



IOWA DEPARTMENT OF TRANSPORTATION

MDP REPLACEMENT

AMES, IOWA

PROJECT #BG-3A22(038)--80-85

IOWA DOT MATERIALS LAB
MDP REPLACEMENT
AMES, IOWA

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REVISION _____ DATE _____

SHEET TITLE
COVER SHEET

PROJECT LOCATION AMES, IOWA
PROJECT NUMBER _____
ISSUE DATE September 23, 2015
SHEET NUMBER 8/13/2015

G-101

<p>I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly registered architect under the laws of the State of Iowa.</p> <p>STEPHEN J. STIMMEL, AIA Printed or typed name</p> <p>Signature _____ Pages or sheets covered by this seal. ALL ARCHITECTURAL SHEETS</p> <p>Date Issued: September 23, 2015</p>	<p>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.</p> <p>Signature _____ Date _____</p> <p>JOHN NIGRO, P.E. My license renewal date is December 31, 2015</p> <p>Pages or sheets covered by this seal. ALL STRUCTURAL</p> <p>Date Issued: September 23, 2015</p>	<p>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.</p> <p>Signature _____ Date _____</p> <p>ROBERT A. HEDGEPEETH, P.E. My license renewal date is December 31, 2015</p> <p>Pages or sheets covered by this seal. ALL ELECTRICAL</p> <p>Date Issued: September 23, 2015</p>
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ELECTRICAL LEGEND

SCHEMATIC/GENERAL

	AMMETER		UTILITY FEED
	AMMETER SWITCH		VOLTMETER
	AUTOMATIC TRANSFER SWITCH PHASE CONDUCTORS		TRANSFER SWITCH (N-NORMAL FEED) (E-EMERGENCY FEED)
	CABLE		AUTOMATIC TRANSFER SWITCH - HIGH DETAIL
	CIRCUIT MONITORING EQUIPMENT		FEEDER REFERENCE TAG
	CT RELAY		RELAY
	DISCONNECT SWITCH		MOTOR OVERLOAD PROTECTION
	DISCONNECT SWITCH WITH GROUND FAULT		SURGE PROTECTION DEVICE
	CONNECTION POINT		DISCONNECT SWITCH
	FAULTED CIRCUIT INDICATOR		DISCONNECT SWITCH WITH GROUND FAULT
	FUSE		LOAD BANK
	FUSED DISCONNECT		POINT OF CONNECTION - NEW TO EXISTING
	GENERATOR		
	GROUND FAULT PROTECTION SYSTEM		
	GROUNDING ELECTRODE		
	HIGH VOLTAGE BREAKER		
	INTERLOCKED NORMALLY OPEN (NO) & NORMALLY CLOSED (NC) DISCONNECT SWITCHES		
	LOW VOLTAGE CIRCUIT BREAKER		
	METER		
	MOTOR		
	POTENTIAL TRANSFORMER		
	POWER METER		
	DIGITAL POWER METER		
	POWER TRANSFORMER (DELTA WYE)		
	PUSHBUTTON SWITCH		
	SPLICE BOX		
	UNINTERRUPTIBLE POWER SUPPLY WITH BYPASS		
	INVERTER		
	RECTIFIER		
	CONVERTER		

LIGHTING FIXTURES

	FLUORESCENT SURFACE LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	FLUORESCENT RECESSED LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	FLUORESCENT COVE LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	FLUORESCENT STRIP LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	FLUORESCENT UNDER CABINET LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	PENDANT LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	WALL MOUNTED FLUORESCENT LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	FLUORESCENT VOLUMETRIC LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	RECESSED TROFFER LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	TRACK LIGHT
	BOLLARD LIGHT
	POST MOUNTED LIGHTING FIXTURE- ONE ARM, TWO ARM...
	CEILING MOUNTED INCANDESCENT, FLUORESCENT OR H.I.D. LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	WALL MOUNTED INCANDESCENT OR H.I.D. LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	EXTERIOR WALL PACK LIGHTING FIXTURE - DARKENED AREA INDICATES FIXTURE ON EMERGENCY CIRCUIT
	WALL (FLUSH) MOUNTED, SINGLE FACE EXIT SIGN, ARROW INDICATES DIRECTION OF TRAVEL, SHADED SECTION INDICATES FRONT WITH NO ARROWS
	WALL (END) MOUNTED, DOUBLE FACE EXIT SIGN, ARROW INDICATES DIRECTION OF TRAVEL
	CEILING OR PENDANT MOUNTED, SINGLE FACE EXIT SIGN, ARROW INDICATES DIRECTION OF TRAVEL, SHADED SECTION INDICATES FRONT WITH NO ARROWS
	CEILING OR PENDANT MOUNTED, DOUBLE FACE EXIT SIGN, ARROW INDICATES DIRECTION OF TRAVEL
	CEILING MOUNTED DUAL HEAD EMERGENCY LIGHT
	WALL MOUNTED DUAL HEAD EMERGENCY LIGHT
	ANNOTATIONS - SUPERScript LETTER & NUMBER INDICATES FIXTURE NUMBER, (SEE LIGHTING FIXTURE SCHEDULE) SUPERScript NUMBER INDICATES CIRCUIT NUMBER, (SEE PANELBOARD SCHEDULE) SUPERScript LOWER CASE LETTER INDICATES SWITCH CONTROL, NL DENOTES NIGHT LIGHT CIRCUIT, (TYPICAL FOR ALL FIXTURE TYPES)

CONTROLS

	SINGLE POLE SWITCH
	DOUBLE POLE SWITCH
	THREE WAY SWITCH
	FOUR WAY SWITCH
	KEY OPERATED SWITCH
	DIMMER SWITCH
	PILOT SWITCH
	THREE WAY PILOT SWITCH
	MOTOR SWITCH
	TIMER SWITCH
	DOOR SWITCH
	FUSED SWITCH
	LOW VOLTAGE SWITCH
	LOW VOLTAGE MOMENTARY CONTROL SWITCH
	CIRCUIT BREAKER SWITCH
	FIVE BUTTON PRESET STATION
	TEN BUTTON PRESET STATION
	ANNOTATIONS - (x) DENOTES SWITCH NUMBER, TYPICAL FOR ALL SWITCH TYPES.
	OCCUPANCY SENSOR SWITCH, ANNOTATIONS - (x) DENOTES OCCUPANCY SENSOR SWITCH NUMBER, REFER TO SCHEDULE.
	PUSHBUTTON ON-OFF SWITCH
	CEILING MOUNTED OCCUPANCY SENSOR, ANNOTATIONS - (x) DENOTES OCCUPANCY SENSOR SWITCH NUMBER, REFER TO SCHEDULE.
	WALL MOUNTED OCCUPANCY SENSOR, ANNOTATIONS - (x) DENOTES OCCUPANCY SENSOR SWITCH NUMBER, REFER TO SCHEDULE.
	CEILING MOUNTED DAYLIGHTING SENSOR
	WALL MOUNTED DAYLIGHTING SENSOR
	DOOR OPENER SWITCH
	PHOTOCELL
	NON-FUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	MOTOR STARTER
	COMBINATION MOTOR STARTER DISCONNECT SWITCH
	EMERGENCY SHUT DOWN PUSHBUTTON
	THERMOSTAT - WALL MOUNTED
	THERMOSTAT - CEILING MOUNTED
	VARIABLE FREQUENCY DRIVE
	ROOM LIGHTING CONTROL SWITCH, ANNOTATIONS - (x) DENOTES CONTROL NUMBER, REFER TO SCHEDULE.

