ELECTRICAL SPECIFICATIONS

DIVISION 16

ELECTRICAL

SECTION A: GENERAL ELECTRICAL REQUIREMENTS

1. THESE PLANS AND SPECIFICATIONS APPLY TO THE NEW FACILITY FOR CHEM-AQUA, MACON GA. THE WORK DESCRIBED BY THESE PLANS AND SPECIFICATIONS APPLY TO THE INDICATED PROJECT AND MAY NOT BE MODIFIED OR REUSED WITHOUT WRITTEN APPROVAL OF THE ENGINEER.

2. ALL WORK SHALL BE PERFORMED BY LICENSED ELECTRICAL CONTRACTOR WITH MINIMUM OF TWO YEARS OF EXPERIENCE. LIST OF PREVIOUS JOBS AND REFERENCES SHALL BE MADE AVAILABLE UPON REQUEST. CONTRACTOR SHALL PROVIDE ADEQUATE INSURANCE FOR PERSONNEL AND SHALL REPAIR ANY DAMAGE OCCURRING AS THE RESULT OF THIS PROJECT TO THE PROJECT SITE AND RELATED PROPERTY.

3. ALL WORK SHALL BE PERFORMED IN A PROFESSIONAL MANNER IN ACCORDANCE WITH THE 2014 NATIONAL ELECTRICAL CODE, LIFE SAFETY CODE NFPA 101, ADA CODE, GA ACCESSIBILITY CODE, STATE OF GEORGIA ENERGY CODE AND ALL OTHER APPLICABLE CODES AND ORDINANCES.

4. ALL PERMITS AND FEES SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.

5. ALL EQUIPMENT, MATERIAL, AND DEVICES SHALL BE LISTED OR RECOGNIZED BY UNDERWRITER'S LABORATORY OR ELECTRICAL TESTING LABORATORY AND USED AND INSTALLED IN ACCORDANCE WITH IT'S LISTING.

6. ALL WORK PERFORMED SHALL BE WARRANTED FOR A PERIOD OF ONE YEAR FROM THE FINAL COMPLETION DATE EXCEPT FOR FUSES AND LAMPS IN LIGHT FIXTURES. UPON NOTIFICATION OF A PROBLEM, THE CONTRACTOR SHALL INVESTIGATE THE PROBLEM WITHIN 48 HOURS UNLESS A DIFFERENT TIME PERIOD IS AGREED TO. THE CONTRACTOR SHALL INVESTIGATE, REPAIR OR REPLACE ALL FAULTY EQUIPMENT WITHIN A REASONABLE TIME PERIOD WITHOUT CHARGE TO THE OWNER.

7. THE TERM "PROVIDE" SHALL BE UNDERSTOOD TO MEAN, OBTAIN THE ITEM DESCRIBED, INSTALL ITEM IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS, AND MANUFACTURER'S RECOMMENDATIONS.

8. ALL PENETRATIONS MADE IN FIRE RATED BUILDING PORTIONS SHALL BE SEALED WITH A LISTED FIRE RESISTANT MATERIAL SUITABLE FOR THE APPLICATION.

9. ALL INSTALLATIONS OF ELECTRICAL EQUIPMENT AND MATERIALS SHALL BE COORDINATED WITH OTHER TRADES PRIOR TO INSTALLATION.

10. PLANS ARE DIAGRAMMATIC AND SHOW THE LOCATION OF THE EQUIPMENT, RACEWAY AND FIXTURES, AND ARE NOT TO BE SCALED. ALL DIMENSIONS SHALL BE VERIFIED AT THE BUILDING SITE.

11. CONTRACTOR SHALL VERIFY AND COORDINATE ALL EQUIPMENT AND DEVICE LOCATIONS WITH OWNER'S PROJECT MANAGER PRIOR TO INSTALLATION.

