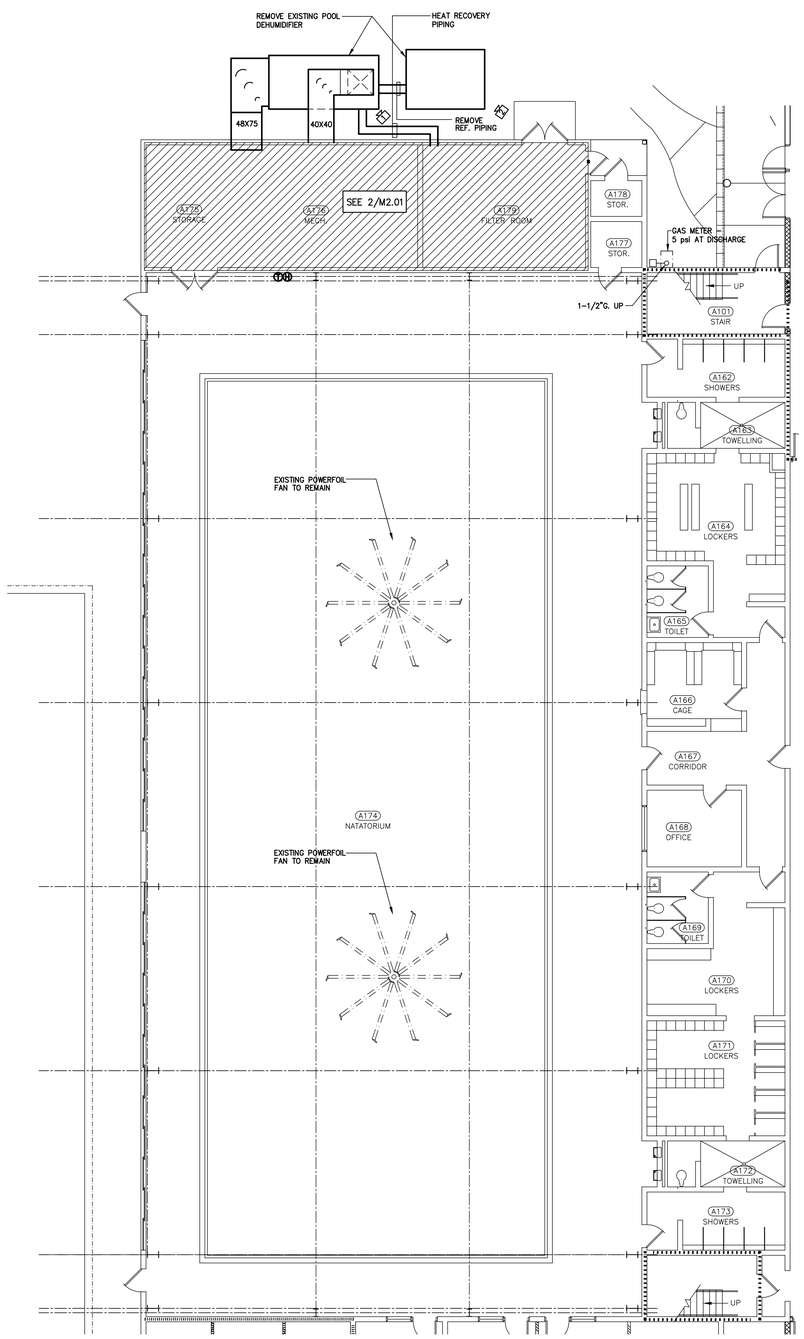
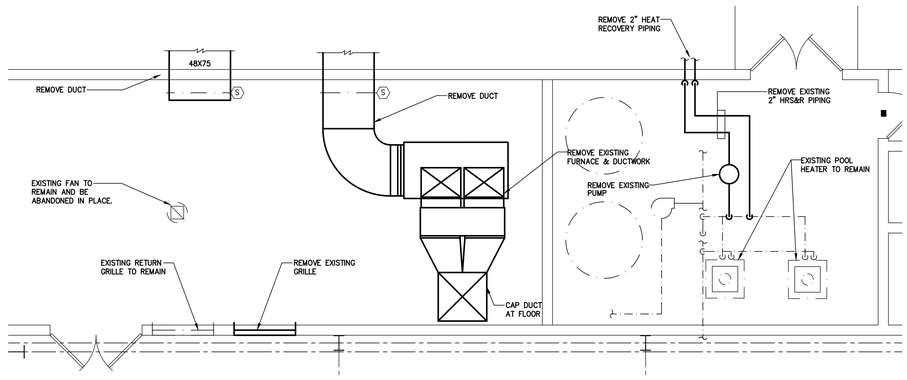


1 M1.01 GROUND FLOOR PLAN

1/8"=1'-0"

1

2



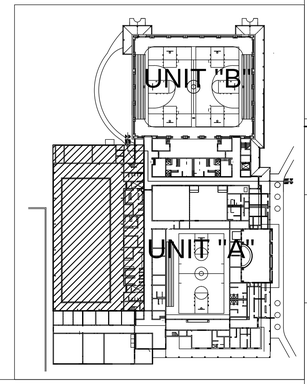
2 M1.01 ENLARGED MECH. & FILTER ROOMS

1/4"=1'-0"

DEMOLITION LEGEND

EXISTING TO REMAIN IN USE OR BE ABANDONED

EXISTING TO BE REMOVED



GENERAL NOTES

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REVISION DATE

MODIFICATIONS TO THE

PEPPER GEDDINGS NATATORIUM

HORRY COUNTY, SOUTH CAROLINA

SOUTH CAROLINA McKNIGHT · SMITH WARD · GRIFFIN ENGINEERS, INC. No. C00926 CERTIFICATE OF AUTHORIZATION

2015

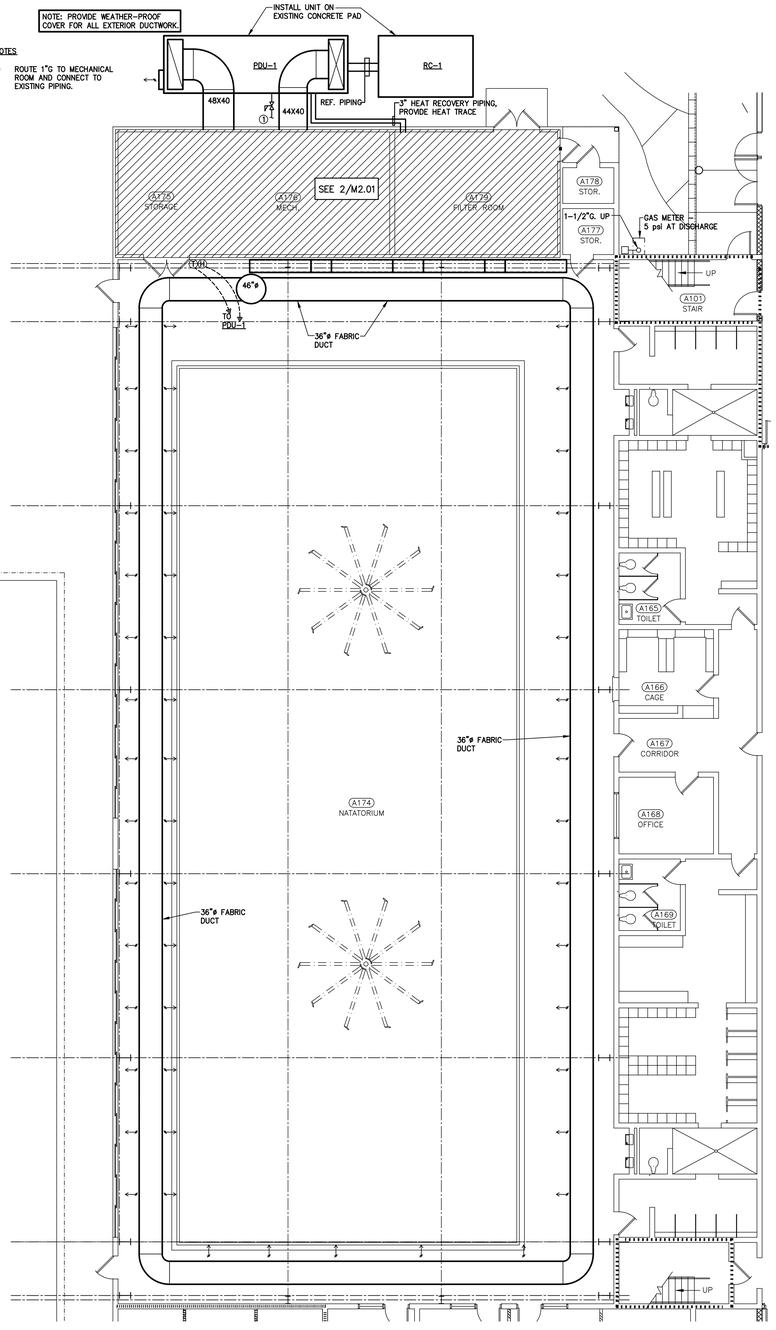
1/17/17

DEMOLITION PLANS

M1.01

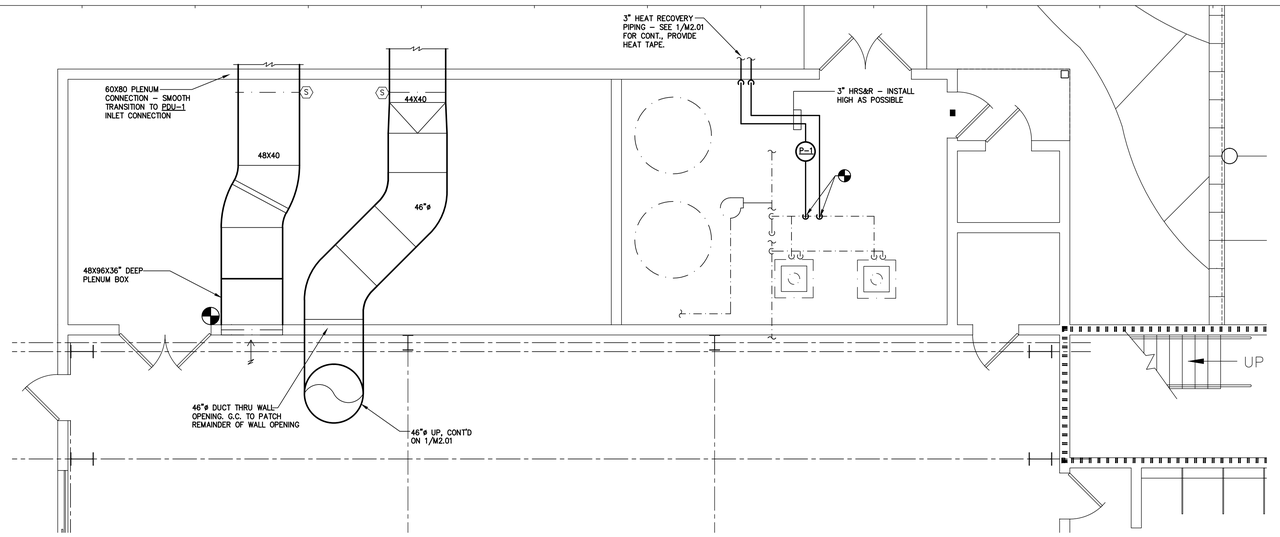
A1 M1.01 MECHANICAL PLANS

SCALE: AS NOTED



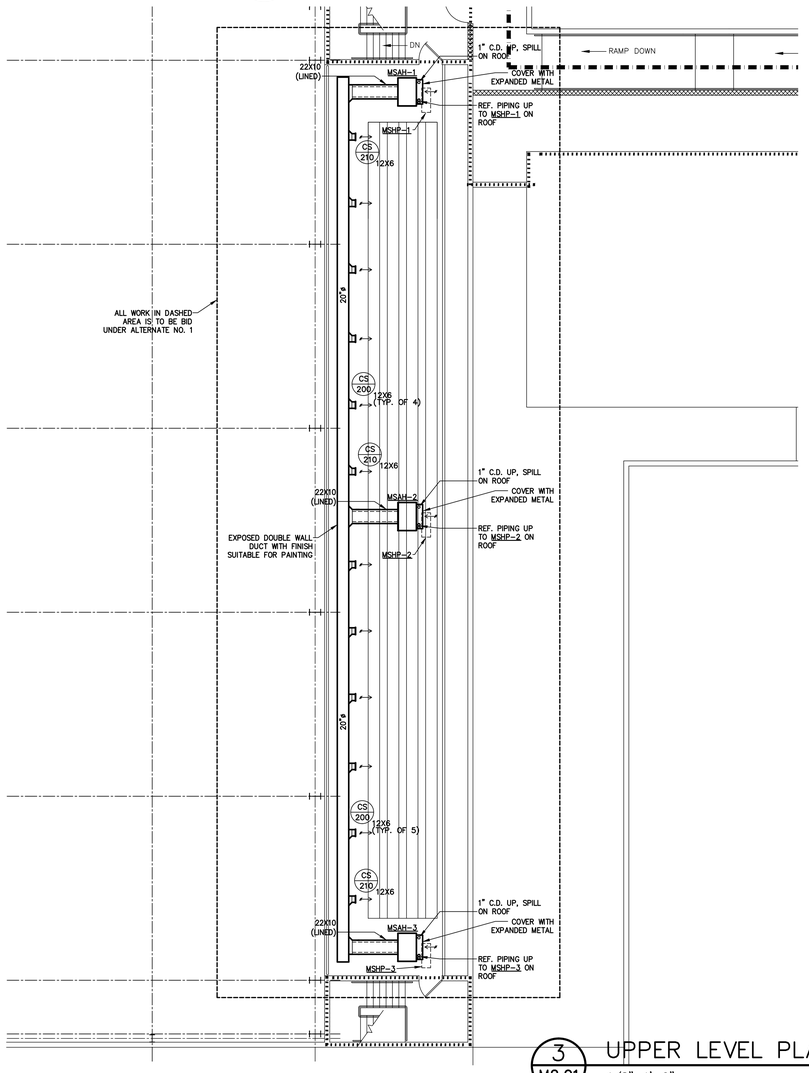
1 M2.01 GROUND FLOOR PLAN

1/8"=1'-0"



2 M2.01 ENLARGED MECH. & FILTER ROOMS

1/4"=1'-0"



3 M2.01 UPPER LEVEL PLAN

1/8"=1'-0"

EXPOSED DUCTWORK:

(A) WHERE EXPOSED ROUND OR FLAT OVAL DUCTWORK IS CALLED FOR ON PLANS, IT SHALL BE PREFABRICATED SPIRAL LOCK SEAM CONDUIT WITH PREFABRICATED FITTINGS AS MANUFACTURED BY UNITED SHEET METAL CO., INC. OR EQUAL.

(B) CONSTRUCTION SHALL BE AN AIRTIGHT, OUTER PRESSURE SHELL, A 1" INSULATION LAYER, AND A PERFORATED METAL INNER LINER THAT COMPLETELY COVERS THE INSULATION THROUGHOUT THE SYSTEM. THE OUTER SHELL SHALL BE MANUFACTURED FROM GALVANIZED STEEL MEETING ASTM A-517-67.

(C) FITTINGS SHALL BE MANUFACTURED TO PUBLISHED STANDARDS FOR DIMENSIONS AND CONSTRUCTION DETAILS. INSTALLATION MANUALS SHALL BE SUPPLIED TO THE CONTRACTOR TO PROVIDE DETAILED INSTRUCTIONS ON METHODS AND PROCEDURES FOR ASSEMBLY.

(D) ALL SEAMS IN THE PRESSURE SHELL OF ALL FITTINGS ARE TO BE CONTINUOUSLY WELDED. GALVANIZED AREAS THAT HAVE BEEN DAMAGED BY WELDING SHALL BE COATED WITH CORROSION RESISTANT ALUMINUM PAINT.

(E) INNER LINERS OF BOTH DUCT AND FITTINGS ARE TO BE ADEQUATELY SUPPORTED BY METAL SPACERS WELDED IN POSITION TO MAINTAIN SPACING AND CONCENTRICITY.

(F) PROVIDE AN INNER COUPLING TO ALIGN THE INNER LINING TO MAINTAIN GOOD AIR FLOW CONDITIONS EQUIVALENT TO STANDARD ROUND HIGH PRESSURE DUCT JOINTS.

(G) OPENINGS SHALL BE FACTORY CUT AND FRAMED FOR THE GRILLE MOUNTING BRACKET AND THE FRAMING SHALL NOT HAVE EXCESSIVE WELDING THAT WILL BE NOTICEABLE BEYOND THE GRILLE FRAME.

(H) ALL EXPOSED DUCT SHALL BE MILL PHOSPHATIZED SO AS TO ACCEPT PAINTING BY THE GENERAL CONTRACTOR.

(I) 90 DEGREES ELBOWS SHALL BE 5 PIECE GORED ELBOWS.

(J) ALL JOINTS SHALL BE SEALED USING BENJAMIN FOSTER 30-02 SEALED BETWEEN SCREWED METAL SEAMS BANDED WITH FIBERGLASS TAPE.

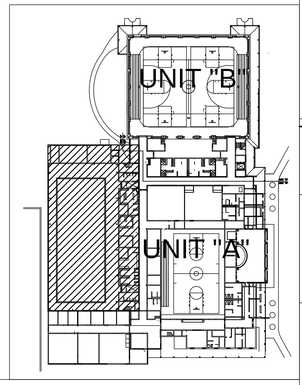
BID UNDER ALTERNATE NO. 1

LEGEND

NEW EQUIPMENT

EXISTING

CONNECT TO EXISTING



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2015

1/17/17

RENOVATION PLANS

M2.01

A1 M2.01 MECHANICAL PLANS

SCALE: AS NOTED

POOL DEHUMIDIFIER / REMOTE CONDENSER SCHEDULE

Unit Tag	CFM		OA	ESP	Fan Motors						Evaporator Coil Performance			Reheat Coil		Gas Heat		Pool Heat			Indoor Unit Electrical						Remote Condenser						Dehumidifier Model	Remote Condenser Model	Weights		Remarks
	SA	EXH	Min.		SA Fan Qty	HP	Exh Fan Qty	HP	Volts	Phase	EDB/EWB	Total Capacity (mbh)	Sensible Capacity (mbh)	Heat Rejection MBH	Control Type	Input/Output	Control	Capacity MBH	GPM	PD Ft. HD	MCA	MOCP	Compressor Data			Volts/Phase	Unit Tag	Condenser Fans		MCA	MOCP	Volts/ Phase				
																							Qty	LRA	RLA			Qty	FLA(ea)								
PDU-1	22,000	6,300	5725	2.5	1	30	2	2	208	3	86/81	626.8	307.5	783.5	Full Modulation	600/480	Modulated	439	75	13.9	279	350	2	385/436	71/85	208/3	RC-1	6	9.7	64	80	208/3	SERESCO NP-045-PT-X-A2ET6223G2C2AD0	SERESCO NG-V-32-CUS-V	13600 Lbs	3200 Lbs	1 - 13

1. Equals by Pool Pack.
2. Electric heat inside unit, wired to unit controller.
3. Single point electrical connection on dehumidifier.
4. Single point electrical connection on remote condenser.
5. Dehumidifier and Remote Condenser shall be provided by same manufacturer.
6. 5-year compressor warranty.
7. Direct drive fans.
8. R410A refrigerant.
9. Double wall galvanized steel cabinet with R-13 foam insulation.
10. Scroll compressors.
11. Coils shall be provided with sea coast protection.
12. Evaporator coil has 2 circuits.
13. Controls by unit mfg.

MINI-SPLIT SYSTEM SCHEDULE

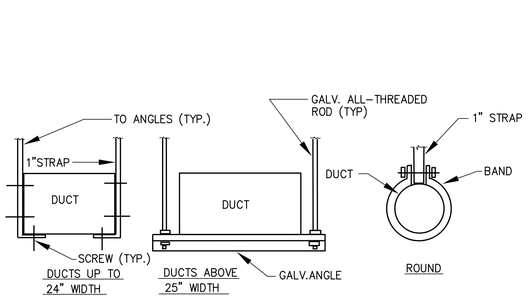
Unit Tag	CFM High	CFM Low	Fan Motor			Cooling Performance			Heating Performance		Unit Electrical		Outdoor Unit										Model (Indoor Unit)	Remarks
			FLA	Volts	Phase	EAT	MBH Total	Efficiency SEER	EAT	Capacity MBH	MCA	MOCP	Unit Tag	Fan		Compressor			MCA	MOCP	Volts	Phase	Model (Outdoor Unit)		
														No.	FLA(ea)	No.	LRA	RLA						
MSAH-1	810	565	2.18	208/230	1	80/67	30	15.5	70	32	2.73	15	MSHP-1	1	0.75	1	17.5	12	25	40	208/230	1	PUZ-A30NHA4	PEAD-A30AA4	1-6
MSAH-2	810	565	2.18	208/230	1	80/67	30	15.5	70	32	2.73	15	MSHP-2	1	0.75	1	17.5	12	25	40	208/230	1	PUZ-A30NHA4	PEAD-A30AA4	1-6
MSAH-3	810	565	2.18	208/230	1	80/67	30	15.5	70	32	2.73	15	MSHP-3	1	0.75	1	17.5	12	25	40	208/230	1	PUZ-A30NHA4	PEAD-A30AA4	1-6

1. MODELS BY MITSUBISHI.
2. MOUNT INDOOR SECTION HIGH AS POSSIBLE.
3. INDOOR UNIT IS POWERED FROM OUTDOOR UNIT. M.C. SHALL COORDINATE POWER REQUIREMENTS FOR ALL SUBSTITUTIONS.
4. REFRIGERANT LINES AND ACCESSORIES PER SPECS AND AS RECOMMENDED BY UNIT MFG.
5. PROVIDE FACTORY CONDENSATE PUMP.
6. BID UNDER ALTERNATE NO. 1.

