



IOWA DEPARTMENT OF TRANSPORTATION ANALYTICAL LAB VAV BOX REPLACEMENT

AMES, IOWA

PROJECT #BG-3A22(036)-80-85

IOWA DEPARTMENT OF TRANSPORTATION
MATERIALS BUILDING
ANALYTICAL LAB VAV BOX REPLACEMENT
AMES, IOWA

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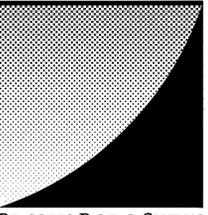
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SHEET TITLE
COVER SHEET

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	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.		PROJECT LOCATION AMES, IOWA
	Signature	Date	PROJECT NUMBER 15044
	SUSAN R. OLTROGGE, P.E. My license renewal date is December 31, 2017		ISSUE DATE 1/15/2016
	Pages or sheets covered by this seal. ALL MECHANICAL SHEETS		SHEET NUMBER G-101
	Date Issued: 01/15/2016		

MECHANICAL LEGEND



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AIR TERMINALS

- DIFFUSER SQUARE CEILING. ARROW INDICATES AIRFLOW. SIDE ABSENT ARROW BLANKED, UNLESS OTHERWISE NOTED. SEE SCHEDULE.
- DIFFUSER LINEAR SLOT CEILING WITH PLENUM. SEE SCHEDULE.
- DIFFUSER LINEAR SLOT CEILING WITH PLENUM. SEE SCHEDULE.

DUCT

- 12"x10" SA DUCTWORK SHOWING SIZE (INCH) AND SYSTEM. SA INDICATES SUPPLY AIR SYSTEM.
- 12"x10" EXH DUCT SHOWING SIZE (INCH) AND SYSTEM. EA INDICATES EXHAUST AIR SYSTEM.
- 12"x10" OA DUCT SHOWING SIZE (INCH) AND SYSTEM. OA INDICATES OUTSIDE AIR SYSTEM.
- 12"x12" RA DUCT SHOWING SIZE (INCH) AND SYSTEM. RA INDICATES RETURN AIR SYSTEM.
- DUCTWORK WITH ACOUSTICAL LINING. SEE SPECIFICATIONS.
- DUCT SECTION - SUPPLY
- DUCT SECTION - EXHAUST / RETURN
- DUCT SECTION - OUTSIDE AIR
- BACKDRAFT DAMPER
- FIRE DAMPER
- FIRE/SMOKE DAMPER
- FLEXIBLE DUCT CONNECTION
- HUMIDIFIER
- INCLINED RISE (R) OR DROP (D) - ARROW IN DIRECTION OF RISE OR DROP
- MANUAL DAMPER
- MOTOR OPERATED DAMPERS
- SMOKE DAMPER
- SECURITY BAR
- TURNING VANES. SEE SPECIFICATIONS

HVAC EQUIPMENT

- HUMIDISTAT
- THERMOSTAT WALL MOUNT UNLESS OTHERWISE INDICATED

MISC. PIPING AND INSTRUMENTATION

- AIR VENT - AUTOMATIC
- AIR VENT - MANUAL
- "AQUASTAT" TEMPERATURE SENSOR/CONTROLLER
- BUCKET TRAP
- CONCENTRIC TRANSITION
- ECCENTRIC TRANSITION
- EXPANSION JOINT
- FLEXIBLE PIPE CONNECTION
- FLOAT TRAP
- FLOAT & THERMOSTATIC TRAP
- FLOW SENSOR
- FLOW CONTROLLER
- FLOW MEASURING STATION
- FLOW DIRECTION ARROW
- PIPE SLEEVE OR GUIDE
- PIPE ANCHOR
- GAUGES - P FOR PRESSURE T FOR TEMPERATURE
- PRESSURE TEMPERATURE SENSOR
- STRAINER
- UNION

