shallower boxes are required by structural conditions and are specifically approved by Architect. Ceiling and bracket outlet boxes shall not be less than 4" octagonal except that smaller boxes may be used where required by particular fixture to be installed. Flush or recessed fixtures shall be provided with separate junction boxes when required by fixture terminal temperature requirements. Switch and receptacle boxes shall be 4" square or of comparable volume. Luminaire and equipment supporting boxes shall be rated for weight of equipment supported; include 1/2 inch (13 mm) male fixture studs where required.
3. Provide metallic boxes rated for 2-hour, fire-rated walls with gasket to reduce noise-transmission in all fire-rated walls. A minimum horizontal distance of 24-inches shall separate metallic boxes located on opposite sides of walls. This minimum horizontal spacing may be reduced using UL classified wall opening protective materials, commonly known as "putty pads" or "insert pads" pending written approval from the local authority having jurisdiction (AHJ). Refer to Architect's plans for all wall types prior to bid and any related work.
4. All boxes installed in demising walls separating tenants, electrical room walls, mechanical room walls, conference room walls, nurse's office walls, and other room walls deemed private by the Owner shall be provided with gasket to reduce noise-transmission.
5. All boxes installed in exterior walls shall be provided with appropriate caulking and gaskets to seal off and prevent air leakage. Follow caulking and gasket manufacturer's installation guidelines to ensure correct and effective installation.
6. Acceptable Manufacturers:
   a. Appleton
   b. Crouse Hinds
   c. Steel City
   d. RACO

B. Pull and Junction Boxes: Where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code. Where intermediate cable supports are necessary because of box dimensions, provide insulated removable core brackets to support conductors. Junction boxes are to be equipped with barriers to separate circuits. Where splices are to be made, boxes shall be large enough to provide ample work space. All conductors in boxes are to be clearly tagged to indicate characteristics. Boxes shall be supported independently of raceways. Junction boxes in moist or wet areas shall be galvanized type. Boxes larger than 4-inches square shall have hinged covers. Boxes larger than 12-inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

C. Install boxes in accordance with NECA "Standard of Installation." Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

D. Set wall mounted boxes at elevations to accommodate mounting heights indicated or specified in section for outlet device. Electrical boxes are shown on drawings in approximate locations unless dimensioned. Adjust box location up to 10-feet (3m) if required to accommodate intended purpose. Orient boxes to accommodate wiring devices. Maintain headroom and present neat mechanical appearance.

E. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 7.

F. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

G. Use flush mounting outlet box in finished areas. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening. Do not install flush mounting box back-to-back in walls; provide minimum 6-inches (150 mm) separation. Provide minimum 24 inches (600 mm) separation in acoustic rated walls. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness. Use stamped steel bridges to fasten flush mounting outlet box between studs. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

H. Use adjustable steel channel fasteners for hung ceiling outlet box. Do not fasten boxes to ceiling support wires. Support boxes independently of conduit. Use gang box where more than one device is mounted together. Do not use sectional box. Use gang box with plaster ring for single device outlets. Use cast outlet box in exterior locations exposed to the weather and wet locations. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations. Set floor boxes level.

I. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

J. Adjust floor box flush with finish flooring material. Adjust flush-mounting outlets to make front flush with finished wall material. Install knockout closures in unused box openings.

2.4 WIRING DEVICES

A. Provide wiring device type plates for all wall-mounted devices. All wall plates shall be either brushed aluminum or smooth high impact nylon for all public areas as directed by the Architect. Provide galvanized steel for all Utility, Electric and Mechanical Rooms. Colors of wall plates as directed by the Architect.

B. Wiring devices standard for the project (i.e., with no specific type indicated) shall conform to the following:

1. Visible part colors of wiring devices shall be as directed by the Architect for all public areas. Provide Ivory colored devices for all Utility, Electrical and Mechanical rooms.
2. Exclude compact type devices.

C. Wiring device switches shall be toggle type, A.C. quiet design, specification grade, 20 amps on 120 volt circuits. Switches shall be mounted 48-inches to center line above finished floor unless noted otherwise. Equivalent 277volt, 20 amp switches shall be used where required.

D. Standard duplex convenience receptacles shall be 125volt, 20 amps, three wire (two circuit wires plus ground), "U-slot" ground NEMA configuration 5-20R, specification grade. Receptacles shall be mounted 18" to center line above finished floor unless noted otherwise. Where indicated on plans provide receptacles with ground fault current interrupters, UL Class A; 20A, 125V.

E. Non-standard convenience receptacles and special purpose power supply receptacles shall be as listed on plans.

F. Provide ground fault circuit interrupter (GFCI), weather-resistant type receptacles in all wet and damp locations as defined by the National Electrical Code. All outdoor receptacles and where indicated on the plans shall be installed in a weatherproof while-in-use enclosures.

G. Weatherproof Receptacle Enclosures shall be NEMA 3R rated for rain-tight while-in-use, gasketed, impact resistant thermoplastic with hinged gasketed device cover.

H. Provide extension rings to bring outlet boxes flush with finished surface. Clean debris from outlet boxes. Install devices plumb and level. Install receptacles with grounding pole on top. Connect wiring device grounding terminal to branch circuit equipment grounding conductor. Use jumbo size plates for outlets installed in masonry walls. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

I. Install wall switch 48 inches above finished floor to top of handle. On position, shall be up. Install convenience receptacles 18-inches above finished floor. Install convenience receptacle 6-inches above backsplash of counter. Install dimmer switches 48 inches above finished floor to top.

J. Verify that each receptacle device is energized. Test each receptacle device for proper polarity. Test each GFCI receptacle device for proper operation.

2.5 CABINETS & ENCLOSURES

A. Cabinets shall be as follows: Boxes: Galvanized steel. Box Size: As required and/or indicated on plans. Backboard: Provide 3/4-inch thick plywood backboard for mounting terminal blocks. Paint matte white. Fronts: Steel, flush type with concealed trim clamps, door with concealed hinge, and flush lock keyed to match branch circuit panelboard. Finish with gray baked enamel. Knockouts: As required and/or indicated on plans. Provide metal barriers to form separate compartments wiring of different systems and voltages. Provide accessory feet for free-standing equipment.

B. Hinged Cover Enclosures shall be as follows: Construction: NEMA 250, Type 1, 3R, or 4 steel enclosure, as required and/or indicated on plans. Covers: Continuous hinge, held closed by flush latch operable by key or hasp and staple for padlock. Provide interior plywood panel for mounting terminal blocks and electrical components; finish with white enamel. Enclosure Finish: Manufacturer's standard enamel.

C. Install in accordance with NECA "Standard of Installation." Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner under the provisions of Section 16190. Install cabinet fronts plumb.

D. Clean electrical parts to remove conductive and harmful materials. Remove dirt and debris from enclosure. Clean finishes and touch up damage.

E. ICS 4 - Terminal blocks for industrial control equipment and systems. Power Terminals: Unit construction type with closed back and tubular pressure screw connectors, rated 600 volts. Signal and Control Terminals: Modular construction type, suitable for channel mounting, with tubular pressure screw connectors, rated 300 volts. Provide ground bus terminal block, with each connector bonded to enclosure.

F. Provide grounding provisions for all cabinets/enclosures and bond to grounding system as required per Code.

2.6 GROUNDING & BONDING

A. Ground all systems and equipment in accordance with best industry practice, the requirements of NFPA 70 and the following:

1. Provide grounding bonds between all metallic conduits of the light and power system which enter and leave cable chambers or other non-metallic cable pulling and splicing boxes. Accomplish this by equipping the conduits with bushings of the grounding type individually cross connected.
2. Bond metallic conduits containing grounding electrode conductors and main bonding conductors to the ground bus service enclosure and/or grounding electrode at both ends of each run utilizing grounding bushings and jumpers.
3. Provide grounding bonds for all metallic conduits of the light and power system which terminate in pits below equipment for which a ground bus is specified. Accomplish this by equipping the conduits with bushings of the grounding type connected individually to the ground bus.
4. Provide supplementary ground bonding where metallic conduits terminate at metal clad equipment (or at the metal pull box of equipment) for which a ground bus is specified. Accomplish this be equipping the conduits with bushings of the grounding type connected individually by means of jumpers to the ground bus. Exclude the jumpers where directed. This exclusion will be required where an isolated ground for electronic equipment is to be maintained.
5. Each grounding type bushing shall have the maximum ground wire accommodation available in standard manufacture for the particular conduit size. Connection to bushing shall be with wire of this maximum size.
6. Bonding conductors on the load size of the service device and equipment grounding conductors shall be sized in relation to the fuses or trip size of the overcurrent device supplying the circuit.
7. The central equipment for the fire protective alarm system and telephone system shall have its grounding terminal connected to the grounding electrode by means of a No. 6 green coded insulated conductor, run in 3/4" conduit. Utilize a ground clamp of a type specifically manufactured for the purpose.
8. Perform inspections and tests listed in NETA ATS, Section 7.13. Document test results in Record Documents.
9. Grounding means shall never exceed 10 ohms when located outdoors, or 5 ohms when located indoors.
10. An acceptable means of grounding is to provide an underground 2" thick, concrete-encased electrode of either ½" diameter, electrically conductive reinforcing bar of #4/0 bare copper conductor (minimum of 20-feet in length) per NEC 250.52(A)(3).

2.7 EQUIPMENT WIRING SYSTEMS

A. Cords & Caps: Manufacturers: Hubbel, Pass & Seymour or Arrow Hart. Attachment Plug Construction: Conform to NEMA WD 1. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment. Cord Construction: ANSI/NFPA 70, Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

B. Motor Control Equipment: Each motor shall have a starter furnished under this Section where it is not being supplied by other sections. Wire and installed under this Section, unless otherwise noted herein or on the drawings.

1. Connect the motor starting devices for all motors, except where otherwise specifically provided for under other sections, furnish all necessary connections between controllers and motors, in conduit and leave motors ready to start. Change connections, if necessary, to secure proper rotation of motors.
2. Perform all the necessary wiring in connection with the motor starting and remote control equipment, where so designated, furnished under other sections. Where control or starting equipment is sent to the job as individual units, they shall be installed, wired up complete and left ready for operation under work of this section.
3. Wiring to motor shall be in rigid conduit with watertight flexible conduit from wall to motor only.

C. Included in the general requirements for motor control equipment wiring and connections, the following specified items shall be performed:

1. Installation and connection of motor controls which will be furnished under the heating, ventilating and air conditioning section and the plumbing section.

D. Starters by This Contractor: Where starters are not provided under other sections, this Contractor shall furnish starters for motors 1/2 HP and larger and where required by the control sequence for smaller motors and shall be magnetic across the line starters with adjustable overload protection in each phase line, all in NEMA 1 enclosures. Starters shall be solid state or acceptable substitute. Combination starters shall be with fused or non-fusible disconnect as required.

1. Magnetic starters shall have 120 volt holding circuits, integral transformers, auxiliary contacts as required by the control sequence and integral selector switches with push-to-test pilot lights. One side of each pilot light shall be connected on the load side of the motor starter.
2. Integral transformers shall have overload protection on the secondary section and, also, the secondary neutral shall be grounded.
3. Starters shall be as manufactured by Square D Company or General Electric.

E. Temperature control wiring shall be by others as indicated under the heating, ventilating and air conditioning section.

F. Provide a suitable plywood backboard on a wall and/or angle iron or unistrut framework with plywood for all starters. Starters will be installed and wired under this section.

G. All starters shall be located next to the panel feeding same, if panel is in a closet or utility space, unless noted otherwise on the drawings. If panel is located in a finished space (i.e. corridor, gymnasium, etc.) starters shall be located in nearby utility closet or space acceptable to the Engineer.

H. Nameplates: Each starter shall have a 1.0" x 2.5" hot stamped nameplate identifying the unit and panel it is fed from. The lettering shall be white 1/2" high in a black background.

I. Connections to systems: Make electrical connections in accordance with equipment manufacturer's instructions. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field-supplied attachment plug is indicated. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes. Install disconnect switches, controllers, control stations, and control devices as indicated. Modify equipment control wiring with terminal block jumpers as indicated. Provide interconnecting conduit and wiring between devices and equipment where indicated.

J. Building and Energy Management Systems (BMS/EMS): This contractor shall provide a price to the Mechanical Contractor to provide power and data wiring to all BMS/EMS components requiring same. Coordinate with Mechanical Contractor prior to bid and prior to any work the exact wiring requirements, connections requirements and exact locations for all BMS/EMS components. Such components shall include, but may not be limited to:

1. Control transformers
2. Central equipment controllers
3. BMS controllers
4. BMS Head-end equipment
5. Line-voltage thermostats

2.8 SUPPORTING DEVICES

A. Materials and Finishes: Provide adequate corrosion resistance. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products. Steel channel shall be galvanized.

B. Anchors and Fasteners:

1. Concrete Structural Elements: Use precast insert system, expansion anchors.
2. Steel Structural Elements: Use beam clamps, or welded fasteners.
3. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
5. Solid Masonry Walls: Use expansion anchors or preset inserts.
6. Sheet Metal: Use sheet metal screws.
7. Wood Elements: Use wood screws.

C. Installation: Install products in accordance with manufacturer's instructions. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation". Do not fasten supports to pipes, ducts, mechanical equipment, and conduit. Do not use spring steel clips and clamps. Do not use powder-actuated anchors. Do no drill or cut structural members. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts. Install surface-mounted cabinets and panelboards with minimum of four anchors. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

2.9 ELECTRICAL IDENTIFICATION

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background. Locations: Each electrical distribution and control equipment enclosure, communication cabinets. Letter Size: Use 1/8 inch letters for identifying individual equipment and loads. Use 1/4 inch letters for identifying grouped equipment and loads.

B. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background. Use for identification of individual power receptacle faceplates indicating panel & circuit number the outlet is fed from and control device stations. In addition to nameplates as described above, use labels on all panelboards, disconnect switches and enclosed circuit breakers to identify where the equipment is fed from, voltage & phase.

C. Wire markers: Tape, or tubing type wire markers. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection. Power and Lighting Circuits shall be marked with panel and branch circuit or feeder number as indicated on drawings. Control Circuits shall be marked with control wire number indicated on schematic and interconnection diagrams on drawings

D. Conduit markers: Corrosion and abrasion resistant. Location: Furnish markers for each conduit longer than 6 feet (2 m). Spacing: 20 foot on center. Indicate voltage and phase.

E. All panelboards shall be provided with a typed (hand written is not allowed) circuit directory indicating the load fed by each circuit breaker and it's location in the building.

2.10 ENCLOSED SWITCHES

A. Fusible Switch Assemblies shall be provided in accordance with the following. Description: NEMA KS 1, Type GD with externally operable handle interlocked to prevent opening front cover with switch in ON position, enclosed load interrupter knife switch. Handle lockable in OFF position. Fuse clips: Designed to accommodate NEMA FU1, Class R fuses. Provide NEMA 3R where located outdoors, kitchens or other interior wet areas.

B. Non-fusible switch assemblies shall be provided in accordance with following. Description: NEMA KS 1, Type GD with externally operable handle interlocked to prevent opening front cover with switch in ON position enclosed load interrupter knife switch. Handle lockable in OFF position. Provide NEMA 3R where located outdoors, kitchens or other interior wet areas.

C. Install in accordance with NECA "Standard of Installation". Install fuses in fusible disconnect switches. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

2.11 PANELBOARDS

A. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

B. Panelboard Bussing: Bus bars shall be copper. Provide copper ground bus bar in all panelboards.

C. Minimum Integrated Short Circuit Rating: 10,000 amperes RMS symmetrical for 240 volt panelboards; 65,000 amperes RMS symmetrical for 480 volt panelboards, or as indicated.

D. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.

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DRAWN BY: YYY
DATE: AUGUST 25, 2023
REVISIONS:
9/1/2023 - Addendum #1

TRI-TOWN COMMUNITY ACTION AGENCY
1126 HARTFORD AVENUE
JOHNSTON, RI

PEDIACTRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

ELECTRICAL SPECIFICATION SHEET 1 OF 2

ISSUED FOR BID

E3-0

E. Enclosure: NEMA PB 1, Type 1
F. Cabinet Box: 6 inches deep, 20 inches wide for 240 volt and less panelboards, 20 inches wide for 480 volt panelboards.
G. Cabinet Front: Flush or Surface cabinet front as scheduled with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard ANSI 49 enamel.

2.12 ENCLOSED CIRCUIT BREAKERS

A. Enclosed Molded Case Circuit Breaker: Comply with NEMA AB 1. Include provisions for padlocking. Provide insulated grounding lug in each enclosure. Provide Products suitable for use as service entrance equipment where so applied. Fabricate enclosure from steel.
B. Install enclosed circuit breakers where indicated, in accordance with manufacturer's instructions. Install enclosed circuit breakers plumb. Provide supports in accordance with these specifications. Height: 5 ft (1.6 M) to operating handle. Provide engraved plastic nameplates.
C. Inspect each circuit breaker visually. Perform manual mechanical ON-OFF operations on each circuit breaker. Verify circuit continuity on each pole in closed position. Determine that circuit breaker will trip on overcurrent condition, with tripping time to NEMA AB 1 requirements. Include description of testing and results in test report.

2.13 FUSES

A. All fuses shall be rated for proper voltage in which they are applied. Interrupting ratings shall be greater than the short circuit current available at the terminals of the switch.
B. Fuse types:
1. Fuses for branch circuits shall be time delay class J.
2. Fuses for equipment other than motor loads shall be general fast acting RK-5 or Class J.
3. Control power transformers for motor controller circuits shall be as recommended by motor starter and motor control center manufacturer.
4. Fuses for motors shall be sized at 250% of the motor FLA.
5. Fuses for non-motor loads shall be sized at 125% of the rated FLA of equipment served.
6. Fuses for elevator lifts shall be dual element type and sized in accordance with the elevator manufacturer's recommendations.
C. Spare Fuses
1. Provide spare fuses in the amount of 20% (not less than three (3) nor more than nine (9) of all sizes and types).
2. Spare fuses shall include general purpose fuses, motor fuses, and control fuses used in motor control centers, starters etc.
3. A complete list and quantity of spare fuses shall be submitted with record drawings for review.

2.14 ENCLOSED MOTOR CONTROLLERS

A. The Electrical Contractor shall review the mechanical drawings and coordinate with the Mechanical Contractor for electrical components of the mechanical equipment and systems such as motors, factory mounted motor starters, factory mounted disconnect switches, variable frequency drives and controls to be provided under Division 15 (by the Mechanical Contractor).
B. The Electrical Contractor shall provide motor starters, variable frequency drives and disconnect switches for equipment shown on the drawings where the Mechanical Contractor is not providing such equipment.
C. The electrical contractor shall provide all power wiring for all HVAC equipment.
D. Manual Motor Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller with thermal overload elements on each phase, red pilot light, NO, NC auxiliary contact, and push button or toggle operator.
E. Fractional Horsepower Manual Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload elements on each phase, red pilot light, and toggle operator.
F. Motor Starting Switch: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, without thermal overload elements on each phase, with red pilot light and toggle operator.
G. Enclosures: NEMA ICS 6; Type 1 for indoors and Type 3R for outdoors and wet/damp locations (kitchens, mechanical rooms, pool equipment rooms, etc...).
H. Automatic Magnetic Motor Controllers: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower. Reversing Controllers: Include electrical interlock and integral time delay transition between FORWARD and REVERSE rotation. Two Speed Controllers: Include integral time delay transition between FAST and SLOW speeds. Coil operating voltage: 120volts, 60 Hertz. Overload Relay: NEMA ICS; bimetal or melting alloy. Enclosure: NEMA ICS 6, Type 1 for indoors or Type 3R for outdoors and wet/damp locations (kitchens, mechanical rooms, pool equipment rooms, etc...).
I. Product Options and Features as follows. Auxiliary Contacts: NEMA ICS 2, 2 each normally open and closed contacts in addition to seal-in contact. Cover Mounted Pilot Devices: NEMA ICS 2, standard duty type. Pilot Device Contacts: NEMA ICS 2, Form Z, rated A150. Pushbuttons: Recessed type. Indicating Lights: LED type. Selector Switches: Rotary type. Relays: NEMA ICS 2. Control Power Transformers: 120 volt secondary, in each motor starter. Provide fused primary and secondary, and bond un-fused leg of secondary to enclosure.
J. Installation Requirements: Install enclosed controllers where indicated, in accordance with manufacturer's instructions. Install enclosed controllers plumb. Provide supports in accordance with these specifications. Height: 5 feet to operating handle. Install fuses in fusible switches. Select and install overload heater elements in motor controllers to match installed motor characteristics. Provide engraved plastic nameplates under these specifications. Provide neatly typed label inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

2.15 ENCLOSED CONTACTORS

A. General purpose contactors: NEMA ICS 2, AC general purpose magnetic contactor. Coil Voltage as indicated. Poles as indicated. Size as indicated. Enclosure per NEMA ICS 6, Type as scheduled.
B. Lighting contactors: NEMA ICS 2, magnetic lighting contactor. Coil Voltage as indicated. Poles as indicated. Size as indicated. Contact Rating shall match branch circuit overcurrent protection, considering de-rating for continuous loads.
C. Accessories: Provide Pushbuttons and Selector Switches per NEMA ICS 2, heavy duty type. Provide indicating lights per NEMA ICS 2, push-to-test type. Provide auxiliary contacts per NEMA ICS 2, Class A300 or A600 as required per equipment served.

2.16 INTERIOR LUMINAIRES

A. Lighting fixtures shall be in accordance with identifications as follows:
B. All lamping shall be of the highest quality and efficiency.
C. Finishes shall be as selected by the Architect or as indicated on the plans.
D. Any additional appurtenances required for installation and operation, where same are not covered by the identification used on the drawings, shall be included. Lighting fixtures and equipment shall be furnished complete, wired and assembled, including canopies, lamps and other incidental items. Install specified lamps in each luminaire.
E. Recessed fixtures shall be coordinated with ceiling construction by the Electrical Contractor prior to Bid. Refer to the Architect's plans, details and elevations for ceiling types by area. Provide plaster trim kits as required by ceiling construction.
F. Exact location of all fixtures shall be confirmed with Architect prior to rough-in. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
G. Recessed fixtures throughout shall have their components, wiring and external connections coordinated for use in ceilings utilized as air handling plenums. Install recessed luminaires to permit removal from below. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating. Install clips to secure recessed grid-supported luminaires in place
H. Fixtures for use outdoors or in areas designated as damp locations, shall be suitably gasketed and UL listed for such applications.
I. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire
J. Emergency batteries for exterior fixtures shall be remote mounted within the building. Verify maximum distances for remote mounting the emergency batteries with the manufacturer prior to installation. Locate remote emergency batteries above accessible ceilings or utility rooms as required. Provide test switches for all emergency batteries as required.
K. Unless noted otherwise, all fixtures shall be 3500K and have a minimum CRI of 85.
L. The Contractor shall obtain all information relative to the exact type of hung ceilings and suspension systems to be installed before ordering any recessed fixtures. This Contractor shall furnish the proper type fixtures applicable to the ceiling framing system. If, other than the type of fixtures specified are required for installation due to the type of ceiling construction, this Contractor shall furnish and install the proper type fixtures and mounting appurtenances required at no extra charge.
M. The Contractor shall coordinate the exact locations of all lighting fixtures with the ceiling pattern during the construction period and before installation of the fixtures. Interferences between lighting fixtures, and other equipment, shall be brought to the attention of the Architect/Contractor.
N. Include the aiming and/or adjustments of all lighting fixtures requiring same in accordance with instructions issued by the Architect in the field. Aim and adjust luminaries as indicated or as directed by the Owner, Architect or Engineer. Position exit sign directional arrows as indicated. Operate each luminaire after installation and connection. Ensure proper connection and operation.
O. Lighting fixtures shall be supported from building structural only, not from hung or suspended ceiling, by means of chains or threaded rods. The use of tie wire will not be allowed. All fixtures shall include seismic clips and shall be supported to comply with seismic regulations. Install suspended luminaires using pendants supported from swivel hangers or other suitable leveling means. All rows of fixtures shall be level, aligned with building lines and run parallel to each other. Provide pendant length required to suspend luminaires at indicated height. Support luminaires to building structure, independent of ceiling framing.

2.17 FIRE ALARM SYSTEM

A. GENERAL
1. The contractor shall submit complete documentation for the Fire Alarm/Life Safety System Data Sheets for all items to ensure compliance with these specifications. Copies of this information shall be submitted as required to the Architect award of this work and shall be subject to the approval of the architect.
2. The contractor shall submit, as part of the complete bid documentation package, certification that the engineered system distributor is a fully authorized factory trained and certified distributor of the system detailed within this specification.
3. All equipment and material shall be new and unused, and listed by Underwriter's Laboratories for the specific intended purpose. All control panel components, field peripherals and interactive computer peripherals shall be designed for continuous duty operation without degradation of function or performance.
4. All equipment covered by this specification or noted on installation drawings shall be the best equipment suited for the application and shall be provided by a single manufacturer.
5. Provide all equipment and accessories and compatible devices for a complete and fully functioning addressable fire alarm system. The fire alarm system shall be coordinated with and inspected by the local fire department, and any inconsistency mentioned during any inspection shall be corrected by contractor at no additional cost to owner.
6. The control panel shall contain a microprocessor with 10/100 ethernet media access controller (MAC). The system shall be designed specifically for fire detection, and notification applications.
7. The installing contractor shall coordinate master-box, radio-box, and/or dialer requirements with local fire department.

B. FIRE ALARM LIFE SAFETY SYSTEM SEQUENCE OF OPERATION
1. The operation of a manual station or activation of any automatic alarm initiating device (system smoke, heat, waterflow) shall automatically:
a. Initiate the transmission of the alarm to the Municipal Fire Station or approved Central Station via the Local Energy or Radio Master-box.
b. Sound a code 3 temporal evacuation signal over all audio (notification) circuits, except in designated areas of assembly. In designated areas of assembly (used a pre-recorded voice message) and/or conduct manual voice evacuation from the system microphone(s) located at the FACP or remote location(s) in accordance with the local requirements.
c. Flash all visual signals throughout the building in a synchronized manner.
d. Flash an alarm LED and sound an audible signal at the FACP. Upon acknowledgement, the alarm LED shall light steadily and the audible shall silence. Subsequent alarms shall re-initiate this sequence.
e. Upon alarm initiation by an elevator lobby smoke detector or other designated recall device, recall all elevators that serve the floor of initialization to the main egress level. If the alarm initiates on the main egress level, return the elevator to the alternate floor as directed by the local authority having jurisdiction.
f. Visually indicate the alarm initiating device type and location via LCD display located at the FACP (and at any remote annunciators) and (illuminate the appropriate alarm zone LED at the remote annunciator).
g. Automatically shut down or control HVAC equipment to initiate smoke control functions as required. Manual override controls and programmable relay interface shall serve as an interface to the Building Automation System.
h. Operate prioritized outputs to release all magnetically held smoke doors and magnetically locked doors throughout the building.
i. Activate the exterior weatherproof beacon.

C. WIRING
1. Provide in accordance with manufacturer's instructions all wiring, conduit and outlet boxes required for the installation of complete system as described herein and as shown on the drawings. Wiring shall be Class A.
2. Installation and fire alarm system wiring shall be installed in metal raceway. An equipment bonding conductor shall be provided in all flexible metallic raceways.
3. Color code for fire alarm systems shall be per the State Fire Alarm code.
4. DC supply to the main fire alarm panel shall be white and black. Fire alarm primary power source shall be on dedicated branch circuit. Circuit breaker locks shall be used. If a separate feed is required for the battery charger it shall be black and white unless the main fire alarm panel required only AC feed. In this case the conductors to the battery charger shall be red and white and shall be on a circuit breaker of fits own.
5. Conductors shall be minimum #14-gauge solid copper type THHN/THWN. Conductor's size shall be increased as required to maintain voltage drop to a maximum of 3%. All AC and DC portions of the system shall be installed in separate raceway. Addressable loop wiring may be #16 providing manufacturer's recommended distance is observed. Systems requiring shielded wiring for addressable loops shall not be acceptable.
6. Red painted terminal cabinets with hinged local covers shall be provided at all junction points. All conductor splices shall be made on screw type terminal blocks, wire nuts shall not be used. All terminate within terminal cabinet shall be properly labeled. Provide terminal cabinet at each building cable entrance and at other locations as required.
7. All fire alarm initiating zone and signal wiring shall be wired Class A.
8. Final connections between the equipment and the wiring system shall be made under the direct supervision of a representative of the manufacturer.
9. Upon completion of the installation of fire alarm equipment, the electrical contractor shall provide to the engineer a signed statement substantially in the form as follows:
a. The undersigned having been engaged as the electrical contractor on this project confirms the fire alarm equipment was installed in accordance with the specifications and in accordance with wiring diagrams, instructions, and recommendations furnished by the manufacturer.

D. GUARANTEE AND FINAL TEST
1. All testing (pre-testing, final testing, quarterly testing and program change testing) to be coordinated with the owner and scheduled in advance so that owners and personnel can be present during testing. Contractor to certify that all tests comply with the "State Fire Code", latest edition.
2. Before this installation shall be considered complete and acceptable to the awarding authorities, a complete test on the system shall be performed as follows:
a. A pre-test will be held by the electrical contractor with the manufacturer's authorized representative present. After certification of a complete pre-test, the installing contractor shall inform the authority having jurisdiction of the outcome of the test and will re-inspect in the presence of the authority having jurisdiction and the manufacturer's authorized representative.
b. Final test: The electrical contractor in the presence of authorized representative of the manufacturer and the fire department shall operate every manual station, smoke detector, and thermodetector. Each station/detector circuit and horn circuit shall be opened in at least two locations to check for the presence of correct supervisory circuitry. When this testing ahs been completed to the satisfaction of both the electrical contractor's job foreman and the representative of the manufacturer, a letter from the contractor cosigned by the manufacturer attesting t he satisfactory completion of said testing, shall be forwarded to the owner.
3. The electrical contractor shall guarantee all equipment and wiring to be free from inherent mechanical and electrical defects for a period of one year from the date of final acceptance.
4. The contractor shall provide the Owner with a formal written equipment guarantee upon completion of the installation and testing of the system. The guarantee period shall begin on the day of acceptance of the system by the Owner and shall provide for a period of one year. This guarantee shall be located in the manufacturer's submission prior to approval. This guarantee shall be as normal policy by the equipment manufacturer.
5. The manufacturer shall maintain a full-time service and parts facility, with seven days per week, 24 hour per day service available.
6. All service technicians shall be licensed by the State Fire Code covering service and maintenance of systems.
7. Include sheet metal details, shall conform to the following:
8. Provide all sleeves through fireproof and waterproof slabs, walls, etc., required for electric work.
9. Provide waterproof sealing for the sleeves through waterproof slabs, walls, etc.
10. Provide fireproof sealing for the sleeves through fireproof walls, slabs, etc.
11. Provide fireproof sealing for the openings in fireproof walls, slabs, etc., resulting from removal of existing electrical sleeves, conduits, poke-thru's etc.
12. No splicing of wires will be permitted in the Fire Alarm System.
13. Bundle wiring passing through pull boxes and panelboards in a neat and orderly manner with plastic cable ties. Cable ties shall be by Ty-Raps as manufactured by Thomas & Betts, Holub Industries Inc., Quick Wrap, Bundy Unirap, or equal.
14. Turn branch circuits and auxiliary system wiring out of wiring gutters at 90 degrees to circuit breakers and terminal lugs.