12. EQUIPMENT POWER SUPPLY AND WIRING REQUIREMENTS: THE CONTRACTOR SHALL SUBMIT FOR REVIEW A TABULATED SHEET OF EQUIPMENT POWER SUPPLY AND WIRING REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT REQUIRING POWER AS SPECIFIED IN DIVISION 15. REQUIREMENTS SHALL BE IDENTIFIED BY HORSEPOWER OR KW, OPERATING AMPERAGE, REQUIRED VOLTAGE AND PHASE REQUIREMENTS, AND MANUFACTURERS SUGGESTED OVERCURRENT CIRCUIT PROTECTION DEVICE SIZE AND MINIMUM CIRCUIT AMPACITY SIZE. WHERE THE ELECTRICAL REQUIREMENTS SUBMITTED FOR MECHANICAL EQUIPMENT DIFFERS FROM THE BRANCH CIRCUITRY SHOWN ON THE ELECTRICAL DRAWINGS (WHEN USING THE BASIS OF DESIGN UNIT LISTED IN THE MECHANICAL SCHEDULES/SPECIFICATIONS OR A SIMILAR UNIT OF THE SAME SIZE FROM LISTED ALTERNATE MANUFACTURERS), THE CONTRACTOR SHALL MAKE THE NECESSARY ADJUSTMENTS TO THE BRANCH CIRCUITRY PER THE 2014 NEC AT NO ADDITIONAL COST TO THE OWNER. WHEN CHANGES ARE MADE TO POWER REQUIREMENTS FOR EQUIPMENT DUE TO OWNER/ARCHITECT/ENGINEER APPROVED VALUE ENGINEERING CHANGES TO EQUIPMENT, THE COST MUST BE INCLUDED IN THE VALUE ENGINEERING OVERALL CHANGE ORDER COST. COSTS DUE TO ADJUSTMENTS IN BRANCH CIRCUITRY TO EQUIPMENT DUE TO VALUE ENGINEERING CHANGES WILL NOT BE ALLOWED AFTER THE OVERALL VALUE ENGINEERING CHANGE ORDER HAS BEEN APPROVED. IN ALL CASES, POWER WIRING REQUIREMENTS FOR MECHANICAL EQUIPMENT MUST BE PROVIDED TO THE ENGINEER BEFORE OR AT THE SAME TIME AS THE SHOP DRAWINGS FOR THE ELECTRICAL DISTRIBUTION GEAR OR EQUIPMENT. IN NO CASE SHALL THE ELECTRICAL DISTRIBUTION GEAR OR EQUIPMENT BE ORDERED OR BRANCH CIRCUITRY ROUGHED IN PRIOR TO ENGINEER REVIEW AND COMMENT ON THIS DOCUMENT. ANY EQUIPMENT ORDERED OR BRANCH CIRCUITRY ROUGHED IN ON THE JOBSITE WITHOUT THIS REVIEW AND COMMENT WILL BE TOTALLY AT THE CONTRACTORS RISK.

SECTION B: BASIC MATERIALS

1. ALL CONDUCTORS USED FOR 600 VOLTS OR LESS SHALL BE HIGH GRADE COPPER CONDUCTORS WITH 75 DEGREE C, THHN OR THWN THERMOPLASTIC INSULATION. ALL CONDUCTORS SHALL BE MADE IN THE USA. ALL CONDUCTORS ROUTED IN UNDERGROUND CONDUIT SHALL BE RATED FOR WET LOCATIONS.

2. ALL INTERIOR 120 VOLT, 20 AMP POWER AND LIGHTING CIRCUIT WIRING SHALL BE INSTALLED IN EMT CONDUIT. UNLESS OTHERWISE NOTED. POWER CIRCUITS FOR HVAC EQUIPMENT SHALL BE IN ELECTRICAL METALIC CONDUIT. ALL CONDUIT SHALL BE SUPPORTED FROM BUILDING STRUCTURE. IT SHALL NOT BE SUPPORTED FROM DUCTWORK, PIPING, CEILING GRID OR CEILING GRID SUPPORTS, OR ANY OTHER NON-STRUCTURAL ITEM. CONDUIT SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC. CONDUIT IN EXPOSED AREAS SHALL BE IN EMT.

3. CONDUIT UNDERGROUND SHALL BE SCHEDULE 40 PVC. IF MORE THAN ONE CONDUIT IS PROVIDED IN A SINGLE TRENCH, THE CONDUIT SHALL BE RACKED WITH SPACERS EVERY FOUR FEET TO MAINTAIN A MINIMUM SPACING BETWEEN CONDUIT OF TWO INCHES. BACKFILL USED FOR UNDERGROUND INSTALLATIONS SHALL BE FREE OF FOREIGN MATTER. WHERE EXPOSED TO WEATHER, CONDUIT SHALL BE GALVANIZED RIGID STEEL OR INTERMEDIATE METALLIC CONDUIT. THE CONDUIT SHALL BE TERMINATED WITH LISTED FITTINGS AND ALL CONDUIT ENDS SHALL BE REAMED AND SMOOTH. ALL CONDUIT ENDS IN BOXES SHALL BE PROVIDED WITH INSULATED BUSHINGS.

4. A #12 INSULATED COPPER GROUND CONDUCTOR SHALL BE INCLUDED IN ALL BRANCH CIRCUITS RATED 20 AMPERES. ALL OTHER CIRCUITS AND FEEDERS WILL BE PROVIDED WITH AN INSULATED COPPER GROUND CONDUCTOR SIZED AS NOTED OR IN ACCORDANCE WITH THE NEC, WHICHEVER IS GREATER.

5. THE MINIMUM SIZE OF ALL CONDUCTORS NOT OTHERWISE INDICATED IS #12 AND THE MINIMUM SIZE OF ALL CONDUIT UNLESS OTHERWISE INDICATED IS 1/2 IN.

