



State of Utah

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Lieutenant Governor

Department of Administrative Services

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Executive Director

Division of Facilities Construction and Management

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Director

ADDENDUM #1

Date: May 8, 2008

To: Contractors

From: Wayne Smith, Project Manager, DFCM

Reference: Draper Complex Main Chillers Replacement
Utah National Guard – Draper, Utah
DFCM Project No. 07294480

Subject: Addendum No. 1

Pages	Addendum	1	page
	<u>Engineer's Addendum</u>	<u>21</u>	<u>pages</u>
	Total	22	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

1.1 **SCHEDULE CHANGES** – There are no changes to the project schedule.

1.2 **GENERAL** – The 2008 Utah Legislature passed SB 220 entitled: "Cause of Action for Defective Construction." The Governor of the State of Utah has signed the bill. The bill becomes effective 60 days after the close of the 2008 Legislative General Session.

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

Utah!
Where ideas connect

ADDENDUM

Project Name:

Addendum No.:

DFCM Project #

Date:

From: WHW Engineering Inc
8619 South Sandy Parkway
Sandy, Utah 84070
Phone (80) 466-4021 Fax (801) 466-8536

To:

This Addendum forms and becomes a part of the Contract Documents and modifies the original Bidding Documents dated _____ as noted below. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of 2 pages, 3 specification sections, and 2 drawings.

I - CHANGES TO PRIOR ADDENDA: NA

II - CHANGES TO BIDDING REQUIREMENTS: None

III - CHANGES TO AGREEMENT & OTHER CONTRACT FORMS: None

IV – CHANGES/CLARIFICATIONS TO CONDITIONS OF THE CONTRACT: None

V - CHANGES/CLARIFICATIONS TO SPECIFICATIONS:

- Item V-1.** Demolition shall be the contractors responsibility to remove from site and properly dispose of equipment, refrigerant, etc.
- Item V-2.** Electrical work shall be performed by a licensed design build electrician. Electrician shall be responsible to comply with all applicable codes, local jurisdictions, State of Utah DFCM design and construction requirements, etc. See attached Division 16 specifications for general information.

VI - CHANGES/CLARIFICATIONS TO DRAWINGS:

- Item VI-1.** Drawings MD401 and ME401 are being re-issued due to a CAD error which made note bubbles hard to read.
- Item VI-2.** New chillers shall be brought in through an existing 4'0" door. Disassemble and re-assemble condenser water piping and condenser pump as necessary to fit through door. If chiller requires breaking down and re-assembling to fit, work shall be done by factory authorized representative as necessary to maintain warranty.
- Item VI-3.** New variable frequency drives shall be mounted on free standing uni-strut frames in front of pumps. VFDS may be stacked 2 high in order to save floor space.
- Item VI-4.** VFDS shall be provided (including factory start-up) and controlled by ATC. Design Build Electrician shall provide electrical power connections to VFDS.
- Item VI-5.** Drawings ME401 called out pumps as alternate. This is incorrect. Pumps will be part of the base bid. See revised sheet.

PRIOR APPROVALS

THE FOLLOWING ITEMS, AS SUBMITTED, ARE CONSIDERED, IN GENERAL AND IN NAME ONLY, AS EQUAL TO THOSE ITEMS SPECIFIED. THIS REVIEW DOES NOT RELIEVE THE CONTRACTOR OR SUPPLIER OF THE RESPONSIBILITY OF CONFORMING TO THE DRAWINGS AND SPECIFICATIONS, NOR DOES IT RELIEVE THE CONTRACTOR OF THE REQUIREMENTS OF THE SPECIFICATIONS FOR COORDINATION WITH OTHER TRADES. ALL DIMENSIONS SHALL BE CONFIRMED AND CORRELATED AT THE JOBSITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXISTING CONDITIONS AND THE SUITABILITY OF "EQUAL" PRODUCTS FOR THE SPECIFIED APPLICATION.

Description

Manufacturer

15185 – Pumps

Patterson

End of Addendum

SECTION 16051 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. DFCM Design and Construction standards, and DFCM general conditions apply.