3.2 TESTING REQUIREMENTS & INSTRUCTIONS

A. Where any repairs, modifications, adjustments, tests or checks are to be made, the Contractor shall contact the Engineer to determine if the work should be performed by or with the Manufacturer's Representative.
B. Tests are to:
1. Provide initial equipment/system acceptance.
2. Provide recorded data for future routine maintenance and trouble-shooting.
3. Provide assurance that each system component is installed satisfactorily and can be expected to perform, and continue to perform its specified function with reasonable reliability throughout the life of the facility.
C. At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action by the Contractor requires prior Engineer approval, retesting, and inspection.
D. When the electrical tests and inspections specified or required within Division 16 are completed and results reported, reviewed, and approved by the Engineer, the Contractor may consider that portion of the electrical equipment system or installation electrically complete. The Contractor will then affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of the unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "Notification or Substantial Electrical Completion" for approval by the Engineer following Engineer's acceptance of electrical completion. If later in-service operation or further testing identified problems attributable to the Contractor, these will be corrected by the Contractor, at no additional cost to the Authority.
E. Grounding Systems:
1. Test main building loops and major equipment grounds to remote earth, directly referenced to an extremely low resistance (approximately 1 ohm) reference ground benchmark. Perform a visual inspection of the systems, raceway and equipment grounds to determine the adequacy and integrity of the grounding. Ground testing results shall be recorded, witnesses, and submitted to the Engineer.
2. Perform ground tests using a low resistance, null-balance type ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.
3. Test each ground rod and measure ground resistance. If resistance is not 10 ohms or less, drive additional rods to obtain a resistance of 10 ohms or less. Submit tabulation of results to Engineer. Include identification of electrode, date of reading and ground resistance valve in the test reports.
4. Test each building and major equipment grounding system for continuity of connections and for resistance. Ground resistance of conduits, equipment cases, and supporting frames, shall not exceed 5 ohms to ground. Submit all readings to the Engineer.
5. Where ground test results identify the need for additional grounding conductors or rods that are not indicated or specified, design changes will be initiated to obtain the acceptable values. The Contractor is responsible for the proper installation of the grounding indicated and specified.
6. Operating Instructions: Furnish operating instructions to Owner's designated representative with respect to operations, functions and maintenance procedures for equipment and systems installed. Cost of such instruction up to a full five (5) days of Electrical Subcontractor's time shall be included in contract. Cost of providing a Manufacturer's Representative at site for instructional purposes shall also be included.

3.3 BRANCH CIRCUITRY

A. For all lighting and appliance branch circuitry, raceway sizes shall conform to industry standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.
B. Circuits shall be balanced on phases at their supply as evenly as possible.
C. Feeder connections shall be in the phase rotation which establishes proper operation for all equipment supplied.
D. Reduced size conductors indicated for any feeders shall be taken as their grounding conductors.
E. Feeders consisting of multiple cables and raceways shall be arranged such that each raceway of the feeder contains one (1) cable for each leg and one (1) neutral cable, if any.
F. For circuitry indicated as being protected at 20 Amps or less, abide by the following:
1. All 20 amp, 120/208 volt, 3-phase, 4-wire combined branch circuit homeruns shall be provided with a #8 AWG neutral conductor.
2. Minimum conductor size shall be No. 12 AWG cooper.
3. Conductors operating at 120 vols by exceeding in excess of 100 ft. or at 277 volts extending in excess of 200 ft., or the last outlet or fixture tap shall be No. 10 AWG cooper throughout.
4. Lighting fixtures and receptacles shall not be connected to the same circuit.
G. Type MC Cable Installation:
1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:
a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Cable supports such as Caddy WMX-6, MX-3, and clamps such as Caddy 449 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of type specifically designed for use with cable, i.e., romex connectors not acceptable.
b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek Co.; not with a hacksaw.
c. Use split "insuliner" sleeves at terminations.

3.4 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

A. Outlets and outlet size boxes shall be of galvanized cast ferrous metal only.
B. The finish of threaded steel conduit shall be galvanized only.
C. Wires for pulling into raceways for lighting and appliance branch circuitry shall be limited to "THWN".
D. Wires for pulling into raceways for feeders shall be limited to "THWN".
E. Plates for toggle switches and receptacles shall have gasketed snap shut covers suitable for wet locations while in use.
F. Final connections of flexible conduit shall be neoprene sheathed.
G. Apply one (1) layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.
H. Enclosures, junction boxes, pull boxes, cabinets, cabinet trims, wiring troughs and the like, shall be fabricated of galvanized sheet metal.
I. Enclosures for individually mounted switching and overcurrent devices shall be NEMA Class IV weatherproof construction.
J. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.
K. Panels shall be equipped with doors without exception.
L. The following shall be interpreted as damp or wet locations within building confines:
1. Spaces where any designations indicating weatherproof (WP) or vapor proof appear on the drawings.
2. Below waterproofing in slabs applied directly on grade.
3. Spaces defined as wet or damp locations by Article 100 of the National Electric Code.
4. Parking garage.

3.5 LIMITING NOISE PRODUCED BY ELECTRICAL INSTALLATION

A. Perform the following work, in accordance with field instructions issued by the Architect to assure that minimal noise is produced by electrical installations due to equipment furnished as part of the electrical work.
B. Check and tighten the fastenings of sheet metal plates, covers, doors and trims used in the enclosures of electrical equipment.
C. Remove and replace any extraneously individual device containing one or more magnetic flux path metallic cores (e.g., discharge lamp ballast, transformer, reactor, dimmer, and solenoid) which is found to have a noise output exceeding that of other identical devices installed at the project.

3.6 SUPPORTS AND FASTENINGS

A. Support work in accordance with best industry standards, and Local Electric Code.
B. Include supporting frames or racks for equipment, intended for vertical surface mounting, which is required in a free standing position.
C. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braces to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.
D. No work intended for exposed installation shall be mounted directly on any building surface. In such locations, flat bar members or spaces shall be used to create a minimum of ¼" air space between the building surfaces and the work. Provide ¾" thick exterior grade plywood painted with two (2) coats of fire-retardant gray paint for mounting of panelboards.
E. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric conduits, raceways or cables for support.
F. Nothing shall rest on, or depend for support on, suspended ceiling media.
G. Support less than 2" trade size, vertically run, conduits at intervals no greater than 8'. Support such conduits, 2-1/2" trade size or larger, at intervals no greater than they story height, or 15', whichever is smaller.
H. Where they are not embedded in concrete, support less than 1" trade size, horizontally run, conduits at intervals no greater than 7'. Support such conduits, 1" trade size or larger, at intervals no greater than 10'.
I. Support all lighting fixtures directly from structural slab, deck or framing member.
J. Where fixtures and ceilings are such as to require fixture support from ceiling openings frames, include in the electric work the members necessary to tie back the ceiling opening frames to ceiling suspension members or slabs so as to provide actual support for the fixtures noted above.
K. As a minimum procedure, in suspended ceilings support smalls runs of circuitry (e.g., conduit not in excess of 1" trade size) from ceiling suspension members as defined above. Support larger runs of circuitry directly from structural slabs, decks or framing members.
L. Fasten electric work to building structure in accordance with the best industry practice.
M. Floor mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastenings in all cases.
N. For items which are shown as being ceiling mounted at locations where fastenings to the building construction element above is not possible, provide suitably auxiliary channel or angle iron bridging tying to building structural elements.
O. As a minimum procedure, where weight applied to the attachment points is 100 lbs. or less, fasten to concrete and solid masonry with bolts and expansion shields.
P. As a minimum procedure, where weight applied to building attachment points exceed 100 lbs., but is 300 lbs. or less, conform to the following:
1. At field poured concrete slabs, utilize inserts with 20' minimum length slip-through steel rods, set transverse to reinforcing steel.

3.7 SPLICING AND TERMINATING WIRES AND CABLES

A. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.
B. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.
C. Join solid conductors No. 8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors No. 8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected.
D. Join, tap and terminate standard conductors No. 6 AWG and larger by means of solder sleeves, taps, and lugs with applied solder or by means of bolted saddle type or pressure indent type connectors, taps and lugs. Exclude connectors and lugs of the types which apply set screws directly to conductors. Where equipment or devices are equipped with set screw type terminals which are impossible to change, replace the factory supplied set screws with a type having a ball bearing tip. Apply pressure indent type connectors, taps and lugs utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector.
E. Except where wire nuts are used, build up insulation over conductor joints to a value, equal both in thickness and dielectric strength, to that of the factory applied conductor insulation. Insulation of conductor taps and joints shall be by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by a means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.

3.8 PULLING WIRES INTO CONDUITS AND RACEWAYS

A. Deliay pulling wires or cables in until the project has progressed to a point when general construction procedures are not liable to injure wires and cables, and when moisture is excluded from raceways.
B. Utilize nylon snakes or metallic fish tapes with ball type heads to set up for pulling. In raceways 2" trade size and larger, utilize a pulling assembly ahead of wires consisting of a suitable brush followed by a 3-1/2" diameter ball mandrel.
C. Leave sufficient slack on all runs of wire and cable to permit the secure connection of devices and equipment.
D. Include circular wedge-type cable supports for wires and cables at the top of any vertical raceway longer than 20 feet. Also include additional supports spaced at intervals which are no greater than 10'. Supports shall be located in accessible pull boxes. Supports shall be of a non-deteriorating insulating material manufactured specifically for the purpose.
E. Pulling lubricants shall be used. They shall be products manufactured specifically for the purpose.

3.9 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES, OUTLET BOXES AND PULL BOXES

A. Flush wall-mounted outlet boxes shall not be set back to back but shall be offset at least 12" horizontally regardless of any indication on the drawings.
B. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.
C. In conjunction with concealed circuitry, abide by one of the following instructions (as may be applicable to the conditions) in order to assure the aforementioned accessibility. (Not required for circuitry concealed by removable suspended ceiling tiles.)
D. For a small (outlet size) box on circuitry concealed in a partition or wall, locate box or fitting so that its removable cover side, (or the face of any applied raised cover) penetrates through to within 1/8" of the exposed surface of the building materials concealing the circuitry and apply a blank or device plate to suit the functional requirements.
E. For a large box on circuitry concealed in a partition, suspended ceiling, or wall, locate box totally hidden but with its removable cover directly behind an architectural access door or panel (included for the purpose, separate from the electric work) in the building construction which conceals the circuitry.
F. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).
G. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein.
H. Utilize an outlet box no smaller than 5" square by 2-1/2" deep.
I. Allow no fixture to be supplied from an outlet box in another room.
J. Multiple local switches indicated at a single location shall be gang-mounted in a single outlet box.
K. Install junction boxes, pull boxes and outlet boxes in conjunction with concealed circuitry.
L. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.
M. Outlet boxes for switches shall be located at the strike side of doors. Indicate door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.
N. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.
O. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.
P. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.
Q. Barriers in junction and pull boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1/4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

END OF SECTION

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ELECTRICAL SPECIFICATION SHEET 2 OF 2

ISSUED FOR BID

E3-1

FIRE PROTECTION DESIGN NOTES:

1. APPLICABLE LAWS, REGULATIONS AND STANDARDS ALL MATERIAL AND WORK PROVIDED SHALL BY IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:

   1.1. LOCAL WATER DEPARTMENT
   1.2. STATE BUILDING CODE
   1.3. AUTHORITY HAVING JURISDICTION
   1.4. CURRENT ADOPTED NFPA 13 - INSTALLATION OF SPRINKLER SYSTEMS & ALL REFERENCED DOCUMENTS NOTED IN CHAPTER 10.
   1.5. CURRENT ADOPTED NFPA 25 - INSPECTION, TESTING AND MAINTENANCE OF WATER BASED FIRE PROTECTION SYSTEMS.
   1.6. OWNER'S INSURANCE COMPANY
   1.7. STANDARDS OF THE UNDERWRITER'S LABORATORIES (UL)

2. DESIGN RESPONSIBILITY FOR SPRINKLER SYSTEM ENGINEERING DESIGN SERVICES, INC. PROVIDES A PERFORMANCE-BASED DESIGN AND SPECIFIES THE DESIGN CRITERIA TO BE USED BY THE INSTALLING CONTRACTOR WHO FINALIZES THE SYSTEM LAYOUT AND PROVIDES HYDRAULIC CALCULATIONS TO CONFIRM DESIGN CRITERIA. THE WORKING PLANS AND HYDRAULIC CALCULATIONS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE FIRE PROTECTION IN THE STATE OF MASSACHUSETTS AND SUBMITTED TO THE BUILDING DEPARTMENT AND LOCAL FIRE DEPARTMENT FOR FINAL REVIEW AND APPROVAL. THE PROFESSIONAL ENGINEER IS CONSIDERED THE ENGINEER OF RECORD AND CERTIFIES SYSTEM INSTALLATION FOR CODE COMPLIANCE AT COMPLETION OF THE INSTALLATION.

3. SPRINKLER SYSTEM TO BE INSTALLED FURNISH AND INSTALL A COMPLETE AUTOMATIC SPRINKLER SYSTEM WITHIN THE BUILDING, HYDRAULICALLY DESIGNED ON A COMPUTER PROGRAM.

4. THE SPRINKLER SYSTEM SHALL BE HYDRAULICALLY DESIGNED IN ACCORDANCE WITH THE FOLLOWING DESIGN DENSITIES:

   4.1. LIGHT HAZARD OCCUPANCY GROUP
   4.1.1. DENTIST OFFICE
   4.1.2. WET SPRINKLER DESIGNED FOR .10 GPM OVER THE MOST REMOTE 1500 SQUARE FEET.
   4.1.3. ADDITIONAL 100 GALLON PER MINUTE FLOW FOR EXTERIOR FIRE HOSE FLOW MAXIMUM SPACING OF 225 SQUARE FEET PER SPRINKLER HEAD UNLESS OTHERWISE NOTED OR INDICATED.

5. THE OCCURRENCE OF FIRE OR ANY OTHER SOURCE OF HEAT GENERATED IN A SUFFICIENT AMOUNT TO FUSE HEAT SENSITIVE ELEMENTS AT INDIVIDUAL FIRE SPRINKLERS OR A BREAK AT ANY POINT WITHIN THE FIRE SPRINKLER PIPING SYSTEM EQUAL TO THE WATER FLOW FROM ONE FIRE SPRINKLER WILL CAUSE THE BASE BUILDING MAIN ALARM CHECK VALVE ASSEMBLY WATER FLOW SWITCH TO ACTIVATE, WHEN ELECTRICAL CONTACTS WITHIN THE MAIN ALARM CHECK VALVE WATER FLOW SWITCHES ACTIVATE, AN ALARM SIGNAL IS SENT TO THE FIRE ALARM CONTROL PANEL CAUSING THE PANEL TO ACKNOWLEDGE AN ALARM CONDITION.