6. ALL JUNCTION BOXES SHALL BE PROVIDED WITH COVERS AND ALL UNUSED OPENINGS SHALL BE PLUGGED. ALL JUNCTION BOXES SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE. COVERS OF BOXES SHALL BE LABELED WITH THE CIRCUIT NUMBER WITH A BLACK PERMANENT MARKER IN 3/4 IN. HIGH LETTERS (LEGIBLE HANDWRITTEN LETTERING IS ACCEPTABLE).

7. ALL OUTLET BOXES SHALL BE SQUARE METAL BOXES. PROVIDE PLASTER RINGS FOR ALL OUTLET BOXES CONTAINING DEVICES TO PROVIDE A FIRM MOUNTING SUPPORT FOR THE DEVICE.

8. ALL CONVENIENCE RECEPTACLES SHALL BE SPECIFICATION GRADE 20 AMP RECEPTACLES, COORDINATE COLOR WITH OWNER.

9. ALL LIGHT SWITCHES SHALL BE SPECIFICATION GRADE 20 AMP TOGGLE SWITCHES FULL LOAD RATED FOR TUNGSTEN-HALOGEN LAMPS, COORDINATE COLOR WITH OWNER.

10. PROVIDE FACEPLATES FOR ALL RECEPTACLES AND SWITCHES. COORDINATE STYLE AND COLOR WITH OWNER/ARCHITECT.

11. PROVIDE BETWEEN 12 AND 24 INCHES OF LIQUID TIGHT FLEXIBLE CONDUIT BETWEEN RIGID CONDUIT AND ANY EQUIPMENT CONTAINING MOTORS. THE FLEXIBLE CONDUIT SHALL BE SUPPORTED TO PREVENT THE CONDUIT FROM RESTING ON THE GROUND OR CONCRETE PAD.

12. PROVIDE WEATHERPROOF RECEPTACLE WITHIN 25 FEET OF EACH PIECE OF EXTERIOR EQUIPMENT. THIS RECEPTACLE SHALL BE MOUNTED HORIZONTALLY WITH METAL HINGED "IN USE" COVER MOUNTED TO OPEN UP. THIS OUTLET SHALL BE A GFCI RECEPTACLE. THIS RECEPTACLE SHALL BE MOUNTED IN DIE CAST NON CORRODING METAL BOX.

13. WHEN OUTLETS OR BOXES ARE INDICATED INSTALLED ON OPPOSITE SIDES OF THE SAME WALL, THE CONTRACTOR SHALL ADJUST THE LOCATION TO OFFSET THE OUTLETS WITH A WALL STUD PROVIDING SEPARATION. OUTLETS CANNOT BE LOCATED ON BOTH SIDES OF WALL BETWEEN THE SAME TWO STUDS, THEY MUST BE ON OPPOSITE SIDES OF STUDS (STUD BETWEEN THEM).

SECTION C: DISTRIBUTION EQUIPMENT

1. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUIT FOR ALL FEEDERS IN ACCORDANCE WITH THE PLANS.

2. SEPARATELY MOUNTED CIRCUIT BREAKERS SHALL BE MOUNTED IN NEMA TYPE I ENCLOSURES IN INDOOR APPLICATIONS AND IN NEMA 3R ENCLOSURES IN EXTERIOR OR WET LOCATIONS. ALL CIRCUIT BREAKER ENCLOSURES SHALL BE PROVIDED WITH HINGED COVERS AND PROVISIONS FOR PADLOCKING THE COVERS.

3. ALL EQUIPMENT CONTAINING MOTORS SHALL BE PROVIDED WITH A DISCONNECTING MEANS WITHIN TEN FEET OF THE UNIT UNLESS OTHERWISE NOTED. THIS DISCONNECTING MEANS SHALL AS A MINIMUM BE A NON-FUSED SWITCH OR TOGGLE STARTER SIZED TO MATCH THE EQUIPMENT. PROVIDE OTHER DEVICES AS NOTED ON THE PLANS. PROVIDE NEMA TYPE I ENCLOSURES INDOORS AND NEMA 3R OUTDOORS.

4. PROVIDE GFCI CIRCUIT BREAKERS AND RECEPTACLES AS INDICATED ON THE PLANS AND IN THESE SPECIFICATIONS. THESE DEVICES SHALL BE CLASS A GFCI DEVICES.

5. PROVIDE PANELS AS SCHEDULED ON PLANS. CIRCUIT BREAKERS SHALL BE THERMAL-MAGNETIC BREAKERS WITH A MINIMUM INTERRUPTING RATING OF 10,000 AIC FOR 120/208V AND 14,000 AIC FOR 277/480V OR AS INDICATED ON THE PLANS. BREAKERS SHALL HAVE 65/75 DEGREE C RATED TERMINATIONS. PANELS NOTED SHALL BE SERVICE ENTRANCE RATED. MOUNT PANELS WITH TOP OF PANEL 6 FT. ABOVE FLOOR, PROVIDE 3/4 IN., GREY PAINTED PLYWOOD BACKBOARD FOR ALL PANELS SECURED TO WALL WITH 1/4 IN. TOGGLE BOLTS. PANEL MANUFACTURERS: SQUARE D I-LINE SERIES, GE, SEIMENS, AND CUTLER HAMMER. ALL CURRENT CARRYING PARTS SHALL BE COPPER.