PIPE FITTINGS

- CLEANOUT TO GRADE
- END CAP
- END OF LINE CLEANOUT
- HOSE BIB

VALVES MISC

- AUTOMATIC CONTROL VALVE (TWO WAY)
- AUTOMATIC CONTROL VALVE (THREE WAY)
- BALL DRIP VALVE
- CHECK VALVE
- OUTSIDE STEM & YOKE VALVE - OS&Y
- PRESSURE REDUCING VALVE
- PLUG COCK
- POST INDICATOR VALVE
- SHUTOFF VALVE SEE SPECIFICATIONS FOR TYPE, FOR SYSTEM.
- STOP COCK
- SOLENOID VALVE

SCHEMATIC PIPE

- | | | | |
|-----|------------------------------|-----|-------------------------------------|
| CHS | CHILLED WATER SUPPLY | NPW | NON-POTABLE WATER |
| CHR | CHILLED WATER RETURN | RO | REVERSE OSMOSIS WATER |
| CD | CONDENSATE DRAIN | ROR | REVERSE OSMOSIS WATER RECIRCULATING |
| CDS | CONDENSER WATER SUPPLY | SS | SANITARY WASTE |
| CDR | CONDENSER WATER RETURN | V | SANITARY VENT |
| HWS | HEATING WATER RETURN | ST | STORM PIPING |
| HWR | HEATING WATER SUPPLY | OFD | OVERFLOW STORM PIPING |
| LWS | GEOTHERMAL WATER SUPPLY | DI | DEIONIZED WATER |
| LWR | GEOTHERMAL WATER RETURN | DIR | DEIONIZED WATER RECIRCULATING |
| HPS | HIGH PRESSURE STEAM | CW | DOMESTIC COLD WATER |
| HPC | HIGH PRESSURE CONDENSATE | HW | DOMESTIC HOT WATER |
| MPS | MEDIUM PRESSURE STEAM | RHW | DOMESTIC HOT WATER RECIRCULATING |
| MPC | MEDIUM PRESSURE CONDENSATE | TW | DOMESTIC TEMPERED WATER |
| LPS | LOW PRESSURE STEAM | AV | ACID VENT |
| LPC | LOW PRESSURE CONDENSATE | AW | ACID WASTE |
| RS | REFRIGERANT SUCTION | G | NATURAL GAS |
| RL | REFRIGERANT LIQUID | O | OXYGEN |
| RBP | REFRIGERANT BYPASS | A | MEDICAL AIR |
| FC | FIRE PROTECTION - CHEMICAL | VAC | VACUUM |
| FP | FIRE PROTECTION - MAIN | | |
| SP | FIRE PROTECTION - WET PIPING | | |
| DP | FIRE PROTECTION - DRY PIPING | | |
| F | FIRE PROTECTION - STANDPIPE | | |

STANDARD ANNOTATION SYMBOLS

- EQUIPMENT IDENTIFICATION
- DETAIL MARK - SEE DRAWING 1 ON SHEET 8.2
- RISER REFERENCE
- CONNECTION TO EXISTING (NEW TO EXISTING)
- ELEVATION MARK - SEE DRAWING A ON THIS SHEET
- REVISION DELTA
- NOTE REFERENCE
- SECTION MARK - SEE DRAWING 2 ON THIS SHEET 8.3