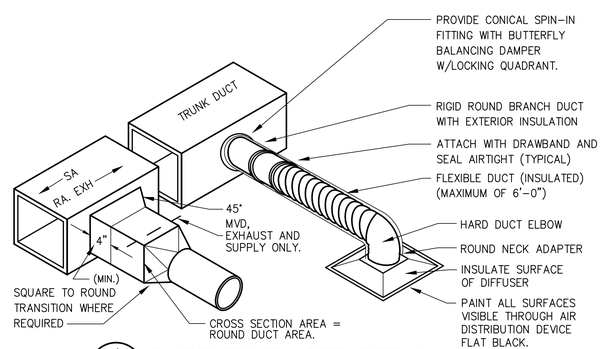
PUMP SCHEDULE

UNIT TAG	SERVICE	GPM	HEAD (ft.)	RPM	EFF. (%)	HP	VOLTS	PHS.	TYPE	MFR. & MODEL NO.	RMKS.
P-1	POOL HEAT	75	35	1750	64	1.5	208	3	INLINE	B & G E-80 2.5X2.5X7B	1 - 3

1. EQUALS BY GRUNDFOS & ARMSTRONG.
2. PROVIDE WITH VARIABLE FREQUENCY DRIVE
3. IMPELLERS SHALL BE TRIMMED IN FIELD PER NC ENERGY CODE REQUIREMENTS.



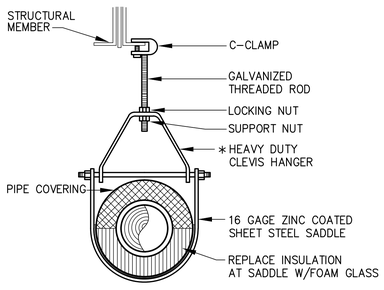
3 M3.01 DUCTWORK HANGER DETAILS
NTS



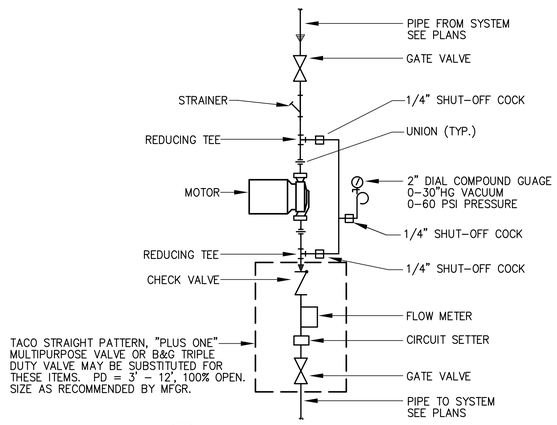
4 M3.01 DUCT TAKE-OFF DETAIL
NTS

MECHANICAL EQUIPMENT LEGEND

SYMBOL		DESCRIPTION
SINGLE LINE	DOUBLE LINE	
LOW PRESSURE DUCTWORK		
10 X 12	10 X 12	DUCT SECTION—1ST FIGURE WIDTH, 2ND DEPTH
		SQUARE TO ROUND TRANS.
		FLEX DUCTWORK
		ELBOW W/TURNING VANES
		LONG RADIUS ELBOW
EXH		EXHAUST DUCT SECTION
SA		SUPPLY DUCT SECTION
OA		OUTSIDE AIR DUCT SECTION
RA		RETURN/RELIEF AIR DUCT SECTION
MISCELLANEOUS		
T	T	THERMOSTAT
H	H	HUMIDISTAT
S	S	SMOKE DETECTOR
CD	CD	CONDENSATE DRAIN
B.D.	B.D.	BACKDRAFT DAMPER
M	M	MOTOR OPERATED DAMPER
		DAMPER
$	$	MANUAL SMTCH
		TIE INTO EXISTING AT THIS POINT



1 M3.01 PIPE HANGER DETAIL
NTS
*CONTRACTOR OPTION: MICHIGAN HANGER #403



2 M3.01 INLINE PUMP DETAIL
NTS

GENERAL NOTES

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2015
1/17/17
SCHEDULES, DETAILS, & LEGEND

M3.01

A1 M3.01

MECHANICAL SCHEDULES, DETAILS, & LEGEND

SCALE: NTS

DUCTWORK

DUCTWORK SHALL BE CONSTRUCTED OF ZINC COATED SHEET STEEL AND SHALL CONFORM TO THE 1ST EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS –METAL AND FLEXIBLE, 1985 AS FOLLOWS:

RECTANGULAR DUCT: 1" W.G. PRESSURE CLASS – TABLE 1–4.

ROUND DUCT: 2" W.G. PRESSURE CLASS – TABLE 3–2.

ALL DUCTWORK MUST BE SEALED IN ACCORDANCE WITH SEAL CLASS C AS DEFINED IN SMACNA HVAC DUCT CONSTRUCTION STANDARDS–METAL AND FLEXIBLE, 1985.

DUCT HANGERS AND SUPPORTS SHALL CONFORM TO THOSE SHOWN IN TABLES 4–1 AND 4–2 OF SMACNA HVAC DUCTWORK 1985, 1ST EDITION.

EXPOSED DUCTWORK

WHERE EXPOSED ROUND OR FLAT OVAL DUCTWORK IS CALLED FOR ON PLANS, IT SHALL BE PREFABRICATED SPIRAL LOCK SEAM CONDUIT WITH PREFABRICATED FITTINGS AS MANUFACTURED BY UNITED SHEET METAL CO., INC. OR EQUAL.

CONSTRUCTION SHALL BE AN AIRTIGHT, OUTER PRESSURE SHELL, A L" INSULATION LAYER, AND A PERFORATED METAL INNER LINER THAT COMPLETELY COVERS THE INSULATION THROUGHOUT THE SYSTEM. THE OUTER SHELL SHALL BE MANUFACTURED FROM GALVANIZED STEEL MEETING ASTM A–517–67.

FITTINGS SHALL BE MANUFACTURED TO PUBLISHED STANDARDS FOR DIMENSIONS AND CONSTRUCTION DETAILS. INSTALLATION MANUALS SHALL BE SUPPLIED TO THE CONTRACTOR TO PROVIDE DETAILED INSTRUCTIONS ON METHODS AND PROCEDURES FOR ASSEMBLY

ALL SEAMS IN THE PRESSURE SHELL OF ALL FITTINGS ARE TO BE CONTINUOUSLY WELDED. GALVANIZED AREAS THAT HAVE BEEN DAMAGED BY WELDING SHALL BE COATED WITH CORROSION RESISTANT ALUMINUM PAINT.

INNER LINERS OF BOTH DUCT AND FITTINGS ARE TO BE ADEQUATELY SUPPORTED BY METAL SPACERS WELDED IN POSITION TO MAINTAIN SPACING AND CONCENTRICITY.

PROVIDE AN INNER COUPLING TO ALIGN THE INNER LINING TO MAINTAIN GOOD AIR FLOW CONDITIONS EQUIVALENT TO STANDARD ROUND HIGH PRESSURE DUCT JOINTS.

OPENINGS SHALL BE FACTORY CUT AND FRAMED FOR THE GRILLE MOUNTING BRACKET AND THE FRAMING SHALL NOT HAVE EXCESSIVE WELDING THAT WILL BE NOTICEABLE BEYOND THE GRILLE FRAME.

ALL EXPOSED DUCT SHALL BE MILL PHOSPHATIZED SO AS TO ACCEPT PAINTING BY THE GENERAL CONTRACTOR.

90 DEGREES ELBOWS SHALL BE 5 PIECE GORED ELBOWS.

ALL JOINTS SHALL BE SEALED USING BENJAMIN FOSTER 30–02 SEALED BETWEEN SCREWED METAL SEAMS BANDED WITH FIBERGLASS TAPE.

REFRIGERANT PIPING

CONNECT SPLIT SYSTEM AIR HANDLING UNITS TO HEAT PUMPS WITH REFRIGERANT PIPING, TYPE "K" HARD DRAWN COPPER "ACR" TUBING WITH WROUGHT COPPER SWEAT FITTINGS. ALL JOINTS ARE TO BE MADE WITH HARD SOLDER SUCH AS "SIL–FOS" OR "SILVER SOLDER."

PIPE INSULATION – REFRIGERANT SUCTION PIPING – FLEXIBLE FOAMED ELASTOMERIC PLASTIC TUBING WITH A DENSITY OF 6 LBS./CF, K OF 0.27 @ 70 DEGREES F., SELF–EXTINGUISHING, AND A WATER VAPOR TRANSMISSION OF LESS THAN 0.05 PERM IN., FLAME SPREAD RATING 25 OR LESS, SMOKE DEVELOPED RATING OF 50 OR LESS (ASTM E84–75).

CONTROLS (MINI–SPLIT SYSTEMS)

PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT FOR EACH SYSTEM.

FANS – SEE FAN SCHEDULE.

TESTING AND BALANCING

WORK SHALL BE PERFORMED BY TECHNICIANS COMPETENT IN THE TRADE OF TESTING AND BALANCING ENVIRONMENTAL SYSTEMS AND SHALL BE DONE IN AN ORGANIZED MANNER UTILIZING APPROPRIATE TEST AND BALANCE FORMS. ALL EQUIPMENT SHALL BE BALANCED TO WITHIN +/– 10% OF THE SCHEDULED VALUE.

INSTRUMENTS FOR USE IN THE TEST AND BALANCING PROCEDURES SHALL BE OF FIRST QUALITY AND BE ACCURATELY CALIBRATED AT THE TIME OF USE. ALL FIELD INSTRUMENTS USED IN THE BALANCE SHOULD HAVE BEEN CALIBRATED AT LEAST WITHIN THE PREVIOUS THREE MONTHS.

STARTING DATE FOR MECHANICAL SYSTEM SHALL BE SCHEDULED WELL IN ADVANCE OF EXPECTED COMPLETION DATE AND SHALL BE ESTABLISHED A MINIMUM OF TWO WEEKS PRIOR TO ACCEPTANCE DATE. THE SYSTEM SHALL BE IN FULL OPERATION WITH ALL EQUIPMENT FUNCTIONAL PRIOR TO ACCEPTANCE DATE.

PERFORMANCE READINGS SHALL BE TAKEN AND RECORDED ON ALL AIR DISTRIBUTION DEVICES AND THE SYSTEM SHALL BE BALANCED OUT PRIOR TO ACCEPTANCE. BALANCING OF THE SYSTEM SHALL BE ACCOMPLISHED WITH DUCT DAMPERS AND ONLY MINOR ADJUSTMENTS MADE WITH GRILLE DAMPERS. RECORD AND SUBMIT RESULTS IN TABLE FORM ALONG SIDE OF SCHEDULED QUANTITIES.

ALL CONTROLS SHALL BE CALIBRATED BY QUALIFIED PERSONNEL PRIOR TO ACCEPTANCE DATE. THERMOSTATS SHALL BE IN CLOSE CALIBRATION WITH ONE ANOTHER AND SHALL OPERATE THEIR RESPECTIVE UNITS WITHOUT INTERFERENCE FROM ADJACENT UNITS.

ALL UNITS SHALL BE CHECKED OUT THOROUGHLY AND THE INFORMATION RECORDED ON EACH MACHINE. CHECK SHEETS SHALL BE INCLUDED IN OPERATING AND MAINTENANCE INSTRUCTIONAL MANUAL.

GAS PIPING

ALL ABOVE GROUND PIPING AND FITTINGS SHALL BE STEEL OR COPPER AS FOLLOWS:

STEEL PIPE; ANSI/ASTM A53 "WELDED AND SEAMLESS STEEL PIPE".

COPPER PIPE; ANSI/ASTM B42 "SEAMLESS COPPER PIPE".

ALL BELOW GRADE PIPING AND FITTINGS SHALL BE THERMOPLASTIC GAS PRESSURE PIPE AND FITTINGS IN ACCORDANCE WITH ASTM D2513–88B.

FITTINGS SHALL BE STEEL, COPPER OR MALLEABLE IRON. PIPE JOINTS IN STEEL OR COPPER PIPE MAY BE SCREWED, WELDED OR BRAZED. FITTINGS SHALL BE SUITABLE FOR THE APPROPRIATE WORKING PRESSURE.

ALL GAS PIPING SHALL BE TESTED WITH AIR AT 150 PSIG MINIMUM. ALL JOINTS SHALL BE CHECKED TO DETERMINE IF ANY LEAKS OCCUR, USING SOAP SOLUTION. ANY JOINT OR FITTING FOUND DEFECTIVE SHALL BE REMOVED AND REPLACED. NO CAULKING OR OTHER ARTIFICIAL MEANS WILL BE USED TO MAKE REPAIRS.

GROUND PLUG SHUTOFF COCKS SHALL BE INSTALLED AT EACH EQUIPMENT SERVICE STUB. PIPING SHALL BE INSTALLED WITH VALVES, DRIP POCKETS, STOP COCKS, AND OTHER ACCESSORIES THAT MAY BE REQUIRED TO GIVE PROPER SERVICE.

A MINIMUM NO. 18 AWG INSULATED COPPER TRACER WIRE CONDUCTOR SHALL BE INSTALLED ADJACENT TO UNDERGROUND NON–METALLIC GAS PIPING AND SHALL BE ACCESSIBLE OR TERMINATE ABOVE GRADE AT EACH END.

PAINT ALL GAS PIPING LIGHT YELLOW.

ALL PIPING SHALL BE SUPPORTED ON NOT LESS THAN 10' CENTERS AND WITHIN 30" OF EACH CHANGE OF DIRECTION EXCEPT THAT PIPING 1 1/4" SIZE AND SMALLER SHALL BE SUPPORTED ON 8' 0" CENTERS.

PIPE HANGERS SHALL BE SUPPORTED BY MEANS OF IRON HANGER RODS FROM THE BUILDING CONSTRUCTION OR FROM STRUCTURAL STEEL MEMBERS, AND IN AN APPROVED MANNER. WHERE REQUIRE, PIPING SHALL BE HUNG FROM ANGLE IRON CLIPS OR SUITABLE BRACKETS ATTACHED TO SIDES OF MASONRY CONSTRUCTION.

INSULATION

THIS SECTION OF SPECIFICATIONS AND RELATED DRAWINGS DESCRIBE REQUIREMENTS PERTAINING TO INSULATION.

PROVIDE ALL INSULATION IN CONJUNCTION WITH EQUIPMENT, PIPING AND DUCTWORK FURNISHED UNDER THIS DIVISION.

QUALITY ASSURANCE

PRODUCTS OF THE MANUFACTURERS LISTED UNDER MATERIALS WILL BE ACCEPTABLE FOR USE FOR THE SPECIFIC FUNCTIONS NOTED. ADHESIVES, SEALERS, VAPOR BARRIERS, AND COATINGS SHALL BE COMPATIBLE WITH THE MATERIALS TO WHICH THEY ARE APPLIED, AND SHALL NOT CORRODE, SOFTEN OR OTHERWISE ATTACK SUCH MATERIAL IN EITHER THE WET OR DRY STATE.

MATERIALS SHALL BE APPLIED SUBJECT TO THEIR TEMPERATURE LIMITS. ANY METHODS OF APPLICATION OF INSULATING MATERIALS OR FINISHES NOT SPECIFIED IN DETAIL HEREIN SHALL BE IN ACCORDANCE WITH THE PARTICULAR MANUFACTURER'S PUBLISHED RECOMMENDATIONS.

INSULATION SHALL BE APPLIED BY EXPERIENCED WORKERS REGULARLY EMPLOYED FOR THIS TYPE OF WORK.

RATING

INSULATION AND ACCESSORIES SUCH AS ADHESIVES, MASTICS, CEMENTS, TAPE AND JACKETS, UNLESS NOTED OTHERWISE, SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING OF NOT MORE THAN 50. MATERIALS THAT ARE FACTORY APPLIED SHALL BE TESTED INDIVIDUALLY. NO FUGITIVE OR CORROSIVE TREATMENTS SHALL BE EMPLOYED TO IMPART FLAME RESISTANCE.

FLAME SPREAD AND SMOKE DEVELOPED RATINGS SHALL BE DETERMINED BY METHOD OF TEST OF SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS, NFPA NO. 255, ASTM E–84, UL 723.

PRODUCTS OF THEIR SHIPPING CARTONS SHALL BEAR A LABEL INDICATING THAT FLAME AND SMOKE RATINGS DO NOT EXCEED ABOVE REQUIREMENTS.

TREATMENT OF JACKETS OR FACINGS TO IMPART FLAME AND SMOKE SAFETY SHALL BE PERMANENT. THE USE OR WATER–SOLUBLE TREATMENT IS PROHIBITED.

CERTIFY IN WRITING, PRIOR TO INSTALLATION, THAT PRODUCTS TO BE USED WILL MEET RATING CRITERIA.

PIPE INSULATION

HOT WATER PIPING INSULATION MATERIALS SHALL BE HEAVY DENSITY FIBERGLASS WITH AN ALL–SERVICE JACKET (ALL–SERVICE JACKET TO BE USED ONLY IN MECHANICAL EQUIPMENT ROOMS) COMPOSED OF AN OUTER LAYER OF VINYL, FIBERGLASS SCRIM CLOTH, ALUMINUM FOIL, AND KRAFT PAPER, IN THAT ORDER, FROM OUTSIDE TO INSIDE OF PIPE COVERING. CHILLED WATER PIPING INSULATION MATERIALS SHALL BE CLOSED CELL POLYSTYRENE INSULATION.

1. CHILLED WATER SUPPLY AND RETURN PIPING, INCLUDING DRAIN LINES FROM CHILLED WATER COILS OR APPARATUS HANDLING CHILLED WATER.
2. HOT WATER HEATING SUPPLY AND RETURN PIPING.
3. INSULATION SHALL HAVE A MINIMUM DENSITY OF 1?LB/FT3, PERASTM C–303 AND D–1622.
4. INSULATION SHALL HAVE A ?K? VALUE OF 0.255 (BTU–IN/HR–SQ FT–F)AT 75§ F PER ASTM C–177 OR C–518.
5. COMPRESSIVE STRENGTH MUST MAINTAIN A MINIMUM OF 15 PSI AT 10% DEFLECTION PER ASTM D–1621.
6. WATER VAPOR PERMEABILITY SHOULD NOT EXCEED 4.0 PERM–INCH PER ASTM E–96.
7. FITTINGS (VALVES, FLANGES, 90§ AND 45§ ELBOWS) SHALL BE MANUFACTURED 1– ?LB/FT3 PRE–MOLDED CLOSED CELL INSULATION.
8. FITTING INSULATION THICKNESS IS TO BE EQUAL TO THE ADJACENT PIPE INSULATION THICKNESS.

THICKNESSES:

1. CONDENSATE DRAIN LINES: 1".

HVAC PIPING

FURNISH AND INSTALL ALL CONDENSER WATER, HOT WATER, MAKE UP WATER, AND CONDENSATE DRAIN PIPING AS SHALL BE REQUIRED IN ORDER TO PROVIDE A COMPLETE AND SATISFACTORY SYSTEM.

THE MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY VALVES AND SPECIALTIES TO MAKE THE INSTALLATION COMPLETE AND AS SPECIFIED BELOW. ALL SPECIALTY ITEMS UNLESS OTHERWISE NOTED SHALL BE FOR OPERATION ON AT LEAST 125 POUND PSIG WORKING PRESSURE AS RATED IN ACCORDANCE WITH THE STANDARDS OF ASA.

CONDENSER WATER AND HOT WATER, PIPING

ALL NEW PIPE USED IN ENTIRE SYSTEM EXCEPT WHERE OTHERWISE SHOWN OR SPECIFIED, SHALL BE STANDARD WEIGHT SCHEDULE 40 BLACK STEEL PIPE WITH WEIGHTS AND DIMENSIONS IN ACCORDANCE WITH AMERICAN STANDARD ASSOCIATION B36–10 AS MANUFACTURED BY NATIONAL TUBE COMPANY, BIRMINGHAM TANK COMPANY, BETHLEHEM STEEL COMPANY OR APPROVED EQUAL.

PIPING 2" AND SMALLER SHALL BE HARD DRAWN COPPER TUBING ASTM B 88 TYPE "L". FITTINGS FOR COPPER TUBING SHALL BE ANSI B16.18 OR B16.22 SOLDER JOINT FITTINGS. ENDS OF PIPE SHALL BE REAMED, PIPE AND FITTINGS CLEANED. USE ONLY 95–5 (95% TIN AND 5% ANTIMONY) SOLDER WITH NON–CORROSIVE FLUX ON 1–1/4" AND SMALLER AND ON 1–1/2" AND LARGER USE SILVER SOLDER (MINIMUM 12% SILVER), WITH A MELTING POINT GREATER THAN 1000OF. SUBMIT SOLDER FOR APPROVAL.

PIPE AND PIPE FITTINGS

PROVIDE ALL PIPING AND CONNECTIONS TO ALL ITEMS OF EQUIPMENT AS SHOWN AND/OR REQUIRED TO FULLY COMPLETE THE SYSTEM INDICATED, INCLUDING DRAINS AND OTHER CONNECTIONS. THE DRAWINGS SHOW THE ARRANGEMENT DESIRED AND THE CONTRACTOR SHALL FOLLOW THE DRAWINGS AS ACCURATELY AS POSSIBLE. IF CONFLICT SHOULD ARISE, THE CONTRACTOR SHALL VERIFY ALL MEASUREMENTS ON THE JOB AND CUT PIPE UNLESS SPECIFICALLY NOTED FOR EXPANSION LOOPS. ALL PIPING SHALL BE REAMED OR FILED AND CLEANED TO REMOVE BURRS AND OTHER OBSTRUCTIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ALL PIPING WORK IN A NEAT WORKMANLIKE MANNER. THIS SHALL BE INTERPRETED TO MEAN THAT ALL PIPING SHALL BE NEATLY ALIGNED, INSTALLED AND SUPPORTED IN EQUALLY SPACED PARALLEL RUNS USING TRAPEZE HANGERS WHERE APPLICABLE, INSTALL SQUARE, TRUE AND PLUMB WITH WALLS, EQUIPMENT OR OTHER RELATED SURFACES USING STANDARD FITTINGS. ANY PIPE WORK INSTALLED IN A DISORDERLY OR UNWORKMANLIKE MANNER AS ADJUDGED BY THE ARCHITECT SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

BRANCH CONNECTIONS TO MAINS SHALL BE MADE FROM THE CENTER–LINE OF MAINS ON HORIZONTALRUNS. NO BRANCH CONNECTIONS ARE TO BE MADE FROM THE BOTTOM OF PIPING.