POWER DEVICES

	SIMPLEX RECEPTACLE - WALL MOUNTED
	SIMPLEX RECEPTACLE - FLOOR MOUNTED
	SIMPLEX RECEPTACLE - CEILING MOUNTED
	SIMPLEX RECEPTACLE - ABOVE COUNTERTOP
	DUPLEX RECEPTACLE - WALL MOUNTED
	DUPLEX RECEPTACLE - FLOOR MOUNTED
	DUPLEX RECEPTACLE - CEILING MOUNTED
	DUPLEX RECEPTACLE - ABOVE COUNTERTOP
	QUADRAPLEX RECEPTACLE - WALL MOUNTED
	QUADRAPLEX RECEPTACLE - FLOOR MOUNTED
	QUADRAPLEX RECEPTACLE - CEILING MOUNTED
	QUADRAPLEX RECEPTACLE - ABOVE COUNTERTOP
	ANNOTATIONS - WP DENOTES WEATHERPROOF, NL DENOTES RECEPTACLE WITH NIGHT LIGHT, GF DENOTES GROUND FAULT, IG DENOTES ISOLATED GROUND, S DENOTES SECURE, (TYPICAL FOR ALL TYPES OF RECEPTACLES)
	HIGH VOLTAGE RECEPTACLE - WALL MOUNTED
	SPECIAL EQUIPMENT CONNECTION - WALL MOUNTED
	SPECIAL EQUIPMENT CONNECTION - FLOOR MOUNTED
	SPECIAL EQUIPMENT CONNECTION - CEILING OR SURFACE MOUNTED
	JUNCTION BOX - WALL MOUNTED
	JUNCTION BOX - FLOOR MOUNTED
	JUNCTION BOX - CEILING MOUNTED
	JUNCTION BOX - SURFACE OR EQUIPMENT MOUNTED
	ELECTRIC MANHOLE
	HAND DRYER
	MOTOR DAMPER
	MULTI-OUTLET ASSEMBLY WITH POWER RECEPTACLES
	AUTOMATIC TRANSFER SWITCH
	ELECTRICAL PANELBOARD
	UTILITY SWITCHBOARD
	UNDERFLOOR DUCT

SECURITY

	CARD READER
	MOTION DETECTOR
	DOOR ALARM
	DOOR POSITION SWITCH
	ELECTRIC DOOR STRIKE
	ELECTRIC LATCH
	GLASS BREAKAGE DETECTOR
	INFRARED DETECTOR
	KEEPER SWITCH
	KEY PAD
	MAGNETIC LOCK
	PANIC BUTTON
	REQUEST TO EXIT
	SOUNDER
	SECURITY CAMERA

FIRE ALARM DEVICES

	FIRE FIGHTER JACK
	MANUAL PULL STATION
	FIRE ALARM HORN
	FIRE ALARM SPEAKER
	COMBINATION FIRE ALARM SPEAKER & STROBE LIGHT
	COMBINATION FIRE ALARM HORN & STROBE LIGHT
	FIRE ALARM STROBE LIGHT
	HEAT DETECTOR - COMBINATION RATE OF RISE & FIXED
	HEAT DETECTOR - RATE COMPENSATION
	HEAT DETECTOR - RATE OF RISE ONLY
	HEAT DETECTOR - THERMAL DETECTOR
	HEAT DETECTOR - FIXED TEMPERATURE
	SMOKE DETECTOR - PHOTOELECTRIC
	SMOKE DETECTOR - AIR SAMPLING
	SMOKE DETECTOR - IONIZATION
	DUCT SMOKE DETECTOR
	SMOKE BEAM DETECTOR
	REMOTE TEST STATION
	KNOX BOX
	FIRE/SMOKE DAMPER
	CHIME LIGHT
	ELECTRIC BELL
	FLOW SWITCH
	TAMPER SWITCH
	DOOR HOLDER-WALL MOUNTED
	DOOR HOLDER-FLOOR MOUNTED
	END OF LINE RESISTOR
	FIRE ALARM CONTROL PANEL
	FIRE ALARM ANNUNCIATOR
	ADDRESSABLE RELAY MODULE

COMMUNICATION DEVICES

	VOICE/DATA OUTLET-WALL MOUNTED
	VOICE/DATA OUTLET-CEILING MOUNTED
	VOICE/DATA OUTLET-FLOOR MOUNTED
	ANNOTATIONS-SUPERScript IDENTIFIES FAR END CABLE PUNCH DOWN ASSIGNMENT, REFERENCE TELECOM SCHEDULE (TYPICAL FOR ALL TYPES)
	WALL TELEPHONE
	PUBLIC TELEPHONE
	SPEAKER HORN
	SPEAKER-CEILING MOUNTED
	SPEAKER-WALL MOUNTED
	PAGING SPEAKER
	SOUND MASKING SPEAKER
	SPEAKER VOLUME CONTROL
	INTERCOM
	REMOTE INTERCOM
	PAGING STATION
	MICROPHONE
	AUDIO/VIDEO J-BOX - 2 GANG WITH COVER
	TV OUTLET
	CLOSED CIRCUIT TV OUTLET
	ANALOG CLOCK - SINGLE SIDED
	ANALOG CLOCK - DOUBLE SIDED
	DIGITAL CLOCK - SINGLE SIDED
	DIGITAL CLOCK - DOUBLE SIDED
	AMPLIFIER
	WIRELESS ACCESS POINT - CEILING MOUNT
	WIRELESS ACCESS POINT - WALL MOUNT
	CABLE TRAY
	MULTI-OUTLET ASSEMBLY WITH DATA RECEPTACLES
	J-HOOK COMMUNICATION PATHWAY

MEDICAL/NURSE CALL DEVICES

	BLANKET WARMER
	DUPLEX GROUNDING MODULE
	X-RAY EMERGENCY SHUTDOWN PUSHBUTTON
	X-RAY RECEPTACLE AND INDICATOR MODULE
	X-RAY VIEWING SCREEN
	NURSE CALL ANNUNCIATOR
	CODE BLUE
	DOME LIGHT
	DUTY STATION
	MASTER CONTROL STATION
	OPERATING ROOM STATION
	PATIENT STATION
	STAFF EMERGENCY STATION
	STAFF EMERGENCY
	TOILET SHOWER STATION
	ZONE LIGHT

CIRCUITING

	ELECTRICAL CIRCUITING IN WALL, UNDERFLOOR OR ABOVE CEILING
	EXISTING ELECTRICAL CIRCUITING IN WALL, UNDERFLOOR OR ABOVE CEILING
	ELECTRICAL CIRCUITING UNDERGROUND
	ELECTRICAL CIRCUITING FOR EMERGENCY SYSTEM IN WALL, UNDERFLOOR OR ABOVE CEILING
	ELECTRICAL CIRCUITING INDICATING NUMBER OF HOT CONDUCTORS AND GROUND WIRES (TYPICAL FOR ALL TYPES)
	ELECTRICAL CIRCUITING "HOMERUN" TO PANELBOARD (TYPICAL FOR ALL TYPES)
	ELECTRICAL CIRCUITING IN EXPOSED CONDUIT OR MANUFACTURED WIRING SYSTEM

LIGHTNING PROTECTION

	LIGHTNING AIR TERMINAL
	LIGHTNING CABLE THROUGH ROOF
	LIGHTNING BIMETAL CONNECTOR
	LIGHTNING BONDING POINT
	LIGHTNING GROUND ROD

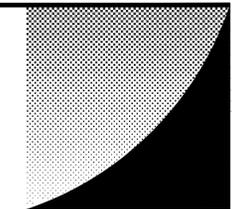
IOWA DOT MATERIALS LAB
MDP REPLACEMENT
AMES, IOWA

REVISION DATE

SHEET TITLE
ELECTRICAL LEGEND
SHEET

PROJECT LOCATION AMES, IOWA
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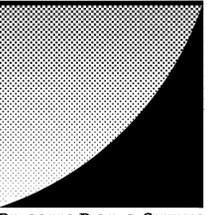
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XREFS: 14063-24x36 Project - Titleblock.dwg

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 |
| CRJ- | INTAKE RECLAIM COIL | PPB- | DOMESTIC PRESSURE BOOSTER PUMP |
| CRP- | CONDENSATE RETURN PUMP | PR- | PANEL RADIATOR |
| CRU- | COMPUTER ROOM UNIT | PRR- | 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-C- | ELECTRIC WATER COOLER | SHT- | SHOWER TRIM |
| EW-S- | EMERGENCY WASH STATION | SS- | SERVICE SINK |
| F | FURNACE | ST- | SINK TRIM |
| FB- | FILTER / FILTER BANK | TC- | TRANSFER GRILLE - CEILING MOUNTED |
| FC- | CEILING 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 | | |

