ELECTRICAL SPECIFICATIONS

PART 1 – GENERAL

A. THE WORK TO BE ACCOMPLISHED UNDER THESE SPECIFICATIONS INCLUDES PROVIDING ALL LABOR, MATERIALS, EQUIPMENT, CONSUMABLE ITEMS, SUPERVISION, ADMINISTRATIVE TASKS, TESTS AND DOCUMENTATION REQUIRED TO INSTALL COMPLETE AND FULLY OPERATIONAL ELECTRICAL SYSTEMS AS DESCRIBED HEREIN AND SHOWN ON THE DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE WORK OF THIS SECTION WITH THE WORK OF OTHER TRADES.

B. ALL MATERIAL AND WORKMANSHIP SHALL COMPLY WITH ALL APPLICABLE CODES, SPECIFICATIONS, LOCAL AND STATE ORDINANCES, INDUSTRY STANDARDS AND UTILITY COMPANY REGULATIONS.

C. THE ELECTRICAL CONTRACTOR SHALL FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND OBTAIN NECESSARY INSPECTIONS AND APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION, AS REQUIRED TO PERFORM WORK IN ACCORDANCE WITH ALL LEGAL REQUIREMENTS. THE ELECTRICAL CONTRACTOR SHALL PAY ANY UTILITY CHARGES AND PERFORM WORK IN ACCORDANCE WITH UTILITY COMPANY REQUIREMENTS.

D. THE WORK SHALL BE COMPLETE FROM POINT OF SERVICE TO EACH OUTLET OR DEVICE WITH ALL ACCESSORY CONSTRUCTION AND MATERIALS REQUIRED TO MAKE EACH ITEM OF EQUIPMENT OR SYSTEM COMPLETE AND READY FOR OPERATION. THE INTENT OF THIS PROJECT IS TO USE THE EXISTING SERVICE, PANELBOARDS, AND TRANSFORMERS WHERE POSSIBLE. THE WORK SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING. THE ELECTRICAL CONTRACTOR SHALL PROVIDE:

1. BRANCH CIRCUITS AND DEVICES FOR POWER AND CONVENIENCE RECEPTACLES.
2. ALL MOTOR WIRING, SAFETY DISCONNECTS, AND MOTOR STARTERS UNLESS INTEGRAL WITH EQUIPMENT.
3. COMPLETE INTERIOR LIGHTING SYSTEM INCLUDING NORMAL AND EMERGENCY FIXTURES, EXIT SIGNS, LAMPS, CONTROLS, TRIM AND ACCESSORIES.
4. COMPLETE EXTERIOR LIGHTING SYSTEM INCLUDING BUILDING FIXTURES, CONTROLS, LAMPS AND ACCESSORIES.
5. MODIFICATIONS TO THE EXISTING FIRE ALARM AND DETECTION SYSTEM TO INCLUDE NEW NOTIFICATION DEVICES, PULL STATIONS, HEAT DETECTORS, AREA SMOKE DETECTORS, DUCT SMOKE DETECTORS, REMOTE ANNUNCIATOR, AUXILIARY CONTACTS FOR EQUIPMENT INTERLOCKING, AND OTHER DEVICES SHOWN ON THE DRAWINGS. THESE DEVICES SHALL BE INTEGRATED INTO THE EXISTING FCI SYSTEM INSTALLED ON THE PREMISES.

E. INSTALL THE FOLLOWING FURNISHED BY OTHERS:

1. MOTORS
2. CONTROL PANELS

F. ELECTRICAL CONTRACTOR SHALL MAINTAIN A SET OF DRAWINGS ON WHICH HE SHALL SHOW THE ACTUAL INSTALLATION OF ALL WORK PERFORMED. THIS SET OF PRINTS IS TO BE TURNED OVER TO THE OWNER UPON COMPLETION OF THE WORK. (ONE LINE AS–BUILT DRAWING).

G. ELECTRICAL CONTRACTOR SHALL SUBMIT TO THE OWNER SHOP DRAWINGS, PRODUCT DATA AND SAMPLES FOR APPROVAL BEFORE INSTALLATION.