1.2 SUMMARY

- A. Electrical work shall be design build, as necessary to accommodate mechanical work electrician shall be licensed for design build work. Electrician shall be responsible to comply with all current codes and DFCM and Utah National Guard Standards.
- B. Provide power modifications, and electrical connections for new chillers, pump, VFD's etc.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.

- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors **2 inches** above finished floor level.
- G. Size pipe sleeves to provide **1/4-inch** annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 7 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems."

- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel or cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for **1-inch** annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for **1-inch** annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION 16051

SECTION 16120 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.
- B. Related Sections include the following:
 - 1. Division 16 Section "Voice and Data Communication Cabling" for cabling used for voice and data circuits.
 - 2. Division 16 Section "Undercarpet Cables" for flat cables for undercarpet installations.
 - 3. Division 16 Section "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70.
- B. Conductor Insulation: Comply with NEMA WC 70.
- C. Multiconductor Cable: Comply with NEMA WC 70.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.4 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 16 Section "Electrical Supports and Seismic Restraints."
- F. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."

3.3 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least **6 inches** of slack.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
 - 1. For sleeve rectangle perimeter less than **50 inches** and no side greater than **16 inches**, thickness shall be **0.052 inch**.
 - 2. For sleeve rectangle perimeter equal to, or greater than, **50 inches** and 1 or more sides equal to, or greater than, **16 inches**, thickness shall be **0.138 inch**.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both wall surfaces.
- G. Extend sleeves installed in floors **2 inches** above finished floor level.
- H. Size pipe sleeves to provide **1/4-inch** annular clear space between sleeve and cable unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 7 Section "Joint Sealants."
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 7 Section "Through-Penetration Firestop Systems."
- L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

- M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.5 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground exterior-wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections and prepare test reports.
- C. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
 - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- D. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.

2. Test results that comply with requirements.
 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 16120

SECTION 16130 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Qualification Data: For Design Build Electrician.
- C. Source quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Aluminum Rigid Conduit: ANSI C80.5.
- C. IMC: ANSI C80.6.
- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
- E. EMT: ANSI C80.3.
- F. FMC: [Zinc-coated steel][or aluminum].
- G. LFMC: Flexible steel conduit with PVC jacket.
- H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
- I. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

- A. Description: Sheet metal sized and shaped as indicated, NEMA 250,.
- B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Finish: Manufacturer's standard enamel finish.

2.3 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.
- C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- D. Nonmetallic Floor Boxes: Nonadjustable, round.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum or galvanized, cast iron with gasketed cover.
- G. Cabinets:
 - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.

2.5 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.6 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Minimum Raceway Size: **3/4-inch** trade size.
- B. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
- C. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- D. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least **6 inches** away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 16 Section "Electrical Supports and Seismic Restraints."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than **1-inch** trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than **200-lb** tensile strength. Leave at least **12 inches** of slack at each end of pull wire.
- L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
 1. **3/4-Inch** Trade Size and Smaller: Install raceways in maximum lengths of **50 feet**.
 2. **1-Inch** Trade Size and Larger: Install raceways in maximum lengths of **75 feet**.
 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where otherwise required by NFPA 70.
- N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed **30 deg F**, and that has straight-run length that exceeds **25 feet**.
- O. Flexible Conduit Connections: Use maximum of **26 inches** of flexible conduit forequipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

- Q. Set metal floor boxes level and flush with finished floor surface.
- R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
 - 1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
 - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 7 Section "Through-Penetration Firestop Systems."
- L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

- M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for **1-inch** annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for **1-inch** annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.4 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.5 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 16130

SHEET NOTES

- SHEET NOTES:**
- ① REMOVE EXISTING CHILLER AND ASSOCIATED ELECTRICAL, CONTROLS, PIPING CONNECTIONS, ETC.
 - ② ADDITIVE ALTERNATE #1: REMOVE EXISTING IN-LINE CHILLED WATER PUMPS.
 - ③ EXISTING BASE MOUNTED PUMPS SHALL REMAIN.
 - ④ EXISTING TRENCH DRAIN SHALL REMAIN.
 - ⑤ EXISTING DISTRIBUTION PANELS SHALL REMAIN.
 - ⑥ EXISTING IN-LINE PUMPS SHALL REMAIN.
 - ⑦ EXISTING SMALL CHILLER SHALL REMAIN.
 - ⑧ REMOVE EXISTING ELECTRICAL PANELS ASSOCIATED WITH CHILLERS
 - ⑨ REMOVE EXISTING SECTION OF CHILLED WATER PIPING AS SHOWN.
 - ⑩ EXISTING BASE MOUNTED CONDENSER WATER PUMPS, AND ASSOCIATED CONDENSER WATER PIPING SHALL REMAIN.