IOWA DOT MATERIALS LAB
MDP REPLACEMENT
AMES, IOWA

REVISION DATE

SHEET TITLE
MECHANICAL LEGEND
AND ABBREVIATIONS

PROJECT LOCATION AMES, IOWA

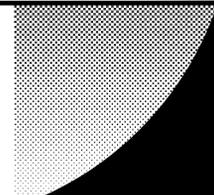
PROJECT NUMBER September 23, 2015

ISSUE DATE 8/13/2015

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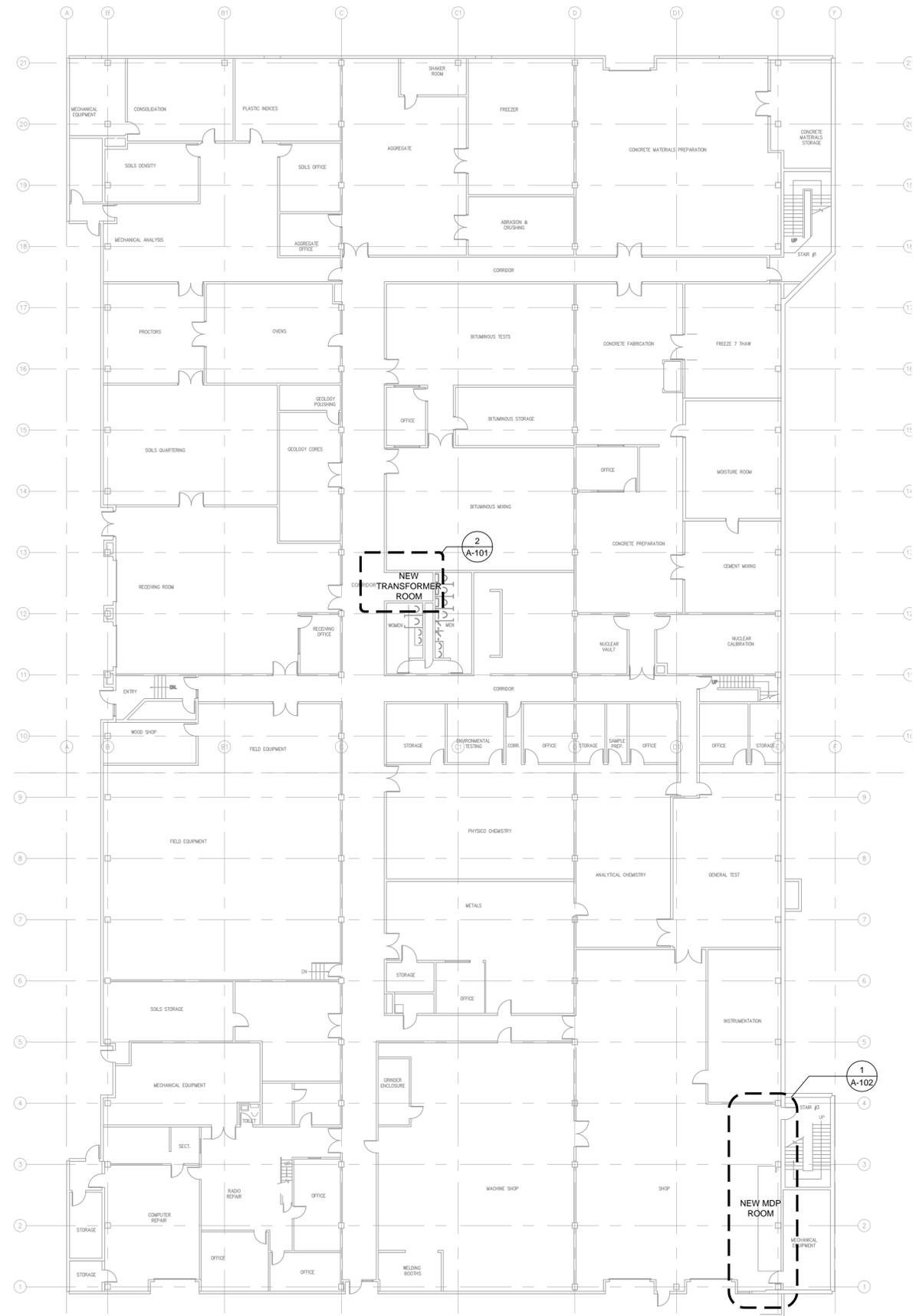
G-103

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



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2 OVERALL BUILDING "MAP"
SCALE: 1/16" = 1'-0"

DOOR FRAME SCHEDULE

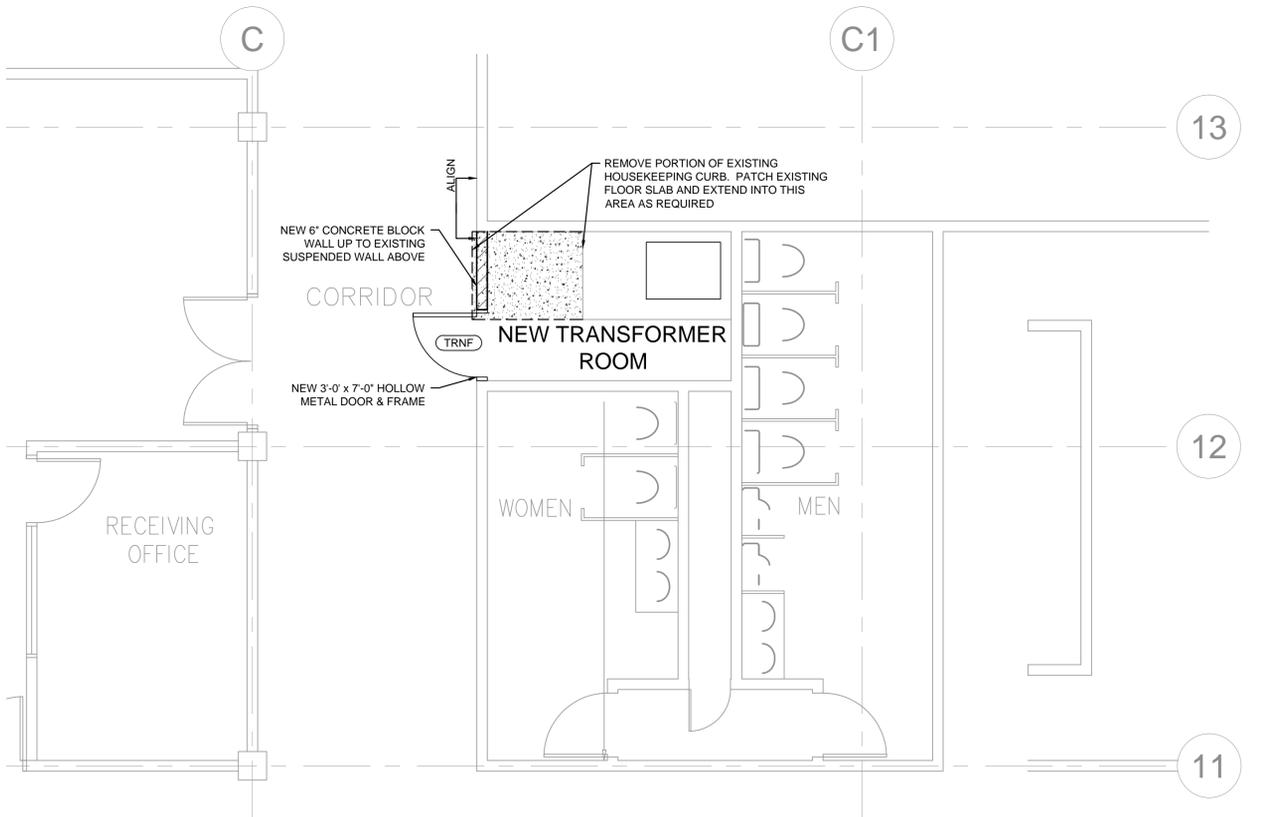
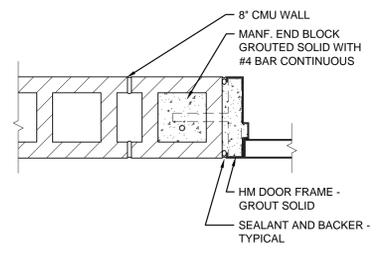
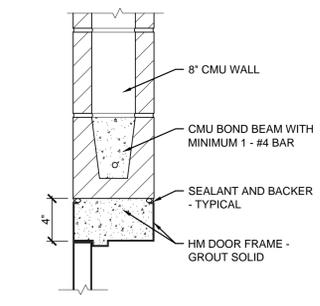
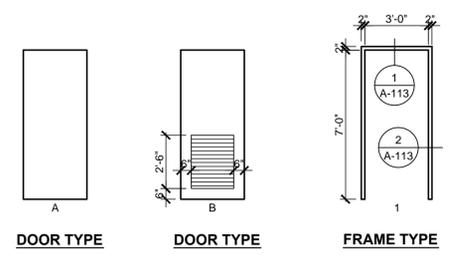
DOOR MARK	LABEL (MIN)	ROOM NO.	TO/ FROM	ROOM NO.	DOOR			FRAME			HDWR GROUP NO.	REMARKS			
					WIDE x HIGH	TYPE	MAT'L	QTY	TYPE	MAT'L			DETAIL		
TRNF	-	CORR	TO	TRNF RM	3'-0" x 7'-0"	B	HM	1	1	HM	3/--	4/--	-	1	1
MDP	-	SHOP	TO	MDP	3'-0" x 7'-0"	B	HM	1	1	HM	3/--	4/--	-	1	1