6. FINAL SYSTEM ACCEPTANCE REQUIREMENTS FOR THE FIRE SPRINKLER SYSTEM WILL BE AS REQUIRED BY NFPA 13 CHAPTER 25.

7. THE BUILDING FIRE SPRINKLER SYSTEM WILL BE HYDROSTATICALLY TESTED PER NFPA #13. ALL VALVE SUPERVISORY SWITCHES AND WATER FLOW INDICATORS WILL BE TESTED FOR PROPER OPERATION AND INTEGRATION IN TO THE BUILDING FIRE ALARM SYSTEM AS REQUIRED BY NFPA #72.

8. TESTING SHALL BE IN ACCORDANCE WITH 780 CMR 901.5, 901.5.1 AND BE WITNESSED BY THE LOCAL FIRE DEPARTMENT TO THEIR SPECIFICATIONS AND SATISFACTION.

9. TESTING SHALL BE IN ACCORDANCE WITH LOCAL SAFETY CODE AND BE WITNESSED BY THE LOCAL FIRE DEPARTMENT TO THEIR SPECIFICATIONS AND SATISFACTION.

GENERAL FIRE PROTECTION NOTES:

1. THE FIRE PROTECTION WORK COVERED HEREIN SHALL BE INSTALLED BY A LICENSED FIRE PROTECTION SUB-CONTRACTOR HIRED BY THE GENERAL CONTRACTOR TO PROVIDE ALL LABOR AND MATERIALS NECESSARY TO INSTALL, COMPLETE AND MAKE READY FOR CONTINUOUS OPERATION, THE FIRE PROTECTION SYSTEMS, APPARATUS AND EQUIPMENT FOR THIS PROJECT.

2. ALL EQUIPMENT AND MATERIALS FURNISHED UNDER THE FIRE PROTECTION CONTRACT, LABOR AND TESTING PERFORMED HEREIN SHALL BE IN COMPLETE ACCORDANCE WITH THE STATE BUILDING CODE, ALL LOCAL CODES AND REGULATIONS, NATIONAL FIRE PROTECTION ASSOCIATION, INSURANCE REGULATIONS AND REQUIREMENTS GOVERNING SUCH WORK.

3. ANY AND ALL PERMITS REQUIRED FOR INSTALLATION OF ANY MATERIAL SHALL BE OBTAINED AS PART OF THE WORK OF THE SPECIFICATION INCLUDING ALL FEES OR EXPENSES INCURRED.

4. SHOP DRAWINGS: SHOP DRAWINGS OF ALL SPECIFIED HARDWARE AND APPARATUS SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL.

5. GUARANTEE: ALL MATERIALS AND EQUIPMENT FURNISHED AND INSTALLED UNDER THIS SPECIFICATION SHALL BE GUARANTEE IN WRITING FOR ONE (1) YEAR FROM THE DATE OF ACCEPTANCE OF THE BUILDING BY THE OWNER.

6. INSPECTION: ALL WORK SHALL BE SUBJECT TO THE INSPECTION OF THE OWNER, THE ARCHITECT AND SUCH OTHER INSPECTORS HAVING JURISDICTION. A PROPERLY EXECUTED CERTIFICATE OF INSPECTION SHALL BE PROVIDED.

7. EXAMINATION OF SITE: THE FIRE PROTECTION SUBCONTRACTOR, BEFORE SUBMITTING PRICES OR BEGINNING WORK, SHALL THOROUGHLY EXAMINE THE SITE AND CONTRACT DOCUMENTS. NO CLAIM FOR EXTRA COMPENSATION WILL BE RECOGNIZED IF DIFFICULTIES WHICH AN EXAMINATION OF SITE CONDITIONS AND CONTRACT DOCUMENTS PRIOR TO EXECUTING CONTRACT WOULD HAVE REVEALED.

8. COORDINATION: COORDINATE ALL WORK INSTALLED UNDER THIS SPECIFICATION WITH THAT OF ALL OTHER FIRE PROTECTIONS.

9. PROTECTION OF PROPERTY: PROTECT ALL NEW AND EXISTING WORK BEFORE, DURING AND AFTER INSTALLATION.

10. CERTIFICATES OF APPROVAL: UPON COMPLETION OF ALL WORK, THE FIRE PROTECTION SUBCONTRACTOR SHALL FURNISH, IN DUPLICATE, CERTIFICATES OF INSPECTIONS FROM ALL INSPECTORS AND AUTHORITIES HAVING JURISDICTION.

11. ALL VALVES SHALL BE PROVIDED WITH A SUPERVISORY SWITCH. SUPERVISORY SWITCHES SHALL BE FURNISHED AND INSTALLED BY THE FIRE PROTECTION SUBCONTRACTOR AND WIRED BY THE ELECTRICAL CONTRACTOR. SUPERVISORY SWITCH SHALL BE POTTER ROEMER 6220 OR APPROVED EQUAL.

12. FLOW SWITCHES SHALL BE INSTALLED WHERE REQUIRED PER CODE. FLOW SWITCHES SHALL BE FURNISHED AND INSTALLED BY THE FIRE PROTECTION SUB CONTRACTOR AND WIRED BY THE ELECTRICAL CONTRACTOR. FLOW SWITCH SHALL BE POTTER ROEMER 6200 SERIES, RED, TAMPER-PROOF SWITCH HOUSINGS WITH FLOW PADDLE, ADJUSTABLE PNEUMATIC RETARD SETTING OR APPROVED EQUAL.

13. INSPECT INTERNAL PIPE WALLS OF EXISTING PIPING FOR SIGNS OF SCALE BUILD-UP. COMPLETELY POWER FLUSH EXISTING MAINS AND BRANCH PIPING. HYDROSTATICALLY TEST EXISTING PIPING ACCORDING TO NFPA 13 AND 25. INSPECT ALL FITTINGS AND CONNECTIONS FOR LEAKS AND REPLACE AS REQUIRED.

FIRE PROTECTION SPECIFIC NOTES:

1. BIDDERS SHALL UTILIZE A COMPLETE SET OF FIRE PROTECTION BIDDING DOCUMENTS IN PREPARING OF BID INCLUDING 1. DRAWINGS AND SPECIFICATIONS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR ERRORS OR MISINTERPRETATIONS RESULTING FROM THE USE OF INCOMPLETE SETS OF FIRE PROTECTION BIDDING DOCUMENTS. THE FIRE PROTECTION BIDDING DOCUMENTS SHALL INCLUDE:

   1.1. DRAWINGS
   1.1.1. FP0-1 - FIRE PROTECTION LEGEND, NOTES & DETAILS
   1.1.2. FPD1-1 - FIRE PROTECTION EXISTING/DEMOLITION PLAN
   1.1.3. FP1-1 - FIRE PROTECTION SPRINKLER HEAD PLAN
   1.1.4. FP2-1 - FIRE PROTECTION SPECIFICATIONS

2. THE WORK COVERED CONSISTS OF FURNISHING ALL LABOR AND MATERIALS NECESSARY TO INSTALL, COMPLETE AND READY FOR CONTINUOUS OPERATION, THE FIRE PROTECTION SYSTEMS, APPARATUS AND EQUIPMENT FOR THIS PROJECT.

3. ALL EQUIPMENT AND MATERIALS FURNISHED UNDER THE FIRE PROTECTION SUB-CONTRACT, LABOR AND TESTING PERFORMED HEREIN SHALL BE IN COMPLETE ACCORDANCE WITH THE STATE BUILDING CODE, ALL LOCAL CODES AND REGULATIONS, NATIONAL FIRE PROTECTION ASSOCIATION, INSURANCE REGULATIONS AND REQUIREMENTS GOVERNING SUCH WORK.

4. ANY AND ALL PERMITS REQUIRED FOR INSTALLATION OF ANY MATERIAL SHALL BE OBTAINED AS PART OF THE WORK OF THE SPECIFICATION INCLUDING ALL FEES OR EXPENSES INCURED.

5. IT IS THE INTENT OF THESE DOCUMENTS THAT THE ENTIRE TENANT SHALL BE PROVIDED WITH 100% SPRINKLER COVERAGE.

6. PROVIDE A COMPLETE HYDRAULICALLY CALCULATED SPRINKLER SYSTEM THROUGHOUT THE TENANT SPACE. ALL WORK SHALL BE IN STRICT CONFORMANCE WITH NFPA 13 AND INCLUDING ALL RULES AND REGULATIONS OF THE LOCAL FIRE DEPARTMENT.

7. THE SPRINKLER CONTRACTOR SHALL OBTAIN FROM THE BUILDING MANAGER, ALL PERTINENT HYDRAULIC DATA ASSOCIATED WITH THE EXISTING BUILDING. THIS CONTRACTOR SHALL UTILIZE THIS INFORMATION IN PREPARING HIS HYDRAULIC PIPE SIZING CALCULATIONS.

8. THE SPRINKLER CONTRACTOR SHALL PREPARE WORKING DRAWINGS OF THE SPRINKLER WORK AND OBTAIN APPROVALS FROM THE LOCAL FIRE DEPARTMENT PRIOR TO INSTALLATION.

9. ROUTING OF SPRINKLER MAINS, BRANCHES AND HEADS SHALL BE THOROUGHLY COORDINATED WITH OTHER TRADES AND BUILDING STRUCTURE PRIOR TO SUBMISSION OF COORDINATED SHOP DRAWINGS.

10. SPRINKLER HEAD FINISHES SHALL BE IN ACCORDANCE WITH THE FOLLOWING:

    10.1. SPRINKLER HEADS IN AREAS WITH NO FINISHED CEILING SHALL BE UPRIGHT TYPE LOCATED AS HIGH AS POSSIBLE.

    10.2. SPRINKLER HEADS IN FINISHED AREAS SHALL BE CONCEALED PENDENT TYPE WITH COVER PLATE (COLOR OF COVER PLATE TO MATCH CEILING COLOR AND SHALL BE APPROVED BY THE ARCHITECT) (REFER TO DETAIL ON THIS DRAWING FOR LOCATION OF SPRINKLER WITHIN A CEILING TILE).

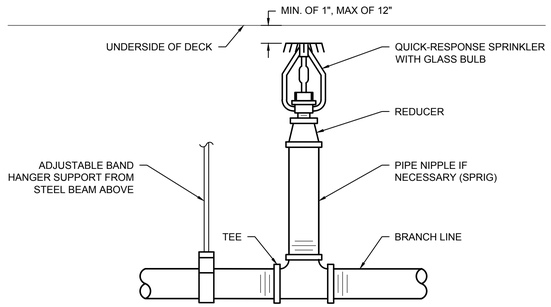
11. MISCELLANEOUS DISCREPANCIES OR OMISSIONS WHICH MIGHT APPEAR ON THE PLANS OR SPECIFICATIONS WILL NOT RELIEVE THE FIRE PROTECTION SUB CONTRACTOR OF CODE COMPLIANCE.

FIRE PROTECTION LEGEND:

- ● NEW PENDENT SPRINKLER HEAD
- ○ NEW UPRIGHT SPRINKLER HEAD
- ◁ NEW SIDEWALL SPRINKLER HEAD
- E ● EXISTING PENDENT SPRINKLER HEAD TO REMAIN
- E ○ EXISTING UPRIGHT SPRINKLER HEAD TO REMAIN
- R EXISTING SPRINKLER HEAD TO BE REMOVED (PENDENT OR UPRIGHT)
- RE RELOCATED PENDENT SPRINKLER HEAD
- RE RELOCATED UPRIGHT SPRINKLER HEAD

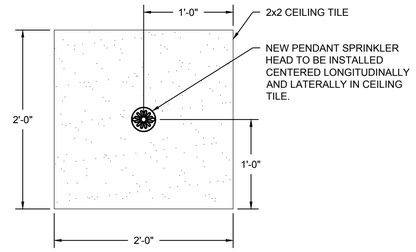
LEGEND NOTE:
NOT ALL SYMBOLS ARE NECESSARILY USED. ABSENCE OF A SYMBOL ON THE DRAWINGS DOES NOT NECESSARILY MEAN IT IS NOT REQUIRED. REFER TO DETAILS & SPECIFICATIONS FOR A COMPLETE UNDERSTANDING OF WORK REQUIRED.

CEILING AREA NOTE:
REVIEW EXISTING PENDENT SPRINKLER LOCATIONS IN RELATION TO NEW AND REMOVED WALLS. MODIFY EXISTING PENDENT SPRINKLER LOCATIONS AS REQUIRED TO COMPLY WITH ALL OBSTRUCTION RULES OF NFPA 13. INSTALL NEW PENDENT-STYLE SPRINKLERS, PIPING AND FITTINGS AS REQUIRED. INCLUDE 10'-0" OF PIPING FOR EACH NEW SPRINKLER.

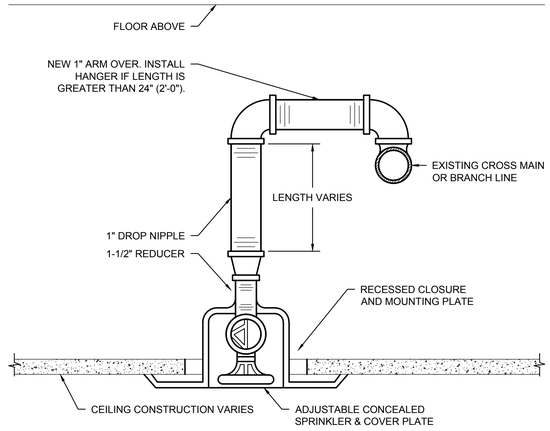


NOTES:
FIRE PROTECTION CONTRACTOR TO INCLUDE THE INSTALLATION OF QUICK RESPONSE UPRIGHT BRASS SPRINKLERS IN ALL CONCEALED SPACES ABOVE CEILINGS THAT CONTAIN COMBUSTIBLE MATERIALS AS DEFINED BY N.F.P.A.

UPRIGHT SPRINKLER DETAIL
NTS



SPRINKLER HEAD LOCATION DETAIL
NTS



NOTES:
1. INSTALL QUICK RESPONSE CONCEALED TYPE SPRINKLERS. INSTALL STANDARD RESPONSE CONCEALED TYPE SPRINKLERS IF INSURANCE COMPANY IS FM GLOBAL. COORDINATE WITH OWNER.
2. ADJUST AS REQUIRED TO INSTALL ACCORDING TO ARCHITECTURAL REFLECTED CEILING PLANS IN ROOMS & CORRIDORS. COLOR OF PLATE TO MATCH ARCHITECTURAL BACKGROUND.