HOT WATERAND CONDENSER WATER PIPING

PIPING AND PIPE WORK: GRADE ALL PIPING PROPERLY TO INSURE NOISELESS CIRCULATION OF WATER WITHOUT FORMATION OF POCKETS. UNLESS OTHERWISE CALLED FOR IN THE PLANS AND SPECIFICATIONS, HORIZONAL PIPE RUNS SHALL BE GRADED TO PERMIT COMPLETE DRAINAGE OF THE SYSTEM.

WELDING: ALL WELDING OF JOINTS IN PIPING CONNECTIONS DONE IN THE FIELD SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN STANDARD CODE FOR PRESSURE PIPING.

WELDING MAY BE EITHER BY METAL ARC–WELDING PROCESS OF THE OXYACETYLENE WELDING PROCESS AND IN GENERAL CONFORMANCE WITH PROCEDURES ESTABLISHED IN THE LATEST EDITION OF APPENDIX B TO SECTION 6 OF THE ASA CODE FOR PRESSURE PIPING B31.1.

WELDING FITTINGS SHALL BE USED WITH WELDED PIPING. THESE SHALL BE WELDING PATTERN IN ACCORDANCE WITH ASTM SPECIFICATIONS A–234 AND ASA STANDARD B16.9. SUCH FITTINGS SHALL BE PROVIDED AT ALL CHANGES IN DIRECTION OR CHANGES IN PIPE SIZE EXCEPT AS HEREINAFTER PROVIDED.

WELDOLET OR THREADOLET FITTINGS MAY BE USED IN LIEU OF WELDED FITTINGS FOR BRANCH CONNECTION TO SIZE 2–1/2" AND LARGER MAINS, PROVIDED BRANCH IS TWO OR MORE PIPE SIZES SMALLER THAN THE MAIN.

FITTINGS: FITTINGS IN WELDED PIPING SHALL BE STANDARD WEIGHT WELDING FITTINGS, WITH RADII OF 1–1/2" THE DIAMETER AND EQUAL TO TUBE TURNS, LADISH, TAYLOR FORGE OR APPROVED EQUAL. SEE "WELDING" SECTION FOR LATERAL CONNECTIONS AND WELDING FITTINGS STANDARDS.

DURING ERECTION, CARE SHALL BE TAKEN TO REMOVE ALL DIRT, SCALE AND OTHER FOREIGN MATTER FROM INSIDE THE PIPING BEFORE TYING IN LONG SECTIONS OR INSTALLING VALVES.

A HYDROSTATIC PRESSURE TEST, AS REQUIRED BY PROJECT SPECIFICATIONS, SHALL BE PERFORMED AT ONE AND ONE–HALF TIMES THE NORMAL SYSTEM OPERATING PRESSURE FOR NOT LESS THAN TWO HOURS. CARE SHALL BE TAKEN TO INSURE ALL TRAPPED AIR IS REMOVED FROM THE SYSTEM PRIOR TO THE TEST. APPROPRIATE SAFETY PRECAUTIONS SHALL BE TAKEN TO GUARD AGAINST POSSIBLE INJURY TO PERSONNEL IN THE EVENT OF A FAILURE.

BLOWING–OUT SYSTEM

ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY BLOWN–OUT UNDER PRESSURE AND CLEAN OF ALL FOREIGN MATTER WASTING CONDENSATE THROUGH TEMPORARY CONNECTIONS SO LONG AS NECESSARY TO THOROUGHLY CLEAN BEFORE SYSTEM IS PLACED IN OPERATION. USE EVERY PRECAUTION TO PREVENT PIPE COMPOUND, SCALE, DIRT, WELDING AND OTHER OBJECTIONABLE MATTER GETTING INTO PIPING SYSTEM AND EQUIPMENT.

HANGERS

ALL PIPING SHALL BE SUPPORTED ON NOT LESS THAN 10' CENTERS AND WITHIN 30" OF EACH CHANGE OF DIRECTION EXCEPT THAT PIPING 1–1/4" SIZE AND SMALLER SHALL BE SUPPORTED ON 8'–0" CENTERS.

ALL PIPING SHALL BE HUNG BY MEANS OF SPLIT TYPE WROUGHT IRON HANGER RINGS SIMILAR TO GRINNELL FIGURE 104 EXCEPT AS OTHERWISE NOTED. COPPER PIPING NOT INSULATED SHALL BE HUNG FROM COPPER PLATED HANGERS SIMILAR TO FIGURE CT–97. ALL INSULATED PIPING SHALL BE HUNG BY MEANS OF CLEVIS TYPE HANGERS SIZED TO FIT OUTSIDE OF INSULATION, GRINNELL FIGURE 260.

PIPE HANGERS SHALL BE SUPPORTED BY MEANS OF IRON HANGER RODS FROM THE BUILDING CONSTRUCTION OR FROM STRUCTURAL STEEL MEMBERS, AND IN AN APPROVED MANNER. WHERE REQUIRED, PIPING SHALL BE HUNG FROM ANGLE IRON SLIPS OR SUITABLE BRACKETS ATTACHED TO SIDES OF MASONRY CONSTRUCTION.

ALL INSULATED PIPING SHALL BE PROVIDED WITH INSULATING PROTECTION SHEET METAL SADDLES. THESE SHALL BE 20 GAUGE GALVANIZED IRON. SADDLES SHALL BE OF A LENGTH EQUAL TO TWO TIMES THE OUTSIDE DIAMETER OF THE INSULATION AND SHALL EXTEND TO ABOVE THE CENTER LINE OF THE PIPE.

WHERE PIPING PASSES THROUGH MASONRY CONSTRUCTION, STEEL PIPE SLEEVES SHALL BE PROVIDED, SIZED TO ALLOW AT LEAST 1/2" CLEARANCE AROUND PIPE OR INSULATION WHERE PIPE IS INSULATED. SLEEVES SHALL BE FLUSH WITH FINISHED WALLS AND EXTEND 1/2" ABOVE FINISH FLOORS. A WATERTIGHT SEAL SHALL BE PRO–VIDED BETWEEN FLOOR AND SLEEVE AND SPACE BETWEEN PIPE AND SLEEVE SHALL BE CAULKED WITH LEAD WOOL.

TEST

PRESSURE TEST ALL HOT WATER AND CONDENSER WATER PIPING AT A PRESSURE OF 150 PSIG FOR 24 HOURS. ARCHITECT/ENGINEER SHALL BE NOTIFIED 72 HOURS BEFORE TEST IS TO BE PERFORMED.

DUCT INSULATION

A. MATERIALS. INSULATION SHALL BE OWENS–CORNING AS SPECIFIED HEREINAFTER OR PRODUCTS OF CERTAIN–TEED/ST. GOBAIN OR MANVILLE. ADHESIVES SHALL BE AS MANUFACTURED BY 3–M FOSTER OR INSULATION MANUFACTURER. INSULATION SHALL HAVE COMPOSITE (INSULATION, JACKET AND ADHESIVE) FIRE AND SMOKE HAZARD RATING AS TESTED BY ASTM E–84, NOT EXCEEDING FLAME SPREAD –25 AND SMOKE DEVELOPED –50.

PIPE INSULATION

APPLICATION. INSULATION AND SURFACES TO BE INSULATED SHALL BE CLEAN AND DRY WHEN INSULATION IS INSTALLED AND DURING THE APPLICATION OF ANY FINISH. INSTALLATION SHALL COMPLY WITH MIDWEST INSULATION CONTRACTORS ASSOCIATION "NATIONAL COMMERCIAL AND INDUSTRIAL INSULATION STANDARDS", (MICA).
INSULATION, AND FINISHED WITH TAPE AND VAPOR BARRIER MASTIC. SEAL OFF VAPOR BARRIER TO REFRIGERANT PIPING. END JOINT STRIPS AND OVERLAP SEAMS SHALL BE ADHERED WITH A VAPOR BARRIER MASTIC. VALVES, FITTINGS, AND FLANGES SHALL BE INSULATED WITH STRIPS OF PIPE

PIPE AT ALL FITTINGS, HANGERS, AND EVERY 20 FEET ON STRAIGHT RUNS.

DELIVERY, PREPARATION, STORAGE AND HANDLING:

1. DELIVER MATERIALS TO SITE IN ORIGINAL FACTORY PACKAGING, LABELED WITH MANUFACTURER?S IDENTIFICATION, INCLUDING PRODUCT DENSITY AND THICKNESS.

2. STORE INSULATION IN ORIGINAL WRAPPING, AND PROTECT FROM WEATHER AND CONSTRUCTION TRAFFIC.

3. ALL INSULATION AND SURFACES TO BE INSULATED SHALL BE KEPT DRY AND FREE FROM ALL MOISTURE PRIOR TO AND DURING THE APPLICATION OF INSULATION AND VAPOR BARRIER. IT IS CRITICAL TO KEEP THE ENTIRE INSULATION SYSTEM FREE FROM MOISTURE. ALL WET INSULATION AND WET VAPOR BARRIER JACKETING; TAPES, JOINT SEALERS AND MASTICS WILL BE REMOVED FROM THE JOB SITE AT THE INSULATION CONTRACTOR?S EXPENSE.

JOINT SEALANT

1. A 1/4" BEAD OF NON–HARDENING VAPOR RETARDANT BUTYL RUBBER JOINT SEALANT SHALL BE USED TO SEAL ALL LONGITUDINAL AND CIRCUMFERENTIAL JOINTS ON BOTH INDOOR AND OUTDOOR APPLICATIONS.
2. LAYERS OF INSULATION SHOULD NOT BE BONDED TOGETHER. EXCESSIVE SEALER IN THE JOINTS SHOULD BE AVOIDED DURING APPLICATION. DO NO FEATHER EDGE. IT IS IMPORTANT THAT ALL INSULATION SECTIONS BE TRIMMED AND TIGHTLY BUTTED TO ELIMINATE VOIDS, GAPS OR OPEN JOINTS. JOINT SEALER SHALL NOT BE USED TO FILL THESE IMPERFECTIONS. INSULATION ENDS SHALL BE RUBBED AGAINST EACH OTHER TO ACHIEVE A TIGHT FIT PRIOR TO APPLICATION OF JOINT SEALER.
3. JOINT SEALER SHALL BE VAPOR BARRIER TYPE, MOISTURE AND WATER RESISTANT, 97% SOLIDS BY WEIGHT, NON–HARDENING, FLEXIBLE WITH A SERVICE TEMPERATURE RANGE FROM –50§F TO 180§F.
4. ALL JOINT SEALERS SHALL BE COMPATIBLE WITH CLOSED CELL INSULATION AND BE ABSOLUTELY FREE OF SOLVENTS OR ANY CHEMICALS THAT WILL ATTACK EPS.
5. JOINT SEALANT MATERIAL SHALL BE RECOMMENDED BY CLOSED CELL MANUFACTURER.

DUCT INSULATION

ALL VAPOR BARRIERS AND JOINTS SHALL BE SEALED TO PREVENT CONDENSATION. CLEAN AND DRY ALL DUCTWORK BEFORE INSTALLING INSULATION. ALL WELD JOINTS SHALL BE WIRE BRUSHED AND GIVE ONE (1) COAT OF RED LEAD BEFORE INSULATING. STAPLES WILL NOT BE PERMITTED IN INSULATION.

LINED DUCT.

1. DUCTWORK AS INDICATED BELOW SHALL BE LINED WITH OWENS–CORNING AEROFLEX VAPOR–SEAL DUCT INSULATION, 1–1/2 PCF, 1" THICK, OR EQUAL BY CERTAIN–TEED/ST. GOBAIN OR JOHNS MANSVILLE.
2. DUCT LINER AND ADHESIVE SHALL MEET REQUIREMENTS OF NFPA 90A AND SHALL HAVE UL FIRE HAZARD CLASSIFICATION NOT TO EXCEED THE FOLLOWING: FLAME SPREAD –25; FUEL CONTRIBUTED –50; SMOKE GENERATED –50. THERE WILL BE NO EROSION OF DUCT LINER MATERIAL AT VELOCITIES UP TO 4000 FPM. DUCT LINER SHALL BE APPLIED TO THE SHEET METAL WITH 100% COVERAGE OF ADHESIVE. THE DUCT LINER SHALL BE CUT TO ASSURE CORNER JOINTS WITH NO GAPS. ON HORIZONTAL RUNS, TOPS OF DUCTS OVER 12" IN WIDTH AND SIDES OF 16" IN HEIGHT SHALL BE ADDITIONALLY SECURED WITH MECHANICAL FASTENERS. ON SPANS LESS THAN 30" FASTENERS ARE TO BE PLACED AT MIDPOINTS. ON VERTICAL RUNS, FASTENERS SHALL BE PLACED ON A MAXIMUM OF 15" CENTERS ON ALL WIDTH DIMENSIONS OVER 12". FASTENERS SHALL BE FLUSH WITH THE LINER SURFACE. ALL EXPOSED EDGES AND LEADING EDGES OF ALL TRANSVERSE AND LONGITUDINAL JOINTS OF THE LINER SHALL BE COATED WITH A FIRE RESISTANT ADHESIVE. THE EXPOSED MECHANICAL FASTENERS SHALL BE COATED WITH A FIRE RESISTANT ADHESIVE. THE UPSTREAM END MUST BE CONTINUOUSLY ADHERED TO FOR A 6" WIDTH.

WRAPPED DUCT

1. ALL LOW PRESSURE SUPPLY DUCTS AND ALL MEDIUM PRESSURE DUCTS UNLESS NOTED SHALL BE INSULATED BY WRAPPING WITH 2" THICK, MINIMUM INSTALLED "R" VALUE = 5.0, FIBERGLASS WITH VAPOR BARRIER JACKET WITH JOINTS OVERLAPPED A MINIMUM OF TWO INCHES. INSULATION SHALL BE ADHERED TO DUCT WITH NON–COMBUSTIBLE INSULATION BONDING ADHESIVE APPLIED IN 4" STRIPS, 8" ON CENTER. ALL JOINTS SHALL BE SECURED WITH FLARE DOOR STAPLES ON 3" CENTERS THROUGH ALL LAPS OVER DUCT TAPE.

FABRIC DUCTS

MANUFACTURERS
DUCT SOX CORPORATION, FABRIC AIR, AIR SOX AND APPROVED EQUALS.

FABRIC AIR DISPERSION SYSTEM
AIR DIFFUSERS SHALL BE CONSTRUCTED OF A WOVEN FIRE RETARDANT FABRIC COMPLYING WITH THE FOLLOWING PHYSICAL CHARACTERISTICS:

1. FABRIC CONSTRUCTION. 100% FLAME RETARDANT AND RETREATED WITH A MACHINE WASHABLE ANTI–MICROBIAL AGENT FROM THE MANUFACTURER.
2. WEIGHT. 6.75 OZ./YDý PER ASTM D3776
3. COLOR. (STANDARD: BLUE, WHITE, TAN, RED, GREEN, GRAY, BLACK OR CUSTOM)
4. AIR PERMEABILITY: 2 (+2/–1) CFM/FTý PER ASTM D737, FRAZIER
5. TEMPERATURE RANGE: 0 DEGREES F TO 180 DEGREES F
6. FIRE RETARDANCY. CLASSIFIED BY UNDERWRITERS LABORATORIES IN ACCORDANCE WITH THE FLAME SPREAD/SMOKE DEVELOPED REQUIREMENTS OF NFPA 90–A AND ICC AC 167.
7. ANTIMICROBIAL AGENT SHALL BE PROVEN 99% EFFECTIVE AFTER 10 LAUNDRY CYCLES PER AATCC TEST METHOD 100.

SYSTEMS FABRICATION REQUIREMENTS.

1. AIR DISPERSION ACCOMPLISHED BY LINEAR VENT AND PERMEABLE FABRIC, LINEAR VENT TO CONSIST OF MANY 3/16" DIAMETER OPEN ORIFICES RATHER THAN A MESH STYLE VENT TO REDUCE MAINTENANCE REQUIREMENTS OF MESH STYLE VENTS.
2. SIZE OF AND LOCATION OF LINEAR VENTS TO BE SPECIFIED AND APPROVED BY MANUFACTURER.
3. INLET CONNECTION TO METAL DUCT VIA FABRIC DRAW BAND WITH ANCHOR PATCHES AS SUPPLIED BY MANUFACTURER. ANCHOR PATCHES TO BE SECURED TO METAL DUCT VIA. ZIP SCREW FASTENER – SUPPLIED BY CONTRACTOR.
4. INLET CONNECTION INCLUDES ZIPPER FOR EASY REMOVAL/MAINTENANCE.
5. LENGTHS TO INCLUDE REQUIRED ZIPPERS AS SPECIFIED BY MANUFACTURER.
6. SYSTEM TO INCLUDE ADJUSTABLE FLOW DEVICES TO BALANCE TURBULENCE, AIRFLOW AND DISTRIBUTION AS NEEDED. FLOW RESTRICTION DEVICE SHALL INCLUDE ABILITY TO ADJUST THE AIRFLOW RESISTANCE FROM 0.06 ? 0.60 IN W.G. STATIC PRESSURE.
7. END CAP INCLUDES ZIPPER FOR EASY MAINTENANCE.
8. FABRIC SYSTEM SHALL INCLUDE CONNECTORS TO ACCOMMODATE SUSPENSION SYSTEM LISTED BELOW.
9. ANY DEVIATION FROM A STRAIGHT RUN SHALL BE MADE USING A GORED ELBOW OR AN EFFICIENCY TEE. NORMAL 90 DEGREE ELBOWS ARE 5 GORES AND THE RADIUS OF THE ELBOW IS 1.5 TIMES THE DIAMETER OF THE DUCT.

DESIGN PARAMETERS.

1. USE FABRIC DIFFUSERS ONLY FOR POSITIVE PRESSURE AIR DISTRIBUTION COMPONENTS OF THE MECHANICAL VENTILATION SYSTEM.
2. DO NOT USE FABRIC DIFFUSERS IN CONCEALED LOCATIONS.
3. FABRIC DIFFUSERS SHALL BE DESIGNED FROM 0.25" WATER GAGE MINIMUM TO 3.0" MAXIMUM, WITH 0.5" AS THE STANDARD.
4. FABRIC AIR DIFFUSERS SHALL BE LIMITED TO DESIGN TEMPERATURES BETWEEN 0 DEGREES F AND 180 DEGREES F (–17.8 DEGREES C AND 82 DEGREES C).
5. DESIGN CFM, STATIC PRESSURE AND DIFFUSER LENGTH SHALL BE DESIGNED OR APPROVED BY THE MANUFACTURER.

SUSPENSION HARDWARE.

1. TENSION CABLE. SYSTEM SHALL BE INSTALLED USING A TENSION CABLE SYSTEM INCLUDING A SINGLE (1 ROW) OR DOUBLE STRANDS (2 ROW) OF CABLE LOCATED 3" ABOVE TOP–DEAD–CENTER (1 ROW) OR 3" ABOVE THE 10 AND 2 O'CLOCK LOCATIONS OF THE SYSTEM. 2 ROW SUPPORTS ARE REQUIRED FOR SYSTEMS OF 32" DIAMETER AND LARGER. HARDWARE TO INCLUDE CABLE, EYEBOLTS, CABLE CLAMPS AND TURNBUCKLE(S) AS REQUIRED. SYSTEM ATTACHMENT SHALL BE MADE USING NYLON SNAP CLIPS SPACED 24 INCHES. COMPONENT CABLING OPTIONS INCLUDE STANDARD GALVANIZED STEEL CABLE, STANDARD STAINLESS STEEL CABLE, HEAVY WEIGHT STAINLESS STEEL CABLE, AND PLASTIC COATED STAINLESS STEEL CABLE. CABLING AND CLAMPING MATERIAL SHALL BE APPROVED FOR USE IN CHLORINATED ENVIRONMENTS.

2. SUSPENDED H–TRACK. SYSTEM SHALL INCLUDE A SINGLE (1 ROW) OR DOUBLE (2 ROW) RUNS OF ALUMINUM H–TRACK SYSTEM LOCATED 1.5" ABOVE TOP–DEAD–CENTER (1 ROW) OR 1.5" ABOVE THE 10 AND 2 O'CLOCK (2 ROW) LOCATIONS OF THE SYSTEM. 2 ROW SUPPORTS ARE REQUIRED FOR SYSTEMS OF 32? DIAMETER AND LARGER. HARDWARE TO INCLUDE 10' SECTIONS OF TRACK, SPLICE CONNECTORS, TRACK END CAPS AND VERTICAL CABLE SUPPORT KITS – CONSISTING OF A LENGTH OF CABLE WITH A LOCKING STUD END AND GRIPPLE QUICK CABLE CONNECTORS. RADIUS ALUMINUM TRACK MUST BE INCLUDED FOR ALL RADIUS SECTIONS.
   A. FABRIC/TRACK ATTACHMENT
      (1) CORD IN CONTINUOUS SUPPORTING CORD (NOT ALLOWED FOR SYSTEMS >24" DIA.)
      (2) SNAP TABS ARE A DETACHABLE SLIDING TAB POSITIONED EVERY 24" ALONG THE LENGTH OF THE SYSTEM (ALL DIAMETERS).
   B. HARDWARE COMPONENTS (OPTIONAL)
      (1) PROVIDE 316 STAINLESS STEEL COMPONENTS INCLUDING COUPLER ASSEMBLY, VERTICAL CABLE SUPPORT AND GRIPPLE QUICK CABLE CONNECTOR.