PART 2 – INSTALLATION

A. WIRING METHODS

1. UNLESS OTHERWISE NOTED ALL WIRING SHALL BE INSTALLED IN RACEWAY. CONDUITS SHALL BE INSTALLED SO THAT THEY ARE MECHANICALLY SECURE, ELECTRICALLY CONTINUOUS AND NEAT IN APPEARANCE. MC CABLES SHALL BE PROPERLY SUPPORTED AND BUNDLED. ALL CONDUIT TERMINATIONS IN PANELS, ENCLOSURES, OUTLET BOXES AND EQUIPMENT SHALL BE PROVIDED WITH BUSHINGS.
2. ALL CONDUIT INSTALLED OUTDOORS, ALL RISERS BETWEEN FLOORS AND CONDUIT EXPOSED TO PHYSICAL DAMAGE SHALL BE RIGID STEEL, RIGID ALUMINUM OR INTERMEDIATE METAL CONDUIT.
3. UNLESS OTHERWISE NOTED, ALL OTHER POWER DISTRIBUTION WIRING INCLUDING FEEDERS AND BRANCH CIRCUITS SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT) WHERE EXPOSED AND IN MC CABLE ABOVE CEILINGS AND IN WALLS. SEE DRAWING NOTES FOR CONNECTION TO EXISTING ROMEX CABLE IN WALLS NOT TO BE MODIFIED AS PART OF THIS PROJECT.
4. ALL FIRE ALARM SYSTEM WIRING SHALL BE INSTALLED IN EMT WHERE EXPOSED. MC CABLE IDENTIFIED FOR THIS PURPOSE MAY BE USED ABOVE CEILINGS AND IN WALLS.
5. FLEXIBLE CONDUIT SHALL BE USED TO TERMINATE ALL LIGHTING, MOTORS AND VIBRATING EQUIPMENT. LIQUID–TIGHT FLEXIBLE CONDUIT SHALL BE USED OUTDOORS AND IN ALL WET OR DAMP AREAS OR WHERE EXPOSED TO GREASE OR OIL.
6. ALL FIRE RATED WALLS SHALL BE SEALED WITH A UL APPROVED MATERIAL INSTALLED TO MAINTAIN THE ORIGINAL FIRE RATING OF THE WALL.
7. COLOR CODING OF WIRING
   A. 208Y/120 VOLT, THREE PHASE, FOUR WIRE SYSTEM:
      - HOT PHASE A – BLACK
      - HOT PHASE B – RED
      - HOT PHASE C – BLUE
      - NEUTRAL – WHITE
      - SWITCH LEG – OTHER THAN PHASE WIRE COLOR
      - GROUND – GREEN, IF INSULATED
   B. 480Y/277 VOLT, THREE PHASE, FOUR WIRE SYSTEM
      - HOT PHASE A – BROWN
      - HOT PHASE B – ORANGE
      - HOT PHASE C – YELLOW
      - NEUTRAL – GRAY
      - SWITCH LEG – OTHER THAN PHASE WIRE COLOR
      - GROUND – GREEN, IF INSULATED
8. ADDITIONAL BREAKERS ADDED TO EXISTING PANELBOARDS SHALL BE OF THE SAME MANUFACTURE, MODEL AND INTERRUPTION RATING AS THE EXISTING BREAKERS IN THAT PANELBOARD.
9. THE PANELBOARD DIRECTORY CARD SHALL BE COMPLETED UPON SUBSTANTIAL COMPLETION OF PROJECT AND INSTALLED IN THE RESPECTIVE PANELBOARD.
10. OUTLET BOXES:
    A. SURFACE MOUNT OUTLET BOXES FOR EXPOSED CONDUIT RUNS AND ABOVE ACCESSIBLE TYPE SUSPENDED CEILINGS. JUNCTION AND OUTLET BOXES, ABOVE ACCESSIBLE TYPE SUSPENDED CEILINGS, SHALL BE SO LOCATED WITHIN 18 INCHES OF THE SUSPENDED CEILING TO PROVIDE ACCESS TO THE ENCLOSED WIRING SYSTEM.
    B. DO NOT USE SECTIONAL OR HANDY BOXES UNLESS SPECIFICALLY REQUESTED.
    C. ADJUST OUTLET MOUNTING HEIGHT TO AGREE WITH REQUIRED LOCATION FOR EQUIPMENT SERVED.
    D. OUTLET BOXES FOR SWITCHES, RECEPTACLES, TELEPHONES, ETC. SHALL BE CONCEALED.
    E. OUTLET BOXES SHALL BE INSTALLED AT ALL LIGHTING FIXTURES. FIXTURES ARE NOT TO BE USED AS JUNCTION BOXES.
11. PULL AND JUNCTION BOXES:
    A. LOCATE PULLBOXES AND JUNCTION BOXES AS REQUIRED. ALL JUNCTION BOXES FOR CIRCUIT HOMERUNS ARE TO BE LOCATED ABOVE THE SUSPENDED CEILING IN AN ACCESSIBLE LOCATION. AT NO TIME SHALL A JUNCTION BOX FOR A CIRCUIT HOMERUN BE LOCATED IN THE WALL.
    B. STEEL ENCLOSED WIREWAYS AND AUXILIARY GUTTER MAY BE USED AT GROUPED EQUIPMENT LOCATIONS AND AT OTHER LOCATIONS WHERE MULTIPLE CIRCUITS ARE RUN, ONLY WHEN USE IS ACCEPTABLE TO THE ARCHITECT.
12. ALL RECEPTACLES SHALL BE WIRED WITH VERTICAL FEED FROM ABOVE CEILING JUNCTION BOXES.
13. POWER AND LIGHTING OUTLET AND JUNCTION BOXES ARE TO BE IDENTIFIED WITH A PERMANENT MARKER IN A NEAT AND LEGIBLE MANNER INDICATING THE CIRCUIT NUMBER AND PANEL IDENTIFICATION.
14. WHERE POWER AND LIGHTING OUTLET AND JUNCTION BOXES ARE INSTALLED THE BRANCH CIRCUIT IDENTIFICATION SHALL BE MARKED WITH A PERMANENT MARKER IN AEE NEAT AND LEGIBLE MANNER ON THE COVER OF ALL JUNCTION/SPLICE BOXES.