6. SYSTEM COORDINATION: THE MANUFACTURER OF THE PANELBOARDS SHALL PROVIDE SERIES RATED EQUIPMENT BASED ON U.L. LISTED TEST RESULTS. THE CONTRACTOR SHALL VERIFY THE AVAILABLE SHORT CIRCUIT CURRENT AT THE SERVING TRANSFORMER.

7. PROVIDE EACH PANELBOARD WITH A TYPEWRITTEN CIRCUIT BREAKER DIRECTORY CARD INSIDE A PLASTIC COVERING (EVERY CIRCUIT AND CIRCUIT MODIFICATION SHALL BE LEGIBLY IDENTIFIED AS TO ITS CLEAR, EVIDENT, AND SPECIFIC PURPOSE OR USE. THE IDENTIFICATION SHALL INCLUDE SUFFICIENT DETAIL TO ALLOW EACH CIRCUIT TO BE DISTINGUISHED FROM ALL OTHERS). THE DIRECTORY AND COVERING SHALL BE LOCATED INSIDE A STEEL FRAME PROVIDED INSIDE THE DOOR OF EACH PANELBOARD. THE DIRECTORY SHALL BE TYPED TO IDENTIFY THE LOAD FED BY EACH CIRCUIT BREAKER AND THE AREAS SERVED.

8. PROVIDE NAMEPLATES FOR ALL PANELBOARDS, DISCONNECT SWITCHES, ENCLOSED CIRCUIT BREAKERS, COMBINATION STARTERS, CONTACTORS, AND ALL OTHER ELECTRICAL DISTRIBUTION EQUIPMENT PANELS. MOUNT NAMEPLATES ON EXTERIOR OF THE DOOR OF ALL SURFACE MOUNTED PANELS AND EQUIPMENT. NAME PLATES SHALL BE LAMINATED PLASTIC PLATES WITH 3/16 INCH HIGH WHITE LETTERS ETCHED ON BLACK BACKGROUND. NAME PLATES SHALL BE INSTALLED PARALLEL TO EQUIPMENT LINES. THE NAME OR USAGE OF EACH DEVICE OR BRANCH CIRCUIT SHALL BE ETCHED IN THE NAMEPLATE. CONTRACTOR TO COORDINATE EXACT EQUIPMENT IDENTIFICATION WITH THE OWNER. SECURE NAMEPLATES VIA EPOXY GLUE.

SECTION D: LIGHTING

1. TYPES AND SPECIFIC REQUIREMENTS ARE PROVIDED ON THE LIGHTING FIXTURE SCHEDULE ON THE PLANS. ALL LIGHT FIXTURES SHALL BE PROVIDED WITH LAMPS AND FULLY FUNCTIONING AT COMPLETION OF PROJECT.

2. ALL LED FIXTURES SHALL HAVE A COLOR TEMPERATURE OF 4000 DEG. IF NOT SHOWN.

3. ALL SURFACE MOUNTED FIXTURES SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE. ALL CEILING MOUNTED FIXTURES SHALL BE SUPPORTED FROM STRUCTURE AND BRACED TO PREVENT MOVEMENT IF IMPACTED.

4. ALL RECESSED FIXTURES IN LAY IN TYPE CEILINGS SHALL BE PROVIDED WITH GRID CLIPS TO FASTEN FIRMLY TO CEILING SUPPORT GRID. THE CEILING GRID SHALL BE SUPPORTED AT EACH CORNER OF A FIXTURE.

5. CONNECTION TO ALL FIXTURES IN LAYIN CEILING SHALL BE BY FLEXIBLE CONDUIT OF FOUR TO SIX FEET IN LENGTH. A GROUND CONDUCTOR WILL BE INCLUDED WITH THIS CONNECTION.

6. ALL LENSES ON FIXTURES SHALL BE 0.125 INCH THICK MINIMUM. ALL HOUSINGS SHALL BE 22 GAUGE STEEL MIN. AND HAVE A POST FABRICATION HIGH REFLECTIVE WHITE FINISH.

7. ALL FLUORESCENT LAMPS SHALL BE 32 WATT WITH A OUTPUT EXCEEDING 2900 LUMENS AND A COLOR RENDERING INDEX OF GREATER THAN 80. SEE SCHEDULES FOR COLOR TEMPERATURE OF LAMPS (4100 DEG. IF NOT SHOWN)

8. ALL FLUORESCENT BALLASTS SHALL BE ELECTRONIC TYPE BALLAST WITH A SOUND RATING CATEGORY OF A. BALLAST SHALL NOT CONTAIN ANY PCB'S. TOTAL HARMONIC DISTORTION <20%.