3. FLUSH–MOUNT TRACK. SYSTEM SHALL INCLUDE ALUMINUM FLUSH–MOUNT SYSTEM LOCATED 1.5" ABOVE TOP–DEAD–CENTER OF THE SYSTEM. HARDWARE TO INCLUDE 12" SECTION OF TRACK, SNAP TABS, SPLICE CONNECTIONS AND END CAPS AS REQUIRED. SNAP TABS MUST PROMOTE EASY SLIDING MOVEMENT THROUGH ALUMINUM TRACK AND MUST BE DETACHABLE FROM THE FABRIC. RADIUS ALUMINUM TRACK FOR SUPPORT OF THE ELBOWS THROUGH THE CORNERS USING EITHER SNAP TABS OR CORD–IN.
   A. FABRIC/TRACK ATTACHMENT
      (1) CORD IN CONTINUOUS SUPPORTING CORD (NOT ALLOWED FOR SYSTEMS >24" DIA.)
      (2) SNAP TABS ARE A DETACHABLE SLIDING TAB POSITIONED EVERY 24" ALONG THE LENGTH OF THE SYSTEM (ALL DIAMETERS).
4. SURFACE MOUNT. SYSTEM SHALL INCLUDE ALUMINUM FLUSH–MOUNT SYSTEM LOCATED FLUSH WITH THE TOP OF SYSTEM. WIDTH BETWEEN MOUNTING POINTS (OF THE TRACK TO THE CEILING) SHALL BE 2" WIDER THAN THE SPECIFIED DIAMETER OF THE DUCT. HARDWARE TO INCLUDE 12' SECTIONS OF TRACK, SPLICE CONNECTIONS AND END CAPS AS REQUIRED. SYSTEM ATTACHMENT SHALL BE MADE BY CORD SEWN INTO TOP SIDE FLAPS OF THE SYSTEM SUPPORTED ENTIRE LENGTH.

INSTALLATION OF FABRIC AIR DISPERSION SYSTEM
A. INSTALL CHOSEN SUSPENSION SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANUFACTURER. INSTRUCTIONS FOR INSTALLATION SHALL BE PROVIDED BY THE MANUFACTURER WITH PRODUCT.

CLEANING AND PROTECTION

A. CLEAN AIR HANDLING UNIT AND DUCTWORK PRIOR TO THE SYSTEM UNIT–BY–UNIT AS IT IS INSTALLED. CLEAN EXTERNAL SURFACES OF FOREIGN SUBSTANCE, WHICH MAY CAUSE CORROSIVE DETERIORATION OF FACING.
B. TEMPORARY CLOSURE. AT ENDS OF DUCTS, WHICH ARE NOT CONNECTED TO EQUIPMENT OR DISTRIBUTION, DEVICES AT TIME OF DUCTWORK INSTALLATION, COVER WITH POLYETHYLENE FILM OR OTHER COVERING, WHICH WILL KEEP THE SYSTEM CLEAN UNTIL INSTALLATION IS COMPLETED.
C. IF SYSTEMS BECOME SOILED DURING INSTALLATION, THEY SHOULD BE REMOVED AND CLEANED FOLLOWING THE MANUFACTURERS STANDARD TERMS OF LAUNDRY.

POOL DEHUMIDIFIER SPECIFICATION

SPLIT SYSTEM DESIGNED FOR NATATORIUM ENVIRONMENT CONTROL INCLUDING:
DEHUMIDIFICATION
UNIT MOUNTED INDIRECT FIRED GAS HEATER FOR SPACE HEATING
COOLING MODE WITH HEAT REJECTION TO A REMOTE OUTDOOR AIR COOLED FLUID COOLER (DRY–COOLER). NO SITE REFRIGERATION WORK SHALL BE REQUIRED.
POOL WATER HEATING FROM RECLAIMED COMPRESSOR WASTE HEAT
UNIT MOUNTED MINIMUM OUTDOOR AIR CONNECTION

QUALITY AND SAFETY ASSURANCE

THE UNIT SHALL BE ETL LISTED.
UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED, PIPED, AND TEST RUN PRIOR TO SHIPPING. ALL CONTROLS SHALL BE FACTORY ADJUSTED AND PRESET TO THE DESIGN CONDITIONS. A FACTORY TEST REPORT SHALL BE AVAILABLE UPON REQUEST.
LIVE REMOTE MONITORING OF THE UNIT DURING FACTORY TESTING SHALL BE AVAILABLE VIA THE INTERNET.
THE UNIT SHALL HAVE A MECHANICAL VESTIBULE WHERE THE ELECTRICAL PANEL, COMPRESSORS, POOL WATER HEAT EXCHANGERS, RECEIVERS AND MOST OF THE REFRIGERATION CONTROLS ARE OUT OF THE PROCESS AIR STREAM.
UNIT SHALL HAVE A MICROPROCESSOR CONTROLLER WITH UNIT MOUNTED REFRIGERANT PRESSURE TRANSDUCERS ON EACH INDEPENDENT COMPRESSOR CIRCUIT, MULTIPLE TEMPERATURE SENSORS AND AN ETHERNET CONNECTION FOR FACTORY MONITORING, ADJUSTING AND CONTROL VIA THE INTERNET. THE REFRIGERANT PRESSURE TRANSDUCERS SHALL BE ACTIVELY USED FOR UNIT CONTROL. A WEEKLY GRAPH OF THE SPACE CONDITIONS SHALL BE PROVIDED TO THE CUSTOMER. DEMONSTRATION OF THESE CAPABILITIES MUST BE CARRIED OUT AT THE ENGINEER'S OFFICE PRIOR TO BID DAY.
INTERNET START–UP ASSIST: THE UNIT SHALL HAVE REMOTE FACTORY START–UP CAPABILITY VIA THE INTERNET.
THE UNIT SHALL HAVE 24–7 REMOTE COMPUTER MONITORING WITH AUTOMATED ALARM NOTIFICATIONS AND SYSTEM PERFORMANCE ALERTS.
WARRANTY: THE ENTIRE SYSTEM SHALL HAVE A 24 MONTH LIMITED PARTS WARRANTY FROM SHIP DATE.
THE SYSTEM SHALL BE COVERED BY AN ADDITIONAL 1–YEAR LABOUR WARRANTY WHEN IT IS CONNECTED TO THE FACTORY VIA LIVE INTERNET MONITORING SYSTEM FROM DATE OF INITIAL START–UP.
THE UNIT SHALL HAVE LIVE REMOTE SERVICE CAPABILITY VIA THE INTERNET WITH THE ABILITY FOR FIELD SERVICE TECHNICIANS TO RECEIVE SERVICE AND TROUBLE ALERTS VIA EMAIL AND MAKE ADJUSTMENTS VIA SMART–PHONE APPLICATION REMOTE CONTROL.

GENERAL
THE NATATORIUM CONTROL SYSTEM SHALL INCLUDE:
MECHANICAL PROCESS DEHUMIDIFICATION
OUTDOOR CONFIGURATION
THE UNIT SHALL HAVE AN INDIRECT FIRED NATURAL GAS HEATER INSTALLED DOWNSTREAM OF THE BLOWER, SIZED TO MEET THE SKIN LOSSES AND OUTDOOR AIR HEATING LOADS OR AS SPECIFIED BY THE DESIGN ENGINEER.
POOL WATER HEATING TYPE: COAXIAL
AIR FILTRATION TYPE: MERV 8 2–INCH FILTERS FOR RETURN AND OUTDOOR AIR.
MINIMUM OUTDOOR AIR CONNECTION.
PROGRAMMABLE MICROPROCESSOR CONTROLLER WITH LIVE, 24–7 REMOTE INTERNET ACCESS, MONITORING AND CONTROL.
UNIT SHALL HAVE A SERVICE VESTIBULE WHERE THE COMPRESSOR, REFRIGERATION SPECIALTIES AND CONTROL VALVES AND ALL ELECTRONICS ARE OUTSIDE OF PROCESS AIR STREAM.

SEQUENCE OF OPERATION
UNIT SHALL BE DESIGNED AND SIZED TO MAINTAIN THE SPECIFIED CONDITIONS. THE UNIT OPERATION SHALL BE AS FOLLOWS:
UNIT STARTUP

POWER IS TURNED ON OR SYSTEM IS RESTARTED.
AFTER A SHORT INITIAL DELAY TO ALLOW SENSORS TO STABILIZE, THE BLOWER STARTS AND OPERATES CONTINUOUSLY.
BASED ON UNIT MOUNTED SENSOR FEEDBACK THE UNIT SHALL BEGIN/RESUME OPERATION AND WILL OPERATE BASED ON THE SEQUENCE DESCRIBED BELOW.

AIRSIDE CONFIGURATION

THE UNIT DELIVERS SPECIFIED SUPPLY AIR CONTINUOUSLY TO THE NATATORIUM.
THE MINIMUM EXHAUST AIR VOLUME IS SET TO MEET THE ENGINEER?S SCHEDULE.
THE MINIMUM OUTDOOR AIR VOLUME IS SET TO MEET THE ENGINEER?S SCHEDULE.

DEHUMIDIFICATION MODE

RETURN AIR RELATIVE HUMIDITY IS ABOVE HUMIDITY SETPOINT.
COMPRESSOR STARTS USING COMPRESSOR START SEQUENCE.
IF THE UNIT CANNOT MAINTAIN RELATIVE HUMIDITY WITHIN SETPOINT, COMPRESSOR 2 WILL START.
THE COMPRESSOR WASTE HEAT IS REJECTED INTO THE GLYCOL FLUID LOOP WHICH FLOWS IN PARALLEL TO THE REHEAT COIL AND AIR CONDITIONING AIR COOLED HEAT EXCHANGER.
THE REHEAT COIL HAS FULL (0–100%) MODULATING CAPABILITIES. THE REHEAT OUTPUT WILL MODULATE TO MAINTAIN THE SPACE TEMPERATURE AT SET POINT YEAR ROUND.

AIR CONDITIONING MODE

RETURN AIR TEMPERATURE IS ABOVE ROOM TEMPERATURE SETPOINT.
COMPRESSOR STARTS IF NOT ALREADY OPERATING IN DEHUMIDIFICATION MODE.
UNNEEDED COMPRESSOR HOT GAS IS DIVERTED TO A REFRIGERANT TO GLYCOL FLUID COOLED HEAT EXCHANGER. UP TO 100% OF COMPRESSOR HEAT IS REJECTED INTO THE GLYCOL FLUID WHICH IN TURN IS PUMPED OUTDOORS TO AN OUTDOOR AIR COOLED HEAT EXCHANGER FOR 100% HEAT REJECTION AT SUMMER DESIGN AMBIENT CONDITIONS.
100% OF COMPRESSOR HEAT IS REJECTED AT THE OUTDOOR AIR COOLED HEAT EXCHANGER ON A SUMMER DESIGN DAY. ON OFF PEAK DAYS THE REHEAT OUTPUT WILL MODULATE TO MAINTAIN THE SPACE TEMPERATURE AT SET POINT YEAR ROUND.
IF THE UNIT CANNOT MAINTAIN RETURN AIR TEMPERATURE WITHIN SETPOINT, COMPRESSOR 2 WILL START.

SPACE HEATING MODE

RETURN AIR TEMPERATURE IS BELOW ROOM TEMPERATURE SETPOINT.
THE MICROPROCESSOR SPACE HEATING OUTPUT SIGNAL (0–10 VOLT) IS SENT TO THE HEATING COIL CONTROLLER. THE SIGNAL OUTPUT WILL REGULATE BASED ON THE RETURN AIR TEMPERATURE.

POOL WATER HEATING MODE

RETURN POOL WATER TEMPERATURE IS BELOW POOL WATER SETPOINT.
IF COMPRESSOR IS ALREADY OPERATING FROM A DEHUMIDIFICATION OR AIR CONDITIONING DEMAND, THE CONTROL VALVES DIVERT THE COMPRESSOR HOT GAS THROUGH THE COAXIAL HEAT EXCHANGER/POOL WATER HEATER AND THE REST OF THE COMPRESSOR HEAT IS REJECTED AT EITHER THE REHEAT COIL OR THE AC HEAT EXCHANGER.
IF THERE IS NO PRE–EXISTING DEMAND FOR THE COMPRESSOR TO OPERATE, THE MICROPROCESSOR SENDS A SIGNAL TO THE AUXILIARY POOL WATER HEATER (REMOTE BY OTHERS) TO OPERATE. THE COMPRESSOR WILL NOT NORMALLY OPERATE SOLELY FOR A POOL WATER HEATING DEMAND UNLESS CONFIGURED TO DO SO AT THE CONTROLLER.

FREEZE PROTECTION

SUPPLY AIR TEMPERATURE FALLS BELOW FREEZESTAT SETPOINT OR OPTIONAL FREEZESTAT SENSOR INDICATES A FREEZESTAT CONDITION.
ALL EXHAUST FANS ARE STOPPED AND ALL OUTDOOR AIR DAMPERS ARE FULLY CLOSED.
FREEZESTAT ALARM IS TRIPPED. ALARM HAS TO BE MANUALLY CLEARED BY OPERATOR.

CABINET

THE CABINET SHALL BE DESIGNED FOR OUTDOOR INSTALLATION AND SHALL BE 2" DOUBLE WALLED WITH PAINTED INNER LINER.
CABINET CONSTRUCTION: ALL CABINET 16, 20, 24 GAUGE SHEET METAL SHALL BE GALVANIZED G90 STEEL OR GALVALUMETM ALLOY, MILL APPLIED ZINC PHOSPHATE PRIMER FOLLOWED BY AN EXTERIOR GRADE WHITE SILICONE MODIFIED POLYESTER TOP COAT. THE SHEET METAL IS ENGINEERED TO FORM A CABINET WITH MAXIMUM STRENGTH AND RIGIDITY. PANELS SHALL BE FASTENED TO THE FRAME WITH STAINLESS STEEL HARDWARE. PANELS SHALL BE ISOLATED FROM THE STEEL FRAME WITH DIELECTRIC GASKETS TO PREVENT GALVANIC CORROSION. ALL SEAMS SHALL BE CAULKED WITH SILICONE INSIDE AND OUT TO PREVENT AIR AND WATER LEAKAGE.

BASE RAILS: THE UNIT BASE FRAME SHALL BE FORMED OF 2 LAYERS OF 10 GAUGE GALVANIZED STEEL. LIFTING LUGS SHALL BE PROVIDED ON THE BASE FRAME FOR RIGGING THE UNIT.
THE CABINET WALLS SHALL BE 20 GAUGE PRE–PAINTED STEEL, 2–INCH DOUBLE–WALL CONSTRUCTION WITH A FULLY PAINTED INNER METAL LINER AND 2–INCH FIBERGLASS INSULATION.
THE CABINET FLOOR SHALL BE COMPRISED OF A 16–GAUGE GALVANIZED STEEL PANEL WITH A 20–GAUGE PRE–PAINTED STEEL INNER LINER, 2–INCH DOUBLE WALL ENGINEERED WITH STRUCTURAL BENDING FOR MAXIMUM RIGIDITY AND BE MECHANICALLY FASTENED TO THE BASE FRAME OF THE UNIT.
THE CABINET ROOF SHALL BE 20–GAUGE PRE–PAINTED STEEL, 2–INCH DOUBLE WALL ENGINEERED WITH STRUCTURAL BENDING FOR MAXIMUM RIGIDITY AND BE MECHANICALLY FASTENED TO THE BASE WALLS OF THE UNIT.
THE CABINETS SHALL BE MECHANICALLY ASSEMBLED WITH STAINLESS STEEL 5/32" SEALED POP RIVETS. WHERE BOLTS ARE REQUIRED BRIGHT ZINC PLATED BOLTS SHALL BE USED.
ACCESS DOORS SHALL BE SUPPORTED ON MULTIPLES HINGES AND HAVE MULTIPLE COMPRESSION LATCHES TO PROVIDE QUICK ACCESS. DOORS SHALL BE PROVIDED FOR ENTRANCE TO ALL SECTIONS HOUSING COMPONENTS REQUIRING ROUTINE MAINTENANCE. FULL HEIGHT ACCESS DOORS HAVE "HOLD BACK" LATCHES TO PREVENT DOOR CLOSURE DURING THE PERFORMANCE OF SERVICE PROCEDURES.
THE UNIT SHALL HAVE NON–CORRODING PROTECTIVE MESH SCREENS ON ALL AIR INTAKE OPENINGS.
THE UNITS SHALL HAVE NON–CORRODING PROTECTIVE MESH SCREENS COVERING INTERNAL FAN BLADES, PROTECTIVE GRATES COVERING ALL FLOOR ACCESS PORTS.

OUTDOOR AIR INTAKE:

MINIMUM OUTDOOR AIR CONNECTION: DUCT COLLAR, MANUAL DAMPER AND FILTER

INSULATION: THE UNIT SHALL BE INSULATED PER THE FOLLOWING STANDARDS:

ALL EXTERIOR CABINET SECTIONS SHALL BE INSULATED WITH TWO (2) INCH THICK FIBERGLASS INSIDE THE DOUBLE WALLED CABINET.
FIRE RESISTANT RATING TO CONFORM TO NFPA STANDARD 90A AND 90B.
SOUND ATTENUATION COEFFICIENT SHALL NOT BE LESS THAN 1.02 AT A FREQUENCY OF 1,000 HZ AS PER ASTM STANDARD C423.
THERMAL CONDUCTIVITY SHALL NOT EXCEED 0.26 BTU/IN–H–SQFT–F AT 75 F.

CABINET CONFIGURATION SHALL INCLUDE:

A FILTER RACK WITH SEPARATE ACCESS DOORS SHALL BE PROVIDED FOR THE RETURN AIR AND MINIMUM OUTDOOR AIR STREAMS.
UNIT SHALL BE EQUIPPED WITH DUCT COLLARS TO ADMIT THE MINIMUM OUTDOOR AIR AS SCHEDULED. THE OUTDOOR AIR INTAKE ASSEMBLY SHALL HAVE A BUILT IN AIR FILTER RACK WITH SEPARATE ACCESS DOOR AND MANUAL AIR BALANCING DEVICE.
MECHANICAL VESTIBULE: THE UNIT SHALL HAVE THE COMPRESSOR, RECEIVER, SOLENOID VALVES AND THE ELECTRICAL PANEL IN A SEPARATE COMPARTMENT OUT OF THE PROCESSED AIR STREAM. ALL COMPONENTS SHALL BE SERVICEABLE WHILE THE UNIT IS IN OPERATION WITHOUT DISTURBING THE AIRFLOW.
ELECTRICAL PANEL: THE UNIT SHALL HAVE A BUILT–IN ELECTRICAL CONTROL PANEL IN A SEPARATE COMPARTMENT IN ORDER NOT TO DISTURB THE AIRFLOW WITHIN THE DEHUMIDIFIER DURING ELECTRICAL SERVICING. ALL ELECTRICAL COMPONENTS SHALL BE MOUNTED ON A 16 GAUGE GALVANIZED SUB–PANEL.

FILTERS
FILTERS SHALL BE STANDARD SIZED, REPLACEABLE, OFF–THE–SHELF FILTERS USED THROUGHOUT INCLUDING:
RETURN AIR: 2–INCH MERV 8, 30% PLEATED FILTERS WITH RUST–FREE NON–METALLIC STRUCTURE ON A FACE LOADING RACK.
OUTSIDE AIR: 2–INCH MERV 8, 30% PLEATED FILTERS WITH RUST–FREE NON–METALLIC STRUCTURE.

COILS

EVAPORATOR/DEHUMIDIFIER COILS SHALL BE DESIGNED FOR MAXIMUM MOISTURE REMOVAL CAPACITY.
COILS SHALL BE FULLY DIPPED AND COATED WITH A POLYESTER/ENAMEL COATING FOR MAXIMUM CORROSION PROTECTION. COATING SHALL COMPLY WITH ASTM B117/D1654 AND ASTM D2126 FOR CORROSION RESISTANCE AGAINST COMMON ACIDS, SALT AND GASES.
COIL SHALL HAVE GALVANIZED CASING AND END PLATES.
ALUMINUM FIN AND COPPER TUBES MECHANICALLY BONDED TO ASSURE HIGH HEAT TRANSFER.
AIR REHEAT COILS SHALL BE SIZED FOR VARIABLE HEAT TRANSFER INTO THE AIR WITH A CAPACITY OF 100% OF THE COMPRESSORS TOTAL REQUIRED HEAT OF REJECTION.
COILS SHALL BE FULLY DIPPED AND COATED WITH A POLYESTER/ENAMEL COATING FOR MAXIMUM CORROSION PROTECTION. COATING SHALL COMPLY WITH ASTM B117/D1654 AND ASTM D2126 FOR CORROSION RESISTANCE AGAINST COMMON ACIDS, SALT AND GASES.
COIL SHALL HAVE GALVANIZED CASING AND END PLATES.
ALUMINUM FIN AND COPPER TUBE JOINTS MECHANICALLY BONDED TO ASSURE HIGH HEAT TRANSFER

DRAIN PANS
EACH EVAPORATOR COIL SHALL BE PROVIDED WITH A POSITIVE DRAINING, COMPOUND–SLOPED, BAKED POWDER PAINT COATED ALUMINUM DRAIN PAN WITH FULLY–WELDED CORNERS TO ENSURE ZERO WATER RETENTION.
BLOWERS AND BLOWER MOTORS

DAMPERS
INTERNAL DAMPERS SHALL BE PARALLEL BLADE AND MADE FROM EXTRUDED ANODIZED ALUMINUM WITH NEOPRENE DOUBLE SEAL TIPS TO MINIMIZE LEAKAGE. DAMPER BLADES SHALL BE MOUNTED ON STEEL RODS WHICH ROTATE ON NYLON BUSHINGS. ALL DAMPER HARDWARE SHALL BE CORROSION RESISTANT.
POOL WATER HEATER
COAXIAL TYPE WITH CORROSION RESISTANT CUPRO–NICKEL WATER CIRCUIT TUBING.
COAXIAL TYPE WITH CORROSION RESISTANT CUPRO–NICKEL WATER CIRCUIT TUBING.
SELF–PURGING AND SELF–DRAINING COUNTER FLOW DESIGN.
WATER CIRCUIT PIPING SHALL BE TRANSPARENT BRAIDED HOSE, FOR VISUAL WATER FLOW CONFIRMATION.
TERMINATING CONNECTIONS ARE PVC SCHEDULE 40 NPT FITTINGS LOCATED AT THE CABINET WALL FOR EASY CONNECTION.
MAXIMUM LOOP OPERATING PRESSURE: 60 PSIG

COMPRESSORS

TYPE: SCROLL TYPE, SUCTION GAS COOLED, SUITABLE FOR REFRIGERANT R–410A
THE COMPRESSORS SHALL BE MOUNTED ON RUBBER IN SHEAR ISOLATORS TO PREVENT TRANSMISSION OF ANY NOISE AND VIBRATION TO THE SPACE BELOW.
REMOVABLE CRANKCASE HEATER FOR LIQUID MIGRATION PROTECTION.
COMPRESSORS SHALL BE LOCATED OUTSIDE THE CONDITIONED AIR STREAM IN THE UNIT'S SERVICE VERSTIBULE.
COMPRESSOR MANUFACTURER MUST HAVE A WHOLESALE OUTLET FOR REPLACEMENT PARTS IN THE NEAREST MAJOR CITY.