B. GROUNDING

1. A SEPARATE GREEN GROUNDING CONDUCTOR SHALL BE INSTALLED AS AN EQUIPMENT GROUNDING CONDUCTOR IN ALL RACEWAY AND WITH EVERY FEEDER, BRANCH CIRCUIT AND CONTROL CIRCUIT. THIS SHALL BE IN ADDITION TO THE GROUNDED METALLIC CONDUIT SYSTEM.
2. ALL EQUIPMENT GROUNDING CONDUCTORS SHALL BE TERMINATED AT BOTH ENDS.
3. ALL RACEWAY AND NON–CURRENT CARRYING METAL EQUIPMENT SHALL BE ELECTRICALLY CONTINUOUS AND BONDED TO THE GROUNDING SYSTEM.

PART 3 – EQUIPMENT

A. CONDUIT

1. RIGID STEEL CONDUIT SHALL BE HOT DIPPED GALVANIZED INSIDE AND OUTSIDE, INCLUDING ALL THREADS. THE CONDUIT SHALL BE FURNISHED IN NOMINAL 10–FOOT LENGTHS, WITH BOTH ENDS THREADED AND ONE GALVANIZED COUPLING PROVIDED WITH EACH LENGTH. THE THREADS OPPOSITE THE COUPLING END SHALL BE PROTECTED BY A PLASTIC CAP.
2. ELECTRICAL METALLIC TUBING SHALL BE OF ZINC COATED STEEL WITH AN INTERIOR COATING OF LACQUER OR ENAMEL. MINIMUM CONDUIT SIZE SHALL BE 3/4".
3. LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE CONSTRUCTED WITH A FLEXIBLE CORE OF GALVANIZED STEEL AND AN OIL RESISTANT PVC JACKET TO FORM A LIQUID TIGHT RACEWAY. THE OVERALL JACKET SHALL BE WRINKLE FREE AND SUITABLE FOR USE IN TEMPERATURES FROM –40 DEG. C TO + 100 DEG. C. LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE ANACONDA "SEALTITE" TYPE UA OR APPROVED EQUAL.
4. FLEXIBLE METAL CONDUIT SHALL BE HOT DIPPED GALVANIZED INTERLOCKED STRIP STEEL.