- GENERAL NOTES:**
- 1. FIELD VERIFY ALL EXISTING CONDITIONS BEFORE PROCEEDING WITH ANY DEMOLITION, FABRICATION, ETC.
 - 2. THIS CONTRACTOR SHALL HIRE A LICENSED DESIGN BUILD ELECTRICIAN TO DISCONNECT EXISTING EQUIPMENT, AND RE-CONNECT NEW EQUIPMENT TO EXISTING POWER.

CONSULTANTS



PROJECT NAME & ADDRESS

**DRAPER NATIONAL
GUARD HQ CHILLER
REPLACEMENT
DFCM #07294480**

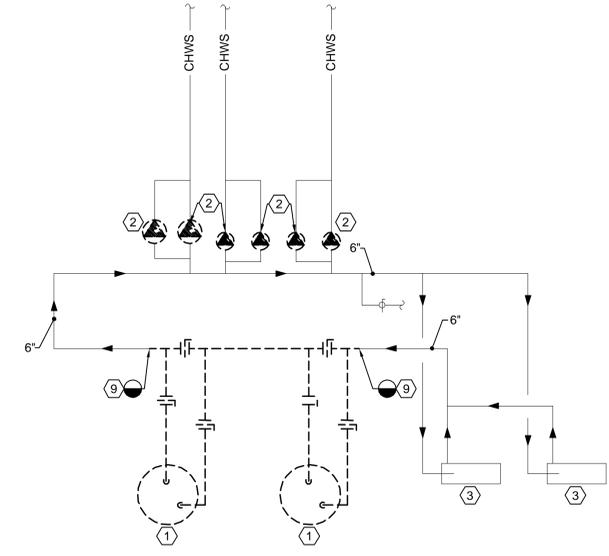
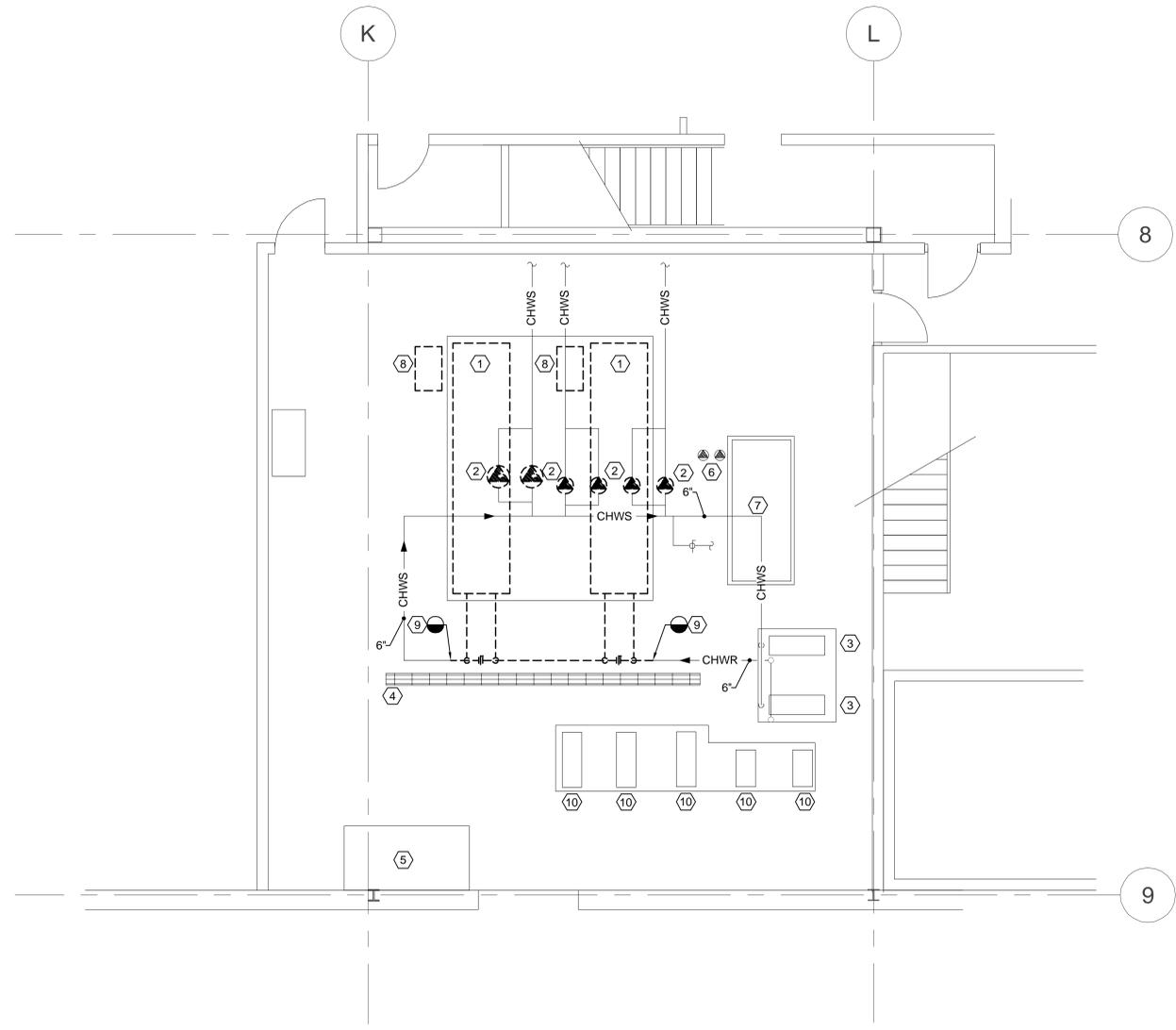
12953 S. Minuteman Dr.
Draper, Utah 84020