DOOR NOTES:
1. PAINT ALL DOORS AND FRAMES AS SPECIFIED.
2. SEE SPECIFICATION FOR HARDWARE SETS

NUMBERED REMARKS:
1. SIZE LOUVER AS REQUIRED TO MEET MINIMUM AIR FLOW REQUIREMENTS.

ROOM FINISH NOTES

- NEW MDP ROOM**
1. PAINT ALL NEW EXPOSED CONCRETE AND CMU BLOCK (INSIDE AND OUTSIDE OF ROOM) WITH EPOXY PAINT AS SPECIFIED. PAINT EXISTING CONCRETE BLOCK WALL THAT FORMS THE EAST WALL OF THE MDP ROOM AS SPECIFIED. PAINT BOTH INSIDE THE MDP ROOM AND OUTSIDE THE MDP ROOM TO THE CORNERS OF ADJACENT WALLS OR CEILINGS.
 2. PAINT THE EXPOSED PORTION OF THE PLYWOOD "ROOF" AS SPECIFIED.
 3. ALL CONCEALED STEEL TO BE GALVANIZED. ALL EXPOSED STEEL TO BE PAINTED AS SPECIFIED. PAINT STEEL MEMBERS SUPPORTING FLOOR GRATES.
- NEW TRANSFORMER ROOM**
1. PAINT ALL NEW AND EXISTING WALL WITH ACRYLIC PAINT AS SPECIFIED. AT CORRIDOR, EXTEND PAINT OVER EXISTING TO A JOINT, CORNER OR LOGICAL BREAK. PATCH CONCRETE FLOOR AND EQUIPMENT SLAB. PROVIDE TWO COATS OF SEALER ON ALL NEW CONCRETE. PROVIDE ONE COAT OF SEALER ON ALL EXISTING CONCRETE TO REMAIN.



1 NEW TRANSFORMER ROOM PLAN
SCALE: 1/4" = 1'-0"

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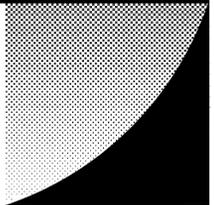
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SHEET TITLE
**OVERALL PLAN,
ENLARGED NEW
TRANSFORMER ROOM
PLAN, DOOR AND
FINISH SCHEDULES**

PROJECT LOCATION: AMES, IOWA
PROJECT NUMBER: September 23, 2015
ISSUE DATE: 8/13/2015
SHEET NUMBER

A-101

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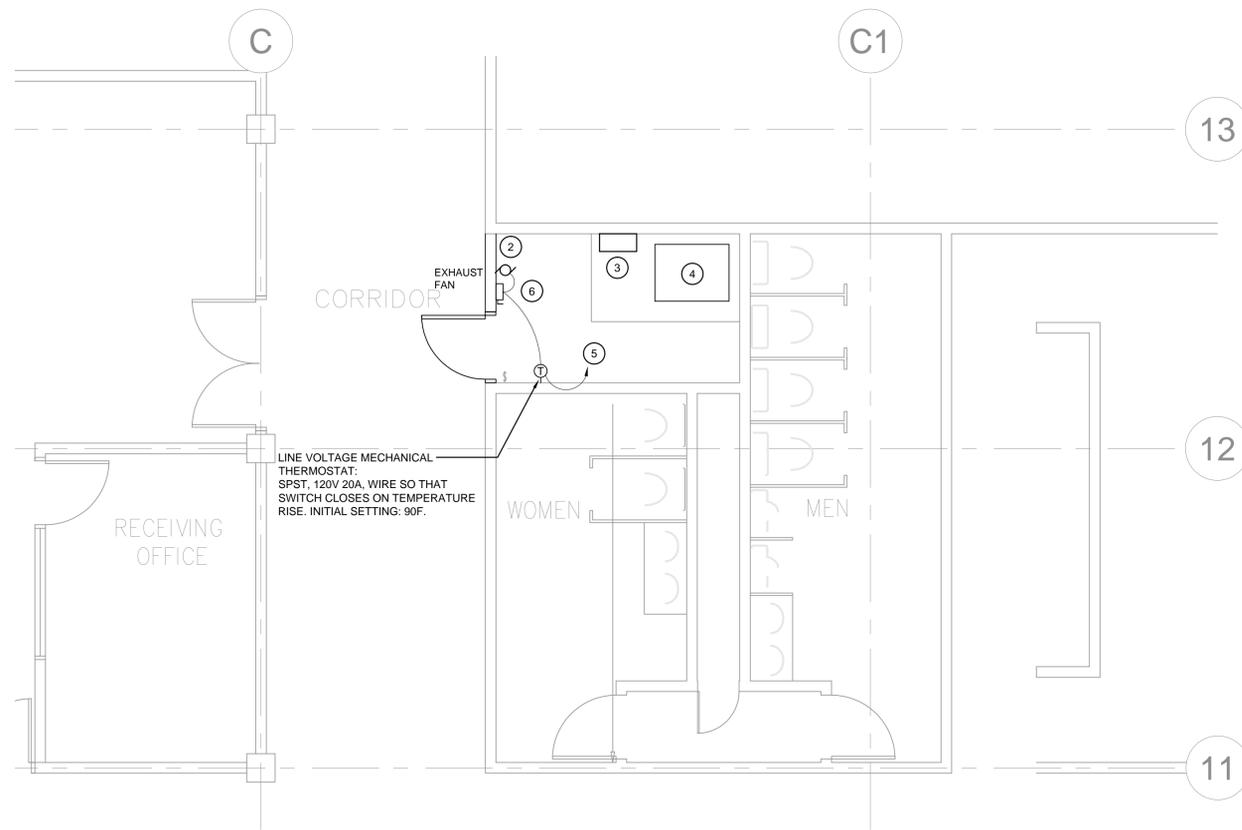
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GENERAL NOTES