B. CONDUIT FITTINGS

1. INSULATED BUSHINGS FOR CONDUIT SIZES 1–1/4 INCHES AND LARGER SHALL HAVE METAL BODIES AND THREADS, WITH MOLDED–ON HIGH IMPACT PHENOLIC THERMOSETTING INSULATION TO PREVENT CONDUCTOR INSULATION DAMAGE. BUSHINGS SHALL BE TYPE IBC INSULATED BUSHINGS AS MANUFACTURED BY O.Z./GEDNEY OR AN APPROVED EQUAL. INSULATED BUSHINGS FOR CONDUIT SIZES 1 INCH AND SMALLER MAY BE OF PLASTIC, O.Z./GEDNEY TYPE "A", OR AN APPROVED EQUAL.
2. INSULATED GROUNDING BUSHINGS SHALL BE SIMILAR TO THE INSULATED BUSHINGS DESCRIBED ABOVE, EXCEPT THEY SHALL HAVE SET SCREWS TO LOCK THE BUSHINGS ON THE CONDUITS AND SHALL HAVE MECHANICAL TYPE LUGS ATTACHED. THE LUGS SHALL BE SIZED TO ACCEPT THE GROUND WIRE SIZES AS SET FORTH IN THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, BUT IN NO CASE SMALLER THAN NO. 8 AWG WIRE. GROUNDING BUSHINGS SHALL BE TYPE BLG AS MANUFACTURED BY O.Z./ GEDNEY OR AN APPROVED EQUAL.
3. MALE BUSHINGS SHALL BE THOMAS AND BETTS CORPORATION INSULATED THROAT CHASE NIPPLES, OR A PRODUCT OF EQUAL CONSTRUCTION. BUSHINGS USED ONLY TO PASS CONDUCTORS THROUGH METAL PARTITIONS, ETC. SHALL BE O.Z./GEDNEY, TYPE "MBI".
4. BUSHINGS FOR USE WITH EMT SHALL BE O.Z./GEDNEY TYPE SBT OR APPROVED EQUALS.
5. HUBS. WATER–TIGHT CONDUIT CONNECTIONS ARE REQUIRED ON ALL NEMA 3R, 4, AND 4X ENCLOSURES AND ALL ELECTRICAL EQUIPMENT LOCATED OUTDOORS OR IN DAMP OR WET AREAS. WHERE HUBS OR WATER–TIGHT THREADED CONNECTIONS ARE NOT PROVIDED AS PART OF THE ENCLOSURE, WATER–TIGHT HUBS SHALL BE MYERS "SCRU–TITE", OR APPROVED EQUAL. ALL OTHER TERMINATIONS SHALL BE DOUBLE LOCKNUT AND BUSHING.
6. FITTINGS FOR USE WITH LIQUID–TIGHT FLEXIBLE CONDUIT SHALL BE ZINC PLATED MALLEABLE IRON O.Z./GEDNEY TYPE 4Q OR APPROVED EQUAL.
7. LOCKNUTS. LOCKNUTS SHALL BE HOT DIPPED GALVANIZED STEEL OR MALLEABLE IRON. STANDARD LOCKNUTS SHALL BE USED FOR CONNECTIONS TO NEMA 1 ENCLOSURES. SEALING LOCKNUTS WITH INTEGRAL GASKET SHALL BE USED FOR CONNECTIONS TO NEMA 12 ENCLOSURES.