MARK	DATE	REVISION
△	05/06/08	ADDENDUM #1

PROJECT MANAGER:
WMP
DRAWN BY:
STAFF
CHECKED BY:
WMP
DATE:
04/17/08
WHW JOB NO.:
07051

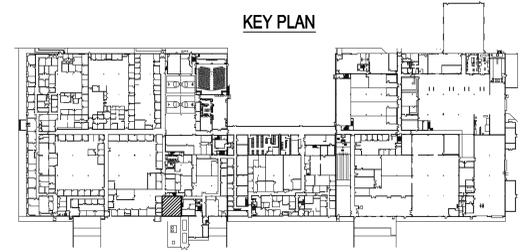
SHEET TITLE
**MAIN FLOOR LARGE
SCALE MECHANICAL
DEMOLITION PLAN**

SHEET NO.
MD401



B1 EXISTING CHILLED WATER FLOW SHEET
SCALE: NONE

A1 MAIN FLOOR LARGE SCALE
MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"



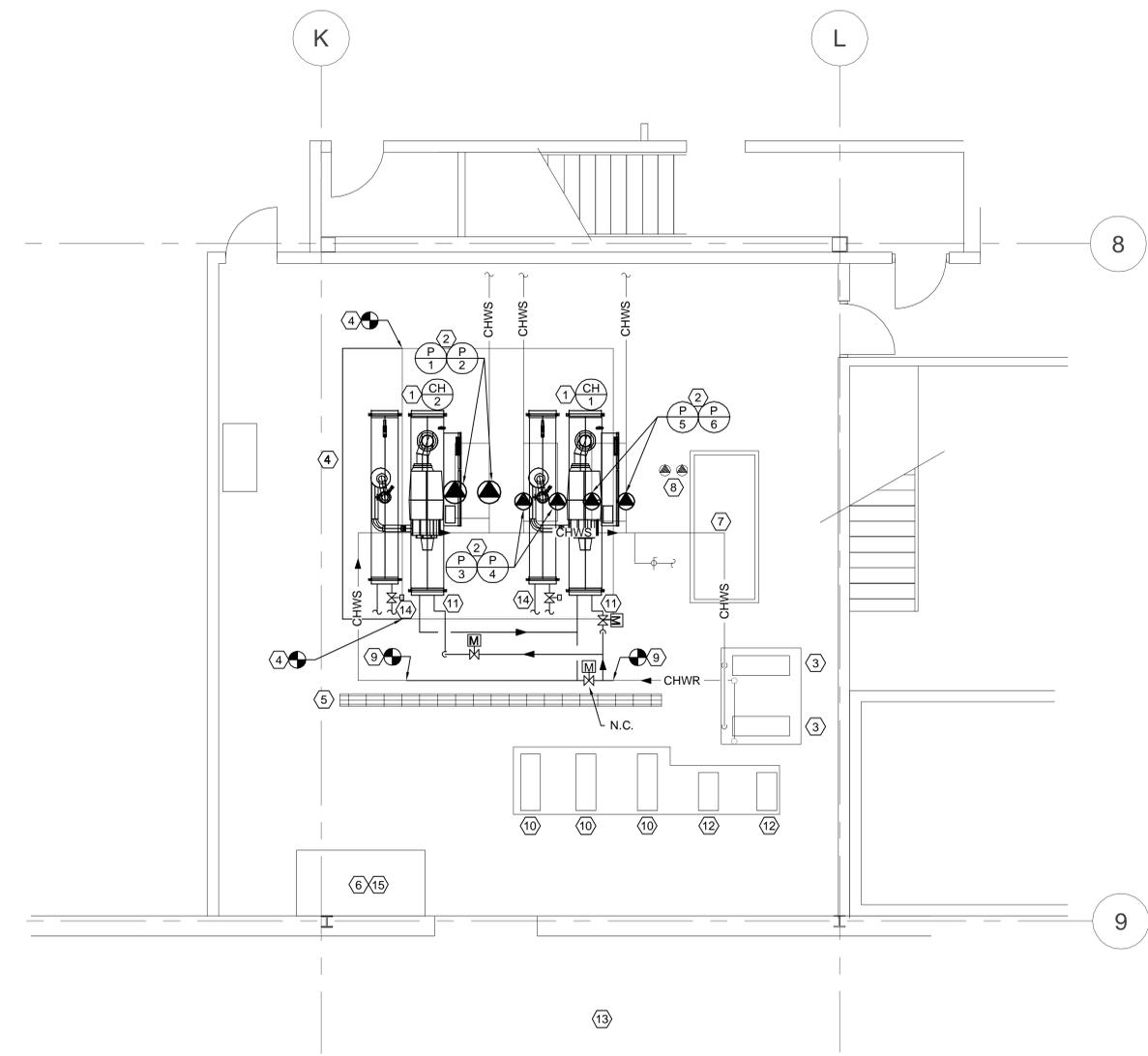
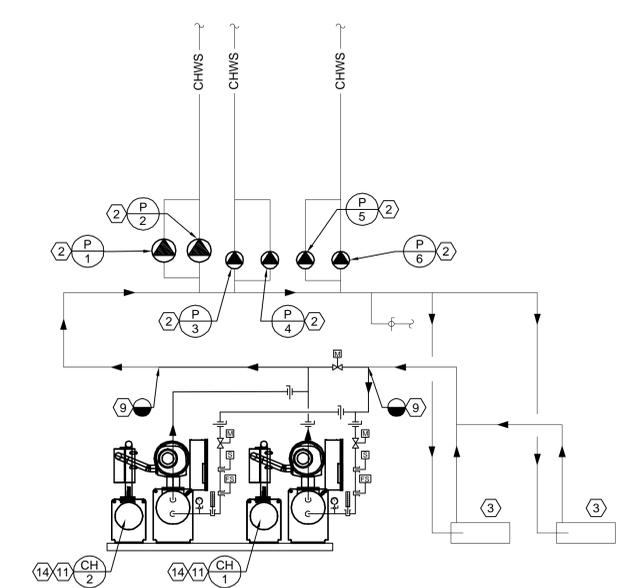
KEY PLAN