SECTION E: DRY TYPE TRANSFORMERS

1. GENERAL: TRANSFORMERS SHALL BE RATED 480 VOLT DELTA 120/208 VOLT WYE OR AS OTHERWISE NOTED WITH KVA RATINGS AS INDICATED ON DRAWINGS. AUTOTRANSFORMERS ARE NOT ACCEPTABLE.

2. ENCLOSURES: ALL VENTILATING OPENINGS SHALL BE OF THE LOUVERED TYPE. THE BASE OF THE TRANSFORMER SHALL BE CONSTRUCTED OF MINIMUM TWELVE GAUGE STEEL WITH STAMPED OPENINGS FOR VENTILATION. THE ENCLOSURE COATING SHALL BE UL RECOGNIZED FOR OUTDOOR USE, COLOR ANSI 49.

3. TAPS: ALL TRANSFORMERS 15 KVA AND LARGER SHALL HAVE TWO 2-1/2% FULL CAPACITY TAPS ABOVE AND FOUR 2-1/2% FULL CAPACITY TAPS BELOW NORMAL RATED PRIMARY VOLTAGE.

4. INSULATION: TRANSFORMERS WITH THE RATINGS THROUGH 25 KVA SHALL HAVE EITHER CLASS B INSULATION AND BE DESIGNED SO THAT UNDER FULL LOAD THE AVERAGE CONDUCTOR TEMPERATURE DOES NOT EXCEED 80 DEGREE C RISE ABOVE 40 DEGREE C AMBIENT, OR CLASS H INSULATION AND BE DESIGNED SO THAT UNDER FULL LOAD THE AVERAGE CONDUCTOR TEMPERATURE DOES NOT EXCEED 115 DEGREE C RISE ABOVE 40 DEGREE C AMBIENT. TRANSFORMERS WITH RATINGS 30 KVA OR LARGER SHALL BE CONSTRUCTED WITH CLASS H INSULATION AND SO DESIGNED THAT UNDER FULL LOAD THE AVERAGE CONDUCTOR TEMPERATURE DOES NOT EXCEED 115 DEGREE C RISE.

5. MANUFACTURERS: ACCEPTABLE MANUFACTURERS ARE SQUARE D, GENERAL ELECTRIC, CUTLER-HAMMER, OR I.T.E. SIEMENS.

SECTION F: FIRE ALARM SYSTEM

1. ACCEPTABLE MANUFACTURERS: NOTIFIER AFP 320, FIRE LITE, EDWARDS, SILENT KNIGHT, AND SECUTRON. PROVIDE A FIRE ALARM SYSTEM FOR THIS PROJECT. THE MAIN PANEL SHALL BE LOCATED AS SHOWN. THE FIRE ALARM SYSTEM SHALL BE DESIGNED FOR CLASS B OPERATION. THE WIRING FOR THE FIRE ALARM SYSTEM SHALL BE UL LISTED RED PLENUM RATED FIRE ALARM CABLE. THE FIRE ALARM SYSTEM SHALL BE MADE IN THE US AND BE UL LISTED. ALL WIRING AND DEVICES FOR THE SYSTEM SHALL BE SUPERVISED. COLOR CODE ANY CONDUIT INSTALLED EVERY 24 IN. WITH RED MARKINGS.

2. THE MAIN PANEL SHALL HAVE A BATTERY BACKUP AND BE SURGE PROTECTED. THE BATTERY SHALL BE CAPABLE OF PROVIDING NORMAL OPERATION FOR A PERIOD OF 24 HOURS WITH ENOUGH RESERVE TO ANNUNCIATE A BUILDING ALARM FOR 15 MINUTES.

3. DEVICES SHALL BE PROVIDED WITH RECESSED METAL BOXES. ALL DEVICES SHALL BE MOUNTED FLUSH WITH WALL EXCEPT FOR PULL STATIONS WHICH SHALL BE SEMI-FLUSH. SURFACE MOUNTED UNLESS OTHERWISE SHOWN.

4. HORN/STROBE DEVICES SHALL MEET THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT. THE HORN SHALL PRODUCE A SOUND LEVEL OF 90 DECIBELS AND THE STROBE SHALL PRODUCE A FLASHING PULSE OF LIGHT OF 75 CANDELA.

5. STROBE DEVICES SHALL PRODUCE A FLASHING PULSE OF LIGHT OF 75 CANDELA.

6. PULL STATIONS SHALL BE NON-GLASS-BREAK TYPE AND KEYED THE SAME AS THE FIRE ALARM PANEL.

7. THE SMOKE DETECTORS SHALL BE THE PHOTOELECTRIC TYPE POWERED FROM THE MAIN PANEL.

8. THE GENERAL BUILDING ALARM WILL SOUND WHEN ACTIVATED AT THE CONTROL PANEL, BY SMOKE DETECTOR, OR BY A PULL STATION. ALARM WILL ALSO SOUND WHEN ACTIVATED BY A DUCT SMOKE DETECTOR OR SPRINKLER CONTROL VALVE FLOW SWITCH.