C. JUNCTION BOXES

1. PULL AND JUNCTION BOXES SHALL BE OF CODE GAUGE METAL WITH CONTINUOUSLY WELDED. ALL JUNCTION BOXES SHALL HAVE GASKETED SCREW COVERS. SHEET STEEL BOXES SHALL BE GALVANIZED AFTER FABRICATIONS. SCREWS FOR GALVANIZED STEEL BOX COVERS SHALL BE MADE OF BRASS
2. UNLESS OTHERWISE SHOWN ON DRAWINGS, ALL BOXES INSTALLED INDOORS SHALL BE RATED NEMA 1 AND ALL BOXES INSTALLED OUTDOORS SHALL BE RATED NEMA 3R.

D. OUTLET BOXES

1. OUTLET BOXES FOR CONCEALED WORK SHALL BE PRESSED STEEL BOXES, GALVANIZED AND NOT LESS THAN #12 GAUGE. EACH CEILING OUTLET DESIGNATED FOR A LIGHTING FIXTURE SHALL HAVE A FIXTURE SUPPORT SECURED IN PLACE WITH BOLTS AND NUTS. CEILING BOXES SHALL BE OCTAGONAL WITH LUGS AND SCREWS FOR BACK PLATES.
2. OUTLET BOXES INSTALLED OUTDOORS, IN CONCRETE OR EXPOSED, SHALL BE CAST IRON ALLOY OR COPPER FREE ALUMINUM WITH GASKETED COVERS.
3. PROVIDE OUTLET BOX ACCESSORIES AS REQUIRED FOR EACH INSTALLATION, INCLUDING BOX SUPPORTS, MOUNTING EARS AND BRACKETS, WALLBOARD HANGERS, BOX EXTENSION RINGS, FIXTURE STUDS, CABLE CLAMPS AND METAL STRAPS FOR SUPPORTING OUTLET BOXES, WHICH ARE COMPATIBLE WITH OUTLET BOXES BEING USED AND TO FULFILL INSTALLATION REQUIREMENTS FOR INDIVIDUAL WIRING SITUATIONS.

E. SUPPORTS

1. THE ELECTRICAL CONTRACTOR SHALL SIZE AND PROVIDE ALL SUPPORTS NECESSARY FOR THE INSTALLATION OF ALL RACEWAY.
2. CHANNEL FRAMING AND ANGLE SHALL BE GALVANIZED STEEL OR ALUMINUM AND ALL NUTS, BOLTS AND HARDWARE SHALL BE CARBON STEEL, CADMIUM PLATED OR HOT DIPPED GALVANIZED. REAM CLAMPS AND ALL SHALL BE GALVANIZED STEEL ORLS. ALL MALLEABLE IRON.

F. WIRING

1. ALL CONDUCTORS SHALL BE ANNEALED COPPER IN ACCORDANCE WITH ASTM B–3.
2. ALL LIGHTING AND CONVENIENCE RECEPTACLE BRANCH CIRCUIT WIRING SHALL BE TYPE THHN/THWN, SOLID OR STRANDED CONDUCTOR, MINIMUM SIZE #12 AWG.
3. WIRING FOR CONTROL CIRCUITS SHALL BE THHN/THWN, STRANDED, CLASS B STRAND IN ACCORDANCE WITH ASTM B–8, MINIMUM SIZE #14 AWG.
4. INSULATED GROUNDING CONDUCTORS SHALL BE STRANDED COPPER WITH TYPE TW, THW OR THHN/THWN INSULATION COLORED GREEN.
5. METAL CLAD WIRING FOR MODULAR FURNITURE SHALL BE "SUPER NEUTRAL TYPE" WITH STEEL ARMOR AS MANUFACTURED BY AFC. ASSEMBLY SHALL INCLUDE 4#12 PHASE CONDUCTORS, 2#10 NEUTRALS AND 2#12 GROUNDS.