HARD-PIPED SPRINKLER DETAIL
NTS

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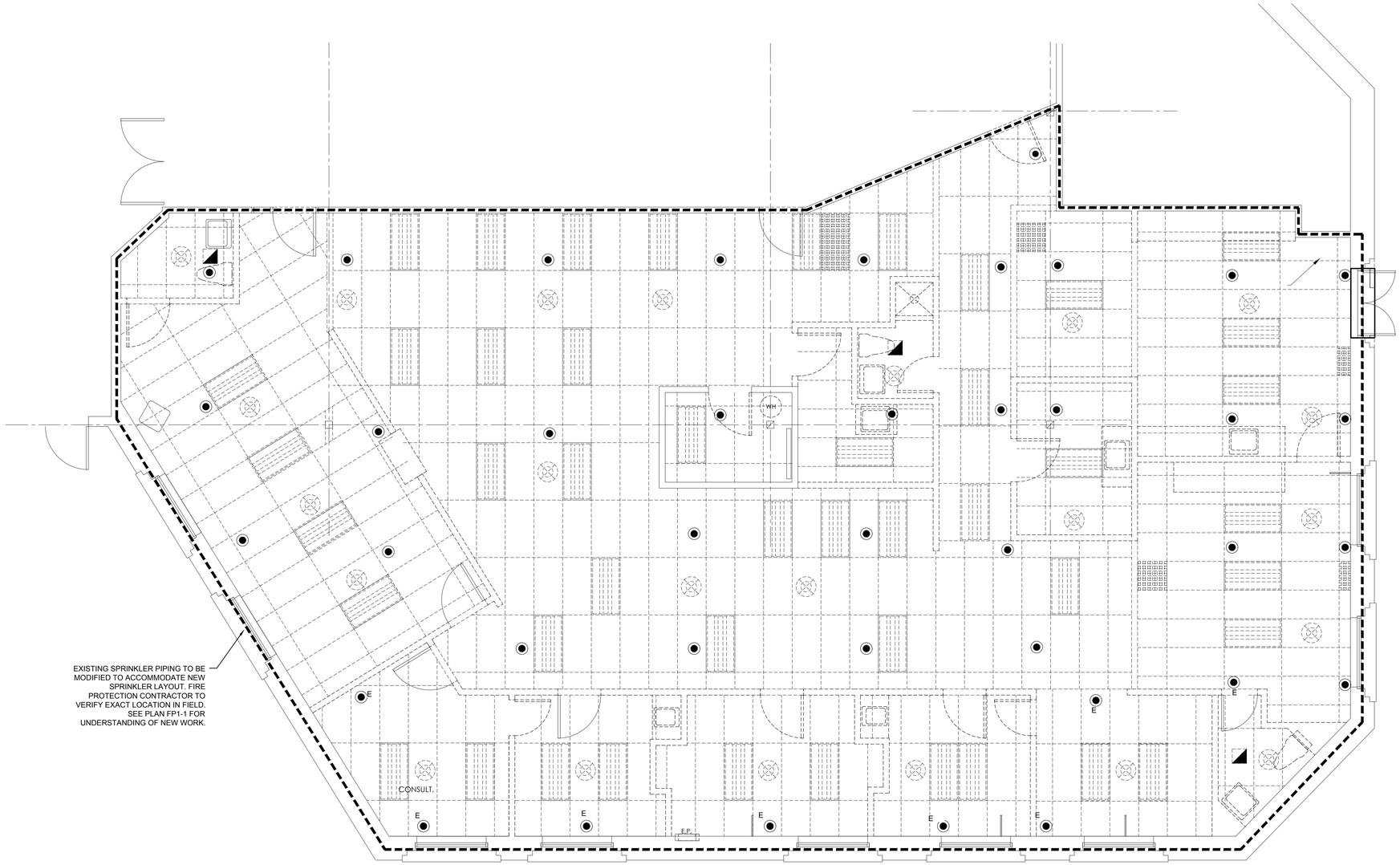
FIRE PROTECTION LEGENDS & NOTES

ISSUED FOR BID

FP0-1



NORTH

FIRE PROTECTION - EXISTING / DEMOLITION PLAN
1/4" = 1'-0"

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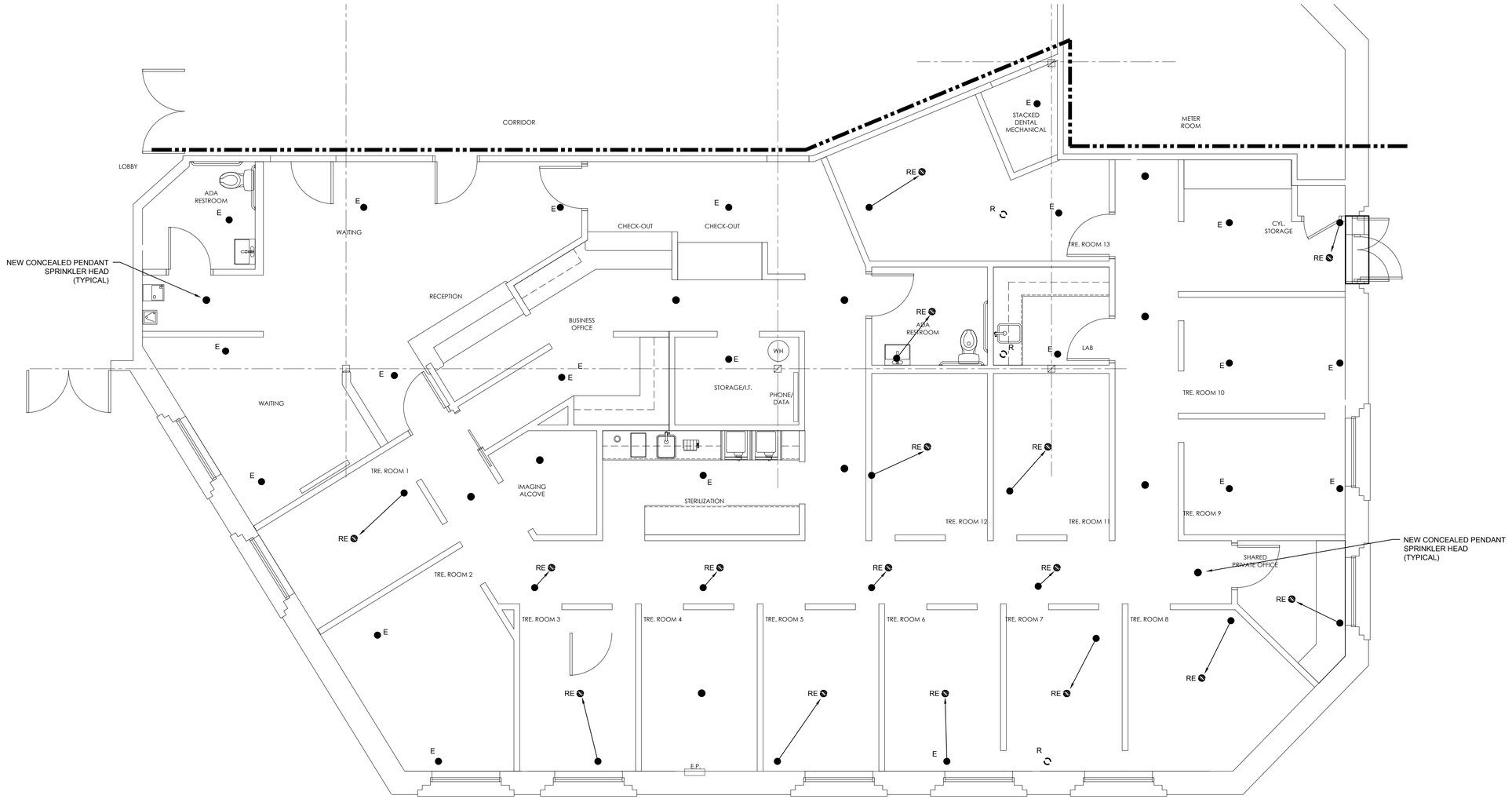
FIRE PROTECTION DEMOLITION PLAN

ISSUED FOR BID

FPD1-1



FIRE PROTECTION NOTE:

CONTRACTOR TO ADJUST HEAD HEIGHT AND LOCATION TO CENTER EXISTING HEADS WITHIN CEILING TILES.

FIRE PROTECTION - SPRINKLER HEAD PLAN

NORTH

1/4" = 1'-0"

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FIRE PROTECTION SPRINKLER HEAD PLAN

ISSUED FOR BID

FP1-1

SECTION 210000 - FIRE PROTECTION

PART 1: GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

B. Bidders shall utilize a complete set of Bidding Documents in preparing of Bid including Drawings and Specifications. The Engineer assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

1.2 SUMMARY OF WORK

A. This section addresses materials and methods common to more than one Subcontractor. Refer to the drawings to determine the extent of work required of each individual trade.

1.3 DESCRIPTION OF WORK

A. The work described herein shall be interpreted as work to be done by the Sprinkler (Fire Protection) Subcontractor. Work to be performed by other trades will be specifically referenced to a particular Contractor or Subcontractor.

1. Perform NEW hydrant flow test
2. Fire service from 5'-0" outside of the building foundation
3. Complete wet pipe sprinkler systems.
4. Preparation of complete and detailed working plans in accordance with the latest editions of NFPA 13.
5. Hydraulic calculations.
6. Submit drawings to insurer and local authorities and obtain necessary approvals, permits and certificates.
7. Sprinklers, piping, fittings, hangers, and valves.
8. Alarm check valve assemblies, trim, and motor gong.
9. Fire department connection.
10. Flow, tamper, and pressure switches.
11. Inspector's test stations, drain valves and piping.
12. Double check valve assembly.
13. Pressure gauges with shut off valves and drainage provisions.
14. Fire Department valves.
15. Locate sprinklers in center of ceiling tiles in both directions.
16. Sleeves, escutcheons, hangers and supports.
17. Fire-safing of penetrations through rated floor and wall assemblies.
18. Signage.
19. Testing.
20. Completion and submission of NFPA 13 Contractor's material and test certificate for underground and above ground piping.
21. Core drilling
22. Coordination of drawings.
23. Dimensioned coring plan.
24. Access panels.

B. Furnish and install all pipe, fittings, valves, accessories, double check valve assemblies, motor gongs, drains, meters, alarm check valve assemblies, fire department valves and connections and alarm devices to make a complete and operable system in accordance with NFPA Pamphlets 13 and 14 and the State Building Code.

C. Sprinklers located in elevator hoist ways and machine rooms shall be required unless the standards of NFPA 8.14.5 Elevator Hoist-ways and Machine Rooms has been satisfied.

D. Sprinklers located in electrical rooms shall be required unless the standards of NFPA 8.14.10 Electrical Equipment have been satisfied.

E. The complete fire protection systems shall be flushed, fully tested, accepted by the local fire department, and in operation, prior to final acceptance by the Engineer.

F. Provide full hydraulic calculations.

1.4 CODES, ORDINANCES, AND PERMITS

A. All material and work provided shall be in accordance with the following codes and standards:

1. NFPA Pamphlets latest editions
   - a) NFPA 13 - Installation of Sprinkler Systems & all referenced documents noted in Chapter 10
   - b) NFPA 25 - Inspection, Testing and Maintenance of Water-Based Fire Protection Systems
2. Local State Fire Safety Code
3. Local State Department of Public Safety
4. Standards of the Underwriter's Laboratories (UL)
5. State and Local Building Codes
6. Local Fire Department requirements
7. Local Water Department requirements
8. Owner's insurance company
9. Insurance Service Organization (ISO)
10. Factory Mutual (FM)

B. Where the contract documents indicate more stringent requirements than the above codes and ordinances, the contract documents shall take precedence.

C. File all documents, pay all fees and secure all inspections and approvals necessary for the work of this section.

D. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings, in addition to contract drawings and documents in order to comply with all applicable local ordinances and regulations, whether or not shown on drawings and/or specified.

E. It shall be the responsibility of this Contractor to prepare drawings showing complete and fully coordinated sprinkler head and piping layouts in accordance with the requirements of NFPA and those authorities having jurisdiction over this project. It shall also be the responsibility of the Sprinkler Subcontractor to obtain all approvals from local authorities and the Owner's Insurance Underwriter prior to submission to the Architect. Revise head location as required for areas that have ornate ceiling work or as requested by the Architect. Provide side wall heads in areas as instructed.

1.5 CONTRACT DRAWINGS

A. The Contract Drawings are generally diagrammatic and convey the Scope of Work and General Arrangement of apparatus and equipment. The locations of all items shown on the drawings or called for in the specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results, must be determined at the project and shall have the approval of the Architect and Engineers before being installed. The Subcontractor shall follow drawings in laying out work and shall check drawings of the other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, the Subcontractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or before proper execution of the work.

B. Specifications: The specifications are intended only to complement the drawings; however, work detailed and/or noted only on the drawings or work described only in the specifications shall all be considered as part of the scope of work.

1.6 CONFLICT BETWEEN PLANS AND SPECIFICATIONS

A. In case of conflict between the contract drawings and specifications, the Engineer shall determine which takes precedence.

1.7 SHOP DRAWINGS AND PRODUCT DATA

A. SUBMITTALS: Submit shop drawings, manufacturers data and certificates for equipment, materials and finish, and pertinent details for each system where specified in each individual section, and have them approved before procurement, fabrication, or delivery of the items to the job site. Partial submittals will not be acceptable and will be returned without review. Submittals shall include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry, and technical society publication references, and other information necessary to establish contract compliance of each item the Contractor propose to furnish.

B. Submit in accordance with Division 1.

C. It is the intent of these specifications that all equipment, materials and workmanship used on this project be in complete conformance with all local, state and national codes, ordinances and standards.

D. Substitutions shall be equivalent to specified equipment in all aspects of quality and performance and shall conform to the intent stated above. It is the contractor's responsibility to submit only those items that meet these requirements. Should any non-conforming items be installed, they shall be replaced by the contractor at no additional cost to the owner.

E. The approval of the equipment does not relieve the Subcontractor of responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist.

F. Refer to General Requirements for the substitutions of equipment and submittal of shop drawings. If apparatus or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, piping, supports, or construction, it shall be provided. Contractor to assume cost and entire responsibility thereof.

1.8 INSPECTION AND TESTS

A. During the progress of the work, it shall be subject to the inspection of the Owner and to such other inspectors, as may have jurisdiction.

B. At completion of the work, Contractor shall submit to the Owner's representative in writing a statement stating: (1) that the work is complete; (2) that the entire installation is in accordance with the specification; (3) that preliminary tests have been made; and (4) that the work is ready for final inspection and test.

C. A final inspection of the installation to determine compliance with the drawing and specifications will be made by the Owner's representative. Work will be checked for quality of materials, quality of workmanship, proper installation and finished appearance. This Contractor shall provide the services of the project foreman for inspection purposes. The foreman shall remove and reinstall access panels, ceiling tiles, etc., as required to facilitate any inspections required by the Owner's representative.

D. The Contractor shall arrange and conduct operating tests on all equipment in the presence of the Owner's representative. The component parts of systems and the various systems shall be demonstrated to operate in accordance with the requirements and intent of this specification. Any non-complying or defective materials or workmanship disclosed as a result of the inspection and the Contractor shall correct tests promptly, and the tests repeated as often as necessary until approved and accepted by the Owner's representative.

1.9 GUARANTEE

A. Except as otherwise specified, all work, materials and equipment shall be guaranteed against defects resulting from the use of inferior materials, equipment, or workmanship for one year from the date of final completion of the contract, or from full acceptance by the Owner, whichever is earlier.

B. If, within any guarantee period, repairs or changes to guaranteed work are required as a result of the use of defective materials or equipment, inferior workmanship or work that is not in accordance with the terms of the contract, and upon receipt of notice from the Owner, the following shall be done without expense to the Owner.

C. Place in satisfactory condition in every particular all of such guaranteed work and correct all defects therein.

D. Repair all damage to the building or site/equipment or contents thereof which is the result of the use of defective materials or equipment or inferior workmanship, or of work not in accordance with the terms of the contract.

E. Make good any work or materials, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

F. In fulfilling the requirements of the contract or of any guarantee embraced in or required thereby, any work guaranteed under another contract is disturbed, restore such disturbed work to original condition and guarantee such restored work to the same extent as it was guaranteed under such other contract.

G. If upon failure to proceed promptly after notice to comply with the terms of the guarantee, the Owner may have the defects corrected and Contractor and his surety shall be liable for all expenses incurred.

H. This Contractor shall obtain in the General Contractor's and Owner's name, the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities, which the Contractor may have by law or other provisions of the Contract Documents. The guarantee shall be for a period of one (1) year minimum from the date of acceptance or final payment.

1.10 STORAGE OF MATERIALS

A. Store materials prior to their installation where designated by the General Contractor and Architect. This Contractor shall be responsible for all materials stored and shall protect all installed equipment from injury or defacement.