9. THE MAIN PANEL SHALL PROVIDE INDICATION OF EACH INITIATING DEVICE LOCATION FOR ALARM. TROUBLE AND SUPERVISORY CONDITIONS. THE PANEL SHALL HAVE LAMP TEST, ALARM SILENCE, TROUBLE AND SUPERVISORY SILENCE, SYSTEM RESET, AND ALARM INITIATE CONTROLS. THE PANEL SHALL ALSO INDICATE VOLTAGE AND BATTERY TEST. THE PANEL SHALL ALSO INCLUDE AN LCD DISPLAY. PANEL SHALL BE IN A RECESSED ENCLOSURE WITH LOCKABLE, SEE THROUGH, HINGED FRONT COVER.

10. THE FIRE ALARM PANEL SHALL BE EQUIPPED WITH A DIGITAL DIALER WITH LINE SEIZURE FUNCTION FOR OFF PREMISES REMOTE MONITORING (FIRE DEPARTMENT) DURING ALARM CONDITION. PROVIDE 3/4 IN. CONDUIT FROM F.A. PANEL TO TELEPHONE BACKBOARD. FINAL TELEPHONE CONNECTION BY THE OWNERS TEL SYSTEM SUPPLIER. FIELD COORDINATE.

11. SMOKE DETECTORS IN DUCT WORK SHALL BE PHOTOELECTRIC TYPE FURNISHED AND CONNECTED UNDER DIVISION 16. POWER SUPPLY FOR DETECTORS SHALL BE 24 VOLTS D.C. AND SUPPLIED FROM FIRE ALARM CONTROL PANEL. PROVIDE CONTACTS TO AUTOMATICALLY SHUT DOWN FAN MOTORS. SAMPLING TUBES SHALL EXTEND ACROSS THE ENTIRE WIDTH OF THE DUCT. PROVIDE REMOTE STATION AT READILY ACCESSIBLE LOCATION IN MECHANICAL ROOM, OR IF AIR HANDLING UNIT IS ABOVE CEILING, MOUNT REMOTE STATION IN WALL BELOW CEILING, HAVING LED TO INDICATE ALARM CONDITION AND KEY SWITCH TO TEST AND RESET ALARM RELAY. MOUNT REMOTE STATION 6 FT. ABOVE FINISHED FLOOR. DETECTORS FOR AIR HANDLING EQUIPMENT RATED OVER 2000 CFM, BUT UNDER 15,000 CFM SHALL BE LOCATED IN THE SUPPLY DUCT. DETECTORS FOR AIR HANDLING EQUIPMENT RATED OVER 15,000 CFM SHALL BE LOCATED IN THE SUPPLY AND RETURN DUCTS. DETECTORS SHALL BE PROVIDED WHETER CALLED FOR ON THE PLANS OR NOT. LOCATION OF DETECTORS IN DUCT WORK SHALL BE AS RECOMMENDED BY DETECTOR MANUFACTURER, BUT IN NO CASE SHALL DETECTOR BE LOCATED AHEAD OF FILTERS. SEE MECHANICAL DRAWINGS FOR DUCT DETECTOR LOCATIONS.

12. PROVIDE MODULES TO MONITOR FIRE SPRINKLER TAMPER AND FLOW (TIME DELAY) SWITCHES WHERE SHOWN ON DRAWINGS.

13. IN ADDITION TO ITEMS CURRENTLY SHOWN ON THE PLANS, PROVIDE AN ADDITIONAL (4) HORN/STROBES, (4) SMOKE DETECTORS, (2) DUCT MOUNTED SMOKE DETECTORS, AND (2) PULL STATIONS. PROVIDE ALL ASSOCIATED CONDUIT, CABLING AND LABOR FOR COMPLETE INSTALLATION OF THE AFOREMENTIONED DEVICES (100 FEED OF CONDUIT AND CONDUCTORS EACH DEVICE). THE STATE FIRE MARSHAL OR LOCAL AUTHORITY HAVING JURISDICTION SHALL LOCATE THE DEVICES. THESE DEVICES WILL BE ADDED DURING THE COMPLETION STAGE OF THE PROJECT. THE OWNER SHALL DECIDE IF ANY UNUSED DEVICES WILL BE TURNED OVER TO THE OWNER OR IF A CREDIT SHALL BE PROVIDED FOR THE UNUSED EQUIPMENT.

SECTION G: EMERGENCY GENERATOR

1. PROVIDE ONE NEW KOHLER (OR EQUAL) DIESEL FUEL ENGINE DRIVEN GENERATOR SET, 45 KW, @ 0.8 PF, 60 HZ, 3 PHASE, UL 2200, 208/120 VOLT.