G. INTERIOR LIGHTING

1. GENERAL. PROVIDE FLUORESCENT FIXTURES OF SIZES, TYPES AND RATINGS INDICATED AND SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE ON THE CONTRACT DRAWINGS.
2. FLUORESCENT–LAMP BALLASTS: PROVIDE LOW–ENERGY SOLID STATE FLUORESCENT LAMP BALLASTS, CAPABLE OF OPERATING LAMP TYPES INDICATED; WITH HIGH POWER FACTOR, RAPID–START, AND LOW–NOISE FEATURES. BALLASTS SHALL HAVE LAMP CURRENT CREST FACTOR OF 1.5 OR LESS AND TOTAL HARMONIC DISTORTION LESS THAN 10%.
3. COMPACT FLUORESCENT BALLAST: PROVIDE HIGH POWER FACTOR BALLAST CAPABLE OF OPERATING LAMP TYPES SPECIFIED.
4. SUBMIT MANUFACTURER'S PRODUCT DATA, PHOTOMETRICS, AND INSTALLATION INSTRUCTIONS FOR EACH TYPE OF LIGHT FIXTURE SPECIFIED. INCLUDE THE BALLAST MANUFACTURER, TYPE AND TECHNICAL DATA FOR THAT BALLAST. ALSO INCLUDE THE PROPOSED LAMP FOR EACH FIXTURE AND MANUFACTURERS DATA FOR THAT LAMP.
5. LIGHT FIXTURES SHALL BE PROVIDED WITH HOUSINGS, TRIMS, BALLASTS, LAMP HOLDERS, SOCKETS, REFLECTORS, WIRING AND OTHER COMPONENTS REQUIRED, AS A FACTORY–ASSEMBLED UNIT FOR A COMPLETE INSTALLATION.
6. COORDINATE LIGHT FIXTURE INSTALLATIONS WITH OTHER TRADES. FLUORESCENT LIGHT FIXTURES SHOULD BE INSTALLED AT LEAST TWO FEET AWAY FROM SMOKE DETECTORS. COORDINATE ALL LIGHTING FIXTURES WITH MECHANICAL PIPING AND DUCT WORK TO ALLOW FOR PROPER CLEARANCE.
7. INSTALL LIGHTING FIXTURES IN ACCORDANCE WITH THE ARCHITECTURAL REFLECTED CEILING PLANS.
8. PROVIDE FIXTURES AND/OR FIXTURE OUTLET BOXES WITH HANGERS, CHANNEL OR OTHER METHOD OF FASTENING AND SUPPORTING FIXTURES REQUIRED FOR PROPER INSTALLATION.

H. SAFETY SWITCHES

1. SAFETY SWITCHES SHALL BE 600 VAC OR 240 VAC NEMA HEAVY DUTY, HORSEPOWER RATED VISIBLE BLADE TYPE. SWITCHES SHALL BE NON–FUSED OR FUSED AS INDICATED ON THE DRAWINGS. THE SWITCH OPERATING MECHANISM SHALL BE SPRING ACTIVATED QUICK MAKE – QUICK BREAK. THE EXTERNAL OPERATING HANDLE SHALL INDICATE THE SWITCH POSITION AND SHALL BE PADLOCKABLE IN THE OFF POSITION. A DEFEATABLE INTERLOCK SHALL BE PROVIDED TO PREVENT OPENING THE COVER WHEN THE SWITCH IS ON AND PREVENT CLOSING THE SWITCH CONTACTS WHEN THE COVER IS OPENED. SWITCH SHALL BE PROVIDED WITH A FACTORY SUPPLIED GROUND KIT.
2. SAFETY SWITCHES INSTALLED INDOORS SHALL BE PROVIDED WITH NEMA 1 ENCLOSURES. SAFETY SWITCHES INSTALLED OUTDOORS OR IN WET AREAS SHALL BE PROVIDED WITH NEMA 3R.

I. DEVICES

1. LIGHTING TOGGLE SWITCHES SHALL BE COMMERCIAL SPECIFICATION GRADE 120/277V, SIDE WIRED AND PROVIDED WITH GROUNDING SCREW. 20 OR 30 AMP AS REQUIRED.
2. CONVENIENCE RECEPTACLES SHALL BE HOSPITAL GRADE GROUNDING TYPE, NEMA 5–20R, SIDE WIRED.