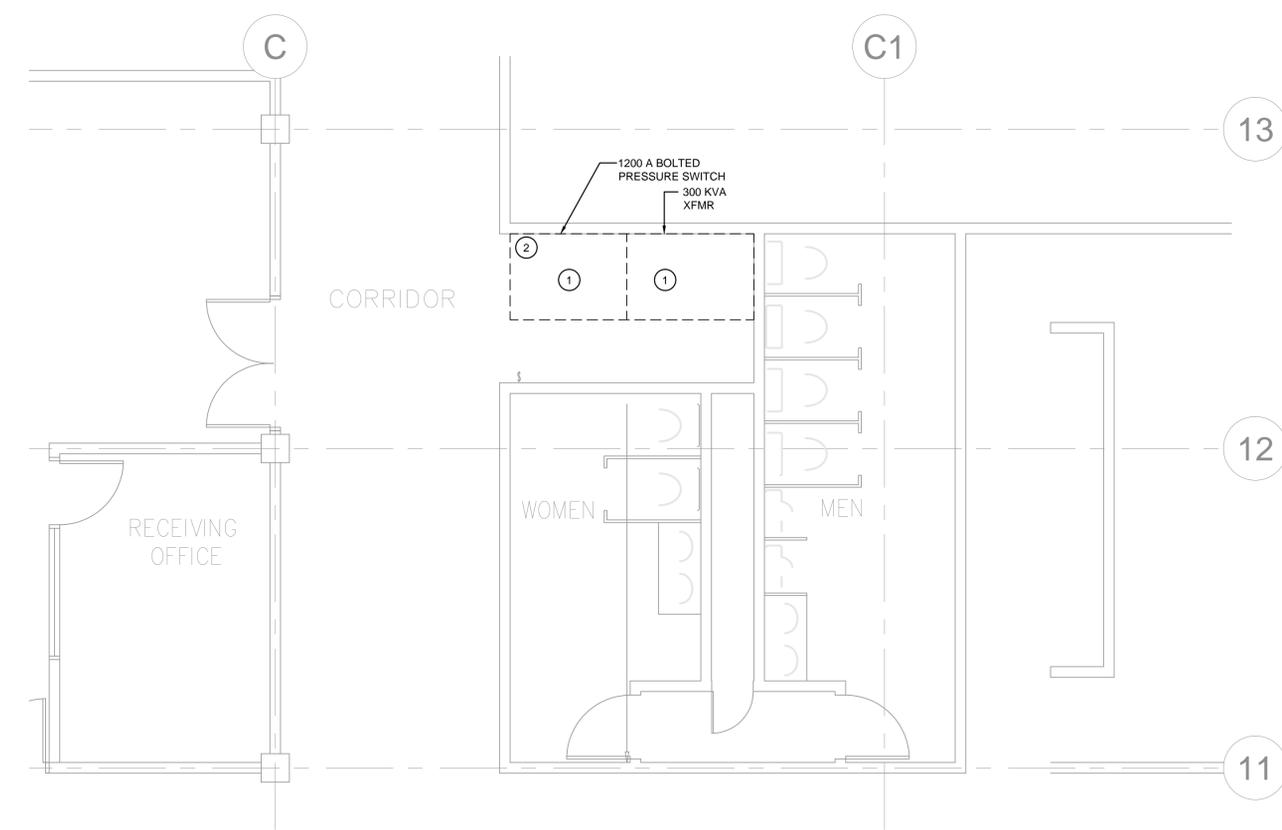
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- 2 ELECTRICAL ENTITIES DRAWN WITH THIS LINETYPE (- - -) INDICATES DEMOLITION WORK UNLESS OTHERWISE NOTED.
- 3 ELECTRICAL ENTITIES DRAWN WITH THIS LINETYPE (———) INDICATES NEW WORK UNLESS OTHERWISE NOTED.
- 4 DEMOLITION DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION. REPORT DISCREPANCIES TO OWNER BEFORE DISTURBING EXISTING INSTALLATION. DASHED WALLS ARE SCHEDULED TO BE REMOVED.

KEYED NOTES

- 1 DEMOLISH EXISTING SWITCHBOARD, PRIMARY BREAKER & 300 KVA TRANSFORMER.
- 2 EXISTING BUS CONNECTION. (1000 A ITE FEEDERISER BUS).
- 3 NEW 500 A ENCLOSED CIRCUIT BREAKER.
- 4 NEW 300 KVA STEP DOWN TRANSFORMER.
- 5 CIRCUIT TO NEARBY 208VY/120V PANEL. 1P-20A CIRCUIT WITH 2-#12 & 1-#12G IN 3/4" CONDUIT.
- 6 EXHAUST FAN & MOTOR STARTER WITH PILOT LIGHT.



2 PARTIAL PLAN - NEW
TRANSFORMER ROOM
SCALE: 1/4" = 1'-0"



1 PARTIAL PLAN - EXISTING
TRANSFORMER ROOM
SCALE: 1/4" = 1'-0"

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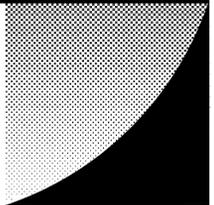
IOWA DOT MATERIALS LAB
 MDP REPLACEMENT
 AMES, IOWA

REVISION _____ DATE _____

SHEET TITLE
ELECTRICAL
PARTIAL PLANS -
TRANSFORMER ROOM

PROJECT LOCATION AMES, IOWA
PROJECT NUMBER
ISSUE DATE September 23, 2015
SHEET NUMBER 8/13/2015

E-101



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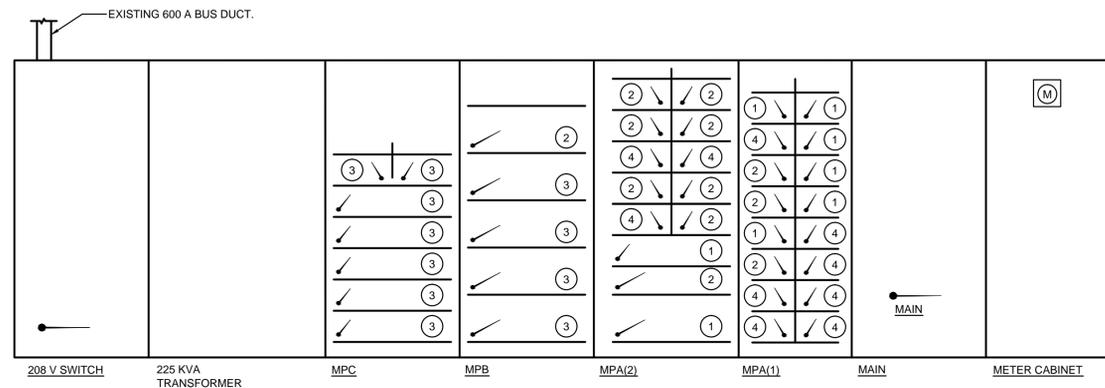
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GENERAL NOTES

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- 2 ELECTRICAL ENTITIES DRAWN WITH THIS LINETYPE (- - -) INDICATES DEMOLITION WORK UNLESS OTHERWISE NOTED.
- 3 DEMOLITION DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION. REPORT DISCREPANCIES TO OWNER BEFORE DISTURBING EXISTING INSTALLATION. DASHED WALLS ARE SCHEDULED TO BE REMOVED.