2. GENERATOR ACCESSORIES: DEC 3: NFPA-110 LEVEL 1 CONTROLLER; ALUMINUM WEATHER HOUSING WITH CRITICAL SILENCER; SOUND ATTENUATED ENCLOSURE; SAFEGUARD BREAKER; BLOCK HEATER; BATTER RACK & CABLES; PRE ALARM SENDERS; RUN RELAY & FAILURE RELAY W/HARNESS; FLUSH MOUNTED REMOTE ANNUNCIATOR PANEL; AUTOMATIC FLOAT BATTERY CHARGER; 600A CIRCUIT BREAKER.

3. ADDITIONAL ACCESSORIES SHALL INCLUDE THE FOLLOWING: RATED POWER FACTOR TEST; CERTIFIED TEST REPORT; (6) OPERATIONAL & MAINTENANCE MANUALS; 1 YEAR STANDARD WARRANTY; STARTUP INCLUDING BATTERY AND FLUIDS; ON-SITE FACTORY TESTING AND WALK THROUGH.

4. PROVIDE ONE AUTOMATIC TRANSFER SWITCH. SEE DRAWINGS FOR REQUIREMENTS OF TRANSFER SWITCH.

5. PROVIDE SKID MOUNTED DIESEL FUEL TANK SIZED BY MANUFACTURER FOR 72 HOURS OF OPERATION AT FULL LOAD.

6. THE ENGINE SHALL BE 1800 RPM, WATER-COOLED IN LINE OR VEE TYPE FOUR-STROKE CYCLE COMPRESSION IGNITION DIESEL. ENGINES REQUIRING PREMIUM FUELS WILL NOT BE CONSIDERED. THE ENGINE SHALL BE EQUIPMENT WITH FUEL, LUBE OIL, INTAKE AIR FILTERS, LUBE OIL COOLER, FUEL TRANSFER PUMP, FUEL PRIMING PUMP, ENGINE DRIVEN WATER PUMP, UNIT MOUNTED INSTRUMENTS, WATER TEMPERATURE GAUGE, LUBRICATION OIL PRESSURE GAUGE, AND BATTERY CHARGIN AMMETER.

ELECTRICAL LEGEND

LIGHTING AND POWER

Symbol	Description
	CONDUIT RUN CONCEALED ABOVE CEILING OR IN WALL, HASH MARKS INDICATE NUMBER OF CONDUCTORS (3 CONDUCTORS UNLESS SHOWN).
	EXPOSED CONDUIT RUN.
A-2,4	HOMERUN TO PANELBOARD, LETTER OR LETTERS INDICATE PANELBOARD. NUMBERS INDICATES CIRCUIT NUMBERS.
	LIGHT FIXTURE, SEE SCHEDULE FOR MOUNTING AND TYPE.
	LIGHTING FIXTURE, WALL BRACKET MOUNTED. (MOUNTING HEIGHT AS NOTED ON DRAWINGS.)
	DUPLEX CONVENIENCE OUTLET, 18 IN. ABOVE FLOOR UNLESS OTHERWISE NOTED.
	DUPLEX CONVENIENCE OUTLET, GFI TYPE. MOUNTED ABOVE COUNTER. MOUNT AT 46 IN. ABOVE FLOOR.
	DUPLEX CONVENIENCE OUTLET, GFI TYPE. 18 IN. ABOVE FLOOR UNLESS OTHERWISE NOTED. "WP" INDICATES WEATHERPROOF.
J	FLUSH WALL MOUNTED JUNCTION BOX, 18 IN. ABOVE FLOOR UNLESS OTHERWISE NOTED.
	SPECIAL RECEPTACLE TO MATCH EQUIPMENT. CORRD WITH OWNER FOR TYPE.
RR	RETRACTIBLE CORD REEL MOUNTED TO STRUCTURE. COORD WITH OWNER FOR TYPE.
$	SINGLE POLE TOGGLE SWITCH, 42 IN. MOUNTING HEIGHT.
$3	THREE OR FOUR WAY SWITCH AS INDICATED, 42 IN. MOUNTING HEIGHT.
$M	MOTOR RATED TOGGLE SWITCH.
	PANELBOARD, SEE SCHEDULE.
	DISCONNECT. SEE DRAWINGS FOR SIZE AND TYPE.
	FIRE ALARM HORN AND FLASHING LIGHT. 80 IN. ABOVE FLOOR TO THE BOTTOM OF THE LENS.
	FIRE ALARM CEILING MOUNTED STROBE LIGHT.
F	FIRE ALARM PULL STATION. WALL MOUNTED 42 IN. ABOVE FLOOR.
VS	TAMPER SWITCH, FURNISHED AND INSTALLED WITH SPRINKLER SYSTEM. INTERLOCK WITH FIRE ALARM SYSTEM BY ELECTRICAL.
WF	FLOW SWITCH, FURNISHED AND INSTALLED WITH SPRINKLER SYSTEM. INTERLOCK WITH FIRE ALARM SYSTEM BY ELECTRICAL.
FAA	FIRE ALARM REMOTE LCD ANNUNCIATOR, FLUSH WALL MOUNTED.
FACP	FIRE ALARM CONTROL PANEL, FLUSH WALL MOUNTED.
2	FIRE ALARM DUCT SMOKE DETECTOR.
2 P	FIRE ALARM CEILING SMOKE DETECTOR.
3	COMBINATION 360 DEGREE, ULTRASONIC AND PASSIVE INFRARED SENSOR (WATT STOPPER "DT-300", GREENGATE, NOVITAS, HUBBELL, LEVITON, SENSOR SWITCH).
H	ULTRASONIC OCCUPANCY SENSOR (WATT STOPPER "WT-2250", GREENGATE, NOVITAS, HUBBELL, LEVITON, SENSOR SWITCH).
$O	WALL MOUNTED SENSOR SWITCH, 42 IN. MOUNTING HEIGHT (WATTSTOPPER DW-100, GREENGATE, NOVITAS, HUBBELL, LEVITON, SENSOR SWITCH).