1.11 DEFINITIONS

A. "Piping" includes, in addition to pipe, all fittings, valves, hangers, and other accessories relating to such piping.

B. "Concealed" means hidden from sight in trenches, chases, furred spaces, shafts, hung ceilings, embedded in construction or in crawl spaces.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Provide" means furnish and install complete and ready to operate.

1.12 COOPERATION WITH OTHER TRADES

A. Give full cooperation to other trades and furnish in writing to the Architect any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Coordination drawings shall be initiated by this contractor. It this contractor's responsibility for preparation of project coordination drawings showing the installation of all equipment, piping, ducts and accessories to be provided under Section 210000 of the Specifications.

1. Drawings shall be prepared at not less than 1/4 in. = 1 ft. scale, and shall show building room layouts, structural elements, ductwork and lighting layouts of function. Drawings shall indicate horizontal and vertical dimensions, to avoid interference with structural framing, ceilings, partitions, and other services.
2. A reproducible copy of each drawing prepared shall then be submitted to each Contractor working under Sections 220000, 230000, and 260000, who shall be responsible to coordinate his equipment and systems and shall show these on the drawings submitted.
3. After each Contractor has fulfilled his obligation, he shall return the drawings to the Sprinkler Contractor. After each drawing has been coordinated between trades, and appropriate revisions made, each trade shall sign each drawing, indicating acceptance of the installation.
4. The Sprinkler Contractor shall then print the coordination original and these prints submitted through the General Contractor to the architect for review and comment, similar to shop drawings. Comments made on these drawings shall result in a correction and re-submittal of the drawings.

C. Furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

1.13 PROJECT RECORD DOCUMENTS

A. Each Contractor shall record clearly, neatly, accurately, and promptly as work progresses the following data:

1. Changes made resulting from change orders or instructions issued by the Architect.
2. Changes in routing made to avoid conflict with other trades or structural conditions.
3. Final location of equipment and panels if different than contract documents.

B. Upon completion of the project submit to the Architect a set of electronic media noting "as built" conditions indicating all variations and deviations of his work from contract documents.

1.14 WORKING PLANS

A. Submit Working Plans and hydraulic calculations signed and sealed by a Professional Engineer licensed to practice fire protection state in which project is located, to authorities that have jurisdiction, including:

1. Architect
2. Insurance Underwriter
3. Fire Department

B. Working plans and computerized hydraulic calculations shall be prepared by a minimum Level-3 N.I.C.E.T. certified sprinkler layout designer. Drawings shall be signed and the N.I.C.E.T. certificate number indicated on plan.

C. Working plans shall be at least 1/8" = 1' 0" scale on sheets of uniform size. Working plans shall show all data required by NFPA 13 and 14. Submit working plans and hydraulic calculations in one complete package.

D. Working plans will be subject to Architect's final approval. Submit to Architect after review by other authorities. If necessary to submit plans to Architect before review by other authorities, identify authorities that have not reviewed plans and resubmit for final approval when review by all parties is complete.

E. Pipe sizing shall be based on hydraulic calculations of sprinkler and/or combination systems.

1.15 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Operating Instructions: Provide operating instructions to the Owner's designated representative with respect to the operation functions and maintenance procedures for all equipment and systems installed. The cost of providing a manufacturer's representative at the site for instructional purposes shall be included in the Contract Price.

B. Maintenance Manuals: At the completion of the project, turn over to the General Contractor four (4) complete manuals in 3-ring binders, indexed, containing the following:

1. Complete shop drawings of all material and equipment of this section.
2. Operation descriptions of all systems.
3. Names, addresses and telephone numbers of all suppliers of system components.
4. Preventative maintenance instructions for all systems.
5. Spare parts list of all system components.
6. Copies of all valve charts.

1.16 UTILITY COMPANY COORDINATION

A. This section includes, but is not limited to coordination with the following utilities, agencies and authorities having jurisdiction:

1. Water Department: This Contractor shall coordinate with the local water department and provide all material & labor required to comply with the utility. Notify Engineer of discrepancies between the plans and the local utility company's standards. No extra compensation will be given for corrections required to this Contractor for failure to coordinate with the utility company, but corrections shall be made.
2. Fire Department: Review plans and specifications with the local fire department. Obtain and pay for all permits.
3. Building Inspector: Review plans and specifications with the local building inspector, if not done so by the General Contractor.
4. OSHA Representative: Review plans and specifications with the local OSHA representative, if not done so by the General Contractor.
5. Dig Safe: This contractor shall notify and coordinate with Dig Safe prior to any excavation, digging, trenching, grading, tunneling, augering, boring, drilling, pile driving, plowing-in or pulling-in pipe or other sub-structure, backfilling, demolition, and blasting related to this Contractor.

B. The Fire Protection Contractor shall pay for all permits, inspections, labor, material and fees associated with the various Utility Companies coordination requirements mentioned in this section and for this Contractor's work under this project.

C. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structural and other trades and to meet Architectural requirements.

D. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Architect. Where the plumbing work shall interfere with the work of other trades, assist in working out the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owners, make reasonable modifications to the work as required by normal structural interferences. Pay the General Contractor for additional openings, or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.

E. If any fire protection work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the trades involved without extra cost to the Owners.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Architect and Engineer for review and approval.

1.17 BIDDER'S REPRESENTATION

A. By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors have carefully and thoroughly reviews the drawings, specifications, and other construction documents and have found them complete and free from ambiguities and sufficient for the purpose intended.
2. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the Owner, or the Owner's employees or agents including architects, engineers, or consultants, in assembling the bid figure.
3. Final location of equipment and panels if different than contract documents. The bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

B. Upon completion of the project submit to the Architect a set of electronic media noting "as built" conditions indicating all variations and deviations of his work from contract documents.

PART 2: PRODUCTS

2.1 PIPING AND FITTINGS

A. Above ground wet pipe sprinkler system 2-1/2 in. or larger: Pipe material shall be steel pipe; Schedule 10; rolled groove without metal removal, ASTM A-135. Fittings for grooved end steel pipe shall be ductile iron, ASTM A-536, or steel, ASTM A-53, short radius or standard fittings with grooved or shouldered ends. Couplings shall be ductile iron conforming to ASTM A-536, with rigid joints, Victaulic style 75, 004, or 177 flexible joints with gasket, nuts and bolts.

B. Underground service piping shall be cement-mortar, lined inside A21.4. Ductile iron ANSI A21.51, tar coated outside, joined with push on joints A21.11, A21.10, Class 250, mechanical joint. Verify materials with local Water Department.

C. Pipe fittings and couplings used in the sprinkler and/or standpipe systems shall be of the materials indicated above and shall be designed to withstand a working pressure of not less than 175 PSI.

2.2 HANGERS

A. Hangers and hanging methods shall be NFPA 13 Standards or more stringent requirements, as specified herein. All hangers, clamps, rods, shields, etc., shall be UL listed and FM approved.

B. Mains 4 in. and larger shall be supported using adjustable standard weight clevis hangers. Piping 3 in. and smaller shall be supported using standard adjustable flat iron hangers.

C. Sprinkler piping shall be substantially supported from the building structure and must support the load of the water filled pipe plus a minimum of 250 lb. applied to the point of hanging.

D. Where the building structure is accessible only by penetrating one or more hung ceiling structures, holes of sufficient size to secure the hanger shall be cut, patched, and painted by this Contractor. The use of an escutcheon or large diameter cover plate will not be allowed to conceal the cut openings, unless openings are uniform in size and of a small diameter which can be concealed by a rod button (finish selected by Architect). Cutting and patching of rated ceilings shall be performed in an acceptable manner to maintain the rating to the approval of the Architect and the Building Inspector.

E. The use of toggle type hangers of any kind or wall and ceiling plates will not be allowed.

F. Provide additional supports on piping as necessary to prevent movement of piping as required by the Architect and Engineer. Of particular concern are vertical runs of piping, and the top and bottom of standpipe risers. Supports may consist of wall plates, properly secured to the building structure, threaded rods, and split ring pipe clamps.

G. Seismic Restraints: It is the intent of this seismic specification to keep all building system components in place during a seismic event.

1. All systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.
2. This contractor shall engage a professional structural engineer registered in the jurisdiction of this project to review the entire installation to determine all seismic restraint requirements and methods. Contractor shall submit a report outlining the structural engineer's review as well as seismic restraint shop drawings and supporting calculations prepared by the professional structural engineer for review by the Architect.
3. Seismic restraints shall be designed in accordance with seismic force levels as detailed in the applicable building code.

2.3 ALARM

A. Hangers and hanging methods shall be NFPA 13 Standards or more stringent requirements, as specified herein. All hangers, clamps, rods, shields, etc., shall be UL listed and FM approved.

B. Supervisory switches shall be furnished and installed by the Sprinkler Subcontractor and wired by the Electrical Contractor. Potter-Electric 6220, Grinnell or Reliable.

C. Flow switches shall be furnished and installed by the Fire Protection Contractor and wired by the Electrical Contractor. Potter-Roemer Fig. 6200 Series, red, tamper-proof switch housings with flow paddle, adjustable pneumatic retard setting 0 - 70 seconds, voltage compatible with the fire alarm system. This Contractor shall set the retard as directed by the local fire department, or 45 seconds if there is no preference.

D. Pressure switches shall be provided by this Subcontractor. Provide pressure switches to announce main water flow on wet alarm check valves.

1. Pressure switches shall be UL listed and FM approved, minimum of 175 psi rated, of electrical characteristics to be compatible with the fire alarm system, with tamper proof cover screws, a weatherproof, oil resistant housing, as manufactured by Potter Electric Signal.
2. Pressure switches to actuate alarms on a pressure rise between 4 and 8 psi (water flow detection) shall be Potter Electric signal Model PS10 Series.
3. Pressure switches designed for high- or low-pressure supervisory applications, to detect a 10 psi increase or decrease in normal system pressure shall be Potter Electric signal PS40 Series. Provide a Model BVL bleeder valve to allow testing.

2.4 DRAINS AND TEST CONNECTIONS

A. Furnish and install system drains so that all portions of the fire protection system can be drained. Drains shall be provided at the base or risers, low points or the ends of runs to ensure complete drainage. All drains that exit the building, will do so at ground level, in a manner approved by the Architect and Engineer.

B. All system drains shall be concealed or exposed in mechanical spaces. Location of system drains will be specifically shown on the shop drawings.

2.5 VALVES

A. All valves shall be free from defects and shall be stamped or marked with the manufacturer's name, FM-approved and UL listed, of US manufacturer, and be rated for 175 psi working pressure.

B. Ball Valves

1. Ball Valves - 2 in. and smaller shall be rated to 350 psi and shall be bronze with chrome-plated brass ball and stainless-steel stem, standard port, weatherproof actuator with pre-wired supervisory switches, grooved or threaded ends, Victaulic Series 728 or equal.

C. Gate Valves

1. Gate valves shall be of the 175 psi Standard Class.
2. Gate Valves - 2 in. and smaller shall be all bronze, with rising stem and screwed ends.
3. Gate Valves - 2 in. and larger shall be bronze mounted, iron body, outside screw and yoke type, flanged. The interior main service valves must be OS&Y gate type valves.

D. Grooved-End Gate Valves

1. Grooved-end gate valves shall be of the 250 psi Standard Class.
2. Grooved-end Gate Valves - 2 in. and larger shall be ductile iron, bronze mounted, outside screw and yoke type, Victaulic Series 771, or non-rising stem type, Victaulic Series 772 with upright or wall post indicator (Series 773 or 774).

E. Butterfly Valves

1. Butterfly Valves - 2-1/2 in. and smaller shall be slow closing with visual position indicator, built-in supervisory tamper switch, ASTM 584 bronze body and housing, brass or cast iron handle, Type 304 stainless steel disc, EPDM elastomer seal, cast aluminum switch housing, grooved or threaded ends, Milwaukee Butterball BB SC Series or equal as manufactured by Central. The supervisory switch shall be SPDT rated for 10 amps, 115 VAC, 0.5 amps, 28 VDC. The entire assembly shall by UL listed, FM approved and rated for 175 psi working pressure. Butterfly valves shall not be used as the main fire service valves.
2. Butterfly Valves - 3 in. and larger shall be slow closing with visual position indicator, built-in supervisory tamper switch, ASTM-66, ductile iron body and disc, EPDM seal, grooved or lug ends, Victaulic 765 (365 psi), or Victaulic 705 (300 psi), or equal. The supervisory switch shall be SPDT rated for 10 amps, 115 VAC, 0.5 amps, 28 VDC. The entire assembly shall be UL listed, FM approved and rated for minimum 175 psi of working pressure.

F. Check Valves

1. Check valves shall be installed horizontally and be iron body, bronze mounted, swing type, flanged ends, automatic ball drip, with manufacturer's name, pressure rating, and year of manufacturer cast on body. (Victaulic S\717H (365 psi) or S/717 (300 psi) check valve with grooved ends is allowed subject to the approval of the local authority).

G. Fire Department Valves

1. Fire department valves shall be Potter-Roemer Model 4065-D, 2-1/2 in. cast brass hose valve with 2810-RL, 2-1/2 in. female x 1-1/2 in. male reducer fitting with 4615-RL cap and chain and 4723 chrome plated escutcheon. Hose threads to be compatible with the local fire department standards. The finish of the valve reducer and cap shall be rough chrome plated. Where valves are submitted to 100 psi or higher, provide adjustable pressure restricting angle valves, Potter-Roemer Figure 4085. This valve shall have an adjustable flow restriction feature which may be overridden by removing a clip normally secured by a sealed band. This Contractor shall set the flow restriction device on each valve on each floor at an outlet pressure as directed by the local fire department.

2.6 SPRINKLERS

A. All sprinkler heads shall be UL listed, FM approved and meet the specified criteria.

B. Sidewall sprinkler heads where called for shall be horizontal sidewall low profile, glass bulb, chrome plated finish.

C. In areas utilizing acoustical tile ceilings, heads shall be centered in tiles in both directions. Heads shall be located as close as practical to the center line of all corridors. Provide additional sprinkler heads, an allowance of 2% of the total sprinkler heads, to accommodate this condition. Unused funds of this allowance will be returned to the owner.

D. Sprinklers in high heat areas, such as mechanical rooms, or below skylights shall have temperature rating of 212 degrees Fahrenheit.

E. Provide sprinkler head guards for all heads subject to accidental damage or vandalism.

F. The pipe fitting supplying all new upright sprinkler heads shall be a minimum of 1 in. to allow the installation of pendant type sprinkler heads in the future.

2.7 SPARE SPRINKLERS

A. The Contractor shall furnish spare heads equal to one percent of the total number installed under the Contract. The sprinklers shall be packed in a suitable container, and shall be representative of, and in proportion to, the number of each type and temperature rating heads installed. No less than three of each type of head installed shall be provided as spares. In addition, two sprinkler wrenches shall be provided.

2.8 FIRE DEPARTMENT CONNECTIONS

A. Furnish and install a surface type fire department connection, cast brass inlet body, with drop clappers, pin lug swivels, plugs, chains, cast brass round wall plate with sillcock, equal to a Potter-Roemer Model 5750 Series, Elkhart or Guardian. Plate shall be lettered "AUTO SPKR STANDPIPE". Unit shall conform to the requirements of the local fire department. The finish shall be polished chrome plated.

B. On the line to the fire department connection, provide an approved straightway check valve installed in horizontal position within the building. Piping shall be arranged to drain between check valve and Siamese connection by approved ball drip connection piped to nearest drain or through wall.

2.9 DOUBLE CHECK VALVE ASSEMBLY

A. Furnish and install where indicated on plan, an approved double check detector assembly having epoxy coated cast iron body with bronze seats and bronze body ball valve test cocks. The assembly shall be manufactured by Ames, Watts, or Hersey and be sized for the highest system demand.