REFRIGERATION CIRCUIT

THE UNIT SHALL CONSIST OF TWO FACTORY SEALED REFRIGERATION CIRCUITS FOR HUMIDITY AND/OR AIR CONDITIONING CONTROL. NO SITE REFRIGERATION WORK SHALL BE REQUIRED.
REFRIGERATION CIRCUIT SHALL HAVE PRESSURE TRANSDUCERS MONITORING THE REFRIGERANT HIGH AND LOW PRESSURES. THE REFRIGERATION CIRCUIT SHALL BE ACCESSIBLE FOR DIAGNOSTICS, ADJUSTMENT AND SERVICING WITHOUT THE NEED OF SERVICE MANIFOLD GAUGES.
SHALL HAVE SOLENOID CONTROL VALVES, CHECK VALVES, A LIQUID LINE FILTER DRIER, LIQUID AND MOISTURE INDICATOR, THERMOSTATIC EXPANSION VALVE AND PUMP DOWN SOLENOID VALVE.
UNIT SHALL HAVE AN EXTERNALLY ADJUSTABLE BALANCED PORT DESIGN MECHANICAL THERMOSTATIC EXPANSION VALVE. THE VALVE SHALL HAVE A REMOVABLE POWER HEAD.
TAMPER PROOF, HERMETICALLY SEALED NON–ADJUSTABLE HIGH AND LOW PRESSURE CONTROLS AND REFRIGERATION SERVICE VALVES SHALL BE INSTALLED USING SCHRADER TYPE VALVES. REFRIGERATION SERVICE VALVES SHALL BE LOCATED OUTSIDE OF THE AIRSTREAM.
RECEIVER SHALL HAVE TWO REFRIGERANT LEVEL (MAXIMUM AND MINIMUM) INDICATING SIGHT GLASSES.
SUCTION LINE SHALL BE FULLY INSULATED WITH « INCH CLOSED CELL INSULATION.

CONTROL PANEL

ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR EXTERNAL POWER WIRING AND DISCONNECT SWITCH FUSING. POWER BLOCK TERMINALS SHALL BE PROVIDED.
FACTORY–INSTALLED NON–FUSED DISCONNECT
SHALL BE MOUNTED INSIDE THE SERVICE VESTIBULE OUTSIDE OF THE PROCESS AIR STREAM.
BLOWER MOTORS SHALL BE PROTECTED WITH THERMAL TRIP OVERLOADS.
UNIT SHALL HAVE A VOLTAGE MONITOR WITH PHASE PROTECTION.
AVAILABLE DRY CONTACTS SHALL INCLUDE:
ALARM
BLOWER INTERLOCK
STAGE 1 & 2 HEATING
OUTDOOR AIR DAMPER CONTROL
REMOTE EXHAUST FAN #1
REMOTE EXHAUST FAN #2
OUTDOOR–AIR COOLED EQUIPMENT
SYSTEM ON
AUXILIARY POOL HEATER 1
HEAT RECOVERY
TERMINALS SHALL BE PROVIDED FOR 24 VOLT POWER TO THE OUTDOOR AIR COOLED CONDENSER FAN CONTACTOR.
ALL WIRING SHALL BE INSTALLED IN ACCORDANCE WITH UL OR CSA SAFETY ELECTRICAL CODE REGULATIONS, AND SHALL BE IN ACCORDANCE WITH NFPA.
ALL COMPONENTS USED SHALL BE UL OR CSA LISTED.
COLOR–CODING AND WIRE NUMBERING SHALL BE PROVIDED FOR EASY TROUBLESHOOTING. ALL WIRES SHALL BE IN A WIRE DUCT. WIRING DIAGRAMS LOCATED NEAR ELECTRICAL PANELS ON UNIT.
COMPRESSORS SHALL HAVE A TIME DELAY START TO PREVENT SHORT CYCLING.
PRESSURE TRANSDUCERS FOR REFRIGERANT HIGH PRESSURE AND SUCTION PRESSURE SHALL BE PROVIDED.
AIRFLOW SWITCH AND DRY CONTACT FOR ALARM SHALL BE PROVIDED.

MICROPROCESSOR CONTROL

A MICROPROCESSOR CONTROLLER WITH THE FOLLOWING CHARACTERISTICS WILL BE PROVIDED:

ALL SET POINTS AND ADJUSTMENTS ARE PREPROGRAMMED AT THE FACTORY DURING QUALITY CONTROL AND TEST OPERATION.
THE MICROPROCESSOR PROGRAM HAS AN UPDATABLE FLASH MEMORY.
THE FLASH MEMORY WILL BE UPDATABLE VIA AN INTERNET CONNECTION.
A MINIMUM: 11 ANALOG INPUTS, 4 ANALOG OUTPUTS, 24 DIGITAL INPUTS AND 16 DIGITAL OUTPUTS.
FOUR SERIAL INTERFACE PORTS INCLUDING BOTH RS232 AND RS485 TYPES.
AN ETHERNET PORT WITH RJ–45 CONNECTOR AND LED ACTIVITY INDICATOR.
A REAL TIME CLOCK TO TIME STAMP UNIT OPERATION LOG WITH PROGRAMMABLE 7–DAY OCCUPIED/UNOCCUPIED SCHEDULING CAPABILITIES.
TWO MANUAL DEMAND FORCED MODES TO ALLOW USER A MANUAL BYPASS OF THE MICROPROCESSOR IN THE EVENT OF CONTROLLER FAILURE.
KEYPAD AND DISPLAY PANEL SHALL HAVE A BACKLIT GRAPHIC LIQUID CRYSTAL DISPLAY.

UNIT SHALL HAVE PRESSURE TRANSDUCERS MONITORING THE REFRIGERANT HIGH AND LOW PRESSURES. THE REFRIGERATION CIRCUIT SHALL BE ACCESSIBLE FOR DIAGNOSTICS, ADJUSTMENT AND SERVICING WITHOUT THE NEED OF SERVICE MANIFOLD GAUGES.

THE FOLLOWING STATUS LEDS SHALL BE ON THE CONTROLLER:

ALARM – INDICATES THERE HAS BEEN A FAILURE REQUIRING SERVICE.
DEHUMIDIFICATION – INDICATES THAT THE SYSTEM IS DEHUMIDIFYING THE SPACE.
COOLING – INDICATES THAT THE AIR–CONDITIONING MODE.
POOL HEATING – INDICATES THAT THE SYSTEM IS HEATING THE POOL WATER WITH RECYCLED ENERGY.
SPACE HEAT – INDICATES THAT THE SPACE HEATING IS OPERATING.
MAINTENANCE – INDICATES WHETHER OR NOT MAINTENANCE IS REQUIRED.
MANUAL – INDICATES THAT THE SYSTEM HAS BEEN SET TO MANUAL OPERATION.

THE FOLLOWING SET POINTS SHALL BE ACCESSIBLE AND ADJUSTABLE FROM THE DISPLAY PANEL:

SPACE TEMPERATURE
SPACE RELATIVE HUMIDITY
POOL WATER TEMPERATURE

THE FOLLOWING SENSORS SHALL BE UNIT–MOUNTED AND MONITORED AT THE DISPLAY PANEL. ALL INFORMATION FROM THESE ITEMS SHALL BE ACTIVELY USED IN THE CONTROL AND OPERATION STRATEGIES FOR THE UNIT:

REFRIGERANT HIGH PRESSURE
REFRIGERANT LOW PRESSURE
RETURN AIR TEMPERATURE
SUPPLY AIR TEMPERATURE
RETURN AIR RELATIVE HUMIDITY
ENTERING POOL WATER TEMPERATURE
LEAVING POOL WATER TEMPERATURE
EVAPORATOR LEAVING AIR TEMPERATURE
SUCTION TEMPERATURE
DISCHARGE TEMPERATURE

SYSTEM FAULT: SHALL INDICATE VIA TEXT MESSAGE TO THE DISPLAY WHAT SYSTEMS REQUIRE ATTENTION OR SERVICING. BUILT–IN MONITORING AND DIAGNOSTICS SHALL ALLOW THE USER TO VIEW THE FOLLOWING:

POWER FAILURE
DIRTY AIR FILTER
REFRIGERANT HIGH AND LOW PRESSURE
SYSTEM OFF
ANTI–SHORT CYCLE DELAY

AIR HEATING
UNIT–MOUNTED INDIRECT FIRED GAS HEATER SHALL BE SIZED TO MEET THE SCHEDULED HEATING CAPACITY AND HAVE THE FOLLOWING CHARACTERISTICS:
MODULATING CONTROL.
THE HEATER SHALL BE SPARK IGNITION NATURAL GAS INDIRECT FIRED TYPE WITH CAPACITY AS SHOWN IN THIS SUBMITTAL AND IS INSTALLED 'BLOW THROUGH' OR DOWNSTREAM FROM THE BLOWER. THE HEAT EXCHANGER TUBES ARE CONSTRUCTED OF FORMED AND WELDED SERIES 409 STAINLESS STEEL, 16 GAUGE SUITABLE FOR INSTALLATION DOWNSTREAM OF THE COOLING COIL AND SATISFACTORY FOR AIR INLET TEMPERATURES BELOW 40 F. THE BURNER IS THE POWER FIRING TYPE AND INCORPORATES A PRIMARY COMBUSTION AIR BLOWER AND SPARK IGNITION TRANSFORMER.
STANDARD CONTROLS SHALL INCLUDE A MODULATING GAS VALVE, INTERMITTENT SPARK IGNITION, OVERHEAT CONTROL, ROLLOUT FLAME SUPERVISION, COMBUSTION AIR FLOW PROVING SWITCH, POSITIVE BURNER SAFETY SWITCH, PILOT COCK, MAIN GAS COCK WITH 100% SHUT OFF, ADJUSTABLE MAIN AND PILOT PRESSURE REGULATORS.
THE NATURAL GAS HEATER SECTION SHALL BE AN ETL RECOGNIZED COMPONENT. THE GAS TRAIN SHALL BE COMPLETE WITH ALL CONTROLS FACTORY MOUNTED TO COMPLY WITH REQUIREMENTS OF ETL. THE GAS TRAIN IS COMPLETE WITH A MODULATING MAIN GAS VALVE AND IS READY FOR CONNECTION TO A NATURAL GAS SUPPLY WITH PRESSURE BETWEEN 7 IN AND 14 IN WC.
THE COMPLETE UNIT SHALL BE TEST FIRED AND PRELIMINARY ADJUSTMENTS MADE PRIOR TO LEAVING THE FACTORY.

AIR CONDITIONING
AIR–COOLED AIR CONDITIONING VIA FLUID COOLER
UNIT SHALL BE EQUIPPED WITH AIR CONDITIONING MODE WHERE EXCESS COMPRESSOR HEAT IS REJECTED TO A REMOTE OUTDOOR AIR–COOLED HEAT EXCHANGER (AKA DRY COOLER) VIA A SINGLE PIPE SET GLYCOL FLUID LOOP. NO SITE REFRIGERATION WORK SHALL BE REQUIRED. THE UNIT SHALL ALSO INCLUDE A CIRCULATING PUMP AND EXPANSION TANK. THE UNIT MOUNTED FLUID COOLED CONDENSER AND REMOTE OUTDOOR AIR–COOLED HEAT EXCHANGER SHALL BOTH BE CAPABLE OF REJECTING 100% OF THE COMPRESSOR HEAT REJECTION WITH AN AIR ON TEMPERATURE AT SUMMER DESIGN CONDITIONS.
UNIT SHALL BE PROVIDED WITH A DRY CONTACT RATED FOR 24VAC/5A TO OPERATE THE REMOTE OUTDOOR FLUID COOLER CONTROL.
REFRIGERATION CIRCUIT SHALL INCLUDE REFRIGERANT VALVES, RECEIVER WITH PRESSURE RELIEF VALVE SET AT 550 PSIG, PRESSURE CONTROL VALVE AND PRESSURE DIFFERENTIAL VALVE, AND TWO MANUAL SHUTOFF VALVES TO ISOLATE THE OUTDOOR FLUID COOLER.
COILS SHALL BE TESTED AT 425 PSIG AND MOUNTED VERTICALLY FOR COMPLETE SURFACE UTILIZATION. COILS SHALL BE COUNTER FLOW AND HAVE ADEQUATE CAPACITY TO DISSIPATE THE TOTAL HEAT REJECTION OF THE SYSTEM AT DESIGN CONDITIONS. DRY–COOLER SHALL HAVE GUARDS TO PROTECT THE COILS FROM VANDALISM AND WEATHER RELATED DAMAGE.
THE FAN SHALL BE A DIRECT DRIVEN AXIAL FAN MADE WITH A DUAL SPEED EXTERNAL ROTOR MOTOR WITH INNOVATIVE BIONIC BLADES IN DIE–CAST ALUMINUM MOULDS. THE FAN ASSEMBLY SHALL BE BALANCED IN CLASS G 6.3 ACC DIN ISO 1940, DYNAMIC ON TWO LEVELS. THE FAN ASSEMBLY SHALL BE SUITABLE FOR AMBIENT TEMPERATURES OF –40øC TO MAX. +70øC. THERMAL CONTACTS INSTALLED IN THE WINDINGS COMPLIANT WITH THCL 155. DRIVE MOTOR IN EXTERNAL ROTOR PRINCIPLE, SEALED IN PROTECTION CLASS IP54 WITH MOISTURE PROTECTION IMPREGNATION OF THE WINDINGS, TOPICAL PROTECTION. HIGH CORROSION RESISTANCE DESIGN WITH HIGH QUALITY AND RELIABILITY.

FACTORY PERFORMANCE TESTING

THE UNIT SHALL BE THOROUGHLY TESTED UNDER FACTORY TEST CONDITIONS. A COPY OF THE TEST REPORT SHALL BE AVAILABLE TO THE ENGINEER UPON REQUEST.
MICROPROCESSOR CONTROLS SHALL BE FACTORY ADJUSTED AND PRESET TO THE DESIGN CONDITIONS DURING TESTING.
THE UNIT SHALL BE ACCESSIBLE FOR REAL–TIME MONITORING WHILE IN THE QC TEST CHAMBER UPON REQUEST.

PRODUCT DELIVERY, ACCEPTANCE, STORAGE AND HANDLING

PERFORM A THOROUGH PHYSICAL INSPECTION OF THE UNIT UPON DELIVERY FROM THE SHIPMENT CARRIER.
IDENTIFY AND REPORT ANY PHYSICAL DAMAGE IMMEDIATELY TO MANUFACTURER.
IF UNIT IS TO BE STORED PRIOR TO INSTALLATION STORE IN A CLEAN, DRY PLACE. PROTECT FROM WEATHER, DIRT, FUMES, WATER, CONSTRUCTION, AND PHYSICAL DAMAGE.
HANDLE UNIT CAREFULLY DURING INSTALLATION TO PREVENT DAMAGE, BREAKING, DENTING AND SCORING.
DAMAGED UNITS OR DAMAGED COMPONENTS SHALL NOT BE INSTALLED. CONTACT MANUFACTURER FOR RMA INSTRUCTIONS.
COMPLY WITH MANUFACTURER'S RIGGING AND INSTALLATION INSTRUCTIONS FOR UNLOADING THE UNIT AND MOVING IT TO THE FINAL LOCATION.

CONNECTIONS

WHERE INSTALLING PIPING ADJACENT TO UNITS, ALLOW SPACE FOR SERVICE AND MAINTENANCE.
DUCT CONNECTIONS: DRAWINGS INDICATE THE GENERAL ARRANGEMENTS OF THE DUCTS. CONNECT UNITS TO DUCTS WITH FLEXIBLE DUCT CONNECTORS. COMPLY WITH REQUIREMENTS FOR FLEXIBLE DUCT CONNECTORS.
ELECTRICAL CONNECTIONS: COMPLY WITH REQUIREMENTS FOR POWER WIRING, SWITCHES AND MOTOR CONTROLS IN ELECTRICAL SECTIONS.

INSTALLATION
THE AGENCY RESPONSIBLE FOR START–UP SHOULD WORK IN ACCORDANCE WITH THE SPECIFICATIONS AND IN ACCORDANCE WITH THE SERESCO'S INSTRUCTIONS AND ONLY BY WORKERS EXPERIENCED IN THIS TYPE OF WORK.
START UP

START UP ASSISTANCE AND ONSITE TRAINING SHALL BE PERFORMANCE BY A FACTORY TECHNICIAN. TECHNICIAN MUST BE AN EMPLOYEE OF THE MANUFACTURER. OTHERS SHALL NOT BE ACCEPTABLE.
DETAILED INSTRUCTIONS FOR START UP AS PROVIDED BY THE MANUFACTURER MUST BE FOLLOWED.
INSTALLING CONTRACTOR MUST CONTACT THE MANUFACTURER PRIOR TO START UP TO CONFIRM START UP PROCEDURES.
REMOTE INTERNET ACCESS AND CONTROL MUST BE INITIATED AND CONFIRMED BY THE FACTORY PRIOR TO START UP FOR EXTENDED LABOUR WARRANTY TO BE IN EFFECT.

A1 / M4.01 — MECHANICAL SPECIFICATIONS
SCALE: N/A

GENERAL NOTES

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STATE OF SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 27690 DAVID G. PEARCE
1-17-17

REVISION DATE

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SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION McKNIGHT · SMITH WARD · GRIFFIN ENGINEERS, INC. No. C00926

MODIFICATIONS TO THE
PEPPER GEDDINGS NATATORIUM
HORRY COUNTY, SOUTH CAROLINA

2015
1/17/17
SPECIFICATIONS

M4.01

DEMOLITION LEGEND

RV – EXISTING TO BE REMOVED
RL – EXISTING TO BE RELOCATED
RM – EXISTING TO REMAIN
RP – EXISTING TO BE REPLACED

DEMOLITION NOTES:

1. ELECTRICAL MATERIALS WHICH ARE BEING REMOVED, UNLESS OTHERWISE INDICATED, SHALL BE COME THE PROPERTY OF THE CONTRACTOR.

2. ALL ABANDONED CONDUCTORS SHALL BE REMOVED BACK TO POINT OF SUPPLY.

3. WHERE ACCESSIBLE, ALL ABANDONED CONDUIT SHALL BE REMOVED. ALL CONDUIT REMAINING SHALL BE MECHANICALLY SECURED.

4. WHERE DEVICES ARE REMOVED, CIRCUIT WIRING AND CONDUIT SHALL BE RE–WORKED AS REQUIRED TO PERMIT REMAINING DEVICES TO CONTINUE TO FUNCTION AS NECESSARY.