ALL MOUNTING HEIGHTS ARE FROM FINISHED FLOOR TO CENTERLINE OF OUTLET OR DEVICE.

LIGHTING FIXTURE SCHEDULE

NOTE: VERIFY ALL CEILING TYPES, FIXTURE MOUNTING HEIGHTS AND VOLTAGES PRIOR TO ORDERING.

TYPE	DESCRIPTION	MANUFACTURER
A	2 FT.x4 FT. RECESSED FLUORESCENT TROFFER WITH ACRYLIC PRISMATIC, K-12 - MIN .125 LENS. LAMPS: 3-32 WATT, T-8, 4100 DEGREE K BALLAST: UNV VOLT ELECTRONIC	LITHONIA "SP8" SERIES PHILIPS, COLUMBIA, HUBBELL, COOPER
B	2 FT.x4 FT. RECESSED FLUORESCENT TROFFER WITH ACRYLIC PRISMATIC, K-12 - MIN .125 LENS. LAMPS: 2-32 WATT, T-8, 4100 DEGREE K BALLAST: UNV VOLT ELECTRONIC	LITHONIA "SP8" SERIES PHILIPS, COLUMBIA, HUBBELL, COOPER
C	DOWNLIGHT, RECESSED SELF FLANGED, 6 IN. APERTURE CLEAR SPECULAR LOW IRIDESCENT REFLECTOR. LAMPS: LED, 4000 DEGREE K, 2000 LUMEN BALLAST: UNV. VOLT	PRESCOLITE "LF6LEDG4" SERIES PHILIPS, LITHONIA, COOPER
D	4 FT. INDUSTRIAL WET LOCATION FIXTURE WITH IMPACT RESISTANT, POLYCARBONATE LENS. LAMPS: 2-32 WATT, T-8, 4100 DEGREE K BALLAST: UNV VOLT ELECTRONIC	LITHONIA "XWL" SERIES PHILIPS, COLUMBIA, HUBBELL, COOPER
	FIXTURE, EGRESS, WALL MOUNTING, TWO HEAD, WITH NICAD BATTERY UNIT (90 MINUTE), WHITE FINISH. LAMPS: WITH UNIT BALLAST: UNV. VOLT	LITHONIA "ELM2" SERIES SURELITE, DUALITE EMERGILITE, CHLORIDE
A	FIXTURE, EGRESS, WALL MOUNTING, TWO HEAD, WITH BATTERY UNIT (90 MINUTE), WHITE FINISH. LAMPS: WITH UNIT BALLAST: UNV. VOLT	LITHONIA "IND" SERIES SURELITE, DUALITE EMERGILITE, CHLORIDE
	FIXTURE, EGRESS EXIT, LED, UNIVERSAL MOUNTING, WHITE FINISH, GREEN LETTERS, SINGLE OR DOUBLE FACE, WITH BATTERY UNIT (90 MINUTE), DIRECTION OF ARROWS AS SHOWN ON THE DRAWINGS. FIXTURE PROVIDED WITH TWO HEAD EGRESS KIT. "WG" INDICATES PROVIDE WIRE GUARD. LAMPS: LED BALLAST: UNV. VOLT	LITHONIA "LHQM" SERIES SURELITE, DUALITE EMERGILITE, CHLORIDE

ELECTRICAL DESIGN
EDC
CONSULTANTS, INC.
175 NEW ST., STE.1
MACON, GA 31201
EDC# M15031

STROUD
AND COMPANY

NEW FACILITY BUILDOUT FOR
CHEM-AQUA
ENGINEERED EQUIPMENT SOLUTIONS
580 JOE TAMPLIN INDUSTRIAL BLVD.
MACON, GEORGIA

DRAWN BY: JHM
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DATE: 6-5-2015

GEORGIA REGISTERED NO. 25199 PROFESSIONAL ENGINEER JEFFREY H. McGEE

ADAMS and DAY
ARCHITECTS, A.I.A., P.C.
2936 VINEVILLE AVENUE - MACON, GEORGIA 31204
PHONE: (478) 745 - 1167

[redacted]

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