B. The double check detector assembly shall be provided with tight closing supervised valves on the inlet and outlet. Valves must be USC approved and must come with the assembly. The back flow prevention devices shall be approved by the following agencies: AWWA, UL, FM, USC, State DEP.

C. The installation, meaning labor and materials shall be in accordance with the requirements of the State DEP regulations and the Local Water Department regulations. (Note: Review requirements for metering of service with local authority and include such costs in bid. KCWA requires a full-size meter on all services).

D. Submit plans to DEP and obtain permit for each reduced pressure or double check valve backflow preventer installation and submit copies of permit to Architect for record.

E. Double Check Valve Assembly shall be Ames Fire & Waterworks 2000SS-OSY. The double check valve assembly shall consist of two independently operated spring-loaded cam-check valves, required test cocks, and optional inlet and outlet resilient wedge shut-off valves. Each cam check shall be internally loaded and provide a positive drip tight closure against the reverse flow of liquid caused by back-siphonage or backpressure. The modular cam-check includes a stainless-steel spring and cam-arm, rubber faced disc and a replaceable seat. The body shall be manufactured from 300 series stainless steel, 100% lead free through the waterway, with a single two-bolt access cover. UL/FM outside stem and yoke resilient seated gate valves shall be included.

2.10 ALARM CHECK VALVE ASSEMBLIES

A. Wet Alarm Check Valve Assemblies

1. Wet alarm check valve shall be approved vertical type for wet systems, complete with Series 752 retard chamber, alarm switch, drain valve, pressure gauges, electric alarm bell and other required trimmings. Valve internal components shall be replaceable without removing valve from the installed position. Similar to Victaulic FireLock® NXT Series 751, Viking, or equal as approved; and UL/FM Global approved.

B. Dry Alarm Check Valve Assemblies

1. Dry alarm check valve shall be approved vertical type for dry systems, complete with Series 746-LPA accelerator, alarm switch, drain valves, pressure gauges, Series 757 regulated air pressure maintenance system, tank mounted air compressor, dryer and other required trimming. Valve shall be externally resettable, and internal components shall be replaceable without removing valve from the installed position. Similar to Victaulic FireLock® NXT Series 768, Viking, or equal as approved; and UL/FM Global approved.

C. Main drains from alarm check valves shall be piped to discharge on grade, where approved by architect.

2.11 SYSTEMS IDENTIFICATION

A. All valves in the sprinkler system shall have permanent signs indicating their purpose.

B. A legend shall be placed at the main shut off valve indicating the location of shut off valves and inspectors test valves.

C. If fire suppression control valves are located in a separate room or concealed space, a sign shall be provided on the entrance door or near concealed space. The lettering for such sign shall be red and at least 4 in. in height, and shall read, "SPRINKLER CONTROL VALVE".

D. Where necessary, provide metal or phenolic signage or lettering of the approximate size and color and message to identify items. Examples of typical signage would be "AUXILIARY DRAIN", "INSPECTOR'S TEST MAIN DRAIN", or "FIRE VALVE CABINET".

E. All signage shall be attached with non-corrosive chain or screws per NFPA.

F. Provide information signs on the alarm check valves of all hydraulically designed systems bearing the design data per NFPA 13.

2.12 FIRE SAFING

A. Where piping passes through fire rated walls, floors and ceilings, provide a fire safing system so as to maintain the integrity of the rated assemblies to the satisfaction of the Architect and the Building Inspector. The fire safing system shall be as manufactured by 3M, Dow, Bio-Fire Shield, or Nelson. Provide manufacturer's details or custom details when there are no manufacturer's details for each condition with a UL listing referenced. Where there piping is insulated, pipe insulation shall run continuously through the rated opening. Details shall show the required depth and annular space width requirements and limitations and any packing requirements.

B. Refer to architectural drawings for rated walls and partitions. When there are not architectural drawings, or they do not indicate rated walls and partitions, the following guidelines shall be used: All floors, corridor walls, party walls, mechanical room walls, duct and pipe chase walls, stairwells, trash room and chute walls shall be considered minimum 2-hour fire rated walls.

2.13 ESCUTCHEONS

A. Install escutcheons around exposed pipe passing through finished floor, wall or ceiling. Escutcheons shall be one-piece heavy cast brass, chromium plated, with set screw adjustable and shall be of sufficient outside diameter to cover sleeve opening and shall fit snugly around pipe.

PART 3: EXECUTION

3.1 WORKMANSHIP

A. The entire work provided in this specification shall be constructed and finished in every respect in a workmanlike and substantial manner. It is not intended that the drawings shall show every pipe, fitting, and appliance. Furnish all parts as may be necessary to complete the system in accordance with the best trade practices and to be the satisfaction of the Architect, Engineer and General Contractor.

B. This Contractor shall keep other contractors fully informed as to the shape, size and position of all openings required for his apparatus and shall give full information to the General Contractor or other contractors sufficiently in advance of the work so that all openings may be built in advance. Furnish and install all sleeves, supports, etc., specified or required.

C. In the case of failure on the part of this Subcontractor to give proper and timely information as noted above, he shall do his own cutting and patching, or have same done by the General Contractor at this Subcontractor's expense, but in any case, without extra expense to the Owner.

D. This Contractor shall obtain detailed information from the manufacturer of apparatus as to the proper method of installing and connecting same. This Contractor shall also obtain all information from the General Contractor and the other contractors which may be necessary to facilitate his work and the completion of the whole project.

3.2 CORE DRILLING

A. All holes through concrete or masonry for the passage of fire protection piping not provided by sleeves or openings at the time of casting, shall be cut by the Fire Protection Contractor using an approved core boring machine with diamond edge bit and vacuum sludge removal device. The size of holes shall provide for fire stopping around a pipe. The location of all core-drilled holes shall be coordinated with the structural reinforcing and be reviewed by the Architect prior to commencing work.

B. Prior to coring, the Sprinkler Subcontractor shall submit a minimum 1/8 in. scale plan, dimensioning the location of proposed cored opening locations and indicating the core diameter. Prior to developing the coring plan, the Sprinkler Subcontractor shall examine the site carefully in an attempt to determine whether there are structural, mechanical or electrical obstacles in the proposed coring locations. Once the plans are reviewed by the Architect and Owner's representative, the Sprinkler Subcontractor may proceed with caution.

3.3 TESTING PIPING SYSTEMS

A. Test all work in the presence of the Architect/Engineer and/or Owner, Owner's representative and Fire Inspector as called for in local codes in the following manner:

1. Upon completion and prior to acceptance of the installation, the new fire Protection work shall be tested as required by the National Fire Protection Association Pamphlet No. 13, 14 and Insurance Underwriter and arrangements made for approval. Piping shall be tested to a hydrostatic test pressure of 200 psi for a period of two hours.
2. Provide 48 hours' notice prior to commencing tests.

B. Testing shall include piping from the fire department connection to the alarm check valve.

C. Any leaks in joints or evidence of defective pipe or fittings disclosed by tests shall be immediately corrected by replacing defective parts with new joints or materials. No makeshift repairs effected by caulking threaded pipe with lead wool, application of wicking or patented compounds being permitted. Perform smoke tests as required by local code or by the Architect/Engineer.

D. This subcontractor shall furnish all equipment, labor, and materials, required for these tests.

3.4 PROTECTION PIPING

A. Each subcontractor shall be responsible for his work and equipment until finally inspected, tested, and accepted. Carefully store materials and equipment which are not immediately installed after delivery on site. Close open ends or work with temporary covers or plug during construction to prevent entry of obstructing materials.

B. Each subcontractor shall protect work and materials of other trades from damage that might be caused by his work or workman and make good damage thus caused.

C. The premises shall be kept reasonably clean at all times, and rubbish shall be removed as directed by the General Contractor.

D. Upon completion of this work, this Contractor shall clean all equipment and replace damaged parts. Upon failure of this Contractor to fulfill his obligation, this work will be taken care of at his expense.

3.5 WORK AND JOB COORDINATION

A. Sprinkler system and equipment shall not be installed in congested and possible problem areas without first coordinating the installation of same with the other trades and the General Contractor.

B. Particular attention shall be directed to the coordination of system with all equipment of other trades installed in and above the ceiling areas. Conflicts in heights and clearance above hung ceilings shall be brought to the attention of the General Contractor for a decision before equipment is installed.

C. Furnish to the General Contractor and other trades all information relative to the position of the sprinkler/standpipe installation that will affect them so that they may plan their work and installation accordingly.

3.6 SUPPLEMENTARY STEEL, CHANNEL AND SUPPORTS

A. Furnish and install all supplementary steel, channels and supports required for the proper installation, mounting and support of all equipment.

B. Supplementary steel and channels shall be firmly connected to building construction in a manner approved by the Architect/Engineer.

C. The type and size of the supporting channels and supplementary steel shall be determined by the Sprinkler Subcontractor and shall be sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.

D. All supplementary steel and channels shall be installed in a neat and workmanlike manner parallel to the walls, floor and ceiling construction. All turns to be made with 90-degree fittings, as required to suit the construction and installation conditions.

3.7 SLEEVES AND INSERTS

A. Sleeves shall be furnished, set, and properly secured in place and at all points where piping passes through masonry or concrete.

1. All sleeves shall be of sufficient diameter to provide 4 in. clearance around piping 4 in. diameter and greater.
2. All sleeves shall be of sufficient diameter to provide 2 in. clearance around pipe less than 4 in. diameter.

B. Sleeves through concrete slabs, and interior concrete and masonry walls or partitions shall be steel pipe. Fire-stop annular openings between sleeves and pipes at floor slab passages and make watertight. Galvanized sleeves and copper piping shall not be placed in concrete.

C. Install UL-listed and FM approved inserts or other anchoring devices in concrete and masonry construction as required to support piping. Inserts shall be of the adjustable type as manufactured by Carpenter and Patterson, Grinnell, or Fee and Mason.

3.8 WATER SUPPLY

A. Water supply data shall be recent and shall include static pressure and residual pressure flowing at greater than the demand GPM. Flow tests shall be dated less than one year from date of receipt of the contract. Flow tests dated later than one year shall not be valid, and a new test shall be performed by this Contractor to the requirements of NFPA. Tests shall be taken at hydrants in close proximity (within 500 ft.) of the building to be serviced.

3.9 INSTALLATION OF SPRINKLER PIPING

A. Pipe, fittings and hangers shall be installed in accordance with the recommendations of NFPA 13 in a neat and workmanlike manner.

B. Where possible, all piping shall be concealed. Where it is not possible to conceal piping, it shall be located as inconspicuously as possible to minimize the visual impact and shall be approved by the Architect prior to installation.

C. Care shall be taken to ensure that all new piping shall be installed in practical alignment. Pitch piping to drain or draw-off points.

D. Test valves and flushing connections shall be provided in the piping system as required for proper operation and by code.

E. Provide a minimum 48 hours' notice to the local fire department and owner prior to shut-down of the existing sprinkler system.

3.10 FIRE WATCH CONDITION

A. The Fire Protection Contractor shall coordinate with the local fire department and AHJ and shall arrange for a "FIRE-WATCH" condition before any vales are shut during the renovation of the existing sprinklers. Arrange fire-watch condition 48 hours in advance and receive approval from local AHJ and fire department. Notify AHJ and fire department when sprinkler system has been reactivated and tested.

END OF SECTION

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DRAWN BY: TCC
DATE: AUGUST 25, 2023
REVISIONS:
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TRI-TOWN COMMUNITY ACTION AGENCY
1126 HARTFORD AVENUE
JOHNSTON, RI

PEDIACTRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

FIRE PROTECTION SPECIFICATIONS

ISSUED FOR BID

FP2-1

EMERGENCY LIGHTING NOTE:

ALL NEW EMERGENCY BATTERY UNITS AND EXIT SIGNS, SHALL BE TIED INTO LOCAL AREA, 120 VOLT LIGHTING CIRCUIT AHEAD OF ANY / ALL SWITCHING. (TYPICAL)

EMERGENCY LIGHTING SYMBOL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
	SELF-CONTAINED EMERGENCY, WALL MOUNTED LIGHTING FIXTURE WITH DUAL LIGHTING HEADS. COORDINATE WITH E.C. TO PROVIDE ALL NECESSARY ACCESSORIES FOR WIRING DEVICES. MFG. LITHONIA LIGHTING, CAT. #EU2C.	WALL
WP RH	WEATHER PROOF (LOW VOLTAGE) WALL MOUNTED LIGHTING FIXTURE. COORDINATE WITH E.C. TO PROVIDE ALL NECESSARY ACCESSORIES FOR WIRING DEVICES. MFG. LITHONIA LIGHTING, CAT. #ERE-B-T-WP.	UNIVERSAL (VERIFY IN FIELD)
	LOW VOLTAGE POWER WIRING BETWEEN EMERGENCY BATTERY UNITS AND REMOTE LIGHTING HEADS. REFER TO "EMERGENCY LIGHTING CONNECTION DETAIL" FOR WIRING REQUIREMENTS. CONTRACTOR TO VERIFY ALL ROUTING, LENGTHS AND TERMINATIONS OF WIRING .	
X	SINGLE FACE LED EDGE-LIT EXIT SIGN WITH EMERGENCY BATTERY BACK-UP. MFG. LITHONIA, CAT. #EXIT-(ARROWS). PROVIDE ARROWS AS INDICATED ON PLANS, FIELD VERIFY WALL (OR) CEILING MOUNTING.	WALL / CLG.
X1	COMBINATION SINGLE FACE LED LIGHTED EXIT SIGN WITH EMERGENCY LIGHTING HEADS, BATTERY BACK-UP & SPARE CAPACITY FOR REMOTE LIGHTING HEADS. MFG. LITHONIA LIGHTING, CAT. #ECR-LED-HO-M6. PROVIDE ARROWS AS INDICATED ON PLANS, FIELD VERIFY WALL (OR) CEILING MOUNTING.	WALL / CLG.