5. ALL EXISTING ELECTRICAL DEVICES AND EQUIPMENT NOT SHOWN AS BEING ABANDONED SHALL BE RECONNECTED.

6. MATERIALS NOTED TO BE REUSED IN THE NEW WORK SHALL BE CLEANED, REPAIRED, STORED AND PROTECTED ON THE SITE.

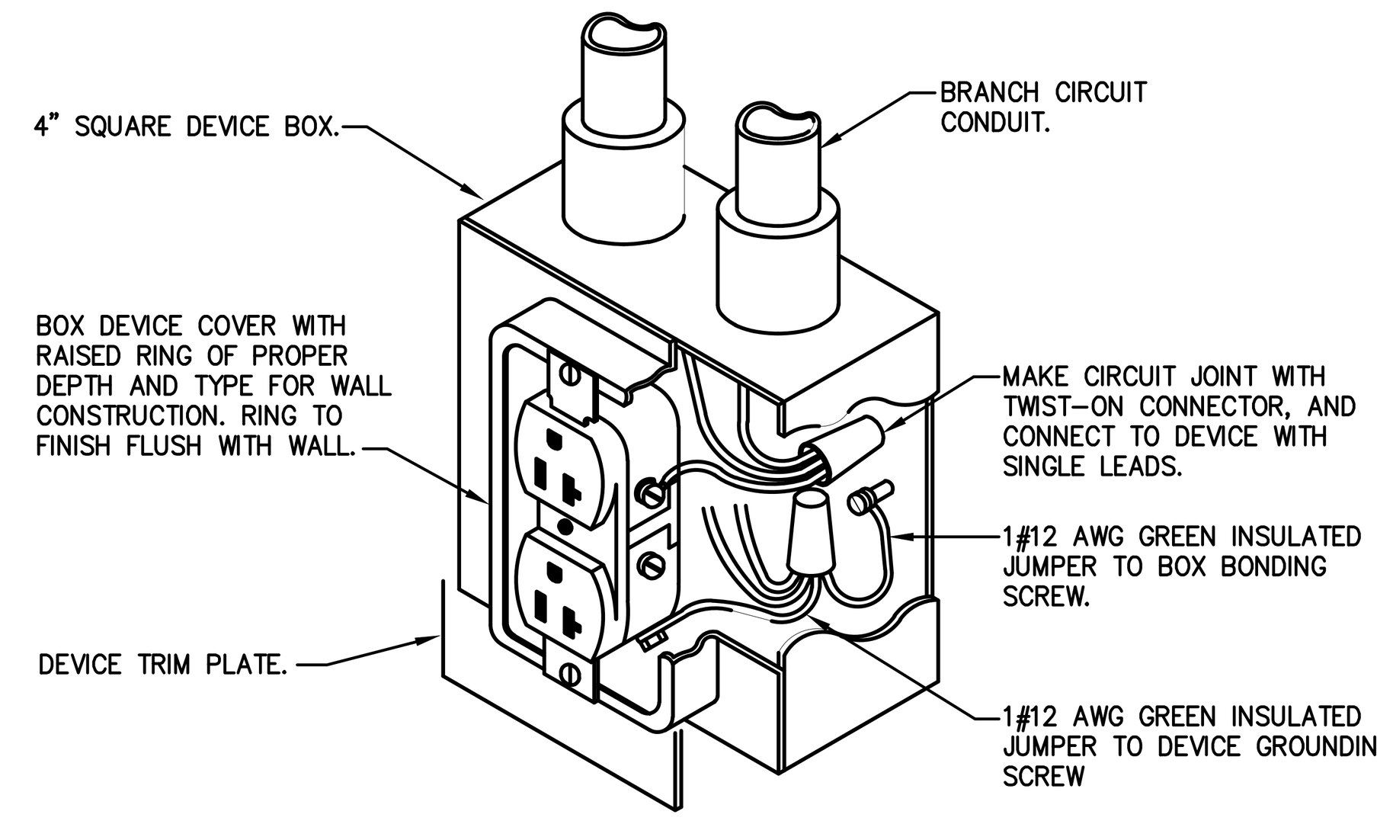
7. TEMPORARY CONNECTIONS SHALL BE PROVIDED TO ALLOW UNINTERRUPTED SERVICE DURING THE PERIOD OF CONSTRUCTION EXCEPT AS SCHEDULED. ALL INTERRUPTIONS SHALL BE SCHEDULED AND MUST HAVE PRIOR APPROVAL FROM THE OWNER.

8. RELOCATE ANY EXISTING CONDUITS, CONDUCTORS, FIXTURES AND OUTLETS AS INDICATED BY THE DRAWINGS.

9. BACKBOXES OF OUTLETS AND SWITCHES SHOWN TO BE REMOVED FROM WALLS AND FLOORS REMAINING SHALL BE REMOVED AND THE WALLS AND FLOORS PROPERLY PATCHED.

10. WHERE NEW WALL FINISHES REQUIRE ADDITIONAL BOX DEPTH, PROVIDE OUTLET BOX EXTENSIONS OF THE NECESSARY DEPTH.

11. ALL ELECTRICAL PANELS AFFECTED BY THIS WORK SHALL HAVE THEIR PANEL DIRECTORIES UPDATED. ELECTRICAL CONTRACTOR SHALL PROVIDE A TYPED UPDATED PANEL DIRECTORY FOR EVERY PANEL WHERE ELECTRICAL LOAD IS REMOVED OR ADDED BY THIS WORK.



2 / E1.01 DETAIL – TYPICAL DUPLEX RECEPTACLE INSTALLATION
NOT TO SCALE

EQUIPMENT CONNECTION SCHEDULE

SYMBOL	EQUIPMENT	LOAD	VOLTAGE/ PHASE	DISCONNECT TYPE	DISCONNECT RATING	DISCONNECT POLES	DISCONNECT TRIP/FUSE	DISCONNECT ENCLOSURE	CONDUCTORS	RACEWAY TYPE	RACEWAY SIZE	NOTES
(1)	PDU–1	256.9 FLA (279MCA)	208/3	NFDS	400	3	–	3R	3–500MCM(AL),1#1(AL)G	LFMC	3"	
(2)	RC–1	6@9.7 FLA (64MCA)	208/3	NFDS	100	3	–	3R	3#6,1#8G	LFMC	1"	
(3)	P–1	1.5 HP	208/3	UNIT PROVIDED WITH VFD ◇2					3#12,1#12G	FMS	1/2"	
(4)	MSAH–1, 2, 3	0.36 FLA	208/1	NFDS	30	2	–	1	2#12,1#12G	FMC	1/2"	◇1
(5)	MSHP–1, 2, 3	12.0 RLA, 0.75 FLA (25MCA)	208/1	FDS	30	2	30	3R	2#10,1#10G	LFMC	1/2"	◇1
(6)												
(–)												
(–)												

LEGEND

DISCONNECT TYPES
ETCB = ELECTRONIC–TRIP CIRCUIT BREAKER
FDS = FUSIBLE DISCONNECT SWITCH
MCP = MOTOR CIRCUIT PROTECTOR
NFDS = NON–FUSIBLE DISCONNECT SWITCH
ST/DS = COMBINATION STARTER/DISCONNECT SWITCH
TMCB = THERMAL–MAGNETIC CIRCUIT BREAKER
TOG = TOGGLE SWITCH
C/DS = COMBINATION CONTACTOR/DISCONNECT SWITCH

DISCONNECT ENCLOSURE TYPES
1 = NEMA 1 ENCLOSURE
3R = NEMA 3R ENCLOSURE
4 = NEMA 4 ENCLOSURE
4X = NEMA 4X ENCLOSURE

RACEWAY TYPES
EMT = ELECTRIC METALLIC TUBING
FMC = FLEXIBLE METAL CONDUIT
IMC = INTERMEDIATE METAL CONDUIT
LFMC = LIQUID–TIGHT FLEXIBLE METAL CONDUIT
PVC = NON–METALLIC PVC CONDUIT
RMC = RIGID METAL CONDUIT

STARTER TYPES
CFVNR = COMBINATION FULL VOLTAGE, NONREVERSING

CONTROL DEVICES
HOA = HAND–OFF–AUTO
RPL = RED PILOT LIGHT
AUX = AUXILLARY CONTACTS (2 N.O., 1 N.C.)
CT50 = 50 VA CONTROL TRANSFORMER

NOTES

ALL ELECTRICAL CHARACTERISTICS SCHEDULED ABOVE ARE BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN. ELECTRICAL CONTRACTOR SHALL VERIFY ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT WITH EQUIPMENT SUPPLIER(S) PRIOR TO ROUGHING, AND SHALL VERIFY EXACT LOCATION AND EXACT TYPE OFCONNECTION. ALL EQUIPMENT SHALL BE PROPERLY AND SECURELY GROUNDED. ANY SIGNIFICANT CHANGES IN LOCATION, ELECTRICAL REQUIREMENTS, OR TYPE OF CONNECTION REQUIRED FOR ANY EQUIPMENT SCHEDULED ABOVE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN WRITING PRIOR TO PROCEEDING.

CONDUCTORS AND RACEWAY SPECIFIED IN THE ABOVE SCHEDULE ARE FOR FINAL CONNECTION TO UNIT AND SHALL BE EXTENDED FROM THE DISCONNECT SHOWN ON THE FLOOR PLANS TO THE EQUIPMENT TERMINATION BOX.

CONDUIT AND BOXES REQUIRED FOR EQUIPMENT CONNECTIONS SHALL BE INSTALLED IN SUCH A WAY AS TO NOT COVER UP EQUIPMENT NAMEPLATES, SERVICE AREAS, AIR FLOW AREAS, ETC.

◇1 INDOOR UNITS (MSAH) RECEIVE POWER FROM OUTDOOR UNITS (MSHP) THROUGH FIELD–SUPPLIED INTERCONNECTED WIRING.

◇2 VFD FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.

GENERAL NOTES

NOTES:

◇1 EXISTING POOL DEHUMIDIFIER TO BE REMOVED BY MECHANICAL CONTRACTOR. EC TO REMOVE EXISTING DISCONNECT SWITCH AND WIRE. EXISTING CONDUIT MAY BE REUSED WHERE POSSIBLE. (FIELD VERIFY)

◇2 EXISTING POOL DEHUMIDIFIER TO BE REMOVED BY MECHANICAL CONTRACTOR. EC TO REMOVE EXISTING DISCONNECT SWITCH, WIRE BACK TO SOURCE AND EXPOSED CONDUIT.

◇3 NOT USED.

◇4 EXISTING FAN TO REMAIN.

◇5 EXISTING PUMP TO BE REMOVED BY MECHANICAL CONTRACTOR. EC TO REMOVE EXISTING DISCONNECT SWITCH, WIRE BACK TO SOURCE AND EXPOSED CONDUIT.

◇6 EXISTING POWERFOIL FAN TO REMAIN.

◇7 REMOVE EXISTING FIXTURES LOCATED ON POOL SPECTATOR BLEACHER LEVEL. EXISTING WIRE AND CONDUIT TO REMAIN TO USE WITH NEW FIXTURE. REFER TO NEW WORK FOR ADDITIONAL INFORMATION.

◇8 REMOVE EXISTING POOL LIGHTING FIXTURES. EXISTING WIRE AND CONDUIT TO REMAIN TO USE WITH NEW FIXTURE. REFER TO NEW WORK FOR ADDITIONAL INFORMATION.

SYMBOL SCHEDULE

GENERAL SYMBOLS

SYMBOL	DESCRIPTION
	CONDUIT RUN CONCEALED ABOVE CEILINGS OR IN WALLS.
	CONDUIT RUN CONCEALED IN OR BELOW FLOORS OR UNDERGROUND.
	CONDUIT RUN EXPOSED.
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	SQUARE ON CONDUIT SYMBOL INDICATES THAT CIRCUIT CONTINUES BUT NOT SWITCHLEG.
	HOMERUN TO PANEL AND CIRCUIT(S) DESIGNATED. ARROW(S) INDICATE QUANTITY OF CIRCUITS.
J	JUNCTION BOX PER N.E.C.
◇1	SPECIAL NOTE, NUMERALS IDENTIFY, SEE SCHEDULE.
(1)	SPECIAL CONNECTION TO A SPECIFIC ITEM OF EQUIPMENT. SEE CONNECTION SCHEDULE.

DISTRIBUTION

SYMBOL	DESCRIPTION
	ELECTRICAL PANELBOARD, EXISTING
	CONTROL CABINET, FLUSH OR SURFACE MOUNTED.
	DISCONNECT SWITCH, NON–FUSIBLE.
	DISCONNECT SWITCH, FUSIBLE.
	DISCONNECT SWITCH PROVIDED WITH EQUIPMENT.
	GROUND CONNECTION.
	COMBINATION MOTOR STARTER AND NON–FUSIBLE DISCONNECT SWITCH.

WIRING DEVICES

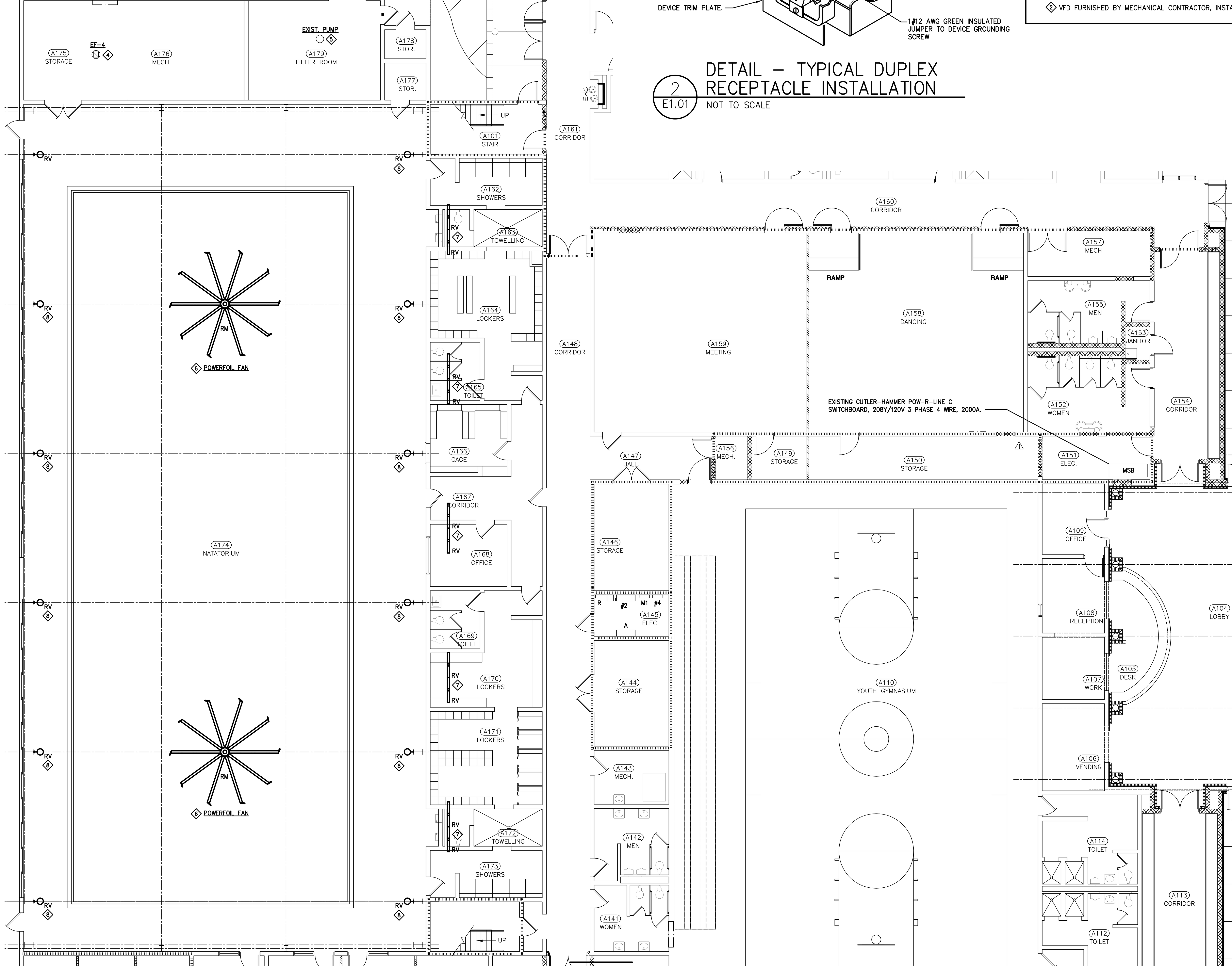
SYMBOL	DESCRIPTION
	DUPLEX RECEPTACLE, 125V, 3–WIRE GROUNDING TYPE.
WP	DUPLEX GFCI RECEPTACLE. PROVIDE WITH OPERABLE, IN–USE WEATHERPROOF COVER.

LIGHTING

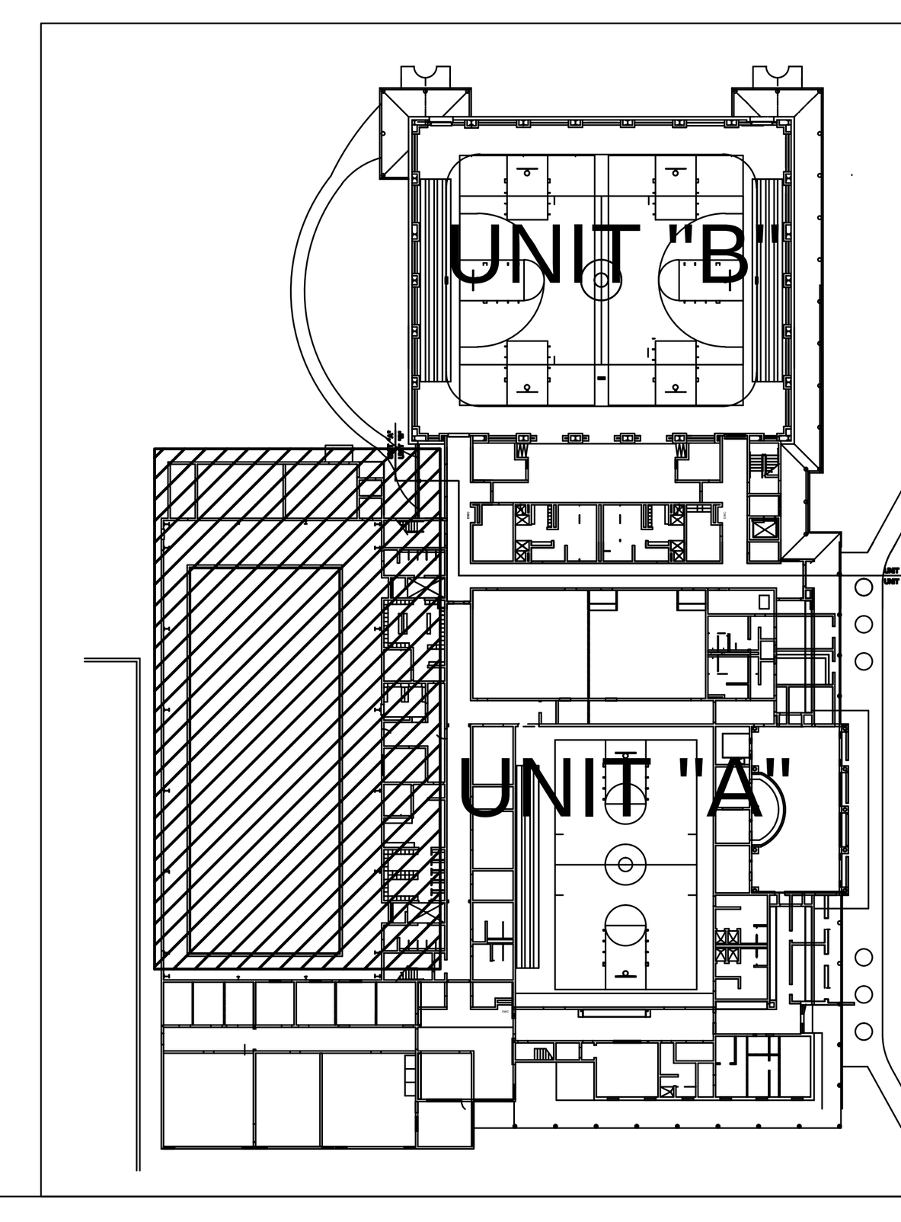
SYMBOL	DESCRIPTION
	LED ENCLOSED FIXTURE.
	LED LIGHTING FIXTURE, COLUMN MOUNTED.

FIRE ALARM SYSTEM

SYMBOL	DESCRIPTION
S	FIRE ALARM SYSTEM DUCT MOUNTED PHOTOELECTRIC TYPE SMOKE DETECTOR.