STANDARD DRAWING ABBREVIATIONS

- | | | | |
|--------|--|------|------------------------------------|
| AFF | ABOVE FINISHED FLOOR | KO | KNOCK OUT |
| AFG | ABOVE FINISHED GRADE | KVA | KVA KILOVOLT AMPERES (ELEC) |
| ASHRAE | "AMERICAN SOCIETY OF HEATING REFRIGERATING & AIR CONDITIONING ENGINEERS" | KW | KW KILOWATTS (ELEC) |
| ASTM | AMERICAN SOCIETY FOR TESTING & MATERIALS | NEC | NATIONAL ELECTRICAL CODE |
| BOC | BOTTOM OF CURB | NC | NORMALLY CLOSED |
| BTU | BRITISH THERMAL UNIT | NO | NORMALLY OPEN (ELEC) |
| BTUH | BRITISH THERMAL UNIT PER HOUR | OA | OUTSIDE AIR |
| C | CONDUIT (ELEC) | PNL | PANEL |
| CKT | CIRCUIT | PL | PILOT LIGHT (ELEC) |
| CO | CLEAN OUT | PT | POTENTIAL TRANSFORMER (ELECTRICAL) |
| CW | COLD WATER, DOMESTIC | PWR | POWER |
| DC | DIRECT CURRENT (ELEC) | RA | RETURN AIR |
| DEMO | DEMOLITION | RCP | REINFORCED CONCRETE PIPE (MECH) |
| EA | EXHAUST AIR | RHW | RECIRCULATING HOT WATER, DOMESTIC |
| FACP | FIRE ALARM CONTROL PANEL | SA | SUPPLY AIR |
| G, GND | GROUND (ELEC) | SWBD | SWITCHBOARD |
| GPM | GALLONS PER MINUTE | SWGR | SWITCHGEAR |
| HP | HORSE-POWER (GENERAL) | V | VOLT(S) (ELEC) |
| HW | HOT WATER, DOMESTIC | V | VENT (MECH) |
| IG | ISOLATED GROUND (ELEC) | VA | VOLT AMPERE |
| JB | JUNCTION BOX | VTR | VENT THRU ROOF |
| | | W | WASTE (MECH) |
| | | W | WATTS (ELEC) |