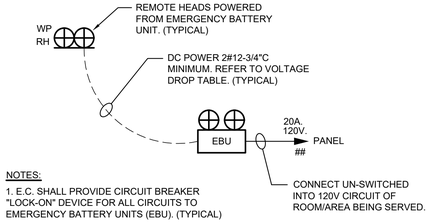
FIRE ALARM LEGEND

NFPA SYMBOL	TYPICAL INDUSTRY SYMBOL	DESCRIPTION / REMARKS	NFPA SYMBOL	TYPICAL INDUSTRY SYMBOL	DESCRIPTION / REMARKS
FACP	FACP	FIRE ALARM SYSTEM / VOICE EVACUATION CONTROL PANEL.		S	FIRE ALARM SYSTEM, SMOKE DETECTOR.
FSA	ANN	FIRE SYSTEM ANNUNCIATOR ALARM	CO	CO	FIRE ALARM SYSTEM, CARBON MONOXIDE DETECTOR.
BATT	BATT	BATTERY PACK AND CHARGER - FROM NECA 100, SYMBOL 7.010	P	S	FIRE ALARM SYSTEM, DUCT SMOKE DETECTOR LOCATED IN THE SUPPLY & RETURN DUCTWORK OF HVAC UNITS WITH 2000 CFM (OR) GREATER.
WP MB	WP M	FIRE ALARM SYSTEM, MASTER-BOX. PROVIDE ALL REQUIRED ACCESSORIES, ANTENNA, CABLE, ETC.	RTS	RTS	FIRE ALARM SYSTEM, REMOTE TEST STATION WITH SIGNAL / INDICATOR FOR DUCT SMOKE DETECTOR.
WP K	WP K	FIRE ALARM SYSTEM, WEATHER-PROOF KNOX BOX.	DK	DS	FIRE ALARM SYSTEM, DRILL SWITCH.
WP	WP	FIRE ALARM SYSTEM, WEATHER-PROOF "RED" BEACON, LOCATED AT ENTRANCE OF BUILDING MOUNTED DIRECTLY OVER "KNOX-BOX".		DH	FIRE ALARM SYSTEM, DOOR HOLDER.
	S	FIRE ALARM SYSTEM, SPEAKER / STROBE DEVICE, SUB-SCRIPT INDICATES CANDELA RATING.	R	135° R/R H	FIRE ALARM SYSTEM, RATE-OF-RISE TEMPERATURE HEAT DETECTOR, SUB-SCRIPT INDICATES TEMPERATURE RATING. (SUITABLE FOR 50'-0" "ON CENTER" MOUNTING)
S	S	FIRE ALARM SYSTEM, SPEAKER DEVICE.	AC F	AC FT H	FIRE ALARM SYSTEM, FIXED TEMPERATURE HEAT DETECTOR INSTALLED ABOVE DROP CEILING, SUB-SCRIPT INDICATES TEMPERATURE RATING. (SUITABLE FOR 50'-0" "ON CENTER" MOUNTING)
15cd	15cd	FIRE ALARM SYSTEM STROBE. SUB-SCRIPT INDICATES CANDELA RATING.	AIM	MM	FIRE ALARM MONITOR MODULE.
P	F	FIRE ALARM SYSTEM, PULL STATION, PROVIDE WITH STOPPER II PROTECTIVE COVER AND MOUNTED SO THAT THE OPERABLE PART OF THIS DEVICE IS 48" ABOVE FINISHED FLOOR.	AOM	CM	FIRE ALARM CONTROL MODULE.
R	R	FIRE ALARM SYSTEM, RELAY.			

EMERGENCY LIGHTING 6-VOLT SYSTEM VOLTAGE DROP TABLE

TOTAL WATTS ON WIRE RUN	WIRE GAUGE 12	10	8	6
6	94	150	238	379
7	81	129	204	325
8	70	112	179	284
10	56	90	143	227
12	44	70	112	178
14	40	64	102	162
16	33	53	84	134
18	30	47	75	119
20	28	45	71	114
21	27	43	68	108
24	24	38	60	95
25	21	34	54	86
30	19	30	48	76
35	15	25	39	63
40	13	21	33	53
48	11	17	28	44
50	11	17	27	43
75	7	11	18	29
100	5	8	14	21
125	4	7	11	17
150	3	5	9	14
175	3	5	8	12
200	2	4	6	10
225	2	4	6	10
250	2	3	5	9

MAXIMUM LENGTH OF RUN IN FEET



NOTES:

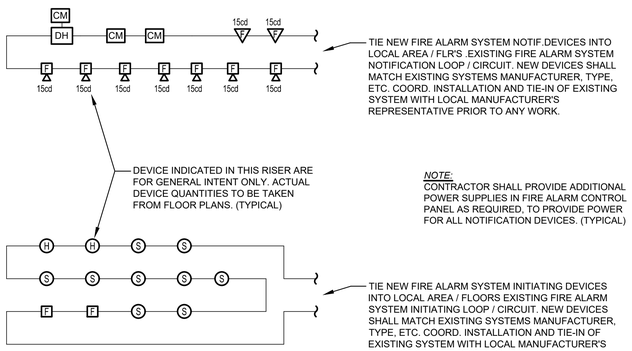
1. E.C. SHALL PROVIDE CIRCUIT BREAKER "LOCK-ON" DEVICE FOR ALL CIRCUITS TO EMERGENCY BATTERY UNITS (EBU). (TYPICAL)
2. DETAIL IS TYPICAL TO ALL DRAWINGS, UON.

TYPICAL EMERGENCY LIGHTING CONNECTION DETAIL

NOT TO SCALE

FIRE ALARM NOTES

1. E.C. SHALL PROVIDE CIRCUIT BREAKER LOCK-ON DEVICES FOR FACP AND NAC POWER EXTENDER CIRCUITS.
2. E.C. SHALL FURNISH & INSTALL REMOTE INDICATING LIGHTS/TEST SWITCHES FOR DUCT SMOKE DETECTORS AS WELL AS SMOKE DETECTOR LOCATED AT THE TOP OF THE ELEV. SHAFTS.
3. REFER TO FLOOR PLANS FOR EXACT NUMBER OF DEVICES & CANDELA RATINGS.
4. COLOR CODE PER NFPA, (LATEST EDITION).
5. ALL SPLICES SHALL BE MADE ON SCREW TYPE TERMINAL BLOCKS. NO WIRENUTS WILL BE ALLOWED.
6. RED PAINTED TERMINAL CABINETS & BOXES WITH LOCKABLE COVERS SHALL BE PROVIDED AT ALL JUNCTION POINTS.
7. AFC FIRE ALARM / CONTROL CABLE TYPE MC (UL LISTED) MAY BE USED ABOVE CEILINGS AND IN CONCEALED AREAS WHERE ACCEPTABLE TO THE LOCAL AUTHORITY HAVING JURISDICTION, OTHERWISE WIRING SHALL BE INSTALLED IN EMT CONDUIT. WIRING IN EXPOSED AREAS SHALL BE EMT, E.C. SHALL PROVIDE AN ALTERNATE TO PAINT PER ARCHITECTS DIRECTION.
8. THE CONTRACTOR AT COMPLETION OF THE FIRE ALARM SYSTEM SHALL TEST THE ENTIRE SYSTEM PER THE LOCAL FIRE DEPARTMENTS REQUIREMENTS. THE CONTRACTOR SHALL REPLACES OR FIX ANY PART OF THE SYSTEM NOT PROPERLY WORKING.
9. ALL WIRING SHALL BE PER MANUFACTURER'S RECOMMENDATIONS. E.C. SHALL TAKE INTO ACCOUNT VOLTAGE DROP. (TYPICAL)
10. ALL FIRE ALARM SYSTEM COMPONENTS & MOUNTING HEIGHTS SHALL COMPLY WITH ADA REQUIREMENTS.
11. E.C. SHALL PROVIDE ANY AND ALL AUXILIARY EQUIPMENT IN ORDER TO PROVIDE A COMPLETE, PROPERLY FUNCTIONING SYSTEM. COORDINATE REQUIREMENTS WITH LOCAL MANUFACTURERS REP.
12. ALL FIRE ALARM STROBE SIGNAL DEVICES SHALL BE SYNCHRONIZED TYPE DEVICES AND COMPLY WITH ADA REQUIREMENTS.
13. NO T-TAPPING OF FIRE ALARM WIRING SHALL BE ALLOWED. (TYPICAL)
14. ALL FIRE ALARM WIRING & RACEWAY SHALL BE SUPPORTED BY THE BUILDING STRUCTURE AND SHALL NOT BE LOCATED AS TO BE DAMAGED BY BUILDING USE.
15. FIRE ALARM SYSTEM BATTERIES AND CHARGER SHALL BE PROVIDED FOR STAND-BY BATTERY POWER CAPACITY PER THE STATE'S FIRE LAWS (LATEST EDITION). E.C. SHALL SUBMIT BATTERY CALCULATIONS FOR THE MODIFIED SYSTEM DOCUMENTING CODE COMPLIANCE.
16. NEW NOTIFICATION APPLIANCE CIRCUIT EXPANDER PANELS SHALL BE PROVIDED WITH INTEGRAL BATTERY BACK-UP PER STATE'S FIRE LAWS (LATEST EDITION).



NOTE:
CONTRACTOR SHALL PROVIDE ADDITIONAL POWER SUPPLIES IN FIRE ALARM CONTROL PANEL AS REQUIRED, TO PROVIDE POWER FOR ALL NOTIFICATION DEVICES. (TYPICAL)

"PARTIAL" FIRE ALARM RISER DIAGRAM

NOT TO SCALE

FIRE ALARM RISER NOTES

1. PROVIDE FIRE ALARM ISOLATION MODULE AT THE BEGINNING AND END OF EACH LOOP OF INITIATING DEVICES. ALSO PROVIDE FIRE ALARM ISOLATION MODULE AT A MAXIMUM OF EVERY 25 DEVICES ON LOOP.
2. PROVIDE 20 AMP CIRCUIT (2#12 + 1#12 GND. IN 3/4"C.) FROM SPARE BREAKER IN LOCAL 120/208V PANEL FOR EACH NEW NAC PANEL. PROVIDE BREAKER LOCK-ON DEVICE.
3. GROUND NEW NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL, PER LATEST EDITION OF NATIONAL ELECTRICAL CODE.

NOTES:

- CONTRACTOR SHALL PROVIDE ADDITIONAL POWER SUPPLIES IN FIRE ALARM CONTROL PANEL AS REQUIRED AS WELL AS NEW NOTIFICATION EXTENDER PANELS (NAC), TO PROVIDE POWER FOR ALL NOTIFICATION DEVICES. COORDINATE REQUIRED EQUIPMENT WITH LOCAL MANUFACTURER'S REPRESENTATIVE. (TYPICAL)
- CONTRACTOR SHALL ACQUIRE ACTUAL DEVICE COUNTS FROM FLOOR PLANS, NOT THIS RISER. THIS RISER DIAGRAM IS FOR WIRING INTENT PURPOSES ONLY.
- FIRE ALARM SYSTEM AND ASSOCIATED EQUIPMENT DESIGN HAS BEEN BASED AROUND EDWARDS SYSTEM TECHNOLOGY, INC. (EST). CONTRACTOR SHALL CONTACT AND COORDINATE WITH LOCAL MANUFACTURER'S REPRESENTATIVE, FOR ALL SPECIFIC INSTALLATION AND EQUIPMENT INFORMATION REQUIRED. (OR EQUAL) FIRE ALARM SYSTEM SHALL BE APPROVED DURING SUBMITTAL REVIEW.

COORDINATION NOTES

CONTRACTOR SHALL PROVIDE A SET OF COORDINATION DRAWING'S WITH ALL TRADES EQUIPMENT LOCATED, INDICATING ANY / ALL CONFLICTS WITH THE CURRENT ELECTRICAL DESIGN PRIOR TO THE START OF ANY WORK. THESE PLANS SHALL INCLUDE ARCHITECTURAL ELEVATION & DETAIL DRAWINGS WITH PROPOSED ELECTRICAL EQUIPMENT LOCATED FOR REVIEW AND APPROVAL. ANY COORDINATION ISSUES WITH EQUIPMENT, PRIOR TO THESE PLANS BEING APPROVED SHALL BE REPAIRED AT THIS CONTRACTOR'S EXPENSE.

ALL LOCATIONS & MOUNTING HEIGHTS OF ELECTRICAL DEVICES (LIGHTING, RECEPTACLES, FIRE ALARM, LIFE SAFETY DEVICES, ETC.) SHALL BE COORDINATED AND APPROVED BY ARCHITECT PRIOR TO ANY INSTALLATION. ANY DEVIATION FROM THIS REQUIREMENT RESULTING IN AN INCORRECT INSTALLATION OR LOCATION SHALL BE REPAIRED BY THIS CONTRACTOR AT THEIR OWN EXPENSE.

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DRAWN BY: YYY
DATE: AUGUST 25, 2023
REVISIONS:
9/1/2023 - Addendum #1

TRI-TOWN COMMUNITY ACTION AGENCY
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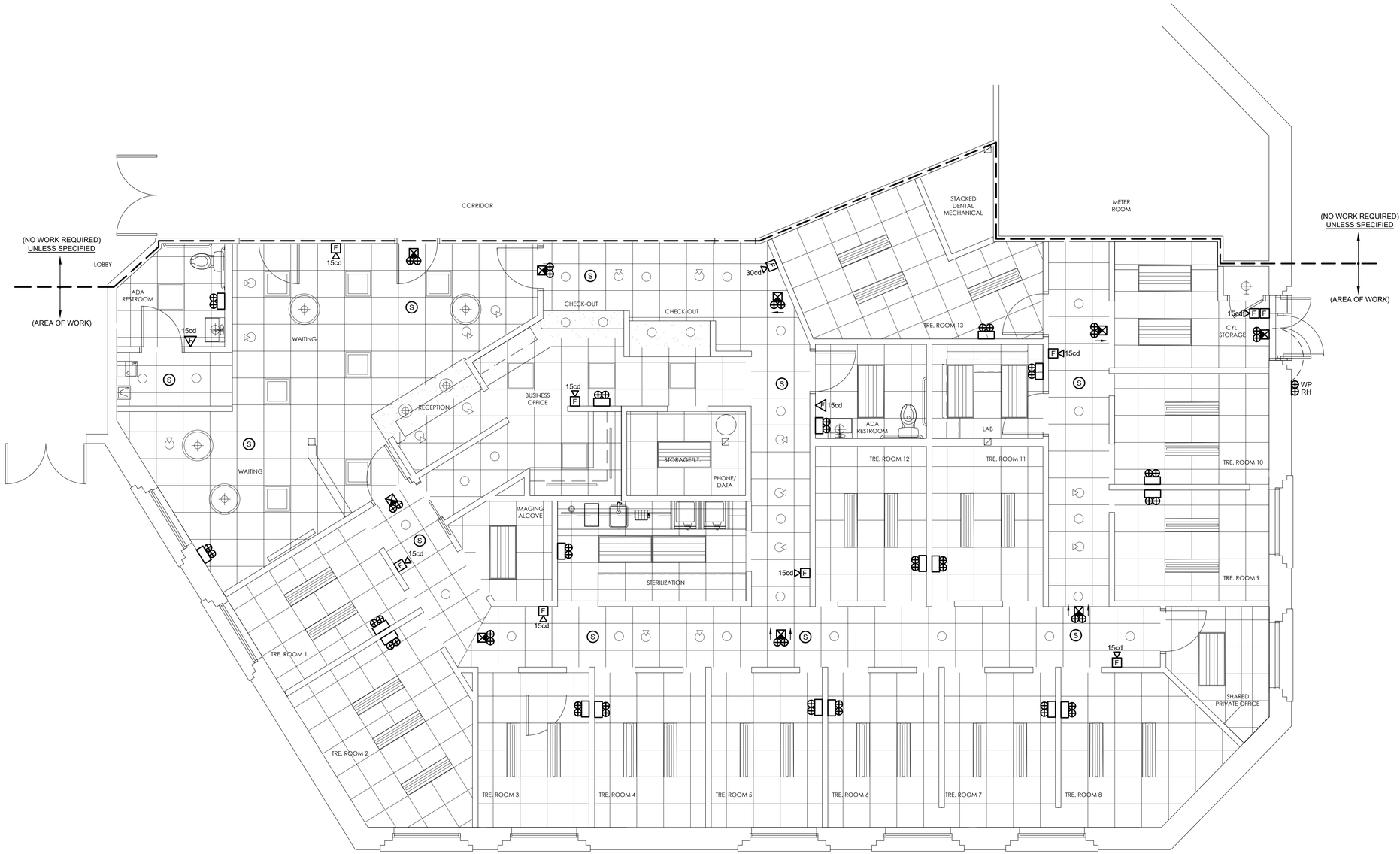
JOHNSTON, RI

PEDIATRIC DENTAL CENTER
1637 MINERAL SPRING AVENUE, SUITE 201
NORTH PROVIDENCE, RHODE ISLAND

ELECTRICAL LIFE SAFETY LEGENDS, RISER & DETAILS

ISSUED FOR BID

LS0-0



ELECTRICAL - LIFE SAFETY FLOOR PLAN
1/4" = 1'-0"
NORTH

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