J. PANELBOARDS

1. PANELBOARDS SHALL BE OF THE SIZES, RATING AND ARRANGEMENT SHOWN ON THE DRAWINGS.
2. PANELBOARDS SHALL BE PROVIDED COMPLETE WITH ALL OVERCURRENT DEVICES, ACCESSORIES AND TRIM SAFETY BARRIERS FOR DEAD FRONT CONSTRUCTION.
3. THE REQUIRED SHORT CIRCUIT RATINGS OF ASSEMBLED PANELBOARDS ARE SHOWN ON THE DRAWINGS. THE SHORD CIRCUIT RATING OF EVERY OVERCURRENT DEVICE IN THE PANEL SHALL MEET OR EXCEED THE PANEL RATING. UNLESS OTHERWISE NOTED ON THE DRAWINGS, SERIES RATED COMBINATIONS WILL NOT BE PERMITTED.
4. ALL BUS WORK SHALL BE 1000 AMP/SQ.IN. COPPER.NEUTRAL BUSSES SHALL BE 100% RATED WITH ADEQUATE CONNECTIONS FOR ALL OUTGOING NEUTRAL CONDUCTORS.PANELBOARDS SHALL BE PROVIDED WITH COPPER GROUND BUSSES
5. BUS SHALL BE DESIGNED FOR SEQUENCE PHASE CONNECTION TO ALLOW THE INSTALLATION OF ONE, TWO OR THREE POLE BRANCH CIRCUIT BREAKERS IN ANY POSITION.

K. OVERCURRENT DEVICES

1. OVERCURRENT DEVICES SHALL BE TRIP–FREE MOLDED CASE, BOLT–ON, THERMAL MAGNETIC CIRCUIT BREAKERS.
2. FRONT FACES OF ALL CIRCUIT BREAKERS SHALL BE FLUSH. TRIP INDICATION SHALL BE CLEARLY SHOWN BY THE HANDLE POSITION BETWEEN THE ON AND OFF POSITIONS.
3. GROUND FAULT CIRCUIT BREAKERS SHALL REQUIRE NO MORE PANEL SPACE THAN STANDARD BREAKERS.
4. ALL CONNECTIONS SHALL BE RATED FOR 75'C COPPER CONDUCTORS.

L. SWITCHBOARDS

1. SWITCHBOARD SHALL BE METAL ENCLOSED OF SIZE, RATING AND ARRANGEMENT SHOWN ON DRAWINGS. SHORT CIRCUIT RATINGS OF ASSEMBLY SHOWN ON DRAWINGS. THE SHORT CIRCUIT RATING OF EVERY OVERCURRENT DEVICE SHALL MEET THE SWITCHBOARD RATING. NO SERIES RATING SHALL BE PERMITTED.
2. SWITCHBOARDS SHALL BE PROVIDED COMPLETE WITH OVERCURRENT DEVICES, ACCESSORIES, ENGRAVED LABELS AND TRIM.
3. SWITCHBOARD MAIN AND BRANCH CIRCUIT BREAKERS SHALL BE PROVIDED WITH GROUND FAULT PROTECTION IN ACCORDANCE WITH NEC ARTICLE 517.
4. SWITCHBOARD SHALL CONSIST OF ONE OR MORE FREE STANDING SECTIONS BOLTED TOGETHER TO FORM A RIGID ASSEMBLY. VERTICAL SECTIONS SHALL BE CONSTRUCTED OF BOLTED FORMED STEEL CHANNELS WITH CODE GAUGE STEEL SIDES AND BACK PLATES, AND BOLT ON FRONT TRIM. ALL EXTERIOR AND INTERIOR STEEL SURFACES SHALL BE FINISHED IN ANSI–61 GRAY OVER A RUST INHIBITING PRIMER. ENCLOSURE TO BE A NEMA 1 SUITABLE FOR INSTALLATION AGAINST A WALL. ALL CONNECTIONS AND TERMINATIONS SHALL BE COMPLETELY FRONT ACCESSIBLE.
5. MAIN PHASE BUSES, NEUTRAL BUS AND EQUIPMENT GROUND BUS SHALL BE FULL–CAPACITY, SILVER PLATED, COPPER OF 98% CONDUCTIVITY WITH COPPER FEEDER CIRCUIT BREAKER LINE CONNECTIONS, RATED AS SHOWN ON DRAWINGS. A CONTINUOUS HARD DRAWN, COPPER GROUND BUS WITH 98% CONDUCTIVITY SHALL BE PROVIDED THE ENTIRE LENGTH OF SWITCHBOARD. GROUND BUS TO BE 1/4" BY 2" MINIMUM SIZE, AND PROVIDED WITH PRESSURE CONNECTOR TERMINATIONS FOR ALL FEEDER AND BRANCH–CIRCUIT GROUND CONNECTIONS. ALL BUSES SHALL HAVE ADEQUATE BRACING FOR SHORT CIRCUIT CURRENTS INDICATED. NEUTRAL BUS SHALL BE 100% RATED.
6. MAIN OVERCURRENT DEVICE TO BE FIXED MOUNTED, SOLID STATE, 100% RATED MOLDED CASE CIRCUIT BREAKER. BREAKER SHALL BE TRUE RMS SENSING AND HAVE THE FOLLOWING ADJUSTABLE SETTINGS:
   –LONG–TIME DELAY
   –SHORT–TIME PICK–UP
   –SHORT–TIME DELAY
   –INSTANTANEOUS PICK–UP
   –GROUND FAULT PICK–UP
   –GROUND FAULT DELAY
   DISTRIBUTION OVERCURRENT DEVICES SHALL BE TRIP–FREE THERMAL MAGNETIC MOLDED CASE CIRCUIT BREAKERS SIZED AS INDICATED ON DRAWINGS. ALL CONNECTIONS TO BE RATED 75 DEGREE CELCIUS.
7. SWITCHBOARD SHALL BE PROVIDED WITH A MULTIFUNCTION DIGITAL PANEL METER. THE METER SHALL BE CAPABLE OF DISPLAYING VOLTAGE BETWEEN PHASES, CURRENT IN EACH PHASE, WATTS, VARS, KVA, AND POWER FACTOR.
8. SWITCHBOARD SHALL BE UL LISTED FOR SERVICE ENTRANCE.