KEYED NOTES

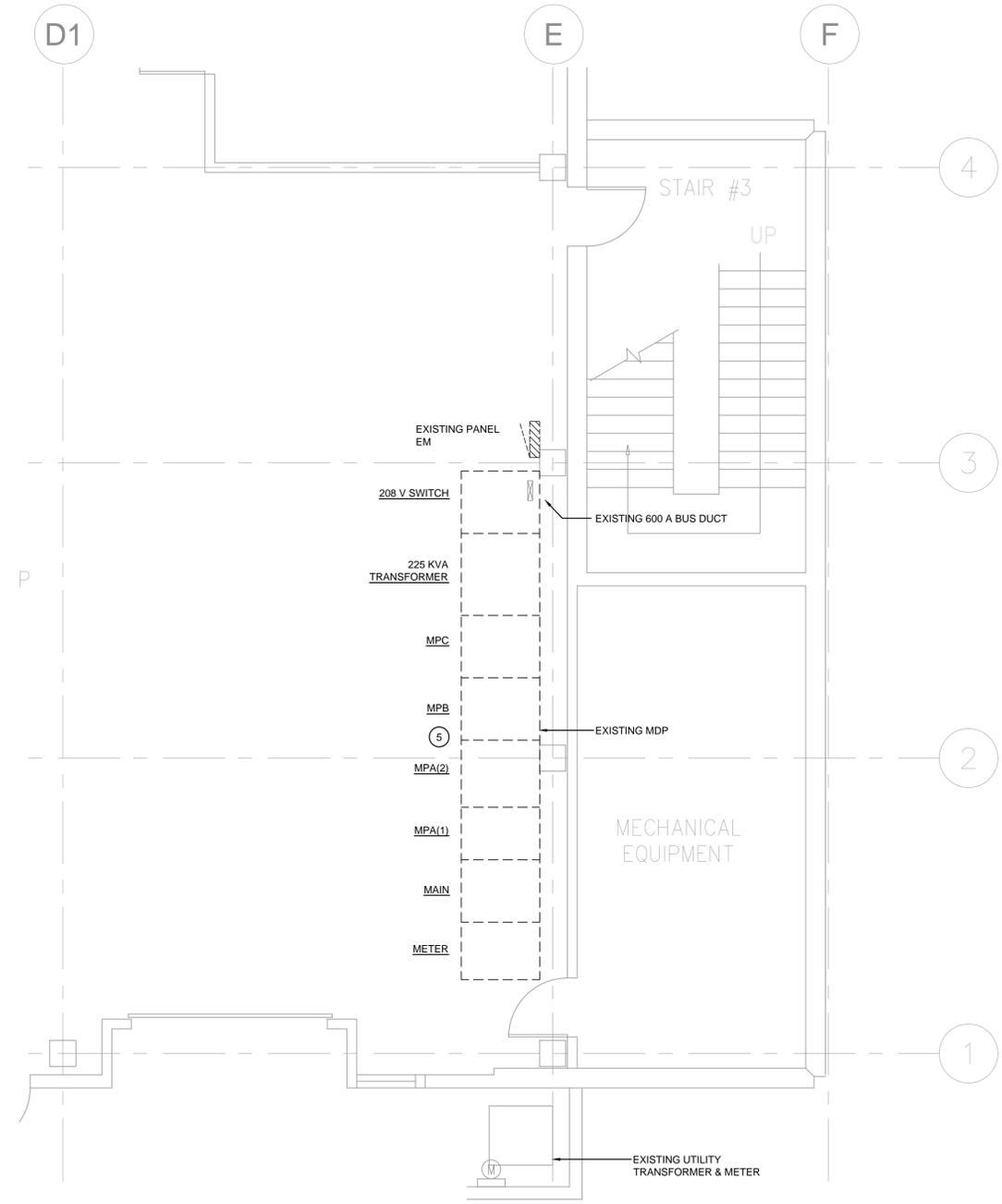
- 1 SWITCH IN OFF POSITION.
- 2 DECOMMISSIONED LOAD.
- 3 LOAD TO NEW MDP.
- 4 LOAD TO NEW MPA.
- 5 REMOVE EXISTING LIGHTING. STORE FOR RE-INSTALLATION. REFER TO SHEET E-103.



3 EXISTING MDP ELEVATION
SCALE: 1/2" = 1'-0"

	800 A BOLTED PRESSURE SWITCH CONNECTION TO 600 A ITE FEEDER BUS WITH GROUND FAULT RELAY. (FROM TOP OF GEAR).
	225 KVA TRANSFORMER SEPARATELY DERIVED GROUND ROD.
	MPC EXISTING DRIVEN GROUND ROD. 4 CONDUITS FROM BELOW.
	MPB 5 CONDUITS FROM BELOW.
	MPA(2) 9 CONDUITS FROM BELOW.
	MPA(1) EXISTING DRIVEN GROUND ROD. 5 CONDUITS FROM BELOW.
	MAIN BOLTED PRESSURE SWITCH FA 3000 A WITH GROUND FAULT RELAY. PANEL EM-1 TAPPED FROM BUS IN THIS SECTION.
	METER CABINET 8 INCOMING FEEDER CONDUITS FROM BELOW.

2 EXISTING MDP PLAN DETAIL
SCALE: 1/4" = 1'-0"



1 PARTIAL PLAN - DEMO MDP ROOM
SCALE: 1/4" = 1'-0"

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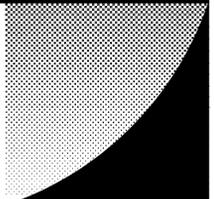
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SHEET TITLE
ELECTRICAL
PARTIAL PLANS &
DETAILS - MDP ROOM
DEMOLITION

PROJECT LOCATION AMES, IOWA
PROJECT NUMBER
ISSUE DATE September 23, 2015
SHEET NUMBER 8/13/2015

E-102

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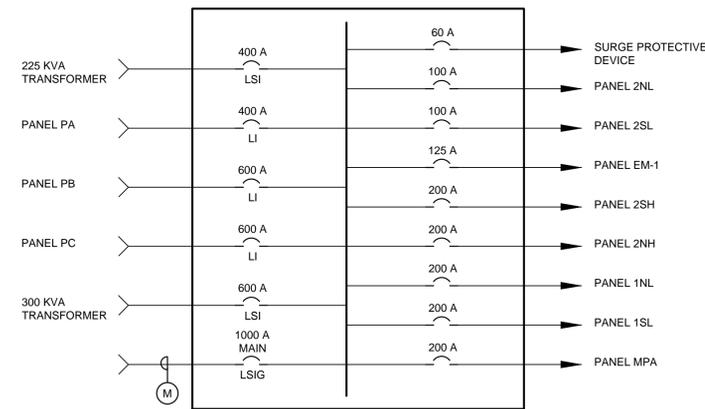


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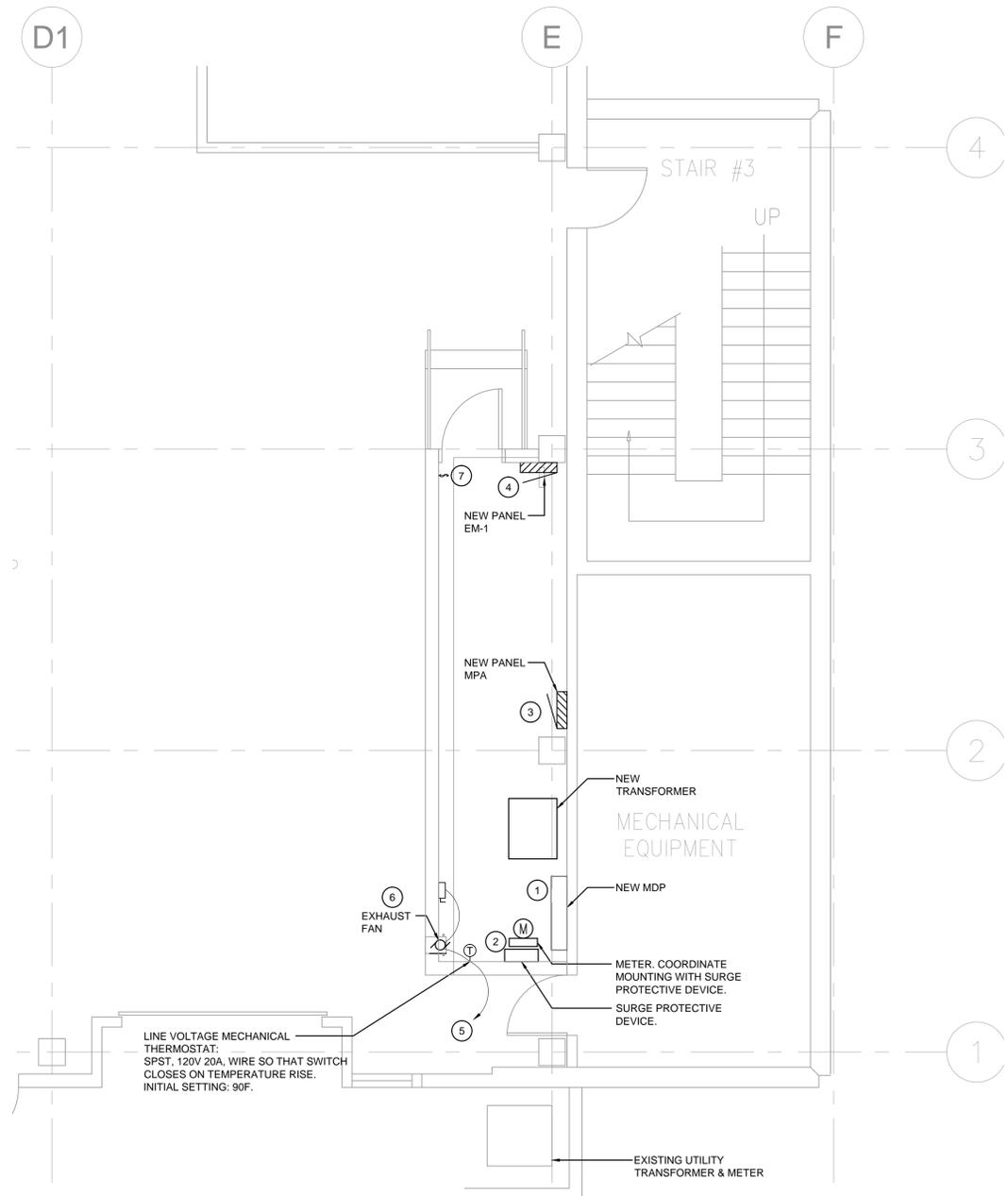
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PANEL MPA									
SHORT CIRCUIT RATING: 25,000 AMPS			FED FROM PANEL MDP				MAIN BREAKER: 200 AMP		
INSTALLATION: SURFACE							480Y/277 VOLTS		
SIZE OF MAIN: 200 AMP							3 PHASE, 4 WIRE		
NO.	DESCRIPTION	PHASE WIRES, GND CONDUIT SIZE	LOAD (VA)	BKR	P H	BKR	LOAD (VA)	PHASE WIRES, GND CONDUIT SIZE	DESCRIPTION
1	P-CHEM, 146, 147, 148, C-stair CUH	-	-	3P-20A	A	3P-20A	-	-	SW Entry CUH
3	-	-	-	-	B	-	-	-	-
5	-	-	-	-	C	-	-	-	-
7	Rm 127 Dust Collector	-	-	3P-20A	A	3P-50A	-	-	MCC 1-3, 2-2
9	-	-	-	-	B	-	-	-	-
11	-	-	-	-	C	-	-	-	-
13	S Entry CUH	-	-	3P-20A	A	3P-50A	-	-	MCC 1-4
15	-	-	-	-	B	-	-	-	-
17	-	-	-	-	C	-	-	-	-
19	S Stair CUH	-	-	3P-20A	A	-	-	-	SPACE
21	-	-	-	-	B	-	-	-	SPACE
23	-	-	-	-	C	-	-	-	SPACE
25	Pump P6	-	-	3P-20A	A	-	-	-	SPACE
27	-	-	-	-	B	-	-	-	SPACE
29	-	-	-	-	C	-	-	-	SPACE
31	Control Air Comp	-	-	3P-20A	A	-	-	-	SPACE
33	-	-	-	-	B	-	-	-	SPACE
35	-	-	-	-	C	-	-	-	SPACE
37	Rm 153 Dust Collector	-	-	3P-20A	A	-	-	-	SPACE
39	-	-	-	-	B	-	-	-	SPACE
41	-	-	-	-	C	-	-	-	SPACE