STANDARD EQUIPMENT ABBREVIATIONS

- | | | | |
|------|----------------------------------|-------|--|
| AD- | AREA DRAIN | HX- | HEAT EXCHANGER |
| AE- | AIR ELIMINATION DEVICE | HP- | HEAT PUMP |
| AF- | AIR FITTING | L- | LAVATORY |
| AHU- | AIR HANDLING UNIT | LT- | LAVATORY TRIM |
| BFA- | BACKFLOW ASSEMBLY | MAU- | MAKE-UP AIR UNIT |
| B | BOILER | MB- | MOP BASIN |
| BFU- | BOILER FEED UNIT | MH- | MANHOLE |
| C | CONDENSER | OD- | OVERFLOW DRAIN |
| CB- | CATCH BASIN | PCD- | CONDENSATE DRAIN PUMP |
| CW- | CHILLED WATER COIL | PCW- | CONDENSER WATER PUMP |
| CDX- | DX COIL | PDI- | DEIONIZED WATER PUMP |
| CF- | CARBON DIOXIDE FITTING | PDR- | DOMESTIC DRINKING WATER RECIRCULATING PUMP |
| CH- | CHILLER | PF- | FIRE PUMP |
| CHC- | HEATING COIL | FFO- | FUEL OIL SYSTEM PUMP |
| CON- | CONVECTOR | PHP- | HEAT PUMP SYSTEM PUMP |
| CPH- | PREHEAT COIL | PHR- | DOMESTIC WATER RECIRCULATING PUMP |
| CRE- | EXHAUST RECLAIM COIL | PHW- | HEATING WATER PUMP |
| CRH- | REHEAT COIL | PIR- | IRRIGATION PUMP |
| CRI- | INTAKE RECLAIM COIL | PPB- | DOMESTIC PRESSURE BOOSTER PUMP |
| CRP- | CONDENSATE RETURN PUMP | PR- | PANEL RADIATOR |
| CRU- | COMPUTER ROOM UNIT | PRA- | PRESSURE REDUCING ASSEMBLY |
| CT | COOLING TOWER (MECHANICAL) | PRC- | RECLAIM SYSTEM PUMP |
| CT | CURRENT TRANSFORMER (ELECTRICAL) | PRO- | REVERSE OSMOSIS WATER PUMP |
| CU- | CONDENSING UNITS | PRV- | PRESSURE RELIEF VALVE |
| CUH- | CABINET UNIT HEATER | PSE- | SANITARY SEWAGE EJECTOR PUMP |
| DA- | DEAERATOR | PST- | STORM AND FOOTING DRAIN SUMP PUMP |
| DC- | DRY COOLER | RC- | RETURN - CEILING MOUNTED |
| DD- | DECK DRAIN | RD- | RETURN - DUCT MOUNTED |
| DF- | DRINKING FOUNTAIN | RDR- | ROOF DRAIN |
| DS | DOWNSPOUT | RF- | RETURN - FLOOR MOUNTED |
| DWC- | DRINKING WATER CHILLER | RTU- | ROOF TOP UNIT |
| DWH- | DOMESTIC WATER HEATER | RWC- | REMOTE WATER CHILLER |
| EW- | EMERGENCY EYE WASH | S- | SINK |
| EWF- | EXHAUST FAN | SA- | SOUND ATTENUATOR |
| EFC- | EVAPORATIVE FLUID COOLER | SC- | SUPPLY - CEILING MOUNTED |
| ES- | EMERGENCY SHOWER | SD- | SUPPLY - DUCT MOUNTED |
| ET- | EXPANSION TANK | SF- | SUPPLY - FLOOR MOUNTED |
| EVC- | EVAPORATIVE CONDENSER | SG- | STEAM GUN |
| EW- | EXHAUST - WALL MOUNTED | SH- | SHOWER |
| EW- | ELECTRIC WATER COOLER | SHT- | SHOWER TRIM |
| EW- | EMERGENCY WASH STATION | SS- | SERVICE SINK |
| F | FURNACE | ST- | SINK TRIM |
| FB- | FILTER / FILTER BANK | TC- | TRANSFER GRILLE - CEILING MOUNTED |
| FC- | FAN | TD- | TRENCH DRAIN |
| FCU- | FAN COIL UNIT | TF- | TRANSFER GRILLE - FLOOR MOUNTED |
| FD- | FLOOR DRAIN | TW- | TRANSFER GRILLE - WALL MOUNTED |
| FE- | EXHAUST FAN | UH- | UNIT HEATER |
| FPC- | FIRE PROTECTION CABINET | UR- | URNAL |
| FPT- | FAN POWERED TERMINAL | VAV- | VARIABLE AIR VOLUME TERMINAL UNIT |
| FR- | RETURN / RELIEF FAN | VF- | VACUUM FITTING |
| FS- | SUPPLY FAN | WC- | WATER CLOSET |
| FSK- | FLOOR SINK | WH- | WALL HYDRANT |
| FTR- | FINNED TUBE RADIATION | XFMR- | TRANSFORMER (ELEC) |
| GF- | GAS FITTING | | |
| HB- | HOSE BIBB | | |

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 MATERIALS BUILDING
 ANALYTICAL LAB VAV BOX REPLACEMENT
 AMES, IOWA

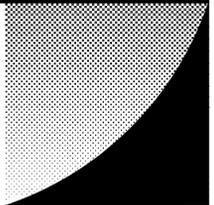
REVISION DATE

SHEET TITLE
 MECHANICAL LEGEND
 AND ABBREVIATIONS

PROJECT LOCATION AMES, IOWA
 PROJECT NUMBER 15044
 ISSUE DATE 1/15/2016
 SHEET NUMBER

G-102

THIS IS A MASTER LIST. ALL ITEMS LISTED MAY NOT BE APPLICABLE TO THIS PARTICULAR PROJECT.