M. INTERIOR TRANSFORMER

1. INTERIOR TRANSFORMER SHALL BE OF RATINGS AND SIZES SHOWN ON DRAWINGS. TRANSFORMERS SHALL BE DRY TYPE, SELF–COOLED WITH VENTILATED ENCLOSURE.
2. TRANSFORMER SHALL HAVE 220 DEGREE C INSULATION SYSTEM WITH A TEMPERATURE RISE NOT EXCEEDING 115 DEGREES C UNDER FULL–RATED LOAD IN A MAXIMUM AMBIENT TEMPERATURE OF 40 DEGREES C.
3. TRANSFORMERS TO BE PROVIDED WITH 6 FULL CAPACITY TAPS, 2 AT 2–1/2% ABOVE RATED PRIMARY VOLTAGE AND 4 AT 2–1/2% BELOW RATED PRIMARY VOLTAGEAGE
4. TRANSFORMER WINDINGS SHALL BE EITHER ALUMINUM OR COPPER.

N. FIRE ALARM SYSTEM

1. NEW FIRE ALARM SYSTEM TO BE AN ADDRESSABLE SYSTEM SUCH THAT EVERY INITIATING DEVICE HAS A DIFFERENT DISTINCT ADDRESS ON THE SYSTEM.
2. FIRE ALARM SYSTEM CONTROL PANEL TO BE AN EDWARDS SYSTEM TECHNOLOGY QS4 MULTI–LOOP INTELLIGENT CONTROL PANEL.
3. NEW INITIATING DEVICES SHALL BE ADDRESSED OVER EXISTING CONVENTIONAL FIRE ALARM SYSTEM WIRING.
4. NEW NOTIFICATION DEVICES SHALL BE PROVIDED AT LOCATIONS SHOWN ON DRAWINGS. NEW WIRING WILL NEED TO BE INSTALLED FOR NOTIFICATION DEVICES.

NOTE:

1. SEE SHEET E–001 FOR LEGEND AND GENERAL NOTES.

REV.	DESCRIPTION	DATE
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SHEET TITLE: GENERAL NOTES

SCALE:	AS NOTED	DATE:	2–25–05
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