PANEL EM-1									
SHORT CIRCUIT RATING: 25,000 AMPS			FED FROM PANEL MDP				MAIN BREAKER: 125 AMP		
INSTALLATION: SURFACE							480Y/277 VOLTS		
SIZE OF MAIN: 125 AMP							3 PHASE, 4 WIRE		
NO.	DESCRIPTION	PHASE WIRES, GND CONDUIT SIZE	LOAD (VA)	BKR	P H	BKR	LOAD (VA)	PHASE WIRES, GND CONDUIT SIZE	DESCRIPTION
1	N End Lts, Gnd Floor	-	-	1P-20A	A	1P-20A	-	-	Ext Lts- 2nd Flr
3	Ext Lights, Gnd Floor	-	-	1P-20A	B	1P-20A	-	-	SE Gnd Flr
5	Ext Lights/1st Flr timeclock	-	-	1P-20A	C	1P-20A	-	-	Lts - SW Gnd Flr
7	SPARE	-	-	1P-20A	A	3P-20A	-	-	Ex Fan
9	SPARE	-	-	1P-20A	B	-	-	-	-
11	SPARE	-	-	1P-20A	C	-	-	-	-
13	SPACE	-	-	-	A	-	-	-	SPACE
15	SPACE	-	-	-	B	-	-	-	SPACE
17	SPACE	-	-	-	C	-	-	-	SPACE



2 NEW MDP
SCALE: NONE



1 PARTIAL PLAN - LEVEL 2
SCALE: 1/4" = 1'-0"

GENERAL NOTES

- ELECTRICAL ENTITIES DRAWN WITH THIS LINETYPE (——) INDICATES EXISTING TO REMAIN UNLESS OTHERWISE NOTED.
- ELECTRICAL ENTITIES DRAWN WITH THIS LINETYPE (——) INDICATES NEW WORK UNLESS OTHERWISE NOTED.

KEYED NOTES

- RELOCATE CIRCUITS TO NEW MDP AS NOTED ON DETAIL 2, THIS SHEET.
- LOCATE SURGE PROTECTIVE DEVICE TO MINIMIZE WIRE LENGTH FROM BREAKER.
- RELOCATE CIRCUITS TO NEW PANEL AS NOTED ON DETAIL 2, THIS SHEET.
- RELOCATE CIRCUITS FTO NEW PANEL FROM OLD PANEL.
- CIRCUIT TO NEARBY 208VY/120V PANEL. 1P-20A CIRCUIT WITH 2-#12 & 1-#12G IN 3/4" CONDUIT.
- EXHAUST FAN & MOTOR STARTER WITH PILOT LIGHT.
- RE-INSTALL LIGHTING AS REQUIRED FOR ILLUMINATION AT WORK AREAS. RE-USE EXISTING CIRCUIT. MOUNT SWITCH BY DOOR.

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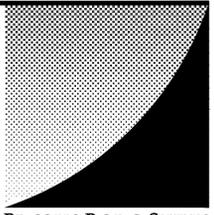
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SHEET TITLE
**ELECTRICAL
PARTIAL PLAN &
DETAILS -
MDP ROOM
NEW WORK**

PROJECT LOCATION: AMES, IOWA
PROJECT NUMBER: _____
ISSUE DATE: September 23, 2015
SHEET NUMBER: 8/13/2015

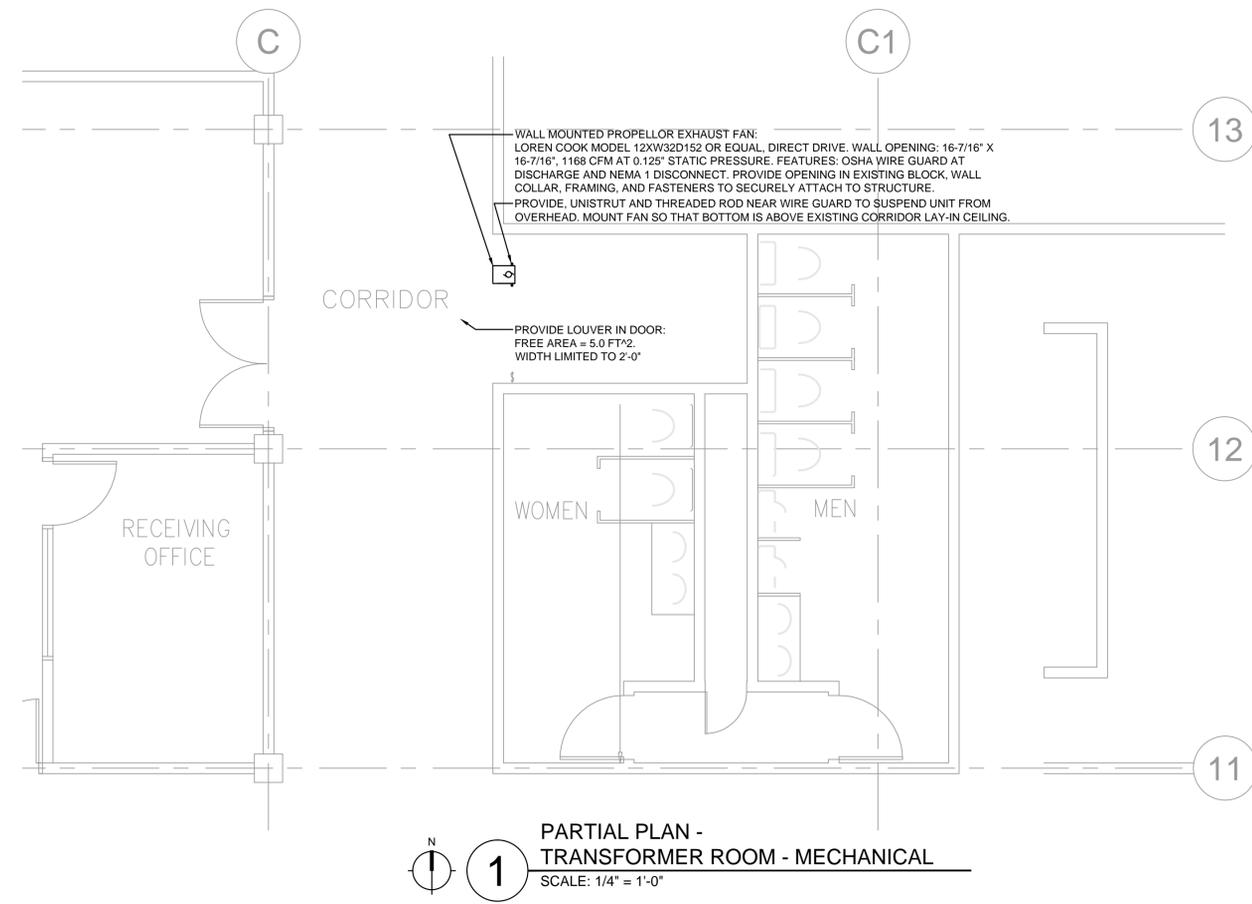
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1 PARTIAL PLAN -
TRANSFORMER ROOM - MECHANICAL
SCALE: 1/4" = 1'-0"