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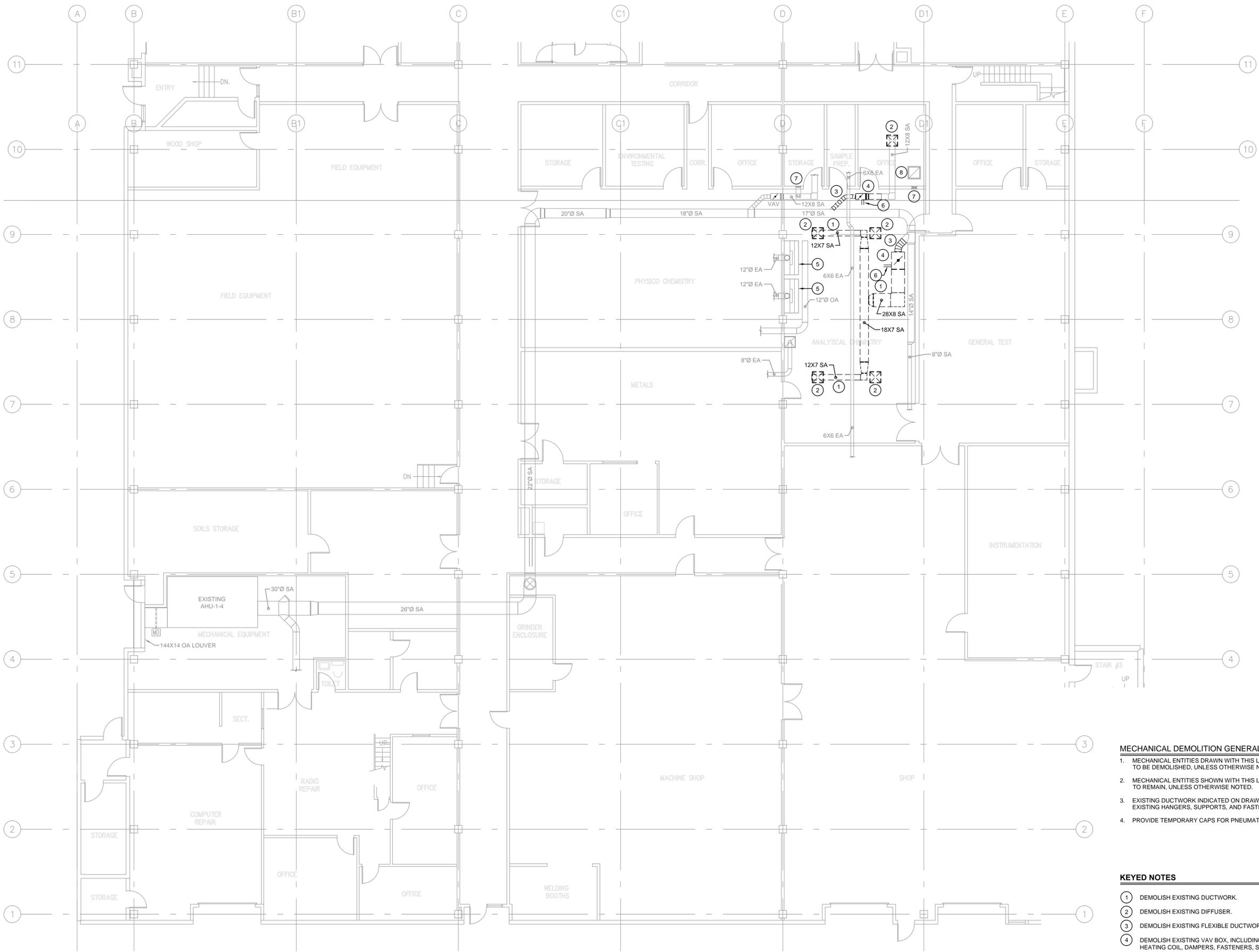
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AMES, IOWA

REVISION _____ DATE _____

SHEET TITLE
**MECHANICAL
DEMOLITION**

PROJECT LOCATION: AMES, IOWA
PROJECT NUMBER: 15044
ISSUE DATE: 1/15/2016
SHEET NUMBER

MD101



MECHANICAL DEMOLITION GENERAL NOTES:

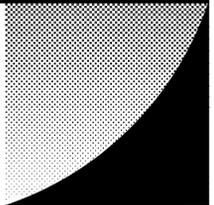
1. MECHANICAL ENTITIES DRAWN WITH THIS LINETYPE (---) INDICATES ENTITIES TO BE DEMOLISHED, UNLESS OTHERWISE NOTED.
2. MECHANICAL ENTITIES SHOWN WITH THIS LINETYPE (---) INDICATES ENTITIES TO REMAIN, UNLESS OTHERWISE NOTED.
3. EXISTING DUCTWORK INDICATED ON DRAWINGS TO BE REMOVED, INCLUDING EXISTING HANGERS, SUPPORTS, AND FASTENERS.
4. PROVIDE TEMPORARY CAPS FOR PNEUMATIC TUBING THAT IS DISCONNECTED.

KEYED NOTES

- 1 DEMOLISH EXISTING DUCTWORK.
- 2 DEMOLISH EXISTING DIFFUSER.
- 3 DEMOLISH EXISTING FLEXIBLE DUCTWORK.
- 4 DEMOLISH EXISTING VAV BOX, INCLUDING ELECTRIC HEATING COIL, HOT WATER HEATING COIL, DAMPERS, FASTENERS, STRUT AND CONTROLS. EXISTING PNEUMATIC TUBING TO BE DISCONNECTED AND REMAIN IN PLACE.
- 5 EXISTING EXHAUST HOOD SHOWN FOR REFERENCE.
- 6 DEMOLISH EXISTING HWS/ HWR PIPING BACK TO EXISTING SHUT-OFF VALVES.
- 7 EXISTING TRANSFER GRILLE SHOWN FOR REFERENCE.
- 8 DEMOLISH EXISTING RETURN GRILLE.

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

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**MECHANICAL
HVAC**

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SHEET NUMBER

M-101



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

MECHANICAL GENERAL NOTES:

1. DRAWINGS SHOWING LOCATIONS OF FIXTURES, EQUIPMENT, DUCTWORK, PIPING, ETC. ARE DIAGRAMMATIC AND MAY NOT ALWAYS REFLECT ACTUAL INSTALLATION CONDITIONS. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL PIPING, DUCTWORK, EQUIPMENT, ETC., AND MAY NOT INCLUDE ALL OFFSETS AND FITTINGS. AS REQUIRED, THE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONSTRUCTION AND THE WORK OF OTHERS WILL PERMIT.
2. VERIFY SIZE AND LOCATION OF EXISTING PIPING, DUCTWORK AND EQUIPMENT AS IT RELATES TO NEW WORK.
3. MECHANICAL CONTRACTOR SHALL COORDINATE ALL PIPING AND DUCTWORK WITH ALL DUCTWORK AND OTHER TRADES PRIOR TO COMMENCEMENT OF WORK.
4. FURNISH AND INSTALL MECHANICAL PRODUCTS IN COMPLIANCE WITH LOCAL BUILDING CODES AND THE AUTHORITY HAVING JURISDICTION, AND IN ACCORDANCE WITH GENERALLY ACCEPTED INDUSTRY STANDARDS AND PRACTICES AND MANUFACTURER'S RECOMMENDATIONS.
5. VERIFY ACTUAL LOCATIONS OF CEILING AND WALL MOUNTED DEVICES WITH ARCHITECTURAL.
6. FIRE CAULK ALL MECHANICAL PENETRATIONS AT FIRE RATED WALLS. SEE CODE PLAN FOR FIRE RATED WALL LOCATIONS.
7. REMODEL WORK TO BE PERFORMED DURING NORMAL BUSINESS HOURS.

KEYED NOTES

- 1 CAP EXISTING DUCTWORK.
- 2 WALL MOUNTED THERMOSTAT - 52" A.F.F.
- 3 PROVIDE "Y" DUCT FITTING.
- 4 RECONNECT EXISTING 3/4" HWS/ HWR PIPING.
- 5 PROVIDE ACCESS DOOR ON SIDE OF DUCT.

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