1 / E1.01 GROUND FLOOR PLAN – DEMOLITION
1/8"=1'-0"



A1 / E1.01 ELECTRICAL PLAN - DEMOLITION
SCALE: AS NOTED

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704/527–2112

16–069

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 18963 MARK P. ARRINGTON
1-17-17

REVISION	DATE

TYCH & WALKER ARCHITECTS, LLP
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MODIFICATIONS TO THE
PEPPER GEDDINGS NATATORIUM
HORRY COUNTY, SOUTH CAROLINA

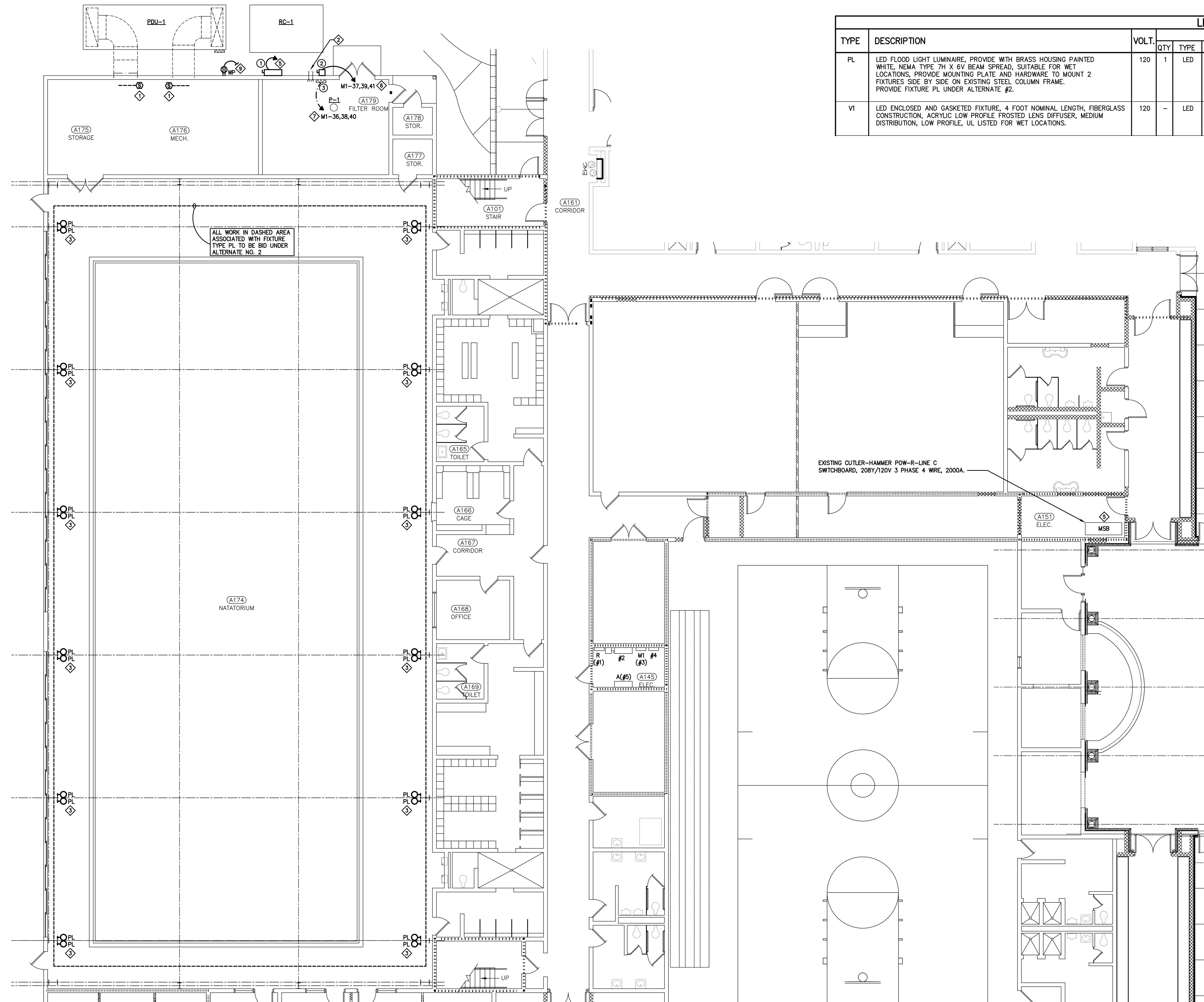
SOUTH CAROLINA McKNIGHT • SMITH WARD • GRIFFIN ENGINEERS, INC. No. C00926 CERTIFICATE OF AUTHORIZATION

2015
1/17/17
FLOOR PLAN - DEMOLITION

E1.01

GENERAL NOTES

LIGHTING FIXTURE SCHEDULE														
TYPE	DESCRIPTION	VOLT.	LAMPS							DRIVER		WATTS	MOUNTING	MANUF. CATALOG NO.
			QTY	TYPE	BULB	BASE	TEMP	CRI	LUMENS	QTY	TYPE			
PL	LED FLOOD LIGHT LUMINAIRE, PROVIDE WITH BRASS HOUSING PAINTED WHITE, NEMA TYPE 7H X 6V BEAM SPREAD, SUITABLE FOR WET LOCATIONS, PROVIDE MOUNTING PLATE AND HARDWARE TO MOUNT 2 FIXTURES SIDE BY SIDE ON EXISTING STEEL COLUMN FRAME. PROVIDE FIXTURE PL UNDER ALTERNATE #2.	120	1	LED	LED	–	4000 K	82	25295	1	CONSTANT	207	SURFACE, COLUMN, 2 FIXTURES SIDE BY SIDE ON MOUNTING PLATES	RAB #FXLED-200 SERIES OR APPROVED EQUAL
V1	LED ENCLOSED AND GASKETED FIXTURE, 4 FOOT NOMINAL LENGTH, FIBERGLASS CONSTRUCTION, ACRYLIC LOW PROFILE FROSTED LENS DIFFUSER, MEDIUM DISTRIBUTION, LOW PROFILE, UL LISTED FOR WET LOCATIONS.	120	–	LED	LED	–	4000 K	80	3000	1	0–10V STANDARD	39	WALL, SURFACE	LITHONIA #FEM LED OR APPROVED EQUAL

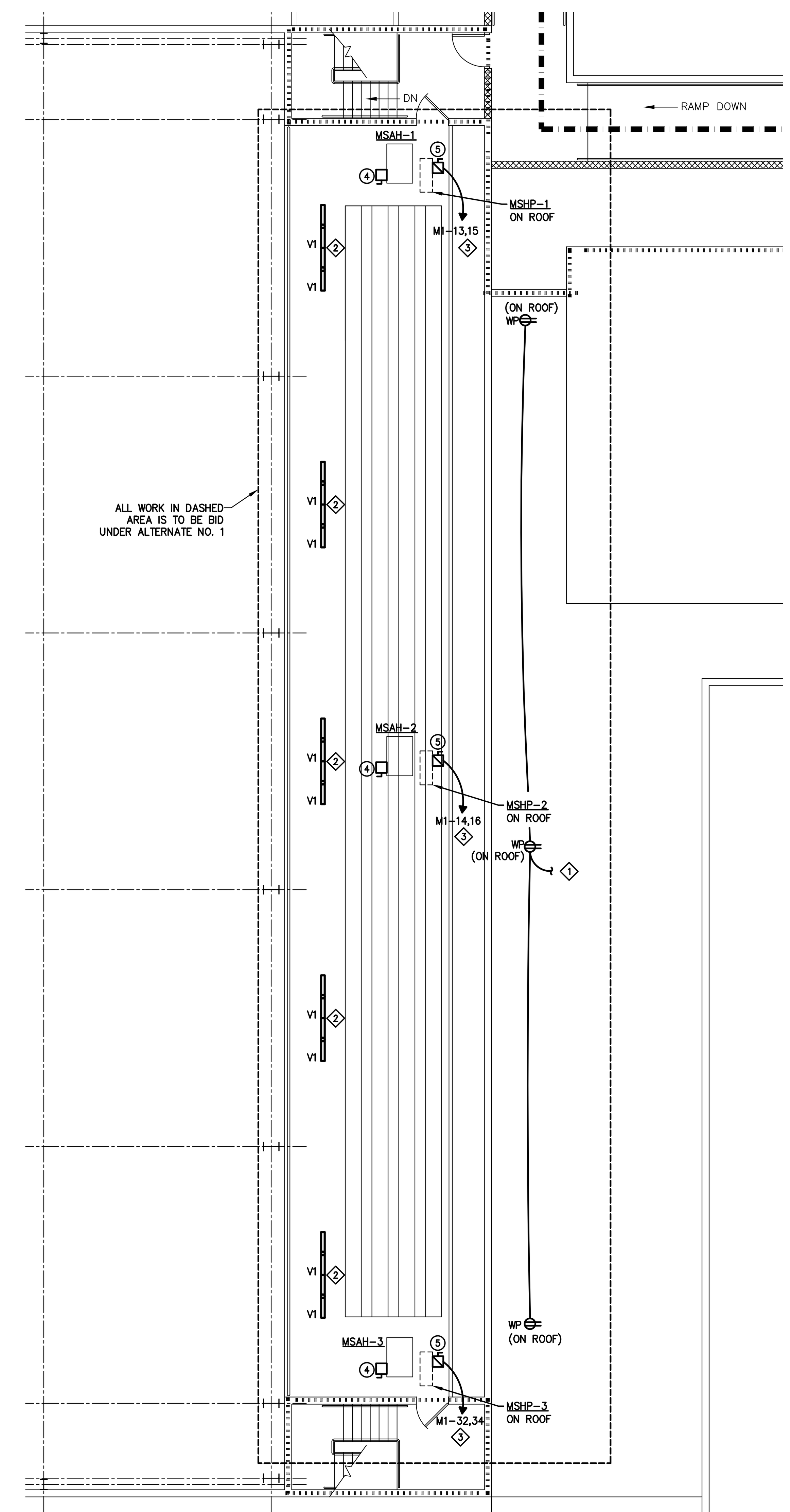


1 E2.01 GROUND FLOOR PLAN – NEW WORK

1/8"=1'-0"

NOTES:

1. CONNECT NEW DUCT DETECTORS (FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR, INSTALLED IN DUCT BY MECHANICAL CONTRACTOR) TO EXISTING ADDRESSABLE FIRE ALARM CIRCUIT AS REQUIRED. PROVIDE SAMPLING TUBE FULL WIDTH OF DUCT AND SUPPORT FAR END.
2. CONNECT NEW HEAT TAPE TO EXISTING CIRCUIT FOR HEAT TAPE USED PRIOR TO DEMOLITION. HEAT TAPE PROVIDE BY MECHANICAL CONTRACTOR.
3. REPLACE EXISTING METAL HALIDE FIXTURES WITH NEW LED FIXTURES. CONNECT NEW FIXTURES TO EXISTING CIRCUITS. UTILIZE EXISTING LIGHTING CONTROLS FOR NEW FIXTURES.
4. NOT USED.
5. IN EXISTING MSB, REMOVE EXISTING 300/3 CIRCUIT BREAKER FOR UNIT "PD-1" AND REPLACE WITH NEW 350/3 CIRCUIT BREAKER. PROVIDE WIRE AND CONDUIT AS INDICATED IN EQUIPMENT CONNECTION SCHEDULE. CIRCUIT BREAKER TO MATCH SHORT CIRCUIT CHARACTERISTICS OF EXISTNG. UTILIZE EXISTING CONDUIT TO EXTENT POSSIBLE.
6. IN SPACE INDICATED IN EXISTING PANEL "M" PROVIDE NEW 80/3 CIRCUIT BREAKER AND CONNECT WITH 3#6,1#8G,1"C.
7. IN SPACE INDICATED IN EXISTING PANEL "M" PROVIDE NEW 15/3 CIRCUIT BREAKER AND CONNECT WITH 3#12,1#12G,1/2"C.
8. NOT USED.
9. CONNECT TO NEAREST RECEPTACLE CIRCUIT IN MECHANICAL ROOM A176 WITH 2#12,1#12G,1/2"C.

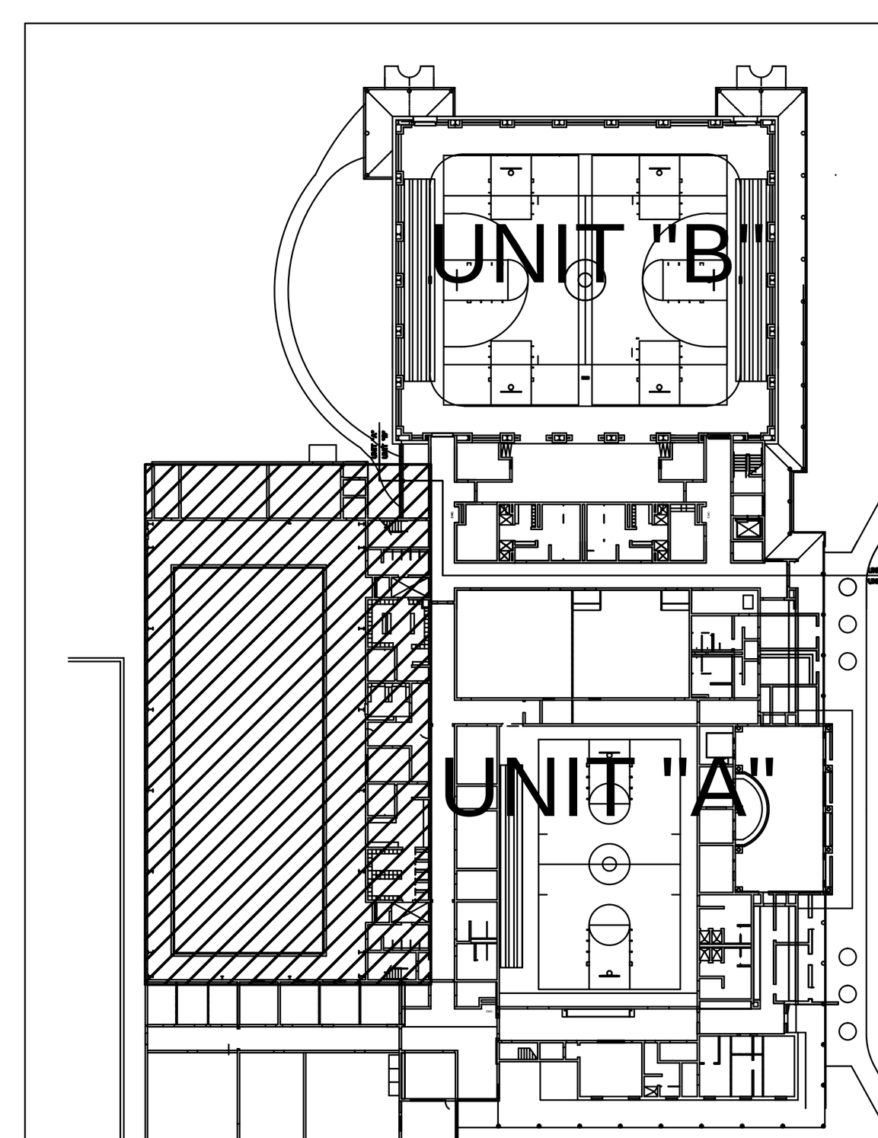


2 E2.01 UPPER LEVEL PLAN – NEW WORK

1/8"=1'-0"

NOTES:

1. CONNECT TO NEAREST RECEPTACLE CIRCUIT LOCATED IN ELECTRICAL ROOM A145 WITH 2#12,1#12G,1/2"C.
2. REPLACE EXISTING FLUORESCENT FIXTURES WITH NEW LED FIXTURES. CONNECT NEW FIXTURES TO EXISTING CIRCUITS. UTILIZE EXISTING LIGHTING CONTROLS AND CONDUIT FOR NEW FIXTURES.
3. IN SPACE INDICATED IN EXISTING PANEL "M1" (#3) PROVIDE NEW 30/2 CIRCUIT BREAKER AND CONNECT WITH 2#10,1#10G,1/2"C.



A1 E2.01 ELECTRICAL PLAN - NEW WORK

SCALE: AS NOTED

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MODIFICATIONS TO THE

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2015

1/17/17

FLOOR PLAN - NEW WORK

E2.01

ELECTRICAL GENERAL REQUIREMENTS

1.1 SCOPE:

a. Applicable requirements of the General Conditions of the Contract, Amendments, Supplementary General Conditions, and Special Conditions govern work under this Division.

b. Work covered by this Division consists of providing all labor, equipment, supplies, and materials; and performing all operations, including trenching, backfilling, cutting, patching, and chasing necessary for the installation of complete electrical systems in strict accordance with these specifications and the applicable drawings.

c. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

d. This Contractor is referred to the General and Special Conditions of the contract which shall form a part and be included in this section of the specification and shall be binding on this Contractor.

e. Some items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items or equipment as indicated on the drawings, and as required for complete systems.

1.2 RECORD DRAWINGS:

a. During construction of this project, the Contractor shall maintain one complete set of electrical contract drawings, on which shall be recorded all significant changes. This set of drawings shall be used for no other purpose. Upon completion of the work, the Contractor shall submit these drawings to the Architect/Engineer for approval and presentation to the Owner.

1.3 REGULATIONS AND COMPLIANCE:

a. The requirements of the International Building Code, the National Electrical Code, and of all other State and Local codes, ordinances, regulations and interpretations by authorities having jurisdiction are binding upon this Contractor, and nothing contained in, or inferred by, these specifications or the applicable drawings may be construed as waiving those requirements. The latest edition of the National Electrical Code, referred to herein and on the drawings as "N.E.C.", forms a part of these specifications; and under no circumstances may the installation fail to meet the minimum requirements therein.

b. This Contractor shall secure and pay for all permits, fees, inspections and licenses required. It is the responsibility of the Contractor to notify the Local Electrical Inspector to schedule the required inspections. Upon completion of the project and prior to his request for final payment he shall present to the Architect/Engineer a certificate of inspection and approval from the inspection authorities.

c. All materials and equipment shall bear the approval label, and shall be listed by the Underwriters' Laboratories, Inc.

2.1 GENERAL:

a. Except where reuse of existing items are specifically indicated or permitted, all materials and equipment shall be new and shall conform with the standards of the National Electrical Manufacturer's Association and Underwriter's Laboratories, Inc. in every instance where such a standard has been established for the item involved.

b. Materials shall be inspected by the Contractor upon their arrival at the site to be sure they are correct. Material and equipment stored on the site shall be protected against physical damage, dirt and damage caused by precipitation, wind, condensation, excessive humidity, and extremes of temperature. Materials shall be stored in their original cartons within substantial, clean and dry storage facilities provided under this Contract. Conduit, large galvanized boxes, and lighting poles may be stored outdoors on suitable blocks or racks clear of the earth and undergrowth, and pitched to drain. Large electrical equipment intended for ultimate installation outdoors may be stored in the weather on suitable blocks or platforms clear of the earth and undergrowth, and with interior lamps or space heaters continuously energized to prevent condensation. Alternate storage provisions may be submitted to the Architect/Engineer for approval prior to the arrival of the material. Under no circumstances shall equipment be stored in the weather under a cover of polyethylene or tarpaulin. The Architect/Engineer will be the sole judge as to the acceptability of storage facilities, and when directed by the Architect/Engineer, improperly stored or damaged material shall be removed from the site and replaced with new material.

c. The Contractor shall coordinate the work and equipment of this Division with the work and equipment specified elsewhere in order to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, wiring, etc., which is required by the work of this section shall be performed in accordance with the requirements of the applicable section of the specifications.

d. It is the intention of these specifications and drawings to call for finished work, tested and ready for operation. Whenever the work "provide" is used, it shall mean "furnish and install complete and ready for use".

3.1 COORDINATION:

a. This Contractor coordinate the work of all subs and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

b. Where the work will be installed in close proximity to, or may interfere with the work of other trades, the Contractor shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Engineer, the Contractor shall prepare composite working drawings and sections at a suitable scale not less than 3/8" = 1'-0", clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs his work before coordination, or so as to cause any interference with work of any subs, he shall make the necessary changes in his work to correct the condition without extra charge.

c. The Contractor shall 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.

3.3 SLEEVES, CUTTING, AND PATCHING:

a. Contractor shall place his own sleeves and advise other trades of required chases and openings so they can be properly built in. Where any raceway supports installed under this Contract pierce the roof, suitable pitch pockets shall be provided and coordinated with the roofing contractor as necessary to be acceptable to the Architect. Provide suitable fittings where any raceways or equipment cross expansion joints.

b. Permitted cutting or patching necessary shall be done by Contractor. Structural members shall not be cut except by written permission of Architect/Engineer.

3.4 PROTECTION AND CLEAN-UP:

a. Protect all material and work from damage during construction. Equipment installed in the building prior to its being closed in and dried out shall be protected from the elements in the same manner as previously specified for stored materials. Protect finished surfaces from splattering of mortar, paint, dirt, plaster, etc.. Do not install device plates, face plates, canopies, flush cabinet trims, or fixtures on walls or ceilings until after painting or cleaning of the surface has been completed, and arrange for such items that are required to be field painted to be painted before being mounted. Repair, clean and touch-up or replace, all damaged material. At the completion of the project, remove all dust from finished surfaces, including lighting fixtures, lenses and lamps.

b. The Contractor shall keep premises free of debris resulting from his work.

3.5 PAINTING AND FINISHING:

a. Suitable finishes shall be provided on all items of electrical equipment and materials which are exposed. This shall consist of either an acceptable finish as manufactured and supplied to the job or application of suitable finishes after installation.

b. Where installed in finished areas, exposed equipment and materials shall be supplied with prime coat, and shall be professionally painted or enameled as directed to match or blend with adjacent surfaces.

c. In unfinished areas such as equipment rooms, exposed equipment shall be furnished with suitable factory applied finishes (e.g. standard gray enamel finish for panelboards, etc.).

3.6 OBSERVATION:

a. The project will be observed periodically as construction progresses.The Contractor will be responsible for notifying the Architect at least 72 hours in advance when any work to be covered up is ready for inspection. No work will be covered up until after observation has been completed on such items as piping and insulation, etc.

EQUIPMENT CONNECTIONS AND COORDINATION

1.1 GENERAL:

a. Heating, Ventilating, Air Conditioning, Refrigeration and Plumbing Equipment: Unless otherwise indicated, provide all power wiring, including feeders and branch circuits, to the terminals of the equipment, including mounting of motor starters; feeder and branch circuit over-current protection; disconnecting means within sight of each motor and each starter, whether of not specifically indicated on drawings.

BASIC MATERIALS AND METHODS

1.1 WIRING METHOD:

a. Unless otherwise indicated or specified, the Wiring Method for this project shall consist of copper conductors with 600 volt insulation installed in metal raceways.

b. The word "Raceway" and the word "Conduit" (or abbreviation "C") used herein or on the drawings indicate Rigid Metal Conduit, and where permitted, Intermediate Metal Conduit, Electrical Metallic Tubing, Rigid Nonmetallic Conduit, Flexible Metal Conduit, or Liquidtight Flexible Metal Conduit.

c. Reference to "Rigid Conduit" or "RMC" indicates heavy-wall Rigid Metal Conduit only.

d. Reference to "IMC" indicates Intermediate Metal Conduit.

e. Reference to "PVC" indicates Rigid Nonmetallic Conduit.

f. Reference to "EMT" or "Tubing" indicates Electrical Metallic Tubing.

g. Reference to "Flex" or "Flexible Conduit" indicates Flexible Metal Conduit, or, where required, Liquidtight Flexible Metal Conduit.

1.2 FASTENINGS METHODS:

a. Acceptable fastening methods include wood screws and nails on wood construction, toggle bolts on hollow masonry, expansion bolts and lead anchors on brick and concrete, and machine screws on metal surfaces.

b. Explosive fasteners may be used in steel and concrete in accordance with the manufacturer's recommendations.

c. Wire, perforated metal strap, and wooden plugs are not acceptable as fastening material.

d. Materials used shall be good quality, made of zinc or cadmium coated steel or other non-corroding material.

e. Materials, whether exposed or concealed, shall be firmly and adequately held in place. Fastening and support shall afford safety factor of three or higher, and shall be in full compliance with the seismic protection requirements of the N.C. State Building Code.

f. Fixtures, raceways, and equipment shall be supported from the structure. Nothing may be supported on suspended ceiling unless definitely noted so on the Drawings or specifically permitted by the Architect/Engineer.

g. Equipment and raceways attached to outside walls, or interior walls subject to permanent moisture, shall be shimmed out with non-corrodible material so as to provide 1/4" air space between wall and equipment or raceway.