HVAC POWER VENTILATORS

PART 1 - GENERAL

- 1.1 SUMMARY**
 - A. Section Includes:
 1. Propeller fans.
- 1.2 SUBMITTALS**
 - A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:
 1. Certified fan performance curves with system operating conditions indicated.
 2. Motor ratings and electrical characteristics, plus motor and electrical accessories.
- 1.3 CLOSEOUT SUBMITTALS**
 - A. Operation and Maintenance Data: Operation, and maintenance manuals.
- 1.4 QUALITY ASSURANCE**
 - A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - B. UL Standards: Power ventilators shall comply with UL 705.
- 1.5 COORDINATION**
 - A. Coordinate size and location of structural-steel support members.

PART 2 - PRODUCTS

- 2.1 PROPELLER FANS**
 - A. Manufacturers:
 1. Basis of Design: Loren Cook.
 2. Other manufacturers: Greenheck, PennBarry, ACME, Twin City Fan.
 - B. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.
 - C. Fan Wheel: Replaceable, aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.
 - D. Fan Drive: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.
 - E. Accessories:
 1. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
 2. Wall Sleeve: Galvanized steel to match fan and accessory size.
 - F. Capacities and Characteristics: As shown on the drawings.
- 2.2 MOTORS**
 - A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."
 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- 2.3 SOURCE QUALITY CONTROL**
 - A. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

- 3.1 INSTALLATION**
 - A. Install power ventilators level and plumb.
 - B. Check for proper rotation.
 - C. Clean motor and shafts, including removing grease, rust and burrs.
 - D. Support suspended units from structure using threaded steel rods.
 - E. Install units with clearances for service and maintenance.
- 3.2 CONNECTIONS**
 - A. Install ducts adjacent to power ventilators to allow service and maintenance.
- 3.3 FIELD QUALITY CONTROL**
 - A. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

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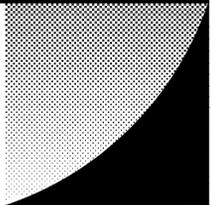
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SHEET TITLE
**MECHANICAL
PLANS AND DETAILS -
TRANSFORMER ROOM**

PROJECT LOCATION	AMES, IOWA
PROJECT NUMBER	September 23, 2015
ISSUE DATE	8/13/2015
SHEET NUMBER	M-101

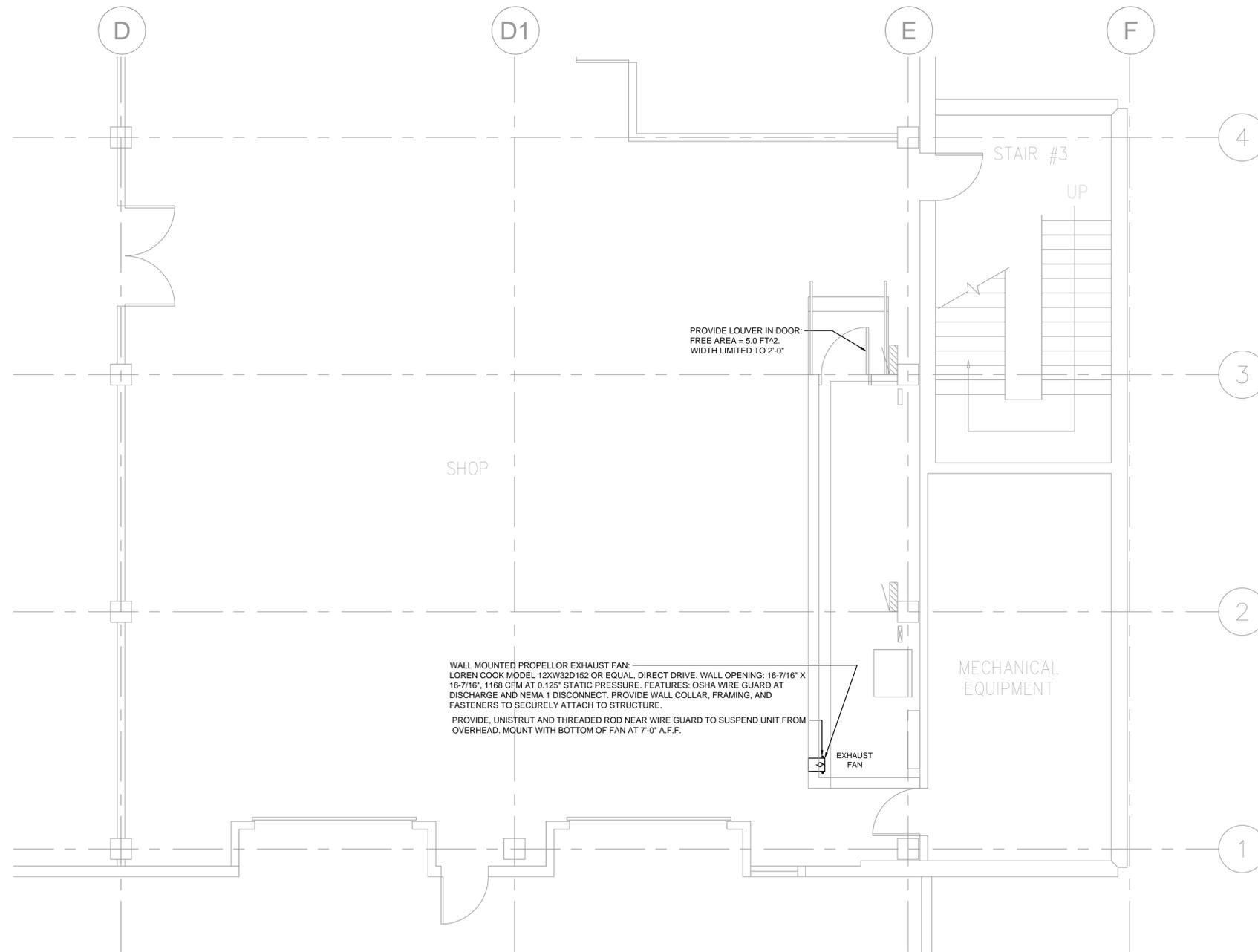
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1 PARTIAL PLAN -
MDP ROOM
SCALE: 1/4" = 1'-0"

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SHEET TITLE
**MECHANICAL
FLOOR PLAN -
MDP ROOM**

PROJECT LOCATION AMES, IOWA
PROJECT NUMBER _____
ISSUE DATE September 23, 2015
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M-102