SHEET NOTES

- SHEET NOTES:
- 1 PROVIDE NEW CHILLER AND CHILLED WATER PIPING, RE-CONNECT TO EXISTING CONDENSER PIPING, AND CONTROLS. MOUNT ON EXISTING CONCRETE HOUSEKEEPING PAD. PROVIDE SAFETY RELIEF VENT PIPING TO EXTERIORS.
 - 2 PROVIDE NEW IN-LINE PUMPS, RE-CONNECT TO EXISTING PIPING, ELECTRICAL, AND CONTROLS. MODIFY AS NECESSARY.
 - 3 EXISTING BASE MOUNTED CHILLED WATER PUMPS SHALL REMAIN. PROVIDE NEW 15 HP VFD FOR EACH PUMP.
 - 4 PROVIDE NEW HOUSE KEEPING PAD, EXTEND 3'-6", AND DOWN INTO EXISTING PAD.
 - 5 EXISTING TRENCH DRAIN SHALL REMAIN.
 - 6 EXISTING DISTRIBUTION PANEL SHALL REMAIN.
 - 7 EXISTING SMALL CHILLER SHALL REMAIN.
 - 8 EXISTING IN-LINE PUMPS SHALL REMAIN.
 - 9 PROVIDE NEW CHILLED WATER PIPING AS SHOWN.
 - 10 PROVIDE NEW VFDs FOR EXISTING 25 HP CONDENSER WATER PUMPS. ASSOCIATED CONDENSER WATER PIPING SHALL REMAIN.
 - 11 PROVIDE NEW CHILLED WATER PIPING CONNECTIONS TO NEW CHILLERS. SEE DETAIL. INSTALL CHILLERS IN SEQUENCE SO THAT AT LEAST 1 REMAINS OPERATIONAL AT ALL TIMES.
 - 12 EXISTING SMALL CONDENSER PUMPS TO EXISTING SMALL CHILLER SHALL REMAIN.
 - 13 EXISTING COOLING TOWER AND ASSOCIATED PIPING, ELECTRICAL, ETC. SHALL REMAIN. COORDINATE WITH ATC TO PROGRAM 4 STAGES OF TOWER. (2 CELLS, 2 FAN SPEEDS PER CELL)
 - 14 PROVIDE CONDENSER PIPING MODIFICATIONS AS NECESSARY TO CONNECT TO NEW CHILLERS. PROVIDE 2-WAY MODULATING CONTROL VALVE IN CONDENSER SUPPLY TO CHILLER. SEE DETAIL.
 - 15 THIS CONTRACTOR SHALL HIDE A DESIGN BUILD ELECTRICIAN TO PROVIDE ELECTRICAL CONNECTIONS FOR NEW CHILLERS. PROVIDE NEW WIRING AND BREAKERS. MODIFY EXISTING CONDUIT AS NECESSARY.
 - 16 CHILLER ROOM LOCATION.

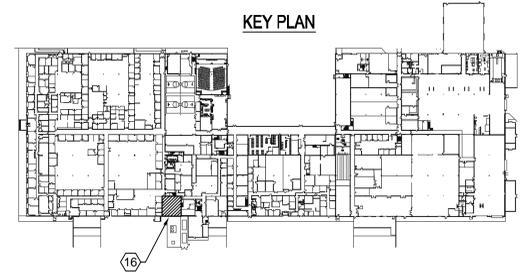
- GENERAL NOTES:
1. FIELD VERIFY ALL EXISTING CONDITIONS BEFORE PROCEEDING WITH ANY DEMOLITION, FABRICATION, ETC.
 2. THIS CONTRACTOR SHALL HIRE A LICENSED DESIGN BUILD ELECTRICIAN TO DISCONNECT EXISTING EQUIPMENT, AND RE-CONNECT, NEW EQUIPMENT TO EXISTING POWER. RE-PLACE BREAKERS, DISCONNECTS, ETC.

CONSULTANTS



B1 NEW CHILLED WATER FLOW SHEET
SCALE: NONE

MAIN FLOOR LARGE SCALE MECHANICAL PLAN
SCALE: 1/4" = 1'-0"



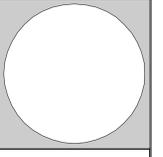
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07051



SHEET TITLE
**MAIN FLOOR LARGE
SCALE MECHANICAL PLAN**

SHEET NO.
ME401