1.3 NAMEPLATES:

a. Suitable nameplates shall be provided for the identification of electrical equipment including Switchboards, Panelboards, Motor Starters, Safety Switches, and Circuit Breakers.

b. Nameplates shall be of engraved white core plastic laminate, not less than 1/16" thick. For 120/208 volt systems, nameplates shall have white letters on black backgrounds.
c. Engraving shall be of professional quality, with block style letters, minimum 1/4" high.

d. Nameplates shall be attached with sheet metal screws. They shall be sized to allow for installation of screws without obscuring text.

RACEWAYS AND FITTINGS

1.1 MATERIALS AND APPLICATIONS:

a. Rigid Metal Conduit shall be zinc coated steel or alloy 6063-T42 aluminum with threaded couplings and fittings. Termination at sheet metal enclosures shall consist of double locknuts and insulating bushings. Rigid Steel conduit shall be used for all exposed and concealed work except where other raceways are indicated or permitted. Aluminum conduit complete with aluminum fittings may be used in lieu of steel conduit except in wet locations, underground, or in poured concrete. Steel and aluminum shall not be mixed in the same run of conduit.

b. Intermediate Metal Conduit (IMC) with threaded couplings and fittings may be used for exposed and concealed work in lieu of rigid metal conduit except underground outside the building foundation, or where supporting lighting fixtures, or in hazardous locations, or where exposed to severe impact or injury. Termination at sheet metal enclosures shall consist of double locknuts and insulating bushings.

c. Electrical Metallic Tubing (EMT) of 2" maximum size may be used for concealed work in lieu of Rigid Metal Conduit except underground or in poured concrete. EMT of 2" maximum size may be used for exposed work in lieu of Rigid Metal Conduit except outdoors, or above a roof, or where supporting lighting fixtures, or where exposed to severe impact or injury, or in hazardous locations, or less than 10 feet above a floor or platform in other than in electrical, mechanical, or communications closets or equipment rooms.

d. Flexible Metal Conduit shall be of zinc coated steel of minimum length, and shall be used in lieu of Rigid Metal Conduit for connections to moving or vibrating apparatus, recessed lighting fixtures, dry-type transformers, and motors. Flexible Metal Conduit may be used where rigid connections are impractical due to obstructions or space limitations. Flexible Metal Conduit used in wet, damp, or corrosive location shall be PVC jacketed liquid-tight complete with liquid-tight connectors.

e. Fittings for steel conduit and tubing shall be of zinc coated steel or malleable iron. Insulating bushings of plastic provided for Rigid and Intermediate Metal Conduits shall be rated for 150oC. Bonding bushings shall be steel or malleable iron with non-removable plastic throats rated 150oC. EMT fittings shall be of the compression type. Set-screw, indentor, pressure cast, and die cast fittings are not acceptable. Connectors for EMT, Flexible Metal Conduit and Liquid-tight Flexible Metal Conduit shall be the insulated throat type. Connectors for Flexible Metal Conduits shall be of the "Tite-Bite" design.

f. Conduit expansion fittings shall be of zinc coated cast or malleable iron and steel conduit, complete with flexible bonding straps. Expansion fittings shall allow longitudinal conduit movement of 4 inches.

g. Minimum raceway size shall be 1/2". Other raceway sizes, unless indicated on the drawings, shall be determined by the Contractor in accordance with NEC requirements for type THW insulated conductors, or the actual insulation used if it is thicker than type THW.

2.1 INSTALLATION:

a. Rigid and Intermediate Metal Conduits shall be made up with full threads, to which a conductive pipe compound (T & B Kopr-Shield or equal) has been applied, and butted in coupling. Terminations at sheet metal enclosures in indoor dry locations shall be made with double locknuts and an insulating bushing. Terminations at sheet metal enclosures in outdoor, damp, and wet locations shall be made with threaded conduit hubs of zinc coated malleable iron.

b. Conduits shall be rigidly supported not more than 8 feet on center and shall be concealed within walls, ceilings, and floors, except as indicated or specifically approved by the Architect/Engineer; kept at least 6" from flues and steam or hot water pipes; and protected against the entry of dirt, plaster, or trash. Raceways shall be supported independently of suspended ceiling members and suspension wires.

c. Suspended EMT shall be provided with additional hangers at elbows and bends, and where necessary to avoid strain at couplings and connectors.

d. Exposed conduits, where permitted, shall be run parallel or perpendicular to walls, structural members and ceilings; with right-angle turns consisting of symmetrical bends or cast metal fittings with threaded hubs. Offsets may be used where necessary provided that they are of minimum length.

e. Conduits crossing expansion and contraction joints shall cross perpendicular to the joint and shall be provided with expansion fittings. Conduits shall not be embedded in the concrete slabs at the expansion and contraction joints.

CONDUCTORS

1.1 MATERIALS:

a. Unless otherwise indicated, all wire and cable conductors shall be copper.

b. Conductors shall be not smaller than #12 AWG except that #10 AWG minimum is required for the entire length of 120 volt branch circuits whose distance to the center of the load exceeds 75 feet. #14 AWG may be used for signal and remote control circuits. #16 AWG may be used for taps to individual recessed lighting fixtures on circuits protected by over-current devices rated at 20 amperes or less and contained within flexible metal conduits that do not exceed 6 feet in length. Other conductors smaller than #14 AWG may be used only where specifically indicated on the drawings or specified herein.

c. Conductors #10 AWG and smaller shall be solid, dual rated type THWN/THHN.

d. Conductors #8 AWG and larger shall be stranded, dual rated type THWN\THHN.

e. Each conductor shall bear easily readable markings along entire length, indicating size and insulation type.

f. Insulation on conductors #10 AWG and smaller shall be suitably colored in manufacture.

g. Conductors in any location subject to abnormal temperature shall be furnished with an insulation type suitable for temperature encountered.

h. Where no indication is made of wire size, the conductor shall be of N.E.C. size to match its overcurrent protective device, but in no case smaller than #12 AWG.

2.1 SPLICES, TAPS, AND CONNECTIONS:

a. Splices in conductors #10 AWG and smaller shall be made with twist-on spring steel devices UL listed as Pressure Cable Connectors, with integral insulating covers rated 75oC. at 600 volts.

b. Splices in copper conductors #8 AWG and larger shall be made with mechanical devices UL listed as Pressure Cable Connectors and insulated with thermoplastic tape UL listed for use as sole insulation. Tape may be omitted from connectors supplied with securely fastened insulating covers which completely enclose the connector and the conductors. Insulating covers shall be rated 75oC at 600 volts.

2.2 COLOR CODING:

a. All wiring shall be color coded.

b. On 120/208V, 3 phase, 4 wire power systems, conductors shall be color coded Black (Phase A), Red (Phase B), Blue (Phase C), and White (Neutral).

c. Conductors #8 AWG and larger may be identified with two or more bands of proper color plastic tape applied near each splice and termination. Painting of wire will not be acceptable.

d. Phase sequence shall be "A", "B" and "C" from left to right, top to bottom or front to back when facing equipment.

2.3 BRANCH CIRCUIT RACEWAY WIRING:

a. A neutral shall not serve more than one circuit connected to the same phase. The neutral carrying all or any part of the current of any specific load shall be contained in the same raceway or enclosure with the phase wire or wires also carrying that current.

b. Circuits shall be connected to panels as shown in the panel schedules.

2.4 SERVICE & FEEDER CONDUCTORS:

a. Unless specifically shown otherwise, each feeder and each set of service conductors shall be installed in a separate raceway.

b. Where paralleling of conductors is shown for feeders or service entrance, it is absolutely required they be exactly the same length between terminations.

c. Where service or feeder conductors are so installed that the conductor markings cannot be read without moving or twisting conductors, they shall be provided with suitable tags indicating the conductor size and insulation.

GROUNDING AND BONDING

1.1 SCOPE:

a. The electric system neutral, the neutral of each separately derived system, and all non-current-carrying metal parts, raceways, and enclosures shall be permanently and effectively grounded.

b. Grounding and bonding shall be provided in strict accordance with the National Electrical Code, and as specified herein and on the drawings.

c. The Contractor shall note that required grounding conductors and connections are not all shown on the drawings. NEC requirements apply.

2.1 MATERIALS AND APPLICATIONS:

a. Grounding conductors shall be of THWN insulated copper, unless otherwise indicated.

b. Grounding bus bars in distribution equipment shall be bare copper.

c. Clamps for attaching conductors to water pipes and ground rods shall be of bronze. Ground rod clamps shall be U.L. listed for direct burial.

d. Clamps for attaching conductors to building steel shall be of steel, bronze, or malleable iron.

e. Threaded hubs for bonding metal raceways to the contained grounding electrode conductors and to the water pipe clamps shall be of bronze or malleable iron. Similar hubs shall be used to bond the same raceways to the conductors and to sheet metal equipment enclosures.

f. Driven grounding electrodes shall consist of copper clad steel rods. Rods shall be 8 feet long and 5/8" diameter unless otherwise indicated.

g. Bonding bushings shall be of steel or malleable iron with non-removable plastic throats rated 1500C.

h. Bonding locknuts and wedges for service conduits shall be of zinc coated steel.

3.1 EQUIPMENT GROUNDING:

a. All non-current-carrying metal parts, raceways, and enclosures of the electrical system and of equipment supplied through the electrical system shall be permanently and effectively grounded.

b. Equipment grounding conductors shall be provided for each feeder and for each branch circuit and shall be contained within the same raceways as the feeder and branch circuit conductors. The equipment grounding conductor shall be THWN insulated copper, not smaller than #12 AWG.

c. Copper bonding strips normally included in small sizes of liquid-tight flexible metal conduit and dependent upon the terminal connectors for bonding continuity will not be accepted in lieu of the equipment grounding conductors specified herein.

d. Where metal raceways enter sheet metal enclosures through knockouts provide bonding bushings and jumpers to the enclosure under any of the following conditions:

1. Voltage exceeds 250 volts to ground.

2. Branch circuit conduit exceeds 1" in size.

3. Feeder conduit regardless of voltage and size.

BOXES

1.1 MATERIALS AND APPLICATIONS:

a. Unless specifically noted or approved otherwise, boxes shall be of zinc coated steel or cast ferrous alloy as manufactured by Steel City, Raco, Crouse-Hinds, Appleton, or approved equal.

b. For exposed work on the exterior of the building, and in damp or wet interior locations, boxes shall be of cast metal with threaded conduit hubs and gasketed covers; or of zinc coated sheet steel of NEC gauge and size with screw fastened gasketed covers and threaded conduits hubs of zinc coated malleable iron and no knockouts or extraneous openings. Cover screws shall be stainless steel.

c. For exposed work Equipment Rooms; or, in other dry areas, 8 feet or more above a floor or platform, boxes 5" square and larger shall be NEC gauge and size of zinc coated sheet steel. 4" octagonal, 4" square and 4-11/16" square "knockout" boxes shall be of zinc coated steel, NEC gauge and size. Box extensions are not permitted on exposed "knockout" boxes, and covers shall be of the raised surface type. "Handy" boxes are not permitted.

WIRING DEVICES

1.1 MANUFACTURERS:

a. Wiring devices and device plates shall be manufactured by General Electric, Hubbell, Bryant, Arrow Hart, Pass and Seymour, Leviton, or Eagle.

1.2 DEVICES AND PLATES – GENERAL:

a. Unless otherwise indicated or directed, devices shall be gray in color.

b. Unless otherwise indicated, plates for flush outlets shall be of #302 stainless steel. Those for surface cast boxes shall be of steel, of shape and finish to match the box. Screws shall be steel to match the plate.

c. Each device (including each switch) shall be equipped with a Hex-Head green grounding screw for grounding the device and plate to the outlet box and to the equipment grounding conductor run with the circuit conductors. "Self-Grounding" type mounting screws will not be accepted as the device grounding method.

1.3 SWITCHES:

a. Switches used for lighting control shall be rated 20 amps, 120-277 VAC, side wired, Pass and Seymour 521-G series.

b. Switches used for disconnecting small single-phase motors and appliances shall be rated 20 or 30 amps to match the branch circuit rating and comply with their horsepower ratings, 120-277 VAC, side wired, Pass and Seymour 521-G series and 30 ACI series.

c. Pilot lights shall be neon.

d. Weatherproof switches shall be equipped with stainless steel covers UL listed for wet locations with cover closed, Pass and Seymour WP-1.

1.4 RECEPTACLES:

a. Unless otherwise indicated or required, receptacles shall be the duplex type, side and back wired, with nylon face. On circuits supplying two or more such receptacles, they shall be rated 15 amps, 125 volts, NEMA 5-15R. Duplex receptacles on individual circuits shall be rated 20 amps, 125 volts, NEMA 5-20R.

b. Where no other features are indicated on the drawings provide Hubbell 5262 and 5362 series for 5-15R and 5-20R respectively.

c. Where indicated on the drawings provide Ground Fault Circuit Interrupter receptacles, Hubbell GF5262 and GF5362 series for 5-15R and 5-20R respectively.

d. Where indicated on the drawings provide Weatherproof receptacles consisting of Ground Fault Circuit Interrupter receptacles as specified above with aluminum covers UL listed for wet locations while in use.

SECONDARY DISTRIBUTION EQUIPMENT

1.1 OVERCURRENT PROTECTION DEVICES:

a. Unless otherwise indicated, circuit breakers shall be provided as the overcurrent protection devices for services, separately derived systems, feeders, and branch circuits. Fuses may be used only where indicated on the drawings, or required by the nameplate for equipment connected, or specified herein.

b. Molded-case and insulated-case circuit breakers shall be the static or thermal-magnetic type, quick-make and quick-break for manual and automatic operation. Multipole breakers shall be common trip. Circuit breakers shall be bolted in place where possible. Thermal-magnetic breakers shall be calibrated at 40oC. or ambient compensated. Ampere ratings, frame sizes, and short circuit ratings shall be as indicated on the drawings. Series ratings may be applied only where specifically indicated on the drawings. Individual enclosures shall be NEMA 1 indoors, 3R outdoors, unless otherwise indicated. Other circuit breakers shall be suitable for installation in Switchboards, Panelboards, and Motor Control Centers as hereinafter specified.

c. Single-pole 15 and 20 amp circuit breakers shall be SWD rated.

d. Fuses shall be the non-renewable, time delay, cartridge type, UL Class RK5 unless otherwise indicated; for installation in Safety Switches, Panelboards, Switchboards, and/or Motor Control Centers as hereinafter specified.

1.2 SWITCHING EQUIPMENT:

a. Fusible switches shall be incorporated into Safety Switches, as hereinafter specified. Manual operation shall be quick-make and quick-break. Fuse holders shall be the Class R rejection type unless otherwise indicated.

b. Safety Switches shall be the NEMA heavy duty type, horsepower rated, with interlocked covers, non-fusible except where fused switches are indicated or fuses are required. Switch mechanisms shall be quick-make and quick-break. Enclosures shall be NEMA 1 indoors, NEMA 3R outdoors unless otherwise indicated. Fuse holders, where required, shall be as specified above for fusible switches.

c. Switches for disconnecting small single-phase motors and appliances shall comply with WIRING DEVICES.

2.1 INSTALLATION:

a. Distribution Equipment shall be installed in strict accordance with the manufacturer's instructions for handling, support, connections, assembly, protection, energization, adjustment, and similar procedures.

b. Fastening methods shall comply with BASIC MATERIALS AND METHODS.

c. Floor mounted equipment such as Switchboards, Motor Control Centers, and Dry-Type Transformers shall be provided with 4" high concrete pads and shall be secured to the concrete pad. Pads shall have a 3/4 inch chamber on each accessible side.

d. Equipment interiors shall be thoroughly cleaned of dust, dirt, trash, and other foreign material prior to energization of the equipment.

e. Exterior Safety Switches that are readily accessible to unauthorized persons shall have their covers padlocked closed by the Contractor. Keys shall be identified and delivered to the Owner.

f. Upon completion or the project, furnish to the Owner one complete set of replacement fuses, consisting of three fuses of each type and rating used.

g. Directory cards for Panelboards and for group mounted Switchboard sections shall be neatly filled-in with a typewriter to indicate the type and location of the load on each circuit or feeder.

LIGHTING FIXTURES AND ACCESSORIES

1.1 SCOPE:

a. The Contractor shall furnish and completely install Lighting Fixtures and Accessories as indicated on the drawings and as herein specified.

b. All fixtures shall be equipped with lamps.

c. A lighting fixture shall be provided for each lighting outlet indicated. Outlets lacking fixture designations shall be brought to the attention of the Architect/Engineer before submitting proposal; otherwise units selected by the Architect/Engineer shall be furnished and installed at no additional charge.

1.2 SUBMITTALS:

a. Submit for approval complete manufacturer's data sheets for all fixtures. Indicate all components, characteristics, and options.

b. Submit for approval manufacturer's data sheets for all lamps to be furnished.

c. Submit for approval Lighting Fixture samples as requested by the Architect/Engineer. Samples shall be equipped with lamps, cords, plugs, and ballasts for 120 volt operation.

2.1 LIGHTING FIXTURES:

a. All fixtures shall be labeled by Underwriters' Laboratories, Inc.

b. It is the Contractor's responsibility to properly determine and provide correct components, accessories, and hardware required for the installation.

c. Plastic materials indicated to be "acrylic" shall be of 100% virgin methyl methacrylate producted by Rohm and Haas, DuPont, or Cyanimid.

d. Recessed Fluorescent Fixtures (Troffers) shall conform to the following minimum requirements unless modified by notes and schedules on the Drawings:

2.2 LED DRIVERS

a. General
1. Ten-year operational life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
2. Designed and tested to withstand electrostatic discharges up to 15,000 V without impairment per IEC801-2.
3. Electrolytic capacitors to operate at least 20 degrees C below the capacitor's maximum temperature rating when the driver is under fully-loaded conditions and under maximum case temperature.
4. Maximum inrush current of 2 amperes for 120V and 277V drives.
5. Withstand up to a 4,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A.
6. Manufactured in a facility that employ ESD reduction practices in compliance with ANSI/ESD S20.20.
7. Class A Sound Rating – Inaudible in a 27 dBA ambient.
8. No visible change in light output with a variation of plus/minus 10 percent line voltage input.
9. Total Harmonic Distortion less than 20 percent and meet ANSI C82.11 maximum allowable THD requirements.
10. Drives to track evenly across:
a. Multiple fixtures.
b. All light levels.
11. Constant current drives must provide models to:
a. Support from 200mA to 2.1 Amps (in 10mA steps) to ensure a compatible driver exists.
b. Support LED arrays up to 40W or 50W (710mA to 1.05A in 10mA steps).
12. Constant voltage drives must provide models to:
a. Support from 10V to 40V (in 0.5V steps) to ensure a compatible driver exists.
b. Support LED arrays up to 40W.
13. Configuration tool must be available to optimize the following for LED fixtures:
a. Light level.
b. Efficacy.
c. Thermal performance.
14. Driver must be capable of operating from a supply voltage of 120 through 277VAC at 60Hz for digitally addressable and 3-wire models.

b. 3-Wire Control
1. Continuous dimming from 100 percent to 1 percent relative light output.
2. Provide integral fault protection to prevent driver failure in the event of an input mis-wire.

c. Digitally Addressable Control
1. Continuous dimming from 100 percent to 1 percent relative light output.
2. Ability to operate with installed or specified building control system.
3. Lights automatically return to the setting prior to power interruption.
4. Each driver responds independently to:
a. Up to 32 occupant sensors.
b. Up to 16 daylight sensors.
5. Responds to digital load shed command.
a. Sets high end trim.
b. Automatically scales light output proportional to load shed command.

d. Forward Phase Control (Neutral Wire Required)
1. Continuous dimming from 100 percent to 1 percent relative light output.

3.1 COORDINATION:

a. Contractor shall verify ceiling or wall type in or on which each fixture is to be mounted, and shall furnish unit with appropriate trim type, mounting hardware, and accessories to fit the construction; and feed through junction boxes as required to maintain proper access to system wiring.

3.2 INSTALLATION:

a. Lighting fixtures shall be installed in accordance with the manufacturer's instructions.

b. Lighting fixtures shall be supported from the building structure using corrosion resistant steel hardware. 10 gauge minimum steel wire may be used for support from the structure where concealed above suspended ceilings.

c. In addition to the supports from the structure, fixtures shall also be secured to suspended ceilings on which they are mounted, or in which they are recessed. Where fixtures are secured to suspended ceilings, the primary supports from the building structure shall be slack.

d. A minimum of two supports from the structure shall be provided for each lighting fixture unless otherwise indicated or approved by the Architect/Engineer. The supports shall be located at diagonal corners of rectangular fixtures.

e. Conductors in fixture taps shall be #16 AWG minimum, type TFN, in 3/8" flexible metal conduit of 72" maximum length. A green insulated equipment grounding conductor shall be included.

f. Mount fixtures plumb and square. Keep rows in perfect line.

g. At time of project completion, fixtures and lamps shall be clean and fully operational.

h. High Intensity Discharge lamps that fail during the 12 month guarantee period will be considered to have been defective and shall be replaced by the Contractor at no cost to the Owner.

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ELECTRICAL - SPECIFICATIONS

SCALE: NO SCALE

GENERAL NOTES

McKNIGHT · SMITH
WARD · GRIFFIN
ENGINEERS, INCORPORATED
PO Box 240826 • 4223 South Boulevard
Charlotte, NC
704/527-2112 16-069

[illegible]

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 18963 MARK P. ARRINGTON

1-16-17

REVISION DATE

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MODIFICATIONS TO THE

PEPPER GEDDINGS NATATORIUM

HORRY COUNTY, SOUTH CAROLINA

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION McKNIGHT • SMITH WARD • GRIFFIN ENGINEERS, INC. No. C00926

2015

1/16/17

SPECIFICATIONS

E3.01